Geophysical Research Abstracts
Vol. 18, EGU2016-341, 2016
EGU General Assembly 2016


# Origin and fate of the North Atlantic Current at the Mid-Atlantic Ridge

Tilia Breckenfelder (1,2), Paul G Myers (3), Monika Rhein (1,2), Clark Pennelly (3), and Xianmin Hu (3)

(1) MARUM – Center for Marine Environmental Sciences, Bremen, Germany (t.breckenfelder@uni-bremen.de), (2) Institute of Environmental Physics, University of Bremen, Germany , (3) Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Canada

Warm, salty tropical and subtropical water is brought into the subpolar gyre by the North Atlantic Current (NAC). The NAC is the northward extension of the Gulf Stream and is part of the upper branch of the Atlantic Meridional Overturning Circulation. The warm, salty water is further transported into the Nordic Seas via the Rockall Trough, into the Denmark Strait and, finally into the Labrador Sea, where it plays an important role in the deep water formation process. On its way into the Labrador Sea the water mass increases its density by dissipating heat to the atmosphere and thereby influencing the local climate.
To further understand the processes behind warm water transport towards higher latitudes, we start our investigation at the Mid-Atlantic Ridge (MAR). Here, the NAC flows from the western to eastern basin of the North Atlantic and crosses the MAR via the Charlie-Gibbs, Faraday and Maxwell Fracture Zones.
The role of the subpolar and subtropical gyre on the different water masses, and their properties, originating or reaching the MAR is studied using the lagrangian tool ARIANE with the 3D velocity fields taken from a 1/12° AGRIF nest set in a regional NEMO configuration. One result of this investigation is that the majority of particles released at the MAR, distributed over the entire water column, recirculate. Most of the remaining particles make their way into the East Greenland Current or turn in the eastern basin towards the south. The influence of the North Atlantic Oscillation (NAO) is investigated by studying the pathways of the NAC and their properties during different NAO phases.