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Evaluation of the MERRA-2 Assimilated Ozone Product

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This study presents an evaluation of the assimilated ozone product from the Modern-Era Retrospective Analysis for Research and Applications, Version 2 (MERRA-2) produced at NASA's Global Modeling and Assimilation Office (GMAO) spanning the time period from 1980 to present. MERRA-2 assimilates partial column ozone Version 8.6 retrievals from a series of Solar Backscatter Ultraviolet Radiometers (SBUV) on NOAA spacecraft between January 1980 and September 2004 and retrieved ozone profiles from the Microwave Limb Sounder (MLS) and total column from the Ozone Monitoring Instrument (OMI) on NASA's EOS Aura satellite starting October 2004. We compare the MERRA-2 ozone fields with the following independent data: total ozone from the Total Ozone Mapping Spectrometer (TOMS), profile observations from Stratospheric Aerosol and Gas Experiment II (SAGE II), Upper Atmosphere Research Satellite's MLS instrument (UARS MLS), Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) and ground-based ozonesondes. Our study will show the spatial and temporal variability of stratospheric and upper tropospheric ozone in MERRA-2 and implications of the change in observing system from SBUV to EOS Aura data when a small bias was introduced in the northern hemisphere due to OMI having slightly lower total column ozone values. In general, the comparisons of the ozone profiles are good (differences of less than 10 % in the stratosphere) and total ozone column agreement with TOMS is within 6%.