

KYANITES FROM MIOCENE (OSM) SANDS OF THE GRAUPENSANDRINNE AND THE ALPINE FORELAND: A VALLEY-FILL STUDY BY MEANS OF CATHODOLUMINESCENCE ANALYTICS

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The Miocene Graupensandrinne is a small, elongated, fluvial sediment structure, which extended along the northern rim of the foreland basin as a palaeo-valley (Buchner, 1996). It consists of poorly sorted sands to fine-gravels. The material is expected to be debris of the basement rocks from the Bavarian-Bohemian-Massive.

Directions of deposition of the Graupensandrinne as well as of the Alpine foreland were compared in a CL-pilot study, illustrated by the mineral kyanite. The mineral luminescence occur in two known colours: red and blue (Marshall, 1988). In the CL-spectra of the examined kyanites intrinsic bands appear at 420 nm and 500 nm. Beside the intrinsic bands, there are two characteristic narrow bands at 688,5 nm and 705,2 nm emerging from a broad band. These are the emission lines of the $3d^3$ -transition within a Cr^{3+} -center, which is commonly known from other minerals (e.g. topaz, corundum) (Gaft et al., 2005). Kyanites with a red luminescence exclusively show the two characteristic Cr-bands. Blue luminescent kyanites however show more strongly developed intensities within the range of short-wave radiation, but the appearance of the characteristic Cr-bands is likewise possible. Occurrence and distribution of the red and blue CL-characteristics permit a CL-classification of kyanite in four maintypes as well as in five and two subtypes, respectively (Görgen et al., 2006). For this study the CL-classification was reduced to three maintypes: I – kyanites with a red luminescence, II – kyanites with a blue luminescence, III – kyanites with red and blue luminescence.

This study proves that the kyanites from the Graupensandrinne between its north-eastern end at Kelheim and its south-western end at Riedern am Sand always show

the same composition. About 80% are exclusively red luminescent (type I) and about 20% are red and blue luminescent (type III) kyanites, but no blue luminescent (type II) ones occur. The same observation was made at host-rock material from the Bavarian-Bohemian-Massive. In contrast, kyanites from the Alpine foreland south of the Graupensandrinne show all three types of luminescence. With some more than 90% red luminescent kyanites dominate the composition. The remaining percentage of the composition contains nearly equal amounts of blue as well as red and blue luminescent kyanites. Material from the Kaunertal, Ötztal and Pitztal in the Alps show the same composition. Therefore, it is improbable to expect Alpine material being a valley-fill of the Graupensandrinne. In contrast, material from the Bavarian-Bohemian-Massive seems to be responsible for a valley-fill of the Graupensandrinne delivered through the palaeo-river courses of Main and Naab.

- Buchner, E., Seyfried, H. & Hische, R (1996): Die Graupensande der süddeutschen Brackwassermolasse: ein Incised Valley-Fill infolge des Ries-Impaktes. – Z. dt. geol. Ges., **147/2**, 169–181.
- Marshall, D.J. (1988): Cathodoluminescence of geological materials. – 149 S.; Unwin-Hyman, Boston.
- Gaft, M., Reisfeld, R. & Panczer, G. (2005): Luminescence spectroscopy of minerals and materials. – 356 S.; Springer, Berlin.
- Görgen, P., Götte, T., Neuser, R.D. & Richter, D.K. (2006): KL-Schwermineralanalyse am Beispiel von Disthen. – Schriftenreihe der Deutschen Geologischen Gesellschaft, **45**, 83, Hannover.