FRAC'TURE PATTERN DESCRIPTION AND ANALYSIS OF THE HARD ROCK HYDROGEOLOGICAL ENVIRONMENT, IN A SELECTED STUDY AREA IN TINOS ISLAND, HELLAS

K. Botsialis, E. Vassilikis, G. Stournaras

National and Kapodistrian University of Athens, Greece
Faculty of Geology, Department of Dynamic, Tectonic & Applied Geology

ABSTRACT

The description of the main parameters that control the groundwater flow regime, are of critical interest to hydrogeologists, since they form the basis for the assessment of the groundwater potential. The present study aims to analyze the fracture pattern in the hard rock hydrogeological environment in Tinios Island, Saronic Gulf, Greece. The main parameters that were considered were: a) the frequency and spatial location of fractures, b) fractures orientation, c) materials that fill the fractures, d) the hydraulic conductivity within the fractures, and e) the hydraulic gradient. The study area is a small section of the island of Tinios Island, approximately 15 km². The island is characterized by a karstic hydrogeological environment with an important role of fractures and karsts. The major part of the area is covered by karstic caprock, with fractured units in the basement, which form the main aquifers. The analysis of the fracture pattern is based on the geomorphological characteristics of the island and the study of the fracture frequency and orientation in the studied area. The fracture pattern was analyzed using digital maps of the area, satellite images, and field work. The fracture frequency was determined using digital maps and satellite images, while the fracture orientation was determined using field work and digital maps. The results of the study showed that the fracture pattern is mainly controlled by the geomorphological characteristics of the island, with a higher frequency and orientation of fractures in the karstic caprock. The study also showed that the fracture pattern is related to the geology of the area, with a higher frequency and orientation of fractures in the basement rocks. The results of the study are important for the understanding of the groundwater flow regime in the studied area, and for the development of sustainable groundwater management strategies. The study also highlighted the importance of digital maps and satellite images in the analysis of the fracture pattern, and the need for further research to better understand the relationship between the fracture pattern and the groundwater flow regime.

CONCLUSIONS

The present study of the fracture pattern in the hard rock hydrogeological environment of Tinios Island, Saronic Gulf, Greece, has revealed that the fracture pattern is mainly controlled by the geomorphological characteristics of the island, with a higher frequency and orientation of fractures in the karstic caprock. The study also showed that the fracture pattern is related to the geology of the area, with a higher frequency and orientation of fractures in the basement rocks. The results of the study are important for the understanding of the groundwater flow regime in the studied area, and for the development of sustainable groundwater management strategies. The study also highlighted the importance of digital maps and satellite images in the analysis of the fracture pattern, and the need for further research to better understand the relationship between the fracture pattern and the groundwater flow regime.

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