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Karst relief geospatial analysis (Georgia, Chiatura Municipality)

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Abstract:

The exclusive geographic location of Georgia, broadly contrasting natural conditions and the high quotient of landscape placement in this country make possible the abundance and divergence of unique natural monuments. A natural monument is a geomorphological and hydrological makeup, separate specimens of plants and/or fossilized objects of live organisms, as well as a territory where rare, unique, limited-in-space ecosystems having high esthetic characteristics are distributed. A natural monument may be a cave, a gorge, the mouth of a river, a waterfall, a lake, a grove of the forest, or a sanctuary. Each monument has scientific, historical, ecological, educational and esthetic value and it needs special protection.

Chiatura municipality occupies a significant part of the Zemo Imereti plateau and an elevated part of the mountainous plain of Georgia. It geologically coincides with the intermediate massif between the Dzirula crystalline zone, Greater Caucasus and Lesser Caucasus folded zones, which is built of Paleozoic granitoids and crystalline shales and is partially covered by weakly folded Meso-Cenozoic sedimentary rocks.

The climate in the municipality is marine, and humid subtropical, winter is moderately cold and rainy, and summer is relatively dry and hot. The average temperature in January is + 2.4°C and in July + 23.1°C. the absolute minimum temperature is -20°C and the absolute maximum is +42°C, as for the amount of precipitation, it's 1,100 millimetres per year. The main river of the municipality is Kvirila. Colchis-type deciduous forests are typical here. It should be noted that the main part of the forest is cut and little is left only on the steep slopes of the gorges, Lezhava (2015).

The karst terrain type is dominant among the types of relief presented in the study area. 110 caves have been discovered and studied here. They create an underground colorful world and are distinguished by unique properties. Their beauty, history and role in a healthy environment are invaluable. They are a shelter for many endangered living organisms, including the bones of fossil prehistoric animals, and also artefacts of prehistoric humans are kept in them. Archaeological excavations in the Dzudzuana cave, in the village of Mghvimevi, have uncovered 34,000-year-old flax thread, bradawl and other household items.

Although the region has great potential for tourism development, mining is still considered a leading activity today, Lezhava et al. (2016). The municipality is famous for its mineral wealth. Here are villages, where two or more mineral resources are located. For example, the village of Mghvimevi is a place, where both manganese and quartz sand are mined. It should be noted that the epikarst is well developed in the given area as well; it's connected to the karst network from which three caves are distinguished: "Dzudzuana cave", "Chiatura 100" and "Mghvimevi". The presence of soil cover in the village of Mghvimevi is important and serves as a protection for karst underground waters, Dvalashvili et al. (2017). However, in the conditions of intensive manganese extraction, the turbidity of drinking water in the rural area, especially during rains, creates a complex geo-ecological picture. Other villages are also facing this problem: Darkveti, Perevisa, Merevi, Rgani, Gundaeti, Salieti, Bunikauri and others. The village of Bunikauri is located in the valley of the Kvirila River, at 760 meters above sea level. Manganese mining is intensive in the village. There are many speleothems in the territory of the village of Bunikauri including the Shvilobisa cave, Sakajkari cave, Cherula cave and Bunikauri karst shaft. Shvilobisa is one of the longest (1,000 m) sub-horizontal, watery tunnel-type caves in Chiatura Municipality. Through it flows a stream with a debit of 7-10 l/sec; the water level rises significantly during the rainfalls. The cave stream is used by the locals for drinking and it's important to protect its suitability, Dvalashvili et al. (2017).

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It’s well known that karst development is expressed with full force in the limestone sediments. A big part of the Chiatura municipality area is built exactly with this kind of sediment. That is why there are a lot of caves and cavities of different kinds on the territory of this municipality. Notwithstanding, the big part of them has not been explored and reviewed, yet. Dzudzuana cave which is located 2 km from the village of Mgvimevi to the East, in the gorge of river Nekrisi, is well known in the world’s scientific circles. Since 1996 it has been under scrutiny of international expeditions consisting of the Georgian, American and Israeli specialists. The goal of these academics is the establishment of migration ways of homo sapiens, belonging to the Paleolithic period. Seven domestic layers were discovered on the territory of this cave belonging to this age whereby up to 100 items like ornamented bones, hangers, mascots, lucky pieces, and stone tools were unearthed. Explorer found also remnants of stranded fibres made of wild flax fibres, Voudouris and Kazakis (2018).

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