Terranes and Terrane Boundaries in the Sudetes

Zbigniew CYMERMAN

Polish Geological Institute, Lower Silesian Branch,al. Jaworowa 19, 53-122 Wrocław, Poland

The Sudetes consist of many, relatively small tectonostratigraphic zones with tectonic boundaries building a mosaic-like pattern (Fig. 1). In the Sudetes, seven distinct lithostratigraphic terranes exhibit almost a symmetrical distribution (Cymerman et al., 1997). The central terrane of magmatic arc rocks called the Góry Sowie Terrane (GST) along with the marginal/oceanic and ophiolitic rocks of the Central Sudetic Terrane (CST) is bordered, respectively to the NW and SE, by the sialic Saxothuringian Terrane (ST) and Moldanubian Terrane (MLT). These are in turn bordered (again respectively to the NW and SE) by the Lusatian Terrane (LT) and

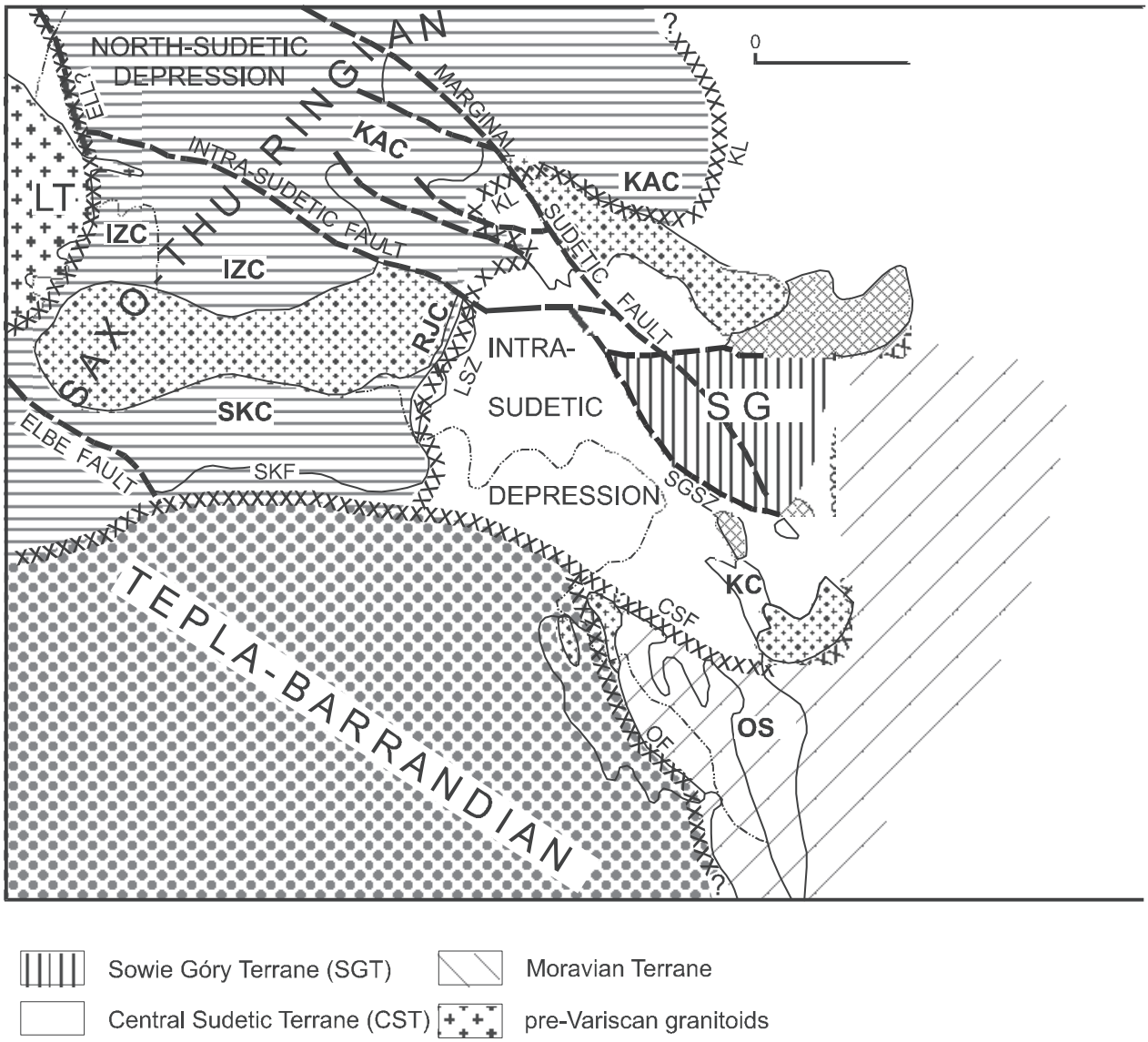

Fig. 1. Map of the Sudetic terranes and their boundaries: BNSZ - Brzeg-Nysa shear zone; CSF - Central Sudetic fault zone; ELL - East Lusatian line; KL - Kaczawa line; LSZ - Leszczyniec shear zone; NSZ - Niemcza shear zone; NYSZ - Nyznerov shear zone; OF - Orlica fault zone; SGSZ - Sowie Góry shear zone; SKF - South Karkonosze fault zone; ZSTSZ - Z³oty Stok-Trzebieszowice shear zone. Geological units: ESD - East Sudetic Domes, IZC - Izera complex; KAC - Kaczawa complex; KC - K³odzko complex; NKC - Niemcza-Kamieniec complex; OSD - Orlica-Œnie¿nik Dome; SKC - South Karkonosze complex; SOC - Œlê¿a ophiolite complex; STC - Strzelin complex.

and represent fragments of Gondwana affinities (e.g. Linnemann et al., 1997).

The LT and MRT represent Gondwana-derived microplates separated by rifting processes in the Cambrian-Ordovician times. The resultant basinal/oceanic crust of the CST and thinned continental crust of the ST and MLT were subsequently affected by episodes of subduction/obduction processes perhaps as early as in the Ordovician and/or during the subduction of the Rheic Ocean in the Silurian to Early Carboniferous time. The CST includes a few dismembered ophiolite sequences, the basinal/oceanic MORB-type crust of the eastern part of the Rudawy Janowickie complex, and of the Kaczawa complex located east of the Kaczawa Line, and the Kłodzko complex. The ophiolites have a trace element geochemistry of MORB affinity (Pin et al., 1988), being interpreted as the products of normal oceanic spreading, or possibly as a subduction-related marginal basin setting. Most of the structures in the Sudetes result from the accretion of Cadomian terranes (LT and MRT) at subduction zones, which overprint and strongly obscure the less widespread Caledonian structures associated with rift and transform plate margins. Reactivation of the primary, Caledonian terrane boundaries during later penetrative deformational events obscured the original accretionary relationships.

It seems probable that the SGT was formed as a volcanic arc (Kröner and Hegner, 1998), on the present SW peripheries of Baltica, and drifted north together with Baltica. The SGT was subjected to an oblique collision against East Avalonia during the Caledonian orogeny. A SW fragment of this terrane as a thrust-nappe, together with the obducted fragment of the oceanic crust of the CST, were included into the mosaic structure of the Sudetes during the Variscan deformations. The GST was thrust to the SSW on the ophiolitic rocks of the CST. The GST exhibits a history of three distinct, multi-orogenic, regional metamorphic events with an early HP metamorphism (e.g. Kryza et al., 1996).

The present disposition of the Sudetic terranes and their often very complex boundaries (Fig. 1) reflect earlier Cadomian and/or Caledonian plate boundaries later strongly reworked by the Variscan plate interaction. For example, in the ST and MLT, earliest Caledonian structures are related to divergent events associated with rifting and transform-type plate margins. These structures became overprinted and obscured by the more prominent structures resulting from accretion of these terranes to the CST during protracted Caledono-Variscan orogeny. Subsequently, the fundamental terrane boundaries were reactivated and overprinted by late- and post-orogenic Variscan deformations.

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