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Approximate deconvolution large eddy simulation of a barotropic ocean circulation model ANNE STAPLES, OMER SAN, Virginia Tech — We investigate a new large eddy simulation closure modeling strategy for two-dimensional turbulent geophysical flows. This closure modeling approach utilizes approximate deconvolution, which is based solely on mathematical approximations and does not employ additional phenomenological arguments. The new approximate deconvolution model is tested in the numerical simulation of the wind-driven circulation in a shallow ocean basin, a standard prototype of more realistic ocean dynamics. The model employs the barotropic vorticity equation driven by a symmetric double-gyre wind forcing, which yields a four-gyre circulation in the time mean. The approximate deconvolution model yields the correct four-gyre circulation structure predicted by a direct numerical simulation, but on a coarser mesh and at a fraction of the computational cost. This first step in the numerical assessment of the new model shows that approximate deconvolution could be a viable tool for under-resolved computations in the large eddy simulation of more realistic turbulent geophysical flows.

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