Evolution of the SW Pacific across the last glacial cycle: Insights from ^{230}Th normalized export production fluxes

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Many studies have inferred a dominant role for the Southern Ocean in modulating glacial-interglacial variability of atmospheric pCO_2 [1]. The potential importance of the Southern Ocean for pCO_2 reflects its leverage on the efficiency of the global soft-tissue loop, by which the photosynthetic production, sinking and remineralization of organic matter stores carbon in the ocean interior, lowering atmospheric CO_2. By reconstructing paleofluxes of export production and redox conditions at the sediment-water interface, inferences of past ocean dynamics can be made. Thus far, available high-resolution sediment records are dominated by cores from the Atlantic sector of the Southern Ocean. Here, we present new results for a sedimentary archive collected from the abyssal southwest Pacific right at the location of today's Antarctic polar front. We report multi-proxy ^{230}Th-normalized export production records covering the last glacial cycle. The records show a strong climate-related signal, with higher export fluxes during interglacials and lower values during the last ice age [2], consistent with previously reported evidence from the South Atlantic and the SE Pacific signaling lower upward supply of subsurface nutrient-rich waters [3] [4]. Our data therefore provide the opportunity to compare past atmospheric CO_2-changes with a well-dated sub-millenially resolved record in a region previously sparsely considered over a full glacial cycle.

[1] Sigman and Boyle (2000) Nature **407**, 859-869. [2] Anderson et al. (2009) Science **323**, 1443-1448. [3] Jaccard et al. (2013) Science **339**, 1419-1423. [4] Lamy et al. (2014) Science **343**, 403-407.