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PETROGENESIS OF TWO-MICA GRANITES OF THE ŠÉVÉTINMASSIF

by

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Abstract
The two-mica granites of the Ševětin massif are an integral part of the Late Carboniferous magmatic activity in the Ševětín area, but probable with no relation to the evolution of the biotite granodiorites, which represent the main magmatic phase of this massif. They are highly peraluminous granites with low content of Zr (28–60 ppm), Th (1.9–6.7 ppm) and ΣREE (ca. 50 ppm) compared to the two-mica granites of the Eisgarn type. The two-mica granites of the Ševětín massif originated by dehydration melting of muscovite in pT conditions of nearly granite-melt solidus.

Introduction
The Ševětín massif represents a NNE–SSW-elongated linear intrusion emplaced along a regional sinistral shear zone, one of the regional shear zones limiting the Blanice Graben. The Ševětín massif is usually assigned to the Moldanubian (South Bohemian) Batholith. The Ševětín massif comprises biotite granodiorite to granite of the Ševětín type as well as two-mica granites of the Deštná subtype (RENÉ et al., 1999), which form the southeastern and eastern parts of the massif. Biotite granodiorite to granite of the Ševětín type was studied by AMBROŽ (1935), MATĖJKA (1991a, b), RENÉ et al. (1999) and JANOUŠEK et al. (2002). The two-mica granites of this granitic massif were investigated by MATĖJKA (1991a, b) and NOSEK (1999). Results of geological mapping (SUK et al., 1978) support the idea that the granitic rocks of the Ševėtín massif are a marginal facies of two-mica granites of Eisgarn type of the Moldanubian Batholith. The objectives of the present paper are to describe geological setting and mineralogical and chemical composition of the two-mica granites of the Ševětín massif and to discuss their relationship with the two-mica granites of the near Klenov massif (Deštná subtype, RENÉ et al., 1999) as well as the two-mica granites of the eastern margin of the main body of the Moldanubian Batholith (Lásenice subtype, BREITER & KOLLER, 1999) (Fig. 1). This study was produced within two scientific projects supported by the Grant Agency of the Czech Republic (Project No. 205/97/0514) and Czech-Austrian agency AKTION (Project KONTAKT 12/1999).

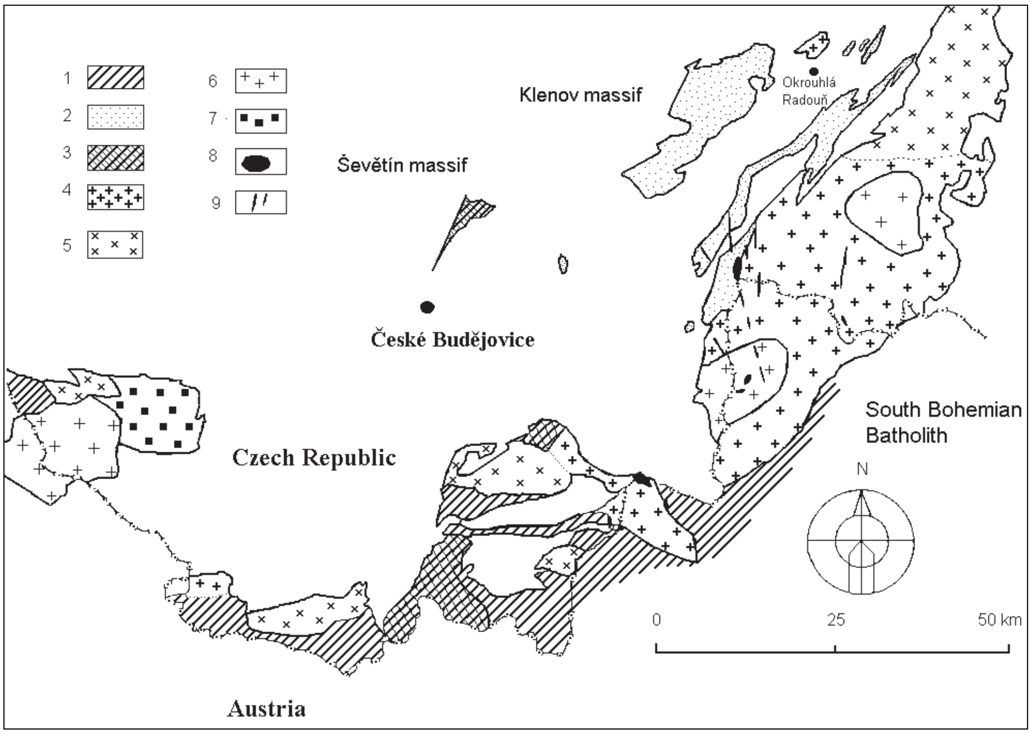

Fig. 1

Schematic distribution of the individual types of granitic rocks in the Czech part of the Moldanubian Batholith. After BREITER & SOKOL (1997), revised by René.

1 – granite of the Weinsberg type, 2 – granite of the Lásenice and Deštná subtype,

3 – granodiorite of the Freistadt and Mauthausen type, 4 – granite of the Číměř subtype,

5 – granite of the Mrákotín subtype, 6 – granite of the Zvule (Landštejn) subtype,

7 – durbachites, 8 – granite of the Homolka type, 9 – dykes of granite porphyries.

Geological setting of the Ševětín massif

The Ševětín massif is exposed as a large, partly linear-elongated magmatic body in the wider surroundings of the village of Ševětín, north of the town of České Budějovice. It follows the NNE–SSW-striking Drahotěšice shear zone, which is partly filled by vein quartz (Fig. 2). A system of the Drahotěšice and Kaplice (Rodl) shear zones also forms the Late Carboniferous - Early Permian pull-apart Lhotice Basin on the southeastern margin of the Ševětín massif. Granitic rocks of the Ševětín massif are partly covered also by Cretaceous and Tertiary deposits of the České Budějovice Basin. The thick cover of these younger platform sediments and the occurrence of two-mica granites in the eastern and southeastern part of the Ševětín massif made the authors of the geological map at scale 1 : 25.000 (SUK et al., 1978) suggest a gradual transition between the Ševětín and the Klenov massifs. Geological mappings at the scale 1 : 200.000 based on evaluation of all boreholes that reached the basement of platform sediments (ZEMAN et al., 1987) argue, on the other hand, for a separation of both magmatic bodies by a wider belt of sillimanite-biotite paragneisses and migmatites of the Moldanubian Zone.

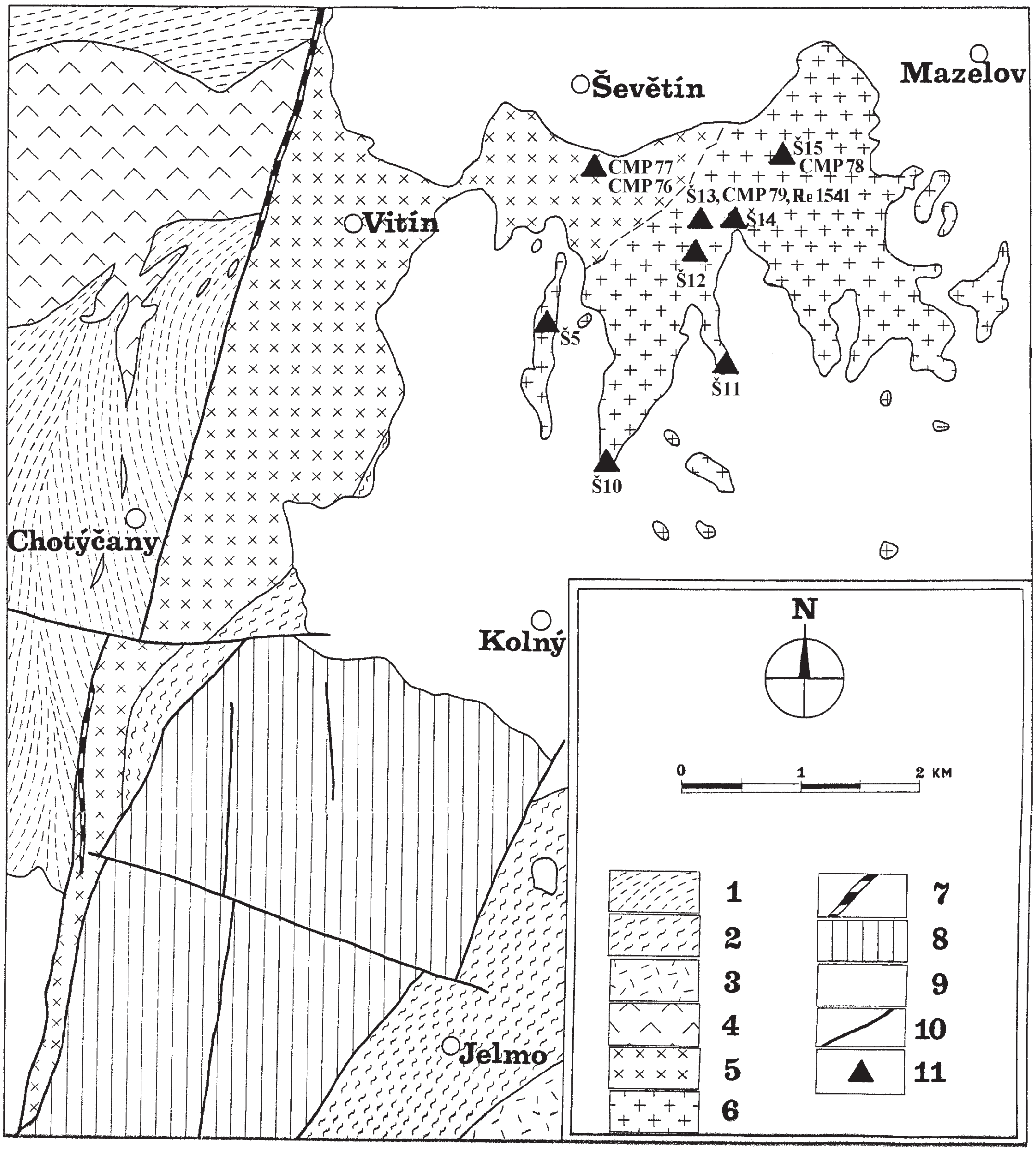

Fig. 2
Geological sketch map of the Ševětín massif with positions of sampling sites (after SUK et al., 1978), revised by authors.
1 – biotite and sillimanite-biotite paragneisses of the Moldanubian Zone,
2 – migmatitized biotite paragneisses to migmatites, locally cordierite-bearing,
3 – granulites, 4 – muscovite-biotite orthogneisses, 5 – biotite granodiorites of the Ševětín type,
6 – two-mica granites of the Deštná subtype, 7 – quartz veins,
8 – Permo-Carboniferous sediments, 9 – Cretaceous sediments,
10 – faults, 11 – sampling sites.

As for the mutual relation of the biotite granodiorites to granites of the Ševětín type and two-mica granites within the Ševětín massif itself, their boundaries are sharp (DUDEK, 1967; SUK et al., 1978) even though their relative age is hard to determine. DUDEK (1967) and SUK et al. (1978) considered the biotite granodiorites to granites of the Ševětín type to be a marginal facies of the two-mica Eisgarn-type granites. KODYM (1954), on the other hand, ranked it within the Freistadt-type granodiorite. Radiometric ages of the two granite types are unknown. Granitic rocks of the Ševětín massif are accompanied by dyke rocks, such as lamprophyres (AMBROŽ, 1935) as well as granodiorite porphyries (VRÁNA et al., 1993; KOŠLER et al., 2001). Dating of the emplacement of the Ševětín massif is restricted only to the cooling age of the granodiorite porphyry (Ar/Ar, hornblende – 270 ± 2 Ma, KOŠLER et al., 2001) and dating of shear motions on the Rodl shear zone (Ar/Ar, muscovite – 281.3 ± 0.6 Ma, BRANDMAYR et al., 1995).
The age of the emplacement can also be derived from the age of the Late Carboniferous (Stephanian) cover of the Lhotice Basin. In boreholes of the Lhotice basin Late Carboniferous sandstones, arkoses and conglomerates directly overlying slightly chloritized or unaltered granodiorites of the Ševětín massif were found (DUDEK & PEŠEK, 1989; PEŠEK et al., 2001). The age of the oldest sediments of the Lhotice basin was determined from findings of various plant macrofosills and macrosporas typical for the Westphalian C (PEŠEK et al., 2001). The thickness of the Late Carboniferous-Early Permian cover was about 340–380 meters in this case. All these data give evidence about a very rapid exhumation of some parts of the Moldanubian Zone during the Late Carboniferous and/or Early Permian. On the other hand, the above mentioned dykes of granodiorite porphyries were emplaced in the area between the Ševětín and Klenov massifs in the same period and some shear zones were filled with uranium mineralization on the northeastern margin of the Klenov massif (U/Pb, uraninite - 255 ± 3 Ma, ANDERSON et al., 1989). The rate of exhumation during the Late Carboniterous in area of the Lhotice Basin can be estimated at about 8–10 mm/y (RENÉ, 2002). Hydrothermal activity that gave rise to 100 m thick quartz veins along the Drahotěšice shear zone was accompanied by a small occurrence of sulphidic mineralization of subeconomic importance near Vitín (URBAN, 1957). Small islets of the basement, also with two-mica granites, occur in the area between the Ševětín and Klenov massifs, otherwise covered by sediments of the České Budějovice and Třeboň basins (e.g., Záblatí, Horní Slověnice, Dunajovice). All these occurrences are ranked to the two-mica granites of the Klenov massif (DORNIČ et al., 1977).

Petrography

The Ševětín massif comprises both granodiorites to monzogranites of the Ševětín type and two-mica granites of the Deštná subtype. The Ševětín type granodiorites to granites are massive, fine- to coarse-grained rocks with disseminated small biotite aggregates. They consist of plagioclase, K-feldspar, quartz and biotite; accessory minerals are represented by muscovite, apatite and zircon; garnet was also mentioned by AMBROŽ (1935). KODYMOVÁ (1967) found also garnet, hornblende, monazite, xenotime, tourmaline and ilmenite in her study of accessory minerals from the Sevětín granodiorite. Some samples also contained staurolite, anatase, rhombic pyroxene, sphene and rutile. Two varieties of biotite granodiorites differing in their colour and grain size can be distinguished in the northeastern part of the Ševětín massif in the quarries near Ševětín. The light-coloured variety is a medium-grained, grey rock with biotite content of ca. 4 vol. %, the dark-coloured one is a fine-grained, dark grey rock with biotite content of 8–10 vol. %.

Mutual relationship of the two varieties is best visible in the main quarry at Ševětín where the dark variety forms blocks enclosed in the light-coloured one (see also JANOUŠEK et al., 2002). The two-mica granites of the Ševětín massif are fine- to medium-grained, also with disseminated small biotite aggregates. These small accumulations of biotite, which occur in both types of granitic rocks of the Ševětín massif probably represent relics of original metamorphic protolith of these granitoids. The two-mica granites consist of plagioclase, K-feldspar, biotite and muscovite. Characteristic component of these two-mica granites is cordierite which forms rounded grains up to 3 mm large. Cordierite is usually altered to pinite. Some samples also contain rare andalusite. Plagioclase is sometimes zoned with albite rims. The content of anorthite component is about 10–16 %. Accessory minerals are represented by apatite, zircon, monazite and rare tourmaline. The two-mica granites in the area between the Ševětín and Klenov massifs are medium-grained rocks, sometimes with phenocrysts of K-feldspars. The content of biotite in these granites is usually low (2–5 vol. %). Muscovite often forms orientated intergrowths with biotite. Typical component of these granites is also cordierite, which forms subhedral grains up to 1 mm large. The groundmass of these granites contains quartz, plagioclase (An_{12-25}), K-feldspar, muscovite, biotite and accessories (apatite, zircon, monazite, andalusite, tourmaline, ilmenite). Biotite has a remarkable pleochroism: it is light yellow-brown in the X direction and brown to dark red-brown in the Y and Z directions.

Analytical methods

Analyses of typical samples of biotite granodiorites and two-mica granites are shown in Table 1 and 2. For chemical analysis of rocks samples of 2–5 kg in weight were taken. The rocks were crushed in jawbreaker and agate ball mill. After each step of grinding, the samples were systematically reduced in quantity. Major elements and some trace elements (Rb, Ba, Sr, Zr, Nb) were determined by conventionally X-ray fluorescence spectrometry on the Philips PW-1400 spectrometer (University of Salzburg, Austria, analyst F. Schitter). Major elements were analysed on fused glass discs, for analysis of trace elements pressed rock powder pellets were used. FeO content was determined by titrimetric method (IRSM AS CR, analyst V. Chalupský). U and Th were determined by gamma-ray spectrometry using the NT-512 multi-channel gamma-ray spectrometer (Geofyzika Brno, analyst M. Škovierová). REE contents were determined by ICP-MS (Charles University Prague, Plasma Quad 3 ICP mass spectrometer, analyst M. Mihaljevič̌; Activation Laboratories Ltd., Ancaster, Canada, Perkin Elmer Sciex ELAN 6100 ICP mass spectrometer, analyst D´Anna). The solutions of rock samples for ICP MS analyses were prepared from lithium metaborate/tetraborate fusions. All analyses were calibrated against international standards. Precision of all analytical methods was tested by duplicate analyses.

Chemical composition

Biotite monzogranites to granodiorites of the Ševětín massif are moderately peraluminous with a value of A/CNK (mol. Al_2O_3/CaO+Na_2O+K_2O) ratio between 0.96 and 1.10. According to the classification of CHAPPEL & WHITE (1974) they exhibit transitional I/S character, thus being distinct from typical S-granites of the Eisgarn type. From the viewpoint of Al_2O_3 and SiO_2 distribution, these rocks are largely affected by conspicuous fractional crystallization.

	CMP-76	CMP-77	CMP-78	Re-1541	Re-1221	Re-1232	Re-1489	Re-1490	Re-1496
SiO_2	70.44	71.70	74.92	73.49	73.26	74.17	74.27	72.74	73.59
TiO_2	0.34	0.27	0.10	0.12	0.16	0.08	0.14	0.22	0.12
Al_2O3	14.61	14.56	14.32	14.66	14.49	14.35	13.72	15.21	14.47
Fe_2O_3	1.86	0.76	1.47	1.26	0.15	0.11	0.35	0.56	0.33
FeO	1.41	1.33	0.12	n.d.	0.98	0.44	0.20	0.77	0.74
MnO	0.04	0.04	0.03	0.04	0.04	0.02	0.01	0.02	0.01
MgO	0.89	0.32	0.14	0.31	0.40	0.22	0.11	0.42	0.25
CaO	1.68	1.23	0.38	0.61	0.86	0.78	0.44	0.84	0.65
Na_2O	2.66	3.53	3.07	3.82	3.52	3.68	3.68	3.22	3.37
K_2O	4.04	4.11	4.06	4.71	4.50	4.59	5.39	5.02	5.00
P_2O_5	0.10	0.05	0.02	0.23	0.22	0.16	0.22	0.21	0.20
LOI	1.17	1.57	0.93	0.96	1.00	0.90	0.90	0.75	0.63
Total	99.24	99.47	99.56	100.21	99.58	99.50	99.43	99.98	99.36
Ba (ppm)	1081	699	309	553	580	429	264	396	210
Rb (ppm)	157	175	184	216	183	172	216	260	239
Sr (ppm)	204	147	48	163	146	89	66	80	56
Zr (ppm]	231	115	28	58	78	81	72	104	48
U (ppm)	7.1	5.4	2.2	4.3	3.3	5.7	6.8	6.3	6.3
Th (ppm)	22.8	13.0	1.9	6.7	7.8	2.8	6.6	19.6	5.5

Table 1

Representative analyses of granodiorites and two-mica granites of the Ševětín massif (wt. %)

CMP-76 – Ševětín, active quarry, biotite granodiorite,

CMP-77 - Ševětín, active quarry, biotite granodiorite,

CMP-78 – Ždár pond, abandoned quarry, two-mica granite, subtype Deštná,

Re-1541 – Mazelov, abandoned quarry, two mica granite, subtype Deštná,

Re-1221 – Horní Slověnice, abandoned quarry, two-mica granite, subtype Deštná,

Re-1232 – Dunajovice, abandoned quarry, two-mica granite, subtype Deštná,

Re-1489 – Záblatí, small boulders, two-mica granite, subtype Deštná,

Re-1490 – Mnich, abandoned quarry, two-mica granite, subtype Deštná,

Re-1496 – Dolní Pěna, abandoned quarry, two-mica granite, subtype Lásenice.

	CMP-76	CMP-77	CMP-78	Re-1541	Re-1221	Re-1232	Re-1489	Re-1490	Re-1496
La	48.2	34.1	5.6	14.3	20.93	35.3	12.2	24.0	9.74
Ce	82.5	60.3	11.05	29.6	35.3	20.93	28.9	49.3	20.6
Pr	10.9	8.6	2.57	3.23	3.29	3.29	4.11	5.87	2.44
Nd	35.7	28.7	8.5	11.4	12.54	12.54	18.3	22.3	8.65
Sm	5.7	5.1	2.01	2.19	2.76	2.76	6.35	4.66	2.43
Eu	1.20	0.97	0.46	0.63	0.82	0.82	1.81	0.53	0.34
Gd	3.3	2.65	1.29	1.91	2.15	2.15	10.3	3.74	2.17
Tb	0.45	0.35	0.23	0.36	0.36	0.36	2.42	0.48	0.41
Dy	2.3	1.9	1.51	2.27	2.01	2.01	15.6	2.27	2.10
Ho	0.46	0.37	0.33	0.47	0.35	0.35	2.99	0.37	0.33
Er	1.18	0.9	0.92	1.32	0.98	0.98	8.77	1.05	0.85
Tm	0.2	0.15	0.17	0.21	0.13	0.13	1.27	0.15	0.11
Yb	1.12	0.88	0.98	1.34	0.92	0.92	7.83	0.91	0.65
Lu	0.2	0.16	0.18	0.20	0.17	0.17	1.09	0.13	0.08
La_N/Yb_N	29.08	26.19	3.86	7.21	15.37	7.41	1.05	17.82	10.13
Eu/Eu*	0.85	0.81	0.87	0.94	1.03	1.13	0.68	0.39	0.45

Table 2

Contents of rare earths elements of granodiorites and two mica granites of the Ševětín massif (ppm).

This fractionation is also visible from Zr distribution, since the Zr vs. SiO_2 ratio clearly shows a release of the largest amount of zircon at the beginning of fractionation of the granite melt. Regarding the distribution of other trace elements, the biotite granodiorites of the Ševětín massif show a negative correlation between the content of U and Zr, but a positive one between the content of Th and Zr, thus indicating a contemporaneous crystallization of zircon and monazite as the principal carriers of Th at the beginning of the fractionation of the granitic melt. The biotite granodiorites of the Ševětín massif are characterized by higher Ba and Sr contents that indicate similarity between these granitoids and the fine-grained biotite granitoids of the Freistadt and Mauthausen types in the distribution of LILE. Due to this similarity biotite granodiorites of the Ševětín massif were classified within the Freistadt-type granodiorites (RENÉ et al., 1999). A more detailed comparison based on the distribution of Sr, Rb (Fig. 3) and REE (Fig. 4) and analyses of the Freistadt, Mauthausen and Schrems types (VELLMER, 1992; GERDES, 1997) give better possibility to range biotite granodiorites of the Ševětín massif to biotite granodiorites of the Mauthausen type and/or better to the Schrems type of biotite granites. Compared to the granodiorites of the Freistadt type, biotite granitoids of the Ševětín massif are also characterized by the higher content of Th (11.5–27.3 ppm), which can be very well compared with higher content of Th in the Mauthausen granodiorites (20–34 ppm, VELLMER, 1992) or higher content of Th in the Schrems granites (21–28 ppm, VELLMER, 1992).

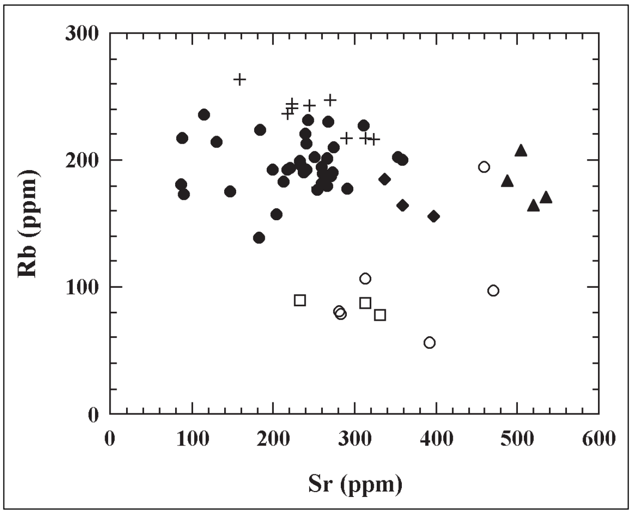

Fig. 3
Rb–Sr diagram for granites and granodiorites of the Freistadt and Mauthausen types.
Empty circles – granites of the Freistadt type, empty squares – granites of the Freistadt type from the Trhové Sviny area, full circles – granites and granodiorites of the Ševětín type, crosses – granites of the Mauthausen type, diamonds – granites of the Schrems type, triangles – granites of the Pavlov type.

The two-mica granites of the Ševětín massif are typical peraluminous granites with elevated values of the A/CNK ratio, ranging from 1.24 to 1.44. These values agree well with the peraluminosity of the Eisgarn-type granites (A/CNK = 1.02–1.45) or the Deštná-type granites (A/CNK = 0.99–1.37). The peraluminous character of these rocks is best expressed in the content of muscovite and cordierite, andalusite or sillimanite. In the classification of CHAPPEL & WHITE (1974), these rocks can be assigned to typical S-type granites. The two-mica granites of the Ševětín massif are typical Ca-low granites with CaO content of 0.29–0.61 wt. %. Compared to the biotite granodiorites of this massif, they have also distinctly lower Ba and Sr contents (Fig. 5). A very typical feature of the two-mica granites of the Ševětín massif are the low contents of Zr, Th and REE, which are comparable with the contents in two-mica granites of the Deštná and Lásenice subtypes (Table 3).

The two-mica granites of the Ševětín massif and two-mica granites of the Deštná subtype have very similar patterns of normalized REE with relatively low LREE/HREE ratio and missing negative Eu anomaly (Fig. 6).

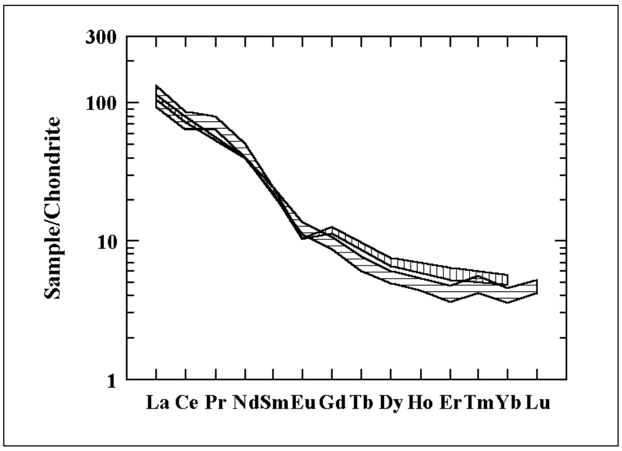

Fig. 4
Chondrite-normalized REE pattern for granodiorites and granites of the Ševětín and Schrems types.
Vertical lines – granites of the Schrems type, horizontal lines – granodiorites of the Ševětín type. Normalizing values are from TAYLOR & McLENNAN (1985).

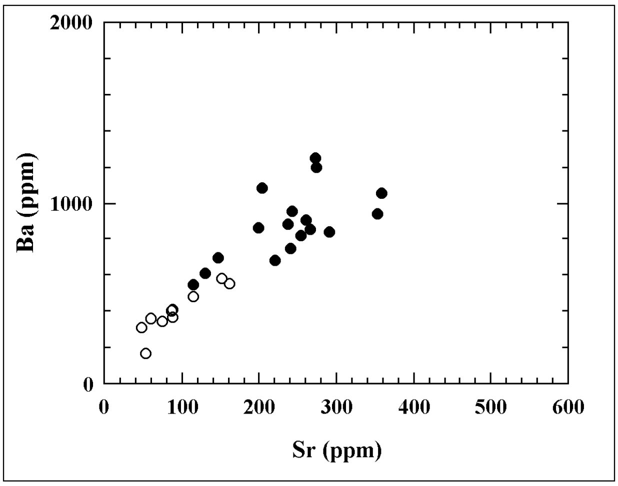

Fig. 5
Distribution of Ba and Sr in biotite granites to granodiorites of the Ševětín type and in two-mica granites of the Ševětín massif.
Full circles – biotite granites to granodiorites of the Ševětín type, empty circles – two-mica granites.

Subtype	ΣREE	La_N/Yb_N	Eu/Eu*	Zr	Th	Th/U
Ševětin massif	53.6	5.5	0.88	43	4.1	1.3
Deštná	57.3	8.6	1.04	49	6.9	1.2
Lásenice	59.9	10.5	0.45	57	5.1	1.0
Eisgarn (Čiměř)	169.3	32.8	0.29	126	25.8	3.3

Table 3
Average content (value of median) of selected trace elements in the two-mica granites (ppm).
Σ REE – total content of REE (from La to Lu)

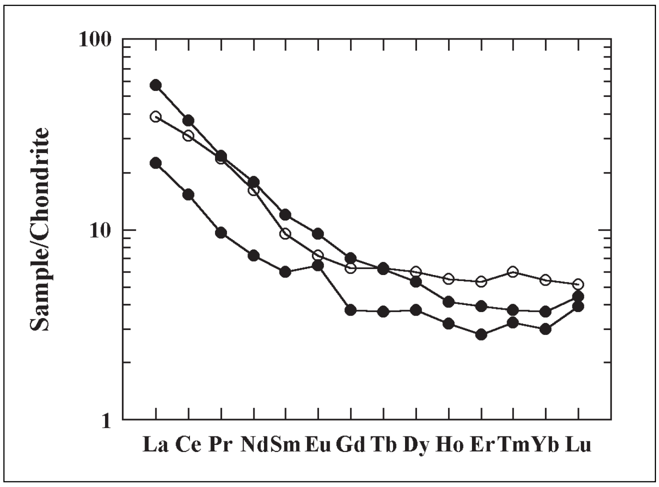

Fig. 6
Chondrite-normalized REE pattern for two-mica granites of the Ševětín and the Deštná types.
Symbols see Fig. 5.
Normalizing values are from TAYLOR & McLENNAN (1985).

Origin of two-mica granites of the Ševětín massif

A number of papers dedicated to the origin of two-mica granites of the Moldanubian Batholith were published recently (KLEČKA & MATĖJKA, 1992; VELLMER & WEDEPOHL, 1994; FINGER et al., 1997; GNOJEK & PŘICHYSTAL, 1997; BREITER et al., 1998; MATĖJKA & JANOUŠEK, 1998; BREITER & KOLLER, 1999; RENÉ et al., 1999; GERDES et al., 2000; HUMER & FINGER, 2002; JANOUŠEK et al., 2002; RENÉ, 2002). The origin of the two-mica granites of the Moldanubian Batholith is usually believed to be connected with partial melting of sediment-derived metamorphic rocks (e.g., BREITER & KOLLER, 1999; HUMER & FINGER, 2002; RENÉ, 2002). In order to generate the necessary quantity of granitic melt of corresponding composition, an adequate amount of volatiles and the necessary heat source are needed. The presence of primary muscovite indicates the necessary quantity of water in these melts (HOLTZ, 1989), and the relatively low solidus temperature of the granitic melt can be derived from the presence of andalusite (D´AMICO et al., 1981). VELLMER & WEDEPOHL (1994) concluded that partial melting of metapelites of the lower and/or middle crust produced two-mica granites of the Eisgarn type. Another thermal and geochemical model of origin of the two-mica granites of the Moldanubian Batholith was established by GERDES et al. (2000). According to this model, the protolith of two-mica granites were psammite-dominated to pelite-dominated greywackes. The source rocks come from the middle crust level, from a depth of 26–36 km. The mechanism of crustal thickening as a heat source was argmented by the production of radiogenic heat released from rocks of the middle crust. According to this model, 30–50 vol. % of the source rocks were melted during partial melting with the main process of partial melting being the dehydration melting of biotite. The most recent model for the origin of the two-mica granites of the Moldanubian Batholith (HUMMER & FINGER, 2002; RENÉ, 2002) supposes partial melting of paragneisses of the Monotonous Group and/or by partial melting of paragneisses of both the Monotonous and Varied groups of the Moldanubian Zone. Partial melting was controlled by melting of muscovite and biotite. Variable composition of the individual subtypes of two-mica granites (Číměř, Mrákotín, Lipnice, Deštná and Lásenice subtypes) is a function of the variable degree of partial melting and also of variable fractionation of granite melt.

The most significant difference in composition of the two-mica granites of the Eisgarn type (Čímĕř, Mrákotín and Lipnice subtypes) and Deštná and Lásenice subtypes is the lower content of REE, Zr and Th in the two-mica granites of the Deštná and Lásenice subtypes and also in the two-mica granites of the Ševĕtín massif. Low content of Zr, La and Th in all these granites is very probably a result of disequilibrium melting of a monazite-bearing protolith.
In contradiction to previous studies on the origin of two-mica granites of the Moldanubian Batholith we assume the dehydration melting of muscovite as the main melting process leading to the origin of the two-mica granites of the Deštná and Lásenice subtypes and the two-mica granites of the Ševĕtín massif. The most significant argument for the origin of these granites by partial melting of muscovite is the estimate of temperature of crystallization of granite melts. This estimate was based on the temperatures of saturation of REE and Zr according to models of solubility of monazite (MONTEL, 1993) and zircon (WATSON & HARRISON, 1983, 1984) in granite melt. The data of the temperature of crystallization are presented in Table 4 and indicate that the temperature of granite melt of the two-mica granites of the Ševĕtín massif, the Deštná and the Lásenice type was close to the solidus temperature of dehydration melting of muscovite-quartz assemblages (JOHANNES & HOLTZ, 1996; HOLTZ et al,. 2001). Crystallization of this granite melt also occurred at the peak temperature of the high-T overprint (700–770ºC) of the Moldanubian Zone (BÜTTNER & KRUHL, 1997; KALT et al., 1999). This finding is in some contradiction to the idea of BREITER & KOLLER (1999), which supposed the origin of granite melt of the Lásenice type during the thermal peak of regional metamorphism of the Moldanubian Zone.

Subtype	T_{Zr}	T_{LREE}
Ševĕtín massif	696	730
Deštná (Klenov massif)	724	734
Lásenice	699	715
Eisgarn (Čímĕř)	780	816

Table 4

Calculated melt temperatures (°C) inferred from the zircon (T_{Zr}) and monazite (T_{REE}) geothermometers (WATSON & HARRISON, 1983; MONTEL, 1993) for two mica granites. As the composition of monazite is unknown, a value of - X_{REEPO4} = 0.83 was used following MONTEL (1993).

Conclusion

The two-mica granites of the Ševĕtín massif are an integral part of this magmatic body and show no direct relation to biotite granodiorites of the same massif. Their modal and chemical composition is very close to the composition of two-mica granites of the Deštná type and or the Lásenice type. All these granites are moderately to highly peraluminous granites containing characteristic Al-rich accessories (cordierite, andalusite, sillimanite). Compared to the composition of the two-mica granites of the Eisgarn type, the two-mica granites of the Ševĕtín massif are characterized by low content of Zr, Th and REE. Their significant feature is also the absence of negative Eu anomaly and only very slightly evolved fractionation of original granite melt.

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