GEOS-Chem Steering Committee Telecon
December 8, 2009 15:30 GMT
Attending: Daniel Jacob, Bob Yantosca, Steven Pawson, Randall Martin, Prasad Kasibhatla, Colette Heald, Dylan Jones, Dylan Millet, Daven Henze, Max Suarez, Mat Evans, Kevin Bowman
Absent (emailed input): Yuxuan Wang, Rokjin Park

1. **General news (Daniel)**

- v8-02-04 presently going through 1-year benchmark: it includes LINOZ, updated volcanic SO2 emissions, near-IR photolysis HNO4, updated MEGAN, updated fixes for sea salt. Should be released before the holidays.
- Benchmark will include aerosol diagnostics (Colette) for the first time
- Target for v8-02-05 implementation is end of January 2010. That version will include updated isoprene chemistry from Caltech as option, ISORROPIA II, updated aerosol optical properties.
- Other priority updates between now and mid-2010 include: global 1x1.25 simulation from Dalhousie (could go into 8-02-05), updated CO2 from Toronto (waiting for final code from Ray – end of January), TOMAS aerosol scheme (proceeding, final debugging at CMU), GFED3 (waiting for final data from Prasad), updated Hg simulation (in final development at Harvard), strat chemistry fields (Toronto).
- Sad to lose Philippe LeSager to KNMI – he will lead software development of TM5
- ESMF development on temporary hold, waiting on GMAO for direction. Present work with GMAO focuses on development of column code.

2. **Report on isoprene chemistry telecon and chemistry WG report (Mat)**

- Isoprene chemistry telecon in September recommended implementing Caltech scheme as an option into GEOS-Chem. There have been some issues with it but it is on track for implementation in v8-02-05. Will not be a "fix" to all problems but will allow people to investigate model sensitivity to isoprene scheme. There continues to be literature coming out.

3. **Regional air quality WG report (Rokjin/Yuxuan)**

- The nested grid aerosol simulation for East Asia is showing some apparent bugs, presently under investigation.

- Yuxuan plans to work with Dylan J. to develop nested grid simulation for CO2 in GEOS-Chem.

4. **Adjoint and data assimilation WG report (Daven/Kevin)**

- Daven is working on GEOS v8 adjoint with Monika, and Lin Zhang is putting tagged Ox into the adjoint. About a dozen groups so far have downloaded the v8 adjoint.
- JPL is still working with v7 because some capabilities not yet migrated to v8
- Rao Kotamarthi from Argonne has been developing an ensemble Kalman filter data assimiliation system for GEOS-Chem. Prasad has been independently working on error statistics for ensemble

Kalman filter approaches using GEOS-Chem. At some point they may want to coordinate. Keep an eye on this development.

- As Bob's column version of GEOS-Chem becomes mature it will be important to adapt the adjoint to it. This will greatly facilitate MPI parallelization.

5. **Aerosols WG report (Colette)**

- New optics code & properties have been delivered to Harvard, to be released in v8-02-05, Randall has provided README with the optics file for traceability
- ISOROPPIA II in the pipeline for integration in v8-02-05
- Sea salt updates/fixes in pipeline for v8-02-04
- Recommendation from Aerosol WG to remove inorganics from SOA partitioning, to be implemented in v8-02-05
- TOMAS is integrated in v8, is back at CMU being tested & benchmarked. Plan to deliver back to Harvard in Dec.
- Contacted Dom Spracklen about integrating oceanic OC source into standard code
- Aromatic SOA (Daven Henze) to be part of SOA updates from Havala Pye. These SOA updates are not on the radar of the Aerosol WG or Harvard, so follow-up is required.
- Fangqun Yu is getting ready to incorporate APM aerosol microphysics into the standard version of GEOS-Chem in the Jan-Apr 2010 timeline. He will contact GEOS-Chem support team to discuss integration strategies. Colette recommends that we initiate this process once TOMAS integration is complete.
- Eric Leibensperger brought up the issue that current OC/BC inventories from Cooke and Bond are sub-micron. Suggestions from these papers that a 25% and 40% scaling should be implemented to account for super-micron primary emissions. This is a concern when comparing to PM2.5 observations. Has led to a discussion on size ranges in aerosol simulation. Input on this discussion can be emailed to Eric or Colette.

6. **Carbon gases WG report (Dylan/Dylan)**

- MEGAN v2.1 from Mike Barkley has been implemented in v8-02-04
- Some bugs in the dicarbonyl simulation have been fixed.
- Ethanol and acetaldehyde simulation by Dylan M. (paper submitted) could improve the acetaldehyde in the standard code by adding a fixed ethanol distribution, but ethanol distribution is very uncertain at this point, so perhaps to be considered in the future.

- Methane simulation efforts in by EPFL and Harvard have been integrated and released into v8-02-03. Edinburgh has wetland & rice emissions from top-down estimates and also ocean source but has not contributed them yet.
- CO2 code at Toronto is being further upgraded (ship emissions, aircraft emissions, chemical source of CO2) hence delay in delivery to Harvard, hope to deliver by end of January
- Paul Palmer group working on getting year-specific CASA fluxes (Randy Kawa), at some point we may want to include this in the standard model.
- There is growing interest in running CO/CO2 single-tracer simulations at the native resolution of the GEOS-5 met fields. Consensus was that there should be no major technical problem with that.

7. **Dalhousie GEOS data site and Emissions WG report (Randall)**

- Updated soil NOx emission module is being completed by Rynda Hudman.

- North American and European nested simulation capabilities have been developed at Dal including updated NEI 2005 for the US with weekday/weekend and altitude information retained.

- Global 1x1.25 simulation (Lok Lamsal) will be included in standard model (8-02-05 or next). This simulation requires 3 weeks to run a year on a machine with 16Gb RAM and 8 processors. Implementation is being discussed between Bob and Dal.

- New GEOS data archive at Dal available for external access includes met fields 2005 & 2006 1x1.25 and nested met fields NA & EU 2004-2008. This is the beginning of a distributed data archive with nodes outside Harvard.

8. **Column code report (Bob)**

- Bob has completed a column version of GEOS-Chem without emissions and is working with GMAO to interface it with GEOS-5. Next step is to include emissions, which GMAO views as a separate code component. Steven and Bob will talk next week as to the best way of making this happen.
- The long-term plan is for the column code to become the basic building block for the standard GEOS-Chem code. This will improve transfer of updates to GMAO and facilitate MPI parallelization. Bob will soon add the column code to the standard GEOS-Chem source code as a separate directory for user input.
- The plan at GMAO is to have alternate column chemistry and emission components from GEOS-Chem and GMI as input to GEOS-5. Since GEOS-Chem is a feeder for many parts of GMI this doesn't really provide two independent simulations, but the GMI version presently in GEOS-5 is 3-4 years old.
- Important to have new GEOS-Chem standard code be as resolution-agnostic as possible. In some cases this cannot be strictly achieved but then there should be switches to implement different resolutions.

9. **GMAO report (Steven/Max)**

- Implementation of GEOS-Chem column code into GEOS-5 involves 3 steps. Step 1: Read constituents and run them through GEOS-5, Step 2: build chemistry, Step 3: emissions included as well. First 2 steps likely to be completed quickly (by next telecon), last step will depend on emissions progress

- MERRA milestone: 2 streams completed (with 3 year overlap which looks good) and third stream going on and will continue indefinitely. Currently at mid-2008, will complete 2008 by Jan.

- Plan at GMAO to run through 2000s with GMI and will likely run from 1979-current with aerosols in replay mode (essentially CTM)

- GEOS-5 code is openly available but not supported. But GEOS GCM code is openly available AND supported. This offers a possibility for coupling with GEOS-Chem for chemistry-climate applications .

10. **Other business (Daniel/all)**

- Many of the top development priorities identified at the GC User's group meeting last April have now been implemented or soon will be. We should begin to look forward to new priorities for code development.
- The web page list of recent developments for which co-authorship is recommended requires no updates. We will revisit it at the next Steering Committee telecon in March.