Минно-геоложки университет "Св. Иван Рилски"
Годишник, том 47, свитък I, Геология и геофизика, София, 2004, стр. 287-289

THE PALEOMAGNETIC STUDY OF SOME PLUTONIANS OF UPPER CRETACEOUS AGE FROM THE MARITSA NEOINTRUSIVE ZONE, THE EASTERN SREDNOGOTIE AND STRANDJA

N. Petkov
Geophysical Institute, Bulgarian Academy of sciences, 1113 Sofia, Bulgaria, e-mail: jelev@geophys.bas.bg

ABSTRACT. The present publication generalizes the results obtained in the interpretation of the paleomagnetic investigations of the intrusive formations from the Maritsa neointruzive zone, Eastern Srednogorie and Strandja.

ПАЛЕОМАГНИТНА ИЗУЧЕНОСТ НА НЯКОИ ПЛУТОНИ С ГОРНОКРЕДНА ВЪЗРАСТ ОТ МАРИШКАТА НЕОИНТРУЗИВНА ЗОНА, ИЗТОЧНОТО СРЕДНОГОРИЕ И СТРАНДЖА

Н. Петков
Геофизичен институт, Българска академия на науките, 1113 София, България, e-mai : jelev@geophys.bas.bg

РЕЗЮМЕ. В настоящата публикация са обобщени резултатите, получени при интерпретацията на палеомагнитните изследвания на интрузивните формации от Маришката неоинтрузивна зона, Източното Средногории и Странджа.

I. Plutonians in the Maritza neointrusive zone

The Vitosha, Plana and Captain Dimitriev plutonians are representatives of the so-calld Laramian intrusions of the Maritza neointrusive zone (Dabovski, 1968). All of them are multi-impulsive and joined. According to geological data (Dimitrov, 1961; Bojadjiev, 1971; Dabovski, 1969), the older ones are basic rocks of different varieties. The age of the plutonians is assumed to be upper Cretaceous-Paleocene, the Plana plutonian being relatively the oldest.

The collection contained the following investigated samples:

1. No 295 – aplitoid veined rock in monzonites, taken from a find opposite Hotel Moreni, Mt. Vitosha.

2. No 296 – monzonites, taken from a find opposite Hotel Moreni, Mt. Vitosha.

3. Nos 297 – 302 – anorthosites, taken from a find on the highway to Chalet Aleko, Mt. Vitosha.

4. Nos 360 – 363 – monzonites, taken from the Kamenodelets quarry near Murchayevo, Mt. Vitosha.

5. Nos 364 – 367 – gabbro, taken from the quarry near Kladnitsa, Mt. Vitosha.

6. Nos 303 – 306 – gabbro-diorites, taken from a find on top of the big oak forest of Samokov, Plana plutonian.

7. Nos 308 – 311 и 437 – 440 – quartz-diorites, taken from a fined on the Shipochen – Novo Selo highway, Plana plutonian.

8. Nos 368 – 373 – gabbro, taken from a find on the Sofia – Samokov highway opposite the Passarel dam, Plana plutonian.

9. Nos 316 – 320 и SP-258-SP-263 – quartz-monzodiorites, taken from a fined on the Cap. Dimitrievo – Biaga highway.

Table 1 shows the position of the paleopoles calculated by the direction of the initial remanent magnetization of the different rocks types. As can be seen, the rocks of the Vitosha and Plana plutonians are magnetized both normal and inversely, while those of Cap. Dimitrievo only normal. This means that an inversion of the Earth's magnetic field occurred during the formation of the Vitosha and Plana plutonians. This highly important fact permits, despite the erroneously determined positions of the paleopoles, to make a paleomagnetic age correlation of the plutonians (Nozharov and Petkov, 1976). As is known from world paleomagnetic data (Tarling, 1974), the first inversion of the Earth's magnetic field (from + to –) in the Upper Cretaceous occurred 79 million years ago. It follows that the Vitosha and Plana plutonians are not older than 79 millions years, and Cap. Dimitrievo than 76 million years. The Plana plutonian is probably somewhat older than the Vitosha one. Thus the age determined by paleomagnetic data is in good agreement with the absolute age of the Vitosha plutonian (the youngest) – 73 – 75 $\pm$ 5 million years (Velinov, 1974).

Table 1.

Paleomagnetic and magnetic characteristics of the plutonians

No	Number of samples	No	D_m	I_m	R	K	$\alpha_{95}°$	Pola-rity	Paleopol positions		d_p	d_m
									Φ°(N)	Λ°(E)		
1	297-302	6	2°	33°	5.421	9	24	N	65°	199°	15.5	27.3
2	360-363	3	8°	61°	2.874	16	32	N	84°	121°	37.5	49.0
3	364-367	4	17°	59°	3.797	15	25	M	77°	122°	27.2	36.7
4	All rocks from Vitosha	14	8°	50°	12.064	7	17	M	76°	172°	14.8	22.2
5	303-306	1	60°	-26°	—	—	—	O(R)	12°S	324°	—	—
6	308-311 437-440	5	14°	69°	4.677	12	23	N	76°	62°	32.5	38.3
7	368-373	6	351°	63°	5.686	16	17	M	83°	314°	21.5	27.3
8	All rocks From Plana	12	351°	66°	11.056	12	13	M	81°	342°	17.9	21.8
9	316-320 Cap. Dimitrievo	8	338°	65°	7.723	25	11	N	74°	320°	14.7	18.2

II. Plutonians from the Eastern Srednogorie and Strandja

The plutonians from Eastern Srednogorie and Strandja are presented by two intrusive formations (Nozharov et al., 1977; Dolapchieva et al., 1982; Nozharov et al., 1982; Nozharov and Petkov, 1984).

The first one – a gabbro-diorite-granodiorite formation is presented by the rocks of the Izgrev, Gramatikovo and Manastir plutonians. The rocks of this formation are normally magnetized – Manastir plutonian, the Izgtev plutonian – reversely and the Gramatikovo plutonian – anomalously. Here the rocks from the Manastir plutonian are comparatively older. These rocks are referred to the upper part of the coniacian. The rocks from the Izgrerv plutonian are referred to the lower part of the santonian – 79-82 million years. The rocks from the Gramatikovo plutonian are of intermediate age: coniacian-santonian.

The second one – the gabbro-monzonite-sienite formation is presented by the rocks of the Varlibriag and Zidarovo plutonions. According to the scheme accepted by us (Dolapchieva et al., 1982) the development of this formation starts from mid-santonian and ends probably in the campanian. The rocks from the Varlibriag plutonian are normally and reversaly magnetized. The plutonian was formed within the 72-75 million years interval. The rocks of the Zidarovo plutonian are magnetized only normally. Its formation can be reffered to the 76-80 million years interval.

The magnetization intensity, the magnetic susceptibility, the polarity of the rocks from the respective plutonians, the mean declinations and inclinations, the positions of the paleopoles for the given region, as well as the statistical parameters characterizing the accuracy of the investigations (Fisher, 1953) are given in Table 2.

The intrusive rocks from the region of Izgrev and Zidarovo plutonians are characterized by Curie points of the primary titanomagnetite: 100-150°C respectively and with high Curie points of the titanomagnetite formed in intermediate magmatic chambers – 525-550°C and 450-475°C respectively. On the basis of Curie points the depths of formation of the initial magmatic chambers are determined: 67-61 km for the Izgrev plutonian and 61-54 km for Zidarovo plutonian correspondingly. Later the titanomagnetite oxidation occurs in intermediate magnetic chambers at depths 7-4 km for Izgrev plutonian and 18-14 km for Zidarovo plutonian. In the rocks from the Varlibriag plutonian the oxidation of the primary titanomagnetite occurs in magmatic chambers at depths 7-4 km (Nozharov et al., 1982).

Table 2.

Paleomagnetic and magnetic characteristics of the plutonians

Rock tapes and Locality	N	I_n $x10^{-3}$ A/m	κ $x4.10^{-6}$ SI	Q_m	D_m	I_m	K	α_{95}°	Pola-rity	Paleopol positions		d_p	d_m
										Φ°	Λ°		
Gabbro-Manastir Plutonion	10	4400	8500	1.0	35°	43°	14	13	N	59°N	131°E	11.0	17.0
Gabbro-diorites Izgrev plutonion	4	700	2000	0.7	356°	66°	71	11	N	84°N	5°E	14.5	17.8
Diorites Gramatikovo-plutonion	11	525	—	—	244°	73°	72	11	O(N)	23°N	356°E	8.5	9.7
Monzonites Varlibriag-plutonion	6	1200	2560	1.0	12°	38°	26	13	N	67°N	178°E	9.0	15.0
Sienites Varlibriag plutonion	10	530	1250	0.8	192°	-25°	9	17	R	59°S	5°E	9.8	18.3
Sieno-Diorites Zidarovo plutonion	6	300	3300	0.2	321°	52°	36	11	N	58°N	293°E	10.5	15.4

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Препоръчана за публикуване от
катедра "Приложна геофизика", ГПФ