P26 Assessing the impact of adaptive radiosonde releases for improving local-scale atmospheric environment nowcasting with NCAR WRF-RTFDDA and OSSE

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Many weather-critical applications are situated in remote local areas (a scale of 10s km to few 100s km) where weather observations are extremely sparse and often absent. In order to obtain weather information, the current weather analysis and nowcasting (a few hour ahead) at desired accuracy, radiosondes are often launched, mobile surface observations are deployed, and sometimes advanced mobile wind profilers and other remote-sensing instruments are used. High-resolution NWP models and proper data assimilation approaches are basic tools to extend the observations information in space (full application area) and time (0 – 6h ahead) and of critical importance to maximizing the impact of these costly adaptive observation systems. In this study, NCAR/RAL (Research Applications Laboratory) collaborates with Israeli researchers to employ the NCAR/RAL WRF-based RTFDDA system along with a field experiment to study this problem. In this proof-of-concept study, a week-long field experiment was conducted in northern Israel with three-hourly radiosonde releases at three sites located about 40km apart. Data assimilation with the WRF RTFDDA "observation nudging" has been conducted with both real observations and Observation System Simulation Experiments (OSSEs). This paper focuses on the OSSE design and results. First, the NCAR WRF-based RTFDDA system was run with a fine-mesh nest at 1.1 km horizontal grid spacing to produce a "nature run" from which simulated observations were extracted and observation errors were introduced. Next, a set of degraded initial conditions was produced to generate errors. A series of OSSE data assimilation experiments were then conducted to study the impact of the observations on local scale weather analysis and 0 – 6h forecasts and the optimal geographical coverage of the observational network.