

Reconstruction of the last glacial-interglacial cycle in the Kerguelen Plateau's PFZ and SAZ, Southern Ocean.

Civel Matthieu¹, Crosta Xavier², Cortese Giuseppe³, Michel Elisabeth⁴, Mazaud Alain⁴, Thöle Lena⁵, Jaccard Samuel⁵, Ikehara Minoru¹, Itaki Takuya⁶.

¹*Center for Advanced Core Research, Kochi University, Kochi*

²*UMR CNRS EPOC, Université de Bordeaux, France*

³*GNS Science, Lower Hutt, New Zealand*

⁴*LSCE-IPSL, CEA-CNRS-UVSQ, Gif-sur-Yvette, France*

⁵*Institute of Geological Sciences & Oeschger Centre for Climate Change Research, University of Bern, Switzerland*

⁶*National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba*

The Southern Ocean (SO) connects the Atlantic, the Indian and the Pacific oceans and therefore influences the thermohaline circulation (THC) (Rintoul et al., 2001). The latitudinal position of the SO hydrological fronts also impacts the transfer of heat and salt to the THC by the Agulhas Current (Caley et al., 2012). Finally, the SO strongly influences global climate due to its control over atmospheric CO₂ content via surface and deep-water stratification and SO productivity (Kohfeld et al., 2017). Deglaciations are fast transition periods between glacial and interglacial mean states. Deglaciations appear different over the last 400.000 years in term of shape and amplitude (EPICA, 2004), which may have been modulated by the interplay of complex mechanisms (sea ice, fronts migration, bipolar seesaw, heat transfer from lower latitudes) initiated in the SO (Deaney et al., 2017). However, little is still known about the exact role of the SO in deglaciations because of the lack of adequate records in the Indian sector, especially after the last 70 kyrs. The main objectives of the project are to (1) document variations in the Antarctic Circumpolar Current and its associated fronts, (2) reconstruct variations in surface and subsurface ocean temperatures and sea ice extent, in order to better understand their impact over global circulation during the last 400 kyrs and (3) reconstruct variations in biosiliceous productivity. These parameters will allow to document the timing and unfolding of the past 4-5 deglaciations. For this project I will focus on two sediment cores, one taken from the Kerguelen Plateau in 2011, the MD11-3353 and one that will be recovered on the Crozet Plateau in 2019. I will reconstruct sea-surface temperature and subsurface temperatures by using advanced statistics applied to diatom and radiolarian census counts (Crosta et al., 2004; Cortese et al., 2007). These two microfossil groups, being the two most important silica producers groups in the SO, will also provide information on global siliceous productivity in these areas. I will focus on the last 4-5 deglaciations (transition MIS12-MIS11 at ~400 kyrs) to encompass very different transitions. This presentation mainly focus on the first radiolarian counts obtained on MD11-3353 sediment core and their comparison to similar results obtained on core MD12-3396CQ that I studied for my Master thesis. Core MD12-3396CQ was taken east of the Kerguelen Plateau while core MD11-3353 was retrieved west of the Plateau. Hence my results will help describe and compare the unfolding of the last deglaciation at a sub-millennial time scale around the Kerguelen Plateau along with driving mechanisms.

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