GEOS-Chem Steering Committee Telecon
January 8, 2013 10-11:30 Eastern

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

Absent: Lyatt Jaegle

1. **Benchmarking of nested model (Jun, Yuxuan)**
    - Benchmarking for 6 month nested grid just completed (with bug fix for re-gridding emissions in place – went into 9.2b)
    - Scatter plots of PM2.5 vs IMPROVE obs show that nested grid is an improvement over standard 4x5 simulation
    - Now have established a protocol to continue the nested benchmarking in the future
    - Sajeev Philip from GC Support Team has been taking on a lot of responsibility for nested grid and Randall/Jun will speak to him about taking on some of the responsibility for the benchmarking (perhaps as a back-up/complement to the nested model working group).
    - Discussion of the general question of who takes ownership for specialized simulation benchmarking. General agreement that development teams/working groups take responsibility for these and determine the needs as they evolve.

2. **IGC6 logistics (Daniel)**
    - General preparation for the meeting going well. Harvard event coordinator involved (Sandra Klemm).
    - Same room as before, but to meet fire regulations (since there were too many people in the room at IGC5), Daniel followed up Noelle's suggestion for an overflow room (with video feed) and there will also be an online video feed for those who cannot attend.
    - Limiting the meeting to 160
    - Currently have 123 registrants, but know that some have not registered, so there will be one more call for registration with a Jan 31 deadline. Afterwards will work on agenda.
    - Funding: waiting on approval from NASA-ACMAP ($25K), $55K on hand from other committed funds and also in-kind travel from NOAA and NCAS. Randall attempted but unsuccessful with IGAC request. Daniel currently has funding requests – decisions will be made by Daniel, Randall and Mat.
    - Setting a local cost cap of $10K

3. **IGC6 agenda (Randall)**
    - Have GCSC elections on Monday so that WG meetings can be led by new chairs.
    - Also moved the clinics up on Monday as requested.
    - Tuesday/Wednesday: working groups will be in late-afternoon/early evening so that we can go beyond the 5:15pm time limit on the plenary room.
    - Thursday: No working group summaries (found to be rushed & repetitive) and move into the plenary discussion of model priorities
    - Poster introductions time limited strictly to 30s

- Idea of more posters and longer talks was suggested. But overall the GCSC felt it's best to get as many faces on stage and an opportunity to talk, particularly for students. Some discussion about how the short talk format should be conveyed (not an AGU talk), and the challenge of conveying some useful background information when only 7 minute talks. Possibility of WG chairs doing an introductory talk that encapsulates the topics to be discussed that week. Decided that WG chairs will add this to their talks on Monday. Will also prompt people to be sure to convey the big picture context in their 7 min talks.
- Q: will there be a break-out on the grid-independent model? Add to GMAO Q&A on Monday but may conflict with GCST commitments in the clinics and split the audience. Possibly trim the clinics down to 1 hr …? Randall will consider this and update the agenda

4. GCSC election (Daniel)

- Plan to mention this in the next email to prompt registration
- Currently have several members up for election. Some folks have indicated they are happy to be up for election, two have indicated that they would prefer to step down (Loretta, Paul). So the question is how to proceed.
- Question about whether there should be term limits. Is the community large enough and diverse enough for this to occur? Many people will try to avoid competition, so perhaps not best to list interest from incumbents.
- Proposed approach: List positions that are open, solicit interest for filling those positions (ask for statement of interest/qualifications). If no interest expressed, then current GCSC members can stay on (or not).
- Email to entire community or just to group leaders? Suggestion to go to group leaders.
- Only currently unfilled position is deputy adjoint model scientist. Not critical need, but Daniel will advertise existence of the position.
- We will decide on next steps at next telecom when Daniel gets a list of candidates. People should certainly encourage applicants for their WGs at this time.

5. Progress on 9.2 (Bob)

- 9.02e to go out for approval today (but fix for emissions regridding)
- Chemistry updates spread over 3 one-month benchmarks. Includes standardization of Fabian Paulot mechanism, and updating rate constants.
- Grid independent updates include lots of changes under the hood. Hope to pass on new code to GMAO. Bob, Mike, and Christoph will meet later this week, then have a telecon with GMAO. Plan to run chemistry by meeting. Think they are close. Tested in sandbox already.
- Emissions component from Christoph about 80-90% done. Done a fantastic job. Will make combining and scaling easier. Hope to clean up confusion.

6. **Chemistry upgrade (Mat)**

- Updating rate constants for consistency with observations, update to isoprene scheme, include HO2 uptake onto aerosol, putting inhibition to N2O5 uptake. Changing isoprene and HO2 likely will have large impact. Running benchmarks to test, including 1-yr benchmarks.
- Concern that chemical calculation has become more expensive. Daniel: interacting with Melissa. Simulations at Harvard take 50% longer. Slowdown was neither Bromine chemistry nor strat chem. Now suspecting PARANOX or calcrate. Melissa is actively pursuing. Top priority.

- Prasad: no slowdown on his machine.
- Bob: possible compiler issues? Seems to be something substantive. Need to be vigilant when receiving updates.
- Mat: need to pay attention to runtimes on benchmarks. 9-1-3 takes factor of 2 longer on his machine. Run times important. Need to keep the model efficient.
- Bob: large variety of wall clock times. Earlier benchmarks subject to hardware differences. Last few benchmarks use same equipment to standardize. Should result in more consistent wall clock times between runs. Scalability decreased from 7.3 to 6.2. May be playing a role in slowdown.

7. Mercury (Noelle)

- 9-02c. Substantial upgrade with nested and Bromine oxidation field. Has own benchmark available on wiki through git. Need to create new soil files for every update. Y. Zhang just finished benchmark and will make available. Some issues with nested that will take a few weeks to sort.
- New POP simulation. Heard interest from several groups.
- Reason to make a mercury benchmark available is the large number of shadow users that use the code, but not active in community. Important for them to know when simulation matches obs.
- Daniel: encourage shadow users to come to meeting

8. GMAO (Steven)

- About to flip switch on ½ degree resolution simulation back to 2005.
- Next stream to be turned on is ¼ degree resolution stream. Will be less stable and incorporate changes over time.
- Impact of subgrid resolved transport still being investigated at GMAO. PBL passed on Sajeev at Dal. Testing ongoing.
- Daniel: anyone looking at eddy transport?
- Pawson: yes, but nothing conclusive yet. Hope to have something ready by time of GC meeting.

9. Adjoint model updates (Daven)

- Released update to code. Now distributed using Git. Users need to reregister to use new system. Most of update on software side. New build. Few updates that included new science process. Next round with more science.

10. Timing issues (Daniel, Randall)

- Already discussed 9-1-3. Investigating at Harvard.
- Ongoing effort at Harvard to speed up simulation using backward Eulerian solver after learned from Ted Russell that this is what CMAQ uses. Adrian Sandu just added it to the KPP library of solvers for purpose of GEOS-Chem testing.
- Evidence that decreasing chemistry timestep can improve accuracy. However, the computational expense of a short chemical timestep inhibits simulations at high spatial

resolution and thus also produces error. The degree of error depends on species and atmospheric region (e.g. upper tropospheric O3 vs boundary layer NO2.) Sajeev has begun conducting multiple simulations to quantitatively describe these errors vs a reference simulation. Suspect that an outcome will be that the choice of chemical and transport timesteps will depend on the scientific question of interest. A recommendation to consider at this time is whether GC publications should specify the timesteps used.

- Mat: lot of users that don't understand subtleties of timesteps. Need to guide them with timestep recommendations. Otherwise can encourage people to enter problematic regimes.

11. Other business (P. Kasibhatla)

- Bugs often creep up in emission updates. Can we think of a more robust protocol to test emission fields?
- Bob: Christoph's developments may help by cleaning up legacy code. Code is transparent through the new data structure. But we will also need to be more vigilant in benchmarking emission updates in 9-2.