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Dynamics of deep and intermediate water circulation in the South Pacific Ocean during Marine Isotope Stage 11 and Termination V

LENA JEBASINSKI[1], JULIA GOTTSCHALK[2], OLIVIA ZÖLLER[1] AND EXPEDITION 383 SCIENCE PARTY[3]

[1]Kiel University
[2]Institute of Geosciences, Kiel University
[3]International Ocean Drilling Program, Texas A&M University
Presenting Author: lena.jebasinski@ifg.uni-kiel.de

Marine Isotope Stage (MIS) 11 (426-396 kyr before present) was a remarkably long and warmer-than-present climate interval in Earth's history – a condition attributed to a unique interplay of global carbon cycle processes. The Pacific Ocean has a strong leverage on atmospheric CO_2 levels and hence global climate for instance through ocean-atmosphere CO_2 exchange in the Pacific sector of the Southern Ocean, however, the role of South Pacific carbon cycle dynamics on MIS 11 conditions remains insufficiently understood. Here, we present preliminary high-resolution stable carbon isotope measurements of planktonic and benthic foraminifera complemented by sedimentary census counts (i.e., planktonic foraminiferal assemblages and fragmentation counts) from three deep and intermediate-water sites in the Central South and Southeast Pacific (IODP Sites U1540, U1542, and U1543) to investigate how deep and intermediate water masses have interacted and controlled ocean-atmospheric CO_2 exchange during MIS 11 and the preceding deglaciation. We find elevated carbon isotopic ratios and a reduced gradient between deep and intermediate water $\delta^{13}C$ during MIS 11, suggesting a weakened Southern Ocean stratification and a reorganization of Antarctic Intermediate Water formation in the South Pacific Ocean. Emerging proxy results will be additionally used to specify these aspects further, in particular the geometry of circulation changes in the study region such as the vertical extent of Antarctic Intermediate Water, and the degree of carbon storage in Circumpolar Deep Water. Our data provide insights into the contribution of the Pacific Ocean to excess warm climate conditions of MIS 11 via changes in ocean circulation and elevated ocean-atmosphere CO_2 fluxes in the Pacific sector of the Southern Ocean and thereby allow comparisons to the Holocene.