Geophysical Research Abstracts
Vol. 17, EGU2015-15415-1, 2015
EGU General Assembly 2015

Spatial Pattern of Biological Soil Crust with Fractal Geometry

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Soil surface characteristics are subjected to changes driven by several interactions between water, air, biotic and abiotic components. One of the examples of such interactions is provided through biological soil crusts (BSC) in arid and semi-arid environments. BSC are communities composed of cyanobacteria, fungi, mosses, lichens, algae and liverworts covering the soil surface and play an important role in ecosystem functioning.

The characteristics and formation of these BSC influence the soil hydrological balance, control the mass of eroded sediment, increase stability of soil surface, and influence plant productivity through the modification of nitrogen and carbon cycle.

This study focus on characterize the spatial arrangements of the BSC based on image analysis and fractal concepts. To this end, RGB images of different types of biological soil crust where taken, each image corresponding to an area of 3.6 cm2 with a resolution of 1024x1024 pixels. For each image and channel, mass dimension and entropy were calculated.
Preliminary results indicate that fractal methods are useful to describe changes associated to different types of BSC. Further research is necessary to apply these methodologies to several situations.