Geophysical Research Abstracts
Vol. 20, EGU2018-19312-1, 2018
EGU General Assembly 2018

Pasture Spatial Distribution and Correlation with Soil Moisture during a cycle

Pilar López (1), Carmelo Alonso (2), Rosa María Benito (3), Ana María Tarquis (3,4)

(1) Dept. of Applied Mathematics, Universidad Complutense de Madrid (UCM), Madrid, Spain, (2) Earth Observation Systems, Indra Sistemas S.A., Spain, (3) Grupo de Sistemas Complejos, Universidad Politecnica de Madrid (UPM), Madrid, Spain, (4) CEIGRAM, UPM, Madrid, Spain (anamaria.tarquis@upm.es)

The study of the dynamics of the vegetation cover, such as pasture, is the result of a complex interaction between vegetation, soil, climate and man activity. One aspect to understand it is to characterize the spatial patterns of pasture along the seasons and their relation with soil moisture content. In the present work we discuss the spatial distribution of pasture based on the entropy concept.

In order to do so, monthly Sentinel-2A images, from July 2015 till August 2016, were processed to extract Normalized Difference Vegetation Index (NDVI), with a resolution of 10mx10m, and Normalized Soil Moisture Index (NSMI), with a resolution of 20mx20m. The are of study is located in a pasture landscape at the north of the Community of Madrid (Spain) between meridians 3º 46’ 40" and 3º 44’ 44" W and parallels 40º 43’ 12" and 40º 42’ 36".

NDVI positive values are sensitive to the proportion of vegetation into the pixel. Based on this, the pixels where classified in:bare soil, a mixture of vegetation and bare soil and full vegetated. The configuration entropy, characteristic length and entropy dimension were calculated for each set of pixels.

The results showed a different cyclic pattern for the three NDVI sets along the seasons with different correlations with the corresponding NSMI.

ACKNOWLEDGEMENTS
This work has been supported by the Ministerio de Economía y Competitividad (MINECO) under contract nos. MTM2012-39101 and MTM2015-63914-P.

REFERENCES
-Alonso, C., Tarquis, A.M., Zúñiga, I. & Benito, R. Spatial and radiometric characterization of multi-spectrum satellite images through multi-fractal analysis. Nonlin. Processes Geophys., 24, 141-155, 2017.
-Andraud, C., Beghdadi. A. & Lafait, A. Entropic analysis of random morphologies. Physica A, 207 (1–3), 208-212, 1994.
-Carlson, T. N., & Ripley, D. A. (1997). On the relation between NDVI, fractional vegetation cover, and leaf area index.Remote Sensing of Environment, 62, 241– 252.
-Piasecki, R. Entropic measure of spatial disorder for systems of finite-sized objects. Physica A 277 157 – 173, 2000.
-Shannon, C.E. A mathematical theory of communication. Bell System Technical Journal, 27, 379 – 423, 1948.
-Tarquis, A.M., McInnes, K.J., Keys, J., Saa, A., Garcıa, M.R. & Díaz, M.C. Multiscaling analysis in a structured clay soil using 2D images. J. of Hydrology 322, 236–246, 2006.