



Abstract Details

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Category: Ocean and Atmospheres

Paper ID: 57-OOA-A2039

Title: (OA18) High latitude and low latitude air mass influences on palaeohydrology of southeastern Australia.

Abstract: Australian climate is characterised by the relative importance of high latitude or low latitude weather patterns. Much of the hydrology of this sub-tropical continent is sensitive to the intrusion of tropical air masses into the south, often related to ENSO fluctuations. Fluctuations in the strength of tropical (monsoonal) weather systems have been used to explain the pattern of palaeohydrologic change in northern Australia and the Lake Eyre Basin and has been put forward as part of the explanation of the apparent differences between the Holocene and Last Interglacial. However, the impact on the complex palaeohydrological record of southern Australia remains unclear and some proposed circulation reconstructions would contradict those explanations. At issue is the question of the response of circulation patterns over Australia to Quaternary glaciations: did air masses move latitudinally in response to global glaciation and in what direction? In much of the discussion of Australian Quaternary climates there is an unrecognised conflict between explanations involving air masses with temperature and humidity much the same as the Holocene changing only in location and those which also allow intrinsic change in air mass properties. To test the response of the circulation to global changes, aeolian evidence of wind patterns is reviewed, including dune orientation and dust transport pathways. In addition new work is introduced from a sensitive lunette dune from an area of southeastern Australia presently undergoing seasonal reversal of wind direction. At this lake, Old Harbour, two lunettes (one dating to MIS5 and one dating to MIS3) have been studied. Both were formed as the result of very similar hydrological conditions, but the older lunette was formed by deflation of the lake bed by easterly winds (as occur in summer today), while the younger lunette was formed by deflation of the lake bed by westerly winds (a winter time weather pattern today). This sensitive area shows that in MIS5 the tropical circulation system penetrated further south than during the Holocene and retreated north during MIS3. Northward movement of the westerly system is supported by other dated lunette dunes and linear sand dunes, continuing into the LGM. This simple response of the circulation system to global climates mirrors the pattern observed in the northern part of the PEPPII transect. Nevertheless, greater penetration of the sub-tropical easterly winds was not accompanied by higher water levels and it appears that simple latitudinal change may not be enough to account for the observed palaeohydrological record.

Presentation Mode: Oral

Keywords:

Status: Pending.

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