

Recent Developments in Airborne Radiometric Measurements from NCAR/NSF Aircraft

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Measurements of the solar and terrestrial radiation spectra from aircraft have numerous applications to climate-related studies. Recent developments of various passive radiation sensors for use on the NCAR/NSF C-130 and Gulfstream V (GV) aircraft offer new capabilities for radiation budget studies, investigation of photochemical processes, and interpretation of trace gas, hydrometeor, and aerosol measurements. Energy transfer through horizontal layers is characterized by two spectrometers which provide visible to near-IR irradiance measurements from the GV. In addition to these spectrally resolved measurements of irradiance, a set of (broadband) pyrgeometers extends the observations into the IR portion of the spectrum. Pyrgeometers are also available on the C-130, and new pyranometers have been acquired for making broadband irradiance measurements from the C-130 in the visible wavelengths as well. Work is underway to develop stabilized platforms for these sensors to compensate for aircraft attitude changes. In addition to irradiance measurements, spectrally resolved actinic flux measurements provide spherical radiances used to determine photolysis frequencies from the GV. Finally, measurements of emitted radiation on oxygen absorption lines are acquired by the Microwave Temperature Profiler. Temperature profiles from above and below the GV are retrieved from these observations, providing meteorological context for a variety of measurements made by other instruments. Specifications and applications for these sensors will be discussed at the workshop.