



Contribution ID: 52

Type: Poster

Comparison of mean age of air in ERA5, ERA-I, MERRA2 and JRA-3Q using the BASCOE chemistry transport model and observations from MIPAS, ACE-FTS and CAIRT

We present an intercomparison of the mean age of air (AoA) derived from three recent reanalyses: the European Centre for Medium-Range Weather Forecasts Reanalysis version 5 (ERA5) and its predecessor (ERA-Interim), the National Aeronautics and Space Administration's Modern-Era Retrospective analysis for Research and Applications version 2 (MERRA2), and the Japan Meteorological Agency's 3-Quarter Century Reanalysis (JRA-3Q). AoA is computed using an idealized clock tracer within the Belgian Assimilation System for Chemical Observations (BASCOE) chemistry transport model.

We examine the simulated AoA time series with a particular focus on differences between the reanalyses. Preliminary results indicate that MERRA2 and JRA-3Q show a decreasing AoA trend between 1990 and 2000, after which all three reanalyses exhibit a relatively stable AoA with no significant trends. ERA5 consistently provides the youngest AoA, suggesting a faster stratospheric transport. These findings are compared with the results of Chabrilat et al. (2018), which analyzed older reanalysis versions (ERA-Interim and JRA-55) using a previous version of the BASCOE model, and with Ploeger et al. (2019, 2021), which presented AoA from the CLaMS model driven by ERA-Interim, MERRA2, JRA-55 and ERA5. We also compare with existing limb retrievals of age of air from MIPAS and ACE-FTS, as well as mock retrievals from the future CAIRT mission, which is currently in phase A of development.

This study provides insights into the evolution of AoA estimates in successive reanalysis products and highlights key differences in stratospheric transport representations.

Topic

Atmospheric composition (Earth and planets), chemistry and transport

Author: VERVALCKE, Sarah (Belgian Institute for Space Aeronomy)

Co-authors: Dr ERRERA, Quentin (Belgian Institute for Space Aeronomy); Dr CHABRILLAT, Simon (Belgian Institute for Space Aeronomy)

Presenter: VERVALCKE, Sarah (Belgian Institute for Space Aeronomy)