activity, while the distribution of mineral deposits in them is found to be distinctly laterally zoned. The lesser ringlike structures correspond to the structure of the ore fileds or mineral deposits, as it is a case with the Bukovik-Kadiica polymetallic ore system. Especial feature within these structural elements are the faulting structures with general direction NE-SW which relicts are saved up to date. They have controled seismic zones and have shown influence to the loalization of magmatic bodies and ore mineralization on places where structures of NW-SE cross cut. These types of structures are common in so called wide zones of relaxation. After the activization of Cenozoic faults followed stage of formation of pericline structures and systems of concentric structures of volcanic type (numerous volcanic calderas in the Kratovo-Zletovo volcanic area). The Bukovik-Kadiica ore district, characterized by complex polymetallic mineralization, is located in the most eastern parts of the Besna Kobila-Osogovo-Tassos metallogenic zone. Determination of tectonic elements was done by different methodologies: generalization of horizontals, river networks, interpretation of satellite imagery etc. From north to the east, the lower part of the area, has been surrounded by the raised arc (1600-1700 m). Radial and radial-centrifugal forms allowed determination of two crossed oval structures: southern and northern. Higher points, erosion study and alluvial accummulation are pointing our to a slope-like development with characteristic valleys and slopes on the southern oval structure and raise of the northern oval structure. Intersection of the oval forms has been complicated by the ring structure 3.5 km in diameter. Its central part overlaps with the independently raised Bukovik (1700 m). Around the raised area there is a depression belt, which has been articulated with the highest parts of the adjacent river valleys. To the east, outer side of the structure has been limited by raised arc. The Bukovik ring structure has been located within the intersection of orthogonal system of fissures determined on the linear tectonic elements of the recent relief. Field observations, desk studies, satellite imagery, metallogenic features, confirmed that morphostructural parameters of the Bukovik-Kadiica area are characterized by structures of two general directions (NW-SE and NE-SW). Also, this study has shown that mineralization was closely associated to the intersection knots of major structures.

Strain geometry and kinematics along the central Pindos Thrust Belt in Northern Greece: implications for the structural evolution of the External Hellenides

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The Pindos Thrust Belt (PTB) represents the intensively folded and thrusted sedimentary sequence deposited in the Pindos basin along the western margin of the Pelagonian microcontinent. Pindos Thrust Belt expands, from northern Greece to the southern Greece on the Peloponnesus, exhibiting a NW-SE strike, thereafter it turns in an E-W striking direction. Its north continuation in Albania is represented by the Crasta –Cukali Zone. PTB is enveloped between the Gavrovo Zone, to the West and the Pelagonian nappe system to the East. The zone accommodates a succession of continuous Mesozoic deep sea sediments, comprising cherts, clay- silt- stones and pelagic limestones. An Upper Cretaceous to Eocene flysch terminates the sequence. Orogenic processes (Neohellenic Stage) associated with plate convergence during Tertiary caused compression and crustal thickening, generating folding and thrusting (PTB) followed by normal faulting and extension.

Based on a quantitative analysis along the N-S striking segment of PTB in Northern - Central Greece we present structural data concerning the Tertiary deformation regime of PTB. Strain and paleostress tensor analysis of deformation were also performed on selected outcrops.

Data analysis point to the following deformation styles to have affected the PTB:

An early D1 deformation style of Paleocene to Eocene age, represented by asymmetrical, angular, tight folds with axes bearing a N-S to NW-SE present day orientation. D1 is associated with the progressive westward to south-westward propagation of thrusting of

the external Hellenic orogenic wedge over the Adriatic platform. Back-thrust structure geometry with NE -ward vergency is also recorded. Striaetion lineation on the thrust planes exhibits a ENE-WSW to NNE-SSW strike. Paleostress analysis shows a subhorizontal, E-W to NE-SW trending maximum main axis σ_1 and a subvertical minimum main σ_3 -axis.

A late D2 deformation style of Oligocene –Miocene age, overprints the former D1 structures, producing WNW-ESE to E-W trending compressional structures, such as asymmetrical steep folds and thrust faults.

Sense of movement is evaluated mainly towards SSW to S. Striaetion lineation along thrust planes exhibits progressively a NNE-SSW to N-S trend. NW-SE dextral and NE-SW sinistral trending strike slip faults, associated with the D2 compressional structures, induced a SE- or NW-ward orogen parallel motion. Furthermore, some of the D1 thrust faults were reactivated during the D2 as strike slip faults. Paleostress analysis shows a subhorizontal maximum main axis σ_1 in a N-S to NNE-SSW direction during D2 event.

Both in map and outcrop scale curvature of D1 structure trace, as well as the orientation geometry of the D1 and D2 structures, imply a continuous deformation regime during Tertiary time under oblique plate convergence and a transpression related strain field.

Seismotectonic model on geological data for 1892 Dulovo earthquake, lower Danube valley

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The potentially active faults in the area of Lower Danube Valley between the arcs of Carpathian and Balkan mountain chains are not properly recognized. The epicentre of the only historically known “strange” earthquake on the territory of Bulgaria with a magnitude evaluated at $M_s = 7$, known as the “1892 Dulovo Earthquake” is situated in this area. The first step for creating a seismotectonic model for this earthquake is the identification of the nearby active fault. The analysis has shown that it is realistic to accept that the earthquake occurred in the frames of the Tutrakan Graben. A fault segment of the Dulovo Fault, the most probably activated during the 1892 Dulovo Earthquake, is recognised. Its length is 42±5 km, and the width is 15±2 km. The offset of the normal faulting from the last seismic events is evaluated at 2 m. Three approaches are used for determination of the maximum magnitude of the earthquake that can be generated. They give M_s in the range between 6.8 and 7.5. The most probable value is 7.0.

Migrations caused by catastrophic flooding of the Black Sea during the Holocene

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Geological data suggest an exceptionally large natural catastrophe in the Black Sea region 7500-7600 yrs. BP. Before it Black Sea was a fresh water lake with coasts 90–120 m below the recent sea level. This catastrophic rapid flooding of the Black Sea by the Mediterranean Sea waters was dated in numerous samples by ^{14}C at 7 560 ±50 cal. yrs BP. It flooded 160000 km^2 and destroyed settlements of the early civilizations around the Black Sea coast. At that time here were settled Indo-Europeans.