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An Overview of Results from the GEWEX Radiative Flux Assessment

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The Global Energy and Water Cycle Experiment (GEWEX) Radiative Flux Assessment (RFA) is an international effort to produce a community-wide evaluation of the currently available long-term radiative flux data sets derived from satellite based analyses in the context of global change detection and analysis. Its primary activity consists of assessing the uncertainties associated with these data sets by comparing TOA and surface radiative flux data products to each other and investigating the sources of differences. Surface measurements are also assessed and compared to the satellite based data sets. Data sets from global long-term reanalyses and global climate models are also compared against the satellite records. The assessment includes both upwelling and downwelling SW and LW fluxes, for all-sky and clear-sky conditions over all portions of the globe and at a variety of spatial and temporal scales. Its goal is to characterize variations in the fluxes over time and to establish error estimates for each product over the various temporal and spatial scales, thus facilitating the use of these products in future climate studies.

This presentation will discuss an overview of the Flux Assessment, including a summary of results to date, weaknesses in the current satellite and surface observation systems, and recommendations for future improvements to these systems. Results will focus upon comparisons of the mean and variability of the TOA and Surface fluxes from multiple satellite based measurement algorithms and model reanalyses. Time series comparisons between datasets will be presented and discussed. Surface fluxes from multiple algorithms are compared against high quality surface measurements from the Baseline Surface Radiation Network (BSRN) for both mean ensemble and monthly ensemble anomalies. Finally, any final steps for concluding the assessment are provided included lessons learned from the assessment as a whole. Such lessons are important towards assessing long-term data products and their usefulness as Climate Data Records (CDRs) or Essential Climate Variables (ECVs). Final conclusions regarding the absolute and relative accuracy of the various data sets will be discussed including the key attributes of the data sets that cause the most uncertainties.