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Assessment of interannual variability of the ozone column in the upper troposphere and low stratosphere between different reanalysis of the S−RIP

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Resumo

The different reanalysis data platforms help us to understand the influence of gases on atmospheric circulation through past variability. This information can be used as observations to serve as a comparison with atmospheric climate models. Understanding the role of major gases in the atmosphere, such as ozone (O3), in both weather, seasonal and climate forecasts is of fundamental importance for the performance and accurate development of climate models. This paper aims to present the results of the intercomparisons between different reanalysis that make up the SPARC (Stratosphere−troposphere Process and Role in Climate) Reanalysis Intercomparison Project (S−RIP) for the ozone column. Multi−Sensor Reanalysis (MSR) ozone column was used. Multi−sensor Reanalysis (MSR) was constructed using an onboard satellite dataset of sensors (approximately 15 sensors) of the ozone column. Climate Change Initiative (CCI) vertical ozone profile data were used for the analysis of different pressure levels. For this study, data from six different reanalyses were used for both vertical profile and total ozone column. It was utilized the reanalyses CAMS, CFSR, ERA−Interim, ERA−5, MACC, and MERRA−2. The study period is from 2003 to 2012 because, for reasons of comparison between the reanalysis, two of the six databases had begun in 2003 (MACC and CAMS). Was calculated the average, standard deviation, simple differences, and anomalies, monthly and annual, for the total column ozone and ozone profile. The results of the observations on the total ozone column (TCO) in more recent reanalysis results in realistic representations of TCO in reanalysis, except when the data coverage is lacking, such as during the polar night. The vertical distribution of stratospheric ozone presents problems in all reanalysis because they still present difficulties in the representations of chemical and radioactive interactions of high−level models in the stratosphere. However, significant biases are found in the mainly vertical distribution of ozone found in the upper troposphere and lower stratosphere in all reanalysis.