

## **Preliminary impact study of GPS RO observations in the low resolution WRF-NMM in NCEP**

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The assimilation of GPS RO profiles from COSMIC in global data assimilation systems has been incorporated in many operational weather centers, such as NCEP and ECMWF. This new type of observation has significantly improved the models forecast skill.

Less work has been reported on the impact of COSMIC in regional assimilation systems. Based on the global data assimilation system that will be operational at NCEP by then end of 2009, we have slightly modified the code that deals with the assimilation of GPS RO observations in the global system to adapt it to the characteristics of the regional system. At NCEP, both the global and regional assimilation systems use the same analysis code. This makes it easy to adapt the work done in the global model to the regional model, and vice versa. Accordingly, we have conducted preliminary tests in order to assess the impact of the assimilation of COSMIC in a low resolution version of the WRF-NMM regional model. The modifications include some additional tuning of the observation error characterization and some treatment of the boundary condition issues.

Results show that GPS RO observations slightly reduce the RMS error and mean error of temperature and wind at 84-hour forecast time, when verification is done against rawinsonde observations. Although GPS RO observations slightly reduce the RMS and mean error, the improvements are consistent for the different forecast times.

In general, the impact of COSMIC observations in the low resolution WRF-NMM model is found to be neutral or positive. The reasons for this are mainly due to (1) lower numbers of profiles available in the regional area, (2) benefits of COSMIC are already implicit in the initial conditions –as they come from the NCEP’s global forecast, and (3) the experiments are no cycling.