

# Details on CAM3.5 Aerosol dataset conversion.

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### Constants:

-SHR\_CONST\_AVOGAD = 6.02214e26\_R8 ! Avogadro's number ~ molecules/kmole  
-DMS molecular weight: 62.13 g/mol (see [http://en.wikipedia.org/wiki/Dimethyl\\_sulfide](http://en.wikipedia.org/wiki/Dimethyl_sulfide))  
-Black Carbon – 12.0109997 g/mol  
-Organic Carbon – 12.0109997\_r8 grams/mole g/mol  
-S = 32.06, O=15.9994  
-SO2 = 64.0588 g/mol  
-SO4 = 96.0576 g/mol  
trop\_mozart chemistry uses SHR\_CONST\_AVOGAD for Avogadro's number  
Molecular weights are defined in:  
~/branches/trop\_mozart\_aero\_cam3\_4\_03/models/atm/cam/src/chemistry/trop\_mozart\_aero/mo\_sim\_dat.F90

- DMS : 62.1324005\_r8 grams/mole
- SO2 : 64.0647964\_r8 grams/mole
- SO4 : 96.0635986\_r8 grams/mole
- Carbon Aerosols : 12.0109997\_r8 grams/mole

### Location of conversion codes:

- /project/cseg/erik/cam3.5\_aerosol/
- [http://www.cgd.ucar.edu/cms/bundy/Projects/cam\\_cases/cam\\_prognostic\\_aerosol\\_runs](http://www.cgd.ucar.edu/cms/bundy/Projects/cam_cases/cam_prognostic_aerosol_runs)

### DMS data-set

- Copy climatology to each year from 1870 to 2000.
- Change DMS name to total
- Convert units to molecules/cm2/s (multiply by SHR\_CONST\_AVOGAD/(1x10^4 x 62.1324005) )
- Add scale\_factor=1.f, long\_name="dms total emissions", \_FillValue=-999.f, Species, Grid, Conventions, institution, and authors  
Use Yorick script that does interpolation to do above changes.  
Annual average global area-weighted sum = 37.1266 Tg/year (Total DMS, not just S)

### SOx data-set

- Rename "date" dimension to "time"
- Change name of "SOx" to "total"
- Create 4-files: SO2-surface, SO4-surface, SO2-100m, SO4-100m  
(98% is SO2, 2% is SO4)
- Convert units to molecules/cm2/s (multiply by 0.02 x SHR\_CONST\_AVOGAD/(1x10^4 x 32.06) for SO4 )  
(multiply by 0.98 x SHR\_CONST\_AVOGAD/(1x10^4 x 32.06) for SO2 )  
(multiply by 0.02 x SHR\_CONST\_AVOGAD/(1x10^4 x 32.06) for SO4)
- Add scale\_factor=1.f, long\_name="SOx total emissions", \_FillValue=-999.f, Species, Grid, Conventions, institution, and authors  
Use Yorick script that does interpolation to do above changes.  
Annual average global area-weighted sum = 56.96 Tg/year

### Carbon data-set

- Create 2-files: Organic-C, Black-C
- Output: FFBCSF\_BBBCSF+BFBCSF for output hydrophobic Black Carbon
- Output: FFOCSF+BBOCSF+BFBCSF+NOCSF for output hydrophobic Organic Carbon
- Convert units to molecules/cm2/s from kg/m2/year  
(multiply by SHR\_CONST\_AVOGAD/(1x10^4 x 12.0109997) for BC )  
(multiply by SHR\_CONST\_AVOGAD/(1x10^4 x 12.0109997) for OC )
- Add scale\_factor=1.f, long\_name="black carbon total emissions", \_FillValue=-999.f, Species, Grid, Conventions, institution, and authors, Label  
species as "CB1" and "OC1"  
for hydrophobic black and organic carbon. "CB2" and "OC2" are hydrophilic carbon and I'm assuming will be set to zero emission.

Use Yorick script that does interpolation to do above changes.  
Create script to convert 10-year monthly climatology to 130 year monthly dataset.  
Annual average global area-weighted sum = 6.51 Tg/year OC and 2.747 Tg/year BC