# Review of: "Spatial Analysis of Soil Fertility Using Geostatistical Techniques And Artificial Neural Networks"

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Potential competing interests: No potential competing interests to declare.

Review

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Spatial Analysis of Soil Fertility Using Geostatistical Techniques And Artificial Neural Networks

The article is devoted to the topical issue of obtaining information about the spatial variability of soil properties. Spatial analysis allows you to assess the change individual soil properties and the formation of soil classes to support decision making in homogeneous areas as a basis for site-specific management and for promoting precision agriculture. Various methods of spatial information analysis were used to create maps of individual indicators. In addition to traditional kriging, artificial intelligence methods based on the classification of artificial neural networks were used. These maps are designed to differentiate fertilizer application rates, adapted to the state of the environment and the needs of crops. Based on ten criteria, 5 classes of land fertility were identified using Kohonen fuzzy network clustering. The reliability of the resulting classes was checked geostatistically.

The FKCN neural network architecture used in the analysis consists of three layers. The input layer contains the normalized values of ten (10) soil variables from models for predicting these attributes. The remote layer includes neurons is equivalent to a given number of digital soil classes, and the third layer calculates function of each cell belonging to each of the soil classes, based on distances calculated on the previous layer and given values of the fuzzy coefficient (f).

The estimation of the empirical semivariogram of the soil variables were fitted to Gaussian, spherical, exponential, stable and cylindrical mathematical models respectively, considering the isotropic behavior of the variables.

The work makes an important conclusion that the area for the establishment of productive plots that guarantee the homogeneity of the internal structure of the soils should not be larger than 1.0 ha in order to allow the representativeness of the soil.

Some disadvantage of the work is the small number of samples - 70, and for high-quality geostatistical analysis at least 100 sampling points are required.

The article may be published in the open scientific press.