

Urban Geology: Educational Proposal for Geoscience: A Case Study From the Inner City of Athens, Greece

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Background and Objectives

The limited exploitation and low understanding of geological notions, in modern education in physical sciences, motivated the design of research procedures about the understanding of rock formations, of recognizing rocks, of informing about geological potential, using techniques entailed in the scientific/educational methodology by inquiry, suggesting educational walking paths through historical center of Athens.

From the geological point of view, the basin of Athens is bounded to the east by Mountain Hymettus which is built by metamorphic alpine formations (marbles and schists), constituting the lower tectonic unit, and to the west by the overlying tectonic unit of Mountains Egaleo and Poikilo, which include non-metamorphic formations like limestones, volcanosedimentary sequences and ophiolites. The tectonic contact of these two units includes a low gradient detachment fault.

The major part of the basin is covered by neogene and quaternary formations (terrestrial, marine and lake deposits of conglomerates, sandstones, marls and pelitic rocks, but also laterally extended debris and scree deposits).

Below the neogene formations, small alpine low-grade metamorphic rock formations (crystalline limestones and phyllites) are emerging forming small individual hills (Tourkovounia, Lycabettus, Acropolis, Philopappus etc.), overlying both the metamorphic formations of Hymettus and the non-metamorphic formations of Egaleo.

In this paper, the geology of the city of Athens and in particular the area of the inner city (historic center) is mainly studied. The designed geological walk trail is a practical endorsement, where the students will use fieldwork skills to identify a range of rocks and geological materials in the built environment and can also be informed about geological features of the area. Someone would think that urban area is poor for geological study and contains few useful geological data. This thought derives from the fact that primary surface of a city has been built and sharpened artificially, streets have been constructed, hydrographic networks have been shaped and hide, natural surface has been degraded.

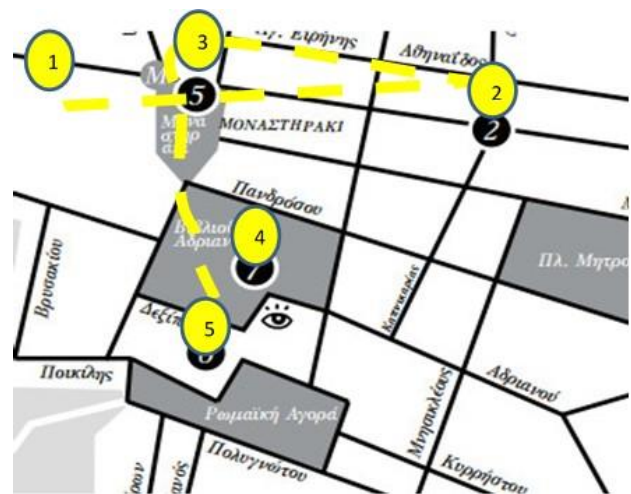


Figure 1. The walk trail: (1) Monastiraki (2) Kapnikarea (3) Pantanassa (4) Library of Hadrian (5) Roman Market.

Research Methodology

This work is an attempt to follow research steps forth by inquiry – based learning: a) trigger of interest, b) reminding of basic knowledge/formulation of hypotheses, c) experimentation/trials d) formulation of conclusions, e) applications/generalization according to learning.

We designed the walk trail: Syntagma- Monastiraki-Kapnikarea-Pantanassa-Library of Hadrian -Roman Market (Fig. 1) and we pursued the educational research with an experimental group of students of secondary school of Attica.

Results and Conclusions

The results of our research were compared with a control group of students of secondary school of Attica who visited our paleontology museum in Faculty of Geology and Geoenvironment of School of Science of National & Kapodistrian University of Athens. We noticed that students’ understanding, creativity, cooperation and critical thinking were spectacularly improved. They learned about the Eridanus River, they could recognize white marble of Pendeli, grey Hymettus’ marble, green marble of Karystos, granites and limestones with fossils. The most interesting point of the research was when the students realized that the complexity of the natural world arises from the combinations of few simple procedures.

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