Geophysical Research Abstracts, Vol. 7, 10436, 2005
SRef-ID: 1607-7962/gra/EGU05-A-10436

Wintertime Dense Water Formation in the Northern Adriatic Sea

C. M. Lee (1), M. Jeffries (1), B. H. Jones (2), R. Arnone (3), C. Dorman (4), M. Orlic (5), H. Peters (6), P. Poulain (7), D. Thaler (8)

(1) Applied Physics Laboratory, University of Washington, (2) Department of Biology, University of Southern California, (3) Naval Research Laboratory, Stennis Space Center, (4) Scripps Institution of Oceanpgraphy, (5) University of Zagreb, (6) Rosenstiel School of Marine and Atmospheric Science, University of Miami, (7) L'Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, (8) Austrian Military Weather Service

Results from a new climatology and a recent wintertime measurement program reveal two wintertime North Adriatic dense water pools situated beneath strong Bora pathways (Gulf of Trieste and Kvarner Bay). A region of relatively fresh water which extends along the windstress (and surface heat loss) minimum region between the Po delta and the Istrian coast separates the two dense pools. The new climatology isolates the dense water pools and the offshore Po extension by mapping historical data taken from periods during and directly following Bora events. More recently, quasi-synoptic, three-dimensional surveys of physical and optical variability characterized the mesoscale features that dominate the Northern and Central Adriatic, following their response to strong forcing events. During winter (February), sampling emphasized the response to episodic Bora wind events. A broad survey of the northern basin characterized the structure of a Bora-driven Po plume extension and revealed cyclonic (anticyclonic) circulation to the north (south) of the plume, consistent with the response found in previous numerical experiments (Orlic et al., 1994). Along-basin sections occupied 20 days apart revealed the formation of two northern dense water pools, one to either side of the Po extension. Three strong Bora events occurred between occupations. We hypothesize that the buoyant Po plume inhibits dense water formation and that two dense pools form in response to competing wind-driven processes, (1) strong, short-scale lateral variations in net surface heat loss (large beneath Bora pathways, smaller in the wind minimum regions) and (2) offshore extension of the Po river plume.