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PNSWSH

Technical Implementation Notice 16-08
NOAA's National Ocean Service Headquarters Washington DC
Related by National Weather Service Washington DC
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Subject: Upgrading National Ocean Service's Lake Erie
        Operational Forecast System, Effective April 26, 2016

Effective on or about April 26, 2016 beginning at 12z
Coordinated Universal Time (UTC) run, the National Centers for
Environmental Prediction (NCEP) will be upgrading the National
Ocean Service's Lake Erie Operational Forecast System (LEOFS).
The summary of this upgrade are:
  - Change the core numerical model
  - Change the model setup
  - Change the run schedule
  - Change the output filenames
  - More stations/points in the station output

1. Core numerical model changes from POM to FVCOM

The core ocean model used for the present LEOFS is a customized
version of the Princeton Ocean Model (POM), which is not a
standard hydrodynamic model for NOS OFS. The upgraded LEOFS uses
Finite Volume Community Ocean Model (FVCOM), one of standard
core hydrodynamic models for NOS OFS development and
implementation. FVCOM is a widely used, open-source, community
supported model. The upgrade of LEOFS is a collaborative effort
of NOAA's Great Lakes Environmental Laboratory, NOS/Coast Survey
Development Laboratory, NOS/Center for Operational Products and
Services, and NWS/NCEP Central Operations.

The present LEOFS uses a 81 x 24 regular horizontal grid with
5km resolution and 10 vertical layers while the upgraded LEOFS
uses an unstructured triangular grid of 6106 nodes and 11509
elements with grid size ranging from 400m to 3.5km and 20
vertical layers.

2. Model setup Changes

The nowcast cycles of the present LEOFS are forced by surface meteorological analyses based on surface weather observations from land stations and overwater platforms while the forecast cycles are forced by surface weather forecasts from the National Weather Service's National Digital Forecast Database (5-km spatial resolution).The nowcast cycles of the upgraded LEOFS is forced by the 2-hr forecast guidance from the NWS' High Resolution Rapid Refresh (HRRR) model while the forecast cycles are forced by forecasts from the NDFD (2.5km spatial resolution).

The present LEOFS has no lateral boundary conditions. The upgraded LEOFS has two open boundaries: one for the Detroit River and one for the Niagara River. For the nowcast cycle, near-real-time water level observations from nearby NOAA water level gauges at Gibraltar, MI and Buffalo, NY are used to specify water level open boundary conditions, respectively. An offset for each open boundary is applied to the observed water level to account for the rough river channel representation and/or distance between station and boundary location. The offset is adjusted each cycle based on the model observation discrepancy at Fermi Power Plant, MI and Buffalo, NY, respectively. Water temperature observations from the USGS station at Fort Wayne, MI are used to specify temperature along the open boundaries. For the forecast cycle, the open boundary conditions are persisted from nowcast cycle for both water levels and water temperature.

3. Cycle Changes

 -Current:
    The nowcast runs every hour, and forecast runs every 6-hour at 00, 06, 12, 18z for 60-hour forecast.
 -Upgraded:
    Both nowcast and forecast will run every 6 hours at 01, 07, 13 and 19z, and forecast runs for 120-hour. This is to be consistent with other OFS run schedules.

4. Model Output Change

The model output files available on NCEPs http and ftp servers
  nomads.ncep.noaa.gov/pub/data/nccf/com/nos/prod/
  ftpprd.ncep.noaa.gov/data/nccf/com/nos/prod
  ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/nos/prod

- The LEOFS files will change in directory structure from:
  /glofs.YYYMMDD -> /leofs.YYYYMMDD/
Where YYYYMMDD is Year, Month, Day

- The upgraded LEOFS will follow NOS OFS standard file name convention. Only the first octet will change from:
  glofs.leofs.*.YYYYMMDD.tCCz.nc ->
  nos.leofs.*.YYYYMMDD.tCCz.nc
Where CC is cycle time

- The field output is now hourly, so each file contains only one
time record.
  glofs.leofs.fields.forecast.YYYYMMDD.tCCz.nc ->
  nos.leofs.fields.fFFF.YYYYMMDD.tCCz.nc
  glofs.leofs.fields.nowcast.YYYYMMDD.tCCz.nc ->
  nos.leofs.fields.nNNN.YYYYMMDD.tCCz.nc
Where FFF is from 000 to 120
Where NNN is from 000 to 006

- The restart files will be changing both in name and format.
This will more accurately follow the NOS OFS standards:
  glofs.leofs.rst.nowcast.YYYYMMDD.tCCz.bin ->
  nos.leofs.rst.nowcast.YYYYMMDD.tCCz.nc

- Point/station Output Changes
The file now contains a total of 28 stations. In addition to the
11 stations in the present LEOFS, 4 more buoy locations (Oregon,
OH (45165), 2 near Cleveland, OH (45164 and 45169), Erie, PA
(45167)), 6 water level stations on the Canadian coast (Bar
Point, Kingsville, Erieau, Port Stanley, Port Dover and Port
Colborne), 5 points for NERFC potential model use and 2 points
on the open boundary are also included.

Gridded and point forecast guidance from parallel runs will be
available in netCDF files on the NCEP NOMADS server in the
directory,
  para.nomads.ncep.noaa.gov/pub/data/nccf/com/nos/para/

Graphics products are now displayed on the CO-OPS developmental
web page at
  http://tidesandcurrents.noaa.gov/ofs/dev/leofs/leofs.html

Operational data are also available on CO-OPS thredds server
  http://opendap.co-ops.nos.noaa.gov/thredds/catalog.html

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NWS National Technical Implementation Notices are online at:

  http://www.nws.noaa.gov/os/notif.htm

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