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Spatial analysis and representation of multi-element stream sediment and floodplain geochemical data

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Multi-element distributions in stream sediments and floodplain sediments were investigated in several, previous geochemical sampling campaigns with the purpose of identifying anomalies related to mineral occurrences [1]. In these studies anomalies were identified for single elements and element associations using statistical methods taking into account the geological background. Knowledge on mineral occurrences and other geological manifestations, as well as, anthropogenic pressures were also taken into consideration for data interpretation. Element concentrations were evaluated on a catchment basis, as samples were considered representative of the catchment area at the appropriate scale. In the hilly areas stream sediments were collected in smaller catchments, while in the lowland areas and in larger catchments floodplain sediments were collected at two different depths. The results were summarised, on country level and regional or subregional scale element distribution maps. However, problems related to scale and sample density, data gaps and representativity could not be fully resolved. The purpose of the present study is to enhance spatial representation of the regional geochemical data in order to characterise geochemical background and baseline conditions, as well as, to highlight potential environmental pressures. For this purpose we use extensive, regionally available geochemical data of variable sampling density. Spatial analysis is improved by testing and validating geochemical data for selecting the representative sample points.

Exploratory data analysis and non-parametric statistical methods are used together with spatial analysis methods within a geographic information system in order to identify distributions and association patterns of major and minor geochemical elements. In this study, several ancillary, potential explanatory parameters are investigated, such as those related to geological rock type, hydrology, land use and land cover, which help identify factors of greater influence on element distribution patterns and make statistical and spatial analysis even more effective.

Ódor, Horváth, Fügedi (1997), *Journal of Geochemical Exploration* 60, 55-66.