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Service Change Notice 21-14 Updated
NOAA's National Ocean Service Headquarters Silver Spring MD
Relayed by National Weather Service Headquarters Silver Spring MD
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To: Subscribers:
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From: Patrick Burke
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 NOS/Center for Operational Oceanographic Products and
 Services

Subject: Updated: Implementation of new Oceanographic Forecast
Modeling System for the U.S. West Coast (WCOFS) and the Upgraded
Northern Gulf of Mexico (NGOFS2): Effective Monday, March 22,
2021

Updated to reflect new implementation date of Monday, March 22,
2021.

Effective on or about Monday, March 22, 2021, beginning at 12
Coordinated Universal Time (UTC), the new NOAA/National Ocean
Service (NOS) Operational Forecast Systems for the West Coast
(WCOFS) and the Northern Gulf of Mexico (NGOFS2) will be
implemented on NOAA's Weather Climate Operational Supercomputing
System (WCOS). NGOFS2 integrates the existing Northern Gulf of
Mexico (NGOFS), Northeastern Gulf of Mexico (NEGOFS), and
Northwestern Gulf of Mexico (NWGOFS) into one model grid and
extends the model domain to the Mexico border and into the
Mississippi River up to Baton Rouge. NGOFS, NEGOFS, and NWGOFS
will be retired and their products (NetCDF output files and web
products) will no longer be available after NGOFS2 is
implemented in operations.

Changes to the existing OFS:

Output from NGOFS, NEGOFS, and NWGOFS will no longer be
available on the CO-OPS THREDDS server:

<https://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>
<ftp://tidepool.nos.noaa.gov/pub/outgoing/ofs>

or on National Centers for Environmental Prediction (NCEP)

NOMADS and FTP Web services:

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

<ftp://ftpprd.ncep.noaa.gov> Under directory structure:

pub/data/nccf/com/nos/prod/OFS.YYYYMMDD and with filenames:

nos.OFS.fields.nHHH.YYYYMMDD.tCCz.nc

nos.OFS.fields.fHHH.YYYYMMDD.tCCz.nc

nos.OFS.hflux.forecast.YYYYMMDD.tCCz.nc

nos.OFS.hflux.nowcast.YYYYMMDD.tCCz.nc

nos.OFS.init.nowcast.YYYYMMDD.tCCz.nc

nos.OFS.stations.nowcast.YYYYMMDD.tCCz.nc

nos.OFS.stations.forecast.YYYYMMDD.tCCz.nc

nos.OFS.met.forecast.YYYYMMDD.tCCz.nc

nos.OFS.met.nowcast.YYYYMMDD.tCCz.nc

nos.OFS.obc.YYYYMMDD.tCCz.nc nos.OFS.river.YYYYMMDD.tCCz.nc.tar

nos.OFS.forecast.YYYYMMDD.tCCz.in

nos.OFS.forecast.YYYYMMDD.tCCz.log

nos.OFS.nowcast.YYYYMMDD.tCCz.in

nos.OFS.nowcast.YYYYMMDD.tCCz.log

nos.OFS.jlogfile.YYYYMMDD.tCCz.log

nos.OFS.corms.YYYYMMDD.tCCz.log

Where YYYY, MM, DD is year, month, day, CC is cycle

(03,09,15,21), HHH is forecast hour, and OFS is ngofs, negofs,
or nwgofs

Output from CBOFS, DBOFS, and GOMOFS will be made available
greater than 5 minutes earlier.

New NGOFS2 System:

NGOFS2 will provide users with nowcast (analyses of near
present) and forecast guidance of the three-dimensional physical
conditions of the Northern Gulf of Mexico, including surface
water levels, surface water currents, water temperature and
water salinity, and 3-D water currents, water temperature, and
water salinity up to 48 hours.

As its core ocean prediction model, NGOFS2 uses the same Finite
Volume Community Ocean Model (FVCOM) developed jointly by the
University of Massachusetts, Dartmouth and the Woods Hole
Oceanographic Institution as used by the existing NGOFS, NEGOFs,
and NWGOFs. FVCOM is a prognostic, unstructured-grid, finite-
volume, free-surface, 3-D primitive equation coastal ocean
circulation model with a horizontal grid comprised of
unstructured triangular cells and the irregular bottom is
presented using generalized terrain-following coordinates.
FVCOM is one of the NOS- supported community ocean models used
to develop predictive coastal applications.

NGOFS2 operates within the NOS Coastal Ocean Modeling Framework (COMF) and will have the same four daily nowcast and forecast cycles as NGOFS at 03, 09, 15, and 21 UTC.

NGOFS2 bathymetry has a minimum depth of 1.0 m and maximum depth of 1750.3 m. The unstructured triangular grid has 303,714 nodes and 569,405 elements. The horizontal triangular grid size ranges from 45 m to 10 km, with higher resolution located in tidal creeks, inlets connecting bay with coastal ocean, and intracoastal waterways and coarser resolution along the open boundary. The model has 41 uniform sigma levels in vertical.

The meteorological forcing for the nowcast and forecast cycles is provided by the NWS 12 km resolution North American Mesoscale (NAM) weather prediction model. Non-tidal water levels and thirty seven tidal constituents along the open boundary are interpolated from NWS Global Real-Time Ocean Forecast System (G-RTOFS) and the Advanced Circulation Model (ADCIRC) ec2001 tidal database, respectively. The temperature and salinity along the open boundary are interpolated from the G-RTOFS forecast guidance. The river forcing is provided by USGS Real-time river discharge observations for nowcast cycles, the last observed discharges are persisted for forecast cycles.

New WCOFS System:

The WCOFS domain encompasses the entire West Coast from California to Washington to the 10 m isobath and extends offshore for more than 1,000 km. WCOFS will provide users with nowcast (analyses of near present) and forecast guidance of the three-dimensional physical conditions of the entire West Coast of the U.S., including water levels, water currents, water temperature and water salinity up to 72 hours.

WCOFS is based on the [Regional Ocean Modeling System \(ROMS\)](#) developed by the coastal ocean modeling community and supported by Rutgers University. ROMS is a free-surface, terrain-following, primitive equation ocean model widely used by the scientific and operational community for a diverse range of applications. ROMS is one of the NOS-supported community ocean models used for predictive coastal applications and it operates within the NOS Coastal Ocean Modeling Framework (COMF). The model grid has 348x1016 points in the horizontal with grid resolution of about 4 km. The vertical grid follows the terrain and consists of 40 levels.

WCOFS nowcast/forecast starts with an analysis from a 3-day data assimilation window. ROMS's four dimensional variational data

assimilation (4DVAR) methodology is used to improve the initial conditions of the ocean state. Currently, the following observations are assimilated: 3-satellite sea surface temperature (SST) (the Visible Infrared Imaging Radiometer Suite (VIIRS) onboard the Suomi National Polar-Orbiting Partnership, VIIRS from NOAA-20, and Advanced Baseline Imager from GOES-17), surface currents from the National High Frequency Radar (HFR) network, and absolute dynamic topography (ADT) from satellites Jason 3, Sentinel 3, Cryosat 2, and SARAL/Altika.

WCOFS has three open-ocean boundaries (north, south and west). NCEP's Global Real Time Ocean Forecast System (RTOFS) is used to provide open boundary conditions for non-tidal water level, temperature, salinity, and non-tidal depth integrated currents. Tidal currents and water level are constructed from Oregon State University's TPX08 tidal database. Temperature and salinity within a 100km zone along the open boundary are also nudged towards RTOFS temperature and salinity fields.

Meteorological surface forcing conditions are derived from the National Weather Service's (NWS) North American Mesoscale 12 km atmospheric forecast model data. Operational products from the NWS Global Forecasting System (FV3GFS) serve as the backup meteorological surface forcing conditions in the event that NAM products are not available for both the nowcast and forecast runs. Additionally, WCOFS uses USGS real-time river discharge observations at the Columbia River and climatology discharge and temperature for 14 rivers in Washington and the Fraser River in Canada during the nowcast run. River discharge and temperature are held constant from the last observation throughout the forecast period.

Nowcast and forecast guidance cycles are run daily with 24-hour nowcast and 72-hour forecast.

Dissemination of New Products D1. Model output files:
Fields and station forecast guidance from WCOFS and NGOFS2 will be available in NetCDF format on CO-OPS THREDDS server:

<https://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>
<ftp://tidepool.nos.noaa.gov/pub/outgoing/ofs>

and on NCEP Web services

<https://nomads.ncep.noaa.gov/pub/data/nccf/com/nos/prod/>
<ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nos/prod/>
<https://www.ftp.ncep.noaa.gov/data/nccf/com/nos/prod/>

As part of NCEP's standard 30 day parallel testing, the output products from NCO parallel runs will be available here:

<https://para.nomads.ncep.noaa.gov/pub/data/nccf/com/nos/para/>

Delayed long term model archives on National Centers for Environmental Information (NCEI) NOMADS are available here:

<https://www.ncei.noaa.gov/thredds/model/model.html>

Web products for WCOFS and NGOFS2 will be displayed at:

<https://tidesandcurrents.noaa.gov/ofs/wcofs/wcofs.html>

<https://tidesandcurrents.noaa.gov/ofs/ngofs2/ngofs2.html>

IOOS EDS viewer: <https://eds.ioos.us/#>

The following types of model output files will be available from WCOFS and NGOFS2:

The first type is field/gridded data which includes three dimensional gridded data at three-hourly intervals:

`nos.{OFS}.fields.nHHH.YYYYMMDD.tCCz.nc`

where HHH is 000, 003, and 06 when OFS = ngofs2 where HHH is 003, 009, ..., 024 when OFS = wcofs

`nos.{OFS}.fields.fHHH.YYYYMMDD.tCCz.nc`

where HHH is 000, 003, ..., 048 when OFS = ngofs2 where HHH is 003, 006, ..., 072 when OFS = wcofs

and two-dimensional gridded surface data at one-hourly

intervals: `nos.{OFS}.2ds.nHHH.YYYYMMDD.tCCz.nc`

where HHH is 000, 001, ..., 006 when OFS = ngofs2 where HHH is 001, 002, ..., 024 when OFS = wcofs

`nos.{OFS}.2ds.fHHH.YYYYMMDD.tCCz.nc`

where HHH is 000, 001, ..., 048 when OFS = ngofs2 where HHH is 001, 002, ..., 072 when OFS = wcofs

where

YYYYMMDD is year, month, day

CC is 03, 09, 15, or 21 when OFS = ngofs2 CC is 03 when OFS = wcofs

The second type is station/point data with a 6 minute interval. Water level, surface wind, water temperature, salinity, and water currents are the output variables.

`nos.{OFS}.stations.nowcast.YYYYMMDD.tCCz.nc`

`nos.{OFS}.stations.forecast.YYYYMMDD.tCCz.nc`

where

CC is 03, 09, 15, or 21 when OFS = ngofs2 CC is 03 when OFS = wcofs

and three-dimensional daily averaged field output.

`nos.wcofs.avg.nowcast.YYYYMMDD.tCCz.nc`

nos.wcofs.avg.forecast.YYYYMMDD.tCCz.nc where CC is 03

D2. Model Input Files:

The following forcing condition files are also available for rerun and research purposes: Initial condition file for nowcast:

nos.{OFS}.init.nowcast.YYYYMMDD.tCCz.nc Meteorological forcing

files: nos.{OFS}.met.nowcast.YYYYMMDD.tCCz.nc

nos.{OFS}.met.forecast.YYYYMMDD.tCCz.nc

nos.ngofs2.hflux.nowcast.YYYYMMDD.tCCz.nc

nos.ngofs2.hflux.forecast.YYYYMMDD.tCCz.nc River forcing file:

nos.ngofs2.river.YYYYMMDD.tCCz.nc.tar

nos.wcofs.river.YYYYMMDD.tCCz.nc Open boundary forcing file:

nos.{OFS}.obc.YYYYMMDD.tCCz.nc Open boundary nudging file:

nos.wcofs.clim.YYYYMMDD.tCCz.nc

nos.wcofs.roms.tides.YYYYMMDD.tCCz.nc Run control input files:

nos.{OFS}.nowcast.YYYYMMDD.tCCz.in

nos.{OFS}.forecast.YYYYMMDD.tCCz.in Real-Time model run log

files: nos.{OFS}.corms.YYYYMMDD.tCCz.log

nos.{OFS}.jlogfile.YYYYMMDD.tCCz.log

nos.{OFS}.nowcast.YYYYMMDD.tCCz.log

nos.{OFS}.forecast.YYYYMMDD.tCCz.log

{OFS}.status where

CC is 03, 09, 15, or 21 when OFS = ngofs2 CC is 03 when OFS =

wcofs

Forecast guidance from both WCOFS and NGOFS2 are used by commercial, recreational mariners, fisherman, emergency managers, search and rescue responders, and NWS marine weather forecasters. The development and implementation of WCOFS is a joint project of the NOS/Center for Operational Oceanographic Products and Services (CO-OPS), the NOS/Office of Coast Survey (OCS), National Environmental Satellite, Data, and Information Service (NESDIS), and NWS/NCEP/NCEP Central Operations (NCO). Rutgers University provided technical support for ROMS. The development and implementation of NGOFS2 is a joint project of the NOS/Center for Operational Oceanographic Products and Services (CO-OPS), the NOS/Office of Coast Survey (OCS), NWS/NCEP/NCEP Central Operations (NCO) and the FVCOM development group at the University of Massachusetts, Dartmouth.

WCOFS and NGOFS2 will be monitored 24 x 7 by both NCO/NCEP and CO-OPS Continuous Real-Time Monitoring System (CORMS) personnel.

Additional information about WCOFS and NGOFS2 can be found at

https://tidesandcurrents.noaa.gov/ofswcofs/wcofs_info.html

https://tidesandcurrents.noaa.gov/ofsnngofs2/ngofs_info.html

NOTE: The NOS OFS model is not designed to be used as a storm surge model, and during extreme weather events may provide inaccurate results. Its water level forecast guidance data are released for limited public utility and should be used with appropriate caution. In particular, WCOFS uses a numerical hydrodynamic model to generate the nowcast and forecast information; therefore, they should be considered as model-generated nowcast and forecast guidance. For more detailed information related to the OFS disclaimer, please visit <https://tidesandcurrents.noaa.gov/disclaimers.html>.

NCEP urges all users to ensure their decoders can handle changes in content order and volume changes. These elements may change with future NCEP model implementations. NCEP will make every attempt to alert users to these changes before implementation.

Any questions, comments or requests regarding this implementation should be directed to the contacts below. We will review any feedback and decide whether to proceed.

If you have any questions concerning these changes, please contact:

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For questions regarding dataflow aspects, please contact:

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National Service Change Notices are online at:

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

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