Paleoceanographic reconstruction of the Mozambique Channel : geochemical study of Fe-Mn crusts

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The Mozambique Channel (MC) plays a key role in water mass exchange between the Atlantic and Indian Oceans. Today, Atlantic currents arrive from the south and are characterized by Nd isotope compositions (ƐNd) between -9 and -11, whereas Indian currents, resulting from the mixture between Atlantic and Pacific Ocean waters, flow from the north and are characterized by ƐNd between -8 and -7.5 [1]. Whereas recent studies [2] provide a good view of the present-day MC hydrodynamic conditions, the Cenozoic geodynamic history and its consequences on the topography and on the past deep-current circulation remains unclear.

Fe-Mn crusts represent archives of water-mass geochemistry [3]. Radiogenic isotope studies of these encrustations provide important information for the circulation patterns and/or geodynamic change reconstructions [4]. In this study, we focused on multi-elements and isotopic analyses of 9 thick Fe-Mn crusts, dredged over 2000 km in the MC, to investigate water mass changes during the Cenozoic.

The ƐNd recorded by encrustations, based on a time scale built from radioactive decay of the authigenic $^{10}Be/^{9}Be$ ratio [5], show significant variability between the Indian and the Atlantic domains, most likely related to a major subsidence event near Bassas da India during the Pliocene and an uplift phenomenon of the Davie Ridge during the Middle-Miocene. This latter event suggests a deeper topography at Early-Miocene and direct consequences on the Atlantic currents circulation.

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