Discovering past and present nature of remote Ukrainian mountains: Bukovynian Carpathians within the National Nature Park Cheremoskyi

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The Chornyi Dil Ridge, situated in the Ukrainian Carpathians within the historical region of Bukovyna, is a geological and ecological treasure trove. While extensive research has been conducted on the crystalline structures of the Maramarosh Mountains in this region since the 19th century, the midaltitude massif of Chornyi Dil Ridge, with its highest point at 1483 m a. s. l., remains relatively unexplored. This ridge, preserved within the National Nature Park Cheremoskyi since 2009, offers a unique blend of natural and cultural features, geological monuments, and biodiversity, thanks to its remote location in the southernmost part of the Ukrainian Carpathians.

The Chornyi Dil Ridge showcases a rich diversity of rocks in terms of age, lithological and facies composition. Some of the oldest metamorphic formations in the crystalline massif include chlorite-muscovite, quartz-feldspar, and biotite schists belonging to the Bilopototska Series (Upper Proterozoic). Additionally, schists, quartzites, and Late Proterozoic intrusive formations, characterized by biotite and muscovite granite-gneisses, contribute to the geological complexity of the area. The southern part of the ridge predominantly comprises conglomerates, sandstones, and gravels of the Soymulian beds of Cretaceous, while basalt conglomerates, sandstones, carbonate mudstones, and siltstones of the Rudarnenska Series, along with colourful sandstones, mudstones, jasper, marbled limestones, and conglomerates of the Boltagulian (Jurassic), add further geological intrigue. Notably, gastropods and brachiopods are found in the basal layers of some formations, providing insight into the region's paleontological history.

The geological structure and lithology of the rocks in the Maramarosh, Rakhiv, and Chornohora (Magur) Series influence the hydrographic network of the region, particularly the Upper White Cheremosh valley and its tributaries. The river's course is impacted by several tectonic zones, leading to a convex deformation of its longitudinal profile. As the river approaches the transverse monolithic massif of the Grebenyshche Ridge, it changes direction and follows the fault zone upstream. This hydrographical configuration is a result of the intricate geological history of the Chornyi Dil Ridge.

The Chornyi Dil Ridge is known for its unique climate, which has been documented since the Austrian rule times. This region is characterized by colder temperatures compared to its adjacent areas, often experiencing a lack of meteorological summer and heightened precipitation during the spring and autumn months. The Chornyi Dil Ridge is home to indigenous communities of cedar and spruce forests, some of which are listed in the Green Book of Ukraine. These relict associations are notable for the presence of cedar pine, a species listed in the Red Book of Ukraine, making this ridge the sole habitat for this species in the

Bukovinian Carpathians. Furthermore, the ridge hosts rare plant species, including bitter root (*Saussurea discolor*), the Eastern Carpathian endemic yellow monkshood *(Aconitum jacquinii Rchb*), the South-Eastern Carpathian endemic silene zawadzkii (*Elisanthe zawadzkii*), and the iconic edelweiss (*Leontopodium alpinum*).

The Chornyi Dil Ridge is a region of immense geological and ecological significance within the Ukrainian Carpathians. Its diverse geological formations, complex hydrographical patterns, unique climate, and exceptional biodiversity make it a subject ripe for further research and exploration. Uncovering the geological history and ecological importance of this remote area promises to yield valuable insights into the past, present, and future of mountain development in the region.