



Air-sea interactions in the Gulf Stream region from long-term in-situ observations

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As part of the CLIMODE research program, a fixed surface mooring was deployed in the Gulf Stream (38N, 65W) for 15 months. Air-sea measurements (1 minute sampling), including radiation, and subsurface oceanographic data (5 minutes sampling) were collected. These high quality and long term measurements are the first of their kind in this region where high winds and strong currents are common. Air-sea fluxes are computed using the COARE bulk parameterization. These estimates are also compared with turbulent fluxes measured by a Direct Covariance Flux System mounted on the buoy. Wintertime heat loss events in excess of 1500 W/m^2 are found during cold air outbreaks when SST is high. The synoptic weather timescale characterizes for a large part the air temperature and humidity signals whereas the low frequency SST signal modulates the air-sea temperature gradient and subsequent heat transfer. Using this high-resolution dataset we describe the variability of the near surface atmospheric conditions. Very rapid changes in SST and spatial resolution show the challenge faced by remote sensing in frontal oceanic regions. Other variables are compared with existing NWP products when available. The evolution of the marine boundary layer is also investigated in relation to the atmospheric forcing.