



Inter-ocean gateway flows during the present and last interglacial periods

M. Prange (1,2), V. Varma (2), M. Schulz (1,2)

(1) MARUM - Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany (mprange@marum.de),

(2) Faculty of Geosciences, University of Bremen, Bremen, Germany

Inter-basin gateways regulate the heat and freshwater budgets of the oceans and act as an important controller of the global overturning circulation. Here, we analyze the temporal evolution of inter-ocean water transports through the Drake Passage/Malvinas Current, the Agulhas System and the Indonesian straits in transient climate simulations of the present and the last interglacial. The orbital-forced simulations were carried out using the Community Climate System Model version 3 (CCSM3) and cover the time intervals 9-2 ka and 130-115 ka before present. For both interglacials, the simulated long-term trends exhibit increasing volume fluxes through all three gateways, although these trends are much larger during the last interglacial. The effect of intensifying gateway flows on heat and freshwater fluxes is analyzed and implications for the large-scale ocean hydrography and circulation are discussed. A common forcing factor for the trends in Drake Passage flow and Agulhas leakage could be identified, namely a gradual southward shift of the Southern Hemisphere Westerlies during both interglacials. Results from a model-intercomparison of Holocene transient simulations reveal that the gradual southward movement of the wind system is a robust feature in full- and intermediate-complexity coupled climate models.