Forecast Sensitivity to Observations in an Analysis-Forecast System of the California Current Circulation

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Abstract

The U.S. Integrated Ocean Observing System (IOOS) forms the backbone of real-time ocean analysis-forecast systems of U.S. territorial waters. In addition to satellite remote sensing, the IOOS is augmented with in situ observations from a variety of platforms including Argo floats, buoys and gliders. In addition, remote sensing observations of surface currents are also available from an extensive national network of coastal HF radars. Maintenance of these observing systems is obviously labor-intensive and costly. Routine monitoring of the impact of the data from each element of the observing array on ocean analysis-forecast systems is therefore recognized as an important activity, not only for maintaining the array and demonstrating its value, but also as an aid for planning future expansions of the observing network. This talk will focus on current efforts to quantify forecast sensitivity to observations (FSO) in an ocean analysis-forecast system of the California Current System (CCS) along the U.S. west coast. The real-time system is based on ROMS-4D-Var, and FSO has been applied to metrics of forecast skill that target important features of the CCS circulation along the central California coast. On average, _˜50-60% of all observations assimilated into the model were found to yield improvements in the forecast skill. An adjoint-based approach for Observing System Experiments has also been used in combination with FSO to quantify the extent to which different components of the observing network support each other.

Keywords: Forecast sensitivity observation impacts, California Current, 4D, Var, U.S. IOOS

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