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PNSWSH

Service Change Notice 20-89 Updated
National Weather Service Headquarters Silver Spring MD
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To: Subscribers:
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 -Emergency Managers Weather Information Network
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From: Brian Gross
 Acting Director, NCEP

Subject: Updated: Implementation of the Extratropical Surge and
 Tide Operational Forecast System Global (ESTOFS-Global)
 Effective: November 10, 2020

Updated to reflect new implementation date.

Effective on or about November 10, 2020, beginning with the 1200 Universal Coordinated Time (UTC) cycle, the National Centers for Environmental Prediction (NCEP) Central Operations (NCO) will upgrade the Extratropical Surge and Tide Operational Forecast System (ESTOFS) to ESTOFS Global (ESTOFS-Global).

The new upgrade will replace and retire all three current operational ESTOFS models: ESTOFS-Atlantic, ESTOFS-Pacific, and ESTOFS-Micronesia. The new ESTOFS-Global will provide global coverage that will extend model coverage of the existing ESTOFS models.

Expected benefits from this upgrade include:

- Improved spatial resolution in U.S. waters
- Unification of ESTOFS modeling infrastructure
- Reduction of bias and errors due to removal of the open ocean boundary
- Inclusion of internal tides
- Inclusion of self-attraction and loading

- Inclusion of sea-ice effect on wind drag coefficient
- Implementation of dynamic water level bias correction

1) Implementation of dynamic water level bias correction effect

Observed coastal water level anomalies are assimilated to reduce linear bias. This model bias is associated with unresolved physical processes (river outflow, wave setup, seasonal baroclinic variability, mesoscale circulation, poorly resolved weather signals, etc). A 2-day average of the water level anomalies is used, which has been found to be the best representation of setup/setdown state for the model. These anomalies are defined as the observed water level minus the tidal prediction, so only the surge is corrected using this offset, as we are assuming the tides are perfectly represented. The offsets are computed each cycle (every 6 hours) at observation locations and interpolated across the model grid using Shepard's Inverse Distance Weighted (IDW) method. The offsets are computed before the nowcast and persisted as a constant offset during the nowcast and forecast.

2) Output changes for web services

With this upgrade, the following changes will be noted on NCEP web services:

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

A. Directory Changes:

from - estofs/prod/estofs_atl.YYYYMMDD
 estofs/prod/estofs_mic.YYYYMMDD
 estofs/prod/estofs_pac.YYYYMMDD
to - estofs/prod/estofs.YYYYMMDD

Where YYYYMMDD is year, month and day.

B. NOMADS Grib Filter Changes:

from: https://nomads.ncep.noaa.gov/cgi-bin/filter_estofs_atl.pl
https://nomads.ncep.noaa.gov/cgi-bin/filter_estofs_pac.pl
https://nomads.ncep.noaa.gov/cgi-bin/filter_estofs_mic.pl
to - https://nomads.ncep.noaa.gov/cgi-bin/filter_estofs.pl

C. OpenDAP Changes:

from - https://nomads.ncep.noaa.gov/dods/estofs_atl
https://nomads.ncep.noaa.gov/dods/estofs_pac
https://nomads.ncep.noaa.gov/dods/estofs_mic
to - <https://nomads.ncep.noaa.gov/dods/estofs>

D. Timeliness changes:

ESTOFS-Global files may be up to 40 minutes later relative to the current production output times of ESTOFS-Atlantic and ESTOFS-Micronesia files. Files currently in the ESTOFS-Pacific production directory may be up to 1:40 later.

E. Resolution changes:

The increased unstructured grid consists of 8 million nodes, which increases coastal grid resolution to up to 80 m for Hawaii and US West Coast and to up to 120 m for US East Coast, Puerto Rico, Micronesia, and Alaska. The grid extends inland up to 6 m above Mean Sea Level (MSL) for the US East Coast, and up to 20 m above MSL for the Pacific Islands.

F. Filename changes and additions - fields files:

The increased resolution will impact the following field files. Some files will change name, while others will be new.

from - estofs.{atl,pac,mic}.tCCz.fields.cwl.nc
to - estofs.tCCz.fields.cwl.nc
new - estofs.tCCz.fields.htp.nc
estofs.tCCz.fields.swl.nc

Where tCCz is forecast cycle: CC=00, 06, 12, 18;
cwl = combined water level, htp = tidal predictions, swl = surge-only component.

G. Filename changes and additions - point output:

ESTOFS-Global will produce point output at 558 locations globally. These point locations will be provided in the following files:

from - estofs.{atl,pac,mic}.tCCz.points.cwl.nc
estofs.{atl,pac,mic}.tCCz.points.htp.nc
to - estofs.tCCz.points.cwl.nc
estofs.tCCz.points.htp.nc
new - estofs.tCCz.points.swl.nc

Where tCCz is forecast cycle: CC=00, 06, 12, 18;
cwl = combined water level, htp = tidal predictions, swl =

surge-only component.

H. Filename changes and additions - grib2 output:

GRIB2 CONUS file names will change, providing US East Coast and West Coast regions separately.

from - estofs.{atl,pac}.tCCz.conus.fHHH.grib2

to - estofs.tCCz.conus.{east,west}.fHHH.grib2

Where fHHH is forecast hour: HHH=000 through HHH=180.

GRIB2 file names for all regions will change:

from - estofs.atl.tCCz.puertori.fHHH.grib2

estofs.pac.tCCz.alaska.fHHH.grib2

estofs.pac.tCCz.hawaii.fHHH.grib2

estofs.mic.tCCz.guam.{fHHH,cwl,htp,swl}.grib2

estofs.mic.tCCz.northpacific.{fHHH,cwl,htp,swl}.grib2

to - estofs.tCCz.puertori.fHHH.grib2

estofs.tCCz.alaska.fHHH.grib2

estofs.tCCz.hawaii.fHHH.grib2

estofs.tCCz.guam.fHHH.grib2

estofs.tCCz.northpacific.fHHH.grib2

Where tCCz is forecast cycle: CC=00, 06, 12, 18;
fHHH is forecast hour: HHH=000, 001, 002, ... 180; cwl =
combined water level, htp = tidal predictions, swl = surge-only
component.

I. Filename changes and additions - SHEF output:

SHEF files will change names and include entire US coastal stations including Puerto Rico, Hawaii, Micronesia, and Alaska.

from - estofs.{atl,mic}.tCCz.points.cwl.shef

estofs.{atl,mic}.tCCz.points.htp.shef

estofs.{atl,mic}.tCCz.points.swl.shef

to - estofs.tCCz.points.cwl.shef

estofs.tCCz.points.htp.shef

estofs.tCCz.points.swl.shef

Where tCCz is forecast cycle: CC=00, 06, 12, 18;
cwl = combined water level, htp = tidal predictions, swl =
surge-only component.

3) NOAAPORT/SBN Changes

1. Timing changes:

There are timeliness changes up to 60 minutes later for Atlantic and Micronesia data and 80 minutes for Pacific data distributed over NOAAPORT.

2. Update to SHEF ID impacting headers:

Users who are using the Micronesia SHEF IDs labeled "TIBEM" will need to begin using the Atlantic SHEF IDs labeled "TIBEA".

Product	Old Header	New Header
SHEF Harmonic Tidal Prediction	SXUS01 KWBM TIBEM	SXUS01 KWBM TIBEA
SHEF Combined Water Level	SXUS02 KWBM TIBEM	SXUS02 KWBM TIBEA
SHEF Sub-tidal Water Levels	SXUS03 KWBM TIBEM	SXUS03 KWBM TIBEA

The Ocean Prediction Center (OPC) of NWS will deliver graphics of the model outputs on the following site:

https://ocean.weather.gov/estofs/estofs_surge_info.php

NOAA's nowCOAST (<https://nowcoast.noaa.gov>) will be upgraded to provide maps of water level forecast guidance from the latest ESTOFS-Global forecast cycle, as well as geo-referenced hyperlinks to point forecast guidance time series plots, via the nowCOAST map viewer and the map service at https://nowcoast.noaa.gov/arcgis/rest/services/nowcoast/guidance_model_coastalocean_estofs_time/MapServer. However, displayed coverage will be limited to approximately the same geographic areas as the previous ESTOFS grid domains (Northwest Atlantic, Gulf of Mexico, Puerto Rico, Northeast Pacific, Hawaii, and Micronesia). Maps of forecast guidance for the entire ESTOFS-Global coverage area will be made available in a future nowCOAST upgrade.

A consistent parallel feed of data is available on the NCEP HTTPS site at the following URL:

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

NCEP urges all users to ensure their decoders can handle changes

in content order, changes in the scaling factor component within the product definition section (PDS) of the GRIB files, 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.

For questions concerning science changes, please contact:

Dr. Edward P. Myers
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For questions regarding the data flow aspects of these datasets, contact:

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National Service Change Notices are online at:
<https://www.weather.gov/notification/>

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