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NOAA's National Ocean Service Headquarters Washington DC
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From: Frank Aikman
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NOS Office of Coast Survey

Subject: Implementation of New Extratropical Surge and
Tide Operational Forecast System for the Pacific
(ESTOFS Pacific) for the West Coast, Gulf of Alaska,
and Hawaii, Effective June 24, 2014

Effective June 24, 2014, beginning at 1200Z Coordinated Universal Time (UTC), 800 AM EDT, the Extratropical Surge and Tide Operational Forecast System for the Pacific (ESTOFS Pacific) will be implemented on the NOAA Weather and Climate Operational Supercomputing System (WCOS) operated by NCEP Central Operations (NCO). ESTOFS Pacific will provide users with nowcasts (analyses of near present conditions) and forecast guidance of water level conditions for the West Coast, Gulf of Alaska, and Hawaii. The forecast outputs will include water levels caused by the combined effects of storm surge and tides, by astronomical tides alone, and by sub-tidal water levels (isolated storm surge) out to 180 hours.

The hydrodynamic model employed by ESTOFS is the ADvanced CIRCulation (ADCIRC) finite element model. ADCIRC was developed to perform high resolution simulations of time-dependent, free surface circulation and transport problems in two and three dimensions. ESTOFS uses the Two-Dimensional Depth Integrated (2DDI) version of ADCIRC, which computes the water surface elevation and barotropic depth-averaged currents. ADCIRC uses the finite element method in space, taking advantage of highly flexible, irregularly spaced grids.

The unstructured grid used by ESTOFS Pacific consists of 132,630 nodes and 256,314 triangular elements. Coastal resolution generally ranges between 1 and 3 km. Harmonic tidal constituents from the global tidal model TPXO8-ATLAS are used to specify tidal water surface fluctuations at the open ocean boundary, while tidal potential forcing is applied within the interior of the

domain. The performance of this grid for astronomical tides was verified using tidal elevation data from observation stations located throughout the domain.

ESTOFS Pacific is designed to provide water surface elevations caused by storm surge and astronomical tide to the NCEP WAVEWATCH III (WW3) wave model for coupling wave and water level predictions. Therefore, the ESTOFS set-up is designed to mimic WW3: it uses the same Global Forecast System (GFS) atmospheric forcing (ESTOFS applies 10 m wind speeds and sea level pressure from GFS), has the same forecast cycle (4 times per day concurrent with GFS), length (6 hour nowcast followed by a 180 hour forecast), and will run concurrently on the WCOSS.

ESTOFS output files are provided in two formats: structured GRIB2 files for the contiguous United States (2.5 km resolution) and for Alaska (6 km resolution) and Hawaii (2.5 km resolution), and unstructured NetCDF files on the native ESTOFS finite element grid. NetCDF output is also provided at station locations. GRIB2 files are created for each hourly prediction during a forecast cycle, consisting of records of combined water level (surge with tide), harmonic tidal prediction (astronomical tides), and sub-tidal water levels (the isolated surge). NetCDF files contain an entire nowcast/forecast cycle, and consist of the hourly combined water level over the native ESTOFS grid, or 6-minute combined water level records at station locations.

Beginning June 24 at 1200Z UTC, operational forecast guidance from ESTOFS Pacific will be available in the netCDF and GRIB2 files described above via the NCEP server at:

<http://www.ftp.ncep.noaa.gov/data/nccf/com/estofs/prod>

<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/estofs/prod>

Operational ESTOFS GRIB2 output will also be disseminated via NCEP's NOAA Operational Model Archive and Distribution System (NOMADS) server at

<http://nomads.ncep.noaa.gov/>

ESTOFS is monitored 24 x 7 by NCO. ESTOFS Pacific output is not currently available via SBN or within AWIPS at this time.

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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National Technical Implementation Notices are online at:

<http://www.weather.gov/om/notif.htm>

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