

Multiscaling of vegetative indexes from remote sensing images obtained at different spatial resolutions

Carmelo Alonso (1,2), Ana M. Tarquis (2,3), Ignacio Zúñiga (4), and Rosa M. Benito (2)

(1) Earth Observation Systems, Indra Sistemas S.A., Madrid, Spain, (2) Grupo de Sistemas Complejos. ETSIAAB, UPM, Ciudad Universitaria, 28040 Madrid. Spain, (3) CEIGRAM, ETSIAAB, UPM, Madrid, Spain (anamaria.tarquis@upm.es), (4) Dpt. Física Fundamental, Facultad de Ciencias, Universidad Nacional de Educación a Distancia (UNED), Madrid, Spain

Vegetation indexes, such as Normalized Difference Vegetation Index (NDVI) and enhanced Vegetation index (EVI), can be used to estimate root zone soil moisture through high resolution remote sensing images. These indexes are based in red (R), near infrared (NIR) and blue (B) wavelengths data. In this work we have studied the scaling properties of both vegetation indexes analyzing the information contained in two satellite data: Landsat-7 and Ikonos. Because of the potential capacity for systematic observations at various scales, remote sensing technology extends possible data archives from present time to over several decades back. For this advantage, enormous efforts have been made by researchers and application specialists to delineate vegetation indexes from local scale to global scale by applying remote sensing imagery.

To study the influence of the spatial resolution the vegetation indexes map estimated with Ikonos-2 coded in 8 bits, with a resolution of 4m, have been compared through a multifractal analysis with the ones obtained with Landsat-7 8 bits, of 30 m. resolution, on the same area of study. The scaling behaviour of NDVI and EVI presents several differences that will be discussed based on the multifractal parameters extracted from the analysis.

REFERENCES

- Alonso, C., Tarquis, A. M., Benito, R. M. and Zúñiga, I. Correlation scaling properties between soil moisture and vegetation indices. *Geophysical Research Abstracts*, 11, EGU2009-13932, 2009.
- Alonso, C., Tarquis, A. M. and Benito, R. M. Comparison of fractal dimensions based on segmented NDVI fields obtained from different remote sensors. *Geophysical Research Abstracts*, 14, EGU2012-14342, 2012.
- Escribano Rodriguez, J., Alonso, C., Tarquis, A.M., Benito, R.M. and Hernandez Diaz-Ambrona, C. Comparison of NDVI fields obtained from different remote sensors. *Geophysical Research Abstracts*, 15, EGU2013-14153, 2013.
- Lovejoy, S., Tarquis, A., Gaonac'h, H. and Schertzer, D. Single and multiscale remote sensing techniques, multifractals and MODIS derived vegetation and soil moisture, *Vadose Zone J.*, 7, 533-546, 2008.
- Renosh, P. R., Schmitt, F. G., and Loisel, H.: Scaling analysis of ocean surface turbulent heterogeneities from satellite remote sensing: use of 2D structure functions. *PLoS ONE*, 10, e0126975, 2015.
- Tarquis, A.M., Platonov, A., Matulka, A., Grau, J., Sekula, E., Diez, M. and Redondo J. M. Application of multifractal analysis to the study of SAR features and oil spills on the ocean surface. *Nonlin. Processes Geophys.*, 21, 439-450, 2014.