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4DVAR data assimilation and Adjoint-based sensitivity analysis in an eddy resolving ocean model of the Peruvian Current System

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Peruvian Current system plays a key role in the climate variability of the Eastern Tropical Pacific and also has teleconnections to other regions of high climate impact like the Tropical Pacific. This region is highly influenced by the strong wind forcing and the oceanic circulation is characterized by strong eddy activity with short zonal scales. The highly active primary production in this region with a very strong concomitant upwelling is of great importance to the surrounding economies. Hence, we use a high resolution regional ocean modeling system (ROMS) to study the sensitivity of the circulation in this region to wind forcing and meridional advection. Sensitivity of the eddy kinetic energy to wind forcing is also studied to exhibit their influence on its seasonal and interannual variability. Sea surface temperature, height and subsurface temperature and salinity data measured from CTD casts are assimilated via 4DVAR to generate an estimate of the current circulation for a period of two months in 2008. We present the methods and initial results for the assimilation.