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Public Information Statement, Comment Request
National Weather Service Headquarters Washington, DC
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From: Geoff DiMego
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NCEP/Environmental Modeling Center

Subject: Soliciting Public Comments through February 28, 2011
on Modification of the Computation of Instability
Parameters in the NCEP Model Suite

The National Centers for Environmental Prediction (NCEP) is proposing to modify the computations of convective available potential energy (CAPE), convective inhibition (CIN), and lifted index (LI) in its modeling systems during 2011. The change is based on the need to account for moisture in computations involving lifted parcels and has only a modest impact on the values. The NWS is seeking comments on this proposed change through February 28, 2011.

The proposed changes involve using the virtual temperature instead of temperature for all parameters involving the stability of a lifted air parcel. All of the CAPE, CIN and LI parameters (best, surfaced-based, mixed layer) will be computed using virtual temperature to properly compute the density of the air parcel being lifted (Doswell and Rasmussen, Weather and Forecasting, December 1994).

NCEP's Storm Prediction Center (SPC) has been using the virtual correction in its internal sounding analysis programs for 15 years, since computations incorporating the virtual temperature are more physically correct, and they strongly support the plan to change the computations in the NCEP models. The incorporation of the virtual temperature correction into the NCEP model instability fields will also be more consistent with forecast tools on the SPC web page including displays of observed sounding parameters and hourly Mesoscale Analysis fields, which are used extensively throughout the operational forecast community.

<http://www.spc.noaa.gov/exper/>

The impact to the instability parameters is generally minimal, with the magnitude of the impact proportional to the water vapor content of the atmosphere. For those with algorithms based on particular threshold values of cape or lifted index, the largest changes occur when values of those parameters are already extreme and do not affect the overall interpretation of the field.

A full description of the changes with examples of the impact can be found at

<http://www.emc.ncep.noaa.gov/mmb/gmanikin/virtual.ppt>

If this proposal is approved, NCEP will change to the North American Mesoscale (NAM) model as part of the upgrade scheduled for this summer. The revised computation will not be added to the Rapid Update Cycle (RUC); it will instead be included in the Rapid Refresh model, which will replace the RUC late this summer. This change must also be made to the Global Forecast System (GFS) and Short-Range Ensemble Forecast (SREF). It is possible there will be one major implementation to unify the cape/cin/LI computations across all NCEP models this summer. Details regarding this plan will be sent in another TIN after the process of vetting the proposed changes is completed.

NWS will evaluate all comments to determine whether to proceed with this change. If approved, a TIN will be issued containing implementation dates.

Send comments on this proposal and requests for test files to:

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National Public Information Statements are online at:

<http://www.weather.gov/os/notif.htm>

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