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Glacial-interglacial terrigenous sediments changing provenance off Wilkes Land-Antarctica: paleoceanographic implications

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The knowledge of carbon cycle budget is one of the biggest challenge in paleoclimatology, and relationships between CO2 concentrations and modification of deep oceanic circulation during glacial periods are still a matter of debate. In that frame, modification of the Circum Antarctic Current pattern might have played an active role in changing CO2 distribution through complex atmosphere-ocean exchanges.
A method of determining the provenance of oceanic current is to use the terrigenous fraction of sediments as a record of changes in the main detrital supply to the ocean (Bout-Roumazeilles et al., 1999; 2007). Indeed, fine-grained particles may be advected for thousand of kilometres within deep currents and changes in particle provenance can mainly be ascribed to modification of the circulation of deep-water masses. Recent analyses (clay mineralogy, grain-size distribution, elemental geochemistry) of a core collected off Wilkes land-Antarctica (Denis et al., 2009) revealed a major modification of terrigenous sedimentation during glacial intervals (Marine Isotopic Stage 2, MIS6, MIS8, MIS10) suggesting deep-currents reorganization. Sedimentological and geochemical data indicate that detrital sedimentation results from both proximal continental inputs (i.e. Wilkes Land Antarctica) and distal volcanic supplies during interglacial intervals (Holocene, MIS5, MIS7, MIS9 and 11). The volcanic contribution seems to disappear during glacial periods as the result of major alteration of deep circulation.

Bout-Roumazeilles et al., 1997. Paleoceanography, 12 (5): 671-686.
Bout-Roumazeilles et al., 2007. Quaternary Science Reviews, 26: 3197−3215.
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