GOES-R Volcanic Ash Risk Reduction (R3): New operational GOES-R decision support within NOAA's High Resolution Rapid Refresh

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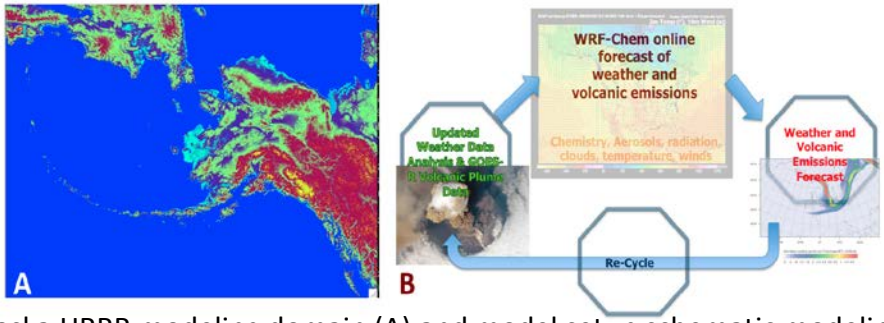
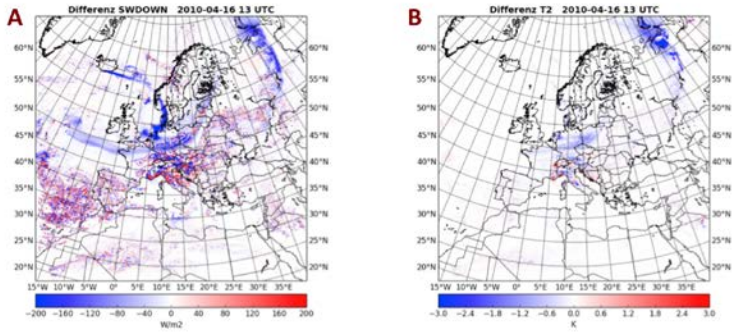
This project directly aligns with NOAA's Research and Development Objectives of a Weather Ready Nation, Data & Observations, and Integrated Environmental Modeling. We implement the actual GOES-R Volcanic Ash–Detection and Height baseline product into operations directly addressing the GOES-R highest priority topic area to improve operational environmental prediction in NWP and data assimilation (DA). We aim to build an improved GOES-R volcanic ash decision support system that NOAA and NWS can use for near real time prediction

- **Provide pathways to use GOES-R ash retrievals within the numerical prediction systems used by NOAA**
- **Test the ability to use GOES-R Advanced Baseline Imager Volcanic Ash Algorithm (ABI-VAA) data to define volcanic Eruptions Source Parameters (ESP) for near-real time volcanic activity**
- **Create best GOES-R volcanic ESP estimates**
- **Implement the ESP data to initialize the Weather Research Forecast model coupled to Chemistry (WRF-Chem)**
- **Generate improved near-real time WRF-Chem modeled volcanic ash alerts in an operational-like setting**
- **Implement the ABI-VAA into NOAA's experimental High Resolution Rapid Refresh modeling system**
- **Include aerosol-radiation-cloud feedback into the WRF-Chem modeling environment**



Alaska HRRR modeling domain (A) and model setup schematic modeling scheme with GOES-R volcanic plume data as model source (B).



Radiation and temperature feedback to volcanic ash as modeled by WRF-Chem for the Eyjafjallajökull eruption from April 16, 2010. The difference (with versus without volcanic ash-plume) is shown for the down-welling shortwave radiation (A) and for the near surface temperature (B). Figure courtesy Marcus Hirtl, University of Alaska Fairbanks.