

North Atlantic Circulation in three Atlantic simulations of $1/12^\circ$, $1/25^\circ$, and $1/50^\circ$

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Transport structure of the large-scale North Atlantic circulation (i.e., the Atlantic meridional overturning circulation, the subpolar and subtropical gyres) in three Atlantic simulations are examined. These simulations are identical in model bathymetry, vertical resolution, initialization, as well as the surface forcing, with the horizontal resolution being the only difference. The comparisons show that the large-scale transport structure of the North Atlantic circulation is overall consistent between the three simulations. The simulation at $1/50^\circ$ however exhibits a much improved representation of the high-energetic Gulf Stream extension to the east of New England Seamount Chain and the subsequent North Atlantic Current, highlighting the importance of mesoscale and sub-mesoscale eddies in setting up the narrow recirculations of the Gulf Stream extension and the North Atlantic Current.