
The main pycnocline in the north Atlantic subtropical gyre from Argo data

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Abstract

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 because this density feature is observed throughout the year. 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 and circulate equatorward.

In-situ data from the Argo array provide temperature/salinity profiles allowing the characterization in space and time of the permanent pycnocline. We thus developed a new method to characterize its depth, thickness and thermohaline characteristics.

We will present an algorithm computing pycnocline properties from a profile of the Argo database. The utilization of the Argo database involves methodological challenges to analyze results given by the algorithm because one has to deal with millions of property/value pairs. For instance, we have to ensure consistency and veracity of information among a huge variety of vertical profiles.

We will then present methods used to improve performance computing and analysis tools developed to explore and extract knowledge out of the database of pycnocline characteristics.

Keywords: Argo, Quality Control, Pattern, Clustering, North Atlantic, Subtropical gyre, Stratification

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