The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

SPATIAL STRUCTURE ANALYSIS OF SATURATED HYDRAULIC CONDUCTIVITY IN THREE CALCAREOUS SOIL SERIES OF FARS PROVINCE

Ali Akbar Moosavi, Davood Shahriari
Department of Soil Science, College of Agriculture, Shiraz University, Shiraz, IR Iran.
Corresponding Author E-mail address: aamousavi@gmail.com

ABSTRACT
Soil saturated hydraulic conductivity (K_s) plays key role in water movement, soil remediation, and pollutant or material transportation within soil profile. Saturated hydraulic conductivity varies in space and knowledge about its spatial distribution is necessary in soil management practices. Therefore objective of this study was to investigate the spatial distribution of K_s in three calcareous soil series of Agricultural Experimental Station, located in Bajdgah, Shiraz, IR Iran. Forty experimental locations with separation distances of 100 to 200 m were selected. At each experimental location, K_s were measured using Auger Hole method. Statistical and geostatistical analysis were carried out using MINITAB and GS+ software packages. The Ks values in unsampled locations were predicted using Ordinary Point Kriging method and the contour map of krigged values was prepared. Results indicated that the mean value of K_s in Daneshkadeh, Pompe-Namazi and Kooye-Asatid soil series was 0.62, 0.89 and 1.59 m day^{-1}, respectively. Whereas, the coefficient of variation (CV) in the aforementioned studied soil series was 69, 56, and 41 %, respectively. Spatial analysis revealed that the exponential model with the range of 259 m, sill parameter of 0.11 m^2 and nugget effect of 0.0001 m^2 was the best fitted model to spatial structure of measured K_s. The ratio of nugget effect to sill that is one of the measures for strength of spatial continuity was about 0.5 indicating that 50 % of K_s variability is spatially structured and 50 % is random variable. Contour map of estimated values revealed that the highest variability of K_s was obtained in soil series of Kooye-Asatid. The finding of the present study can be used in precision management of soil and many applications of soil.

Keywords: Auger Hole Method, Geostatistic, Ordinary Point Kriging, variogram analysis