7B.7 WRF-LES simulation of summer monsoon convection initiation at the U.S. Army White Sand Missile Range.

Liu, Yuewei, Yubao Liu, Jason Knievel, Branko Kosović, *National Center for Atmospheric Research,* Robert Dumais, and David Knapp, *United States Army Research Laboratory/White Sands Missile Range*

RTFDDA-VLES (real-time four-dimensional data assimilation and very large eddy simulation) model based on the National Center for Atmospheric Research (NCAR) WRF (Weather Research and Forecasting) Model is employed to study a summer monsoon convection case and a late spring severe wind case at the White Sands Missile Range (WSMR), New Mexico (NM). Both convection and high winds affect the missile test planning and execution at WSMR. Because the terrain is complex and the synoptic-scale forcing is relatively weak, so both cases are forced and modulated by the orography, especially by the surrounding San Andres Mountains and Sacramento Mountains. It is of great interest to study the capability of numerical weather prediction models for simulating such weather at high resolutions so that the fine scale terrain can be reasonably represented. WRF-based RTFDDA-VLES model is configured with five nested-grid domains at grid intervals of 8.1, 2.7, 0.9, 0.3, and 0.1 km, respectively. For these two cases, four dimensional (4D) data assimilation is activated on three coarse meshes. Preliminary modeling results show that smaller grid intervals increase the model's ability of simulating fine-scale structure and intensity of moist convection and high wind. Spurious noise and phase shifts of the simulated phenomena occurred on all domains. Sensitivity experiments reveal the impact of different sub-grid filters (diffusion schemes), terrain smoothing, and surface momentum fluxes and heat fluxes on the simulated convection.