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Spatial modelling of quality parameters for the shallow groundwaters of the Moldavian Platform

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Abstract

The aim of the present study is to estimate the continuous spatial distribution for certain quality (contents of Na^+, K^+, Mg^{2+}, SO_4^{2-}, HCO_3^- and TDS) related to the shallow groundwaters of the Moldavian Plateau. The analysis of covariance (ANCOVA), starting from 71 measurement points, was chosen for this purpose. The potential predictors for the spatial variation of groundwater quality that our study takes into account are the following: X and Y coordinates of points, digital elevation model (DEM), terrain slope, topographic wetness index, de Martonne aridity index, land use, surface lithology and soil classes. Compared to other methods, the analysis of the covariance has the advantage of allowing the integration of the qualitative variables as predictors. The results show that 32–45% of the spatial variation of the analysed parameters is explained by ANCOVA models, using as main predictors the de Martonne aridity index, terrain slope, X coordinate (the west-east spatial trend), land use and soil classes.

Keywords: groundwater quality parameters, analysis of the covariance, Moldavian Platform.

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