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Assessment for global longwave radiative fluxes estimated by GEWEX Surface Radiative Budget (SRB) project and the Calipso-CloudSat-CERES-MODIS (CCCM).

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Accurate estimates of the cloud radiative effect and greenhouse effect are required to better estimate the climate variability on regional and global scales. The radiation budget at the surface is a key interface for energy exchange and therefore for detecting climate change. Surface longwave radiative fluxes (LRFs) are an important component of this terrestrial energy budget.

These LRFs are measured from ground-based instruments but accurate satellite-based estimates are required to understanding the flux variability at larger spatial scales. To date most satellite based longwave flux algorithms make assumptions regarding the vertical profiles of clouds. New methods, using CALIPSO and CloudSat now specify cloud vertical profiles explicitly, although are limited in time and space.

This study assesses the LRFs estimated by two different projects the GEWEX (Global Energy and Water Cycle Experiment) SRB (Surface Radiative Budget) and CCCM (CALIPSO-CloudSat-CERES-MODIS) during an overlapping time period for the year 2007. The assessment compares the NASA/GEWEX Surface Radiation Budget (SRB) dataset and CCCM LW archived fluxes derived on a 1° x 1° global grid. The study quantifies the agreement between both data sets on different spatial and temporal scales, showing a mean annual differences of -1.4$\pm$4.4 Wm^{-2} (All sky)and -2.8$\pm$2.4 Wm^{-2} (Clear sky) for dowelling fluxes, while about -0.8$\pm$2.4 Wm^{-2} for upwelling fluxes and considers differences in monthly and annual zonal averages for land/ocean and day/night time periods.

The zonal differences between GEWEX-SRB and C3M are mainly at the Polar Regions due to the different cloud properties in both algorithms. The difference at the tropical regions could be due to on the cloud random overlap assumptions in SRB. The difference for upward fluxes is in the skin temperature prescription. Both upward and downward longwave flux difference standard deviations are reduced when larger scale SRB grid box averages are compared to C3M footprint averages using a minimum threshold. This technique is being developed to better classify and understand differences.