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IDENTIFYING HISTORIC POLLUTION ON LAKE BACAU I, ROMANIA USING GIS AND SATELLITE IMAGES

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Abstract

The Lake Bacau I, located in Bacau City, Romania was built in 1966 with a double purpose: as reservoir belonging to the energy system of the Bistrita River and to provide the water needed for the industrial units located in the area. Also, for more than 40 years, the lake was used by the same plants to discharge the wastewater, more or less treated. In present, most of the industrial units are closed and the discharge of wastewater in the lake is banned, the area being used mainly for recreational activities. The aim of the study was to test if historic pollution of the banks can be identified using heavy metals concentration in water as indicators, and analysis of spatial distribution maps and satellite images as methods. The research hypothesis was that due to long time exposure, heavy metals were accumulated in the banks from the areas influenced by the discharging pipes, and in present act as pollution source for the water. These areas, where pollution sources are active, should be highlighted on the distribution maps. Water samples from 30 locations in the vicinity of the banks were taken and concentrations of Cd and Mn were determined. The distribution maps highlighted two zones of high concentrations, located on the right bank in the same areas as the discharging pipes, confirming the research hypothesis. A third zone was located on the left bank and it was explained, through the analysis of the satellite images of the lake, as a result of the pollutants' transport. The paper shows how analysis of heavy metals' spatial distribution in water using GIS and satellite images can be used to identify historic pollution of the banks. Also, because the accessibility, affordability and the broad topic make this approach suitable to educational interdisciplinary projects too, the methods used in processing and transmitting data collection in real-time were emphasized.

Key words: Cd, geostatistic analysis, Mn, real-time data transfer, satellite image decomposition

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