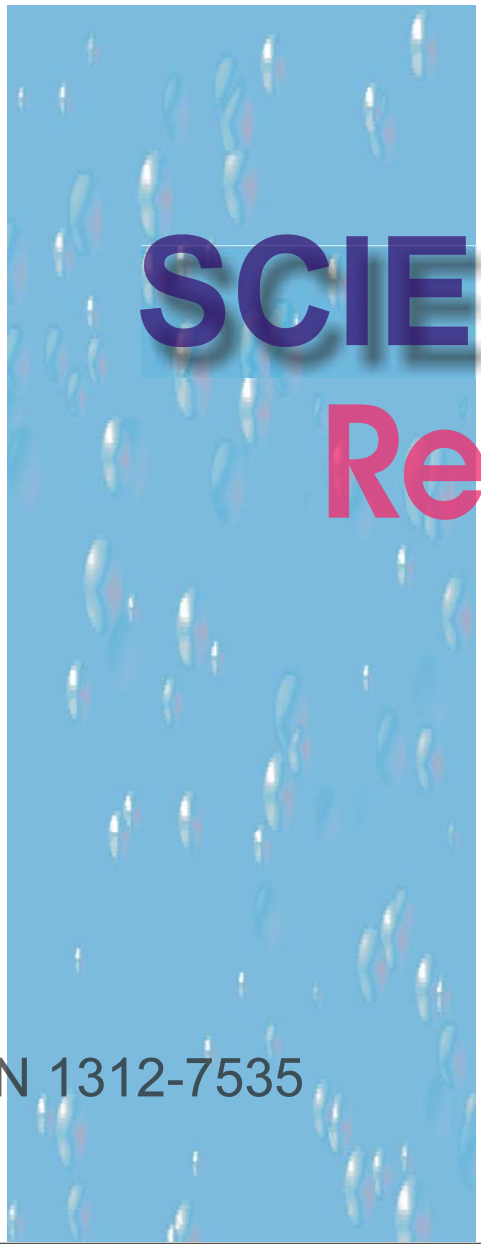
VOLUME 5
2007

SOUTH-WEST
UNIVERSITY
·NEOFIT RILSKY·
BLAGOEVGRAD, BULGARIA



SCIENTIFIC Research

ISSN 1312-7535

ELECTRONIC ISSUE

Morphological and morphostructural peculiarity of Mountain Slavyanka (Orvilos Mountain)

Krasimir Stoyanov Stoyanov
Southwest University "N. Rilski" – Blagoevgrad, Bulgaria

***Abstract**: Here is regarded the morphological peculiarity of Slavyanka. An analisis is done of the vertical structure of the terrain. In morpho-structural respect this geomorphological unit consists of the Tsarev peak and Gotsev peak vault concentrical structures.*

***Keywords:** Slavyanka Mountain, Tsarev peak and Gotsev peak vault concentrical structures.*

1. INTRODUCTION

Slavyanka Mountain (Gr. Orvilos-Όρβηλος) is a part of Pirin-Falakro mountain system, situated between the down stream of Struma River or Strymónas (Στρυμόνας), Mesta river or Nestos (Νέστος) and White Sea (Aegean Sea).

The following mountains are situated here: Pirin, Slavyanka, Sengelska Mountain, Sturgach, Black Forest (Monte Negro), Vrondu (Βρόντος), Falakro, Pangalon (Παγγαίο), Menikion (Μενοίκιο), and Chaldag [3]. From the listed mountains, only Pirin is fully situated in Bulgarian territory, Slavyanka and Sturgach are border mountains, and the rest mountains are situated on the territory of Northern Greece.

On the north Orvilos is connected with Ririn trough the Paril saddle (1173 m). The northern slope of the mountain is outlined from the valleys of the rivers Cheresha (initial flow of Kalimanska river) and Burovitsa river (initial flow of Matnitsa river). On the north-west the border follows the vivid zone of west Pirin fault separating it from the Petrich basin. After that it has been realized an orographic conection with the Angistron Mountain already on a Greek territory, on south-west, close to the Kali saddle (875 m). On the south-west the border follows proluvial side of the mountain with the well formed Ahladohorion basin. The valley of river Hasanitsa is southern border that separates it from Vrondu Mountain. On the spring area of Hasanitsa river on the nort-west site, near Presekite saddle (1170 m) iz realized an orographic connection with the Black Forest Mountain (Monte Negro). The easter slopes of Orvilos finish steeply in an wide basin area, a part of lower Nevrokop Basin drained by Vatitopu river.

Further north on Bulgarian territory the east border is represented by the Lovchanska basin by which flows Burovska river.

In these boundaries Orvilos embrace approximately 193 sq. km.

It's length in straight line is about 20 km, and wigth up to 14 km (on the meridian of Shabran peak)(fig. 1).

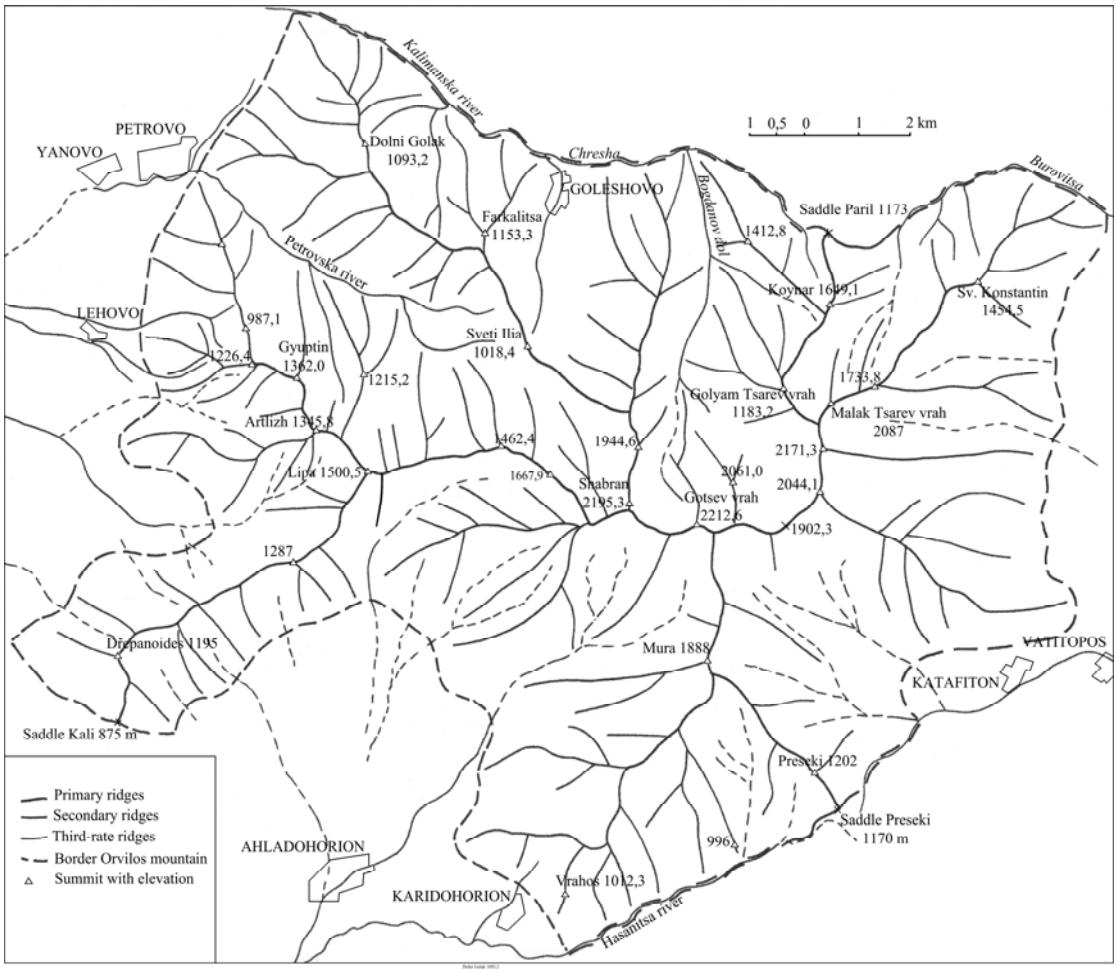


Fig. 1. Morphographical map of Slavyanka

2. MORPHOGRAPHICAL CHARACTERISTICS

Slavyanka has outlined andhigh risen ridge, stretching in main east-west direction [7],[8]. Its peaks are not relatively well expressed with vaulth and round structure.it gives to the mountainit's characteristical massive and round shape. The slopes deriving from the ridge are not well expressed. The highest point – Gotsev peak (2212 m) is rising almost in the middle of the mountain. Some few better defined peaks are over 2000 m high and this are: Shabran 2195 m, Big Tsarev peak 2183 m, Little Tsarev peak (2087 m). Trough the grater parth of the main ridge passes the frontier between Bulgaria and Greece.

In western direction, after Lipa peak (1501 m)(fig.1) the main ridge is lowering and branches on two first grade slopes. One of them in northwestern direction and after in direction reaches the lands of Lehovo village. A national border is passed through it. This slope is climbing till the Gyuptin peak (1362 m). The ridge south west from Lipa peak that is narrow and significantly lowered 1100-1200 m reaches the saddle Kali (875 m).

From Slayanka's main ridge are deriving many side first grade limited by steep slopesand deeply inserted mountains, occasionally affected by advanced erosion processes.

Most impressive in the northis the one that is deriving on south-west from Little Tsarev peak. This rim is heading precipitously north from the peak, through pyramid Koynar peak (1649 m), and later it lowes and reaches the Paril saddle. There are two lateral rimsderiving from the northern area down the Shabran peak. One is heading north from the area Livada follows furthed down the left valley slope of Belyanov valley. The other one, that is the larges in mountain, heading north west through Shepatek country is lowering to

Saint Ilia country in the spring area of Petrovska river (970 m). this rim fills the space between the valley of Kalimanska and Petrovska rivers add concludes in the Dolni Golak peak (1093 m). moast significant rim on the souty is the one that starts from the border pyramide № 100 close to Gotsev peak. Firstly it lowers it's high and after that it rises and forms the massive Mura peak (1888 m). After the peak the ridge significantly lowers and branches out. The highest ridge of all in the south-western direction comes to an end in the valley of Hasanitsa river in the land of Karidohorion Village. In the south-eastern direction alow ridge Preseki peak (1202 m) carry out the connection with the Black Forest.

Characteristical morphological peculiarity of the Mountain is the well distinguished asimetry in the inclination of it's slopes. Trough almost all it's stretching from Little Tsarev peak till pyramid № 97, the slopesheading Greece (first eastern, and later southern) in it's top part represent clearly expressed, sharply sloping or almost vertical rock formation smarked well formed fault, and in it's lower part they have less inclination. On the other hand their top part the northern slopes are more precipitous. This asymmetry of the terrain is also typical for oyher souty Bulgarian mountains and it's already marked and analysed in some publications [10], [11]. The steep and almost vertical slopes and deeply situated surrounding basin sand plateaus, underline the impressive image of the mountain.

The peculiarity of the rock composition and tectony, as well as the climate conditions suggests the pour water resources of the mountain. For the configuration of the river valleys are typical sudden changes in direction, with no doubt dictated from the fail movement. Significant slopes, and deep erosioin, also originating from the intensive rising of the mountain and from action of the multiple steeply folling faults. On the north (in Bulgarian territory) the major parts of the rivers are flowing to Pirinska Bistritsa river, and in the north-easter parts of the mountain, the rivers are flowing to Burovitsa river that is actually right flow of Matnitsa river. On the souty (in Greek territory) more important river is Krusovitis river – to the basin of Struma river.

3. MORPHOMETRICAL CHARACTERISTIC OF THE TERRAIN

The intensity of the river valleys net is determined by certical dismembering of the bterrain. It illustrates the intensity of the endogenic terrain forminf forces. From the map of the vertical dismembering (fig. 2) are seen significant differences in this dismembering reflection of the different geodonamical regimen of the mountain and it"s surrounding parts. From the enclosed topoizoampliyudinal map of the northern part of the mauntain can be done the following deductions:

The areas with low degree of dismembering are situated:

- in the upper river site of Petrovska river and Goleshovska river. Together they form a significant internal mountain fault depression area centered around the country of Saint Ilia in which the dismembering of the terrain folls under 200 m /sq.km;
- the valley of the Burovitsa river and Cheresha river that is flowing from the region of Pari saddle western direction. Here the indicator is between 200-250 m/sq.km;
- the ridge leveling that is developed northern of Gotsev and Shabran peaks, decreases the vertical dismembering of the terrain by 300-350 m/ sq.km.

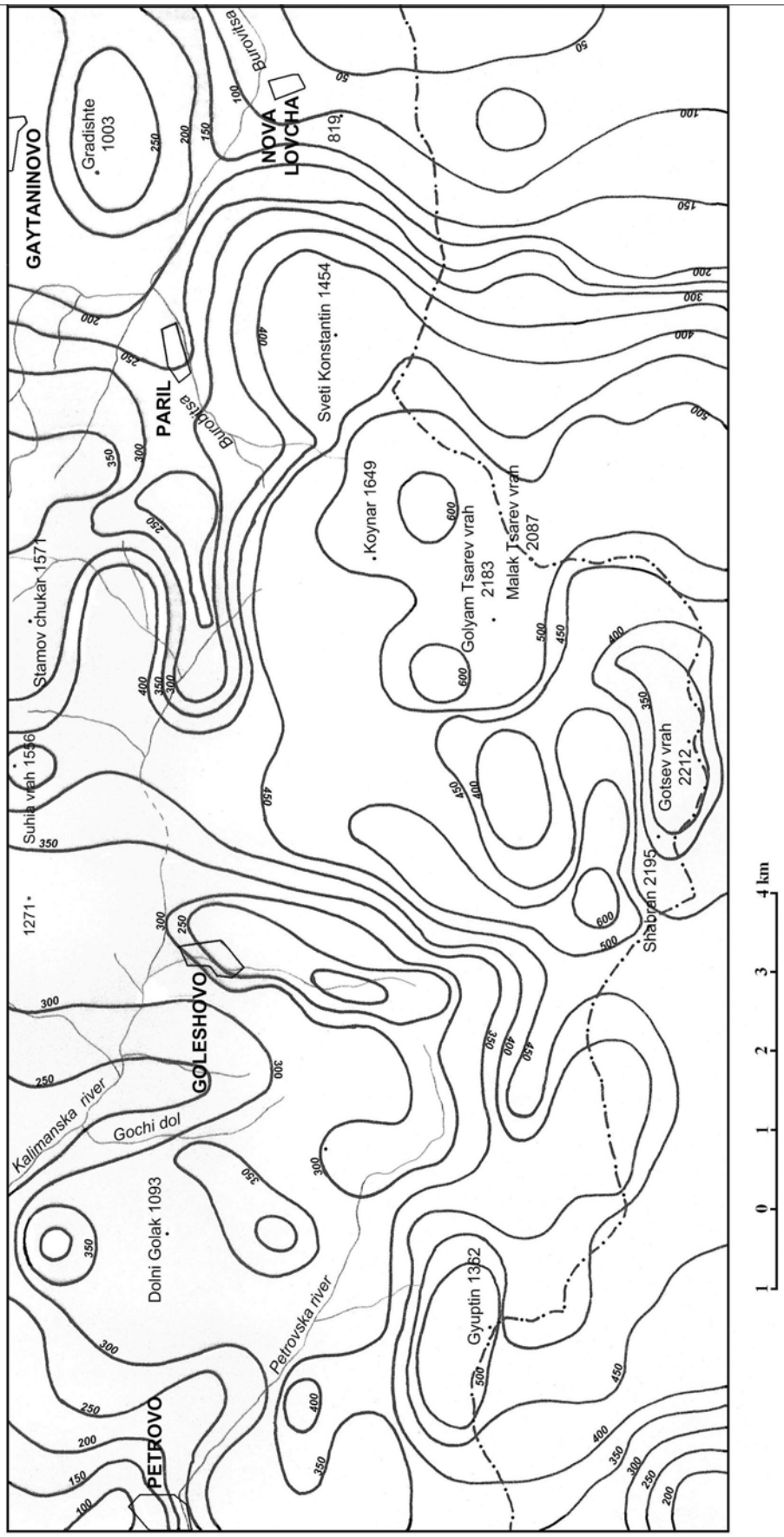


Fig. 2. Topoisoamplitudinal map of Slavyanka

The rest bigger part of the mountain is distinguished by precipitous and very precipitous slopes, where almost everywhere the vertical dismembering is over 450 m/sq.km. North west Big Tsarev peak, the Hambar gully area and north-west from Shabran peak this indications are exceptionally big up to 600 m/sq.km.

4. HISTORY OF THE GEOMORPHOLOGICAL INVESTIGATIONS

The region of south-western Bulgaria has been a subject of investigations already at the beginning of the past century. It has been visited by the well known geomorphologists J. Tsvijch, K. Jovanovich, Ostraih,F. Kosmat, H.Luis and others. They direct their interests mainy to the exploration of Pirin, Rila and Western Rhodopes. Later in the time the region has been also explored by many Bulgarian geomorphologists – Galabov (1966), Popov (1966), mainly in regard to regional investigations.

Slavyanka mountain, as well as the surrounding mountains, that are in the presental most fully in Greece are a subject of a spetial interest of Georgiev [2], [3], [4] and athers. During more than 40 years he works on the problems of geology and geomorphology of the area, and mostly explores the denudation surfaces [3], the petrography and the ores and minerals [4], and he also pays spetial attention to the yield of iron ore (1946, 1953, 1978, 1984) [2].

In geological respect this region is well explored. It has been a subject of full geological mapping by Boyadzhiev and others, 1967F, and Kozhuharov and others, 1959F. Multiple publications that has been collected and analysed, contribute to the published geological map M 1:100000, by Publishing House Committee of geology and Gelogy Institute of BAS, and enclosed explanation [5], [6]. The region is also a subject of fundamental investigations, referring the geodynamic and the neotectonic [9], [10], [12], [13].

5. GEOLOGICAL STRUCTURE AND TECTONICA

The mountain has a relatively uniform rock composition. It is formed with docambrian metamorphic rocks of the Dobrostan Unit [5], [6] - marbles shists, anfibolits while in it’s grater part are found the rocks of the marble units. Amongst this rocks in the most northern basin there are situated parts of the teshovsks granitoids. (Teshovski plutone). In the north western basin of the mountain next to Lehovo Village a small plutonic body of a granatoid is revield. The marble unit stays over the upper multicoloral unit is built with gneiss, amfibolits, calcoschists and marbles. The middle colorful unit found in the core of the Petrovska anticline, is mainly build by amfibolits, some gneisses and schists, and also some marble units. In a tectonic respect, Slavyanka Mountain is a part of the Pirin horst. It has a lot of steep slopes and clearly defined border smarked by the fault river valleys and deep basins. A very active neotectonic zone is formed and is dismembered of separate developed tectonic blocks, devided by deep vvalleys and abysses. Several fold structures are formed in all the rocks. During it’s Alps development the region has block and fault structure [5], [6].

6. STRUKCTURAL AND GEOMORPHOLOGICAL ANALYSIS OF THE TERRAIN

In morphostructural respect the mountain system of Slavyanka is called “Alibotushka mountain morpfostructure” (Tzankov et al, 2005). It has konkav shape toward north-west and horst composition strongly complicated by the additional diferential block movements.

In morphostructural respect this geomorphological unit differs with the changing character of it’s dimentional situation. The Tsarev peak and Gotsev peak Vault concentrical

structures are clearly distinguished on the background of the ridge of this structure. The ridge plunges relatively faster north wards of these structures and in the west of them it lowers in much more horizontal way. The inclination of the terrain rapidly reduces it's intensity in the middle and lower parts of the slopes. On the slipes of the morphostructure on the north-western slopes, there are clearly distinguished listric prismas that are gradually reducing from the ridge to the basin. These are multipleprismas with different size and orientation. These are steeping plunging faults, devided by deep shaping river basins. An active vertical erosion is typical for them.

The form of the terrain connected with the neotectonic motions of the earth, takes an important place in the contemporary terrain of explored area.

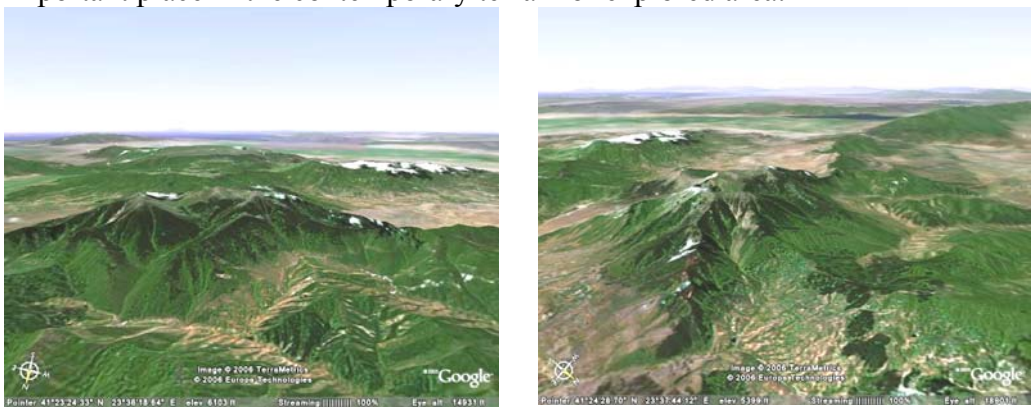


Fig. 3. Tridimentional image of the mountain structure of Slavyanka [14]. A northeast and north outlook. The deep fault valleys and the forming of two voult structure are well defined

6. CONCLUSION

The lasting complex continental evolution for about 2500000 years has led to full elimination of the tracks of the newest regional structural plan of the Alps and also to the emerging and imposing of the tracks of new geodynamic regimen.

The erosion proceses followed through the very end of late Miocene, Pliocene and early Pleistocene, has led to the emerging of the orthoplen that comes after the early Pleistocene.it's mosaic block deintegration has started in the beginning of the middle Pleistocene and continues with the same strength till the present. The fast mountain formation that shape the contemporary appearance of the mountain, has started in that time. The quaternary regional fault net consisting of a steep falling listric faults has a decisive role in this process.

REFERNCES

[1] Baltakov, G., (2003) *Neogenic and Quaternary sculpture geomorphogenesis of the eastern parts of the Balka Peninsula*. Thesis for obtaining a scientific degree "Doctor of the sciences", Sofia.

[2] Georgiev, G., K., (1953) *Iron mining industry in Murvashko (the Alibotush Mountain and surrounding mountains)*. In: Ore activity in the Southwest Bulgaria, 1-123.

[3] Georgiev, G., K., (1959) *Investigations on the geomorphology of Slavyanka-Alibotush*. In: Year book VMGI, 5, №2, 259-281.

[4] Georgiev, G., K., (1984) *Petrographical notes of Slavyanka-Alibotush Mountain*, In: Problems of the geology of Southwest Bulgaria, „Technics", Sofia, 27-30.

[5] Kozhuharov, D., R.Marinova, (1991). *Geological map of Bulgariq, M 1:100000,*

sheet Gotse Delchev, Geology and Geophisics
[6] Kozhuharov, D., (1994) Explanation note the geological map of Bulgaria, s. Gotse Delchev.
[7] Nikolov, V., M. Jordanova, (2002). *Mountains in Bulgaria*, Prof. M. Drinov, S., 168-171
[8] Pancheliev, At., (2005) *Slavyanka Mountain*, *a guide*, "Pirin-Pirin", Blagoevgrad.
[9] Tzankov, Tz., N. Spassov, G. Nikolov, (2000) *Role of the circular structures for the contemporary relief building in Mesta River Valley (South West Bulgaria and North Greece)*. Reports of Geodesy, 4.7, Warsawian University of Technology, Warsaw.
[10] Tzankov, Tz., Spassov, N., Kr. Stoyanov, (2005) *Neogene-Quaternary Geodynamics and Paleogeography of Middle Struma River Valley Area*. Neofit Rilski, Blagoevgrad, ISBN 954-680-365-0, pp 199
[11] Tzankov, Tz., Kr. Stoyanov (2005) *Morphostructural characteristics of Belasitza linear complex horst mountain*. 3th Congress of Geographers in R. Macedonia, Skopje, October 15-16, (103-110)
[12] Zagorchev, I. 1992. *Neotectonic development of the Struma (Kraistid) lineament, southwest Bulgaria and northern Greece.-Geological* Magazine, 129,2., 197-222.
[13] Zagorcev, I. 1992a. *Neotectonics of the Central parts of the Balkan Peninsula: basic features and concepts*. Geol. Rundschau, 81, 3, 635-654.
[14] http://earth.google.com/