



## Urban Groundwater Mapping - Bucharest City Area Case Study

Dragos Gaitanaru (1), Constantin Radu Gogu (1), Ioan Bica (1), Leonard Anghel (1), Mohamed Amine Boukhemacha (1), and Angela Ionita (2)

(1) Universitatea Tehnica de Constructii Bucuresti, Bucuresti, Romania (dragos.gaitanaru@gmail.com), (2) Research Institute for Artificial Intelligence "Mihai Drăgănescu", Romanian Academy, Bucharest, Romania

Urban Groundwater Mapping (UGM) is a generic term for a collection of procedures and techniques used to create targeted cartographic representation of the groundwater related aspects in urban areas.

The urban environment alters the physical and chemical characteristics of the underneath aquifers. The scale of the pressure is controlled by the urban development in time and space. To have a clear image on the spatial and temporal distribution of different groundwater- urban structures interaction we need a set of thematic maps is needed. In the present study it is described the methodological approach used to obtain a reliable cartographic product for Bucharest City area. The first step in the current study was to identify the groundwater related problems and aspects (changes in the groundwater table, infiltration and seepage from and to the city sewer network, contamination spread to all three aquifers systems located in quaternary sedimentary formations, dewatering impact for large underground structures, management and political drawbacks).

The second step was data collection and validation. In urban areas there is a big spectrum of data providers related to groundwater. Due to the fact that data is produced and distributed by different types of organizations (national agencies, private companies, municipal water regulator, etc) the validation and cross check process is mandatory. The data is stored and managed by a geospatial database. The design of the database follows an object-orientated paradigm and is easily extensible.

The third step consists of a set of procedures based on a multi criteria assessment that creates the specific setup for the thematic maps. The assessment is based on the following criteria: (1) scale effect <neighborhood to metropolitan area - how the groundwater is interacting with urban structures>, (2) time <water level fluctuation and pollution aspects>, (3) vertical distribution and (4) type of the groundwater related problem.

The final step is the cartographic representation. In this final step the urban groundwater maps are created. All the methodological steps are doubled by programmed procedures developed in a groundwater management platform for urban areas. The core of the procedures is represented by a set of well defined hydrogeological set of geospatial queries.

The cartographic products (urban groundwater maps) can be used by different types of users: civil engineers, urban planners, scientist as well as decision and policies makers.