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Effect of spatial variability of soil properties on infiltration

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Topography and soil properties are key determinants of spatial variability of water content. Prediction of soil hydraulic properties are essential for modeling water flow and solute transport. In the southeastern of Buenos Aires Province, the effect of the relief on soil spatial variability is result of the relationship between elevation and effective depth (ED). Digital elevation models (DEM) provide quantitive information about relief. The objective was to determine the effect of spatial variability of soil properties on infiltration. The field was 50 ha and the soil classes were vertic Hapludoll, typic and petrocalcic Argiudoll. ED was measured using Gidding_Soil_Sampler® in 30x30m grid size. Elevation data were measured ussing a DGPS Trimble_R3®. From this, a DEM was generated. Two elevation and ED areas were delineated named High and Low zones. Three soil samples were taken at each zone with three replications at depth 0-30 and 30-90 cm. Texture, bulk density (δb) and organic matter (OM) were determined. A disc infiltrometer was used to determine the water infiltration rate (i). Clay content (As) and OM were homogeneous in the profile of the High zone. However, As content at 30-90 cm decreased in the Low zone. At the High zone, δb ranged from 1.31 to 1.34 g cm-3 and was higher than at the Low zone (δb=1.16 - 1.27 g cm-3). Also the i had less variation at the High zone. Under pressure head of -1 cm , the i increased in the Low zone. At lower pressure heads, the i was greater in the High zone. Higher i at the Low zone could be due to major ED, textural heterogeneity and higher OM content. Textural homogeneity, shallow ED and high δb allowed a more stable i at the High zone. Using topography and ED is a promising way of characterizing soil hydraulic behavior and its spatial variability across a field.