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Abstract volume

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Correlation of Cretaceous deposits along the Dniester river (Ukraine) by palynological and lithological methods

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Summary. Rocks of Cenomanian and Turonian age, which are exposed on the right bank of the Dniester, Ukraine, are correlated with deposits of similar age in the left bank based on palynological (dinocysts and spore-pollen complexes) and lithological methods. The Dniester Pumped Storage Power Plant (PSP station) was built on this site, located on the right bank of the river between two dams of the Dniester Hydroelectric Power Plant (HPP station), and it is the Cretaceous and Neogene deposits that serve as the retaining walls of these fortifications.

The object of our study is the Cretaceous deposits of four outcrops located on the right bank of the Dniester River. Two dams of the Dniester HPP and the Dniester PSP were built along this section of the river. Construction of the Dniester Pumped Storage Power Plant is underway, a project that will give Europe its largest and most powerful hydroelectric facility.

Previously, we investigated sections of Cretaceous deposits on the left bank of the Dniester river (Shevchuk & Klimenko 2011; Ivanik et al. 2012; Shevchuk 2016, 2020). Many remains of fossil fauna and flora were documented here, which made it possible to stratify these deposits in detail (Gavrilishin et al. 1991). To date, rocks on the right bank of the Dniester river have not been studied by means of biostratigraphic and lithological methods.

Cretaceous deposits in this area are overlain by Neogene deposits. We have previously studied these Neogene deposits, stratified them in detail and attributed them to the Tortonian-Sarmatian age (Ivanik et al. 2021). All these places are united by the fact that something is built into these dense limestones of the Neogene age. These include the cave St. Nicholas Monastery (also known as the Halytska wall), the Dniester Pumped Storage Power Station, the Dniester Hydroelectric Power Station, quarries in the center of Sokyryany; the latter are mines for the extraction of white building stone. Cretaceous deposits lie on the Silurian and in some places on Ediacaran deposits. Phosphorites are often found in the studied Cenomanian deposits and underlying Ediacaran (Shekhunova et al. 2016).

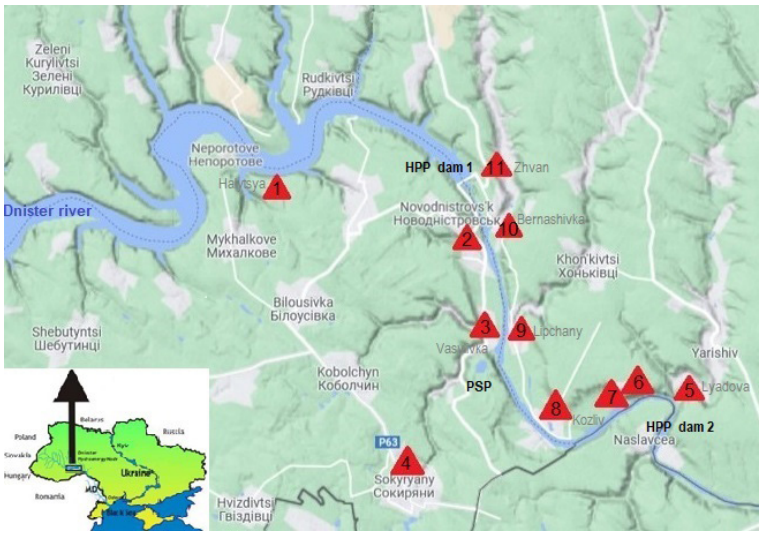

Fig. 1. Map of the study area. Outcrops of the the right bank of the Dnister district of Chernivtsi region: 1) outcrop near the village of Halytsya (Halytska wall); 2) the outskirts of the village of Novodnistrovsk including the wall of the Dniester HPP, dam №1; 3) outcrop under the Dniester PSP near the village of Vasylivka; 4) a series of outcrops in the town Sokyryany under the quarry mines; left bank of Mohyliv-Podilskyi district of Vinnytsia region: 5) outcrop under the wall on the territory of Lyadovsky monastery; 6-7) two outcrops between the villages of Kozliv and Nahoriany - near the dam №2 of the Dniester HPP; 8) outcrop near the village of Kozliv; 9) outcrop near the village Lipchany; 10) outcrop near the village of Bernashivka; 11) outcrop near the village Zhvan.

Outcrops exposing Cretaceous rocks of the Dniester district are of particular interest to stratigraphers-paleontologists as they contain a diverse complex of fossil biota. This includes brachiopods, gastropods, foraminifera, microspongiofauna and others. Also in the samples of these rocks there are organic remains of plant origin (spores and pollen of higher plants, wood remains, remains of green and dinophytic algae and others). Different systematic composition of fossil organisms distinguishes Cenomanian complex from Turonian.

Cenomanian spore-pollen complex established in these sections is characterized by the participation of spores of ferns - up to 25%, pollen of gymnosperms - 50% and angiosperms - up to 25%. There are spores of the family Polypodiaceae. Spores of *Gleicheniidites* sp., *Plisifera delicata*, *Cyathidites* sp., *Phlebopteris* sp., *Cicatricosisporites* sp., *Ophioglossum cenomanicus*, *Lygodiumsporites* sp. are rarely observed. The pollen part of the complex is dominated by pollen of the gymnosperm family Pinaceae and Podocarpaceae. There are genus of relatively small size: *Pinuspollenites* spp. and *Cedripites* spp. Pollen *Liliacidites* sp. dominates among angiosperms and pollen identified by artificial classification: *Tricolpopolenites* sp. and *Clavatipollenites* sp. Dinocyst: *Diconodinium cristatum*, *Spiniferites ramosus*, *Chlamydophorella nyei*, *Cleistosphaeridium* sp., *Odontochitina costata*, *Cribroperidinium cooksonae*, *Cribroperidinium intricatum*, *Oligosphaeridium* spp., *Callaiosphaeridium* sp., *Coronifera oceanica*, *Epelidosphaeridia spinosa*, *Litosphaeridium siphoniphorum*.

Turonian spore-pollen complex. Spores - up to 17% (Polypodiaceae, Gleicheniaceae, Schizaeaceae, Matoniaceae, *Leiotriletes* sp., *Staplinisporites caminus*, *Taurocusporites reduncus*. Gymnosperm pollen - 55% (Pinaceae, Cupressaceae, Ginkgocycadaceae, Araucariaceae). Angiosperm pollen - up to 33% (*Tricolpites* spp., *Tricolpites reticulatus*, *Tricolpopolenites* sp., *Tricolpoporopollenites* sp., *Liliacidides* sp., *Liliacidides variegates*. The first appearance of the pollen *Proteacidites magnus*. Dinocysts: *Florentinia mantelli*, *Spiniferites* spp., *Cauveridinium membraniphorum*.

The Cenomanian and Turonian deposits, which are exposed on the right bank of the Dniester, are well correlated with the similar age deposits of the left bank and adjacent territories. The lithological composition of rocks of the Mesozoic on the right bank of the Dniester river is more homogeneous and is characterized mainly by limestones of various origins.

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