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Impact of the salt leakage through the Indian-Atlantic ocean gateway on the Atlantic MOC

G. Marino (1), R. Zahn (1,2,3), P. Ziveri (1), M. Ziegler (4), I.R. Hall (4), and H. Elderfield (5)

(1) Institut de Ciència i Tecnologia Ambientals (ICTA), Universitat Autònoma de Barcelona (UAB), Bellaterra (Cerdanyola del Vallès), Barcelona, Spain (gianluca.marino@uab.cat), (2) Departament de Física, Universitat Autònoma de Barcelona (UAB), Bellaterra (Cerdanyola del Vallès), Barcelona, Spain, (3) Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain, (4) School of Earth and Ocean Sciences, Cardiff University, Cardiff, United Kingdom, (5) The Godwin Laboratory for Palaeoclimate Research, Department of Earth Sciences, University of Cambridge, Cambridge, United Kingdom

Freshwater perturbation in the northern North Atlantic exerts a strong influence on the stability of the Atlantic meridional overturning circulation (AMOC) with potentially severe impacts on the regional and global climates. The occurrence of ice rafted detritus (IRD) in the glacial sediments of the North Atlantic testifies to past episodes of Laurentide ice sheet surging that also coincided with AMOC curtailments and prominent climate deterioration in the Northeast Atlantic and Western Europe. The equally abrupt warming shifts observed in Greenland ice core and North Atlantic sediment core records that characterize the end of each IRD event have been related to the rapid resumption of AMOC and its associated heat transport.

The hysteresis response, under glacial boundary conditions, of the AMOC to freshwater forcing suggests that a reduction in this forcing may have been sufficient to trigger the rapid AMOC resumptions revealed by several palaeoceanographic records. But recent modelling studies allude to the potential importance of a salt surplus, originating in the Indian Ocean and transported to the South Atlantic via the Agulhas leakage, that may have acted as a positive feedback on the AMOC strengthening. This possibility, however, has yet to be adequately tested with palaeoproxy reconstructions.

We present a suite of multi-centennial-scale palaeoceanographic records spanning a full glacial cycle from the Southwest African margin and Agulhas Plateau that have been generated as part of the EU Marie Curie GATEWAYS project. The sediment cores are positioned such that they monitor the leakage of Agulhas water into the Atlantic and the Agulhas Return Current that straddles the South Atlantic subtropical front on its way to the Indian Ocean. Paired Mg/Ca-δ^{18}O analyses on the planktonic foraminifera *Globigerinoides ruber* and *Globigerina bulloides* reveal millennial-scale surface ocean temperature and salinity changes at the core sites that reflect recurrent oscillations of the Agulhas Leakage. Coeval changes in the IRD record from the Agulhas Plateau allude to pronounced latitudinal migrations of regional oceanic fronts during the Agulhas leakage events. The timing of events in our records of surface ocean conditions (temperature, salinity, IRD) are out-of-phase with similar events in the North Atlantic, suggesting that the Agulhas leakage, via its impact on the AMOC activity, may be a significant climate forcing on millennial timescales during the Late Pleistocene.