

Can satellites replace mooring arrays? Satellite altimetry transport estimates of the Atlantic overturning meridional circulation

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The Atlantic meridional overturning circulation (AMOC) is a large-scale oceanic circulation comprising net northward flow in the upper 1000 m of the Atlantic and net southward flow below. Variations in the AMOC have significant repercussions for the climate system, hence there is a need for proxies that can approximate changes in the AMOC on larger spatial scales. Here we show that a direct calculation of ocean circulation at 26°N from satellite altimetry compares well with transport estimates from the RAPID mooring array. We find that the relationship between sea level anomaly and dynamic height from the western boundary RAPID moorings is robust in the surface layer, with poor agreement occurring largely below 1000 m. In the surface layer (1000 m), transport is estimated from a combination of satellite altimetry leading to a correlation of $r=0.73$ and $r=0.84$ (significant at 95% level) with the upper mid-ocean and MOC transport estimates from RAPID respectively on low frequency (10-mos) timescales.