Transport WG Breakout Report

Transport characteristics: FP, MERRA-2

- Have a GMAO–GC users common set of tracers for evaluation
- Define a common set of benchmarks that GMAO can compute and share
- Implement into G-C v11-03 (GCHP & GCC)

http://wiki.seas.harvard.edu/geos-chem/index.php/Transport_Working_Group

Summary of the tracers in the GMI "tracer" mechanism:
Species number: Species name:
1. Age:
2. e90
3. tm25
4-6. Radon/Lead/Lead-stratosphere:
7-10. Beryllium 7/10 and Beryllium 7/10-stratosphere:
11. CH3I:
12 . fCO2:
13. Linoz:
14. Synoz:
15. SF6:
16. CLOCK
17. Uniform

Additional Tracers in GEOS - used in part to get an age spectrum

```
# Name     Units       Long Name
# -----    ------      ------------------------------
nh_5      'mol mol-1'   Northern Hemisphere 5 day tracer
nh_50     'mol mol-1'   Northern Hemisphere 50 day tracer
sh_5      'mol mol-1'   Southern Hemisphere 5 day tracer
sh_50     'mol mol-1'   Southern Hemisphere 50 day tracer
ntr_5     'mol mol-1'   Northern Hemisphere Subtropical 5 day tracer
ntr_50    'mol mol-1'   Northern Hemisphere Subtropical 50 day tracer
str_5     'mol mol-1'   Southern Hemisphere Subtropical 5 day tracer
str_50    'mol mol-1'   Southern Hemisphere Subtropical 50 day tracer
tr_5      'mol mol-1'   Tropical 5 day tracer
tr_50     'mol mol-1'   Tropical 50 day tracer
e90       'mol mol-1'   Constant emission 90 day tracer
e90_n     'mol mol-1'   Constant emission Northern Hemisphere 90 day
tracer
e90_s     'mol mol-1'   Constant emission Southern Hemisphere 90 day
tracer
st80_25   'mol mol-1'   Stratospheric source 25 day tracer
aoa_nh    'days'        Age of air tracer (Northern Hemisphere surface source)
::
```

and a few others

```
CH3I      'mol mol-1'   Methyl iodide
st80_25   'mol mol-1'   Stratosphere source 25 day tracer
CO_50_na  'mol mol-1'   Anthro CO North America 50 day tracer
```

GEOS resolution & subgrid convection:

- GCST has received the code from Karen Yu (Harvard).
- Work is slated to begin right after the v11-02 release.
- Bob Y. (GCST) and Tailong He (U. Toronto) will work on this.

GC alternative meteorology:

- GCHP can handle other met fields easier than GC-Classic.
- Some structural modifications to the code might be needed, depending on the met fields in question.
- Seb Eastham (MIT): interfacing GCHP with CAM & CESM, identified several areas where the code needs to be modified.
- Lin Zhang (PKU): BCC-CSM
- May Fu (PKU): WRF

Pressure fixer: still needed? (Seb / Bob)

- As long as we are using winds instead of mass fluxes for input.
- Still testing the use of cubed-sphere mass fluxes in GCHP.
- now have a one-day archive of consistent winds and mass fluxes from GMAO (c360) which they are running in GCHP.
- Seem to get good agreement between the “wind-driven” and “flux-driven” versions, but need to run the tests necessary to confirm whether or not to remove the pressure fixer.
- high on Seb’s list of priorities

Wet deposition parameterizations, pH dependency, Henry's law coefficients (Bob)**:**

- The Henry's law routines in use by both the wetdep routines and HEMCO have the capability to apply a pH correction via the pKa coefficient.

- The Henry's law coefficients need updating to the latest values in the literature (GCST would need someone to tell us what values to from e.g. Sander 2015).

- Need to use the same Henry's law coefficients in drydep as is in the rest of the code. (Right now, drydep uses its own hardcoded Henry's law coefficients).

- When GCST implemented the species database, all Henry's law coefficients were not changed at the time. GCST were waiting to v11-03 to start this work, and will need assistance from someone in the community.