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Surface and deep water carbon isotope record of the last one million years in the SW Pacific Ocean

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The Pleistocene carbon isotope record from the core MD 97-2114 (SW Pacific Ocean) is used to reconstruct the surface- and deep-water circulation variability during the last one million years. The analyzed core has been recovered from an IMAGES (International Marine Past Global Change Study) cruise, at 1,935 m water depth, on the north eastern slope of Chatham Rise (east of New Zealand).
This region represents a key area for investigating the evolution during the Pleistocene of the biogeochemistry and dynamic of the southern oceanic fronts (Subtropical, Subantarctic, Polar Fronts). In fact, in this crucial area the largely wind-driven Antarctic Circumpolar Current (ACC) interacts with the west Pacific Ocean circulation via Deep Western Boundary Current (DWBC) coming from the Antarctic region.
The excellent record of the core MD 97-2114 offers a unique opportunity to investigate the climate and oceanographic evolution of the region at a millenarian time-scale by mean of a high-resolution chemostratigraphic, multi-proxy dataset.
Moreover, quantitative data on the calcareous planktic and benthic microfossil record, integrated with the C and O isotope data performed both on planktic and benthic foraminiferal tests, allows to understand coupling or decoupling events between sea surface and bottom waters in terms of productivity, current activity and carbon export dynamics. The northward migration of the Polar Front during the Mid-Pleistocene Transition is particularly focalized for its potential effects on the primary productivity and on the carbon biological pump. This oceanographic event seems to be related to a variation in the volume of the DWBC like a response to changes in the water production from the Antarctic source, as already proposed in previous papers.