Summary of PhD Dissertation in English

The Strandja Zone is an NW-SE-trending mountain belt consisting of pre-Late Cretaceous autochthonous and allochthonous units located on the Bulgarian-Turkey border. This zone is one of the least studied areas in the Black Sea region, variously assigned as part of the Balkanides or Pontides. All neighbouring units contain remnants of the Variscan basement massifs; however, the Variscan evolution was in many places obliterated by younger tectonic events or covered by sedimentary rocks.

In the Strandja Zone, the Paleozoic and Early Mesozoic geological evolution is obscured by Late Jurassic to Early Cretaceous metamorphism and deformation called In local literature the 'Early Alpine' event. The heterogeneity of this event was a key feature in distinguishing three units of the Strandja Zone in Bulgarian territory: the Strandja, Sakar and Veleka units. The Sakar and Strandja units display many similarities. Both units contain Gondwana-derived pre-Late Carboniferous high-grade country rocks intruding by Late Carboniferous to Triassic granitoids. In the Sakar Unit, the country rocks and granitoids are covered by Permian-Triassic metasedimentary rocks metamorphosed at amphibolite-facies conditions during Early Alpine metamorphism. In contrast, only low-grade metamorphism affected the coeval sedimentary succession in the Strandja Unit.

The paleogeographic position of the Strandja Zone during the Paleozoic and Mesozoic is a topic of debate. Previous studies proposed that the Strandja Zone formed a magmatic arc 1) either from Late Devonian to Early Carboniferous together with Balkan, Sredna Gora, Sakarya and Caucasus; 2) or from Late Carboniferous to Triassic together with Rhodope Zone and Serbo-Macedonian Metamorphic Complex as the westernmost extension of the Euroasian active continental margin related to the subduction of the Paleo-Tethys Ocean. The first model was questioned by the occurrence of the Variscan shear zone between low- and high-grade metamorphic country rocks of Balkan and Sredna Gora zones, respectively, whereas the second model was challenged in this study.

This study focuses on the Sakar Unit of the Strandja Zone, dominated by Late Carboniferous to Triassic granitoids of the Sakar Batholith in the central part, the Harmanli Block Magmatic Complex in the south-western part, and the southern plutons of Izvorovo, Levka and Ustrem, previously grouped as the Lesovo Complex.

The dissertation presents new U-Pb zircon, titanite and rutile dating coupled with geochemical, petrographic and field studies. It provided 1) the first crystallization ages of the Izvorovo (ca. 251-256 Ma) and Levka (ca. 306 Ma) plutons; 2) a better constraint on the emplacement age of the Sakar Batholith (ca. 319 Ma); 3) evidence of Variscan metamorphism and deformation in the Sakar Unit (>ca. 319 Ma); 4) evidence of two stages of Early Alpine metamorphism and deformation with a Late Jurassic (ca. 154 Ma) regional phase and Early Cretaceous (ca. 125-116 Ma) localized hydrothermal activity associated with albitization, which both reached similar temperatures (~530-620^{o}C).

The study also revealed that Late Carboniferous to Triassic magmatism in the Strandja Zone represents two groups of granitoids formed in the Late Carboniferous and Permian-Triassic. The older group is interpreted to be related to a post-collisional setting, similar to coeval magmatism in the Sredna Gora and Sakarya zones, whereas the younger group was formed probably in rift- or subduction-related settings.

The similarities of the Gondwana-derived country rocks affected by Variscan metamorphism and deformation and intruded by Late Carboniferous granitoids in the Strandja and Sredna Gora zones led to the conclusion that they share a common Paleozoic evolution. Both these zones, probably together with Serbo-Macedonian Metamorphic Complex and Sakarya Zone, were a part of the metamorphic core of the Variscan Orogen. Subsequently, the Strandja Zone was affected by Late Jurassic to Early Cretaceous metamorphism and deformation contemporarily with (ultra-) high-grade metamorphism and deformation in the Rhodope Zone. Although the events are coeval, the differences in metamorphic conditions do not allow direct connections between the Strandja and Rhodope zones in the Mesozoic.

The thesis also presents challenges in interpreting the geochemical and geochronological data, such as 1) the problem with discrimination of tectonic settings for granitoids based only on geochemical data, which is presented together with the support of zircon population characteristics and magma generation temperatures; 2) the problem with the interpretation of U-Pb geochronological zircon data spread along the Concordia, for which the proposed solution assumes partial lead loss due to a metamorphic event; 3) interpretation of highly-radiogenic initial lead composition in rutile, presented with isotopic and textural evidence of igneous titanite being a precursor.