Spectral and Broadband Albedos - Not an Easy Measurement

J. Michalsky[1], G. Hodges[2] and P. Kiedron[2]

[1]NOAA Earth System Research Laboratory, 325 Broadway, Boulder, CO 80305; 303-497-6360, E-mail: joseph.michalsky@noaa.gov
[2]Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309

Albedo is usually measured using radiometers with a near-cosine response that respond over a 180º field of view. One is oriented horizontally to measure surface reflected irradiance and the other is oriented horizontally to measure the downwelling solar irradiance. On a clear day the ratio of these two measurements, the measured albedo, varies as a function of the angle between the sun and the zenith direction. The response is also a function of wavelength. In this talk we discuss briefly the normalized difference vegetative index (NDVI), which is defined here as $(A_{870} - A_{673})/(A_{870} + A_{673})$, where the subscripts refer to wavelengths in nanometers and *A* is the albedo at those wavelengths. Figure 1 shows the behavior of NDVI over a four-year period. Most of the talk will focus on the wavelength and solar zenith angle dependence of snow albedos. These measurements, taken at Table Mountain north of Boulder and at the Sioux Falls SURFRAD site, will be, mostly unfavorably, compared to models and other measurements of snow albedo.

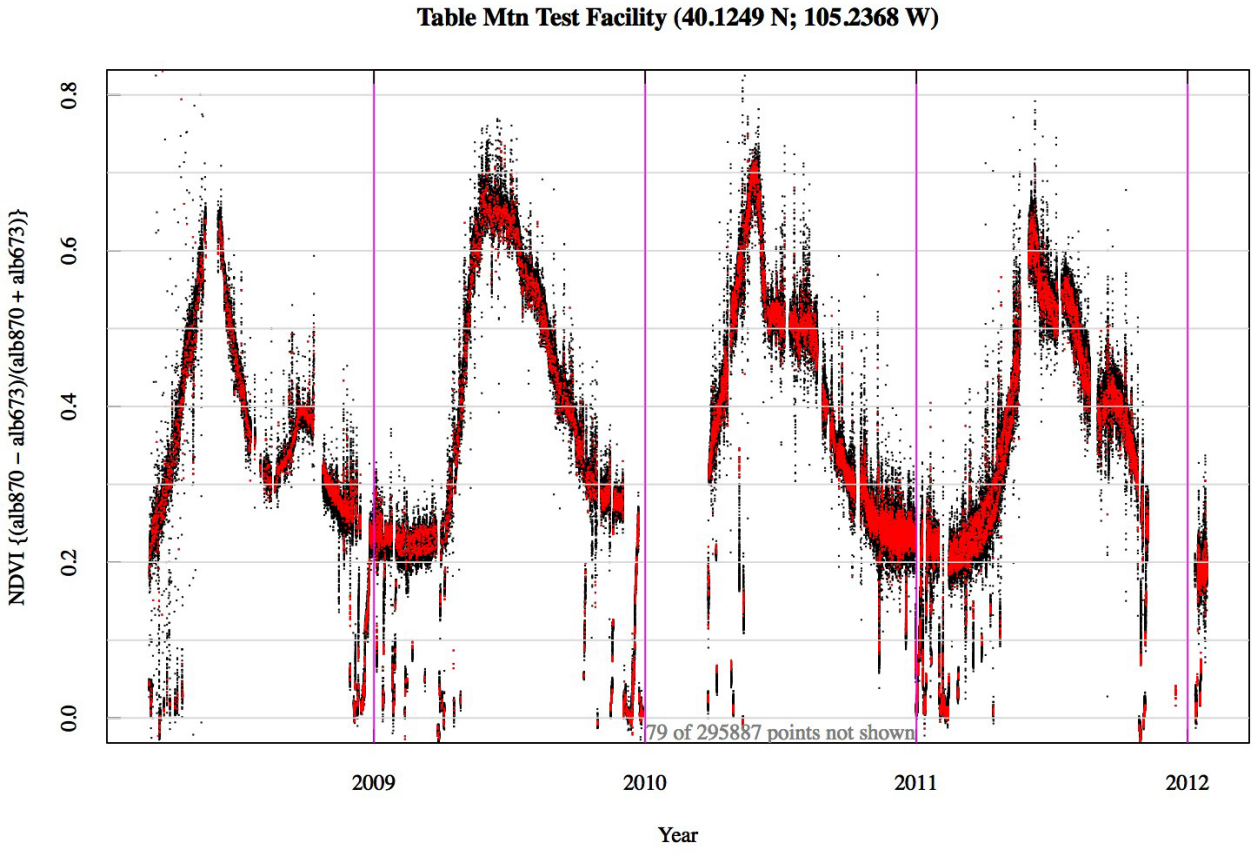

Figure 1. The normalized difference vegetative index for Table Mountain, 16 km north of Boulder, Colorado. Note the steep increase with a consistent peak in late May with a minimum in mid winter. After the May peak the path toward the winter minimum depends primarily on precipitation, and has a different character in each of the four years of this measurement history.