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UNIVERZITET METROPOLITAN BEOGRAD

Univerzitet Singidunum FUTURA Fakultet za primenjenu ekologiju

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REGIONAL DEVELOPMENT AND CROSS-BORDER COOPERATION

Pirot, Republic of Serbia

STARA PLANINA MT. AS A POSSIBLE TRANSNATIONAL GEOPARK

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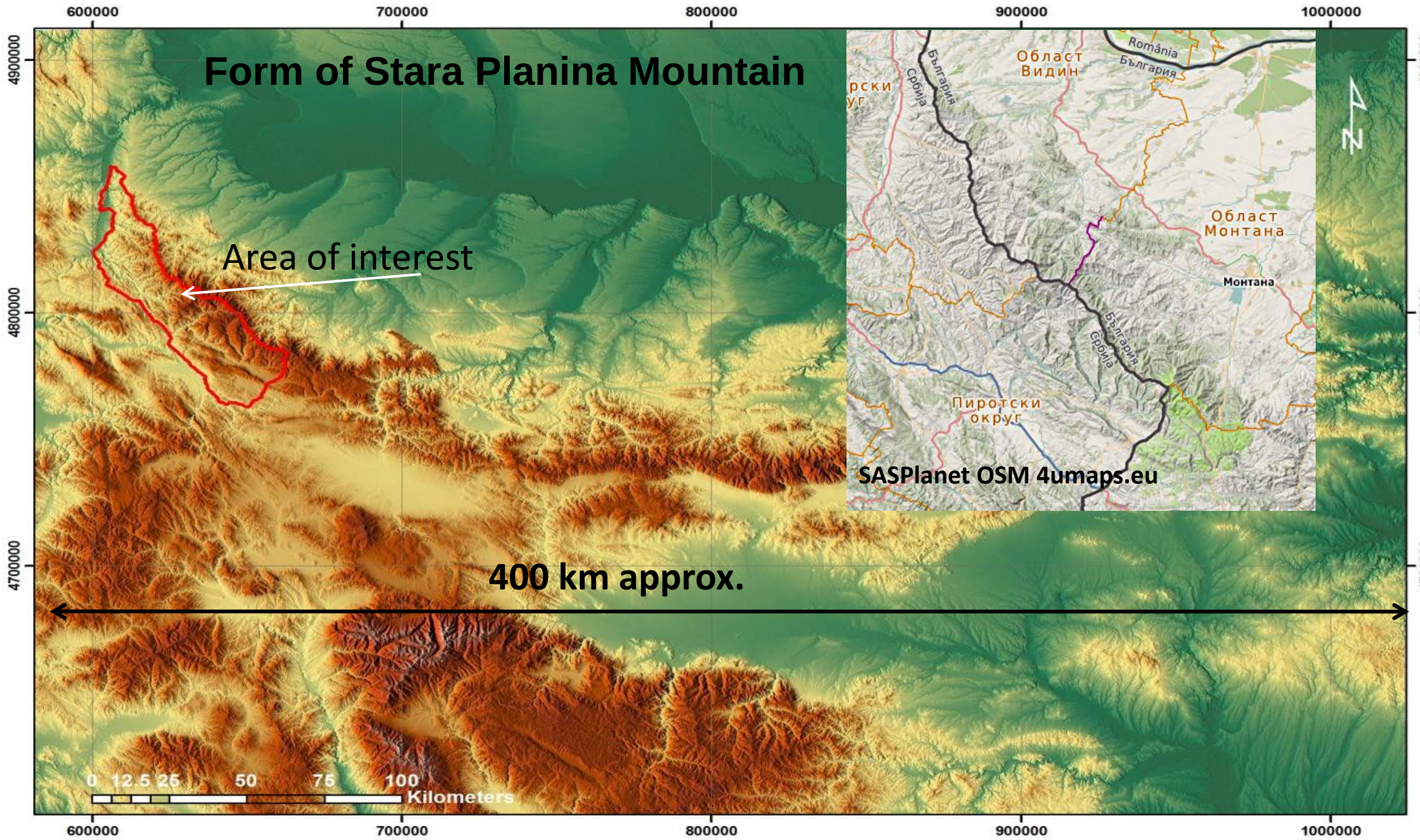
Mount Stara Planina

- Mount Stara Planina can be considered from several perspectives: nature park, geography, geology, etc. The present overview is associated with the study of radioactivity. To the east (ridges) and south, the area is bounded by the border with Bulgaria, and to the west (north to south) by the rivers: Beli Timok, Trgoviški Timok, Stanjanska, Klajča, Temska and Nišava. In general, the part of Mt. Stara Planina located in Serbia is smaller than that extending from the Bulgarian border to the Black Sea. On the National Base Geological map (S 1:100000), the study area is shown in the Bor, Zaječar, Knjaževac and Belogradčig, Bela Palanka, Pirot and Breznik sections. On the Geological maps of the former Socialist Republic of Serbia (1:200000), it is shown in the Knjaževac-Zaječar and Priština-Niš sections .

Form of Stara Planina Mountain



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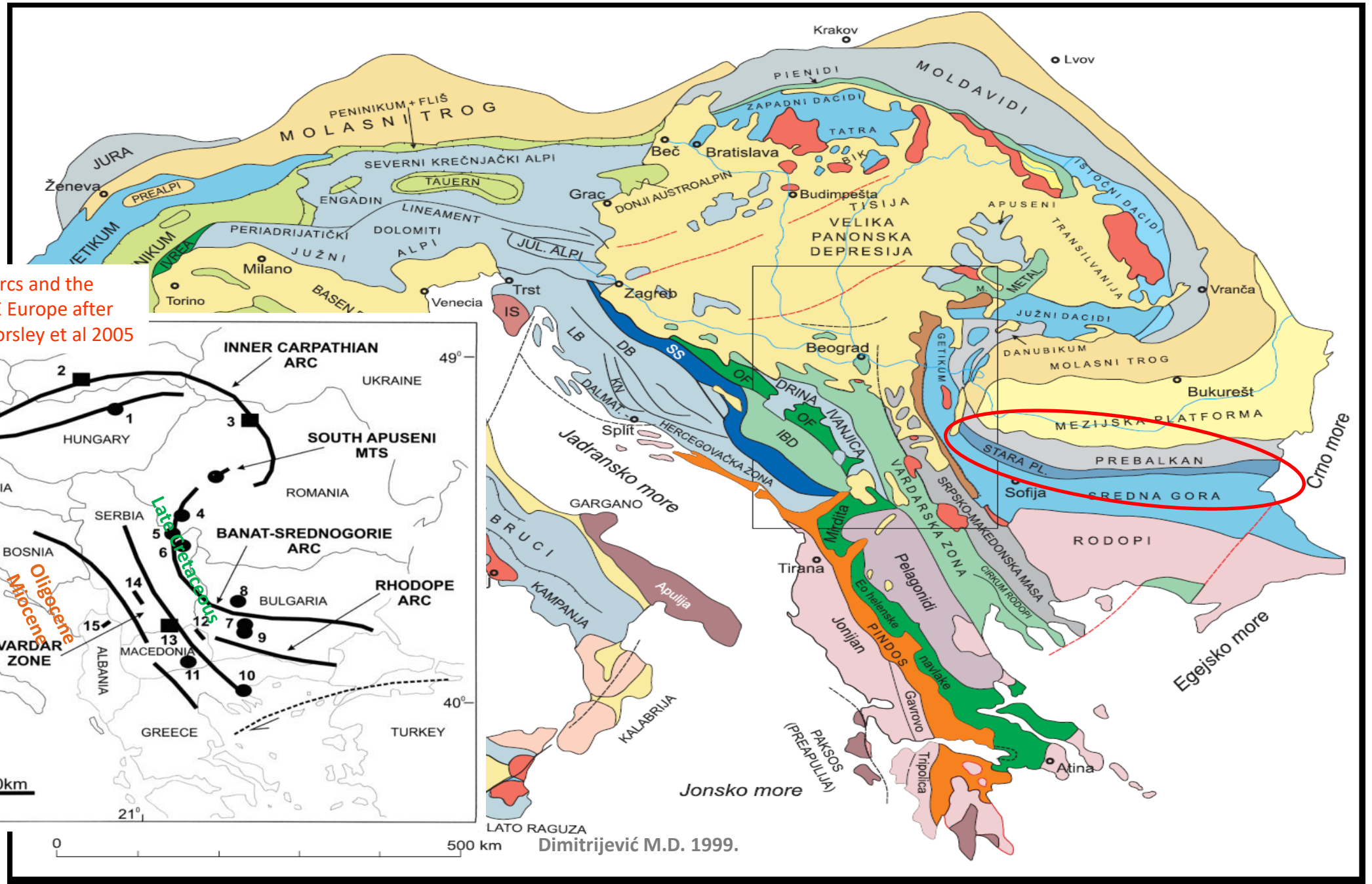
90 My ago late Cretaceous Microplates (in red circle)

On basis of https://www.alternityrpg.net/onlineforums/index.php?s=0&showtopic=6088&st=0

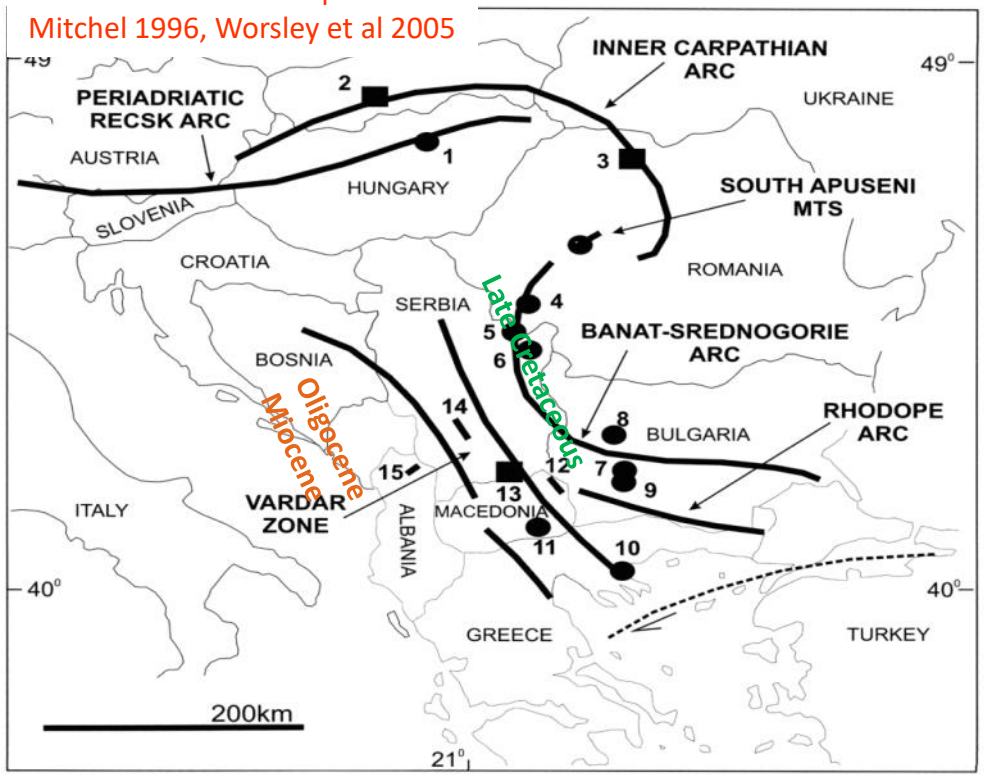
Play tectonic form late Permian to Oligocene Microplates (in red circle)

On basis of https://www.alternityrpg.net/onlineforums/index.php?s=0&showtopic=6088&st=0

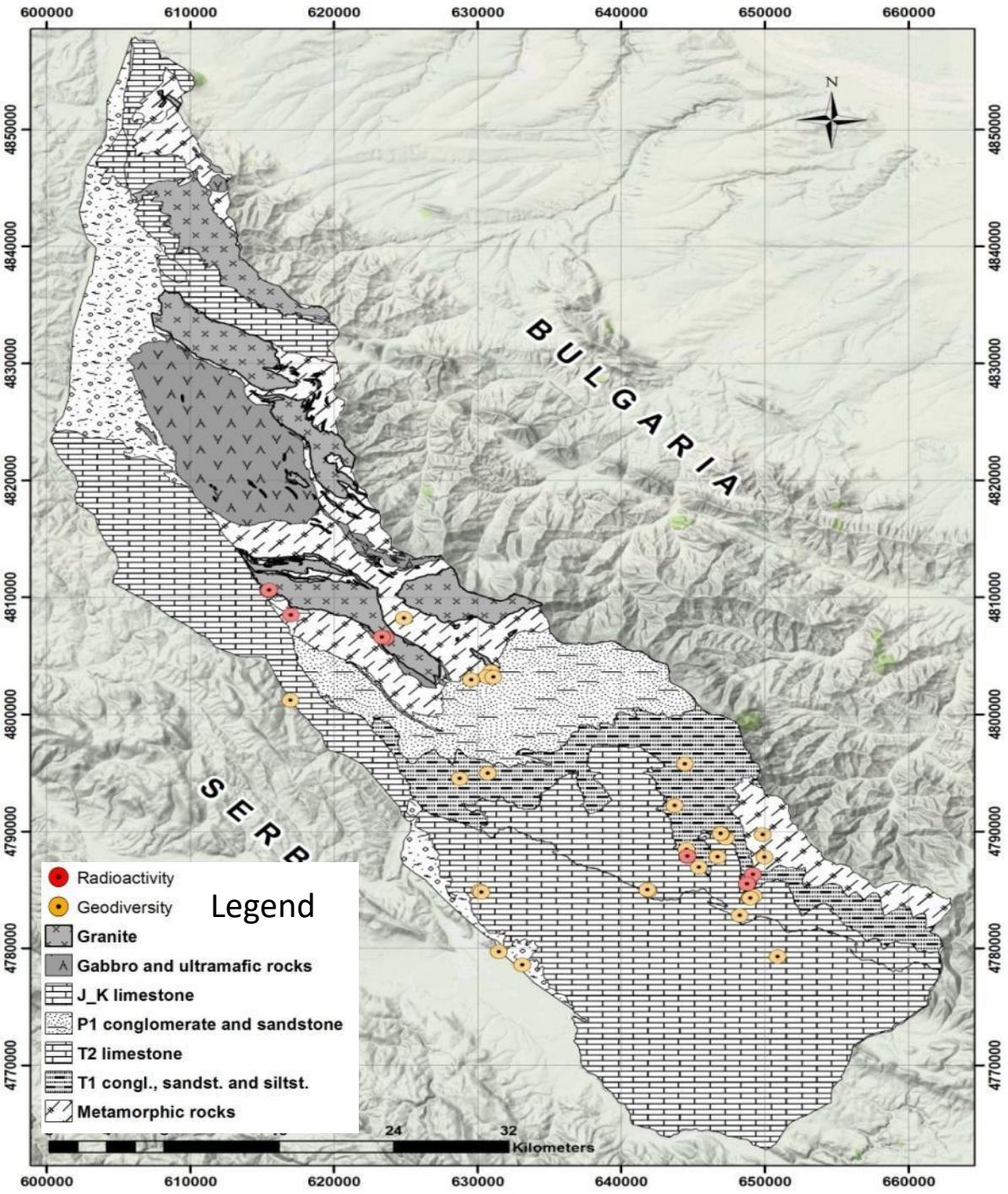
Simplified Tectonic Schematic Map of South-East Europe

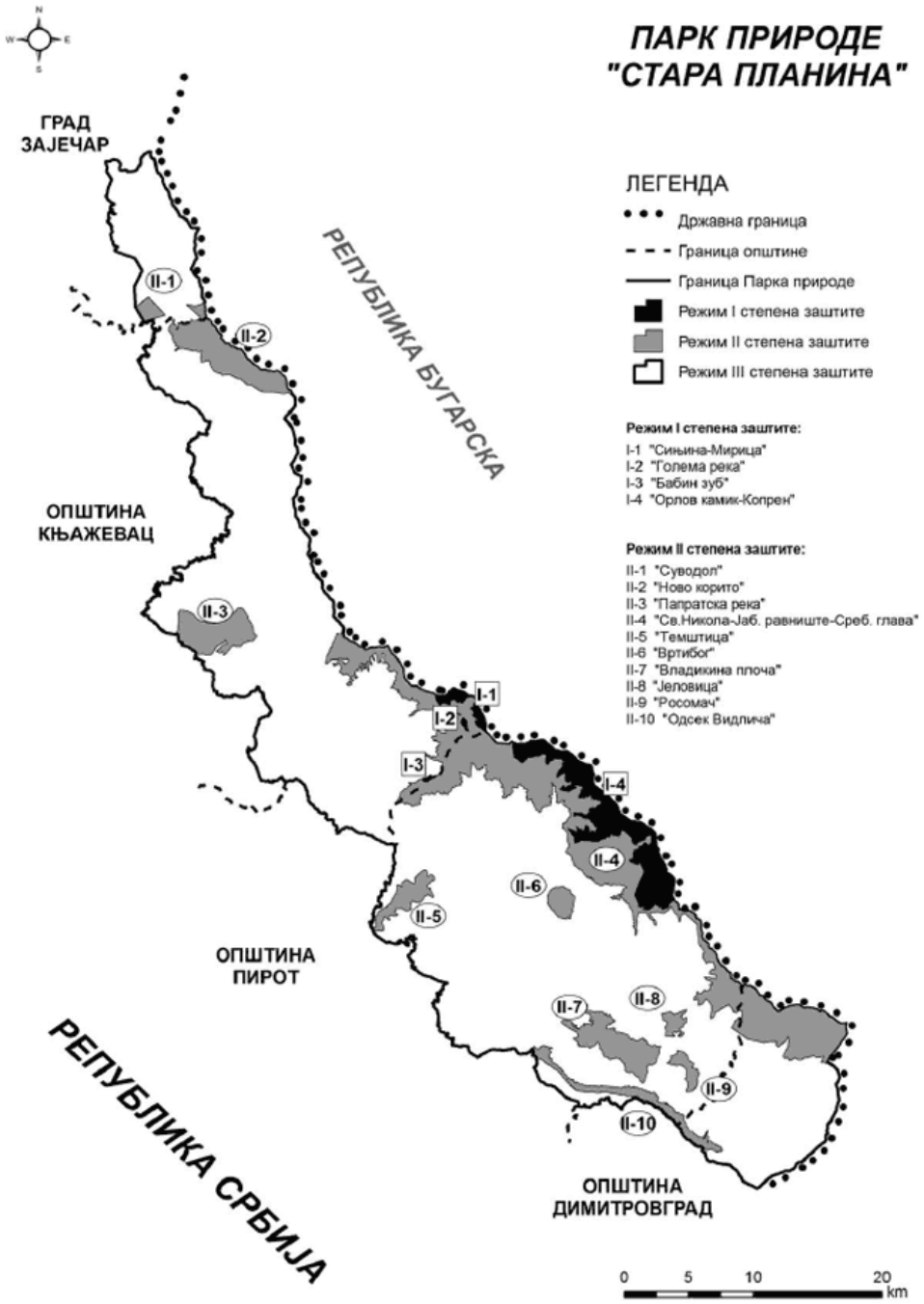


Carpathian Arcs and the Vardar Zone SE Europe after Mitchel 1996, Worsley et al 2005

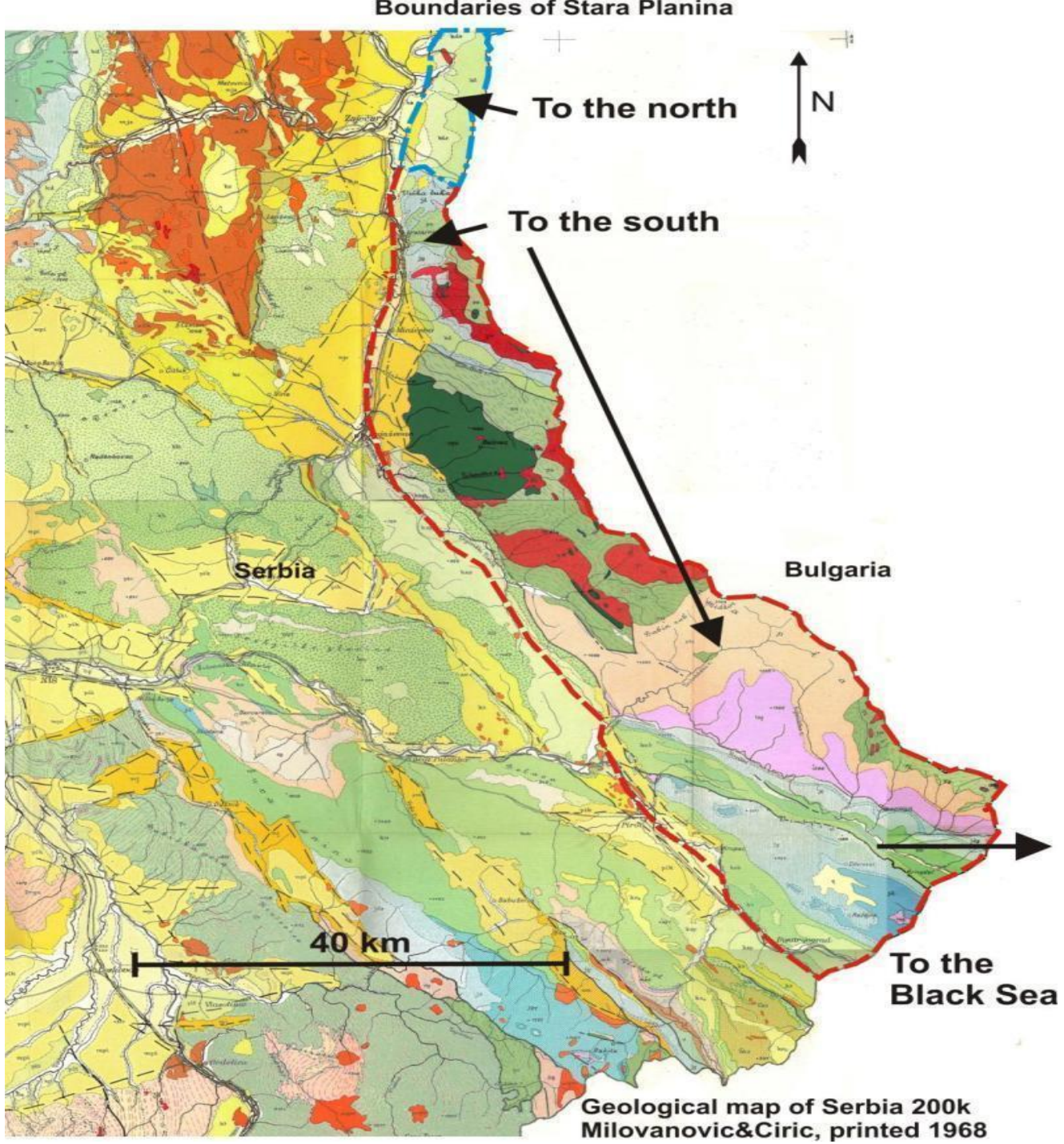


Dimitrijević M.D. 1999.





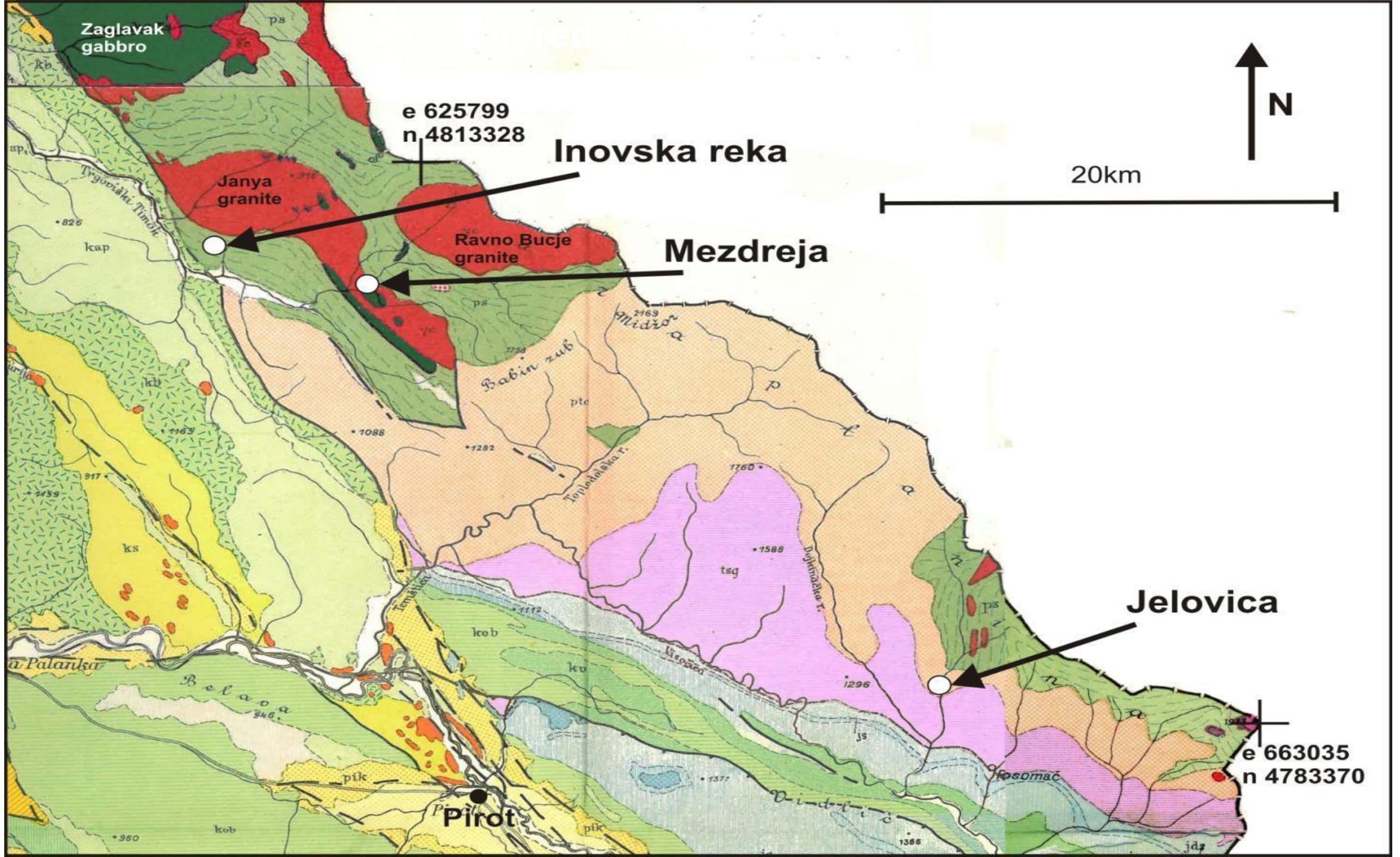
http://demo.paragraf.rs/demo/combined/Old/t/t2009_04/t04_0096.htm



Map shows extension of Stara Planina at 200k geological map

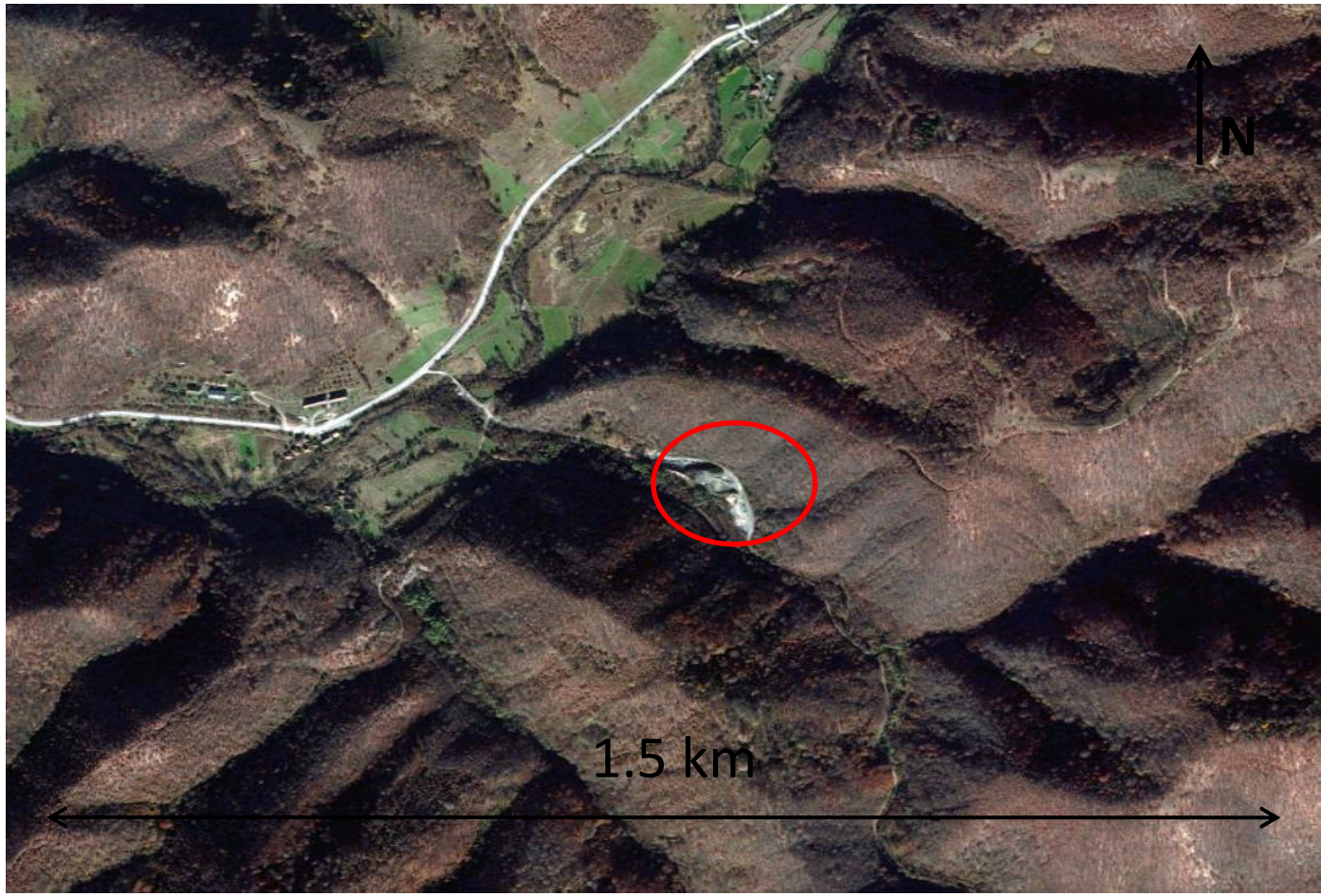
Mezdreja

- The Janja (Janya phonet.) – early Palaeosoic age granite is generally of the normal chalcoalkaline type, which transitions to the monconite-akerite type along the edges and alkaline granite in the middle. Deformation and secondary alterations have been noted in the entire massif, especially in its peripheral parts. The texture of the Janja granites is porphyritic. They are comprised of quartz, oligoclase, K-feldspar (microcline, rarely orthoclase), and biotite. Sphene, apatite, zircon and magnetite are incidental, while secondary constituents include sericite, chlorite, epidote, calcite, limonite and clay.


Zaglavak gabbro
e 625799
n 4813328
Inovska reka
Janya granite
Ravno Bucje granite
Mezdreja
N
20km
Jelovica
e 663035
n 4783370
Pirot

Example Mezdreja

- The Mezdreja Deposit is located in the southern part of the igneous metamorphic Janja complex, between the Crnovrška and Debeštička rivers. They are defined by two fault zones, referred to as 0 and 1. Uranium mineralization is finely dispersed in crushed and hydrothermally altered granite, or developed in the form of veinlets and coats of pitchblende visible to the eye.



Raster basis: SASPlanet, Bing satellite

Granite outcrop in vicinity of mine entrance

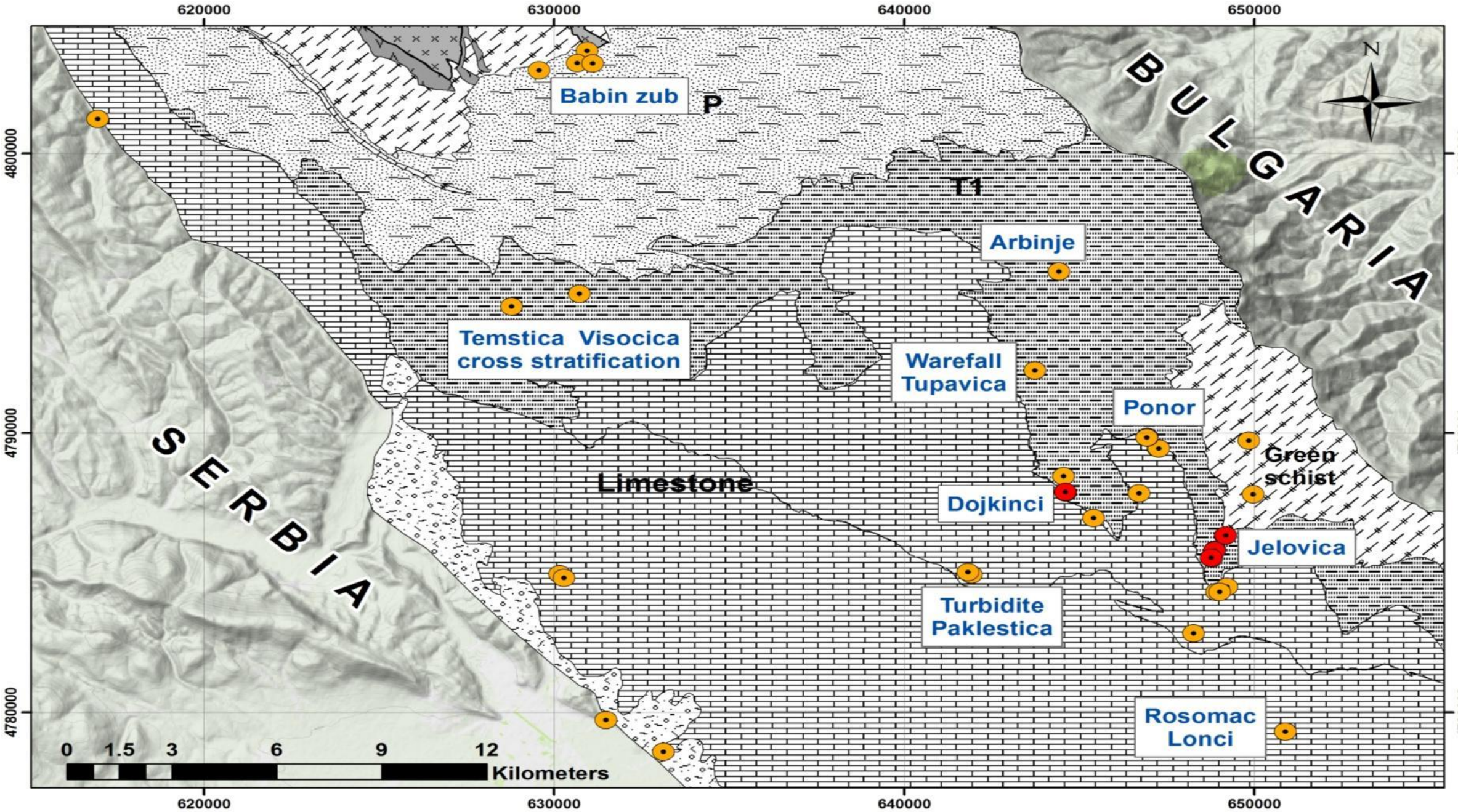
500 – 550 cps

BBV2016DSC0821

Macro photography of sample of granite outcrop from Mezdreja locality

BBV2016DSC00284

Stara Planina sedimentary geodiversity occurrences



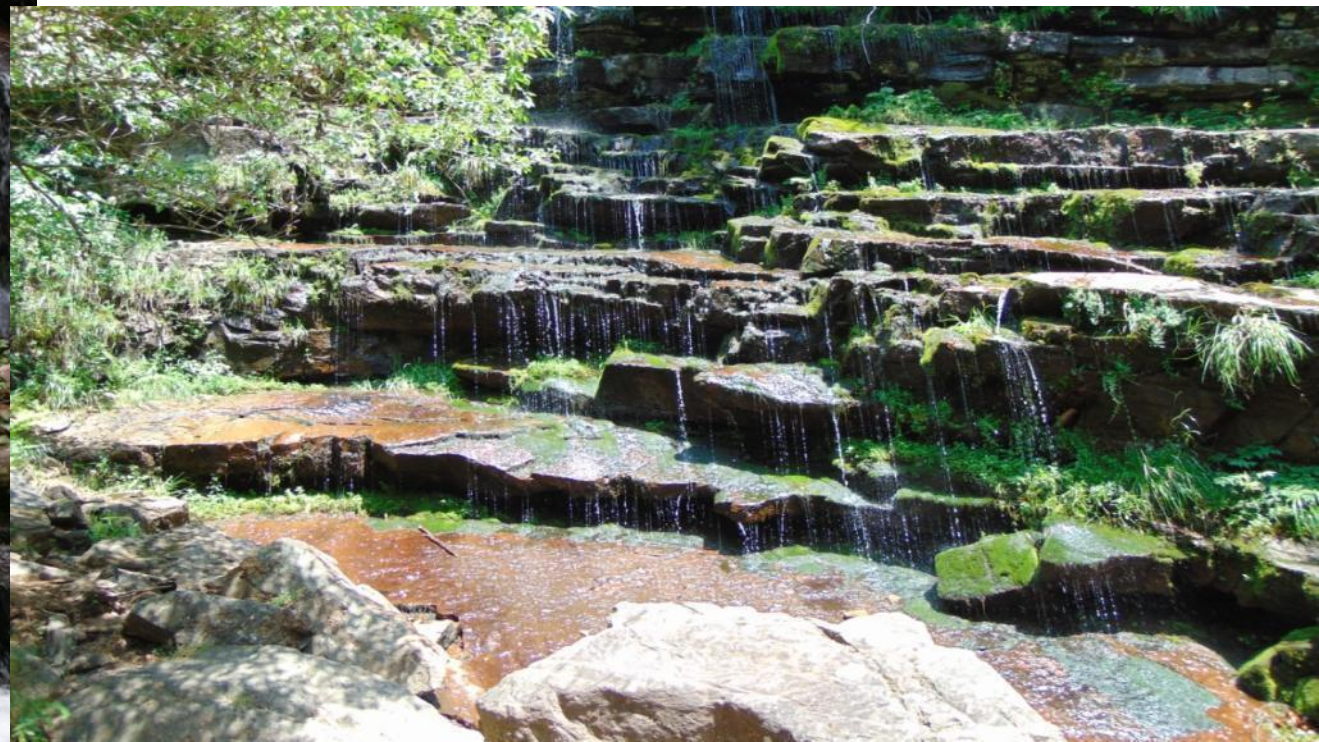
Babin Zub

- **Babin Zub** (“Grandmother’s Tooth”) is situated in Permian sediments, at the point of contact with Paleozoic metamorphic rocks and about 3 to 3.5 km east of the southern fringe of the Janja granite. There is a red sandstone formation comprised of continental sediments – arkose basal conglomerates (missing in places), sandstones, siltstones and shales. The thickness of the basal conglomerates varies, up to 200 m or more.

Arbinje

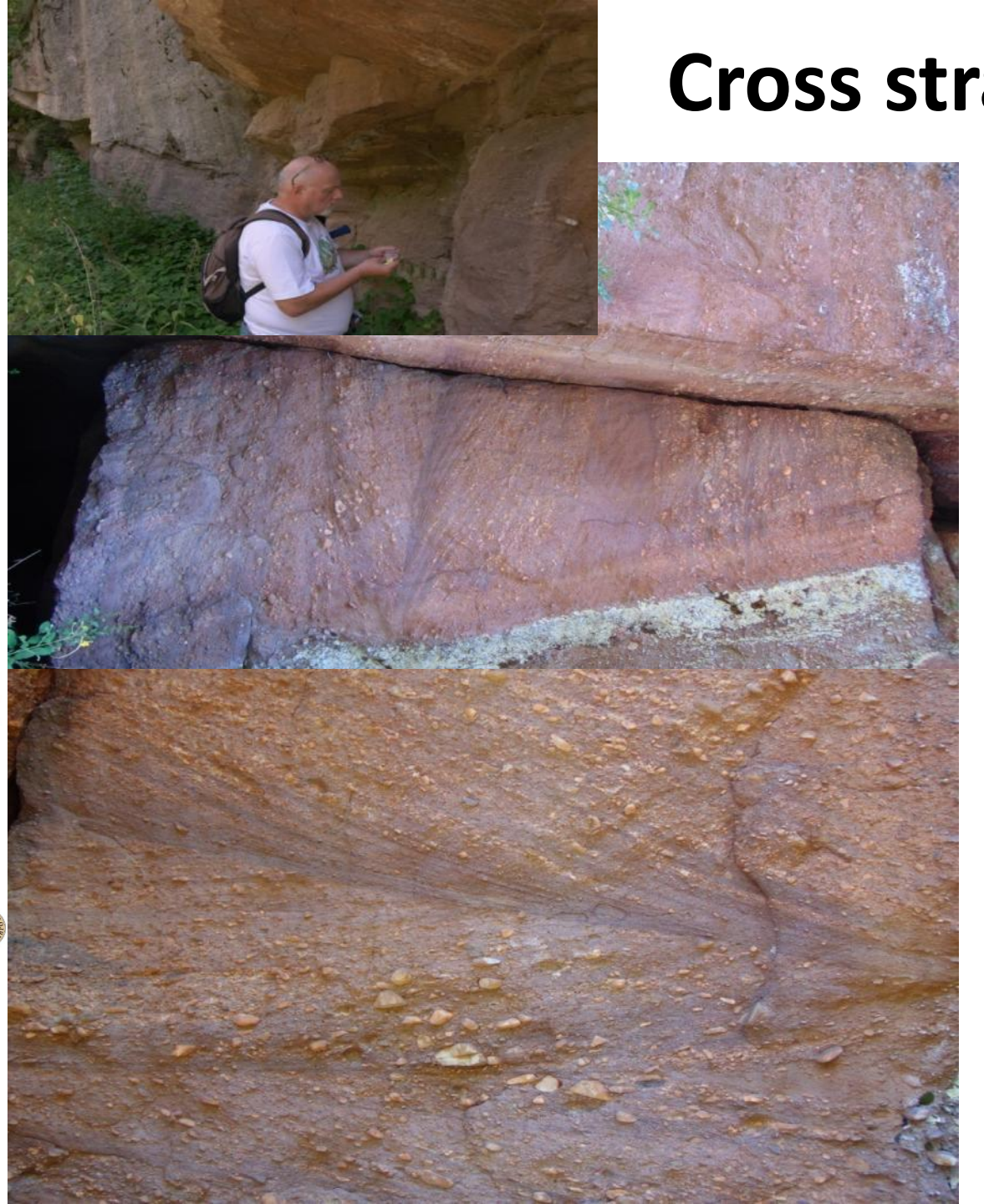
Arbinje These are plates created by an Early Triassic assemblage of red sediments and river flow. The older, Seis age layers are comprised of coarse clastic sediments – quartz and sub-arkose conglomerates and sandstones, whose stratification is typically inclined ("multicolored sandstones"), which transgress Permian sandstones, albeit with no clear angular discordance, and lie below layers that contain Campil age fauna. In the northwestern part of Stara Planina, Seis sediments are overlain by younger Liassic deposits. The Seis sediments are built up of basal quartz conglomerates and sandstones (quartz horizon), which in the upward direction turn into coarse-grained sub-arkoses (sub-arkose horizon) and medium-grained arkose sandstones.

Tupavica waterfall



Canyon of river Temstica

Cross stratification



- A special texture characteristic of the conglomerate, part and sandstone is the angular stratification, i.e. hair lamination. Inside the conglomerate layer, rarely sandstones occur several parallel laminaes arranged slanted relative to the surface of the layers. The thickness of the lamine is over a dozen centimeters. According to the shape and characteristics of sloping lamina on the field, the planar and angles on the layering varies.
- In the canyon of Temstica, these are outcrops heights of several tens of meters and length of several hundred meters. Through these walls, Temstica cut the canyon of more than a kilometer long.

Ponor

Depression Ponor is about 5 km south of Kopren pik (1963 m), and in relation to the village of Dojkinci, it is located 2 km in north-west direction. From the village of Dojkinci, the easiest way to Ponora is the forest road, about 10.5 km long, using an off-road vehicle. This depression, with a total area of about 2.3 sq km, is located between the Dojkina and Jelovačka rivers, and it was formed within the T1 conglomerates and sands, and in contact with the T2 limestone.

Ponor

Turbidite Paklestica

- On the surface of the layers of Jurassic limestone in the southern part of Stara planina several sites contain various biogenic texture forms (trace fossils), preserved traces of movement. One of the more famous localities is located in the village Pakleštica on the right bank of the Visočica River, some 300 m upstream from the last house of this village. They were created by life activity, by the movement of organisms, whose remains are not preserved.

Rosmacki lonci

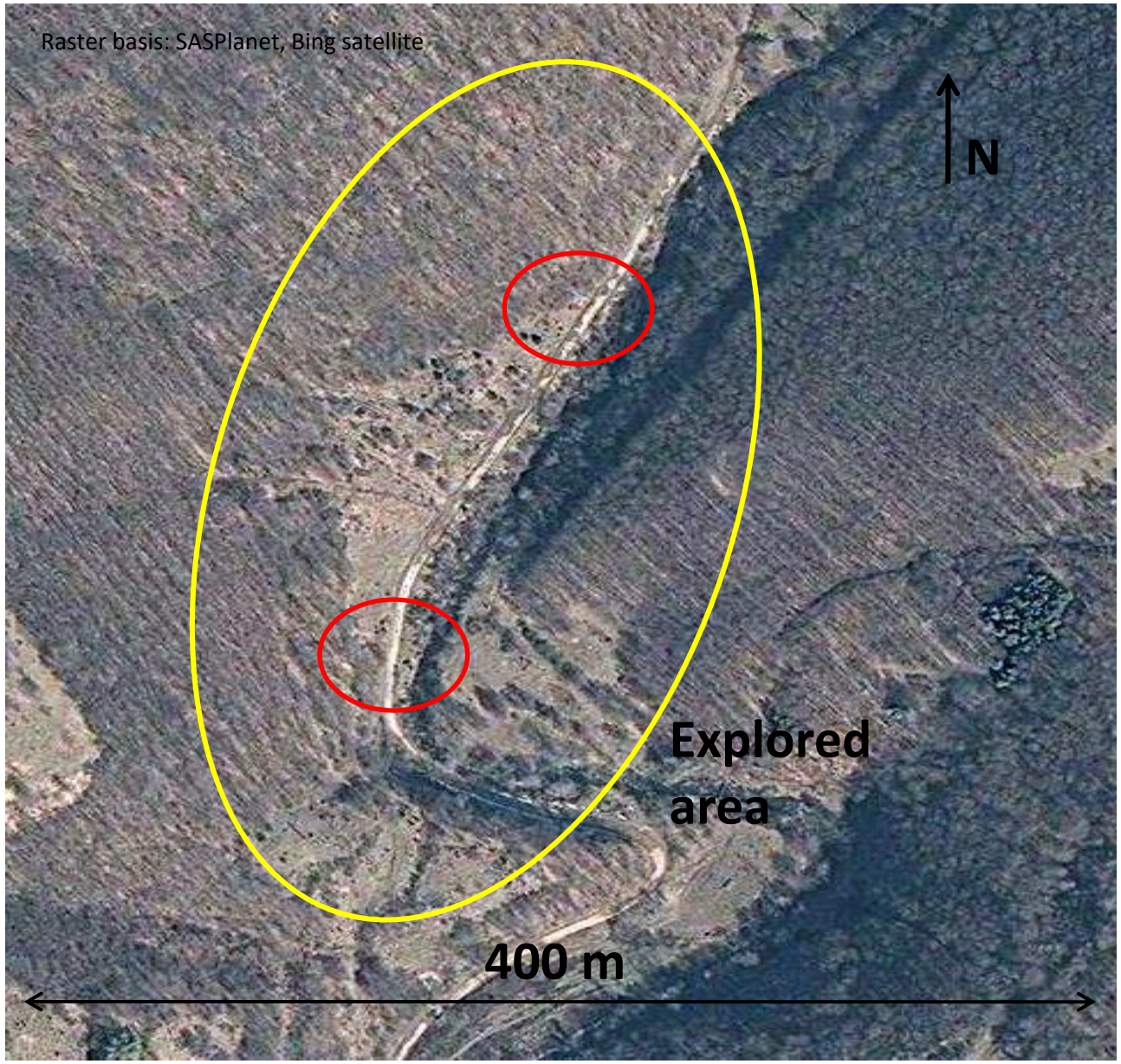
- In the southern part of Stara Planina, near the village Slavinja, about 1.5 km upstream of the Rosomac River, developed is Jurassic limestone. Rosomačka river has cut a canyon with "pots", in diameter up to a meter and depth up to 1 meter. It is relatively small in length and depth is up to 20 m. Juric limestone rock association was formed in the deeper parts of the ocean of Tetris, which at that time existed in this area.

Rosmacki lonci

- Jurassic limestone, which builds the canyon, is clayey to marvelous and very rich in fossil remains: ammonite, belemnitide, radiolarie, etc. (Anđelković et al., 1969). The basic form of the appearance of these walls is a pronounced stratification. The thickness of the layers is from a few cm to 60 cm (Vasić, 1992). There are also lumpu-cloggy forms of limestone.

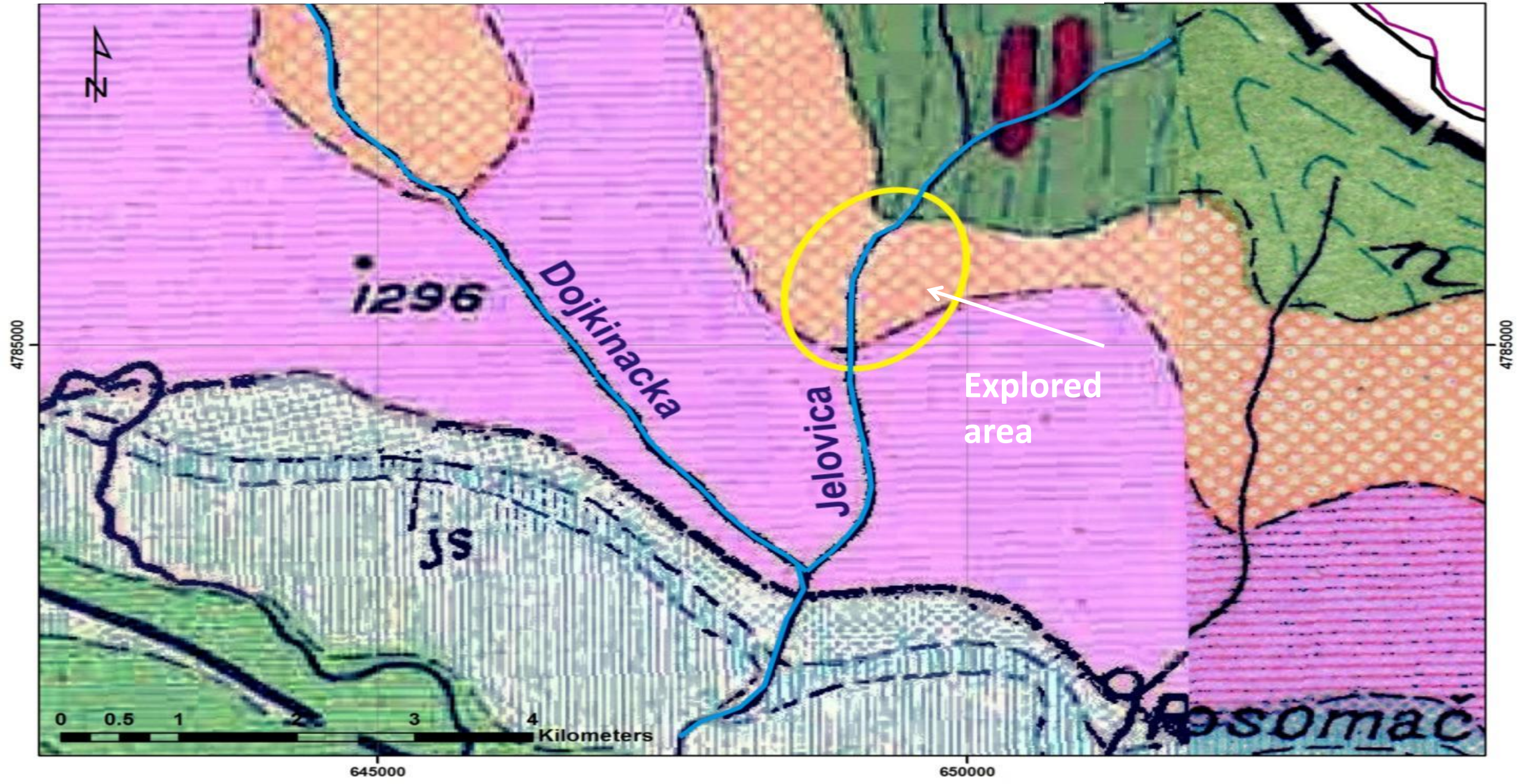
Jelovica Multicolor series

- According to the Pirot section of the geological map, observation points relating to the Multicolor Series are located within a zone identified as Lower Triassic. Known locations of elevated uranium concentrations are situated within the area of Dojkinci – Jelovica . The sample was collected from a part that could be named the “Jelovica occurrence”. Red conglomeratic sandstone is developed in the lower part, and marls and sandstones in the upper part of the batch. The sandstone color varies from red in the lower part to greenish in the upper part. Elevated uranium concentrations have been detected in gray siltstones.



Example 3 Multicolor series

200k geological map



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P – T1 Boundary, basal conglomerates

T1 red and gray siltstone

120 – 140 cps

BBV2016DSC0904

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Fakultet za menadžment Zaječar

Contracting District Chamber of Economy Pirot

City of Pirot

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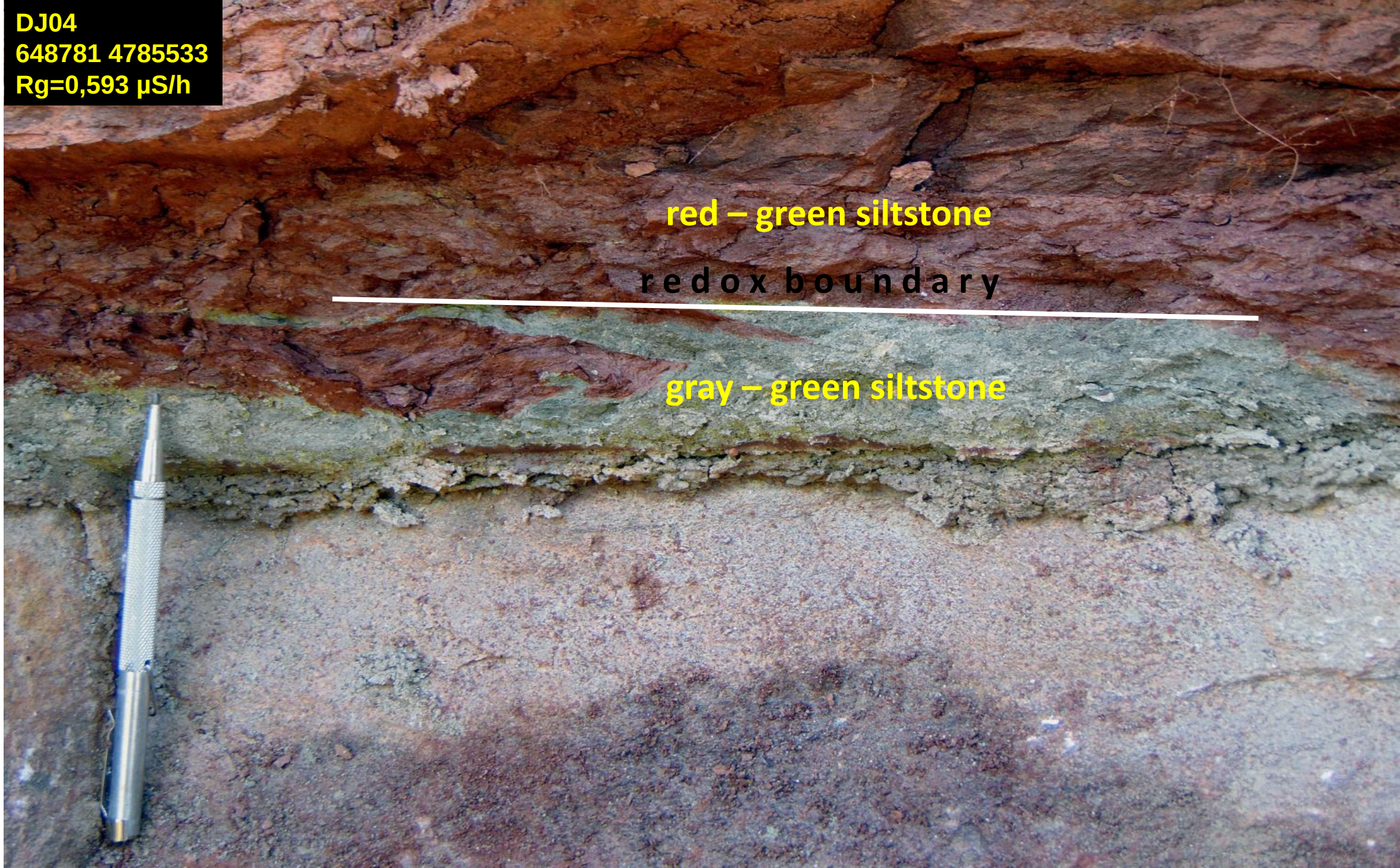
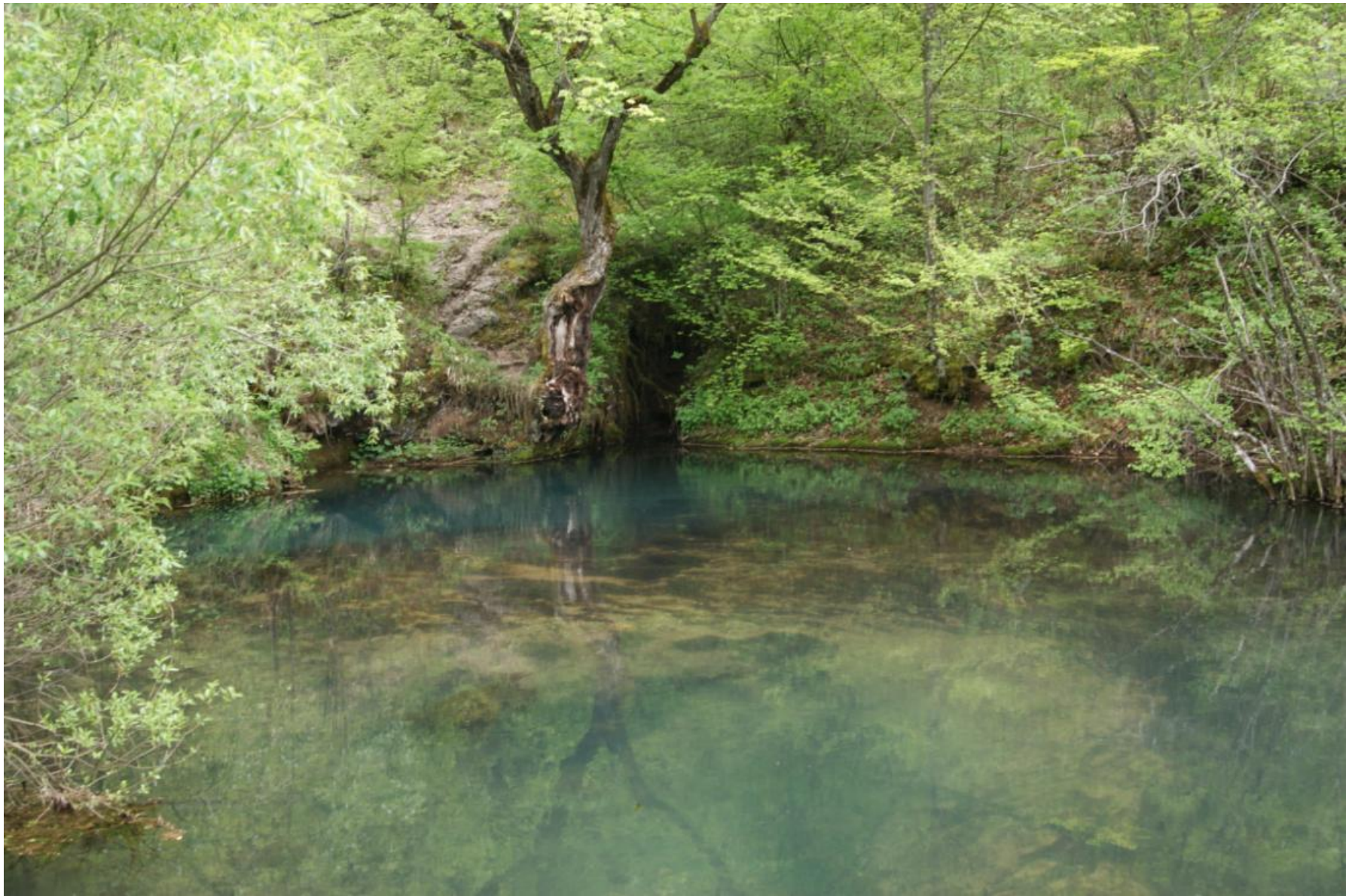

DJ04
648781 4785533
Rg=0,593 µS/h
red – green siltstone
redox boundary
gray – green siltstone

Open geological outcrop of red T1 siltstone in Jelovica area

Karst spring Jelovičko vrelo

- The biggist and the most important karst spring in karst masiff Vidlič
- Discharge of spring is 80 l/s up to m^3/s



Open geological outcrop with Jurassic brachiopods

Terebratula

Rhynchonella

Thank you