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Observing system simulation experiments at NCEP

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Observing System Simulation Experiments (OSSEs) at NCEP have been focused on evaluating data impacts on a global scale. A 31-day run (Feb 5-Mar 7,1993) by ECMWF was used as the Nature Run (NR). The NCEP operational data assimilation system was used to assimilate the data. Adjustments to the NR and calibrations using existing instruments were performed. Over the last few years, many important findings have been achieved using a T62 resolution model. During the calibration process, a larger impact from wind data as compared to temperature was confirmed. OSSEs to assess the forecast impact of Doppler Wind Lidar (DWL) were also conducted. A large analysis impact in the tropics, the importance of scanning, and a large forecast impact in the smaller scales are noted. However, technical difficulties in doing the scanning need to be resolved. The data impact was found to be dependent on the observational error assigned. The correlated error in observations is particularly important in assessing the impact on a large scale. More detailed diagnostics, including a study of the error characteristics, are being proposed.

It is also noted that the data impact is known to be dependent on the resolution of the data assimilation system. The spectral resolution was upgraded to T170 so the effect of using a higher resolution could be investigated. In the large scales, the forecast improvement from T62 to T170 is almost the same as the forecast improvement from scanned lidar; however, in the small scales, the improvement due to lidar exceeded the model-based improvement. The apparent data impact from lidar was reduced in the T170 experiments because of higher skill in the background fields.

In order to pursue more detailed assessments of future data, Nature Runs with a higher resolution over a longer period of time have been considered. Based on the NCEP

OSSE results, the requirements for the Nature Run in the next generation of OSSEs will be discussed.