Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06951, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06951
EGU General Assembly 2008

Comparison of orbital-scale land and ocean records from the Australian region: value for climate reconstruction

P. Kershaw (1), K. Sniderman (1) S. van der Kaars (1,2) and B. Wagstaff (1)

(1) School of Geography and Environmental Science, Monash University, Melbourne, Australia, (2) Now at Albrecht-von-Haller-Institute for Plant Sciences, University of Gottingen, Germany (peter.kershaw@arts.monash.edu.au / Fax: +61399052948 / Phone: +61399052927)

Close correlations, at least on orbital scales and in the late Quaternary, have been established between climate signals for the North Atlantic region, most conspicuously from comparison of marine indicators and pollen from marine sediment cores off the Iberian Peninsula of southern Europe, although differences in detail between marine and continental stratigraphies have been detected. Similar correlations are evident in the late Quaternary of the southern part of Australia indicating the dominant control of North Atlantic ice volume forcing on the climate of these high to mid latitudes. However, the degree of synchroneity between marine and terrestrial records decreases both back in time and within lower latitudes.

Early Pleistocene terrestrial pollen records from volcanic crater lakes in south-eastern Australia show clear dominance of regional precessional forcing with little indication of the obliquity signal that is most conspicuous in adjacent marine records. It is proposed that the marine isotope record results from the suggested cancellation of northern and southern precessional influences under existing lower ice volumes in both polar areas. Although no orbital frequency analyses have been undertaken on more recent records, the indication is that there was a switch to global climate control with the increase in glacial-interglacial amplitude around the Mid Pleistocene transition.

In northern Australia, within the late Quaternary, both terrestrial and some marine

climate proxies tend to deviate from the global isotope glacial-interglacial pattern and this is consistent with the dominance of precession on monsoonal systems. However, there is also a great deal of regional variation and, even proxies from the same or nearby cores, give different climate signals. In addition, there is evidence, from pollen in particular, of stepwise changes to more arid conditions over the last 300,000 years. Explanations are difficult but could include a complex and changing geography with associated altered oceanic and atmospheric circulation, less intense monsoon systems than in other parts of the tropics, responses to changing precessional amplitude and, in more recent times, vegetation alteration due to Aboriginal landscape burning.

Overall, it is important to have both marine and terrestrial records from ocean cores to provide insights into atmospheric and oceanic circulation systems but their climatic signals, at least in the Australian region, must be treated with caution.