



Surface ultraviolet irradiance derived from GOES data

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Currently available UV data are obtained from polar platforms. However, for most biological processes the relevant quantity is the daily-integrated dose, a quantity that can be determined more accurately from geostationary satellites. To this end, a retrieval system was designed for efficient estimation of surface erythemal ultraviolet (EUV) flux from the visible radiances measured by the imager instruments onboard the US Geostationary Operational Environmental Satellites (GOES). Erythemal fluxes are determined for the Diffey and Parrish action spectra. The system takes advantage of the already proven capability of retrieving total shortwave irradiance from GOES. It is based on a parameterized relationship between UV, UV-B and EUV. The latter is obtained from radiative transfer calculations for varying amounts of ozone and values of cloud and aerosol optical thickness. Presently, the surface UV flux is estimated offline, in near real-time, using inputs from two systems. One system is the Continental United States (CONUS) GOES Surface and Insolation Product (CONUS GSIP) system that provides the necessary radiances and auxiliary data at a 0.5-degree latitude/longitude grid and uses column amount of ozone from the NOAA Stratosphere Monitoring Ozone Blended Analysis (SMOBA). The second system is the full-disk GSIP system with a latitude/longitude resolution of 1/8 of a degree and which ingests the NOAA Global Forecast System (GFS) total column amount of ozone. Surface UV is estimated identically in both systems, but cloud detection and sources of auxiliary data are different. The satellite-estimated UV flux is compared to that measured at the ground.