

Title: Analysis of top-down solar influence using MERRA data

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Abstract: One of the most accepted explanations for the influence of the Sun on the Earth's climate is through the so-called 'top down' influence, where the tropical atmosphere is heated through the absorption of ultraviolet radiation by ozone. This added thermal energy is then re-distributed to the mid-latitudes through changes in circulation. Solar Cycle 23-24 is without question the most accurately measured solar cycle in history in terms of both atmospheric and solar observations and spans an observation period of more than 12 years. While many solar-related climatic effects will require multiple solar cycles to truly quantify the solar influence, these highly accurate and uninterrupted data records can potentially yield mechanistic information about how the top down influence operates within the Earth's atmosphere. Since the signals seen in the atmosphere are quasi-periodic (diurnal, monthly, annual, quasi biennial, secular, etc.) Fourier and trend analysis methods are the most logical analytical techniques that can be applied to identify statistically significant frequencies in the multifactorial atmospheric data record.

Concurrent solar data from the Solar Radiation Physical Model (SRPM) and NOAA (F10.7 and the Geomagnetic ap Index) will be used to analyze potential solar effects on the top layer of the Earth's atmosphere to identify the potential effects of solar intensity and its mechanism throughout our atmosphere.