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Spatio-temporal assessment of soil contamination in Tenya river basin (Bulgaria) using geostatistical and GIS methods

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The last two centuries were marked by an increasing of soil pollution due to the diversification of industry and rising demands of society. The spatial estimation of soil contamination levels for large scale studies is limited by socio-economic, political, legislative, and environmental factors. These factors, often in combination, create difficulties in the assessment of pollution levels in places where the data is scarce. The aim of this work it is a) to calculate several pollution coefficients, as the coefficient of concentration, coefficient of dispersion, technogenic concentration coefficient, and aggregate pollution index; b) to identify the best interpolation method from geostatistical and other interpolation methods estimate soil pollution The study area was located in the Teyna river basin (Bulgaria) - a left tributary of Iskur River, Bulgaria. It was collected a total of 22 soil probes and several heavy metals and metalloids, and natural radionuclides were analyzed in the period between 1996 and 2011. The most accurate method for interpolate the studied variables was assessed using the cross-validation method. From all the methods tested, the Inverse Multiquadratic Function from the set of the Radial Basis Functions performs comparatively better than other interpolation methods. The spatial changes of total soil contamination, which took place between 1996 and 2011, were assessed using GIS methods.