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Spatial and Temporal Variability of the Mixed Layer and Entrainment/Detrainment in the SPURS Area

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Observations collected with a unique fleet of instrumentation during the Salinity Processes in the Upper Ocean Regional Study (SPURS) I field campaign allow the physical mechanisms controlling upper ocean salinity in the North Atlantic salinity maximum to be resolved at a variety of space and time scales. Previous work has shown that subsurface processes are as important as surface fluxes in maintaining the salinity maximum. In this study, we focus on the spatial and temporal variability of the mixed layer and vertical entrainment/detrainment fluxes in the SPURS I area using high density ($\sim$0.5 degree) measurements of temperature and salinity. Mixed layer salinity was at a maximum at the beginning of the study period (October 2012) and slowly decreased as the mixed layer deepened through early spring. Objective maps of mixed layer depth show small spatial variability during the late spring and summer months and larger spatial variability during the late winter and early spring as the mixed layer shoals. Higher temporal and spatial resolution maps of mixed layer depth combined with geostrophic velocities and satellite wind stress fields are utilized to investigate the variability of entrainment/detrainment rates in the region.