



## **Assessment of the natural and antropogenic hazards in karst for the region of the Tylenovo, Northern Bulgarian Black Sea Coast**

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The studied territory located in the northern parts of Dobrudzha plateau, within the region of Tyulenovo town, in the contemporary contact zone land-sea and on the karst plateau. The investigated territory is a part of the Moesian micro-plate of craton setting from Paleozoic up to the present days. Its morphostructural development is related to the development of both Euxino-Caspian and Black Sea basins, and the forming of the Diagonal ridge, as a positive structure during the Attian tectonic phase (11-12 Ma). As a result of the transgression-regression phases during Neogene and Quaternary the regional and local erosional bases are changed and the erosion, denudation and karst processes are intensified or slowed down as well. This is shown with the discovered caves and caves systems, filled up with fresh karst water to different levels - from 70 m up to 150 m below the contemporary sea level, and onshore in the coastal part - to 2, 5, 10, 20, 50 and 70 m. The block broken as a result of paleoearthquakes during Neogene are simultaneous to the sedimentation. The beginning of this unique seismic gravitational complex should be put right after the global Chaudian regression. At that time along the Tyulenovo fault, NNE-SSW oriented, a seismic energy is released and from the Dobrudzha plateau edge blocks and packets of Sarmatian limestones are broken off and moved (slid) down seaward on the dipping eastward Oligocene clays. Tyulenovo paleoseismic dislocation is situated in the eastern most point of the coast on a 23 m high abrasion cliff in immediate proximity to the S of the village. The seismogenic structures were reactivated during the Karangathian and New Black Sea transgressions. It could be assumed that this huge rock-fall in the profile represents the collapsed roof of a big cave. Except the vertical cracks, horizontal cracks in the Middle Sarmatian limestone were formed too in the terrain due to the repeated reac-

tivation of the fault. The marine caves and surf niches were formed in these during transgression. The Tyulenovo paleoseismic structures was active during the contemporary stage, catastrophic earthquake on March 31 st 1901 and Vranchea (1977) etc. The natural and anthropogenic karst complex is subject to anthropogenic impact since 6,000 years B.C. Settlement of primitive man, who lived in the caves, are discovered here. One of the best resorts of Bulgarian Black Sea coast is located here. Production of oil and gas is held in the region of Tyulenovo town.