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PNSWSH

Service Change Notice 22-108 Updated
National Weather Service Headquarters Silver Spring MD
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To: Subscribers:
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From: Shachak Pe'eri
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           NOS/Office of Coast Survey

Subject: Updated: Upgrade of the Surge and Tide Operational Forecast
System (STOFS, Formerly ESTOFS) to Version 1.1.0: Effective December 13,
2022

Updated the From: field to reflect the National Ocean Service (NOS) office
responsible for the model system.

Effective on or about December 13, 2022, beginning with the 1200
Coordinated Universal Time (UTC) cycle, the National Centers for
Environmental Prediction (NCEP) Central Operations (NCO) will upgrade the
Surge and Tide Operational Forecast System (STOFS, formerly ESTOFS) to
Version 1.1.0. This implementation may be delayed if there is declaration
of either an Enhanced Weather situation or Critical Weather Day.

STOFS V1.1.0 represents a major upgrade of the ESTOFS modeling system,
last upgraded in July 2021. STOFS V1.1.0 contains several enhancements
improving model performance, resolution, and coverage, including a name
change to STOFS, an addition of a three dimensional (3D) component for the
Atlantic basin, and upgrades to the global modeling system.

Model upgrades include:

- Renaming Extratropical Surge and Tide Operational Forecast System
(ESTOFS) to STOFS, as global forecast guidance is provided by the system.
Please be prepared to rename scripts, URLs, etc. with this name change
from ESTOFS to STOFS.

- Addition of a 3D modeling component, called STOFS-3D-Atlantic, to
support 3D coastal flooding for the Atlantic basin (i.e., U.S. East Coast,
Gulf of Mexico, and Puerto Rico). STOFS-3D-Atlantic will use input from
the National Water Model to include inland hydrology and extreme
precipitation effects on coastal flooding, and will also provide surface
currents for marine navigation use. This modeling component will use the
Semi-implicit Cross-scale Hydroscience Integrated System Model (SCHISM)
model core.

- Upgrades to the global modeling component, now called STOFS-2D-Global,

which uses the ADvanced CIRCulation (ADCIRC) model core.

- Improved spatial resolution for the U.S. East Coast, U.S. West Coast, Alaska, and Iceland. For the U.S. West Coast, the improved resolution especially in small inlets and near jetties will provide better resolved depth-integrated currents for the Nearshore Wave Prediction System (NWPS), which hopes to resolve wave-current interactions, e.g., steepening waves, important for weather/wave forecasters in small/large inlets.

- Additional station output for NWS Eastern and Alaska Regions, and for satellite altimetry use.

- Upgrade of bottom friction representation by the use of spatially-varying Manning's N, for improved tide and surge prediction.

- Removal of the water level bias correction "offset" script to remediate high water spots observed to occur in some coastal areas partly as a result of this script. The bias correction will be revisited for a possible future model upgrade.

Output changes for NCEP Operational Model Archive and Distribution System (NOMADS) and FTPPRD web services:

- The overall directory structure for the model will move on NOMADS and FTPPRD to reflect the new model name. On implementation day, data will go under:

https://nomads.ncep.noaa.gov/pub/data/nccf/com/stofs/prod/
https://nomads.ncep.noaa.gov/pub/data/nccf/com/stofs/v1.1/
ftp://ftpprd.ncep.noaa.gov/pub/data/nccf/com/stofs/prod/
ftp://ftpprd.ncep.noaa.gov/pub/data/nccf/com/stofs/v1.1/

- The gridded binary (GRIB) filter and OpenDAP locations on NOMADS will also change to reflect the new model name as well as distinguish between the 2D global and 3D Atlantic regions:

https://nomads.ncep.noaa.gov/cgi-bin/filter_stofs_2d_glo.pl
https://nomads.ncep.noaa.gov/cgi-bin/filter_stofs_3d_atl.pl
https://nomads.ncep.noaa.gov/dods/stofs_2d_glo
https://nomads.ncep.noaa.gov/dods/stofs_3d_atl

File additions and file name changes:
These are the additional files for STOFS-3D-Atlantic:

stofs_3d_atl.t12z.{n001_024,f001_024,f025_048}.field2d.nc
stofs_3d_atl.t12z.fields.out2d_{nowcast,forecast_day1,forecast_day2}.nc
stofs_3d_atl.t12z.{ncast,fcast}.station.profile.nc
stofs_3d_atl.t12z.points.cwl.temp.salt.vel.nc
stofs_3d_atl.t12z.points.cwl.shef stofs_3d_atl.t12z.fields.cwl.maxele.nc
stofs_3d_atl.t12z.conus.east.f{hour}.grib2 (where {hour}={000-048})
stofs_3d_atl.t12z.conus.east.cwl.grib2
stofs_3d_atl.t12z.puertori.f{hour}.grib2 (where {hour}={000-048})
stofs_3d_atl.t12z.puertori.cwl.grib2

The following are file name changes for STOFS-2D-Global:

```
stofs_2d_glo.tCCz.points.{cwl,htp,swl}.nc
stofs_2d_glo.tCCz.points.{cwl.htp.swl}.shef
stofs_2d_glo.tCCz.fields.{cwl,htp,swl}.nc
stofs_2d_glo.tCCz.alaska.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.alaska.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.conus.east.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.conus.east.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.conus.west.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.conus.west.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.guam.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.guam.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.hawaii.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.hawaii.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.northpacific.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.northpacific.f{hour}.grib2 (where {hour}={000-180})
stofs_2d_glo.tCCz.puertori.{cwl,htp,swl}.grib2
stofs_2d_glo.tCCz.puertori.f{hour}.grib2 (where {hour}={000-180})
```

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

Timeliness changes:
The following STOFS-2D-Global NetCDF cwl (combined water level) points and fields files will be available over 5 minutes earlier:

```
stofs_2d_glo.tCCz.points.cwl.nc stofs_2d_glo.tCCz.fields.cwl.nc
```

Where tCCz is forecast cycle: CC=00, 06, 12, 18; cwl = combined water level.

File size changes:
The increased stations for NWS Eastern and Alaska Regions and for satellite altimetry use, and the increased unstructured grid consisting of over 12.78 million nodes, which increases coastal grid resolution from up to 300 m to up to 80 m for US West Coast and Alaska with the addition of a floodplain, changes the following STOFS-2D-Global NetCDF and GRIB2 (up to 30%) file sizes:

```
stofs_2d_glo.tCCz.points.{cwl,htp,swl}.nc
stofs_2d_glo.tCCz.fields.{cwl,htp,swl}.nc
stofs_2d_glo.tCCz.{alaska,conus.east,conus.west,guam,hawaii,northpacific,puertori}.f{hour}grib2
```

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

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

https://nomads.ncep.noaa.gov/pub/data/nccf/com/stofs/para/

https://para.nomads.ncep.noaa.gov/pub/data/nccf/noaaport/stofs_2d_glo/

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:

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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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