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Palaeogeography and Tectonic Evolution of the Žernov-Nachod-Kudowa Sedimentary Area

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Location and geological framework

The Nachod Basin (NB) has a diamond shape with its corners marked by Červený Kostelec, Ždárek, Lewin Kłodzki and Nachod (Fig. 1). It constitutes the eastern part of the Trutnov-Nachod Basin (*sensu* Holub 1975, Martinek *et al.* 2002 & 2006) or more extensively a part of the Krkonoše Piedmot Basin (podkrkonošská pánev, *sensu* Holub & Tasler, 1974; Holub, 1976). The eastern part of the NB appears as an intramountain depression that is filled with Cretaceous sediments. In Polish scientific papers, it is referred to as the Kudowa Trough. The name derives from the German term Kreidescholle von Cudowa that was first used by Michael (1893) and later by other German geologists (e.g. Flegel, 1905; Rode, 1934). The western part of the NB also constitutes a tectonically lowered area that is mostly filled with Triassic and Cretaceous sediments (Žernov Trough). The central part of the NB forms both the geomorphic and structural elevation, built mostly of the Permian sediments, and it is referred to as the Radechova Elevation. The Permian sediments additionally fill two tectonic grabens – the Brzozowie and Lewin Kłodzki Grabens. The NB area is bordered by Poříčí-Hronov Fault Zone from the north, by Česká Skalice – Spalona fault system from the south and by Ždárek-Jakubowice-Zieleniec Fault from

the east. The western border of the NB constitutes an axis of a basement elevation where the thickness of Permian sediments is significantly reduced (cf. Fig. 2, Holub 1976).

South-Sudetic Basin Suite

The Mnichovo-Hradište Basin, Krkonoše Piedmot Basin, the Trutnov Basin, the Nachod Basin and the Nysa Kłodzka Graben compose all together a regional system of tectonically controlled depressions – the South-Sudetic Basin Suite (SSBS) – that is evidently related to WNW-ESE trending fault system. The dominant horizontal component of tectonic movement in the western segment of the SSBS (including Nachod Basin) is dextral, as documented by tectonic structures in Permo-Carboniferous sedimentary cover. Interestingly, the easternmost segment of the SSBS reflects sinistral sense of the horizontal component of tectonic transport along the same (!) tectonic fault planes or fault sets (cf. Wojewoda in Don & Wojewoda 2005). However, the latest kinematics is documented by structural features only in the Cretaceous cover. Such a contradiction is quite apparent. It can be explained either by progressive opening (from the west to the east of the SSBS) of individual basins between the late Carboniferous and the late Cretaceous to Neogene, or by consequent kin-

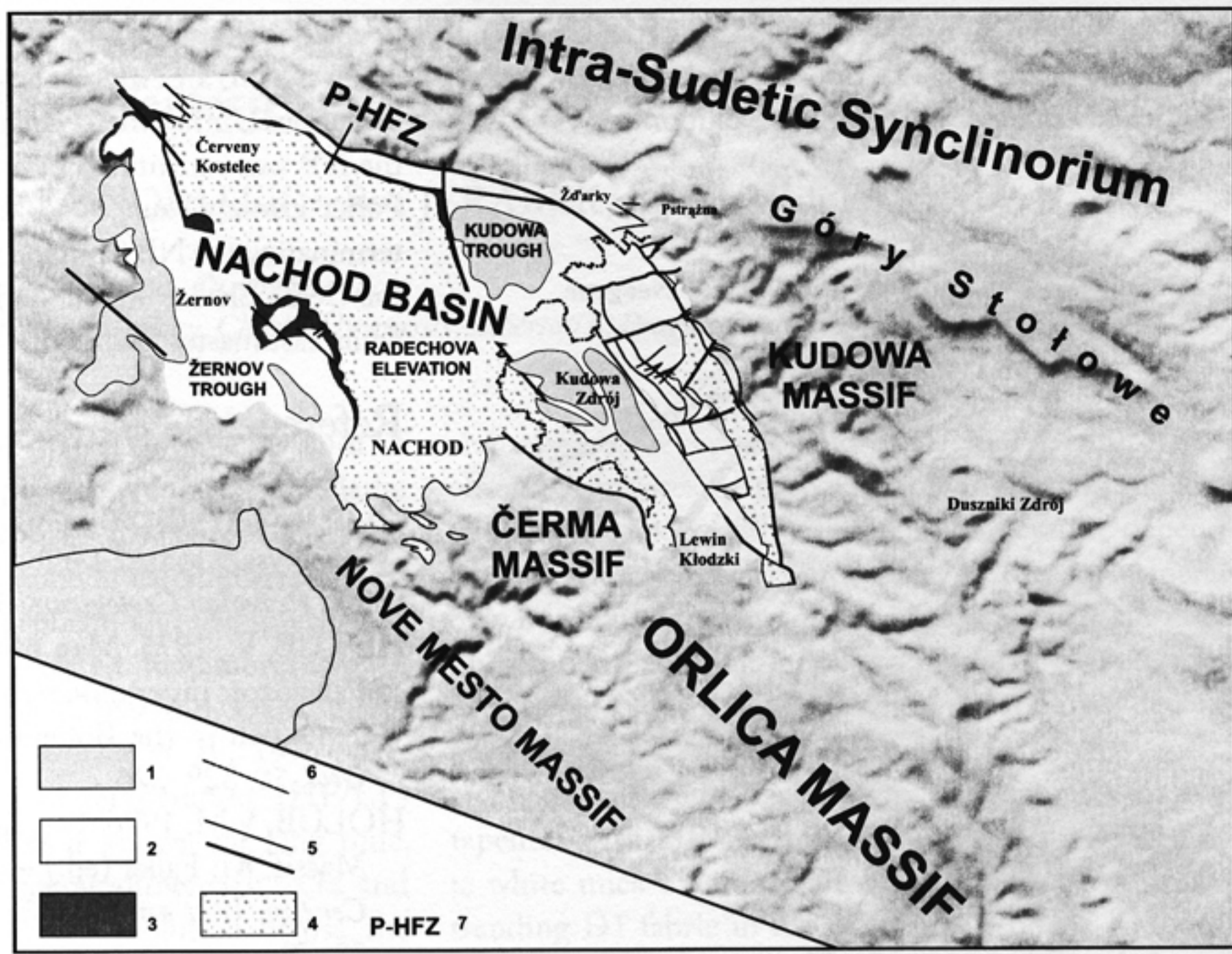


Fig. 1. Location scheme of the Nachod Basin
 1 – Neogene;
 2 – Upper Cretaceous
 3 – Upper Permian (Saxonian)
 4 – Upper Permian (Thuringian);
 5 – faults;
 6 – supposed faults;
 7 – Poříčí-Hronov Fault Zone

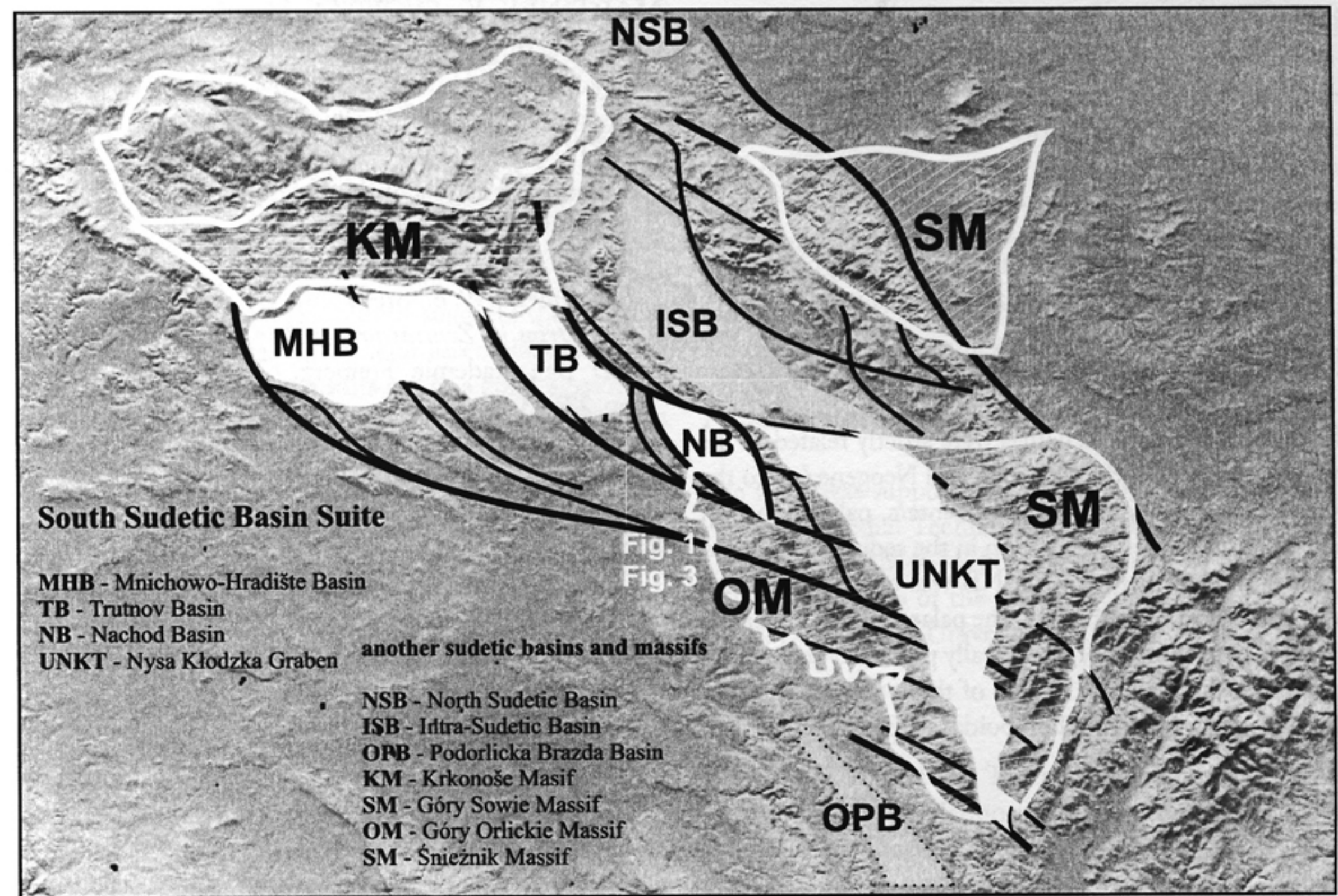


Fig. 2. Structural scheme of the Middle Sudetes (DEM SRTM 60 m)
 White planes – Saxonian-to-Neogene tectonic depressions which constitute the South Sudetic Basin Suite (SSBS).
 White counters – major sudetic crystalline massifs

ematic development of the whole SSBS in the Cretaceous and the Neogene (Fig. 2). Supposedly both above causes significantly influenced the SSBS evolution.

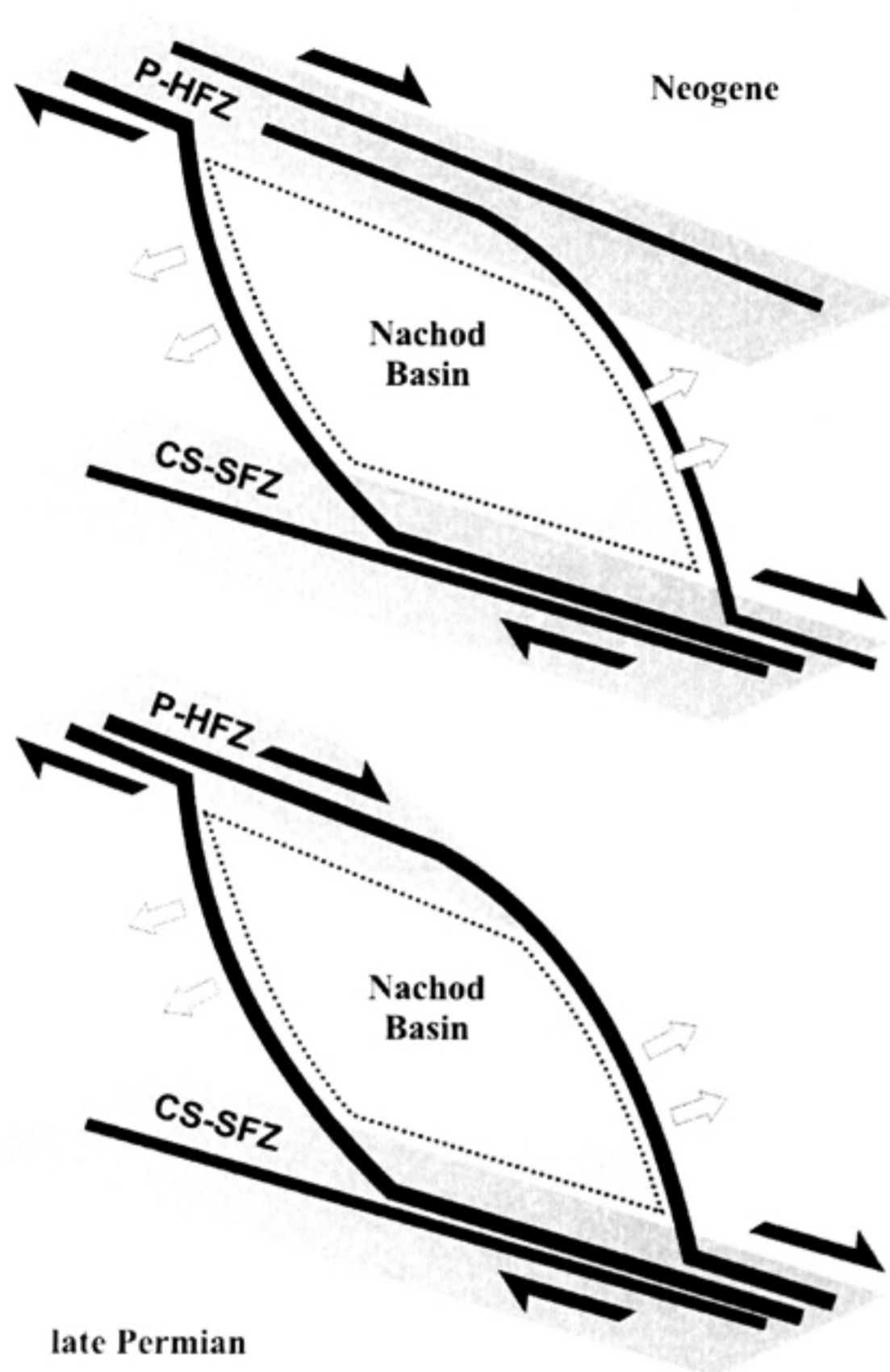


Fig. 3. Palaeogeographic-structural schemes of the Nachod Basin during late Permian and Neogene.

Palaeogeography of the Nachod Basin

The palaeogeographic schemes were strictly related to the NB borders only in the Saxonian and Neogene (up to the Recent), as documented by depocenters, palaeotransport directions and facies distribution in the sedimentary rocks. During the late Permian the NB was open towards the west and closed from the east. The palaeocurrent indicators are parallel to the axes of tectonically produced depressions (grabens, palaeovalleys?) and all of them are consequently directed westwards. The rhomboidal shape of the Permian

depositional centres and location of their thickness maxima in the NB area suggest a pull-apart scheme of the basin evolution. During the Permian, the eastern termination of the NB was constituted by a fault that continued into the Pořiči-Hronov Fault Zone. The latter was a strike slip zone terminating the NB from the north, which propagated into the Česká Skalice - Spalona Fault Zone. These branching faults cast master frames on the NB shape (Fig. 3).

References

- DON, J. & WOJEWODA, J. 2005. Tectonics of the Upper Nysa Kłodzka Graben: Contentious Issues – Reply. *Przegląd Geologiczny* 53, 212–221.
- HOLUB, V., 1975. Map of the thicknesses of the Late Palaeozoic inner molasses fillings of the Variscan orogenic belt in the Bohemian Massif. *Věstník Ústř. úst. Geol.* 50, 329–226.
- HOLUB, V.M. 1976. Permian Basins in the Bohemian Massif. M. Falke (ed.) – *The Continental Permian in Central, West and South Europe*. D. Reidel Publ. Co., 53–79.
- HOLUB, V.M., TÁSLER, R. 1974. Mladší paleozoikum a spodní trias v podloží české křídové pánve. M. Malkovsky (ed.) – *Geologie české křídové pánve a jejího podloží*. Ústřední ústav geologický, 72–99.
- MARTÍNEK, K., SVOJTKA, M., FILIP, J. 2006. Reconstructing Post-Carboniferous History of the Krkonoše Piedmont Basin Using Detrital Apatite Fission-Track Data. *Geolines* 20, 91–92.
- MARTÍNEK, K., ULICNÝ, D. & GRYGAR, R. 2002. Kinematic analysis of the Krkonoše Piedmont Basin, NE Bohemian Massif: sedimentary and deformation history from Upper Carboniferous to Eocene. W: Schneider, J.W. & Breitreuz, C. (ed.), „*Oberkarbon - Untertrias in Zentraleuropa: Prozesse und ihr Timing*“, TU Bergakademie Freiberg, Geologisches Institut, pp. 22–23.
- MICHAEL, R. 1893. Cenoman und Turon in der Gegend von Cudowa in Schlesien. *Zeitschrift der Deutschen Geologischen Gesellschaft* 45, 195–244.
- RODE, K. 1934. Die Tektonik der Scholle von Kudowa. *Geologische Rundschau* 25, 81–94. FLEGEL, K. 1904 b. Heuscheuer und Adersbach-Weckelsdorf. Eine Studie über die obere Kreide im böhmisch-schlesischen Gebirge. *Zur Geologie des böhmisch-schlesien Grenzgebirges*, pp. 123–158.