GEOS-Chem Steering Committee Telecon
November 9, 2011 14:30 GMT

Attending: Daniel Jacob, Bob Yantosca, Randall Martin, Colette Heald, Mathew Evans, Ray Nassar, Dylan Millet, Loretta Mickley, Noelle Selin, Yuxuan Wang, Lyatt Jaegle, Jun Wang, Jingqui Mao, Steven Pawson, Hong Liao, Kevin Bowman, Jeff Pierce, Dylan Jones, Paul Palmer, Daven Henze, Prasad Kasibhatla

Finalization of v9.1.2 (R. Yantosca)

- Big list of bug fixes, new science includes RETRO, GFED3 and APM
- Ready to start 1 year benchmarks. Results expected to be posted next week

Benchmarking Process for 9.1.2 – how did it work? (All)

- We have been very careful documenting every change, but perhaps taking too long.
- Consider bundling changes together, use judgment on this. Daniel will try to identify bundles for v9.1.3 and pass this by the GCSC
- Overall going very well. Melissa has taken over 1 month benchmarks → takes about a day and people have been good about providing feedback

Updating the credits and model description page (D. Jacob)

- Daniel sent around an update to model development credits and narrative page. Randall sent feedback. Need to ensure that developers are properly credited.
- Also a question of when we start moving things from new developments to established code, but so far this has been straight-forward
- Raise any concerns/suggestions with Daniel.

What should go into 9.1.3 (All)

- Randall indicated that the soil NOx emissions update should be delayed until paper submitted by Rynda Hudman (and updates finalized)
- Acid uptake on dust is a desire of aerosol community, but not believed to be time sensitive, so could be delayed (Colette)
- Nested grid CO2 was discussed as a possibility of delay, but there was a stated interest in having that integrated (Kevin Bowman), so considering that it's rather separate, it should be included.
- Mat suggested that the chemistry updates in the ready-to-go in section are not large, but there are peroxy radical chemistry updates on the horizon → could be rolled together into one chemistry update. There is also a bug in the chemistry mechanism (Fabien Paulot) that needs to be fixed.
- Jun Wang suggested that nested grid CO2 simulation & historical emissions emission inventory are priorities for release
- Colette and Jeff have some concern aerosol updates & deposition updates in the same release. There will be a Rn simulation for the deposition. Perhaps not necessary to separate the updates

in different releases, but important to keep an eye on the impact of individual updates on the overall quality of the aerosol simulation.

- Daniel would like to see the PARANOX ship plume emissions in v9.1.3 as well
- May Fu has indicated that dicarbonyl simulation merged with Paulot chemistry probably not ready until the end of the year
- Streets future Hg emissions ready and Hg folks interested, shouldn't impact benchmarking so should go in (Lyatt and Noelle)
- Hg (II) Gas-aerosol partitioning is also a big improvement and in favour of including (Lyatt and Noelle)
- What is cloudwater pH update from Becky Alexander? She hasn't communicated with aerosol WG. Loretta will follow up and ask for blurb for wiki.
- There may be some updates to code for grid-independent GC from Mike.
- Will be adding tracers with this version, so will need new restart files.

GMAO News (S. Pawson)

- MERRA will continue for as long as we have good data, but at some point will become obsolete, so in the coming years will transition to GEOS 5.7.2 system for re-analysis system and will initially want to focus on EOS era (2003-) and establish continuity with MERRA
- GEOS5.7.2 has an aerosol data assimilation
- Cube sphere @ 10km being run, plan for GEOS6, but somewhere down the road. One big issue is resolving convective systems and having smooth and accurate transitions.
- PBL height issue not seen online in GMAO model because using a 3D diffusion coefficient, so this was an issue in diagnostic PBL. Jintai Lin's recalculation of the PBL height works fine, but Randall reports that there still appear to be issues with nighttime mixing. Under investigation.
- MERRA precip high bias over land (compared vs. NRT system), Helen will do a Rn-Be-Pb210 simulation with MERRA and GEOS5 → aerosol lifetime is low with MERRA. Will pass on the results of this to Colette and Jeff.

Update on processing GEOS 5.7.2 data (R. Yantosca)

- GMAO started creating new data product 5.7.2 in late August/September (0.25x0.3125 res). Met fields very similar to MERRA fields and 1hr data for surface variables.
- October 2011 GMAO will turn off GEOS5.2.0 stream
- Bob has written scripts to download the data from GMAO and tested this, writing re-processing code (now in netcdf formats)
- Will save 2x2.5, 4x5 and SEA4CRS nested grid (20S-50N, 60E-150E) initially at Harvard.
- Possibly other grids saved out at Dalhousie in the future. Needs to be discussed and prioritized.
- Run time for nested grid will increase both because of increased resolution and also increasing dynamic time step → so may be a challenge to run full-chemistry on the 0.25x0.3125 grid. Will need to continue supporting 0.5 degree nested simulation.
- Note that MERRA grid (1/2 x 2/3) is an anomaly, GEOS5.7.2 is ¼ x 5/16 so a scale up of the GEOS5.7.2 product would be to ½ x 5/8

Update on grid-independent GEOS-Chem (R. Yantosca for Mike Long)

- Spoke with Arlindo DaSilva at GSFC to discuss how code Harvard is building would work with GEOS5.
- Modifications to grid-independent model to be done at highest level via preprocessor switches. Thus "normal" GC user will not have to interact with this.
- Working on emissions routines, chemistry routines, ESMF wrapping and getting around legacy code.
- Timeline: expect GI code modifications could be done by end of the year, and ESMF wrapping expected mid-2012.
- Expect better performance to come from being able to use MPI.
- Intention that could then use the GI GEOS-Chem model online or offline.
- Some discussion of involvement of larger GC community in this process.

Update on regridding (R. Martin)

- Ray Nassar raised issue at IGC5 that current re-gridding algorithm forced to go through 1x1 (and thus we can lose information in a 2-step re-gridding process), so Mat Cooper has been working on replacing the regridding code based on code that GMAO uses with GC wrapper. Could be included in the 'almost there' developments list.
- Some discussion of re-gridding emissions on the fly. Worry about having different emissions in different formats, and would need to have some harmonization. Netcdf may be logical direction given GI will move towards this format.
- MERRA archive at Harvard is at 4x5. Mat Cooper is working on creating the archive at 2x2.5. Driven by project to analyse the satellite AOD record over last decade. Has processed 1990s and 2000s, would do the rest of the record as service to community. Would take a lot of disk space. The question is then the priorization of MERRA 2x2.5 vs. nested NA.
    - Dylan Jones interested in STE with MERRA 2x2.5. Noelle would also be interested in 2x2.5. Colette also interested, but some concern about precip issues affecting aerosols.
        - Steven mentioned that lifetime issue may come in only from 1997 onwards b/c of observing system changes.
    - Nested NA interests: JPL, Toronto, MIT
    - Daniel and Randall will discuss disk storage offline.
- Distributed storage system (mirror sites) discussed at IGC5. Has not moved forward so far. Chinese now have their own data repository. Rokjin, Noelle, Randall and possibly Mat offered servers. Noelle will work on this and look at testing between Harvard and MIT.

Documenting GEOS-Chem participation in community intercomparisons (D. Jacob)

- Fangqun Yu contributing GC results with aerosol microphysics to AEROCOM.
- Chris Holmes participating in Hg intercomparison
- Paul Palmer participating in Transcom methane and CO2
- Jingqui Mao POLARCAT intercomparisons

- Gabriel Curci OA AEROCOM intercomparison
- Loretta will set up ACCMIP emissions in future, discuss participation with Kevin Bowman
- Discussion of CO2 intercomparisons: Paul Palmer, Ray Nassar, Dylan Jones, Kevin Bowman and Steven Pawson will email offline.
- Need a table on GC webpage with intercomparisons

Other Discussion (All)

- Students in Jeff and Randall's group have found that burdens of secondary species significantly higher in nested NA than in 2x2.5 (burdens 2.5x higher), but NOT affecting primary species. Lyatt says Hg nested grid simulation had a similar issue: 40% higher at surface in nested grid – found this is an aqueous phase issue, models underestimate the amount in aqueous phase at low res. Nested grids are correct, but it is the 2x2.5 and 4x5 that are problematic. Harvard doesn't see this issue withO3 and sulfate (Lin Zhang). Need to have offline discussion to see if this has been properly investigated and/or fixed (Daniel will discuss with Lin and Lyatt).
- Mat has raised issue about how chemistry scheme works, including KPP, will organize a telecon on this.
- Appeal to WG chairs to bring issues/new developments to the fore