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**Decoupled Southern and Northern Hemisphere processes controlled by the Maritime continent: insights from a continuous Pliocene NW Australian shelf borehole (and decades of previous Ocean Drilling)**

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International Ocean Discovery Program (IODP) Site U1463 was recently drilled on the NW Australian continental shelf (Northern Carnarvon Basin) in 145 m of water. Pliocene paleowater depth was much greater than modern. Benthic foraminifera indicate Pliocene waters were at least 250m deep and may have reached up to 1000m water depths. Thus, Site U1463 is an excellent location to evaluate continental and marine sediments. Shipboard analyses, including gamma ray logs, of the hemi-pelagic, homogenous carbonate mudstones allow for development of a continuous Pliocene continental record of humidity and aridity that we interpret in the context of regional tectonic and oceanographic events.

Site U1463 is an important archive of continental change and serves to reconcile patchy and sometimes conflicting records of Pliocene continental climate in Australia. For example, our record of early Pliocene fluvial rejuvenation differs from records that suggest Western Australia fluvial activity terminated in the middle Miocene. Today, southern and northern Australia operate under very different climate conditions. Our continuous record provides a framework to interpret the existing climate records, most of which come from southwest and southeast (e.g., Murray Basin) Australia.

We show the major NW Australian climate intervals were driven by progressive changes in the Maritime Continent (MC), influencing both Indonesian Throughflow (ITF) and Indian Ocean circulation, and closely associated with regional oceanographic events, in particular the Western Pacific Warm Pool (WPWP). Constriction of the MC and cooling in the WPWP led to a reduction in humidity on the Australian continent, culminating in the onset of aridity at 2.2 Ma, well after northern hemisphere ice volume increases. The close relationship between Australian climate and Indian Ocean circulation was established through comparison to previous DSDP, ODP and IODP records (Sites 214, 709, 763<sup>1</sup>, among others), and suggests the Indian Ocean influences Australia, South Asia, and Africa, while the Pacific and Atlantic Oceans are more directly tied to northern hemisphere glaciation. An Atlantic teleconnection is suggested by the similar timing of surface ocean cooling and diatom assemblages off Namibia at Site 1084<sup>1,2</sup>. Physical connections between oceans (ITF, WPWP, Agulhas Current) profoundly influence climate contributions and are thus critical points of evaluation. Continued study of previously drilled

(e.g., Leg 175) and planned 2016-2017 IODP drilling will advance our understanding of this enigmatic system.

*References:*

- [1] Karas C et al (2011) *Paleoceanography* 26(3): PA2217
- [2] Marlowe J et al (2000) *Science* 290: 2288-2291

