



Equatorial moisture transport in the Asia-Australia region during the Last Glacial Maximum - evidence of an altered weathering regime in northern Australia

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The Last Glacial Maximum (LGM), about 20,000 years ago, was on average cooler and also drier across the globe. Northern Australia, however, has few appropriate sites from which to gain proxy evidence of the climatic conditions during the culmination of the last glacial. The sediment blown off the continent and deposited in marine cores can begin to provide such evidence. In Australia there are two preferred off-shore dust paths – one of which is to the north-west. Sediment cores from the Timor Trough show higher elemental ratios of Mg/Al, K/Al, and Ti/Al and the presence of an inorganic nitrogen fraction during the late glacial compared to the Holocene (the last 10,000 years). These changes indicate both greater amounts of material off the continent during glacial times and a weathering regime more common in arid, cold climates at the source region of the sediment. To complement the proxy evidence, the results from GCMs forced with LGM sea surface temperatures, ice-sheets and lower atmospheric CO₂, were examined. They show cold and dry conditions across northern Australia and stronger off-shore winds in the north-west, conditions that match the climate reconstructions based on the sediment in the marine cores. Cross-equatorial moisture transport during this time does not extend as far south as in the present day, contributing to these dry conditions. However, further north there was limited change in that transport. The LGM sea surface temperature grids used to force these GCMs were based upon temperature reconstructions from cores such as the ones examined here. The fact that the proxy reconstructions of the continental climate from the marine cores matches the GCM simulations based on the surface temperatures reconstructed from such cores provides a consistent picture of the climate of northern Australia dur-

ing glacial times. This provides evidence where there are few appropriate sites for direct proxy evidence to be obtained.