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Poster
On interannual times scales, the ocean plays an important role in controlling surface heat flux, with stored heat leading to exchange of heat between the ocean and the atmosphere. A correlation analysis between both interannual sea surface height (SSH, as a proxy for upper ocean heat content) and sea surface temperature (SST) with surface turbulent heat flux (OAFLUX, Objectively Analyzed Air-sea Flux) shows that throughout much of the North Atlantic, SSH and SST are lagged correlated with surface turbulent heat flux, with both SSH and SST leading surface turbulent heat flux by several months throughout much of the North Atlantic Basin, with the predictive skill of SST slightly better than SSH. In general, a warm ocean leads to heat from the ocean to the atmosphere so that the turbulent fluxes damp the heat anomaly in the ocean. A seasonal analysis shows that for spring and summer, SST does marginally better than SSH in predicting turbulent heat flux. However, in fall and winter (October through February) SSH gives a more robust prediction of turbulent heat flux in a region that extends from the western boundary south of the separated Gulf Stream (70W, 28N) and to the Northeast (35W and 45N), with the location depending on the month of the year. In these regions in fall and winter, SSH predicts turbulent heat flux one to two years in advance. The regions of high predictive skill also track the seasonal evolution of the maximum mixed-layer depth and the atmosphere can access water subducted near the subtropical/subpolar gyre boundary. This analysis provides evidence that changes in the atmosphere can be forced by anomalies in subtropical mode water (eighteen degree water).
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