4–8 November 2019, Kraków, Poland
ECSS2019-157

Storm-Scale Ensemble Forecasting during NOAA 2019 HWT using FV3 with Multiple Physics

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As NOAA NWS proceeds to build all of its future global and regional operational forecasting systems based on the GFDL Finite Volume Cubed-Sphere (FV3) dynamic core, the Center for Analysis and Prediction of Storms (CAPS) in the University of Oklahoma is among the first to test FV3 for convection-allowing model (CAM) forecasting. In 2017 and 2018 HWT Spring Forecast Experiments (SFE), CAPS ran multiple forecasts with the global version of FV3 with a near 3-km CONUS grid two-way nested within a global 13-km FV3 grid, using various advanced PBL and microphysics implemented into FV3 by CAPS scientists. Preliminary evaluations suggest that the severe weather and precipitation forecasting results are broadly comparable to WRF forecasts, although there are noted deficiencies with surface condition forecasts that require further investigations and improvement. In 2019 HWT SFE, two sets of storm-scale ensemble forecasts (SSEF) at CAM resolution of about 3 km were run with a standalone regional FV3 core (called SAR-FV3). One ensemble uses NAM as background and different PBL (scale-aware MYNN, scale-aware ShinHong, and EDMF), LSM (NOAH, RUC), surface layer (GFS, MYNN) and microphysics (Thompson, NSSL, Morrison-G); another uses NAM plus IC/LBC perturbations from EMC SREF and different physics combinations. The goal is for understanding the performance of and refining advanced physics schemes within FV3 and recommending the best physics suite for FV3-based operational (deterministic and ensemble forecasting) CAM applications. Detail configuration and preliminary analysis from 2019 HWT SFE will be presented at ECSS2019.