The new geological 1:150000-scale map of the Bavarian Forest

GALADÍ-ENRÍQUEZ, E., TEIPEL, U. & ROHRMÜLLER, J.

Bavarian Environment Agency - Geological Survey, Leopoldstr. 30, D-95615 Marktredwitz; elena.galadi-enriquez@lfu.bayern.de, ulrich.teipel@lfu.bayern.de, johann.rohrmueller@lfu.bayern.de

The Bavarian Forest is located in the south-eastern part of Germany, adjacent to the frontier with the Czech Republic and Austria. Geologically, it belongs to one of the largest outcrops of Variscan basement in Central Europe – the Bohemian Massif. The rocks in this area are predominantly high-grade gneisses and migmatites, orthogneisses, metabasites, granulites, and Variscan to late-Variscan intrusives.

Up to now, the most recent compilation of the geology of the Bavarian Forest was the one of TROLL (1964). This author integrated the geological information available in two map sheets at 1:100000 scale. The map was based on information from a few already published 1:25000-scale geological sheets, on individual observations, and on historical maps dating from the 19th and early 20th century (e.g. GÜMBEL 1868).

In the framework of a major geoscientific project financed by the Bavarian Ministry of the Environment and the EU a geological mapping campaign focusing on east and northeast Bavaria took place in 2001-2007. The Geological Survey at the Bavarian Environment Agency as well as researchers of different German and Austrian Universities mapped the area at the 1:25000 scale.

Publication of the 1:25000 geological sheets is still in progress and many of these maps are already available. Beside the maps, an array of specific research was carried out, including geochronological, geothermobarometric, and structural studies. The cooperation between Agency and Universities was remarkably fructiferous, leading to the publication of several articles in scientific journals. All of the above has significantly improved the state of knowledge about the geology of the Bavarian Forest.

In spite of the excellent compilation work of TROLL (1964), the amount of geological information available in the 1960s was limited. The above-mentioned, recent mapping campaign has produced a huge amount of information which is worth being offered to the public in a compiled form. Hence, the Bavarian Environment Agency has integrated new and pre-existing maps, all of them originally performed at the 1:25000 scale, in order to produce a new 1:150000-scale map of the Bavarian Forest (TEIPEL et al. 2008). The map allows a global visualization of the geology of the Bavarian Forest based on the present state of knowledge. As an advantage in comparison with former compilations, its legend is structured attending to the chronological, petrographic and genetic features of the cartographic units, including detailed descriptions. In order to allow a better comprehension of the map in an international scope, especially among geologists working in the Central European Variscides, the legend is available in three languages (German, English, and Czech), and the nomenclature used regards the recommendations of the IUGS. The map includes a short geological overview and additional information, such as locations of former mines, outcrops, geotopes, and points of interest. This makes the map interesting not only for geologists looking for basic information for their research work, but also for non-specialists who are interested in geology in a rather touristy way.

TROLL, G. (1967): Führer zu geologisch-petrographischen Exkursionen im Bayerischen Wald - Teil I. - Geologica Bavarica, **58**: 1-188, München.

TEIPEL, U., GALADÍ-ENRÍQUEZ, E., GLASER, S., KROEMER, E., ROHRMÜLLER, J. (2008): Erdgeschichte des Bayerischen Waldes - Geologische Karte 1:150 000. - LfU, Augsburg.

Deformation phases in the southern Bavarian Forest: constraints from sheared granitoids

GALADÍ-ENRÍQUEZ, E.[1], ZULAUF, G.[2], GALINDO-ZALDÍVAR, J.[3] & ROHRMÜLLER, J.[1]

[1]Bavarian Environment Agency - Geological Survey, Leopoldstr. 30, D-95615 Marktredwitz; [2]Institut für Geowissenschaften - Facheinheit Geologie, Altenhöferallee 1, D-60438 Frankfurt am Main, Germany; [3]Dpto. de Geodinámica - Universidad de Granada, Campus Fuentenueva s/n, E-18071 Granada, Spain; elena.galadi-enriquez@lfu.bayern.de, g.zulauf@em.uni-frankfurt.de, jgalindo@ugr.es, johann.rohrmueller@lfu.bayern.de

A deformation sequence is established from an array of small granitic bodies situated in the area between the Bayerischer Pfahl and the Danube shear zones, in the neighbourhood of the Fürstenstein Pluton (Bavarian Forest, south-eastern Germany). The major tectonic features of the study area are related to the so-called Bayerischer Pfahl shear-zone system (sensu Galadí-Enríquez 2007, including the Bayerischer Pfahl, Danube, Buchberger Leite, Rodl, and Karlstift shear zones among others). It consists of subvertical NW-SE dextral shears, subsidiary NNW-SSE dextral shears and conjugate NE-SW sinistral shears. The latter have been active over a wide time and temperature span, ranging from amphibolite facies to near-surface conditions (e.g. BRANDMAYR et al. 1995). The Bayerischer Pfahl shear-zone system formed under N-S to NNW-SSE compression, as proposed by BRANDMAYR et al. (1995). Such a compression direction is also responsible for the subvertical NW-SE striking foliation developed under dextral simple shear in migmatites of the study area (S_2 after Galadí-Enríquez 2007). However, the granitic bodies presented here were affected by sinistral shears along subvertical planes trending ENE to ESE. Since this deformation took place under NE-SW compression and is not compatible with the previous N-S to NNW-SSE compression trend, it is proposed that these sinistral shear zones found in granites do not belong to the Bayerischer Pfahl shear-zone system and constitute themselves a separated one, which is called „D_3 shear-zone system“. The deformation D_3 took place under upper greenschist to lower amphibolite facies conditions (~480-550°C), as supported by the observed microfabrics and quartz lattice-preferred orientation patterns. The silicon content of magmatic and syn-kinematic white mica suggests that both the intrusion and the deformation of the granites affected by D_3 occurred at deep to intermediate levels of the crust (27-17 and 19-14 km, respect.). Datings on two of the deformed granites yielded 324.4 ± 0.8 Ma (GALADÍ-ENRÍQUEZ et al. 2005) and 315.0 ± 1.0 Ma (SIEBEL unpubl. data). Thus, the age of D_3 is most probably ~315 Ma, although an episodic D_3 is also conceivable involving some additional older pulses. After D_3 the N—S to NNW—SSE compression which governed D_2 was restored, giving way to the next deformation phase D_4, which was linked to further deformation at and next to the principal shears of the Bayerischer Pfahl shear-zone system under greenschist facies conditions. The causes for the change of the stress field leading to a NE—SW compression during D_3 might be related to (1) changes in the dynamics of the tectonic plates in late-Variscan times, (2) orogenic collapse leading to the sinking of the Teplá-Barrandian and lateral extrusion of the surrounding Moldanubian rocks, (3) distortion of the regional stress field by local intrusion of large stocks, such as the Saldenburg granite of the Fürstenstein Massif, or (4) distortion of the regional stress field due to the existence of ephemeral releasing bends in the Bayerischer Pfahl shear zone.

BRANDMAYR, M., DALLMEYER, R.D., HANDLER, R. & WALLBRECHER, E. (1995): Conjugate shear zones in the Southern Bohemian Massif (Austria): implications for Variscan and Alpine tectonothermal activity. - Tectonophysics, **248**: 97-116.

GALADÍ-ENRÍQUEZ, E. (2007): Granitoids from the European Variscides: an approach to their emplacement and tectonometamorphic history. - Unpubl. Diss. Univ. Frankfurt: 1-240.