Geochemical tracing of varying northern vs. southern water-masses contributions in the sub Antarctic Atlantic ocean (MD07-3076) since the last glacial maximum.

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The Southern Ocean (SO) is a key area for the understanding of the carbon cycle. Being today a sink today, it acted as a source of atmospheric CO2 during the last glacial maxima. The interest of constraining the deep water masse variations through time is then obvious. The variation of deep oceanic circulation in the Atlantic sector of the SO during the last climatic cycle have been widely studied. However, only a few studies focused on the sediment load of these water masses and on their terrigenous signal although these parameters enable to reconstruct the dynamic components of deep ocean circulation. Here, we propose to reconstruct the particle 'source to sink' in the SO during the last climatic cycle in order to characterize the dynamical variations of the main water masses. These first results are based on grain-size distribution, clay mineralogy, and Sr and Nd isotopic composition of distinct grain-size fractions of the sediments. This study shows (1) a decrease of the contribution of Southern-borned water masses (i.e. Circum Polar Deep Water, Antarctic Bottom Water) associated with an increase of the North Atlantic Deep Water during the deglaciation; (2) a strong impact of the continental climate conditions (hydrolysis) over the South American sediment delivery to the ocean during the Holocene; (3) unexpected sedimentological and geochemical variations during Heinrich Events suggesting strong and brutal modifications of North Atlantic Deep Water vs. AntArctic Bottom Water contributions during these periods.