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irrigated areas. In this study, to monitor mesquite water use efficiency the concept of a NDII, which is defined as the ratio of actual to foliar water content, have been applied and compared with the ground measurements of stomatal conductance, field spectral, volumetric soil water content. As results, on the base of the PALSAR L-band microwave polarimetric backscatter coefficient, the soil moisture and surface roughness could be estimated with a good accuracy for bare-soil surfaces. The time series satellite imagery for the period 1985 to 2013 was used, to extract and classify the Mesquite trees expansion areas. The results showed that mesquite was expanded inside of the curves of the major rivers, within 500m from the river channel.
Keywords: invasive species Mesquite (Prosopis juliflora), Sub-Saharan Africa, change detection, Remote Sensing Approach

PS2.9 ⚡ Assimilation of Remote Sensing Data for Land Surface Models

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Earth Observation (EO) data provide information about terrestrial ecosystems on longer temporal and higher spatial scales than is available from ground-based measurements. Using these data to drive terrestrial ecosystem models is therefore an attractive prospect, but linking EO data to vegetation properties of interest (i.e. leaf area and biochemistry) in a consistent way is not straightforward and requires the use of a radiative transfer (RT) model describing canopy structure. Realistic RT models are slow to run and have many parameters which are often poorly constrained, making the inversion problem impractical at large scales and over long timeframes. To overcome these issues we introduce a data assimilation scheme that uses statistical emulators (Gaussian processes) in place of the original model, providing significant calibration efficiencies. We present a method to further improve the inversion through constraints on phenology and leaf biochemistry using published data of leaf biochemical measurements. The speedup in retrieval using emulators is substantial compared to the original models, making this a very attractive approach for inverting large-scale and long-term data.
Keywords: Remote sensing Radiative transfer Data assimilation

PS2.10 ⚡ Species distribution modelling of a new invasive mosquito in North East Italy: A Bayesian approach

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Aedes koreicus is a highly invasive mosquito, recognised as zoonotic vector of infectious diseases. Native to East-Asia, it has recently become established in Europe. Only limited data is currently available on its ecology. Using data from LExEM, a project that aims to study *Ae. koreicus*, we created a presence/absence dataset of *Ae. koreicus* in Northeast Italy. We enriched this dataset with remotely sensed predictors (MODIS LST and NDWI), land use and topographic information to create a Bayesian SDM. Bayesian data analysis is particularly useful when distribution data of a species is sparse, as is often the case with new invasive species. It allows the inclusion of prior knowledge about the species, and thus provides more robust coefficient estimates. We used both mildly and strongly informed priors derived from the scientific literature. Data acquisition regarding the ecology of invasive species and the modelling of their potential distribution are critical in supporting public health policy. Indeed, the spread of new invasive mosquitoes is of increasing concern due to the risk of outbreaks of exotic vector-borne diseases that they can trigger.
Keywords: Invasive species, Public Health, Vector-borne diseases, Species Distribution Modelling, Bayesian inference.