GEOS-5 Forecasting Support for ARCTAS: Aerosols, Ozone, CFCs, CO and Related Tracers

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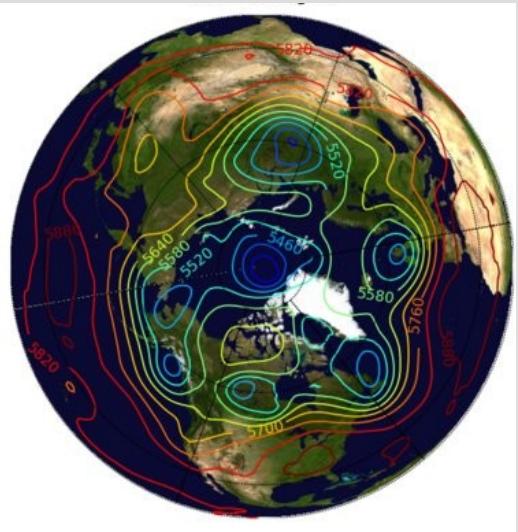


GEOS-5 Forecasting Support for ARCTAS: Aerosols, Ozone, CFCs, CO and Related Tracers

Pre-mission activities:

- GEOS-5 system configuration and customization for ARCTAS, including additional CO and CFC tag tracers
- Evaluation at GEOS-5 climate and forecast skills in the Arctic
- http://geos5.org/wiki/index.php?title=GEOS-5_Configuration_for_ARCTAS

During the ARCTAS Field Campaign:

- Twice Daily Forecasts with tailored GMAO Suite for ARCTAS
- On-going monitoring, evaluation and in-field analysis of aerosol and tracer products

Post-mission tasks:

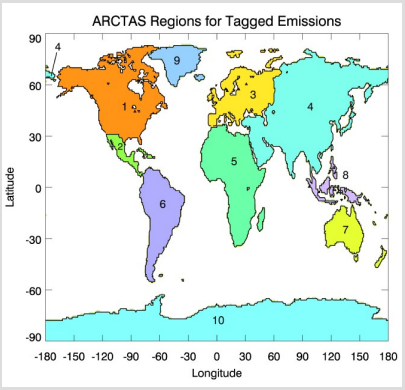
- Improved Assimilated Datasets of CO and Aerosols
- Evaluation of Plume Rise Model on Transport of Boreal Forest Fire Emissions
- Evaluation of aerosol radiative forcing in the Arctic
- Impact of Artic haze deposition on snow albedo

GEOS-5 Baseline System

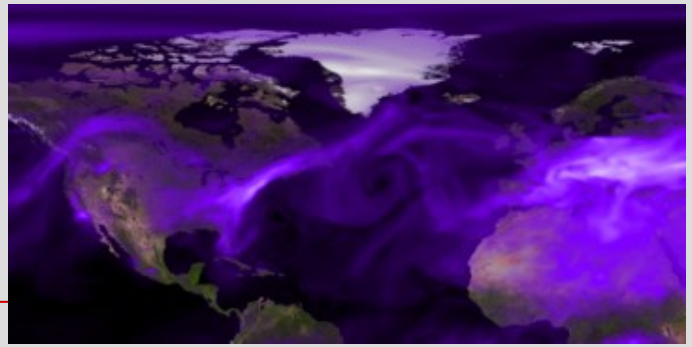
- ***Latest GEOS-5 Atmospheric Data Assimilation System used for MERRA***
  - GEOS-5 Atmospheric Global Climate Model
  - The Gridpoint Statistical Interpolation (GSI) analysis system, jointly developed by NOAA/NCEP and GMAO
  - *Resolution:* 1/2x2/3^{o} lat/lon, 72 levels (0.01 hPa)
- ***GEOS-5 Aerosol/Chemistry (AeroChem) components used in support of TC4***:
  - Global CO and CO2 tracers
  - GOCART aerosols: dust, sea-salt, carbonaceous, sufates
  - Advection, diffusion, and convective transport performed on-line within the GEOS-5 AGCM.

GEOS-5 Customization for ARCTAS: Additional Tracers

- 4 Organic Carbon tag tracers driven by
  - boreal biomass burning
  - non-boreal biomass burning
- 5 CO tag tracers driven by
  - boreal biomass burning
  - non-boreal biomass burning
  - non-biomass emissions: North America, Europe and Asia
- 2 CFC F12 tracers tagged according to
  - Tropospheric origin/stratospheric origin
- Emissions: Pyro-Cu parameterization

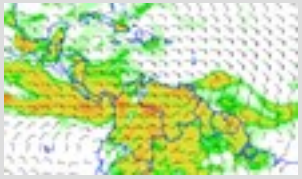


Data Products



- The GEOS-5 File Specification Addendum
  - describes the additional data products being generated for ARCTAS
  - Datasets to remain on-line about 1 year
- Real-time data delivery system:
  - OPeNDAP server, subsetting software
  - Anonymous FTP
  - Web Map Server (WMS) - GoogleEarth
  - (On-demand model data on flight track)
- On-line visualization system:
  - Web-based visualization of Chemical Weather
  - Chemical Wx Maps, WMS viewer

Forecasting schedule

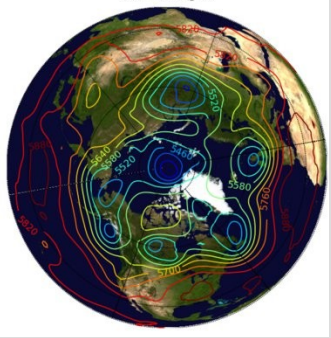


- GMAO will produce 2 daily forecasts at 00Z and 12Z (flexible)
- Length of the forecasts:
  - Up to 5 days, depending on your requirements
  - How soon do you need the forecasts?
- Data available on-line shortly after model writes the file.
- Are any special interfaces needed for regional modelers?

Other Issues for Discussion

- GEOS-5 product suite: is the GEOS-5/ARCTAS file spec (TC4+new tracers) adequate?
- Is the real-time data delivery system adequate?
  - Anonymous FTP
  - OPeNDAP server + on-site subset on-the-fly
  - WMS server + web visualization tools
  - Any interest in sampling model data on flight track?
- Coordination and operation of the different chemical forecast activities
  - Formation of a *Chemical Forecast Desk*
  - Do regional modelers need boundary conditions?
  - Would the met forecasters need any GEOS-5 input?
- CARB field campaign: any special requirement?

URL's of Interest



- A working document describing the GEOS-5/ARCTAS configuration can be found at:

http://geos5.org/wiki/?title=GEOS-5_Configuration_for_ARCTAS

- Once the system is deployed a mini-portal to the data products will be found at:

  http://gmao.gsfc.nasa.gov/missions/arctas/

- In the meantime, you can consult the TC4 forecasting support page:

http://gmao.gsfc.nasa.gov/highlights/tc4mission/