Indonesian Throughflow variability during the Mid Pleistocene Transition (IODP 363 Site U1483)

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The Indonesian Throughflow (ITF) is crucial in controlling the exchange of heat between the Pacific and Indian Oceans. The heat transported by the ITF is related to the Asian-Australian Monsoon dynamics because the strength of the warm surface flow and cool thermocline is controlled by the seasonal reversal of monsoonal winds (Gordon, 2005). Recent studies showed that changes in sea-level also influence the ITF because most of the seas feeding the ITF are very shallow. The Mid Pleistocene Transition between 1400 and 600 ka represents a major shift in global climate, as it was marked by a change from ~41 to ~100 kyr glacial/interglacial periodicity, resulting in higher amplitude sea-level variations and intensified glacial cooling. Reconstruction of ITF variability during the MPT has the potential to clarify the impact of glacio-eustatic sea-level and temperature changes affected the monsoonal climate and hydrology of Northwestern Australia.

The International Discovery Program (IODP) Expedition 363 retrieved at Site U1483 (13°5.24′S, 121° 48.25′E) drilled in 1733 m water depth on the Scott Plateau, off Northwestern Australia, an extended, continuous hemipelagic sediment succession spanning the past two million years. We analyzed radiolarian assemblages at this site to reconstruct the evolution of sea surface temperature (SST) and primary productivity during the MPT. We also combined radiolarians accumulation rates and elemental ratios of Si/Ti data obtained from X-Ray Fluorescence core scanning to monitor changes in siliceous productivity. Preliminary results suggest a drastic and abrupt decrease in local marine productivity at ~1000 ka. Interestingly this decrease occurred just before the first intense glaciation of the MPT. Thus, it is probable that significant changes related to both sea-level variation and Asian-Australian Monsoon dynamics occurred, which highly influenced the ITF.

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