Geophysical Research Abstracts
Vol. 17, EGU2015-5205, 2015
EGU General Assembly 2015

A complex North Atlantic permanent pycnocline revealed by Argo data

Charlène Feucher (1), Guillaume Maze (1), and Herlé Mercier (2)

(1) Ifremer, Laboratoire de Physique des Océans, Plouzané, France (charlene.feucher@ifremer.fr), (2) CNRS, Laboratoire de Physique des Océans, Plouzané, France

In the North Atlantic subtropical gyre, the oceanic vertical structure of density is characterized by a region of rapid increase with depth. This layer is called the permanent pycnocline. The pycnocline is the transition layer between light, low-latitude, surface water masses which are ventilated every winter when penetrated locally by the mixed layer and dense, deeper water masses whose properties are set in the high latitudes.

Assessing the structure and variability of the permanent pycnocline is of a major interest in the understanding of the climate system because the pycnocline embeds the warm water sphere and most of the wind-forced horizontal circulation.

We characterized the large scale structure of the permanent pycnocline with in-situ data from the Argo array. We developed a new method to objectively characterize its properties (depth, thickness, temperature, salinity, density, potential vorticity). Results reveal a surprisingly complex structure with inhomogeneous properties. In the Gulf Stream recirculation region the pycnocline is deep, thick, the maximum of stratification is found in the middle on the layer and follow an isopycnal surface. But away from this textbook regional description, the pycnocline is characterized by vertical asymmetries and gradients in thermohaline properties. T/S distribution along the permanent pycnocline depth reveals a diversity of water masses.

We will present the mean observed structure and properties of the permanent pycnocline and relate them to physical processes that constraint them.