



Timing and Kinematics of Cretaceous to Paleogene inversion at the SE margin of the Central European Basin System: Part 2, Thermochronology

V.-E. Hoffmann (1), I. Dunkl (1), H. von Eynatten (1), F. Jähne (2), T. Voigt (2), and J. Kley (2)

(1) Geowissenschaftliches Zentrum, Dept. Sedimentologie/Umweltgeologie, Universität Göttingen, Germany (vhoffma@gwdg.de), (2) Institut für Geowissenschaften, Universität Jena, Germany

During the Late Cretaceous to Early Tertiary some parts of the Central European Basin System (CEBS) were uplifted along NW-SE to WNW-ESE striking compressive fault systems. As a result Pre-Zechstein (Permian) basement is exposed at the southern border of the CEBS from Central Germany to the Sudetes still further east (e.g. Harz Mountains, Thuringian Forest). Thrust-related basins like the Subhercynian Cretaceous Basin (SCB) in the foreland of the Harz Mountains accumulated up to 2500m of siliciclastic and chemical sediments in only 10 million years (Late Turonian to Lower Campanian, Voigt et al., 2006). By means of low-temperature thermochronology it is possible to characterise these basin inversion processes with respect to timing, pattern and rates of cooling and exhumation.

Differed authors have already applied Apatite Fission Track analysis (AFT) in certain areas of the southern margin of CEBS. Thomson and Zeh (2000) published AFT apparent ages of 69 to 81 Ma for the Ruhla Crystalline Complex in the Thuringian Forest. Similar AFT-ages (73-84 Ma) of granitoids from the Harz Mountains were reported by Thomson et al. (1997). The late Carboniferous felsic volcanic rocks near Halle yield a much broader range of AFT apparent ages (75-108 Ma; Jacobs and Breitzkreuz, 2003). Comparable AFT-ages (84-90 Ma) had been also observed for gabbros from the north-eastern part of the Mid German Crystalline High (Ventura et al. 2003).

The present study tries to bridge some of the major gaps in the regional distribution of thermochronological data by analysing samples from central and southern parts of the CEBS. Overall almost 50 AFT-ages from Saxony-Anhalt, Lower Saxony, Thuringia, Hesse and North Rhine-Westphalia were measured. Emphasis is placed on the regions from the Harz Mountains to the Rhenish Uplands and the Thuringian Forest and its foreland. Furthermore, apatite (U-Th)/He thermochronology is used to better constrain the time-temperature history models. Apart from some mixed age information two different age groups can be recognized. A major group that is similar to the one reported above points to a short but intense pulse of exhumation and inversion in Coniacian to Campanian time. A younger, less significant age cluster yields information on a second phase of cooling and exhumation in the Paleocene-Eocene. The length distribution of AFT data leads to the assumption of rapid, partially multi-phase, exhumation events. In addition, the data of this study provides indications for thick Jurassic burial that likely reflect phases of Mesozoic extensional tectonics in at least parts of the CEBS.

Jacobs, J., Breitzkreuz, C. (2003): Zircon and apatite fission-track thermochronology of Late Carboniferous volcanic rocks of the NE German Basin. *International Journal of Earth Sciences (Geologische Rundschau)*, 92, 165-172.

Thomson, S., Brix, M., Carter, A. (1997): Late Cretaceous denudation of the Harz Massif assessed by apatite fission track analysis. In: G. Büchel and H. Lützner (Editors), *Regionale Geologie von Mitteleuropa*, 149. Hauptversammlung Deutsche Geologische Gesellschaft, Jena. Schriftenreihe der Deutschen Geologischen Gesellschaft, 3, 115.

Thomson, S.N., Zeh, A. (2000): Fission-track thermochronology of the Ruhla Crystalline Complex: New constraints on the post-Variscan thermal evolution of the NW Saxo-Bohemian Massif. *Tectonophysics*, 324, 17-35.

Ventura, B., Lisker, F., Kopp, J. (2003): Apatite fission track data from the dill-core Züllsdorf 1/63: implications for the reconstruction of the post Variscan exhumation of the Mid German Crystalline High. *Zeitschrift für Geologische Wissenschaften*, 31, 251-261.

Voigt, T., Wiese, F., von Eynatten, H., Franzke, H.-J. & Gaupp, R. (2006): Facies evolution of syntectonic Upper Cretaceous deposits in the Subhercynian Cretaceous Basin and adjoining areas (Germany). *Zeitschrift der Deutschen Gesellschaft für Geowissenschaften*, 157/2, 203-244.