

THE UPPER CRETACEOUS GOSAU BASINS OF THE APUSENI MTS./ROMANIA, PROVENANCE ANALYSIS AND THERMAL HISTORY

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Abstract: From the distribution in the heavy mineral assemblage the beginning of the Banatitic intrusions and the uplift of a high-pressure metamorphic complex can be interpreted. Vitrinite reflectance data record the high heatflow due to the Banatitic intrusions as well as the depth of the basin itself.

The remnants of the Upper Cretaceous Gosau basins of the Apuseni Mts. record a similar sedimentary succession as the well known Gosau basins of the Eastern Alps: the Lower Gosau subgroup, represented by shallow marine deposits (alluvial-fan deposits, marls, sandstones, tempestites, and patch reefs), and the Upper Gosau subgroup (turbiditic flysch and pelagic sediments). The controlling tectonic process of the Austroalpine Gosau basins is proposed to be subduction tectonic erosion, which led to the strong subsidence of these basins (Wagreich 1995).

Investigations on heavy minerals and the maturation of organic matter can help to understand the sudden subsidence which took place in Campanian/Maastrichtian time. Heavy minerals were extracted from samples which were taken along several profiles through the Upper Cretaceous Gosau basins of the Apuseni Mt. (e.g. Salciua basin, Vidra basin, Iara basin).

The Lower Gosau subgroup reflects a predominantly metamorphic clastic source. In the Upper Gosau subgroup the metamorphic influence becomes less important. The start of the Banatitic intrusions in Maastrichtian time may explain the high percentage of apatite. Important amount of rutile can be interpreted as the exhumation of a high-pressure metamorphic complex. Chrome spinel as a heavy mineral was only found in samples from the Lower Gosau subgroup. This is in line with data from the Eastern Alps (Woletz 1967). The chrome spinel indicates an ophiolitic source terrain, which may have disappeared in Campanian time.

The vitrinite reflectance data show a range of 0,8 to 1,8 % R_r within the Upper Cretaceous sequence (see Fig. 1). Increased coalification (up to 3,7 % R_r) was measured in the Vladeasa region and near Baia de Aries, close to large Banatitic intrusions, which is able to explain these high reflectance values. The reconstruction of the architecture of the Gosau basins is a very delicate problem, because tectonic shortening obliterated relevant information. Due to shortening and uplift of the basin and the high contrast in erodibility to the surrounding rock, most of the sediments were eroded. The required data for the reconstruction of the basin, like the one discussed above, need to go along with tectonic data, e.g. fault plane analysis with kinematic indicators, in order to examine faults and their relative displacement. Despite high heat flow due to the Banatitic intrusions, a maximum basin depth of up to 2000 m can be assumed.

Key words: Apuseni Mts., Gosau basins, vitrinite reflectance, heavy minerals

References

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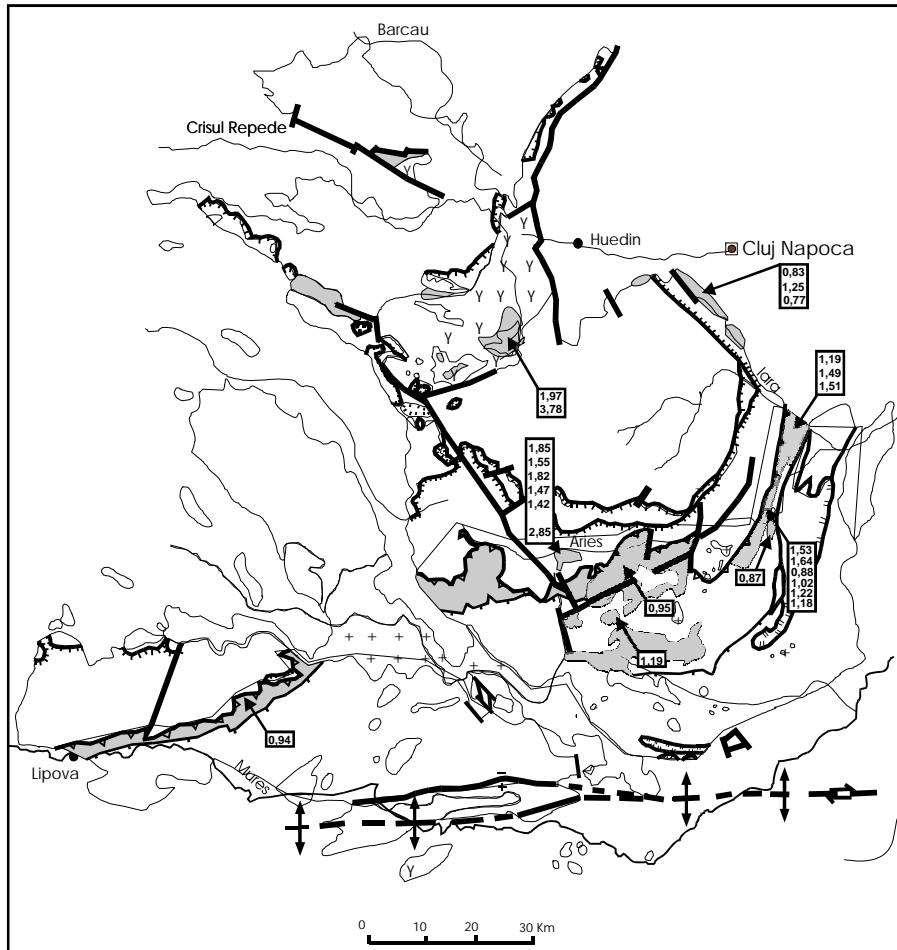


Fig. 1: Upper Cretaceous Gosau remnants and vitrinite reflectance data.

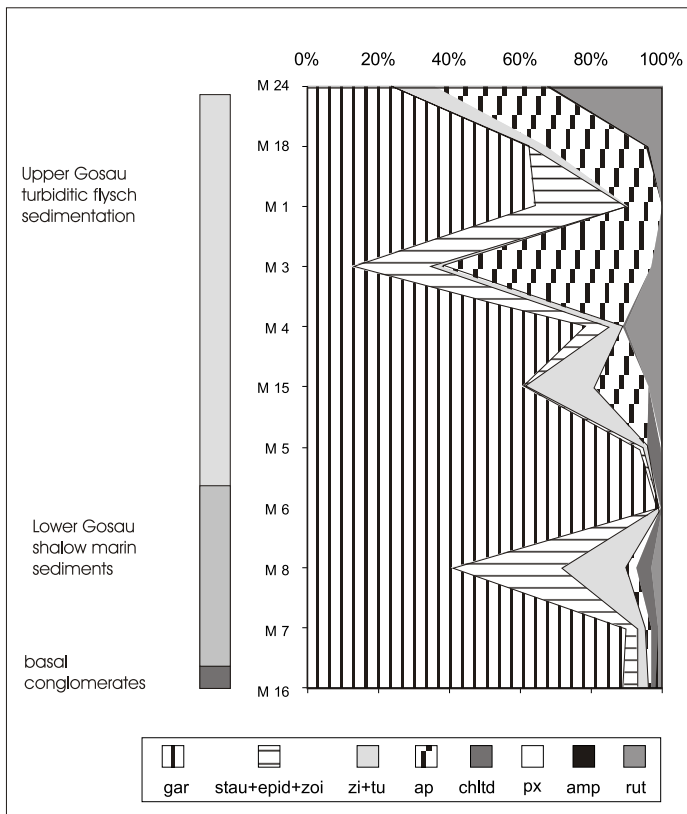


Figure 2: Heavy mineral distribution of a profile trough Gosau Sediments/Apuseni Mts. (Salciua basin).