Aerosol and Atmospheric Composition (AAC) Working Group

Presented by

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Presented at SIP Coordination Meeting

January 31, 2018; College Park, MD

Aerosols and Atmospheric Composition WG Membership

- William Brune (Penn State Univ)
- Gregory Carmichael (U. Iowa)
- *Arlindo DaSilva (NASA/GSFC)***
- David Edwards (NCAR)
- Gregory Frost (NOAA/CSD)
- Steven Ghan (DOE/PNNL)
- 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)***

- Sim Larkin (USFS)
- Craig Long (NWS/NCEP)
- Stuart McKeen (NOAA/CSD)
- *Jeff McQueen (NOAA/NCEP)***
- Rohit Mathur (EPA)
- Steven Pawson (NASA/GSFC)
- Brad Pierce (NESDIS/STAR)
- Kenneth Pickering (U. Maryland)
- *Ivanka Stajner (NWS/STI) ***
- *Ariel Stein (NOAA/ARL)***
- Jun Wang (NOAA/NCEP)

*Co-Chair ***

AAC WG
Project Milestone Accomplishments

- **SIP project accomplishments to date:**
  - <u>10.1 Model and Coupler</u>:
    - Coupled FV3GFS - GSDCHEM (GSD GOCART) is in the new Vlab git repository
    - FV3GFS passes a subset of desired exchange fields to GSDCHEM via NUOPC/NEMS
    - Ongoing development involves contributions from ESRL, EMC, GFDL & other partners
    - Tested GOCART and MAM7 aerosol components in a lower-resolution GFS
  - <u>10.2 Data Assimilation</u>:
    - DA of MODIS and VIIRS AOD into FV3GFS with inline GOCART
    - Development of a GEOS chemical data assimilation system at NASA/GMAO
  - <u>10.3 Emissions</u>:
    - Developed a global unified scale-independent anthro. database + dust & fires
- **SIP project issues:**
  - I/O still needed: leveraging capabilities from FV3 and implementing some that are chemistry-specific requires coordination with other teams
  - Shared development and coordination in a unified system takes time and has held up teams waiting for a coupled application to be ready
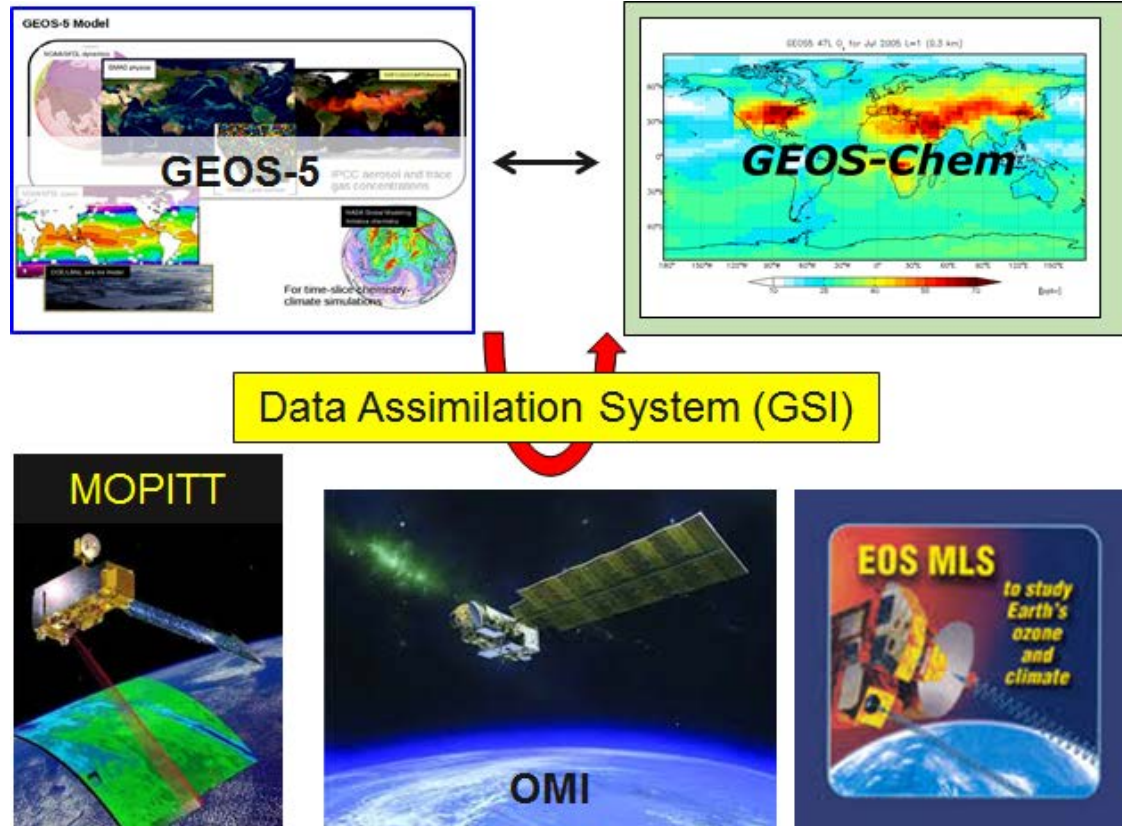 - Need for Atm. Composition software support, e.g. from GMTB

Assimilation of satellite data

Assimilation of AOD into FV3GFS with inline GOCART using hybrid GSI+EnKF at NOAA/ESRL
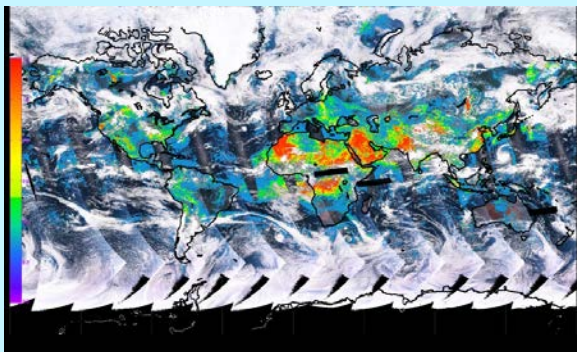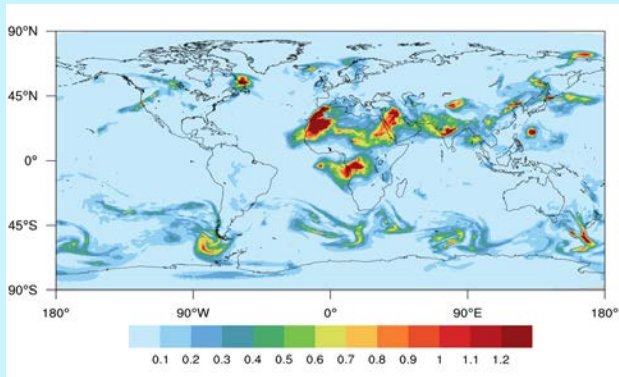
GEOS chemical data assimilation system development at NASA/GMAO: joint assimilation of O_3, NO_2 and CO

AAC WG
Team Coordination and Dependencies

- – <u>System Architecture WG</u>: coupler support, flexibility for additional variable transfer in coupling and future maintenance

- – <u>Physics and Dynamics WG</u>: aerosol-aware physics development, advanced physics options, mass conservation

- – <u>Infrastructure WG</u>: documentation, training, and data portal

- – <u>Verification WG:</u> MET based verification; evaluation protocol and test plan for adoption of new capabilities for the full system and for AAC component, e.g. tracer conservation test

- – <u>Post-processing WG</u>: Extension of NCEP post for atmospheric composition parameters and meteorological variables for offline use

- – <u>Data Assimilation WG:</u> GSI, JEDI coordination on coupling atmospheric composition with meteorological variables; development of CRTM for CMAQ and MAM7

- – <u>Emissions and emission updates:</u>
  - • Inventories: e.g. global UMD/PNNL CEDS, EDGAR HTAP; EPA NEI for US
  - • Measurements/Verification: NOAA/NESDIS, NASA, EPA, NOAA/ESRL etc.