Near-surface salinity improvements in the US West Coast Ocean Forecast System (WCOFS)

The WCOFS is a regional real-time operational forecast system centered on the US West Coast. The model domain spans in the alongshore direction from Mexico to British Columbia, Canada. The 3-day forecasts are updated daily and are constrained by assimilation of the alongtrack altimetry, satellite SST, and HF radar surface currents using ROMS 4DVAR. Ongoing efforts are directed toward improvement of the representation of the near-surface salinity. First, we test the impact of adding terrestrial discharges from many small rivers along the US and Canadian shorelines of Eastern Pacific, compared to the older model which included only Columbia, Fraser River and several smaller inputs in the Salish Sea (around Seattle). The additional discharges are obtained from the GloFAS hydrological model. Adding these discharges dramatically improves the sea surface salinity (SSS) bias and seasonal and interannual variability in the coastal transition zone off Vancouver Island, where the fresher water is transported with eddies. Comparisons utilize Argo float and satellite SMAP SSS data. Second, we are working to improve the data assimilation system skill by constraining SSS using climatology and in-situ data. Also, we are trying to reduce spurious eddy variability caused by data assimilation that may contribute to positive SSS bias in the upwelling region.

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