Geophysical Research Abstracts
Vol. 17, EGU2015-15425, 2015
EGU General Assembly 2015

Influence of tillage in soil penetration resistance variability in an olive orchard

Juan López de Herrera (1,2), Tomas Herrero Tejedor (1), Antonio Saa-Requejo (2,3), Ana M. Tarquis (2,4)

(1) Dpto de Ingeniería Cartográfica, Geodesia y Fotogrametría. EUIT Agrícolas, UPM, Ciudad Universitaria sn, 28040 Madrid, Spain, (2) CEIGRAM, ETSI Agrónomos, Universidad Politécnia de Madrid (UPM), Spain, (3) Dpto Producción Agrícola, ETSI Agrónomos, UPM, Spain, (4) Dpto. de Matemática Aplicada, UPM, Spain. (anamaria.tarquis@upm.es)

Soil attributes usually present a high degree of spatial variation due to a combination of physical, chemical, biological or climatic processes operating at different scales. The quantification and interpretation of such variability is a key issue for site-specific soil management (Brouder et al., 2001). The usual geostatistical approach studies soil variability by means of the semi-variograms. However, recently a multiscaling approach has been applied on the determination of the scaling data properties (Kravechenko et al., 1999; Caniego et al., 2005; Tarquis et al., 2008). This work focus in the multifractal analysis as a way to characterize the variability of field data in a case study of soil penetrometer resistance (SPR) in two olive orchards, one applying tillage for 20 years and the other one non.

The field measurements and soil data were obtained at the village of Puebla de Almenara (Cuenca, Spain) (39^o 47'42.37'N, 2^o 49'29.23'W) with 869 m of elevation approximately. The characteristic of the soil at the surface is classified as clay loam texture according to Guidelines for soil description of FAO. The soil consists of clays and red silts with some clusters of limestone's and sands.

Two transect data were collected from 128 points between the squared of the olive tree, tillage and no tillage area, for SPR readings with a sampling interval of 50 cm. In each sampling, readings were obtained from 0 cm till 20 cm of depth, with an interval of 5 cm. The multifractal spectrum for each area and depth was estimated showing a characteristic pattern and differentiating both treatments.

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