AUSTRALIAN NUCLEAR SCIENCE
AND TECHNOLOGY ORGANISATION

LUCAS HEIGHTS SCIENCE AND TECHNOLOGY
CENTRE

AN UPDATED ANALYSIS OF THE LUCAS HEIGHTS CLIMATOLOGY - 1975 TO 1996.

by

G H CLARK

ABSTRACT

Meteorological data collected from 1975 to 1996 in the Lucas Heights region have been summarised to provide an update on the climatology. Initially data were recorded in analogue form but since 1991 advanced digital recording systems have allowed more accurate and extensive statistics to be analysed. Since 1993 a network of meteorological stations has been installed through the surrounding area to investigate the influence of complex terrain on wind flow and atmospheric dispersion patterns. A large data volume is presented together with some initial interpretation of these complex terrain influences on the Lucas Heights region climatology.

1. INTRODUCTION

This report is an update from that of Clark (1985) and represents a statistical summary of meteorological data analysed since 1975. During this period there have been major changes in the technology associated with data collection and analysis. In the early 1970s, data were recorded on mechanical and electro-mechanical instruments and extracted using manual methods. In subsequent years the data were extracted using a chart digitiser (Clark and Parker 1987). With rapid advances in the technology of microcomputers, data acquisition technology improved to allow more accurate, less person-power intensive extraction of data.

One aim of this report is to briefly discuss the impact of these technological advances on the ANSTO meteorological data acquisition program. More importantly, with ANSTO meteorological data increasingly in demand by outside consultants for environmental impact studies, and the many regular requests for climatological data from other ANSTO personnel and the general public, it is timely to present a description and summary of the current program. In particular, attention will be given to a description of the instrumentation and the history of the program for collection of high quality data. Analyses of the wind and temperature statistics will allow a preliminary discussion of the influences of the local complex terrain and in particular the Woronora Valley. A discussion of the climatology of more general meteorological measurements such as net-all wave solar radiation and rainfall will also be undertaken together with a summary of atmospheric stability statistics which are related to atmospheric dispersion conditions.

2. METEOROLOGICAL INSTRUMENTATION AND CALIBRATION HISTORY

2.1 Introduction

In order to collect high quality of meteorological data suitable for environmental impact studies, it is important to establish methodologies which are consistent with International Best Practice (IBP) and Australian Standards [AS 2923 (1987)] . In the early days of the ANSTO meteorological data acquisition program, there was little guidance available on these methodologies. Nevertheless, techniques were established and have evolved to now be consistent with the spirit of the Australian standards and IBP. A description of the data collection and calibration methods available prior to 1986 is given in Clark (1986). That report covers the period of recording data as traces on analogue charts. Subsequently, data were recorded directly in digital form with a greater precision and range of statistical calculations now being possible. This section summarises the old analogue data collection methods and describes the new statistical techniques used in the digital systems.

2.2 Pre-April 1991 - Lucas Heights tower and analogue recording

In Table 1 there is a summary of analogue data collected at the Lucas Heights meteorological tower during the period up to 1991 when digital recording of data commenced. Most data were extracted as 30 minute averages; the exceptions were net all-wave solar radiation and rainfall rate statistics. It was most convenient to

collect both dry and wet bulb temperatures at 49m on the meteorological tower at Lucas Heights with differential temperature also recorded between 9 and 49m. In those days sensors were calibrated *in-situ* by regular comparison with an aspirated psychrometer so that a range of ambient conditions could be sampled over the period of the field study. If a resistance bulb sensor failed it was detected quickly by inspection of the charts, soon replaced and a new calibration sequence commenced. The differential temperature sensors were calibrated using *in-situ* water baths with one sensor maintained at a near constant temperature and the other varied both above and below to simulate the range of observed conditions in the atmosphere.

In terms of current practice, calibration of the anemometers was somewhat inadequate because of logistical difficulties at the time. It was not possible to place the large and cumbersome Dines anemograph in a wind tunnel for calibration. Instead, the data were compared against another more sensitive (and recently calibrated) anemometer placed nearby to collect data over a range of conditions. With this method of correlation, a calibration curve was developed.

It was also difficult to periodically withdraw other anemometers from service (with consequent loss of data) for calibration in the CSIRO NATA wind tunnel in Victoria. In 1987 ANSTO constructed a low wind speed wind tunnel with the specific aim of having a facility to calibrate an expanding inventory of anemometers. This tunnel has a variable speed DC motor connected to a sensitive potentiometer which allows small changes in wind/tunnel speed of the order of several cm s^{-1}. A pitostatic tube connected to an Airflow Type 5 manometer and operated to detect differential air pressure was used to measure the tunnel speed. The maximum tunnel speed is of the order of 10 m s^{-1} . The usual method for calibration is to step up through about 10 to 14 wind speeds in this range, with great care at the lowest speeds to allow determination of the threshold (starting) speed. The threshold is determined from extrapolation of the linear regression analysis calibration curve.

Climatronics WMIII anemometers are the basis of the current generation of ANSTO meteorological stations. These have a threshold between 0.3 and 0.4 m s^{-1} when fresh from the factory or refurbishment. On installation, the orientation of the anemometer is checked against Magnetic North and a correction is applied after collection of the raw data, so that all calibrated data are with respect to True North. The current practice is to calibrate the anemometers on a 12 month cycle, or more frequently if there is any sign of performance degradation.

The net all-wave solar radiation measurements were made using a radiometer based on the CSIRO Funk design. Initially data were recorded on the same Honeywell Chart recorder that was used for the temperature data. Data were then manually extracted from charts using a planimeter. Subsequently another radiometer was connected to a printing integrator to allow easier access to digital data. Data were extracted as 60 minute averages.

During this period, rainfall rates were recorded every six minutes using a CSIRO digital event recorder. Data from this system were analysed in Clark (1985) and will not be discussed further in this report.

2.3 Post-April 1991 - Lucas Heights network and digital recording

2.3.1 Lucas Heights Meteorological Tower

In April 1991 a new digital data acquisition system (DAS), developed at ANSTO by Bartsch (1996a), was installed for collection of data from the Lucas Heights meteorological tower, within the Lucas Heights Science and Technology Centre (LHSTC). The system design specifications included battery power, portability, multi-channel data collection and the ability to upgrade with advances in computer technology. On the instrument side, it was necessary to have universal transducer and actuator input and output. This was linked to a micro-computer via an RS 232 standard interface. A modular approach was used with one module for computer Input/Output (I/O) and up to eight modules for instrument data I/O. All incoming data in digital form are input to counting channels to provide integrated values. The channel sampling frequency has been programmed to be 10 seconds with an averaging period of 15 minutes; both sampling and averaging periods are selectable from computer software. At present, the micro-computer memory capacity means the data are downloaded every two weeks.

In Table 2 there is a listing of the statistical calculations of the meteorological parameters recorded each averaging period (e.g. 15 minutes). It is apparent that there is considerable room for expansion of this system in terms of other input measurements. It is now appropriate that some attention be given to an explanation of the statistical methods used in the system. The program to run the DAS is written in the BASIC language and therefore has considerable flexibility in the types of statistics which can be calculated. In terms of wind speeds and directions; both scalar and vector calculations are made. The scalar wind speed simply takes an average of the wind speed transducer input. The vector average wind speed is calculated by splitting the ten second integrated wind speed into orthogonal components according to the wind direction and then summing the 90 values over the 15 minute averaging period. At the end of this period, the average orthogonal wind speeds allow the vector wind speed and direction to be calculated. Because of the cross-over from 360 to 0° at north, the scalar average wind direction will not have much meaning if the wind fluctuates through north during the averaging period; in other directions it may be useful for comparison.

The fluctuations of wind speeds and directions are also measured as standard deviations in both scalar and vector modes. For wind speed this a straight forward calculation in the scalar mode but in the more complicated vector mode the method of Ackerman (1983) is used. In terms of the standard deviation of wind direction (σ_θ), again the cross-over problem causes meaningless scalar statistics when winds fluctuate across north. The method of Yamartino (1984) has been used for calculation of the "vector" value of σ_θ. Yamartino is based on summation of the 10 second orthogonal components of a unit wind speed vector into software registers. Data recorded as wind speed averages are in counts/10s while average wind directions are recorded in hundredths of a degree (i.e. 27316 = 273.16°).

The average temperature data are calculated for the total 15 minute period whereas the maximum and minimum temperatures are based on the 10 second integrated values sampled during the averaging period. The temperature data are

recorded as thousandths of a degree Celsius (e.g. 15931 = 15.931°C). In Table 2 where data are noted as being "accumulated", this means the number of counts integrated across the full 15 minute averaging period. The alpha/beta accumulated counts result from input of a prototypical α/β environmental radiation detector which is under development in ANSTO. Similarly, the gamma detector accumulated counts are from another γ radiation detector under development. Problems exist with the α/β detector design but the γ detector data look more promising. The accumulated rainfall counts represent output from Climatronics (Channel 101) and RIMCO (Channel 102) tipping bucket rain gauges. Each count in this case represents approximately 0.25 mm of rain; this is subject to instrument adjustment and calibration.

2.3.2 Lucas Heights Network of Meteorological Stations

Three additional data acquisition systems have been placed at off-site locations in order to investigate the influence of the local complex terrain on wind flow, dispersion patterns and temperatures (Figure 1). The stations at the Lucas Heights Community and Boys Town Schools will detect the ridge top meteorology on opposite sides of the valley while the station at Shackles Estate is 10m above river level in a steep sided section of the valley. The meteorological transducers have been placed on a 10m tower placed on the roof of each school which makes the height of 18.54m above ground at Boys Town and 15.65m at the Lucas Heights Community School. The data acquisition systems at the schools are similar in operation (Bartsch 1996b) to that at the LHSTC except that there is a reduced number of meteorological variables being acquired (Table 3). The station at Shackles Estate is slightly different in that it operates from solar panels which keep the DAS and computer batteries charged; the other DAS's are trickle charged from mains AC chargers. A list of the statistics from the network stations is given in Table 3. The method to derive these statistics is the same as at the LHSTC. Data from these stations are again downloaded to a portable Notebook computer each two weeks, even though computer memory would allow a much longer period to acquire data. This download frequency is part of the quality assurance program to enable regular inspection of data and inter-comparison between stations in the network in order to identify any problems with meteorological sensors.

2.3.3 Data Quality Assurance and Calibration Procedures

In order to collect high quality meteorological data which are essential for environmental impact assessments, it is necessary to establish a program of regular inspection of the data and calibration procedures. When analogue data were being recorded at Lucas Heights it was possible to regularly inspect chart traces in order to identify if a transducer had malfunctioned and required replacement. With digital data collection new procedures are required. At all stations there is a regularly updated display of the ten second data on the microcomputer screen which allows qualitative comparison with independent observations. Other procedures to ensure good quality data will be described later.

Wind speed sensors are calibrated in the Lucas Heights wind tunnel with data output to a microcomputer display attached to an identical DAS to those located in the network of stations. In this way the average wind speed recording (counts/10s) can be related to a range of wind/tunnel speeds. Wind directions are checked by

rotation of the vane to known orientations. The temperature transducers are placed in a waterproof plastic sheath and calibrated in a water bath which has controlled temperature changes; the same independent thermometer is used for all calibrations. In the case of the net all-wave solar radiometer, a comparison is made against a secondary standard radiometer which is placed nearby and is only exposed for the short period of the calibration at 12 monthly intervals. The rainfall rate data are calibrated by slowly pouring a known amount of water into the rain gauge and noting the number of bucket tips, each bucket measuring approximately 0.25 mm of rain, depending on instrument adjustment.

For the temperatures and wind speeds, data are corrected between calibrations by a method of linear interpolation between calibration dates. To date there has not been any notable drift in the radiometer calibrations, but if this did occur, a similar method of linear interpolation could be used for calibration of these data. Once the time series of data are calibrated, data are plotted in four day blocks on a computer screen and scanned for inconsistencies between stations in the network; an example plot is seen in Figure 2. It is apparent that data from Shackles Estate are different from all other stations due to the topographical location and influences on the local meteorology. These aspects will be discussed more fully in later sections of this report.

2.4 Data quality

It is the aim of all meteorological data collection programs to collect the best quality data, 100% of the time. However, because the equipment used has electro-mechanical parts which are subject to wind, temperature and other environmental stresses, it is inevitable that these goals are not achieved. Good data quality is assured by a program of regular instrument calibration procedures (discussed above) and also regular inspection and cross-correlation of data between stations and temporal and spatial correlations at a particular station. In Figure 2 is an example of the data display available when the data are downloaded each two week period. From these plots and the other statistical comparisons, bad data can be identified and edited from the data files.

In Table 4 there is a summary of the "data quality" for all statistics recorded from the Lucas Heights meteorological tower. It should be noted that there is a gap in data availability between the analogue and digital systems. This simply reflects the difficulty in digitising the analogue data due to a lack of manual effort; the analogue charts could be processed at some future date if this effort was forthcoming. The "data quality" statistics from the network of off-site meteorological stations are also shown in Table 5. Without looking at individual cases, by separating stations, times of observations, etc., a summary of the data collection program is as follows :

1. In general the collection of "good data" is better from the analogue charts than with the digital systems. However, it can be argued that more accurate and extensive data statistics are collected from the digital systems; errors are greater in extraction of the chart data.
2. Overall, good data are collected better than 90% of the time.
3. At the network stations (Table 5) the two school stations indicate a greater (5 - 7%) collection of good quality scalar wind speed data than for the vector wind direction. This was due to the influence of heavy birds (cockatoos, magpies and currawongs) in initially damaging the wind vanes by sitting and doing aerial

gymnastics on them. A heavier duty ANSTO designed wind vane now seems to have solved this problem.

4. In spite of the remote stations having to operate for longer periods without data inspection (by comparison with the Lucas Heights tower which is inspected regularly each day), the data quality is comparable, if not better.

3. WIND SPEED AND DIRECTION STATISTICS

3.1 Introduction

Given the large number of statistics available in Tables 4 and 5, it would be too unwieldy to summarise and present them all in tabular or graphical form in this report. Instead, there is a discussion of representative statistics in the following sections. These emphasize cross comparisons between the analogue and digital data and the influence of the complex terrain on both the vertical profiles of winds and the horizontal wind fields through the region surrounding the LHSTC. If any reader would like access to other statistics not reported and discussed here, then the author is happy to make these available in separate form.

3.2 Lucas Heights Wind Rose Analyses - Pre-1991

In order to be consistent with past reports (Clark 1985), wind speed and direction data have been summarised as Bailley-type wind roses as a function of location, time of day and season. In Figures 3 to 6, the data from the Dines anemograph collected over a 10.5 year period can be compared to the 49m data (Figures 7 to 10) collected over a 12 year period which is not simultaneous with the Dines. In addition, the tabulated data which resulted in these plots are also included in the Appendix as a more accessible reference to the quantitative data.

The following are general observations which can be drawn from these wind roses :

1. The expected increase in wind speeds with height above the ground is reflected in the wind roses with the distributions at 49m having a peak in the 4 to 8 ms^{-1} range by comparison with the 7m data where the 2 to 4 ms^{-1} is dominant.
2. In summer, at night winds prevail from the south-south-east to south-south-west sector. Even though winds are in transition during the 0900 to 1200 EST time period, there are indications of the early onset of the sea breeze from the north-east to east-north-east sector. These sea breezes intensify and become more predominant later in the day before turning through the south-east sector in the evening.
3. In autumn, the nocturnal winds at 7m are light (<2 ms^{-1}) and turned more to the south to south-west sectors compared to a slight shift to westerly sectors with higher speeds at 49m. With good vertical mixing during the day, the wind direction distributions are similar at 7 and 49m, winds predominating from the south with a small sea breeze component from the east-north-east.
4. There is a definite shift of winds to the more westerly sectors from the 7m to 49m winter data. South-west to north-west winds predominate through the whole day, although there is a also a small peak from the south direction during the afternoon.

It is thought the nocturnal winds result from regional drainage of cooler air into the Sydney basin (Clark 1985)

5. The nocturnal south-west sector winds at 49m in spring continue this regional drainage wind influence with a stronger southerly influence nearer the ground. During the afternoon the sea breeze is observed on 20 to 25% of all occasions.

3.3 Lucas Heights Wind Rose Analyses Methods - Post-1991

The digital data acquisition system has been installed at the LHSTC for the last 5.5 years and therefore has not collected the same amount of data as the analogue system which means a more limited dataset is available for climatological analysis. Nevertheless, in most environmental impact assessments a time series of this length would be considered representative of the site. Therefore, it will be interesting to compare the digital and analogue data statistics.

The plots of data from the 10m level on the tower (Figures 11 to 14) are again compared to those at 49m (Figures 15 to 18) :

1. In summer it is apparent there is a similar distribution of winds to the analogue wind roses (Figures 3, 11, 7 & 15) with winds from the south at 10m before 0900 EST being observed approximately 5 to 10% more often since 1991. Likewise, the sea breezes are observed from the east-north-east on nearly 25% of occasions at 10m during the period 1200 to 1800 EST, compared to below 20% in the pre-1986 data. The winds at 49m have more consistency between the earlier analogue and digital datasets.
2. Wind in autumn from the 1991 to 1996 (Figures 12 [10m] and Figure 16 [49m]) data show consistency with the earlier analogue data (Figure 4 [7m] and Figure 8 [49m]). At night the predominant wind directions at 10m are from the south to west-south-west sectors with the winds at 49m indicating a slight shift in the distribution to more westerly winds. During the afternoon north-east to east-north-east sea breezes develop together with winds from the south-east to east sectors. Clark (1982) has described how south-east winds observed by an acoustic sounder during autumn have similar structures to sea breezes, with a limited vertical mixing layer.
3. At night in winter there is virtually no influence of winds from the north through east to south sectors with a predominance of wind from the south-south-west to west-south-west sectors at 10m (Figure 13) and again a turning of winds to more westerly sectors aloft (Figure 17). During the day winds turn more to north-west through the lower atmosphere although a peak in the distribution increasing to 15% of observations at 10m is observed from the south during the afternoon. There is virtually no occurrence of sea breezes in winter.
4. The nocturnal distribution of spring winds is very similar to those in autumn during the other transitional season from summer to winter; winds prevail from the south to west-south-west directions. Just before sunrise and persisting through the morning, there is a shift to the north-west, with over 15% frequency of observations at 10m (Figure 14) and about 13% at 49m (Figure 18) from this direction. This is more marked in the digital observations than from the earlier analogue data (Figures 6 and 10). During the afternoon sea breezes are again observed from the north-east to east-north-east sectors. There is again a similarity to the analogue wind direction distributions (Figures 6 and 10) but with a slightly

greater influence of winds from the west to north-west sectors in the more recent data.

3.4 Lucas Heights Surface Roughness

During the period from 1991 to 1993, additional wind speed and direction measurements were made at other altitudes on the tower. These measurements allowed wind profiles under near neutral atmospheric conditions to be identified. With the assumption of horizontally homogeneous surface roughness conditions, for neutral atmospheric stability there is a logarithmic variation of wind speed (u) with height (z) according to the following relationship :

$$u = \frac{u_*}{k} \ln\left(\frac{z-d}{z_o}\right)$$

where k = von-Karman's constant (= 0.35), u_* = friction velocity, d = displacement length and z_o = surface roughness length. The surface roughness length variation with terrain complexity, land use and vegetation types has been summarised by Stull (1988). Based on a summary of many field measurements, he found that values of z_o varied between 0.7 and 1.15m for surfaces which ranged in roughness between that found in the centres of large towns and cities to low mountains and forests. In addition, the displacement length (d) is associated with homogeneous vegetation canopies. Stanhill (1969) found that d=0.64h where h is the average height of the vegetation whereas Garratt (1978) used a method based on surface roughness element density. Using a method described by Stull (1988) to determine d, and curve fitting three measurements of wind speed on the Lucas Heights tower at 10m, 18m and 49m, the values of u_* and z_o can be determined. These parameters can then be related to local surface roughness influences.

Several cases were tested. For all wind speeds and cases with neutral or near neutral atmospheric stabilities (determined from the 10m and 49m temperatures) the average value for z_o was 0.70m and for d was 1.36m. If cases were restricted to those with 49m wind speeds greater than 3 m s^{-1}, the z_o value decreased to 0.61m and d also decreased slightly to 1.32m.

The cases with all wind speeds have also been tabulated against wind direction (8 sectors) at the three different heights, 10m, 18m and 49m (Table 6). It is apparent that there is a predominance of winds with neutral atmospheric stability which occur from the south direction. There is also quite a marked variation of average values of surface roughness with wind direction. Values are lowest (0.37m) with winds from the south to south-west sectors. In these sectors there is a dispersed eucalypt tree forest with a significant gully some 400m from the tower. Values of surface roughness are largest from the north sector although the number of observations is limited and the dispersion of values greatest (see the standard deviation s.d. column in Table 6). The large values from the north-west through to the east sectors could reflect the closer occurrence of buildings and trees to the tower. Clarke and Brook (1979) note that caution should be taken when using neutral stability wind profiles in case the observations lie within the surface transition layer. At Lucas Heights because there is also considerable inhomogeneity in surface roughness features, there may be some questions about applicability of the logarithmic wind profiles. Nevertheless, the values

derived for Lucas Heights seem physically realistic and consistent with the discussions and observations of Stull (1988) and Garratt (1977).

3.5 Lucas Heights Meteorological Station Network - Results and Discussion

The main purpose for installation of off-site meteorological stations is to study the influence of the complex terrain on the winds, turbulence and temperatures. At present a study is being conducted into a range of wind field and atmospheric dispersion models in order to ascertain the best for the Lucas Heights region. These models are being validated by comparison with controlled atmospheric tracer releases and quantitative measurements of downwind tracer air concentrations. For the current report, analysis of the long term statistics will allow an assessment of the diurnal and seasonal, as well as the terrain influences.

3.5.1 Wind Rose Analyses

Data from the Lucas Heights meteorological tower have been re-analysed for the period of the installation of the network of stations, from April 1993 (Lucas Heights Community and Boys Town Schools) and June 1993 (Shackles Estate). Again it is appropriate to discuss comparisons on a seasonal basis :

1. In summer the consistency between the shorter (Figures 19 & 23) and longer (Figure 11 & 15) digital data analyses should be noted. At the Lucas Heights Community School (LHCS) (Figure 27) there is a slight shift in the nocturnal/early morning winds from the predominant south at Lucas Heights meteorological tower towards south-west. This shift to the south-west sectors is also noted in the wind direction distribution across the valley at Boys Town (Figure 31). In addition, there is nearly a 10% occurrence of wind from the north-west and north-north-east in the 0600 to 0900 EST time period. At night there appears to be a shift to slightly higher wind speeds at both schools. By contrast the nocturnal winds in the Woronora valley at Shackles Estate (Figure 35) appear completely decoupled from those on the plateau and ridges above. There is a predominance of winds from the south-west to west sectors with a majority of these in the 0 to 1 ms^{-1} range. As the Shackles Estate is located furthest north-east from the LHSTC in the network and is well exposed to winds from that direction, sea breezes are first detected (22% of observations) from the east-north-east during the 0900 to 1200 EST period. By contrast with all other sites, the LHCS sea breeze observations are turned more towards the east than the north-east. The remnants of the sea breeze are stilled observed in the 2100 to 2400 EST wind rose from all sites except Shackles Estate where the nocturnal south-west to west winds are quickly re-established.
2. During autumn the nocturnal wind direction distributions at the two schools on the valley ridges are similar with winds from the south to west-south-west sectors predominant (Figures 28 & 32). At the LHSTC tower the 10m (Figure 20) nocturnal winds have a stronger component from the south whereas at 49m (Figure 24) the west-south-west winds are more often observed. Similar to the summer wind roses at Shackles Estate, the nocturnal winds in autumn still occur from the south-west to west sectors (Figure 36). During the late morning and early afternoon the distribution of winds becomes more confused with influences from the south to south and north-west sectors at LHSTC and LHCS and a more uniform distribution at BoysTown. The wind distribution at the Shackles Estate is essentially bi-modal with sea breezes

from the north-east and east-north-east and other down valley winds channelled from the south-south-west to south-west sectors. More easterly sea breezes than at other stations are still detected at LHCS.

3. The influence of the valley on wind flow patterns is most marked in the Shackles Estate winds observed during winter (Figure 37). At night most winds are below 1 ms^{-1} from the south to south-west sectors. On the plateau and ridges above (Figures 21, 25, 29 & 33), the winds are similar but are turned more westerly to prevail from the south-south-west to west-south-west sectors. During the day winds at these sites turn towards the north to be observed most frequently from the west-south-west to north-west sectors. Again by contrast, the winds at Shackles Estate remain from the south to south-west sectors for most of the day.
4. At the LHSTC the near ground (10m) the nocturnal wind directions during spring (Figure 22) have a peak in their distribution from the south, with a more uniform distribution of 10% of occurrence in sectors from south-south-west through to the north-west. There is a similar distribution at LHCS (Figure 30) and Boys Town (Figure 34) except the peak is from the south-south-west sector. At Shackles Estate (Figure 38) the apparent topographic channelling of winds from the south-south-west to west-south-west sectors continues. After their absence in winter, daytime sea breezes again develop from the east-north-east during the late morning and afternoon. These remain an influence until the 1800-2100 EST time period at the ridge/plateau sites, but disappear earlier in the valley.

3.5.2 Direct Comparison between Stations - Topographic Influences

The climatological analyses above were completed independently at each station. It is also appropriate to make direct comparisons of wind and temperature data between stations in the network at a particular time. The data have been separated into night and day according to the definition used in the Mitchell and Timbre (1979) atmospheric stability categorisation scheme i.e. night extends from one hour before sunset to one hour after sunrise. The network "difference" statistics for various meteorological parameters are shown in Table 7.

In the case of wind direction, and the fluctuation of wind directions (σ_θ), it is not expected that there would be a systematic variation between stations. Instead, an average value close to zero with a spread of values around the average might be anticipated; these comments do not apply to the two stations at the LHSTC. The values in Table 7 confirm this hypothesis in part but at the same time reveal possible local influences on the data which can be related to topography and other factors. As an example, there appears to be a systematic variation of about 14° in the horizontal wind directions between the LHSTC and Boys Town stations i.e. the 10m LHSTC winds are turned more clockwise compared to those at Boys Town. At the same time there is a greater spread of wind directions at Boys Town than occurred with the LHCS data when directly compared to those at the LHSTC. The most revealing comparison of local influences is that between the Woronora river valley floor and the LHSTC. In this case, conclusions from the climatological analyses above are confirmed in that wind speeds are systematically lower and σ_θ values larger in the valley while local circulations cause variable wind directions when compared to the values on the plateau at the LHSTC. While temperatures will be discussed below in more detail, it is interesting to note that similar variability exists in the comparisons of simultaneous temperature data. However, lower nocturnal and higher

daytime temperatures in the valley confirm the local micro-meteorological influences on the valley data.

3.5.3 Cross Valley Flow under Stable Atmospheric Conditions

Under stable atmospheric conditions usually experienced at night, light winds develop and air can be trapped in a valley, even though winds aloft may be quite strong. Bell and Thompson (1980) and Kimura and Manins (1988) have applied numerical modelling techniques to describe the interactions of cross-valley flow above, to flow within in the valley. They used the Froude Number (Fr) to develop criteria for onset of stagnation and blocking of flow within the valley, or sweeping of winds from above down through the valley.

The Froude Number is defined as :

$$Fr = \frac{U}{Nh}$$

where U is the wind speed above the valley (taken as the LHSTC 10m wind speed in our case), h is the valley depth and N is the Brunt-Vaisalla buoyancy frequency defined as :

$N = \sqrt{\frac{g}{\theta}\frac{d\theta}{dz}}$ where in our case the potential temperature (θ) gradient is measured between 2 and 10m at LHSTC and g is the acceleration due to gravity. At the location of Shackles Estate, the valley is 100m deep (=h) and the ridge to ridge valley width is approximately 1.2km.

Cross-valley winds were defined as being between south-west and north-west based on the LHCS wind directions. In Table 8, the wind speeds at LHSTC (10m) are compared to those at the Shackles Estate and are separated into ranges of Froude number in an attempt to determine when stagnation finishes and stronger winds are experienced at the valley floor as the winds sweep down from aloft. As the Froude Number increases to a value of 1.0, the occurrence of light winds at the valley floor decreases from > 90% below 1 ms^{-1} to 65% in the range of Fr 1.5 to 2 and 59% for Fr > 2.0. At the same time greater than 11% of wind speeds at Shackles Estate are > 2 ms^{-1} for Fr > 1.5. It is difficult to identify a critical Froude Number below which stagnation begins, but it appears that this might lie in the range of Fr between 1.0 and 1.5. This result would be consistent with the numerical modelling study of Bell and Thompson (1980), the laboratory results reported by Kimura and Manins (1988) and the observational study of Manins and Sawford (1982), but it does depend on the measurements used to determine Fr and the local topographic influences.

3.6 Summary

Marked topographic influence on the wind speeds and directions has been observed from the climatological analysis of data in the Lucas Heights area. Regional drainage of cool air from the south-west to north-west sectors is most likely the main influence on nocturnal winds observed across the region. Topographic channelling occurs on the floor of the Woronora valley with light, katabatically driven winds observed to be decoupled from winds above at night during all times and seasons. In the valley, 10% of winds are calm by contrast with less than 0.2% out of the valley. Similar

to the nocturnal conditions, winds in the valley from the south-south-west to west-south-west directions are also observed under higher wind speed, daytime conditions. In addition, sea breezes from the north-east to east-north-east sectors are observed during all seasons except winter, at all stations in the network.

4. ANALYSIS OF TEMPERATURES

Prior to 1991 when the analogue chart recordings were used, dry and wet bulb temperatures were measured at the top of the meteorological tower together with differential dry bulb temperatures between 9 and 49m. Wet bulb temperatures are difficult to maintain on a continuous basis and so there is a consequent lower return of good quality data. The differential temperature circuitry allowed calibration with greater certainty than when two absolute measurements and calibrations are used for determination of temperature differences between two levels, as in the post-1991 data. These factors should be considered in the following analyses.

4.1 Pre-1991 Statistics

Nearly 15 years of dry bulb temperature data have been summarised in Tables 9 (9m) and 10 (49m). The 9m data were determined from simultaneous measurements of temperature at 49m and the differential temperature between 9m and 49m and thus there were two sets of calibration factors involved. The extreme and average minimum and maximum temperature data are based on the 30 minute averages extracted from charts. Although these extreme statistics are not necessarily from the same day at both 9m and 49m, the values are consistent with observations that daytime temperatures decrease with height and night time temperatures generally increase with height, particularly under conditions of extreme atmospheric stability when the lowest temperatures are recorded. The 9m extreme low values during the winter months may be a fraction too low and reflect the increased uncertainty when two calibrations are involved.

The uncertainty in two sets of calibrations and the method of *in-situ* calibration using the aspirated psychrometer lead to a number of problems with the wet bulb temperature data. In addition, because the dry and wet bulb sensors were located at the top of the tower, it was difficult to ensure that the wet bulb remained correctly dampened to allow good quality data to be collected. As a result, the wet bulb data were assessed to be not worthy of general statistical analysis without more detailed investigation of the time series of data to identify problem data.

Several schemes for defining the atmospheric diffusion category (e.g. USNRC 1974) rely on a measurement of the vertical temperature gradient in the lower atmosphere. In Table 11 temperature difference data between 9 and 49m have been analysed on a monthly basis by time of day. A final edit on the data was made by eliminating any gradients greater than a absolute value of 6°C per 40m; approximately 100 cases > +6°C and 5 cases below -6°C were eliminated out of 253680 cases. As expected the most stable conditions occur at night in the winter months with extreme values up to 6°C per 40m and the most unstable conditions occur during daytime in summer. In both cases these represent the extremes of atmospheric stability diffusion conditions.

4.2 Post-1991 Statistics

Five levels of temperature data were available from the meteorological tower at the LHSTC after the move from an analogue to digital recording system; 2m, 10m, 18m 30m and 49m. There were no differential temperature measurements between levels and therefore any evaluation of temperature gradients would rely on the results of individual sensor calibrations, thus increasing the uncertainties of the gradient data. At the stations in the network, it is important to consider that temperature measurements are taken at different altitudes above the ground, even though they are near the top of a 10m mast, in two cases on the roof of a building. This could influence the extreme and average statistics discussed below.

4.2.1 Comparison of Network Stations and LHSTC Meteorological Tower

Average, standard deviation and extreme statistics have been summarised as a function of time of day and month of the year. All statistics are based on the 15 minute average data with the monthly average minima and maxima derived from the 24 hour values. Only the 2m (Table 12), 10m (Table 13) and 49m (Table 14) temperature statistics are presented for the LHSTC. The reasons for this are that the 2m and 10m data are used later on for atmospheric stability categorisation and the 10m and 49m data can be compared to the analogue chart statistics discussed previously.

The extreme maximum temperature at 2m was 42.9°C recorded on 21-December-1994. This can be compared to the extreme of 41.7°C recorded at Stevenson screen level (1.2m) and reported by Charash and Bendun (1968) for the LHSTC. It should be emphasized that these extreme statistics are not always recorded on the same day which might account for an occasional apparent anomaly, for example the extreme maximum in February when the 2m data were unavailable during the hottest part of the day on which the extreme maximum was recorded at the 10m and 49m levels. The average data again follow the predictable diurnal cycles of increasing temperatures with height under nocturnal conditions, maximum stability during the winter months and daytime unstable conditions during all seasons.

At the two ridge top stations the temperature statistics are quite similar over all seasons and times of day. In general the average maxima temperatures at Boys Town are lower by amounts varying from 0.5°C in April to 1.4°C in December but the minima temperatures are very similar, with Boys Town slightly warmer than the LHCS at night during the winter months. The differences between the two school stations and the 10m average temperature data from the LHSTC are minimal, in spite of the altitude differences. As was indicated with the analysis if the wind data, the main contrast in temperatures again comes from the Woronora valley station at Shackles Estate. With drainage of cool air into the valley at night, average minima temperatures are lower by up to 4.3°C in July. This difference decreases to 0.4°C in January when the occurrence of nocturnal katabatic winds would be at a minimum. With decreased wind speeds, less air movement and heat transfer out of the valley, the maxima temperatures are higher by between 0.5 and 1.6°C than on the ridges and plateau above.

4.3 Summary

Temperature measurements from across the region indicate the influence of the Woronora river valley on the local microclimate. The low wind speeds at the valley floor discussed above are associated with drainage of cool air into the valley at night. The

higher daytime temperatures also indicate some trapping of warm air in the valley. There are only small differences in temperatures between the three stations on the ridges and plateau above the valley. Statistics on the vertical temperature gradients at the LHSTC indicate predictable diurnal and seasonal variations. Because these data are measured close to the ground, more extreme unstable and stable gradients are observed.

5. ATMOSPHERIC STABILITY CATEGORIES

5.1 Introduction

This introduction was mainly taken from a discussion in Clark et al (1993) which was written for a study at Jabiru in the Northern Territory.

There is no objectively unique or *a priori* method for defining the atmospheric stability categories which indicate the prevailing atmospheric dispersion conditions. Pasquill (1961) and Gifford (1961) originally related dispersion experiment data at sites in rural England to the meteorological conditions such as wind speed and cloudiness. Since the studies of Pasquill (1961) and Gifford (1961) a number of other people have attempted to further quantify "cloudiness" and introduce a number of measures of atmospheric stability. In 1977 an American Meteorological Society review panel considered the current schemes for stability classification and dispersion parameters (Hanna et al 1977). They recommended a 'split-sigma' approach to stability classification in which horizontal and vertical dispersion are separately categorised. In the horizontal plane, they recommended measurement of σ_θ and the use of an empirical relation of this quantity to the downwind distance in order to calculate the horizontal dispersion parameter, σ_y. At the same time horizontal dispersion in the unstable boundary layer was considered differently, with theoretical relationships invoked between the mixing layer depth, vertical scaling velocity and mean wind speed. Measurements to support this approach are not normally made on a routine basis and require sophisticated instrumentation. In the vertical direction Hanna et al (1977) recommended that a measure of atmospheric stability be made by estimation or measurement of the boundary layer depth, the Monin-Obukhov length (L) and/or the Bulk Richardson number, Ri_B. A major observation was that the temperature gradient (e.g. USNRC 1974) is not, by itself, a good indicator of vertical stability. This was based on both theoretical grounds and empirical observations.

In the following sections various methods are discussed and then compared in statistical analyses. Although it is appropriate that the latest methods and recommendations from Hanna at al (1977) be used, it is useful to consider the performance of more traditional methods.

5.1.1 Standard Deviation of Wind Direction (σ_θ) - USNRC Scheme and Mitchell and Timbre modifications

The USNRC (1974) recommends a classification of the Pasquill stability category in terms of σ_θ, as well as the vertical temperature gradient. Such a classification assumes that under the most stable atmospheric conditions (Pasquill category G) there is minimum horizontal fluctuation in the wind direction and therefore minimum horizontal dispersion. This classification ignores the observation that significant plume meander can occur in these stable conditions, a point elaborated by Mitchell and Timbre (1979) [hereafter referred to as M&T (1979)] in a modification to USNRC (1974). The

footnotes in Table 25 indicate that the modifications by M&T (1979) at night should only apply to the vertical dispersion stability category whereas the original USNRC (1974) scheme is also appropriate to the horizontal stability category when applied in the night or day. In applying M&T (1979) it is necessary to estimate the times of sunrise and sunset. A routine written by Goodin (1977) and taken from Ryan (1977) was used to determine sunrise and sunset times which allowed the determination of "night" in M&T (1979) i.e. one hour before sunset until one hour after sunrise.

5.1.2 The Golder (1972) Method

Application of the Golder (1972) method requires a number of theoretical assumptions and some estimates of the site characteristics. Golder (1972) effectively re-analysed the available atmospheric dispersion experiment data in terms of turbulence measurements in the lower atmosphere. He then developed a nomogram which related the Pasquill stability categories to the Monin-Obukhov length (L) and surface roughness length (z_o). The Monin-Obukhov length is calculated from measurements of vertical turbulent heat flux and surface friction velocity (u_*) among other more easily measured parameters.

In a discussion of the application of atmospheric boundary layer parameters to atmospheric diffusion problems van Ulden and Holstag (1985) state that Monin-Obukhov surface similarity theory applies to shallow layers with small surface roughness lengths. One method to calculate the Monin-Obukhov length (L) was taken from Irwin and Binkowski (1981) for the stable atmosphere and Wang (1981) for the unstable conditions. In both formulations the Bulk Richardson number (Ri_B) was used to estimate the Monin-Obukhov length (L). This is described below as the Irwin/Binkowski/Wang (IBW) method. In addition, a more recent method described by Byun (1990) was also used with measurements of the bulk Richardson number to estimate Monin-Obukhov stability length; the temperature gradient between 2 and 10m and the scalar wind speed measurement at 10m was used to calculate Ri_B. The Golder (1972) nomograms are plotted in Fig. 39. A comparison is made in Fig. 39 between the current formulation (solid lines), those of Holmes et al (1982) [dashed lines] and the points taken from the Golder curves (*) to develop the parameterisations. Both the IBW and Byun (1990) Ri_B methods have been applied to Golder (1972).

5.1.3 Smith (1972) scheme

Net all-wave solar radiation data are available for application to the Smith (1972) scheme. In the scheme, Smith (1972) has related the vertical sensible heat flux (H) and wind speed in the lower atmosphere to a continuous estimate of the Pasquill stability categories. Smith provides a relationship between H and the net all-wave solar radiation (ΔR) i.e. H = factor*(ΔR - 100) where H and ΔR are in units of Wm^{-2}. In the Smith scheme the value of "factor" is taken as 0.4, but this was developed mainly from European data.

5.1.4 Discussion

The frequency distributions of Pasquill stability categories using the different schemes discussed above are summarised for the LHSTC over all times of day and seasons in Table 18. In the IBW and Byun schemes using Golder, there is a similar distribution of stable (E to G) Pasquill stability categories. Compared to Byun, there is also a shift to slightly less stable categories away from the neutral D category when using

the IBW method. Application of the Smith (1972) method indicates less data availability when simultaneous wind speed and net all-wave solar radiation data are required. Smith (1972) has a significant occurrence of the least stable category A and fewer cases of the more stable categories F and G. Both the Golder (1972) (from 10m data) and Smith (1972) schemes should only be compared against the vertical stability categories (σ_z or sigz in Table 18) derived using the Mitchell and Timbre (1979) method. At 10m there is quite a different distribution of categories using M&T with a bi-modal distribution centred around the neutral category D and another peak in the unstable category A. In a sense, the distribution of σ_z Pasquill categories using M&T is a hybrid between Golder (1972) and Smith (1972). The occurrence of a large fraction (93%) of neutral to unstable horizontal categories (σ_y or sigy in Table 18) indicates observation of meandering winds at Lucas Heights, during both day and night. At 49m the statistics support the observations that although the winds are stronger than at 10m, there is less atmospheric turbulence and smoother, less dispersive flow. This is evident from the higher occurrence (up to 46%) of the more stable categories (E to G) in both the horizontal and vertical directions.

It also informative to directly compare simultaneous estimates of the stability categories using the different schemes (Table 19). With the Bulk Richardson number being used for both Irwin, Binkowski, Wang (IBW) and Byun schemes there is good simultaneous correspondence of the stability categories. However, there is a real spread of categories predicted by Smith when directly compared to IBW, in particular, because of Smith's tendency towards the neutral to slightly stable categories D and E. The Mitchell and Timbre (1979) [M&T] scheme leads to a direct correspondence of horizontal and vertical diffusion categories in the unstable categories A to C. At 10m M&T indicates the atmosphere becomes more stable (as indicated by the σ_z categories) and a meandering of the wind occurs with about 8% of cases in the most unstable horizontal diffusion category A. This contrasts with the last table in Table 19 where statistics at 49m indicate much less horizontal meander of the wind under stable atmospheric conditions. The other tables which intercompare the M&T scheme between the 10m and 49m levels confirm the tendency to less stable diffusion categories being observed near the ground (both for σ_y and σ_z) when compared to the smoother, more stable flow regime aloft. This could result from the influence of near surface roughness features like trees and buildings and from the regional drainage winds aloft under nocturnal conditions.

The M&T scheme has been applied to all meteorological stations in the network to allow comparison of diffusion regimes through the region (Table 20). At night there is a similar distribution of the horizontal stability categories between the two ridge top stations (LHCS and BT) with these tending to slightly more stable conditions than at the LHSTC (at 10m). By contrast, conditions in the Woronora valley indicate a much higher occurrence of the most stable category G (for σ_z) and significant meandering of the winds, with 43% occurrence of category A for horizontal diffusion. In the daytime, the Woronora valley station again stands out as having a different micro-climate with 83% occurrence of the most unstable and dispersive Pasquill category A.

Summary statistics on the atmospheric stabilities, wind speeds and directions are presented for Lucas Heights as tables in Appendix A.

6. RAINFALL and EVAPORATION STATISTICS

Rain can cause a cleansing of pollutants from the atmosphere by a mechanism of wash-out or wet deposition. For this reason it is of interest to measure the rate of rainfall which determines the rate of wet deposition. Two rainfall rate tipping bucket rain gauges are recorded each 15 minutes on the digital data acquisition system. In addition, for climatological purposes, the 24 hour integrated rainfall data are recorded at Lucas Heights. Rainfall recordings are taken at 0900 LST (Local Standard Time) each morning as part of the Bureau of Meteorology observation network. Also for the purposes of maintaining continuity in a climatological record, the 24 hour evaporation is recorded using a Class A evaporation pan. All these data will be discussed below.

6.1 24 hour Measurement Statistics

Measurements of 24 hour rainfall commenced in 1958 when the meteorology group contributed as a full observation station to the Bureau of Meteorology network. Statistics from these years have been obtained from the National Climate Centre of the Bureau of Meteorology and are reproduced here as Table 21. The statistics on both rainfall and evaporation have been compiled to complete the records up until the end of 1996 in Table 22. Annual rainfall varies from a minimum of 556 mm to a maximum of 1658 mm with the evaporation having a narrower range from approximately 1100 mm to 1460 mm.. Only in one year (1988) in sixteen years was the rainfall greater than evaporation.

6.2 Rainfall Rate Statistics

It is more difficult to maintain the tipping bucket rain gauges to ensure good quality data than to take the 24 hour observations. It has been noticed that occasionally one of the gauges produced a string of spurious readings after getting stuck in a critical position. These data were initially edited by comparing the integrated 24 hour rainfall rate data with the manual readings. A second editing process was undertaken by comparing the two gauges and eliminating values when one gauge exceeded the other by more than 5 mm/hr in a 15 minute period. The results of the analyses are shown as frequency distributions of rainfall rates in Table 23. From these statistics, it appears that the Climatronics gauge reads low when compared to the RIMCO gauge, with 90% of values less than 4 mm hr^{-1} and 5.5 mm hr^{-1} respectively. Comparison of simultaneous measurements by the two gauges (Table 24) confirms that the RIMCO gauge overestimates the rainfall rates compared to the Climatronics gauge. Without more exhaustive comparisons with the manual 24 hour observations it is not possible to say which gauge is correct, although anecdotal evidence suggests it is the RIMCO gauge.

The rainfall rate data are also tabulated against the simultaneous wind directions at 10m on the LHSTC meteorological tower (Table 25). While the distribution of wind directions during rain is bi-modal with a peak from the south-south-east to south-south-west sectors and another centred around the north-east sector, it is difficult to detect a trend of heavier rain being associated with winds from any particular direction. The findings of a peak near the south sector agrees with Clark (1985), but in the earlier data there was no secondary peak from the north-east.

7. NET ALL-WAVE SOLAR RADIATION STATISTICS

For the climatological record, the 15 minute net all-wave solar radiation data have been plotted from the commencement of data collection in May 1992 until the present (Figure 40). This allows visualisation of both seasonal trends in the maximum amplitudes of the diurnal cycle and variations due to cloudiness. The diurnal cycle of monthly average values of net all-wave radiation values also indicate seasonal trends in the data. These are plotted on an annual basis from 1992 to 1996 as Figures 41 to 45.

8. ACKNOWLEDGEMENTS

Great dedication and technical support is required to collect high quality meteorological data on a long term, continuous basis. For this reason, it is appropriate first to acknowledge the contribution of the late Mr. Kurt Bendun during the days of analogue chart recording. Then it was the great contribution and development of the excellent digital data acquisition system by Mr. Friedl Bartsch which has provided ANSTO with a very reliable and flexible system. Mr. Bert Muller also made a valuable contribution to the maintenance of equipment in the Lucas Heights network of meteorological stations as well as in the successful design of a "cockatoo-proof" wind vane. In more recent times, the work of Mr Jim Pascoe has enabled continuation of high quality data collection.

Since the network was installed in 1993, we are indebted to Mr Sid and Mrs Faye Kanard who have maintained surveillance of the Shackles Estate station, to Ms Sue Brian, the General Assistant and staff at the Lucas Heights Community School and to the staff at Boys Town School, for allowing us access to, and looking after the meteorological stations.

9. REFERENCES

Ackerman, G.R. 1983 : Means and standard deviations of horizontal wind components. Note to Journ. Climate and Applied Meteorology, **22,** 959-961.

AS 2923 1987 : Ambient air - guide for measurement of horizontal wind for air quality applications. Standards Association of Australia.

Bartsch, F.K.J. 1996a : Operation of Lucas Heights data acquisition system. Unpublished, private communication.

Bartsch, F.K.J. 1996b : Operation of New Reactor Study data acquisition systems. Unpublished, private communication.

Bell, R.C., Thompson, R.O.R.Y 1980 : Valley ventilation by cross winds. Journ. Fluid Mech. **96**, pp 757-767.

Byun, D.W. 1990 : On the analytical solutions to flux-profile relationships for the atmospheric surface layer. Journ. of Applied Meteorology **29**, 652-657.

Charash, E., Bendun, E.O.K. 1968 : Selected climatological data from Lucas Heights 1958-1966. AAEC/TM453.

Clark, G.H. 1982 : A climatology of air pollution meteorology parameters on the southern extremity of Sydney. Proceedings of Conference "The urban atmosphere - Sydney, a case study" organised by CSIRO Divn. of Fossil Fuels, Leura, May 5-6.

Clark, G.H. 1985 : Some meteorological parameters for atmospheric dispersion modelling at Lucas Heights, NSW, Australia 1975 to 1983. AAEC/E613.

Clark, G.H. 1986 : A description of the meteorological instrumentation, calibration methods and data digitisation at Lucas Heights. AAEC ESD/TN-18.

Clark, G.H., Parker, P.T. 1987 : A user's guide to the 'Bitpad-One' chart digitiser. ANSTO/TN-19.

Clark, G.H., Petersen, M.C.E., Bartsch, F.K.J., Pfitzner, J., Akber, R.A. 1993 : The climatology and air pollution meteorology at Jabiru East, Northern Territory, 1988 to 1990. Office of the Supervising Scientist, Open File Record, OFR No. 87.

Clarke,R.H., Brook, R.R. 1979 : The Koorin expedition. Atmospheric boundary layer data over tropical savannah land. Bureau of Meteorology, Dept. of Science and Environment, Govt. Publ. Service.

Gifford, F.A. 1961 : Use of routine meteorological observations for estimating atmospheric dispersion. Nuclear Safety **17**, 68-86.

Garratt, J.R. 1977 : Aerodynamic roughness and mean monthly surface stress over Australia. CSIRO Divn. Of Atmos. Res. Tech. Paper No. 29.

Garratt, J.R. 1978 : Flux profile relationships above tall vegetation. Quart. Journ. of Royal Meteorol. Soc. **104**, 199-212

Golder, D. 1972 : Relations among stability parameters in the surface layer. Boundary Layer Meteorology **3**, 47-58.

Goodin, W.R. 1977 : Personal communication.

Hanna, S.R., Briggs, G.A., Deardorff, J., Egan, B.A., Gifford, F. 1977 : AMS workshop on stability classification schemes and sigma curves - summary and recommendations. Bulletin of the American Meteorol. Soc. **58**, 1305-1309.

Holmes, N., Richmond, K., Sanguineti, M. 1982 : Studies of the meteorology and dispersion characteristics of the Beverley area - Lake Frome, South Australia. Prepared by Dames and Moore, NSW.

Irwin, J.S., Binkowski, F.S. 1981 : Estimation of the Monin-Obukhov scaling length using on-site instrumentation. Atmospheric Environment **15**, 1091-1094.

Kimura, F., Manins, P.C. 1988 : Blocking in periodic valleys. Bound. Layer Meteorol. **44**, 137-169.

Manins, P.C., Sawford, B.L. 1982 : Mesoscale observations of upstream blocking. Quart. Journ. of Royal Meteorol. Soc., **108**, 427-434.

Mitchell, A.E. Jnr, Timbre, K.O. 1979 : Atmospheric stability class from horizontal wind fluctuation. Air Pollution Control Association Annual Meeting, Cincinnati, Ohio. Paper 79-29.2.

Pasquill, F. 1961 : The estimation of the dispersion of winde borne materials. Meteorological Magazine, **90**, 33-49.

Ryan, B.C. 1977 : A mathematical model for diagnosis and prediction of surface winds in mountainous terrain. Journ. of Applied Meteorology **16**, 571-584.

Smith, F.B. 1972 : A scheme for estimating the vertical dispersion of a plume from near ground level. Proc. Third Meeting of Expert Panel on Air Pollution Modelling, North Atlantic Treaty Organisation, NATO-CHHS Report 14, pp XVII-1 to XVII-14.

Stanhill, G. 1969 : A simple instrument for the field measurement of turbulent diffusion flux. Journ. of Appl. Meteorol. **8**, 509-513.

Stull, R.B. 1988 : An introduction of boundary layer meteorology. Kluwer Academic Publishers. pp.666.

USNRC 1974 : Regulatory Guide 1.23. Onsite meteorology program. United States Regulatory Commission, Washington, D.C..

van Ulden, A.P., Holtslag, A,.A.M. 1985 : Estimation of atmospheric boundary layer parameters for diffusion applications. Journ. Climate and Applied Meteorology **24**, 1196-1206.

Wang, I.T. 1981 : The determination of surface layer stability and eddy fluxes using wind speed and vertical gradient measurements. Journ. Applied Meteorology **20**, 1241-1248.

Yamartino, R.J. 1984 : A comparison of several "single-pass" estimators of the standard deviation of wind direction. Journ. Applied Meteorology **23**, 1362-1366.

Lucas Heights Meteorological Data - Analogue Recording

Recording Instrument	Meteorological Variable	Height (m)	Variable Name	Units	Start Date	End Date
Honeywell	Dry bulb temperature	49	drycal1	°C	300775	180190
Honeywell	Wet bulb temperature	49	wetcal1	°C	120876	180190
Honeywell	Differential temperature	9-49	dtcal1	°C	300775	180190
Climatronics WMIII	Wind speed	7	wscal7	$m\ s^{-1}$	161084	220186
Dines	Wind speed	7	dwscal	$m\ s^{-1}$	110775	110286
Climatronics WMIII	Wind speed	10	wscal10	$m\ s^{-1}$	160286	190390
Climatronics WMIII	Wind speed	30	wscal30	$m\ s^{-1}$	200286	150390
Kaymont	Wind speed	49	wscal	$m\ s^{-1}$	081177	011190
Climatronics WMIII	Wind direction	7	wdcal7	°	161084	220186
Dines	Wind direction	7	dwdcal	°	110775	110286
Climatronics WMIII	Wind direction	10	wdcal10	°	160286	190390
Climatronics WMIII	Wind direction	30	wdcal30	°	200286	150390
Kaymont	Wind direction	49	wdcal	°	081177	011190
Dines	Turbulence category	7	dinturb	C+B 1974	110775	170484
Kaymont	Turbulence category	49	kwturb	C+B 1974	081177	050683
Honeywell/LICOR	Net all-wave radiation*	0.5	radcal	$mW\ cm^{-2}$	180276	160788
	*N.B 60 min averages					

C+B 1974 = Clark and Bendun (1974)

Table 1

Parameter Index	DAS Signal Identifier	Statistic type Identifier	Statistic	Height (m)
1	U1	M	Scalar average	2
2	U1	D	Scalar standard deviation	2
3	U2	M	Scalar average	10
4	U2	D	Scalar standard deviation	10
5	U3	M	Scalar average	18
6	U3	D	Scalar standard deviation	18
7	U4	M	Scalar average	30
8	U4	D	Scalar standard deviation	30
9	U5	M	Scalar average	49
10	U5	D	Scalar standard deviation	49
11	D1	M	Scalar average	2
12	D1	D	Scalar standard deviation	
13	U1	VM	Vector average	
14	D1	VM	Vector average	
15	U1	VD	Vector standard deviation	
16	D1	VD	Vector standard deviation	
17	D2	M	Scalar average	10
18	D2	D	Scalar standard deviation	
19	U2	VM	Vector average	
20	D2	VM	Vector average	
21	U2	VD	Vector standard deviation	
22	D2	VD	Vector standard deviation	
23	D3	M	Scalar average	18
24	D3	D	Scalar standard deviation	
25	U3	VM	Vector average	
26	D3	VM	Vector average	
27	U3	VD	Vector standard deviation	
28	D3	VD	Vector standard deviation	
29	D4	M	Scalar average	30
30	D4	D	Scalar standard deviation	
31	U4	VM	Vector average	
32	D4	VM	Vector average	
33	U4	VD	Vector standard deviation	
34	D4	VD	Vector standard deviation	
35	D5	M	Scalar average	49
36	D5	D	Scalar standard deviation	
37	U5	VM	Vector average	
38	D5	VM	Vector average	
39	U5	VD	Vector standard deviation	
40	D5	VD	Vector standard deviation	

U = Wind speed
D = Wind direction
T = Temperature

TABLE 2 - Lucas Heights Tower - Data Acquisition System Parameter Statistics

Parameter Index	DAS Signal Identifier	Statistic type Identifier	Statistic	Height (m)
41	T1	M	Average	2
42	T1	H	Maximum (High)	
43	T1	L	Minimum (Low)	
44	T2	M	Average	10
45	T2	H	Maximum (High)	
46	T2	L	Minimum (Low)	
47	T3	M	Average	18
48	T3	H	Maximum (High)	
49	T3	L	Minimum (Low)	
50	T4	M	Average	30
51	T4	H	Maximum (High)	
52	T4	L	Minimum (Low)	
53	T5	M	Average	49
54	T5	H	Maximum (High)	
55	T5	L	Minimum (Low)	
56	B1	A	Accumulation	2
57	B2	A	Accumulation	10
58	B3	A	Accumulation	18
59	B4	A	Accumulation	30
60	B5	A	Accumulation	49
61	G1	A	Accumulation	2
62	G2	A	Accumulation	10
63	G3	A	Accumulation	18
64	G4	A	Accumulation	30
65	G5	A	Accumulation	49
66	NR	A	Accumulation	
67	NR	M	Average	
68	NR	D	Standard Deviation	
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				

T = Temperature
B = Alpha/Beta Detector counts
G = Gamma Detector counts
NR = Net radiation

TABLE 2 contd. - Lucas Heights Tower - Data Acquisition System Parameter Statistics

Parameter Index	DAS Signal Identifier	Statistic type Identifier	Statistic
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			
101	Ra	A	Accumulation
102	Ra	A	Accumulation
103			
104			

Ra = Rainfall

TABLE 2 contd. - Lucas Heights Tower - Data Acquisition System Parameter Statistics

Parameter Index	DAS Signal Identifier	Statistic type Identifier	Statistic
1			
2			
3			
4			
5	T1	M	Average
6	T1	H	Maximum (High)
7	T1	L	Minimum (Low)
8			
9			
10			
11			
12			
13	U1	M	Scalar Average
14	U1	D	Scalar standard deviation
15	D1	M	Scalar average
16	D1	D	Scalar standard deviation
17	U1	VM	Vector average
18	U1	VD	Vector standard deviation
19	D1	VM	Vector average
20	D1	VD	Vector standard deviation

T = Temperature
U = wind speed
D = wind direction

Lucas Heights Network - Data Acquisition System Parameter Statistics

Table 3

Location :	150.9820E	34.0520S	AGM :	E313768m	N6230240m	Altitude :	155m	
Meteorological Variable	Height (m)	Variable Name	Units	Start Date	End Date	No. of Observations	Good Data (%)	Bad Data (%)
Analogue Chart Data	30 min	averages						
Dry bulb temperature	49	drycal1	°C	300775	180190	253824	96.11	3.89
Wet bulb temperature	49	wetcal1	°C	120876	180190	235632	92.42	7.58
Differential temperature	9-49	dtcal1	°C	300775	180190	253824	97.36	2.64
Wind speed	7	wscal7	$m\ s^{-1}$	161084	220186	22320	94.48	5.52
Wind speed	7	dwscal	$m\ s^{-1}$	110775	110286	185760	97.62	2.38
Wind speed	10	wscal10	$m\ s^{-1}$	160286	190390	54144	98.97	1.03
Wind speed	30	wscal30	$m\ s^{-1}$	200286	150390	69888	98.80	1.20
Wind speed	49	wscal	$m\ s^{-1}$	081177	011190	197904	96.89	3.11
Wind direction	7	wdcal7	°	161084	220186	22320	94.48	5.52
Wind direction	7	dwdcal	°	110775	110286	185760	96.26	3.74
Wind direction	10	wdcal10	°	160286	190390	71712	97.38	2.62
Wind direction	30	wdcal30	°	200286	150390	69888	98.32	1.68
Wind direction	49	wdcal	°	081177	011190	197904	96.40	3.60
Turbulence category	7	dinturb	C+B 1974	110775	170484	153888	97.43	2.57
Turbulence category	49	kwturb	C+B 1974	081177	050683	71616	98.37	1.63
Net all-wave radiation*	0.5	radcal	$mW\ m^{-2}$	180276	160788	108816	97.46	2.54
*N.B 60 min averages								
Digital Data	15 min	averages						
Scalar wind speed	10	scws10m	$m\ s^{-1}$	050491	121196	196704	93.40	6.60
Scalar wind speed	18	scws18m	$m\ s^{-1}$	050491	020393	67008	89.45	10.55
Scalar wind speed	30	scws30m	$m\ s^{-1}$	050491	020393	67008	90.03	9.97
Scalar wind speed	49	scws49m	$m\ s^{-1}$	050491	121196	196704	93.23	6.77
Vector wind direction	10	vmwd10m	°	050491	121196	196704	93.45	6.55
Vector wind direction	18	vmwd18m	°	050491	020393	67008	89.46	10.54
Vector wind direction	30	vmwd30m	°	050491	070792	44160	94.47	5.53
Vector wind direction	49	vmwd49m	°	050491	121196	196704	93.46	6.54
Vector wind speed	10	vmws10m	$m\ s^{-1}$	050491	121196	196704	93.45	6.55
Vector wind speed	49	vmws49m	$m\ s^{-1}$	050491	121196	196704	93.46	6.54
Std. Devn.Wind Speed	10	sigu10m	$m\ s^{-1}$	050491	121196	196704	93.40	6.60
Std. Devn.Wind Speed	49	sigu49m	$m\ s^{-1}$	050491	121196	196704	93.23	6.77
Std. Devn.Wind Dim.	10	wddv10m	°	050491	121196	196704	93.45	6.55
Std. Devn.Wind Dim.	49	wddv49m	°	050491	121196	196704	93.46	6.54
Dry Bulb Temperature	2	lhtm02m	°C	050491	121196	196704	92.55	7.45
Dry Bulb Temperature	10	lhtm10m	°C	050491	121196	196704	92.94	7.06
Dry Bulb Temperature	18	lhtm18m	°C	050491	121196	196704	93.10	6.90
Dry Bulb Temperature	30	lhtm30m	°C	050491	121196	196704	92.76	7.24
Dry Bulb Temperature	49	lhtm49m	°C	050491	121196	196704	92.34	7.66
Minimum Temperature	2	lh02tmn	°C	050491	121196	196704	91.99	8.01
Maximum Temperature	2	lh02tmx	°C	050491	121196	196704	92.52	7.48
Net All-wave Radiation	0.5	netradn	$W\ m^{-2}$	130592	121196	157920	92.95	7.05
Horiz. Stability Category	10	sigy10m	Pasquill	050491	121196	196704	93.45	6.55
Horiz. Stability Category	49	sigy49m	Pasquill	050491	121196	196704	93.46	6.54
Vert. Stability Category	10	sigz10m	Pasquill	050491	121196	196704	93.45	6.55
Vert. Stability Category	49	sigz49m	Pasquill	050491	121196	196704	93.46	6.54
Climatronics rainfall rate	0	raincli	$mm\ h^{-1}$	201092	121196	142560	94.86	5.14
RIMCO rainfall rate	0	rainrim	$mm\ h^{-1}$	191092	121196	142656	93.23	6.77

C+B 1974 = Clark and Bendun (1974)

Table 4

Data Quality - Lucas Heights Network

Meteorological Variable	Height (m)	Variable Name	Units	Start Date	End Date	No. of Observations	Good Data (%)	Bad Data (%)
Lucas Heights Comm.	**School**							
Location :	151.0049E	34.0382S	AGM :	E315865m	N6231948m	Altitude :	135m	
Scalar Wind Speed	15.7	scwscs	ms^{-1}	310393	271196	128448	95.64	4.36
Vector Wind Direction	15.7	vmwdcs	°	310393	271196	128448	87.47	12.53
Stand Devn. Wind Dirn.	15.7	wddvcs	°	310393	271196	128448	87.46	12.54
Dry Bulb Temperature	15.7	cstm10m	°C	310393	271196	128448	95.68	4.32
Minimum Temperature	15.7	cstmn10	°C	310393	271196	128448	95.68	4.32
Maximum Temperature	15.7	cstmx10	°C	310393	271196	128448	95.59	4.41
Boys Town School								
Location :	151.0044E	34.0669S	AGM :	E315963	N6228723	Altitude :	172m	
Scalar Wind Speed	18.5	scwsbt	ms^{-1}	010493	271196	128352	97.10	2.90
Vector Wind Direction	18.5	vmwdbt	°	010493	271196	128352	90.15	9.85
Stand Devn. Wind Dirn.	18.5	wddvbt	°	010493	271196	128352	90.15	9.85
Dry Bulb Temperature	18.5	bttm10m	°C	010493	271196	128352	97.03	2.97
Minimum Temperature	18.5	bttmn10	°C	010493	271196	128352	97.03	2.97
Maximum Temperature	18.5	bttmx10	°C	010493	271196	128352	96.90	3.10
Shackles Estate								
Location :	151.0194E	34.0299S	AGM :	E317260	N6233019	Altitude :	10m	
Scalar Wind Speed	10	scwsse	ms^{-1}	040693	251196	122592	96.13	3.87
Vector Wind Direction	10	vmwdse	°	040693	251196	122592	96.13	3.87
Stand Devn. Wind Dirn.	10	wddvse	°	040693	251196	122592	96.13	3.87
Dry Bulb Temperature	10	setm10m	°C	040693	251196	122592	96.13	3.87
Minimum Temperature	10	setmn10	°C	040693	251196	122592	96.13	3.87
Maximum Temperature	10	setmx10	°C	040693	251196	122592	95.74	4.26

Table 5

beginning date : 50491 end date : 280293
The program which produced these results is in
$PROG/wprofile/wprof5.f - linear regression - new DAS data - 3 levels

Wind speeds at 49m > 0.0 m/s

****** Neutral atmospheric conditions ******

Total no. of observations 3763
No. of bad data = 173
No. of cases when u2<u1 or u3<u2 = 71
No Convergence or non-logarithmic profile = 3045

height = 10.0 m

wind	u*			z0			d		
direction	av.	s.d.	no.	av.	s.d.	no.	av.	s.d.	no.
N	0.23	0.04	7.	2.09	0.54	7.	2.06	0.62	7.
NE	0.41	0.02	73.	1.06	0.09	73.	1.56	0.18	73.
E	0.39	0.02	47.	1.18	0.08	47.	1.55	0.20	47.
SE	0.42	0.02	58.	0.73	0.06	58.	1.27	0.18	58.
S	0.37	0.01	148.	0.37	0.03	148.	1.47	0.12	148.
SW	0.41	0.02	62.	0.41	0.06	62.	1.12	0.17	62.
W	0.55	0.02	69.	0.75	0.08	69.	1.08	0.16	69.
NW	0.42	0.08	10.	0.98	0.18	10.	0.73	0.32	10.
Overall	0.41	0.01	474.	0.70	0.03	474.	1.36	0.06	474.

height = 18.0 m

wind	u*			z0			d		
direction	av.	s.d.	no.	av.	s.d.	no.	av.	s.d.	no.
N	0.25	0.05	5.	2.05	0.73	5.	1.49	0.72	5.
NE	0.41	0.02	68.	1.09	0.10	68.	1.53	0.18	68.
E	0.37	0.01	53.	1.11	0.08	53.	1.45	0.20	53.
SE	0.39	0.02	37.	0.87	0.09	37.	1.71	0.22	37.
S	0.38	0.01	172.	0.37	0.02	172.	1.41	0.11	172.
SW	0.43	0.02	58.	0.40	0.04	58.	1.02	0.17	58.
W	0.56	0.02	70.	0.83	0.08	70.	1.06	0.16	70.
NW	0.31	0.04	11.	1.12	0.26	11.	1.44	0.47	11.
Overall	0.41	0.01	474.	0.70	0.03	474.	1.36	0.06	474.

height = 49.0 m

wind	u*			z0			d		
direction	av.	s.d.	no.	av.	s.d.	no.	av.	s.d.	no.
N	0.36	0.07	12.	1.91	0.27	12.	1.25	0.38	12.
NE	0.40	0.02	65.	0.98	0.09	65.	1.57	0.19	65.
E	0.38	0.02	56.	1.11	0.08	56.	1.65	0.19	56.
SE	0.38	0.02	35.	0.78	0.09	35.	1.40	0.22	35.
S	0.38	0.01	168.	0.37	0.02	168.	1.41	0.11	168.
SW	0.41	0.02	52.	0.41	0.04	52.	1.03	0.18	52.
W	0.56	0.02	74.	0.78	0.08	74.	1.05	0.16	74.
NW	0.39	0.07	12.	1.25	0.35	12.	1.37	0.48	12.
Overall	0.41	0.01	474.	0.70	0.03	474.	1.36	0.06	474.

Table 6

Difference Statistics

Beginning Date : 40693 End Date : 121196

Time of Day : Night

	Wind Speed (m/s)			Wind Dirn (degs)			Sigma Theta (degs)			Temperature (deg.C)		
Stations	Ave	Std	No.	Ave	Std	No.	Ave	Std	No.	Ave	Std	No.
1h10m - 1h49m	-2.3	1.2	68575.	0.3	38.8	68852.	7.0	14.0	68852.	0.1	0.7	68361.
1h10m - cs15.7m	-0.7	1.7	66380.	3.2	29.3	60697.	2.2	20.2	60721.	-0.3	0.5	66451.
1h10m - bt18.5m	-0.8	0.8	67270.	14.8	40.7	61915.	-1.3	26.7	61934.	-0.1	0.7	67146.
1h10m - se10m	1.6	0.9	58917.	10.8	78.3	57032.	-15.1	40.8	59022.	1.4	2.3	66922.

Time of Day : Day

	Wind Speed (m/s)			Wind Dirn (degs)			Sigma Theta (degs)			Temperature (deg.C)		
Stations	Ave	Std	No.	Ave	Std	No.	Ave	Std	No.	Ave	Std	No.
1h10m - 1h49m	-2.0	1.2	46990.	-1.6	19.7	47002.	6.8	10.7	47002.	-0.4	0.4	46859.
1h10m - cs15.7m	-0.9	3.9	45495.	7.1	30.9	41566.	1.7	25.8	41566.	0.0	0.6	45525.
1h10m - bt18.5m	-0.8	1.0	46049.	13.5	37.3	42584.	-1.9	32.7	42584.	0.5	0.5	46030.
1h10m - se10m	1.4	1.2	45300.	37.3	75.2	45104.	-23.7	47.4	45272.	-0.6	1.4	45795.

N.B. Temperature difference in the first line is 1h10m - 1h02m.

Table 7

Wind speed at Lucas Heights (10m) vs. Shackles Estate - Froude Number influence under Stable conditions with cross-valley flow i.e. LHCS wind directions between 225 and 315 degs

Beginning Date : 40693 End Date : 121196

Froude Number range : 0.00 to 0.50

	Lucas Heights (10m) wind speed (m/s)							
Se10m	0.0 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 6.0	6.0 to 8.0	>8.0	Total
0.0 to 0.5	1.70	13.53	31.88	3.27	0.02	0.00	0.00	50.40
0.5 to 1.0	1.16	10.80	29.36	3.77	0.00	0.00	0.00	45.09
1.0 to 2.0	0.08	1.03	2.69	0.66	0.00	0.00	0.00	4.47
2.0 to 4.0	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.04
4.0 to 6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.0 to 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.94	25.39	63.94	7.72	0.02	0.00	0.00	4833.

Froude Number range : 0.50 to 1.00

	Lucas Heights (10m) wind speed (m/s)							
Se10m	0.0 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 6.0	6.0 to 8.0	>8.0	Total
0.0 to 0.5	0.09	1.01	14.51	40.15	0.19	0.00	0.00	55.95
0.5 to 1.0	0.03	0.47	7.96	26.65	0.09	0.00	0.00	35.21
1.0 to 2.0	0.00	0.03	1.98	6.17	0.22	0.00	0.00	8.40
2.0 to 4.0	0.00	0.00	0.00	0.41	0.03	0.00	0.00	0.44
4.0 to 6.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6.0 to 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.13	1.51	24.45	73.38	0.53	0.00	0.00	3178.

Froude Number range : 1.00 to 1.50

	Lucas Heights (10m) wind speed (m/s)							
Se10m	0.0 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 6.0	6.0 to 8.0	>8.0	Total
0.0 to 0.5	0.00	1.32	5.83	35.24	4.51	0.00	0.00	46.90
0.5 to 1.0	0.00	0.56	2.13	22.88	4.64	0.00	0.00	30.22
1.0 to 2.0	0.00	0.13	0.69	11.41	5.39	0.06	0.00	17.68
2.0 to 4.0	0.00	0.00	0.00	2.38	2.76	0.00	0.00	5.14
4.0 to 6.0	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.06
6.0 to 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	2.01	8.65	71.97	17.30	0.06	0.00	1595.

Number in the lower right corner of the table is the total of 15 minute observations

Table 8

Wind speed at Lucas Heights (10m) vs. Shackles Estate - Froude Number influence under
Stable conditions with cross-valley flow i.e. LHCS wind directions between 225 and 315 degs

Beginning Date : 40693 End Date : 121196

Froude Number range : 1.50 to 2.00

	Lucas Heights (10m) wind speed (m/s)							
Se10m	0.0 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 6.0	6.0 to 8.0	>8.0	Total
0.0 to 0.5	0.00	0.00	22.70	9.36	3.64	0.00	0.00	35.70
0.5 to 1.0	0.00	0.00	13.34	10.40	5.89	0.17	0.00	29.81
1.0 to 2.0	0.00	0.00	7.45	5.20	10.05	0.35	0.00	23.05
2.0 to 4.0	0.00	0.00	0.17	1.39	9.36	0.00	0.00	10.92
4.0 to 6.0	0.00	0.00	0.00	0.17	0.17	0.17	0.00	0.52
6.0 to 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	43.67	26.52	29.12	0.69	0.00	577.

Froude Number range : > 2.00

	Lucas Heights (10m) wind speed (m/s)							
Se10m	0.0 to 0.5	0.5 to 1.0	1.0 to 2.0	2.0 to 4.0	4.0 to 6.0	6.0 to 8.0	>8.0	Total
0.0 to 0.5	0.00	0.00	2.69	29.74	0.54	0.00	0.00	32.97
0.5 to 1.0	0.00	0.00	1.94	21.66	2.80	0.00	0.00	26.40
1.0 to 2.0	0.00	0.00	1.19	16.92	7.54	0.32	0.00	25.97
2.0 to 4.0	0.00	0.00	0.00	2.69	7.65	2.48	0.00	12.82
4.0 to 6.0	0.00	0.00	0.00	0.00	0.54	0.97	0.32	1.83
6.0 to 8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
>8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	5.82	71.01	19.07	3.77	0.32	928.

Number in the lower right corner of the table is the total of 15 minute observations

Table 8

Lucas Heights at 9m dates : 10875 to 180190

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	19.4	18.9	20.8	23.7	24.7	23.6	21.5	20.3	17.9	26.0	8.3	41.7
	2.5	2.4	2.7	3.7	4.4	4.1	3.3	2.7	standard deviations			
	2520.	2518.	2513.	2515.	2509.	2509.	2513.	2513.	number of observations			
February	19.6	19.0	20.6	23.5	24.6	23.5	21.4	20.4	18.2	25.8	12.2	41.4
	2.2	2.1	2.5	3.4	4.1	3.8	2.9	2.3	standard deviations			
	2209.	2208.	2211.	2212.	2201.	2210.	2212.	2208.	number of observations			
March	18.1	17.5	18.7	21.8	23.2	22.2	19.9	18.9	16.7	24.1	8.4	38.7
	2.4	2.4	2.5	3.1	3.7	3.6	2.7	2.4	standard deviations			
	2292.	2292.	2293.	2290.	2297.	2306.	2310.	2305.	number of observations			
April	15.5	14.9	15.7	19.0	20.3	19.2	17.2	16.2	14.0	21.0	5.7	34.7
	2.8	2.8	2.9	3.3	3.9	3.6	3.0	2.8	standard deviations			
	2231.	2236.	2234.	2230.	2246.	2255.	2257.	2250.	number of observations			
May	13.0	12.6	13.0	16.2	17.7	16.6	14.6	13.7	11.3	18.6	1.1	25.1
	2.5	2.5	2.5	2.7	3.0	2.8	2.5	2.6	standard deviations			
	2574.	2563.	2564.	2565.	2565.	2577.	2582.	2572.	number of observations			
June	10.6	10.1	10.3	13.6	15.4	14.3	12.2	11.2	8.9	16.1	2.4	23.4
	2.3	2.4	2.4	2.2	2.1	2.2	2.0	2.2	standard deviations			
	2513.	2513.	2516.	2514.	2513.	2516.	2512.	2506.	number of observations			
July	9.3	8.7	8.9	12.5	14.5	13.5	11.2	10.0	7.5	15.2	0.2	22.9
	2.3	2.3	2.3	2.3	2.5	2.5	2.2	2.3	standard deviations			
	2572.	2568.	2553.	2546.	2551.	2565.	2574.	2574.	number of observations			
August	10.2	9.5	10.2	14.2	16.1	15.1	12.5	11.2	8.2	17.1	1.7	39.0
	2.5	2.5	2.6	2.6	2.9	2.9	2.5	2.6	standard deviations			
	2769.	2764.	2756.	2755.	2761.	2764.	2764.	2766.	number of observations			
September	12.2	11.5	13.0	16.9	18.6	17.4	14.8	13.4	10.3	19.7	3.0	33.5
	2.9	2.8	3.0	3.2	3.9	3.9	3.2	3.0	standard deviations			
	2602.	2597.	2599.	2604.	2604.	2611.	2617.	2606.	number of observations			
October	14.3	13.6	15.9	19.2	20.4	19.1	16.6	15.3	12.6	21.5	4.8	38.5
	2.9	2.9	3.2	4.0	4.5	4.3	3.4	3.0	standard deviations			
	2639.	2644.	2646.	2645.	2634.	2639.	2646.	2644.	number of observations			
November	16.1	15.6	18.3	21.2	21.9	20.5	18.3	17.1	14.6	23.2	7.1	40.9
	2.7	2.7	3.2	4.2	4.5	4.0	3.1	2.8	standard deviations			
	2512.	2514.	2511.	2512.	2516.	2523.	2512.	2509.	number of observations			
December	18.0	17.5	20.1	23.1	24.0	22.7	20.3	19.0	16.6	25.2	10.0	39.9
	2.4	2.4	3.0	4.2	4.6	4.2	3.2	2.6	standard deviations			
	2676.	2676.	2680.	2671.	2671.	2685.	2682.	2682.	number of observations			

Table 9

Lucas Heights at 49m dates : 10875 to 180190

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	19.6	19.1	20.2	22.8	23.7	22.7	21.1	20.2	18.1	25.0	12.2	41.6
	2.6	2.4	2.5	3.6	4.4	4.0	3.3	2.9	standard deviations			
	2520.	2518.	2515.	2517.	2509.	2509.	2514.	2514.	number of observations			
February	19.9	19.5	20.3	22.8	23.8	22.8	21.2	20.5	18.6	25.0	12.3	40.9
	2.2	2.1	2.3	3.4	4.1	3.7	2.9	2.4	standard deviations			
	2210.	2208.	2211.	2213.	2202.	2210.	2212.	2208.	number of observations			
March	18.7	18.2	18.7	21.1	22.4	21.6	19.9	19.2	17.4	23.4	9.3	38.0
	2.3	2.3	2.3	2.9	3.6	3.5	2.7	2.3	standard deviations			
	2358.	2358.	2355.	2356.	2357.	2368.	2370.	2365.	number of observations			
April	16.3	15.8	16.0	18.4	19.7	18.9	17.5	16.9	14.7	20.8	5.2	34.7
	2.7	2.7	2.8	3.2	3.8	3.6	3.1	2.9	standard deviations			
	2406.	2408.	2406.	2405.	2414.	2420.	2424.	2418.	number of observations			
May	14.0	13.5	13.5	15.6	17.2	16.4	15.1	14.5	12.2	18.1	5.1	24.4
	2.5	2.5	2.5	2.7	3.0	2.8	2.5	2.5	standard deviations			
	2574.	2563.	2565.	2566.	2567.	2577.	2582.	2571.	number of observations			
June	11.4	10.9	10.8	13.0	14.8	14.1	12.8	12.0	9.8	15.5	3.8	22.4
	2.3	2.3	2.3	2.1	2.0	2.1	2.1	2.2	standard deviations			
	2520.	2519.	2519.	2516.	2515.	2520.	2520.	2520.	number of observations			
July	10.2	9.7	9.5	11.9	13.8	13.3	11.8	10.9	8.5	14.6	2.9	21.9
	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	standard deviations			
	2602.	2598.	2589.	2579.	2583.	2595.	2604.	2600.	number of observations			
August	11.3	10.6	10.5	13.3	15.3	14.7	12.9	12.1	9.4	16.3	3.6	40.4
	2.5	2.5	2.5	2.5	2.8	2.8	2.6	2.6	standard deviations			
	2775.	2770.	2764.	2768.	2772.	2771.	2770.	2770.	number of observations			
September	13.0	12.3	12.8	16.0	17.7	16.7	14.9	14.0	11.1	18.8	4.9	37.2
	2.9	2.8	2.8	3.2	3.9	3.9	3.4	3.1	standard deviations			
	2604.	2604.	2608.	2619.	2623.	2626.	2621.	2607.	number of observations			
October	14.8	14.2	15.3	18.2	19.4	18.3	16.4	15.6	13.1	20.6	6.1	37.8
	2.9	2.9	2.9	3.8	4.4	4.2	3.4	3.0	standard deviations			
	2706.	2708.	2713.	2715.	2705.	2705.	2712.	2712.	number of observations			
November	16.5	16.0	17.6	20.2	20.8	19.7	18.0	17.2	15.0	22.2	7.2	40.4
	2.9	2.8	3.1	4.1	4.4	4.0	3.2	3.0	standard deviations			
	2518.	2520.	2521.	2520.	2522.	2530.	2521.	2516.	number of observations			
December	18.2	17.8	19.3	22.1	22.8	21.7	19.9	19.0	16.8	24.1	11.2	40.0
	2.4	2.4	2.8	3.9	4.5	4.1	3.2	2.7	standard deviations			
	2688.	2688.	2692.	2688.	2683.	2695.	2694.	2694.	number of observations			

Table10

Lucas Heights Meteorological Data : 10875 to 180190

Time (EST.)	january Av.	s.d.	Ext. Low	Ext. High	february Av.	s.d.	Ext. Low	Ext. High	march Av.	s.d.	Ext. Low	Ext. High	april Av.	s.d.	Ext. Low	Ext. High	may Av.	s.d.	Ext. Low	Ext. High	june Av.	s.d.	Ext. Low	Ext. High
0000-0030	0.10	0.83	-1.9	5.7	0.21	0.73	-1.2	4.0	0.56	0.92	-0.7	4.9	0.83	1.09	-0.8	5.0	0.87	1.21	-3.7	5.5	0.78	1.13	-0.9	5.2
0030-0100	0.11	0.79	-1.9	3.1	0.26	0.77	-1.1	3.7	0.60	0.98	-0.7	4.9	0.84	1.09	-0.8	4.6	0.89	1.21	-3.6	5.8	0.77	1.12	-0.9	5.1
0100-0130	0.13	0.85	-1.9	4.0	0.30	0.79	-1.1	3.3	0.65	1.02	-0.7	4.8	0.80	1.06	-0.9	4.8	0.91	1.22	-3.8	5.5	0.78	1.13	-0.8	5.2
0130-0200	0.15	0.84	-1.9	3.8	0.32	0.80	-1.2	3.7	0.68	1.02	-0.7	4.9	0.83	1.09	-1.0	5.6	0.93	1.20	-3.6	5.8	0.78	1.13	-0.8	5.3
0200-0230	0.16	0.86	-1.9	4.0	0.33	0.82	-1.1	4.2	0.69	1.03	-0.7	5.5	0.84	1.12	-1.2	5.5	0.94	1.23	-4.1	5.2	0.80	1.16	-0.8	5.3
0230-0300	0.18	0.88	-1.9	4.2	0.34	0.84	-1.2	4.2	0.70	1.03	-0.7	5.8	0.83	1.12	-0.9	5.0	0.91	1.19	-3.9	5.3	0.82	1.15	-0.8	5.5
0300-0330	0.21	0.90	-1.9	4.4	0.37	0.87	-1.2	4.6	0.73	1.04	-0.6	5.7	0.86	1.14	-1.1	5.4	0.90	1.20	-4.2	5.8	0.84	1.16	-1.3	5.1
0330-0400	0.23	0.91	-1.8	5.0	0.39	0.89	-1.4	4.5	0.73	1.01	-0.7	5.5	0.89	1.14	-0.8	5.4	0.92	1.19	-4.1	5.2	0.84	1.14	-0.9	5.0
0400-0430	0.25	0.96	-1.7	5.2	0.41	0.89	-1.5	4.7	0.75	1.02	-0.6	5.5	0.89	1.14	-1.0	5.0	0.87	1.13	-4.3	4.7	0.83	1.16	-1.2	5.0
0430-0500	0.29	0.96	-1.8	4.1	0.44	0.91	-1.7	4.6	0.76	1.04	-0.7	5.3	0.93	1.17	-1.1	4.8	0.87	1.13	-4.3	4.7	0.85	1.15	-1.4	4.6
0500-0530	0.29	0.97	-1.9	4.1	0.45	0.93	-1.5	4.3	0.76	1.05	-0.6	4.8	0.94	1.18	-0.9	4.9	0.93	1.19	-4.4	5.2	0.83	1.14	-1.6	4.5
0530-0600	0.15	0.91	-1.9	4.0	0.43	0.90	-1.2	4.5	0.79	1.07	-0.7	4.7	0.96	1.18	-0.8	5.1	0.93	1.18	-4.2	5.2	0.87	1.15	-1.4	4.8
0600-0630	-0.19	0.79	-2.4	3.4	0.29	0.86	-1.3	3.4	0.76	1.06	-0.7	5.0	0.93	1.17	-0.9	4.7	0.94	1.20	-4.3	5.2	0.86	1.15	-1.4	5.1
0630-0700	-0.49	0.66	-2.9	2.0	-0.02	0.76	-1.4	4.0	0.52	0.96	-0.7	4.4	0.86	1.17	-0.8	4.4	0.92	1.19	-3.9	5.3	0.85	1.16	-1.3	5.6
0700-0730	-0.68	0.68	-4.0	1.7	-0.28	0.59	-1.7	2.7	0.15	0.83	-1.9	4.1	0.60	1.12	-0.9	4.6	0.82	1.15	-3.6	4.9	0.81	1.15	-1.2	5.3
0730-0800	-0.79	0.74	-4.9	1.2	-0.45	0.57	-2.2	3.2	-0.20	0.74	-2.9	4.1	0.10	0.87	-1.6	4.0	0.50	1.03	-3.7	4.5	0.58	1.06	-1.0	5.3
0800-0830	-0.84	0.76	-5.5	1.7	-0.55	0.57	-2.3	2.4	-0.42	0.71	-3.1	4.4	-0.31	0.57	-2.1	2.6	0.05	0.79	-3.9	3.3	0.15	0.89	-1.4	3.9
0830-0900	-0.85	0.76	-4.9	1.4	-0.62	0.54	-2.4	1.8	-0.56	0.65	-3.4	2.8	-0.49	0.51	-2.6	3.0	-0.29	0.59	-3.8	3.1	-0.25	0.66	-1.6	3.1
0900-0930	-0.90	0.77	-5.0	1.0	-0.68	0.51	-2.8	1.3	-0.64	0.64	-4.0	2.5	-0.59	0.50	-3.1	3.0	-0.53	0.49	-3.7	2.0	-0.48	0.57	-2.1	3.1
0930-1000	-0.90	0.75	-4.5	1.2	-0.69	0.53	-3.0	1.9	-0.70	0.67	-5.5	2.3	-0.65	0.52	-2.9	3.0	-0.62	0.47	-2.1	1.8	-0.62	0.46	-2.3	0.9
1000-1030	-0.91	0.78	-4.5	1.0	-0.73	0.56	-2.9	2.5	-0.73	0.66	-4.5	2.5	-0.68	0.51	-2.4	3.0	-0.66	0.44	-2.0	0.9	-0.69	0.42	-2.2	0.5
1030-1100	-0.92	0.81	-4.5	1.3	-0.76	0.58	-2.6	2.5	-0.77	0.67	-5.5	2.1	-0.68	0.47	-2.6	1.4	-0.68	0.45	-2.0	1.3	-0.73	0.44	-2.8	0.5
1100-1130	-0.95	0.80	-4.5	1.1	-0.78	0.58	-2.6	2.8	-0.73	0.66	-5.0	2.3	-0.59	0.50	-2.7	1.8	-0.57	0.42	-2.1	1.0	-0.59	0.41	-2.8	0.8
1130-1200	-0.90	0.79	-4.5	2.4	-0.73	0.60	-2.9	3.0	-0.63	0.60	-3.3	2.5	-0.57	0.50	-2.3	0.8	-0.59	0.47	-2.0	2.6	-0.62	0.44	-2.9	0.9
1200-1230	-0.89	0.74	-3.7	2.1	-0.70	0.60	-2.8	2.9	-0.69	0.57	-3.2	2.2	-0.65	0.47	-2.4	0.7	-0.63	0.45	-2.0	1.4	-0.68	0.43	-2.3	1.2
1230-1300	-0.98	0.74	-4.1	1.9	-0.75	0.55	-2.4	1.5	-0.75	0.55	-3.2	1.5	-0.66	0.45	-2.3	0.5	-0.64	0.41	-2.0	1.0	-0.69	0.42	-3.0	1.3
1300-1330	-1.04	0.74	-4.0	1.4	-0.77	0.57	-2.5	0.9	-0.71	0.56	-3.4	1.2	-0.66	0.45	-2.1	1.0	-0.63	0.40	-1.9	0.8	-0.66	0.42	-2.6	1.3
1330-1400	-1.10	0.71	-3.6	1.2	-0.79	0.56	-3.2	0.9	-0.79	0.53	-3.0	1.0	-0.68	0.42	-2.0	0.7	-0.57	0.40	-1.8	0.8	-0.57	0.43	-2.2	1.4
1400-1430	-1.13	0.73	-3.5	2.8	-0.86	0.58	-3.4	1.3	-0.86	0.52	-3.4	1.0	-0.67	0.43	-2.0	0.7	-0.55	0.41	-1.8	1.5	-0.56	0.43	-2.2	1.5
1430-1500	-1.10	0.72	-4.5	1.3	-0.92	0.53	-2.6	1.2	-0.83	0.53	-3.1	1.3	-0.66	0.41	-1.8	0.5	-0.55	0.40	-1.8	0.5	-0.54	0.42	-2.3	1.6
1500-1530	-1.06	0.72	-4.0	1.9	-0.89	0.55	-2.6	1.7	-0.81	0.53	-2.7	1.8	-0.63	0.39	-1.9	0.7	-0.50	0.38	-1.6	1.0	-0.48	0.38	-1.6	1.6
1530-1600	-1.00	0.71	-3.4	2.8	-0.83	0.55	-2.4	2.7	-0.77	0.50	-2.7	1.7	-0.55	0.40	-1.5	0.9	-0.42	0.36	-1.4	0.9	-0.40	0.38	-1.7	1.6
1600-1630	-0.94	0.71	-3.8	2.1	-0.77	0.50	-2.3	0.7	-0.71	0.47	-2.7	1.6	-0.50	0.37	-1.4	0.8	-0.28	0.37	-1.5	1.0	-0.25	0.37	-2.7	1.5
1630-1700	-0.87	0.67	-3.4	2.3	-0.69	0.50	-2.1	0.8	-0.58	0.48	-2.4	1.5	-0.34	0.36	-1.1	1.0	-0.09	0.40	-2.3	1.4	-0.03	0.38	-2.5	1.3
1700-1730	-0.77	0.66	-3.5	2.7	-0.60	0.48	-2.0	1.3	-0.45	0.45	-1.8	1.6	-0.15	0.37	-0.9	1.4	0.09	0.46	-2.4	2.2	0.13	0.45	-0.8	1.8
1730-1800	-0.67	0.65	-3.4	3.7	-0.50	0.45	-1.8	1.1	-0.28	0.44	-1.7	1.5	0.00	0.41	-0.7	1.3	0.21	0.53	-2.5	2.4	0.26	0.53	-0.7	2.0
1800-1830	-0.58	0.56	-2.8	1.3	-0.40	0.43	-1.6	3.1	-0.15	0.48	-1.4	2.1	0.11	0.47	-0.7	2.2	0.29	0.60	-2.6	3.6	0.34	0.60	-0.7	2.5
1830-1900	-0.46	0.52	-2.4	1.8	-0.32	0.38	-1.4	1.4	-0.06	0.55	-1.3	4.4	0.17	0.52	-1.7	2.0	0.37	0.70	-2.6	3.9	0.43	0.71	-0.8	3.3
1900-1930	-0.36	0.56	-2.4	2.6	-0.26	0.37	-1.3	1.6	0.02	0.60	-1.1	5.1	0.26	0.59	-1.5	2.7	0.46	0.77	-2.7	4.9	0.54	0.82	-0.8	4.9
1930-2000	-0.29	0.59	-2.2	4.9	-0.21	0.39	-1.3	2.2	0.08	0.61	-1.2	5.5	0.35	0.68	-1.9	3.3	0.54	0.84	-2.9	5.2	0.60	0.87	-0.7	4.2
2000-2030	-0.24	0.60	-2.0	5.0	-0.16	0.41	-1.2	2.6	0.15	0.62	-1.3	4.7	0.40	0.73	-2.1	3.2	0.60	0.92	-3.1	5.2	0.62	0.92	-0.8	4.7
2030-2100	-0.18	0.59	-1.9	2.6	-0.08	0.48	-1.2	4.1	0.23	0.65	-1.1	4.1	0.47	0.73	-2.2	3.4	0.69	0.96	-3.2	5.0	0.66	0.99	-0.9	4.8
2100-2130	-0.14	0.63	-1.9	2.7	-0.03	0.50	-1.2	3.3	0.29	0.69	-1.3	4.1	0.52	0.78	-2.1	3.6	0.77	1.02	-3.3	5.1	0.67	1.01	-1.0	4.9
2130-2200	-0.09	0.66	-1.9	3.0	0.03	0.50	-1.2	1.8	0.36	0.73	-1.3	4.5	0.60	0.86	-1.9	4.1	0.82	1.07	-3.3	5.4	0.73	1.07	-0.9	5.1
2200-2230	-0.04	0.69	-1.8	3.4	0.07	0.54	-1.2	2.7	0.40	0.79	-1.3	4.4	0.64	0.89	-2.0	3.9	0.82	1.08	-3.5	6.0	0.75	1.14	-0.9	5.6
2230-2300	0.00	0.74	-2.1	4.4	0.09	0.58	-1.1	2.8	0.45	0.84	-1.3	4.4	0.66	0.97	-2.1	4.3	0.79	1.07	-3.4	4.9	0.77	1.15	-1.0	5.6
2300-2330	0.05	0.74	-1.8	3.5	0.17	0.64	-1.2	2.7	0.50	0.90	-1.3	5.0	0.72	1.07	-1.9	4.8	0.83	1.11	-3.2	5.0	0.75	1.12	-0.9	5.8
2330-2400	0.09	0.79	-1.7	5.0	0.20	0.69	-1.2	3.4	0.54	0.91	-1.3	4.5	0.78	1.10	-2.0	4.7	0.87	1.18	-3.2	5.7	0.77	1.12	-1.2	5.5

Temperature gradients are in units of deg.c/40m Av. = average, s.d. = standard deviation, Ext. = extreme

Statistics of all temperature gradients
Table 11

Time	july				august				sept.				october				november				december			
(EST.)	Av.	s.d.	Ext. Low	Ext. High	Av.	s.d.	Ext. Low	Ext. High	Av.	s.d.	Ext. Low	Ext. High	Av.	s.d.	Ext. Low	Ext. High	Av.	s.d.	Ext. Low	Ext. High	Av.	s.d.	Ext. Low	Ext. High
0000-0030	0.92	1.27	-3.9	5.5	1.06	1.29	-1.0	5.9	0.82	1.18	-1.4	5.8	0.39	0.98	-2.0	5.4	0.29	0.99	-2.1	5.0	0.13	0.81	-2.4	5.2
0030-0100	0.93	1.28	-4.1	5.5	1.07	1.34	-1.0	5.8	0.84	1.15	-1.4	5.4	0.45	1.01	-2.0	5.0	0.31	0.98	-2.0	5.0	0.16	0.82	-2.3	5.0
0100-0130	0.91	1.28	-4.1	5.5	1.10	1.36	-1.0	5.4	0.82	1.15	-1.4	5.9	0.47	1.04	-2.0	5.0	0.34	1.00	-2.2	4.8	0.19	0.85	-2.5	5.2
0130-0200	0.92	1.27	-4.0	5.0	1.12	1.36	-1.0	5.8	0.84	1.16	-1.4	5.0	0.49	1.05	-2.1	4.9	0.37	1.00	-2.1	5.6	0.22	0.87	-2.5	5.0
0200-0230	0.90	1.24	-3.5	5.5	1.10	1.34	-1.2	5.3	0.80	1.13	-1.4	5.3	0.48	1.01	-1.9	5.1	0.39	1.02	-2.1	5.4	0.26	0.92	-2.7	5.0
0230-0300	0.91	1.25	-3.4	5.3	1.05	1.31	-1.3	5.8	0.79	1.12	-1.3	4.9	0.47	1.02	-1.9	5.3	0.43	1.05	-2.1	5.5	0.28	0.92	-2.6	5.0
0300-0330	0.94	1.30	-3.5	5.6	1.07	1.28	-1.3	5.9	0.82	1.11	-1.3	4.8	0.54	1.10	-1.8	5.6	0.43	1.01	-1.9	4.4	0.33	0.95	-2.8	5.5
0330-0400	0.92	1.25	-3.5	5.5	1.04	1.27	-0.9	5.9	0.84	1.10	-1.3	5.0	0.55	1.08	-1.9	5.3	0.44	1.01	-2.0	5.9	0.34	0.96	-2.6	5.3
0400-0430	0.91	1.27	-4.5	5.9	1.05	1.25	-1.2	5.1	0.85	1.07	-1.3	5.3	0.59	1.11	-1.9	4.8	0.44	1.03	-2.1	4.6	0.36	0.93	-2.5	5.1
0430-0500	0.92	1.21	-0.7	5.6	1.05	1.23	-1.2	5.0	0.91	1.13	-1.3	5.0	0.61	1.12	-1.9	5.4	0.45	1.04	-2.2	5.8	0.38	0.91	-2.7	5.6
0500-0530	0.94	1.22	-0.8	5.5	1.06	1.26	-1.1	5.2	0.89	1.10	-1.2	4.7	0.61	1.13	-1.9	4.2	0.38	1.01	-2.2	4.9	0.27	0.87	-2.7	3.9
0530-0600	0.97	1.21	-0.8	5.6	1.10	1.28	-1.1	5.6	0.88	1.06	-1.3	5.7	0.45	1.08	-1.9	5.0	0.08	0.89	-2.1	3.7	0.01	0.79	-3.2	3.9
0600-0630	0.95	1.18	-0.8	6.0	1.11	1.33	-1.2	5.5	0.80	1.04	-1.3	4.5	0.02	1.00	-2.6	4.0	-0.39	0.74	-2.6	3.1	-0.42	0.75	-3.4	3.9
0630-0700	0.95	1.19	-0.8	5.8	1.04	1.31	-1.0	5.2	0.42	0.93	-1.4	4.0	-0.46	0.89	-4.1	3.1	-0.67	0.67	-3.4	2.0	-0.69	0.79	-4.0	3.7
0700-0730	0.90	1.18	-0.9	5.0	0.78	1.23	-1.1	5.3	-0.08	0.83	-2.8	4.6	-0.74	0.86	-5.1	3.5	-0.82	0.70	-4.1	0.9	-0.82	0.84	-5.0	3.9
0730-0800	0.58	1.07	-0.9	5.3	0.26	1.03	-1.5	4.9	-0.48	0.68	-3.3	2.7	-0.90	0.84	-5.2	3.4	-0.90	0.76	-5.0	1.3	-0.90	0.90	-5.6	4.1
0800-0830	0.13	0.92	-1.4	4.2	-0.31	0.82	-3.1	4.5	-0.73	0.62	-3.5	1.7	-1.05	0.89	-5.4	2.7	-0.94	0.78	-5.0	1.5	-0.97	0.89	-5.0	0.7
0830-0900	-0.26	0.64	-1.7	2.8	-0.61	0.71	-4.5	3.4	-0.85	0.61	-3.5	1.6	-1.08	0.87	-5.4	1.2	-0.98	0.79	-5.0	1.3	-0.99	0.87	-5.0	0.4
0900-0930	-0.51	0.55	-2.0	1.8	-0.77	0.68	-4.0	3.4	-0.91	0.61	-4.5	0.8	-1.12	0.87	-5.2	1.2	-1.01	0.80	-4.8	1.4	-1.03	0.91	-5.0	0.6
0930-1000	-0.64	0.52	-2.4	1.5	-0.88	0.68	-3.8	3.4	-0.96	0.65	-5.2	0.8	-1.12	0.89	-5.5	0.9	-1.04	0.86	-5.0	0.7	-1.06	0.94	-5.0	1.1
1000-1030	-0.72	0.50	-2.3	1.3	-0.89	0.70	-3.5	3.9	-0.97	0.60	-3.8	0.6	-1.14	0.88	-5.6	0.7	-1.02	0.85	-5.0	1.0	-1.04	0.92	-5.0	0.8
1030-1100	-0.72	0.51	-3.1	1.8	-0.89	0.67	-3.5	3.6	-0.97	0.61	-4.9	0.7	-1.14	0.83	-4.6	0.8	-1.05	0.83	-5.5	0.9	-1.08	0.94	-5.0	0.9
1100-1130	-0.65	0.47	-2.5	2.6	-0.78	0.63	-3.5	3.6	-0.87	0.58	-4.0	0.8	-1.00	0.77	-4.3	0.8	-1.01	0.79	-5.0	0.9	-1.07	0.92	-5.0	1.1
1130-1200	-0.57	0.50	-1.6	3.8	-0.72	0.47	-2.3	1.8	-0.85	0.54	-3.3	0.7	-0.96	0.73	-3.4	1.7	-0.95	0.71	-3.4	0.8	-0.99	0.91	-5.0	0.9
1200-1230	-0.70	0.52	-3.1	4.1	-0.84	0.62	-3.5	2.9	-0.93	0.56	-4.0	0.7	-0.99	0.73	-3.4	1.5	-1.03	0.73	-3.4	0.5	-1.03	0.75	-4.1	0.5
1230-1300	-0.73	0.44	-3.4	0.7	-0.85	0.60	-3.4	3.0	-0.88	0.59	-3.4	1.0	-0.99	0.72	-3.4	1.5	-1.08	0.71	-3.4	0.9	-1.09	0.78	-5.0	1.0
1300-1330	-0.73	0.45	-2.9	1.8	-0.84	0.61	-3.4	3.0	-0.87	0.54	-2.8	0.8	-1.01	0.72	-3.4	1.4	-1.13	0.70	-3.5	1.6	-1.19	0.78	-4.1	0.9
1330-1400	-0.65	0.49	-2.9	4.3	-0.83	0.59	-3.5	2.7	-0.97	0.59	-4.5	0.6	-1.08	0.73	-3.4	1.4	-1.17	0.72	-3.4	2.9	-1.22	0.82	-4.0	1.3
1400-1430	-0.62	0.46	-2.9	2.9	-0.80	0.59	-3.1	2.7	-0.98	0.61	-3.4	0.9	-1.09	0.75	-4.0	1.5	-1.19	0.78	-4.1	4.0	-1.24	0.81	-4.5	0.9
1430-1500	-0.61	0.46	-2.9	2.6	-0.77	0.54	-2.9	2.1	-0.92	0.60	-3.8	1.1	-1.11	0.75	-3.7	2.5	-1.16	0.80	-4.0	5.3	-1.21	0.78	-4.1	0.8
1500-1530	-0.52	0.51	-2.9	4.8	-0.74	0.53	-2.7	2.3	-0.86	0.57	-2.9	0.9	-1.08	0.74	-3.4	2.7	-1.12	0.74	-4.0	3.1	-1.16	0.81	-4.0	1.8
1530-1600	-0.46	0.45	-2.8	3.2	-0.65	0.51	-2.3	2.1	-0.85	0.56	-2.9	0.6	-1.01	0.72	-3.2	2.1	-1.06	0.70	-4.0	2.0	-1.08	0.77	-4.0	1.7
1600-1630	-0.29	0.49	-2.3	4.4	-0.54	0.49	-2.3	2.9	-0.74	0.57	-2.8	1.7	-0.93	0.67	-3.1	0.9	-0.97	0.66	-3.4	1.3	-1.00	0.75	-3.9	1.6
1630-1700	-0.10	0.44	-1.9	2.7	-0.39	0.48	-2.1	3.0	-0.58	0.53	-2.4	1.7	-0.80	0.63	-2.8	0.7	-0.88	0.63	-3.5	1.5	-0.93	0.71	-3.8	1.1
1700-1730	0.09	0.49	-2.1	1.8	-0.17	0.49	-1.5	3.1	-0.42	0.49	-2.5	1.7	-0.67	0.61	-2.6	1.7	-0.78	0.62	-3.4	1.5	-0.83	0.68	-3.8	1.1
1730-1800	0.23	0.58	-2.1	3.0	0.01	0.51	-1.6	3.1	-0.23	0.46	-1.9	1.7	-0.52	0.59	-2.9	2.1	-0.66	0.60	-3.2	1.7	-0.72	0.66	-3.6	1.4
1800-1830	0.36	0.68	-2.2	5.2	0.12	0.53	-1.5	3.3	-0.10	0.49	-1.4	2.2	-0.39	0.57	-2.6	2.3	-0.54	0.55	-2.4	1.5	-0.62	0.62	-3.6	1.3
1830-1900	0.45	0.77	-2.3	4.7	0.22	0.58	-1.4	3.2	-0.03	0.53	-1.4	2.7	-0.30	0.58	-2.1	2.0	-0.44	0.55	-2.3	1.5	-0.49	0.66	-3.6	5.4
1900-1930	0.56	0.82	-2.4	3.6	0.33	0.65	-1.4	3.3	0.08	0.59	-1.4	3.5	-0.20	0.61	-2.0	2.3	-0.37	0.55	-2.1	1.5	-0.39	0.61	-3.6	5.6
1930-2000	0.65	0.90	-2.5	4.4	0.42	0.73	-1.4	3.6	0.17	0.65	-1.3	4.4	-0.13	0.63	-1.9	2.4	-0.29	0.57	-2.2	1.9	-0.32	0.60	-3.5	5.2
2000-2030	0.76	1.03	-1.1	4.9	0.53	0.81	-1.4	3.8	0.27	0.74	-1.4	4.7	-0.04	0.67	-2.0	2.6	-0.22	0.59	-2.2	1.6	-0.27	0.59	-3.4	2.5
2030-2100	0.83	1.07	-0.9	5.7	0.61	0.88	-1.3	4.2	0.35	0.77	-1.4	4.9	0.05	0.72	-2.1	2.6	-0.15	0.62	-2.2	2.7	-0.20	0.61	-3.4	2.3
2100-2130	0.88	1.12	-0.9	5.3	0.68	0.97	-1.2	5.1	0.43	0.79	-1.3	4.7	0.11	0.74	-2.1	2.9	-0.06	0.71	-2.2	3.7	-0.14	0.62	-3.1	2.6
2130-2200	0.91	1.16	-0.7	5.3	0.76	1.05	-1.0	5.3	0.51	0.85	-1.3	4.2	0.18	0.79	-2.2	3.3	0.03	0.81	-2.1	4.8	-0.08	0.62	-3.1	2.1
2200-2230	0.91	1.19	-1.5	5.1	0.83	1.11	-1.0	5.1	0.57	0.91	-1.3	4.5	0.23	0.84	-2.3	3.5	0.11	0.88	-2.1	4.0	-0.04	0.69	-2.7	3.9
2230-2300	0.89	1.22	-2.2	5.5	0.89	1.16	-1.3	5.0	0.63	1.02	-1.4	5.6	0.25	0.88	-2.4	3.3	0.15	0.91	-2.0	4.8	0.00	0.76	-2.5	5.6
2300-2330	0.90	1.19	-1.8	5.1	0.94	1.21	-1.0	5.8	0.71	1.10	-1.3	5.9	0.31	0.92	-2.6	4.3	0.20	0.91	-1.9	4.1	0.04	0.77	-2.4	5.4
2330-2400	0.90	1.22	-1.6	5.3	1.00	1.28	-1.3	5.9	0.75	1.12	-1.4	5.7	0.33	0.93	-2.7	4.6	0.27	0.97	-2.0	5.4	0.06	0.79	-2.5	5.2

Temperature gradients are in units of deg.c/40m Av. = average, s.d. = standard deviation, Ext. = extreme

Statistics of all temperature gradients
Table 11 contd.

Lucas Heights at 2m dates : 50491 to 121196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average		Extreme	
									Minimum	Maximum	Minimum	Maximum
January	18.6	18.1	20.4	23.4	24.5	22.9	20.6	19.4	17.1	26.0	11.8	37.2
	2.3	2.4	2.8	3.8	4.5	3.9	3.0	2.4	standard deviations			
	1752.	1751.	1751.	1786.	1784.	1787.	1779.	1776.	number of observations			
February	18.4	17.7	19.6	22.9	24.2	22.8	20.5	19.2	16.8	25.5	10.5	40.1
	2.4	2.5	2.6	3.5	4.1	3.6	2.7	2.3	standard deviations			
	1696.	1704.	1702.	1704.	1697.	1689.	1690.	1692.	number of observations			
March	16.8	16.0	17.8	21.2	22.3	21.2	18.8	17.6	15.1	23.4	7.8	32.0
	2.2	2.2	2.6	2.5	3.0	3.0	2.1	2.1	standard deviations			
	1709.	1705.	1736.	1733.	1739.	1740.	1737.	1721.	number of observations			
April	14.1	13.5	14.9	19.1	20.8	19.1	16.6	15.1	12.4	21.7	6.4	29.9
	2.3	2.4	2.6	2.4	2.9	2.9	2.2	2.2	standard deviations			
	1921.	1925.	1931.	1955.	1967.	1957.	1948.	1929.	number of observations			
May	12.6	12.1	12.9	16.8	18.4	16.9	14.5	13.3	10.9	19.3	6.0	28.0
	2.6	2.6	2.6	2.5	2.7	2.8	2.3	2.4	standard deviations			
	2050.	2059.	2064.	2054.	2040.	2052.	2052.	2051.	number of observations			
June	10.2	9.7	10.1	13.9	15.8	14.3	11.8	10.8	8.3	16.6	2.4	23.7
	2.6	2.7	2.8	2.3	2.2	2.4	2.3	2.5	standard deviations			
	2072.	2073.	2065.	2064.	2075.	2086.	2086.	2087.	number of observations			
July	8.9	8.4	8.8	13.0	15.2	13.9	11.1	9.7	6.8	16.0	1.8	21.9
	2.3	2.3	2.4	2.2	2.1	2.2	2.0	2.2	standard deviations			
	1811.	1812.	1813.	1821.	1810.	1806.	1792.	1790.	number of observations			
August	9.2	8.5	9.6	14.5	16.8	15.5	12.3	10.5	7.0	17.8	1.7	29.3
	2.9	2.9	3.1	3.2	3.6	3.7	3.1	3.0	standard deviations			
	2069.	2079.	2082.	2110.	2112.	2112.	2112.	2105.	number of observations			
September	10.9	10.1	12.1	16.5	18.3	16.6	13.6	12.0	8.6	19.5	2.9	30.2
	2.9	3.0	3.0	3.1	3.8	3.8	2.9	2.8	standard deviations			
	2156.	2159.	2154.	2159.	2159.	2159.	2159.	2153.	number of observations			
October	13.4	12.6	15.4	19.0	20.4	18.7	16.0	14.6	11.4	21.5	4.8	33.0
	2.8	2.8	2.8	3.6	4.3	4.2	3.3	2.8	standard deviations			
	2028.	2028.	2028.	2025.	2018.	2027.	2028.	2028.	number of observations			
November	14.7	14.1	17.1	20.5	21.4	19.8	17.2	15.9	13.0	22.9	6.9	36.2
	3.0	2.9	3.0	4.1	4.7	4.2	3.3	3.0	standard deviations			
	1932.	1932.	1925.	1928.	1920.	1918.	1920.	1920.	number of observations			
December	16.5	16.1	18.8	21.8	22.8	21.3	18.8	17.6	15.1	24.0	9.1	42.9
	2.7	2.7	2.7	4.0	4.6	4.2	3.1	2.6	standard deviations			
	1488.	1488.	1472.	1449.	1464.	1471.	1477.	1487.	number of observations			

Table 12

Lucas Heights at 10m dates : 50491 to 121196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	18.8	18.2	20.3	23.2	24.1	22.6	20.6	19.5	17.2	25.5	10.0	37.1
	2.4	2.3	2.8	3.8	4.4	3.9	3.1	2.6	standard deviations			
	1722.	1727.	1744.	1762.	1769.	1775.	1767.	1752.	number of observations			
February	18.5	17.9	19.5	22.5	23.7	22.5	20.4	19.3	17.0	24.9	10.6	40.9
	2.4	2.4	2.6	3.4	4.1	3.6	2.8	2.4	standard deviations			
	1687.	1692.	1690.	1703.	1701.	1702.	1701.	1695.	number of observations			
March	17.2	16.4	17.9	21.0	22.1	21.1	18.9	17.9	15.5	23.2	9.2	31.1
	2.0	2.0	2.4	2.3	2.8	2.8	2.0	1.9	standard deviations			
	1640.	1627.	1660.	1657.	1669.	1666.	1668.	1650.	number of observations			
April	14.6	13.9	15.0	18.8	20.4	19.0	16.7	15.5	12.9	21.4	6.0	29.7
	2.3	2.3	2.5	2.5	2.9	2.9	2.2	2.2	standard deviations			
	2005.	1996.	2002.	2028.	2027.	2028.	2021.	2021.	number of observations			
May	13.0	12.5	13.0	16.5	18.1	16.9	14.8	13.7	11.4	19.0	6.6	27.5
	2.4	2.3	2.4	2.4	2.6	2.7	2.3	2.2	standard deviations			
	2064.	2064.	2064.	2055.	2047.	2045.	2047.	2051.	number of observations			
June	10.6	10.0	10.3	13.6	15.4	14.3	12.2	11.1	8.8	16.3	2.6	23.5
	2.4	2.5	2.6	2.3	2.2	2.3	2.2	2.3	standard deviations			
	2074.	2076.	2074.	2076.	2076.	2086.	2086.	2088.	number of observations			
July	9.3	8.7	9.0	12.6	14.8	13.8	11.4	10.1	7.4	15.6	2.0	21.6
	2.2	2.2	2.3	2.2	2.1	2.2	2.0	2.1	standard deviations			
	1813.	1811.	1812.	1821.	1810.	1806.	1793.	1790.	number of observations			
August	9.8	9.0	9.7	14.1	16.4	15.3	12.6	11.0	7.7	17.4	2.9	28.5
	2.8	2.8	2.9	3.2	3.6	3.7	3.1	3.0	standard deviations			
	2084.	2088.	2082.	2110.	2112.	2112.	2112.	2109.	number of observations			
September	11.3	10.6	12.0	16.0	17.9	16.4	13.7	12.3	9.2	19.0	3.3	29.8
	2.8	2.8	2.8	3.1	3.7	3.8	3.0	2.8	standard deviations			
	2160.	2160.	2159.	2159.	2160.	2159.	2159.	2160.	number of observations			
October	13.7	12.9	15.2	18.6	20.0	18.4	16.0	14.7	11.7	21.1	5.2	33.0
	2.8	2.7	2.8	3.6	4.3	4.2	3.4	2.9	standard deviations			
	2028.	2028.	2028.	2025.	2019.	2027.	2027.	2028.	number of observations			
November	14.9	14.3	16.9	20.1	21.0	19.5	17.2	16.0	13.3	22.5	7.4	35.6
	2.9	2.8	3.0	4.1	4.6	4.2	3.3	3.0	standard deviations			
	1931.	1932.	1929.	1927.	1918.	1905.	1913.	1920.	number of observations			
December	16.7	16.2	18.6	21.5	22.2	21.0	18.9	17.7	15.3	23.6	8.9	42.1
	2.7	2.5	2.7	3.9	4.5	4.1	3.1	2.6	standard deviations			
	1596.	1594.	1583.	1566.	1575.	1580.	1577.	1583.	number of observations			

Table 13

Lucas Heights at 49m dates : 50491 to 121196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	19.0	18.6	19.7	22.2	22.9	21.7	20.2	19.5	17.5	24.5	13.1	35.8
	2.5	2.4	2.6	3.6	4.2	3.7	3.1	2.8	standard deviations			
	1750.	1752.	1757.	1786.	1784.	1786.	1779.	1776.	number of observations			
February	18.8	18.3	19.0	21.6	22.7	21.7	20.1	19.4	17.3	23.9	11.2	39.8
	2.2	2.2	2.3	3.3	3.9	3.5	2.8	2.3	standard deviations			
	1701.	1704.	1702.	1704.	1702.	1702.	1699.	1704.	number of observations			
March	17.6	17.0	17.7	20.0	21.0	20.2	18.7	18.2	16.2	22.0	9.6	30.4
	2.0	2.0	2.2	2.3	2.8	2.8	2.1	2.0	standard deviations			
	1706.	1705.	1736.	1731.	1737.	1740.	1737.	1717.	number of observations			
April	15.6	15.0	15.2	17.9	19.5	18.4	16.9	16.2	13.9	20.5	7.4	28.8
	2.3	2.3	2.2	2.4	2.9	2.8	2.2	2.3	standard deviations			
	1992.	1983.	1989.	2010.	2015.	2016.	2009.	2009.	number of observations			
May	14.1	13.5	13.5	15.7	17.3	16.6	15.3	14.6	12.4	18.2	7.3	26.7
	2.2	2.2	2.2	2.3	2.5	2.7	2.3	2.2	standard deviations			
	2064.	2064.	2064.	2055.	2052.	2052.	2051.	2052.	number of observations			
June	11.4	10.9	10.8	13.0	14.7	14.2	12.8	12.0	9.7	15.6	3.5	22.6
	2.4	2.5	2.5	2.3	2.1	2.3	2.3	2.3	standard deviations			
	2060.	2052.	2050.	2047.	2064.	2074.	2074.	2076.	number of observations			
July	10.4	9.8	9.7	12.0	14.1	13.6	12.0	11.1	8.6	14.9	3.9	20.9
	2.1	2.2	2.2	2.2	2.0	2.1	2.0	2.0	standard deviations			
	1813.	1812.	1813.	1821.	1810.	1806.	1793.	1790.	number of observations			
August	10.8	10.0	10.0	13.2	15.5	14.9	13.1	11.9	8.8	16.6	3.4	27.5
	3.0	2.8	2.8	3.1	3.5	3.6	3.3	3.2	standard deviations			
	2084.	2088.	2080.	2110.	2111.	2112.	2112.	2109.	number of observations			
September	12.2	11.5	11.9	15.1	16.9	15.8	13.9	13.0	10.1	18.1	3.4	29.3
	2.9	2.8	2.7	3.1	3.7	3.8	3.2	3.0	standard deviations			
	2159.	2160.	2151.	2153.	2160.	2159.	2159.	2154.	number of observations			
October	14.4	13.7	14.8	17.7	18.9	17.7	16.0	15.2	12.4	20.2	5.1	31.9
	2.9	2.7	2.7	3.5	4.2	4.2	3.6	3.1	standard deviations			
	2027.	2028.	2025.	2025.	2019.	2027.	2027.	2028.	number of observations			
November	15.3	14.9	16.2	19.0	19.9	18.8	17.1	16.2	13.6	21.4	8.0	34.3
	2.9	3.0	3.1	3.9	4.5	4.2	3.6	3.2	standard deviations			
	1716.	1704.	1696.	1696.	1704.	1699.	1704.	1697.	number of observations			
December	17.0	16.4	17.9	20.5	21.2	20.1	18.5	17.7	15.6	22.6	9.3	41.0
	2.8	2.4	2.6	3.8	4.3	4.0	3.2	2.8	standard deviations			
	1595.	1594.	1583.	1568.	1568.	1579.	1583.	1583.	number of observations			

Table 14

LH Comm School at 15.65m dates : 20493 to 121196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	19.2	18.6	20.3	23.3	24.2	22.8	21.2	20.1	17.6	25.5	13.4	36.3
	2.3	2.1	2.5	3.6	4.1	3.7	3.1	2.6	standard deviations			
	1020.	1020.	1020.	1029.	1032.	1032.	1032.	1032.	number of observations			
February	18.6	18.0	19.4	22.5	23.4	22.3	20.5	19.3	17.1	24.5	10.2	35.0
	2.2	2.2	2.4	3.2	3.5	3.1	2.6	2.2	standard deviations			
	1020.	1020.	1020.	1020.	1020.	1020.	1020.	1020.	number of observations			
March	17.0	16.2	17.5	20.6	21.5	20.7	18.8	17.8	15.3	22.7	9.1	30.9
	2.1	2.1	2.4	2.4	3.0	3.1	2.2	2.1	standard deviations			
	1116.	1116.	1116.	1116.	1116.	1116.	1116.	1116.	number of observations			
April	14.9	14.1	14.7	18.6	20.4	19.1	17.0	15.8	12.9	21.4	5.2	29.2
	2.3	2.3	2.3	2.5	3.0	2.9	2.2	2.3	standard deviations			
	1344.	1344.	1344.	1350.	1347.	1356.	1356.	1355.	number of observations			
May	13.4	12.8	12.8	16.4	18.2	17.2	15.2	14.1	11.3	19.0	6.5	27.6
	2.4	2.4	2.6	2.4	2.6	2.8	2.5	2.4	standard deviations			
	1392.	1381.	1383.	1390.	1365.	1392.	1381.	1382.	number of observations			
June	10.4	9.8	9.8	13.3	15.3	14.2	12.2	11.1	8.5	16.0	4.6	21.1
	2.1	2.0	2.2	2.2	2.2	2.3	2.1	2.1	standard deviations			
	1320.	1325.	1331.	1320.	1319.	1319.	1315.	1325.	number of observations			
July	9.6	8.9	8.8	12.6	14.8	13.9	11.6	10.3	7.4	15.6	1.4	21.0
	2.2	2.2	2.3	2.3	2.0	2.1	2.0	2.1	standard deviations			
	1488.	1488.	1488.	1486.	1486.	1488.	1488.	1488.	number of observations			
August	10.4	9.5	9.8	14.4	16.8	15.8	13.2	11.7	8.1	17.8	2.7	28.3
	3.0	2.9	3.1	3.4	3.8	3.9	3.4	3.3	standard deviations			
	1488.	1487.	1480.	1488.	1488.	1488.	1484.	1488.	number of observations			
September	11.9	11.0	12.1	16.1	17.9	16.6	14.1	12.8	9.5	19.1	3.5	29.8
	3.0	3.0	2.9	3.3	4.1	4.0	3.2	3.0	standard deviations			
	1440.	1440.	1440.	1440.	1439.	1440.	1440.	1440.	number of observations			
October	13.8	12.9	14.9	18.4	19.7	18.4	16.2	14.8	11.7	21.1	5.3	33.8
	2.6	2.5	2.7	3.6	4.4	4.2	3.4	2.8	standard deviations			
	1428.	1428.	1428.	1428.	1428.	1439.	1435.	1428.	number of observations			
November	15.4	14.8	17.1	20.2	21.0	19.7	17.6	16.5	13.6	22.6	7.1	35.2
	2.9	3.0	3.1	4.1	4.7	4.4	3.4	3.0	standard deviations			
	1224.	1224.	1221.	1218.	1224.	1224.	1224.	1224.	number of observations			
December	17.5	16.8	19.1	22.1	23.0	21.9	19.7	18.5	15.9	24.6	9.8	41.9
	2.8	2.6	2.7	4.1	4.8	4.5	3.3	2.8	standard deviations			
	888.	888.	888.	887.	888.	887.	876.	876.	number of observations			

Table15

Boys Town School at 18.45m dates : 20493 to 271196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	18.9	18.3	19.7	22.5	23.3	22.1	20.6	19.7	17.4	24.6	13.3	36.2
	2.4	2.1	2.4	3.5	4.0	3.7	3.2	2.7	standard deviations			
	1116.	1116.	1116.	1116.	1116.	1116.	1116.	1116.	number of observations			
February	18.3	17.8	19.0	21.9	22.9	21.8	20.1	19.0	17.0	23.9	11.5	34.8
	2.1	2.1	2.4	3.2	3.4	3.1	2.6	2.2	standard deviations			
	1020.	1020.	1020.	1018.	1020.	1020.	1020.	1020.	number of observations			
March	16.9	16.2	17.2	20.0	21.0	20.3	18.5	17.6	15.3	22.1	9.4	30.2
	2.1	2.0	2.3	2.3	2.9	3.0	2.2	2.1	standard deviations			
	1116.	1116.	1116.	1116.	1111.	1116.	1116.	1116.	number of observations			
April	14.8	14.2	14.6	18.1	20.0	18.8	16.8	15.8	13.2	20.9	6.8	29.5
	2.7	2.6	2.6	2.8	3.1	3.0	2.4	2.4	standard deviations			
	1428.	1428.	1428.	1428.	1428.	1428.	1428.	1428.	number of observations			
May	13.3	12.8	12.8	15.9	17.6	16.8	15.0	14.0	11.6	18.4	7.7	26.7
	2.4	2.3	2.4	2.3	2.6	2.8	2.5	2.3	standard deviations			
	1413.	1395.	1402.	1397.	1393.	1404.	1394.	1395.	number of observations			
June	10.4	9.9	9.8	12.9	14.7	13.8	12.0	11.0	8.8	15.4	5.4	20.3
	2.1	2.1	2.2	2.1	2.2	2.3	2.1	2.1	standard deviations			
	1295.	1294.	1297.	1309.	1317.	1316.	1308.	1311.	number of observations			
July	9.6	8.9	8.9	12.1	14.2	13.5	11.5	10.3	7.8	14.9	3.0	20.6
	2.1	2.2	2.2	2.1	1.9	2.1	1.9	2.1	standard deviations			
	1488.	1488.	1488.	1488.	1488.	1488.	1488.	1488.	number of observations			
August	10.5	9.6	9.7	13.8	16.1	15.3	13.0	11.7	8.4	17.1	3.2	27.7
	3.1	3.0	3.0	3.4	3.7	3.8	3.4	3.2	standard deviations			
	1476.	1476.	1476.	1476.	1486.	1487.	1476.	1475.	number of observations			
September	11.8	11.1	11.8	15.4	17.2	16.0	13.8	12.6	9.6	18.4	3.2	29.3
	3.2	3.0	2.9	3.3	4.1	4.0	3.3	3.2	standard deviations			
	1368.	1368.	1363.	1369.	1376.	1380.	1375.	1368.	number of observations			
October	13.7	12.9	14.5	17.7	19.0	17.8	15.7	14.6	11.7	20.4	7.3	33.2
	2.6	2.5	2.6	3.5	4.2	4.1	3.3	2.8	standard deviations			
	1332.	1332.	1332.	1324.	1322.	1332.	1332.	1332.	number of observations			
November	15.2	14.6	16.6	19.7	20.5	19.2	17.3	16.2	13.4	22.0	7.2	35.1
	3.2	3.2	3.2	4.4	4.9	4.5	3.8	3.3	standard deviations			
	1392.	1392.	1392.	1398.	1393.	1392.	1392.	1392.	number of observations			
December	16.9	16.3	18.2	21.1	21.9	20.8	18.9	17.9	15.5	23.2	9.0	41.2
	2.9	2.7	2.8	3.9	4.5	4.2	3.3	2.9	standard deviations			
	1116.	1116.	1116.	1116.	1116.	1116.	1116.	1116.	number of observations			

Table16

Shackles Estate at 10m dates : 50693 to 121196

Dry Bulb Temperature (deg.c)

Time (EST.)

Month	0000-0300	0300-0600	0600-0900	0900-1200	1200-1500	1500-1800	1800-2100	2100-2400	Average Minimum	Average Maximum	Extreme Minimum	Extreme Maximum
January	18.6	17.8	20.8	24.3	25.0	23.7	21.6	19.6	17.0	26.1	12.0	37.6
	2.2	2.4	2.9	3.5	4.0	3.7	2.8	2.2	standard deviations			
	1116.	1116.	1116.	1116.	1110.	1116.	1116.	1116.	number of observations			
February	17.9	17.0	19.6	23.6	24.5	23.3	20.9	19.0	16.2	25.4	9.3	36.4
	2.7	2.8	3.1	3.1	3.3	3.0	2.7	2.5	standard deviations			
	1020.	1020.	1020.	1020.	1020.	1020.	1020.	1020.	number of observations			
March	16.0	15.2	17.1	21.8	22.6	21.5	18.4	16.7	14.2	23.7	7.1	30.9
	2.6	2.8	3.1	2.4	2.8	2.7	2.2	2.3	standard deviations			
	1116.	1116.	1116.	1116.	1116.	1116.	1116.	1116.	number of observations			
April	12.4	11.4	13.1	19.6	21.3	19.3	15.3	13.6	10.4	22.1	3.2	28.1
	2.6	2.6	3.0	2.5	2.9	2.7	2.5	2.6	standard deviations			
	1080.	1080.	1080.	1080.	1080.	1080.	1080.	1080.	number of observations			
May	11.1	10.7	11.3	17.3	19.1	16.2	13.1	11.9	9.4	19.9	3.2	27.1
	3.5	3.7	3.8	2.7	2.5	2.9	3.1	3.3	standard deviations			
	996.	1000.	1008.	1003.	988.	996.	996.	984.	number of observations			
June	7.4	6.7	7.2	14.0	16.3	13.0	9.4	8.1	5.4	16.9	0.9	22.6
	3.0	3.1	3.3	2.6	2.0	2.6	2.7	2.9	standard deviations			
	1141.	1140.	1139.	1140.	1152.	1164.	1164.	1162.	number of observations			
July	6.1	5.4	6.1	13.1	15.5	12.5	8.4	7.0	4.1	16.2	0.1	20.9
	2.8	2.8	3.2	2.6	1.9	2.5	2.4	2.6	standard deviations			
	1488.	1488.	1488.	1481.	1488.	1488.	1488.	1488.	number of observations			
August	6.2	5.3	6.8	14.7	17.0	14.6	9.4	7.8	4.1	17.6	0.5	29.3
	3.0	3.0	3.8	3.0	3.2	3.4	2.8	3.2	standard deviations			
	1284.	1279.	1272.	1274.	1284.	1284.	1284.	1284.	number of observations			
September	9.1	8.3	11.1	17.3	18.9	17.1	12.5	10.4	7.0	19.9	2.0	30.3
	3.0	3.3	3.8	3.2	3.9	3.7	2.7	2.7	standard deviations			
	1440.	1440.	1440.	1438.	1440.	1440.	1440.	1440.	number of observations			
October	12.1	11.2	15.0	19.6	20.7	19.2	15.4	13.4	10.0	21.8	4.5	34.7
	2.9	3.2	3.4	3.4	4.1	3.9	2.8	2.8	standard deviations			
	1476.	1474.	1464.	1469.	1476.	1476.	1476.	1476.	number of observations			
November	14.4	13.5	17.6	21.3	22.1	20.6	17.7	15.7	12.5	23.5	5.6	35.9
	3.1	3.4	3.3	4.0	4.6	4.2	3.0	2.8	standard deviations			
	1224.	1224.	1224.	1224.	1223.	1224.	1224.	1224.	number of observations			
December	16.6	15.8	19.6	22.9	23.6	22.3	19.9	17.9	15.0	24.8	8.5	43.1
	3.0	3.1	3.1	4.0	4.5	4.1	3.1	2.8	standard deviations			
	1116.	1116.	1116.	1104.	1109.	1116.	1116.	1116.	number of observations			

Table 17

Frequencies (%) of Pasquill stability categories -

Comparison of different categorisation methods

dates : 50491 to 121196

Stability categorisation scheme : Using Golder(1972) with Irwin/Binkowski(1981),Wang(1981)

	A	B	C	D	E	F	G	bad data	total
Frequency	3.05	23.78	26.51	19.89	9.15	4.38	13.24	16189	180515.

Stability categorisation scheme : Using Golder(1972) with Byun(1990), Bulk Richardson No.

	A	B	C	D	E	F	G	bad data	total
Frequency	0.73	15.04	30.15	26.57	9.35	4.68	13.47	16189	180515.

Stability categorisation scheme : Smith(1972)

	A	B	C	D	E	F	G	bad data	total
Frequency	39.06	1.17	0.79	27.35	31.23	0.23	0.17	52375	144329.

Stability categorisation scheme : Mitchell & Timbre (1979),sigy10m

	A	B	C	D	E	F	G	bad data	total
Frequency	23.35	11.33	26.67	31.11	6.43	0.66	0.46	12881	183823.

Stability categorisation scheme : Mitchell & Timbre (1979),sigz10m

	A	B	C	D	E	F	G	bad data	total
Frequency	13.76	6.92	12.72	38.18	14.87	4.64	8.90	12881	183823.

Stability categorisation scheme : Mitchell & Timbre (1979),sigy49m

	A	B	C	D	E	F	G	bad data	total
Frequency	12.73	3.87	10.06	29.93	28.17	11.33	3.92	12930	183774.

Stability categorisation scheme : Mitchell & Timbre (1979),sigz49m

	A	B	C	D	E	F	G	bad data	total
Frequency	8.61	2.75	7.19	34.00	29.89	12.24	5.31	12930	183774.

Table 18

Golder (1972) and Irwin/Binkowski(1981),Wang(1981) vs. Byun(1990), Bulk Richardson No.

	Byun(1990), Bulk Richardson No.							
Irwin et al	A	B	C	D	E	F	G	Total
A	0.73	1.02	0.00	0.00	0.00	0.00	1.31	3.05
B	0.00	14.02	9.76	0.00	0.00	0.00	0.00	23.78
C	0.00	0.00	20.39	6.12	0.00	0.00	0.00	26.51
D	0.00	0.00	0.00	19.89	0.00	0.00	0.00	19.89
E	0.00	0.00	0.00	0.56	8.59	0.00	0.00	9.15
F	0.00	0.00	0.00	0.00	0.77	3.61	0.00	4.38
G	0.00	0.00	0.00	0.00	0.00	1.07	12.17	13.24
total	0.73	15.04	30.15	26.57	9.35	4.68	13.47	100.
								180515.

no data observed on 16189 (15 minute) occasions

Golder (1972) and Irwin/Binkowski(1981),Wang(1981) vs. Smith(1972)

	Smith(1972)							
Irwin et al	A	B	C	D	E	F	G	Total
A	0.68	0.03	0.03	1.53	1.01	0.00	0.00	3.29
B	14.00	0.26	0.19	6.60	6.14	0.09	0.09	27.37
C	16.28	0.34	0.21	4.87	5.16	0.05	0.05	26.95
D	5.89	0.34	0.21	5.85	4.30	0.02	0.01	16.62
E	1.17	0.09	0.06	2.55	5.22	0.05	0.00	9.15
F	0.33	0.03	0.02	1.33	2.42	0.02	0.00	4.16
G	0.70	0.07	0.07	4.61	6.98	0.00	0.01	12.46
total	39.06	1.17	0.79	27.35	31.23	0.23	0.17	100.
								144329.

no data observed on 52375 (15 minute) occasions

Golder (1972) and Irwin/Binkowski(1981),Wang(1981) vs. Mitchell & Timbre (1979),sigz10m

	Mitchell & Timbre (1979),sigz10m							
Irwin et al	A	B	C	D	E	F	G	Total
A	0.42	0.05	0.04	0.52	0.77	0.37	0.88	3.05
B	6.76	2.16	2.56	6.09	3.30	1.06	1.84	23.77
C	4.58	3.30	6.31	9.85	1.59	0.38	0.47	26.49
D	1.25	1.12	3.36	12.00	1.49	0.30	0.38	19.90
E	0.39	0.18	0.29	4.93	2.08	0.56	0.72	9.16
F	0.12	0.04	0.05	1.63	1.38	0.41	0.76	4.38
G	0.24	0.06	0.09	3.27	4.29	1.56	3.74	13.25
total	13.77	6.90	12.71	38.29	14.89	4.64	8.79	100.
								180383.

no data observed on 16321 (15 minute) occasions

dates : 50491 to 121196

Table 19

Mitchell & Timbre (1979),sigy10m vs. Mitchell & Timbre (1979),sigz10m

	Mitchell & Timbre (1979),sigz10m							
Sigy10m	A	B	C	D	E	F	G	Total
A	13.76	0.00	0.00	0.24	0.36	0.54	8.45	23.35
B	0.00	6.92	0.00	0.51	0.45	3.44	0.00	11.33
C	0.00	0.00	12.72	6.32	7.63	0.00	0.00	26.67
D	0.00	0.00	0.00	31.11	0.00	0.00	0.00	31.11
E	0.00	0.00	0.00	0.00	6.43	0.00	0.00	6.43
F	0.00	0.00	0.00	0.00	0.00	0.66	0.00	0.66
G	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.46
total	13.76	6.92	12.72	38.18	14.87	4.64	8.90	100.
								183823.

no data observed on 12881 (15 minute) occasions

Mitchell & Timbre (1979),sigy10m vs. Mitchell & Timbre (1979),sigy49m

	Mitchell & Timbre (1979),sigy49m							
Sigy10m	A	B	C	D	E	F	G	Total
A	10.83	2.69	3.11	2.62	2.48	1.26	0.37	23.36
B	0.42	0.62	4.08	4.22	1.37	0.47	0.14	11.33
C	0.43	0.24	2.21	16.24	5.95	1.29	0.35	26.70
D	0.58	0.17	0.44	6.26	16.41	5.71	1.58	31.16
E	0.32	0.10	0.15	0.44	1.73	2.37	1.26	6.36
F	0.06	0.02	0.02	0.07	0.17	0.18	0.13	0.64
G	0.08	0.02	0.03	0.06	0.09	0.07	0.10	0.45
total	12.72	3.86	10.03	29.91	28.19	11.35	3.93	100.
								183134.

no data observed on 13570 (15 minute) occasions

Mitchell & Timbre (1979),sigz10m vs. Mitchell & Timbre (1979),sigz49m

	Mitchell & Timbre (1979),sigz49m							
Sigz10m	A	B	C	D	E	F	G	Total
A	8.23	2.09	2.12	0.95	0.31	0.04	0.02	13.76
B	0.18	0.49	3.35	2.67	0.20	0.02	0.01	6.93
C	0.10	0.12	1.60	9.42	1.41	0.05	0.02	12.74
D	0.06	0.03	0.09	11.99	18.27	5.98	1.80	38.22
E	0.01	0.00	0.00	3.91	5.28	3.75	1.85	14.81
F	0.00	0.00	0.00	1.84	1.58	0.78	0.42	4.63
G	0.02	0.01	0.00	3.20	2.86	1.63	1.20	8.92
total	8.60	2.74	7.18	33.98	29.92	12.26	5.32	100.
								183134.

no data observed on 13570 (15 minute) occasions

dates : 50491 to 121196

Table 19

Mitchell & Timbre (1979),sigy49m vs. Mitchell & Timbre (1979),sigz49m

	Mitchell & Timbre (1979),sigz49m							
Sigz49m	A	B	C	D	E	F	G	Total
A	8.61	0.00	0.00	1.68	0.61	0.44	1.39	12.73
B	0.00	2.75	0.00	0.49	0.15	0.48	0.00	3.87
C	0.00	0.00	7.19	1.90	0.96	0.00	0.00	10.06
D	0.00	0.00	0.00	29.93	0.00	0.00	0.00	29.93
E	0.00	0.00	0.00	0.00	28.17	0.00	0.00	28.17
F	0.00	0.00	0.00	0.00	0.00	11.33	0.00	11.33
G	0.00	0.00	0.00	0.00	0.00	0.00	3.92	3.92
total	8.61	2.75	7.19	34.00	29.89	12.24	5.31	100.
								183774.

no data observed on 12930 (15 minute) occasions

dates : 50491 to 121196

Table 19

Frequencies (%) of Pasquill Stability Categories - Mitchell and Timbre (1979)

Beginning Date : 40693 End Date : 121196

Night

Station	Sigmay							Sigmaz						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G
lh10m	15.88	7.89	24.04	39.83	10.55	1.10	0.71	0.00	0.00	0.00	52.26	24.88	8.02	14.84
lh49m	7.64	1.99	4.95	24.49	37.30	17.87	5.76	0.00	0.00	0.00	32.11	40.23	19.49	8.18
cs15.7m	12.70	4.60	11.51	35.41	27.71	6.29	1.76	0.00	0.00	0.00	42.88	35.52	11.02	10.59
bt18.5m	15.47	5.02	14.44	39.83	22.31	2.33	0.59	0.00	0.00	0.00	51.27	31.29	7.57	9.87
se10m	43.33	10.28	16.37	17.05	8.70	2.24	2.02	0.00	0.00	0.00	17.84	25.45	13.62	43.09

Day

Station	Sigmay							Sigmaz						
	A	B	C	D	E	F	G	A	B	C	D	E	F	G
lh10m	34.16	17.04	31.12	16.87	0.67	0.03	0.12	34.16	17.04	31.12	16.87	0.67	0.03	0.12
lh49m	21.44	6.62	17.26	38.20	14.35	1.60	0.53	21.44	6.62	17.26	38.20	14.35	1.60	0.53
cs15.7m	25.91	9.52	23.95	34.45	5.60	0.39	0.19	25.91	9.52	23.95	34.45	5.60	0.39	0.19
bt18.5m	29.44	11.65	28.21	27.35	2.94	0.19	0.22	29.44	11.65	28.21	27.35	2.94	0.19	0.22
se10m	83.07	8.38	4.61	2.49	0.92	0.26	0.27	83.07	8.38	4.61	2.49	0.92	0.26	0.27

Table 20

BUREAU OF METEOROLOGY
National Climate Centre
TEL: (03) 669 4082 FAX: (03) 6694516

BUREAU OF METEOROLOGY REPORT OF MONTHLY AND YEARLY RAINFALL BY N C C 21/ 5/93 PAGE 6975

STATION : 066078 LUCAS HEIGHTS (ANSTO) - DENOTES MISSING OBSERVATION 34 03 S, 150 59 E 140.0 M ELEV

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTALS
1958	RAINFALL (MM)	-	-	-	66.6	7.6	140.8	25.9	54.3	22.2	28.8	18.6	55.9	-
	NO OF RAINDAYS				9	5	13	4	8	6	7	4	13	-
1959	RAINFALL (MM)	104.8	126.5	186.3	42.2	9.0	42.9	141.1	42.8	40.2	196.3	129.2	123.1	1184.4
	NO OF RAINDAYS	13	9	16	9	5	13	8	7	8	17	14	9	128
1960	RAINFALL (MM)	55.2	83.3	53.7	27.2	137.0	47.2	60.1	34.1	50.2	173.9	62.0	273.1	1057.0
	NO OF RAINDAYS	12	15	12	8	10	14	9	8	15	11	7	14	135
1961	RAINFALL (MM)	75.9	58.9	53.3	87.1	13.3	70.8	37.2	208.2	34.1	39.8	432.2	170.0	1280.8
	NO OF RAINDAYS	8	12	10	14	7	9	6	11	11	10	17	13	128
1962	RAINFALL (MM)	159.5	134.2	45.7	56.1	270.3	2.3	60.5	95.8	71.4	18.4	15.6	168.5	1098.3
	NO OF RAINDAYS	17	14	9	12	12	2	9	14	10	8	7	19	133
1963	RAINFALL (MM)	200.0	65.5	282.5	195.7	169.8	229.3	29.2	247.5	62.0	46.7	40.6	234.7	1804.0
	NO OF RAINDAYS	14	8	24	13	14	15	7	15	7	11	11	17	156
1964	RAINFALL (MM)	9.7	27.4	107.1	169.0	16.3	401.4	5.4	35.6	26.9	86.2	52.1	24.6	961.7
	NO OF RAINDAYS	4	9	10	12	7	10	4	8	8	11	7	5	95
1965	RAINFALL (MM)	10.3	12.2	10.4	125.8	32.0	93.2	363.7	11.5	49.4	148.5	8.1	33.9	899.0
	NO OF RAINDAYS	10	9	4	8	6	11	7	8	10	11	5	12	101
1966	RAINFALL (MM)	20.4	80.3	83.2	85.0	18.3	102.6	18.3	67.0	56.7	52.8	190.9	84.7	860.2
	NO OF RAINDAYS	7	11	14	6	4	7	5	10	10	12	13	10	109
1967	RAINFALL (MM)	173.0	81.7	92.9	41.7	16.6	197.0	18.3	215.0	102.6	58.3	74.0	18.4	1089.5
	NO OF RAINDAYS	10	11	12	11	5	22	6	13	7	11	6	7	121
1968	RAINFALL (MM)	132.3	17.7	87.4	12.5	114.1	12.5	58.8	21.7	4.1	-	-	-	-
	NO OF RAINDAYS	13	7	12	4	10	4	7	9	1	-	-	-	-
1969	RAINFALL (MM)	-	-	63.0	217.3	41.5	84.6	22.3	133.4	90.1	48.6	270.7	32.8	-
	NO OF RAINDAYS	-	-	11	5	12	13	9	12	11	15	16	6	-
1970	RAINFALL (MM)	136.2	22.4	91.3	46.2	21.5	33.5	0.3	25.5	118.9	24.9	81.7	261.3	863.7
	NO OF RAINDAYS	17	9	14	7	7	9	1	11	14	7	14	13	123
1971	RAINFALL (MM)	67.2	171.7	74.5	30.0	48.3	15.5	13.8	65.8	33.8	3.0	71.5	150.9	746.0
	NO OF RAINDAYS	14	17	11	10	11	7	7	7	5	6	13	14	118
1972	RAINFALL (MM)	255.7	74.2	145.0	102.7	53.8	63.7	0.8	45.8	15.0	211.3	59.7	42.3	1070.0
	NO OF RAINDAYS	19	17	13	8	12	12	2	11	4	15	13	7	133
1973	RAINFALL (MM)	168.3	259.3	36.6	81.1	17.0	55.5	106.6	58.2	26.8	88.0	126.5	48.2	1072.1
	NO OF RAINDAYS	8	20	12	8	2	14	15	8	8	15	15	13	138
1974	RAINFALL (MM)	270.7	119.9	270.3	161.9	234.9	155.8	6.3	190.9	57.3	73.3	102.1	14.8	1658.2
	NO OF RAINDAYS	17	9	14	17	12	12	4	10	12	14	16	4	141
1975	RAINFALL (MM)	34.3	128.7	292.8	109.6	7.6	267.1	198.1	18.0	34.4	101.2	48.4	15.2	1255.4
	NO OF RAINDAYS	6	13	16	11	5	13	8	10	12	14	8	13	129
1976	RAINFALL (MM)	258.9	115.3	252.5	29.8	34.9	113.4	98.8	9.7	49.8	213.7	121.8	22.0	1320.6
	NO OF RAINDAYS	16	18	17	9	8	11	10	6	10	21	15	5	146
1977	RAINFALL (MM)	57.9	238.0	209.3	29.5	108.6	86.3	0.7	16.6	46.8	6.0	23.6	34.7	858.0
	NO OF RAINDAYS	10	14	12	5	11	8	1	2	12	5	8	8	96
1978	RAINFALL (MM)	250.9	22.5	329.5	86.5	76.3	449.7	17.0	15.2	68.7	50.9	94.2	121.1	1582.5
	NO OF RAINDAYS	15	7	15	8	10	14	4	7	14	10	14	11	129
1979	RAINFALL (MM)	40.3	12.2	109.3	19.8	100.2	99.7	18.8	5.9	35.2	37.6	70.9	6.4	556.3
	NO OF RAINDAYS	9	6	14	8	15	6	3	3	6	10	13	4	97
1980	RAINFALL (MM)	80.2	70.2	38.8	7.9	153.7	61.9	41.2	8.7	1.5	22.9	57.2	41.4	585.6
	NO OF RAINDAYS	11	7	5	6	14	9	7	4	3	9	4	10	89

Table 21

		Year								
		1981	1982	1983	1984	1985	1986	1987	1988	1989
Jan.	R Total	52.0	39.2	24.1	148.7	7.1	179.6	44.4	83.7	104.5
	R Days	13	9	5	13	4	14	7	10	18
	E Total	170.2	190.6	207.8	164.4	206.8	183.0	154.8	160.4	140.2
	E Max	9.5	12.0	14.1	8.8	11.6	10.4	8.8	8.1	8.8
Feb.	R Toatl	163.8	20.9	20.4	133.2	29.4	51.6	19.2	83.3	44.3
	R Days	14	6	11	14	9	11	7	11	10
	E Total	122.8	145.3	164.3	140.5	144.1	121.6	134.2	147.4	125.9
	E Max	8.0	9.9	10.4	8.8	10.1	8.7	7.9	7.4	6.5
Mar.	R Total	14.3	138.7	274.9	157.7	70.8	20.9	134.0	47.4	108.9
	R Days	3	18	8	10	13	5	10	15	18
	E Total	156.2	99.8	159.7	138.2	147.0	118.4	182.2	120.3	90.7
	E Max	8.2	8.0	12.5	7.4	9.5	6.2	11.1	8.4	5.6
April	R Total	190.8	11.4	61.4	93.2	209.0	56.5	8.4	399.6	365.5
	R Days	8	3	12	10	16	8	7	22	21
	E Total	103.1	97.7	92.8	83.9	95.9	105.7	86.1	73.1	70.5
	E Max	6.0	5.0	6.8	6.4	5.7	8.0	4.6	4.9	6.3
May	R Total	91.6	4.1	127.6	75.2	153.9	22.2	78.8	114.2	96.1
	R Days	8	3	15	14	17	9	12	12	20
	E Total	67.2	88.5	64.6	54.5	71.9	57.1	61.4	56.6	42.1
	E Max	4.4	4.9	4.8	3.1	8.3	3.4	5.0	6.3	3.0
June	R Total	55.6	71.4	98.3	72.9	163.5	5.4	53.1	44.6	187.7
	R Days	6	12	10	4	8	2	11	9	20
	E Total	64.7	65.1	53.6	48.7	54.1	55.5	47.2	57.3	55.9
	E Max	3.4	3.2	2.9	3.1	3.5	2.9	3.0	3.7	6.6
July	R Total	39.8	69.8	21.2	141.1	111.4	24.0	93.6	135.8	17.9
	R Days	7	12	8	14	10	9	11	8	9
	E Total	68.7	66.7	50.5	49.2	71.4	60.4	59.7	51.0	53.2
	E Max	4.0	3.5	2.6	3.6	5.9	3.9	4.0	4.0	2.8
Aug.	R Total	6.4	1.3	25.8	13.1	25.2	403.8	360.2	27.3	36.8
	R Days	7	3	10	7	8	10	16	11	6
	E Total	97.1	88.8	66.7	85.8	74.0	63.4	65.7	72.5	72.3
	E Max	5.6	4.7	4.6	4.5	5.8	4.1	6.6	5.3	4.4
Sept.	R Total	7.2	174.5	41.5	31.4	62.6	50.4	10.3	121.6	0.6
	R Days	4	10	9	9	11	8	5	10	1
	E Total	117.4	122.3	115.6	96.9	88.6	100.8	109.8	101.9	109.0
	E Max	8.0	8.7	7.2	5.1	5.4	6.2	6.3	6.6	6.0
Oct.	R Total	137.2	43.6	154.0	26.3	213.6	56.2	191.4	0	12.3
	R Days	11	9	14	9	17	8	14	0	4
	E Total	151.3	135.9	107.0	142.2	131.1	133.7	110.0	178.4	159.1
	E Max	13.2	7.3	5.4	8.0	8.0	8.3	6.6	9.1	9.1
Nov.	R Total	152.6	9.8	57.8	312.3	104.4	127.6	98.4	146.5	54.5
	R Days	13	2	7	16	14	15	8	15	12
	E Total	128.9	182.8	154.0	151.6	148.2	131.6	153.8	131.9	140.4
	E Max	8.9	10.8	8.7	9.9	7.1	7.7	8.6	10.1	7.2
Dec.	R Total	93.3	14.3	80.4	76.1	103.6	28.7	65.7	112.9	72.5
	R Days	10	9	14	9	13	5	14	17	10
	E Total	169.5	172.5	171.4	214.1	179.4	166.3	154.9	142.3	150.8
	E Max	10.1	8.6	10.2	11.2	9.5	11.2	8.0	8.9	9.2
Annual	R Total	1004.6	599.0	987.4	1281.2	1255.0	1027.8	1157.5	1316.9	1101.6
	R Days	104	96	123	129	140	104	122	140	149
	E Total	1417.1	1426.0	1408.0	1370.0	1412.5	1297.5	1319.8	1293.1	1210.1

R Total = Monthly total rainfall (mm)
R Days = Number of rain days in the month
E Total = Total evaporation per month (mm)
E Max = Maximum 24 hour evaporation (mm)

Monthly and annual statistics on rainfall and evaporation at Lucas Heights - 1981 to 1989.

Table 22

		Year						
		1990	1991	1992	1993	1994	1995	1996
Jan.	R Total	64.1	53.6	123.2	50.2	11.2	122.1	136.0
	R Days	12	15	12	10	7	12	13
	E Total	139.8	175.5	137.5	149.0	205.2	135.8	125.2
	E Max	8.0	9.8	7.1	9.1	12.6	7.9	7.6
Feb.	R Total	443.0	24.4	300.4	88.5	47.3	47.6	64.1
	R Days	19	9	12	11	8	12	15
	E Total	104.3	152.8	104.4?	133.4	147.6	122.9	137.5
	E Max	6.0	10.4	7.9	8.0	10.2	7.6	7.8
Mar.	R Total	90.3	27.8	80.2	144.6	151.7	205.4	33.7
	R Days	17	4	9	17	17	16	9
	E Total	114.9	148.3	99.0	117.0?	118.3?	123.7	101.7
	E Max	7.1	8.6	6.1	10.4?	8.2?	8.4	6.1
April	R Total	287.6	28.3	93.6	30.3	95.5	14.2	33.2
	R Days	20	7	13	7	8	2	6
	E Total	70.1	100.2	77.0	83.0	85.9	91.0	99.2
	E Max	4.0	5.6	4.7	4.5	5.8	5.5	6.4
May	R Total	146.2	48.0	37.8	15.8	25.5	199.9	143.5
	R Days	12	13	9	4	5	16	14
	E Total	65.2	58.3	47.2	55.3	82.0	67.7	60.1
	E Max	6.6	3.8	2.7	4.9	6.6	6.0	3.9
June	R Total	21.4	409.5	70.5	34.3	39.5	40.4	51.8
	R Days	11	11	8	6	7	8	9
	E Total	50.9	46.9?	48.7	53.3	51.1	44.1	58.9
	E Max	2.6	2.6	3.2	3.4	3.5	3.3	3.8
July	R Total	45.1	91.6	11.2	64.8	7.4	1.0	78.4
	R Days	8	13	5	10	8	4	6
	E Total	55.9	64.6	59.0	42.1	56.7	60.0	56.7
	E Max	2.9	3.5	3.5	2.6	3.1	3.5	3.2
Aug.	R Total	218.4	9.8	19.2	69.0	8.4	0.0	129.9
	R Days	10	5	8	9	2	0	6
	E Total	69.8	105.5	76.3	76.6	85.5	86.1	76.0
	E Max	5.3	6.4	5.7	6.6	6.0	5.2	5.0
Sept.	R Total	57.8	15.7	17.8	81.8	10.4	249.3	74.8
	R Days	11	6	9	10	2	13	7
	E Total	88.6	119.7	96.9	89.4	130.8	85.8	120.0
	E Max	7.0	8.9	5.2	5.0	6.6	7.0	7.5
Oct.	R Total	34.9	10.0	33.4	54.6	35.1	34.4	31.2
	R Days	14	4	12	7	9	10	10
	E Total	130.2	150.9	106.3	138.2	139.0	121.9	118.1
	E Max	7.8	9.8	7.4	9.9	7.2	6.6	6.8
Nov.	R Total	17.6	34.4	143.4	57.3	94.2	135.4	70.8
	R Days	3	7	18	9	14	15	12
	E Total	165.9?	156.6	127.3	142.4?	164.6	126.4	146.5
	E Max	13.8	8.1	7.9	13.6?	10.5	7.2	7.3
Dec.	R Total	56.4	259.4	186.0	40.7	50.7	93.9	68.8
	R Days	9	9	18	12	9	13	6
	E Total	182.0	180.7	125.8	167.3	163.7	155.0	160.6
	E Max	10.6	9.0	7.6	8.8	11.6	8.5	8.2
Annual	R Total	1482.8	1012.5	1116.7	731.9	576.2	1143.6	916.2
	R Days	146	103	133	112	87	121	113
	E Total	1237.6?	1462.0?	1105.4?	1247.0?	1430.4?	1220.4	1260.5

R Total = Monthly total rainfall (mm)
R Days = Number of rain days in the month
E Total = Total evaporation per month (mm)
E Max = Maximum 24 hour evaporation (mm)
? = uncertainty over an evaporation value in this month

Monthly and annual statistics on rainfall and evaporation at Lucas Heights - 1990 to 1996.

Table 22

Frequency (%) distributions of Rainfall Rates (mm/hr)

Beginning date : 201092 End date : 121196

Rain gauge type : Climatronics

Total number of observations : 1461.

	0.- 1.	1.- 2.	2.- 3.	3.- 4.	4.- 5.	5.- 6.	6.- 7.	7.- 8.	8.- 9.	9.-10.	10.-11.
Frequency	57.63	18.14	8.42	5.00	3.63	1.44	1.30	0.34	0.55	0.62	2.94
Cum. Freq	57.63	75.77	84.19	89.19	92.81	94.25	95.55	95.89	96.44	97.06	100.00

Rain gauge type : Rimco

Total number of observations : 1323.

	0.- 1.	1.- 2.	2.- 3.	3.- 4.	4.- 5.	5.- 6.	6.- 7.	7.- 8.	8.- 9.	9.-10.	10.-11.
Frequency	30.54	23.66	14.74	9.75	7.71	6.73	1.89	1.36	0.68	0.76	2.19
Cum. Freq	30.54	54.20	68.93	78.68	86.39	93.12	95.01	96.37	97.05	97.81	100.00

Table 23

Comparison of Rainfall rate (mm/hr) measurements between Instruments

Climatronics

Rimco	0.- 1.	1.- 2.	2.- 3.	3.- 4.	4.- 5.	5.- 6.	6.- 7.	7.- 8.	8.- 9.	9.-10.	10.-11.	Total
0.- 1.	28.38	1.97	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.50
1.- 2.	17.00	5.46	1.06	0.08	0.00	0.00	0.08	0.00	0.00	0.00	0.00	23.67
2.- 3.	7.28	4.02	2.81	0.53	0.08	0.00	0.00	0.00	0.00	0.00	0.00	14.72
3.- 4.	4.48	2.81	0.68	1.52	0.30	0.00	0.00	0.00	0.00	0.00	0.00	9.79
4.- 5.	2.05	2.28	0.99	0.76	1.29	0.38	0.00	0.00	0.00	0.00	0.00	7.74
5.- 6.	1.29	1.59	1.14	0.91	0.38	0.30	0.99	0.08	0.00	0.00	0.00	6.68
6.- 7.	0.00	0.68	0.46	0.15	0.15	0.00	0.15	0.23	0.08	0.00	0.00	1.90
7.- 8.	0.00	0.00	0.83	0.00	0.23	0.08	0.08	0.00	0.08	0.08	0.00	1.37
8.- 9.	0.00	0.00	0.00	0.30	0.00	0.15	0.00	0.00	0.00	0.15	0.08	0.68
9.-10.	0.00	0.00	0.00	0.00	0.23	0.15	0.00	0.00	0.00	0.23	0.08	0.76
10.-11.	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.15	0.00	0.15	0.46
Total	60.47	18.82	8.12	4.25	2.66	1.06	1.37	0.30	0.38	0.53	0.46	1318.

Table 24

Frequencies (%) of rainfall rates vs. LH10m Wind Directions

Beginning date : 201092 End date : 121196

Rain gauge type : Climatronics

Rainfall Rates (mm/hr)

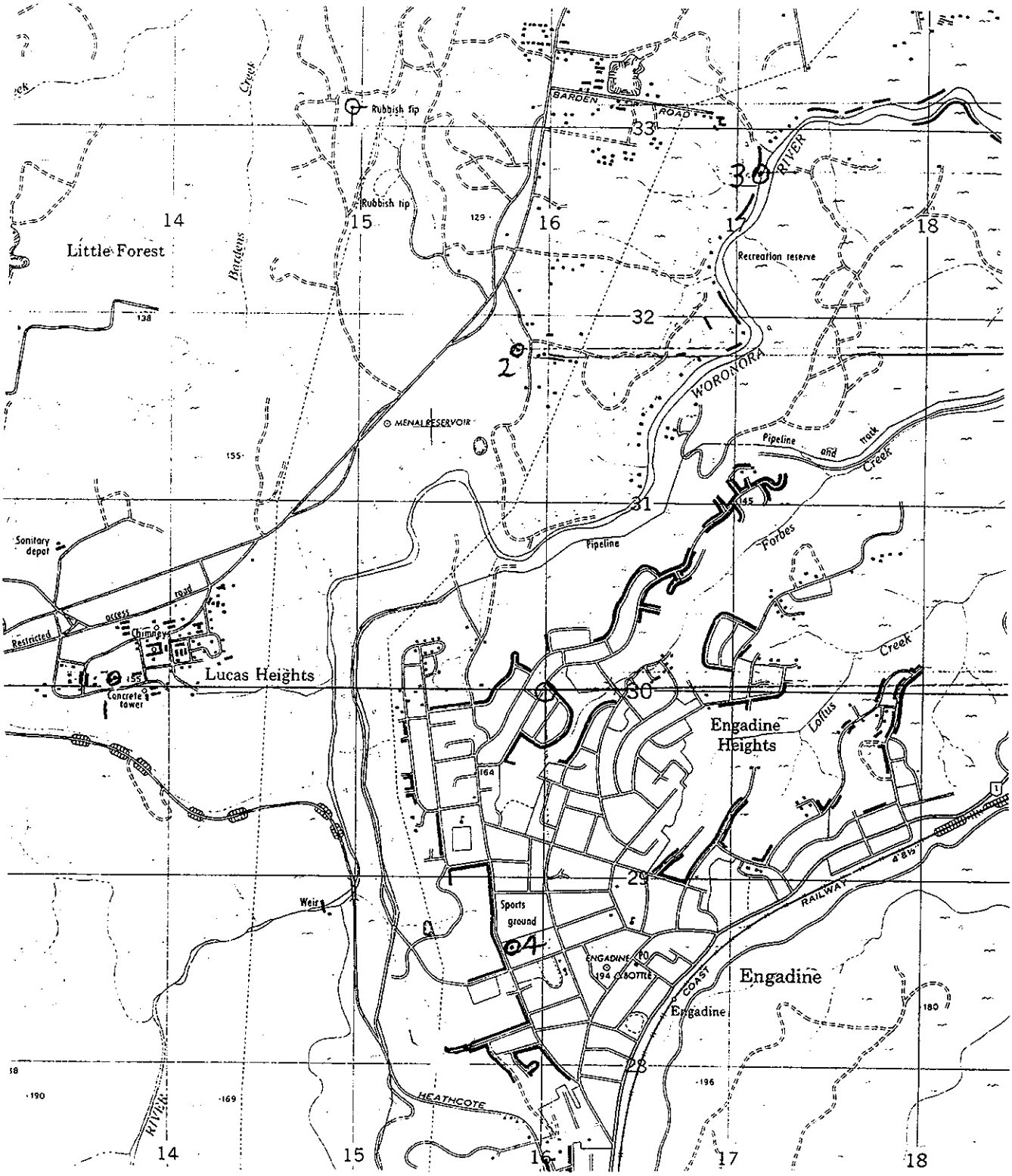
Direction	0.- 1.	1.- 2.	2.- 3.	3.- 4.	4.- 5.	5.- 6.	6.- 7.	7.- 8.	8.- 9.	9.-10.	>10.	Total
N	3.35	0.89	0.21	0.34	0.00	0.21	0.00	0.00	0.00	0.00	0.27	5.20
NNE	1.78	0.89	0.48	0.14	0.00	0.00	0.00	0.00	0.21	0.00	0.07	3.56
NE	4.52	2.53	1.78	0.55	0.68	0.21	0.00	0.07	0.07	0.07	0.34	10.68
ENE	4.04	1.51	0.68	0.62	0.21	0.07	0.00	0.00	0.00	0.00	0.07	7.19
E	1.57	0.14	0.14	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.07	1.98
ESE	3.70	1.30	0.62	0.27	0.21	0.00	0.07	0.00	0.00	0.07	0.27	6.43
SE	4.04	1.51	0.48	0.48	0.21	0.07	0.07	0.00	0.00	0.07	0.14	7.05
SSE	8.08	2.12	1.16	0.41	0.62	0.07	0.34	0.14	0.07	0.00	0.41	13.35
S	11.98	2.60	1.23	0.68	0.55	0.41	0.48	0.07	0.07	0.34	0.89	19.23
SSW	4.93	1.51	0.48	0.41	0.14	0.00	0.14	0.00	0.00	0.00	0.14	7.73
SW	2.05	0.48	0.34	0.14	0.07	0.21	0.07	0.00	0.07	0.00	0.14	3.56
WSW	2.33	0.68	0.14	0.27	0.14	0.07	0.00	0.07	0.00	0.00	0.07	3.76
W	1.57	0.41	0.07	0.14	0.14	0.00	0.07	0.00	0.00	0.07	0.34	2.74
WNW	1.30	0.41	0.21	0.14	0.27	0.00	0.07	0.00	0.00	0.00	0.14	2.46
NW	1.92	0.89	0.14	0.34	0.41	0.07	0.00	0.00	0.07	0.00	0.07	3.90
NNW	0.48	0.27	0.27	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.07	1.16
Total	57.6	18.1	8.4	5.0	3.6	1.4	1.3	0.3	0.5	0.6	2.9	

Rain gauge type : Rimco

Rainfall Rates (mm/hr)

Direction	0.- 1.	1.- 2.	2.- 3.	3.- 4.	4.- 5.	5.- 6.	6.- 7.	7.- 8.	8.- 9.	9.-10.	>10.	Total
N	1.21	1.21	0.76	0.30	0.98	0.08	0.15	0.00	0.00	0.08	0.00	4.76
NNE	1.21	0.98	0.38	0.38	0.38	0.08	0.00	0.00	0.00	0.00	0.30	3.63
NE	2.72	2.80	1.97	1.06	0.68	0.83	0.38	0.30	0.08	0.23	0.08	11.11
ENE	1.97	1.59	1.21	0.98	0.53	0.53	0.15	0.15	0.08	0.15	0.00	7.33
E	0.53	0.68	0.30	0.08	0.23	0.00	0.00	0.08	0.08	0.00	0.08	2.04
ESE	1.28	1.51	0.91	0.53	0.68	0.68	0.15	0.08	0.00	0.00	0.30	6.12
SE	1.74	2.04	1.06	0.68	0.68	0.38	0.15	0.08	0.08	0.08	0.08	7.03
SSE	4.61	3.17	2.42	1.21	0.68	0.60	0.23	0.30	0.08	0.15	0.38	13.76
S	7.11	4.01	2.42	1.74	1.28	1.36	0.38	0.23	0.15	0.08	0.83	19.43
SSW	2.80	1.51	1.13	0.98	0.30	0.60	0.23	0.08	0.00	0.00	0.00	7.63
SW	1.21	0.76	0.60	0.30	0.23	0.08	0.00	0.00	0.08	0.00	0.00	3.25
WSW	1.06	0.76	0.53	0.68	0.23	0.60	0.08	0.00	0.00	0.00	0.00	3.93
W	0.76	0.91	0.30	0.23	0.15	0.00	0.00	0.00	0.00	0.00	0.30	2.57
WNW	0.53	0.68	0.15	0.30	0.30	0.23	0.00	0.00	0.00	0.00	0.08	2.27
NW	1.51	0.83	0.45	0.15	0.30	0.53	0.00	0.00	0.08	0.00	0.15	3.93
NNW	0.30	0.23	0.15	0.15	0.08	0.15	0.00	0.08	0.00	0.00	0.08	1.21
Total	30.5	23.7	14.7	9.8	7.7	6.7	1.9	1.4	0.7	0.8	2.2	

Table 25



Ansto Meteorological Stations in the Lucas Heights Region

1. Lucas Heights Research Laboratories
2. Lucas Heights Community School
3. Shackles Estate
4. Boys Town School

Figure 1

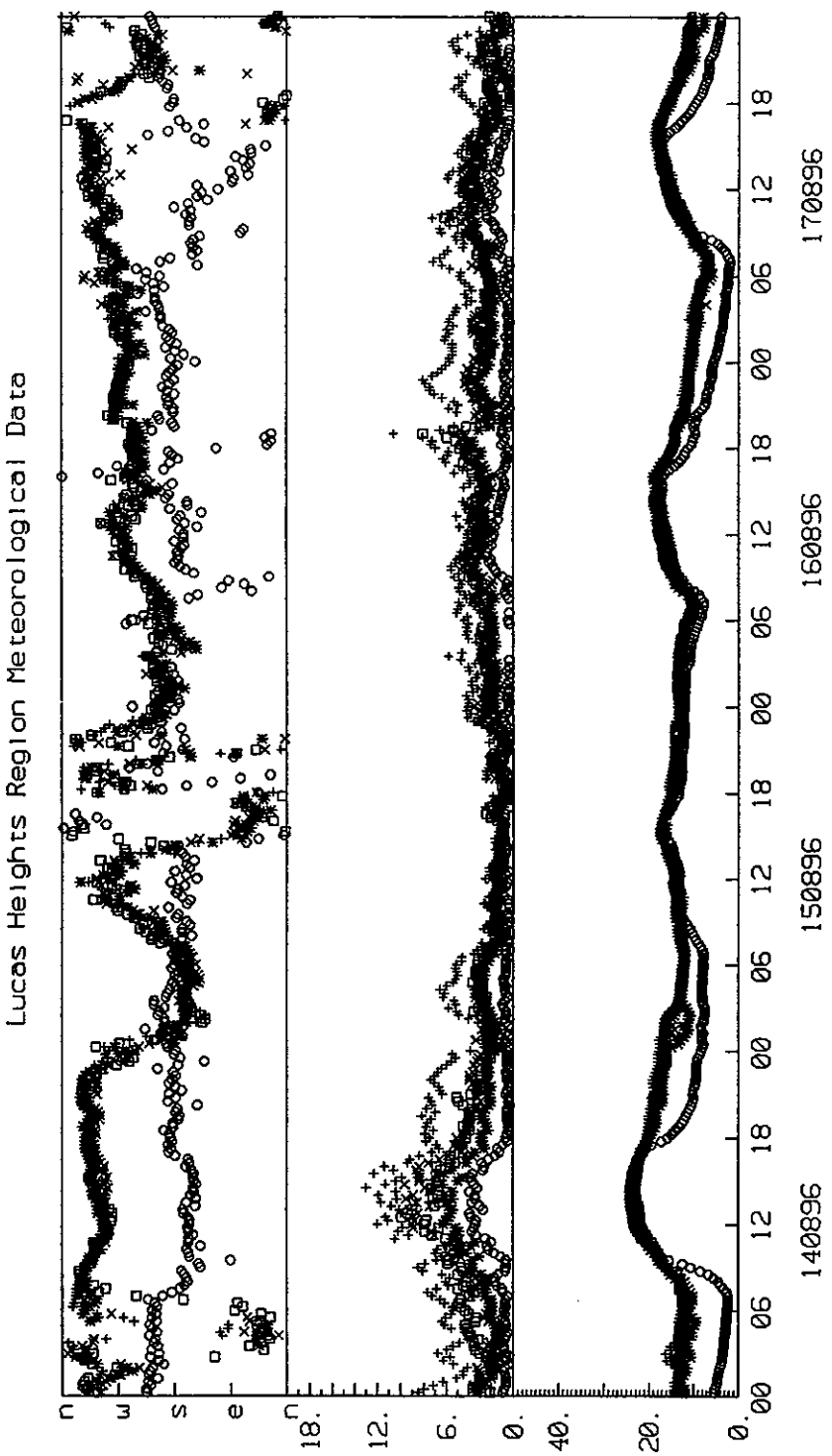
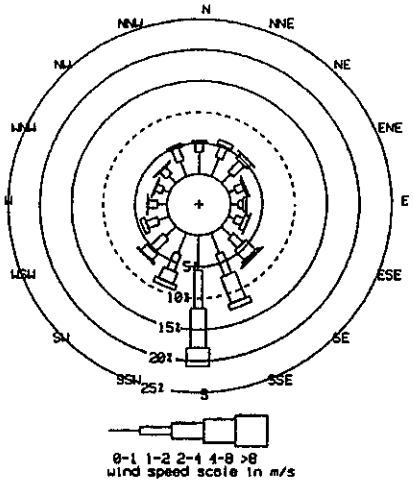
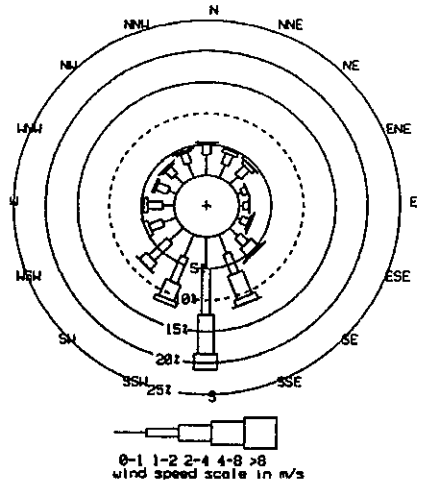

Lucas Heights Region Meteorological Data
10m Lucas Height
49m Lucas Heights
L.H. Comm. School
Boys Town School
Shackles Estate
Wind Direction
Wind speed (m s-1)
Amb temp (°C)
Times (EST)
140896
150896
160896
170896

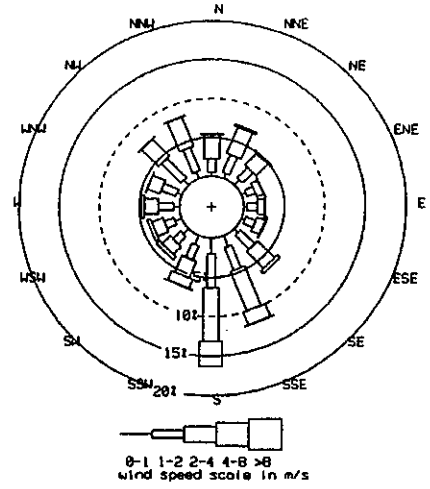
Figure 2



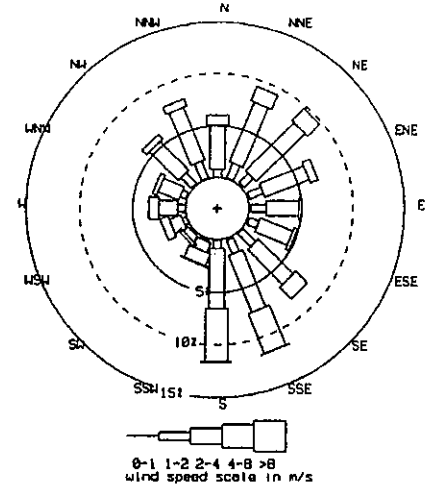
0000-0300 EST 7.0 metres
LHRL Tower



0300-0600 EST 7.0 metres
LHRL Tower



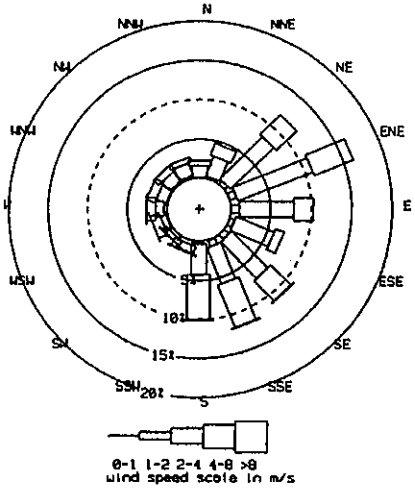
0600-0900 EST 7.0 metres
LHRL Tower



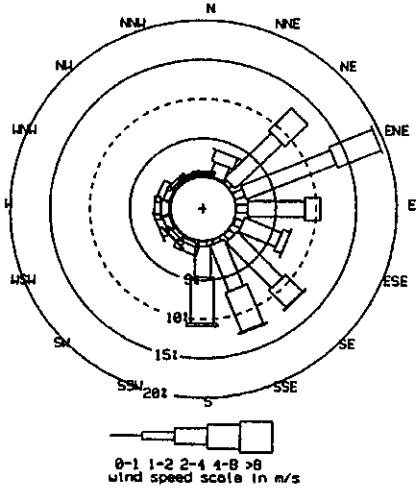
0900-1200 EST 7.0 metres
LHRL Tower

Summer

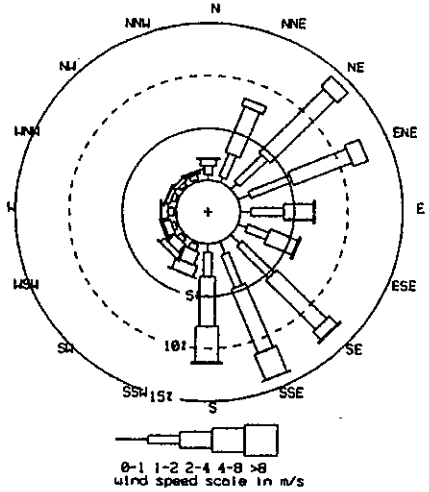
110775 to 110286



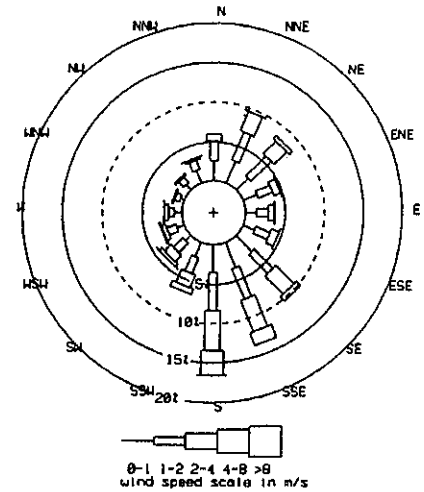
1200-1500 EST 7.0 metres
LHRL Tower



1500-1800 EST 7.0 metres
LHRL Tower

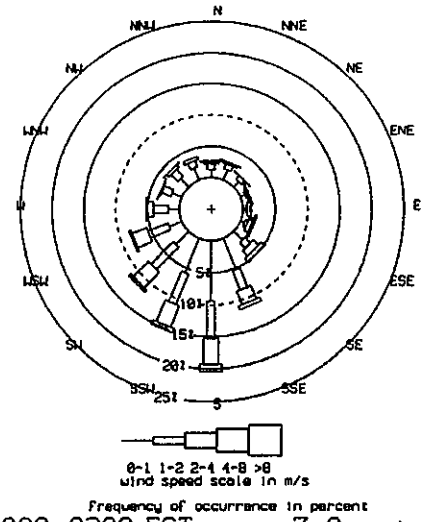


1800-2100 EST 7.0 metres
LHRL Tower

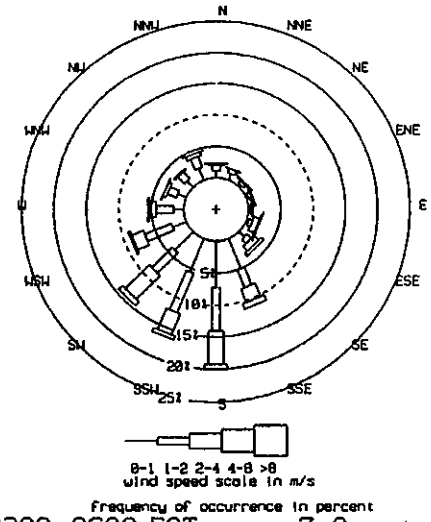


2100-2400 EST 7.0 metres
LHRL Tower

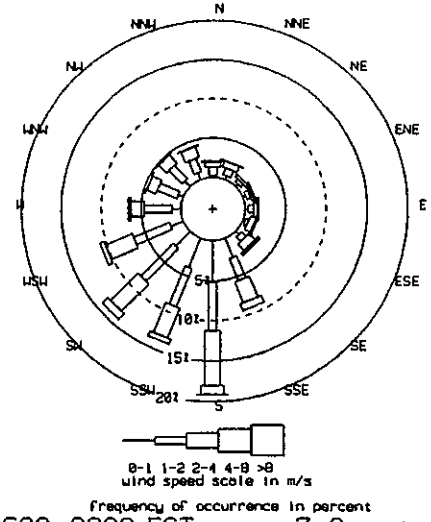
Figure 3



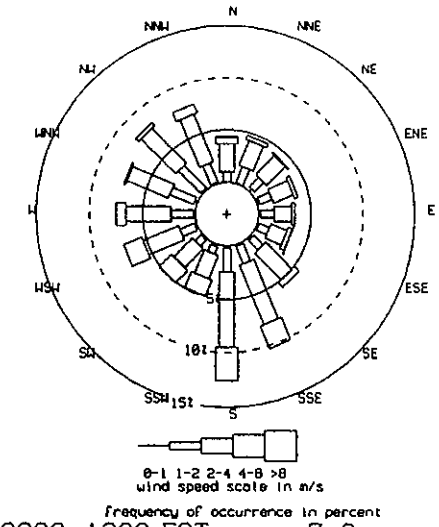
0000-0300 EST 7.0 metres
LHRL Tower



0300-0600 EST 7.0 metres
LHRL Tower



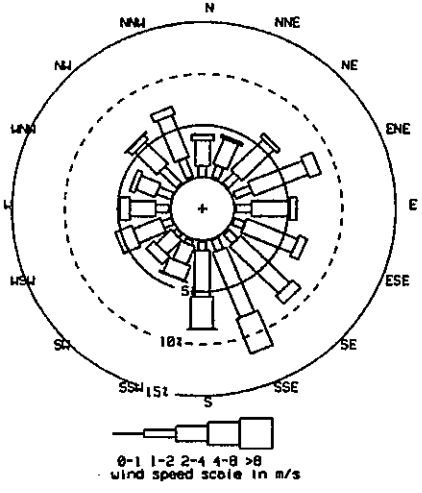
0600-0900 EST 7.0 metres
LHRL Tower



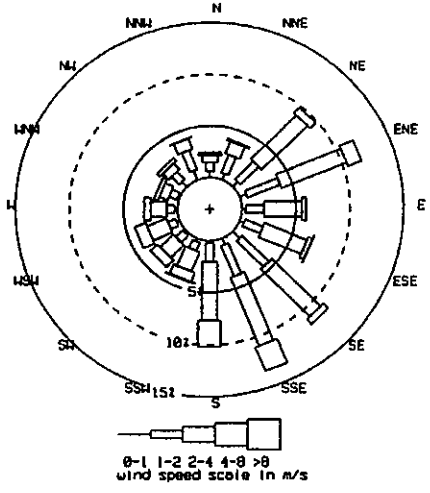
0900-1200 EST 7.0 metres
LHRL Tower

Autumn

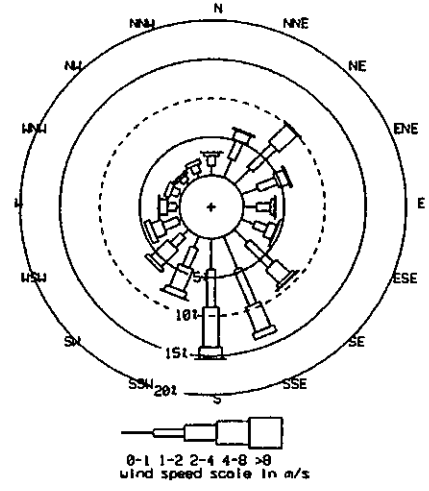
110775 to 110286



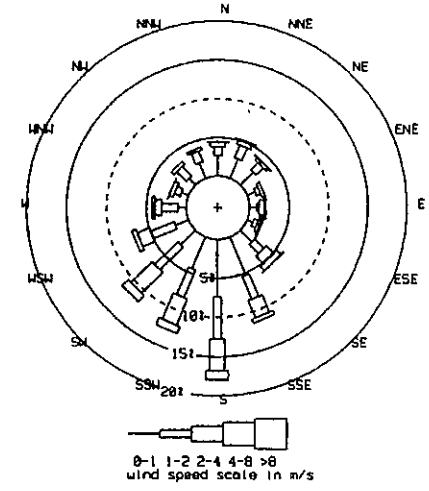
1200-1500 EST 7.0 metres
LHRL Tower



1500-1800 EST 7.0 metres
LHRL Tower

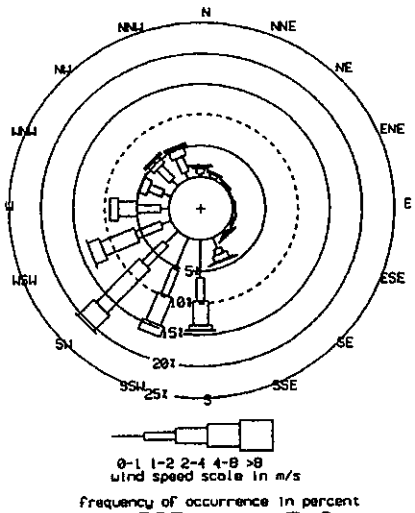


1800-2100 EST 7.0 metres
LHRL Tower

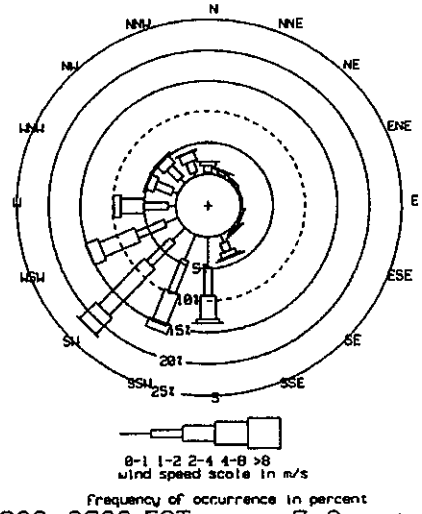


2100-2400 EST 7.0 metres
LHRL Tower

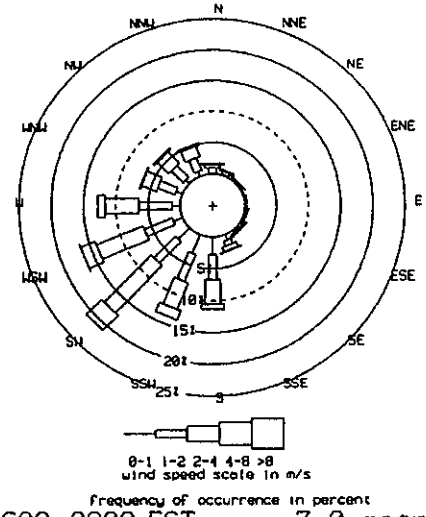
Figure 4



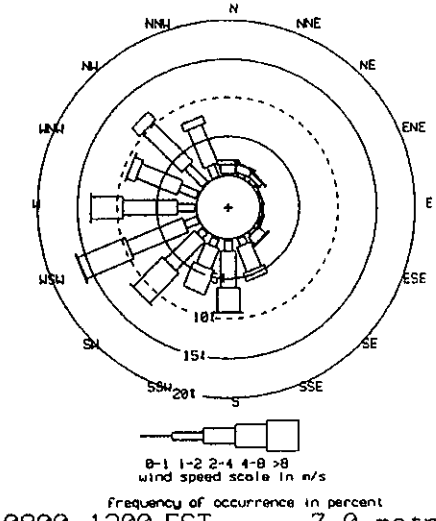
0000-0300 EST 7.0 metres
LHRL Tower



0300-0600 EST 7.0 metres
LHRL Tower



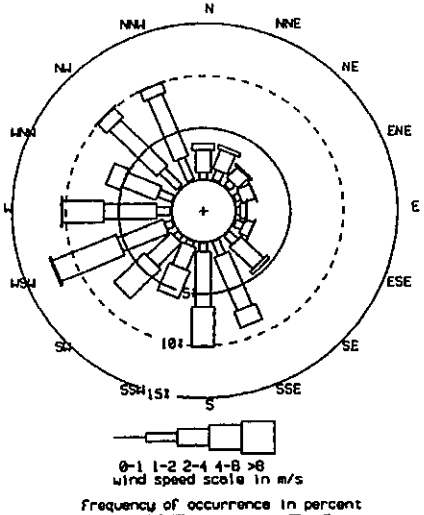
0600-0900 EST 7.0 metres
LHRL Tower



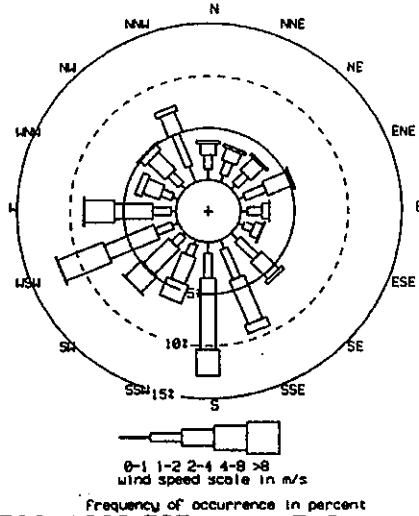
0900-1200 EST 7.0 metres
LHRL Tower

Winter

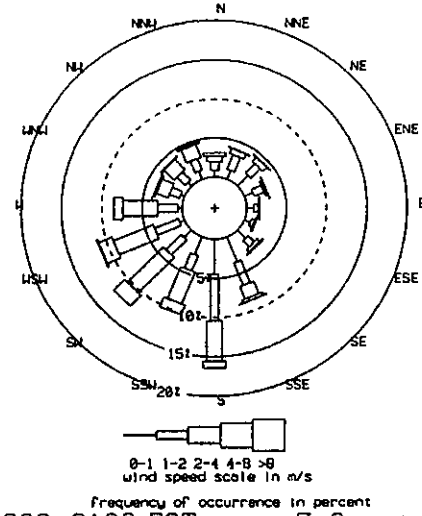
110775 to 110286



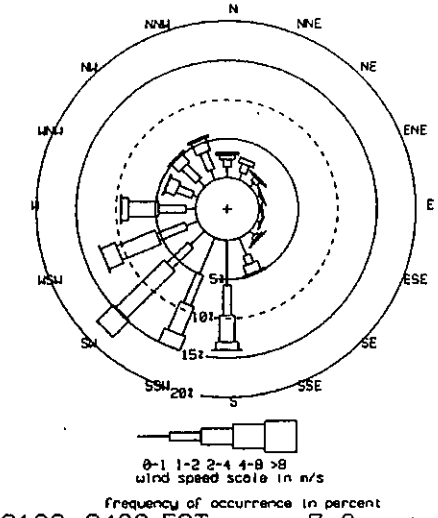
1200-1500 EST 7.0 metres
LHRL Tower



1500-1800 EST 7.0 metres
LHRL Tower

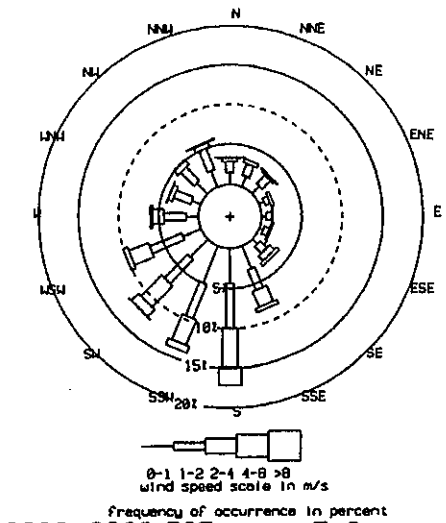


1800-2100 EST 7.0 metres
LHRL Tower

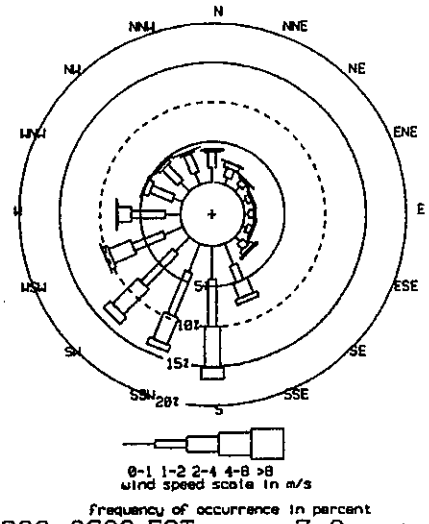


2100-2400 EST 7.0 metres
LHRL Tower

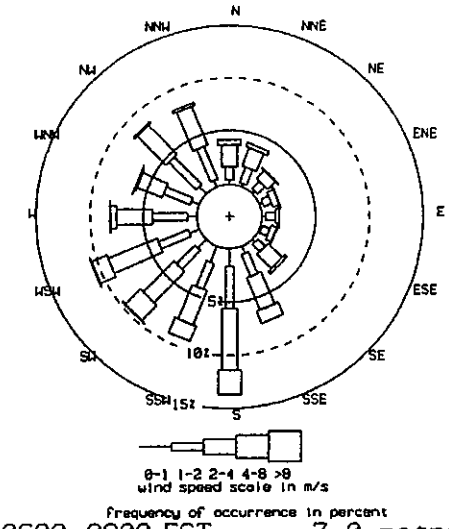
Figure 5



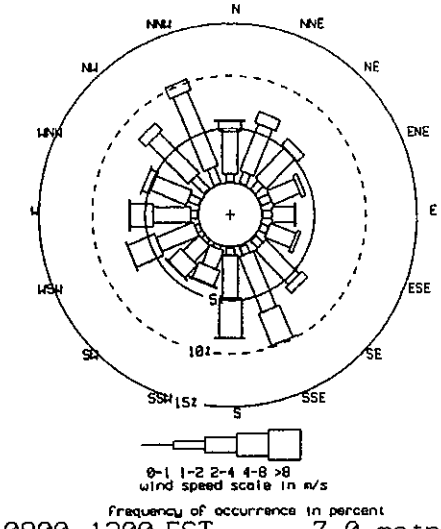
0000-0300 EST 7.0 metres
LHRL Tower



0300-0600 EST 7.0 metres
LHRL Tower



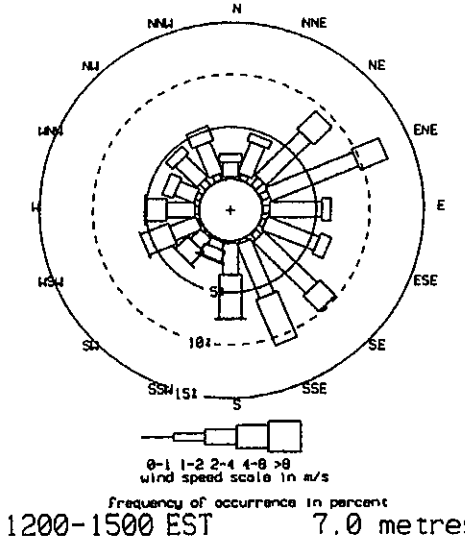
0600-0900 EST 7.0 metres
LHRL Tower



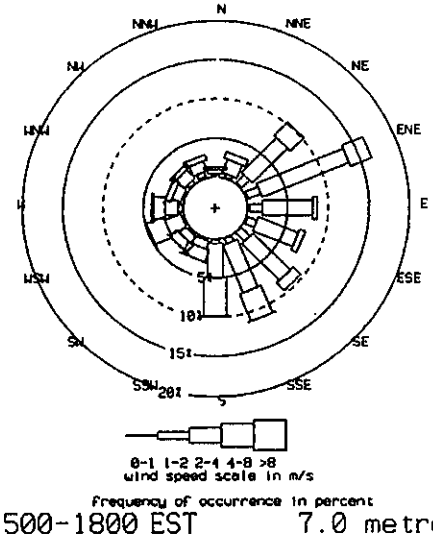
0900-1200 EST 7.0 metres
LHRL Tower

Spring

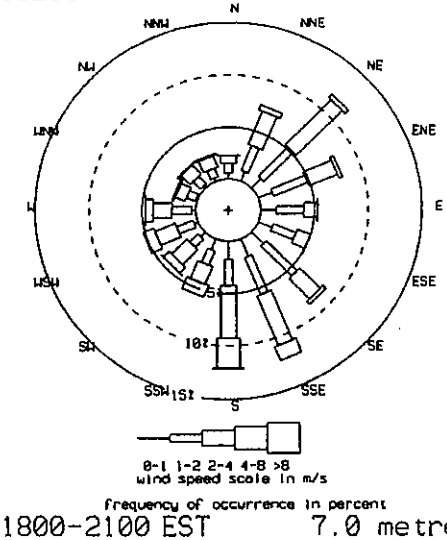
110775 to 110286



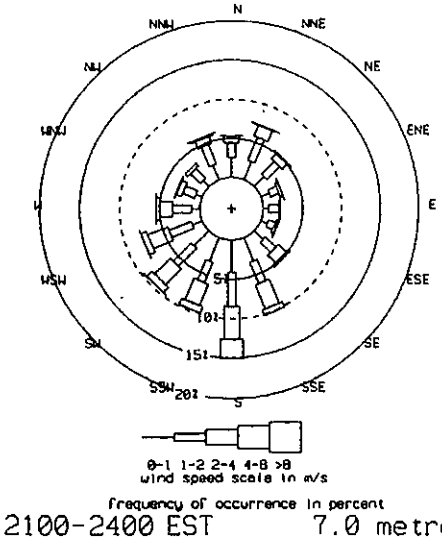
1200-1500 EST 7.0 metres
LHRL Tower



1500-1800 EST 7.0 metres
LHRL Tower



1800-2100 EST 7.0 metres
LHRL Tower



2100-2400 EST 7.0 metres
LHRL Tower

Figure 6

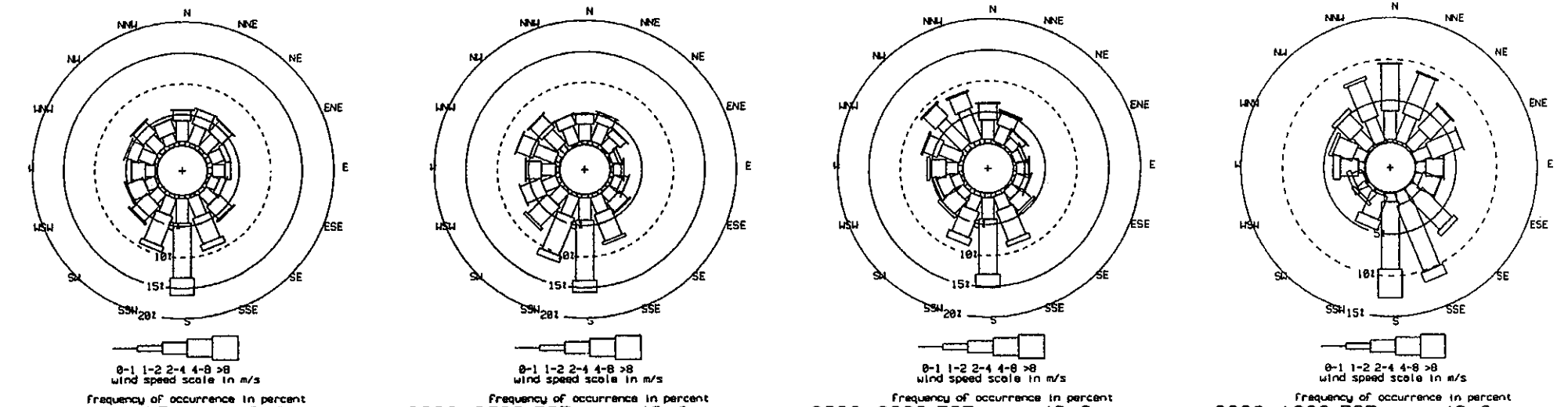
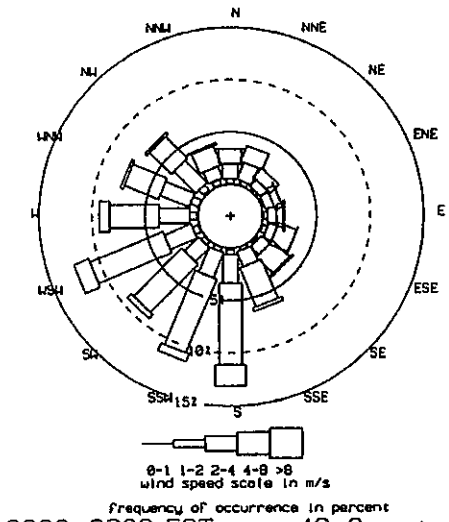
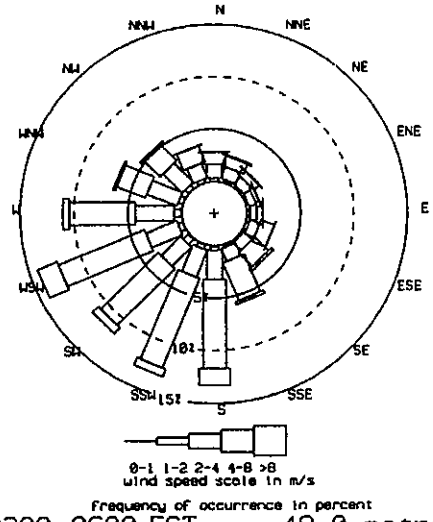

0000-0300 EST 49.0 metres
LHRL Tower
0300-0600 EST 49.0 metres
LHRL Tower
0600-0900 EST 49.0 metres
LHRL Tower
0900-1200 EST 49.0 metres
LHRL Tower
Summer
81177 to 11190
1200-1500 EST 49.0 metres
LHRL Tower
1500-1800 EST 49.0 metres
LHRL Tower
1800-2100 EST 49.0 metres
LHRL Tower
2100-2400 EST 49.0 metres
LHRL Tower
Frequency of occurrence in percent
0-1 1-2 2-4 4-8 >8
wind speed scale in m/s

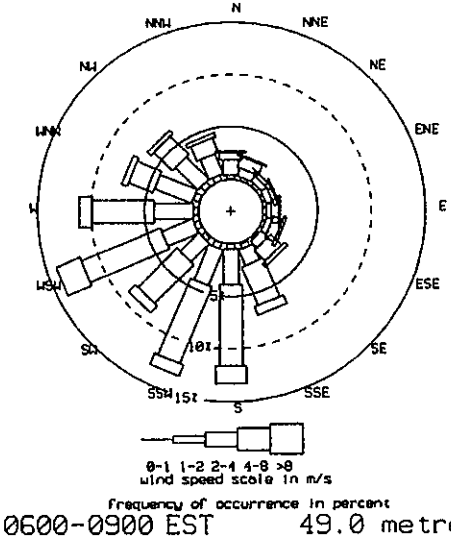
Figure 7



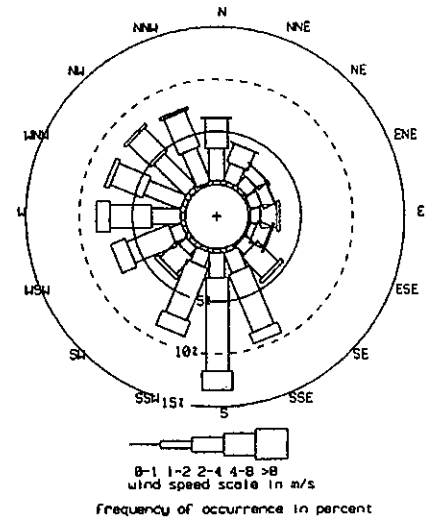
0000-0300 EST 49.0 metres
LHRL Tower



0300-0600 EST 49.0 metres
LHRL Tower



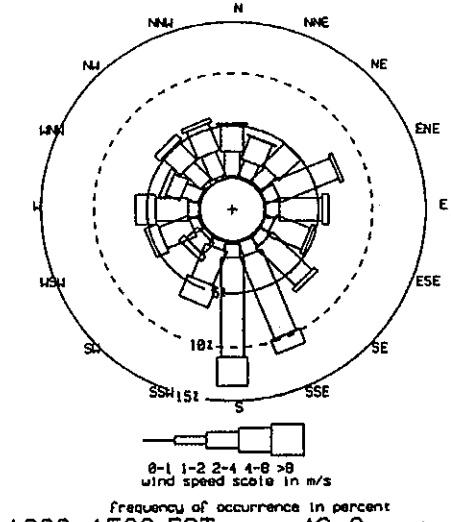
0600-0900 EST 49.0 metres
LHRL Tower



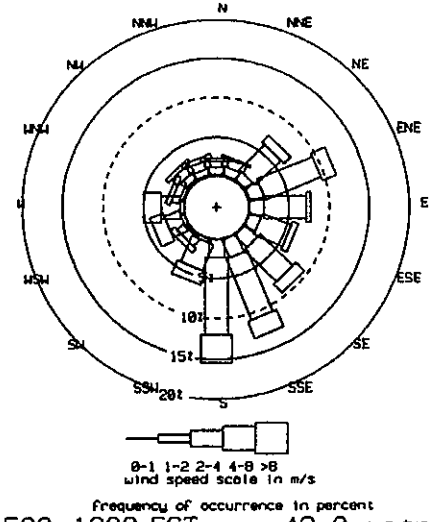
0900-1200 EST 49.0 metres
LHRL Tower

Autumn

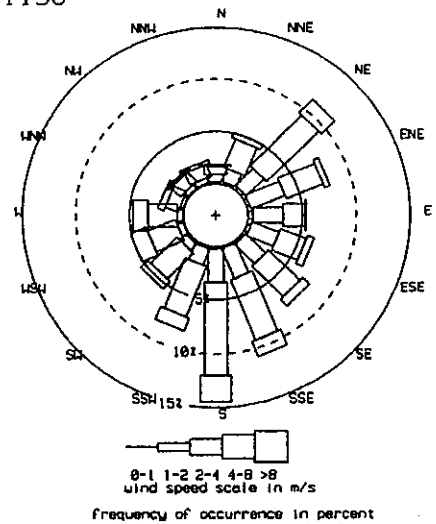
81177 to 11190



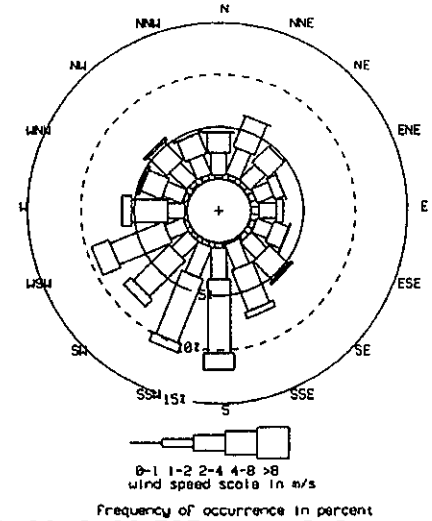
1200-1500 EST 49.0 metres
LHRL Tower



1500-1800 EST 49.0 metres
LHRL Tower

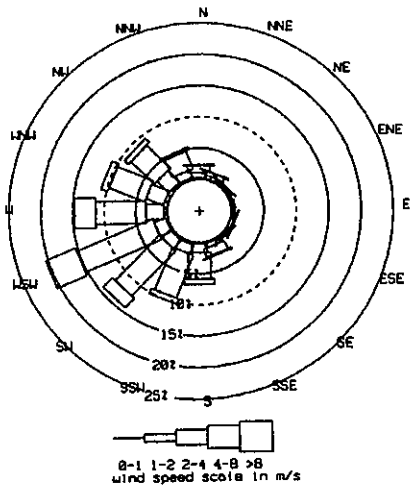


1800-2100 EST 49.0 metres
LHRL Tower

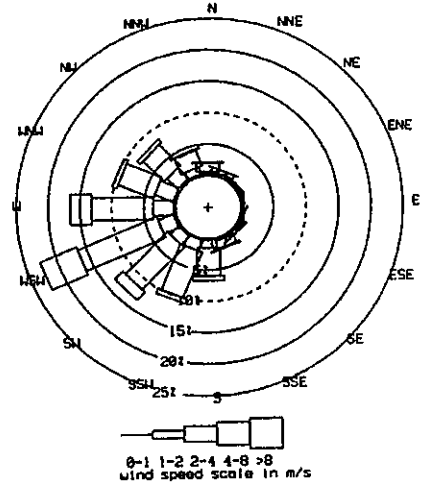


2100-2400 EST 49.0 metres
LHRL Tower

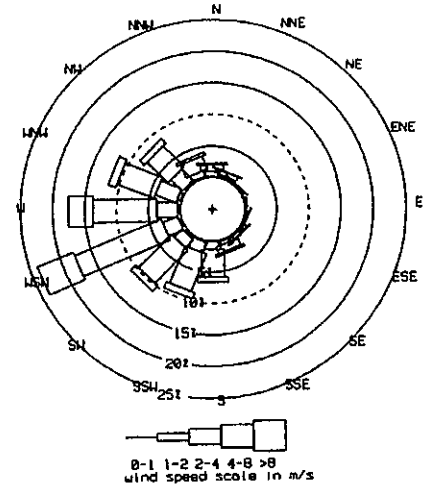
Figure 8



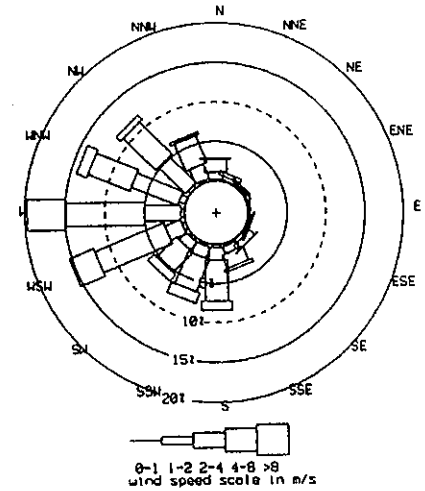
0000-0300 EST 49.0 metres
LHRL Tower



0300-0600 EST 49.0 metres
LHRL Tower



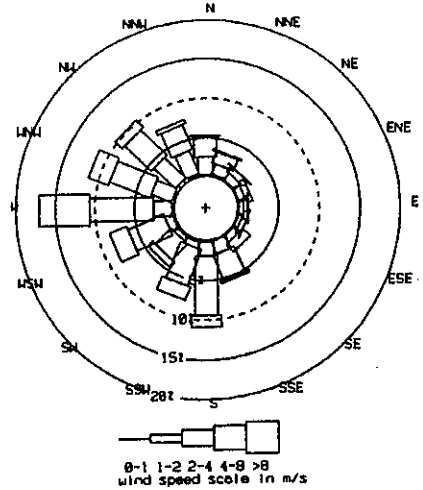
0600-0900 EST 49.0 metres
LHRL Tower



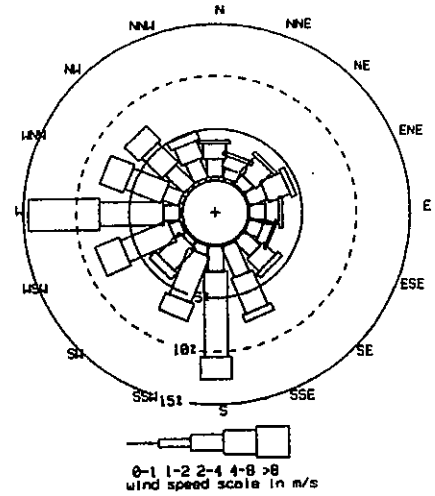
0900-1200 EST 49.0 metres
LHRL Tower

Winter

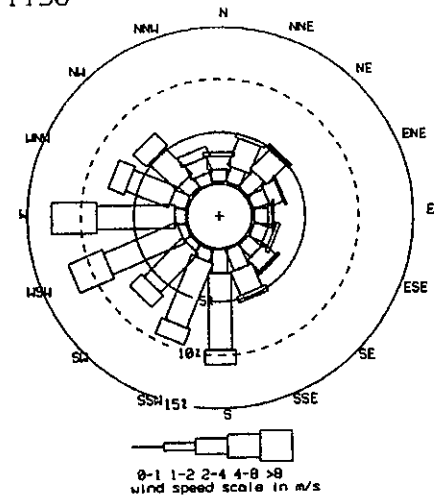
81177 to 11190



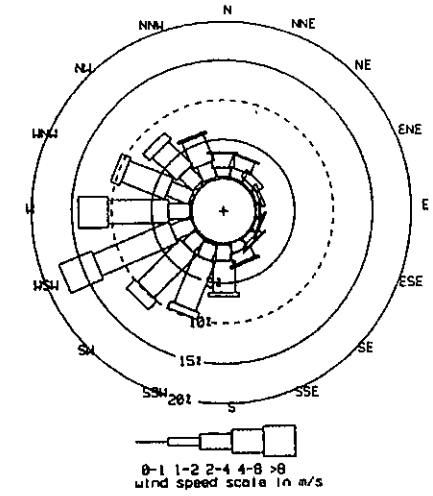
1200-1500 EST 49.0 metres
LHRL Tower



1500-1800 EST 49.0 metres
LHRL Tower



1800-2100 EST 49.0 metres
LHRL Tower



2100-2400 EST 49.0 metres
LHRL Tower

Figure 9

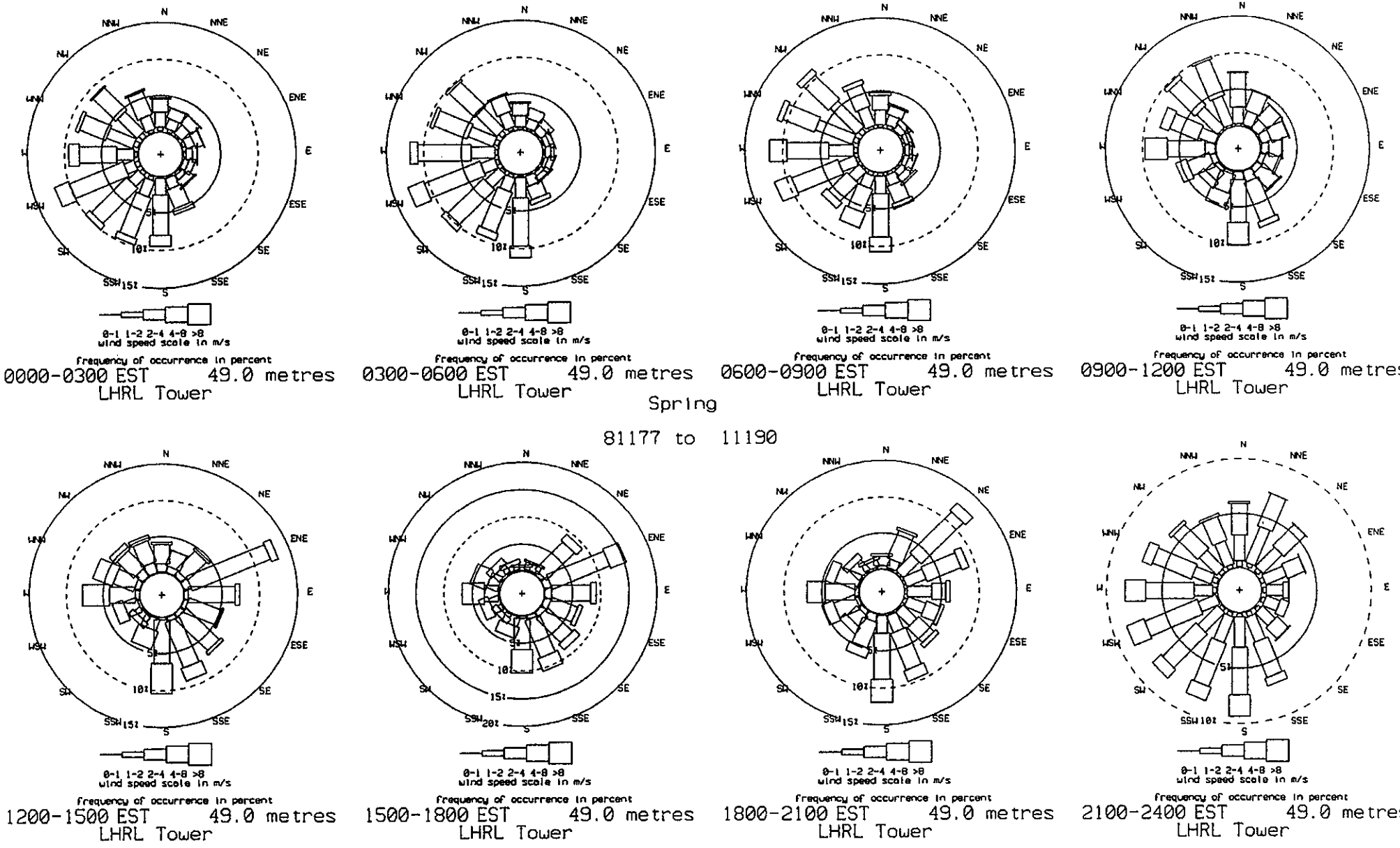
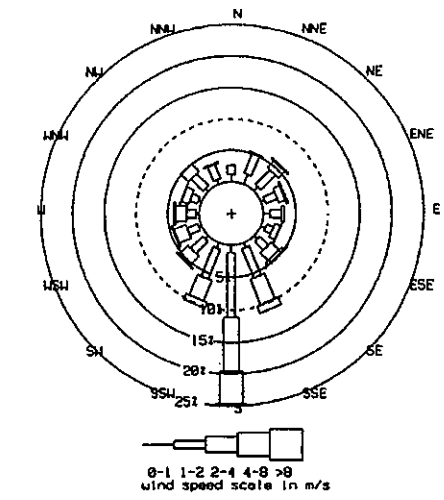
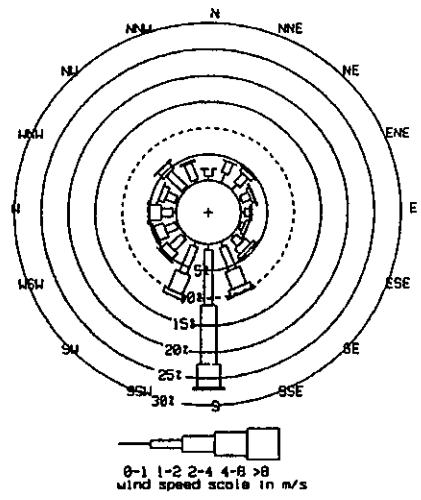

0000-0300 EST 49.0 metres
LHRL Tower
0300-0600 EST 49.0 metres
LHRL Tower
0600-0900 EST 49.0 metres
LHRL Tower
0900-1200 EST 49.0 metres
LHRL Tower
Spring
81177 to 11190
1200-1500 EST 49.0 metres
LHRL Tower
1500-1800 EST 49.0 metres
LHRL Tower
1800-2100 EST 49.0 metres
LHRL Tower
2100-2400 EST 49.0 metres
LHRL Tower
0-1 1-2 2-4 4-8 >8
wind speed scale in m/s
frequency of occurrence in percent

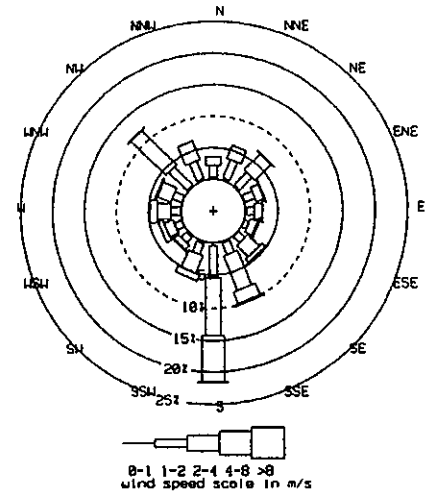
Figure 10



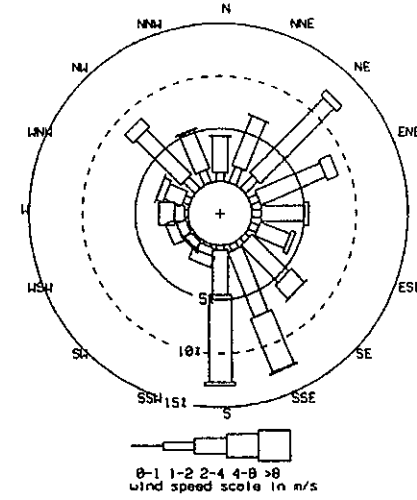
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



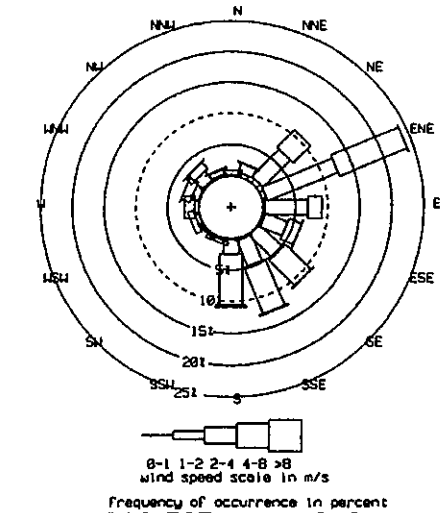
0600-0900 EST 10.0 metres
LHRL Tower 10m



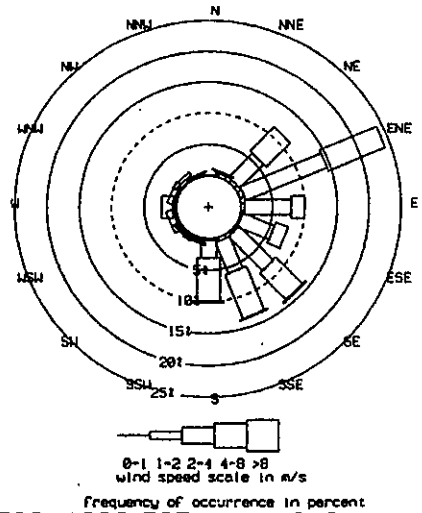
0900-1200 EST 10.0 metres
LHRL Tower 10m

Summer

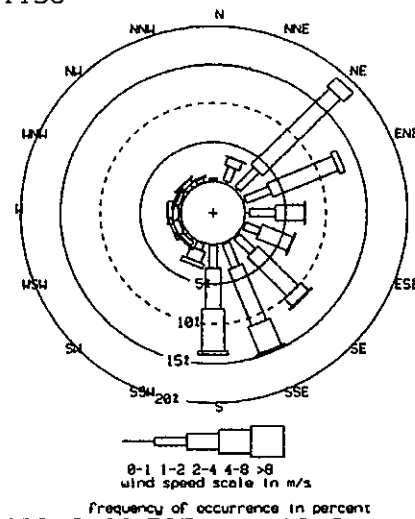
50491 to 121196



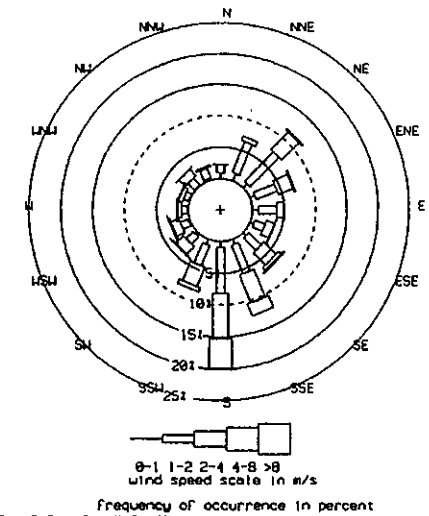
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

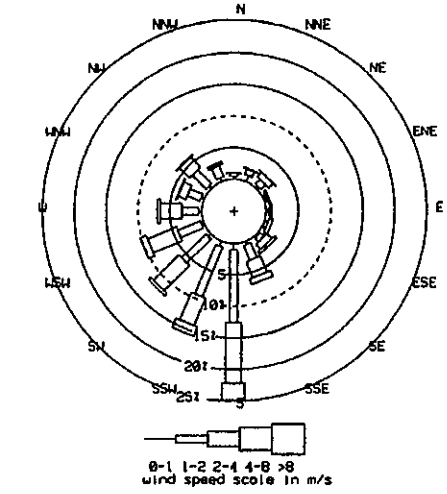


1800-2100 EST 10.0 metres
LHRL Tower 10m

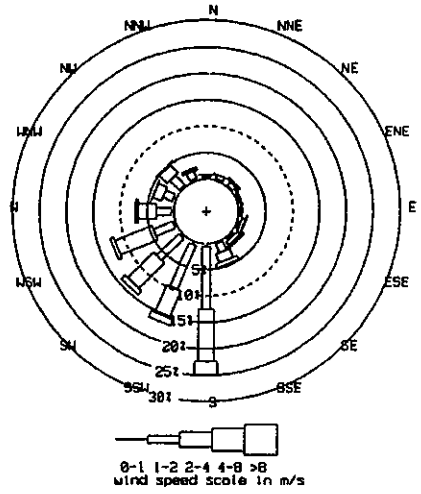


2100-2400 EST 10.0 metres
LHRL Tower 10m

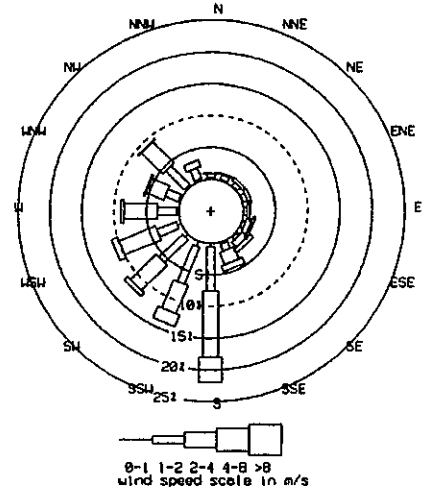
Figure 11



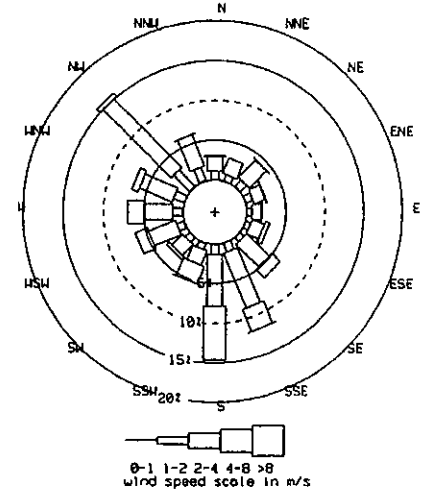
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



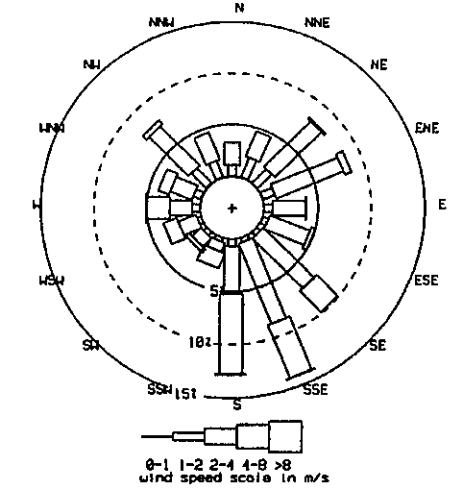
0600-0900 EST 10.0 metres
LHRL Tower 10m



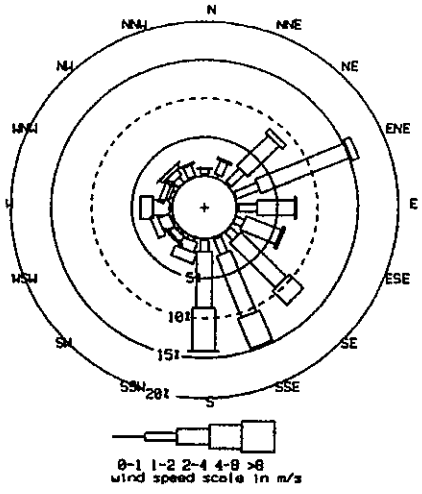
0900-1200 EST 10.0 metres
LHRL Tower 10m

Autumn

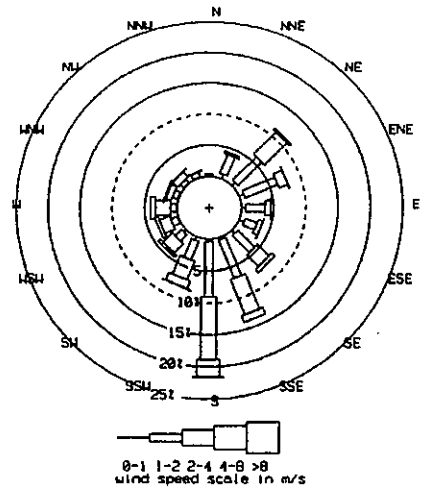
50491 to 121196



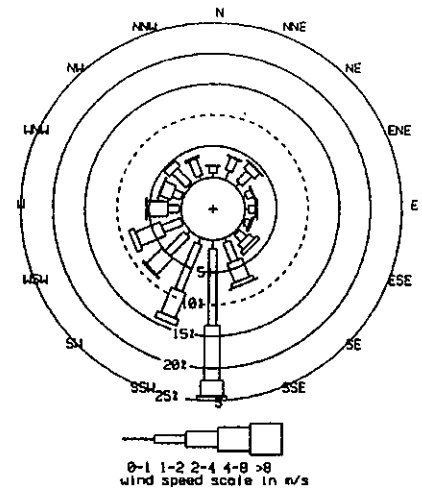
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

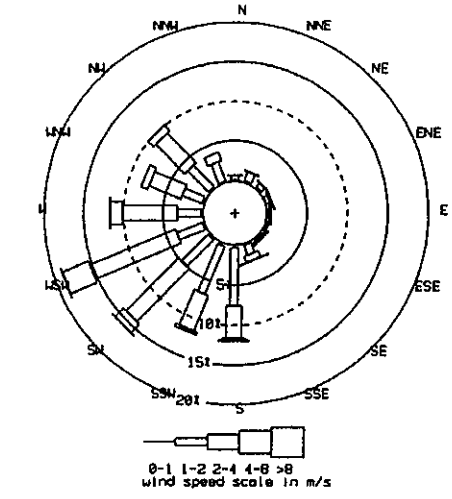


1800-2100 EST 10.0 metres
LHRL Tower 10m

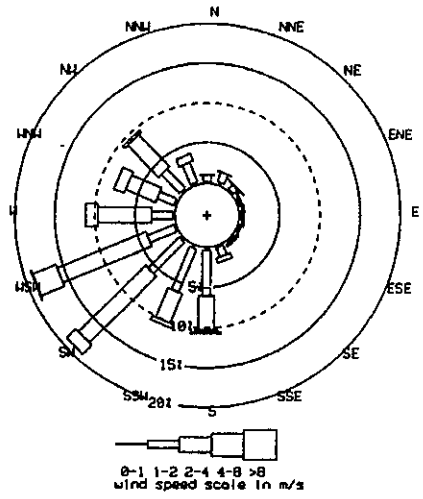


2100-2400 EST 10.0 metres
LHRL Tower 10m

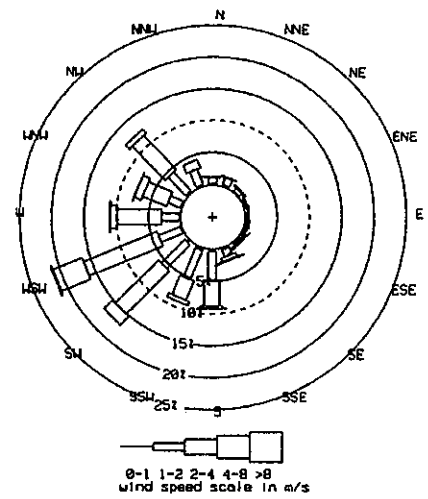
Figure 12



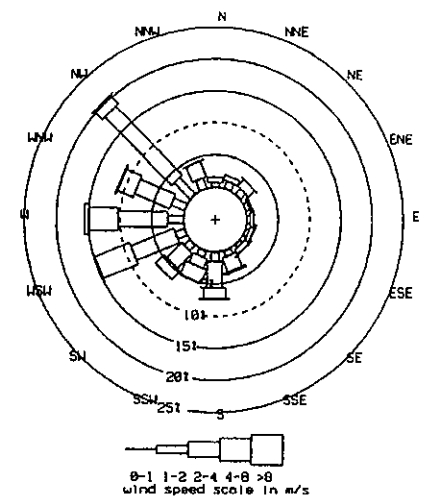
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



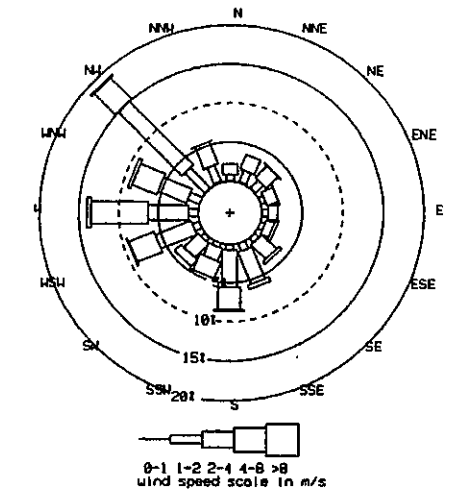
0600-0900 EST 10.0 metres
LHRL Tower 10m



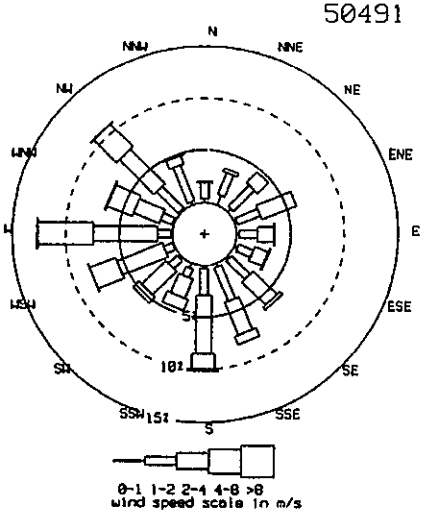
0900-1200 EST 10.0 metres
LHRL Tower 10m

Winter

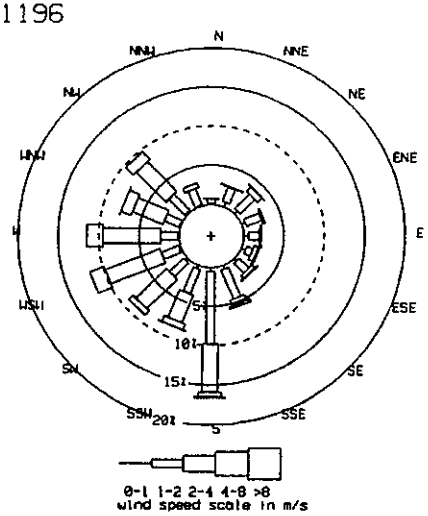
50491 to 121196



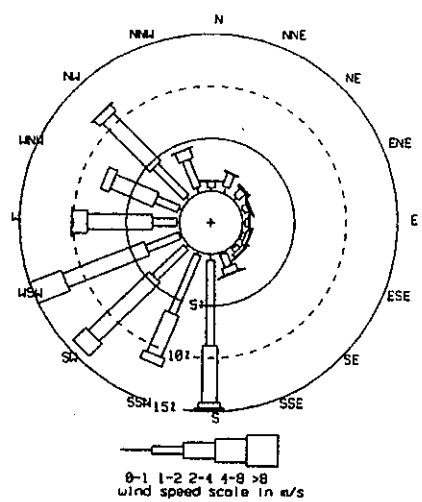
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

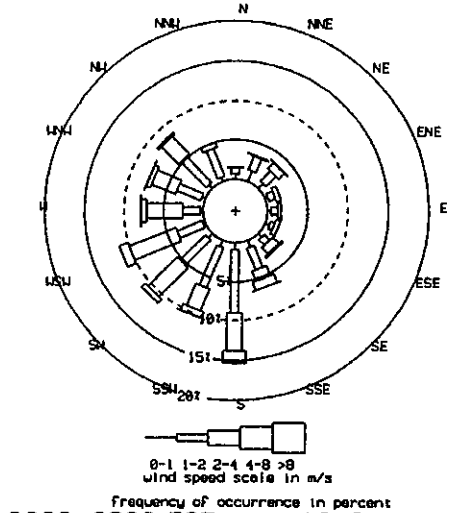


1800-2100 EST 10.0 metres
LHRL Tower 10m

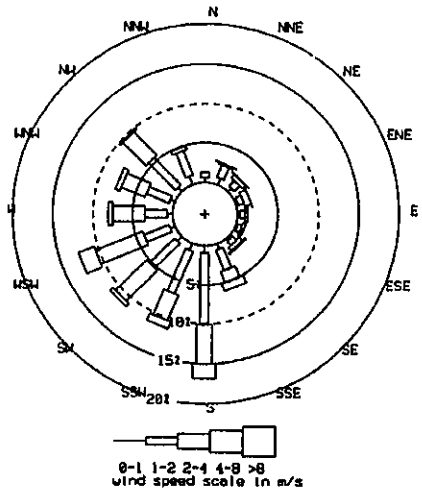


2100-2400 EST 10.0 metres
LHRL Tower 10m

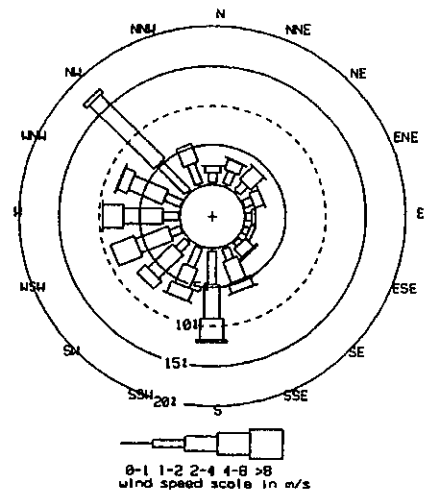
Figure 13



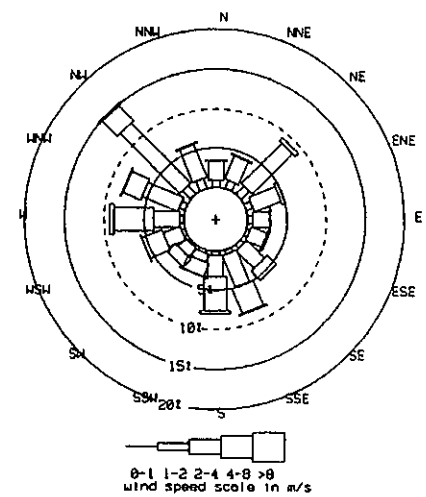
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



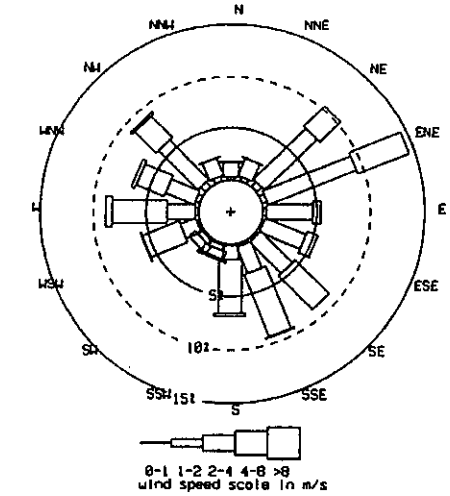
0600-0900 EST 10.0 metres
LHRL Tower 10m



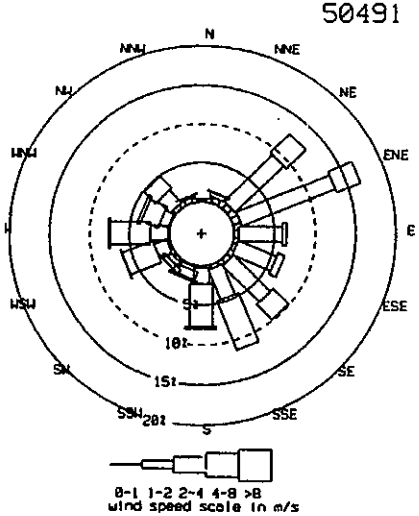
0900-1200 EST 10.0 metres
LHRL Tower 10m

Spring

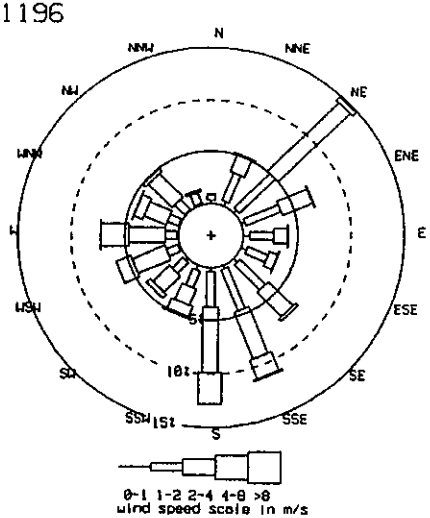
50491 to 121196



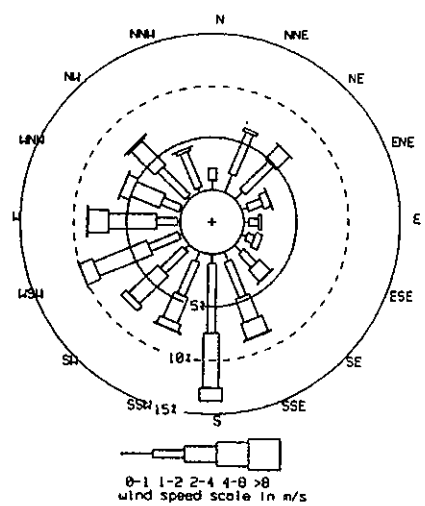
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

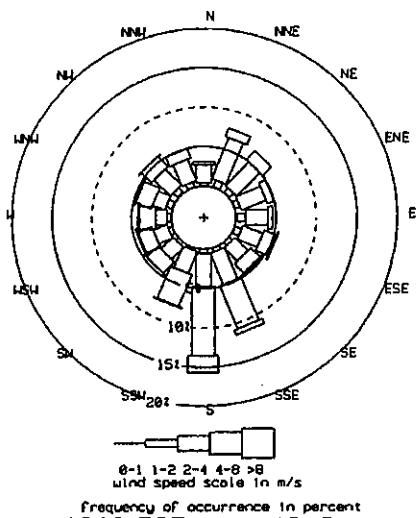


1800-2100 EST 10.0 metres
LHRL Tower 10m

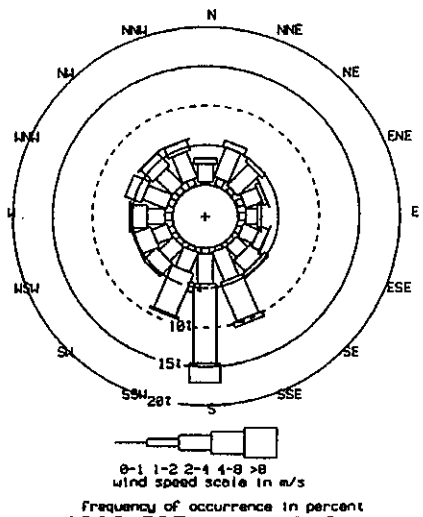


2100-2400 EST 10.0 metres
LHRL Tower 10m

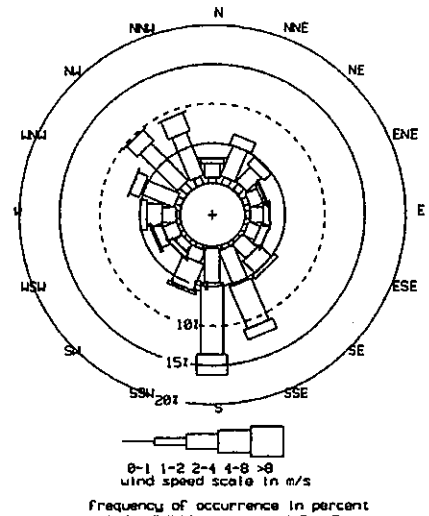
Figure 14



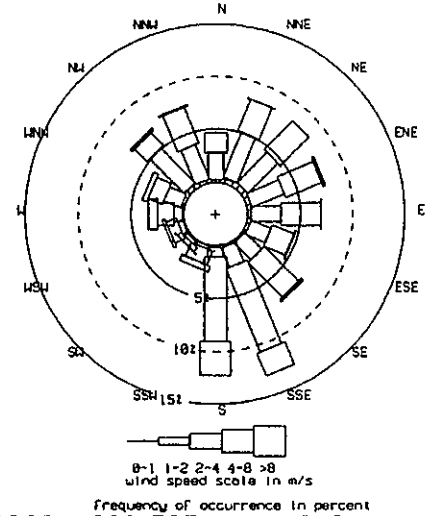
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



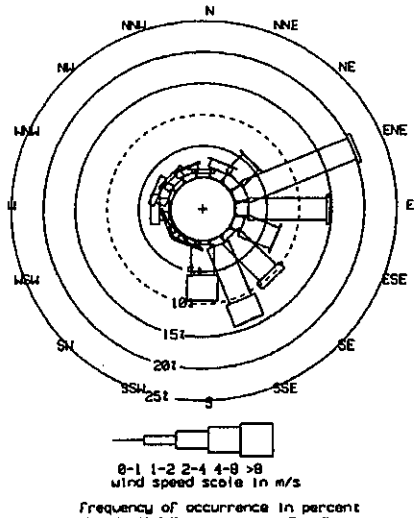
0600-0900 EST 49.0 metres
LHRL Tower 49m



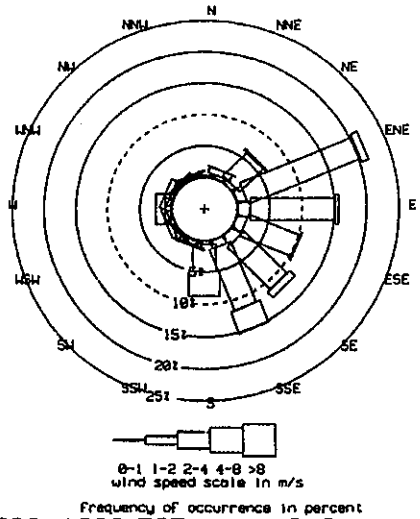
0900-1200 EST 49.0 metres
LHRL Tower 49m

Summer

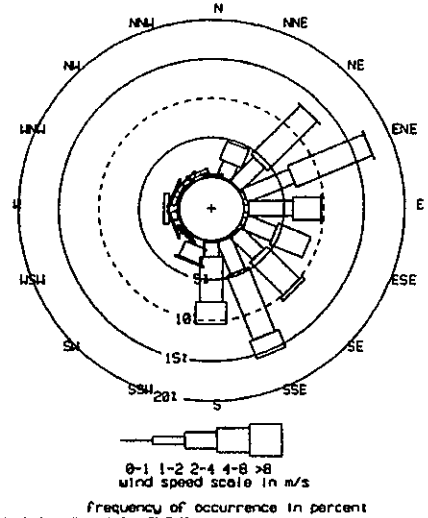
50491 to 121196



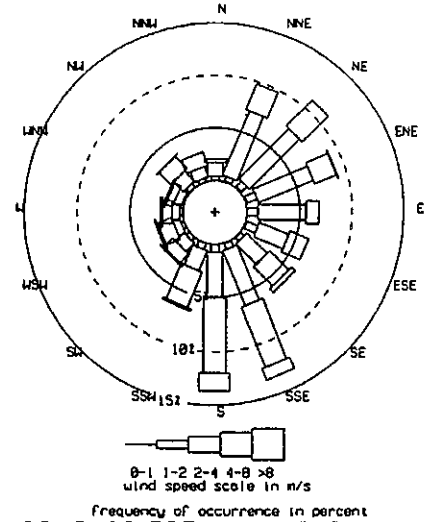
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m

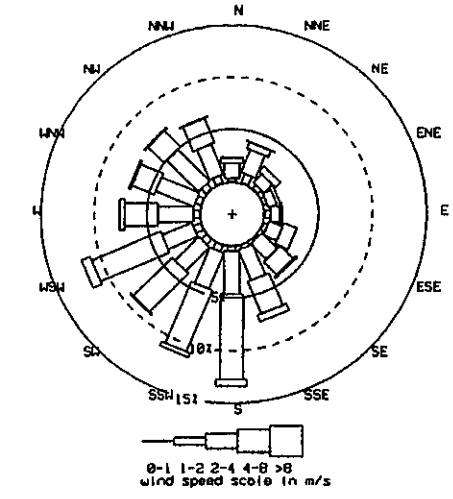


1800-2100 EST 49.0 metres
LHRL Tower 49m

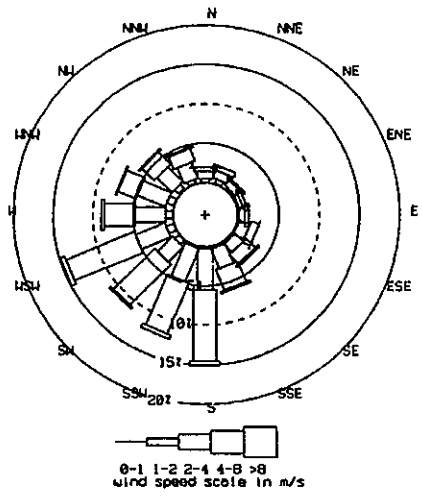


2100-2400 EST 49.0 metres
LHRL Tower 49m

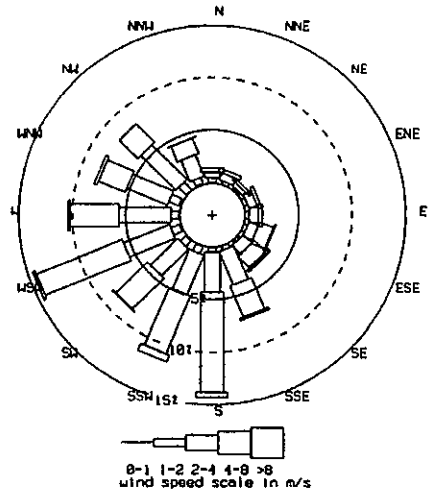
Figure 15



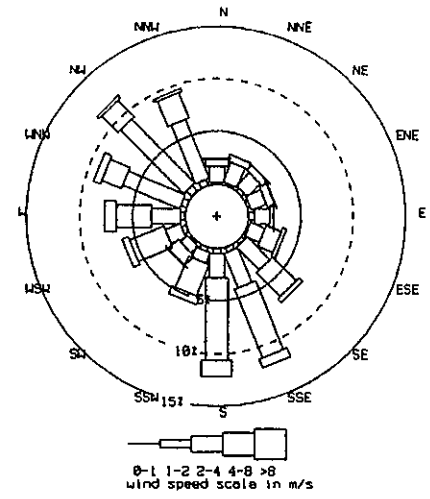
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



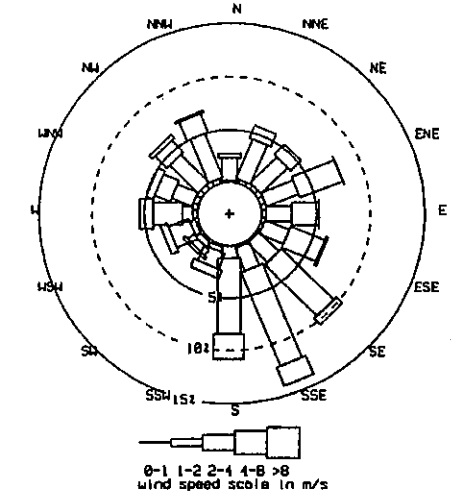
0600-0900 EST 49.0 metres
LHRL Tower 49m



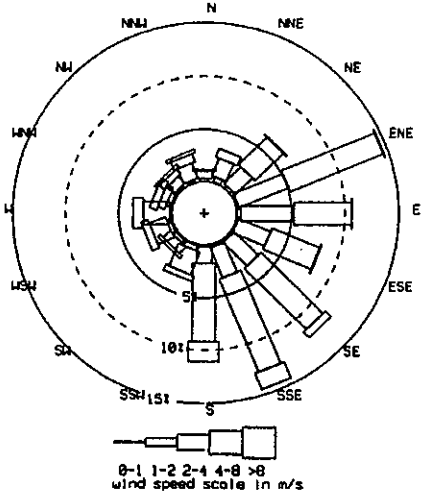
0900-1200 EST 49.0 metres
LHRL Tower 49m

Autumn

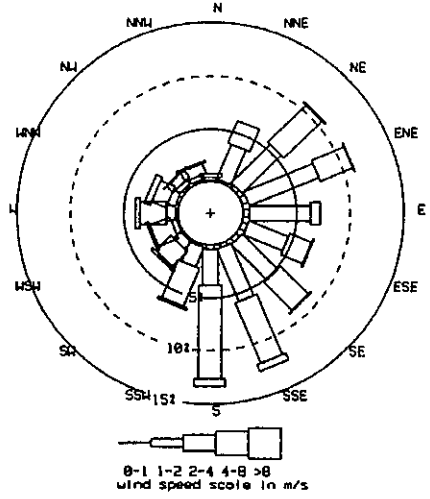
50491 to 121196



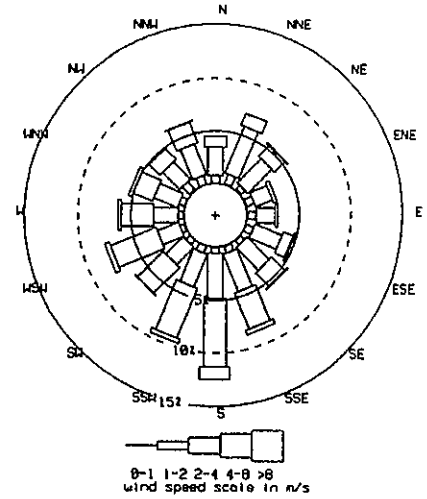
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m

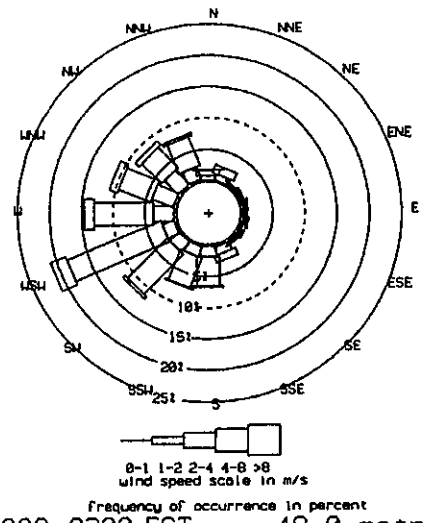


1800-2100 EST 49.0 metres
LHRL Tower 49m

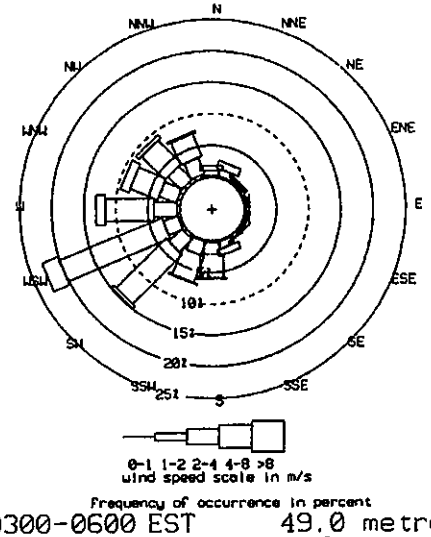


2100-2400 EST 49.0 metres
LHRL Tower 49m

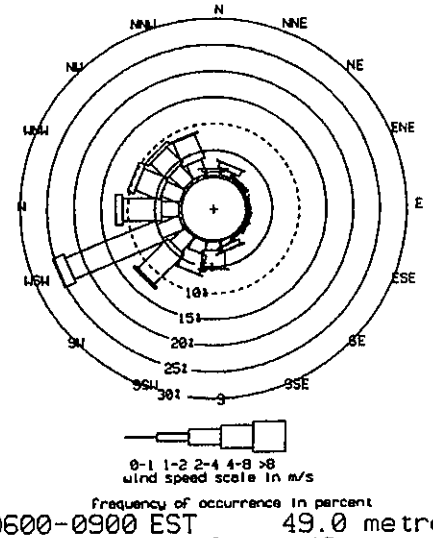
Figure 16



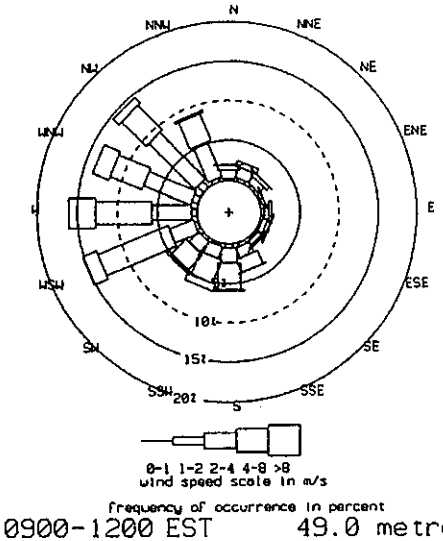
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



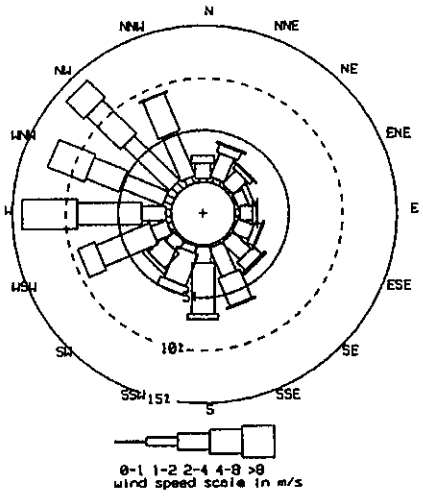
0600-0900 EST 49.0 metres
LHRL Tower 49m



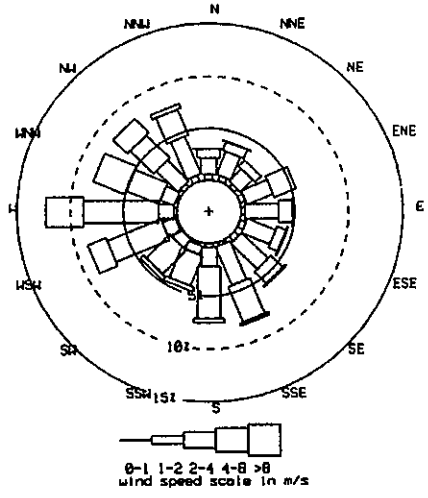
0900-1200 EST 49.0 metres
LHRL Tower 49m

Winter

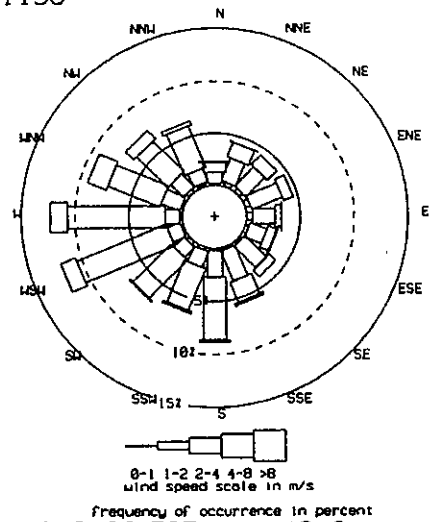
50491 to 121196



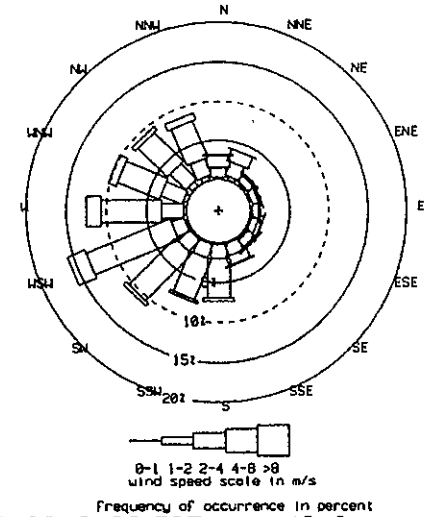
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m



1800-2100 EST 49.0 metres
LHRL Tower 49m



2100-2400 EST 49.0 metres
LHRL Tower 49m

Figure 17

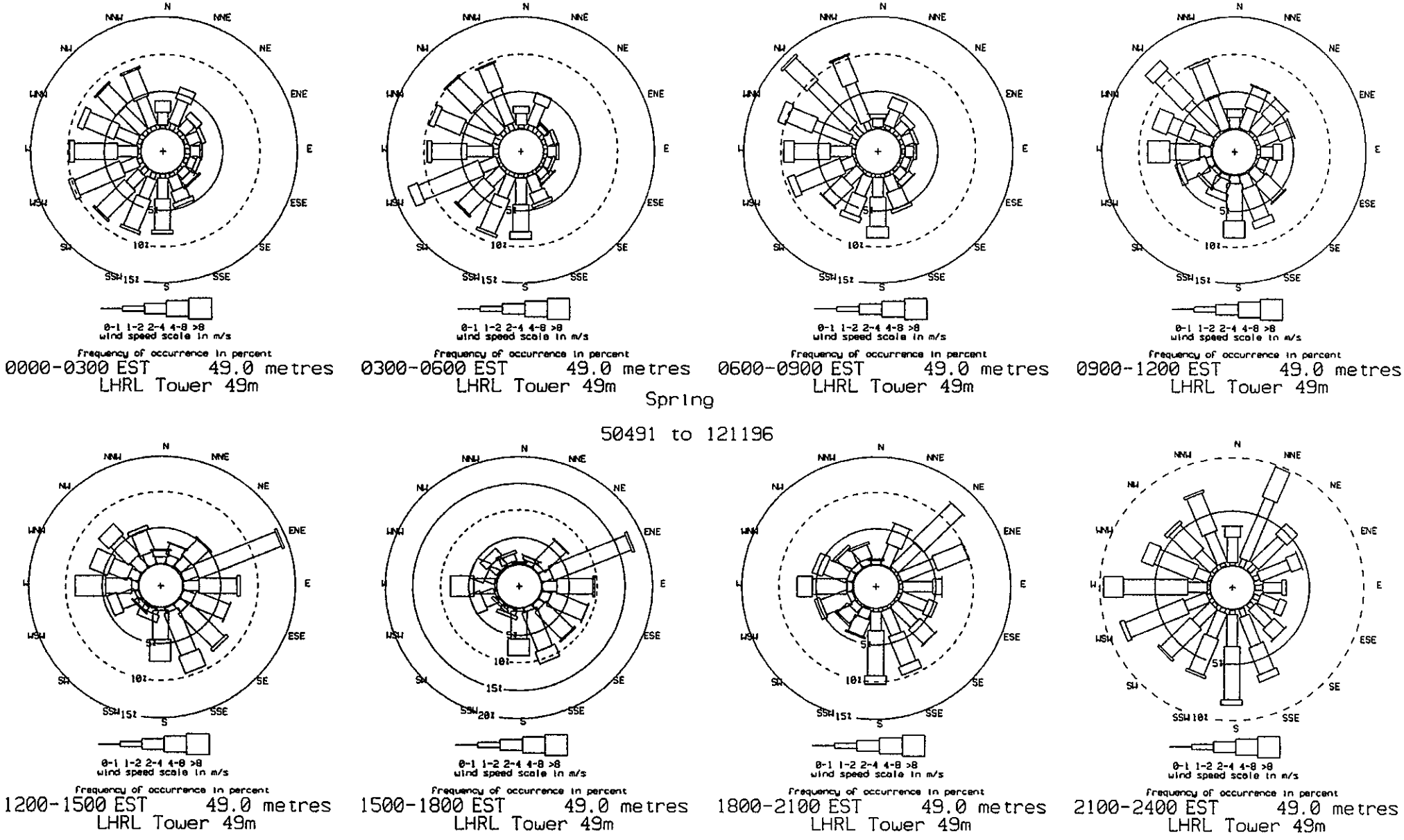
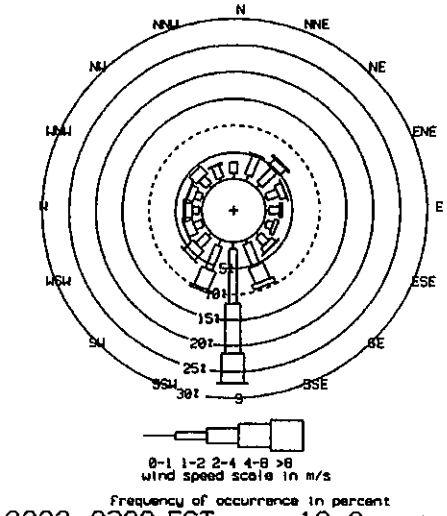
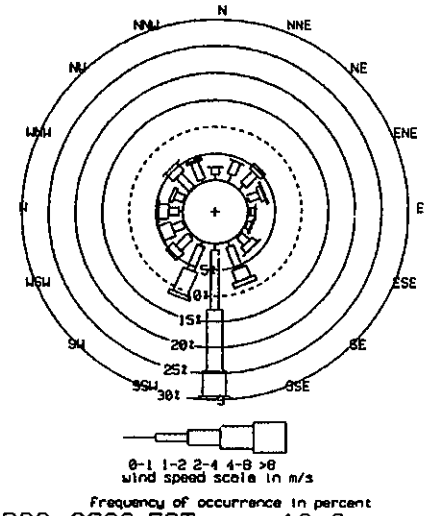

0000-0300 EST 49.0 metres
LHRL Tower 49m
0300-0600 EST 49.0 metres
LHRL Tower 49m
0600-0900 EST 49.0 metres
LHRL Tower 49m
0900-1200 EST 49.0 metres
LHRL Tower 49m
Spring
50491 to 121196
1200-1500 EST 49.0 metres
LHRL Tower 49m
1500-1800 EST 49.0 metres
LHRL Tower 49m
1800-2100 EST 49.0 metres
LHRL Tower 49m
2100-2400 EST 49.0 metres
LHRL Tower 49m

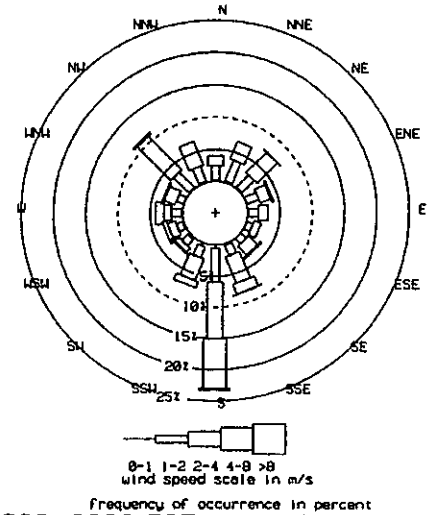
Figure 18



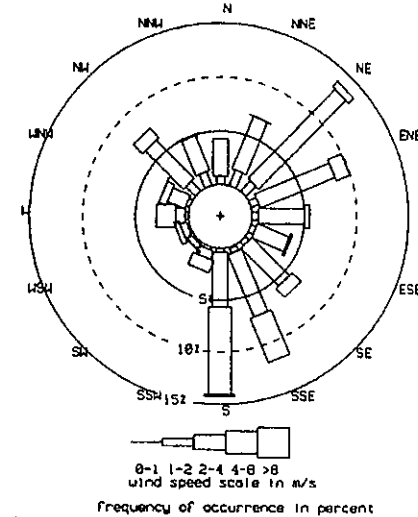
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



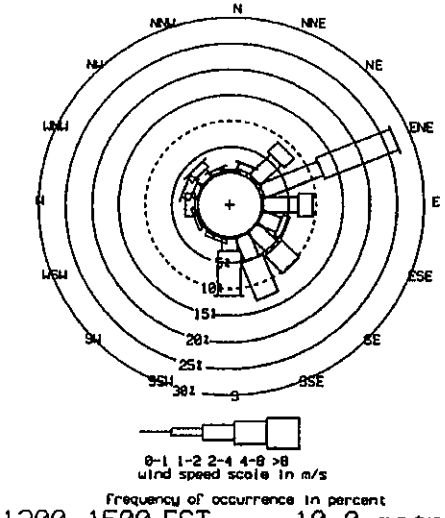
0600-0900 EST 10.0 metres
LHRL Tower 10m



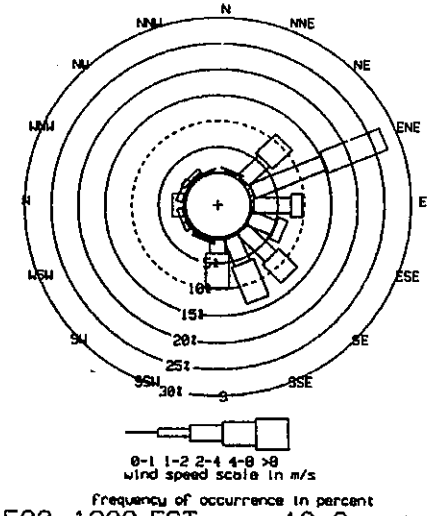
0900-1200 EST 10.0 metres
LHRL Tower 10m

Summer

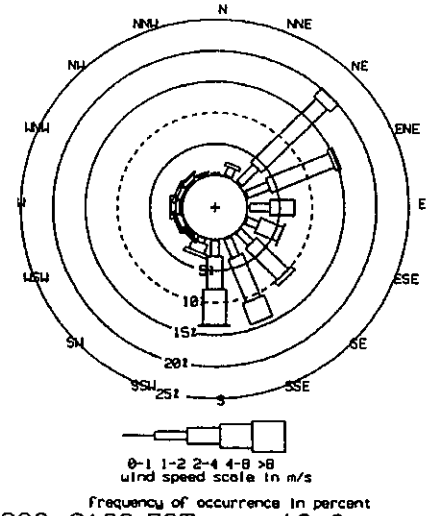
10493 to 121196



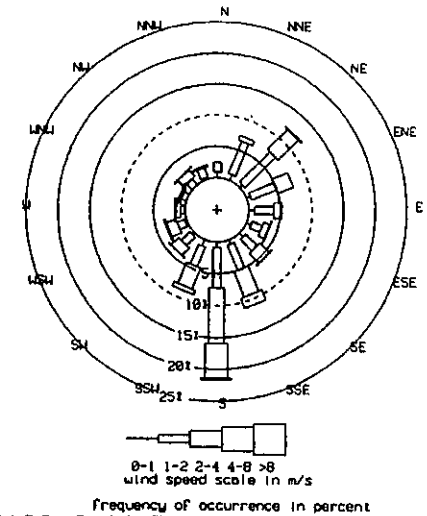
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

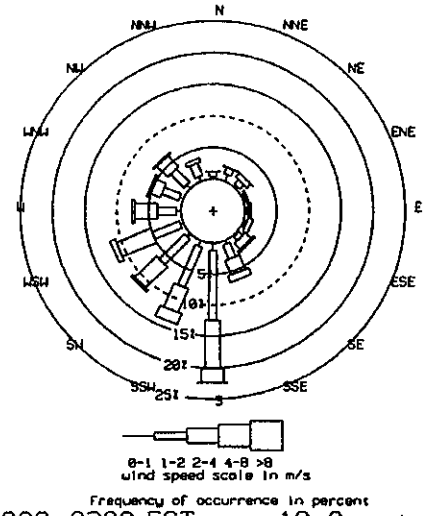


1800-2100 EST 10.0 metres
LHRL Tower 10m

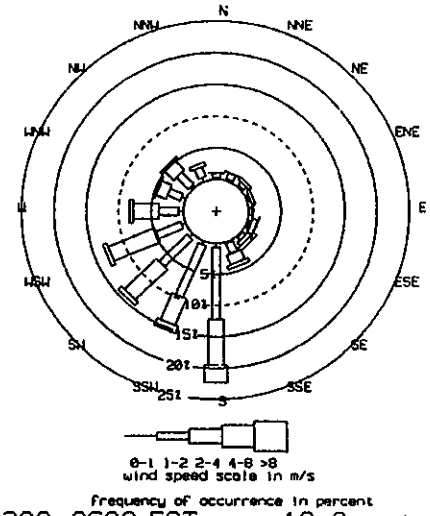


2100-2400 EST 10.0 metres
LHRL Tower 10m

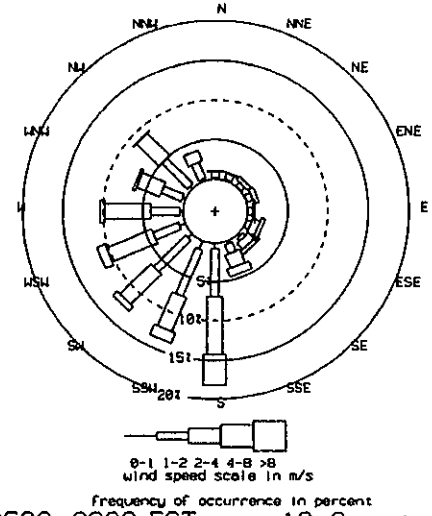
Figure 19



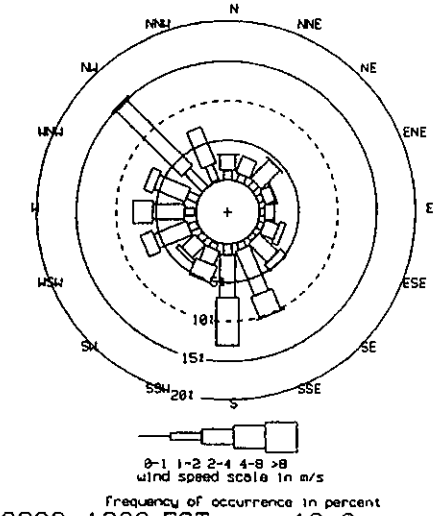
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



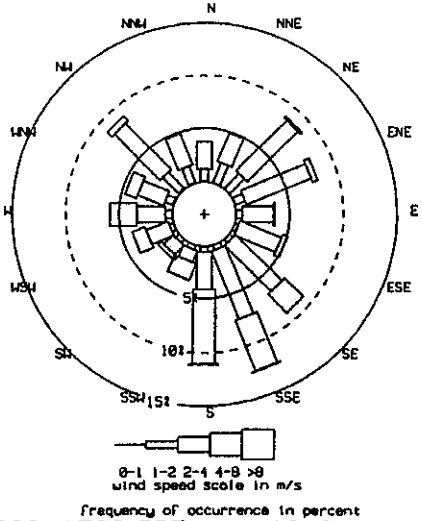
0600-0900 EST 10.0 metres
LHRL Tower 10m



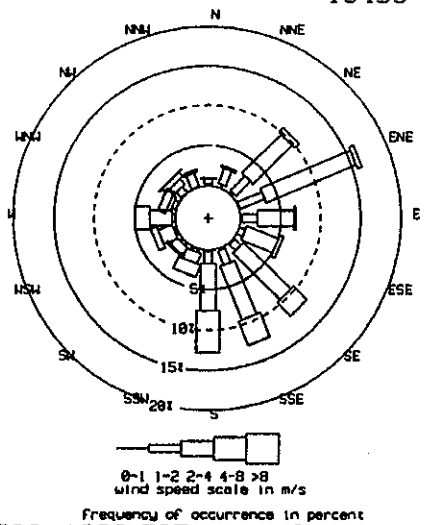
0900-1200 EST 10.0 metres
LHRL Tower 10m

Autumn

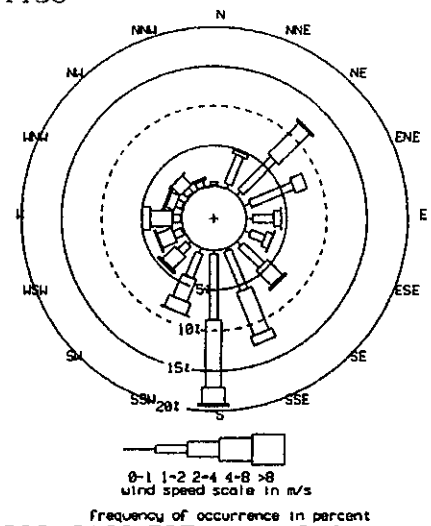
10493 to 121196



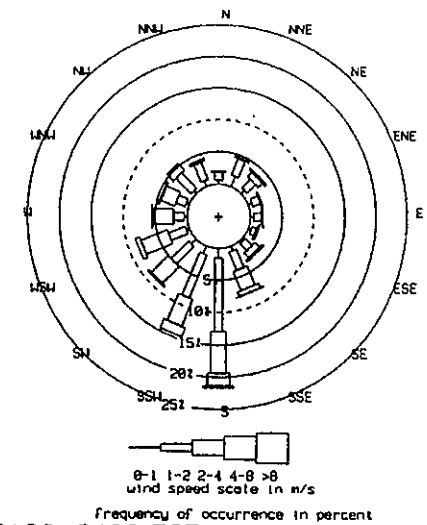
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

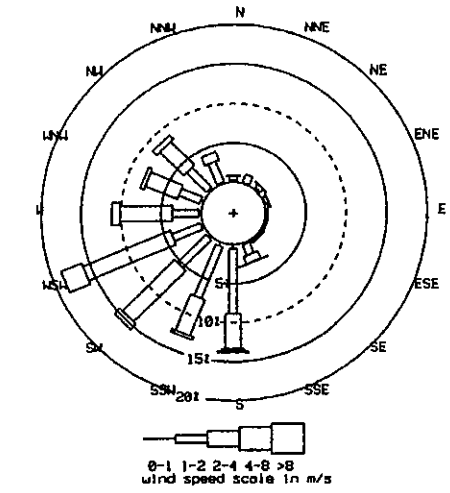


1800-2100 EST 10.0 metres
LHRL Tower 10m

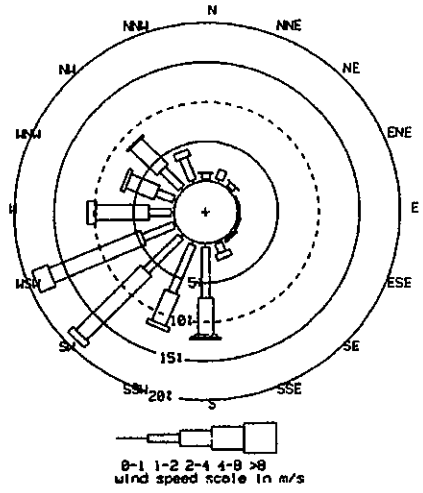


2100-2400 EST 10.0 metres
LHRL Tower 10m

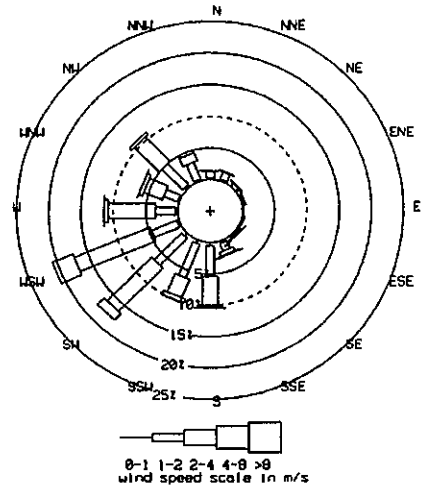
Figure 20



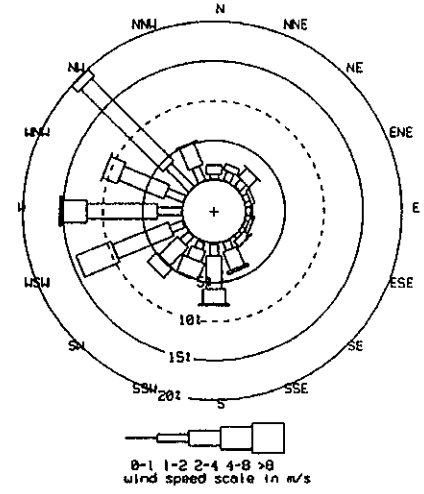
0000-0300 EST 10.0 metres
LHRL Tower 10m



0300-0600 EST 10.0 metres
LHRL Tower 10m



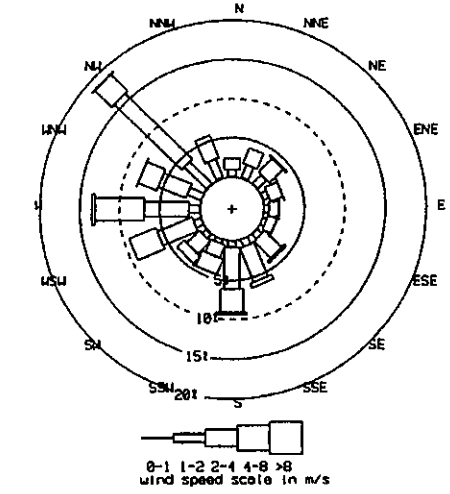
0600-0900 EST 10.0 metres
LHRL Tower 10m



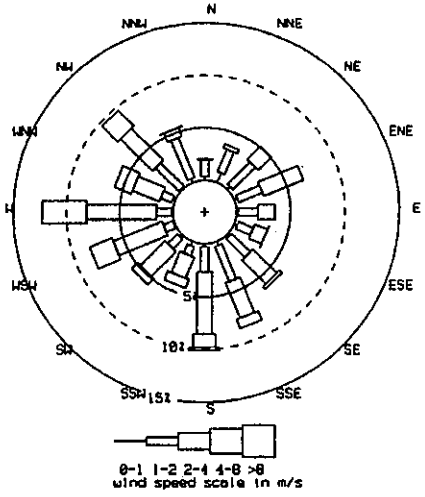
0900-1200 EST 10.0 metres
LHRL Tower 10m

Winter

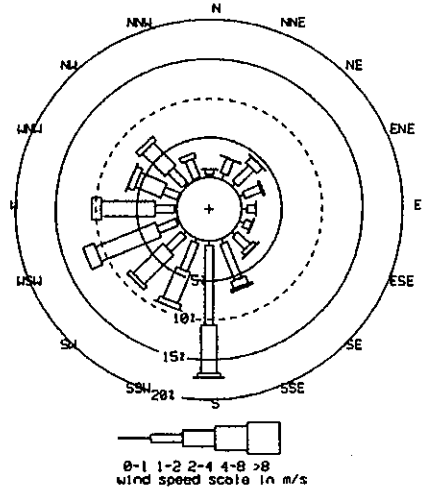
10493 to 121196



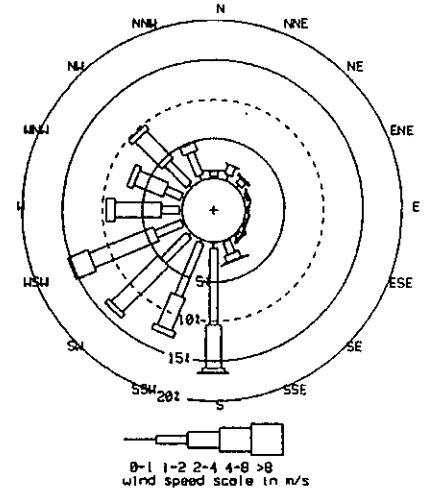
1200-1500 EST 10.0 metres
LHRL Tower 10m



1500-1800 EST 10.0 metres
LHRL Tower 10m

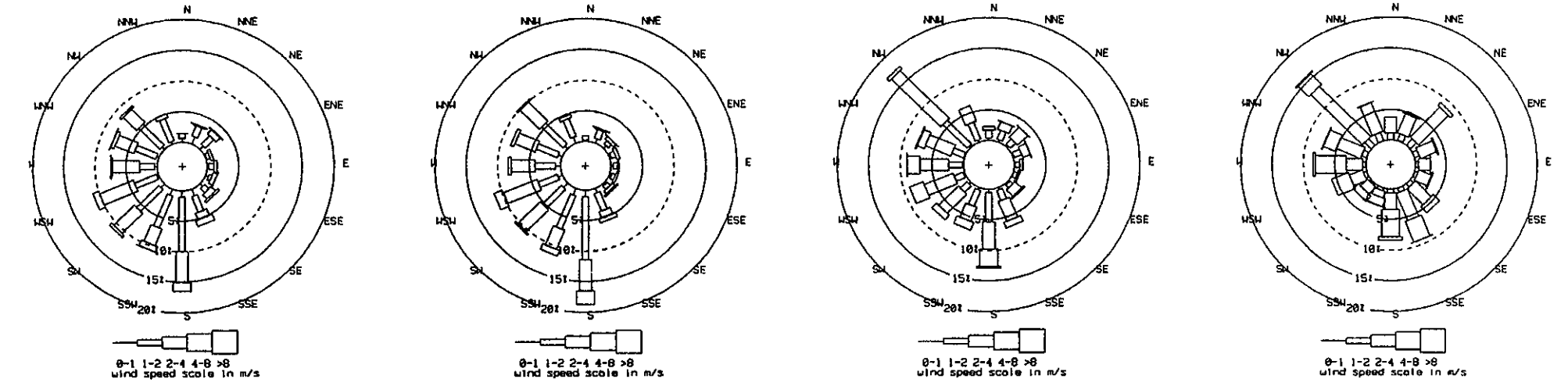


1800-2100 EST 10.0 metres
LHRL Tower 10m



2100-2400 EST 10.0 metres
LHRL Tower 10m

Figure 21



Spring

10493 to 121196

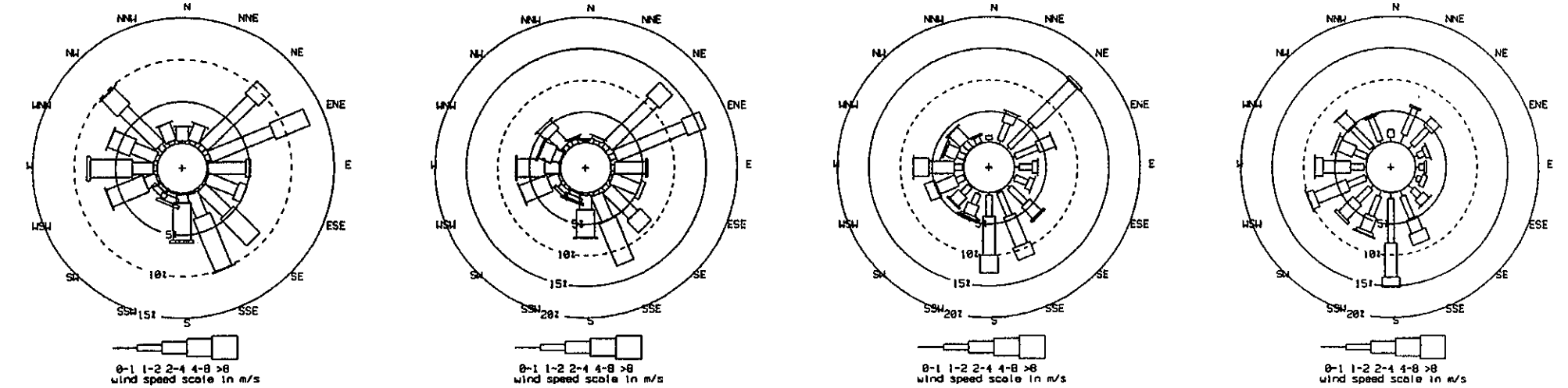
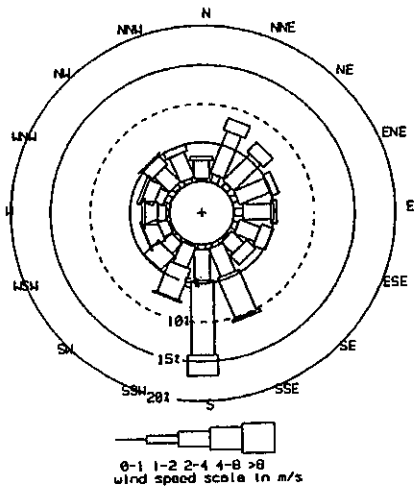
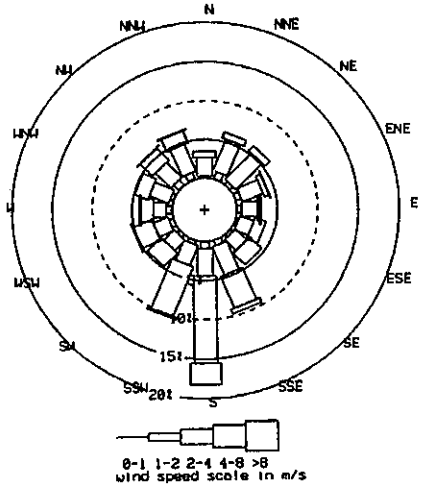


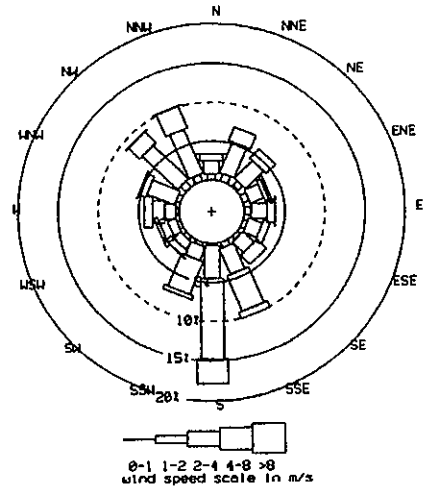
Figure 22



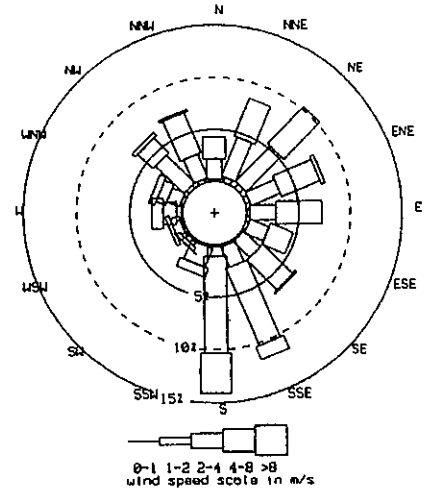
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



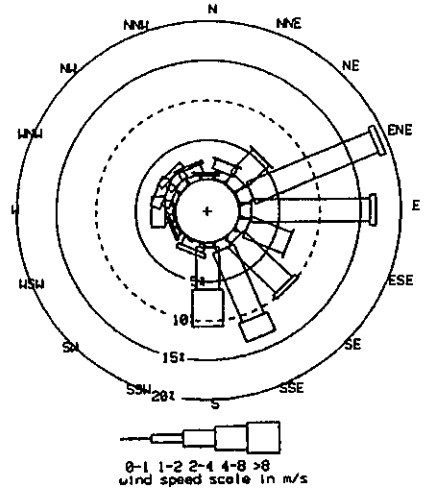
0600-0900 EST 49.0 metres
LHRL Tower 49m



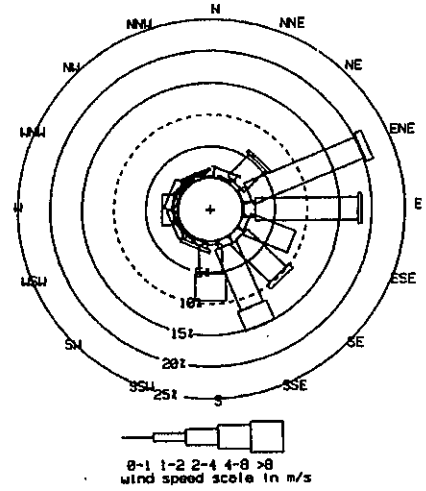
0900-1200 EST 49.0 metres
LHRL Tower 49m

Summer

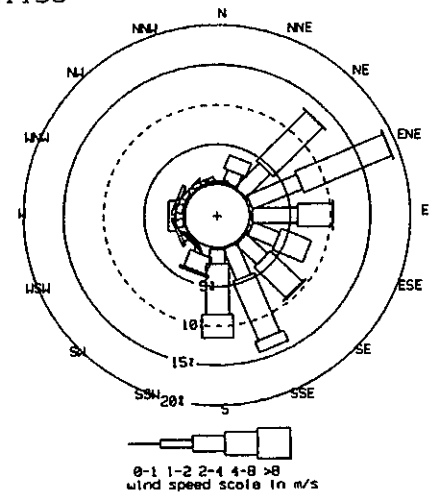
10493 to 121196



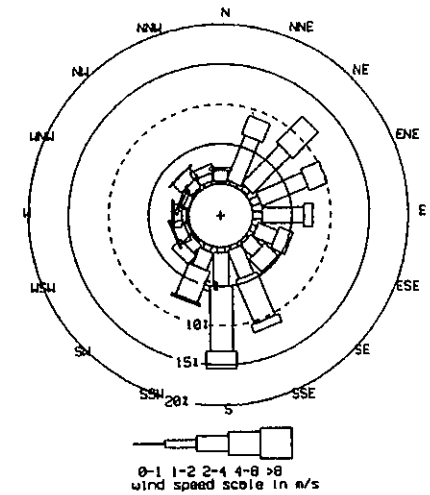
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m

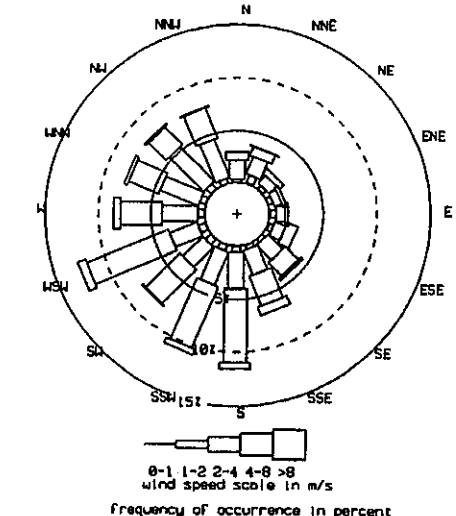


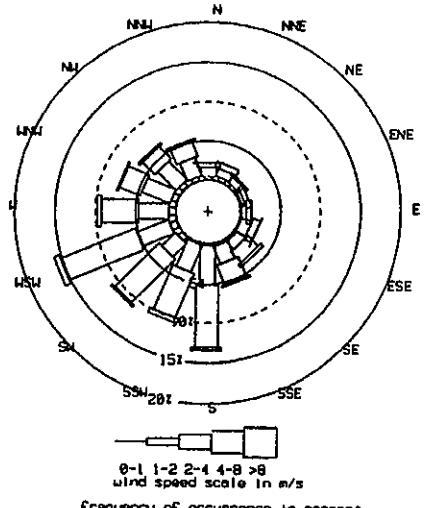
1800-2100 EST 49.0 metres
LHRL Tower 49m

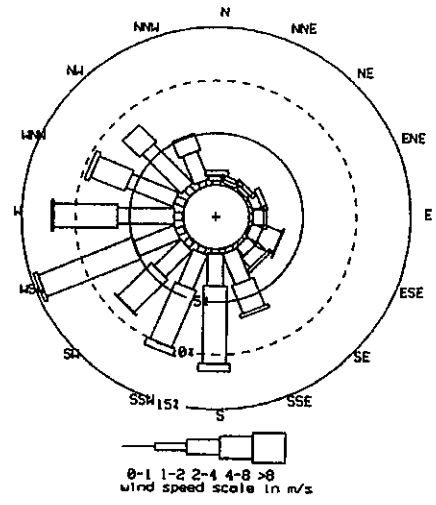


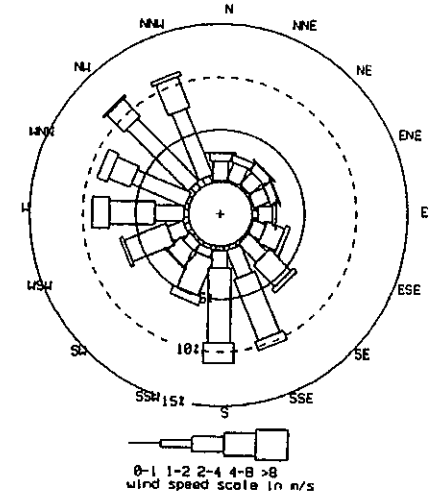
2100-2400 EST 49.0 metres
LHRL Tower 49m

Figure 23



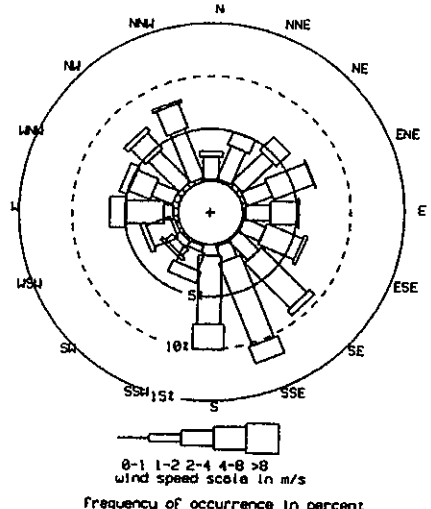


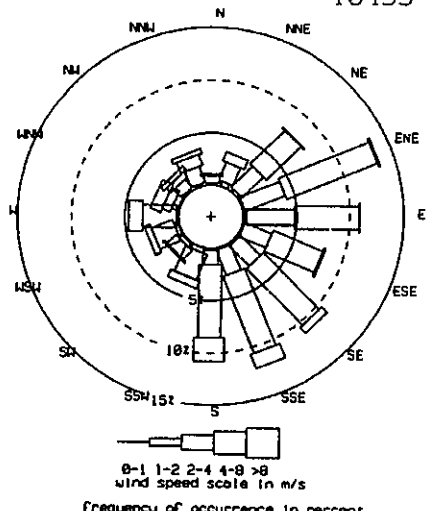


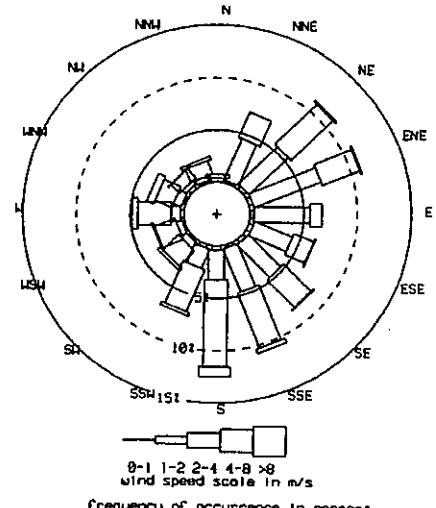


Autumn

10493 to 121196







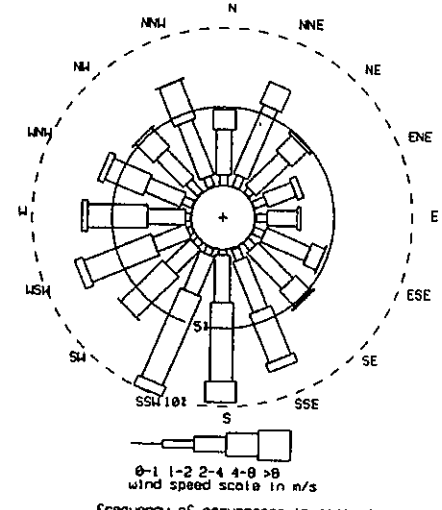
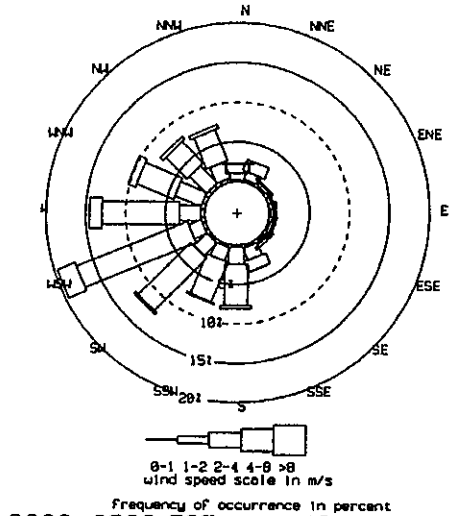
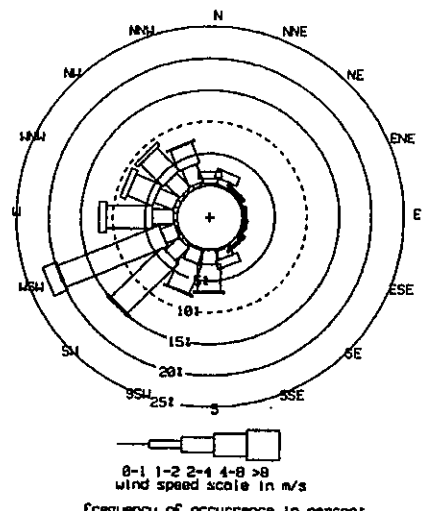


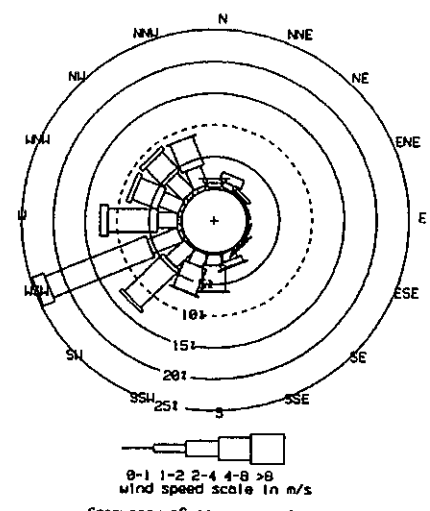
Figure 24



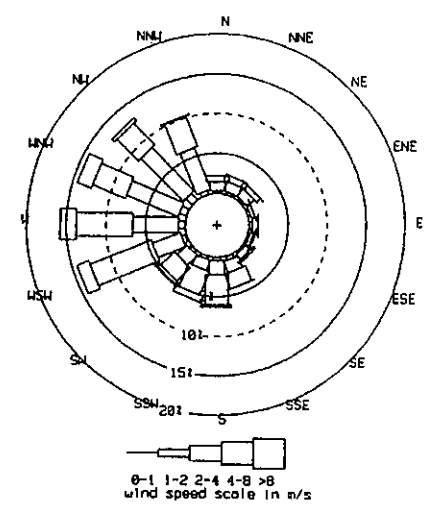
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



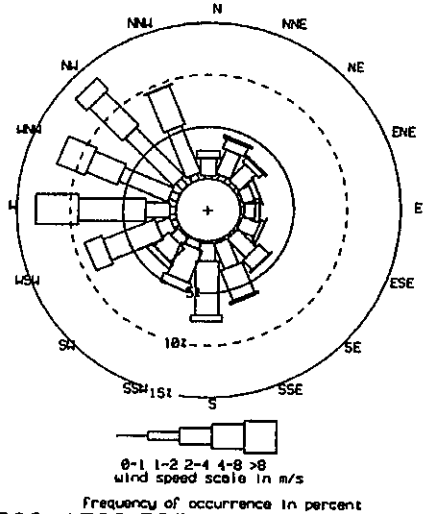
0600-0900 EST 49.0 metres
LHRL Tower 49m



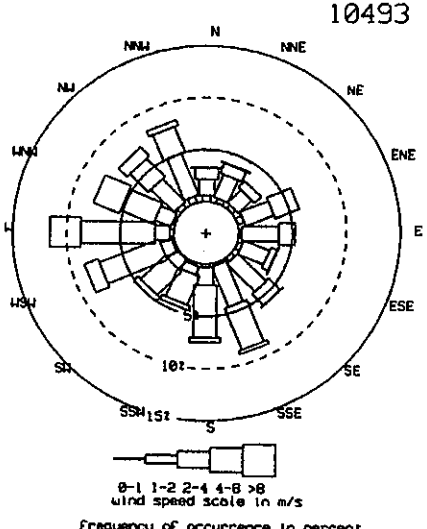
0900-1200 EST 49.0 metres
LHRL Tower 49m

Winter

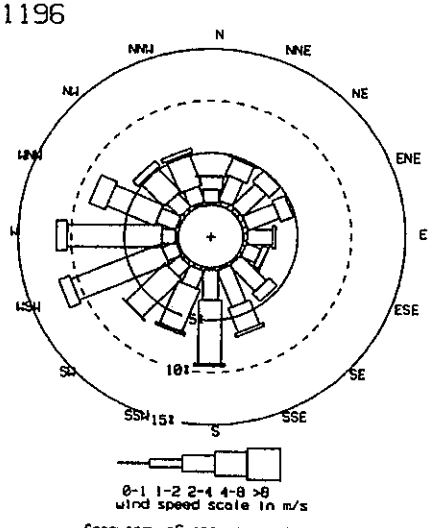
10493 to 121196



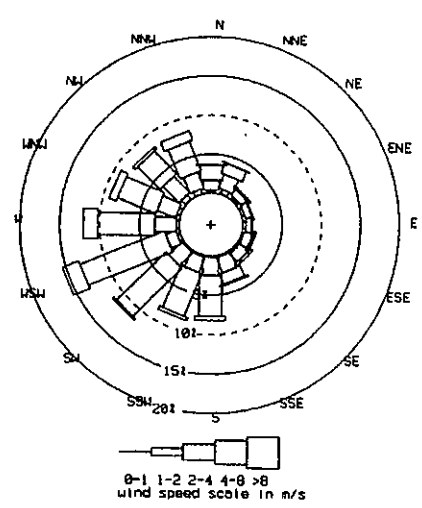
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m

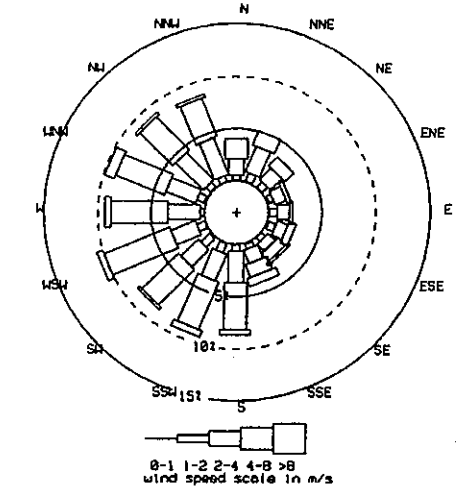


1800-2100 EST 49.0 metres
LHRL Tower 49m

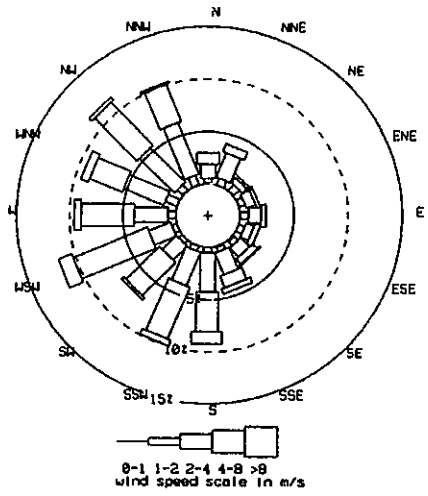


2100-2400 EST 49.0 metres
LHRL Tower 49m

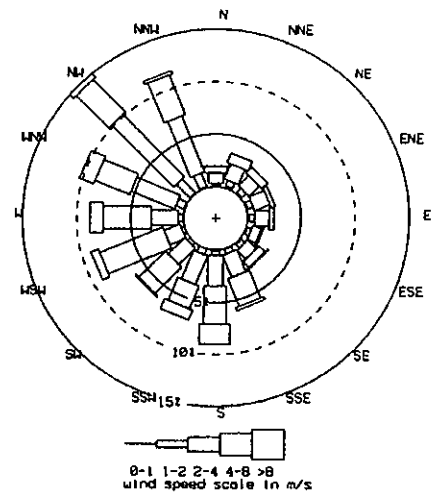
Figure 25



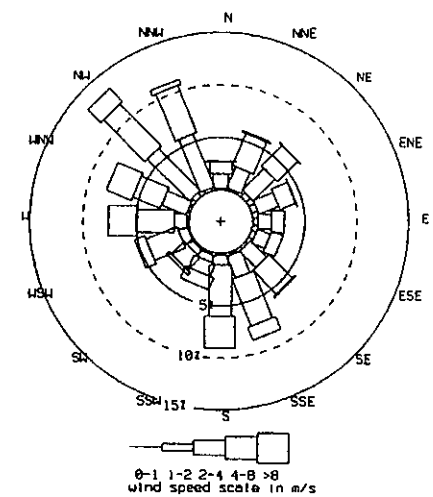
0000-0300 EST 49.0 metres
LHRL Tower 49m



0300-0600 EST 49.0 metres
LHRL Tower 49m



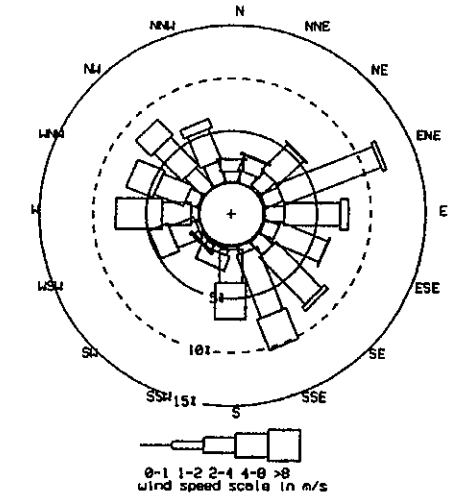
0600-0900 EST 49.0 metres
LHRL Tower 49m



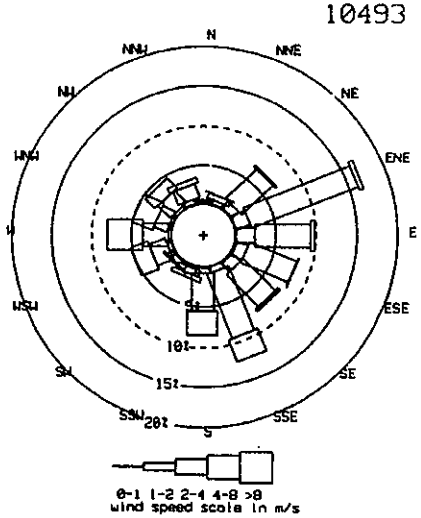
0900-1200 EST 49.0 metres
LHRL Tower 49m

Spring

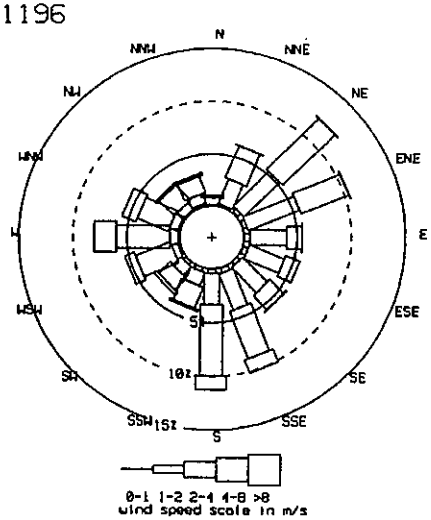
10493 to 121196



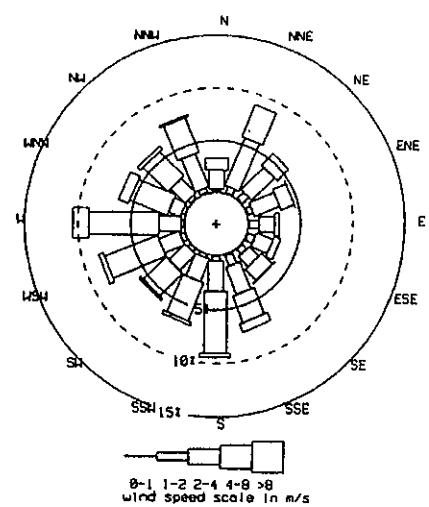
1200-1500 EST 49.0 metres
LHRL Tower 49m



1500-1800 EST 49.0 metres
LHRL Tower 49m

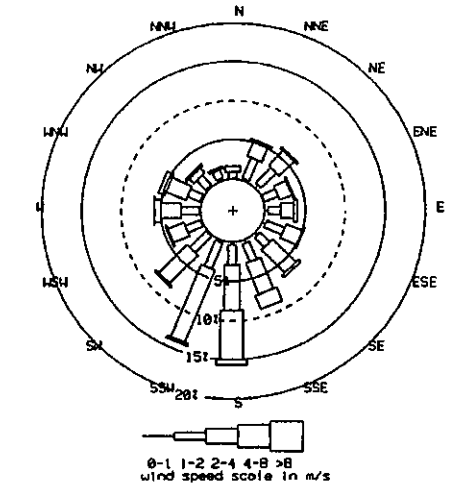


1800-2100 EST 49.0 metres
LHRL Tower 49m

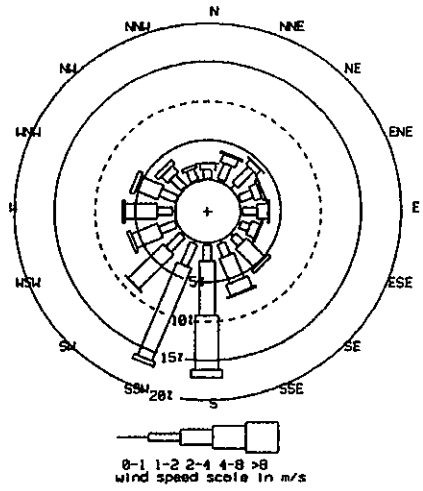


2100-2400 EST 49.0 metres
LHRL Tower 49m

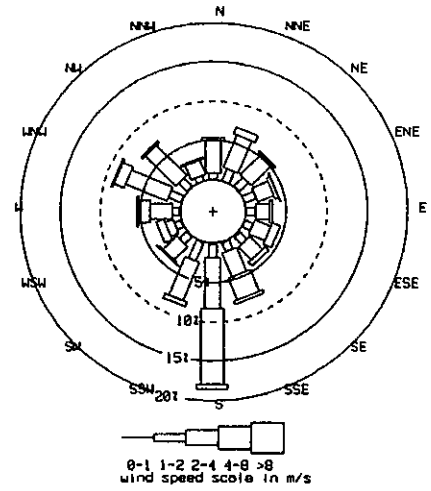
Figure 26



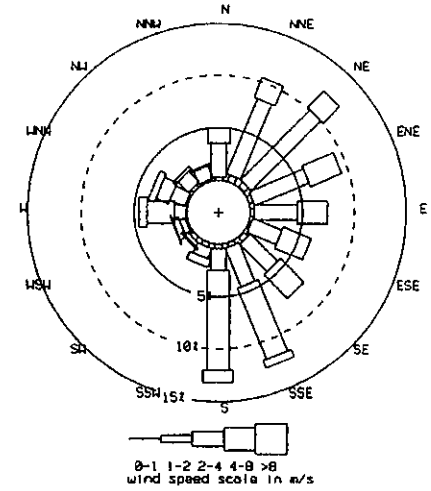
0000-0300 EST 15.65 metres
Lucas Hts. Comm School



0300-0600 EST 15.65 metres
Lucas Hts. Comm School

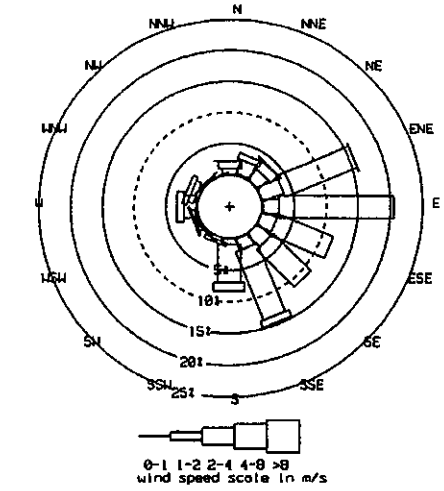


0600-0900 EST 15.65 metres
Lucas Hts. Comm School

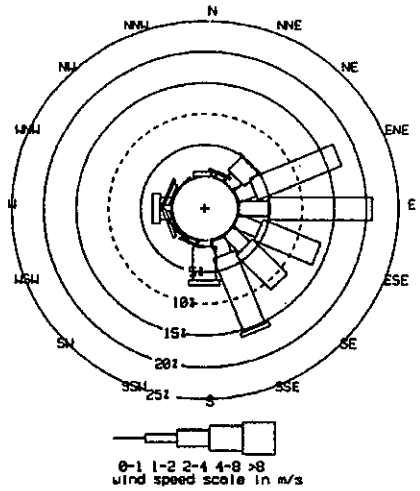


0900-1200 EST 15.65 metres
Lucas Hts. Comm School

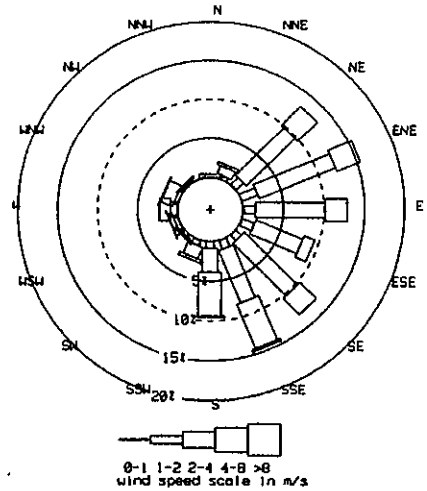
Summer
10493 to 271196



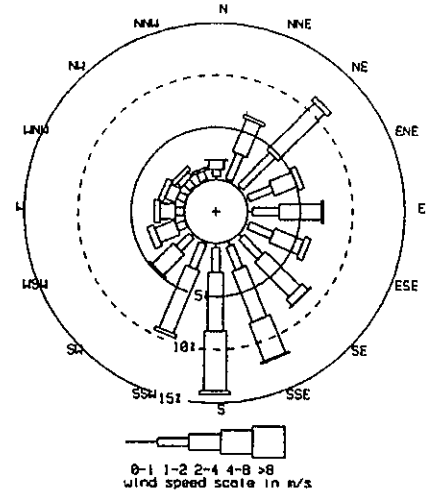
1200-1500 EST 15.65 metres
Lucas Hts. Comm School



1500-1800 EST 15.65 metres
Lucas Hts. Comm School

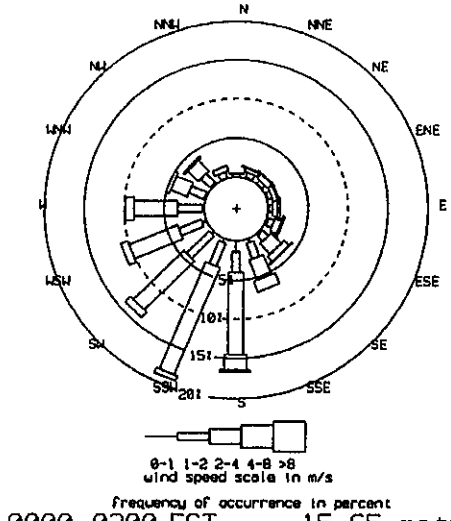


1800-2100 EST 15.65 metres
Lucas Hts. Comm School

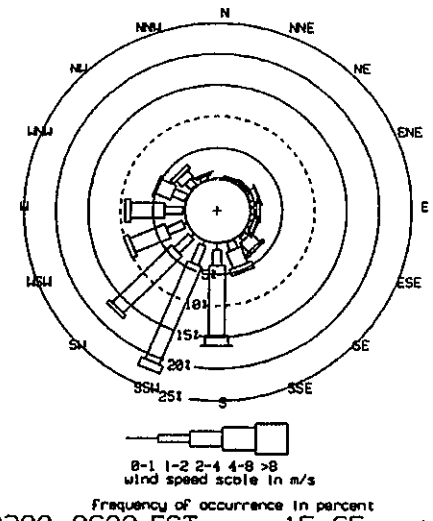


2100-2400 EST 15.65 metres
Lucas Hts. Comm School

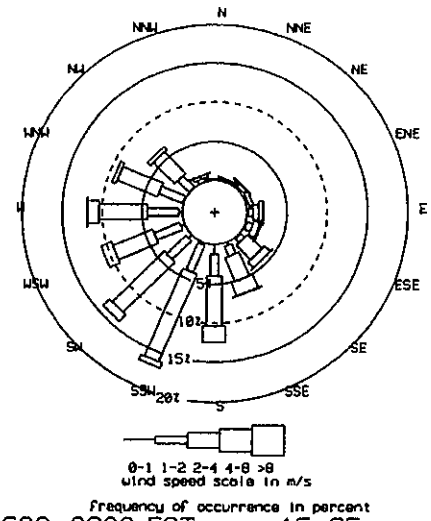
Figure 27



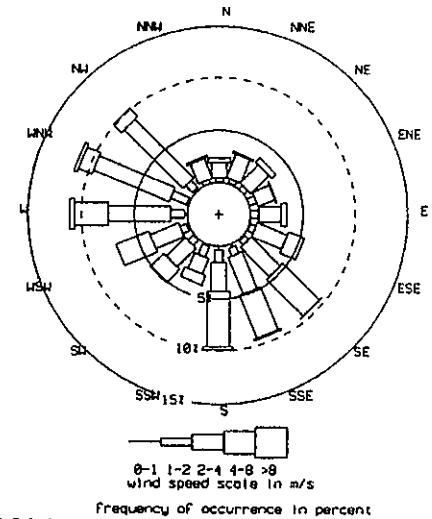
0000-0300 EST 15.65 metres
Lucas Hts. Comm School



0300-0600 EST 15.65 metres
Lucas Hts. Comm School

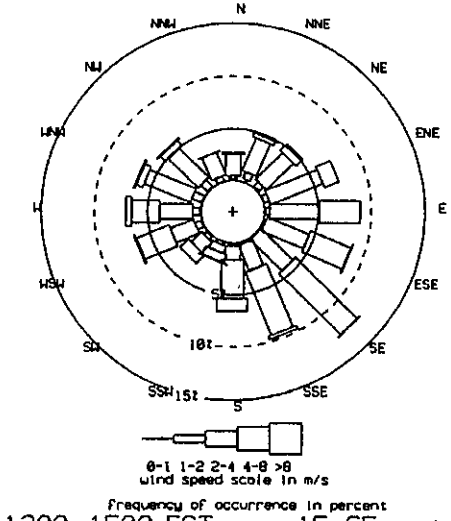


0600-0900 EST 15.65 metres
Lucas Hts. Comm School

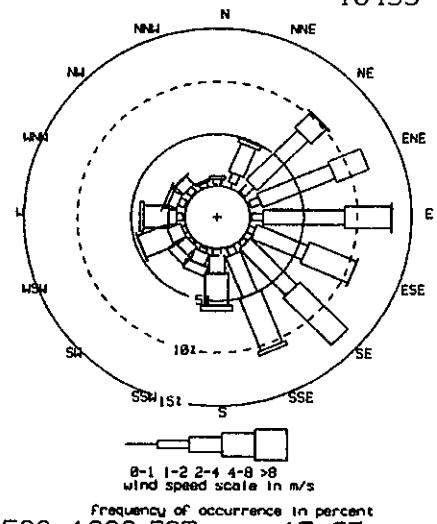


0900-1200 EST 15.65 metres
Lucas Hts. Comm School

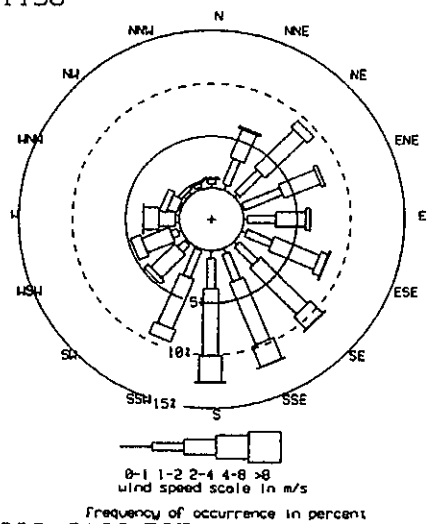
Autumn
10493 to 271196



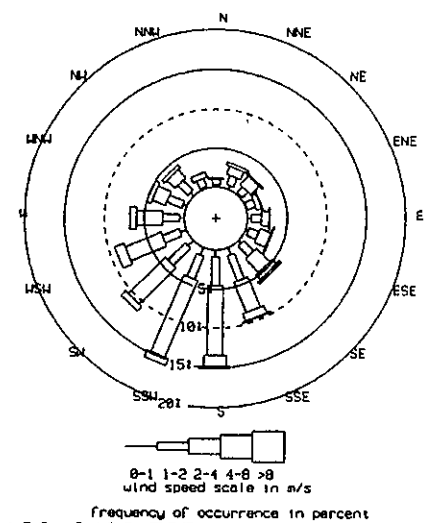
1200-1500 EST 15.65 metres
Lucas Hts. Comm School



1500-1800 EST 15.65 metres
Lucas Hts. Comm School

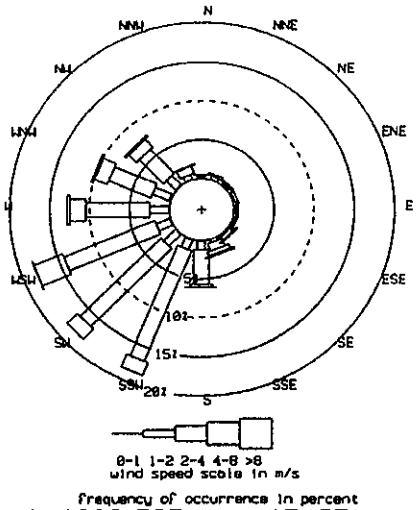


1800-2100 EST 15.65 metres
Lucas Hts. Comm School

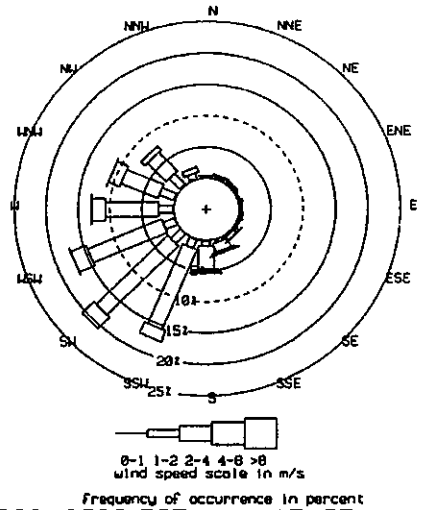


2100-2400 EST 15.65 metres
Lucas Hts. Comm School

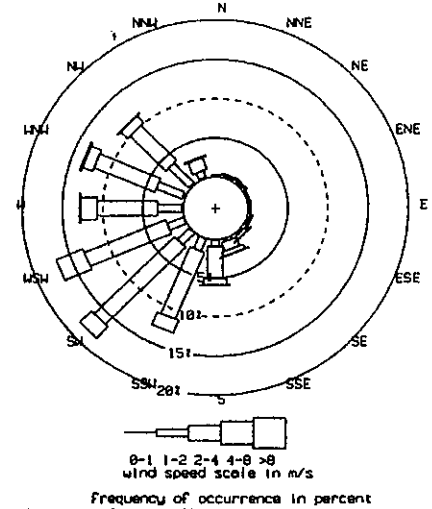
Figure 28



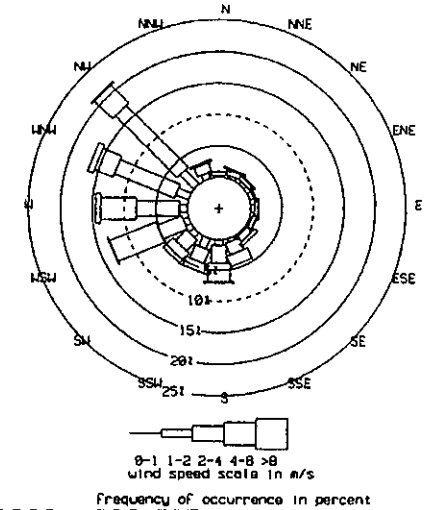
0000-0300 EST 15.65 metres
Lucas Hts. Comm School



0300-0600 EST 15.65 metres
Lucas Hts. Comm School

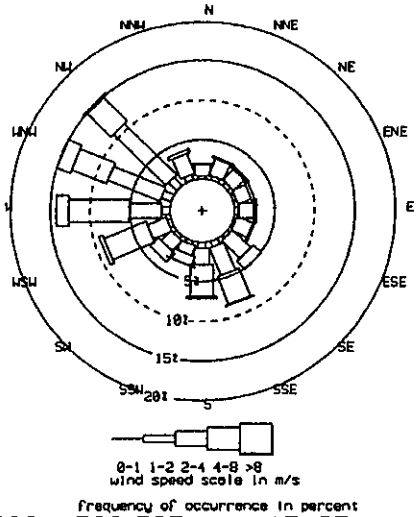


0600-0900 EST 15.65 metres
Lucas Hts. Comm School

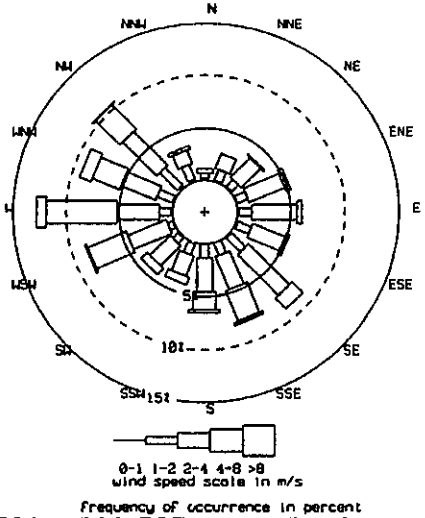


0900-1200 EST 15.65 metres
Lucas Hts. Comm School

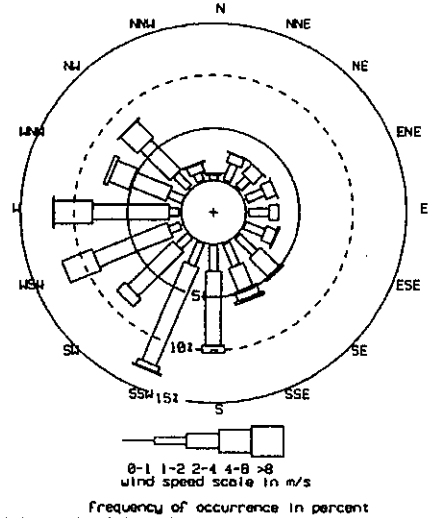
Winter
10493 to 271196



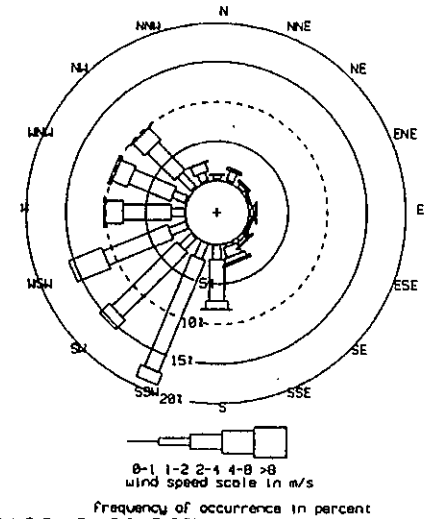
1200-1500 EST 15.65 metres
Lucas Hts. Comm School



1500-1800 EST 15.65 metres
Lucas Hts. Comm School

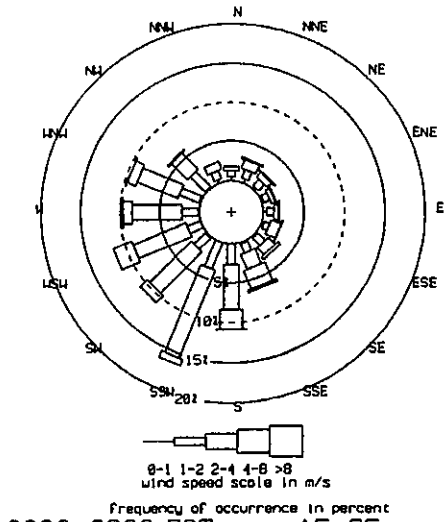


1800-2100 EST 15.65 metres
Lucas Hts. Comm School

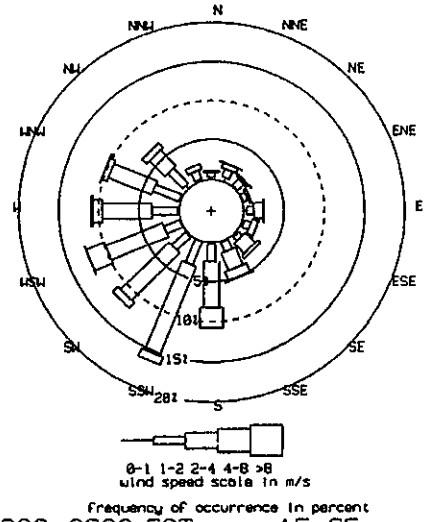


2100-2400 EST 15.65 metres
Lucas Hts. Comm School

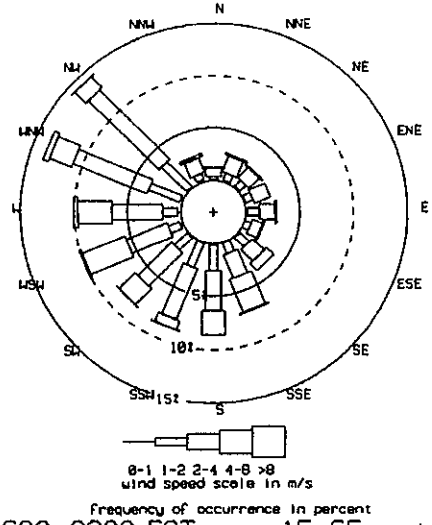
Figure 29



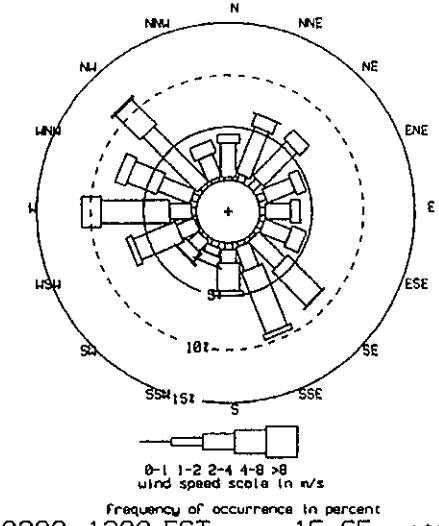
0000-0300 EST 15.65 metres
Lucas Hts. Comm School



0300-0600 EST 15.65 metres
Lucas Hts. Comm School

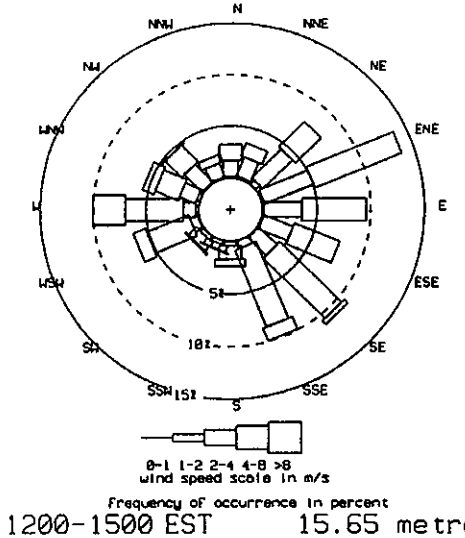


0600-0900 EST 15.65 metres
Lucas Hts. Comm School

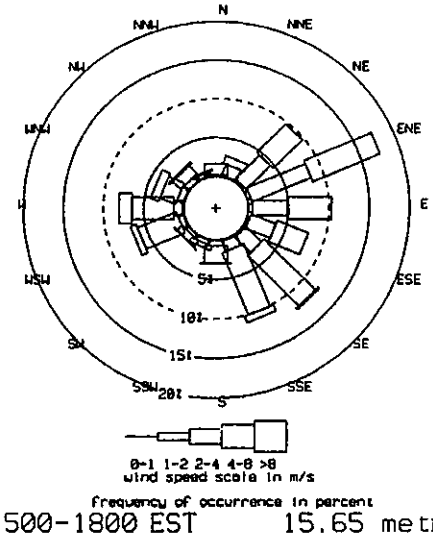


0900-1200 EST 15.65 metres
Lucas Hts. Comm School

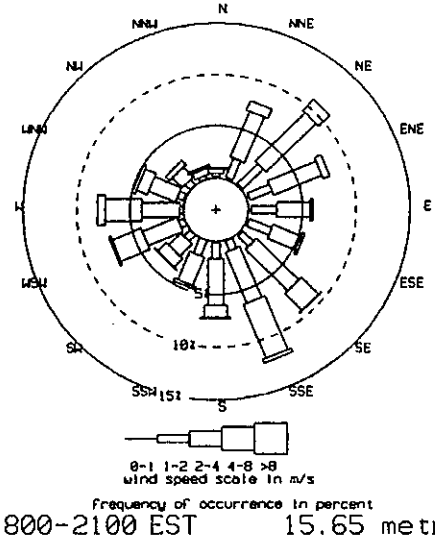
Spring
10493 to 271196



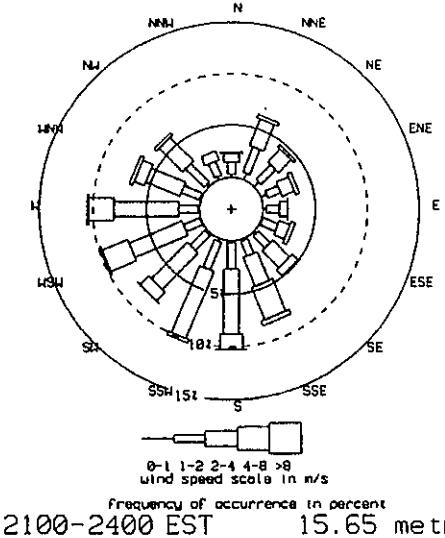
1200-1500 EST 15.65 metres
Lucas Hts. Comm School



1500-1800 EST 15.65 metres
Lucas Hts. Comm School

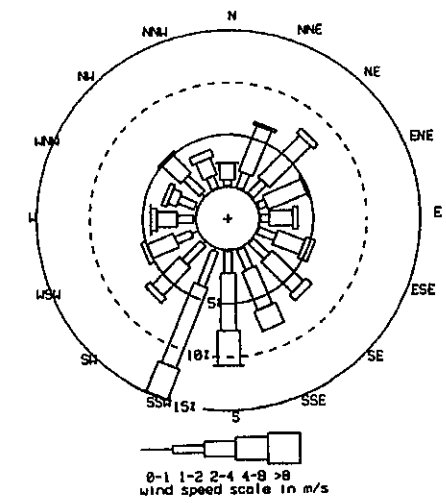


1800-2100 EST 15.65 metres
Lucas Hts. Comm School

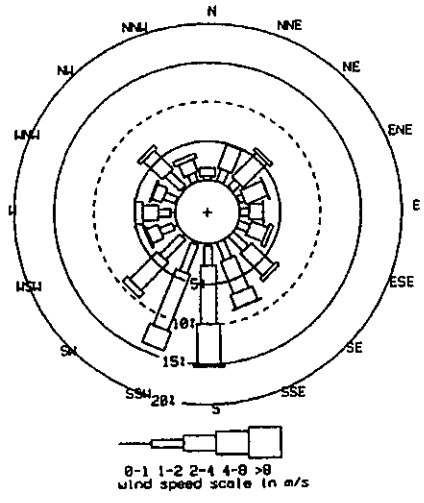


2100-2400 EST 15.65 metres
Lucas Hts. Comm School

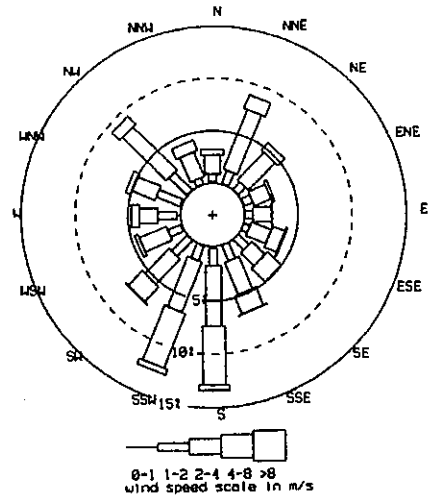
Figure 30



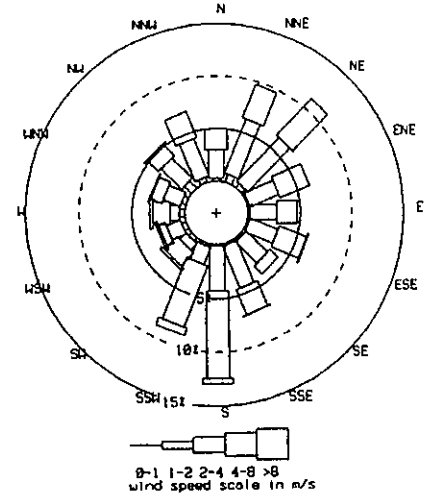
0000-0300 EST 18.45 metres
Boys Town School



0300-0600 EST 18.45 metres
Boys Town School

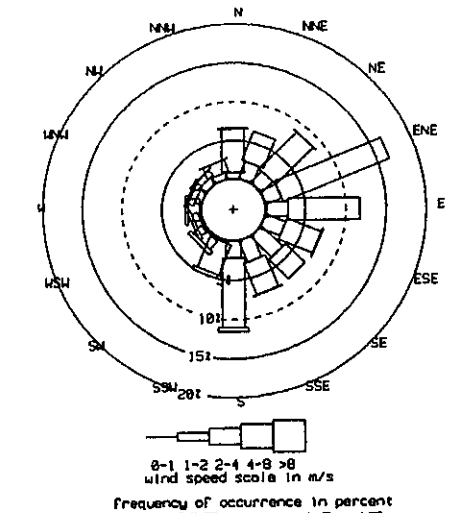


0600-0900 EST 18.45 metres
Boys Town School

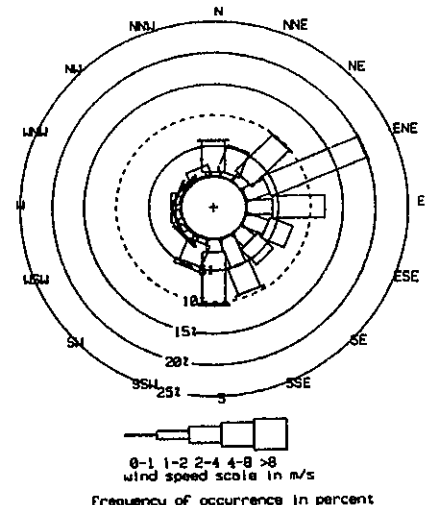


0900-1200 EST 18.45 metres
Boys Town School

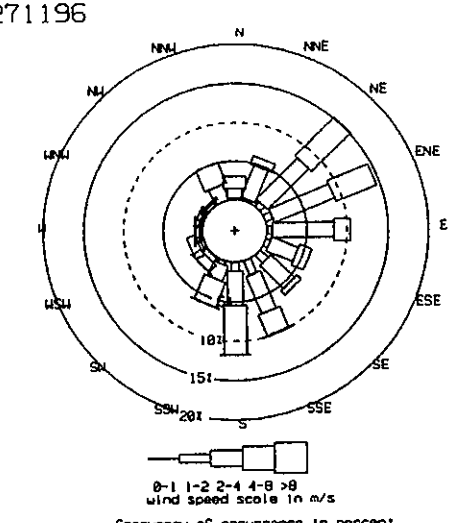
Summer
20493 to 271196



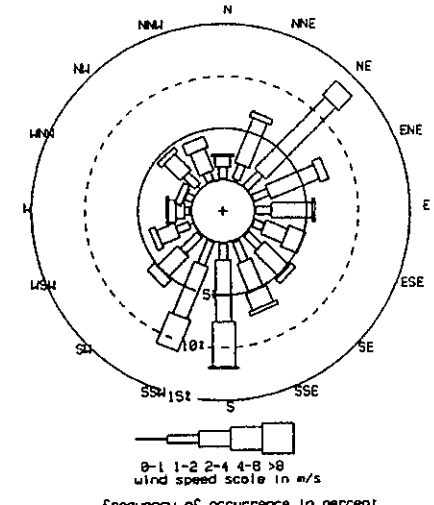
1200-1500 EST 18.45 metres
Boys Town School



1500-1800 EST 18.45 metres
Boys Town School

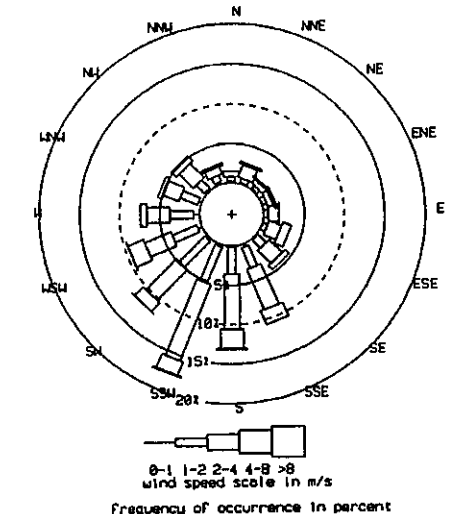


1800-2100 EST 18.45 metres
Boys Town School

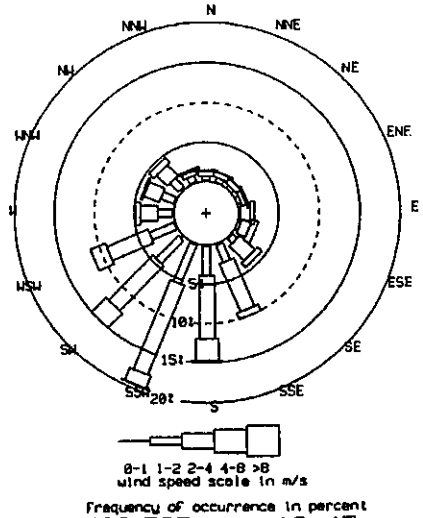


2100-2400 EST 18.45 metres
Boys Town School

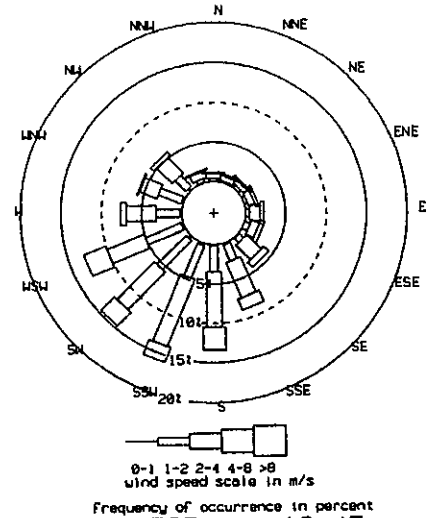
Figure 31



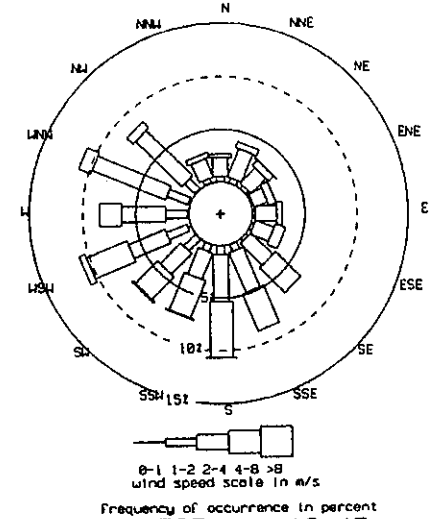
0000-0300 EST 18.45 metres
Boys Town School



0300-0600 EST 18.45 metres
Boys Town School

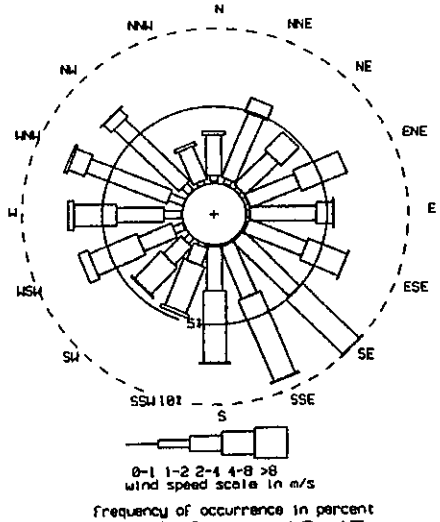


0600-0900 EST 18.45 metres
Boys Town School

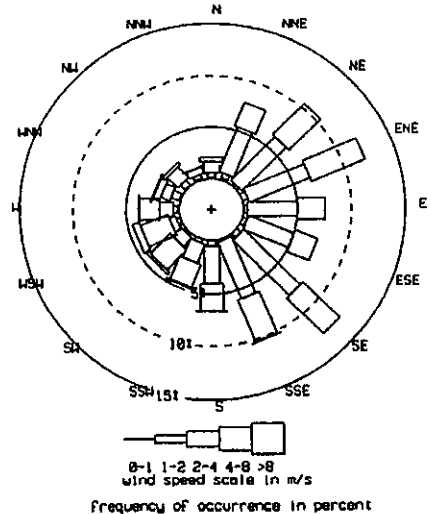


0900-1200 EST 18.45 metres
Boys Town School

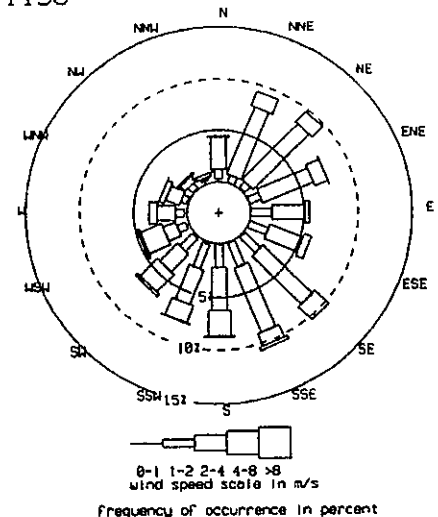
Autumn
20493 to 271196



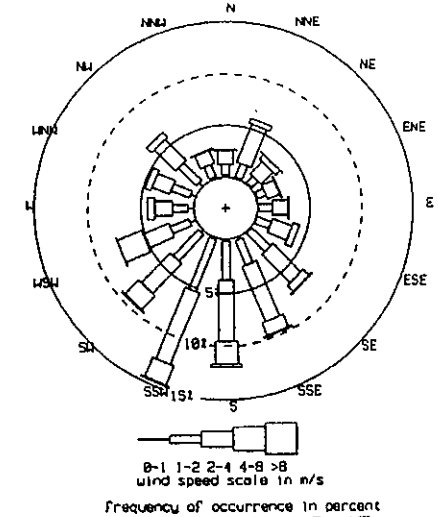
1200-1500 EST 18.45 metres
Boys Town School



1500-1800 EST 18.45 metres
Boys Town School

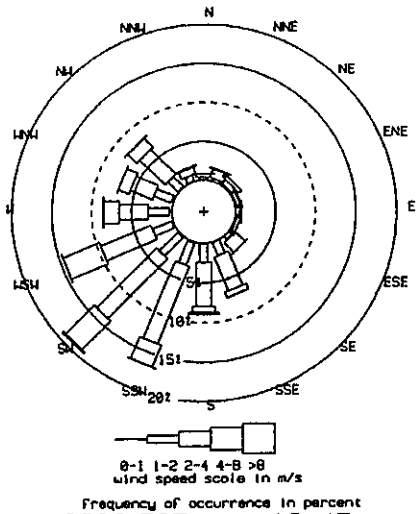


1800-2100 EST 18.45 metres
Boys Town School

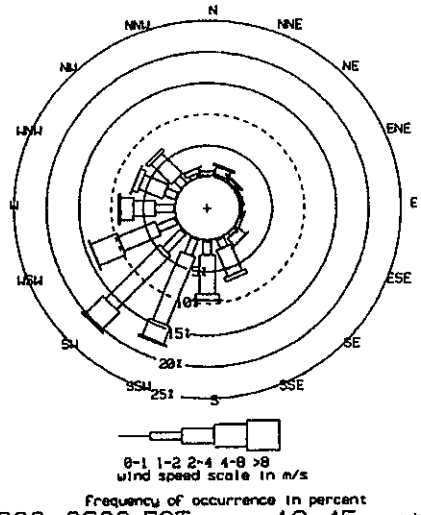


2100-2400 EST 18.45 metres
Boys Town School

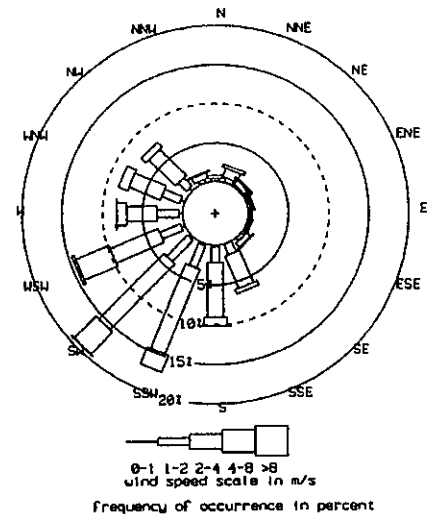
Figure 32



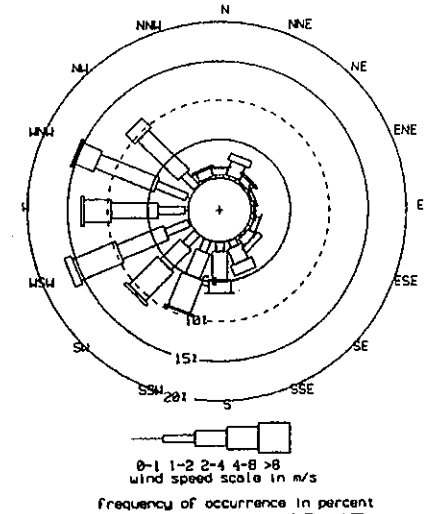
0000-0300 EST 18.45 metres
Boys Town School



0300-0600 EST 18.45 metres
Boys Town School

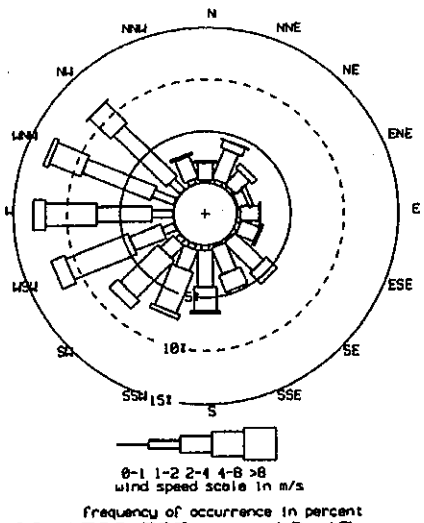


0600-0900 EST 18.45 metres
Boys Town School

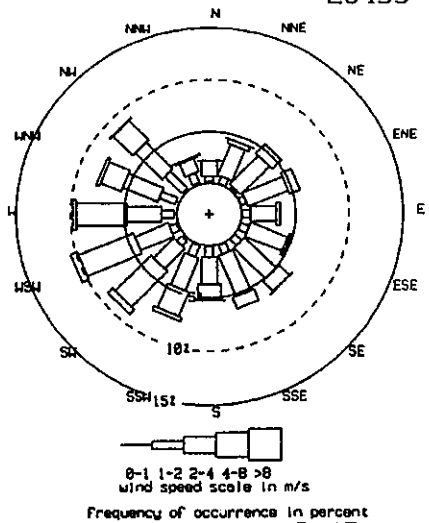


0900-1200 EST 18.45 metres
Boys Town School

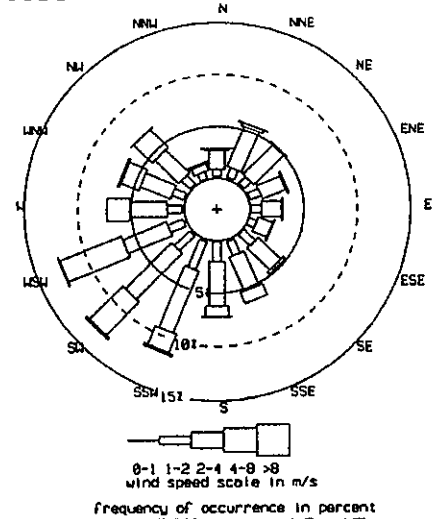
Winter
20493 to 271196



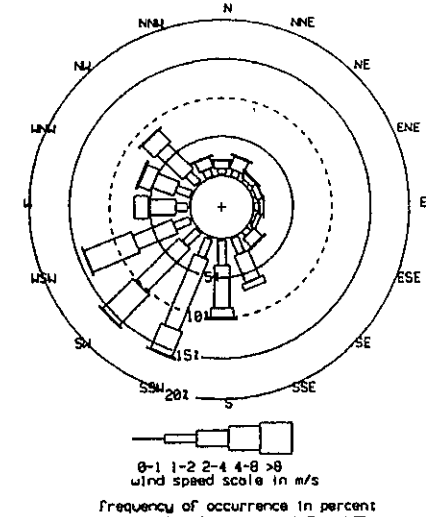
1200-1500 EST 18.45 metres
Boys Town School



1500-1800 EST 18.45 metres
Boys Town School



1800-2100 EST 18.45 metres
Boys Town School



2100-2400 EST 18.45 metres
Boys Town School

Figure 33

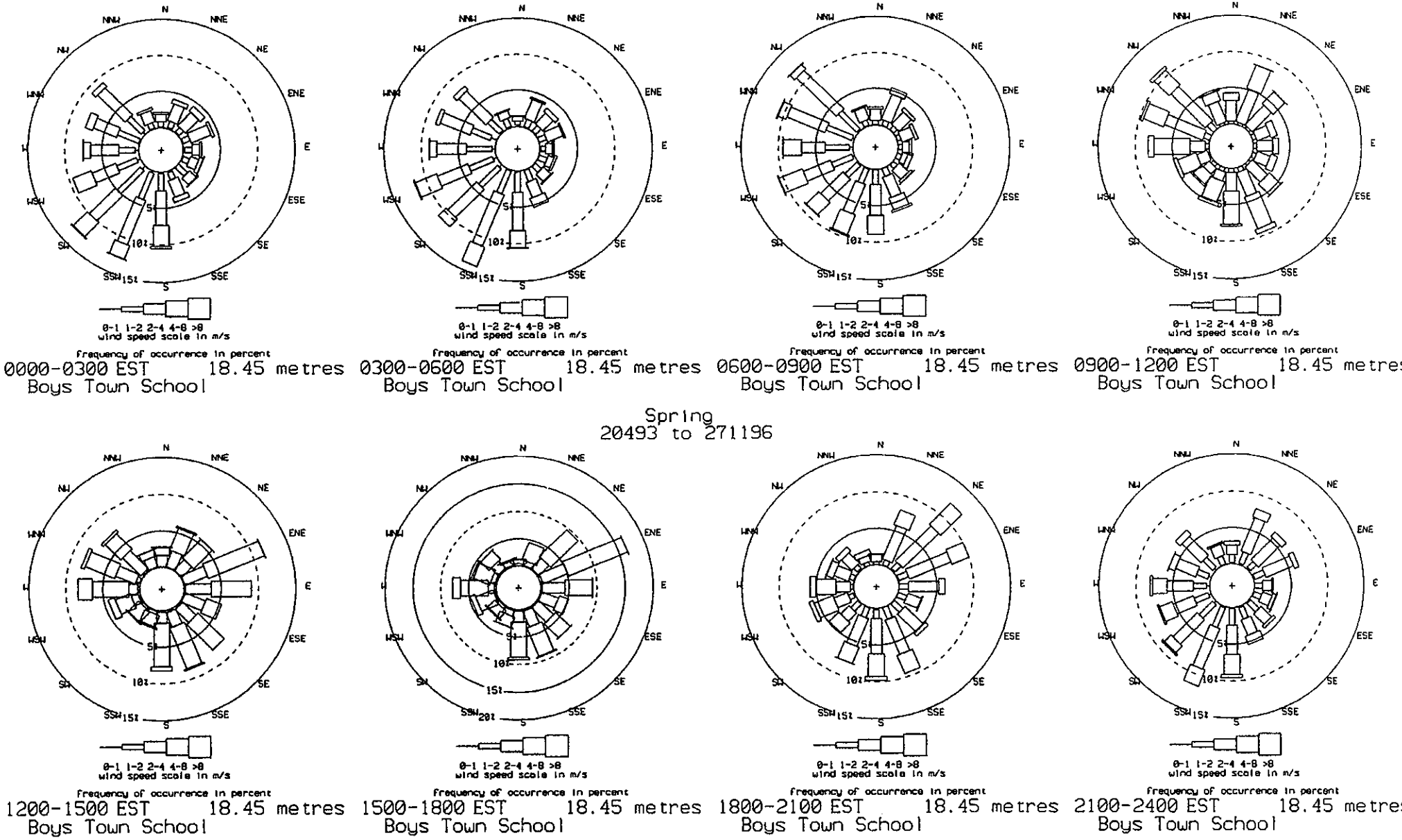
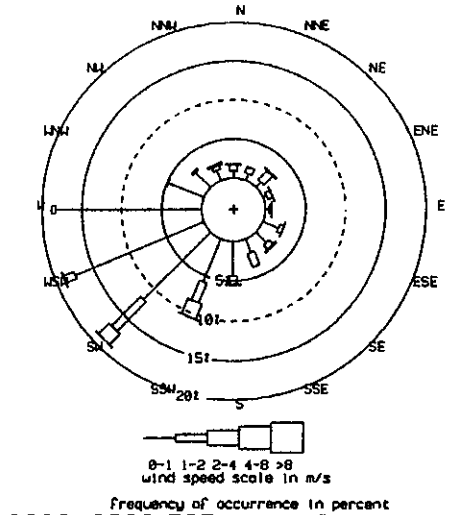
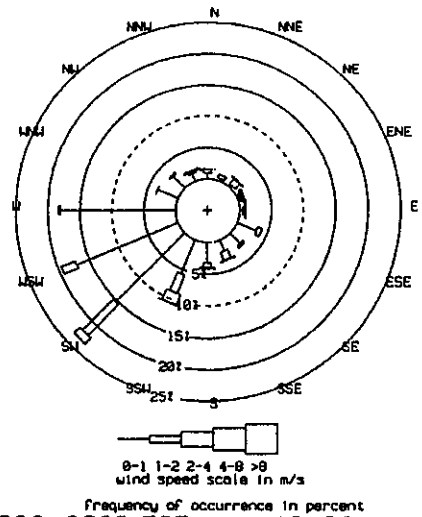

Spring
20493 to 271196
0000-0300 EST 18.45 metres
Boys Town School
0300-0600 EST 18.45 metres
Boys Town School
0600-0900 EST 18.45 metres
Boys Town School
0900-1200 EST 18.45 metres
Boys Town School
1200-1500 EST 18.45 metres
Boys Town School
1500-1800 EST 18.45 metres
Boys Town School
1800-2100 EST 18.45 metres
Boys Town School
2100-2400 EST 18.45 metres
Boys Town School
Frequency of occurrence in percent
0-1 1-2 2-4 4-8 >8
wind speed scale in m/s

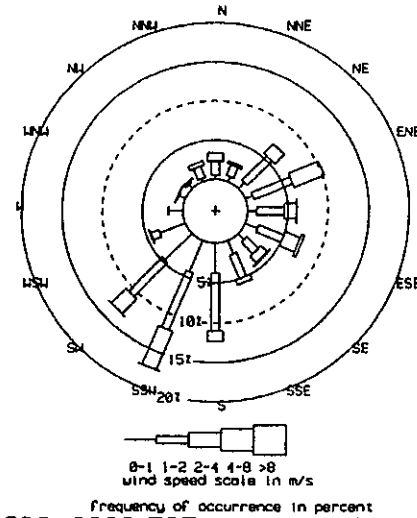
Figure 34



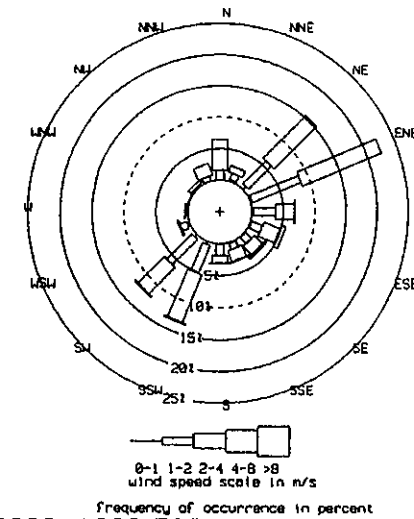
0000-0300 EST 10.00 metres
Shackles Estate



0300-0600 EST 10.00 metres
Shackles Estate

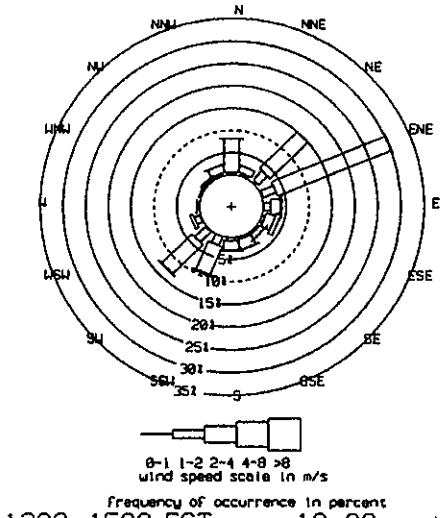


0600-0900 EST 10.00 metres
Shackles Estate

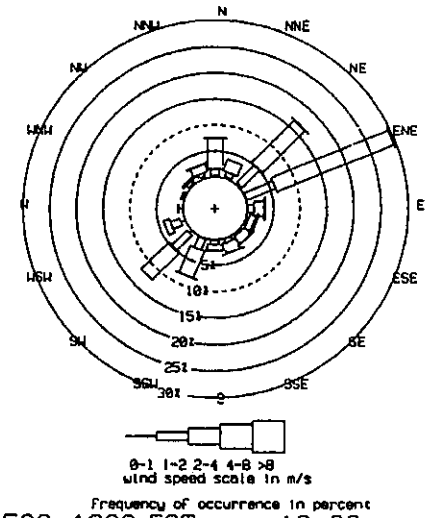


0900-1200 EST 10.00 metres
Shackles Estate

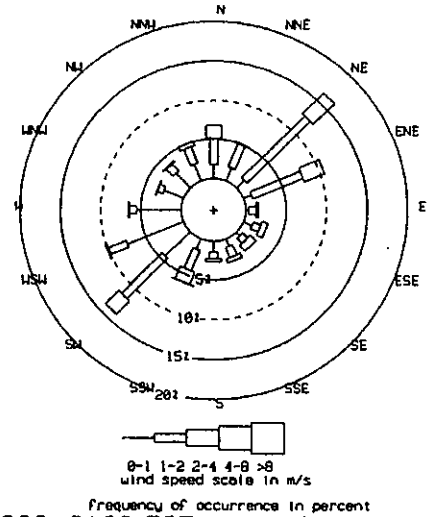
Summer
50693 to 241196



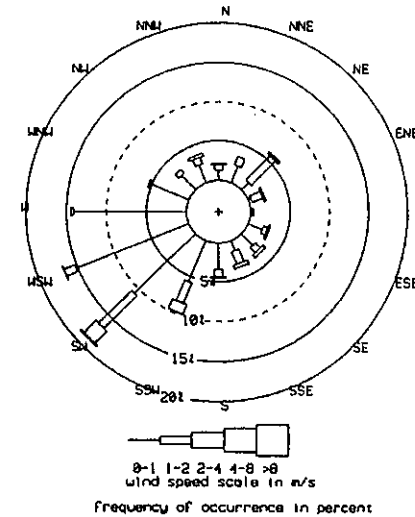
1200-1500 EST 10.00 metres
Shackles Estate



1500-1800 EST 10.00 metres
Shackles Estate

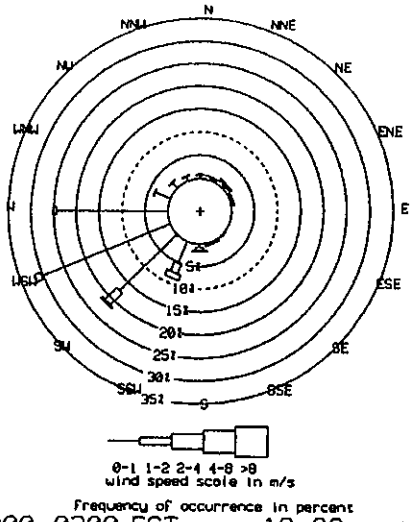


1800-2100 EST 10.00 metres
Shackles Estate

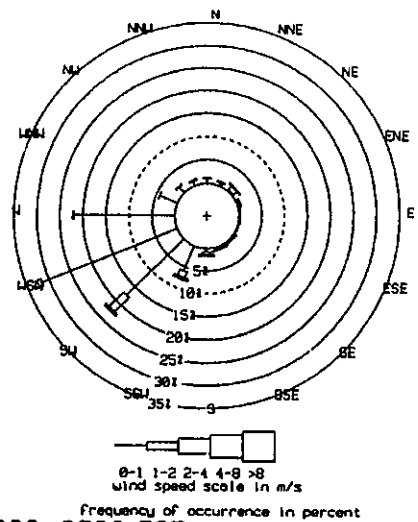


2100-2400 EST 10.00 metres
Shackles Estate

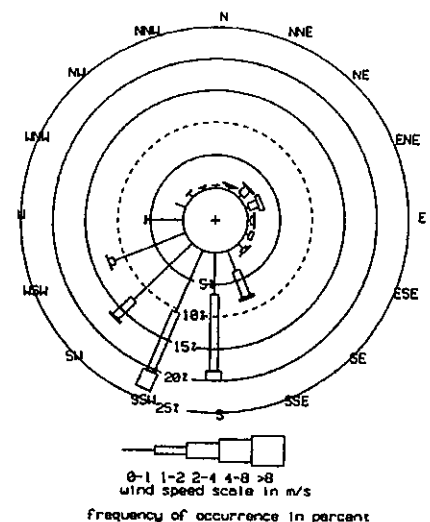
Figure 35



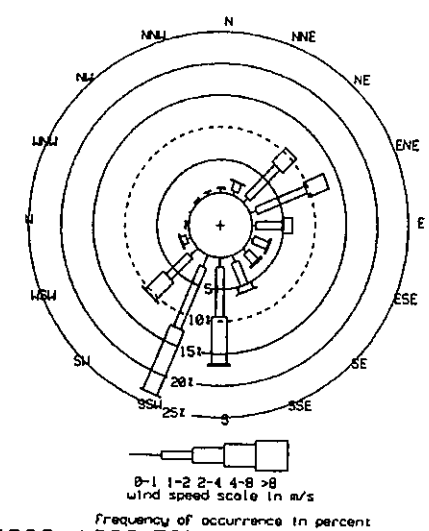
0000-0300 EST 10.00 metres
Shackles Estate



0300-0600 EST 10.00 metres
Shackles Estate

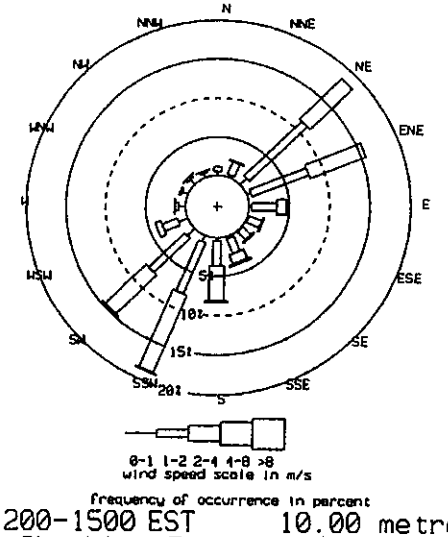


0600-0900 EST 10.00 metres
Shackles Estate

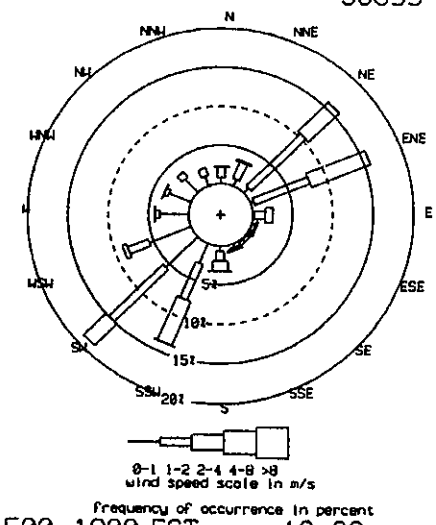


0900-1200 EST 10.00 metres
Shackles Estate

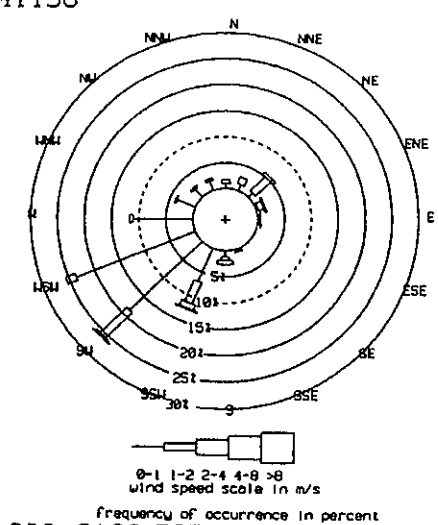
Autumn
50693 to 241196



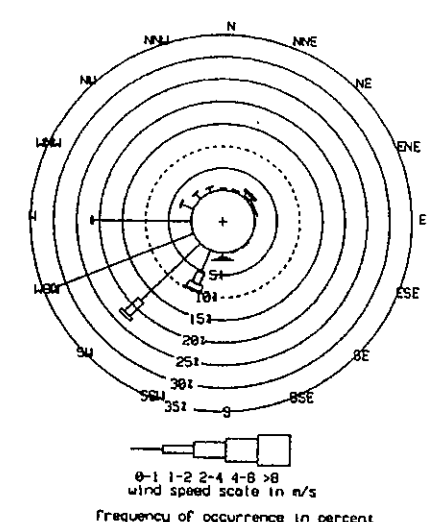
1200-1500 EST 10.00 metres
Shackles Estate



1500-1800 EST 10.00 metres
Shackles Estate

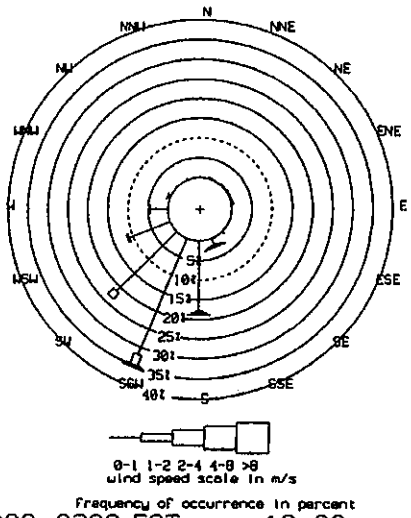


1800-2100 EST 10.00 metres
Shackles Estate

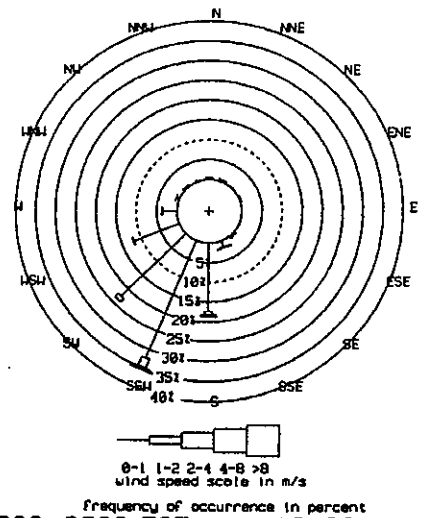


2100-2400 EST 10.00 metres
Shackles Estate

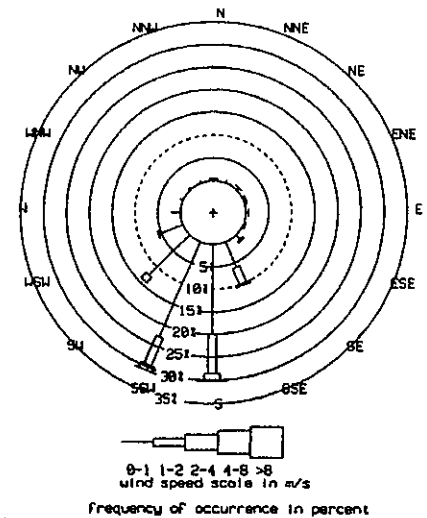
Figure 36



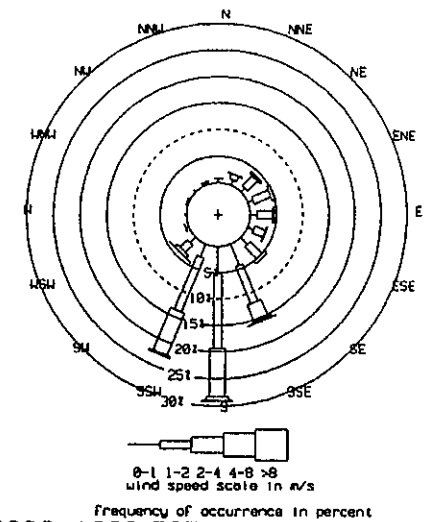
0000-0300 EST 10.00 metres
Shackles Estate



0300-0600 EST 10.00 metres
Shackles Estate

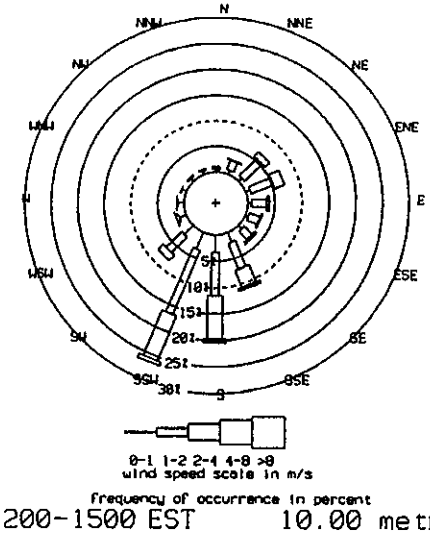


0600-0900 EST 10.00 metres
Shackles Estate

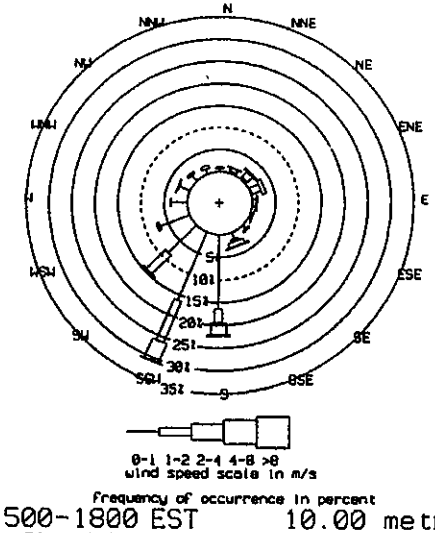


0900-1200 EST 10.00 metres
Shackles Estate

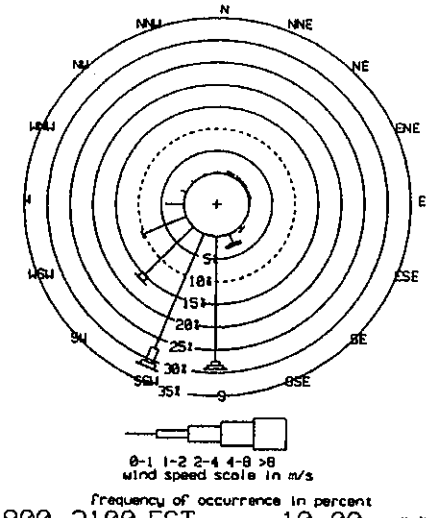
Winter
50693 to 241196



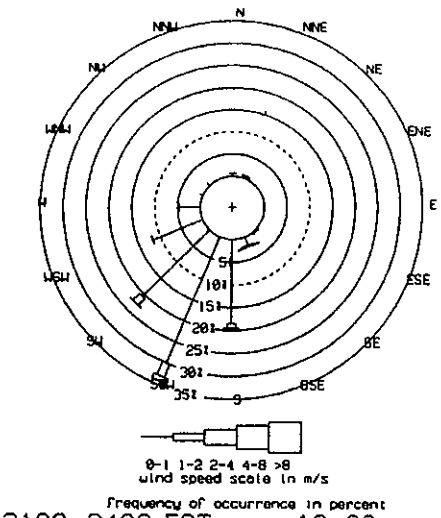
1200-1500 EST 10.00 metres
Shackles Estate



1500-1800 EST 10.00 metres
Shackles Estate

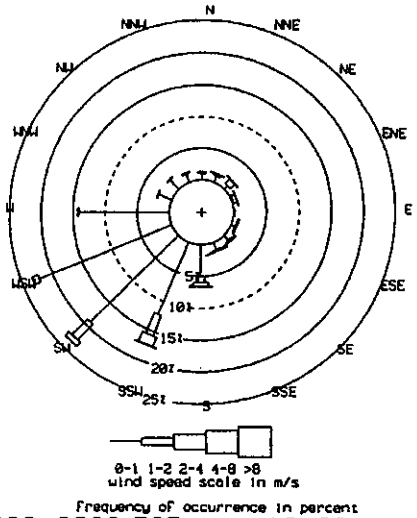


1800-2100 EST 10.00 metres
Shackles Estate

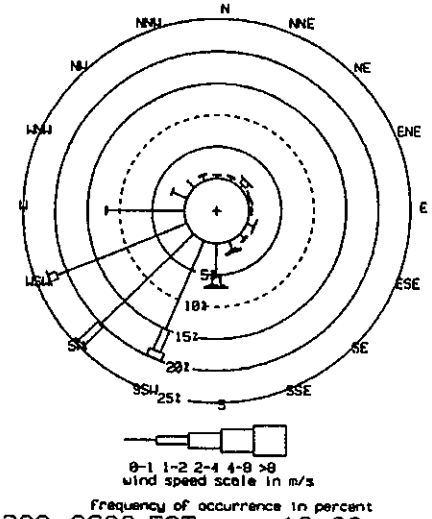


2100-2400 EST 10.00 metres
Shackles Estate

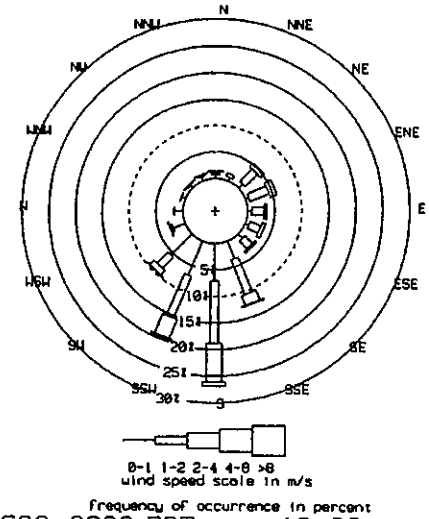
Figure 37



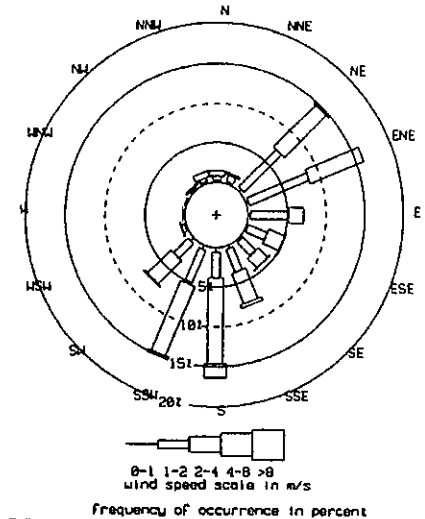
0000-0300 EST 10.00 metres
Shackles Estate



0300-0600 EST 10.00 metres
Shackles Estate

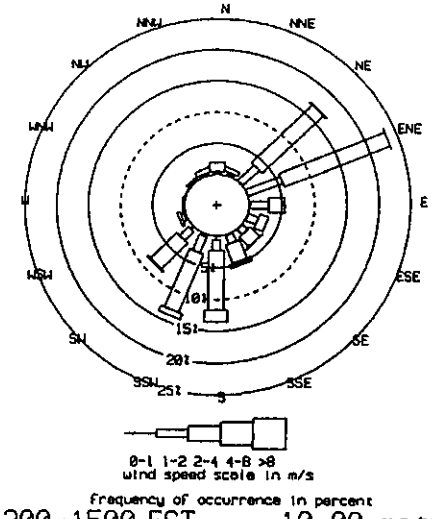


0600-0900 EST 10.00 metres
Shackles Estate

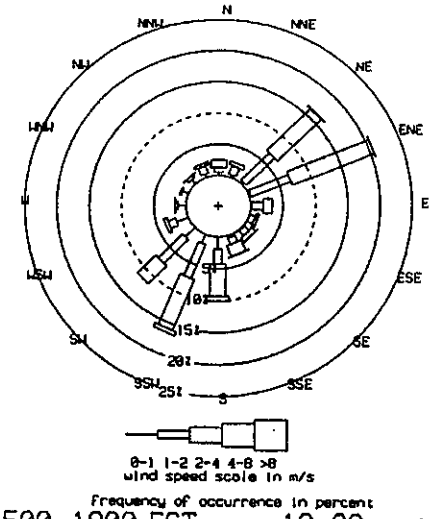


0900-1200 EST 10.00 metre
Shackles Estate

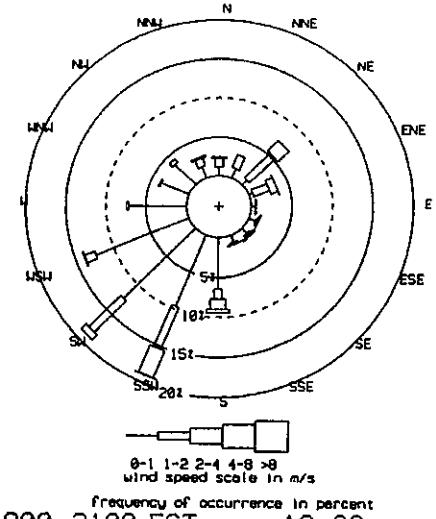
Spring
50693 to 241196



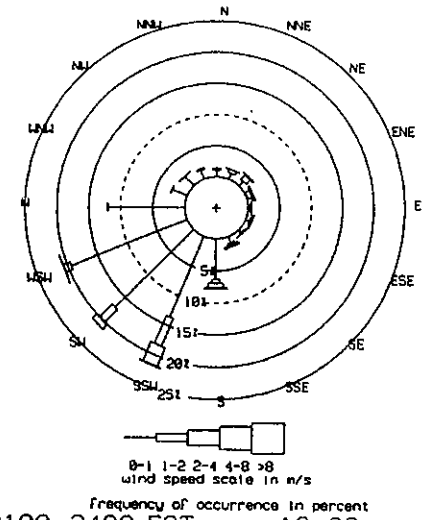
1200-1500 EST 10.00 metres
Shackles Estate



1500-1800 EST 10.00 metres
Shackles Estate

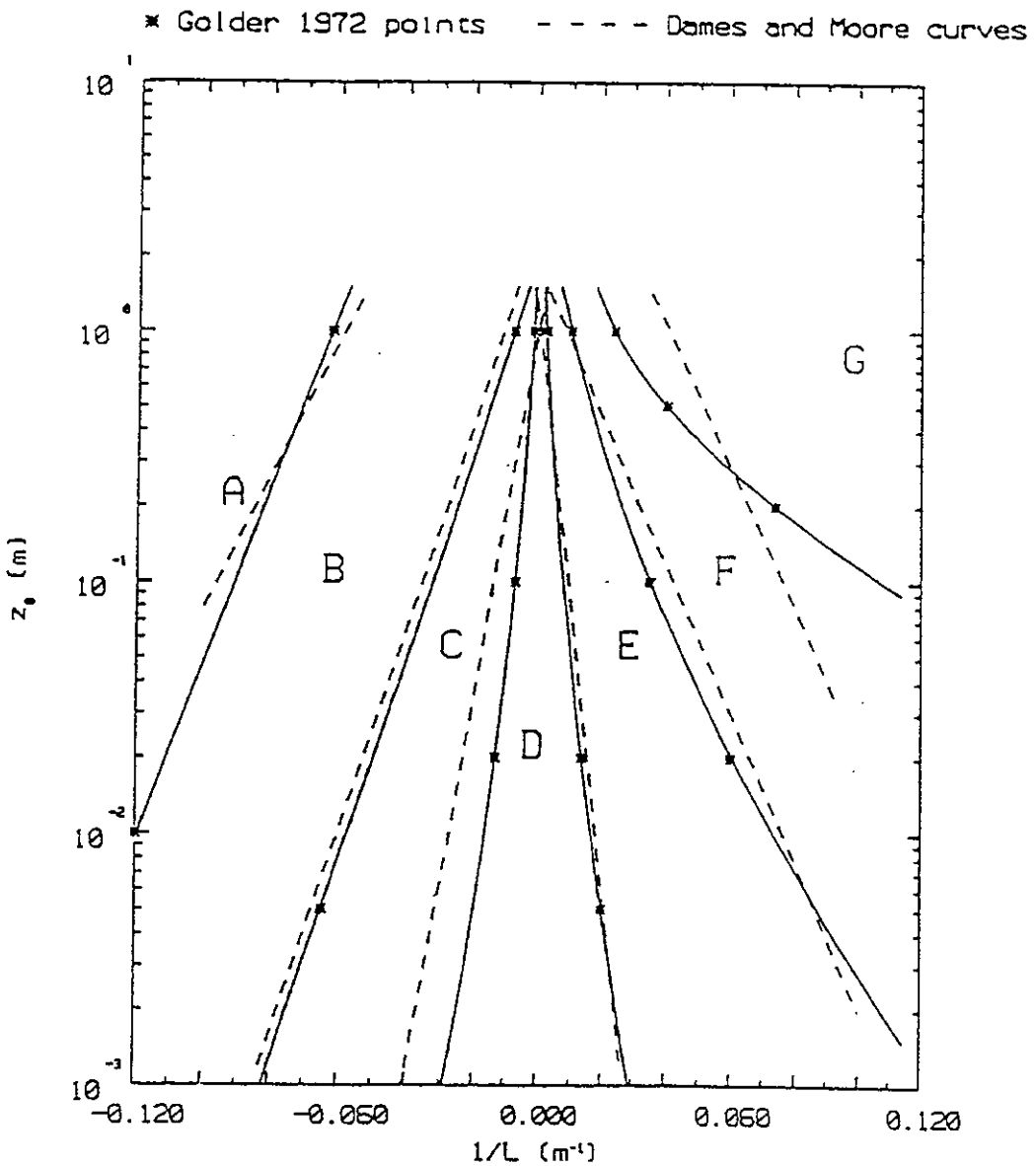


1800-2100 EST 10.00 metres
Shackles Estate



2100-2400 EST 10.00 metres
Shackles Estate

Figure 38



Plot of curves from Golder (1972) - Pasquill stability categories vs. 1/L (Monin-Obukhov length and z_o (roughness length).

Figure 39

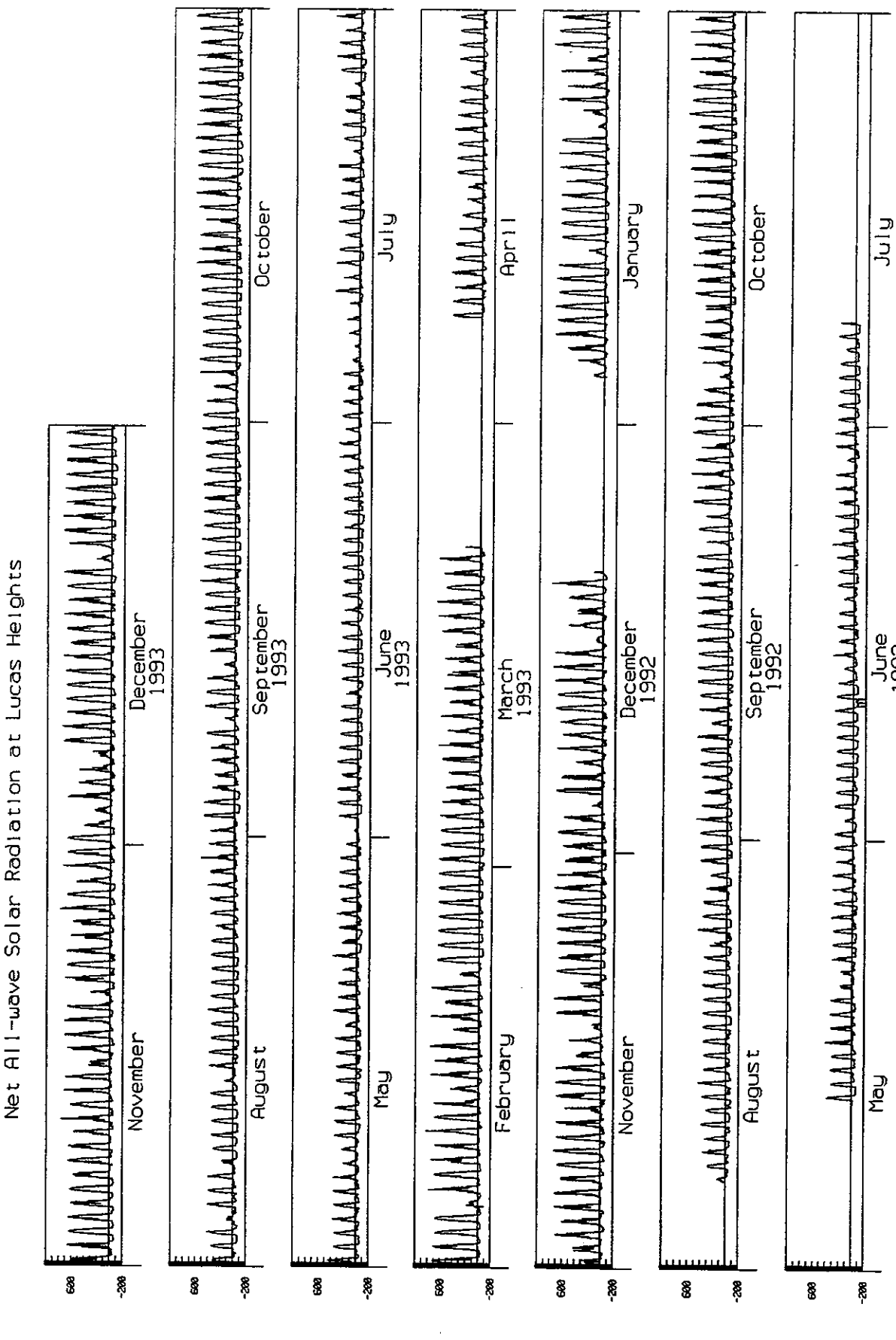

Net All-wave Solar Radiation at Lucas Heights
Solar Radn. W m²
600
-200
November
December 1993
August
September 1993
May
June 1993
February
March 1993
November
December 1992
August
September 1992
May
June 1992
Solar Radn. W m²
January
October
April
July
October
July

Figure 40

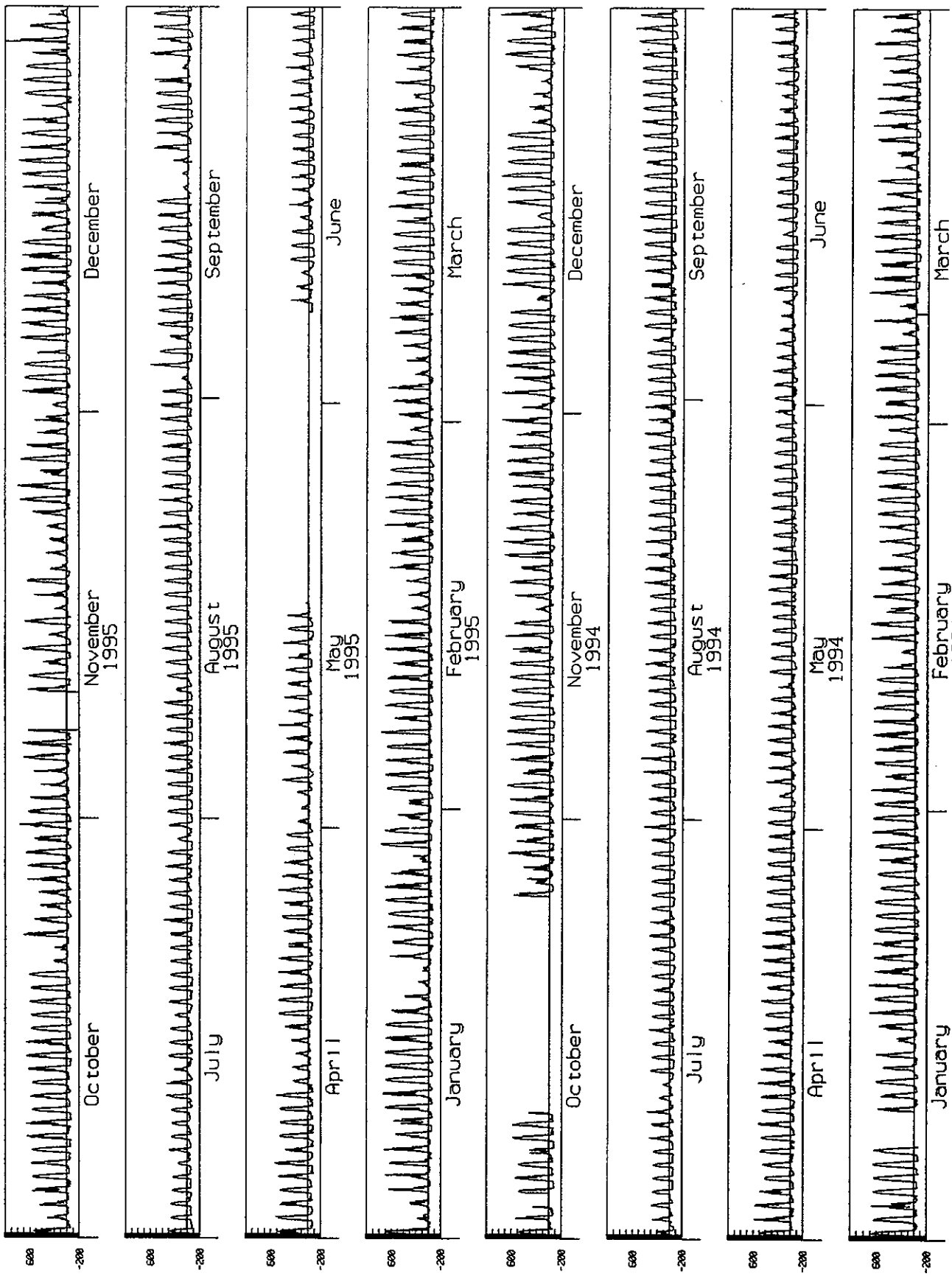

Net All-wave Solar Radiation at Lucas Heights
Solar Radn. W m-2
Solar Radn. W m-2
600
-200
October
November
1995
December
July
August
1995
September
April
May
1995
June
January
February
1995
March
October
November
1994
December
July
August
1994
September
April
May
1994
June
January
February
1994
March

Figure 40

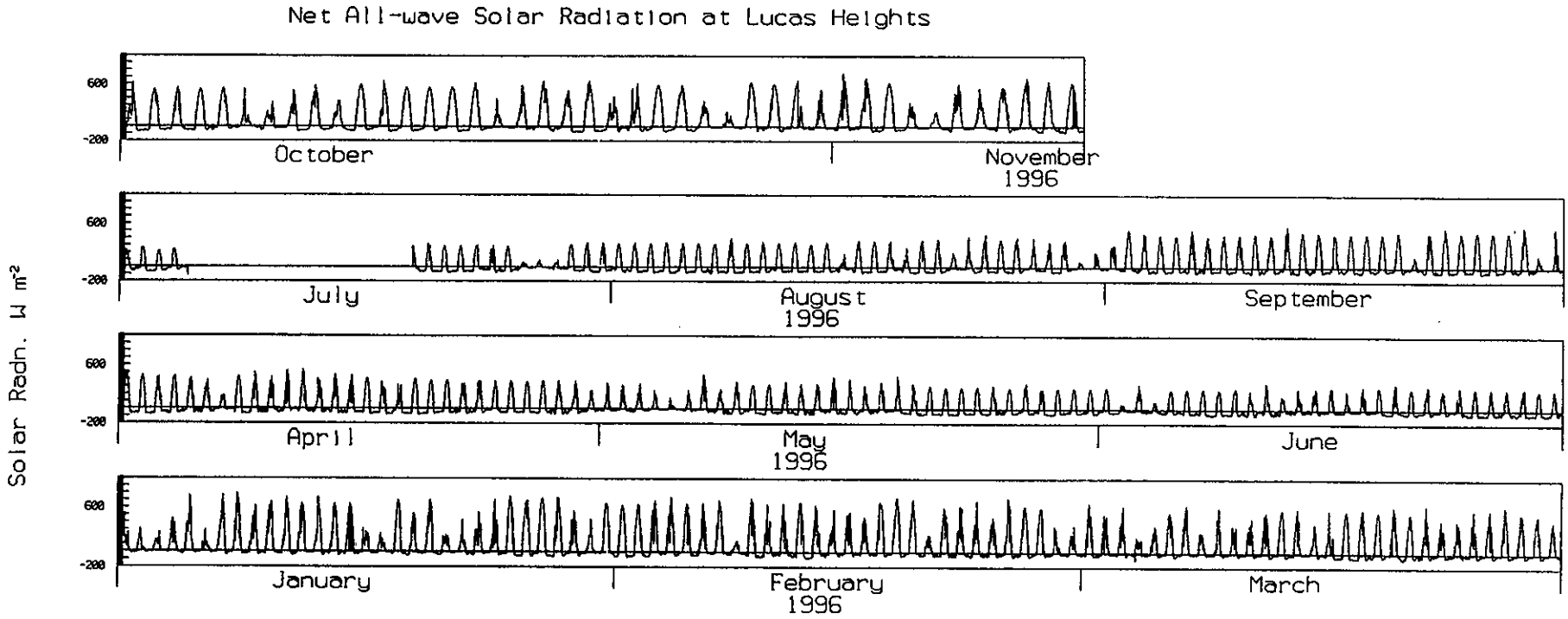

Net All-wave Solar Radiation at Lucas Heights
Solar Radn. W m-2
600
-200
October
November
1996
July
August
1996
September
April
May
1996
June
January
February
1996
March

Figure 40

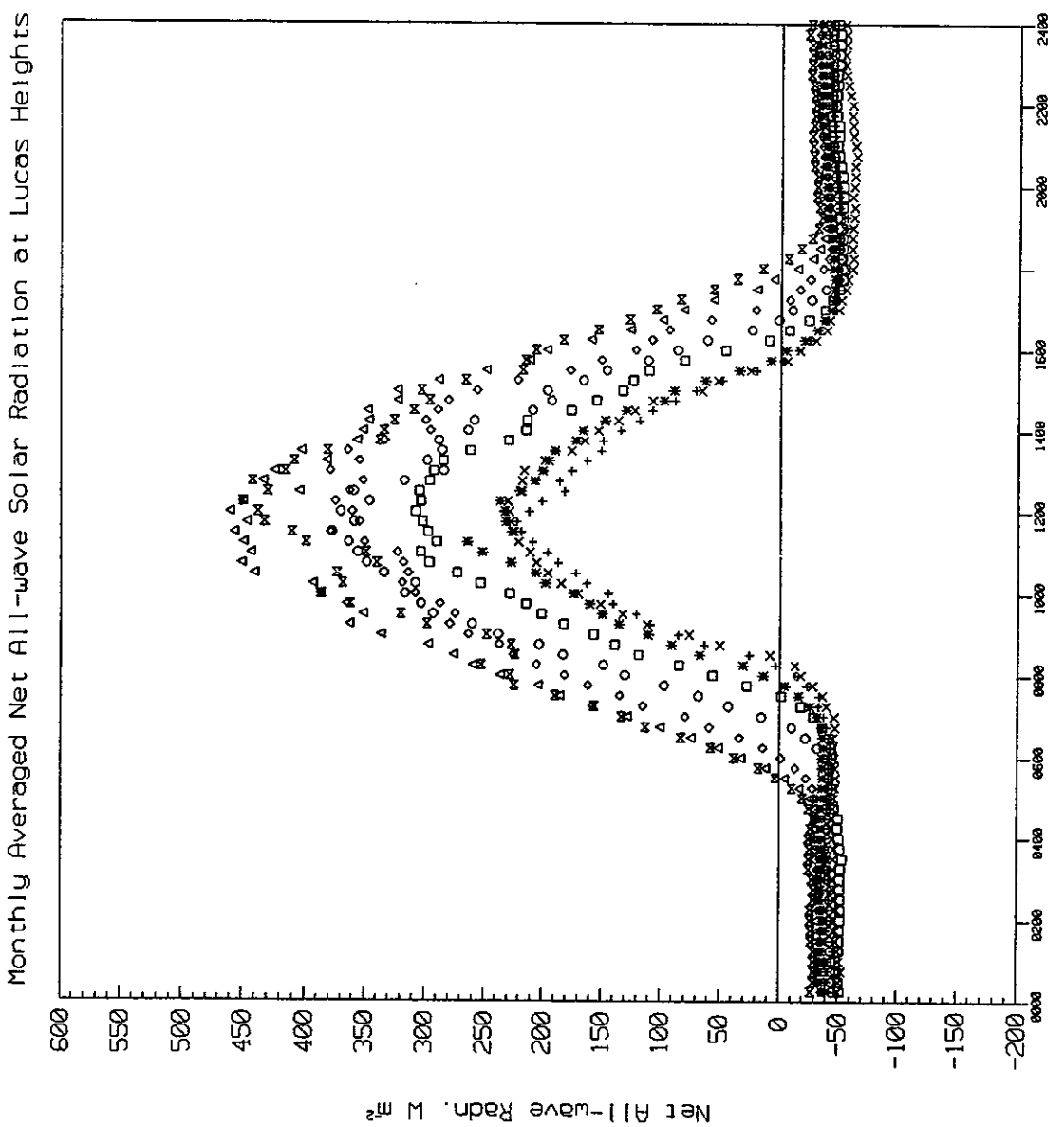

Monthly Averaged Net All-wave Solar Radiation at Lucas Heights
1992
May
June
July
August
September
October
November
December
Net All-wave Radn. W m²
time (lst)

Figure 41

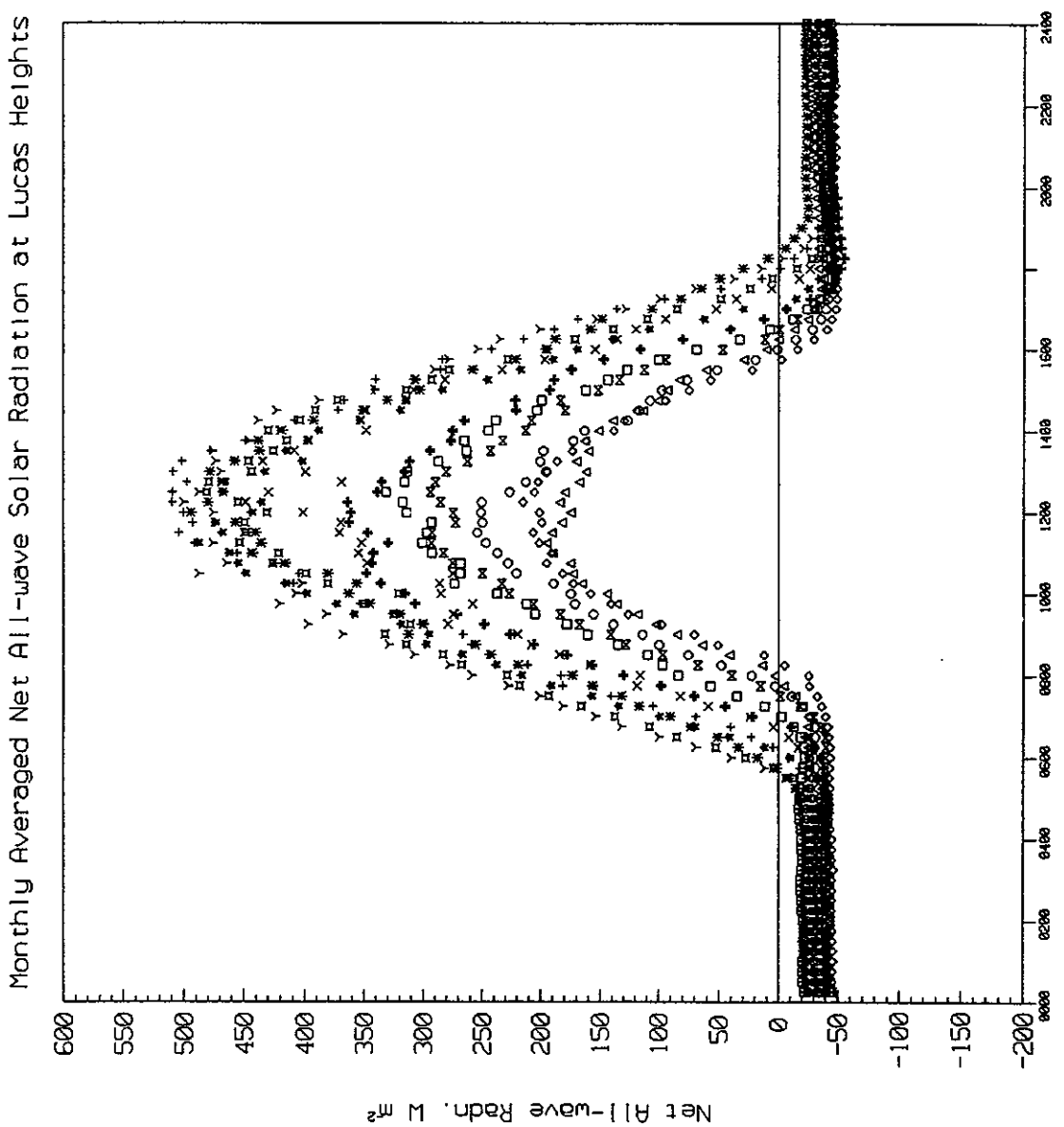

Monthly Averaged Net All-wave Solar Radiation at Lucas Heights
1993
January
February
March
April
May
June
July
August
September
October
November
December
Net All-wave Radn. W m²
time (lst)
600
550
500
450
400
350
300
250
200
150
100
50
0
-50
-100
-150
-200
0000
0200
0400
0600
0800
1000
1200
1400
1600
1800
2000
2200
2400

Figure 42

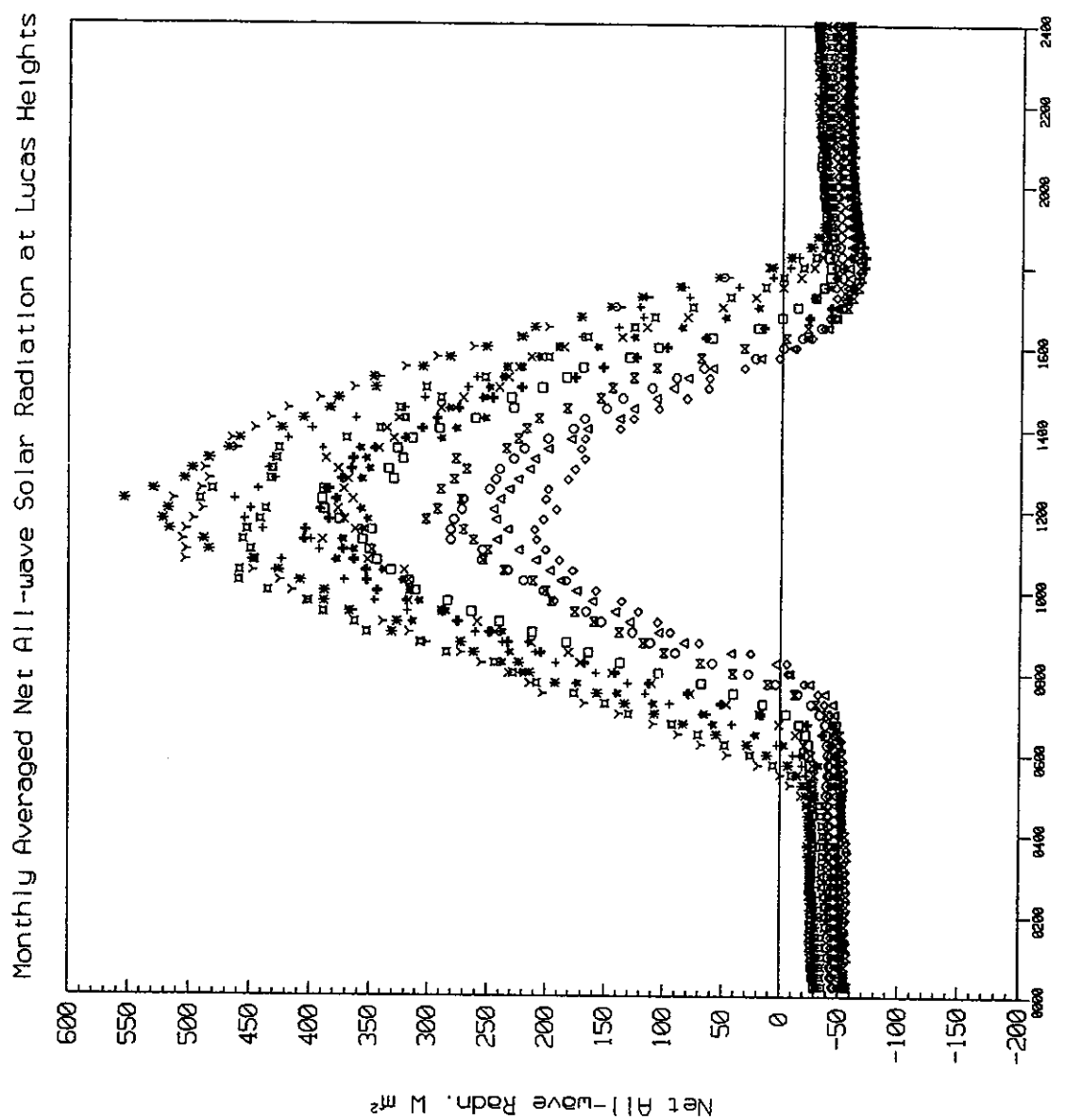

Monthly Averaged Net All-wave Solar Radiation at Lucas Heights
1994
January
February
March
April
May
June
July
August
September
October
November
December
Net All-wave Radn. W m²
time (lst)

Figure 43

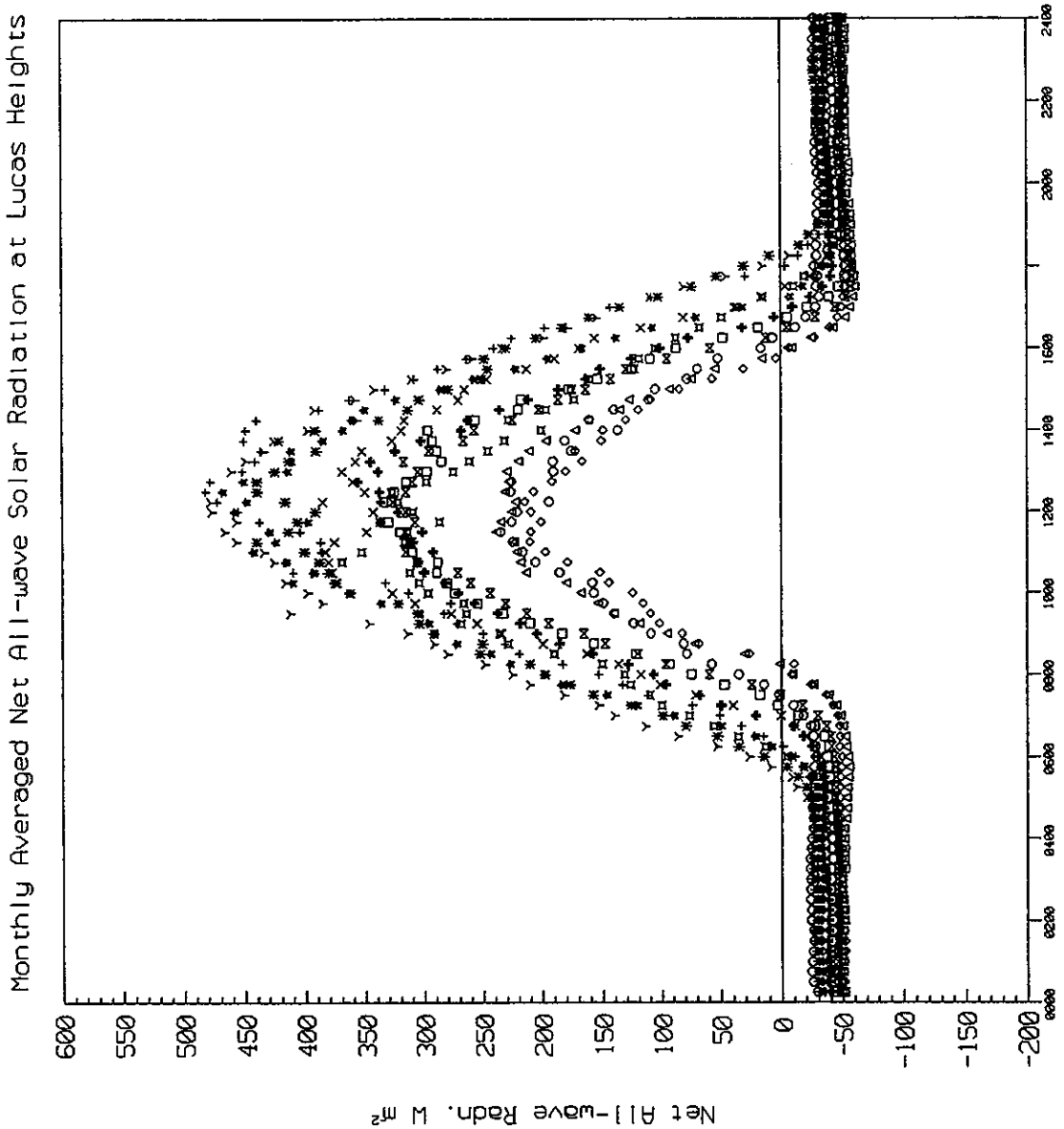

Monthly Averaged Net All-wave Solar Radiation at Lucas Heights
1995
January
February
March
April
May
June
July
August
September
October
November
December
Net All-wave Radn. W m²
time (lst)
600
550
500
450
400
350
300
250
200
150
100
50
0
-50
-100
-150
-200
0000
0200
0400
0600
0800
1000
1200
1400
1600
1800
2000
2200
2400

Figure 44

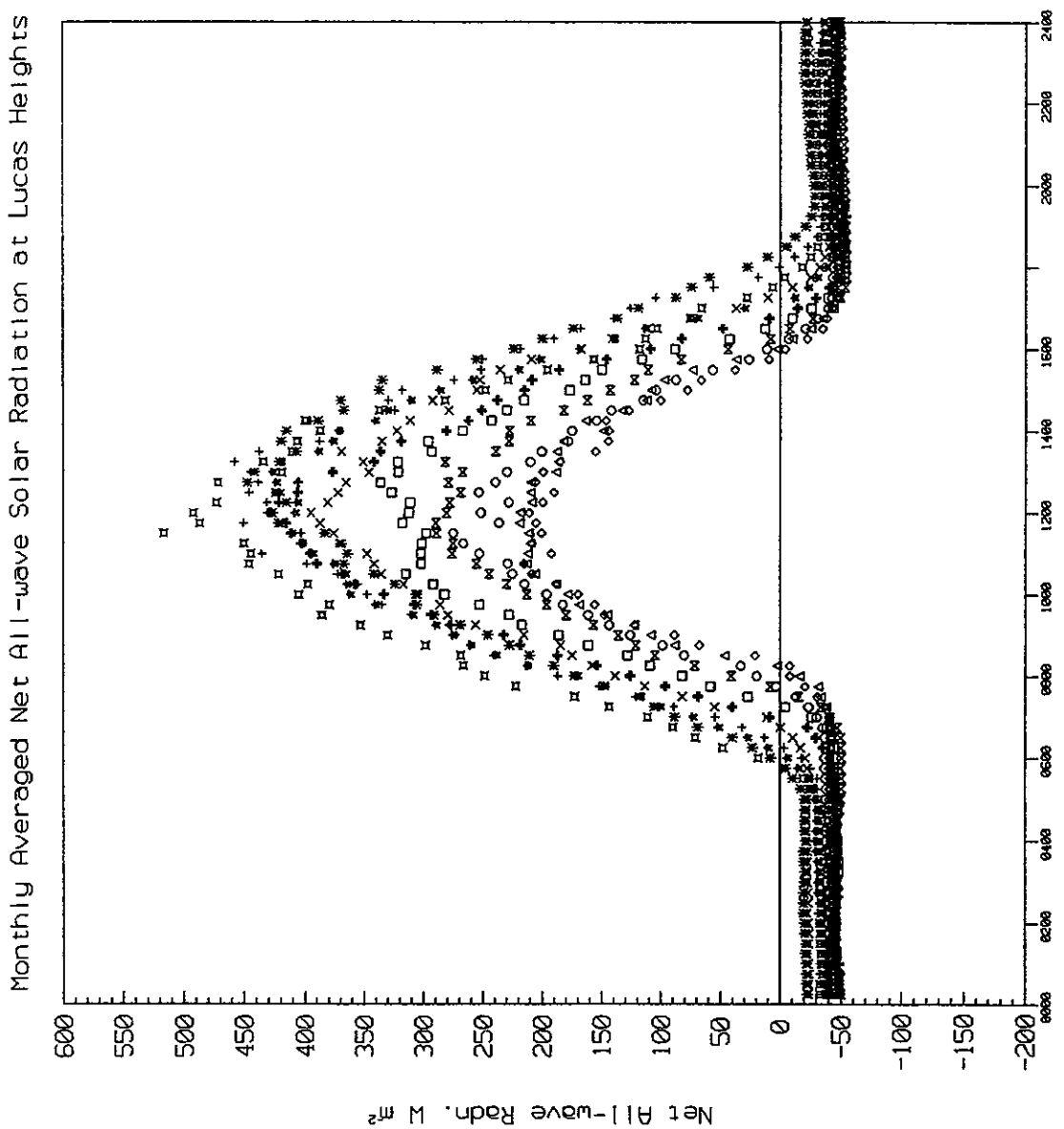

Monthly Averaged Net All-wave Solar Radiation at Lucas Heights
1996
January
February
March
April
May
June
July
August
September
October
November
Net All-wave Radn. W m²
time (lst)
600
550
500
450
400
350
300
250
200
150
100
50
0
-50
-100
-150
-200
0000
0200
0400
0600
0800
1000
1200
1400
1600
1800
2000
2200
2400

Figure 45

APPENDIX A

The tables below provide the quantitative statistics behind the previously plotted data, as well as additional summary statistics. The tables are presented as follows :

1. Bailley-type wind roses, 7m, Lucas Heights meteorological tower, Dines anemograph, 110775 to 110286. Pages A1 to A10
2. Bailley-type wind roses, 49m, Lucas Heights meteorological tower, Dines anemograph, analogue recording, 081177 to 110190. Pages A11 to A20.
3. Bailley-type wind roses, 10m, Lucas Heights meteorological tower, Climatronics WMIII, digital recording, 050491 to 121196. Pages A21 to A30.
4. Bailley-type wind roses, 49m, Lucas Heights meteorological tower, Climatronics WMIII, digital recording, 050491 to 121196. Pages A31 to A40.
5. Frequency of occurrence, average wind speeds, vertical and horizontal stability categories vs. wind dirrections - times of day, seasonal and annual statistics, 10m, Lucas Heights meteorological tower, 050491 to 121196. Pages A41 to A46.
6. Frequency of occurrence, average wind speeds, vertical and horizontal stability categories vs. wind dirrections - times of day, seasonal and annual statistics, 49m, Lucas Heights meteorological tower, 050491 to 121196. Pages A47 to A52.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Summer

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	3.61	1.46	0.30	0.00	0.00	5.37
NNE	3.10	2.13	0.71	0.00	0.00	5.95
NE	2.07	2.42	1.01	0.12	0.00	5.63
ENE	1.20	1.27	0.35	0.02	0.00	2.84
E	1.20	0.80	0.44	0.05	0.00	2.49
ESE	1.15	1.26	0.75	0.05	0.00	3.21
SE	2.20	2.11	2.16	0.44	0.09	6.99
SSE	3.50	3.63	4.43	0.96	0.00	12.52
S	5.63	5.96	6.33	2.96	0.00	20.89
SSW	3.49	2.86	1.92	0.75	0.00	9.01
SW	2.28	2.95	1.31	0.16	0.00	6.70
WSW	1.83	1.85	0.75	0.00	0.00	4.43
W	1.43	1.45	0.17	0.02	0.00	3.07
WNW	1.12	1.10	0.14	0.03	0.00	2.39
NW	1.62	1.38	0.16	0.03	0.00	3.19
NNW	2.58	2.27	0.47	0.00	0.00	5.32
TOTAL	38.03	34.89	21.39	5.60	0.09	5735.

bad data observed for 121 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	3.34	1.63	0.38	0.02	0.00	5.37
NNE	2.23	1.83	0.63	0.00	0.00	4.68
NE	1.86	1.88	0.57	0.12	0.00	4.43
ENE	0.78	0.85	0.10	0.00	0.00	1.74
E	0.61	0.89	0.16	0.00	0.00	1.65
ESE	0.73	1.20	0.33	0.09	0.00	2.35
SE	1.84	1.70	1.74	0.16	0.05	5.50
SSE	3.17	3.46	3.95	0.99	0.05	11.62
S	4.87	7.53	6.21	2.47	0.00	21.08
SSW	3.81	4.35	2.80	0.73	0.00	11.69
SW	2.96	3.90	1.41	0.09	0.00	8.35
WSW	2.19	2.12	0.66	0.05	0.00	5.03
W	1.72	2.37	0.52	0.00	0.00	4.61
WNW	1.37	1.86	0.37	0.00	0.00	3.60
NW	1.95	1.44	0.35	0.02	0.00	3.76
NNW	2.45	1.74	0.33	0.03	0.00	4.56
TOTAL	35.88	38.75	20.50	4.77	0.10	5750.

bad data observed for 106 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Summer

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.56	1.68	3.11	0.17	0.00	5.52
NNE	0.68	2.46	3.63	0.28	0.00	7.06
NE	0.94	1.83	2.06	0.21	0.00	5.05
ENE	0.58	1.08	0.91	0.05	0.00	2.62
E	0.37	1.29	0.91	0.03	0.00	2.60
ESE	0.45	1.29	1.08	0.07	0.00	2.90
SE	0.70	2.45	2.99	0.44	0.00	6.57
SSE	1.45	3.11	5.36	1.76	0.03	11.72
S	2.04	4.23	6.83	3.14	0.00	16.24
SSW	1.21	1.96	2.25	1.24	0.02	6.67
SW	0.93	1.34	1.36	0.54	0.00	4.17
WSW	0.89	1.24	1.48	0.47	0.00	4.09
W	0.73	1.85	1.78	0.35	0.00	4.72
WNW	0.66	1.96	1.66	0.03	0.00	4.31
NW	0.87	3.49	3.06	0.07	0.00	7.49
NNW	0.93	3.23	4.02	0.09	0.00	8.26
TOTAL	13.99	34.50	42.50	8.96	0.05	5725.

bad data observed for 131 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.84	4.26	0.93	0.00	6.03
NNE	0.11	1.52	6.22	1.47	0.00	9.32
NE	0.25	1.23	6.55	1.66	0.00	9.69
ENE	0.19	1.42	4.55	0.79	0.00	6.95
E	0.23	1.42	3.08	0.28	0.00	5.01
ESE	0.19	0.96	3.33	0.32	0.00	4.80
SE	0.11	1.72	4.68	1.56	0.00	8.06
SSE	0.18	1.40	5.85	4.10	0.02	11.54
S	0.07	0.77	5.71	4.99	0.11	11.65
SSW	0.04	0.25	1.00	1.24	0.07	2.59
SW	0.05	0.18	0.61	0.32	0.00	1.16
WSW	0.02	0.42	1.17	0.81	0.00	2.42
W	0.05	0.70	1.75	0.96	0.00	3.47
WNW	0.14	0.56	2.12	0.44	0.00	3.26
NW	0.14	1.42	3.89	0.61	0.00	6.06
NNW	0.09	1.73	5.45	0.74	0.00	8.00
TOTAL	1.84	16.54	60.22	21.21	0.19	5709.

bad data observed for 147 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Summer

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.10	1.51	0.61	0.00	2.23
NNE	0.03	0.23	2.73	1.62	0.00	4.61
NE	0.00	0.57	7.64	3.50	0.00	11.71
ENE	0.05	0.87	9.99	5.27	0.00	16.18
E	0.03	1.04	6.78	2.37	0.00	10.23
ESE	0.02	0.63	5.18	1.11	0.00	6.94
SE	0.02	0.82	6.49	3.57	0.09	10.98
SSE	0.05	0.85	4.91	5.85	0.09	11.74
S	0.10	0.26	3.83	5.81	0.12	10.13
SSW	0.00	0.03	0.49	0.97	0.10	1.60
SW	0.02	0.03	0.40	0.56	0.10	1.11
WSW	0.00	0.10	0.75	1.18	0.02	2.05
W	0.03	0.40	1.03	1.13	0.03	2.63
WNW	0.00	0.12	1.32	1.10	0.00	2.54
NW	0.02	0.21	1.50	0.90	0.00	2.63
NNW	0.02	0.30	1.72	0.66	0.00	2.70
TOTAL	0.40	6.58	56.26	36.20	0.56	5748.

bad data observed for 108 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.09	0.31	0.30	0.00	0.70
NNE	0.00	0.21	1.88	1.50	0.02	3.60
NE	0.09	0.50	8.22	3.96	0.00	12.78
ENE	0.05	1.34	12.03	5.88	0.02	19.32
E	0.09	1.41	7.09	1.91	0.00	10.50
ESE	0.17	0.97	4.99	0.94	0.02	7.09
SE	0.12	0.85	8.10	3.04	0.10	12.22
SSE	0.05	0.50	6.28	5.46	0.12	12.41
S	0.07	0.70	3.88	5.91	0.40	10.95
SSW	0.03	0.23	0.52	1.03	0.00	1.81
SW	0.05	0.10	0.45	0.61	0.07	1.29
WSW	0.02	0.19	0.85	0.83	0.03	1.93
W	0.00	0.21	1.01	0.76	0.00	1.98
WNW	0.05	0.16	0.76	0.82	0.00	1.79
NW	0.03	0.12	0.33	0.45	0.00	0.94
NNW	0.00	0.12	0.33	0.24	0.00	0.70
TOTAL	0.83	7.70	57.04	33.64	0.78	5752.

bad data observed for 104 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Summer

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.50	0.89	0.64	0.12	0.00	2.16
NNE	0.52	2.42	4.65	0.71	0.00	8.31
NE	0.78	3.59	8.46	1.39	0.00	14.23
ENE	1.17	4.13	5.89	1.43	0.00	12.61
E	0.98	3.05	2.77	0.16	0.00	6.95
ESE	0.91	2.05	2.77	0.19	0.00	5.92
SE	1.20	4.14	6.63	1.08	0.10	13.16
SSE	1.27	3.29	6.67	2.65	0.03	13.91
S	0.78	2.30	4.79	3.43	0.16	11.46
SSW	0.21	0.61	1.29	1.06	0.03	3.20
SW	0.21	0.47	0.92	0.56	0.02	2.18
WSW	0.24	0.33	0.70	0.19	0.00	1.46
W	0.19	0.54	0.61	0.10	0.00	1.45
WNW	0.19	0.40	0.38	0.07	0.00	1.04
NW	0.19	0.35	0.37	0.03	0.00	0.94
NNW	0.24	0.47	0.26	0.05	0.00	1.03
TOTAL	9.59	29.03	47.80	13.23	0.35	5743.

bad data observed for 113 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	2.62	2.48	0.86	0.00	0.00	5.96
NNE	3.07	3.83	2.64	0.07	0.00	9.61
NE	2.11	3.62	2.24	0.51	0.00	8.47
ENE	1.90	1.92	0.87	0.03	0.00	4.73
E	1.36	1.54	0.73	0.02	0.00	3.65
ESE	1.59	1.94	1.03	0.02	0.00	4.58
SE	2.83	3.35	3.28	0.79	0.00	10.26
SSE	3.37	4.18	4.30	1.75	0.00	13.59
S	3.46	4.86	5.12	3.13	0.03	16.60
SSW	1.92	2.11	1.76	0.72	0.00	6.52
SW	0.93	1.68	1.12	0.40	0.02	4.14
WSW	0.93	1.24	0.52	0.19	0.00	2.88
W	0.93	0.77	0.52	0.02	0.00	2.24
WNW	0.51	0.65	0.23	0.00	0.00	1.38
NW	0.91	0.91	0.24	0.00	0.00	2.06
NNW	1.73	1.28	0.30	0.03	0.00	3.34
TOTAL	30.17	36.34	25.77	7.67	0.05	5724.

bad data observed for 132 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Autumn

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.26	0.95	0.29	0.14	0.00	2.64
NNE	1.73	0.80	0.33	0.04	0.00	2.91
NE	1.14	0.70	0.06	0.02	0.00	1.92
ENE	0.74	0.25	0.27	0.10	0.00	1.36
E	0.45	0.23	0.47	0.14	0.00	1.30
ESE	0.64	0.41	0.68	0.35	0.00	2.08
SE	1.90	1.20	1.16	0.76	0.00	5.02
SSE	5.20	3.22	2.27	0.56	0.00	11.25
S	9.43	5.86	3.94	1.16	0.00	20.39
SSW	5.78	5.10	3.65	0.70	0.00	15.23
SW	2.89	4.85	3.36	0.41	0.00	11.52
WSW	2.15	3.36	2.50	0.29	0.00	8.30
W	1.73	2.35	0.91	0.23	0.00	5.22
WNW	1.67	1.57	0.19	0.02	0.00	3.45
NW	1.86	1.51	0.43	0.02	0.00	3.82
NNW	2.02	1.03	0.54	0.00	0.00	3.59
TOTAL	40.60	33.40	21.05	4.95	0.00	4845.

bad data observed for 675 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.14	0.85	0.23	0.08	0.00	2.29
NNE	1.01	0.72	0.08	0.00	0.00	1.82
NE	0.43	0.41	0.17	0.06	0.00	1.07
ENE	0.35	0.41	0.06	0.19	0.00	1.01
E	0.21	0.27	0.31	0.00	0.00	0.78
ESE	0.39	0.52	0.93	0.17	0.06	2.07
SE	1.18	0.91	1.03	0.48	0.00	3.59
SSE	5.06	2.91	2.27	0.87	0.00	11.11
S	7.23	6.84	5.14	0.81	0.00	20.02
SSW	5.54	6.67	3.57	0.58	0.00	16.36
SW	3.99	4.48	5.12	0.81	0.00	14.40
WSW	2.27	4.42	1.94	0.27	0.00	8.90
W	1.55	2.73	1.03	0.27	0.00	5.58
WNW	1.40	1.53	0.50	0.06	0.00	3.49
NW	1.36	1.47	0.21	0.00	0.00	3.04
NNW	2.05	1.78	0.62	0.02	0.00	4.46
TOTAL	35.16	36.91	23.22	4.65	0.06	4841.

bad data observed for 679 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Autumn

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.29	0.97	0.64	0.15	0.00	2.05
NNE	0.50	0.89	0.81	0.06	0.00	2.26
NE	0.39	0.46	0.35	0.00	0.00	1.20
ENE	0.39	0.50	0.29	0.19	0.00	1.37
E	0.39	0.62	0.46	0.15	0.00	1.62
ESE	0.33	0.33	0.73	0.23	0.00	1.62
SE	0.60	0.75	1.10	0.33	0.00	2.78
SSE	2.53	2.99	2.78	0.91	0.00	9.21
S	5.25	5.99	6.76	1.08	0.06	19.15
SSW	3.90	5.16	4.07	0.64	0.00	13.77
SW	2.57	5.72	4.79	1.02	0.00	14.10
WSW	1.68	4.87	3.61	0.56	0.00	10.72
W	1.14	3.53	1.62	0.25	0.00	6.53
WNW	0.68	2.68	1.24	0.02	0.00	4.63
NW	0.97	2.36	1.39	0.04	0.00	4.77
NNW	0.95	1.78	1.41	0.06	0.00	4.21
TOTAL	22.59	39.62	32.05	5.68	0.06	4821.

bad data observed for 699 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.95	2.68	0.66	0.00	4.34
NNE	0.06	1.66	2.55	0.39	0.00	4.67
NE	0.33	1.25	2.49	0.15	0.00	4.21
ENE	0.23	1.25	2.03	0.35	0.00	3.86
E	0.21	1.29	1.64	0.31	0.00	3.44
ESE	0.19	1.02	1.66	0.44	0.04	3.34
SE	0.23	1.25	3.49	0.62	0.00	5.58
SSE	0.15	1.76	6.02	2.30	0.00	10.23
S	0.23	2.18	7.10	3.07	0.00	12.58
SSW	0.21	0.75	2.30	1.62	0.00	4.88
SW	0.15	0.79	2.45	1.64	0.00	5.02
WSW	0.21	1.47	3.63	1.83	0.00	7.14
W	0.15	2.16	4.25	0.93	0.00	7.49
WNW	0.27	2.45	4.23	0.21	0.00	7.16
NW	0.19	2.95	4.65	0.42	0.00	8.20
NNW	0.12	1.97	4.90	0.87	0.00	7.86
TOTAL	2.95	25.13	56.07	15.81	0.04	4819.

bad data observed for 701 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Autumn

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.06	1.08	2.42	0.54	0.00	4.10
NNE	0.17	1.20	2.63	0.25	0.00	4.25
NE	0.12	1.41	4.16	0.41	0.00	6.11
ENE	0.27	1.64	5.43	1.16	0.00	8.49
E	0.17	1.45	3.50	0.64	0.00	5.76
ESE	0.15	1.08	5.10	0.77	0.00	7.09
SE	0.21	1.14	6.46	1.04	0.00	8.85
SSE	0.10	1.16	6.80	3.56	0.00	11.62
S	0.10	0.89	4.50	3.09	0.04	8.62
SSW	0.19	0.41	1.91	1.51	0.06	4.08
SW	0.08	0.44	1.91	1.02	0.00	3.44
WSW	0.10	0.93	2.78	1.64	0.00	5.45
W	0.23	1.22	2.40	0.93	0.00	4.79
WNW	0.08	1.49	1.97	0.52	0.00	4.06
NW	0.15	2.24	3.00	0.58	0.08	6.05
NNW	0.21	1.93	4.33	0.79	0.00	7.25
TOTAL	2.38	19.70	59.29	18.44	0.19	4827.

bad data observed for 693 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.66	0.82	0.66	0.27	0.00	2.41
NNE	0.64	1.85	1.26	0.16	0.00	3.91
NE	0.64	2.45	5.95	0.74	0.00	9.78
ENE	0.66	3.25	6.51	1.36	0.00	11.78
E	0.35	1.71	3.46	0.39	0.00	5.91
ESE	0.45	1.77	4.24	0.41	0.04	6.92
SE	0.93	3.52	6.43	0.66	0.00	11.53
SSE	0.66	3.15	7.06	2.49	0.00	13.36
S	0.25	1.79	5.66	2.47	0.00	10.17
SSW	0.29	0.86	2.00	0.93	0.08	4.16
SW	0.16	0.93	1.73	0.89	0.00	3.71
WSW	0.29	0.76	1.94	1.11	0.00	4.10
W	0.27	0.72	1.50	0.60	0.00	3.09
WNW	0.19	0.76	0.84	0.37	0.02	2.18
NW	0.68	1.01	0.80	0.37	0.00	2.86
NNW	0.99	1.98	1.11	0.04	0.00	4.12
TOTAL	8.09	27.35	51.15	13.26	0.14	4856.

bad data observed for 664 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Autumn

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.30	1.20	0.45	0.02	0.00	2.97
NNE	2.58	2.51	1.20	0.16	0.00	6.45
NE	2.78	4.10	3.09	0.21	0.00	10.18
ENE	2.18	2.45	1.34	0.23	0.00	6.20
E	1.55	1.75	0.49	0.08	0.00	3.87
ESE	1.71	1.63	1.01	0.12	0.02	4.49
SE	2.35	4.08	2.39	0.43	0.10	9.36
SSE	4.57	4.92	3.38	0.80	0.00	13.68
S	3.94	4.86	5.07	1.46	0.06	15.39
SSW	1.55	2.66	3.11	0.84	0.02	8.18
SW	1.05	1.77	2.97	0.47	0.00	6.26
WSW	0.41	2.04	1.36	0.72	0.00	4.53
W	0.37	1.13	0.97	0.16	0.00	2.64
WNW	0.41	0.95	0.68	0.00	0.00	2.04
NW	0.49	0.68	0.33	0.08	0.00	1.59
NNW	0.64	1.03	0.49	0.00	0.00	2.16
TOTAL	27.88	37.77	28.33	5.81	0.21	4853.

bad data observed for 667 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	2.61	1.19	0.49	0.10	0.00	4.41
NNE	2.66	1.79	0.64	0.10	0.00	5.19
NE	2.33	1.28	0.35	0.12	0.00	4.08
ENE	1.09	0.54	0.41	0.00	0.00	2.04
E	0.93	0.27	0.64	0.19	0.00	2.02
ESE	0.78	0.56	0.35	0.14	0.06	1.89
SE	2.08	1.65	1.36	0.76	0.02	5.87
SSE	5.31	3.13	2.37	0.54	0.00	11.34
S	7.39	5.31	4.10	1.13	0.00	17.93
SSW	4.41	3.83	3.56	0.93	0.00	12.72
SW	2.57	4.14	3.77	1.07	0.00	11.55
WSW	1.75	3.13	1.71	0.54	0.00	7.12
W	0.99	2.10	0.78	0.35	0.00	4.22
WNW	0.93	0.82	0.56	0.02	0.00	2.33
NW	1.19	1.69	0.47	0.00	0.00	3.36
NNW	2.14	1.46	0.35	0.00	0.00	3.95
TOTAL	39.15	32.87	21.90	5.99	0.08	4858.

bad data observed for 662 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Winter

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.50	0.80	0.30	0.20	0.00	1.80
NNE	0.16	0.53	0.30	0.00	0.00	1.00
NE	0.23	0.20	0.11	0.00	0.00	0.53
ENE	0.09	0.07	0.02	0.00	0.00	0.18
E	0.09	0.30	0.04	0.00	0.00	0.43
ESE	0.25	0.25	0.07	0.00	0.00	0.57
SE	0.39	0.23	0.28	0.11	0.00	1.01
SSE	1.94	0.94	0.98	0.16	0.04	4.06
S	6.09	3.61	3.74	0.84	0.16	14.43
SSW	5.43	4.34	4.77	1.67	0.00	16.21
SW	2.86	4.59	9.54	3.49	0.04	20.52
WSW	1.67	4.18	5.71	1.92	0.04	13.52
W	1.32	3.58	3.01	1.30	0.00	9.20
WNW	1.42	2.30	1.19	0.20	0.00	5.11
NW	1.35	2.79	1.28	0.41	0.00	5.84
NNW	1.14	2.58	1.48	0.41	0.00	5.60
TOTAL	24.93	31.30	32.81	10.69	0.27	5620.

bad data observed for 212 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.21	1.07	0.62	0.09	0.00	1.99
NNE	0.23	0.46	0.23	0.02	0.00	0.94
NE	0.14	0.28	0.07	0.00	0.00	0.50
ENE	0.04	0.20	0.04	0.00	0.00	0.27
E	0.11	0.20	0.00	0.00	0.00	0.30
ESE	0.14	0.18	0.09	0.02	0.00	0.43
SE	0.21	0.23	0.27	0.09	0.00	0.80
SSE	1.35	1.48	0.82	0.21	0.02	3.88
S	4.80	4.38	3.77	0.52	0.07	13.54
SSW	4.38	5.35	4.98	1.51	0.00	16.22
SW	2.83	5.16	10.17	3.63	0.02	21.81
WSW	2.22	4.78	5.99	2.06	0.00	15.07
W	1.23	3.86	3.59	1.12	0.00	9.80
WNW	0.96	2.81	1.33	0.12	0.00	5.23
NW	1.05	2.44	1.60	0.20	0.00	5.28
NNW	0.60	1.85	1.39	0.11	0.00	3.95
TOTAL	20.51	34.72	34.97	9.69	0.11	5622.

bad data observed for 210 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Winter

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.16	0.82	0.52	0.14	0.00	1.64
NNE	0.20	0.39	0.27	0.00	0.00	0.85
NE	0.05	0.23	0.11	0.02	0.00	0.41
ENE	0.07	0.07	0.04	0.00	0.00	0.18
E	0.05	0.14	0.05	0.04	0.00	0.28
ESE	0.12	0.14	0.11	0.05	0.00	0.43
SE	0.23	0.14	0.18	0.16	0.00	0.71
SSE	0.96	0.77	0.77	0.12	0.00	2.62
S	2.81	3.86	3.85	0.77	0.00	11.29
SSW	3.21	4.47	4.50	1.57	0.00	13.75
SW	2.48	4.75	10.35	3.29	0.00	20.87
WSW	1.48	4.72	7.80	2.40	0.02	16.42
W	1.23	5.22	5.18	1.14	0.00	12.77
WNW	1.07	2.87	2.51	0.14	0.00	6.59
NW	0.77	2.60	2.53	0.27	0.00	6.16
NNW	0.78	2.17	1.78	0.30	0.00	5.04
TOTAL	15.67	33.37	40.53	10.42	0.02	5616.

bad data observed for 216 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.23	1.11	0.52	0.00	1.90
NNE	0.09	0.43	0.99	0.11	0.00	1.62
NE	0.18	0.43	0.57	0.14	0.00	1.33
ENE	0.07	0.23	0.05	0.02	0.00	0.38
E	0.04	0.25	0.09	0.00	0.00	0.38
ESE	0.11	0.23	0.29	0.00	0.00	0.63
SE	0.07	0.43	1.15	0.22	0.00	1.87
SSE	0.14	0.97	3.38	1.04	0.00	5.53
S	0.23	1.31	4.60	3.03	0.05	9.23
SSW	0.25	1.04	2.78	3.21	0.00	7.29
SW	0.18	0.93	5.21	5.19	0.02	11.53
WSW	0.14	1.72	7.61	6.50	0.11	16.09
W	0.20	2.23	6.84	4.02	0.04	13.32
WNW	0.22	2.41	5.51	1.13	0.04	9.30
NW	0.16	3.12	7.00	1.38	0.00	11.67
NNW	0.09	1.63	5.26	0.97	0.00	7.95
TOTAL	2.21	17.61	52.44	27.49	0.25	5570.

bad data observed for 262 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Winter

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.61	2.18	0.59	0.00	3.44
NNE	0.12	0.98	1.96	0.36	0.00	3.42
NE	0.18	0.64	1.39	0.16	0.00	2.37
ENE	0.14	0.52	1.27	0.05	0.00	1.98
E	0.07	0.34	0.57	0.05	0.00	1.03
ESE	0.20	0.73	0.84	0.04	0.00	1.80
SE	0.12	1.11	2.98	0.36	0.00	4.57
SSE	0.11	1.48	5.55	1.62	0.00	8.76
S	0.09	0.86	5.32	3.87	0.00	10.13
SSW	0.09	0.45	2.32	2.80	0.00	5.65
SW	0.07	0.59	3.16	3.96	0.00	7.78
WSW	0.12	0.75	4.57	6.49	0.18	12.11
W	0.18	1.25	4.98	3.89	0.14	10.44
WNW	0.14	1.43	3.48	1.43	0.00	6.48
NW	0.25	2.27	6.28	1.25	0.05	10.10
NNW	0.18	2.32	6.44	0.98	0.02	9.94
TOTAL	2.14	16.30	53.26	27.90	0.39	5606.

bad data observed for 226 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.03	1.37	1.05	0.29	0.00	3.74
NNE	0.73	1.35	1.16	0.29	0.00	3.53
NE	0.55	1.34	1.66	0.21	0.00	3.76
ENE	0.61	2.07	2.50	0.16	0.00	5.33
E	0.61	1.35	0.68	0.02	0.00	2.66
ESE	0.53	0.91	0.77	0.09	0.00	2.30
SE	0.86	2.42	2.28	0.34	0.00	5.90
SSE	0.91	3.07	4.49	0.87	0.00	9.34
S	1.07	2.41	6.84	2.51	0.00	12.83
SSW	0.46	1.14	2.73	1.84	0.00	6.17
SW	0.29	1.19	3.39	2.12	0.02	7.01
WSW	0.62	1.60	5.06	4.60	0.05	11.94
W	0.46	1.75	3.62	2.85	0.07	8.75
WNW	0.59	1.11	1.69	0.64	0.00	4.03
NW	0.61	1.39	2.32	0.77	0.02	5.10
NNW	1.66	3.35	2.07	0.53	0.00	7.61
TOTAL	11.59	27.83	42.30	18.13	0.16	5610.

bad data observed for 222 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Winter

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.87	1.08	0.76	0.36	0.00	3.08
NNE	1.24	1.99	0.66	0.05	0.00	3.95
NE	1.88	1.69	0.73	0.07	0.00	4.37
ENE	1.16	1.35	0.32	0.02	0.00	2.84
E	0.94	0.52	0.07	0.11	0.00	1.64
ESE	0.84	0.39	0.20	0.00	0.00	1.42
SE	1.51	1.07	0.46	0.11	0.00	3.15
SSE	3.43	3.11	1.69	0.37	0.05	8.66
S	4.48	5.95	5.17	0.87	0.00	16.48
SSW	2.45	2.06	4.35	1.33	0.00	10.20
SW	1.33	2.67	6.31	1.90	0.00	12.21
WSW	0.64	3.20	5.31	1.76	0.12	11.04
W	0.52	2.54	4.30	1.12	0.00	8.48
WNW	0.50	1.37	1.56	0.23	0.02	3.68
NW	0.62	1.46	1.85	0.11	0.00	4.03
NNW	1.12	1.58	1.76	0.32	0.00	4.78
TOTAL	23.53	32.03	35.51	8.73	0.20	5626.

bad data observed for 206 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.37	0.98	0.59	0.30	0.00	3.24
NNE	1.00	1.09	0.66	0.00	0.00	2.75
NE	0.70	0.62	0.14	0.11	0.00	1.57
ENE	0.41	0.21	0.05	0.05	0.00	0.73
E	0.16	0.23	0.07	0.00	0.00	0.46
ESE	0.46	0.11	0.07	0.00	0.00	0.64
SE	0.82	0.39	0.21	0.07	0.00	1.50
SSE	2.37	1.21	1.18	0.23	0.00	4.99
S	5.78	3.82	3.44	0.96	0.09	14.08
SSW	4.97	4.19	3.92	1.91	0.00	14.99
SW	2.51	3.74	8.54	2.94	0.00	17.74
WSW	1.60	3.80	5.28	1.98	0.05	12.71
W	1.19	3.42	3.78	0.96	0.02	9.38
WNW	0.73	2.07	1.35	0.09	0.00	4.24
NW	1.14	2.53	1.37	0.20	0.00	5.24
NNW	1.41	2.39	1.62	0.30	0.00	5.72
TOTAL	26.64	30.81	32.29	10.11	0.16	5609.

bad data observed for 223 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Spring

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.45	1.30	0.42	0.15	0.03	3.36
NNE	1.39	1.47	0.46	0.00	0.00	3.31
NE	1.32	1.45	0.24	0.10	0.00	3.11
ENE	0.66	0.66	0.37	0.00	0.00	1.69
E	0.59	0.68	0.14	0.00	0.00	1.40
ESE	0.52	0.66	0.20	0.02	0.00	1.40
SE	0.90	1.22	0.83	0.42	0.00	3.36
SSE	3.06	2.70	2.15	0.46	0.00	8.37
S	4.31	5.60	4.92	2.28	0.00	17.11
SSW	4.90	4.65	3.38	0.90	0.00	13.83
SW	3.14	4.11	3.67	1.23	0.02	12.17
WSW	2.43	4.34	2.60	0.57	0.00	9.96
W	1.57	2.76	1.42	0.29	0.00	6.03
WNW	1.18	2.32	0.56	0.08	0.00	4.14
NW	1.93	2.35	0.76	0.00	0.00	5.04
NNW	2.15	2.82	0.61	0.07	0.07	5.71
TOTAL	31.51	39.08	22.72	6.58	0.12	5916.

bad data observed for 90 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.83	1.83	0.27	0.14	0.00	4.06
NNE	0.95	1.08	0.63	0.07	0.00	2.73
NE	0.86	0.73	0.25	0.08	0.00	1.93
ENE	0.56	0.52	0.22	0.03	0.00	1.34
E	0.51	0.58	0.20	0.05	0.00	1.34
ESE	0.52	0.64	0.17	0.08	0.00	1.42
SE	0.85	0.98	0.51	0.25	0.00	2.59
SSE	2.83	2.18	2.01	0.64	0.00	7.67
S	4.10	5.89	5.15	1.47	0.00	16.60
SSW	3.74	5.82	3.57	0.86	0.00	14.00
SW	2.56	5.67	4.42	1.17	0.00	13.81
WSW	2.54	4.15	2.93	0.69	0.02	10.32
W	1.91	4.20	1.68	0.14	0.03	7.96
WNW	1.25	3.03	0.83	0.03	0.00	5.15
NW	1.62	2.64	0.37	0.08	0.02	4.74
NNW	1.56	2.45	0.32	0.00	0.02	4.35
TOTAL	28.18	42.40	23.53	5.81	0.08	5908.

bad data observed for 98 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Spring

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.42	1.22	1.98	0.51	0.00	4.14
NNE	0.29	1.54	1.78	0.39	0.00	4.00
NE	0.32	0.97	1.02	0.07	0.00	2.37
ENE	0.32	0.75	0.63	0.05	0.00	1.75
E	0.36	0.88	0.31	0.05	0.00	1.59
ESE	0.17	0.73	0.54	0.05	0.00	1.49
SE	0.36	0.98	1.83	0.27	0.00	3.44
SSE	0.73	2.17	3.22	1.20	0.00	7.33
S	1.63	3.93	5.80	2.32	0.00	13.69
SSW	1.63	2.56	3.41	1.53	0.00	9.12
SW	1.14	2.39	4.07	1.97	0.07	9.63
WSW	0.97	3.00	4.94	1.58	0.07	10.55
W	0.88	3.27	3.34	0.58	0.08	8.16
WNW	0.76	2.68	2.54	0.14	0.02	6.14
NW	0.93	3.60	3.80	0.15	0.00	8.48
NNW	0.68	3.26	3.90	0.27	0.00	8.11
TOTAL	11.58	33.94	43.11	11.13	0.24	5896.

bad data observed for 110 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.09	0.72	3.90	1.04	0.02	5.76
NNE	0.15	1.02	4.67	1.09	0.00	6.93
NE	0.09	1.04	3.93	0.80	0.00	5.86
ENE	0.07	1.04	2.81	0.39	0.00	4.31
E	0.12	0.83	2.08	0.17	0.00	3.20
ESE	0.07	0.75	2.64	0.34	0.00	3.80
SE	0.12	0.94	4.48	0.75	0.00	6.28
SSE	0.20	0.80	5.57	3.24	0.02	9.83
S	0.14	0.65	4.00	3.68	0.07	8.53
SSW	0.07	0.32	1.82	1.55	0.10	3.87
SW	0.03	0.41	2.11	1.60	0.05	4.21
WSW	0.07	0.43	3.76	2.74	0.05	7.05
W	0.12	0.61	3.53	2.13	0.15	6.54
WNW	0.14	1.06	3.59	0.75	0.02	5.55
NW	0.12	1.72	5.26	0.92	0.00	8.02
NNW	0.10	1.58	7.49	1.09	0.00	10.27
TOTAL	1.69	13.91	61.65	22.28	0.48	5872.

bad data observed for 134 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Spring

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.19	1.42	0.80	0.00	2.41
NNE	0.05	0.53	3.22	0.76	0.00	4.56
NE	0.08	0.95	5.90	2.39	0.00	9.33
ENE	0.12	0.75	8.82	2.70	0.00	12.38
E	0.07	0.61	4.85	0.81	0.00	6.34
ESE	0.05	0.46	5.21	1.07	0.00	6.79
SE	0.10	0.64	7.01	2.02	0.00	9.77
SSE	0.02	0.34	5.63	4.72	0.00	10.70
S	0.02	0.24	3.04	4.14	0.14	7.57
SSW	0.03	0.14	0.78	1.09	0.12	2.15
SW	0.05	0.27	1.39	1.68	0.03	3.43
WSW	0.08	0.22	2.66	2.80	0.02	5.78
W	0.02	0.42	2.66	1.87	0.19	5.16
WNW	0.03	0.51	1.98	1.10	0.00	3.63
NW	0.08	0.78	2.85	0.93	0.00	4.65
NNW	0.03	0.61	3.24	1.46	0.00	5.34
TOTAL	0.85	7.65	60.68	30.33	0.49	5895.

bad data observed for 111 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.14	0.29	0.56	0.30	0.00	1.29
NNE	0.19	0.37	1.81	0.88	0.00	3.25
NE	0.20	1.34	6.25	2.39	0.00	10.18
ENE	0.24	1.68	11.64	2.78	0.00	16.33
E	0.27	1.58	6.22	0.59	0.00	8.66
ESE	0.22	1.20	5.37	0.75	0.00	7.54
SE	0.07	1.56	6.62	1.36	0.00	9.60
SSE	0.10	0.73	6.55	3.73	0.02	11.13
S	0.10	0.51	4.37	4.83	0.17	9.98
SSW	0.03	0.22	1.10	1.59	0.02	2.96
SW	0.03	0.29	1.07	1.19	0.05	2.63
WSW	0.05	0.22	2.13	2.32	0.03	4.76
W	0.08	0.56	1.61	1.52	0.22	4.00
WNW	0.10	0.22	1.17	0.71	0.03	2.24
NW	0.07	0.46	1.49	0.59	0.00	2.61
NNW	0.19	0.64	1.36	0.68	0.00	2.86
TOTAL	2.08	11.86	59.32	26.20	0.54	5904.

bad data observed for 102 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Spring

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.59	0.92	0.71	0.07	0.00	2.29
NNE	0.98	2.58	3.44	0.49	0.00	7.50
NE	1.26	3.94	6.04	0.44	0.00	11.67
ENE	1.36	3.44	2.88	0.34	0.00	8.02
E	1.44	2.58	1.19	0.08	0.00	5.29
ESE	1.36	2.27	1.31	0.07	0.00	5.00
SE	1.58	4.05	2.71	0.36	0.00	8.70
SSE	1.83	3.80	5.12	1.42	0.00	12.18
S	1.75	2.51	5.04	2.83	0.08	12.21
SSW	1.14	1.44	1.82	1.17	0.00	5.56
SW	0.59	1.09	2.00	0.75	0.02	4.44
WSW	0.37	1.63	2.05	1.07	0.00	5.12
W	0.32	1.90	1.75	0.70	0.02	4.68
WNW	0.17	0.85	0.98	0.20	0.00	2.21
NW	0.25	1.00	1.19	0.12	0.00	2.56
NNW	0.37	0.85	1.17	0.15	0.00	2.54
TOTAL	15.37	34.84	39.41	10.26	0.12	5895.

bad data observed for 111 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	2.54	1.88	0.88	0.08	0.00	5.38
NNE	2.56	3.16	1.47	0.05	0.07	7.31
NE	1.78	2.34	0.91	0.12	0.00	5.14
ENE	1.12	1.15	0.34	0.08	0.00	2.69
E	0.71	1.25	0.12	0.07	0.00	2.15
ESE	0.86	0.93	0.32	0.05	0.00	2.17
SE	1.61	1.84	1.35	0.29	0.00	5.09
SSE	3.23	2.86	3.30	0.73	0.00	10.12
S	4.16	4.28	4.20	2.40	0.00	15.04
SSW	3.25	2.76	2.91	0.85	0.00	9.76
SW	2.71	3.16	2.79	0.90	0.03	9.60
WSW	1.34	2.94	2.67	0.73	0.03	7.72
W	0.98	2.39	1.64	0.41	0.03	5.45
WNW	0.85	1.59	0.66	0.14	0.00	3.23
NW	1.05	1.79	0.44	0.00	0.00	3.28
NNW	2.03	2.71	0.93	0.17	0.02	5.86
TOTAL	30.77	37.05	24.95	7.06	0.19	5909.

bad data observed for 97 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Summer

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.33	1.15	1.42	0.27	0.00	4.16
NNE	1.22	1.83	2.88	0.71	0.00	6.64
NE	1.01	1.95	4.60	1.44	0.00	9.00
ENE	0.74	1.61	4.34	1.69	0.00	8.38
E	0.61	1.43	2.75	0.60	0.00	5.39
ESE	0.65	1.29	2.43	0.35	0.00	4.72
SE	1.13	2.14	4.51	1.38	0.05	9.22
SSE	1.63	2.55	5.22	2.94	0.04	12.38
S	2.13	3.33	5.33	3.98	0.10	14.87
SSW	1.34	1.55	1.50	0.97	0.03	5.39
SW	0.93	1.33	0.95	0.40	0.03	3.64
WSW	0.76	0.94	0.86	0.47	0.01	3.04
W	0.64	1.04	0.92	0.42	0.00	3.02
WNW	0.51	0.85	0.87	0.31	0.00	2.54
NW	0.72	1.16	1.23	0.27	0.00	3.38
NNW	1.00	1.39	1.61	0.23	0.00	4.23
TOTAL	16.34	25.53	41.43	16.42	0.27	45886.

Season : Autumn

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.92	1.00	0.98	0.25	0.00	3.15
NNE	1.17	1.43	1.19	0.15	0.00	3.93
NE	1.02	1.51	2.08	0.21	0.00	4.82
ENE	0.74	1.29	2.04	0.45	0.00	4.52
E	0.53	0.95	1.37	0.24	0.00	3.09
ESE	0.58	0.91	1.84	0.33	0.03	3.69
SE	1.19	1.81	2.93	0.64	0.02	6.58
SSE	2.95	2.91	4.12	1.50	0.00	11.48
S	4.23	4.22	5.28	1.78	0.02	15.53
SSW	2.73	3.18	3.02	0.97	0.02	9.93
SW	1.68	2.89	3.26	0.91	0.00	8.75
WSW	1.11	2.62	2.43	0.87	0.00	7.03
W	0.80	1.99	1.68	0.46	0.00	4.94
WNW	0.71	1.53	1.27	0.15	0.00	3.66
NW	0.86	1.74	1.41	0.19	0.01	4.20
NNW	1.14	1.62	1.71	0.22	0.00	4.70
TOTAL	22.37	31.60	36.61	9.32	0.10	38720.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

SEASON : Winter

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.53	0.87	0.89	0.31	0.00	2.60
NNE	0.47	0.90	0.78	0.10	0.00	2.26
NE	0.49	0.68	0.60	0.09	0.00	1.86
ENE	0.32	0.59	0.53	0.04	0.00	1.49
E	0.26	0.42	0.20	0.03	0.00	0.90
ESE	0.33	0.37	0.30	0.02	0.00	1.03
SE	0.53	0.75	0.98	0.18	0.00	2.44
SSE	1.40	1.63	2.35	0.58	0.01	5.98
S	3.17	3.28	4.59	1.67	0.05	12.76
SSW	2.66	2.88	3.80	1.98	0.00	11.32
SW	1.57	2.96	7.09	3.31	0.01	14.94
WSW	1.07	3.10	5.92	3.46	0.07	13.61
W	0.79	2.98	4.41	2.05	0.03	10.26
WNW	0.70	2.04	2.33	0.50	0.01	5.58
NW	0.74	2.32	3.02	0.57	0.01	6.67
NNW	0.87	2.23	2.72	0.49	0.00	6.32
TOTAL	15.92	28.01	40.50	15.38	0.19	44879.

Season : Spring

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.88	1.04	1.27	0.39	0.01	3.59
NNE	0.82	1.47	2.18	0.47	0.01	4.95
NE	0.74	1.59	3.07	0.80	0.00	6.20
ENE	0.56	1.25	3.46	0.80	0.00	6.06
E	0.51	1.12	1.89	0.23	0.00	3.75
ESE	0.47	0.96	1.97	0.30	0.00	3.70
SE	0.70	1.53	3.17	0.71	0.00	6.10
SSE	1.50	1.95	4.19	2.02	0.00	9.66
S	2.03	2.95	4.56	2.99	0.06	12.60
SSW	1.85	2.24	2.35	1.19	0.03	7.66
SW	1.28	2.18	2.69	1.31	0.03	7.49
WSW	0.98	2.12	2.97	1.56	0.03	7.66
W	0.74	2.02	2.20	0.95	0.09	6.00
WNW	0.56	1.53	1.54	0.39	0.01	4.03
NW	0.76	1.79	2.02	0.35	0.00	4.92
NNW	0.89	1.87	2.37	0.49	0.01	5.63
TOTAL	15.27	27.61	41.89	14.94	0.28	47195.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHSTC Tower AT 7.0 M.

BEGINNING DATE : 110775 END DATE : 110286

ANNUAL

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.92	1.02	1.15	0.31	0.00	3.39
NNE	0.91	1.41	1.79	0.37	0.00	4.48
NE	0.81	1.44	2.62	0.66	0.00	5.52
ENE	0.59	1.18	2.64	0.76	0.00	5.16
E	0.48	0.98	1.57	0.28	0.00	3.31
ESE	0.51	0.88	1.64	0.25	0.01	3.28
SE	0.87	1.55	2.91	0.74	0.02	6.09
SSE	1.83	2.23	3.97	1.78	0.02	9.83
S	2.83	3.41	4.93	2.65	0.06	13.87
SSW	2.12	2.43	2.64	1.28	0.02	8.50
SW	1.35	2.31	3.48	1.50	0.02	8.66
WSW	0.97	2.17	3.05	1.61	0.03	7.83
W	0.74	2.00	2.32	0.98	0.03	6.08
WNW	0.61	1.48	1.51	0.35	0.00	3.96
NW	0.77	1.75	1.94	0.35	0.01	4.81
NNW	0.97	1.78	2.12	0.36	0.00	5.24
TOTAL	17.27	28.05	40.26	14.20	0.22	176680.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Summer

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.17	0.56	3.29	1.69	0.02	5.73
NNE	0.09	0.52	2.98	2.49	0.02	6.10
NE	0.16	0.44	2.89	2.25	0.09	5.82
ENE	0.14	0.70	2.02	0.87	0.00	3.73
E	0.05	0.77	1.97	0.87	0.00	3.66
ESE	0.10	0.37	1.50	0.99	0.02	2.98
SE	0.09	0.54	2.27	2.74	0.19	5.82
SSE	0.17	0.37	3.29	4.39	0.96	9.18
S	0.05	0.44	3.97	8.75	2.96	16.17
SSW	0.10	0.51	2.86	5.07	0.84	9.38
SW	0.09	0.51	1.97	3.50	0.26	6.33
WSW	0.10	0.37	1.74	2.88	0.14	5.23
W	0.05	0.30	1.55	2.20	0.10	4.20
WNW	0.12	0.54	2.56	2.09	0.03	5.35
NW	0.10	0.64	2.65	2.34	0.19	5.93
NNW	0.09	0.47	1.60	2.18	0.05	4.39
TOTAL	1.69	8.02	39.13	45.29	5.87	5738.

bad data observed for 214 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.14	0.49	2.68	1.55	0.02	4.88
NNE	0.09	0.57	3.05	1.62	0.02	5.35
NE	0.10	0.33	2.02	1.25	0.10	3.82
ENE	0.10	0.33	0.91	0.51	0.00	1.85
E	0.12	0.38	1.24	0.33	0.03	2.11
ESE	0.05	0.57	1.36	0.84	0.05	2.87
SE	0.07	0.47	1.79	1.83	0.16	4.32
SSE	0.10	0.47	2.72	4.58	0.42	8.29
S	0.07	0.45	3.64	9.63	1.97	15.77
SSW	0.09	0.42	3.36	6.48	1.05	11.39
SW	0.10	0.40	2.54	4.36	0.44	7.84
WSW	0.12	0.52	2.44	3.48	0.03	6.60
W	0.09	0.52	2.28	2.42	0.17	5.49
WNW	0.19	0.71	3.54	2.80	0.10	7.35
NW	0.10	1.13	3.03	2.67	0.14	7.07
NNW	0.14	0.30	2.82	1.71	0.03	5.00
TOTAL	1.69	8.08	39.43	46.06	4.74	5740.

bad data observed for 212 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Summer

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.65	3.11	2.48	0.14	6.44
NNE	0.14	0.23	2.69	2.05	0.28	5.39
NE	0.05	0.44	1.52	0.98	0.12	3.11
ENE	0.05	0.24	1.24	0.52	0.03	2.10
E	0.05	0.42	1.26	0.65	0.09	2.47
ESE	0.07	0.42	1.29	0.86	0.10	2.75
SE	0.09	0.30	1.63	2.24	0.35	4.60
SSE	0.03	0.52	2.29	5.13	0.82	8.80
S	0.05	0.66	3.43	8.82	2.19	15.15
SSW	0.09	0.56	2.41	4.36	1.17	8.59
SW	0.05	0.61	1.47	2.76	0.47	5.37
WSW	0.07	0.35	1.57	2.22	0.51	4.72
W	0.07	0.66	1.87	2.64	0.45	5.70
WNW	0.07	0.51	3.53	2.41	0.24	6.77
NW	0.10	0.82	5.44	2.62	0.28	9.27
NNW	0.10	0.63	5.16	2.64	0.24	8.78
TOTAL	1.15	8.03	39.93	43.38	7.50	5717.

bad data observed for 235 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.09	0.26	3.40	5.62	0.17	9.55
NNE	0.00	0.30	3.30	5.15	0.21	8.96
NE	0.03	0.26	2.50	3.53	0.17	6.50
ENE	0.00	0.10	1.99	4.03	0.03	6.16
E	0.00	0.09	1.20	2.18	0.09	3.56
ESE	0.00	0.12	0.80	2.25	0.10	3.28
SE	0.00	0.10	1.36	5.05	0.63	7.14
SSE	0.00	0.03	1.54	8.56	1.20	11.33
S	0.00	0.10	1.07	8.05	3.49	12.71
SSW	0.00	0.10	0.31	2.93	1.22	4.57
SW	0.00	0.05	0.37	1.29	0.37	2.08
WSW	0.00	0.10	0.21	1.26	0.52	2.10
W	0.00	0.10	0.73	2.17	0.87	3.88
WNW	0.00	0.16	1.41	2.46	0.40	4.44
NW	0.05	0.31	2.36	2.29	0.51	5.52
NNW	0.02	0.19	3.07	4.54	0.40	8.22
TOTAL	0.19	2.41	25.63	61.36	10.41	5727.

bad data observed for 225 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Summer

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.00	0.87	2.20	0.42	3.49
NNE	0.00	0.05	0.73	1.91	0.21	2.90
NE	0.00	0.05	0.87	4.56	0.75	6.23
ENE	0.00	0.02	0.82	15.27	2.52	18.62
E	0.00	0.02	0.64	10.13	0.73	11.52
ESE	0.00	0.02	0.35	4.70	0.54	5.60
SE	0.00	0.02	0.38	6.82	1.54	8.76
SSE	0.00	0.00	0.24	9.25	3.57	13.06
S	0.00	0.02	0.21	5.73	5.76	11.71
SSW	0.00	0.02	0.10	2.06	2.12	4.30
SW	0.00	0.05	0.02	0.78	0.49	1.34
WSW	0.02	0.02	0.10	0.71	0.50	1.35
W	0.00	0.02	0.17	2.00	1.27	3.45
WNW	0.00	0.02	0.36	0.88	1.18	2.45
NW	0.00	0.03	0.42	1.11	0.66	2.22
NNW	0.00	0.02	0.62	1.89	0.47	3.00
TOTAL	0.02	0.36	6.90	70.00	22.71	5764.

bad data observed for 188 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.05	0.12	0.49	0.09	0.75
NNE	0.00	0.00	0.31	1.08	0.35	1.74
NE	0.03	0.05	0.54	7.51	2.28	10.41
ENE	0.00	0.05	0.80	15.25	3.98	20.08
E	0.00	0.00	0.66	10.12	1.25	12.03
ESE	0.00	0.00	0.30	5.89	0.97	7.16
SE	0.00	0.05	0.31	7.53	2.19	10.08
SSE	0.00	0.00	0.26	8.24	4.14	12.64
S	0.00	0.00	0.14	5.82	6.42	12.38
SSW	0.00	0.03	0.10	1.58	1.91	3.63
SW	0.00	0.05	0.12	0.63	0.52	1.32
WSW	0.00	0.00	0.12	0.85	0.94	1.91
W	0.00	0.02	0.12	0.87	1.43	2.43
WNW	0.00	0.00	0.12	0.45	1.03	1.60
NW	0.00	0.03	0.09	0.49	0.50	1.11
NNW	0.00	0.03	0.14	0.38	0.16	0.71
TOTAL	0.03	0.38	4.26	67.18	28.15	5752.

bad data observed for 196 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Summer

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.03	0.37	0.70	0.23	1.33
NNE	0.00	0.03	0.91	3.24	0.12	4.31
NE	0.02	0.05	2.79	13.85	1.48	18.19
ENE	0.02	0.12	2.69	9.57	0.58	12.98
E	0.00	0.07	2.84	3.91	0.26	7.08
ESE	0.00	0.14	2.11	2.93	0.44	5.62
SE	0.00	0.05	2.20	6.31	0.72	9.28
SSE	0.00	0.10	2.21	8.49	1.87	12.68
S	0.00	0.02	2.09	7.69	3.87	13.67
SSW	0.00	0.16	0.80	3.28	1.45	5.69
SW	0.00	0.07	0.26	1.40	0.54	2.27
WSW	0.00	0.03	0.23	1.46	0.45	2.18
W	0.02	0.00	0.17	0.73	0.40	1.33
WNW	0.02	0.02	0.30	0.96	0.10	1.40
NW	0.00	0.00	0.17	0.78	0.12	1.08
NNW	0.02	0.05	0.23	0.47	0.17	0.94
TOTAL	0.09	0.96	20.37	65.78	12.80	5734.

bad data observed for 212 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.33	2.25	2.36	0.00	5.01
NNE	0.12	0.23	3.67	5.75	0.05	9.82
NE	0.00	0.44	4.66	5.94	0.26	11.30
ENE	0.07	0.47	2.71	1.76	0.00	5.01
E	0.09	0.58	2.43	1.22	0.02	4.33
ESE	0.07	0.66	2.64	1.66	0.00	5.03
SE	0.03	0.26	2.83	3.74	0.24	7.11
SSE	0.09	0.23	3.65	5.68	0.72	10.36
S	0.03	0.38	4.05	7.74	3.13	15.34
SSW	0.02	0.35	2.71	3.48	1.36	7.91
SW	0.05	0.28	1.42	2.34	0.35	4.44
WSW	0.02	0.12	0.63	2.27	0.59	3.63
W	0.09	0.12	1.15	1.31	0.28	2.95
WNW	0.03	0.17	0.66	1.19	0.03	2.10
NW	0.05	0.17	1.10	1.48	0.19	3.00
NNW	0.03	0.14	1.00	1.36	0.10	2.64
TOTAL	0.87	4.94	37.56	49.28	7.34	5724.

bad data observed for 222 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Autumn

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.11	0.39	1.41	1.40	0.05	3.36
NNE	0.11	0.35	1.70	1.61	0.00	3.76
NE	0.04	0.25	0.85	1.13	0.00	2.26
ENE	0.07	0.18	0.83	0.69	0.05	1.82
E	0.09	0.34	0.85	0.60	0.12	2.00
ESE	0.14	0.42	0.81	1.78	0.04	3.20
SE	0.12	0.25	1.04	2.17	0.16	3.74
SSE	0.07	0.25	1.57	3.96	0.35	6.20
S	0.11	0.53	2.68	7.75	2.00	13.07
SSW	0.04	0.41	2.56	7.58	0.78	11.35
SW	0.09	0.41	1.85	6.39	0.53	9.27
WSW	0.09	0.58	2.72	7.43	1.54	12.36
W	0.14	0.62	2.88	4.68	0.97	9.29
WNW	0.07	0.81	2.95	3.46	0.26	7.56
NW	0.18	0.62	2.90	2.91	0.25	6.85
NNW	0.09	0.51	1.17	2.01	0.14	3.92
TOTAL	1.54	6.90	28.77	55.55	7.24	5663.

bad data observed for 679 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.32	1.29	1.13	0.05	2.81
NNE	0.07	0.21	1.18	0.99	0.11	2.56
NE	0.04	0.19	0.94	0.65	0.09	1.91
ENE	0.04	0.18	0.71	0.35	0.04	1.31
E	0.04	0.25	0.65	0.56	0.02	1.52
ESE	0.04	0.26	0.97	1.29	0.04	2.59
SE	0.04	0.12	1.02	1.85	0.25	3.28
SSE	0.04	0.25	1.32	3.85	0.26	5.72
S	0.12	0.37	2.70	8.49	1.57	13.25
SSW	0.05	0.42	2.70	9.16	0.76	13.10
SW	0.09	0.65	2.56	7.50	0.76	11.56
WSW	0.07	0.42	3.05	8.63	1.94	14.12
W	0.09	0.65	3.58	6.09	0.58	11.00
WNW	0.04	0.44	2.98	2.86	0.19	6.51
NW	0.02	0.46	2.52	2.06	0.19	5.26
NNW	0.04	0.32	1.46	1.66	0.04	3.51
TOTAL	0.81	5.52	29.65	57.13	6.88	5666.

bad data observed for 676 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Autumn

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.32	1.47	0.65	0.16	2.67
NNE	0.07	0.25	0.78	1.03	0.16	2.28
NE	0.04	0.34	0.58	0.35	0.04	1.34
ENE	0.04	0.27	0.62	0.35	0.14	1.42
E	0.00	0.30	0.44	0.65	0.14	1.54
ESE	0.04	0.27	0.55	0.90	0.25	2.00
SE	0.02	0.25	0.85	1.45	0.39	2.96
SSE	0.12	0.50	1.59	3.93	0.85	6.99
S	0.09	0.48	3.33	7.72	1.65	13.25
SSW	0.07	0.57	3.59	7.84	1.11	13.18
SW	0.07	0.44	2.46	5.13	0.94	9.04
WSW	0.05	0.51	3.04	7.98	2.42	14.02
W	0.09	0.37	3.61	5.84	1.17	11.08
WNW	0.07	0.60	3.68	2.46	0.55	7.36
NW	0.07	0.55	2.92	2.44	0.44	6.42
NNW	0.07	0.48	2.02	1.50	0.37	4.44
TOTAL	0.97	6.48	31.53	50.24	10.78	5651.

bad data observed for 693 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.37	3.02	2.88	0.09	6.36
NNE	0.02	0.35	1.75	1.85	0.04	4.01
NE	0.02	0.34	1.24	1.09	0.05	2.74
ENE	0.02	0.19	1.15	1.13	0.09	2.58
E	0.00	0.19	0.94	1.55	0.26	2.95
ESE	0.02	0.14	0.62	1.38	0.19	2.35
SE	0.00	0.16	1.20	2.75	0.34	4.45
SSE	0.00	0.41	2.07	5.93	1.04	9.45
S	0.05	0.34	2.31	8.90	1.78	13.38
SSW	0.05	0.30	1.48	5.31	1.50	8.65
SW	0.04	0.42	0.92	2.14	0.39	3.90
WSW	0.04	0.32	1.20	4.27	1.48	7.31
W	0.00	0.42	2.77	3.90	1.27	8.37
WNW	0.00	0.44	3.74	3.27	0.44	7.89
NW	0.05	0.46	4.17	3.04	0.28	8.00
NNW	0.02	0.23	3.48	3.65	0.25	7.63
TOTAL	0.32	5.08	32.04	53.05	9.50	5664.

bad data observed for 684 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Autumn

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.18	2.38	2.54	0.11	5.23
NNE	0.00	0.16	1.73	2.26	0.07	4.21
NE	0.00	0.18	1.89	2.82	0.09	4.97
ENE	0.00	0.12	1.30	5.88	0.32	7.63
E	0.02	0.07	1.25	4.03	0.56	5.94
ESE	0.00	0.09	0.86	3.44	0.30	4.69
SE	0.00	0.14	1.04	5.11	0.44	6.73
SSE	0.02	0.11	1.44	8.19	1.37	11.13
S	0.02	0.21	1.39	9.25	2.75	13.62
SSW	0.00	0.12	0.81	3.47	2.06	6.47
SW	0.02	0.09	0.41	1.46	0.60	2.57
WSW	0.04	0.19	0.85	2.98	1.23	5.29
W	0.00	0.12	1.00	3.03	1.89	6.04
WNW	0.04	0.12	1.71	1.43	0.51	3.81
NW	0.05	0.41	2.31	2.36	0.69	5.81
NNW	0.00	0.32	2.47	2.73	0.35	5.87
TOTAL	0.23	2.63	22.83	60.98	13.34	5676.

bad data observed for 672 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.12	1.04	0.76	0.40	2.34
NNE	0.02	0.16	1.09	1.09	0.25	2.60
NE	0.02	0.19	1.20	4.53	1.20	7.14
ENE	0.02	0.19	1.83	7.42	1.93	11.39
E	0.02	0.07	1.85	5.20	0.53	7.66
ESE	0.02	0.07	1.51	3.83	0.77	6.20
SE	0.04	0.09	2.11	5.68	1.49	9.40
SSE	0.00	0.05	2.48	8.21	2.23	12.97
S	0.00	0.07	2.32	9.54	3.48	15.41
SSW	0.02	0.09	0.40	3.59	1.74	5.83
SW	0.02	0.14	0.26	1.05	0.72	2.20
WSW	0.00	0.07	0.39	1.97	1.70	4.13
W	0.00	0.04	0.46	2.36	2.16	5.01
WNW	0.07	0.11	0.42	0.86	0.60	2.06
NW	0.04	0.30	0.97	1.11	0.54	2.95
NNW	0.05	0.18	0.81	1.04	0.63	2.71
TOTAL	0.33	1.93	19.12	58.22	20.39	5690.

bad data observed for 658 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Autumn

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.16	0.72	0.81	0.14	1.86
NNE	0.02	0.19	1.35	2.88	0.49	4.94
NE	0.04	0.28	2.32	6.72	1.74	11.10
ENE	0.00	0.26	3.39	3.64	0.53	7.83
E	0.05	0.35	2.83	1.97	0.11	5.31
ESE	0.07	0.30	2.67	2.53	0.65	6.23
SE	0.04	0.19	2.57	4.06	0.88	7.74
SSE	0.00	0.14	3.08	6.02	1.50	10.73
S	0.04	0.11	3.24	8.64	2.48	14.49
SSW	0.05	0.12	1.65	5.07	1.28	8.18
SW	0.07	0.12	0.81	3.45	0.93	5.38
WSW	0.02	0.05	0.55	2.78	1.60	5.00
W	0.02	0.04	0.49	2.73	1.42	4.70
WNW	0.00	0.04	0.32	1.28	0.58	2.22
NW	0.02	0.04	0.49	1.27	0.26	2.08
NNW	0.02	0.09	0.51	1.25	0.35	2.22
TOTAL	0.47	2.48	27.00	55.09	14.95	5685.

bad data observed for 663 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.11	0.35	2.14	1.85	0.09	4.54
NNE	0.12	0.42	2.68	3.09	0.02	6.34
NE	0.07	0.39	2.07	2.19	0.00	4.71
ENE	0.07	0.56	1.68	0.99	0.02	3.32
E	0.09	0.69	1.68	0.64	0.00	3.09
ESE	0.09	0.51	1.61	1.48	0.09	3.78
SE	0.09	0.51	2.08	2.54	0.25	5.47
SSE	0.04	0.14	2.52	4.08	0.56	7.34
S	0.04	0.46	2.95	6.85	1.55	11.85
SSW	0.07	0.37	3.13	6.29	0.88	10.73
SW	0.09	0.37	2.12	4.78	0.92	8.28
WSW	0.04	0.37	1.84	5.40	1.77	9.41
W	0.04	0.16	1.61	3.46	0.87	6.13
WNW	0.09	0.44	1.92	2.12	0.21	4.78
NW	0.14	0.44	2.26	2.47	0.25	5.56
NNW	0.11	0.44	2.01	2.05	0.05	4.66
TOTAL	1.27	6.64	34.29	50.28	7.52	5664.

bad data observed for 684 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Winter

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.17	0.89	1.20	0.09	2.39
NNE	0.02	0.21	0.43	0.63	0.11	1.39
NE	0.06	0.06	0.28	0.24	0.03	0.68
ENE	0.08	0.08	0.16	0.09	0.00	0.41
E	0.05	0.05	0.24	0.13	0.00	0.46
ESE	0.03	0.05	0.41	0.19	0.08	0.76
SE	0.05	0.11	0.16	0.38	0.02	0.71
SSE	0.02	0.16	0.74	1.36	0.22	2.50
S	0.03	0.16	1.41	4.28	0.76	6.64
SSW	0.05	0.24	1.56	7.32	0.90	10.07
SW	0.02	0.27	1.77	10.00	2.05	14.11
WSW	0.03	0.24	1.93	13.04	5.11	20.34
W	0.16	0.41	2.73	8.03	3.33	14.67
WNW	0.13	0.44	2.96	6.07	1.12	10.72
NW	0.05	0.38	2.58	5.23	0.90	9.14
NNW	0.06	0.22	1.28	3.07	0.40	5.03
TOTAL	0.85	3.24	19.52	61.26	15.13	6327.

bad data observed for 57 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.19	0.36	1.47	0.08	2.15
NNE	0.00	0.11	0.43	0.55	0.08	1.17
NE	0.02	0.08	0.21	0.25	0.00	0.55
ENE	0.00	0.16	0.17	0.05	0.00	0.38
E	0.02	0.06	0.28	0.02	0.02	0.40
ESE	0.00	0.06	0.25	0.13	0.03	0.47
SE	0.03	0.06	0.25	0.44	0.09	0.89
SSE	0.00	0.08	0.28	1.31	0.22	1.90
S	0.06	0.16	1.25	4.48	0.74	6.70
SSW	0.03	0.09	1.84	7.84	0.84	10.64
SW	0.03	0.22	1.85	9.36	1.76	13.22
WSW	0.02	0.35	2.50	13.46	6.19	22.51
W	0.02	0.27	3.17	9.67	3.40	16.53
WNW	0.03	0.33	3.04	5.94	0.74	10.08
NW	0.00	0.36	2.37	4.65	0.68	8.07
NNW	0.02	0.28	1.14	2.71	0.19	4.34
TOTAL	0.32	2.88	19.41	62.32	15.07	6317.

bad data observed for 67 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Winter

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.16	0.81	1.02	0.24	2.25
NNE	0.03	0.10	0.38	0.65	0.11	1.27
NE	0.00	0.11	0.13	0.14	0.02	0.40
ENE	0.02	0.05	0.11	0.05	0.00	0.22
E	0.00	0.03	0.13	0.13	0.00	0.29
ESE	0.00	0.05	0.17	0.21	0.05	0.48
SE	0.02	0.05	0.19	0.48	0.17	0.90
SSE	0.02	0.16	0.56	1.16	0.35	2.24
S	0.02	0.08	1.22	4.51	0.75	6.57
SSW	0.02	0.16	1.76	6.42	1.03	9.39
SW	0.11	0.38	1.76	7.38	1.17	10.80
WSW	0.08	0.35	2.54	14.69	6.04	23.70
W	0.14	0.30	3.25	9.95	3.87	17.51
WNW	0.17	0.51	3.46	6.20	1.28	11.63
NW	0.03	0.33	2.51	4.66	0.98	8.52
NNW	0.00	0.24	0.95	2.22	0.43	3.84
TOTAL	0.68	3.05	19.92	59.85	16.50	6304.

bad data observed for 80 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.06	0.14	0.89	1.70	0.13	2.92
NNE	0.02	0.14	0.46	0.48	0.00	1.10
NE	0.02	0.11	0.27	0.27	0.00	0.67
ENE	0.02	0.08	0.10	0.02	0.00	0.21
E	0.00	0.08	0.10	0.10	0.02	0.29
ESE	0.00	0.06	0.16	0.21	0.10	0.52
SE	0.03	0.05	0.44	0.87	0.03	1.43
SSE	0.03	0.25	0.92	1.89	0.38	3.48
S	0.03	0.32	1.67	5.23	1.16	8.40
SSW	0.03	0.32	1.48	4.42	1.43	7.67
SW	0.06	0.33	1.27	3.51	1.10	6.27
WSW	0.03	0.43	2.08	9.40	3.32	15.27
W	0.06	0.41	4.48	9.91	4.83	19.70
WNW	0.08	0.76	6.23	5.67	1.38	14.12
NW	0.02	0.44	4.70	5.72	0.76	11.64
NNW	0.05	0.30	1.95	3.69	0.32	6.31
TOTAL	0.54	4.24	27.20	53.07	14.95	6295.

bad data observed for 88 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Winter

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.22	2.25	2.70	0.16	5.35
NNE	0.03	0.24	1.39	1.53	0.17	3.37
NE	0.03	0.09	1.08	0.79	0.06	2.06
ENE	0.02	0.13	0.84	0.78	0.00	1.76
E	0.03	0.14	0.52	0.54	0.03	1.27
ESE	0.03	0.06	0.51	0.60	0.03	1.23
SE	0.00	0.11	0.93	1.27	0.00	2.31
SSE	0.00	0.11	1.68	3.31	0.32	5.41
S	0.00	0.17	1.74	7.55	1.34	10.80
SSW	0.00	0.24	0.79	4.81	1.80	7.64
SW	0.05	0.13	0.63	2.74	0.85	4.40
WSW	0.00	0.17	1.00	4.87	2.33	8.37
W	0.02	0.27	2.26	8.11	6.45	17.11
WNW	0.02	0.30	2.70	5.49	2.72	11.23
NW	0.03	0.44	3.78	4.65	1.28	10.19
NNW	0.03	0.33	3.23	3.43	0.49	7.51
TOTAL	0.30	3.16	25.32	53.16	18.05	6322.

bad data observed for 62 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.32	1.74	1.52	0.30	3.91
NNE	0.03	0.28	0.95	1.12	0.32	2.71
NE	0.00	0.13	1.09	2.14	0.33	3.69
ENE	0.02	0.13	1.76	2.12	0.49	4.51
E	0.02	0.11	1.47	1.28	0.28	3.16
ESE	0.00	0.13	1.34	0.90	0.22	2.59
SE	0.02	0.11	1.98	1.60	0.51	4.21
SSE	0.00	0.19	3.08	3.58	0.66	7.51
S	0.00	0.13	2.37	8.01	2.14	12.64
SSW	0.00	0.14	0.85	4.65	1.69	7.34
SW	0.02	0.09	0.54	2.83	0.81	4.29
WSW	0.08	0.21	1.04	4.78	2.44	8.54
W	0.08	0.22	1.47	6.03	6.72	14.52
WNW	0.09	0.32	1.58	3.67	2.39	8.05
NW	0.03	0.28	2.47	2.72	1.93	7.44
NNW	0.00	0.32	1.96	1.76	0.85	4.89
TOTAL	0.41	3.10	25.71	48.69	22.09	6321.

bad data observed for 63 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Winter

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.21	1.19	1.28	0.35	3.03
NNE	0.02	0.21	1.52	2.81	0.38	4.93
NE	0.03	0.16	2.01	2.56	0.40	5.15
ENE	0.00	0.16	1.58	1.28	0.19	3.21
E	0.03	0.22	1.28	0.40	0.17	2.10
ESE	0.05	0.21	1.34	0.60	0.32	2.51
SE	0.03	0.17	1.56	1.47	0.25	3.49
SSE	0.00	0.14	2.09	2.40	0.55	5.18
S	0.03	0.08	2.21	7.16	1.36	10.84
SSW	0.03	0.17	1.11	6.53	1.55	9.39
SW	0.03	0.16	0.68	5.07	1.53	7.47
WSW	0.06	0.13	0.73	7.43	3.44	11.79
W	0.03	0.13	1.00	7.33	4.27	12.75
WNW	0.02	0.22	1.52	4.30	1.61	7.66
NW	0.03	0.24	1.39	3.51	1.72	6.89
NNW	0.00	0.09	1.07	1.47	0.96	3.60
TOTAL	0.41	2.69	22.26	55.59	19.06	6329.

bad data observed for 55 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.25	1.14	1.81	0.16	3.36
NNE	0.03	0.19	1.22	1.66	0.14	3.25
NE	0.00	0.16	0.51	1.03	0.00	1.69
ENE	0.06	0.17	0.49	0.40	0.00	1.12
E	0.03	0.10	0.36	0.17	0.00	0.67
ESE	0.06	0.13	0.57	0.17	0.08	1.01
SE	0.05	0.10	0.78	0.51	0.08	1.50
SSE	0.02	0.05	1.27	1.39	0.25	2.98
S	0.02	0.14	2.03	3.99	0.49	6.67
SSW	0.02	0.32	2.04	6.54	0.87	9.79
SW	0.05	0.19	2.08	7.51	1.50	11.33
WSW	0.05	0.10	2.68	10.33	4.42	17.57
W	0.08	0.14	2.69	7.52	3.72	14.16
WNW	0.06	0.35	2.93	5.91	1.22	10.47
NW	0.11	0.40	2.36	4.17	1.17	8.21
NNW	0.06	0.21	2.04	3.58	0.33	6.23
TOTAL	0.70	2.98	25.19	56.69	14.45	6313.

bad data observed for 71 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Spring

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.20	0.49	2.01	1.84	0.13	4.67
NNE	0.15	0.38	1.37	1.40	0.07	3.38
NE	0.12	0.25	1.51	1.46	0.02	3.35
ENE	0.18	0.35	1.15	1.05	0.05	2.79
E	0.12	0.30	0.89	0.55	0.05	1.91
ESE	0.05	0.10	0.70	0.80	0.00	1.66
SE	0.13	0.35	0.72	0.95	0.18	2.34
SSE	0.08	0.20	1.56	2.78	0.77	5.39
S	0.07	0.18	2.27	5.49	1.42	9.43
SSW	0.18	0.50	2.31	5.84	0.85	9.68
SW	0.08	0.50	1.84	6.76	0.79	9.97
WSW	0.03	0.60	1.40	7.86	2.06	11.96
W	0.15	0.38	2.39	5.03	1.47	9.43
WNW	0.18	0.64	3.78	3.85	0.47	8.91
NW	0.08	0.72	3.65	4.37	0.22	9.03
NNW	0.13	0.33	1.97	3.45	0.22	6.10
TOTAL	1.96	6.29	29.52	53.47	8.76	5979.

bad data observed for 69 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.12	0.28	1.52	1.68	0.18	3.79
NNE	0.10	0.25	1.29	1.39	0.00	3.03
NE	0.08	0.18	1.11	0.92	0.00	2.30
ENE	0.13	0.22	0.65	0.60	0.02	1.63
E	0.13	0.18	0.75	0.44	0.00	1.51
ESE	0.10	0.17	0.45	0.80	0.08	1.61
SE	0.05	0.23	0.52	0.72	0.15	1.68
SSE	0.03	0.23	1.42	1.89	0.65	4.24
S	0.15	0.25	2.78	6.50	1.46	11.14
SSW	0.17	0.39	1.94	5.85	0.99	9.33
SW	0.18	0.35	2.50	6.67	0.89	10.59
WSW	0.13	0.44	1.98	7.98	2.26	12.78
W	0.08	0.39	3.25	7.04	1.07	11.83
WNW	0.13	0.60	3.65	4.69	0.49	9.57
NW	0.15	0.64	3.95	4.74	0.30	9.79
NNW	0.17	0.37	2.09	2.36	0.20	5.19
TOTAL	1.93	5.18	29.88	54.27	8.75	5968.

bad data observed for 80 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Spring

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.10	0.32	1.95	2.03	0.39	4.78
NNE	0.05	0.42	1.38	1.19	0.25	3.29
NE	0.03	0.15	0.89	0.65	0.07	1.79
ENE	0.10	0.25	0.54	0.44	0.07	1.39
E	0.03	0.22	0.62	0.34	0.10	1.31
ESE	0.05	0.18	0.62	0.92	0.10	1.88
SE	0.07	0.27	0.87	0.97	0.30	2.48
SSE	0.05	0.40	1.48	2.50	0.70	5.13
S	0.05	0.49	2.40	5.84	1.91	10.68
SSW	0.07	0.52	1.74	3.39	2.11	7.83
SW	0.05	0.29	1.93	3.46	1.02	6.74
WSW	0.03	0.40	2.28	6.63	2.28	11.62
W	0.05	0.50	3.34	5.50	2.33	11.72
WNW	0.13	0.67	5.25	4.51	0.70	11.27
NW	0.07	0.72	4.91	4.70	0.84	11.24
NNW	0.03	0.37	2.62	3.15	0.65	6.83
TOTAL	0.97	6.17	32.81	46.21	13.84	5962.

bad data observed for 86 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.28	2.22	4.67	0.17	7.39
NNE	0.05	0.22	1.87	2.89	0.03	5.07
NE	0.02	0.17	1.52	2.43	0.07	4.20
ENE	0.00	0.23	1.35	2.34	0.10	4.03
E	0.02	0.15	1.02	1.72	0.12	3.03
ESE	0.00	0.03	0.75	1.77	0.28	2.84
SE	0.00	0.10	0.80	2.83	0.18	3.91
SSE	0.00	0.13	1.54	5.70	0.74	8.11
S	0.02	0.13	1.12	5.80	2.96	10.04
SSW	0.00	0.17	0.35	2.64	2.07	5.23
SW	0.02	0.22	0.50	1.47	1.07	3.28
WSW	0.02	0.07	0.77	3.21	1.51	5.57
W	0.05	0.10	1.35	5.08	3.04	9.63
WNW	0.00	0.17	2.36	4.08	1.32	7.93
NW	0.03	0.27	3.90	4.97	0.60	9.77
NNW	0.02	0.27	4.10	5.29	0.30	9.97
TOTAL	0.28	2.71	25.54	56.90	14.57	5979.

bad data observed for 69 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Spring

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.10	1.14	2.69	0.25	4.18
NNE	0.02	0.07	0.87	2.21	0.02	3.18
NE	0.00	0.07	0.77	3.53	0.30	4.67
ENE	0.00	0.02	0.99	11.18	0.97	13.15
E	0.00	0.00	0.57	6.19	0.60	7.36
ESE	0.00	0.03	0.57	4.53	0.23	5.37
SE	0.00	0.00	0.62	6.06	0.49	7.16
SSE	0.00	0.03	0.62	6.63	1.77	9.05
S	0.00	0.00	0.37	5.96	4.03	10.36
SSW	0.00	0.02	0.17	1.64	2.58	4.40
SW	0.00	0.02	0.27	0.87	0.80	1.96
WSW	0.00	0.02	0.33	1.91	1.51	3.76
W	0.00	0.03	0.57	3.55	3.66	7.81
WNW	0.00	0.07	0.70	2.96	2.83	6.56
NW	0.00	0.07	1.27	3.18	1.14	5.66
NNW	0.00	0.07	1.47	3.11	0.72	5.37
TOTAL	0.02	0.60	11.29	66.19	21.90	5977.

bad data observed for 71 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.02	0.20	0.50	0.43	1.17
NNE	0.00	0.03	0.28	1.25	0.35	1.92
NE	0.02	0.05	0.67	7.01	1.52	9.27
ENE	0.02	0.00	1.34	10.97	2.91	15.24
E	0.00	0.10	1.22	6.86	1.02	9.20
ESE	0.02	0.08	1.14	4.87	0.79	6.89
SE	0.02	0.03	1.00	6.12	1.39	8.56
SSE	0.00	0.05	0.74	7.23	2.44	10.46
S	0.00	0.00	0.49	5.70	4.17	10.35
SSW	0.00	0.02	0.17	1.76	2.09	4.03
SW	0.00	0.00	0.08	0.65	1.10	1.84
WSW	0.00	0.05	0.10	1.81	1.76	3.71
W	0.00	0.02	0.25	2.51	3.93	6.71
WNW	0.00	0.00	0.37	1.99	3.06	5.42
NW	0.00	0.05	0.37	1.42	1.34	3.18
NNW	0.00	0.00	0.28	0.95	0.80	2.04
TOTAL	0.08	0.50	8.70	61.61	29.11	5978.

bad data observed for 70 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Spring

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.05	0.43	1.30	0.30	2.10
NNE	0.05	0.25	1.22	4.03	0.38	5.94
NE	0.07	0.27	3.00	7.97	1.42	12.72
ENE	0.02	0.30	2.78	4.92	0.98	9.00
E	0.02	0.35	3.28	1.90	0.53	6.09
ESE	0.05	0.47	2.52	1.97	0.45	5.45
SE	0.02	0.22	2.63	2.85	0.63	6.35
SSE	0.08	0.17	2.43	5.35	1.47	9.50
S	0.05	0.17	2.38	6.22	3.05	11.87
SSW	0.02	0.05	1.05	3.68	1.33	6.14
SW	0.07	0.05	0.60	1.80	1.05	3.57
WSW	0.08	0.05	0.40	3.00	1.60	5.14
W	0.05	0.03	0.50	3.97	2.37	6.92
WNW	0.00	0.07	0.20	3.05	1.28	4.60
NW	0.00	0.03	0.25	1.80	0.90	2.98
NNW	0.02	0.05	0.27	0.92	0.38	1.63
TOTAL	0.60	2.57	23.96	54.73	18.14	5998.

bad data observed for 48 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.10	0.54	2.34	2.95	0.20	6.13
NNE	0.20	0.35	3.48	3.21	0.02	7.26
NE	0.15	0.38	2.44	2.73	0.03	5.74
ENE	0.03	0.35	2.03	1.69	0.03	4.13
E	0.13	0.30	1.47	0.54	0.02	2.46
ESE	0.13	0.30	1.32	0.82	0.00	2.58
SE	0.15	0.32	1.61	1.39	0.07	3.53
SSE	0.05	0.45	2.38	3.31	0.74	6.93
S	0.13	0.27	2.74	4.25	1.94	9.34
SSW	0.12	0.33	2.48	4.12	1.27	8.32
SW	0.08	0.30	2.46	4.27	1.04	8.15
WSW	0.02	0.12	1.72	5.10	1.71	8.67
W	0.08	0.33	1.67	4.40	1.84	8.33
WNW	0.13	0.49	1.79	3.80	0.92	7.13
NW	0.07	0.35	2.21	3.10	0.35	6.08
NNW	0.03	0.37	2.24	2.33	0.25	5.22
TOTAL	1.62	5.56	34.39	48.00	10.43	5975.

bad data observed for 73 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Summer

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.30	2.01	2.14	0.14	4.64
NNE	0.05	0.24	2.20	2.91	0.16	5.56
NE	0.05	0.26	2.22	4.99	0.66	8.17
ENE	0.05	0.25	1.65	5.99	0.90	8.83
E	0.04	0.29	1.53	3.68	0.31	5.85
ESE	0.04	0.29	1.29	2.52	0.28	4.41
SE	0.03	0.22	1.59	4.53	0.75	7.14
SSE	0.05	0.22	2.02	6.79	1.71	10.80
S	0.03	0.26	2.32	7.78	3.73	14.11
SSW	0.04	0.27	1.58	3.65	1.39	6.93
SW	0.04	0.25	1.02	2.13	0.43	3.87
WSW	0.04	0.19	0.88	1.89	0.46	3.46
W	0.04	0.22	1.01	1.79	0.62	3.68
WNW	0.05	0.27	1.56	1.66	0.39	3.93
NW	0.05	0.39	1.90	1.72	0.32	4.40
NNW	0.05	0.23	1.83	1.90	0.20	4.21
TOTAL	0.72	4.14	26.63	56.06	12.45	45896.

Season : Autumn

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.28	1.68	1.50	0.14	3.64
NNE	0.05	0.26	1.53	1.85	0.14	3.84
NE	0.03	0.27	1.38	2.44	0.40	4.53
ENE	0.03	0.24	1.44	2.56	0.39	4.67
E	0.04	0.28	1.31	1.90	0.22	3.75
ESE	0.05	0.26	1.20	2.08	0.29	3.88
SE	0.04	0.21	1.49	3.21	0.52	5.48
SSE	0.04	0.23	2.01	5.52	1.02	8.82
S	0.06	0.32	2.61	8.39	2.16	13.54
SSW	0.04	0.30	2.04	6.03	1.27	9.68
SW	0.06	0.33	1.42	3.99	0.72	6.52
WSW	0.04	0.32	1.70	5.18	1.71	8.95
W	0.05	0.30	2.05	4.01	1.29	7.70
WNW	0.05	0.37	2.21	2.22	0.42	5.27
NW	0.07	0.41	2.31	2.21	0.36	5.36
NNW	0.05	0.32	1.74	1.99	0.27	4.37
TOTAL	0.74	4.70	28.15	55.07	11.33	45359.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

SEASON : Winter

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.21	1.16	1.59	0.19	3.17
NNE	0.02	0.18	0.85	1.18	0.16	2.40
NE	0.02	0.11	0.70	0.93	0.10	1.86
ENE	0.03	0.12	0.65	0.60	0.09	1.48
E	0.02	0.10	0.55	0.34	0.07	1.08
ESE	0.02	0.09	0.60	0.38	0.11	1.20
SE	0.03	0.10	0.79	0.88	0.14	1.93
SSE	0.01	0.14	1.33	2.05	0.37	3.90
S	0.02	0.15	1.74	5.65	1.09	8.66
SSW	0.02	0.21	1.43	6.07	1.26	8.99
SW	0.05	0.22	1.32	6.05	1.35	8.99
WSW	0.04	0.25	1.81	9.75	4.16	16.01
W	0.07	0.27	2.63	8.32	4.58	15.87
WNW	0.08	0.40	3.05	5.40	1.56	10.49
NW	0.04	0.36	2.77	4.41	1.18	8.76
NNW	0.03	0.25	1.70	2.74	0.50	5.22
TOTAL	0.53	3.17	23.06	56.33	16.91	50528.

Season : Spring

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.08	0.26	1.48	2.21	0.26	4.27
NNE	0.08	0.25	1.47	2.20	0.14	4.13
NE	0.06	0.19	1.49	3.34	0.43	5.51
ENE	0.06	0.22	1.36	4.15	0.64	6.42
E	0.06	0.20	1.23	2.32	0.31	4.11
ESE	0.05	0.17	1.01	2.06	0.24	3.54
SE	0.05	0.19	1.10	2.74	0.42	4.50
SSE	0.04	0.21	1.52	4.43	1.16	7.35
S	0.06	0.19	1.82	5.72	2.62	10.40
SSW	0.07	0.25	1.28	3.61	1.66	6.87
SW	0.06	0.22	1.27	3.24	0.97	5.76
WSW	0.04	0.22	1.12	4.68	1.83	7.90
W	0.06	0.22	1.66	4.63	2.47	9.05
WNW	0.07	0.34	2.26	3.62	1.38	7.67
NW	0.05	0.36	2.56	3.53	0.71	7.21
NNW	0.05	0.23	1.88	2.69	0.44	5.29
TOTAL	0.93	3.70	24.51	55.18	15.69	47816.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 81177 END DATE : 11190

ANNUAL

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.26	1.57	1.86	0.18	3.92
NNE	0.05	0.23	1.50	2.02	0.15	3.95
NE	0.04	0.20	1.43	2.88	0.39	4.95
ENE	0.04	0.21	1.26	3.27	0.49	5.27
E	0.04	0.21	1.14	2.02	0.22	3.64
ESE	0.04	0.20	1.01	1.73	0.23	3.21
SE	0.04	0.18	1.23	2.79	0.45	4.69
SSE	0.03	0.20	1.71	4.63	1.05	7.62
S	0.04	0.23	2.11	6.84	2.37	11.59
SSW	0.04	0.26	1.57	4.86	1.40	8.12
SW	0.05	0.25	1.26	3.90	0.88	6.34
WSW	0.04	0.24	1.39	5.48	2.09	9.24
W	0.05	0.25	1.85	4.78	2.30	9.24
WNW	0.06	0.35	2.29	3.28	0.96	6.94
NW	0.05	0.38	2.40	3.01	0.66	6.50
NNW	0.04	0.26	1.79	2.34	0.36	4.79
TOTAL	0.73	3.90	25.51	55.67	14.19	189599.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	1.19	1.45	0.00	0.00	0.00	2.64
NNE	1.68	3.31	0.20	0.00	0.00	5.19
NE	0.90	3.23	1.45	0.20	0.00	5.77
ENE	0.61	1.90	1.08	0.22	0.00	3.80
E	1.06	1.74	0.49	0.00	0.00	3.29
ESE	0.76	1.12	0.96	0.02	0.00	2.86
SE	0.76	1.88	1.72	0.45	0.04	4.85
SSE	0.78	4.91	4.15	1.14	0.00	10.98
S	1.23	9.82	8.51	5.09	0.10	24.76
SSW	0.96	4.91	3.35	0.96	0.00	10.18
SW	0.65	2.72	1.96	0.18	0.00	5.50
WSW	0.47	1.82	2.02	0.25	0.00	4.56
W	0.49	1.51	1.74	0.33	0.00	4.07
WNW	0.53	1.27	1.19	0.14	0.00	3.13
NW	0.63	2.64	1.76	0.00	0.00	5.03
NNW	0.72	2.47	0.22	0.00	0.00	3.41
TOTAL	13.42	46.69	30.78	8.96	0.14	5110.

bad data observed for 314 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.92	1.23	0.06	0.00	0.00	2.21
NNE	1.92	2.39	0.02	0.00	0.00	4.32
NE	1.43	2.25	0.88	0.06	0.00	4.62
ENE	0.57	1.64	0.55	0.25	0.00	3.01
E	0.68	1.06	0.31	0.00	0.00	2.05
ESE	0.35	0.68	0.65	0.04	0.00	1.72
SE	0.63	1.74	1.39	0.67	0.06	4.48
SSE	1.04	4.62	3.33	1.19	0.12	10.29
S	1.15	10.10	11.02	4.46	0.33	27.06
SSW	0.90	5.42	3.72	0.86	0.00	10.90
SW	0.53	3.01	1.90	0.02	0.00	5.46
WSW	0.35	2.19	1.88	0.35	0.00	4.77
W	0.55	2.25	2.19	0.20	0.00	5.19
WNW	0.45	1.96	1.12	0.02	0.00	3.54
NW	0.31	4.07	1.64	0.02	0.00	6.05
NNW	0.55	3.41	0.35	0.00	0.00	4.31
TOTAL	12.33	48.02	31.00	8.14	0.51	5110.

bad data observed for 314 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.24	1.96	1.41	0.00	0.00	3.61
NNE	0.35	3.20	2.20	0.00	0.00	5.75
NE	0.24	2.77	3.53	0.10	0.00	6.64
ENE	0.16	1.63	1.28	0.16	0.00	3.22
E	0.20	1.16	1.22	0.10	0.00	2.67
ESE	0.10	0.75	1.18	0.29	0.00	2.32
SE	0.12	1.39	2.47	0.69	0.14	4.81
SSE	0.22	1.92	5.73	1.87	0.24	9.97
S	0.45	4.91	8.82	7.34	0.16	21.68
SSW	0.39	1.71	2.95	0.98	0.00	6.03
SW	0.24	1.22	0.90	0.18	0.00	2.53
WSW	0.18	1.10	1.47	0.77	0.00	3.51
W	0.08	1.53	2.02	1.10	0.00	4.73
WNW	0.08	1.57	2.22	0.24	0.00	4.10
NW	0.22	3.97	7.56	0.18	0.00	11.92
NNW	0.27	3.04	3.18	0.00	0.00	6.50
TOTAL	3.51	33.83	48.14	13.98	0.53	5093.

bad data observed for 331 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.80	3.42	0.04	0.00	4.30
NNE	0.02	1.62	5.01	0.02	0.00	6.67
NE	0.04	1.64	10.00	0.72	0.00	12.40
ENE	0.00	0.88	6.73	1.17	0.00	8.78
E	0.00	0.86	4.01	0.53	0.00	5.40
ESE	0.00	0.82	3.07	0.43	0.00	4.32
SE	0.00	0.55	4.89	1.72	0.02	7.18
SSE	0.08	0.59	6.42	5.48	0.12	12.68
S	0.00	0.43	4.15	8.16	0.31	13.05
SSW	0.02	0.25	0.74	1.04	0.00	2.05
SW	0.00	0.22	0.72	0.22	0.00	1.15
WSW	0.06	0.18	0.90	1.00	0.00	2.13
W	0.02	0.33	0.94	1.51	0.00	2.80
WNW	0.00	0.65	1.78	0.68	0.04	3.15
NW	0.00	1.51	5.99	1.10	0.00	8.59
NNW	0.04	1.25	3.93	0.10	0.00	5.32
TOTAL	0.31	12.58	62.71	23.91	0.49	5111.

bad data observed for 313 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.23	0.63	0.02	0.00	0.88
NNE	0.00	0.64	1.45	0.10	0.00	2.19
NE	0.04	0.78	5.96	3.87	0.00	10.65
ENE	0.00	0.68	11.76	11.45	0.02	23.92
E	0.00	0.29	6.61	2.19	0.00	9.09
ESE	0.00	0.37	3.65	2.09	0.04	6.16
SE	0.00	0.12	5.04	5.59	0.04	10.79
SSE	0.02	0.27	4.40	7.88	0.10	12.66
S	0.00	0.20	2.25	8.11	0.29	10.85
SSW	0.00	0.10	0.27	0.55	0.00	0.92
SW	0.00	0.02	0.35	0.21	0.00	0.59
WSW	0.00	0.08	0.63	0.90	0.00	1.60
W	0.00	0.04	0.68	1.56	0.00	2.29
WNW	0.00	0.18	1.09	1.52	0.02	2.81
NW	0.00	0.25	1.72	1.39	0.02	3.38
NNW	0.00	0.33	0.80	0.10	0.00	1.23
TOTAL	0.06	4.59	47.29	47.53	0.53	5117.

bad data observed for 307 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.12	0.02	0.00	0.00	0.16
NNE	0.00	0.55	0.29	0.06	0.00	0.90
NE	0.00	0.57	5.29	5.41	0.00	11.27
ENE	0.06	0.70	13.69	9.59	0.00	24.04
E	0.04	0.53	7.34	2.01	0.00	9.92
ESE	0.00	0.25	5.41	2.09	0.00	7.75
SE	0.06	0.39	7.60	5.90	0.12	14.06
SSE	0.02	0.59	5.27	7.50	0.08	13.46
S	0.00	0.33	2.71	6.91	0.16	10.12
SSW	0.02	0.16	0.37	0.33	0.00	0.88
SW	0.02	0.12	0.39	0.37	0.00	0.90
WSW	0.00	0.12	0.29	1.00	0.00	1.41
W	0.00	0.10	0.41	1.82	0.00	2.32
WNW	0.00	0.12	0.29	0.80	0.00	1.21
NW	0.00	0.16	0.47	0.53	0.00	1.15
NNW	0.04	0.29	0.06	0.06	0.00	0.45
TOTAL	0.27	5.08	49.92	44.37	0.35	5120.

bad data observed for 304 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.14	0.27	0.00	0.00	0.00	0.41
NNE	0.37	1.84	1.09	0.02	0.00	3.32
NE	0.37	3.32	13.72	1.58	0.00	19.00
ENE	0.37	3.25	8.78	0.70	0.00	13.10
E	0.59	3.13	3.62	0.04	0.00	7.37
ESE	0.27	1.97	4.11	0.10	0.00	6.45
SE	0.25	2.72	6.96	1.37	0.12	11.42
SSE	0.20	3.19	7.62	3.64	0.06	14.70
S	0.18	2.80	5.20	5.30	0.41	13.88
SSW	0.10	0.92	1.47	0.57	0.00	3.05
SW	0.04	0.37	0.55	0.22	0.00	1.17
WSW	0.10	0.22	0.72	0.41	0.00	1.45
W	0.06	0.29	0.65	0.65	0.00	1.64
WNW	0.02	0.27	0.45	0.29	0.00	1.04
NW	0.08	0.51	0.53	0.12	0.00	1.23
NNW	0.14	0.47	0.16	0.00	0.00	0.76
TOTAL	3.26	25.53	55.62	15.00	0.59	5115.

bad data observed for 309 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.94	1.25	0.04	0.00	0.00	2.23
NNE	1.25	5.24	0.70	0.00	0.00	7.20
NE	0.88	6.50	3.87	0.20	0.00	11.45
ENE	0.82	3.54	2.49	0.23	0.00	7.08
E	0.92	2.94	1.12	0.06	0.00	5.03
ESE	0.63	1.68	1.35	0.04	0.02	3.72
SE	0.65	2.76	2.68	0.59	0.20	6.87
SSE	0.84	4.77	4.74	1.98	0.00	12.33
S	0.90	7.28	7.16	4.58	0.14	20.06
SSW	0.88	3.39	3.29	0.68	0.00	8.24
SW	0.39	1.62	1.66	0.14	0.02	3.84
WSW	0.25	1.27	1.33	0.25	0.02	3.13
W	0.20	0.80	0.68	0.14	0.00	1.82
WNW	0.12	0.88	0.63	0.16	0.00	1.78
NW	0.06	1.51	1.41	0.06	0.00	3.03
NNW	0.31	1.66	0.22	0.00	0.00	2.19
TOTAL	10.04	47.10	33.37	9.10	0.39	5110.

bad data observed for 314 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.47	0.54	0.02	0.00	0.00	1.02
NNE	1.00	0.94	0.05	0.00	0.00	1.99
NE	0.43	0.99	0.97	0.02	0.00	2.41
ENE	0.33	0.23	0.23	0.00	0.00	0.78
E	0.33	0.29	0.24	0.00	0.00	0.87
ESE	0.17	0.38	0.61	0.00	0.00	1.16
SE	0.28	0.81	1.09	0.43	0.00	2.62
SSE	0.50	2.60	2.72	0.95	0.00	6.77
S	1.06	11.53	9.53	2.75	0.12	24.99
SSW	0.85	8.52	4.68	1.54	0.00	15.59
SW	0.55	5.33	5.65	0.48	0.00	12.02
WSW	0.42	3.76	4.88	1.02	0.00	10.08
W	0.52	2.60	3.31	0.50	0.00	6.93
WNW	0.45	2.16	1.30	0.14	0.00	4.05
NW	0.52	3.03	2.22	0.09	0.00	5.85
NNW	0.62	1.87	0.38	0.00	0.00	2.87
TOTAL	8.50	45.58	37.86	7.93	0.12	5774.

bad data observed for 430 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.36	0.47	0.05	0.00	0.00	0.89
NNE	0.30	0.78	0.03	0.00	0.00	1.11
NE	0.28	0.80	0.42	0.00	0.00	1.49
ENE	0.26	0.19	0.31	0.00	0.00	0.76
E	0.14	0.42	0.14	0.00	0.00	0.69
ESE	0.35	0.38	0.59	0.12	0.00	1.44
SE	0.24	0.50	0.71	0.45	0.00	1.91
SSE	0.31	1.80	1.75	0.78	0.00	4.65
S	0.57	11.98	9.88	2.52	0.09	25.03
SSW	0.59	9.06	5.61	1.25	0.00	16.50
SW	0.56	5.78	6.77	1.01	0.00	14.11
WSW	0.47	3.85	7.43	0.69	0.00	12.44
W	0.54	2.76	3.40	0.45	0.00	7.15
WNW	0.54	1.87	1.75	0.16	0.00	4.32
NW	0.30	2.53	2.00	0.30	0.00	5.12
NNW	0.47	1.44	0.47	0.00	0.00	2.38
TOTAL	6.27	44.62	41.31	7.72	0.09	5762.

bad data observed for 442 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.12	0.66	0.16	0.00	0.00	0.93
NNE	0.19	0.78	0.14	0.00	0.00	1.10
NE	0.09	0.69	0.52	0.00	0.00	1.29
ENE	0.14	0.69	0.54	0.00	0.00	1.36
E	0.16	0.41	0.40	0.02	0.00	0.98
ESE	0.10	0.45	0.85	0.35	0.00	1.74
SE	0.26	0.41	1.09	0.71	0.00	2.47
SSE	0.31	1.21	2.05	0.95	0.00	4.52
S	0.62	6.92	10.39	4.02	0.00	21.96
SSW	0.86	6.30	4.82	1.90	0.00	13.88
SW	0.59	5.15	5.63	0.67	0.00	12.03
WSW	0.60	3.21	6.03	1.07	0.00	10.91
W	0.35	2.99	5.11	0.43	0.00	8.87
WNW	0.31	2.16	2.90	0.24	0.00	5.61
NW	0.28	4.14	4.63	0.10	0.00	9.15
NNW	0.29	1.80	1.07	0.00	0.00	3.16
TOTAL	5.27	37.97	46.31	10.46	0.00	5792.

bad data observed for 412 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	1.02	1.84	0.02	0.00	2.93
NNE	0.02	0.83	2.05	0.00	0.00	2.90
NE	0.03	1.12	3.03	0.05	0.00	4.24
ENE	0.03	0.93	1.45	0.14	0.00	2.55
E	0.03	0.65	1.15	0.05	0.00	1.90
ESE	0.05	0.65	1.64	0.59	0.00	2.93
SE	0.03	0.71	4.05	1.46	0.00	6.26
SSE	0.03	1.19	7.50	2.95	0.02	11.68
S	0.05	1.29	6.57	6.72	0.00	14.63
SSW	0.14	0.74	1.96	2.36	0.02	5.22
SW	0.02	0.79	1.95	0.38	0.00	3.14
WSW	0.12	0.90	3.62	1.60	0.00	6.24
W	0.09	1.24	3.48	2.14	0.00	6.94
WNW	0.02	1.45	4.46	0.86	0.00	6.79
NW	0.03	2.88	12.11	0.55	0.00	15.58
NNW	0.10	1.72	4.24	0.02	0.00	6.08
TOTAL	0.86	18.11	61.11	19.89	0.03	5803.

bad data observed for 401 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	1.07	2.16	0.00	0.00	3.28
NNE	0.05	2.02	2.60	0.00	0.00	4.67
NE	0.00	1.90	6.11	0.19	0.00	8.19
ENE	0.05	1.12	6.74	0.66	0.00	8.57
E	0.03	0.72	3.05	0.07	0.00	3.88
ESE	0.03	0.52	3.98	0.41	0.00	4.95
SE	0.02	0.43	6.64	2.76	0.00	9.85
SSE	0.00	0.41	8.18	5.40	0.05	14.04
S	0.02	0.71	4.49	7.54	0.07	12.82
SSW	0.00	0.36	0.93	1.55	0.00	2.85
SW	0.02	0.43	1.12	0.41	0.00	1.98
WSW	0.00	0.36	1.79	1.35	0.00	3.50
W	0.05	0.67	2.09	2.21	0.02	5.04
WNW	0.05	0.72	2.17	1.07	0.00	4.02
NW	0.10	1.93	5.28	0.50	0.00	7.81
NNW	0.07	1.67	2.79	0.00	0.00	4.54
TOTAL	0.55	15.06	60.13	24.12	0.14	5797.

bad data observed for 407 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.29	0.64	0.12	0.00	0.00	1.05
NNE	0.48	1.81	0.22	0.00	0.00	2.52
NE	0.28	2.34	5.48	0.69	0.00	8.79
ENE	0.21	2.98	12.04	0.84	0.00	16.08
E	0.29	2.17	4.65	0.22	0.00	7.34
ESE	0.07	1.15	4.67	0.33	0.00	6.22
SE	0.14	1.33	7.94	2.46	0.00	11.87
SSE	0.19	2.15	8.27	4.10	0.00	14.71
S	0.16	1.50	6.98	5.50	0.03	14.16
SSW	0.09	0.41	1.33	1.38	0.00	3.20
SW	0.12	0.33	0.83	0.28	0.00	1.55
WSW	0.05	0.29	1.46	0.90	0.00	2.71
W	0.03	0.28	2.08	1.53	0.00	3.93
WNW	0.03	0.45	0.40	0.72	0.00	1.60
NW	0.05	0.91	0.90	0.50	0.03	2.39
NNW	0.10	1.60	0.17	0.00	0.00	1.88
TOTAL	2.58	20.35	57.55	19.45	0.07	5804.

bad data observed for 400 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.19	0.24	0.00	0.00	0.00	0.43
NNE	0.81	3.15	0.36	0.00	0.00	4.33
NE	0.69	5.24	4.95	0.31	0.00	11.19
ENE	0.79	5.46	1.45	0.02	0.00	7.72
E	0.66	3.07	0.83	0.02	0.00	4.57
ESE	0.86	1.95	0.78	0.03	0.00	3.62
SE	0.71	3.74	2.57	0.67	0.00	7.69
SSE	0.38	6.41	5.86	1.10	0.00	13.76
S	0.40	8.62	9.84	2.60	0.19	21.65
SSW	0.60	3.15	3.05	1.29	0.02	8.12
SW	0.47	1.43	2.02	0.40	0.00	4.31
WSW	0.17	1.00	1.74	0.52	0.00	3.43
W	0.14	0.90	2.31	0.71	0.00	4.05
WNW	0.16	0.81	0.88	0.28	0.00	2.12
NW	0.09	0.72	1.17	0.03	0.00	2.02
NNW	0.05	0.81	0.14	0.00	0.00	1.00
TOTAL	7.15	46.72	37.94	7.98	0.21	5801.

bad data observed for 403 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.74	1.12	0.02	0.00	0.00	1.89
NNE	1.52	2.16	0.10	0.00	0.00	3.79
NE	0.81	2.18	1.14	0.21	0.00	4.34
ENE	0.59	1.00	0.19	0.00	0.00	1.78
E	0.54	1.07	0.26	0.02	0.00	1.89
ESE	0.42	0.71	0.35	0.00	0.00	1.47
SE	0.35	1.49	1.09	0.57	0.00	3.50
SSE	0.66	3.29	3.11	0.69	0.02	7.77
S	1.32	12.03	8.58	2.32	0.22	24.47
SSW	0.99	7.86	4.27	1.02	0.00	14.14
SW	0.81	4.24	3.48	0.22	0.00	8.76
WSW	0.36	3.11	4.17	0.90	0.00	8.55
W	0.31	1.78	3.25	0.17	0.00	5.52
WNW	0.36	1.37	1.89	0.16	0.00	3.77
NW	0.42	3.06	1.18	0.00	0.00	4.65
NNW	0.69	2.75	0.28	0.00	0.00	3.72
TOTAL	10.88	49.23	33.36	6.28	0.24	5779.

bad data observed for 425 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.17	0.55	0.03	0.00	0.00	0.75
NNE	0.23	1.15	0.12	0.00	0.00	1.51
NE	0.28	0.57	0.10	0.00	0.00	0.95
ENE	0.13	0.44	0.20	0.07	0.00	0.84
E	0.08	0.22	0.13	0.13	0.00	0.57
ESE	0.10	0.18	0.15	0.03	0.00	0.47
SE	0.07	0.22	0.33	0.02	0.00	0.64
SSE	0.20	1.29	0.80	0.00	0.05	2.34
S	0.38	7.11	4.15	0.18	0.15	11.98
SSW	0.37	6.37	4.77	0.33	0.00	11.85
SW	0.25	4.62	9.30	1.49	0.03	15.69
WSW	0.22	3.41	11.63	3.55	0.03	18.84
W	0.25	2.94	6.91	1.54	0.02	11.66
WNW	0.32	2.61	4.32	0.89	0.00	8.13
NW	0.23	3.70	5.10	0.95	0.00	9.99
NNW	0.20	2.53	1.07	0.00	0.00	3.80
TOTAL	3.50	37.91	49.12	9.19	0.28	5977.

bad data observed for 647 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.23	0.75	0.05	0.00	0.00	1.04
NNE	0.38	1.27	0.02	0.00	0.00	1.67
NE	0.22	0.72	0.10	0.03	0.00	1.07
ENE	0.15	0.20	0.18	0.07	0.00	0.60
E	0.10	0.25	0.18	0.02	0.00	0.55
ESE	0.08	0.28	0.07	0.02	0.00	0.45
SE	0.03	0.30	0.30	0.00	0.00	0.64
SSE	0.23	1.22	0.59	0.00	0.00	2.04
S	0.37	5.59	4.30	0.30	0.18	10.74
SSW	0.42	5.77	3.95	0.49	0.00	10.63
SW	0.35	5.46	11.71	1.62	0.00	19.14
WSW	0.27	3.55	11.96	3.10	0.12	18.99
W	0.27	2.63	6.71	1.49	0.00	11.09
WNW	0.30	2.24	4.12	1.34	0.00	8.00
NW	0.33	3.30	5.52	0.35	0.00	9.50
NNW	0.30	2.63	0.90	0.00	0.00	3.83
TOTAL	4.05	36.16	50.67	8.82	0.30	5976.

bad data observed for 648 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.20	0.92	0.12	0.02	0.00	1.26
NNE	0.28	1.17	0.13	0.00	0.00	1.59
NE	0.18	0.57	0.20	0.00	0.00	0.95
ENE	0.13	0.30	0.15	0.00	0.00	0.59
E	0.07	0.25	0.15	0.08	0.00	0.55
ESE	0.05	0.22	0.28	0.03	0.00	0.59
SE	0.10	0.37	0.30	0.03	0.02	0.82
SSE	0.30	1.17	0.54	0.18	0.02	2.21
S	0.42	4.32	4.02	0.37	0.02	9.14
SSW	0.37	4.89	3.18	0.64	0.00	9.07
SW	0.52	5.17	9.38	1.86	0.00	16.93
WSW	0.25	3.65	12.24	4.87	0.20	21.21
W	0.28	2.68	6.86	0.99	0.12	10.93
WNW	0.23	2.11	4.00	1.16	0.05	7.55
NW	0.35	3.98	7.25	0.82	0.00	12.41
NNW	0.30	2.58	1.32	0.00	0.00	4.20
TOTAL	4.05	34.35	50.13	11.05	0.42	5973.

bad data observed for 651 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.72	0.87	0.00	0.00	1.62
NNE	0.08	1.15	0.80	0.00	0.00	2.03
NE	0.12	1.10	1.42	0.02	0.00	2.65
ENE	0.05	0.62	0.37	0.03	0.00	1.07
E	0.07	0.48	0.52	0.03	0.00	1.10
ESE	0.12	0.48	0.60	0.18	0.00	1.38
SE	0.08	0.50	0.80	0.12	0.00	1.50
SSE	0.13	0.88	2.31	0.32	0.00	3.65
S	0.17	1.38	4.03	1.65	0.13	7.36
SSW	0.17	0.95	1.62	2.33	0.00	5.06
SW	0.12	1.18	3.26	1.85	0.00	6.41
WSW	0.13	1.50	7.24	5.84	0.12	14.84
W	0.08	2.45	7.76	4.45	0.82	15.55
WNW	0.05	2.26	5.98	2.60	0.20	11.09
NW	0.05	3.58	14.84	1.83	0.05	20.35
NNW	0.05	1.70	2.56	0.05	0.00	4.36
TOTAL	1.50	20.93	54.96	21.30	1.32	6006.

bad data observed for 618 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.82	1.32	0.00	0.00	2.19
NNE	0.12	1.53	1.94	0.00	0.00	3.59
NE	0.08	1.35	2.04	0.10	0.00	3.57
ENE	0.05	0.62	1.50	0.03	0.00	2.20
E	0.02	0.78	1.17	0.07	0.00	2.04
ESE	0.02	0.58	1.08	0.38	0.00	2.07
SE	0.08	0.70	2.65	0.40	0.00	3.84
SSE	0.00	1.08	4.42	0.58	0.00	6.09
S	0.10	0.67	4.84	2.87	0.20	8.68
SSW	0.03	0.53	1.75	2.22	0.02	4.55
SW	0.08	0.57	2.54	1.12	0.00	4.30
WSW	0.07	0.85	4.79	3.42	0.13	9.26
W	0.07	1.15	5.04	7.21	0.57	14.03
WNW	0.00	1.57	3.84	3.35	0.38	9.14
NW	0.05	3.55	11.44	3.79	0.22	19.05
NNW	0.18	2.17	3.04	0.02	0.00	5.41
TOTAL	1.00	18.54	53.39	25.56	1.52	5994.

bad data observed for 630 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.35	1.53	0.12	0.00	0.00	2.00
NNE	0.98	2.20	0.33	0.00	0.00	3.51
NE	0.45	2.78	1.40	0.00	0.00	4.63
ENE	0.25	2.23	3.41	0.00	0.00	5.90
E	0.25	1.70	1.48	0.07	0.00	3.50
ESE	0.35	1.48	1.30	0.10	0.00	3.23
SE	0.25	2.52	3.10	0.33	0.00	6.20
SSE	0.37	3.45	3.41	0.83	0.00	8.06
S	0.28	2.58	5.65	1.47	0.20	10.18
SSW	0.52	0.90	1.98	1.15	0.00	4.55
SW	0.23	1.12	3.20	0.80	0.00	5.35
WSW	0.08	0.88	4.60	2.58	0.02	8.16
W	0.12	1.27	5.96	5.25	0.08	12.68
WNW	0.20	1.12	2.63	2.50	0.08	6.53
NW	0.13	2.88	4.65	3.02	0.03	10.71
NNW	0.32	3.61	0.87	0.02	0.00	4.81
TOTAL	5.13	32.25	44.09	18.11	0.42	6003.

bad data observed for 621 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.23	0.48	0.03	0.00	0.00	0.75
NNE	0.67	1.89	0.07	0.02	0.00	2.64
NE	0.48	2.59	0.78	0.03	0.00	3.89
ENE	0.52	2.00	0.30	0.00	0.00	2.82
E	0.58	1.25	0.23	0.07	0.00	2.14
ESE	0.55	0.82	0.55	0.20	0.00	2.12
SE	0.45	1.74	0.47	0.12	0.00	2.77
SSE	0.50	3.99	0.77	0.33	0.00	5.59
S	0.48	9.31	6.07	0.60	0.05	16.52
SSW	0.40	3.40	3.85	0.82	0.02	8.49
SW	0.37	2.50	5.37	0.75	0.00	8.99
WSW	0.23	2.30	7.24	1.92	0.00	11.70
W	0.18	2.14	7.12	2.00	0.00	11.45
WNW	0.15	2.00	4.09	1.33	0.02	7.59
NW	0.23	2.84	5.24	1.33	0.00	9.64
NNW	0.15	2.17	0.58	0.00	0.00	2.90
TOTAL	6.19	41.41	42.78	9.53	0.08	5993.

bad data observed for 631 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.28	0.60	0.00	0.03	0.00	0.92
NNE	0.67	1.32	0.07	0.00	0.00	2.05
NE	0.40	0.85	0.22	0.00	0.00	1.47
ENE	0.30	0.45	0.22	0.05	0.00	1.02
E	0.27	0.28	0.10	0.07	0.00	0.72
ESE	0.17	0.30	0.37	0.10	0.00	0.94
SE	0.22	0.42	0.35	0.12	0.00	1.10
SSE	0.22	1.27	0.68	0.10	0.02	2.29
S	0.65	8.20	5.29	0.55	0.12	14.81
SSW	0.33	6.16	4.22	0.82	0.00	11.54
SW	0.33	4.11	8.06	1.67	0.00	14.18
WSW	0.23	3.27	8.30	3.17	0.00	14.98
W	0.27	2.27	6.14	1.45	0.02	10.15
WNW	0.35	2.30	4.36	0.85	0.00	7.86
NW	0.38	4.09	6.36	0.78	0.03	11.65
NNW	0.57	2.74	1.00	0.02	0.00	4.32
TOTAL	5.64	38.64	45.75	9.78	0.18	5989.

bad data observed for 635 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.66	0.86	0.02	0.00	0.00	1.53
NNE	1.40	1.81	0.10	0.03	0.00	3.35
NE	0.87	1.75	1.02	0.07	0.00	3.71
ENE	0.35	0.84	0.63	0.00	0.00	1.81
E	0.41	0.84	0.45	0.00	0.00	1.70
ESE	0.56	0.53	0.56	0.02	0.00	1.67
SE	0.63	0.97	1.12	0.20	0.00	2.92
SSE	0.96	2.95	1.32	1.12	0.02	6.37
S	0.92	8.08	4.82	1.47	0.00	15.29
SSW	0.91	5.48	3.04	0.84	0.02	10.28
SW	0.76	4.50	5.23	0.64	0.00	11.14
WSW	0.28	3.43	6.30	1.15	0.00	11.17
W	0.35	2.24	4.57	0.63	0.08	7.87
WNW	0.48	3.28	3.25	0.54	0.07	7.62
NW	0.61	4.57	3.10	0.33	0.00	8.61
NNW	0.51	3.79	0.64	0.00	0.00	4.95
TOTAL	10.66	45.95	36.17	7.05	0.18	6061.

bad data observed for 275 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.61	0.66	0.00	0.00	0.00	1.27
NNE	0.89	1.65	0.18	0.02	0.00	2.74
NE	0.59	0.96	0.56	0.02	0.00	2.13
ENE	0.26	0.73	0.81	0.02	0.00	1.82
E	0.30	0.64	0.33	0.00	0.00	1.27
ESE	0.26	0.50	0.33	0.00	0.00	1.09
SE	0.35	0.69	0.55	0.17	0.00	1.75
SSE	0.71	2.81	1.42	1.02	0.00	5.96
S	0.93	9.15	4.91	1.80	0.00	16.79
SSW	0.93	5.85	3.54	0.94	0.00	11.25
SW	0.83	4.39	5.48	0.51	0.00	11.22
WSW	0.64	3.35	6.39	2.10	0.00	12.49
W	0.68	2.78	4.03	0.61	0.00	8.10
WNW	0.63	3.06	3.21	0.63	0.00	7.52
NW	0.69	4.76	4.16	0.17	0.00	9.78
NNW	1.09	3.30	0.43	0.00	0.00	4.82
TOTAL	10.39	45.28	36.33	8.00	0.00	6053.

bad data observed for 283 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.30	1.19	0.86	0.02	0.00	2.37
NNE	0.36	1.69	1.37	0.03	0.00	3.46
NE	0.31	1.41	2.27	0.02	0.00	4.01
ENE	0.15	1.16	1.19	0.02	0.00	2.52
E	0.13	0.71	0.45	0.00	0.00	1.29
ESE	0.13	0.68	0.56	0.00	0.00	1.37
SE	0.18	0.63	1.47	0.22	0.00	2.50
SSE	0.33	1.49	2.88	1.27	0.03	6.01
S	0.45	4.17	4.39	2.70	0.31	12.02
SSW	0.26	2.63	2.62	1.57	0.03	7.12
SW	0.36	1.61	4.25	1.37	0.00	7.60
WSW	0.17	1.41	4.32	3.14	0.00	9.04
W	0.17	1.92	4.97	2.48	0.05	9.58
WNW	0.12	2.17	4.58	1.36	0.10	8.33
NW	0.30	5.00	11.45	0.60	0.00	17.35
NNW	0.38	2.66	2.42	0.00	0.00	5.46
TOTAL	4.10	30.52	50.05	14.80	0.53	6042.

bad data observed for 294 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.87	2.41	0.03	0.00	3.36
NNE	0.08	1.05	3.10	0.13	0.00	4.36
NE	0.05	1.41	7.19	0.57	0.00	9.22
ENE	0.03	0.85	3.63	0.38	0.00	4.89
E	0.02	0.68	2.06	0.12	0.00	2.88
ESE	0.03	0.45	2.15	0.27	0.00	2.90
SE	0.00	0.62	3.20	1.63	0.00	5.44
SSE	0.07	0.52	4.33	3.44	0.13	8.49
S	0.03	0.50	2.75	4.34	0.37	7.99
SSW	0.02	0.40	1.05	1.85	0.05	3.36
SW	0.00	0.30	1.43	1.41	0.00	3.15
WSW	0.05	0.42	2.30	2.71	0.02	5.49
W	0.02	0.50	3.30	4.98	0.48	9.27
WNW	0.02	0.78	4.86	2.40	0.13	8.19
NW	0.03	1.43	10.65	2.73	0.23	15.08
NNW	0.02	1.33	4.48	0.12	0.00	5.94
TOTAL	0.52	12.10	58.86	27.11	1.41	6009.

bad data observed for 327 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.23	1.46	0.02	0.00	1.74
NNE	0.07	0.37	1.81	0.02	0.00	2.26
NE	0.07	0.60	6.86	2.76	0.00	10.28
ENE	0.00	0.50	8.84	5.10	0.00	14.44
E	0.03	0.30	4.30	0.71	0.00	5.35
ESE	0.02	0.20	4.07	1.05	0.00	5.33
SE	0.00	0.25	4.17	4.52	0.00	8.94
SSE	0.02	0.22	2.72	6.31	0.08	9.35
S	0.00	0.13	1.31	5.15	0.28	6.88
SSW	0.05	0.08	0.50	0.78	0.20	1.61
SW	0.02	0.12	0.48	0.76	0.00	1.38
WSW	0.00	0.25	1.56	3.75	0.07	5.63
W	0.02	0.33	2.66	5.18	0.63	8.82
WNW	0.00	0.43	2.92	2.87	0.37	6.60
NW	0.02	0.61	5.30	2.89	0.23	9.05
NNW	0.07	0.42	1.79	0.05	0.00	2.33
TOTAL	0.40	5.03	50.77	41.93	1.86	6019.

bad data observed for 317 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.08	0.21	0.12	0.02	0.00	0.43
NNE	0.10	0.66	0.55	0.10	0.00	1.40
NE	0.07	0.76	8.39	3.37	0.00	12.58
ENE	0.02	0.97	12.39	3.20	0.00	16.58
E	0.02	0.56	5.38	0.50	0.00	6.46
ESE	0.05	0.46	5.14	0.88	0.00	6.52
SE	0.03	0.61	6.47	2.68	0.00	9.79
SSE	0.03	0.43	4.15	6.57	0.00	11.18
S	0.00	0.26	2.00	5.47	0.25	7.98
SSW	0.03	0.13	0.45	1.09	0.25	1.95
SW	0.03	0.35	0.61	0.59	0.02	1.60
WSW	0.00	0.31	1.68	4.08	0.08	6.16
W	0.02	0.15	2.20	4.99	0.26	7.61
WNW	0.02	0.12	1.17	2.25	0.38	3.93
NW	0.02	0.56	2.13	2.13	0.03	4.87
NNW	0.08	0.61	0.23	0.02	0.00	0.94
TOTAL	0.59	7.17	53.05	37.92	1.27	6055.

bad data observed for 281 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.33	0.56	0.00	0.00	0.00	0.89
NNE	0.46	2.85	1.75	0.05	0.00	5.11
NE	0.35	4.67	9.36	0.48	0.00	14.85
ENE	0.36	3.48	3.00	0.08	0.00	6.92
E	0.61	2.16	1.27	0.03	0.00	4.07
ESE	0.56	1.99	0.82	0.03	0.00	3.41
SE	0.49	3.26	3.26	0.28	0.00	7.30
SSE	0.30	4.24	4.67	1.86	0.13	11.19
S	0.38	3.36	6.10	3.05	0.00	12.89
SSW	0.48	1.68	1.68	1.04	0.16	5.04
SW	0.26	1.43	2.13	0.49	0.00	4.32
WSW	0.18	1.10	3.30	1.50	0.00	6.08
W	0.16	1.06	3.38	2.59	0.05	7.24
WNW	0.13	1.07	2.23	0.89	0.03	4.35
NW	0.07	1.34	3.13	0.35	0.00	4.88
NNW	0.15	1.09	0.20	0.00	0.00	1.43
TOTAL	5.28	35.34	46.27	12.73	0.38	6066.

bad data observed for 270 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.94	1.12	0.00	0.00	0.00	2.06
NNE	1.85	4.24	0.31	0.00	0.00	6.40
NE	1.04	3.76	1.81	0.02	0.00	6.63
ENE	0.61	1.42	0.74	0.05	0.00	2.82
E	0.46	0.91	0.30	0.00	0.00	1.67
ESE	0.53	0.71	0.64	0.00	0.00	1.88
SE	0.89	1.72	1.52	0.05	0.00	4.17
SSE	0.92	3.68	2.31	1.55	0.08	8.54
S	0.89	6.53	5.19	1.14	0.00	13.75
SSW	0.94	3.53	2.57	0.71	0.08	7.83
SW	0.56	2.94	3.73	0.63	0.00	7.85
WSW	0.33	2.98	5.34	1.37	0.03	10.06
W	0.23	1.96	4.45	1.96	0.12	8.72
WNW	0.25	1.81	2.92	0.94	0.07	5.99
NW	0.28	3.66	3.10	0.21	0.02	7.27
NNW	0.43	3.64	0.26	0.02	0.00	4.35
TOTAL	11.15	44.61	35.21	8.64	0.40	6064.

bad data observed for 272 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.44	0.91	0.70	0.01	0.00	2.05
NNE	0.70	2.35	1.37	0.02	0.00	4.44
NE	0.49	2.63	5.59	1.52	0.00	10.23
ENE	0.32	1.78	5.80	2.98	0.00	10.88
E	0.44	1.46	3.09	0.62	0.00	5.61
ESE	0.26	0.96	2.55	0.64	0.01	4.41
SE	0.31	1.44	4.10	2.12	0.09	8.06
SSE	0.40	2.61	5.21	3.84	0.09	12.14
S	0.49	4.48	6.22	6.24	0.24	17.68
SSW	0.41	2.11	2.02	0.75	0.00	5.28
SW	0.23	1.16	1.05	0.19	0.00	2.64
WSW	0.18	0.87	1.15	0.62	0.00	2.82
W	0.17	0.86	1.16	0.91	0.00	3.11
WNW	0.15	0.86	1.10	0.48	0.01	2.60
NW	0.16	1.82	2.63	0.42	0.00	5.04
NNW	0.26	1.61	1.11	0.03	0.00	3.02
TOTAL	5.40	27.92	44.86	21.39	0.44	40886.

Season : Autumn

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.29	0.72	0.55	0.00	0.00	1.55
NNE	0.55	1.56	0.70	0.00	0.00	2.80
NE	0.33	1.91	2.83	0.18	0.00	5.25
ENE	0.30	1.58	2.87	0.21	0.00	4.96
E	0.27	1.10	1.34	0.05	0.00	2.77
ESE	0.26	0.78	1.68	0.23	0.00	2.95
SE	0.25	1.18	3.15	1.19	0.00	5.78
SSE	0.30	2.38	4.94	2.12	0.01	9.75
S	0.52	6.81	8.28	4.25	0.09	19.95
SSW	0.51	4.54	3.33	1.54	0.00	9.93
SW	0.39	2.93	3.42	0.48	0.00	7.23
WSW	0.27	2.06	3.89	1.01	0.00	7.22
W	0.25	1.65	3.13	1.02	0.00	6.05
WNW	0.24	1.37	1.97	0.45	0.00	4.04
NW	0.22	2.40	3.69	0.26	0.00	6.57
NNW	0.30	1.71	1.19	0.00	0.00	3.20
TOTAL	5.25	34.68	46.96	12.99	0.11	46312.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.19	0.80	0.32	0.01	0.00	1.31
NNE	0.43	1.46	0.43	0.00	0.00	2.33
NE	0.28	1.32	0.78	0.02	0.00	2.40
ENE	0.20	0.86	0.79	0.03	0.00	1.88
E	0.18	0.65	0.50	0.07	0.00	1.40
ESE	0.18	0.54	0.55	0.13	0.00	1.41
SE	0.16	0.85	1.04	0.14	0.00	2.19
SSE	0.24	1.80	1.69	0.29	0.01	4.04
S	0.36	4.89	4.79	1.00	0.13	11.17
SSW	0.33	3.62	3.16	1.10	0.00	8.21
SW	0.28	3.09	6.60	1.39	0.00	11.36
WSW	0.19	2.43	8.49	3.56	0.08	14.74
W	0.19	2.19	6.56	3.05	0.20	12.20
WNW	0.20	2.03	4.17	1.75	0.09	8.24
NW	0.22	3.49	7.55	1.61	0.04	12.92
NNW	0.26	2.52	1.42	0.01	0.00	4.21
TOTAL	3.88	32.52	48.86	14.17	0.57	47911.

Season : Spring

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.38	0.71	0.61	0.01	0.00	1.71
NNE	0.65	1.79	1.14	0.05	0.00	3.64
NE	0.42	1.92	4.68	0.91	0.00	7.93
ENE	0.22	1.24	3.90	1.10	0.00	6.47
E	0.25	0.85	1.82	0.17	0.00	3.08
ESE	0.27	0.69	1.78	0.28	0.00	3.02
SE	0.32	1.10	2.72	1.21	0.00	5.35
SSE	0.42	2.04	2.97	2.89	0.06	8.39
S	0.45	4.03	3.94	3.14	0.15	11.71
SSW	0.45	2.48	1.93	1.10	0.10	6.06
SW	0.35	1.96	2.92	0.80	0.00	6.04
WSW	0.21	1.66	3.90	2.47	0.02	8.27
W	0.20	1.37	3.69	2.92	0.21	8.40
WNW	0.20	1.59	3.14	1.48	0.14	6.56
NW	0.25	2.74	5.37	1.17	0.06	9.60
NNW	0.34	2.11	1.30	0.02	0.00	3.78
TOTAL	5.40	28.29	45.82	19.74	0.75	48369.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 10.0 M.

BEGINNING DATE : 50491 END DATE : 121196

ANNUAL

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.32	0.78	0.54	0.01	0.00	1.64
NNE	0.58	1.77	0.90	0.02	0.00	3.26
NE	0.37	1.92	3.40	0.63	0.00	6.32
ENE	0.26	1.35	3.25	1.01	0.00	5.87
E	0.28	1.00	1.64	0.21	0.00	3.13
ESE	0.24	0.73	1.61	0.31	0.00	2.89
SE	0.26	1.13	2.70	1.13	0.02	5.24
SSE	0.34	2.19	3.63	2.23	0.04	8.43
S	0.45	5.06	5.77	3.55	0.15	14.98
SSW	0.43	3.21	2.62	1.13	0.03	7.42
SW	0.32	2.32	3.59	0.74	0.00	6.97
WSW	0.21	1.78	4.49	1.97	0.03	8.48
W	0.21	1.54	3.74	2.03	0.11	7.62
WNW	0.20	1.49	2.66	1.07	0.06	5.48
NW	0.22	2.65	4.91	0.89	0.03	8.69
NNW	0.29	2.00	1.26	0.02	0.00	3.58
TOTAL	4.97	30.92	46.69	16.95	0.47	183478.

bad data observed for 13226 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.06	0.35	2.25	0.39	0.00	3.06
NNE	0.06	0.91	5.56	1.12	0.00	7.65
NE	0.10	0.71	4.12	1.56	0.00	6.49
ENE	0.06	0.65	3.31	0.89	0.04	4.95
E	0.14	1.12	2.74	0.57	0.00	4.58
ESE	0.06	0.89	2.66	1.62	0.18	5.40
SE	0.06	0.51	2.35	1.62	0.22	4.75
SSE	0.04	0.49	4.28	5.84	0.63	11.28
S	0.04	0.55	4.18	8.76	2.15	15.68
SSW	0.02	0.30	2.96	4.30	0.12	7.69
SW	0.00	0.43	2.13	1.97	0.02	4.56
WSW	0.08	0.47	1.83	1.89	0.18	4.46
W	0.04	0.51	1.44	1.93	0.28	4.20
WNW	0.10	0.77	1.62	2.07	0.28	4.83
NW	0.18	0.71	2.88	1.77	0.02	5.56
NNW	0.08	0.63	2.90	1.26	0.00	4.87
TOTAL	1.10	10.02	47.21	37.57	4.10	5071.

bad data observed for 353 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.12	0.28	2.23	0.69	0.00	3.31
NNE	0.12	0.97	3.90	0.81	0.00	5.80
NE	0.10	0.59	3.69	0.59	0.00	4.97
ENE	0.18	0.83	2.19	0.47	0.06	3.73
E	0.10	0.85	1.48	0.39	0.10	2.92
ESE	0.02	0.67	2.03	1.12	0.06	3.90
SE	0.06	0.49	1.89	1.99	0.61	5.05
SSE	0.00	0.53	3.94	5.25	0.63	10.35
S	0.02	0.75	3.79	10.06	2.39	17.00
SSW	0.08	0.51	2.66	5.80	0.22	9.27
SW	0.04	0.63	2.41	2.23	0.00	5.30
WSW	0.02	0.73	2.01	2.27	0.10	5.13
W	0.12	0.83	2.25	1.97	0.20	5.36
WNW	0.08	0.79	3.16	2.09	0.00	6.11
NW	0.06	0.81	2.84	2.13	0.06	5.90
NNW	0.10	0.89	3.49	1.36	0.06	5.90
TOTAL	1.20	11.14	43.96	39.22	4.48	5071.

bad data observed for 353 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.69	1.72	0.65	0.02	3.12
NNE	0.04	0.93	4.04	1.36	0.00	6.37
NE	0.12	0.97	2.50	1.20	0.00	4.79
ENE	0.08	0.67	1.60	0.35	0.20	2.90
E	0.08	0.61	1.54	0.83	0.04	3.10
ESE	0.02	0.49	1.56	1.01	0.02	3.10
SE	0.00	0.41	2.45	2.05	0.57	5.48
SSE	0.00	0.55	4.69	5.66	1.30	12.21
S	0.02	0.26	4.30	9.05	2.58	16.21
SSW	0.02	0.49	1.70	3.55	0.34	6.09
SW	0.02	0.49	1.06	0.67	0.04	2.29
WSW	0.04	0.43	1.85	1.10	0.28	3.71
W	0.02	0.49	1.76	1.87	0.87	5.01
WNW	0.04	0.81	4.44	1.32	0.06	6.67
NW	0.08	1.18	6.53	1.85	0.04	9.68
NNW	0.04	1.03	5.80	2.41	0.02	9.29
TOTAL	0.65	10.51	47.53	34.94	6.37	5071.

bad data observed for 353 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.27	2.47	1.90	0.00	4.65
NNE	0.00	0.49	4.55	3.20	0.02	8.26
NE	0.00	0.51	4.02	3.81	0.00	8.34
ENE	0.00	0.43	3.28	3.69	0.24	7.63
E	0.02	0.33	2.82	3.77	0.02	6.96
ESE	0.00	0.31	2.02	2.22	0.10	4.65
SE	0.00	0.16	2.26	4.61	0.24	7.26
SSE	0.02	0.18	1.96	8.47	2.30	12.93
S	0.00	0.22	0.86	7.92	3.26	12.26
SSW	0.00	0.10	0.26	1.41	0.57	2.33
SW	0.02	0.16	0.35	0.45	0.02	1.00
WSW	0.02	0.08	0.47	1.04	0.27	1.88
W	0.00	0.18	0.77	1.55	0.86	3.35
WNW	0.00	0.27	1.73	1.47	0.47	3.94
NW	0.02	0.47	4.59	1.67	0.26	7.00
NNW	0.00	0.31	3.45	3.65	0.14	7.55
TOTAL	0.10	4.47	35.86	50.82	8.75	5098.

bad data observed for 326 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.00	0.76	0.49	0.04	1.29
NNE	0.00	0.08	1.43	1.35	0.04	2.90
NE	0.00	0.14	1.70	3.78	0.08	5.70
ENE	0.00	0.16	2.00	17.87	0.57	20.60
E	0.02	0.12	1.98	12.09	0.43	14.64
ESE	0.00	0.06	1.67	5.43	0.10	7.25
SE	0.00	0.04	1.00	8.39	1.18	10.60
SSE	0.00	0.02	1.16	9.33	3.47	13.97
S	0.00	0.00	0.63	4.94	3.90	9.47
SSW	0.00	0.00	0.10	0.71	0.35	1.16
SW	0.00	0.00	0.12	0.18	0.06	0.35
WSW	0.00	0.00	0.24	0.59	0.37	1.20
W	0.00	0.00	0.27	1.43	1.43	3.14
WNW	0.00	0.02	0.63	1.57	0.96	3.17
NW	0.00	0.04	0.71	1.12	0.51	2.37
NNW	0.00	0.00	0.98	1.00	0.22	2.19
TOTAL	0.02	0.67	15.36	70.25	13.70	5103.

bad data observed for 321 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.06	0.22	0.06	0.00	0.33
NNE	0.00	0.10	0.53	0.94	0.02	1.58
NE	0.00	0.04	0.68	5.15	0.29	6.16
ENE	0.00	0.12	1.45	18.69	1.12	21.37
E	0.00	0.16	1.84	13.19	0.47	15.65
ESE	0.00	0.04	1.57	8.57	0.12	10.29
SE	0.02	0.04	1.68	9.43	1.15	12.33
SSE	0.00	0.02	1.25	10.27	3.50	15.05
S	0.00	0.04	0.47	4.40	3.80	8.71
SSW	0.00	0.02	0.16	0.70	0.29	1.17
SW	0.00	0.02	0.22	0.22	0.06	0.51
WSW	0.00	0.02	0.06	0.53	0.67	1.27
W	0.00	0.02	0.20	0.82	1.51	2.54
WNW	0.00	0.00	0.20	0.45	0.90	1.55
NW	0.00	0.08	0.10	0.37	0.16	0.70
NNW	0.00	0.04	0.39	0.20	0.16	0.78
TOTAL	0.02	0.80	11.00	73.98	14.20	5111.

bad data observed for 313 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.04	0.16	0.16	0.00	0.35
NNE	0.00	0.20	2.00	2.41	0.00	4.60
NE	0.00	0.12	4.15	8.74	0.08	13.09
ENE	0.02	0.41	6.35	10.29	0.08	17.14
E	0.06	0.53	5.51	3.55	0.02	9.66
ESE	0.04	0.51	3.80	4.41	0.00	8.76
SE	0.02	0.29	3.88	5.84	0.47	10.50
SSE	0.00	0.22	4.41	8.50	2.27	15.40
S	0.00	0.22	1.92	5.62	2.66	10.42
SSW	0.00	0.08	0.94	2.06	0.22	3.29
SW	0.00	0.04	0.31	0.25	0.10	0.71
WSW	0.00	0.04	0.16	0.80	0.22	1.21
W	0.00	0.00	0.20	1.10	0.63	1.92
WNW	0.00	0.08	0.27	0.55	0.29	1.20
NW	0.00	0.02	0.25	0.53	0.04	0.84
NNW	0.00	0.02	0.43	0.45	0.00	0.90
TOTAL	0.14	2.80	34.74	55.25	7.07	5104.

bad data observed for 320 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.06	0.35	1.30	0.33	0.00	2.05
NNE	0.04	0.51	6.56	2.62	0.00	9.73
NE	0.12	0.71	6.67	3.48	0.00	10.99
ENE	0.12	1.00	5.57	2.24	0.08	9.02
E	0.04	1.00	4.55	1.22	0.00	6.81
ESE	0.08	1.14	2.99	1.91	0.00	6.12
SE	0.02	0.47	2.72	2.54	0.49	6.24
SSE	0.04	0.61	5.55	5.97	1.16	13.33
S	0.04	0.73	4.31	6.93	1.67	13.68
SSW	0.02	0.63	2.05	3.56	0.18	6.44
SW	0.04	0.37	1.10	1.22	0.12	2.85
WSW	0.02	0.28	0.67	1.44	0.20	2.60
W	0.04	0.26	0.75	0.91	0.22	2.17
WNW	0.00	0.16	0.75	0.67	0.22	1.79
NW	0.04	0.45	1.30	1.61	0.04	3.45
NNW	0.02	0.33	1.06	1.32	0.00	2.74
TOTAL	0.73	9.02	47.90	37.98	4.37	5079.

bad data observed for 345 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.12	0.28	1.40	0.51	0.00	2.32
NNE	0.09	0.89	2.30	0.64	0.04	3.95
NE	0.07	0.46	1.10	0.69	0.00	2.32
ENE	0.07	0.30	0.85	0.32	0.00	1.54
E	0.11	0.50	0.82	0.21	0.00	1.63
ESE	0.11	0.37	1.33	1.29	0.00	3.10
SE	0.00	0.25	2.04	1.72	0.14	4.15
SSE	0.04	0.32	3.14	3.35	0.67	7.51
S	0.02	0.44	4.20	8.04	0.67	13.38
SSW	0.04	0.64	3.72	6.29	0.43	11.11
SW	0.02	0.67	3.17	5.16	0.11	9.12
WSW	0.05	0.73	3.01	7.07	0.89	11.75
W	0.05	0.58	3.33	3.14	0.46	7.57
WNW	0.05	0.57	3.86	2.23	0.23	6.95
NW	0.09	0.64	4.20	2.13	0.12	7.18
NNW	0.11	0.71	3.05	2.52	0.05	6.43
TOTAL	1.03	8.35	41.51	45.30	3.81	5644.

bad data observed for 560 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.43	1.03	0.41	0.04	1.95
NNE	0.07	0.60	1.01	0.64	0.00	2.32
NE	0.05	0.28	0.83	0.28	0.00	1.45
ENE	0.05	0.14	0.48	0.44	0.00	1.12
E	0.04	0.12	0.66	0.51	0.00	1.33
ESE	0.02	0.14	1.37	1.01	0.04	2.57
SE	0.04	0.23	1.38	1.58	0.27	3.49
SSE	0.05	0.20	2.68	2.82	0.25	5.99
S	0.04	0.23	5.21	9.04	0.50	15.02
SSW	0.02	0.20	4.54	6.97	0.50	12.22
SW	0.09	0.71	2.62	7.30	0.27	10.99
WSW	0.05	0.98	3.90	9.26	0.60	14.79
W	0.02	0.92	3.83	3.85	0.34	8.95
WNW	0.09	0.90	3.78	2.41	0.16	7.34
NW	0.20	0.69	2.66	2.15	0.18	5.87
NNW	0.12	0.50	2.13	1.68	0.16	4.59
TOTAL	0.99	7.27	38.10	50.35	3.28	5640.

bad data observed for 564 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.09	0.44	0.53	0.42	0.00	1.47
NNE	0.04	0.30	0.70	0.35	0.00	1.39
NE	0.04	0.23	0.42	0.26	0.00	0.95
ENE	0.02	0.35	0.81	0.32	0.00	1.49
E	0.05	0.32	0.86	0.39	0.00	1.61
ESE	0.04	0.32	0.93	1.39	0.12	2.79
SE	0.05	0.25	1.10	1.49	0.25	3.14
SSE	0.05	0.35	3.44	3.21	0.21	7.26
S	0.04	0.44	3.84	9.50	0.47	14.29
SSW	0.07	0.70	4.10	5.89	0.67	11.43
SW	0.09	0.72	3.58	4.14	0.07	8.59
WSW	0.14	0.86	4.54	8.70	0.25	14.48
W	0.09	0.72	4.82	4.56	0.18	10.36
WNW	0.18	1.03	4.07	2.70	0.28	8.26
NW	0.05	0.98	4.59	2.40	0.00	8.03
NNW	0.11	0.60	2.17	1.54	0.04	4.45
TOTAL	1.12	8.59	40.50	47.26	2.52	5703.

bad data observed for 501 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.17	1.54	0.69	0.02	2.44
NNE	0.02	0.23	2.01	0.64	0.00	2.89
NE	0.00	0.36	1.73	0.67	0.05	2.82
ENE	0.00	0.26	1.54	0.74	0.07	2.61
E	0.05	0.55	1.42	0.35	0.02	2.39
ESE	0.02	0.17	1.49	1.54	0.40	3.62
SE	0.03	0.35	3.05	3.20	0.48	7.11
SSE	0.02	0.45	3.57	6.99	0.88	11.91
S	0.00	0.47	2.32	7.84	1.57	12.20
SSW	0.03	0.35	1.07	3.27	0.78	5.50
SW	0.00	0.24	0.92	1.25	0.07	2.47
WSW	0.03	0.45	1.51	3.50	0.64	6.13
W	0.02	0.43	2.75	3.34	1.14	7.68
WNW	0.00	0.57	5.80	2.02	0.69	9.09
NW	0.02	0.71	8.43	2.22	0.29	11.66
NNW	0.00	0.61	5.95	2.63	0.28	9.47
TOTAL	0.26	6.37	45.08	40.90	7.39	5778.

bad data observed for 426 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.17	2.14	0.40	0.00	2.70
NNE	0.00	0.33	4.07	1.27	0.00	5.67
NE	0.02	0.43	3.48	1.33	0.00	5.25
ENE	0.00	0.47	3.17	4.17	0.05	7.86
E	0.02	0.34	2.43	2.43	0.02	5.24
ESE	0.02	0.29	2.41	3.34	0.21	6.27
SE	0.00	0.17	2.60	6.74	0.79	10.30
SSE	0.00	0.21	2.36	9.61	1.83	14.01
S	0.00	0.07	1.19	7.13	2.43	10.82
SSW	0.02	0.17	0.45	1.57	0.81	3.01
SW	0.02	0.22	0.55	0.67	0.28	1.74
WSW	0.00	0.22	0.52	2.05	0.67	3.46
W	0.02	0.43	0.96	2.76	1.26	5.43
WNW	0.05	0.50	2.07	1.55	0.72	4.89
NW	0.00	0.52	3.74	1.57	0.43	6.25
NNW	0.00	0.45	4.55	1.93	0.17	7.10
TOTAL	0.16	5.00	36.68	48.51	9.66	5805.

bad data observed for 399 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.29	0.71	0.10	0.00	1.10
NNE	0.03	0.52	1.79	0.88	0.00	3.23
NE	0.02	0.28	2.17	3.69	0.09	6.24
ENE	0.00	0.19	4.88	9.38	0.12	14.57
E	0.05	0.34	4.83	5.38	0.02	10.62
ESE	0.00	0.12	3.14	4.78	0.12	8.16
SE	0.02	0.17	3.10	8.09	0.72	12.11
SSE	0.03	0.22	3.00	9.52	1.62	14.40
S	0.02	0.17	1.54	7.43	1.90	11.06
SSW	0.00	0.09	0.48	2.28	0.53	3.38
SW	0.00	0.12	0.36	0.85	0.29	1.62
WSW	0.05	0.12	0.33	1.62	0.69	2.81
W	0.05	0.02	0.17	2.45	0.95	3.64
WNW	0.00	0.16	0.41	0.67	0.72	1.97
NW	0.07	0.22	0.90	0.62	0.31	2.12
NNW	0.05	0.24	1.55	0.83	0.29	2.97
TOTAL	0.40	3.28	29.37	58.57	8.38	5798.

bad data observed for 406 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Autumn

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.09	0.31	0.31	0.00	0.72
NNE	0.03	0.17	3.57	2.31	0.00	6.09
NE	0.02	0.36	5.15	5.00	0.10	10.64
ENE	0.07	0.52	7.00	3.28	0.09	10.95
E	0.02	0.59	5.65	0.95	0.00	7.21
ESE	0.05	0.52	3.93	2.21	0.12	6.83
SE	0.02	0.45	4.64	3.67	0.09	8.86
SSE	0.07	0.31	5.29	6.21	0.64	12.52
S	0.03	0.38	3.38	8.84	0.67	13.31
SSW	0.00	0.22	1.97	3.86	0.22	6.27
SW	0.00	0.21	0.88	1.98	0.26	3.33
WSW	0.02	0.12	0.50	1.98	0.22	2.84
W	0.02	0.24	0.81	2.45	0.40	3.91
WNW	0.02	0.26	0.74	1.43	0.57	3.02
NW	0.03	0.26	0.52	0.84	0.05	1.71
NNW	0.03	0.21	0.40	1.00	0.17	1.81
TOTAL	0.45	4.90	44.73	46.32	3.60	5801.

bad data observed for 403 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.73	2.68	1.03	0.00	4.46
NNE	0.09	0.96	4.79	1.24	0.00	7.08
NE	0.16	0.47	3.24	1.38	0.10	5.35
ENE	0.09	0.77	1.73	0.35	0.00	2.94
E	0.12	0.75	1.80	0.28	0.00	2.96
ESE	0.05	0.73	2.83	1.00	0.12	4.74
SE	0.05	0.52	2.97	1.77	0.07	5.39
SSE	0.07	0.63	3.76	3.66	0.45	8.57
S	0.03	0.51	4.25	6.44	1.24	12.47
SSW	0.02	0.68	3.31	5.07	0.44	9.52
SW	0.03	0.54	2.29	3.43	0.02	6.31
WSW	0.09	0.40	2.13	4.62	0.47	7.71
W	0.07	0.49	2.29	3.03	0.30	6.17
WNW	0.05	0.56	2.40	1.98	0.31	5.30
NW	0.14	0.96	2.27	1.43	0.02	4.83
NNW	0.07	0.84	3.10	2.15	0.03	6.19
TOTAL	1.15	10.56	45.85	38.85	3.59	5717.

bad data observed for 487 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LNRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.12	0.74	0.92	0.08	1.86
NNE	0.00	0.22	0.99	1.34	0.00	2.55
NE	0.05	0.17	0.34	0.22	0.00	0.77
ENE	0.02	0.27	0.30	0.29	0.00	0.87
E	0.10	0.29	0.18	0.32	0.08	0.97
ESE	0.05	0.29	0.34	0.45	0.00	1.12
SE	0.07	0.27	0.34	0.29	0.00	0.96
SSE	0.02	0.35	1.33	1.09	0.00	2.79
S	0.05	0.15	1.69	4.48	0.29	6.66
SSW	0.03	0.22	1.69	5.07	0.12	7.13
SW	0.02	0.27	2.06	8.83	0.44	11.61
WSW	0.03	0.40	1.91	15.99	2.53	20.87
W	0.02	0.40	3.17	9.36	1.58	14.53
WNW	0.05	0.44	3.59	5.39	1.36	10.82
NW	0.02	0.39	3.05	4.41	0.84	8.71
NNW	0.07	0.30	2.11	4.85	0.44	7.77
TOTAL	0.59	4.53	23.84	63.29	7.75	5960.

bad data observed for 664 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.18	0.81	0.84	0.00	1.88
NNE	0.05	0.22	1.09	1.18	0.00	2.53
NE	0.07	0.17	0.30	0.39	0.00	0.92
ENE	0.00	0.03	0.17	0.42	0.00	0.62
E	0.02	0.13	0.17	0.45	0.02	0.79
ESE	0.03	0.12	0.25	0.30	0.00	0.71
SE	0.03	0.05	0.42	0.30	0.02	0.82
SSE	0.00	0.20	1.14	1.02	0.00	2.37
S	0.02	0.15	1.96	3.66	0.20	5.99
SSW	0.00	0.18	2.22	4.41	0.12	6.93
SW	0.02	0.49	2.82	10.96	0.50	14.79
WSW	0.07	0.30	2.38	17.26	2.69	22.70
W	0.00	0.50	3.56	7.54	1.48	13.08
WNW	0.03	0.54	2.82	4.60	1.38	9.37
NW	0.03	0.47	2.94	5.10	0.62	9.17
NNW	0.07	0.52	2.69	3.79	0.27	7.34
TOTAL	0.49	4.26	25.73	62.23	7.29	5957.

bad data observed for 667 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LNRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.27	0.64	0.56	0.02	1.55
NNE	0.03	0.49	1.06	1.13	0.03	2.74
NE	0.05	0.29	0.29	0.40	0.00	1.03
ENE	0.02	0.08	0.25	0.13	0.02	0.50
E	0.00	0.05	0.22	0.29	0.02	0.57
ESE	0.03	0.13	0.29	0.44	0.00	0.89
SE	0.00	0.02	0.40	0.22	0.05	0.69
SSE	0.03	0.13	1.08	0.89	0.13	2.27
S	0.00	0.19	1.68	3.51	0.08	5.47
SSW	0.00	0.30	2.39	3.82	0.07	6.58
SW	0.00	0.35	3.68	7.94	0.45	12.43
WSW	0.08	0.52	4.32	18.08	2.22	25.23
W	0.00	0.54	3.21	7.27	1.24	12.26
WNW	0.02	0.42	3.63	4.86	1.19	10.12
NW	0.08	0.50	3.65	4.15	0.71	9.10
NNW	0.02	0.59	2.89	4.84	0.24	8.58
TOTAL	0.44	4.88	29.68	58.53	6.47	5946.

bad data observed for 678 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.23	0.99	0.64	0.02	1.92
NNE	0.03	0.38	1.29	0.70	0.00	2.41
NE	0.02	0.35	0.95	0.54	0.02	1.87
ENE	0.05	0.23	0.33	0.07	0.00	0.69
E	0.08	0.38	0.59	0.32	0.00	1.37
ESE	0.03	0.20	0.65	0.44	0.12	1.44
SE	0.03	0.28	0.62	0.30	0.02	1.26
SSE	0.07	0.42	1.39	1.76	0.02	3.65
S	0.07	0.47	1.81	3.38	0.22	5.94
SSW	0.03	0.32	1.56	3.15	0.90	5.96
SW	0.02	0.37	1.76	2.58	0.42	5.14
WSW	0.12	0.38	3.21	9.49	1.89	15.10
W	0.07	0.65	4.95	7.05	3.31	16.03
WNW	0.03	0.82	6.33	4.30	2.18	13.66
NW	0.03	1.04	8.12	4.35	0.97	14.51
NNW	0.00	0.49	4.69	3.63	0.25	9.05
TOTAL	0.74	7.03	39.23	42.68	10.33	5975.

bad data observed for 649 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.28	1.51	0.74	0.00	2.56
NNE	0.02	0.49	2.44	0.82	0.17	3.93
NE	0.02	0.27	1.76	0.45	0.12	2.61
ENE	0.02	0.23	1.02	0.49	0.02	1.77
E	0.03	0.40	1.17	0.42	0.03	2.06
ESE	0.00	0.22	1.62	0.65	0.13	2.63
SE	0.00	0.23	2.31	1.07	0.22	3.83
SSE	0.02	0.27	2.96	2.88	0.15	6.27
S	0.00	0.15	1.56	4.83	0.55	7.09
SSW	0.03	0.12	0.67	3.23	0.85	4.90
SW	0.00	0.18	1.15	1.92	0.43	3.70
WSW	0.00	0.47	1.59	5.44	1.72	9.22
W	0.00	0.52	2.24	6.14	5.19	14.08
WNW	0.02	0.84	4.33	3.33	3.80	12.31
NW	0.03	0.79	6.09	4.53	2.38	13.82
NNW	0.02	0.62	4.60	3.90	0.10	9.23
TOTAL	0.22	6.07	37.02	40.83	15.86	5978.

bad data observed for 646 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.54	1.54	0.89	0.05	3.04
NNE	0.10	0.47	2.36	0.92	0.05	3.90
NE	0.03	0.37	1.62	0.80	0.00	2.83
ENE	0.03	0.50	2.63	2.17	0.00	5.34
E	0.05	0.28	3.13	1.30	0.02	4.78
ESE	0.03	0.55	2.83	0.89	0.10	4.40
SE	0.00	0.59	3.43	1.56	0.15	5.72
SSE	0.03	0.28	3.96	3.63	0.23	8.15
S	0.03	0.32	1.86	4.92	0.40	7.53
SSW	0.05	0.22	0.85	3.06	0.45	4.63
SW	0.00	0.07	1.07	3.11	0.43	4.68
WSW	0.03	0.13	1.27	5.42	1.86	8.72
W	0.00	0.28	1.41	7.06	3.50	12.24
WNW	0.03	0.23	1.37	3.25	3.26	8.15
NW	0.00	0.43	2.78	3.13	1.87	8.21
NNW	0.07	0.57	3.93	2.64	0.47	7.68
TOTAL	0.54	5.84	36.03	44.75	12.85	5978.

bad data observed for 646 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.18	0.97	1.00	0.03	2.23
NNE	0.05	0.37	2.31	1.52	0.02	4.27
NE	0.07	0.33	2.53	1.27	0.00	4.20
ENE	0.05	0.44	3.06	0.97	0.00	4.52
E	0.02	0.54	2.14	0.57	0.02	3.28
ESE	0.00	0.33	1.66	0.87	0.10	2.96
SE	0.03	0.22	2.88	0.82	0.00	3.95
SSE	0.02	0.20	3.08	2.01	0.22	5.53
S	0.02	0.18	2.53	5.91	0.18	8.83
SSW	0.00	0.27	1.61	4.24	0.20	6.31
SW	0.05	0.30	1.34	5.06	0.10	6.85
WSW	0.03	0.17	1.29	8.98	1.47	11.94
W	0.05	0.20	1.34	9.08	1.61	12.28
WNW	0.10	0.13	1.86	5.23	1.88	9.19
NW	0.05	0.32	1.69	4.12	1.11	7.29
NNW	0.13	0.22	1.32	4.30	0.39	6.36
TOTAL	0.70	4.40	31.62	55.95	7.32	5971.

bad data observed for 653 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.05	0.23	1.21	1.54	0.07	3.10
NNE	0.07	0.45	1.82	1.57	0.02	3.93
NE	0.07	0.32	0.94	0.27	0.00	1.59
ENE	0.00	0.28	0.80	0.30	0.02	1.41
E	0.02	0.28	0.70	0.18	0.05	1.24
ESE	0.02	0.17	0.89	0.54	0.07	1.67
SE	0.10	0.25	1.05	0.28	0.05	1.74
SSE	0.00	0.13	1.59	1.12	0.15	3.00
S	0.02	0.15	1.82	4.89	0.40	7.28
SSW	0.00	0.17	1.86	5.39	0.35	7.77
SW	0.02	0.17	2.04	8.18	0.50	10.91
WSW	0.02	0.32	1.66	11.30	2.34	15.63
W	0.00	0.32	2.83	7.48	1.87	12.50
WNW	0.03	0.54	2.86	5.62	1.04	10.09
NW	0.07	0.72	2.74	5.22	0.60	9.36
NNW	0.02	0.59	2.21	5.07	0.90	8.79
TOTAL	0.49	5.09	27.03	58.96	8.44	5975.

bad data observed for 649 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 0000 to 0300 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.46	1.72	1.49	0.00	3.70
NNE	0.08	0.80	3.32	1.62	0.00	5.83
NE	0.03	0.57	1.78	0.95	0.00	3.34
ENE	0.13	0.43	1.69	0.52	0.00	2.77
E	0.05	0.64	1.29	0.28	0.00	2.26
ESE	0.11	0.52	0.93	0.54	0.02	2.13
SE	0.02	0.44	1.05	0.98	0.20	2.69
SSE	0.08	0.49	1.90	1.59	0.61	4.67
S	0.03	0.52	2.85	4.27	0.56	8.24
SSW	0.08	0.82	2.82	4.52	0.41	8.65
SW	0.13	0.95	2.29	5.34	0.25	8.96
WSW	0.03	0.61	2.29	6.71	0.74	10.38
W	0.00	0.38	2.78	5.91	0.70	9.78
WNW	0.15	0.51	3.13	4.42	0.82	9.02
NW	0.08	0.57	4.24	3.68	0.23	8.81
NNW	0.03	0.56	4.06	3.88	0.26	8.79
TOTAL	1.08	9.27	38.15	46.72	4.78	6107.

bad data observed for 229 half hours

TIME : 0300 to 0600 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.08	0.43	1.59	0.93	0.00	3.03
NNE	0.02	0.69	3.01	1.36	0.00	5.07
NE	0.03	0.64	0.65	0.23	0.00	1.56
ENE	0.03	0.47	1.00	0.54	0.00	2.05
E	0.03	0.52	1.13	0.39	0.00	2.08
ESE	0.02	0.39	0.79	0.39	0.02	1.60
SE	0.10	0.38	1.05	0.49	0.08	2.10
SSE	0.07	0.34	2.28	1.49	0.49	4.67
S	0.00	0.51	3.60	3.83	1.00	8.94
SSW	0.02	0.47	3.08	5.12	0.38	9.07
SW	0.02	0.43	2.54	4.91	0.21	8.10
WSW	0.00	0.41	2.36	8.68	1.36	12.80
W	0.00	0.72	3.54	4.67	0.61	9.53
WNW	0.03	0.90	4.47	3.60	0.72	9.72
NW	0.03	0.65	4.57	4.70	0.23	10.18
NNW	0.05	0.90	4.93	3.47	0.16	9.51
TOTAL	0.52	8.86	40.56	44.80	5.25	6109.

bad data observed for 227 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 0600 to 0900 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.07	0.18	1.16	0.57	0.02	2.00
NNE	0.15	0.47	2.27	1.54	0.00	4.43
NE	0.10	0.54	1.44	0.80	0.00	2.88
ENE	0.08	0.44	1.36	0.49	0.00	2.37
E	0.11	0.46	1.16	0.34	0.00	2.08
ESE	0.11	0.31	0.95	0.29	0.00	1.67
SE	0.08	0.36	1.26	0.79	0.07	2.55
SSE	0.07	0.43	2.09	2.42	0.43	5.43
S	0.05	0.38	2.70	4.04	1.55	8.72
SSW	0.02	0.51	2.75	2.81	0.77	6.85
SW	0.02	0.29	2.39	3.62	0.13	6.45
WSW	0.03	0.29	1.73	6.48	0.95	9.49
W	0.05	0.43	2.88	4.84	1.37	9.57
WNW	0.07	0.83	5.20	3.70	1.15	10.94
NW	0.05	1.59	7.79	4.22	0.36	14.00
NNW	0.08	1.15	5.45	3.70	0.20	10.57
TOTAL	1.13	8.65	42.58	40.65	6.99	6113.

bad data observed for 223 half hours

TIME : 0900 to 1200 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.00	0.16	1.42	1.13	0.05	2.76
NNE	0.02	0.20	2.93	2.91	0.13	6.18
NE	0.00	0.51	2.67	2.78	0.05	6.00
ENE	0.02	0.47	2.75	2.04	0.03	5.31
E	0.07	0.44	1.72	1.23	0.00	3.45
ESE	0.02	0.36	1.29	1.16	0.00	2.83
SE	0.00	0.21	1.80	3.35	0.16	5.53
SSE	0.03	0.18	1.83	4.61	1.06	7.72
S	0.00	0.16	1.03	5.13	2.31	8.63
SSW	0.02	0.16	0.62	1.78	1.00	3.58
SW	0.00	0.11	0.54	1.67	0.44	2.76
WSW	0.02	0.07	0.87	3.43	0.80	5.18
W	0.00	0.23	1.52	4.02	3.02	8.80
WNW	0.03	0.26	2.85	3.32	2.11	8.57
NW	0.00	0.43	5.51	5.33	1.52	12.79
NNW	0.02	0.21	4.53	4.73	0.43	9.91
TOTAL	0.23	4.17	33.86	48.63	13.11	6116.

bad data observed for 220 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 1200 to 1500 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.07	0.91	0.90	0.08	1.98
NNE	0.00	0.07	1.26	1.57	0.08	2.97
NE	0.02	0.23	1.80	3.01	0.11	5.16
ENE	0.00	0.18	1.99	11.83	0.28	14.28
E	0.00	0.08	2.06	5.01	0.49	7.64
ESE	0.03	0.08	1.65	4.74	0.05	6.55
SE	0.02	0.08	1.40	6.40	0.42	8.33
SSE	0.00	0.08	0.70	6.22	2.45	9.46
S	0.00	0.07	0.39	3.97	2.97	7.40
SSW	0.00	0.05	0.23	0.69	0.96	1.93
SW	0.02	0.05	0.25	0.69	0.18	1.18
WSW	0.00	0.07	0.51	2.42	1.40	4.39
W	0.00	0.07	0.95	3.51	4.13	8.66
WNW	0.00	0.15	1.44	2.74	2.63	6.96
NW	0.00	0.05	2.12	3.50	1.98	7.64
NNW	0.00	0.03	1.78	3.04	0.62	5.47
TOTAL	0.10	1.39	19.44	60.23	18.85	6122.

bad data observed for 214 half hours

TIME : 1500 to 1800 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.02	0.18	0.15	0.21	0.00	0.55
NNE	0.00	0.15	0.75	0.65	0.03	1.58
NE	0.00	0.13	1.03	5.28	0.18	6.62
ENE	0.00	0.05	2.15	15.00	0.44	17.65
E	0.00	0.16	2.63	6.46	0.33	9.57
ESE	0.02	0.13	1.74	6.91	0.03	8.84
SE	0.00	0.11	1.30	6.85	0.26	8.53
SSE	0.00	0.02	0.82	7.47	2.32	10.62
S	0.03	0.08	0.54	5.04	3.03	8.72
SSW	0.02	0.03	0.23	1.06	0.57	1.91
SW	0.00	0.07	0.08	0.47	0.39	1.01
WSW	0.00	0.05	0.44	2.36	2.09	4.94
W	0.00	0.05	0.31	3.69	4.21	8.25
WNW	0.02	0.02	0.26	1.84	2.74	4.88
NW	0.00	0.05	0.28	1.97	1.63	3.93
NNW	0.02	0.16	0.41	1.34	0.47	2.40
TOTAL	0.11	1.44	13.11	66.62	18.72	6132.

bad data observed for 204 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Spring

TIME : 1800 to 2100 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.07	0.51	0.23	0.00	0.83
NNE	0.03	0.10	2.94	2.94	0.02	6.02
NE	0.10	0.31	4.46	7.36	0.02	12.24
ENE	0.05	0.36	5.08	4.37	0.03	9.89
E	0.02	0.51	4.03	1.26	0.02	5.83
ESE	0.05	0.46	3.67	1.24	0.00	5.42
SE	0.00	0.33	3.88	2.82	0.07	7.10
SSE	0.03	0.38	3.61	4.34	1.18	9.53
S	0.05	0.38	2.56	6.19	1.09	10.27
SSW	0.02	0.24	1.32	2.40	0.21	4.19
SW	0.03	0.28	1.01	1.80	0.26	3.38
WSW	0.00	0.21	0.65	3.70	0.75	5.32
W	0.00	0.13	0.72	4.65	2.04	7.54
WNW	0.02	0.15	0.82	3.18	1.47	5.63
NW	0.00	0.11	0.87	2.33	0.38	3.69
NNW	0.02	0.16	0.80	1.86	0.28	3.12
TOTAL	0.44	4.16	36.92	50.68	7.80	6127.

bad data observed for 209 half hours

TIME : 2100 to 2400 EST.

	WIND SPEED (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.08	0.21	2.34	1.00	0.02	3.64
NNE	0.07	0.73	5.93	3.05	0.00	9.78
NE	0.10	0.77	3.38	1.37	0.00	5.62
ENE	0.08	0.51	2.92	1.03	0.02	4.56
E	0.07	0.67	1.76	0.38	0.00	2.87
ESE	0.08	0.56	1.71	0.70	0.00	3.05
SE	0.07	0.44	2.16	1.29	0.03	3.98
SSE	0.08	0.73	2.83	2.63	0.62	6.89
S	0.08	0.41	2.86	4.79	0.47	8.61
SSW	0.03	0.39	2.43	3.50	0.23	6.58
SW	0.07	0.33	2.25	3.74	0.20	6.58
WSW	0.05	0.34	2.11	5.72	0.41	8.62
W	0.03	0.23	1.78	5.83	1.78	9.65
WNW	0.05	0.23	1.27	3.82	1.14	6.52
NW	0.07	0.31	2.01	3.02	0.33	5.73
NNW	0.08	0.33	2.97	3.69	0.23	7.30
TOTAL	1.08	7.19	40.72	45.55	5.47	6123.

bad data observed for 213 half hours

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Summer

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.03	0.26	1.39	0.58	0.01	2.27
NNE	0.03	0.52	3.57	1.73	0.01	5.86
NE	0.05	0.47	3.44	3.54	0.06	7.57
ENE	0.06	0.53	3.22	6.83	0.30	10.94
E	0.06	0.59	2.81	4.46	0.14	8.05
ESE	0.03	0.51	2.29	3.29	0.07	6.19
SE	0.02	0.30	2.28	4.57	0.62	7.78
SSE	0.01	0.33	3.40	7.42	1.91	13.07
S	0.01	0.34	2.55	7.20	2.80	12.92
SSW	0.02	0.27	1.35	2.76	0.28	4.67
SW	0.01	0.27	0.96	0.90	0.05	2.19
WSW	0.02	0.26	0.91	1.21	0.28	2.68
W	0.03	0.28	0.95	1.45	0.75	3.46
WNW	0.03	0.36	1.59	1.27	0.40	3.65
NW	0.05	0.47	2.40	1.38	0.14	4.43
NNW	0.03	0.41	2.31	1.45	0.07	4.27
TOTAL	0.49	6.17	35.41	50.04	7.89	40708.

Season : Autumn

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.32	1.29	0.48	0.01	2.14
NNE	0.05	0.50	2.54	1.00	0.00	4.08
NE	0.05	0.36	2.28	1.68	0.04	4.40
ENE	0.04	0.37	2.58	2.40	0.04	5.43
E	0.06	0.44	2.32	1.32	0.01	4.15
ESE	0.04	0.33	2.19	2.08	0.14	4.78
SE	0.03	0.30	2.62	3.55	0.35	6.85
SSE	0.04	0.34	3.41	5.70	0.82	10.30
S	0.02	0.34	3.23	8.03	1.19	12.81
SSW	0.02	0.38	2.44	4.38	0.55	7.77
SW	0.03	0.43	1.78	3.07	0.17	5.49
WSW	0.05	0.48	2.04	4.82	0.55	7.95
W	0.04	0.48	2.36	3.19	0.63	6.70
WNW	0.05	0.57	2.88	1.87	0.46	5.84
NW	0.07	0.62	3.41	1.67	0.18	5.95
NNW	0.06	0.52	2.86	1.78	0.15	5.37
TOTAL	0.69	6.77	40.22	47.02	5.30	45886.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

SEASON : Winter

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.26	1.05	0.89	0.03	2.27
NNE	0.04	0.39	1.67	1.15	0.04	3.28
NE	0.05	0.28	1.09	0.54	0.02	1.98
ENE	0.02	0.26	1.07	0.61	0.01	1.97
E	0.04	0.30	1.04	0.48	0.03	1.89
ESE	0.03	0.25	1.07	0.57	0.06	1.98
SE	0.03	0.24	1.43	0.61	0.06	2.37
SSE	0.02	0.25	2.07	1.80	0.11	4.25
S	0.03	0.22	1.86	4.45	0.29	6.85
SSW	0.02	0.22	1.60	4.04	0.38	6.28
SW	0.01	0.27	1.99	6.07	0.41	8.76
WSW	0.05	0.34	2.20	11.49	2.09	16.16
W	0.02	0.43	2.84	7.62	2.47	13.38
WNW	0.04	0.49	3.35	4.57	2.01	10.47
NW	0.04	0.58	3.88	4.38	1.14	10.02
NNW	0.05	0.49	3.06	4.13	0.38	8.10
TOTAL	0.52	5.26	31.28	53.39	9.54	47740.

Season : Spring

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.22	1.22	0.81	0.02	2.31
NNE	0.04	0.40	2.80	1.96	0.03	5.23
NE	0.05	0.46	2.15	2.73	0.04	5.43
ENE	0.05	0.36	2.37	4.48	0.10	7.36
E	0.04	0.44	1.97	1.92	0.10	4.48
ESE	0.06	0.35	1.59	2.00	0.01	4.01
SE	0.03	0.29	1.74	2.87	0.16	5.10
SSE	0.04	0.33	2.01	3.85	1.14	7.38
S	0.03	0.31	2.07	4.66	1.62	8.69
SSW	0.02	0.34	1.68	2.73	0.57	5.34
SW	0.03	0.31	1.42	2.78	0.26	4.80
WSW	0.02	0.26	1.37	4.94	1.06	7.64
W	0.01	0.28	1.81	4.64	2.23	8.97
WNW	0.04	0.38	2.43	3.33	1.60	7.78
NW	0.03	0.47	3.42	3.59	0.83	8.34
NNW	0.04	0.44	3.11	3.21	0.33	7.13
TOTAL	0.59	5.64	33.16	50.49	10.13	48949.

DIURNAL WIND SPEED AND DIRECTION ROSES FOR LHRL Tower AT 49.0 M.

BEGINNING DATE : 50491 END DATE : 121196

ANNUAL

All times combined

	Wind Speed (M/S)					
DIRECTION	0-1	1-2	2-4	4-8	>8	TOTAL
N	0.04	0.26	1.23	0.70	0.02	2.25
NNE	0.04	0.45	2.61	1.46	0.02	4.58
NE	0.05	0.39	2.19	2.08	0.04	4.75
ENE	0.04	0.38	2.27	3.47	0.10	6.27
E	0.05	0.43	2.00	1.96	0.07	4.51
ESE	0.04	0.36	1.76	1.93	0.07	4.16
SE	0.03	0.28	2.00	2.83	0.28	5.42
SSE	0.03	0.31	2.68	4.57	0.97	8.56
S	0.02	0.30	2.41	6.01	1.43	10.18
SSW	0.02	0.30	1.78	3.49	0.45	6.04
SW	0.02	0.32	1.56	3.29	0.23	5.42
WSW	0.04	0.33	1.65	5.78	1.03	8.83
W	0.02	0.37	2.02	4.34	1.57	8.32
WNW	0.04	0.45	2.60	2.83	1.16	7.08
NW	0.05	0.54	3.31	2.82	0.59	7.31
NNW	0.04	0.46	2.86	2.70	0.24	6.31
TOTAL	0.58	5.94	34.94	50.28	8.27	183283.

bad data observed for 13421 half hours

STATION : Lucas Heights 10m SEASON : SUMMER HEIGHT : 10 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	2.6	5.2	5.8	3.8	3.3	2.9	4.9	11.0	24.8	10.2	5.5	4.6	4.1	3.1	5.0	3.4
	UBAR	1.0	1.1	1.7	1.9	1.3	1.6	2.2	2.3	2.6	2.1	1.9	2.1	2.1	1.9	1.7	1.2
	SY AV.	C	B	C	C	C	B	C	C	D	C	C	C	C	C	C	B
	SZ AV.	F	F	E	E	E	F	E	E	E	E	E	E	E	E	F	F
0300-0600	PROB(%)	2.2	4.3	4.6	3.0	2.1	1.7	4.5	10.3	27.1	10.9	5.5	4.8	5.2	3.5	6.0	4.3
	UBAR	1.0	1.0	1.4	1.8	1.3	1.9	2.5	2.3	2.7	2.1	1.8	2.1	2.0	1.8	1.7	1.3
	SY AV.	B	B	D	C	C	B	C	C	D	C	C	C	C	C	B	B
	SZ AV.	F	F	E	E	F	E	E	E	D	E	E	E	E	E	E	F
0600-0900	PROB(%)	3.7	5.7	6.6	3.2	2.7	2.3	4.8	10.0	21.7	6.0	2.5	3.5	4.7	4.1	11.9	6.5
	UBAR	1.8	1.8	2.1	2.1	2.1	2.5	2.9	3.1	3.4	2.6	2.0	2.8	2.9	2.3	2.2	2.0
	SY AV.	A	A	B	C	B	B	B	C	C	C	C	C	C	B	B	A
	SZ AV.	A	B	B	C	C	B	C	C	C	C	C	C	C	B	B	B
0900-1200	PROB(%)	4.3	6.7	12.4	8.8	5.4	4.3	7.2	12.7	13.1	2.1	1.2	2.1	2.8	3.2	8.6	5.3
	UBAR	2.4	2.4	2.8	3.0	2.8	2.8	3.3	3.9	4.6	3.7	3.0	3.8	4.0	3.1	2.8	2.5
	SY AV.	A	A	A	B	B	B	B	B	C	B	B	B	B	B	A	A
	SZ AV.	A	A	A	B	B	B	B	B	C	B	B	B	B	B	A	A
1200-1500	PROB(%)	0.9	2.2	10.7	23.9	9.1	6.2	10.8	12.7	10.8	0.9	0.6	1.6	2.3	2.8	3.4	1.2
	UBAR	2.5	2.4	3.5	3.8	3.4	3.6	4.0	4.4	5.1	4.3	3.9	4.3	4.6	4.4	3.7	2.4
	SY AV.	A	A	C	C	B	B	C	B	C	B	B	B	B	B	A	A
	SZ AV.	A	A	C	C	B	B	C	B	C	B	B	B	B	B	A	A
1500-1800	PROB(%)	0.2	0.9	11.3	24.0	9.9	7.8	14.1	13.5	10.1	0.9	0.9	1.4	2.3	1.2	1.2	0.4
	UBAR	1.7	2.1	3.9	3.7	3.3	3.4	3.9	4.2	4.8	3.4	3.6	4.7	4.8	4.6	3.6	1.9
	SY AV.	A	B	D	D	C	B	C	C	C	C	C	C	C	C	B	A
	SZ AV.	A	B	D	D	C	C	C	C	C	C	C	C	C	C	B	A
1800-2100	PROB(%)	0.4	3.3	19.0	13.1	7.4	6.5	11.4	14.7	13.9	3.0	1.2	1.4	1.6	1.0	1.2	0.8
	UBAR	1.2	1.8	2.7	2.5	2.0	2.3	2.7	3.1	3.6	2.7	2.7	3.2	3.3	3.0	2.3	1.5
	SY AV.	A	B	D	D	C	C	C	C	C	C	C	C	C	C	B	A
	SZ AV.	G	F	D	D	E	E	E	D	D	E	E	E	D	E	F	G
2100-2400	PROB(%)	2.2	7.2	11.4	7.1	5.0	3.7	6.9	12.3	20.1	8.2	3.8	3.1	1.8	1.8	3.0	2.2
	UBAR	1.0	1.3	1.8	1.9	1.6	1.7	2.4	2.5	2.8	2.1	2.0	2.3	2.0	2.1	2.0	1.4
	SY AV.	B	B	C	C	C	C	C	C	C	C	C	C	C	C	B	B
	SZ AV.	G	F	E	E	E	E	E	E	D	E	E	E	E	E	E	F

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 10m SEASON : AUTUMN HEIGHT : 10 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	1.2	2.0	2.4	0.8	0.9	1.2	2.6	6.8	25.0	15.6	12.0	10.1	6.9	4.0	5.8	2.9
	UBAR	1.1	1.0	1.8	1.4	1.4	2.0	2.5	2.5	2.4	2.1	2.1	2.4	2.2	1.8	1.8	1.4
	SY AV.	B	C	C	C	C	B	C	C	D	D	D	D	C	C	C	B
	SZ AV.	G	F	E	F	F	F	E	E	E	E	E	E	E	E	E	F
0300-0600	PROB(%)	1.1	1.1	1.5	0.8	0.7	1.4	1.9	4.6	25.0	16.5	14.1	12.4	7.1	4.3	5.1	2.4
	UBAR	1.3	1.2	1.6	1.7	1.4	2.2	2.7	2.5	2.4	2.2	2.3	2.4	2.2	2.0	2.1	1.5
	SY AV.	C	B	C	C	B	B	C	C	D	D	D	D	C	C	C	B
	SZ AV.	G	F	F	E	F	E	E	E	E	E	E	E	E	E	E	F
0600-0900	PROB(%)	1.0	1.1	1.3	1.4	1.0	1.7	2.5	4.5	21.9	13.9	12.0	10.9	8.9	5.6	9.1	3.2
	UBAR	1.4	1.4	1.8	1.7	1.9	2.8	3.0	2.7	2.7	2.4	2.2	2.5	2.3	2.1	2.1	1.8
	SY AV.	B	B	B	B	B	C	C	C	C	C	D	C	C	B	B	B
	SZ AV.	D	D	D	C	D	C	C	C	D	D	D	D	D	D	C	C
0900-1200	PROB(%)	3.0	2.9	4.2	2.5	1.9	2.9	6.3	11.7	14.6	5.2	3.1	6.2	6.9	6.8	15.6	6.1
	UBAR	2.1	2.2	2.3	2.3	2.3	2.9	3.2	3.3	3.8	3.7	2.8	3.2	3.3	2.8	2.5	2.3
	SY AV.	A	A	B	B	B	B	B	B	C	B	B	C	B	B	B	A
	SZ AV.	A	A	B	B	B	B	B	B	C	B	B	C	B	B	B	A
1200-1500	PROB(%)	3.4	4.7	8.2	8.6	3.9	4.9	9.8	14.0	12.8	2.8	2.0	3.5	5.0	4.0	7.8	4.5
	UBAR	2.1	2.1	2.4	2.8	2.6	2.9	3.5	3.7	4.3	4.0	3.0	3.6	3.8	3.2	2.5	2.1
	SY AV.	A	A	B	C	B	B	B	B	C	B	B	B	B	B	A	A
	SZ AV.	A	A	B	C	B	B	B	B	C	B	B	B	B	B	A	A
1500-1800	PROB(%)	1.1	2.5	8.8	16.1	7.3	6.2	11.9	14.7	14.2	3.2	1.6	2.7	3.9	1.6	2.4	1.9
	UBAR	1.3	1.3	2.5	2.7	2.4	2.7	3.1	3.2	3.6	3.6	2.8	3.4	3.7	3.5	2.7	1.5
	SY AV.	B	B	C	D	C	C	C	C	C	C	C	C	C	C	B	A
	SZ AV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
1800-2100	PROB(%)	0.5	4.3	11.2	7.7	4.6	3.6	7.7	13.7	21.6	8.1	4.3	3.4	4.0	2.1	2.0	1.0
	UBAR	1.2	1.3	2.0	1.6	1.5	1.5	2.1	2.2	2.6	2.4	2.3	2.6	2.7	2.5	2.2	1.4
	SY AV.	C	C	D	D	C	C	C	C	D	C	D	D	D	C	B	B
	SZ AV.	G	F	E	D	E	E	E	E	D	E	E	D	D	E	E	F
2100-2400	PROB(%)	2.0	3.8	4.3	1.8	1.9	1.5	3.5	7.8	24.4	14.1	8.7	8.5	5.5	3.8	4.6	3.8
	UBAR	1.0	1.1	1.7	1.2	1.3	1.4	2.3	2.2	2.3	2.0	2.0	2.4	2.2	2.1	1.7	1.3
	SY AV.	B	B	C	C	C	B	C	C	D	C	D	D	D	C	B	B
	SZ AV.	G	F	E	E	E	F	E	E	E	E	E	E	E	E	F	F

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 10m SEASON : WINTER HEIGHT : 10 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	0.9	1.5	1.0	0.8	0.6	0.5	0.6	2.3	12.0	11.8	15.7	18.8	11.6	8.1	10.0	3.8
	UBAR	1.3	1.3	1.4	1.9	2.3	1.8	2.0	2.0	2.0	2.0	2.5	3.0	2.7	2.5	2.4	1.7
	SY AV.	B	B	B	B	B	B	B	C	D	D	D	D	D	C	C	B
	SZ AV.	G	F	F	F	F	F	E	E	E	E	E	D	E	E	E	F
0300-0600	PROB(%)	1.2	1.7	1.1	0.6	0.6	0.5	0.6	2.0	10.7	10.6	19.1	19.0	11.1	8.0	9.5	3.8
	UBAR	1.2	1.3	1.5	2.1	1.9	1.5	1.9	1.7	2.1	2.0	2.6	2.9	2.7	2.7	2.2	1.6
	SY AV.	B	B	B	B	B	B	B	C	D	D	D	D	D	C	C	B
	SZ AV.	G	G	F	F	F	F	E	E	E	E	E	D	E	E	E	F
0600-0900	PROB(%)	1.4	1.6	1.0	0.6	0.6	0.6	0.8	2.2	9.1	9.1	16.9	21.2	10.9	7.5	12.4	4.2
	UBAR	1.4	1.3	1.5	1.6	2.2	2.3	2.0	2.0	2.2	2.0	2.6	3.1	2.6	2.7	2.4	1.7
	SY AV.	B	A	B	B	B	B	B	C	D	C	D	D	C	C	B	A
	SZ AV.	E	E	D	D	D	D	E	D	D	D	D	D	D	D	D	E
0900-1200	PROB(%)	1.6	2.0	2.6	1.1	1.1	1.4	1.5	3.6	7.4	5.1	6.4	14.8	15.5	11.1	20.3	4.4
	UBAR	2.1	1.9	2.0	2.0	2.1	2.4	2.3	2.6	3.2	3.7	3.2	3.6	3.7	3.3	2.7	2.2
	SY AV.	A	A	B	B	B	B	B	B	C	B	C	C	C	B	B	A
	SZ AV.	A	A	B	B	B	B	B	B	C	B	C	C	C	B	B	A
1200-1500	PROB(%)	2.2	3.6	3.6	2.2	2.0	2.1	3.8	6.1	8.7	4.6	4.3	9.3	14.0	9.1	19.1	5.4
	UBAR	2.1	2.0	2.2	2.4	2.2	2.7	2.7	2.7	3.7	4.0	3.3	3.7	4.4	3.9	3.1	2.1
	SY AV.	A	A	A	C	B	B	B	B	C	B	B	C	C	B	B	A
	SZ AV.	A	A	A	C	B	B	B	B	C	B	B	C	C	B	B	A
1500-1800	PROB(%)	2.0	3.5	4.6	5.9	3.5	3.2	6.2	8.1	10.2	4.5	5.3	8.2	12.7	6.5	10.7	4.8
	UBAR	1.3	1.2	1.7	2.2	1.9	1.9	2.2	2.4	2.9	3.0	2.7	3.5	3.8	3.7	3.1	1.6
	SY AV.	A	B	C	C	C	C	C	C	C	C	D	C	C	C	B	B
	SZ AV.	E	E	D	D	D	D	D	D	D	D	D	D	D	D	D	D
1800-2100	PROB(%)	0.8	2.6	3.9	2.8	2.1	2.1	2.8	5.6	16.5	8.5	9.0	11.7	11.4	7.6	9.6	2.9
	UBAR	1.1	1.2	1.5	1.4	1.4	1.9	1.6	1.8	2.1	2.4	2.5	2.9	2.9	2.8	2.6	1.6
	SY AV.	B	B	D	D	C	C	C	D	D	D	D	D	D	C	B	B
	SZ AV.	G	F	E	E	E	E	E	E	E	E	D	D	D	E	E	F
2100-2400	PROB(%)	1.0	2.1	1.5	1.0	0.7	0.9	1.1	2.3	14.8	11.5	14.2	15.0	10.1	7.9	11.6	4.3
	UBAR	1.2	1.1	1.3	1.6	1.6	2.1	2.1	2.0	2.1	2.1	2.7	3.0	2.7	2.6	2.4	1.6
	SY AV.	B	B	B	B	B	B	B	D	D	D	D	D	D	C	B	B
	SZ AV.	G	F	F	F	F	E	E	E	E	E	D	D	E	E	E	F

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 10m SEASON : SPRING HEIGHT : 10 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	1.6	3.3	3.7	1.8	1.7	1.7	2.9	6.4	15.3	10.3	11.1	11.2	7.9	7.6	8.6	4.9
	UBAR	1.0	1.1	1.6	1.6	1.5	1.6	1.9	2.3	2.2	2.1	2.2	2.6	2.5	2.2	1.9	1.4
	SY AV.	A	B	C	C	C	B	C	C	D	C	D	D	C	C	C	B
	SZ AV.	G	F	F	E	F	F	E	E	E	E	E	E	E	E	E	F
0300-0600	PROB(%)	1.3	2.7	2.1	1.8	1.3	1.1	1.8	6.0	16.8	11.2	11.2	12.5	8.1	7.5	9.8	4.8
	UBAR	1.0	1.2	1.5	1.9	1.5	1.5	1.9	2.3	2.2	2.1	2.2	2.7	2.2	2.2	1.9	1.3
	SY AV.	A	B	B	C	C	B	B	C	D	C	D	D	C	C	B	B
	SZ AV.	G	F	F	E	E	F	E	E	E	E	E	E	E	E	E	F
0600-0900	PROB(%)	2.4	3.5	4.0	2.5	1.3	1.4	2.5	6.0	12.0	7.1	7.6	9.0	9.6	8.3	17.3	5.5
	UBAR	1.8	1.8	2.1	2.0	1.7	1.9	2.5	2.9	3.0	2.8	2.8	3.4	3.1	2.9	2.3	1.9
	SY AV.	A	A	B	B	B	B	B	B	C	C	C	C	C	B	B	A
	SZ AV.	B	B	B	C	B	B	B	C	C	C	C	C	C	C	B	B
0900-1200	PROB(%)	3.4	4.4	9.2	4.9	2.9	2.9	5.4	8.5	8.0	3.4	3.1	5.5	9.3	8.2	15.1	5.9
	UBAR	2.4	2.4	2.7	2.7	2.5	2.8	3.3	3.8	4.5	4.4	3.8	3.9	4.5	3.5	3.2	2.5
	SY AV.	A	A	B	B	B	B	B	B	C	B	B	B	B	B	A	A
	SZ AV.	A	A	B	B	B	B	B	B	C	B	B	B	B	B	A	A
1200-1500	PROB(%)	1.8	2.3	10.3	14.4	5.3	5.3	8.9	9.4	6.9	1.6	1.4	5.6	8.8	6.6	9.1	2.3
	UBAR	2.5	2.5	3.3	3.6	3.1	3.4	3.9	4.4	5.2	5.0	3.9	4.6	4.8	4.2	3.7	2.5
	SY AV.	A	A	B	C	B	B	B	B	C	C	B	B	B	B	A	A
	SZ AV.	A	A	B	C	B	B	B	B	C	C	B	B	B	B	A	A
1500-1800	PROB(%)	0.4	1.4	12.6	16.6	6.5	6.5	9.8	11.2	8.0	1.9	1.6	6.2	7.6	3.9	4.9	0.9
	UBAR	1.7	2.0	3.4	3.3	3.0	3.1	3.4	4.2	4.9	5.0	3.6	4.5	4.7	4.9	3.8	1.7
	SY AV.	A	B	C	D	C	C	C	C	C	C	C	C	C	C	B	A
	SZ AV.	B	D	D	D	C	C	C	C	C	C	C	C	C	C	C	D
1800-2100	PROB(%)	0.9	5.1	14.9	6.9	4.1	3.4	7.3	11.2	12.9	5.0	4.3	6.1	7.2	4.4	4.9	1.4
	UBAR	1.1	1.8	2.4	2.0	1.7	1.6	2.1	2.7	3.0	2.8	2.5	3.1	3.6	3.0	2.5	1.5
	SY AV.	B	B	D	D	C	B	C	C	C	C	D	D	C	C	B	B
	SZ AV.	G	F	E	E	E	E	E	E	D	E	E	D	D	E	E	F
2100-2400	PROB(%)	2.1	6.4	6.6	2.8	1.7	1.9	4.2	8.5	13.7	7.8	7.8	10.1	8.7	6.0	7.3	4.4
	UBAR	1.0	1.2	1.6	1.6	1.4	1.6	1.8	2.5	2.2	2.2	2.3	2.6	3.0	2.7	2.0	1.3
	SY AV.	A	B	C	C	B	B	C	C	D	C	D	D	C	C	C	B
	SZ AV.	G	F	E	E	F	E	E	E	E	E	E	D	D	E	E	F

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 10m ALL SEASONS COMBINED HEIGHT : 10 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	1.5	2.9	3.1	1.7	1.5	1.5	2.7	6.4	19.0	12.0	11.3	11.4	7.8	5.9	7.5	3.8
	UBAR	1.0	1.1	1.7	1.8	1.5	1.7	2.2	2.3	2.4	2.1	2.3	2.7	2.5	2.2	2.0	1.4
	SY AV.	B	B	C	C	C	B	C	C	D	C	D	D	C	C	C	B
	SZ AV.	G	F	E	E	F	F	E	E	E	E	E	D	E	E	E	F
0300-0600	PROB(%)	1.4	2.4	2.2	1.5	1.1	1.2	2.1	5.6	19.6	12.3	12.7	12.4	8.0	5.9	7.7	3.8
	UBAR	1.1	1.1	1.5	1.8	1.5	1.8	2.4	2.3	2.4	2.1	2.3	2.7	2.4	2.3	2.0	1.4
	SY AV.	B	B	C	C	C	B	C	C	D	C	D	D	C	C	C	B
	SZ AV.	G	F	F	E	F	F	E	E	E	E	E	E	E	E	E	F
0600-0900	PROB(%)	2.1	2.9	3.1	1.9	1.3	1.5	2.6	5.5	15.9	9.1	10.0	11.4	8.7	6.5	12.8	4.8
	UBAR	1.7	1.7	2.0	1.9	2.0	2.4	2.7	2.8	2.9	2.4	2.5	3.0	2.7	2.6	2.3	1.8
	SY AV.	A	A	B	B	B	B	B	C	C	C	C	C	C	B	B	A
	SZ AV.	B	B	B	C	C	C	C	C	D	D	D	D	D	C	C	C
0900-1200	PROB(%)	3.0	3.9	6.9	4.2	2.7	2.8	5.0	9.0	10.6	4.0	3.6	7.4	8.9	7.5	15.1	5.4
	UBAR	2.3	2.3	2.6	2.7	2.6	2.8	3.2	3.5	4.0	3.8	3.3	3.6	3.9	3.2	2.8	2.4
	SY AV.	A	A	B	B	B	B	B	B	C	B	B	C	B	B	B	A
	SZ AV.	A	A	B	B	B	B	B	B	C	B	B	C	B	B	B	A
1200-1500	PROB(%)	2.1	3.2	8.1	11.9	4.9	4.6	8.2	10.4	9.7	2.5	2.1	5.1	7.8	5.8	10.1	3.4
	UBAR	2.2	2.2	3.0	3.5	3.0	3.2	3.6	3.9	4.5	4.2	3.4	4.0	4.4	3.9	3.2	2.2
	SY AV.	A	A	B	C	B	B	B	B	C	B	B	B	B	B	B	A
	SZ AV.	A	A	B	C	B	B	B	B	C	B	B	B	B	B	B	A
1500-1800	PROB(%)	0.9	2.1	9.3	15.3	6.7	5.9	10.3	11.8	10.6	2.7	2.4	4.8	6.8	3.4	4.9	2.1
	UBAR	1.4	1.5	3.1	3.1	2.8	2.9	3.3	3.5	3.9	3.6	3.0	3.9	4.1	4.1	3.3	1.6
	SY AV.	A	B	C	D	C	C	C	C	C	C	C	C	C	C	B	B
	SZ AV.	D	D	D	D	C	C	C	C	D	D	D	D	D	D	D	D
1800-2100	PROB(%)	0.7	3.9	12.0	7.4	4.4	3.8	7.1	11.2	16.3	6.3	4.8	5.8	6.3	3.9	4.6	1.6
	UBAR	1.1	1.5	2.3	2.0	1.7	1.9	2.3	2.6	2.7	2.5	2.5	2.9	3.1	2.8	2.5	1.6
	SY AV.	B	C	D	D	C	C	C	C	D	C	D	D	D	C	B	B
	SZ AV.	G	F	E	D	E	E	E	E	D	E	E	D	D	E	E	F
2100-2400	PROB(%)	1.8	4.8	5.8	3.0	2.2	1.9	3.8	7.6	18.1	10.5	8.8	9.4	6.7	5.0	6.8	3.7
	UBAR	1.0	1.2	1.7	1.7	1.5	1.7	2.2	2.4	2.4	2.1	2.3	2.7	2.7	2.5	2.1	1.4
	SY AV.	B	B	C	C	C	B	C	C	D	C	D	D	C	C	B	B
	SZ AV.	G	F	E	E	E	E	E	E	E	E	E	D	E	E	E	F

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 10m ALL TIMES COMBINED HEIGHT : 10 M.

SEASON	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
SUMMER	PROB(%)	2.1	4.4	10.2	10.9	5.6	4.4	8.1	12.1	17.7	5.3	2.6	2.8	3.1	2.6	5.0	3.0
	UBAR	1.6	1.7	2.7	3.1	2.5	2.7	3.2	3.3	3.4	2.4	2.1	2.8	3.0	2.7	2.4	1.8
	SY AV.	B	B	C	C	C	B	C	C	C	C	C	C	C	B	B	B
	SZ AV.	D	D	D	D	D	C	D	D	D	D	D	D	D	C	C	C
AUTUMN	PROB(%)	1.7	2.8	5.2	5.0	2.8	2.9	5.8	9.7	19.9	9.9	7.2	7.2	6.0	4.0	6.6	3.2
	UBAR	1.6	1.5	2.2	2.3	2.1	2.4	2.9	2.9	2.8	2.4	2.2	2.6	2.7	2.4	2.2	1.8
	SY AV.	B	B	C	C	C	B	C	C	D	C	D	C	C	B	B	B
	SZ AV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	C	D
WINTER	PROB(%)	1.4	2.3	2.4	1.9	1.4	1.4	2.2	4.0	11.2	8.2	11.4	14.7	12.2	8.2	12.9	4.2
	UBAR	1.5	1.4	1.7	2.0	1.9	2.1	2.2	2.2	2.4	2.4	2.7	3.2	3.3	3.0	2.7	1.8
	SY AV.	B	B	B	C	C	B	C	C	D	C	D	D	C	C	B	A
	SZ AV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
SPRING	PROB(%)	1.7	3.6	7.9	6.5	3.1	3.0	5.3	8.4	11.7	6.1	6.0	8.3	8.4	6.6	9.6	3.8
	UBAR	1.7	1.7	2.6	2.9	2.4	2.6	2.9	3.3	3.1	2.7	2.5	3.2	3.6	3.1	2.6	1.8
	SY AV.	A	B	C	C	B	B	C	C	C	C	C	C	C	C	B	A
	SZ AV.	D	D	D	D	D	C	D	D	D	D	D	D	D	D	C	D
COMBINED	PROB(%)	1.7	3.3	6.3	5.9	3.1	2.9	5.2	8.4	15.0	7.4	7.0	8.5	7.6	5.5	8.7	3.6
	UBAR	1.6	1.6	2.4	2.8	2.3	2.5	2.9	3.0	3.0	2.5	2.5	3.0	3.2	2.9	2.5	1.8
	SY AV.	B	B	C	C	C	B	C	C	C	C	C	C	C	C	B	B
	SZ AV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	C	D

STATION : Lucas Heights 49m SEASON : SUMMER HEIGHT : 49 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	3.1	7.7	6.5	4.9	4.6	5.4	4.8	11.3	15.7	7.7	4.6	4.5	4.2	4.8	5.6	4.9
	UBAR	3.0	3.1	3.2	3.2	2.7	3.6	3.9	4.7	5.2	4.3	3.8	3.9	4.4	4.0	3.4	3.3
	SY AV.	D	D	E	E	D	D	E	D	D	D	E	E	E	D	E	D
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
0300-0600	PROB(%)	3.3	5.8	5.0	3.7	2.9	3.9	5.0	10.4	17.0	9.3	5.3	5.1	5.4	6.1	5.9	5.9
	UBAR	3.0	2.9	2.9	3.0	2.9	3.3	4.7	4.6	5.5	4.5	3.7	4.0	3.9	3.5	3.7	3.3
	SY AV.	D	D	E	D	D	E	E	D	E	D	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
0600-0900	PROB(%)	3.1	6.4	4.8	2.9	3.1	3.1	5.5	12.2	16.2	6.1	2.3	3.7	5.0	6.7	9.7	9.3
	UBAR	3.0	3.1	3.0	3.1	3.3	3.6	4.6	4.9	5.6	4.7	3.3	4.0	5.0	3.3	3.1	3.3
	SY AV.	A	B	B	C	C	D	D	D	D	D	C	D	D	C	C	B
	SZ AV.	A	B	B	C	C	D	D	D	D	D	C	D	D	D	C	B
0900-1200	PROB(%)	4.6	8.3	8.3	7.6	7.0	4.6	7.3	12.9	12.3	2.3	1.0	1.9	3.4	3.9	7.0	7.6
	UBAR	3.8	3.7	3.8	4.2	4.1	4.1	4.9	6.0	6.7	6.5	4.2	5.6	6.2	4.7	3.7	4.1
	SY AV.	A	A	B	C	C	C	C	C	D	C	C	C	C	B	B	A
	SZ AV.	A	A	B	C	C	C	C	C	D	C	C	C	C	B	B	A
1200-1500	PROB(%)	1.3	2.9	5.7	20.6	14.6	7.3	10.6	14.0	9.5	1.2	0.4	1.2	3.1	3.2	2.4	2.2
	UBAR	3.9	4.1	4.7	5.6	5.5	5.0	6.1	6.7	7.7	7.2	5.3	6.3	7.7	6.8	5.8	4.9
	SY AV.	A	B	C	D	D	C	D	C	D	C	B	C	C	C	B	A
	SZ AV.	A	B	C	D	D	C	D	C	D	C	B	C	C	C	B	A
1500-1800	PROB(%)	0.3	1.6	6.2	21.4	15.7	10.3	12.3	15.0	8.7	1.2	0.5	1.3	2.5	1.5	0.7	0.8
	UBAR	3.3	4.5	5.7	5.9	5.5	5.2	5.9	6.6	7.6	6.5	4.9	7.9	8.2	8.0	5.8	5.1
	SY AV.	A	C	D	D	D	D	D	D	D	D	C	D	D	D	C	B
	SZ AV.	A	C	D	D	D	D	D	D	D	D	C	D	D	D	C	B
1800-2100	PROB(%)	0.4	4.6	13.1	17.1	9.7	8.8	10.5	15.4	10.4	3.3	0.7	1.2	1.9	1.2	0.8	0.9
	UBAR	3.6	4.0	4.5	4.4	3.7	4.0	4.6	5.5	6.1	5.0	4.9	6.1	6.8	6.0	5.1	4.5
	SY AV.	A	D	D	D	D	D	D	D	D	D	D	E	E	D	D	C
	SZ AV.	E	E	E	E	E	E	E	D	D	D	D	E	E	E	E	E
2100-2400	PROB(%)	2.0	9.7	11.0	9.0	6.8	6.1	6.2	13.3	13.7	6.4	2.9	2.6	2.2	1.8	3.4	2.7
	UBAR	2.8	3.5	3.5	3.4	3.1	3.3	4.4	4.7	5.1	4.4	4.1	4.7	4.6	4.5	3.9	3.9
	SY AV.	C	D	E	D	D	D	D	D	D	D	D	E	D	D	E	D
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 49m SEASON : AUTUMN HEIGHT : 49 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	2.4	3.9	2.3	1.5	1.6	3.1	4.1	7.5	13.4	11.1	9.1	11.7	7.6	6.9	7.2	6.4
	UBAR	3.3	3.0	3.3	2.9	2.5	3.8	4.1	4.6	4.7	4.5	4.3	5.1	4.4	3.8	3.5	3.7
	SY AV.	C	D	D	D	D	D	D	D	E	E	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	F	E	E	E	E
0300-0600	PROB(%)	2.3	2.3	1.4	1.1	1.3	2.6	3.5	6.0	15.0	12.2	11.0	14.7	8.9	7.3	5.9	4.6
	UBAR	3.2	3.1	3.1	3.5	3.5	4.0	4.6	4.3	4.6	4.5	4.6	4.9	4.2	3.7	3.8	3.8
	SY AV.	D	D	D	D	D	E	D	E	E	E	E	F	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E
0600-0900	PROB(%)	1.5	1.4	0.9	1.5	1.6	2.8	3.1	7.3	14.3	11.4	8.6	14.5	10.4	8.3	8.0	4.5
	UBAR	3.0	3.0	3.0	2.9	2.9	4.3	4.6	4.1	4.7	4.5	4.0	4.7	4.1	3.7	3.3	3.5
	SY AV.	C	B	C	C	D	D	D	D	D	D	E	E	E	D	D	C
	SZ AV.	D	C	C	D	D	D	D	D	D	E	E	E	E	D	D	D
0900-1200	PROB(%)	2.5	2.9	2.8	2.6	2.4	3.6	7.1	11.9	12.2	5.5	2.5	6.1	7.7	9.1	11.7	9.5
	UBAR	3.4	3.3	3.4	3.6	2.9	4.6	4.4	4.9	5.6	5.6	4.2	5.0	5.0	3.9	3.3	3.6
	SY AV.	A	A	B	C	C	C	C	C	C	C	C	D	D	C	C	B
	SZ AV.	A	A	B	C	C	C	C	C	C	C	C	D	D	C	C	B
1200-1500	PROB(%)	2.8	5.7	5.3	7.8	5.2	6.3	10.3	14.0	10.8	3.0	1.7	3.5	5.4	4.9	6.2	7.1
	UBAR	3.1	3.3	3.3	4.1	3.8	4.4	5.1	5.7	6.5	6.3	4.8	5.7	6.0	4.7	3.9	3.6
	SY AV.	A	A	B	C	C	C	C	C	D	C	C	C	C	C	B	A
	SZ AV.	A	A	B	C	C	C	C	C	D	C	C	C	C	C	B	A
1500-1800	PROB(%)	1.1	3.2	6.2	14.6	10.6	8.2	12.1	14.4	11.1	3.4	1.6	2.8	3.6	2.0	2.1	3.0
	UBAR	2.8	3.2	4.3	4.5	4.0	4.4	5.0	5.5	5.9	5.9	5.3	6.0	6.8	6.3	4.7	4.2
	SY AV.	B	C	D	E	D	D	D	D	D	D	D	D	D	D	D	C
	SZ AV.	D	D	D	E	E	D	D	D	D	D	D	D	E	D	D	D
1800-2100	PROB(%)	0.8	6.1	10.6	10.9	7.2	6.8	8.9	12.5	13.3	6.3	3.3	2.8	3.9	3.0	1.7	1.8
	UBAR	3.7	3.6	3.9	3.6	3.1	3.6	4.0	4.5	5.0	4.8	5.1	5.6	5.4	5.6	4.2	4.8
	SY AV.	C	E	E	E	E	E	E	E	E	D	D	E	E	E	E	D
	SZ AV.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2100-2400	PROB(%)	4.5	7.1	5.3	2.9	3.0	4.7	5.4	8.6	12.5	9.5	6.3	7.7	6.2	5.3	4.8	6.2
	UBAR	3.2	3.1	3.5	2.7	2.6	3.3	3.7	4.2	4.9	4.4	4.3	4.9	4.6	4.2	3.2	3.7
	SY AV.	D	D	E	D	E	E	D	D	E	E	E	E	E	E	D	D
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 49m SEASON : WINTER HEIGHT : 49 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	1.9	2.5	0.8	0.9	1.0	1.1	1.0	2.8	6.7	7.1	11.6	20.9	14.5	10.8	8.7	7.8
	UBAR	4.2	4.0	3.1	3.2	3.6	3.5	3.0	3.7	4.8	4.5	5.2	6.2	5.5	5.1	4.8	4.8
	SY AV.	D	E	B	D	D	D	D	D	E	E	E	E	E	E	E	D
	SZ AV.	E	F	E	E	E	E	E	E	E	E	E	F	E	E	E	E
0300-0600	PROB(%)	2.1	2.5	0.9	0.6	0.8	0.7	0.8	2.4	6.0	6.9	14.8	22.7	13.1	9.3	9.1	7.3
	UBAR	3.6	3.8	3.4	4.8	4.2	3.7	3.6	3.9	4.8	4.5	5.0	6.1	5.4	5.2	4.8	4.4
	SY AV.	D	D	B	C	D	C	C	D	E	E	E	E	E	E	E	D
	SZ AV.	E	F	E	D	E	E	E	E	E	E	E	F	E	E	E	E
0600-0900	PROB(%)	1.7	2.7	1.0	0.5	0.6	0.9	0.7	2.3	5.5	6.6	12.4	25.2	12.2	10.1	9.1	8.6
	UBAR	3.6	3.6	3.4	3.5	4.3	3.9	4.3	4.3	4.5	4.3	4.9	5.6	5.2	5.0	4.6	4.5
	SY AV.	C	C	B	C	D	D	C	D	E	D	E	E	E	E	D	D
	SZ AV.	E	E	D	D	E	E	D	D	E	E	E	E	E	E	E	E
0900-1200	PROB(%)	1.9	2.4	1.9	0.7	1.4	1.4	1.3	3.6	5.9	6.0	5.1	15.1	16.0	13.7	14.5	9.1
	UBAR	3.6	3.4	3.3	2.4	3.0	3.9	3.1	3.8	4.8	5.4	4.7	5.6	5.9	4.9	4.0	4.0
	SY AV.	A	B	B	B	C	C	B	C	C	C	C	D	D	D	C	B
	SZ AV.	A	B	B	B	C	C	B	C	C	C	C	D	D	D	C	B
1200-1500	PROB(%)	2.6	3.9	2.6	1.8	2.1	2.6	3.8	6.3	7.1	4.9	3.7	9.2	14.1	12.3	13.8	9.2
	UBAR	3.4	3.5	3.4	3.3	3.1	3.9	3.9	4.1	5.5	6.2	5.1	6.0	7.1	6.1	5.0	3.9
	SY AV.	B	B	B	C	C	C	C	C	C	C	C	C	D	C	C	B
	SZ AV.	B	B	B	C	C	C	C	C	C	C	C	C	D	C	C	B
1500-1800	PROB(%)	3.2	3.9	2.8	5.3	4.8	4.4	5.7	8.1	7.5	4.6	4.7	8.7	12.2	8.1	8.2	7.7
	UBAR	3.4	3.2	3.3	3.5	3.5	3.3	3.7	4.3	5.0	5.3	5.4	6.1	6.7	7.0	5.6	4.1
	SY AV.	C	C	C	D	E	D	D	D	D	D	D	D	D	D	D	D
	SZ AV.	E	D	D	E	E	D	D	D	D	D	D	E	E	E	D	D
1800-2100	PROB(%)	2.3	4.3	4.2	4.5	3.3	3.0	4.0	5.5	8.8	6.3	6.8	11.9	12.3	9.2	7.3	6.4
	UBAR	4.0	3.6	3.4	3.3	3.1	3.8	3.4	4.1	4.6	4.8	5.0	6.0	6.0	6.0	5.4	5.3
	SY AV.	D	D	E	E	E	E	E	E	E	D	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2100-2400	PROB(%)	3.1	3.9	1.6	1.4	1.2	1.7	1.7	3.0	7.3	7.8	10.9	15.6	12.5	10.1	9.4	8.8
	UBAR	4.0	3.5	2.9	3.2	3.1	3.7	3.1	4.1	4.9	4.9	5.3	6.2	5.8	5.2	4.9	5.1
	SY AV.	D	D	D	D	D	D	E	E	E	E	E	E	E	E	E	E
	SZ AV.	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 49m SEASON : SPRING HEIGHT : 49 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	3.7	5.8	3.3	2.8	2.3	2.1	2.7	4.7	8.2	8.6	9.0	10.4	9.8	9.0	8.8	8.8
	UBAR	3.6	3.3	3.3	2.9	2.7	3.0	3.8	4.6	4.6	4.4	4.4	5.1	5.1	4.9	4.0	4.1
	SY AV.	D	D	D	D	D	D	D	D	E	D	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
0300-0600	PROB(%)	3.0	5.1	1.6	2.0	2.1	1.6	2.1	4.7	8.9	9.1	8.1	12.8	9.5	9.7	10.2	9.5
	UBAR	3.3	3.2	2.7	3.1	2.9	3.1	3.3	4.2	4.6	4.5	4.5	5.5	4.5	4.2	4.2	3.8
	SY AV.	C	D	C	D	D	D	D	E	E	E	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
0600-0900	PROB(%)	2.0	4.4	2.9	2.4	2.1	1.7	2.6	5.4	8.7	6.9	6.4	9.5	9.6	10.9	14.0	10.6
	UBAR	3.4	3.4	3.1	3.0	2.8	2.8	3.5	4.4	5.5	4.6	4.4	5.5	5.3	4.5	3.6	3.7
	SY AV.	B	B	B	C	C	C	C	D	D	D	D	D	D	D	C	B
	SZ AV.	B	B	B	C	C	C	C	D	D	D	D	D	D	D	C	C
0900-1200	PROB(%)	2.8	6.2	6.0	5.3	3.5	2.8	5.5	7.7	8.6	3.6	2.8	5.2	8.8	8.6	12.8	9.9
	UBAR	3.8	4.1	3.9	3.6	3.5	3.6	4.6	5.4	6.6	6.4	5.7	5.9	6.8	6.0	4.8	4.4
	SY AV.	A	A	B	C	C	C	C	C	C	C	C	C	C	C	B	B
	SZ AV.	A	A	B	C	C	C	C	C	C	C	C	C	C	C	B	B
1200-1500	PROB(%)	2.0	3.0	5.2	14.3	7.6	6.6	8.3	9.5	7.4	1.9	1.2	4.4	8.7	7.0	7.6	5.5
	UBAR	4.2	4.3	4.4	5.3	5.0	4.7	5.4	6.7	7.4	7.7	5.7	7.0	8.0	7.4	6.2	5.2
	SY AV.	A	A	B	D	D	C	C	C	D	C	B	C	C	C	C	B
	SZ AV.	A	A	B	D	D	C	C	C	D	C	B	C	C	C	C	B
1500-1800	PROB(%)	0.6	1.6	6.6	17.6	9.6	8.8	8.5	10.6	8.7	1.9	1.0	4.9	8.3	4.9	3.9	2.4
	UBAR	3.1	4.0	5.2	5.3	4.7	4.8	5.2	6.6	7.2	7.0	7.3	7.3	8.1	8.6	7.5	5.6
	SY AV.	A	C	D	D	D	D	D	D	D	D	C	D	D	D	D	C
	SZ AV.	C	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D
1800-2100	PROB(%)	0.8	6.0	12.2	9.9	5.8	5.4	7.1	9.5	10.3	4.2	3.4	5.3	7.5	5.6	3.7	3.1
	UBAR	3.2	4.1	4.2	3.9	3.3	3.3	3.9	4.9	5.3	4.6	5.0	5.9	6.6	6.6	5.5	5.2
	SY AV.	B	D	E	E	D	D	E	D	D	D	D	E	E	E	E	D
	SZ AV.	E	E	E	E	E	E	E	D	D	D	E	E	E	E	E	E
2100-2400	PROB(%)	3.6	9.8	5.6	4.6	2.9	3.1	4.0	6.9	8.6	6.6	6.6	8.6	9.7	6.5	5.7	7.3
	UBAR	3.4	3.6	3.2	3.2	2.7	3.0	3.5	4.4	4.6	4.4	4.4	5.0	5.9	5.8	4.6	4.4
	SY AV.	C	D	E	D	D	D	E	D	D	D	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 49m ALL SEASONS COMBINED HEIGHT : 49 M.

TIME (EST.)	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0000-0300	PROB(%)	2.8	4.9	3.1	2.5	2.3	2.8	3.1	6.3	10.8	8.6	8.7	12.1	9.2	8.0	7.7	7.1
	UBAR	3.5	3.3	3.3	3.1	2.8	3.5	3.9	4.5	4.9	4.4	4.6	5.5	5.1	4.6	4.0	4.1
	SY AV.	D	D	D	D	D	D	D	D	E	E	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
0300-0600	PROB(%)	2.7	3.9	2.1	1.8	1.7	2.1	2.8	5.7	11.5	9.3	9.9	14.2	9.4	8.2	7.9	6.9
	UBAR	3.3	3.2	2.9	3.3	3.1	3.5	4.3	4.4	4.9	4.5	4.7	5.5	4.7	4.3	4.2	3.9
	SY AV.	D	D	D	D	D	D	D	D	E	E	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	F	E	E	E	E
0600-0900	PROB(%)	2.0	3.7	2.3	1.8	1.8	2.1	2.9	6.6	10.9	7.8	7.6	13.5	9.5	9.1	10.3	8.2
	UBAR	3.2	3.3	3.1	3.1	3.2	3.7	4.3	4.5	5.2	4.5	4.4	5.3	4.9	4.2	3.7	3.8
	SY AV.	B	B	B	C	D	D	D	D	D	D	E	E	E	D	D	C
	SZ AV.	C	C	C	D	D	D	D	D	D	D	E	E	E	D	D	C
0900-1200	PROB(%)	2.9	4.8	4.6	3.9	3.4	3.1	5.2	8.9	9.6	4.4	2.9	7.3	9.2	9.0	11.7	9.1
	UBAR	3.7	3.7	3.7	3.8	3.6	4.1	4.5	5.2	6.0	5.8	4.8	5.5	6.0	4.9	4.0	4.0
	SY AV.	A	A	B	C	C	C	C	C	C	C	C	D	D	C	C	B
	SZ AV.	A	A	B	C	C	C	C	C	C	C	C	D	D	C	C	B
1200-1500	PROB(%)	2.2	3.9	4.6	10.8	7.1	5.6	8.2	10.8	8.6	2.8	1.8	4.7	8.0	7.0	7.7	6.1
	UBAR	3.6	3.6	4.0	5.1	4.9	4.6	5.3	6.0	6.8	6.6	5.1	6.2	7.2	6.2	5.1	4.2
	SY AV.	A	A	B	D	D	C	C	C	D	C	C	C	C	C	C	B
	SZ AV.	A	A	B	D	D	C	C	C	D	C	C	C	C	C	C	B
1500-1800	PROB(%)	1.3	2.6	5.4	14.5	9.9	7.8	9.5	11.9	9.0	2.8	2.0	4.6	6.9	4.3	3.9	3.6
	UBAR	3.2	3.5	4.8	5.1	4.6	4.6	5.1	5.9	6.4	5.9	5.6	6.6	7.3	7.5	6.0	4.4
	SY AV.	C	C	D	D	D	D	D	D	D	D	D	D	D	D	D	C
	SZ AV.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
1800-2100	PROB(%)	1.1	5.3	9.9	10.4	6.4	5.9	7.5	10.5	10.7	5.1	3.7	5.5	6.6	4.9	3.5	3.1
	UBAR	3.8	3.8	4.1	3.9	3.3	3.7	4.1	4.9	5.2	4.8	5.0	5.9	6.2	6.1	5.3	5.2
	SY AV.	C	D	E	E	E	E	E	D	D	D	D	E	E	E	E	D
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
2100-2400	PROB(%)	3.4	7.6	5.7	4.3	3.3	3.8	4.2	7.7	10.3	7.6	6.8	8.9	7.9	6.1	5.9	6.4
	UBAR	3.4	3.4	3.4	3.2	2.9	3.3	3.8	4.5	4.9	4.5	4.8	5.5	5.5	5.1	4.3	4.4
	SY AV.	D	D	E	D	D	D	D	D	E	D	E	E	E	E	E	E
	SZ AV.	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

BEGINNING DATE : 50491 END DATE : 121196

NOTE : PROB(%) IS THE FREQUENCY OF OCCURRENCE OF A WIND DIRECTION IN THE TIME PERIOD.
UBAR IS THE AVERAGE WIND SPEED IN M/S.
SY AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Y ESTIMATES
SZ AV. IS THE AVERAGE PASQUILL STABILITY CATEGORY APPLICABLE TO SIGMA Z ESTIMATES.

BOTH SY AV. AND SZ AV. WERE DETERMINED USING THE MITCHELL AND TIMBRE (1979) METHOD

STATION : Lucas Heights 49m ALL TIMES COMBINED HEIGHT : 49 M.

SEASON	STATS.	DIRECTION N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
SUMMER	PROB(%)	2.3	5.9	7.6	10.9	8.1	6.2	7.8	13.1	12.9	4.7	2.2	2.7	3.5	3.7	4.4	4.3
	UBAR	3.3	3.4	4.0	4.8	4.4	4.2	5.1	5.5	6.0	4.8	3.9	4.7	5.5	4.5	3.7	3.7
	SY AV.	B	C	D	D	D	D	D	D	D	D	D	D	D	D	C	C
	SZ AV.	C	D	D	D	D	D	D	D	D	D	E	E	D	D	D	C
AUTUMN	PROB(%)	2.2	4.1	4.4	5.4	4.1	4.8	6.8	10.3	12.8	7.8	5.5	7.9	6.7	5.8	5.9	5.4
	UBAR	3.2	3.2	3.7	3.9	3.4	4.1	4.5	4.9	5.2	4.8	4.4	5.0	4.8	4.1	3.6	3.7
	SY AV.	C	C	D	D	D	D	D	D	D	D	E	E	E	D	D	C
	SZ AV.	D	D	D	D	D	D	D	D	D	E	E	E	E	D	D	D
WINTER	PROB(%)	2.3	3.3	2.0	2.0	1.9	2.0	2.4	4.3	6.8	6.3	8.8	16.2	13.4	10.5	10.0	8.1
	UBAR	3.7	3.6	3.3	3.4	3.3	3.7	3.5	4.1	4.9	4.9	5.1	6.0	5.9	5.5	4.8	4.5
	SY AV.	C	C	C	D	D	D	D	D	D	D	E	E	E	D	D	D
	SZ AV.	D	D	D	E	D	D	D	D	E	E	E	E	E	D	D	D
SPRING	PROB(%)	2.3	5.2	5.4	7.4	4.5	4.0	5.1	7.4	8.7	5.3	4.8	7.6	9.0	7.8	8.3	7.1
	UBAR	3.6	3.7	4.0	4.5	3.9	3.9	4.5	5.4	5.7	4.9	4.7	5.7	6.2	5.7	4.7	4.3
	SY AV.	C	C	D	D	D	D	D	D	D	D	D	E	D	D	D	C
	SZ AV.	D	D	D	D	D	D	D	D	D	D	E	E	D	D	D	D
COMBINED	PROB(%)	2.3	4.6	4.7	6.3	4.5	4.2	5.4	8.6	10.2	6.0	5.4	8.8	8.3	7.1	7.3	6.3
	UBAR	3.5	3.5	3.8	4.4	3.9	4.0	4.6	5.1	5.5	4.8	4.7	5.6	5.8	5.2	4.4	4.1
	SY AV.	C	C	D	D	D	D	D	D	D	D	E	E	D	D	D	C
	SZ AV.	D	D	D	D	D	D	D	D	D	D	E	E	E	D	D	D