# Improvements in the US West Coast Ocean Forecast System (WCOFS)

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The US West Coast Ocean Forecast System (WCOFS) has been run operationally by NOAA since 2022. The system is based on ROMS at the 4-km horizontal resolution and includes 4DVAR data assimilation (DA) of satellite altimetry, SST and HF radar surface currents. The system provides daily updates of three-day forecasts. The visualization and quality control are helped by the WCOFS Viewer, which is our attempt to create an intuitive interactive online visualization system. Work is underway to transform the Viewer into a general framework for forecast-observation and model-model comparisons. The real-time operational system has shown a positive bias in the sea surface salinity (SSS) in the upwelling region, in particular, a wider SSS front than in the model without assimilation or observations. The error may come from spurious vertical mixing after the DA correction creates unstable density profiles and/or enhanced horizontal eddy transport due to overly energetic horizontal turbulence induced by DA. The new system is tested that includes a full suite of river discharges, obtained from GloFAS. Other strategies to improve SSS include a more realistic model error standard deviation in the surface mixed layer, assimilation of in-situ salinity from Argo and gliders and nudging SSS to the annual cycle derived from a multiyear ROMS simulation. Utility of satellite SSS products has been assessed. On a way to improve 4DVAR efficiency, code GPU acceleration is tested (so far with simple models).