Case Study: Spectral Albedo Via Small Aircraft

A microlight aircraft is used by the Research Center Karlsruhe, Germany for a variety of studies in the planetary boundary layer. The main concerns are radiation transfer and aerosol radiation interaction. The aircraft is equipped with sensors for the measurement of spectral actinic radiation for in situ measurements of aerosol size distributions and aerosol optical properties. Sensors are independent of the altitude of the aircraft and measurements are typically made during vertical profiles between the ground and altitudes up to 5 km above sea level.

Comparisons of radiation transfer models and experimental results indicate that the spectral albedo, especially above continental surfaces but also above the sea, is a crucial limiting step in the accuracy of experimental model validation. Spectral albedo in shortwave radiation and its homogeneity within a satellite pixel is also needed for satellite validation of planetary boundary layer gaseous compounds, and for the improvement of satellite retrievals for aerosol products.

A set of two Skye Instruments SKR 1850A 4-channel spectral radiation sensors were installed on board the micro-light research aircraft D-MIFU for a recent experiment in the area of Mexico City. These were in addition to the actinic radiation flux sensors to complete the aerosol and radiation instrumentation. The Skye sensors measured upwelling and downwelling radiation in the wavelengths 400, 550, 660 and 1000 nm according to the typical maxima and minima in the spectral reflectivity of the Earth's surface.

The size and weight of instruments are a critical factor on small aircraft, and the installation and operation of the Skye sensors proved to be easy and reliable.

THE EQUIPMENT

SKR 1850 4-channel light sensors with removable cosine correcting head for incident and / or reflected light measurement. Wavelengths are chosen by the user at time of ordering and each sensor is individually calibrated traceable to National Standards. Wavelengths available between 400-1100 nm, bandwidths from 5 nm to broadband. Outputs to suit most dataloggers.

Acknowledgements and Contacts

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