

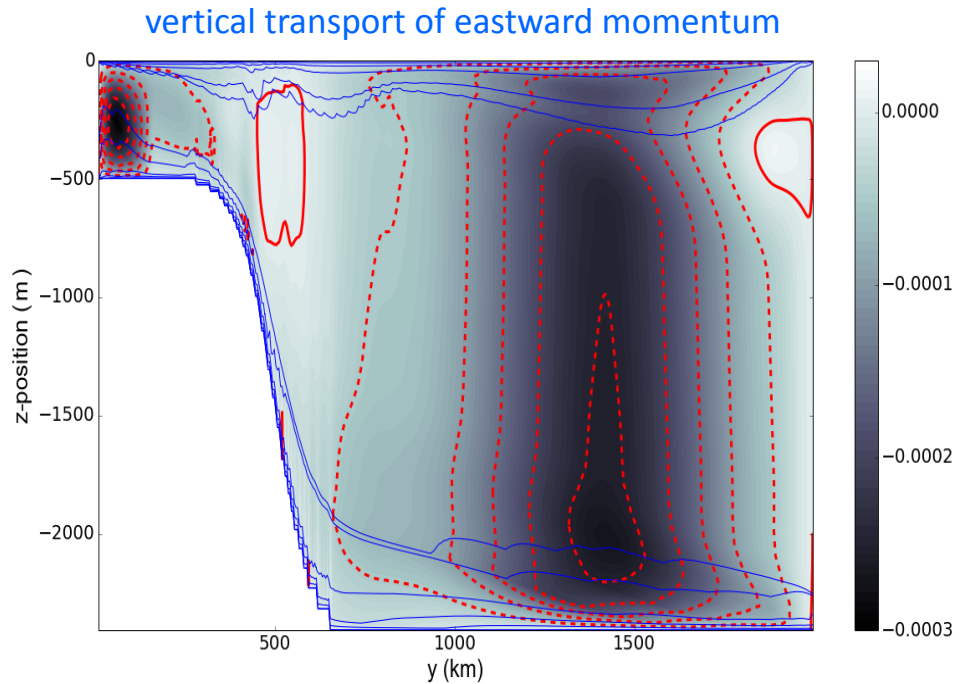
Measuring the impact of mesoscale eddies in the ocean's climate

Objective

Determine the climatological balance of forces that hold in an idealized configuration of the Southern Ocean. In particular, our objective is to identify the role of ocean mesoscale eddies in the equilibrated force balance.

Approach

Within an eddy-rich simulation, we diagnose the newly derived Thickness-Weighted Averaged (TWA) equations to measure the force that mesoscale eddies exert on the climatological, mean zonal flow.



Impact

With unprecedented fidelity we are able to clearly explain how the balance of forces is closed in an idealized configuration of the Southern Ocean.

The role of the mesoscale eddies is to move the imposed surface wind stress to the ocean bottom. Eddies accomplish this through the vertical transport of eastward momentum.

The climate of the Southern Ocean as we know is impossible to realize without the action of mesoscale eddies.

We are now applying this analysis to eddy-rich simulations of the global ocean system to better understand the role of mesoscale eddies in setting the climate of the Earth.

Ringler, Todd and Juan A. Saenz and Phillip J. Wolfram and Luke Van Roekel (2016): A thickness-weighted average perspective of force balance in an idealized circumpolar current, *Journal of Physical Oceanography*, DOI: 10.1175/JPO-D-16-0096.1