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 time-mean 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-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 14.1 Sv of the modeled northward AMOC transport is through the Florida Straits and the remainder (4.1 Sv) through the mid-ocean, primarily in the Ekman layer, but also below 600 m. The model AMOC transport is about ½ surface water and ½ 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 lower NADW layers but with different offshore recirculation pathway, and there exists a second, more northern branch of eastward flow in the lower NADW layer.