CHARACTERIZATION OF THE LATE-VARISCAN I-TYPE GRANITIC ROCKS FROM THE WESTERN CARPATHIANS

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Two groups of the Variscan Carboniferous orogenic granitoids are found in the Western Carpathians area: the granitoids with affinity to the S-type and to the I-type. Both types were differentiated from tonalite up to granite (s.s.), granites prevailing in the S-type group and tonalites-granodiorites in the I-type. The S-type group possibly represents older collisional granitic suites (around 350 Ma by U-Pb and Rb-Sr dating), the I-type group is younger (around 305 Ma by U-Pb dating on zircons).

The I-type granitoids in the Western Carpathians are represented by the Sihla-type s.l.(Broska - Petrík 1993). The petrographical nature suggests relatively lower SiO_2 content (65-72 %) and increased contents of CaO, MgO and FeO. Also compatible trace elements have typically increased concentrations (Sr, Ba, Ni, V, Cr, Zr). Intense subsolidus alterations (chloritization and epidotization of biotite, sericitization of plagioclases) are characteristic of the I-type granitoids. The magnetite - allanite-sphene assemblage of accessory minerals associated with Mg - rich biotite indicate oxidation conditions in the melt. The zircon typology shows low alkalinity (index I.A 250 - 400) and intermediate to higher temperatures (index I.T > 350).

I-type granitoids were determinated in the western part of Veporic unit, in the Modra massif (Malé Karpaty Mts.), Hlohovec body (Považský Inovec Mts.), Malá Fatra Mts., Tríbeč Mts., Čierna Hora Mts.

Significant amount of oval shape mafic microgranular enclaves is locally present in the Western Carpathians I-type granitoids. We suppose that the enclaves are of magmatic origin and were quenched like globules of intermediate and basic composition in lower temperature felsic melt (in sense of Vernon 1983). This evokes an idea of contemporaneous basic and acid magmatism occurring during Variscan granitogenesis (Petrík - Broska 1989).

The genesis of Upper Carboniferous I-type granitoids might be connected with a renewed subduction regime which was suggested to occur on the southeastern flank of Gondwana (Finger -Steyrer 1990). Basic and intermediate magmas could have been products of subduction-related melting in the mantle wedge above subducted slab of the Paleotethys ocean floor. During emplacement of granite magmas operated extensional regime.

INDICATIONS OF CADOMIAN BACK ARC EXTENSION AND ACCRETION FROM THE NEOPROTEROZOIC OF EAST GERMANY

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Within the Torgau-Doberlug-Synclinal Zone and extending into the southern rim of the Mid German Rise (the Southern Phyllitic Zone) a succession of Neoproterozoic to Middle Cambrian rocks occurs. Due to an extensive Cenozoic blanketing it is being investigated by numerous core-drills. The Neoproterozoic Rothstein Formation comprises: submarine basic volcanics with pillow intercalations & pyroclastic rocks / turbiditic greywacke-siltstone-mudstone sequences of a more distal turbiditic setting / pyritic black shales representing pelagic background sediments / hydrothermally altered varieties of the above mentioned rock types / hydrothermally exhalative cherts. This rock assemblage is indicative of an accumulation under distensive tectonic conditions typical for a back arc setting.

The metamorphic overprint of the Rothstein Formation increases from very low grade within the synclinoria to greenschist facies within the Southern Phyllitic Zone. Deformational features display striking similarities to structures developed within accretionary wedges (Knipe & Needham, 1986). These include downslope gravity driven deformations, deformations associated with accretion and collision-deformation related structures. Postcollision adjustments are difficult to record from drill cores as well as to tell from post-Cadomian tectonics.

Overstepping Lower and Middle Cambrian non-metamorphosed sediments accumulated under marine shallow water conditions. They are intruded by diabase sills and dykes of hitherto unknown age. Archeocyaths from Lower Cambrian limestones evidence Upper Atdabanian to Bottomian ages and display exclusively Mediterranean affinities (Elicki & Debrenne, 1993). The Cadomian development of that crustal segment terminated with the intrusion of granodiorites and diorites. In the intrusive complex of Pretzsch–Prettin they are dated at approx. 540 and 500 My respectively Rb–Sr whole rock analyses (Kampe, 1990).

Within the synclinal zone Lower Carboniferous coal bearing sequences are overlying unconformably. The anthracitic state of the coals points to a Variscian thermal overprint. In the Southern Phyllitic Zone the Neoproterozoic is covered unconformably by Rotliegend molasses which evidence Variscan uplift and erosion of the Cadomian succession.

The Cadomian development took place along active plate margins not reaching a continent-continent collisional state. Global syntheses place this type of Cadomian processes onto the African exterior margin of a Neoproterozoic supercontinent -> Protogondwana (Murphy & Nance, 1991; Murphy et al., 1991). Both the geotectonic features of the Cadomian Rothstein Formation and the Mediterranean faunal affinities of the overstepping Cambrian point to such a setting. From the Early Paleozoic breakup of Protogondwana until their welding into the Varscides such crustal segments retained a plate-marginal character. Therefore they are particularly prospective in the search for terrane boundaries and sutures within the Variscides. The strike-parallel occurence of the presented Neoproterozoic to Cambrian successions towards the Mid German Rise adds further evidence to the sutural nature of this Variscian element.

The Neoproterozoic Rothstein Formation displays striking lithological similarities to the Cadomian Blovice Group of the Teplá–Barrandian. Results of comparisional field works in the Blovice Group will be presented.

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FACIES AND PALEOGEOGRAPHIC RELATIONSHIPS IN DEVONIAN OF THE BOHEMIAN MASSIF

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Devonian sedimentary rocks of the Bohemian Massif belong to:

1) Shelf facies (Centralbohemicum with the Barrandian, the Moravo–Silesian Platform Development) which well reflect global transgressive–regressive trends and event–stratigraphic turnovers, and
2) basinal facies which indicate mobile zones with volcanism and subsequent Variscan crustal shortening and subduction (active plate margins: Saxothuringicum, Lugicum, parts of Moravia-Silesia).

Devonian sedimentary sequences of the Bohemian Massif clearly document the wide distribution of anoxic facies in the Lochkovian, the sea level fall close to the Lochkovian – Pragian boundary, and the transgressive trend which started during the Pragian and culminated in the Daleje Event near the lower–upper Emsian (Zlíchovian – Dalejan) boundary.

The anoxic Kačák Event close below the upper Eifelian boundary and the Kellwasser Event in the Frasnian–Famennian boundary interval had generally a greater influence on the facies development than the event near the Devonian–Carboniferous boundary. The Givetian–Frasnian transgression is accompanied by markedly widened distribution of the carbonate coral–stromatoporoid facies which is traceble in areas with different pre–Givetian development.

Paleoclimatic indicators point to the position of the Bohemian Massif within the tropical zone, probably around 10° S.