

Using SURFRAD Aerosol Optical Depth Measurements for Model Evaluation. A Study with FV3-GOCART and WRF-Chem and Their Assimilation Systems

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In 2016 NOAA chose the FV3 dynamical core as a basis for its future global modeling system. First, we present the implementation of the aerosol module in the FV3 model and its assimilation framework. The parameterization of aerosols is based on the GOCART scheme. The assimilation methodology relies on the Ensemble Kalman Filter (EnKF) approach. Aerosol observations include de-biased aerosol optical depth at 550 nm from MODIS satellite and AERONET. The simulations are performed at C192 resolution (approx. 50 km) for August 2015 when significant wildfires over North America occurred. In parallel, simulations for that period are performed using the WRF-Chem model with 3D-Var based 550 nm aerosol optical depth (AOD) assimilation at 20 km resolution.

Results and evaluation of the systems against SURFRAD AOD measurements at different wavelengths as well as Visible Infrared Imaging Radiometer Suite (VIIRS) AOD retrievals are shown.

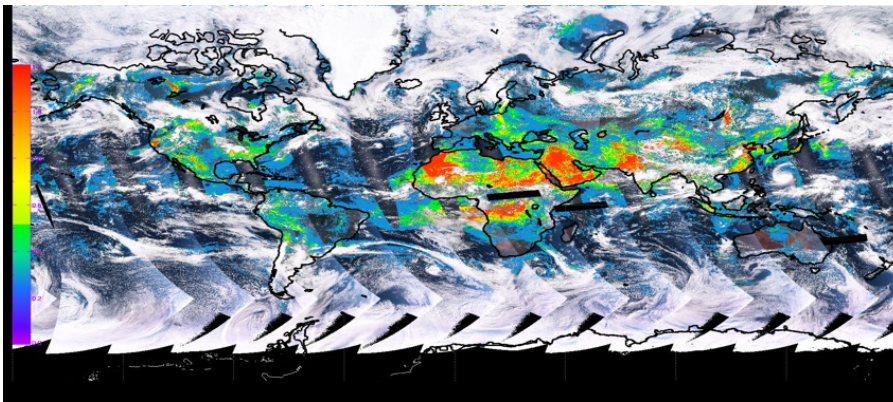


Figure 1. AOD 550 nm from VIIRS retrievals on 20150805.

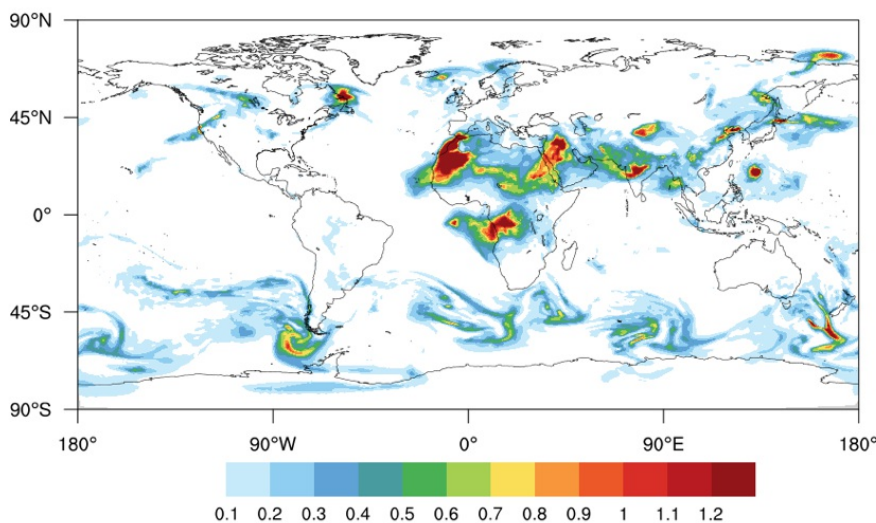


Figure 2. FV3/EnKF assimilation of de-biased MODIS retrievals at 2015080512.