

More than 300 km raft on the ice floe.

Dumortierite, clinohumite and scapolite from the Bohemian Massif in Dunavarsány, Middle Hungary.

SPRÁNITZ, T., VÁCZI, B., LANGE, T. P., JÓZSA, S.

(Department of Petrology and Geochemistry, Eötvös Loránd University, Budapest, Hungary)
spratom.elte@gmail.com

In the gravel pits around Dunavarsány the upper Pleistocene alluvium of the Danube is mined intensively. This alluvium belongs to the Pestvidék Pebble Formation. Why is this pebble formation interesting? It contains mainly (more than 90%) classical fluvial-formed coarse-grained pebbles, but there are some bigger (even more than 1 m in diameter), sometimes almost completely angular blocks too. Three special rock types from the latter range are in the center of our research: marble, gneiss and amphibolite. Characteristic minerals were described from each types. These minerals were unknown or extremely rare in Hungary until now. Clinohumite (general form: $\text{Mg}_9(\text{SiO}_4)_4(\text{OH},\text{F})_2$) was found in one dolomitic marble block in which calcite, dolomite, olivine, spinell, apatite, tremolite, chlorite and phlogopite appear as well. Dumortierite (general form: $\text{AlAl}_6(\text{BO}_3)\text{Si}_3\text{O}_{13}(\text{O},\text{OH})_2$) was described in two different gneiss types. The main rock forming minerals in these gneiss types are quartz, feldspars, biotite (partially chloritized) and muscovite. Besides dumortierite smaller amount of cordierite, tourmaline, andalusite, sillimanite, garnet, apatite and zircon also appear. Scapolite is the third key mineral (general form: $(\text{Ca},\text{Na})_4(\text{Al},\text{Si})_{12}\text{O}_{24}(\text{CO}_3,\text{Cl},\text{SO}_4)$) which was found inside a pyroxene-scapolite dominant vein in amphibolite. It coexists with diopside, plagioclase, hornblende, calcite, titanite, apatite and actinolite. Opaque minerals and white mica also occur. Petrographical analyses of the samples were carried out by optical and scanning electron microscope. Dumortierite, clinohumite and scapolite were verified by Raman-spectroscopy. Afterwards we searched for possible source regions, where the three studied special rock types occur close to each other. In Wachau, Austria these three rock types (gneiss and amphibolite of the Gföhl Unit and marble of the Drosendorf Series) with key minerals (dumortierite, clinohumite and scapolite) occur within few kms, in the vicinity of recent (and former) bed of the River Danube. In the framework of field trips we collected rock samples from more than 30 outcrops. Two big quarries close to the Danube (Klein-Pöchlarn – Ebersdorf and Loja) proved to be the most revealed and suitable locations. We correlated the collected samples (dumortierite bearing gneiss, clinohumite bearing marble and scapolite bearing amphibolite) with those collected in Dunavarsány by the means of the upper mentioned methods and confirmed strong similarity between them. With the knowledge of the place of the most possible origin, the fairly angular shape and the bigger size (gneiss and amphibolite: average 20-30 cm in diameter, marble: 80 cm in diameter) we suggest, that the most probable means of transportation was the fluvio-glacial process. In this process the rocks fall, roll and/or solifluctate from the cliffs onto the river ice and raft even hundreds km along to the lower reach of the river. There the climate is appropriate for the ice floe to melt so the rocks can fall down onto the river bed. These phenomena made possible for us to find unique rock types from the Austrian part of the Bohemian Massif in the middle of Hungary.