Evidence of Jet-Scale Overturning Ocean Circulations in Argo Float Trajectories

Qian Li[1], Sukyoung Lee[1], and Matthew Mazloff[2]

[1]Department of Meteorology and Atmospheric Science, The Pennsylvania State University, University Park, Pennsylvania, USA
[2]Scripps Institution of Oceanography, University of California San Diego, La Jolla, California, USA

Abstract

In a recent study, it was proposed that Reynolds stress by oceanic mesoscale eddies not only drives jets such as Subantarctic Front (SAF), but also can force overturning circulations that are comprised of rising motion on the poleward flank, and sinking motion on the equatorward flank of the jets. In that study, the thermally indirect, jet-scale overturning circulations (JSOCs) were detected in an eddy-resolving model simulation of the Southern Ocean. Here, observational evidence of the existence of JSOCs is demonstrated by showing that the Argo floats tend to drift poleward across the jet with the maximum drift speed coinciding with the corresponding jet maximum. This finding has an implication for the observed deep mixed layer because it was previously shown that in the model the JSOCs play a key role in preconditioning the formation of a deep and narrow mixed layer at just ~1° north of the SAF.

Reference

Li, Q., Lee, S., & Mazloff, M. (2018). Evidence of jet-scale overturning ocean circulations in Argo float trajectories. *Geophysical Research Letters*, 45. https://doi.org/10.1029/2018GL078950