

Solar Ultraviolet Irradiance and Its Variability

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The record for continuous measurement of absolute ultraviolet solar irradiance and its variation now spans 15 years, from the peak of Solar Cycle 22 through the declining phase of Solar Cycle 23. It began with observations by the SOLAR Stellar Irradiance Comparison Experiment I (SOLSTICE I) and by the Solar Ultraviolet Spectral Irradiance Monitor (SUSIM), which operated aboard the Upper Atmosphere Research Satellite (UARS) from September 1991 until August 2005. These measurements overlap by 2.5 years with observations by SOLSTICE II, which continues to operate aboard the Solar Radiation and Climate Experiment (SORCE) spacecraft. Here we present composite time series of absolute solar irradiance derived from these three independent experiments and discuss the morphology of solar ultraviolet irradiance variability ranging from hours to solar cycle time scales.

Solar ultraviolet radiation impinging on the earth system is entirely absorbed by the atmosphere. Energy at far ultraviolet wavelengths (110 - 185 nm) is deposited above altitudes of 80 km and drives the structure of the thermosphere. Middle ultraviolet wavelengths (185 - 300 nm), which are absorbed by ozone, influence the structure and composition of the stratosphere and upper troposphere. We briefly discuss the role of these data in climate research.