Evaluation of potential sites for hyperspectral data validation in Argentinean Pampas

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Abstract: In order to produce research-quality data from existing and future satellite observing systems, it is essential to perform extensive validation campaigns or to set up test sites for validation of radiometric variables. In the context of HYPERNETS project, which is going to develop a new low cost hyperspectral radiometer (and associated pointing system and embedded calibration device for automated measurement of water and land bidirectional reflectance), the availability of robust and well characterized field validation sites is critical. In particular, the availability of ancillary information to contextualize radiometric measurements. In order to select a test site for satellite validation, in the present study two possible sites are characterized in terms of their spatial, temporal and spectral variability of different optical properties based on information from MODIS and Landsat 7.

Sites of study

Both sites are located in Buenos Aires, Argentina.

Balcarce (BS)  
(37° 45' S; 58° 18' O)  
Experimental site (UIB; Estación Experimental Agraria Balcarce -INTA) with soybean crop during 2012/2013. In situ measurements were conducted during 2012-2013 summer season.

Mar Chiquita (MCS)  
(37° 33' S, 57° 17' O)  
Natural site, typical coastal tidal marshes, vegetation dominated by Spartina densiflora. Coastal habitats provide ecosystem services essential to people and the environment.

Spatial variability

Enhanced Vegetation Index mean maps in January 2013.

Temporal variability

Time series of EVI (500 m MODIS product, MCD43A4v6)

In situ measurements at BS

Field data of soybean crop at BS. Net radiance (Rn), rainfall, wind and temperature (T) were measured during 2012-2013 summer period.

Spectral variability at BS and MCS

Landsat-7 vegetation reflectance of soybean crop at BS (green) and of Spartina densiflora at MCS (blue) for four trimesters during 2012-2013.

Conclusions

- At BS and MCS time series of EVI present marked cycles with a peak in summer season.
- Soybean crop shows more spectral variability than Spartina densiflora due to crop management activity.
- At MCS Spartina densiflora presents more temporal heterogeneity than BS due to factors that affect climate.