GEOS-Chem Steering Committee Telecon
August 19, 2016 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 Updates (Daniel)**
    - V11 development is going well, implementation of Flex-Chem is nearly complete
    - Moisture fix is done and ready to go in. Everything is working except for GCAP, implementation issue related to specification of PTOP, so in discussion with chemistry-climate working group.
    - KPP can do total production and loss of chemical species, but cannot do so for chemical families, which is quite important. This capability will be added.
    - Development of GCHP not going quite as fast as would like to see it, but moving resources towards this and expect more progress in coming months.
    - Daniel has been fund-raising for IGC8. NSF is generously supporting and they would like us to invite experimental scientists. Details to be discussed, but perhaps some keynote presentations. NASA is also open to support, so Daniel has submitted proposal. NOAA will support travel for NOAA PIs. Haven't heard back from EPRI. Harvard will continue to support. MIT will also support.

2. **Engineer's Report (Bob)**
    - Since last telecom Support Team has been focused on removing legacy code related to SMVGEAR. In June had a code-a-thon to tackle some of these issues. Currently working on removing redundant arrays for species and tracers to reduce memory usage.
    - Moisture fix to be merged into FlexChem branch, likely v11.01h
    - Fix for wetdep implanted by Viral Shah (UW) to be merged into next version as well
    - On-going work to explore how to more easily define flexible grids for nested simulations
    - There is a list of updates planned for v11, and some of these are critical (moisture fix, wet dep fix, etc.), but some of these may move over to v12. Decision to be made after FlexChem fully implemented.

3. **Guiding Principles for GEOS-Chem developments (Randall, Colette, Daniel)**
    - Discussion document was developed by Randall and Colette with input from Daniel to reflect the current process for model development. The document also articulates the goals of development.
    - Will be posted on the website to inform community. Advertise in newsletter, and bring it up at IGC8.

4. **Adjoint Updates (Daven)**
    - Adjoint/DA WG phone call this summer. Lots of interest in updated observational operators, particularly for OMI and extension to upcoming instruments (TROPOMI, TEMPO). Working on more advanced diagnostics developed at UofT.

- A number of developments on-going in the broader community, but not yet in standard code. These include efforts to work on glyoxal, stratospheric chemistry, updating use of GEOS-FP, ensemble kalman filter implementation.

5. Working Group Reports

a. Hg and POPs (Jenny)

- A lot of updates integrated into v11, so benchmarking is on-going

b. Sources and surface uptake (no chairs present)

- Emily noted that her group has incorporated fire emission height scheme globally (based on Maria val Martin's scheme). Will report back on the impacts.
- Jun Wang working on specific altitudes for volcanic eruptions which may be of interest for standard code.

c. Nested Model (Jun)

- WG Chairs met in July
- Some discussion of the on-going need to benchmark the nested grid simulation raised by Daven. Some concerns were raised about the v10 ¼ degree simulation. Randall indicated that his group has been successful in running this, including correcting some NaNs in met fields. Will follow-up offline.

d. Chemistry-climate (Hong)

- Will be looking into GCAP moisture fix issue
- Old meteorological fields will be archived, and new met fields GISS ModelE2 4x5 and 2x25 are being generated.
- Rokjin Park and Amos Tai have been interfacing GEOS-Chem with CESM
- Lin Zhang interested in interfacing GEOS-Chem with Beijing Climate Model. Student from PKU will be at Harvard for a year to work on this. Perhaps use this experience to work on coupling with other models.

e. Aerosols (Colette)

- Following up on previous discussions, Randall has provided a recommendation for calculating PM2.5 to Support Team. This new diagnostic is scheduled for inclusion in v11.01i
- Telecom held on June 20 to discuss options for future evolution of OA. Very useful discussion. Recognition that user-community has varying needs/interests in SOA. A decision was made to proceed with 2 options for SOA, targeted for inclusion in v12:
    1. SIMPLE: expand the default GEOS-Chem full-chemistry option, to include 2 new tracers (SOAP a precursor and SOA). This will include simple empirical SOA sources from FF, BB, and BVOC. The goal of this scheme is to roughly meet observational constraints, particularly for those interested in PM2.5 but not the details of SOA. Jack Kodros in Pierce group is going to work on this in coordination with Aerosol WG chairs.
    2. COMPLEX: build upon the current SOA optional scheme (the "dry" VBS scheme). Add isoprene aqueous uptake SOA (from Eloise Marais), but use

new tracers to separate from SV scheme. Possibly also add some aging of SOGs in NV scheme. This is the "research-mode" SOA scheme for those interested in process-based descriptions of SOA formation.

- APM microphysics is not working with FlexChem. Bob followed up with Fangqun. Fangqun has APM working with v10 in HEMCO and will work on putting APM back in GEOS-Chem after public release of FlexChem. APM will not be available in v11 of standard code.

f. Chemistry (Barron)

- Historical TOMS database not working well with HEMCO. So updates on that available, which strongly affect the oxidants (via photolysis rates). Important update; will go into v11.
- Have completed review of latest JPL report for kinetics. Will be some small updates to be included in v12
- Working with carbon group on conserving carbon. Some questions with lumped species and will likely propose some revisions on this soon.
    - Some discussion of splitting ALK4 (separating butanes and pentanes): Barron and Emily both exploring the implications of this lumping.
- On-going evolution of isoprene chemistry, need to discuss how this should be integrated in standard model in v12 (waiting on FlexChem).

g. Organics (Emily)

- Settled on best emissions combination to use for ethane. Paper submitted by Emily's group last week, when accepted, will submit recommendation to standard model.
- Acetone: j-values in the database from NCAR instrument are not correct, and will be updated soon. Emily is waiting on this to evaluate j-values in the model.

h. Transport (no chairs present)

- Scavenging bug fix Viral Shah (UW) discovered and fixed, will be implemented in v11. Some minor effects.
- Karen Yu at Harvard has been looking at transport errors associated with offline (vs online) meteorology and degrading spatial resolution. Initial results suggest that errors are not very large (<10%). Good news!

i. GCHP (Mike, Randall)

- GCHP development kit now available for download. Newsletter describes attributes of GCHP. Randall's group has been successful in running GCHP on ComputeCanada platform.
- GCHP has been side-lined with FlexChem. But now in a position to bring FlexChem structure into GCHP framework.
- MAPL due to be included by ESRL in next version of ESMF, this will facilitate user installation of GCHP.
- A lot of work to reconcile lat-lon and cube-sphere versions of GEOS-Chem. Appears there will be an irreconcilable difference between using cube-sphere met fields on lat-lon grids (and vice versa) without noticeable errors. Note however that it's not quite clear how large these errors are. Possible concern for GMAO as much of the community

needs lat-lon grid. Could benefit GEOS-Chem community if they start producing cube-sphere archives.

6. **Python tools for GEOS-Chem output processing:** Barron will report on his tools development at the next telecon.