

OceanObs'09

Community White Paper Proposal

Session 2B: Large-scale Physical Processes: Surface fluxes

Title

Monitoring ocean - atmosphere interactions in western boundary current extensions

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Description

As cold, dry (wintertime) air blows across the warm Gulf Stream and Kuroshio Extension currents, heat and moisture are extracted from the ocean and transferred to the overlying atmosphere. This ocean-atmosphere interaction has both local and remote effects. In particular, the temperature front associated with these currents affects the stability of the atmospheric boundary layer and results in a corresponding frontal structure in the surface winds and clouds. Studies also show evidence that the frontal effects may extend to the top of the troposphere and can influence storm development. These heat and moisture exchanges can also contribute to downstream convective rainfall, and there is some evidence that the front can affect the jet stream baroclinicity and storm track. Atmospheric general circulation models however do not generally have sufficient resolution or boundary layer dynamics to capture the full set of interactions and effects. Furthermore, in some cases at present, the data ingested into numerical weather prediction (NWP) models carry higher errors in the western boundary current regions that contribute to the errors in the products. Comparisons with in situ measurements show that the NWP latent heat loss can have mean biases as large as 60 W/m^2 in western boundary current extension regions. The US CLIVAR Working Group on Ocean – Atmosphere Interactions in Western Boundary Currents <http://www.usclivar.org/wbc.php> will be meeting in Phoenix AZ in January 2009. One goal of this meeting is to provide recommendations for improving the climate observing system in western boundary current extension regions. In particular, a set of metrics will be identified that could be monitored and used for assessing these mid-latitude coupled interactions in models. The Consensus Statement and Recommendations from this workshop will form the basis of the community white paper for the OceanObs09 Conference proposed here.