

This document provides general information for Version 1 of NDACC model support files generated by the Replay ‘MINDS’ simulation. *MINDS uses the same chemical mechanism as the GMI CTM.*

Model support files have been created for the Dobson, FTIR, Lidar, and Sonde working groups based on their stations’ locations, the temporal frequency of sampling, and the atmospheric species (constituents) each instrument type measures. The content and formatting of Replay files are nearly the same as the GMI model support files.

FTIR Files

For each NDACC FTIR station, the FTIR files contain 1 year of 24-hr averaged (daily) constituent fields on pressure levels for: O₃, N₂O, HNO₃, HCl, ClONO₂, BrO, NO, NO₂, CCl₄, CF₃Cl, CF₂Cl₂, HCFC22, CO, CH₂O, CH₄, C₂H₆, and H₂O. Meteorological fields include daily averaged age of air, temperature, pressure, potential vorticity, tropopause pressure, and geometric altitude. Constituent fields are also reported as total columns. FTIR file names take the form ‘RePL-MR2V1_FTIR_station_year.nc’. Use the linux command ‘ncdump -h filename’ to see the file’s contents.

Lidar, Dobson, and Sonde Files

Each file contains 1 year of 3-hourly averaged vertical profiles of constituents and meteorological fields on a geometric altitude grid at a single NDACC measurement site. The Dobson, lidar, and sonde files all contain the same fields: O₃, NO₂, water, temperature, pressure, potential vorticity, tropopause pressure, and age of air. The files for these working groups are found in a single directory. File names are ‘RePL-MR2V1_3HR_station_year.nc’; the instrument type (e.g., sonde) is not part of the name. Use the linux command ‘ncdump -h filename’ to list the file’s content.

The Replay Model Version used to create these files

The Replay outputs provided here come from the ‘MINDS’ simulation. ‘Replay’ is a GEOS model that ‘replays’ to MERRA2 meteorology, thus its temperatures and transport circulation are very similar, but not identical to MERRA2. It differs from a chemical transport model (e.g., the GMI CTM) because the constituents are transported at every model time step (minutes) rather than every time new met fields are read in (hours). This may improve constituent distributions in the troposphere during convective activity. The MINDS simulation is integrated with 0.25° horizontal resolution, 72 vertical levels (same as MERRA2), and uses the same chemistry mechanism as the GMI CTM. MINDS is available for full years 1996-2020; more years will be available in the future. Replay and the GMI CTM show a similar level of agreement with observations. For information on the MINDS project, see [MINDS: Multi-Decadal Nitrogen Dioxide and Derived Products from Satellites | Earthdata \(nasa.gov\)](#)

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