

Modeling the Wavelength and Time Dependence of Solar Forcing of Earth's Atmosphere and Ocean Mixed Layer

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In this study, we have extended a simple 1D radiative convective equilibrium model (Arking, 2005) to include the time dependence in studying the response of the ocean mixed layer and atmospheric temperatures to spectral variations of solar radiation as observed by the Spectral Irradiance Monitor (SIM) on SORCE. The UV, NIR and VIS, force the stratosphere, troposphere, and ocean mixed layers, respectively. Preliminary RCM (Radiative-Convective Model) results show significant differences in temperature profiles when driven by the SIM spectral solar irradiance (SSI) as compared to responses to other scenarios of change of TSI without spectral variations. We discuss plans to test the physical concepts suggested by this simple 1D model by studying similar forcing scenarios applied to GISS 3D model.

Reference:

Arking, A., "Effects of Bias in Solar Radiative Transfer Codes on Global Climate Model Simulations," *Geophys. Res. Lett.*, 32, L20717, doi: 10.1029/2005GL023644, 2005.