



Pacific Meridional Overturning Circulation during the Mid-Pliocene Warm Period

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Today in the North Pacific only intermediate water forms because of a strong halocline, but Pacific Meridional Overturning Circulation (PMOC) may have existed in the past. The mid-Pliocene warm period (3.264-3.025 Ma) is a time of sustained warmth where atmospheric carbon dioxide concentrations were similar to today and the northern hemisphere was relatively ice free – making it a pseudo-analogue for future climate change. North Pacific sedimentological and climate modeling evidence suggests a PMOC formed during this time. To determine the spatial extent of a PMOC during the mid-Pliocene warm period, we constructed a depth transect of sites between 2400 to 3400 m water depth on Shatsky Rise by measuring stable isotopes of *Cibicides wuellerstorfi*. We compare these new results with previously published records and calculate anomalies using the OC3 water column and core-top data products. The $\delta^{13}\text{C}$ spatial pattern is consistent with a modest PMOC of intermediate depth (core ~2000 m) extending to the equator during the mid-Pliocene warm period. Ventilation of the North Pacific by a PMOC has broad implications for deep ocean carbon storage as the North Pacific contains the oldest, carbon-rich waters today. Future work will include minor and trace element analyses to determine the temperature and carbon characteristics of the PMOC water mass and comparisons with PlioMIP modeling outputs.