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## COMPOSING THE VARISCAN COLLAGE OF THE SUDETES: PRESENT STATE-OF-THE-ART

The Variscan structural complex of the Sudetic area is a composite mosaic of geologically diverse pre-Permian units, separated from one another by tectonic contacts of contractional, extensional or strike-slip kinematics. The mutually different evolutionary histories of most of those units, combined with the occurrence of ophiolites or igneous bodies of MORB-type affinities along some of their contacts, as well as of HP metamorphic complexes (including the blueschist and eclogite facies), clearly suggest a coexistence of (fragments of) several tectonostratigraphic terranes contacting along tectonic sutures and major fault and shear zones. Variable configurations of various terranes in the northern part of the Bohemian Massif have been a matter of lively discussion (e.g. Matte et al. 1990; Aleksandrowski 1990, 1995; Oliver et al. 1993; Cymerman, Piasecki 1994; Franke et al. 1995; Cymerman et al. 1997; Franke, Żelazniewicz 2000). Recent results of the present authors make it possible to critically discuss the hitherto made attempts at application of the terrane concept in the Sudetes and to propose a modified, updated and partly new terrane model of the Variscan structural level of the Sudetes (Aleksandrowski, Mazur 2002). The model is based on an assumption that all the major constituent units ('zones') of the central European Variscan belt known from the Bohemian Massif continue into the Sudetic area. The proposed concept rejects some and modifies other previous terrane models; it also gives a palaeotectonic interpretation of particular Sudetic units and a possible scenario for their accretion.

Based on various aspects of the geology of individual Sudetic structural units, a relatively simple division of the Sudetes can be made into distinct tectonostratigraphic terranes of different provenance and evolution. From NW to SE, we propose the following tectonostratigraphic terranes to be distinguished on the NE margin of the Bohemian Massif (Fig. 1): (1) The Lusatia-Izera terrane comprises the Lusatian massif and the Kowary-Izera unit of the Karkonosze-Izera massif, which both correspond to crystalline basement of the passive margin of the Saxothuringian epicontinental area. The Görlitz slate belt and the Ještěd unit are made up of Variscan-deformed sedimentary successions deposited on this passive margin. (2) The South-East Karkonosze terrane is thrust over the Lusatia-Izera terrane and comprises the South Karkonosze and Leszczyńiec units of the Karkonosze-Izera massif. These units contain the

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(meta)sedimentary-volcanic succession of the Saxothuringian oceanic basin and the oceanic basin floor, respectively, the latter overthrust upon the basin's infill during Late Devonian-Early Carboniferous times. This terrane contains a fragment of the Saxothuringian suture. (3) The Kaczawa terrane is separated from the Lusatia-Izera terrane by the strike-slip Intra-Sudetic fault zone and from the Góry Sowie-Kłodzko terrane by an inferred thrust contact. It contains a Palaeozoic rift-to-oceanic volcano-sedimentary succession involved in a Variscan accretionary prism, which formed during latest Devonian-earliest Carboniferous(?) times. The affinities of the Kaczawa succession are still unclear (Saxothuringian or Rheic oceanic basin infill?). (4) The composite Góry Sowie-Kłodzko terrane includes, apart from the Góry Sowie massif and the NE part of the Kłodzko metamorphic unit, also the Świebodzice and Bardo basins, the Central Sudetic ophiolites, the Niemcza shear zone, and the NE part of the basement of the Intra-Sudetic basin. These units represent a variety of palaeotectonic environments, including subducted continental crust (the Góry Sowie), Middle Devonian passive margin (the NE part of the Kłodzko metamorphic unit), oceanic crust (the Central Sudetic ophiolites) and synorogenic basins (of Świebodzice and Bardo). The principal common feature for the units of this terrane is Eo-Variscan, pre-Late Devonian deformation, metamorphism and exhumation, which took place significantly earlier than in the other Sudetic terranes. This terrane shows affinities with parts of the NE Massif Central and Armorican massif, as well as with the Teplá-Barrandian terrane in the Bohemian Massif. (5) The Teplá-Barrandian terrane in its Sudetic segment is interpreted here to incorporate the Nové Město belt, Zábřeh unit and the SW part of the basement to the Intra-Sudetic basin, which crops out in the SW part of the Kłodzko metamorphic unit. It cannot be excluded, though, that the Góry Sowie-Kłodzko terrane is part of the Teplá-Barrandian, and/or that the Góry Sowie massif may represent still another separate terrane (fragment of the Mid-German crystalline zone from the northern rim of Saxothuringia?). (6) The Moldanubian terrane in the Sudetes seems to comprise the Orlica-Śnieżnik massif and the Kamieniec and the Staré Město metamorphic belts. Its western boundary with the Góry Sowie-Kłodzko terrane is probably located along the sinistral Niemcza and Skrzyńka shear zones, with the Teplá-Barrandian terrane – along a thrust that was later converted into a dextral ductile fault in the Orlica mountains, and with the Moravian terrane – along a thrust belt of the East Sudetes. The rock complexes of the terrane display prominent effects of Early Carboniferous collision-related medium- to high-grade HP-HT and HT-MP/LP metamorphism and deformation, analogous to those known from the Moldanubian domain in the Bohemian Massif further south. (7) The Moravian terrane is inferred to occur between the Moldanubian and Brunovistulian terranes, by analogy to the situation further south in Moravia. This narrow terrane is represented by the Velké Vrbno and Branná thrust units of the East Sudetes. (8) The Brunovistulian terrane comprises the Kepník nappe and Desná dome and the successive, easterly located units of the East Sudetes, including the Culm basin and the coal-bearing molasse basin at the East-Sudetic foreland, both basins being established on Brunovistulian basement of

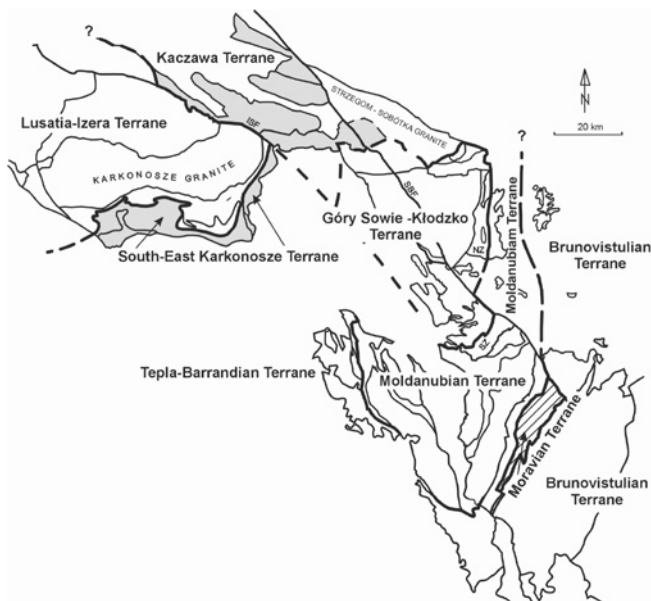


Fig. 1. Distribution of tectonostratigraphic terranes in the Sudetes according to Aleksandrowski and Mazur (2002)

hypothesised Avalonian affinities. Within the Fore-Sudetic block, the Brunovistulian terrane includes also the Strzeżym-Sobótka crystalline massif of similar geological characteristics. The latter two terranes (7 and 8) are equivalent of the traditionally distinguished Moravo-Silesian zone of the Variscides.

The proposed terrane distribution is in many respects similar to those earlier suggested by Matte et al. (1990), Cymerman and Piasecki (1994) and Cymerman et al. (1997). Particular solutions, however, adopted in our model differ significantly from solutions assumed in the latter concepts due to applying new data and, in part, also different criteria, to distinguish the tectonostratigraphic terranes.

Recently, another terrane distribution was suggested by Franke and Żelaźniewicz (2002), assuming the continuation of the Saxothuringian realm across the central Sudetes (our Góry Sowie-Kłodzko terrane and the Sudetic part of the Moldanubian terrane) up to the contact with the Moravo-Silesian domain in the east. This solution we consider as less probable than ours because of significant differences between the timing of deformation and exhumation and/or the history of metamorphism in our Góry Sowie-Kłodzko and Moldanubian terranes in comparison to those of the West Sudetes, which are all jointly considered as Saxothuringian by Franke and Żelaźniewicz (2002).

New research results, in particular new radiometric, structural, sedimentological, geochemical and petrological data are necessary to approach the still many unsolved problems of Sudetic geology, the answers to which can significantly improve knowledge of the tectonic structure and evolution of the Variscan Belt in central Europe.

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