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From:    Timothy McClung
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         Office of Science and Technology

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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National Technical Implementation Notices are online at:

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