



Interannual variability in the Atlantic meridional overturning circulation at 26°N

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From March 2004, as part of the Rapid programme, we have been monitoring the Atlantic meridional overturning circulation at 26°N with a continent-to-continent array of moored instruments. Here we examine the first 5 years of observations to quantify inter-annual variability and trends in the components of the overturning circulation (Ekman transport from satellite scatterometer measurements, Florida Straits transport from electromagnetic cable measurements, and upper mid-ocean geostrophic recirculation from the Rapid array). After removing biennial, annual and semiannual harmonics, there is a trend toward increased southward transport of 1.13 Sv over 5 years in upper mid-ocean geostrophic recirculation, which is significant within 60% confidence intervals. There is also a trend of increased northward Ekman transport of 0.92 Sv over 5 years. Consequently, there is no significant trend in overturning over the five years. For longer periods, cable measurements of Gulf Stream transport through the Straits of Florida and wind stress climatologies reveal no significant trend in either Gulf Stream transport or in northward Ekman transport since 1980. To estimate inter-annual variability in upper mid-ocean geostrophic recirculation over long periods, we examine Sverdrup transport from various wind climatologies. However the results are not consistent: NCEP shows no significant trend while the NOCS climatology based on shipboard observations shows a substantial increase in southward Sverdrup transport since 1980. Such an increase in southward recirculation would suggest a decline in the Atlantic overturning circulation over the last 30 years.