



## **A model of the Quaternary geological deposits of Bucharest City**

Irina Serpescu (1), Emil Radu (2), Constantin Radu Gogu (1), Mohamed Amine Boukhemacha (1), Dragos Gaitanaru (1), and Ioan Bica (1)

(1) Groundwater Engineering Research Center - Technical University of Civil Engineering, Bucharest, Romania (irina.serpescu@utcb.ro), (2) National Institute of Hydrology and Water Management, Bucharest, Romania (emil.radu@hidro.ro)

Bucharest city is located in the central part of the Moesic Platform, in the Romanian Plain with micro-relief resulting from erosion and sedimentary processes which extended along the valleys of the Dambovitza River to the south and the Colentina River to the north. The city is located in the axial area of a syncline where the thickness of the sedimentary deposits is up to 1000 m. The area lies on a rigid base made of metamorphites, and various igneous intrusions (granodiorite, granite). The sedimentary deposits covering this rigid base are made by different phases of erosion and sedimentary processes of marine, lacustrine or continental sediments ending with Quaternary sediments. As a result, different alluvial deposits (such as piedmont, deltaic, alluvial cones, terrace, waterside and lacustrine deposits) can be met. Furthermore one also can find loess deposits which in turn cover totally the older deposits where rivers dug the present relief. To highlight the spatial extent of these geological structures, a geological model of Bucharest city is developed.

A set of information coming from different sources as geological and geotechnical boreholes showing a detailed geological and lithological description, geological and topographical maps, geological and hydrogeological reports have been used to develop the 3D geological model of this region. 33 geological cross sections were defined and interpreted by using lithological and sedimentological criteria. Using these geological cross sections and prior geological knowledge, the Quaternary deposits have been described and classified into 6 structural units given from top to down as follows:

- (1) Superficial deposits represented by loess and anthropogenic materials. The geological model indicates that these deposits show a sporadic development becoming more concentrated in the central west part of the city.
- (2) Colentina Formations composed by of poorly sorted, cross-stratified sand and gravel with clayey lens indicating a high energy deposition environment. The geological model indicates more accentuate vertical lithological heterogeneity than a horizontal one as well as a decrease of the Colentina Formation thickness.
- (3) Intermediary deposits represented by silty-clay with fine sand intercalation indicating a mixed regime with limited lakes and dry lands.
- (4) Mostistea Formation made of sediments with a variety of grain size, from fine sand to coarse sand with small intercalations of gravels and scrap of woods. It was found that areas where the Intermediary deposits are less developed making the Colentina Formation in direct connection to Mostistea Formation.
- (5) Marly Complex composed by a succession of marls and clays with lenticular sandy intercalations indicating a fluvial-lacustrine environment.
- (6) Fratesti Strata made of sand and gravel which includes A, B and C Fratesti levels.