

Online Inclusion of Chemical Modules Into NOAA's Next Generation Global Prediction System (NGGPS)

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The global Finite-Volume cubed-sphere dynamical core (FV3) developed by Geophysical Fluid Dynamics Laboratory (GFDL) was chosen by NOAA to be the Next Generation Global Prediction System (NGGPS) of the National Weather Service in the U.S. In this paper we describe the version that has been coupled with GOCART aerosol modules (FV3-GSDchem) and is now used at ESRL to provide experimental forecasts. The initial chemistry modules include simplified parameterization of sulfur/sulfate chemistry, hydrophobic and hydrophilic black and organic carbon, a 4-bin sea salt, 5-bin dust, volcanic ash, wildfires modeling using Fire Radiative Power (FRP) data from satellite observation, plume rise modeling with an online 1d cloud model. Both, the GOCART and emission modeling systems are residing within the new National Unified Operational Prediction Capability (NUOPC)-based NOAA environmental modeling system (NEMS) component, which will be initially driven by FV3. Model performance of FV3-GSDchem will be compared to Atmospheric Tomography Mission 1 (AToM-1) observations, and results from previous comparisons with FIM-Chem. Impact on numerical weather prediction will be compared to data from the 2012 South American Biomass Burning Analysis (SAMBBA) campaign.

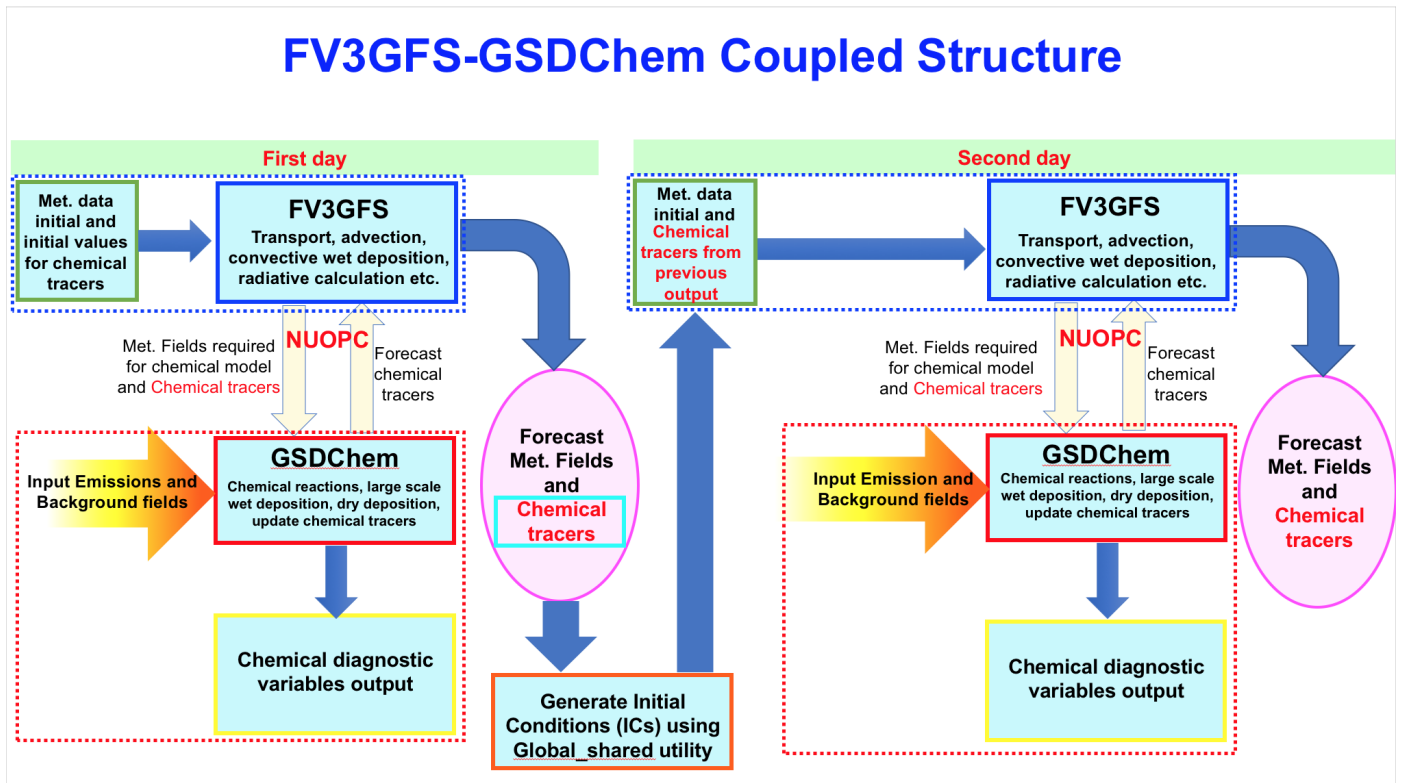


Figure 1. FV3GSF-GSDChem coupled structure.