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Use of a wind-stress blended dataset to drive a regional Mercator 1/4° configuration

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Mercator-Ocean developed an operational system to describe the state of the global ocean based upon primitive equation with a high resolution (1/4°), and in-situ and satellite observations ocean data assimilation. This operational system is driven at the surface by the analysis and forecasts from the ECMWF IFS (cycle 29) spectral model.

The goal of this paper is to evaluate the near real time global blended wind datasets developed by the CERSAT (Centre ERS d'Archivage et de Traitement) and described by Bentamy and Croize-Fillon [2006]. The used objective method merging ECMWF wind analysis with winds obtained from both scatterometer (QuickScat) and radiometer (DMSP, Defense Meteorological satellites Program) instruments gives a better spatial sampling (0.25°) than the ECMWF analysis (˜0.35°).

In order to assess the blended products on oceanic circulation at ij° resolution, two experiments are performed over the year 2005 (starting from rest) with a regional configuration (closed boundaries). The first one is forced with the wind stress ECMWF analysis and, the second one, with a parameterization of CERSAT wind stress using the blended winds. The domain, [100°W-67°W; 5°N-40°S], over the Eastern South Pacific, has been chosen in order to study the well known closed relationships between wind and coastal circulation (upwelling and east current systems) in the domain.

The presence of the satellite component in the blended product erases almost entirely the usual Gibbs fringing which are found along the eastern South Pacific coast in the spectrally truncated ECMWF quantities. However, due to relative weaker blended wind stresses compared to the ECMWF ones at the coast, the modeled Peru Coastal Current (Northward) is less intense. Consecutively, the coastal upwelling is less pronounced in the second experiment. Although the second experiment shows a large and diffuse poleward coastal current system, the first experiment exhibits a clear distinc-

tion between a coherent Poleward Undercurrent (˜100m depth) and a weak Peru-Chile Countercurrent (surface).

This short note presents preliminary results highlighting the importance of the wind-forced oceanic coastal circulation. This work initiated a collaboration between the operational oceanography and the atmospheric ‘remote sensing’ community. This ended in fruitful discussions and in positive feedbacks for both communities. This work should be continued in order to better understand the impact of such products in areas of strong atmospheric-induced oceanic circulation or to evaluate the oceanic response to the scales resolved by the blended products.