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SHORT NOTE

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Tournaisian age of granitoids from the Odra Fault Zone (southwestern Poland): equivalent of the Mid-German Crystalline High?

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Abstract The Odra Fault Zone of southwestern Poland is a NW-trending horst marked by gravimetric and magnetic anomalies and composed of high- to low-grade metamorphic and igneous rocks which are only known from boreholes. This zone embraces a concealed border between Variscan internides and externides. It also contains an array of several I-type, metaluminous to peraluminous, high potassic granitoid bodies which intruded earlier metamorphosed rocks. Except for one case, they remain unfoliated and undeformed, and presumably play a role of stitching plutons at the suture between two obliquely colliding terranes. U–Pb TIMS dating of single zircons from one foliated and one unfoliated granitoid samples yielded identical concordant ages of 344 ± 1 Ma (Tournaisian). They resemble a Pb–Pb age of 350 ± 5 Ma obtained for S-type granitoids from the Luckau area further west in Germany, which is generally regarded as an eastern segment of the Mid-German Crystalline High. Carboniferous granitic intrusions in the high are generally younger (340–290 Ma). Correlations of the the Odra Fault Zone with the Mid-German Crystalline High appear plausible, but by no means certain and require further confirmation.

Keywords Armorica · Saxothuringian Zone · Sudetes · Terrane · U–Pb dating · Wielkopolska · Zircon

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Introduction

The Odra Fault Zone is a c. 200 km long and up to 20 km wide basement horst which separates a crystalline internal domain of the Variscan orogen in the West Sudetes and the Fore-Sudetic Block from a foreland domain overstepped by Permian–Triassic strata of the Fore-Sudetic Monocline (Fig. 1). The horst, entirely concealed under Cenozoic deposits, contains mostly igneous and metamorphic rocks of significantly higher grade than the greenschist Kaczawa Complex to the SW (Jerzmański 1975, 1991; Cwojdziński and Żelaźniewicz 1995) and very low-grade metasiltstones containing Famennian conodonts (Chorowska 1982) immediately to the NE. Still further to the NE, two basement highs occur under the Permian cover. They are composed of low-grade siliceous slates metamorphosed at 340 ± 2.5 Ma and referred to as Wielkopolska Phyllite Zone (Żelaźniewicz et al. 2003). The Odra horst comprises amphibolite and greenschist facies metasediments pierced by unfoliated, with one exception, granitoids, and metabasites. An array of dispersed local magnetic anomalies created by the metabasites is suggested to link across the Elbe Fault Zone with strong, extensive magnetic/gravimetric anomalies which stretches continuously from NE Thuringia SW-ward to Rheinpfalz. Gravimetric highs are accompanied by lows produced by numerous orthogneisses and granitic bodies which occur in subsurface between the Rhine graben and the Elbe Fault Zone, and are exposed in Odenwald, Spessart, Ruhla, Kyffhäuser and Pretzsch-Prettin at the northern margin of the Saxothuringian Zone. They form a belt referred to as the Mid-German Crystalline High. It has been interpreted as a late Devonian–early

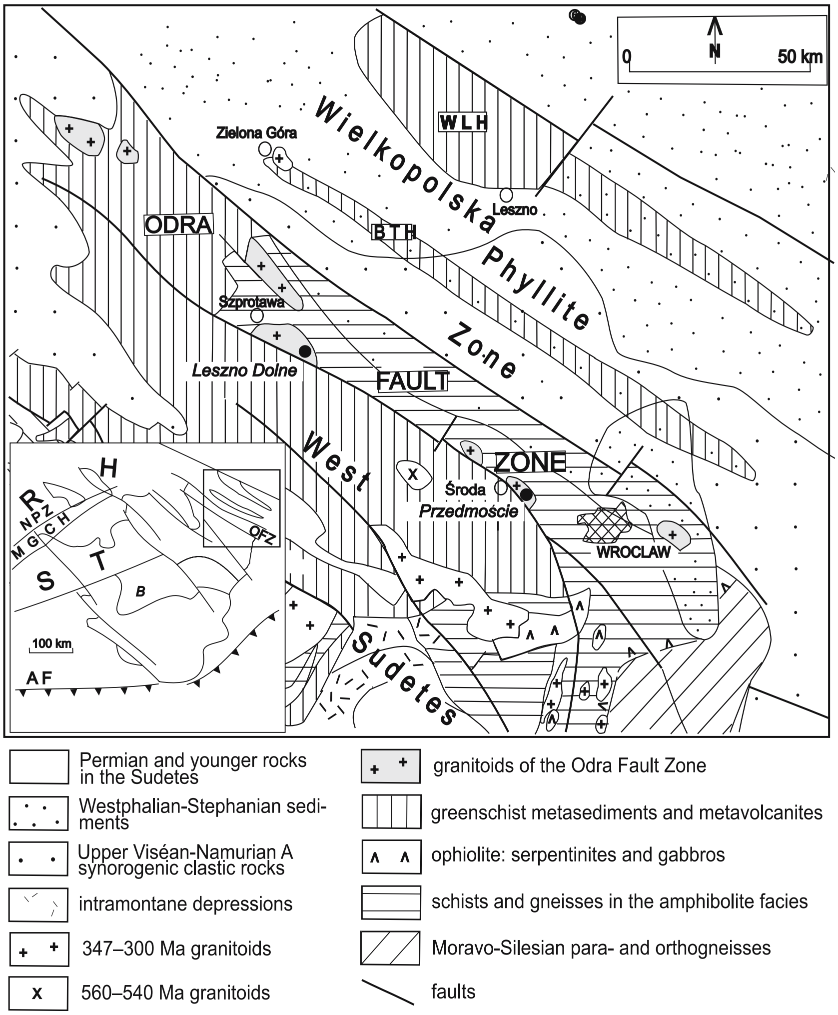

Fig. 1 Sketch map of the Odra Fault Zone and the adjacent units: the West Sudetes taken herewith together with the Fore-Sudetic Block, and the Wielkopolska Phyllite Zone underlying Carboniferous and Permian–Triassic strata of the Fore-Sudetic Monocline. Inset shows location in the Bohemian Massif. Sampled boreholes are shown by black dots. *AF* alpine front, *B* Teplá-Barrandien, *BTH* Bielawy-Trzebnica High, *MGCH* Mide-German Crystalline High, *NPZ* Northern Phyllite Zone, *OFZ* Odra Fault Zone, *RH* Rhenohercynian Zone, *ST* Saxothuringian Zone, *WLH* Wolsztyn-Leszno High

Carboniferous magmatic arc formed by the SE-ward subduction of the Rhenohercynian oceanic crust and the Avalonian foreland under the Saxothuringian microplate (e.g., Oncken et al. 2000; Franke 2000). However, the Mid-German High is recently revealed as a complex polygenic feature, which besides unfoliated Viséan to lowermost Permian granites also comprises Silurian to early Devonian metagranitoids of ca. 430–380 Ma protolith ages (e.g., Reischmann and Anthes 1996; Zeh et al. 2000; summary in Franke 2000) and ca. 357 ± 6 Ma eclogites (Scherer et al. 2002). These are interpreted as remnants of not one but two different magmatic arcs which were stacked together when the Rhenohercynian Ocean was closed in early Carboniferous time (Franke 2000). On maps showing a tectonic template of Europe, the high is considered by some authors to continue via Lausitz to the Odra Fault Zone in SW Poland (Ellenberger and Tamain 1980; Grocholski 1986; Bankwitz et al. 1999; Kopp and Bankwitz 2003). In order to test the suggested continuation and look for possible remnants of two arcs, we have dated two granitoid samples from boreholes within the Odra horst with the U–Pb method on zircon.

Description of samples

The Odra horst comprises hornblende-bearing granodiorites and monzogranites, minor granites, tonalities, and quartz diorites (Oberc-Dziedzic et al. 1999). One zircon sample comes from an unfoliated granodiorite of the Szprotawa area, the other from a foliated granitoid of the Środa Śląska area (Fig. 1). The Szprotawa granitoids were sampled in borehole 2/II Leszno Dolne (261.2–300.0 m), 8 km SE of Szprotawa (Fig. 1). It is a dark gray, fine- to medium-grained, unfoliated and undeformed hornblende-bearing granodiorite, with idiomorphic andesite and poikilitic poorly perthitic microcline phenocrysts (3–10 mm). The Środa Śląska granitoids were sampled in borehole 4/VI Przedmoście (211.5–300.8 m), 4 km NE of Środa Śląska (Fig. 1). This is a hornblende-bearing quartz monzonite with magmatic foliation expressed by a subparallel arrangement of amphibole and feldspar crystals (up to 3 cm large). The primary flow fabric is overprinted by some very narrow mylonitic shear zones (0.5–5 mm thick), both giving a gneissic appearance to the rock. A chemical

Table 1 Chemical composition of the Przedmoście and Leszno Dolne granitoids (XRF analyses in the Central Chemical Laboratory of the Polish Geological Institute, Warsaw, Philips PW 2400 spectrometer)

	Przedmoście	Leszno D
SiO_2	62.35	59.53
TiO_2	0.83	1.22
Al_2O_3	15.62	16.03
Fe_2O_3	7.04	7.39
MnO	0.118	0.136
MgO	5.49	7.45
CaO	5.45	5.47
Na_2O	3.15	2.73
K_2O	4.53	4.17
P_2O_5	0.42	0.362
As	41	132
Ba	1,590	1,044
Bi	3	3
Ce	67	80
Co	18	32
Cr	231	390
Cu	25	32
Ga	18	10
Hf	3	6
La	39	46
Mo	34	4
Nb	15	15
Ni	41	132
Pb	18	28
Rb	175	160
Sr	452	463
Th	14	18
U	5	6
V	152	159
Y	26	24
Zn	78	88
Zr	186	239

composition of the dated granitoids is shown in Table 1. More detailed petrographic description of the Odra granitoids is provided by Oberc-Dziedzic et al. (1999), who also discuss their geochemistry. They are I-type, metaluminous to peraluminous, high-potassic rocks with intermediate A/CNK ratio, which fall into the VAG field on the Y + Nb versus Rb plot (Oberc-Dziedzic et al. 1999) in a way compatible with post-collisional granites (cf. Pearce et al. 1984).

The sampled zircons from the Przedmoście monzonite are mainly colorless, euhedral crystals (S_{12}–S_{22} subtypes of Pupin 1980), with rather simple pattern of oscillatory zoning typical of magmatic rocks. Some grains have older cores and thick zoned igneous rims (Fig. 2a, b). The zircons of the Leszno Dolne sample are mainly light brown and clear (S_8–S_9 subtypes), occasionally with fluid inclusions. In contrast to Przedmoście, some of the typical oscillatory structured grains have thin unzoned, luminescent rims (Fig. 2c, d), which may suggest different source and/or more complex magmatic evolution of the Leszno Dolne granodiorite.

Analytical methods

Samples were crushed and milled in the laboratory of Instytut Nauk Geologicznych, Uniwersytet Wrocławski. Minerals were separated using standard techniques; final zircon fractions were hand picked from density fraction $d > 3.0$ g/cm^3. Chemical decomposition of the zircons, ion exchange separation of U and Pb, and mass spectrometric measurements were performed in the isotope laboratory of Institut für Geowissenschaften und Lithosphärenforschung, Universität Giessen. The air abrasion technique of Krogh (1982) was used to minimize the effect of secondary Pb loss. Ion exchange separation of U and Pb was carried out following a scaled-down modified version of the Krogh (1973) method. Isotopic ratios were determined using a Finnigan MAT 261 multicollector solid-source mass spectrometer in a static mode. The ^{204}Pb was measured

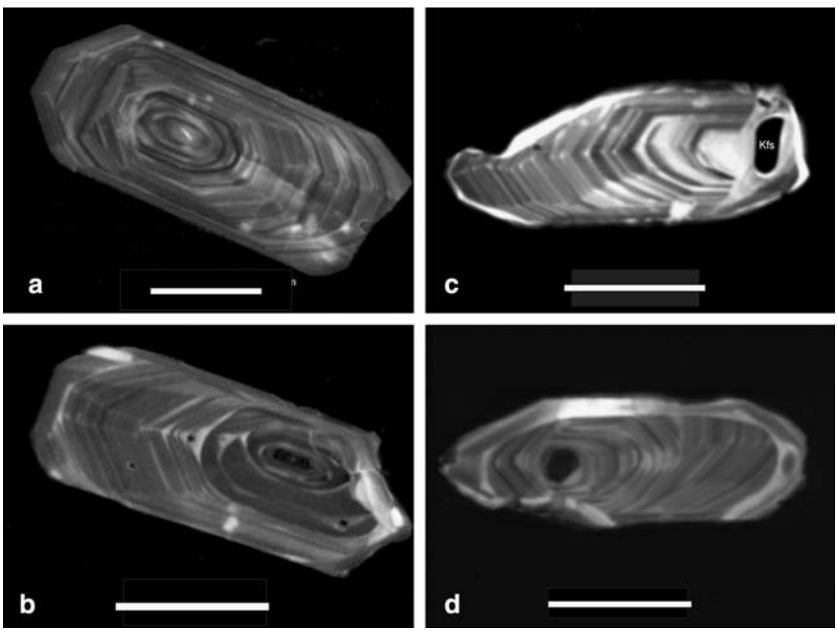

Fig. 2 Examples of CL images of zircons from the Przedmoście monzonite (**a, b**) and the Leszno Dolne granodiorite (**c, d**). *Scale bar* is 100 μm long

simultaneously with a previously calibrated axial secondary electron multiplier in ion counting mode. All the isotopic ratios were corrected for mass fractionation, total procedure blank, and initial lead composition. The isotopic ratio of the initial lead was taken from Stacey and Kramers (1975) for a model lead with an age of 340 Ma. The calculation and correlation of errors for the $^{207}Pb/^{235}U$ and $^{206}Pb/^{238}U$ ratios were carried out after Ludwig (1980). Ages were calculated using the decay constants of Steiger and Jäger (1977), and Jaffey et al. (1971).

Results

Eight single zircons from the Leszno Dolne granodiorite were analyzed: four abraded and four nonabraded. Most of them plot close to each other (Fig. 3a) and form a cluster-type distribution indicating discordance due to the combined Pb inheritance and Pb loss. The zircons 3 and 4 are not shown because they are highly discordant. The zircons have moderate content of uranium, ranging from 336.8 to 686.7 ppm (Table 2). The amount of the

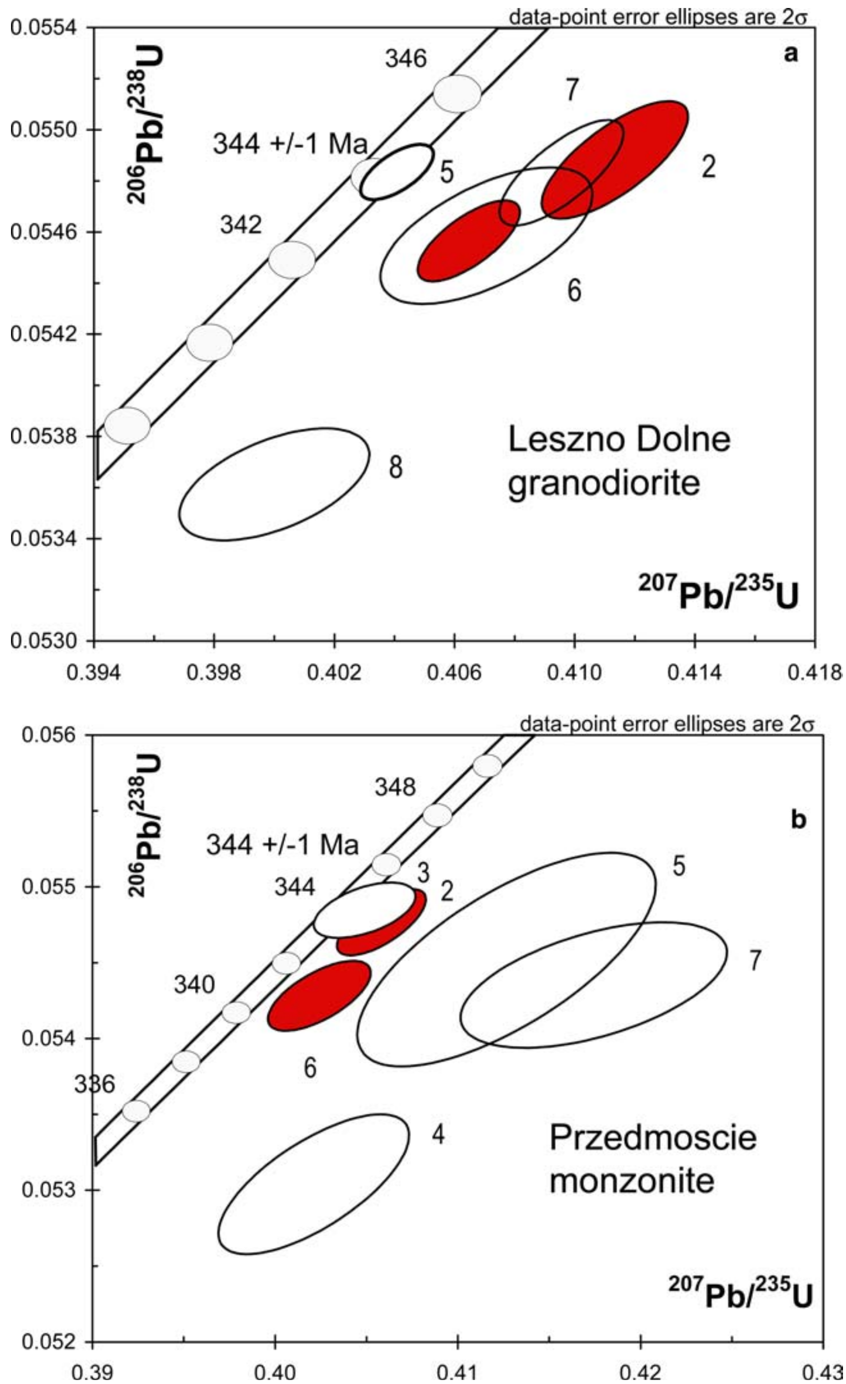

Fig. 3 Concordia plots showing distribution of single grain analyses of zircons from the Leszno Dolne granodiorite (**a**) and the Przedmoście quartz monzonite (**b**)

Table 2 Results of U–Pb isotopic-dilution TIMS analyses of single zircons from the Odra Fault Zone granitoids

Sample	Weight (μg)	Concentration (ppm)			Corrected $^{206}Pb/^{204}Pb$ ratio[1]	Calculated atomic ratios			Cor. R5/R8	Apparent ages (Ma)		
		U	Pb			$^{206}Pb/^{238}U$	$^{207}Pb/^{235}U$	$^{207}Pb/^{206}Pb$		$^{206}Pb/^{238}U$	$^{207}Pb/^{235}U$	$^{207}Pb/^{206}Pb$
			Radiogenic	Initial								
Leszno Dolne												
1 n. abr	38	369.9	20.4	0.8	1,550	0.05456 ± 13	0.4064 ± 14	0.05403 ± 13	0.71	342 ± 1	346 ± 1	372 ± 6
2 n. abr	20	434.5	24.2	0.4	3,876	0.05488 ± 19	0.4113 ± 20	0.05436 ± 18	0.74	344 ± 1	350 ± 2	386 ± 7
3 n. abr	< 10	422.2	23.0	2.4	602	0.05169 ± 37	0.3904 ± 46	0.05477 ± 49	0.64	325 ± 2	335 ± 4	403 ± 20
4 n. abr	< 10	363.8	19.9	1.9	608	0.04966 ± 42	0.3729 ± 48	0.05446 ± 50	0.70	312 ± 3	322 ± 4	390 ± 4
5 abr.	65	447.0	24.7	0.1	21,587	0.05483 ± 09	0.4040 ± 10	0.05344 ± 10	0.65	344 ± 1	345 ± 1	347 ± 4
6 abr.	23	336.8	18.6	0.2	5,453	0.05458 ± 22	0.4070 ± 29	0.05408 ± 31	0.60	343 ± 1	347 ± 2	374 ± 13
7 abr.	20	489.8	27.2	1.4	1,260	0.05483 ± 17	0.4095 ± 17	0.05416 ± 15	0.75	344 ± 1	349 ± 2	378 ± 6
8 abr.	17	686.7	37.1	1.1	2155	0.05360 ± 18	0.3999 ± 26	0.05411 ± 30	0.53	337 ± 1	342 ± 2	376 ± 13
Przedmoście												
1 n. abr.	17	1,448.5	72.6	4.7	983	0.05018 ± 08	0.3760 ± 11	0.05434 ± 13	0.60	316 ± 1	324 ± 1	385 ± 5
2 abr.	< 10	934.0	50.9	1.2	2,760	0.05476 ± 18	0.4057 ± 20	0.05372 ± 19	0.69	344 ± 1	346 ± 2	360 ± 8
3 abr.	< 10	1,127.6	61.4	1.1	3,631	0.05484 ± 15	0.4048 ± 23	0.05354 ± 23	0.51	344 ± 1	345 ± 2	352 ± 11
4 abr.	11	432.1	23.1	2.1	717	0.05302 ± 38	0.4020 ± 43	0.05499 ± 42	0.70	333 ± 2	343 ± 4	412 ± 17
5 abr.	< 10	265.1	14.5	1.7	557	0.05451 ± 58	0.4126 ± 67	0.05490 ± 64	0.70	342 ± 4	351 ± 6	407 ± 26
6 n. abr.	49	181.2	9.8	0.5	1,409	0.05427 ± 19	0.4023 ± 23	0.05376 ± 23	0.66	341 ± 1	343 ± 2	361 ± 10
7 abr.	< 10	433.3	23.8	4.2	368	0.05434 ± 34	0.4174 ± 60	0.05571 ± 70	0.52	341 ± 2	354 ± 5	441 ± 27

[1]Corrected for mass fractionation, spike and blank. Errors are quoted at two sigma level. *Cor. R5/R8* correlation coefficient of $^{207}Pb/^{235}U$ to $^{206}Pb/^{238}U$ errors, *abr.* abraded, *n. abr.* not abraded

radiogenic lead ranges from 199 to 1,605 pg, whereas the initial lead contents vary between 4.6 and 30 pg. The largest zircon (65 μg) yields a concordant age of 344 ± 1 Ma. This is interpreted as the age of the protolith. The correction for the common lead in the concordant zircon is very low compared with that for the other grains and permits to calculate the precise age (Table 2).

Seven single zircons from the Przedmoście monzonite were analyzed: five abraded and two nonabraded. The uranium contents of zircons cover a wide range from 181.2 to 1,448.5 ppm. The highly discordant zircon 1 is not shown. The concordant age 344 ± 1 Ma of zircon 3 (Table 2) is interpreted as the age of the granite protolith. The three analyses with large errors, plotting to the right of zircon 3, are influenced by the common lead correction and/or Pb loss.

The mean $^{206}Pb/^{238}U$ age of ten concordant and subconcordant analyses of both samples is 343.50 + 0.50/−2.5 Ma (97.9% conf.).

Discussion

In the time scales of McKerrow and van Staal (2000) and of Menning et al. (2000), our new U–Pb ages of 344 ± 1 Ma from the Odra granitoids fall into the Tournaisian. They are by some 5 to 40–50 Ma older than granitoids in the Mid-German Crystalline High proper. In Odenwald, the ca. 360 Ma HP/HT metamorphism was followed by the LP/HT event associated with voluminous arc-type subduction-related granite intrusions at 337–336 Ma (Schubert et al. 2001). In the Ruhla crystalline complex, Pb–Pb zircon data indicate that similar granites intruded 337 ± 4 Ma and later zonally underwent ductile shearing, whereas granites dated at ca. 312–288 Ma were only weakly deformed (Zeh et al. 2000). In Kyffhäuser, there are granites dated at ca. 340–324 Ma with Pb–Pb method on zircon and U–Pb method on monazite (Zeh 2003). These data suggest rather protracted magmatic evolution of the Mid-German High which probably embraces various genetic groups of granites, changing with time from arc magmas to postcollisional intrusives (Finger et al. 1997). Our new datings of the Odra Zone granitoids indicate that their intrusive emplacement was localized in time close to the Tournaisian/Viséan turn.

Similar timing was determined by the Rb–Sr method for the unfoliated Strzelin granites in the Fore-Sudetic Block (Oberc-Dziedzic et al. 1996), which are geochemically most similar to the Odra granitoids (Oberc-Dziedzic et al. 1999). In general, the petrographical and geochemical characteristics of the Odra granitoids correspond with late- to post-orogenic granitoids in the West Sudetes and the Fore-Sudetic Block (Oberc-Dziedzic et al. 1999) that represent part of the Saxothuringian belt (Franke and Żelaźniewicz 2000). In the West Sudetes, granitoids of Carboniferous age are I-type granites derived from relatively primitive magmas with low Sr^{87}/Sr^{86} (0.7053–0.7098) initial ratios which contrast with Cambro-Ordovician, S-type (meta) granites ubiquitous in this region (Kennan et al. 1999). Their Rb–Sr whole rock isochron ages range from 347 to 300 Ma (review in Puziewicz and Oberc-Dziedzic 1995; Oberc-Dziedzic et al. 1999). However, most granitoids in the Saxothuringian belt of eastern Germany and western Poland (the Mid-German Crystalline High exclusive) have zircon ages younger than 330 Ma (for review, see Franke and Żelaźniewicz 2000).

The ca. 15–35 Ma older U–Pb zircon ages of the Odra Zone granitoids resemble Pb–Pb data for the S-type biotite-hornblende granitoids from boreholes of Luckau and Luckenwalde in Germany, occurring further west (some 50 km west of Guben) within the suggested concealed eastern continuation of the Mid-German Crystalline High (Ellenberger and Tamain 1980; Grocholski 1986; Bankwitz et al. 1999). Two zircon samples from these granitoids yielded single grain evaporation ages of 350 ± 5 and 337 ± 8 Ma, respectively (Kopp et al. 1998, 1999). The Luckau quartz diorite to tonalite, with gently to moderately dipping magmatic foliation, is mesoscopically akin to the Przedmoście quartz monzonite, although a mylonitic–cataclastic overprint (up to pseudotachylite) is much stronger in the former. Granitoids of similar age of 344–343 Ma were also drilled near Stolzenhein in Lausitz and within the Pretzsch-Prettin igneous complex at the Elbe Fault Zone, whereas to the SW of this zone such 'old' granites are absent (Kopp et al. 2002).

The suggested eastern prolongation of the Mid-German Crystalline High to the east of the Elbe River is entirely concealed under younger deposits and defined only by an array of small magnetic and gravimetric anomalies spread along the northern margin of the Saxothuringian Belt. In Germany, lower grade rocks occurring on the northern and southern flanks of the high are referred to as the Northern Phyllite Zone and the Southern Phyllite Zone, respectively. In Poland, a counterpart of the latter zone would occur in the Kaczawa Complex bordering the Odra horst to the SW. Based on lithostratigraphic and lithotectonic correlations, the Kaczawa Complex is usually regarded as a part of the Saxothuringian Belt (e.g., Franke and Żelaźniewicz 2000, 2002); an alternative proposition to link it with the Northern Phyllite Zone (Aleksandrowski 1995), which represents Rhenohercynian passive margin succession, is not substantiated by such correlations. Our correlation would be consistent with the classical concept of Kossmat (1927) if (1) Famennian meta-cherts (Chorowska 1982) drilled immediately NE of the Odra Zone (boreholes: Klępinka IG-1, Jelenin IG-1) might be compared with late Devonian cherts and shales of the Gießen-Harz Allochthon of the Rhenohercynian Belt to the NW of the Mid-German Crystalline High (e.g., Franke 2000) and (2) sercite–quartz phyllites of the Wielkopolska Phyllite Zone might be taken as an equivalent of the Northern Phyllite Zone of this belt. The phyllites from the Wolsztyn-Leszno High in

Wielkopolska were deformed and metamorphosed under greenschist facies conditions, with D2 event dated by Ar–Ar method on white mica at ca. 340 Ma (Żelaźniewicz et al. 2003). From the Wippra segment of the Northern Phyllite Zone (Harz Mts.), Ahrendt et al. (1996) reported K–Ar ages of the fraction <2 μm ranging between 360 and 320 Ma, with ages around 340 Ma dominating in the central part. However, the Wippra Zone represents the Rhenohercynian foreland, whereas the Wolsztyn-Leszno phyllites belong rather to the overriding upper plate (Żelaźniewicz et al. 2003). The c. 15–30 km wide Northern Phyllite Zone was deformed and metamorphosed through high-P stage close to the suture of the two terranes, with Lower Carboniferous flysch developing in front of the belt. In contrast, the Wielkopolska phyllites (of possibly Devonian protolith age) form a ca. 60–70 km wide belt which is overlain by the flysch and does not bear evidence of ever having been subducted and subjected to P-dominated metamorphism.

Although it is a plausible option, correlation of the Odra horst with the Mid-German Crystalline High is by no means certain. U–Pb ages of 350–430 Ma are also known from granitoids that intruded along the western and southern margins of the Teplá-Barrandian block (Holub et al. 1997; Dörr et al. 1997). The Mid-German Crystalline High is not only characterized by Early Carboniferous I-type magmatism, but also by remnants of an older (Siluro-Devonian) arc (summary in Franke 2000), which has not been detected so far in the Odra Fault Zone, and neither the presence of the Early Carboniferous nor the Silurian-Early Devonian magmatic arc suite and eclogites is confirmed there. Besides, detrital minerals in the Devonian and Carboniferous flysch sediments derived from the Crystalline High contain detrital minerals indicative of blueschist metamorphism (Ganssloser et al. 1996) and K–Ar white mica ages of ca. 380 Ma (Neuroth 1997; Huckriede et al. 2004). Similar evidence of the pre-Carboniferous events still awaits detection in the Variscan flysch in Poland.

Our isotopic data for mostly unfoliated ca. 344 Ma granitoids in the Odra Fault Zone show that tectono-metamorphic history of rocks in this zone was essentially completed during the Tournaisian. In the adjacent units to the SW and to the NE of it, deformation, metamorphism, and sedimentation still went on and the processes were apparently bilaterally polarized away from the Odra Zone. This is shown by the repeatedly reported S-ward vergence of post D1 structures in the whole Kaczawa unit (Schwarzbach 1939; Teisseyre 1963; Oberc 1991; Seston et al. 2000), by the inferred N/NE-ward vergence of D2 structures of 340 Ma age in the Wielkopolska unit (Żelaźniewicz et al. 2003), and also by late- to post-kinematic contact overprint (andalusite-cordierite hornfelses) exerted by the Leszno Dolne granitoids on the adjacent graptolite-bearing Silurian metapelites of the Kaczawa Complex, which had earlier undergone regional metamorphism under the greenschist facies conditions (Jerzmański 1975; Oberc-Dziedzic et al. 1999). The greenschist metamorphism next to the Odra zone that took place before 344 Ma implies remarkable complexity and diachroneity in the evolution of the western Kaczawa unit because in its present SW parts marine sedimentation continued into the Viséan (Chorowska 1978), and lower Carboniferous flysch with high-pressure olistoliths (Wajsprych and Achramowicz 2003) was thrust over the Neoproterozoic Lausitz foreland (Linnemann and Buschmann 1995). Alternatively, two different rock successions may be postulated there (Aleksandrowski and Mazur 2002). Whatever details of the evolution of the western Kaczawa unit were, the Odra Fault Zone, as compared to its neighbors, forms a median structure between the Saxothuringian units of the West Sudetes and the Wielkopolska Phyllite Unit. The Odra zone appears as a deeper crustal element accompanied by magnetic and gravimetric anomalies, composed of relatively older and higher grade metamorphosed rocks with characteristically subvertical foliation due to oblique-compressive deformation. These features are consistent with the view explaining the Odra Fault Zone as a collisional transpressive suture between the Saxothuringia and Wielkopolska terranes (Żelaźniewicz et al. 2003), both being members of the Armorican Terrane Assemblage (Tait et al. 1997). The Sudetic section of the Saxothuringian Terrane probably collided earlier with its Wielkopolska foreland than the Thuringian section with its Rhenohercynian foreland.

The array of the granitoid bodies along the Odra Fault Zone would illustrate a stitching role of the late/post-kinematic I-type granitic magmatism along this Tournaisian suture. Any further ductile deformation increments on this zone might only be of minor and/or local significance because the granitoids are generally undeformed. Large-scale tectonic interpretations which follow Arthaud and Matte (1977) and assume the importance of the Odra Zone during Visean to Permian continental dextral strike-slip shearing in the Variscan belt need to reduce its supposed role in post-Tournaisian times.

Conclusions

- Remnants of Silurian-early Devonian magmatic arc characteristic for the Mid-German Crystalline High have not (so far?) been detected in the Odra Fault Zone.
- Continuation of the Mid-German Crystalline High to the Odra Fault Zone remains plausible but has not been proved by U–Pb dating.
- Emplacement of presumably stitching granitoids in the Odra Fault Zone was constrained to a narrow time interval around 344 Ma, which preceded almost all granitic intrusions in the Mid-German Crystalline High.

– Differences can be explained if the Sudetic section of the Saxothuringian Terrane accomplished oblique collision with its Wielkopolska foreland earlier than the Thuringian section collided with its Rhenohercynian foreland.
– Large-scale tectonic interpretations assuming the importance of continental dextral strike-slip shearing parallel to the Trans-European Suture Zone during the Visean to Permian need to reduce the role of the Odra Fault Zone in post-Tournaisian times.

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