Tectonic deformation and hydrogeological pattern in fissured rocks and karstic systems. Examples from the Pelion Mt and Mani peninsula, Greece

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Tectonic deformation exerts a significant role in the hydrogeological pattern, because water flow either follows or is severely influenced by the tectonic structures of all scales. Two examples are displayed: one in a fissured rocks media (Eastern Pelion) and another one in a karstic system (Mani peninsula).

In the area of Pelion, schists and gneisses are considered of low permeability and negligible primary porosity, nevertheless water recharge and percolation occurs mainly through fractures. The hydrogeological pattern is highly controlled by the tectonic deformation both in the Micro-Mesoscopic (fracturing within the schist) as well as the Macroscopic scale (several km long faults where the springs are aligned). Subsurface flow occurs towards the northeast following the eastern limb of the Pelion mega-anticline, the topographic inclination, the direction of foliation and a major set of faults at this azimouth. Springs are aligned to the faults and three dominant sets of faults are observed. Two of them are NE-SW trending (N $030^o \pm 10^o$ and N $050^o \pm 10^o$), forming a 20^o angle of tectonic wedge, whereas the third set is NW-SE trending (N $320^o \pm 5^o$).

In the case study of Mani the karstic path is highly related to the tectonic structures and in particular:

a) towards the mountain area it follows the anticline megastructures with a NNW-SSE trending fold axis that are plunging towards south;

b) towards the hilly area and the lower slopes it strikes west following the transverse fault structures that form oblique normal faults that are E-W trending;

c) towards the lowland, shoreline and offshore area the karstic water produces gushing springs along strike the NNW-SSE trending normal faults that were formed during the recent extensional field and predominantly towards their intersection points with the transverse E-W trending oblique normal faults.

However, the impact of the tectonic deformation is different within these two systems. In the karstic system major structures predominantly control the water flow which is characterized by high velocities. Water flow involves major localized pathways that are elongated with high seasonal variations in discharge rates. In fissured rocks the microscopic scale plays the predominant role in infiltration and flow processes, whereas the macroscopic structures control mainly the spring's distribution and the localities where the hydraulic head of the aquifer intersects the surface and springs discharge. In fissured rocks, based on our estimates the maximum depth where water penetrates does not exceed 300m and water flow is characterized by slower velocities, involving a time delay mechanism. Finally, several minor and widespread pathways are formed, so that the thickness and the overall pattern of the heterogeneous aquifer changes spatially over short distances not only due to lithology, but predominantly due to the tectonic deformation.

Foraminiferal biofacies analysis and paleoecological data on Upper Cretaceous sediments of the Gagra-Java zone (Western Georgia)

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The paper deals with actual questions concerning biofacies and paleoecology of the Gagra-Java zone. The Gagra-Java zone extends along the Southern slope of the Greater Caucasus, in its turn subdivided into three facies types: Abkhazia-Racha, Odishi-Okriba and Dzirula. The Cretaceous sediments have developed mainly in the junction area of the