IRWG21 a Priori : Whole Atmosphere Community Climate Model (WACCM)

Introduction

WACCM is part of the Community Earth System Model: CESM website

Chemical profiles and statistics from the WACCM v6 model for use as a priori for retrievals with the IRWG community and others can be found on ftp here. These a priori profiles are interpolated to each site from WACCM v6 model output. These averaged and interpolated profiles for IRWG use are designated .v7 on the ftp site since the last set of profiles were designated v6. This should not be conflated with the version of the WACCM model that was used for the particular simulation. We can designate these profiles as IRWG21 a profiles.

- Note that the WACCM output include a very large array of species and parameters. We have included here those output species that we use or might use as primary or interfering species. We have included some species that are not currently useable in SFIT4 (and may or may not have line parameter either) but may be of interest.
- Note that there are species used in SFIT4 that are not WACCM output species and other sources are used.

Here are some details of the current simulation & output:

- These chemical profiles can account for a model based changing atmosphere
- We expect this new version should not be largely different from the previous version
- New simulation is from WACCM V6 [Gettleman, A. et. al., 2019]
    - WACCM V66 is a major update in Community Earth System Model (CESM), including physical, chemical and aerosol parameterizations.
    - Fully coupled CESM2 - WACCM6.
    - We use historical runs from 1850-2014
    - Then SSP5-8.5 runs from 2015-2100
    - New sulfur chemistry -> SO2, OCS, DMS, H2SO4, aerosol …
- This particular WACCM simulation was a developed for CMIP6 [Eyring, V., et. al., 2016]
- For the IRWG2021 we average 61 years: from 1980 – 2040
- File formats should be identical as the previous version IRWG v6
- As of June 2021: Limited testing so far: profiles seem very close, C2H6 is better.
- These are available at ftp://nitrogen.acom.ucar.edu/user/jamesw/IRWG/2021/WACCM.v7
- and may be hosted at NDACC DHF - tbd

To download a single site, for instance Ny Alesund, try : wget -r ftp://nitrogen.acom.ucar.edu/user/jamesw/IRWG/2021/WACCM.v7/Ny_Alesund.V7/

When you build a 'refmod' file for a priori each gas name has numbered ID. These must match the linelist name and number in the 'linelist-core' directory and hard coded molecular data paramaters in the SFIT4 source. The map from HITRAN and ATM to the SFIT4 ID is in the distribution /sfit-core-code/docs/Spectroscopy/LineLists_Map.xlsx and here: