The salinity and heat budgets of the subtropical North Atlantic: initial analysis.

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A major justification for research into the AMOC variability is its impact on the large scale climate system, through modulating the ocean-atmosphere fluxes in the North Atlantic. Estimates of these fluxes generally rely on use of the bulk formulae, in some cases constrained by hydrographic estimates of ocean heat transport. However, estimates using the bulk formulae are known to have large uncertainties, and rely on sparsely observed ocean surface data. In particular, a major source of uncertainty is the calculation of latent heat flux over the ocean.

The Aquarius/SAC-D mission is a recent satellite mission tasked with space-borne measurement of sea surface salinity (SSS). Due to the relationship between SSS and ocean freshwater flux, the Aquarius mission has the potential to provide improved estimates of ocean-to-atmosphere latent heat flux, as implied by observed changes SSS. In order to interpret the relationship between SSS changes and surface latent heat, it is necessary to consider the dynamic salinity budget of the ocean. Taking a relatively well-observed region of the North Atlantic ocean, using data from the moored RAPID array at 26.5N, and Argo float data combined with Jason-series sea surface height measurements at 41N, we consider the heat and salinity budgets of a closed ocean volume.

This work has implications both for satellite estimate of ocean latent heat flux throughout the globe, and for the observation-based studies of the AMOC's climate impact. We present an initial analysis of the relationship between the salinity and heat transports, and their implications for Aquarius estimation of ocean latent heat.