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Technical Implementation Notice 12-23
NOAA's National Ocean Service Headquarters Washington DC
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From: Peter Stone
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 (CO-OPS)

Subject: Implementation of National Ocean Service's New Oceanographic Forecast Modeling System for the Columbia River and Estuary: Effective July 10, 2012

Effective July 10, 2012, beginning at 1500 Coordinated Universal Time (UTC), 1000 AM Eastern Daylight Time (EDT), the NOAA/National Ocean Service (NOS) Columbia River and Estuary Operational Forecast System (CREOFS) will be implemented on NOAA's Central Computer System (CCS) operated by the National Centers for Environmental Prediction (NCEP) Central Operations (NCO).

CREOFS will now provide users with nowcasts (analyses of near present) and forecast guidance of the three-dimensional (3-D) physical conditions of the Columbia River and Estuary, including surface water levels and 3-D water currents, water temperature, and salinity out to 48 hours.

CREOFS uses the Semi-Implicit Eulerian-Lagrangian Finite Element (SELFE) model, developed at the Oregon Health and Science University (OHSU), as its core ocean prediction model. SELFE is an open-source, community-supported, finite-element model for river-to-ocean modeling, with an unstructured grid in the horizontal dimension, hybrid SZ coordinates in the vertical dimension (with Z layers being optional), and flexibility in representing the bathymetry and vertical structure of the water column. The CREOFS grid consists of 74,061 nodes and 142,684 elements and includes the upper and lower Columbia River and estuary. Grid resolution ranges from 39 km on the open ocean boundary to approximately 100m near the coast, indicating the flexibility of the grid size based on bathymetry from the deep ocean to the coast. Additionally, the higher resolution along the navigational channels within bays, from approximately 100m to 10m, provides detailed current features.

CREOFS operates within the NOS Coastal Ocean Modeling Framework (COMF) and has four daily nowcast and forecast cycles at 0, 6, 12, and 18 UTC.

For the CREOFS nowcast cycle, the meteorological forcing is provided by the nested, high-resolution (4 km) NCEP North American Mesoscale (NAM) weather prediction model. River discharge is estimated using near-real-time observations from U.S. Geological Survey river gauges. Oceanographic conditions of subtidal water levels, water temperature and salinity on CREOFS' lateral open boundary on the shelf are estimated based on forecast guidance from the Navy Coast Ocean Model (NCOM) and adjusted by real-time observations at NOS water level gauges. Tides are derived from a regional tidal model of the northeast Pacific Ocean developed by Dr. Mike Foreman. Subtidal water level forecasts from NWS Extra-Tropical Storm Surge (ETSS) Model are used as a backup if NCOM is not available.

For the CREOFS forecast cycle, the meteorological forcing is provided by the nested, high-resolution (4km) NAM weather prediction model. River discharge is estimated by persistence of the most recent near-real-time observations from U.S. Geological Survey river gauges. Oceanographic conditions of subtidal water levels, water temperature and salinity on CREOFS' lateral open boundary on the shelf are estimated based on forecast guidance from NCOM. Tides are derived from Dr. Mike Foreman's northeast Pacific Ocean tidal model. Subtidal water level forecasts from NWS Extra-Tropical Storm Surge (ETSS) Model are used as a backup if NCOM is not available.

Gridded and point forecast guidance from CREOFS will be available in netCDF files on the NCEP server at NOAA's Web Operations Centers (WOC):

ftpprd.ncep.noaa.gov in the directory
/pub/data/nccfs/com/nos/prod/creofs.yyyymmdd

At NOS/CO-OPS OPeNDAP server:

<http://opendap.co-ops.nos.noaa.gov/netcdf/>

and at CO-OPS THREDDS server

<http://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>

CREOFS output is displayed on the CO-OPS webpage at:

<http://tidesandcurrents.noaa.gov>

Additional information about CREOFS can be found at:

<http://www.tidesandcurrents.noaa.gov/models.html>

CREOFS predictions are used by commercial and recreational mariners, fishermen, emergency managers, search and rescue operations, and NWS marine weather forecasters. The development and implementation of CREOFS was a joint project of the NOS/Office of Coast Survey (OCS), the NOS/Center for Operational Oceanographic Products and Services (CO-OPS), NWS/NCEP/NCO and the Oregon Health and Science University. CREOFS is monitored 24/7 by both NCO/NCEP and CO-OPS Continuous Real-Time Monitoring System (CORMS) personnel.

For questions concerning these changes, please contact:

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For questions regarding the dataflow aspects with respect to the NCEP server at the WOC, please contact:

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For questions on how to access CREOFS digital products from CO-OPS servers, please contact:

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National Technical Implementation Notices are online at:

<https://www.weather.gov/notification/archive>

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