



A quantitative investigation of the effect of pore morphology on soil aggregate stability

A. Papadopoulos

Plant Impact plc, Gordon Manley Building, Lancaster Environment Centre, Lancaster University, Lancaster, LA1 4YQ, UK.
Email: apostolos@plantimpact.com

Soil structure determines the operating environment for all physical, chemical and biological processes within the soil. Soil aggregate stability is an important measure for assessing soil structure quality. Non-destructive tomography techniques such as X-ray Computed Tomography (CT) offer great opportunities to quantitatively investigate the soil porous architecture which can provide important information for understanding soil processes and function in a multi-scale manner. For instance, the intra-aggregate pore space is of great importance for microbial activity, the sequestration of organic carbon and water flow. This paper investigates the effect of pore morphology on soil aggregate stability. Apparent porosity, pore size distribution, average pore size and fractal perimeter dimension (pore roughness) were measured from the images of the reconstructed 2-D image stacks. A new theoretical concept of soil aggregate stability is proposed. A strong relationship was observed between soil aggregate stability and pore morphological complexity.