

OSSE Testbed Activities

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ABSTRACT

Observing System Simulation Experiments (OSSEs) are an important tool for evaluating the potential impact of proposed new observing systems, as well as for evaluating trade-offs in observing system design, and in developing and assessing improved methodology for assimilating new observations. Extensive OSSEs have been conducted at NASA/ GSFC and NOAA/AOML over the last three decades. These OSSEs determined correctly the quantitative potential for several proposed satellite observing systems to improve weather analysis and prediction prior to their launch, evaluated trade-offs in orbits, coverage and accuracy for space-based wind lidars, and were used in the development of the methodology that led to the first beneficial impacts of satellite surface winds on numerical weather prediction. The primary objective of the OSSE Testbed is to enable a hierarchy of experiments to: (1) determine the potential impact of proposed space-based, sub-orbital, and in situ observing systems on analyses and forecasts, (2) evaluate trade-offs in observing system design, (3) assess proposed methodology for assimilating new observations in coordination with the Joint Center for Satellite Data Assimilation (JCSDA), and (4) provide guidance for operational observation deployment and construction of national observation networks meeting weather, ocean and climate needs. Sub-objectives are to define both the advantages and limitations of a hierarchy of OSSEs that includes rapid prototyping of instrument or data assimilation concepts, as well as the more rigorous "full" OSSEs, and to generate an OSSE/OSE process that invites participation by the broad community of agency planners, research scientists and operational centers. During the past year, substantial progress was made toward the development of a next-generation global OSSE system, and the development of new OSSE capabilities for hurricanes, oceans, air quality, and severe storms. OSSEs were conducted to evaluate Doppler wind lidar, GPS RO, CYGNSS ocean surface winds, and geostationary hyperspectral IR soundings. These OSSEs and the next generation OSSE system will be completed this year.