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Use of geostatistics for assessing the concentration of heavy metals in a stretch of the River Apodi-Mossoro (Rio Grande do Norte State, Brazil).

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The objective of this study was to assess the environmental changes with respect to the concentration of heavy metals in the sediment contained a stretch of the River Apodi-Mossoró (Rio Grande do Norte State, Brazil), considering changes in land use and soil. The sediment samples were collected at 30 points in the bed Apodi- Mossoró River in a section with features urban-rural town of Mossoró. The concentration of heavy metals in the sediment was determined using composite samples of surface sediments from the bottom with a depth of 20 cm, according to the methodology of APHAAWWA-WPCF (1998), where he subsequently held to determine the presence and quantity of metal concentration total by the technique of atomic absorption spectrometry, and analyzed the following heavy metals: aluminum(Al), cádmium (Cd), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), nickel (Ni), lead (Pb) and zinc (Zn). Data were analyzed using statistical and geostatistical. The geostatistical analysiswas performed by the construction of experimental semivariogramas self-assessment and adjustment by using the technique of Jack-kinifing. The elemento Cd was absent in the samples, which reduces the possibility of environmental contamination events. The average concentrations of the elements under study are within the limits proposed by the environmental legislation (National Environmental Council). However, for the elements Fe, Al and Mn no threshold values, because these are associated with the rocky material of geochemical origin. The elemento Fe had the highest range of values than the other, and all elements except for Zn and Cd showed the presence of outliers, suggesting the possibility that these points are listed as points liable to contribution by human activities. It was verified the presence of human influence, because the elements undergo an increase of concentration values from the point 11, which is located downstream of the urban bus consolidated. The experimental semivariogramas of elements Cu and Zn adjusted to the spherical model, while the elemen Fe was adjusted to the exponential model. The concentration of Mn is set to the Gaussian model, while the other elements (Al, Cr, Ni and Pb) showed pure nugget effect. The spatial variability of heavy metals analyzed in the study area has high spatial discontinuity, being influenced by the presence of human action, leading to the existence of trend in the semivariogram of the data of Al, Ni, Pb and Cr. Being derived values range from 350 m for Cu and Mn, Fe and 400 m to 425 m for Zn. It is recommended that future studies adopt a sampling grid with spacing less than 350 mand is expected to get a better response to the behavior of the spatial variability of the elements.