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The relationships between Burgas Group and Emine Flysh Formation from the town of Sliven to the Black Sea

Nadezda Antova[1], *Gabriel Nikolov*[2], *Teodora Rankova*[1]

[1] *Geology and Geophysics, 1505 Sofia*
[2] *Geological Institute, Bulgarian Academy of Sciences, 1113 Sofia*

Н. Антова, Г. Николов, Т. Ранкова — *Взаимоотношенията между Бургаската група и Еминската флишка свита от Сливен до Черно море.* Проследена е северновергентна възседно-навлачна тектонска структура в южното подножие на Източна Стара планина. По нея горнокредните вулканогенни скали на Бургаската група са надхлъзнати върху кампанско-средно-палеоценския теригенно-карбонатен флиш на Еминската свита със значителни амплитуди. Възседнавлакът отделя Бургаската единица (част от вулканска дъга) от Камчийската единица (част от заддъгов басейн). Навличането се е осъществило след палеоцена, най-вероятно през илирско време.

Field studies in carried out for the purpose of the 1:500 000 Geodynamic Map of Bulgaria along the southern slopes of East Stara Planina Mts. (fig. 1) did not confirm the presence of a normal geological boundary, i. e. a gradual lithological transition, between the volcano-sedimentary part of the Upper Cretaceous represented by the Upper Santonian Draganovo Formation of Burgas Group (Петрова et. al., 1980) and the Campanian-Middle Paleocene terrigenous-carbonate sequence of Emine Flysch Formation (Гочев, 1932 in Джуранов и Пимпирев, 1989). Along the distance of more than 90 km between Sotirya Village, to the east of Sliven, and Tankovo Village, to the west of Slanchev Bryag a regional east-west trending thrust was traced in practically continous outcrops (with the exception of the interval between the village of Iskra and the locality Mindov Kairyak to the west of Pirne Village where the boundary is covered by Neogene-Quaternary deposits). It is displaced by younger longitudinal and transversal normal and strike-slip faults (fig. 2).

The thrust extends along the southern foots of Grebenec and Terziiski Bair Ridges, across Karnobat field with a displacement to the north at Pirne Village and the town of Aitos, then continues along the northern ridges of Aitos Mountain and the northern slopes of the heights between the villages of Bata and Tankovo. Its easternmost parts are buried under the Quaternary of Prosenik Graben. Rocks of different units of Burgas Group — Draganovo, Medovo and Tankovo Formations (Петрова et al., 1980) are thrusted over the terrigenous rocks of Emine Flysch Formation.

The thrust dips generally to the south at 50—75° (section I—VIII in fig. 1) in the interval Sotirya—Medovo and at 40-50° (section IX) at Tankovo. The width of the fault zone varies from several up to 40 m. The zone shows a “flaser“ structure: lenses of deformed rocks from the “cover“ and the “basement“, and tectonic breccias similar to the tectonic melange (different in size and composition rounded rock fragments in a milonitic matrix), are bounded by shear surfaces with striations and extension fractures indicating a thrust displacement of the hanging wall. Several smaller milonitic zones of the same thrust character are observed in the hanging wall. They have the same orientation and show lense-like "flaser" structure with packets of the basement. The shearing is so intensive that even the block structure of the agglomeratic tuffs and lava breccia is erased and the psammitic tephroidal, sedimentary and pyroclastic rocks are turned to milonites and phyllonites. On the contrary, the competent beds of the flysch sequence in the foot wall are broken into elongated lense-like boudins. Close to the contact the beds are everywhere re-orientated parallel to the

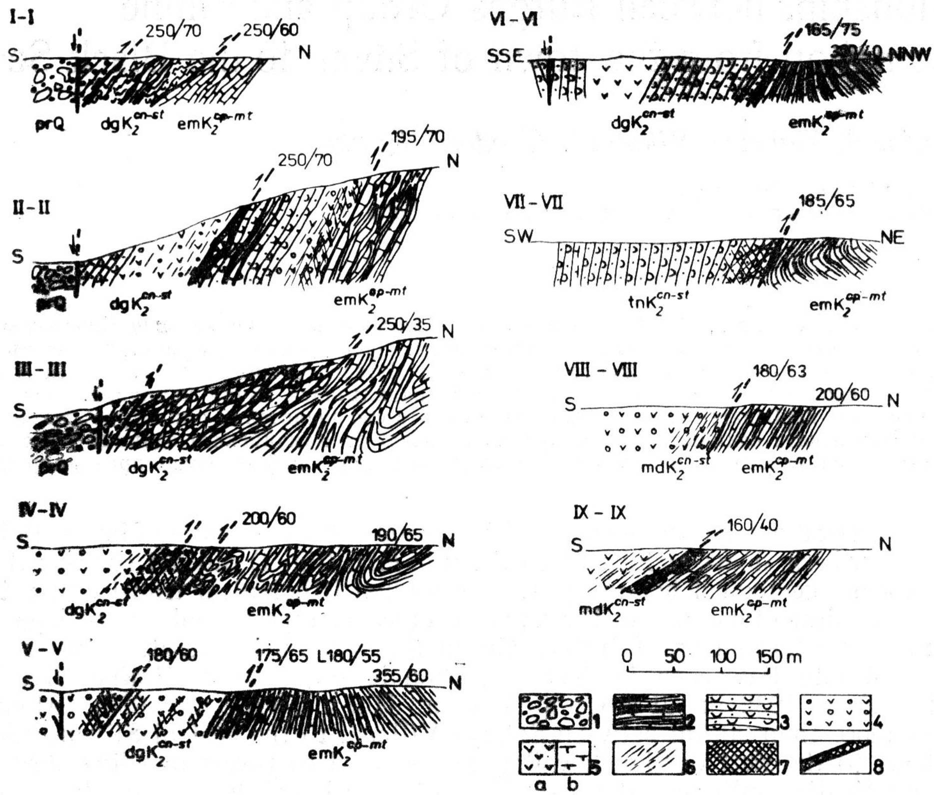

Fig. 1. Geological sections across Peshtersko-Bata thrust: I — along the stream above the water depot SE of Sotirya Village; II — along the stream E of Doreshka R.; III — along Kaloyanska R.; IV — along Kalan Dere N of Blatetz Village; V — along the stream in the northern end of Gorno Aleksandrovo; VI — at the sheep yard E of Dermen Dere stream; VII — along the stream W of Pirne Village, Mindov Kairyak; VIII — Bata Village, the stream below the gipsy's quarters; IX — in the road cutting at Tankovo Village

1 — talus and proluvial deposits; *2* — flysch; *3* — interbedding of tuffs, tuffites, sediments; *4* — aglomeratic and psephitic tuffs of phenobasalts to phenoandesites; *5* — volcanic rocks: a — phenobasalts and phenoandesitic basalts; b — trachytes; *6* — milonitic shearing; *7* — zone of compaction, milonitization, "flaser" structures, shearing; *8* — thrust line with tectonic melange

Фиг. 1. Геоложки разрези напречно на Пещерско-Батенския възсед-навлак: I — по дола над водохранилището ЮИ от с. Сотиря; II — по водния дол И от Дорешка река; III — по Калоянска река; IV — по р. Калан дере С от с. Блатец; V — по дола в северния край на с. Горно Александрово; VI — при кошарата И от Дермен дере; VII — в дола З от с. Пирне, Миндов кайряк; VIII — с. Бата, долът под циганската махала; IX — в шкарпа на пътя при с. Тънково

1 — делувий, пролувий; *2* — флиш; *3* — алтернация на туфи, туфити, седименти; *4* — агломератови и псефитни туфи на фенобазалти до феноандезити; *5* — вулкански скали: (а) фенобазалти и феноандезитобазалти; (б) трахити; *6* — милонитно нашистяване; *7* — зона на уплътняване, милонитизация, „флазерни" текстури, повърхнини на хлъзгане; *8* — възседна линия с тектонски меланж fault plane and are deformed into north vergent fault-bound folds of different size. In this limb no “lenses“ and packets of the thrusted rocks are observed. The intensive tectonic reworking gradually dies out away from the thrust.

The displacements along the thrust are considerable and increase from west to east. At Sotirya Village the agglomeratic tuffs of phenoandesites and phenoande-

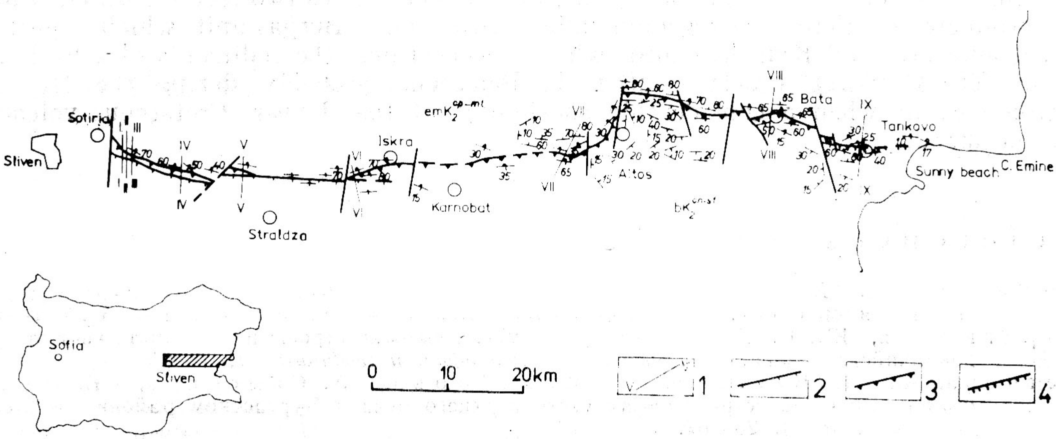

Fig. 2. Map showing Peshtersko-Bata thrust and the locations of the cross-sections from fig. 1
1 — location of 1:5000 cross-section; *2* — normal fault; *3* — reverse fault; *4* — nappe

Фиг. 2. Карта на Пещерско-Батенския възсед-навлак с местата на разрезите от фиг. 1
1 — място на разрез в М 1:5000; *2* — разсед; *3* — възсед; *4* — навлак

sitic basalts with packets of tephroidal and pyroclastic rocks from the middle part of Draganovo Formation are thrusted over the sediments from the base of the Emine Flisch Formation and the underlying volcano-sedimentary deposits. The latter were formed probably in a transitional zone with deposition of terrigenous-carbonate rocks. accompanied by tephroids and agglomeratic tuffs with mixed composition of the fragments (similar transitional rocks of Upper Santonian age crop out in the core of Dryankovets syncline to the east of Aitos). The thrusting zone inthis section includes a packet, with thickness of several up to 20 m, built up of red-colored clayey limestones to marls. known as Vetrila marls (sections I to V in fig. 1). From Iskra to Pirne Village and to the town of Aitos the thrusting involves also rocks of Medovo and Tankovo Formation with a trend of covering the upper lying levels of the Emine Flysch Formation. To the east the thrusting sheares the existing fold structures and as a result the materials of Draganovo Formation thin out and dissappear. According to Синьовски, Желев (1992) the sediments of Emine Flysch Formation at Bata Village are of Lower Campanian age and those at Tankovo belong to the lower parts of the Upper Campanian.

Parts of the tectonic structure in question were described by Карагюлева, Костадинов (1977) as Peshtersko fault (from the Zetjovo Village road junction to the north of Aitos to north of Maglen Village) as a normal to steep northvergent reverse fault and as Bata reverse fault (from Emirsko to Tankovo Village) locally grading to a flexure. These authors supposed a connection between the two faults (which was confirmed by our field works) and pointed out a considerable displacement amplitude proved also by geophysical data. Петрова et al. (1980, fig. 9, 10), however, accept only the Peshtersko reverse fault and trace the latter from the Zetjovo Village road junction to the south of Aitos. To the east of Emirsko Village they described a boundary of a normal lithological transition. Our studies confirm the presence of a thurst structure from Bata to Tankovo village (fig. 1, sections IX and X). The revisions showed that to the west of Aitos this structure (which should be termed Peshtersko-Bata thrust) exists and is well observed along the northern borders of the young grabens.

The relationships between the rock complexes — thrusting of different levels of the Upper Cretaceous volcanogenic sequence upon the Upper Cretaceous-Paleocene flisch sediments and the intensive tectonic deformation of the rocks prove the presence of a thrust structure of a regional significance. It determines two tectonic units, which are products of different paleogeodynamic environments: Burgas unit, which is part of a volcanic arc, and Kamchya unit, which incorporates the sediments of a back-arc basin. The thrusting occurred after the Paleocene, probably during the Illyrian tectonic event when a considerable shortening of the Upper Cretaceous volcanic arc occurred.

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