Network models of soil porous structure

M. Samec (1), A. Santiago (2), J. P. Cardenas (2), R. M. Benito (2), A. M. Tarquis (3), S. J. Mooney (4), and D. Korošak (1)


Soils sustain life on Earth. In times of increasing anthropogenic demands on soils [1] there is growing need to seek for novel approaches to understand the relationships between the soil porous structure and specific soil functions. Recently [2-4], soil pore structure was described as a complex network of pores using spatially embedded varying fitness network model [2] or heterogeneous preferential attachment scheme [3-4], both approaches revealing the apparent scale-free topology of soils. Here, we show, using a large set of soil images of structures obtained by X-ray computed tomography that both methods predict topological similar networks of soil pore structures. Furthermore, by analyzing the node-node link correlation properties of the obtained networks we suggest an approach to quantify the complexity of soil pore structure.