



## **The CERES flux by cloud type product: Algorithm and Validation**

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The Clouds and the Earth's Radiant Energy System (CERES) project now has over 10 years accurately observed top-of-the-atmosphere (TOA) flux record for climate monitoring and diagnostic studies. CERES provides the climate community the following parameters: coincident CERES observed TOA fluxes, computed profile and surface fluxes, as well as MODIS cloud and aerosol retrievals. As part of its suite of products, CERES has packaged its MODIS derived cloud properties in the ISCCP-D2 monthly format that can be compared against climate model diagnostics with ISCCP simulators. There are 4 CERES ISCCP-D2 like products: ISCCP-D2like-MODIS, ISCCP-D2like-geo, ISCCP-D2like-merge, and flux-by-cloud-type product. The flux product combines for the first time CERES measured TOA fluxes along with the associated MODIS cloud properties, which links radiative flux directly to a specific cloud type. This was achieved by dividing the measured flux for a footprint into clear-sky portion and two cloud layer parts of the 20-km CERES footprint. The fluxes from each cloud layer in a CERES footprint were estimated using MODIS radiances for both shortwave and longwave. The spatially distributed cloud properties within the footprint were retrieved from 2-km MODIS pixels. This presentation will focus on algorithm development of the flux by cloud type product and its validation.