

PROCESSES CONTROLLING THE LATE QUATERNARY CLAY MINERAL DISTRIBUTION IN THE TRANSITION BETWEEN SOUTH ATLANTIC, SOUTHERN OCEAN AND INDIAN OCEAN

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In this study we used clay mineralogical data of 20 cores from the transition area between South Atlantic, Southern Ocean and Indian Ocean to investigate the basin wide response of the kaolinite/chlorite ratio to changing glacial/interglacial conditions during the last 130 ka. It has been shown that the kaolinite/chlorite ratio of marine sediments can be used as a proxy to determine fluctuations in the dominance between northern source deep water (NADW) and southern source deep water (AABW and LCDW). However, the problem arises that eolian dust influx from South America and Africa might alter the deep water signal. Varying eolian dust input into the southern Atlantic basin has been described by many authors. In order to analyse the fluctuation patterns in the kaolinite/chlorite ratio and to isolate different signals, we performed a statistical operation (R-mode principle component analysis, Varimax rotated) on the data.

We could separate 2 distinct, regionally concise signals, the first of which we interpret as the "idealised" deep water signal freed from noise that describes the fluctuations of NADW production and export to the southern hemisphere. The second signal contains an eolian dust information from SW Africa. Our data indicate that NADW production underwent significant changes in response to glacial/interglacial climate changes with enhanced production during interglacials. Rather than abrupt switching between a glacial off-mode and an interglacial on-mode, as proposed by some authors, our data suggest a more gradual variability in the NADW production. The dust record from SW Africa indicates more arid climate conditions during interglacials and a more humid climate during glacials in response to the movements of the polar frontal system and displacement of associated westerly winds.