

3RD Joint EARSeL LULC & NASA LCLUC Workshop

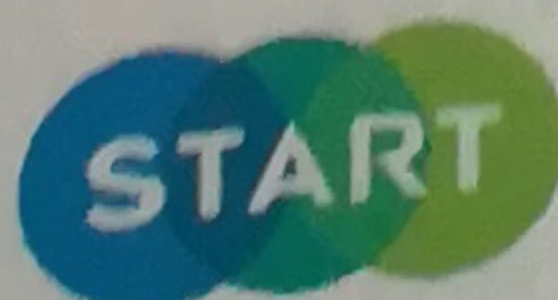
11-12 July 2018, Chania, GREECE

Land-Use / Cover Change Drivers, Impacts and Sustainability within the Water-Energy-Food Nexus

Book of Abstracts



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remotely sensed data processing and analysis of which the SPoRT-LIS surface soil moisture product had excellent measurement capability. Evaluation of validation performance indicates that in-situ soil moisture measurement network had the most significant influence on validation. Results demonstrate that 53% of data at a depth of 5-cm and 51% of the data at a depth of 10-cm was significantly correlated with a Spearman's rho greater than 0.5. Based upon validation results, the authors conclude that the SPoRT-LIS surface soil moisture product is acceptable for operational applications for seasonal and annual soil moisture trend analysis within the Missouri and Arkansas-Red-White river basins. Additional trend analysis was conducted using the BFAST algorithm. The BFAST algorithm is a time-series decomposition method that can be used to evaluate seasonal and annual trends in data and identify any abrupt breaks in these trends. Trend analysis information will be used to develop better water resources management plans for food and energy production.

Key words: *soil moisture, trend analysis, SPoRT-LIS, BFAST*

9 Country Wide Grassland Mapping by Fusion of Optical and Radar Time Series Data

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The identification of grassland is important for supporting agriculture, year-by-year. Since this land cover category shows unique spectral and structural characteristics as well, it is worth to examine the contribution of both optical and radar data to the identification of grassland.

A method was developed where optical (Sentinel-2, Landsat TM8) and radar (Sentinel-1) time series were also used. For radar time series, polarimetric descriptors were generated based on H/A/Alpha decomposition of covariance matrix of Sentinel-1 dual-pol (VV+VH) satellite data. From optical data, different spectral indices were calculated, like NDVI, NDWI, and NDSI. The methodology includes ISODATA classification and pixel-wise maximum-likelihood classification as well. During the analysis, Hungary was divided into different homogenous land zones based on their distinct spectral characteristics, which division improved the results of classification.

Session IV - Advances and outlook in the processing and analysis of remotely sensed data

The results were compared to reference data gained from anonymized request of subsidies of 2018. Overall and Kappa accuracies were evaluated. Moreover, per-class accuracies were calculated by Short, Hellden-, Kappai index. The average accuracies are between 70-90%. On this poster we present the results of our classification and summarize the experiences.

Key words: *Grassland, H/A/Alpha decomposition, polarimetric descriptors, spectral indices, fusion of Sentinel-1 and Sentinel-2 data, classification methods*

10 Trends in Bioproductivity Associated with Land Use/Land Cover Change and Persistence in Semi-Arid West Africa

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Under increasing population pressure, West Africa has experienced changes in land use and land cover at a large scale as evidenced by Landsat imagery, dominated by expansion of agriculture and urban areas, and loss of savanna and forest. Simultaneously, significant trends in above-ground bioproductivity, predominantly positive, have been observed throughout the NOAA AVHRR observation period (1981 to current).

This work used the Land Use Land Cover West Africa dataset by the United States Geological Survey, which is based on visual interpretation of over 1.2 million data points, in order to extract systematic land use and land cover transitions from 1975 to 2000 to 2013 across a rainfall gradient. Different transitions stand out in different bioclimatic (arid through sub-humid) zones.

Then, a co-analysis of temporal trends in a range of vegetation metrics (based on the Normalized Difference Vegetation Index NDVI) associated with specific land cover transitions and precipitation characteristics was carried out. The NDVI metrics were obtained from time series of MODIS and AVHRR data using the Timesat software.

The direction and strength of