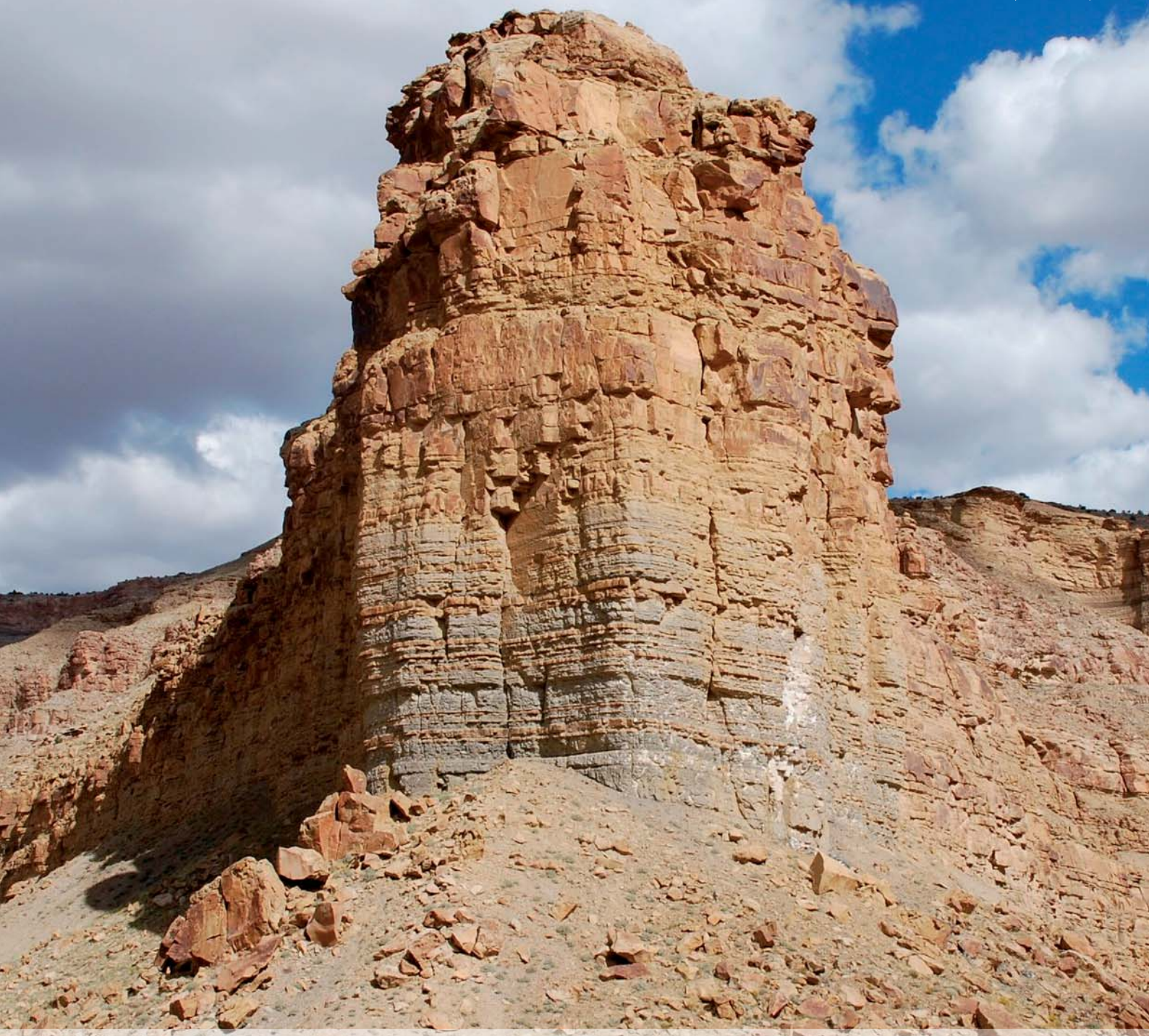
André Bornemann, Thomas C. Brachert & Werner Ehrmann (Eds.)



SEDIMENT 2011

Sediments: Archives of the Earth System

Leipzig, June 23-26, 2011
Abstracts

UNIVERSITÄT LEIPZIG

EXTENSIONAL DEVELOPMENT OF THE SUDETIC BASINS

Jurand Wojewoda

Institute of Geological Sciences, University of Wrocław, Poland,
jurand.wojewoda@ing.uni.wroc.pl

The geological evolution of the north-eastern periphery of the Bohemian Massif (BM), that is historically referred to as the Sudetes, had been recorded in sediments within areas conventionally referred to as basins. Sedimentary formations in the Sudetes represent facies and paleogeographic records of areas which extended considerably beyond the present structural units. Despite the fact that these units sometimes form limited fragments of former areas of deposition, *i.e.* sedimentary basins, it is not entirely correct to refer to them as basins. It is important to distinguish between these two terms. In the case where facies variability and thickness of sediments are clearly related to the boundaries of a structural unit, which in the past probably formed the boundaries of the depositional area, it is justifiable to use the term sedimentary basin. If this is not the case or it is impossible to verify, it is more appropriate to use the term basinal structural unit.

There are several basinal structural units in the Sudetes, within which the current highest structural members consist of sedimentary or metasedimentary rocks. The main ones include the Kaczawa Unit, Świebodzice Unit, Bardo Unit, Eastern Sudetes, Intra-Sudetic Synclinorium, North-Sudetic Synclinorium and the Upper Nysa Kłodzka Trough. While the first three units constitute only relics of the primary basins, the last four units comply to a greater extent with the criteria for a sedimentary basin. Such criteria are also fulfilled by the area located to the south of the Karkonosze Mountains, *i.e.* the Karkonosze Piedmont Basin, Nachod Basin and Orlica Piedmont Basin (cf. Żelaźniewicz & Aleksandrowski 2008).

It is assumed that the most important aspects of the contemporary geological structure of the Sudetes (*i.e.* Sudetic Orogen) were formed during two periods of particularly important tectonic transformation of the area, during the Bretonnian (~352-347) and Sudetian (~328-324) phases, and that they were strengthened by the syntectonic granite intrusions during ~347-315 (Visean-Westphalian). In relation to the above, the sedimentary records comprise two possible palaeographic periods which can be reconstructed: pre-Sudetic (pre-orogenic and synorogenic) and Sudetic (post-orogenic). The products of the pre-orogenic basin constitute the lower part of the Kaczawa Unit (K). In the synorogenic basins, sediments of the upper part of the Kaczawa Unit and Świebodzice Unit (BSi) as well as the Bardo Unit (BBi), and the oldest sediments of the Intra-Sudetic Synclinorium (the initial Intra-Sudetic Basin) (ISBi) were deposited. Post-orogenic basins include the Intra-Sudetic Basin (ISB), Karkonosze Basins, *i.e.* Vrchlabi and Trutnov (VB, TB), Nachod Basin (NB), Orlica Basin (OB) and the Upper Nysa Kłodzka Basin (NTB). The current position of the Sudetic basinal structural units and

Sudetic basins in relation to the most important structural units of the pre-Variscan basement (southern and eastern part of the Izera Block (SI, EI), Orlica-Śnieżnik Dome (O, S) and the Góry Sowie Block (GS)) as well as the facies variability and palaeogeographic reconstructions indicate the possibility of permanent extensional development of the Sudetic region, which started in the Tournaisian and continued till the Neogene (Fig. 1) (Don & Wojewoda 2005; Wojewoda 2007 & 2009 a, b & c; Cacoń et al., 2009). At the same time they put a question mark on the local meaning of the orogenic phases already mentioned above, which are a result of the so-called tangential pressure forces. At the same time they also question the previous understanding of the mechanics of the Sudetic orogeny.

The model of extensional evolution of the Sudetes does not exclude periods of basin inversion in its literal meaning, *i.e.* a relative inversion of the basin areas and the areas of sediment supply. The idea of kinematic inversion on the most important fault planes in the Sudetes is unclear and poorly documented. The extensional model of the evolution of the Sudetic region clearly indicates the high importance of two main fault systems which have behaved uniformly from the end of the Devonian. These are the Intra-Sudetic Tensional Zone (ISTZ) and the South-Sudetic Shear Zone (SSSZ) (Fig. 2). The rhomboidal sub-basins VB, TB and NTB are clearly related to the strike-slip regime within the SSSZ. The ISB is a polygenic and multistage basin which started and developed within the ISTZ. The basinal units SB and BB are related in their paleogeography and facies to the areas of the Fore-Sudetic Homocline and East Sudetic Basin (ESB) respectively, and they used to represent the marginal zones of those basins.

The Poříčí-Hronov Fault Zone (P-HFZ) represents one of the fault systems inside the SSZ and it is closely related to the extensional evolution of the ISB since the late Devonian to early Triassic and of the Intra-Sudetic Synclinorium since the late Cretaceous till now. P-HFZ constitutes the northern marginal fault system for the rhomboidal pull-apart basins related to the SSZ (VB, TB, NB and UNKT) which form together basin successions – , *i,e.* South Sudetic Basin Successions (SSBS) (Fig. 2). Local reverse faults that occur on the boundaries between TB, NB and ISB can be explained by local transpression induced by irregularities of the P-HFZ plane in relation to the main direction of the regional dextral sense of shearing (cf. Wojewoda 2007 & 2009 a, b & c).

Cacoń, S., Wojewoda, J., Kapłon, J., 2009. Acta Geodynamica et Geomaterialia, 6 (3): 230-238.

Don, J., Wojewoda, J., 2005. Prz. Geol., 53 (3): 212-221.

Wojewoda, J., 2007. Acta Geodynamica et Geomaterialia, 4, 4 (148), 1-11.

Wojewoda, J., 2009a. Acta Geodynamica et Geomaterialia, 6 (3): 273-290.

Wojewoda, J., 2009b. 7th Meeting of the Central European Tectonic Studies Group (CETEG'7), 13-16.05.2009, Pecs. Abstracts, p. 60.

Wojewoda, J., 2009c. 10th Czech-Polish Workshop On Recent Geodynamics of the Sudeten and Adjacent Areas. 5-7.11.2009, Szklarska Poręba, Poland.

Żelaźniewicz, A., & Aleksandrowski, P., 2008. Prz. Geol., 56: 904–911.