Geophysical Research Abstracts
Vol. 21, EGU2019-18267, 2019
EGU General Assembly 2019

Transport structure of the South Atlantic Ocean derived from a high-resolution numerical model and observations

Xiaobiao Xu and Eric Chassignet
COAPS/Florida State University, Tallahassee, FL, USA (echassignet@fsu.edu)

The South Atlantic Ocean plays an important role in the Atlantic meridional overturning circulation (AMOC), connecting it to the Indian and Pacific Oceans as part of the global overturning circulation system, yet the detailed time mean circulation structure in this region and the large-scale spatial pattern of the AMOC variability remain unclear. Using model outputs from a 50-year, eddying global ocean-sea ice simulation validated against observations at a zonal section at 34 [U+F0B0] S, a meridional section at 65 [U+F0B0] W in the Drake Passage, and a meridional section southwest of Africa, we depict a relatively simple perspective of the AMOC: i) The upper limb of the AMOC originates from the Agulhas leakage. The cold Pacific water from the Drake Passage does not contribute directly to the AMOC but does play a role in the temperature and salinity properties of the water that flows northward across 34 [U+F0B0] S; ii) the North Atlantic deep water (NADW) in the lower limb of AMOC flows southward as a deep western boundary current all the way to 45 [U+F0B0] S and then turns eastward to flow across the Mid-Atlantic Ridge near 42 [U+F0B0] S. Recirculation around the Vitoria-Trindade seamount chain, however, does bring some NADW into the Brazil Basin interior; iii) the AMOC variability is coherent on seasonal to decadal timescales from 35 [U+F0B0] S to about 35 [U+F0B0] N, where diapycnal water mass transformations between the upper and lower limbs of the AMOC are expected to be small. The consistency and robustness of this model perspective of the AMOC needs to be examined further with new observations and other global simulations.