

## GEOS-Chem Steering Committee Telecon

June 11, 2009 14:30 GMT

Attending: Daniel Jacob, Bob Yantosca, Prasad Kasibhatla, Colette Heald, Yuxuan Wang, Dylan Millet, Dylan Jones, Daven Henze, Kevin Bowman, Mat Evans, Randall Martin

### Recent developments (D. Jacob and R. Yantosca)

- Two Working Groups have been consolidated: (1) Regional Air Quality WG with Yuxuan and Rokjin as co-chairs; (2) Carbon Gases and Organics WG with Dylan J. and Dylan M. as co-chairs.
- Prasad serves on the Steering Committee as GMAO liaison but this does not need to be a separate WG. It would be valuable to have GMAO membership on the Steering Committee. Daniel will contact Max Suarez and Steven Pawson about their interest.
- Recent development work on standard GC model has focused on finishing the new chemistry public release (v8-02-01) and focusing on the new development priorities identified at the Users' meeting. We have implemented Jintai Lin's PBL mixing code (this was led by Jintai) and Tami Bond's OC/EC emission inventory (this was led by Eric Leibensperger) into the latest beta version (v8-02-02). Claire Carouge has been the point person for testing and releasing these new standard versions. We are presently working to add the KPP chemical solver (this is led by Philippe LeSager with assistance from Kumares Singh). Adding Linoz stratospheric ozone (Dylan Jones) will be a top priority once we get the final code from Dylan (next few weeks).
- We are also moving on addition of TOMAS aerosol microphysics (Win Trivitanayurak, Peter Adams) into the standard model. This was an identified priority of the Aerosols WG and Peter and Win have agreed to lead the work in consultation with the GC Support Team.
- Wiki has been expanded, now also a Best Practices page (Colette's suggestion)
- The Steering Committee will operate on a schedule of 90-minute telecons every three months. We are not planning at this time a physical meeting before the next GC Users' Meeting (spring 2011)
- Bob Y. is working in collaboration with GMAO on a column version of GC to be implemented into GEOS-5. It is planned that the column code will be part of the standard model release in the future and provide an eventual gateway to ESMF and MPI implementation. It would be valuable to use the stand-alone column model for diagnostic purposes. At present the column model doesn't include emissions (because that's the way GMAO wanted it), but these will be added in a next stage though it will require hacking through a lot of legacy code.

### Adjoint developments (D. Henze)

- A successful meeting was held at V Tech to develop a standard version of the GC adjoint merging the capabilities developed by individual groups: participants were Kumares Singh, Adrian Sandu, Monika Kopacz, Changshub Shim, and Daven Henze. The result was an integrated adjoint code based on v8-02-01 with GEOS-5 and including updates from the different groups, improved file formats and input files, etc.

- This working code is presently being cleaned up. The goal is to have a standard adjoint ready for distribution by the end of June. Daven, Kumares, and Changsub are finishing up different aspects of the code and its testing.
- The code will be installed on a new CVS server at U. Colorado, allowing users to check out the code and submit updates to Daven to integrate.

#### **GMAO Advisory Board Meeting (P. Kasibhatla)**

- The GMAO Advisory Board (of which Prasad is a member) met in early June to review GMAO activities.
- GMAO recent developments most relevant to GC: (1) MERRA reanalysis is 84% finished (to be completed by the end of the year) (2) GMAO moving to a 4D VAR analysis system (2009-2010) as operational and will eventually plan to redo MERRA analysis (3) GMAO developing integrated ESM, and will assimilate all kinds of atmospheric, oceanic, land parameters, (4) 0.25X0.25 model to be ready to go later this year (5) transition to cubed sphere grid will likely take place in 2010, with a transition from 72 to 90 levels and moving towards non-hydrostatic resolution.
- GMAO expresses commitment to develop and maintain the off-line tpcore capability crucial to GC, particularly as it moves toward the cubed-sphere transport. Prasad will reinforce to GMAO the importance of this capability for the GC community. One important issue is how to degrade model resolution in the cubed sphere framework.

#### **Aerosol WG report (C. Heald)**

- 47 people have signed up to the aerosols email list. The wiki has a detailed aerosol overview & projects page. Folks are encouraged to add their projects.
- Aromatic SOA: Daven has been working on adding aromatic SOA now that v8-02-01 has been released (he needed the aromatic emissions/chemistry that May Fu added in this version).
- Optical properties: aerosol email list was polled for updates to the optics. The primary recommendations that came from this was a recommendation to narrow the size distributions of the aerosol modes (based on several studies, geometric standard deviations will go from 2->1.6 and 2.2->1.8) and that a "master list" of optical properties be produced in 10 nm intervals up to 1500 nm and then in 50 nm intervals up to 4000 nm. Randall has kindly volunteered to run the Mie code using the GADS database (unfortunately we have nothing better) sometime in the next month or so. Colette also made changes to the code so that it can separately read in the optical properties to be used to calculate the AOD online. This separates the calculation from the photolysis jv\_spec.dat input and should allow folks to flexibly swap in wavelengths from the master list to compare with any current or future satellite products. Colette will submit these changes together to Harvard as a small "optics" release by the end of the summer.
- Benchmarking of aerosol model output: plan is to develop this in the fall. Aaron van Donkelaar has already generated a database of PM2.5 observations for this purpose.

#### **Carbon Gases & Organics WG Report (D. Jones and D. Millet)**

- Website is now up on the wiki
- MEGAN terpenes should be updated. Dylan M. will take care of this.

- Unclear what to do about anthropogenic VOC emissions. Standard model is antiquated (Piccot inventory from GEIA) but more recent EDGAR inventories have had major problems. Maybe POET? But it's kind of old too. Looking for user interest to make recommendations on updating anthropogenic VOC emissions.
- The methane simulation in the standard model is antiquated. The groups at Harvard, Purdue, and Edinburgh running methane have gotten together and agreed on an updated simulation to be implemented in the standard model. This will be done under the leadership of Christopher Pickett-Heaps and Kevin Wecht at Harvard. Work has been delayed a bit by the need to incorporate the just-released EDGAR inventory.
- CO<sub>2</sub> simulation: current version in GC is antiquated. Ray Nassar has made major updates that are ready to go into the standard code. These include 8-day GFED2 biomass burning, net terrestrial exchange from Baker 2006 paper, updated ocean-exchange. Ray also has been using a new 50 year emission inventory (1985-2006) for anthro CO<sub>2</sub> but this cannot be made publicly available yet.
- It would be good for GEOS-Chem to participate in Transcom model intercomparisons in order to be better identified as a player in the CO<sub>2</sub> community. Parvatha Suntharalingam has been active in Transcom and Dylan J. will ask her if she is interested.

#### **Emissions WG Report (R. Martin)**

- Emission activities necessarily have some duplication with other WGs, but should remain for now a separate WG because they cut across WGs.
- Ship emissions: Chukyu Lee has updated the ship emissions from EDGAR to ICOADS (much more consistent with OMI SO<sub>2</sub>). Submission to standard model in matter of weeks.
- 1x1.25 emission inventories all regridded: evaluation against sondes, etc. for benchmark look good (Lok). These will need to be incorporated in the standard model at some point.
- GFED3 should be available in the next few months (Prasad will be point of contact)

#### **Chemistry & Oxidants WG Report (M. Evans)**

- Chemistry updated to latest JPL and UPAC in v8-01-01
- Lots of new stuff about isoprene chemistry and information coming out (Caltech, Amazon, QM calculations), not ready for inclusion in standard model yet. Let's review where we stand at the next telecom.

#### **Development Priorities for Standard Model, in order:**

1. GEOS-5 ozone columns (GC support team)
2. KPP implementation (GC support team)
3. TOMAS implementation (Win)
4. Linoz (Dylan J.)
5. Updated methane (Christopher and Kevin)
6. Updated CO<sub>2</sub> (Ray)
7. Updated MEGAN emission from terpenes (Dylan M.)

8. COADS ship emissions (Chukyu)
9. Include updated aerosol optics (Colette, Randall, and aerosols WG)
10. Include aromatic SOA (Daven)
11. Archive OH fields from benchmark for use in off-line simulations (GC support team)

Other model developments in the queue:

- Global 1x1.25 data bases (Lomlok)
- Processing of MERRA data (Bob) - only Bob can do it but he will be busy for a while with development of the column model.
- Conversion of model output to netcdf (GC support team) - good thing to do sooner or later but no clear urgency.

**Web site, wiki pages, WG communications**

- General satisfaction was expressed with the web site and wiki pages (but maybe that's because we ran out of time!)