Interannual Variation In Surface Shortwave Transmission and TOA Albedo at ARM Southern Great Plains Test-bed

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Q: How well can a satellite observing a site daily recover inter-annual variability of surface & TOA SW radiation?

CERES on Terra and Aqua view ARM/SGP nominally once a day during daylight hours.

Monthly Mean* Surface Transmission & TOA Albedo Averaged at 19 ARM SGP Sites

* Monthly mean is based on time of CERES observation of SGP sites, approximately 10:30AM local time.

Variability of TOA albedo and surface transmission are directly linked, though negatively correlated, via scattering and absorption of light by clouds and aerosols which can vary greatly over the course of one day.

The ARM observations above indicate sampling once a day in either AM or PM can recover, with a good correlation, the majority of inter-annual variability of surface SW transmission.

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Conclusion 1: Analysis of ARM observations above indicate sampling once a day in either AM or PM can recover, with a good correlation, the majority of interannual variability of surface SW transmission.

Conclusion 2: Calculation of transmission from the CERES/SARB subsystem does recover the majority of inter-annual variability of surface transmission as observed by 19 ARM SGP sites. This then gives confidence in CERES’ ability to recover global, interannual variability in TOA albedo. Particularly for signals with periods longer than 12 months.