

Model Chemistry Evaluation Program (MCEP):

Purpose of the program: quick-look comparison of model results with established climatologies for chemical in the troposphere.

Input files: monthly mean model output of CAM, WACCM or MOZART model results (h0-files).

Main Program: eval_model.pro, with input area for the user:

1. Model type; must be either 0=CAM or 1=MOZART
2. Number of model files to be compared (max = 2)
3. Directory, file_stem of model input
4. Array of years to be averaged
5. Label model run
6. Number of months processed
7. Time records to combine (e.g., '0,11' for all months per year)
8. Set dust_diag (1:ON, 0:OFF)
9. Define variables to be evaluated; mandatory variables are: date, P0, hyai, hybi, hyam, hybm, PS, T

Results are stored in 'plots/*.ps'

Data used for the comparison and diagnostics applied:

- OH Climatology of Spivakovky et al. (2000) using zonally and monthly averaged concentrations of OH for January, April, July and October up to 100hPa.

Diagnostic: Side to side comparison between model and observations of zonal averages

- Surface carbon monoxide (CO) measurements of the NOAA ESRL Global Monitoring Division as part of the NOAA/CMDL Cooperative Air Sampling Network(Novelli et al., 2003.) Monthly values were average for the period between 1988 and 2001 for specific stations.

Diagnostic: Comparison of the annual variability for each station

- Ozone Sonde climatology between 1980-1994 from Logan et al, 1996.
- Ozone Sonde climatology between 1995-2009 from Tilmes et al, 2011

Diagnostic:

a) monthly averaged profiles for all stations and one months per season (January, April, July and October)

b) Comparison of the annual variability for each station at 3 different pressure levels: 800hPa, 500hPa and 200hPa

- Aircraft observations of various campaigns as described in Emmons et al., 2000. List of species:
'no2','nox','pan','hno3','co','c3h8','c2h6','h2o2','acet','ch3oh','ch2o','ch3ooh','ch4','h2o','so2','h2so4','dms','o3','no'

List of campaigns: STRAT0Z-3 (1984), ABLE-2A (1985), TROPOZ-1 (1987), CITE-3 (1989), ABLE-3B (1990), TROPOZ-2 (1991), PEM-West-A (1991), TRACE-A (1992), PEM-West-B (1994), TOTE (1995), VOTE (1996), PEM-Tropics-A (1996), POLINAT-2 (1997), SONEX (1997), PEM-Tropics-B (1999), TRACE-P (2000), TOPSE (2000)

Diagnostics:

a) Comparison of Aircraft data with each aircraft campaign: Boxes and whiskers indicate the central 50% and 90% of the observations, with a vertical bar at the median, and a star at the mean. Model results are averaged over the region of the specific aircraft campaign, mean values and standard deviations are plotted.

b) correlation between models and observed data for each aircraft campaign

- Surface UC-Irvine hydrocarbon samples from D.Blake and A.Swanson, data for 1996-2001 binned by month and latitude, averaged between 170 and 230 longitude.

Diagnostic: latitudinal variability of CH₄, C₂H₆, C₂H₈, C₂H₄, C₃H₆, and BIGALK for one months per season

- Monthly mean seasalt, SO₄, data in [ug/m³] for different stations averaged between 1983-1996 (if available) (Prospero_Savoie.txt)

- Data: SO₄ surface data from the IMPROVE Network Aerosol Data for various sites averaged between 3/1988-12/2004

Diagnostic:

- a) Annual variability for different Stations
- b) Map with correlation coefficient
- c) Relative difference between model and data and correlation

References:

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