

Title: Calibration of Historical and Future AVHRR and GOES Visible and Near-Infrared Sensors and the Development of a Consistent Long-Term Cloud and Clear-Sky Radiation Property Dataset

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A stable and consistent set of imager radiances is an essential component of any long-term climate data record (CDR). We propose to establish a coherent reflected radiance Fundamental CDR (FCDR) for the AVHRR and geostationary satellite (GEOsat) imagers extending back to 1978. In addition we propose to provide a Thematic CDR using the calibrated AVHRR imagers to retrieve cloud properties that are consistent with MODIS and the future VIIRS instruments. We will be applying mature and robust calibration algorithms, the Nearly Simultaneous Raymatched Technique and the Deep Convective Cloud Technique (DCCT). These methods were used to uncover errors in the MODIS and TRMM VIRS records for visible and infrared calibrations. We have been applying them in real time but need to consolidate and quality control the results so that they may serve as CDRs and can be applied to historical AVHRR and GEOsat data. A set of uncertainties will be developed by applying the two methods to different combinations of satellites. The FCDR will consist of cloud amount, phase, optical depth, effective particle size, height, and temperature. It will be consistent with the CERES MODIS cloud properties, which have a reliable 8-year record and will continue on VIIRS. Slight modifications to the algorithms will be made for 4-channel AVHRR data. The results of this analysis should be extremely valuable for climate studies. We will be collaborating with other CDR teams to ensure non-redundancy and optimization of the products.