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A subtropical Pacific view of the Mid-Pleistocene Transition

Tom Russon (1), Mary Elliot (1), Aleksey Sadekov (1), Guy Cabioch (2), and Thierry Corrège (3)

(1) School of GeoSciences, University of Edinburgh, UK (tom.russon@ed.ac.uk), (2) 2. IPSL / LOCEAN, UMR 7159 IRD/CNRS/UPMC/MNHN, Centre IRD d'Ile de France, 32 Avenue Henri Varagnat, 93143 Bondy CEDEX, France, (3) 3. Université de Bordeaux, UMR 5805 EPOC, Avenue des Facultés, F-33405 Talence, France

The evolution of the low-latitude ocean/atmosphere system during the shift in dominant modes of global glacial/interglacial climate variability associated with the Mid-Pleistocene Transition (MPT) is not well constrained. Here, we present reconstructions of subtropical southwest Pacific climate variability over the Pleistocene, as derived from coupled planktic foraminiferal δ^{18}O-Mg/Ca measurements taken from a southern Coral Sea sediment core. A clear shift from $\sim$40kyr to $\sim$100kyr modes of reconstructed glacial/interglacial Sea Surface Temperature (SST) variability is seen over the MPT and these fluctuations are shown to have remained coherent with the orbital obliquity cycle across the transition. The likely origin of this strong obliquity signal in subtropical southwest Pacific SST is shown to be the southern high-latitudes and comparison with existing SST reconstructions from the equatorial Pacific is consistent with the communication of the signal occurring principally by greenhouse gas forcing. In contrast to the SST reconstruction, regional hydrological cycle variability (based on the calculated local component of $\delta^{18}O_{sw}$ change) shows only very limited coherence with the obliquity cycle and a stronger relationship with the precession cycle. The decoupling of the SST and hydrological cycle responses over the MPT allows constraints to be placed on the role played by the coupled low-latitude ocean/atmosphere system in the evolving sensitivity of global climate to orbital forcing across the transition.