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CHANGE OF THE GROUNDWATER QUALITY FROM INDUSTRIAL AREA ORADEA, ROMANIA, USING GEOGRAPHIC INFORMATION SYSTEMS (GIS)

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Abstract

During the years 1965-1985, a veritable industrial platform was developed in the west part of Oradea, Bihor County, Romania. It stretches on an area of 9 sq. km. and is placed in the meadow of Crisul Repede River. Throughout that period, several industrial facilities were built that lately became sources of pollution for the environment. The purpose of the present paper is to study the influence of historical stages of industrialization and restructuring of enterprises in Western Oradea, addressing the evolution of groundwater quality, by mainly using geospatial analysis means. The evolution of some parameters in the water samples taken from drilling wells which characterize the groundwater quality were analyzed over a period of 30 years by using a pre-existing database, provided by the Romanian Waters National Administration – Crisuri branch. The ArcGIS system was used to highlight the spatial trends of the analyzed indicators on 16 maps. The available values have been incorporated into a pre-existing database, developed in ESRI ArcGIS 9.3. The results regarding the industrial sources indicated an extensive pollution process of the groundwater in the years 1977, 1990, and a reduction of the pollutants' concentrations in the recent monitoring years. Contrary to this evolution, the nitrate concentration increased toward 2008, exceeding the admitted limits. It is also noted, that until 1990 the pollution of the groundwater is rather of industrial nature and after 1990 the level of industrial pollution decreases, as in the restricted areas the agricultural pollution is amplified.

Key words: groundwater, geographical information system, industrial facilities, quality evolution, spatial and temporal distribution of indicators

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