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Potentially toxic elements pollution, source apportionment and ecological risk assessment in soils of agricultural and industrial areas, Bandar Abbas - South of Iran

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The distribution, contamination level, sources and ecological risk of potentially toxic elements (PTEs) in soils from industrial and agricultural area in Bandar Abbas County (BAC) were investigated. A total of 86 topsoil samples were collected and analyzed for Cr, Cd, Pb, Zn, Cu, Ni, As, Co, Mo, Mn, V, Fe, Al, Sc and P by using Inductively coupled plasma mass spectrometry (ICP-MS). Principle component analyses (PCA), geographical information system (GIS) and enrichment factor (EF) were used for the source identification and prepare distribution maps of PTEs. Also, the assessment of contamination level was determined by contamination factor (CF) and potential ecological risk index (RI). Three main sources of different PTEs in soils of study area were identified based on enrichment factor analyses. Results showed that the contamination levels of PTEs were in the descending order of Cu> Cd>Pb>Zn>As>Mo>Cr>Ni>V>Co. Moreover, according to principal component analyses, Cd, Zn, Cu, Mo and Pb originated mainly from anthropogenic sources including power plants, oil and gas refinery, steel and zinc production factories and municipal waste landfills. The mean modified degree of contamination values in the agricultural and industrial soils indicate a very low and moderate contamination, respectively. The results could be used for the long- term monitoring of PTEs in the study area.

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