NEWS

In Brief

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Report addresses future of geographic information science The greatest challenge for the future of geographic information science (GIScience) is producing the large numbers of scientists and technicians that are needed to build on past progress, according to a 27 June report from the U.S. National Research Council of the National Academies.

The report notes that GIScience and related technologies—such as geographic information systems, the global positioning system, and remote sensing—have become crucial to many areas of scientific research. However, the supply of GIScience professionals has not kept pace with the growing need for this type of data.

The committee that prepared the report made several recommendations to increase the future supply of scientists in this field. First, it found that GIScience needs a coherent and comprehensive research agenda. GIScience would also benefit from recognition as a distinct research specialty that would be funded primarily by the U.S. National Science Foundation, according to the report.

In addition, the committee recommended increased collaboration among academic disciplines, private companies, and government agencies in order to promote virtual networks of scientists and laboratories.

To meet future staffing needs, training in GIScience is needed in elementary through graduate-level education, according to the report. Academic institutions were encouraged to better respond to emerging scientific areas such as GIScience.

The report is available at http://newton.nap.edu/catalog/11019.html

—SARAH ZIELINSKI, Staff Writer

Academy seeks nominations for oceanography prize The U.S. National Academy of Sciences (NAS) is seeking nominations for the 2007 Alexander Agassiz Medal. The medal and $15,000 prize honors an original contribution to the science of oceanography.

Nominees are welcome from anywhere in the world, and NAS membership is not required to either submit a nomination or be nominated. Nominations are due 11 September 2006. Additional information, including a list of past nominees and instructions for submitting nominations, is available at http://www.nasonline.org/awards

MEETINGS

Developing an Event Stratigraphy for Australasian Climate Change

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The last glacial-interglacial transition in the Australasian region has been a focus of intense paleoclimate investigation for the past decade or so. This focus is due to the recognition of the southern midlatitudes as a key region to examine climate connections between the hemispheres during the late Pleistocene. That period, between 30,000 and 8000 years ago, was marked by extreme and rapid climatic change in the North Atlantic region. In particular, the Australasian region may be critical to examining the relative importance of atmospheric energy transfers versus deep ocean circulation effects.

In February 2006, 32 members of the Australasian Integration of Ice, Marine and Terrestrial records (INTIMATE) program attended a two-day workshop at the University of Auckland, in New Zealand.

Objectives and Details of the Workshop

The meeting examined and, where possible, integrated the paleoclimate proxy records from Australia and New Zealand. From these discussions, a draft climate event stratigraphy for Australasia and the adjacent Southern Ocean region is being compiled and should be complete for the August 2007 International Union for Quaternary Research (INQUA) meeting. The workshop also dealt with a number of fundamental issues relating to data handling, chronological techniques, benchmark records, and an assessment of future needs to improve the data set of paleorecords.

Chronological issues are paramount in this project. Many of the possible climate events such as the Antarctic Cold Reversal (ACR) and Younger Dryas (YD) are temporally confined, and the consistency in age calculation and reportage is critical when comparing different records. Indeed, one of the first items discussed was the use of the term Last Glacial Maximum (LGM). It has become common in Australasia to use the term LGM in the broad sense: It is often defined as covering a period as wide as 30,000–17,000 years [e.g., *Suggate and Almond*, 2005]. The group expressed concerns that this definition might lead to confusion in the literature, and that for the Australasian INTIMATE group, the internationally recognized ice volume definition of the LGM should be used, i.e., 21,000 ± 3000 years.

The group agreed to report all ages using the international radiocarbon calibration 2004 (IntCal04) [*Reimer et al.*, 2002] to 26,000 calendar years before present (B.P.). There is no internationally agreed calibration curve beyond 26,000 calendar years B.P., but the need was recognized to recommend a common radiocarbon calibration procedure so that ages could be directly compared. The high-resolution record from the Cariaco Basin off Venezuela [*Hughen et al.*, 2004a] was selected by the Australasian INTIMATE group for the period 26,000–30,000 calendar years B.P. until an international consensus emerges. It was therefore felt to be critical that conventional radiocarbon ages, their standard deviations, and lab numbers must be reported. Samples from marine environ-ments should use the Marine 04 calibration to correct for the marine reservoir effect in radiocarbon samples. [*Hughen et al.*, 2004b]. All calibrated radiocarbon age errors should be reported to two standard deviations. An interhemispheric radiocarbon offset of 40 ± 13 years was also recommended [*Hogg et al.*, 2002].

Tephras, volcanic air fall material, are a critical correlative and dating tool in the Australasian INTIMATE project, particularly in New Zealand. The importance of accurate geochemical fingerprinting was highlighted, and the age of the North Island Kawakawa tephra, which fell from the Taupo volcano was accepted as approximately 26,000 years B.P. [*Wilson et al.*, 1988]. The radiocarbon age of this key marker tephra has come under repeated scrutiny over the past few years because of discrepancies with other dating tools [e.g., *Almond et al.*, 2006]. A summary of the best chronological estimates for key marker tephras in our time range has been submitted to *Quaternary Science Reviews*.

The establishment of a benchmark ice core climate change record was also discussed, in a fashion similar to the North Atlantic INTIMATE project, which developed an event stratigraphy linked to oxygen-18 ($\delta^{18}O$) in the Greenland Ice Core Project (GRIP) ice core record [e.g., *Walker et al.*, 1999]. It was unanimously agreed that the selection of Greenland cores was not the appropriate path to take. Instead, focus centered on the applicability of an Antarctic ice core. With the appreciation that Antarctic ice cores break into what may be described as 'coastal' and 'continental' records, agreement was reached to examine candidates from each. The core chronologies are tied to

Greenland via atmospheric gas content [e.g., *Blunier and Brook*, 2001].

The continental records in Antarctica are of better resolution for the 30,000–15,000 year period, while coastal records provide the promise of higher resolution for the 15,000–8000 year period and the possibility of better coherence of climate signals with the southern midlatitudes. The group noted that further discussion was needed about which ice cores should be used, but they agreed in principle to a selection of coastal and continental ice cores. The group provisionally recommended using European Project for Ice Coring in Antarctica (EPICA), Dome C record (continental), and Law Dome (coastal) for comparison. The Byrd record (coastal) is also likely to be relevant.

Comparison of Regional and Interhemispheric Records

Among the key problems faced by the Australasian INTIMATE group is the cohesive integration of the tropical records from central and tropical Australia into the temperate and high-latitude records of the Southern Ocean, New Zealand, and southern Australia. The workshop broke into groups, seeking to compare terrestrial sedimentary records, glacial records, high-precision records (corals, speleothems, tree rings), and terrestrial bioproxies, such as pollen, beetles, and chironomids.

It was clear that there was remarkable consistency between the temperate latitude records of New Zealand and southern Australia. Many of these changes were strikingly similar to those recorded in the Antarctic ice core records of the Southern Ocean region. This will form the basis of an integrated paper, to be submitted to the *Journal of Quaternary Science*, by the Australasian INTIMATE members in the near future.

However, the paucity of sites in central and tropical Australia is exacerbated by uncertainties in chronology and quantified climatic reconstructions. As a result, it is unclear whether similar changes were manifested across the entire Australasian region. This will form a major research front by the group over the next two years.

Prerequisites for robust testing of hypotheses of synchronous/asynchronous interhemispheric climate change through this period are the development of more refined and robust geochronological data sets coupled with quantitative reconstructions of former climatic conditions across the region. Regardless of the above, significant changes are already evident in the Australasian records to indicate that a North Atlantic template is inappropriate to describe climatic changes in this region, at least at the scale of millennial events.

INTIMATE (a core program of the INQUA Palaeoclimate Commission) was launched at the XIV INQUA Congress held in Berlin, Germany in 1995. Intimate's primary objective is the synthesis of records of the Last Termination from the North Atlantic region. The project was established to encourage collaboration between members of the ice core, marine, and terrestrial communities in order to synthesize the large number of high-resolution stratigraphical records of the Last Termination available from the North Atlantic. An Australasian INTIMATE group was initiated at the XVI INQUA Congress in Reno in 2003, where the period of interest was widened to 30,000–8,000 years ago. The first phase of the Australasian working group's activities focused on compiling regional high-resolution climate proxy records for Australia and New Zealand, and this activity has resulted in the production of several papers submitted to *Journal of Quaternary Science* and two national posters [e.g., *Barrell et al.*, 2005].

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