Agricultural and Food Science - abstract

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Geostatistical prediction of clay percentage based on soil survey data

Abstract

In precision farming fields may be divided into management zones according to the spatial variation in soil properties. Clay co
important soil characteristic, because it is associated with other soil properties that are important in management. Soil surve
sampling sites taken from an area of 218 ha were used to predict the spatial variation of clay percentage geostatistically in a
soil in Jokioinen, Finland. The exponential and spherical models with a nugget component were fitted to the experimental variog
indicated that the medium-range pattern could be modelled, but the short-range variation could not, due to sparsity of sample p
distances. The effect of sampling density on the kriging error was evaluated using the random simulation method. Kriging with a
model produced a map with smooth variation in clay percentage. The standard error of kriging estimates decreased only slightly
density of samples was increased. The predictions were divided into three classes based on the clay percentage. Areas with clay
30%, between 30% and 60% and over 60% belong to non-clay, clay and heavy clay zones, respectively. With additional information
samples on the contents of nutrients and organic matter these areas can serve as agricultural management zones.

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