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Technical Implementation Notice 12-24
National Weather Service Headquarters Washington DC
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From: Timothy McClung
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Subject: Changes to the Surface Wind Gust Speed Calculation in the NAM and
DGEX: Effective May 30, 2012

Effective Wednesday, May 30, 2012, beginning with the 1200 Coordinated
Universal Time (UTC) run, the National Centers for Environmental
Prediction (NCEP) will make a modification to the surface wind gust speed
algorithm in the North American Mesoscale (NAM) Analysis and Forecast
System and the Downscaled GFS by NAM Extension (DGEX).

To compute wind gust speed, the NAM/DGEX post-processing code determines
the height of the top of the planetary boundary layer (PBL). It then
determines the wind speed at the top of the PBL and computes the
difference between this wind speed and the speed at the surface. A
fraction of the wind speed difference is mixed down to the surface and is
added to the surface wind speed to give the wind gust speed.

In the NAM/DGEX, the wind gust algorithm uses a PBL height based on a
critical value of turbulent kinetic energy (TKE). This form of PBL height
has been generated in all NAM versions going back through WRF-NMM and the
Eta Model before it. Recent comparisons to observations have found this
TKE-based PBL height is generally too high. Examination of the wind gust
fields have shown that the wind speed gusts are generally too high as well
because wind speeds generally increase with height and the higher PBL
height is causing stronger wind speeds to be mixed down. To correct this
bias, the NAM/DGEX algorithm is being changed to use PBL height based on a
critical value of the bulk Richardson number (added to NAM output in
October 2011). This method produces generally lower PBL heights and hence
generally lower wind gust speeds.

This change will affect all NAM/DGEX products which contain the surface
wind gust speed.

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 gridded binary (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.

For questions regarding this change, please contact:

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