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High-Resolution Fields of Sea Surface Height (SSH) and Surface Velocity

M. Saraceno, P. T. Strub and P. M. Kosro

College of Oceanic and Atmospheric Sciences (COAS), 104 COAS Admin Bldg, Corvallis, OR 97330

The combinations of data from several radar satellite altimeters may be used to resolve mesoscale SSH and surface velocity fields in the ocean, with specific scales that depend on the sampling of the altimeters that are used. However, present altimeter data do not adequately cover the near-shore region (up to 25-50 km from the coast). In the present work, along track Sea Level Anomalies (SLA) are combined with tide gauge time series to cover that gap in the region off the west coast of the US (39-49 °N, 123.5-132 °W) for the period 1999-2005. These fields represent only the geostrophic velocities, below the Ekman layer. To add the Ekman component of the surface velocities, scatterometer wind fields are used. The combination of the two components should represent the absolute surface velocity, which is compared to the available coastal radar velocity fields, which have horizontal resolution of 2-10 km, similar to the resolution expected for future Wide-Swath Altimeters. The goal is to construct the highest resolution fields of surface velocity in coastal regions, from the combination of altimeter, scatterometer and radar data. The analysis of the fields is focused in two particular areas of the northern California Current System, where examples of mesoscale events have been shown to contribute to a net transport across the shelf in autumn-winter: off Cape Blanco (42.5°N) and off Heceta Bank (44.7°N).