

Investigation of Atmospheric Coupling with Solar Variances

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Abstract

In this project, a comparison of atmospheric model results and measured data from the Microwave Limb Sounder (MLS) on the Aura satellite was performed. The comparison used the Whole Atmosphere Community Climate Model (WACCM) with two different solar spectral irradiance (SSI) inputs. The first SSI input is from the Naval Research Laboratory (NRL) that uses solar irradiance reconstructions based on combined sunspot and facular proxy indicators. The second SSI input was produced from measurements made on Solar Radiation and Climate Experiment (SORCE). These two solar inputs produce significantly different outputs from the WACCM model. The output from these two models were then compared to measured atmospheric data from the Microwave Limb Sounder (MLS) and analyzed to determine which solar input produces a more realistic representation of Earth's atmosphere. This analysis was performed for hydroxyl radical (OH), ozone, and temperature. It was determined that MLS OH and ozone results showed an overall better correspondence with SORCE model data. Non-solar contributions significantly influence the Earth's temperature structure so additional analysis is needed to understand the observed effects.