ABSTRACT

Transport results obtained near 26°N in the RAPID program during 2004-2011 and historical measurements in the Florida Straits and east of Abaco, Bahamas are used to examine the temporal variability and time mean structure of the AMOC in eddy resolving simulations with the hybrid coordinate ocean model (HYCOM). The model results yield key aspects of the timemean AMOC approximately consistent to observations. The model-determined transport variations of the Florida Current and trans-basin AMOC show some variation similar to observations.

The model results are used to clarify the sources of the northward AMOC transport and to explore the circulation pattern of the southward transport in the western subtropical North Atlantic (STNA). About 14.1Sv of the modeled northward AMOC transport is through the Florida Straits and the remainder (4.1Sv) through the mid-ocean, primarily in the Ekman layer, but also below 600m. The model AMOC transport is about $\frac{2}{3}$ surface water and $\frac{1}{3}$ AAIW with no contribution from the thermocline water in between. In the western STNA, the DBWC flows southward then eastward in both the upper and low NADW layers but with different offshore recirculation pathway, and there exists a second, more northern branch of eastward flow in the lower NADW layer.

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Fig.2 (a) Bathymetry in the area east of the Bahamas, along with location of long-term current meter arrays for seven deployments during 1986-1997 (Bryden et al., 2005). (b-c) Observation and modelbased mean meridional velocity (in cm s⁻¹) across 26.5°N; observational results are based on moored current meter array data; model results are from 5-year mean of E026. (d-e) Volume transport (d) above and (e) below 1000m accumulated eastward from 77°W. (f-g) Model-based mean transport pattern in the area of western subtropical North Atlantic for (f) upper and (g) lower North Atlantic Deep Water.

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