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Sea surface temperature and marine productivity changes at Southern South America (53°S) over the past ∼52 kyr BP

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We present new paleoceanographic data from a sediment core MD07-3128 recovered during IMAGES XV-MD159-PACHIDERME cruise off southernmost Chile. The coring site is located at 53°S on the continental slope (∼1000 m water depth) off the Pacific entrance of the Strait of Magellan.
The alkenone-derived SST record reveals a very strong warming of ca. 8 °C over the last Termination and millennial-sale variability of the order of 2–4 °C in the glacial section. The timing and structure of the termination and some of the millennial-scale fluctuations in the glacial are very similar to those observed in the well-dated SST record from the Chilean margin ODP Site 1233 (41 ºS) and the temperature records from Antarctic ice-cores. There are however important differences in our new southernmost Chilean margin record, e.g. regarding a long-term warming trend over the MIS3 followed by a cooling towards the Last Glacial Maximum (LGM). These differences are most likely reflecting the impact of the southern Patagonian ice-sheet located close to the site at least during the LGM. Opal/CaCO3 ratios are generally higher and alkenone concentrations lower during millennial-scale cold intervals suggesting SST-related shifts in the calcareous and siliceous plankton communities. These shifts can be interpreted in terms of a northward migration of the Southern Ocean fronts with a concomitant northward migration of the siliceous-ooze belt by ∼5° latitude during these cold periods. The timing of coccoliths dominance look remarkably similar to the pattern of Heinrich event (HE) recorded in the North Hemisphere, in particular H5a, H5, H4, and H2 suggesting mechanistic relationship.