



THE LACK OF CONNECTION IN SURFACE DRIFTERS, BETWEEN THE NORTH ATLANTIC SUBTROPICAL AND SUBPOLAR GYRES

E. Brambilla, L. Talley

Scripps Institution of Oceanography, UCSD, La Jolla, CA 92093 USA [ebrambilla@ucsd.edu]

A transport of 15-20 Sv from the Gulf Stream should flow to the subpolar gyre as the warm water source for the dense water formation.

The surface flow at 15 m, based on Lagrangian drifters, identifies the Gulf Stream system and the North Western Corner of the North Atlantic Current, but it does not provide an accurate description of the water mass exchange between the two gyres.

Most of the drifters are trapped in the subtropical gyre.

We propose that the apparent lack of connection between the gyres results from net southward Ekman velocity.

Ekman velocity has been calculated using the Ralph and Niiler model (1995).

Although it is very small relative to the velocity of the drifters, the Ekman velocity appears to be sufficient to prevent the drifters from flowing northeast. The influence of the Ekman velocity on the trajectories of the drifters is investigated by analyzing possible drifter trajectories based on the mean flow calculated from actual drifters.

Model drifters advected by the total mean velocity field tend to remain in the subtropical gyre, as do the real drifters. In contrast, model drifters advected by the total mean velocity with Ekman velocity removed, more frequently enter the subpolar gyre. The effect of random eddy noise on the geostrophic mean velocity and random wind stress in the Ekman velocity are considered.

Thus we conclude that the flow path followed by the 15-m drifters is not representative of the upper layer connection from the subtropical to the subpolar gyre.