



## **Spatial variability of soil saturated hydraulic conductivity at the commune scale**

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Saturated water flow is a key factor in understanding the dynamic processes of water in soil. It is known that the hydraulic conductivity of soil is highly variable in time and space. Many field studies have been conducted to better understand the nature and characteristics of this variability. Knowledge and understanding of the spatial variability of the hydraulic properties, the processes of water movement and runoff largely contribute to a more rational use of soil water resources. The purpose of this work was to evaluate spatial variability of saturated hydraulic conductivity, texture, bulk density and water content in the soil surface layer (0-10 cm) in the scale of Trzebieszów commune (140 km<sup>2</sup>) (Łuków county, Poland). The results showed that the soil properties had a different spatial structure and dependence. The sand and silt contents and saturated hydraulic conductivity were well matched by a spherical model with a nugget effect. However, the clay content was better suited to the exponential model. All these variables showed a moderate spatial dependence. The soil bulk density and water content did not show distinct spatial variability and they generally had a random nature similar to that described by pure nugget effect. The spatial ranges of soil bulk density and water content were small and much greater and similar with sand and silt contents. Clay content and saturated hydraulic conductivity of the soils showed the largest ranges and their spatial distributions were characterized by the presence of small spots indicating high spatial heterogeneity. The soil water content was negatively correlated with the bulk density. There was no significant correlation between the soil saturated hydraulic conductivity and bulk density, but the descending trend of saturated conductivity with increasing bulk density was observed.

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