Evaluating Surface Flux Results from CERES-FLASHFlux

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Introduction: The Fast Longwave and Shortwave Radiative Flux (FLASHFlux) data product was developed to provide a rapid release version of the Clouds and Earth’s Radiant Energy System (CERES) results, which could be made available to the research and applications communities within one week of the satellite observations by exchanging some accuracy for speed of processing. Unlike standard CERES products, FLASHFlux does not maintain a long-term consistent record. Therefore the latest algorithm changes and input data can be incorporated into processing. FLASHFlux released Version3a January 2013) and Version 3b (August 2014) which include the latest meteorological product from Global Modeling and Assimilation Office (GMAO), GEOS FP-IT (5.9.1), the latest spectral response functions and gains for the CERES instruments, and aerosol climatology based on the latest MATCH data. Version 3b included a slightly updated calibration and some changes to the surface albedo over snow/ice. Typically FLASHFlux does not reprocess earlier versions when a new version is released. The combined record of Time Interpolated Space Averaged (TISA) surface flux results from Versions3a and 3b for July 2012 to October 2015 have been compared to the ground measured based results. The FLASHFlux results are also compared to other two CERES gridded products, SYN1deg and EBAF surface fluxes.

CERES SYN1deg: This data product the SYN1deg combines Terra and Aqua CERES and 3-hourly geostationary (GOE) data to produce 3-hourly TOA, in-air and surface fluxes based on a radiative transfer model. Time of GEO data enables the model to more accurately represent the diurnal variability between the CERES measurement times. For this study the daily averaged surface fluxes were used.

CERES EBAF and Surface-EBAF: The CERES Energy Balanced and Filled (EBAF) product also integrates GEO observations with CERES and provides Top-of-Atmosphere fluxes. Global net radiative flux is constrained to the ocean heat storage term. EBAF surface products provide monthly mean LW and SW fluxes that are consistent with the TOA EBAF. For this study, monthly mean FLASHFlux and SYN1deg were compared with the surface measurements. EBAF is currently available through May 2015.

Conclusions:
• FLASHFlux results compare very well to the ground measured of daily and monthly mean Longwave and Shortwave Surface Fluxes within ±5 Wm-2 for everywhere except in polar areas.
• FLASHFlux biases and random errors are generally larger than those from climate quality datasets, i.e. SYN1deg and EBAF, but useful for for numerous scientific (see A31C-0051, this session), applied science and education uses.
• Improvements of the FLASHFlux surface models continue to be made. A new cloud transmission algorithm is under development for improved longwave flux computation.

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