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Assessment of contamination risk of heavy metals in sediments of coastal Caspian Sea in Nowshahr city, North of Iran

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ABSTRACT:

Since the sediments of Caspian sea are included a sizeable amount of the heavy metals ,this sediments were chemically analyzed for determining the concentration of heavy metals and severity of the contamination .In fact , the aim of this research was evaluate ecological risk of heavy metals As,Pb,Cr,Zn and Cu in southern Caspian sea sediments in the coastal zone of Noshahr city.According to the average concentration of heavy metals, Cr with average concentration of 77 ppm was the highest concentration and the lowest concentration was As with average of 8 ppm which can be shown the variation of the average concentration as follows:Cr>Zn>Cu>Pb>As. On the other hand , the average of all metals is above the limit of the background of area ,except both elements Cr and As with averages 77ppm and 8 ppm which are between the range of TEL and PEL respectively. The rest of the metals are in the range of less than TEL means the level of threshold of effect. It means that only the biological impacts of Cr and As may be observed in the case study. In this research ,the index of potential ecological risk of each heavy metal (Ei) and the ecological risk index (RI) has also been assessed. In terms of the environmental risk potential (Ei) the main element in the environment that has an environmental risk is As and in terms of the risk index, most of the sampling stations are in a law risk range. Because of the lack of human pollutant resources and did not originate from human activities in this case study, the main factor in concentration of heavy metals in the sediments was natural resources and geology of the area. In this research from correlation coefficients, principal component analysis, and cluster analysis were used to determine the origins of and the relationships between the heavy metals found in the sediments of the case study. Two heavy metals Zn and Cr with 80% correlation which is considered as a strong correlation, were introduced as the main metals in sediments, and the Other metals follow the behavior of these two metals. Finally, the IDW interpolation method was employed to extract the spatial distribution map for each heavy metal.

Keywords:

Caspian Sea, sediment quality guidelines, ecological risk index, IDW method