

Problem: GFS upgrade in May 2011 changed the bias characteristics of the boundary layer fields. These low-level GFS fields are often selected as predictors in the GFS MOS system. Of particular note were the 10-m winds used in the GFS MOS wind system which were forced into all MOS wind equations implemented in 2010. (insert point on changes to surface roughness introduced with updated vegetation type coverages, most notable differences were seen in the central and south west U.S.) Warm season wind equations valid from April 1 through September 30 were redeveloped after the model change and improved response to the latest version of the GFS was noted. These new GFS MOS wind equations were implemented in the NCEP production suite on June 12, 2012. Efforts to redevelop the cool season wind equations at that time were not successful due to the limited availability of cool season model sample so they were not replaced. On October 1, the previous original cool season equations were once again running in production and the wind speed problems resurfaced once again. Significant degradation at KABQ was noted by Dr. Deirdre Kann, SOO, Albuquerque WFO New Mexico

Action: The current GFS MOS cool season equations are not acceptable. We will attempt another redevelopment as quickly as possible.

Sample: A two-year minimum of matched model output and observations are recommended for the development of continuous predictands such as 10-m wind speed/direction and 2-m temperature and dewpoint. In this special circumstance the model change on May 11, 2011 precludes a sufficient traditional sample collection but the performance of the current GFS MOS wind system has been degraded significantly and we can't wait another year to address this problem. Early attempts at bias correction showed promise for the temperature and dewpoint elements but more work is needed before we apply bias correction to an element with a Weibull distribution such as wind speed.

Cool Season Sample:

- Oct 1, 2010 - March 31, 2011 (Dec 2010, Jan-Feb 2011 are reforecast GFS v.9.0.1)
- Sept 1, 2011 - April 30, 2012
- Sept 1, 2012 - October 15, 2012

Stations: Use current operational GFS MOS METAR station list. Marine stations were not impacted by changes to the land model. Mesonet stations do not have an up-to-date sample and can not be redeveloped at this time quickly. COOP sites do not have wind guidance and are not included. This development will not be able to address outstanding requests to add more stations to the MOS messages to support TAF forecasting.

Methodology to Address Short Sample

- Include seasonal transition months April 2012 and September 2011 and 2012 to increase the sample size

- Reduce significance of contribution of boundary layer predictors which are most susceptible to model changes. Do not force 10-m model winds.