Application of ion beam analysis and refined sample preparation techniques to the study of aeolian dust samples from north-west Australia

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Ion beam analysis (IBA) can provide extremely accurate data on the elemental composition of dust samples [1]. However, recent analysis of dust samples collected from SE Australia using a range of sample collectors have demonstrated that considerable uncertainty may exist in the interpretation of results because of uncertainties associated with the sample preparation methods [2]. This current study focuses on refining the methods used for preparing dust samples for analysis; it also considers probable source areas for entrained dust in order to minimise additional uncertainties which may be introduced when assumptions about sample composition are made during mathematical treatment of the IBA data.

The dust samples analysed were collected monthly over a three year period in "dust traps" located in the NW passage of dust over Australia. These dust traps are maintained as part of a collaborative project between CSIRO, BOM and ANU researchers looking at precipitation throughout all Australia. The dust samples were analysed using IBA at the ANSTO laboratories at Lucas Heights, and interpreted in conjunction with ion chemistry and stable isotope analysis carried out by CSIRO Land and Water at Adelaide [3]. This work has application to studies of aerosol climate forcing in Australia's NW [4], air quality and health [5], the aeolian transport of terrestrial and marine salt [6] and also has potential uses in mineral exploration.

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