



Solar cycle in MERRA series: attribution and frequency analysis

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This study is focused on the variability of temperature, ozone and circulation characteristics during the eleven-year cycle in the stratosphere and lower mesosphere. The analysis is based on the attribution study using the multiple linear regression model. The study results are supplemented by a frequency analysis using the pseudo-2D wavelet transform algorithms. The analyses were applied for the period 1979-2012 on the MERRA reanalysis dataset (Modern Era Retrospective-analysis for Research and Applications, NASA reanalysis for the satellite era using a new version of the Goddard Earth Observing System Data Assimilation System).

Results of this study show a qualitative agreement with other related studies in the stratosphere. The attribution analysis shows more intensive sudden stratospheric warming during solar maxima and the associated impact on the Brewer-Dobson circulation. Regarding findings above the stratopause region, the results differ substantially from other published studies using different reanalyzed series. This is confirmed by the results of the frequency study too.