

Temporal Variability of Spectral Albedo at Table Mountain, Colorado SURFRAD Site

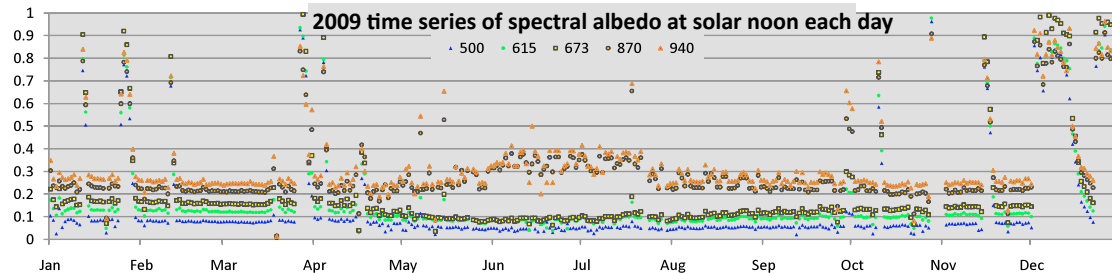
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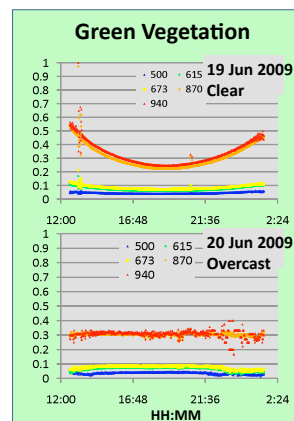
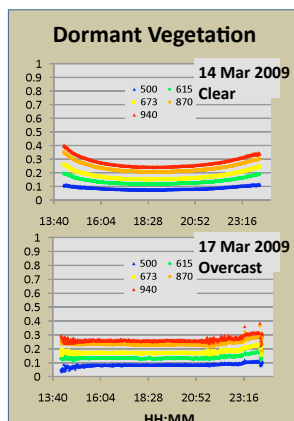
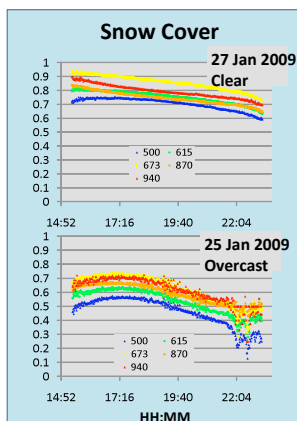
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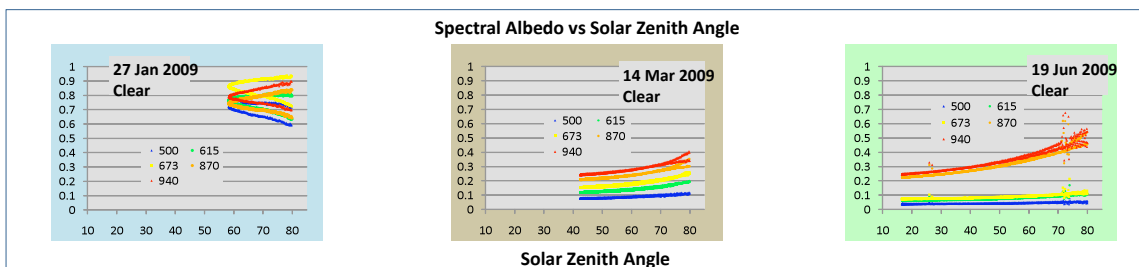
Spectral albedo measurements have been made at NOAA's Table Mountain surface radiation (SURFRAD) site, located near Boulder, Colorado, since the spring of 2008. The instrumentation to accomplish this is a lamp-calibrated Multi-Filter Rotating Shadowband Radiometer (MFRSR) operating in standard fashion, in conjunction with a lamp-calibrated MFRSR head mounted seven meters above the surface. Measured wavelengths are 415, 500, 615, 673, 870 and 940 nm. The MFRSR is commonly used to measure diffuse, total and direct sky irradiance, and for the derivation of spectral aerosol optical depth.



The figure above shows the seasonal variation in the spectral character of the native grassland. The spring and early summer greening, and the winter snow events are the obvious features. Because the plotted values are for local solar noon each day of the year, the displayed variation over the year also includes the less apparent local bi-directional effect captured at the solar-noon zenith angles.



The figures above and below show spectral albedo for days with substantially different surface conditions. They are: snow cover, dormant and seasonally green vegetation. The measured zenith angle variation is also indicated with an azimuthally dependent variation obvious in the snow covered case, possibly due to uneven surface conditions. The specific cause of the azimuthal dependency shown is subject to ongoing investigation, and must be considered when comparing to larger areas that would be viewed by satellites or included in atmospheric models.



The deployment of this capability at all current SURFRAD and ten additional sites in the continental US has been proposed with the first additional measurements beginning in 2012.

Additional measurements available at Table Mountain

Quantity	Downwelling	Upwelling
Shortwave Direct	Yes	N/A
Shortwave Diffuse	Yes	N/A
Shortwave Global	Yes	Yes
Longwave Global	Yes	Yes
Photosynthetically Active Radiation	Yes	Yes
UVB	Yes	Yes
Brewer Spectrophotometer	Yes	N/A
U111 (UV Spectroradiometer)	Yes	N/A
Spectral AOD (MFRSR & CIMEL)	Yes	N/A
Wind Speed & Direction (@ 10m)	N/A	N/A
Air Temp & RH (@ 10m)	N/A	N/A
Surface Pressure	N/A	N/A

