

The annual cycle of AMOC transport at 41°N

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Time varying measurements of the North Atlantic heat and volume transport at 41°N using Argo/altimeter data are now available from 2002-2012, one of the longest continual records of AMOC variability available. In conjunction with the RAPID array at 26.5°N this time series is proving invaluable for studies of the North Atlantic's energy balance and meridional coherence, and has been widely used. Recent work shows that model estimates of AMOC transport agree well with observations at 26.5°N, but at 41°N the simulated and observed annual cycles are out of phase. This raises the important question of what causes this discrepancy, whether models or observation estimates are in error, and how this discrepancy may be accounted for in the future. In this work we present a detailed analysis of the seasonality of the 41N transport, and in particular the difference between models and observations. We find that the difference lies primarily at the eastern boundary, where the observed density profile is out of phase with simulations. This affects the seasonality of the zonal density gradient, and therefore the interior transport.