



Mapping the Surface Radiation Budget with Satellite Data

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The regional and global distribution of all radiation budget components (e.g. solar and infrared broadband fluxes at the surface and the top of the atmosphere (ToA) under clear-sky and all-sky conditions) are an important aspect in the validation of cloud-properties and cloud processes in global modeling. An important and commonly applied reference form satellite-sensor based data-sets. For surface fluxes, however, satellite radiance data cannot be directly converted into broadband surface fluxes and – although constrained by ToA radiances – need to apply ancillary data and models. And inaccuracies and inconsistencies of these adopted data or models quickly propagate into derived (surface) radiative flux products.

Radiation product time-series of the three major projects ISCCP, GEWEX-SRB and CERES were compared. Significant inconsistencies were identified. Some of them can be traced to differences in ancillary data in atmosphere (e.g. aerosol, trace-gases, cloud properties) and at the surface (e.g. reflectance, temperature). These inconsistencies often exceed any accepted maximum error (of $\pm 15 \text{ Wm}^{-2}$) so that meaningful trend-analyses are difficult to impossible.

Therefore, we urge to examine and unify all ancillary data prior to any re-analysis effort.