The main structural features along a transect across the Late Cretaceous Apuseni-Banat-Timok-Sredna Gora magmatic belt, Central Bulgaria

Основни структурни елементи от разрез през къснокредния Апусени-Банат-Тимок-Средногорски магматичен пояс, Централна България

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The Late Cretaceous Apuseni-Banat-Timok-Sredna Gora magmatic belt (ABTS) best outcrops in the central part of the Alpine age Balkanide orogen in Bulgaria. Cretaceous age sedimentary and volcanic rocks of the ABTS magmatic belt typically outcrop in two elongated trends, called the Panagyurishte and Chelopech strips, whilst magmatic and magmatic-hydrothermal systems of same age are hosted in the various surrounding older country-rocks.

After the Cretaceous the rocks of the ABTS magmatic belt were incorporated into the Late Alpine age retro-orogenic wedge of the Balkanide orogen. The dominant present-day structures along the studied transect (Figs. 1 and 2) are the product of compres-
sion during the Late Alpine orogeny, which started in the Paleocene, whilst the main shortening ended by the Late Eocene. The dominant style of deformation is north-vergent, thick-skinned thrusting. Three major thrust-fault zones are currently distinguished along the transect: the Kamenitsa-Rakovitsa, Anton-Bunovo, and Plakalnitsa fault zones. Shortening accommodated by these fault zones led to regional uplift of the involved basement and folding and deformation of the sedimentary cover, especially in the immediate footwall of the major thrusts. No regional detachment horizons are recognised within the Upper Cretaceous sedimentary succession, probably due to the lack of development of a regional, laterally continuous stratigraphy with consistent weak mechanical layers. Back-thrusts are rare and only a few examples are known: the Etropole back-thrust, the decametre-scale imbricate thrusts in the Chugovitsa valley, and occasional thrust faults in the Panagyurishte strip sediments.

A striking feature of the ABTS magmatic belt in the Panaguyrishte and Chelopech strips is the significant along-strike variation in the amount of shortening, structural styles of deformation and, in some areas, the orientation of the main structures. Deformation within the sedimentary cover is extremely heterogeneous and mapping has revealed several areas that are almost unaffected by the Late Alpine shortening. The observed heterogeneity in the Alpine age structures is likely the result of pre-cursor heterogeneity in the distribution of both the pre-Paleocene age sediments and the pre-Alpine age tectonic structures in the basement.

The pre-Alpine basement along the studied transect (Figs. 1 and 2) may be grouped into three distinct basement-types: the Srednogorie high-grade type, the Stara Planina phyllite-dominated type and the so called Plakalnitsa type. The Plakalnitsa basement-type is still poorly studied and crops out in a narrow belt along the Plakalnitsa fault zone. Analysis of newly collected structural data and regional mapping is suggesting that the reactivation of pre-Alpine age basement structures is an important controlling factor on the subsequent structural style of deformation during the evolution of the Late Alpine orogenic belt, as shown by: 1) the spatial coincidence of the traces of the main Late Alpine thrust fault zones with the pre-cursor contacts between the different pre-Late Alpine basement-terranes, and 2) the fact that the geometry of the Late Alpine thrust fault zones is commonly coincident with and follows the same orientations as the Variscan age penetrative structural fabrics in the basement.

Ongoing research is now suggesting that the present-day regional structure of this part of the Late Alpine age, north vergent retro-orogenic wedge is in a large part due to: 1) the heterogeneous regional distribution of the pre-Paleocene sedimentary basins and the discontinuous mechanical stratigraphy of their basin-fill, 2) the existence of pre-cursor rheological variations and inherited pre-Alpine age structural lineaments and penetrative structural fabrics in the basement (of Variscan and Early Alpine age) that have “guided” Late Alpine age structures and 3) the apparent relatively low amount of internal shortening observed within each of the major Late Alpine age thick-skinned thrust sheets in the study area in comparison to greater amount of internal shortening generally observed within the thin-skinned thrust belts and especially those in pro-wedge position.

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