Evaluation of GOCART CO simulation

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Goals

Evaluate GOCART’s regional and global CO simulations with various observations from MOPITT and AIRS satellites, GMD surface and aircraft measurements.
Simulate multi-year CO and aerosols (2000-2006) with GOCART

CO tagged by fossil fuel, biofuel, biomass burning, biogenic emission, and methane oxidation

Obtain concurrent observations for CO from satellite (AIRS, MOPITT), surface (GMD) and aircraft (GMD)
Model-satellite Column CO comparison

Model shows: good spatial pattern; slightly low values in NH
Model-GMD surface CO comparison

North American

- UTA (59.90N, 113.72W)
- KEY (25.67N, 80.20W)

Asia

- TAP (36.73N, 126.13E)
- WLG (36.29N, 100.90E)

West Europe

- MHD (53.33N, 9.90W)
- HUN (46.95N, 16.65E)

Arctic

- ALT (82.45N, 62.52W)
- ZEP (78.90N, 11.88E)

SH land

- IZO (29.30N, 16.48W)
- SPO (88.98S, 24.80W)

Ocean

- AZR (38.77N, 27.38W)
- SEY (4.67S, 55.17W)

Month

CO (ppb)

CMDL

GOCART
Model-GMD vertical CO profile comparison

Jan 2000 – July 2002

CO (500mb, Feb)

GOCART

GMD
Monthly satellite and model CO in 500 mb

Using the different OH and biomass burning emission
MODIS, AERONET, and Model monthly mean AOT comparisons over AERONET stations
Overall, the spatial and temporal distributions of multi-year model column CO and AOT agree with the satellite, aircraft, and ground station observations.

Model column CO are generally lower than the observations over NH mid-latitudes => investigate OH field and biomass burning emission.

Model AOT are generally lower than the observations from tropical to SH mid-latitude oceans => investigate biomass burning emission and model sea salt simulation.