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Service Change Notice 21-50
National Weather Service Headquarters Silver Spring MD
845 AM EDT Fri May 7 2021

To: Subscribers:
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 - Emergency Managers Weather Information Network
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From: Dr. Michael Farrar
 Director
 National Centers for Environmental Prediction

Subject: Initial Implementation of SPC-Post, Including
 Calibrated Thunderstorm and Severe Thunderstorm
 Guidance: Effective May 11, 2021

Effective on or about May 11, 2021, beginning with the 1200 Coordinated Universal Time (UTC) run, the National Centers for Environmental Prediction (NCEP) will begin operationally running the Storm Prediction Center's (SPC's) post-processing suite (SPC-Post). In the event of a Critical Weather Day (CWD) declaration, the implementation may be delayed.

SPC-Post version 1.0.6 includes two primary probabilistic products:
* High-Resolution Ensemble Forecast (HREF) calibrated thunderstorm probabilities
* HREF/ Short-Range Ensemble Forecast (SREF) calibrated tornado, severe hail, and severe wind probabilities

These products and associated output files are discussed separately below.

A) HREF Calibrated Thunderstorm Probabilities

The HREF calibrated thunderstorm probabilities use three inputs from HREFv3: 1) -10C reflectivity, 2) accumulated precipitation, and 3) most-unstable lifted index. Probabilistic thresholds were selected for each input field and then weighted to optimize performance. Finally, the raw probabilistic field is calibrated to one or more cloud-to-ground lightning flashes at each 40-km grid point (i.e., within 20 km or ~12.5 miles).

The HREF calibrated thunderstorm probabilities are available for three different time windows: 1-hour, 4-hour, and full periods, where "full" refers to the remainder of the convective day. The output grib2 file name templates by period (1hr, 4hr, & full) are as follows:

* hrefct.tHHz.thunder_1hr.fFFF.grib2
* hrefct.tHHz.thunder_4hr.fFFF.grib2
* hrefct.tHHz.thunder_full.fFFF.grib2

Where HH refers to the initialization time of the HREF (00 or 12 UTC) and FFF is the forecast hour (hourly from f001 to f048).

On NCEP web services (NOMADS/FTPFRD), these files will be in:

https://nomads.ncep.noaa.gov/pub/data/nccf/com/spc_post/prod/spc_post.YYY YMMDD/thunder

ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/spc_post/prod/spc_post.YYYYMMDD /thunder

B) HREF/SREF Calibrated Severe Probabilities

The HREF/SREF calibrated severe thunderstorm probabilities (i.e., tornado, hail, and wind) use two inputs: 1) HREF neighborhood probability of updraft helicity exceeding the 99.85% value, and 2) SPCSREF (SPC's post-processed guidance calculated from the SREF) environmental exceedance probabilities: STP>1 for tornado, MUCAPE>1000 J/kg x Effective Bulk Shear>20 knots for hail, and MUCAPE>250 J/kg x Effective Bulk Shear>20 knots. The historical frequency of a hazard report occurring within 25 miles of a grid point for that 4-hour period and forecast pair of probabilities is used as the 4-hour calibrated hazard probability.

The HREF/SREF calibrated severe thunderstorm probabilities are available for two different time windows: 4-hour, and 24-hour. The output grib2 file name templates by period (4hr and 24hr):

- * href_cal_wind.tHHz.4hr.fFFF.grib2
- * href_cal_hail.tHHz.4hr.fFFF.grib2
- * href_cal_tor.tHHz.4hr.fFFF.grib2
- * href_cal_wind.tHHz.24hr.fFFF.grib2
- * href_cal_hail.tHHz.24hr.fFFF.grib2
- * href_cal_tor.tHHz.24hr.fFFF.grib2

Where HH refers to the latest initialization time of the HREF or SREF (00, 03, 12, or 15) and FFF is the forecast hour (see below for details).

The specific inputs and available forecast hours are noted below for each initialization (HH) time:

- * 00Z Cycle: 21Z SPCSREF and 00Z HREF
 - * 4-hour: Hourly from f016 to f036
 - * 24-hour (12Z - 12Z): f036
- * 03Z Cycle: 03Z SPCSREF and 00Z HREF
 - * 4-hour: Hourly from f013 to f033
 - * 24-hour (12Z - 12Z): f033
- * 12Z Cycle: 09Z SPCSREF and 12Z HREF
 - * 4-hour: Hourly from f004 to f024
 - * 24-hour (12Z - 12Z): f024
- * 15Z Cycle: 15Z SPCSREF and 12Z HREF
 - * 4-hour: Hourly from f005 to f021
 - * 24-hour (12Z-12Z): f021

On NCEP web services (NOMADS/FTPFRD), these files will be in:

https://nomads.ncep.noaa.gov/pub/data/nccf/com/spcpost/prod/spc_post.YYYYMMDD/severe

ftp://ftp.ncep.noaa.gov/pub/data/nccf/com/spcpost/prod/spc_post.YYYYMMDD/severe

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. We will review any feedback and decide whether to proceed.

If you have questions regarding SPC-Post, please contact:

Dr. Israel Jirak
Science and Operations Officer
Storm Prediction Center
405-325-2456
israel.jirak@noaa.gov

or

Matthew Elliott
Warning Coordination Meteorologist
Storm Prediction Center
405-325-2080
matthew.elliott@noaa.gov

or

Dr. Patrick Marsh
Science Support Branch Chief
Storm Prediction Center
405-325-2080
patrick.marsh@noaa.gov

If you have questions regarding the data flow aspects, please contact:

Anne Myckow
NCEP Central Operations Dataflow Team
ncep.pmb.dataflow@noaa.gov

NWS National Service Change Notices are online at:

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

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