Strategic Implementation Plan (SIP) for a Community-based Unified Forecast System

Aerosols and Atmospheric Composition *Working Group*

Presented by

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Presented at

Coordination Meeting for the Unified Forecast System

Strategic Implementation Plan (SIP) Annual Update

August 2, 2018; College Park, MD

Aerosols and Atmospheric Composition WG Membership

- Gregory Carmichael (U. Iowa)
- *Arlindo DaSilva (NASA/GSFC)***
- David Edwards (NCAR)
- Gregory Frost (NOAA/CSD)
- Paul Ginoux (NOAA/GFD)
- Georg Grell (NOAA/GSD)
- Larry Horowitz (NOAA/GFDL)
- Yu-Tai Hou (NWS/NCEP)
- Ed Hyer (Navy/NRL)
- *Sarah Lu (SUNY-Albany)***
- Craig Long (NWS/NCEP)
- Stuart McKeen (NOAA/CSD)
- *Jeff McQueen (NOAA/NCEP)***
- Rohit Mathur (EPA)
- Mariusz Pagowski (NOAA/GSD)
- Steven Pawson (NASA/GSFC)
- Brad Pierce (NESDIS/STAR)
- *Ivanka Stajner (NWS/STI)* **
- *Ariel Stein (NOAA/ARL)***
- *Rick Saylor, Pius Lee, Daniel Tong, Barry Baker (NOAA/ARL)*
- Jun Wang (NOAA/NCEP)

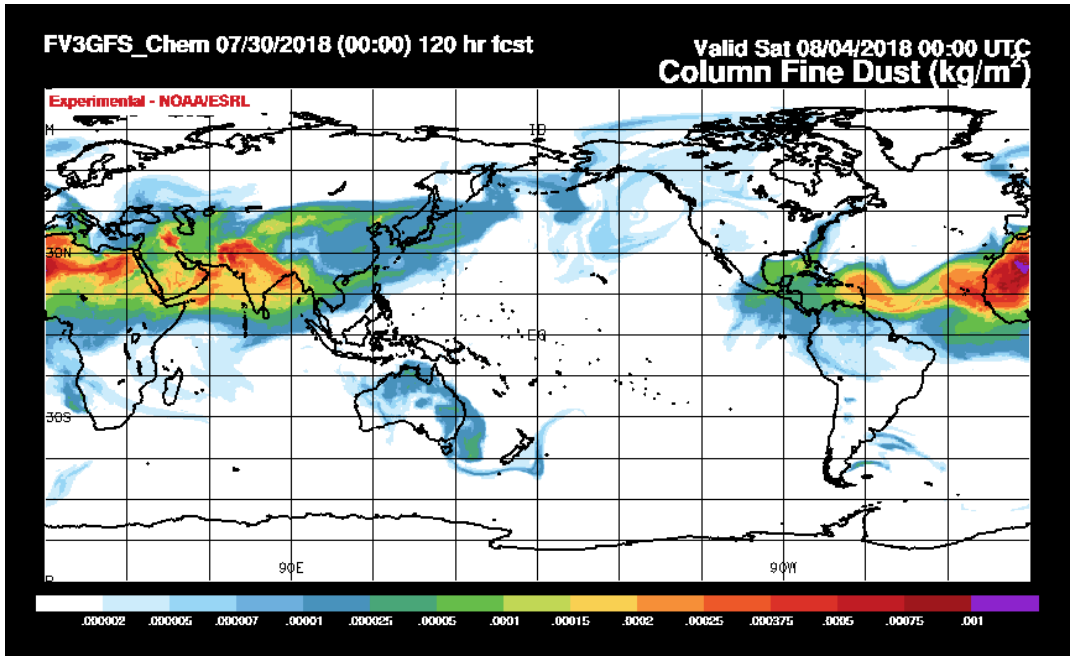
*Co-Chair ***

Atmospheric Composition WG Project Milestone Accomplishments

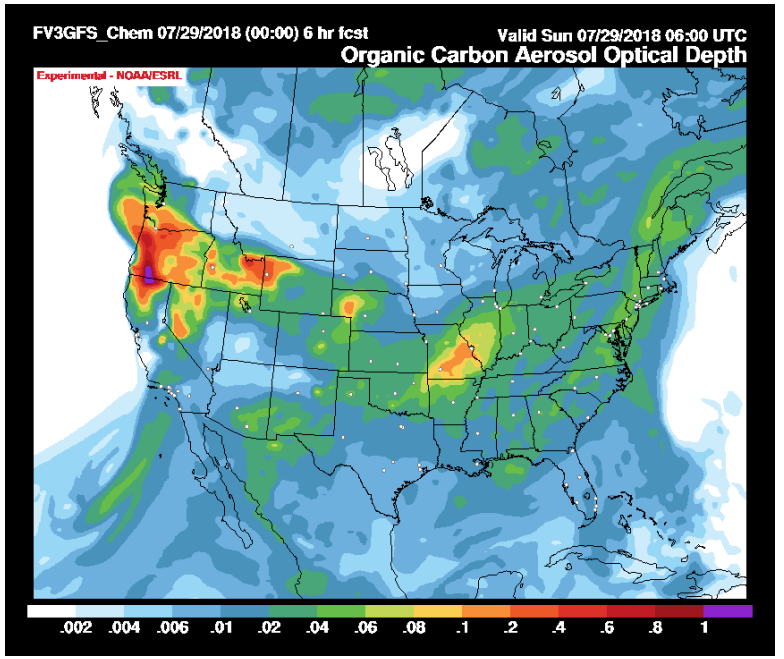
- **SIP project accomplishments to date:**
  - 10.1 Model
    - Created NUOPC cap and included in GSD/GOCART in FV3 framework
    - Transitioned initial FV3GFS-Chem to EMC; C384 real-time runs begun
    - Added aerosols to latest FV3 UPP
  - 10.2 Data Assimilation
    - Developed VIIRS AOD DA using ENKF with FV3GFS-Chem
  - 10.3 Emissions
    - Included Global Emissions in FV3GFS-Chem: HTAP and CEDS
- **SIP project issues:**
  - Regional FV3 CMAQ chemistry coupling delayed (dependency on standalone regional FV3 CAM and NUOPC FV3-GOCART)
  - Closer collaboration needed with the DA WG on the Aerosol DA plan
  - Removing dependency of EPA chemistry suite on embedded physics to couple with FV3 physics
  - Computing resources for more complex chemistry
  - Uncertainty in funding

FV3GFS-GOCART in real-time

Model forecasts are running at ESRL on C384 resolution, same physics as planned for operations this winter, 168hr forecasts take a little more than 3 hours on 264 processors



Dust burden, showing dust transport to US from Sahara 5 day forecast for Friday/Saturday



AOD from organic carbon. 168hr forecast loop Large impact from wildfires

Atmospheric Composition WG Team Coordination and Dependencies

- System Architecture WG: Developed NUOPC cap coupler
- Verification WG: MET+ based verification; developing evaluation protocol and test plan for adoption of new capabilities for the full system and for AAC component
- Post-processing WG: Extension of NCEP post for atmospheric composition parameters and meteorological variables for offline use
- DA WG team:
  - Coordinate timeline for aerosol DA development/T2O
  - GSI, JEDI coordination on coupling atmospheric composition with meteorological variables; development of CRTM for CMAQ/other
  - Request an AAC representative on DA team
- Physics, LSM teams:
  - Ensure physics consistency with chemistry modules
  - Include tracers in transport and interactions with physics
  - Emissions from the surface - coupling with land and physics