

***TSI Data for the CERES Climate Data Record and the FLASHflux Environmental Data Record***  
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The Clouds and the Earth's Radiant Energy System (CERES) instruments aboard the Terra, Aqua and Suomi-NPP satellites measure energy emanating from the Earth's surface-atmosphere system in the shortwave (wavelengths less than 4.5 micrometers), infrared window (wavelengths between 8 and 12 micrometers), and total (all wavelengths). To balance this energy equation, CERES incorporates measurements of the total solar irradiance (TSI) provided by the Total Irradiance Monitor (TIM) instrument aboard NASA's Solar Radiation and Climate Experiment (SORCE) satellite. This balance allows for an overall accounting of the planetary energy budget, and thus, can reveal imbalances within the system, whether they are local, regional or global.

The CERES measurements are also used in the Fast Longwave and Shortwave Radiative Fluxes (FLASHFlux) sub-project within CERES to provide CERES-like fluxes within 7 days of satellite observations. This rapid response necessitates use of CERES data with calibrations that have not been fully adjusted for changes in the instrument gains and the spectral response functions over the last six to twelve months. Since the FLASHFlux data is a short-term environmental data record, rather than a climate data record, some degree of accuracy can be exchanged for rapid data availability. Moreover, experience has demonstrated that recent changes in the gains and instrument response functions are usually quite small, having negligible impact on the environmental data records. While rapidly available versions of the CERES observations, MODIS-derived cloud properties, and other meteorological parameters are available, the remaining variable, the total solar irradiance (TSI), is only available seven days after being measured. Currently, a simple method is used to predict the total solar irradiances ten days into the future based on running means of the latest TSI data. This method, while reasonably accurate for quiet solar conditions, is incapable of catching significant departures from the nominal trend in the TSI data.