

Current Topics in Solar and Thermal Atmospheric Radiation Measurements: The STAR Group Overview

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The CMDL radiation project, Solar and Terrestrial Atmospheric Radiation (STAR) addresses a wide range of problems in the study of the role of atmospheric radiation in climate. The following exemplifies the STAR group activities in the past year. (1) We have furthered the understanding of the global energy budget through contributions to both global satellite analysis and general circulation model evaluations where the goal is to ensure the correct radiative energetics are being incorporated into climate predictive models. (2) The values of fundamental water vapor absorption coefficients have been questioned in the literature and STAR has undertaken efforts to identify and rectify differences observations and a state-of-the-art radiative transfer model (Modtran 4.0). (3) STAR continues in its efforts to help quantify the radiatively important composition of the atmosphere with its aerosol optical depth measurements. (4) A new method for determining liquid water content of clouds was developed using STAR data and simultaneous spectral infrared measurements by the Aeronomy Lab. (5) The radiative impact and causes of a pronounced trend in the arrival of the Alaskan Arctic spring has been investigated in detail. (6) The effects of inadequate radiative parameterization in regional and mesoscale models are also undergoing analysis using STAR data products and expertise. (7) Measurements of UV radiation are being conducted in sensitive areas to better define and understand the impact of varying ozone in the atmosphere. (8) STAR continues to maintain and implement improvements to its long-term radiation monitoring activities. Innovative observational advances developed by STAR are often implemented by related programs around the world. Examples of the scientific results and or progress for these eight projects, and possibly others, will be presented. STAR seeks to make specific incremental contributions through its small independent projects as well as to advance the extensive and lofty goals of national and international programs such as those conducted by NASA, the World Meteorological Organization, the Dept. of Energy and other NOAA labs. Such coordinated efforts with extended resources are necessary to address the complex nature of climate variability research within the realm of the interests and responsibilities of the STAR program.