GEOS-Chem Steering Committee Telecon
February 9, 2017 9:30-11:00 Eastern

Attending/Missing**:**
Peter Adams, Kevin Bowman, **Mathew Evans, Emily Fischer**, Jenny Fisher, **Colette Heald**, **Barron Henderson, Daven Henze, Chris Holmes, Daniel Jacob**, **Dylan Jones**, **Prasad Kasibhatla,** Hong Liao, **Jintai Lin, Hongyu Liu, Michael Long, Randall Martin, Dylan Millet, Andrea Molod**, Steven Pawson, **Jeff Pierce,** Jun Wang, **Yuxuan Wang, Shiliang Wu, Bob Yantosca, Lin Zhang**, Qiang Zhang

1. **General Update (Daniel)**
    - GEOS-Chem now a self-standing chemical module for use in ESMs (e.g. used in GEOS-5, credit to Mike Long). Some interest in porting to other systems, would be nice to do this in models that community can use. Daniel will be meeting with CESM leadership in a couple of weeks to discuss this. Daniel and Mat have also had some interactions with ECMWF.

2. **Engineer's Report (Bob)**
    - Public release of v11.01 last week (including FlexChem, species database, and replacing some historic infrastructure)
    - Some fixes, including fixed a computational bottleneck in convection module, will be available in v11.02a. Will also make a patch available for v11.01 (will not significantly impact simulation, but will speed up)
    - A number of items slated for v11.02: largely updates that have been in the pipeline for some time but have been waiting for FlexChem; will also activate the flexible precision option (REAL4) which leads to 10% improvement in run time, but 40% decrease in memory usage
    - ISORROPIA has had a long-standing noise issue. Seb Eastham has worked on re-coding ISORROPIA (including a switch to turn off ISORROPIA at P & T where would give noisy results). Will be part of v11-02
    - Choice of timestep is important. The optimal timestep recommended by Sajeev et al. (2016) C20T10 is certainly impacting performance (using C60T30 leads to a factor of 2 speed up). So community free to change these back to previous settings to lessen impact on run times. This will need to be advertised.
    - Standard chemistry is now fullchem+SOA+UCX. Can chose to run with tropchem simulation only (less chemistry, fewer vertical levels) so can also lead to a factor of 2 speed up. This will need to be advertised too.

3. **Updated GC narrative and new developments pages (Daniel)**
    - Both of these were updated with the new public release (v11.01)
    - Open for comments, everything prior to v9.02 has now been removed from new developments list, let Support Team know if any of these older items should be retained.
    - Steering Committee should verify that the narrative is now accurate
    - Timeline for v11-02 now set for first 4 sets of updates: v11-02a (minor updates), v11-02b (halogen chemistry), v11-02c (isoprene chemistry), v11-02d (aqueous isoprene SOA, etc). Following this we can discuss what should be included in v11-02, likely at IGC8

4. **GCHP update (Daniel, Randall, Mike)**

- Jiawei Zhuang's presentation at Harvard on GCHP will be shared with the Steering Committee
- Randall has offered to provide leadership for GCHP effort, given access to ComputeCanada resources
- GCHP is the next-generation of GEOS-Chem: MPI capability that is designed to enable scaling across many cores. It operates on the cube-sphere of the GEOS model.
- GCHP now mature. Plan to discuss full benchmarking at IGC8. Invite more people to join group.
- GEOS fields to support global simulations at 25 km resolution are now available at Dalhousie (GMAO now also producing an operational product at 12 km). Still dependent on using "classic" lat-lon fields produced by GMAO. In future would like to be using cube-sphere output from GMAO. For now, working on minimizing the impact of transitioning between lat-lon to cube-sphere and then back to lat-lon.
- Model is very scalable, particularly in light of how dynamical core was designed for the cube-sphere (by S.J. Lin and others). Can now resolve flow over the poles, which is exciting for science applications.
- Planning to work with Paratools to modify Kappa so can use this as the chemical solver
- Use of REAL4 may offer substantial speed-ups as well, will be tested when becomes available in v11-02a
- Some speed up potential in compiler optimization (suggested by Chris Holmes). Has not been extensively explored to date, but could be looked into.
- Long term, as GCHP becomes fully mature it could potentially replace GEOS-Chem "classic", such that all model simulations would be cube-sphere. However we want to maintain low entry point for GEOS-Chem, so perhaps not ideal to replace GEOS-Chem classic. This is something to be discussed at IGC8.
- GCHP now installed on Pleaides (if you have a NASA grant, you can run it there). Mat Evans also working to install it on York U system.
- Lizzie Lundgren handling all the technical communications related to GCHP, so please contact her with questions.

5. Effect of timestep optimization on performance (Mat)

- v11-01 out of the box 4x5 ran 5 times slower than v10 on York system
- reasons: stratosphere vertical levels, UCX chemistry, timestep has been shortened (from C60T30 in 4x5 to C20T10)
- Bring this to everyone's attention and raise whether this new timestep should be the standard. Do not want to trade accuracy for useability.
- Do not want operator duration to take priority over spatial resolution
- Default model will stick with shorter timesteps, as this represents the "Cadillac" simulation. However a good strategy may be to start with longer operator duration and then shorten as science matures
- Will ensure that wiki is very clear about this issue.

6. IGC8 planning (Daniel)

- Registration is somewhat limited by room size at Harvard. Two days ago had 120 registrants. Cannot exceed 200 people. Feb 15 may therefore be a hard deadline. Ensure that your groups register.
- IGC7 worked well, some concern about breakfast and then also some concern about clinics

- Clinics:
    - beginner, adjoint, advanced (GCHP, chemical module in ESM)
    - One possibility is to run the clinics over the lunch break (could feed people or ensure food quickly available). And take a 90 min lunch break.
- Will also plan to have a help desk staffed by Support Team for folks
- Poster sessions on 3 days (including Mon & Tues evenings w/ buffet food)
- Move to a 9am start (rather than 8:30am)
- Merge a couple of the working groups to ease the scheduling: chem+org, Ccycle+DA. Ideal for WGs to meet after the oral sessions.
- Try to ensure that WGs are run consistently
- Unclear if can fit Wennberg+chemistry and Jimenez+aerosols on afternoon of Day 1. Possibly could fit if eliminate WG on Day #1 if move all WGs to Day #4.
- Daniel will circulate a list of registered people (after Feb 15) as well as a draft schedule to the Steering Committee for comments

7. GCSC membership (Daniel)

- We shuffle membership at every GEOS-Chem meeting: some step down, some step up
- Daniel has received some expressions of interest
- Will have an open solicitation
- Daniel will then circulate names & interest to promote discussion amongst the Steering Committee.