On the stability of Ground Calibration Targets : implications for the repeatabilty of RS methodologies

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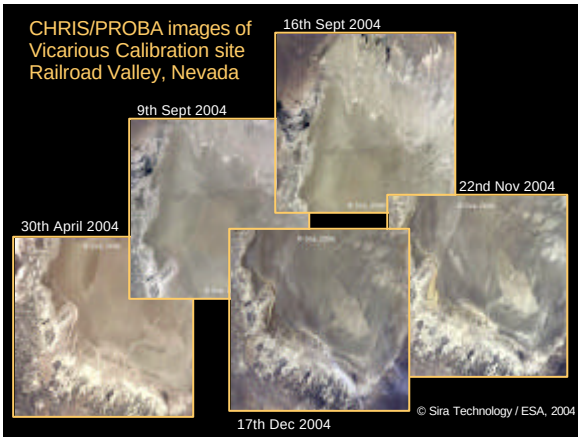
CHRIS/PROBA images of Vicarious Calibration site Railroad Valley, Nevada

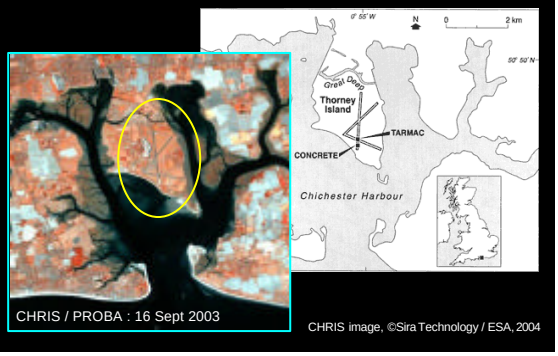


Roles of ground calibration targets

- Vicarious calibration
- Atmospheric correction : ELM
- Validate reflectance retrieval after atmospheric correction.
- Constrain atmospheric correction algorithms based on R-T methods.

How stable is the reflectance of such surfaces?

Thorney Island test site



CHRIS PROBA : Chichester Harbour 7 Oct 2004

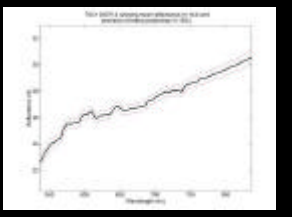
CASI data from Thorney Island

Ground spectra collected with a dual field-of-view GER1500 spectroradiometer and single beam ASD FieldSpec

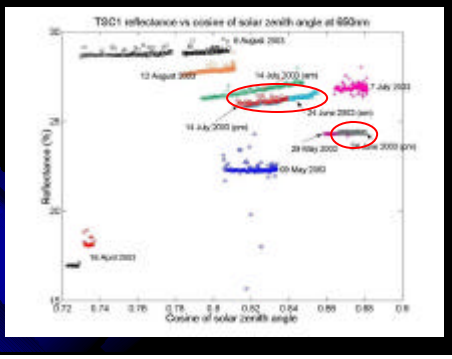
Measuring aerosol optical thickness using a Microtops sunphotometer.

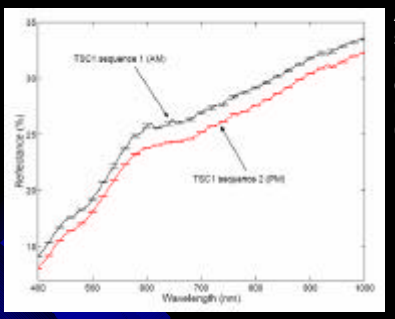
Reflectance of concrete calibration target

- High precision dual-beam mobile spectroradiometer
- Two matched GER1500 spectroradiometers



Long-term change in reflectance of bright target

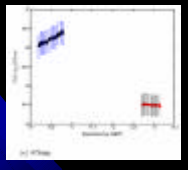


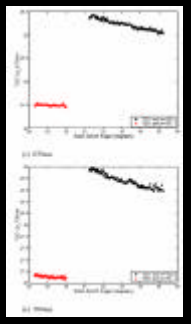


Afternoon spectra significantly lower reflectance, especially in the region around 650nm.

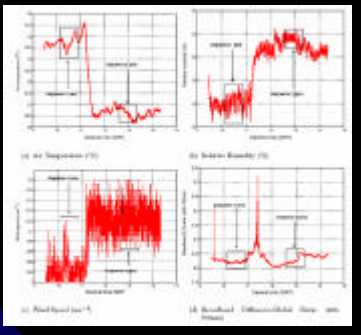
Each sequence shows a small variation with solar zenith angle. Not large enough to account for the difference between am and pm.

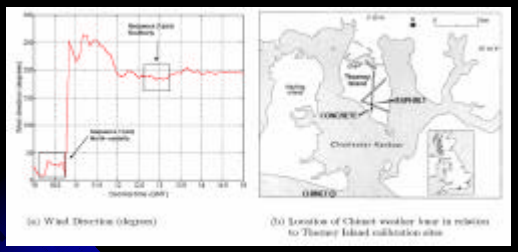
Neither is the spatial uncertainty of location...





First clue to what we think is affecting the concrete reflectance is found in the met. data...





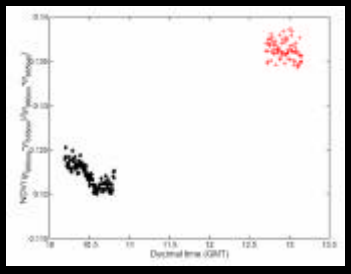
Onset of sea breeze in late morning is confirmed by wind direction measurements from a buoy in Chichester harbour.

But how can a change in wind direction cause a statistically significant change in reflectance ?

Hypothesis 1 : although the proportion of diffuse skylight did not change, maybe the distribution of skylight over the hemisphere changed…

Hypothesis 2 : increased moisture in the atmosphere near the ground reduced the reflectance of the concrete surface, either directly or by re-hydrating the algae.

… and what other problems will that cause us?



Conclusion

- The reflectance of weathered bare surfaces may be a lot more dynamic than we thought, especially in humid temperate environments.
- However, the change in reflectance may be predictable over a number of time scales: seasonal (biotic factors), diurnal (sza) and episodic (meteorological events).
- These results have wider implications, especially in relation to vicarious calibration sites.