

PO Seminar

Tuesday, May 10th, 2011

Clark 507, 3:00 p.m.

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“The response of coastally-trapped buoyant plumes
to downwelling-favorable wind-stress forcing”

Abstract:

The outflow from rivers can form coastally-trapped buoyant plumes, an effective mechanism to transport freshwater - as well nutrients and sediment - along the coast. Wind stress forcing can disrupt or enhance this process, strongly modifying the structure of the plume. In this talk, the response of a coastally-trapped buoyant plume to downwelling-favorable wind forcing is explored using a simplified, two-dimensional numerical model and a prognostic theory for the resulting width, plume depth, density anomaly and along-shelf transport of the plume. The results show a response that includes deepening and narrowing of the plume, convergence of the surface cross-shelf circulation at its offshore edge, and intensification of the plume along-shore transport. As predicted by the theory, the numerical model results show that the response is dependent on the initial plume geometry, its stratification, and the intensity of the wind forcing.

