3.6 Assessment of the Asymmetric Convective Model (ACM2) planetary boundary layer (PBL) scheme and the Pleim-Xiu surface schemes within the Weather Research and Forecasting (WRF) system

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The Weather Research and Forecasting (WRF) model is a highly configurable numerical weather prediction system used in both research and operational forecasting applications. Rigorously testing select configurations and evaluating the performance for specific applications is necessary due to the flexibility offered by the system. The Developmental Testbed Center (DTC) performed extensive testing and evaluation with the Advanced Research WRF (ARW) dynamic core for two physics suite configurations with a goal of assessing the impact that the planetary boundary layer (PBL) scheme, surface layer scheme, and land surface model (LSM) have on the final forecast performance. The baseline configuration was run with the Air Force's operational physics suite, which includes the Yonsei University PBL scheme, Monin-Obukhov similarity surface layer scheme, and Noah LSM. The second configuration was run with the same options as the baseline but substituted in the Asymmetric Convective Model Version 2 (ACM2) PBL scheme and the Pleim-Xiu surface layer scheme and LSM.

This presentation will assess the forecast performance of the two configurations; both configurations were run over the same set of cases, allowing for a direct comparison of performance. The evaluation was performed over a 15-km CONUS domain for a testing period from August 2013 through August 2014. Simulations were initialized every 36 hours and run out to 48 hours; a 6-hour "warm start" spin-up, including data assimilation using the Gridpoint Statistical Interpolation system preceded each simulation. Due to the extensive testing period, this study provides robust results and the ability to investigate seasonal and regional performance. Results will focus on the evaluation of traditional verification metrics as well as an assessment of additional model variables such as the simulated PBL heights and heat fluxes for the two configurations.