



Kriging analysis of geochemical data obtained by sequential extraction procedure (BCR)

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Field examination and laboratory analysis were performed to establish whether nonsanitary landfill Bastijunski brig has a negative influence on Vransko Lake, situated only 1500 m away. Vransko Lake is Croatia's largest natural lake, and it is a part of the Nature Park and ornithological reserve, which indicates its high biodiversity. Therefore it is necessary to understand the environmental processes and complex sediment/water interface. Lake sediments are considered to be a good „sinkhole“ and are often the final recipients of anthropogenic and natural pollutants through adsorption onto the organic or clay fraction in sediments. Geochemical investigation were obtained throughout more than 50 lake sediments cores situated in different parts of the lake

Speciation of heavy metals by modified BCR sequential extraction procedure with the addition of a first step of sequential extraction procedure by Tessier and analysis of residual by aqua regia were used to determine the amounts of selected elements (Al, Cd, Cr, Co, Cu, Fe, Mn, Ni, Pb, Zn) in different fractions. With such approach it is possible to determine which element will be extracted from sediment/soil in a different environmental conditions and can be valuable tool for interpretation of the mobile fraction of the elements, considered bioavailability, that present threat to biota in a case of a contaminant concentration magnification. All sediment and soil samples were analyzed by inductively coupled plasma atomic emission spectrometry.

More accurate interpretation of data is an advantage of BCR sequential extraction procedure while high number of the data together with point data type could be considered as a drawback. Due to high amount of data, graphical presentation is advisable while interpolation tool is a first choice for point type of data, as it makes predictions for defined area based on the measurements. Distribution maps of analysed elements were obtained by kriging as a geostatistical method and they point out a higher amount of mobile fraction of elements Cr, Co, Mn, Al and Fe in the NW part of the lake. This position can be associated with the landfill. Further, mentioned analysis and distribution maps pointed out a zone which wasn't in a scope of investigation, and for which is recorded higher amount of mobile fraction of elements Cd, Cu and Zn in accordance with the other part of the lake. This zone coincides with the estavele („vrulja“), connected with the 7,5 km and 13,8 km distant sinkholes. Such unexpected results signify the advantage of simultaneous use of geochemical data and distribution maps attained by a kriging method presenting statistical distribution of analysed parameter. In all probability, the zone with higher concentration of pollutants can be easily concealed if distinctive distribution maps are not used.