A new approach to interpret aircraft spectral measurements of surface reflectance around ARM Central Facility

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**Problem:** To separate aerosol and surface contributions from airborne spectral measurements of surface reflectance.

- The poster shows how to retrieve surface spectral albedo for *direct illumination only* from spectral measurements of up- and downward fluxes above the vegetation under ambient illumination conditions (Fig. 1).
- Our approach is based on the canopy spectral invariant relationship: *the surface-to-leaf albedo ratio* \( A_{\lambda}/\omega_{\lambda} \) *is a linear function with respect to the surface albedo* \( A_{\lambda} \), see Fig. 2, i.e.,

\[
A_{\lambda}/\omega_{\lambda} = pA_{\lambda} + R_0,
\]

from which \( A_{\lambda} \) for *all wavelengths* can be retrieved (Fig. 3).

- Since the vegetation is highly sensitive to the angular anisotropy of the incident radiation, the difference between the retrieved and measured surface albedo (Fig. 4) is a signature of the aerosol optical properties (single scattering albedo, scattering anisotropy and optical depth). It also determines the ratio of direct to the total flux at the surface.