

PROJECT TITLE: Ocean Climate Memory: fluxes of intermediate waters in the Southern Atlantic and their transformation into surface waters in the Equatorial Atlantic (MOC²)

SUMMARY The stability of the Earth's climate depends on the transport of different properties by the Meridional Overturning Circulation (MOC). Surface waters become deep waters at high latitudes, from where they slowly reach all the deep oceans, reconvert to intermediate waters and return to the surface, mainly in the Antarctic and equatorial Atlantic. This belt transports heat, fresh water, carbon and nutrients, among other properties. Each of these properties has a temporal oceanic memory (Memoria Oceánica del Clima – MOC in Spanish) and has the capacity of controlling future climate. Probably the least well known part of this belt, but yet a most important one, is the path and transformation experienced by the intermediate waters, from the Southern Ocean to the Equatorial Atlantic. The main objective of this proposal is to investigate the transport and transformations experienced by the intermediate waters in their trip from the Austral Ocean until their reincorporation to the surface waters in the Equatorial Atlantic. With this objective we will determine the fluxes of mass, heat, fresh water, carbon and nutrients from the Southern Ocean until the Equatorial region, and we will quantify the incorporation of intermediate waters to the surface ocean in the Equatorial Atlantic. To obtain these results we will develop different models, and carry out and analyze different data sets, from an interdisciplinary perspective. This includes the analysis of several public datasets, calibration efforts for a new satellite sensor, cruises measuring physical, chemical and biological variables, idealized and general circulation models, and the further development of autonomous drifting buoys.

