



Use of geophysical methods in man-made hazard management strategies. Case study from Ploiesti city, Romania

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Identification of damages/changes that are affecting the underground water quality due to the effect of anthropogenic activities is often done after environmental problems have become evident, water potability being strongly affected. In this paper we will discuss the necessity of implementing non-invasive and non-destructive investigation tools in different parts of the management plan for urban areas affected or with high risk of being affected by man-made hazards.

Geophysical investigations represent nowadays a useful tool in environmental problems that affect soil and underground water in urban areas, as useful information can be obtained regarding the following aspects:

- detection of affected areas, especially when the effect or hazard sources are not visible at the surface
- zonation of the area (severely affected zone or less affected)
- investigation of the area (details on affected surface and affected soil depth)
- location of "hidden" sources (illegal waste dump sites, petroleum transport or transfer pipes, etc)
- estimation of soil and underground damages by monitoring petrophysical markers
- risk evaluation (estimations on the direction and speed of environmental problems development, estimations of amplifying negative effects)
- recovery from the man-made hazard of a certain area (monitoring information can give information about natural attenuation of the environmental problems or efficacy of resilience program)
- preparedness for man-made hazards (prediction).

Functionality of the above mentioned plans of geophysical applicability in identifying and characterizing the effect of anthropogenic hazards which affect soil and underground water quality has been tested in Ploiesti city, Romania. In this urban area, as well as in surrounding villages, water potability is severely affected because of the oil-products contamination caused by the refinery facilities developed in the area. Oil-contamination is a major problem environmental problem, due to the fact that affected area is continuously expanding as a consequence of contaminant transport by the underground water. Hydrogeologically the research area is located in the alluvium of one of the main hydrostructures of Romania, which holds important water resources. Preliminary investigations made in the Ploiesti city area, has shown the high vulnerability of the aquifer to pollution and it was detected a highly contaminated area. By detailed investigations made using geophysical investigations in the test-zone, it was possible the detection of the presence of the particular type of pollutants and a map with area zonation has been produced.

Appliance of geophysical investigations in environmental strategies concerning underground water pollution should be added to the ones obtained by direct investigations for risk evaluation and remediation strategies in cases of man made hazards.

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