



Cooling and erosion history of the Krkonoše Piedmont Basin (Bohemian Massif, Czech Republic) interpreted from apatite fission-track analysis

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In order to understand the low-temperature history of the sediments in the Krkonoše Piedmont Basin (Bohemian Massif, Czech Republic), detrital apatites were studied by fission-track (FT) method. The Krkonoše Piedmont Basin (KPB) belongs to a system of post-orogenic extensional / transtensional basins, which formed in the Bohemian Massif in the early post-orogenic phase, between the Westphalian and Saxonian times (ca. 310 – 280 Ma). Most of the basins in Western and Central Bohemia are aligned along the NE-striking boundary of the Saxothuringian Zone of the Variscan orogen, with minor modifications of the structural picture caused by NW-oriented fault zones and small basins formed at a later stage (Stephanian) along NNE-oriented faults such as the Rödl / Blanice Fault Zones. The older parts of the KPB fill underwent partial deformation during the formation of the Trutnov-Náchod sub-basin (Permian-Triassic), which is indicated by the angular unconformity at the base of the Trutnov Formation, the lowermost unit of the sub-basin infill.

Five studied samples dated by fission-track technique come from outcrops from alluvial-fluvial Trutnov Formation (TF). Outcrops of the Trutnov Fm. are dominated by brown-red conglomerates, sandstones with minor siltstone and mudstone interbeds and carbonate-cemented intervals. The apatite fission track lengths in all studied samples are very homogeneous and range from 12.1 ± 1.9 to 13.1 ± 1.5 micrometers (1 sigma). All horizontal confined track distributions are unimodal with a negative skewness, interpreted as resulting from a slow cooling through the apatite partial annealing zone (PAZ, 60 – 120°C). The measured FT apatite cooling ages range from the Early

Cretaceous to Cretaceous / Paleogene and varies from 60 ± 5 Ma to 114 ± 11 Ma (1 sigma), corresponding to an average cooling rate 0,5-1,1 °C/Ma from the Early Cretaceous to the present, while erosion rate exposed rocks with the average rate 24 – 54 m/Ma. Assuming thermal gradient of 25°C/km, these results indicate pre-Cretaceous burial of Permian rocks deeper than 4 km.