



## **Cretaceous Metamorphism in the northern East Carpathians: Constraints from Zircon Fission Track Thermochronology**

**H.R. Gröger** (1,2), M. Tischler (1), B. Fügenschuh (3), S.M. Schmid (1)

(1) Geologisch Paläontologisches Institut, Universität Basel, Bernoullistrasse 32, 4056 Basel, Switzerland, (2) now at: Statoil ASA, Forusbeen 50, 4035 Stavanger, Norway, (3) Institut für Geologie und Paläontologie, Universität Innsbruck, Innrain 52, Bruno Sander Haus, 6020 Innsbruck, Austria

(heigr@statoil.com / 0047-51996632)

The Cretaceous Alpine nappe stacking in the northern East Carpathians is generally considered to have taken place under sub-greenschist facies conditions (e.g. Sandulescu et al. 1981). The samples described derive from the Bucovinian nappe stack (Central East Carpathians, Rodna mountains) and the Biharia nappe system (Preluca massif).

The Alpine top to the NE directed nappe stacking led to an increasing temperature gradient during deformation. Sub-greenschist facies conditions during the Alpine metamorphic overprint only caused partial annealing of fission tracks in zircon in the external main chain of the Central East Carpathians. Full annealing of zircon points to at least 350°C in the more internal elements (Rodna mountains, Preluca massif). This temperature gradient is interpreted to have resulted from increasing tectonic overburden (up to at least 20 km) towards more internal units. Late Cretaceous cooling and exhumation is well constrained by zircon fission track ages. It commences earlier in the more external main chain of the Central East Carpathians (Cenomanian) than in the Rodna mountains and the Preluca massif (Campanian).

The close neighbourhood of Coniacian to Campanian zircon fission track cooling ages to Cenomanian sediments suggests tectonic exhumation in the Rodna mountains. This tectonic exhumation may be due to a phase of Late Cretaceous extensional tectonics so far not supported by structural data. Extensional tectonics related to orogenic collapse (Gosau type basins) is the most likely process, which allows for extensional tectonics.

References:

Sandulescu, M., Krätner H. G., Balintoni, I., Russo-Sandulescu D., Micu M. (1981):  
The Structure of the East Carpathians (Moldavia - Maramures Area). Bucharest, In-  
stitute of Geology and Geophysics.