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Department of Marine Sciences Presents a Seminar by

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PEACH PIESs: Gulf Stream variability inferred from pressure-sensor equipped inverted echo sounders (PIESs) as part of the Processes driving Exchange at Cape Hatteras (PEACH) project

To better understand shelf-export mechanisms and the processes which control the net shelf export along the eastern US, an observational array was deployed near Cape Hatteras on the shelves and the neighboring continental slopes spanning the Hatteras Front. These observations and a hierarchy of numerical models comprise the National Science Foundation-funded PEACH (Processes driving Exchange At Cape Hatteras) Program. The in situ observations from the 19-month deployment of current- and pressure-sensor equipped inverted echo sounders (CPIESs) along and across the Gulf Stream near Cape Hatteras capture spatial and temporal variability where this western boundary current separates from the continental margin. CPIESs' records of acoustic travel time are used to infer changes in thermocline depth DT and Gulf Stream position. Wave-like Gulf Stream meanders are observed where the Stream approaches the separation location with periods less than 15 days, wavelengths less than 500-km, and phase speeds between 40-70 km d-1. Though meander amplitude decreases by 30% on the final approach to Cape Hatteras, some signals are still coherent across the Gulf Stream separation location. Temporal variability in meander intensity may be related to the Loop Current ~1400 km upstream. Mesoscale variability is strongest downstream of the separation location where Gulf Stream position is no longer constrained by the steep continental slope. Low frequency transport changes in the Florida Straits are correlated with SSH gradients along the entire South Atlantic Bight (SAB) and with DT inferred at the CPIES sites. The correlations with DT are likely due to coherent transport anomalies in the Gulf Stream approaching the separation location which then drive Gulf Stream position changes downstream of the separation location. The patterns of coherent transport anomalies may be reflect large-scale atmospheric forcing patterns or rapid equatorward propagation of barotropic signals along the SAB.

Host: Frank Bohlen
Time & Date: 11:00 am, Friday, March 18, 2022

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