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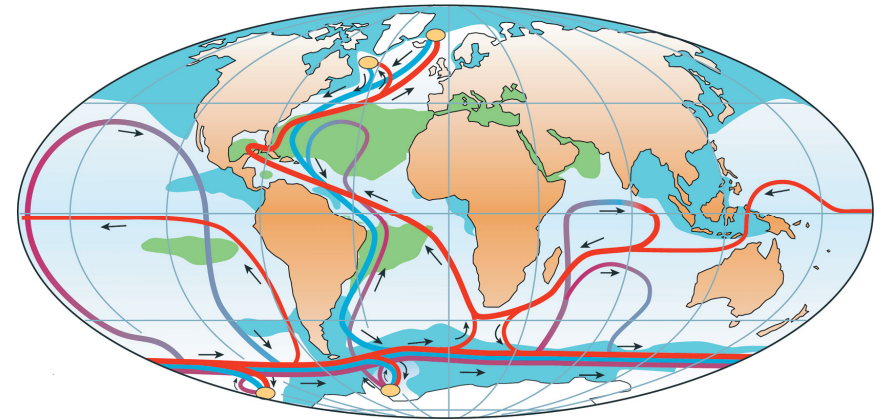
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Pliocene North Atlantic water mass distribution and Meridional Overturning Circulation

This project focuses on changes in the North Atlantic Meridional Overturning Circulation (MOC) and aims to provide a detailed reconstruction of intermediate and deep water mass distribution and circulation in the North Atlantic over the most recent global warm period in the Pliocene (~3.3-3.0 Ma; the mid-Piacenzian). During this 300,000 year interval, global temperature was ~3° C warmer than today, which is predicted to be reached before the end of this century due to anthropogenic climate change. The mid-Piacenzian is considered to be one of the closest and the most recent analogs for future global climate. It is thus uniquely suited for a case study with the goal to better understand the oceanographic and climatic processes controlling and responding to the global warming.

On the basis of geochemical (Mg/Ca, $\delta^{18}\text{O}$) and isotopic analyses (radiogenic Nd isotopes) along 5 sediment core transects in the North Atlantic, we plan (1) to constrain the water-mass composition and flow patterns, and (2) to assess the changes of North Atlantic deep and intermediate water circulation over the Pliocene warm period. This systematic approach will help to more accurately evaluate past variability of the North Atlantic MOC and its effects on climate under environmental conditions similar to our near future.



Scheme of the global overturning circulation. The red curve shows the "warm water route" in the upper layers. The light blue curve denotes the "cold water route" at depth (from Kuhlbrodt et al., 2007).