

# **Qanats between Menikion and Pangeon Mountains: A forgotten and endangered resource for local water supply**

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Due to the growing water shortage in the summer-dry Eastern Mediterranean, the question of water supply has become an important issue. Since antique times subsurface channels (qanats) have been built, which gather groundwater and take it due to the natural slope to places, where the water is needed. In Greece qanat technology has definitely been used during the Ottoman period. After the liberation and the following Greek-Turkish population exchange the knowledge about the systems has disappeared. There is evidence that many of the subsurface galleries are decayed. On the foothills of the Menikion and Pangeon Mountains active qanate systems have been investigated only recently in order to check their activity, contribution to the local water supply and water quality. The results reveal still working qanate systems, which are endangered by regional land use as well as by system-destructive building measures.

## **Middle Pleistocene rodents (Rodentia, Mammalia) from the fissure filling Kamenjak on Venčac near Arandjelovac (central Serbia)**

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In an abandoned limestone quarry (Kamenjak) near Arandjelovac (central Serbia), a fossiliferous fissure filling rich in vertebrate remains has been discovered. The quarry Kamenjak is situated on a ridge of the Venčac Mountains, 500 meters to the west of the top. The fissure is approximately 8 meters long with a maximum width of 70 centimeters, trending in north-south direction. It cuts the layers of weakly metamorphized slates and marbles of the Late Cretaceous age (Turonian-Senonian). The fissure is filled with bone breccia full of bone fragments in reddish matrix of clay, carbonates and limonite.

In this site several samples of bone breccia were collected in 1980 and 1989. Some bones of large and small mammals were extracted from these samples and preliminary described. In this work remains of the following species of rodents have been identified: *Spermophilus citelloides* (Kormos, 1916), *Microtus nivaloides* Forsyth Major, 1902, *Microtus (Terricola) arvalidens* Kretzoi, 1958, *Arvicola* sp. (cf. *cantiana-terrestri*), *Clethrionomys glareolus* (Schreber, 1780), *Lagurus* sp., *Cricetus cricetus* Linnaeus, 1758, *Mesocricetus newtoni* Nehring, 1898, *Cricetulus migratorius* (Pallas, 1773), *Apodemus sylvaticus* (Linnaeus, 1758), *Apodemus microps* (van Kolfshoten, 1985)/*A. maastrichtensis* (Kratohvil & Rossicky, 1952), *Mus* cf. *musculus* Linnaeus, 1758, and *Myoxus sackdilligensis* (Heller, 1930). Some other small vertebrates (insectivores, lagomorphs, amphibians, reptiles) have also been found in this site. The fossil collections are stored at the Museum of Natural History in Belgrade.

The absolute predominance (about 75% of all rodent remains) of only one species (*Microtus nivaloides*) suggests relatively harsh conditions during a cold (glacial) period. This species probably preferred open areas, so it can be concluded that such type of environment prevailed in the vicinity of the site. But some forest inhabitants were also present, as well as indicators of more humid conditions (such as shrews).

On the basis of fossil evidence a Middle Pleistocene age has been proposed for this site. The rodent fauna has been compared with the faunas of some neighbouring countries and it has been concluded that it shows most similarity to the Saalian localities from Hungary (Nagyharsanyhegy-6 and Solymar) and Bulgaria (Morovitsa).

This locality is very interesting because it is the first “fissure filling” site of the Pleistocene age in Serbia with small mammal remains. The second important thing is its Middle Pleistocene age – there are many occurrences of Late Pleistocene mammals in Serbia, but remains of Early and Middle Pleistocene age are rare and usually confined to isolated teeth. Many of the mentioned species are reported in Serbia for the first time. So the investigation of this locality will provide us with a better understanding of this period of Pleistocene.

In the preliminary investigations, the age of the fauna from Venčac has been considered as Late Pleistocene, because of morphological similarity between some extant species and their ancestors. An older age can also be rejected, because there are no *Mimomys* remains, while the genus *Arvicola* – a characteristic element of Middle and Late Pleistocene rodent faunas – is present. Unfortunately, remains of this genus are very scarce and poorly preserved, so they could not be precisely identified and assigned to a species.

The future investigations will hopefully reveal more about this very interesting and rich Middle Pleistocene locality.

## **Regional geology and correlation of the Eastern Circum-Rhodope Belt, Bulgaria-Greece**

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We review on a regional-scale the distinct units of the eastern Circum-Rhodope Belt (CRB) in Bulgaria and Greece aiming to provide an up-to-date synthesis and correlation. The eastern CRB consists of Early-Middle Jurassic supra-subduction zone Evros ophiolite, the MORB related Late Jurassic Samorthaki ophiolite and Middle Triassic-Jurassic clastic, pelitic, carbonate and Cretaceous (?) flysch sedimentary successions. The Lower Cretaceous shallow-water Aliko Limestone seals part of these sedimentary successions already metamorphosed in greenschist-facies. Bulk stratigraphy in ascending order comprises a metasedimentary series overlain by a metavolcanic series. The metamorphic grade increases towards the high-grade basement northwards reaching upper greenschist to epidote-amphibolite facies, and decreases to very low-grade (prehnite-pumpellyite facies) and non-metamorphic stratigraphically upwards in the section. Trace element and REE comparison of the ophiolite basalts and underlying greenschist-facies metavolcanics of same composition reveals similar geochemistry within the distinct units, implying a regional-scale chemical continuity. The allochthonous eastern CRB units show N-directed internal shear deformation and thrust emplacement, obviously along rarely preserved thrust contacts, and record tectonic overprint by Tertiary collision and extensional tectonics in the region. Collectively, the onshore eastern CRB is a region-wide (180 km long along strike ×80 km wide along meridian) tectonic zone including correlative units with regard to their coherent and comparable stratigraphy, tectonics and geochemistry. These units testify for three paleogeographic domains that include Triassic-Jurassic near Rhodope continental margin shallow-water environment, adjacent to this margin Early-Middle Jurassic intra-oceanic arc system responsible for the generation of the supra-subduction zone Evros ophiolite and related to the ophiolite Middle-Late Jurassic trench-slope environment. Another MORB-related paleogeographic domain is indicated by the Samothraki back-arc ophiolite offshore.