A Brief Overview of GEOS-5

- The System and the Products
- Some Relevant Diagnostics
- On-line and Off-line Chemistry

Presented by Steven Pawson of the GMAO at the GEOS-Chem Users’ Meeting
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## GEOS-5: Systems and Products

### System | Products
--- | ---
GEOS-5.0.1 | 2004-2006 “EOS-Aura Analysis”
GEOS-5.1.0 | Near-Real Time Processing: 2006-2008
2004-2007 “EOS-Aura Reprocessing”
GEOS-5.2.0 | Near-Real Time Processing: since 2008
1979-2009 Merra Reanalysis

### Progress with three streams of Merra (0.5°×0.66°L72)

- **1979 Stream**: Jan 1979- July 1986
- **1989 Stream**: Jan 1989- March 1986

- Gaps close ~ June 2009
- Catch up ~ August 2009
Global-mean precipitation is a model-produced quantity from the meteorological analysis. Merra precipitation is closer to observations than earlier reanalyses were. Trends may be physical or related to changes in available input data streams.
Available online: gmao.gsfc.nasa.gov

• Technical documentation: Rienecker et al. (2008)
• Validation (not yet available): Bosilovich et al. (2009)
• File specs for forward processing
• DIFFERENT file specs for Merra

Merra data are being served – no need for special DAAC access
Merra saves a 3-h averaged data stream at 1°×1.25°L72 for CTMs

tavg3_3d_chm_Fv

  ECS short name: AT3FVCHM
  ECS long name: MERRA IAU 3d Chem On Layers
  Characteristics: Time averaged, 3D model levels, at reduced FV resolution
  Dimensions: longitude: 288, latitude: 181, levels: 72 (see Appendix D)
  Times: 1:30, 4:30, 7:30, 10:30, 13:30, 16:30, 19:30, 22:30 GMT

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELP</td>
<td>Layer pressure thickness</td>
<td>Pa</td>
</tr>
<tr>
<td>T</td>
<td>Air temperature</td>
<td>K</td>
</tr>
<tr>
<td>QV</td>
<td>Specific humidity</td>
<td>kg kg⁻¹</td>
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Cloud mass fluxes in July 2005 for GEOS-4 (left) and GEOS-5 (right) show some important differences that will impact chemistry-transport models:

1. Stronger penetration into the tropical upper troposphere in GEOS-4
2. Stronger middle tropospheric convective fluxes in GEOS-5 tropics
3. Stronger shallow convective transport in winter middle latitudes in GEOS-4
Various aerosol and chemistry packages in GEOS-5:
- Linearized CO
- \(^{222}\)Rn, SF\(_6\), age-of-air, etc.
- GOCART aerosols
- GSFC stratospheric chemistry
- GMI-COMBO chemistry

Applications:
- Mission support: from INTEX-NA in 2004 to ARCTAS (right)
- On-line transport studies, as with CTMs
- Constituent assimilation (CO, ozone, etc.)
- Interactive chemistry-climate studies (Poster)
Summary:
• GEOS-5.2.0 Real-Time and Merra products are available.
• Ask for clarifications if things are unclear or data seem wrong.
• Feedback about what’s good and bad can be very helpful.
• On-line tests can help isolate problems with data usage.

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