



Progress in Observing Systems Simulation Experiments - a New nature run and International collaboration -

The NOAA NASA OSSE TEAM

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Data assessment using simulation experiments is the most common method able to provide a quantitative evaluation of future observing systems and instruments. These experiments are known as Observing System Simulation Experiments (OSSE). The National Centers for Environmental Prediction (NCEP) have demonstrated that carefully conducted OSSEs are able to provide useful recommendations which influence the design of future observing systems.

Through OSSEs, future observing systems will be designed to optimize the use of data assimilation systems and forecast models to improve weather forecasts. By using OSSEs, current operational data assimilation systems can be prepared to handle data from new sources and the operational use of data from future instruments and observing systems can be accelerated. Preparations include handling the expected volume of future data and the development of database, data processing (including formatting), and quality control systems. All of this development will accelerate the operational use of these data.

OSSEs conducted at NCEP have focused on evaluating data impacts on a global scale from the use of National Polar-orbiting Operational Environmental Satellite System (NPOESS) candidate instruments, particularly the Doppler Wind Lidar (DWL). The current NCEP system has demonstrated that OSSEs are able to provide critical information for assessing observational data impacts. The OSSE results have often been different from theoretical explanations or speculation.

Through this OSSE, it has been realized that preparation of the nature run consumes a significant amount of effort, and that it is important for many OSSEs with different data assimilation systems to use a common nature run. The nature run is an important element of the OSSEs. A nature run with a 13 month long period, T511 horizontal

resolution, and 91 levels has been produced by European Center for Medium-Range Weather Forecasts (ECMWF). The nature run is available to ECMWF member states and designated users in non member states. Copies are saved in United States. For selected periods, a nature run with T799 horizontal resolution and 92 levels, with a higher temporal resolution will be produced. An additional data set of low resolution pressure data and isentropic level data is also provided by ECMWF to speed up diagnostic and evaluation processes. The design of the nature run was based on discussions among NOAA and NASA scientists.

The research community for data assimilation and designing the future observing system are able to participate in internationally collaborative OSSEs using the same nature run. By using the same nature run, simulated observations can be shared and the results can be compared. Extended international collaboration within the meteorological community is essential for timely and reliable OSSEs.