

1st REEBAUX Workshop 2019

October 14 - 15, 2019

Dalmatia inland, Croatia



DAY 1 – 14th October 2019 (Monday)

- departure from Zagreb at 07:00 a.m. The bus leaves from the parking lot of Faculty of Science, Horvatovac 102a, 10000 Zagreb (Figure 1)

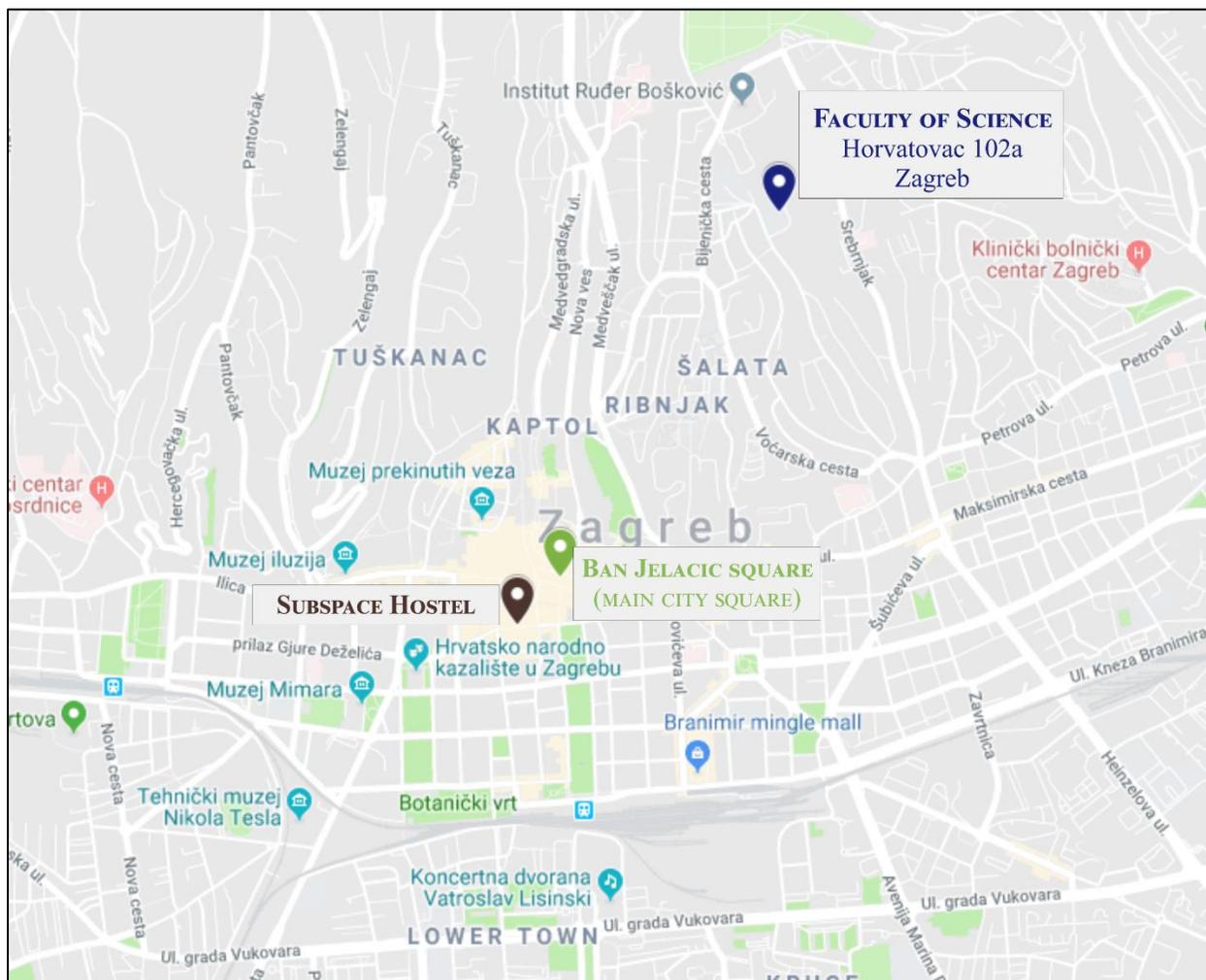


Figure 1. Starting point – Faculty of Science, Horvatovac 102a

- trip towards the field trip stop 1 – Vrace (including one short break; Figure 2)

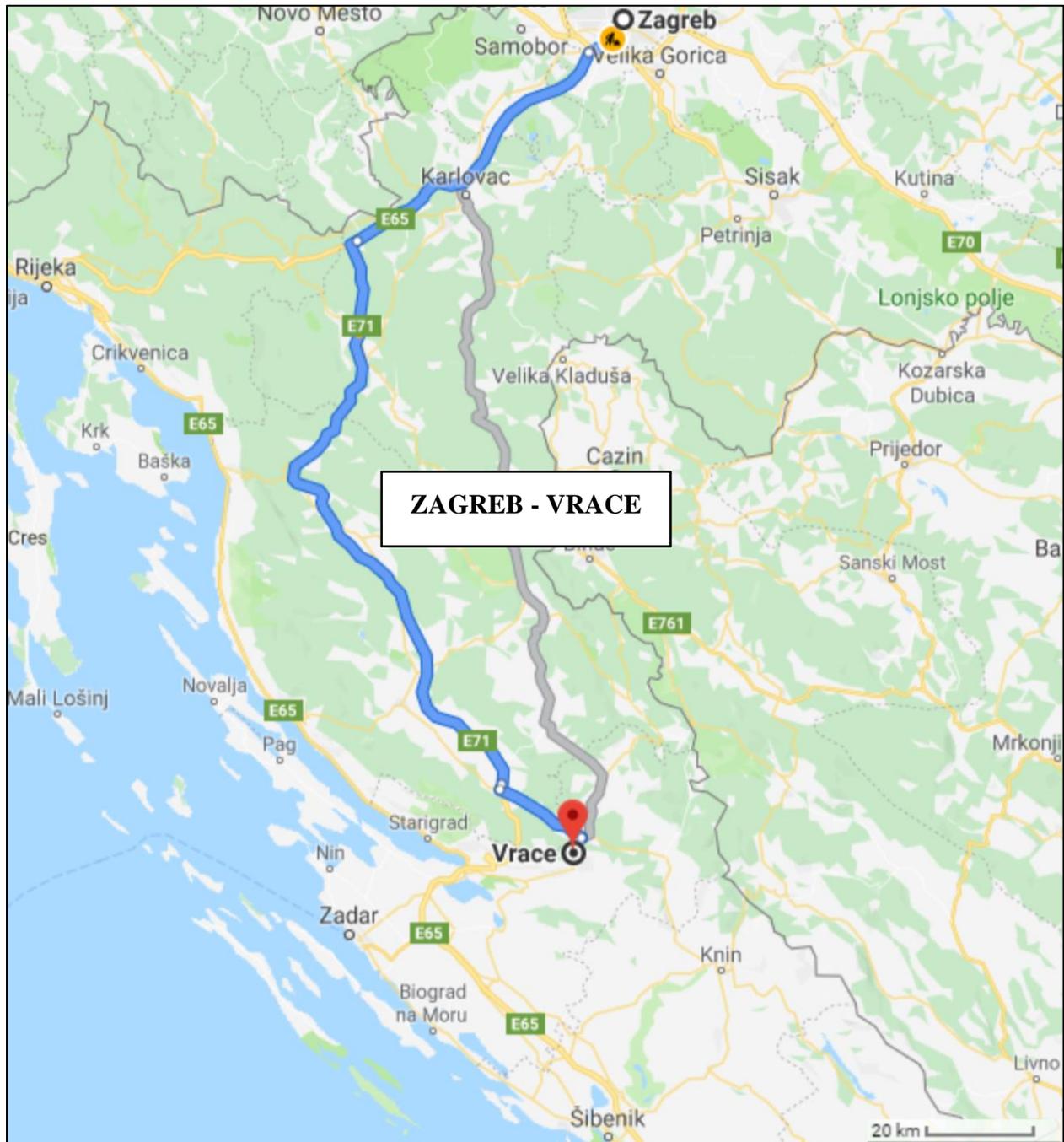


Figure 2. Map showing first part of the trip: Zagreb - Vrace

- **FIELD TRIP STOP 1 – VRACE***
- estimated duration: 10:15 – 10:45 h



Figure 3. Vracc bauxite deposit

The bauxite deposit is located along the road Gračac-Obrovac. It is elongated east-westwards, with approximate length of 700 m. Depth of the ore body ranges 40-50 m. Ladinian Diplopora limestone (Triassic) is at the bottom side of the ore body, and breccia-conglomerates followed by Norian dolomites cover the top of the bauxite. The deposit mostly contains clays and bauxitic clays. Bauxite occurs within the clays in three distinct layers: 1. Lower layer (4.5 m thick) is oolitic to crystalline with diaspore, hematite, kaolinite and chlorite as main mineral constituents. 2. Intermediate layer (5 m thick) with very variable chemical composition, 3. Upper layer (1.7 - 4.3 m thick) with a length of 500 m. The reserves of bauxite are estimated at several hundred tones.

*after: Marković, S. (2002): Hrvatske mineralne sirovine. Institut za Geološka istraživanja, Zagreb, p.544 and Kruk, B., Dedić, Ž., Kovačević-Galović, E., and Kruk, Lj. (2014): Osnove gospodarenja mineralnim sirovinama na području općine Promina u Šibensko-kninskoj županiji. Hrvatski geološki institut, Zagreb, p.87

- departure towards Cetina river spring at 10:45 h; estimated arrival at 12:30 h (Figure 4)



Figure 4. Map showing part of the trip: Vrace - Cetina river spring

- **CETINA RIVER SPRING (karst geological feature 1)**

Cetina river is the most water-rich river in Dalmatia, and has eight karstic springs, the largest one being Glavaševo lake, at 130 m of depth (Figure 5).



Figure 5. Aerial photo of Cetina river spring Glavaševo lake (courtesy of Š. Ašćić)

- Lunch break: restaurant Ivan (Civljani) (13:00 – 14:00 h)
- Arrival and accommodation at the school in Ježević: 14:00 – 15:00 h (Figure 6)

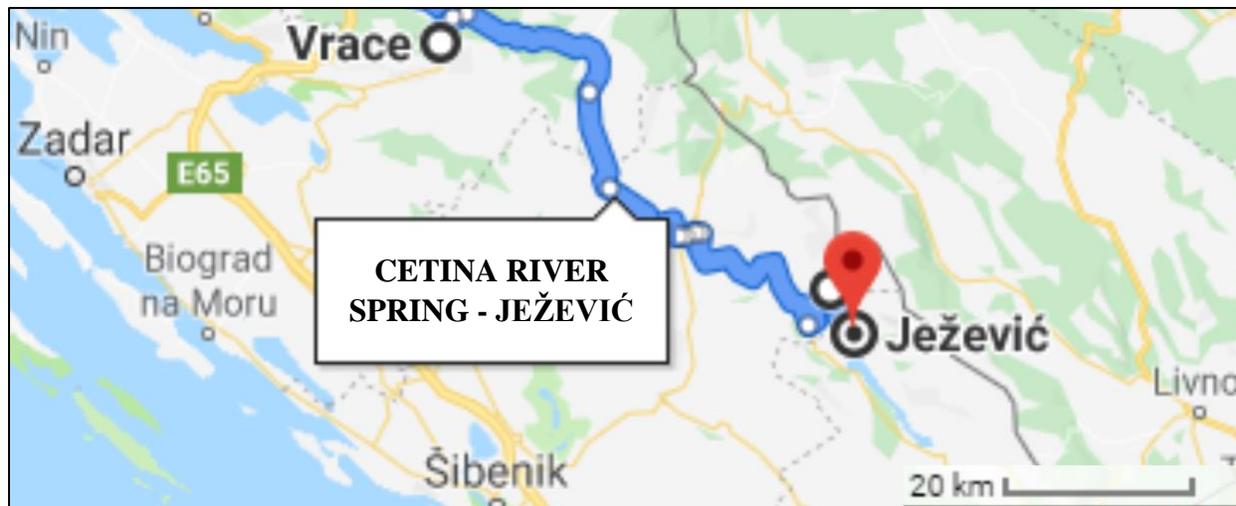


Figure 6. Map showing part of the trip: Cetina river spring – Ježević

- **LECTURES - 15:00 – 19:20 h**

15:00 – 15:40 h	N. Tomašić, A. Čobić	Rare earth elements: Mineralogy and geochemistry – short introduction
15:40 – 16:20 h	H. J. Gawlick	Triassic-Jurassic tectonostratigraphy of the Dinarides and related areas
16:20 – 16:30 h	BREAK	
16:30 – 17:10 h	A. Mindszenty	Bauxites unconformities and tectonics in general and in the Transdanubian Range in particular
17:10 – 17:50 h	I. Vlahović	General stratigraphy of the bauxite deposits in the Dinarides
17:50 – 18:00 h	BREAK	
18:00 – 18:40 h	S. Radusinović	REE in bauxites of Montenegro
18:40 – 19:20 h	V. Madai	Rare earth minerals in the Transdanubian bauxites of northwest Hungary (CriticEL project, 2012-2014)

- Departure for dinner at 19:40; dinner at restaurant Ivan (Civljani) at 20:00 h

DAY 2 – 15th October 2019 (Tuesday)

- Breakfast at 07:00 h

- **LECTURES - 08:00 – 10:50 h**

08:00 – 08:40 h	A. Mladenović P. Oprčkal V. Zalar Serjun	Application of red mud for the remediation of contaminated soil
08:40 – 09:20 h	H. Gielisch	REE in world economy, the relation of REE and Bauxite Residues (BR's), and a new technical procedure to separate the REE's
09:20 – 09:30 h	BREAK	
09:30 – 10:10 h	F. Lowicki	Methods and approaches in estimation of mineral resources and reasonable cut-off grades in general and focusing on REE in bauxites
10:10 – 10:50 h	S. Miko	Short overview of the field trip bauxite localities in the Oklaj area

- Departure at 11:15 h – arrival at the Oklaj area at 12:45 h (Figure 7)

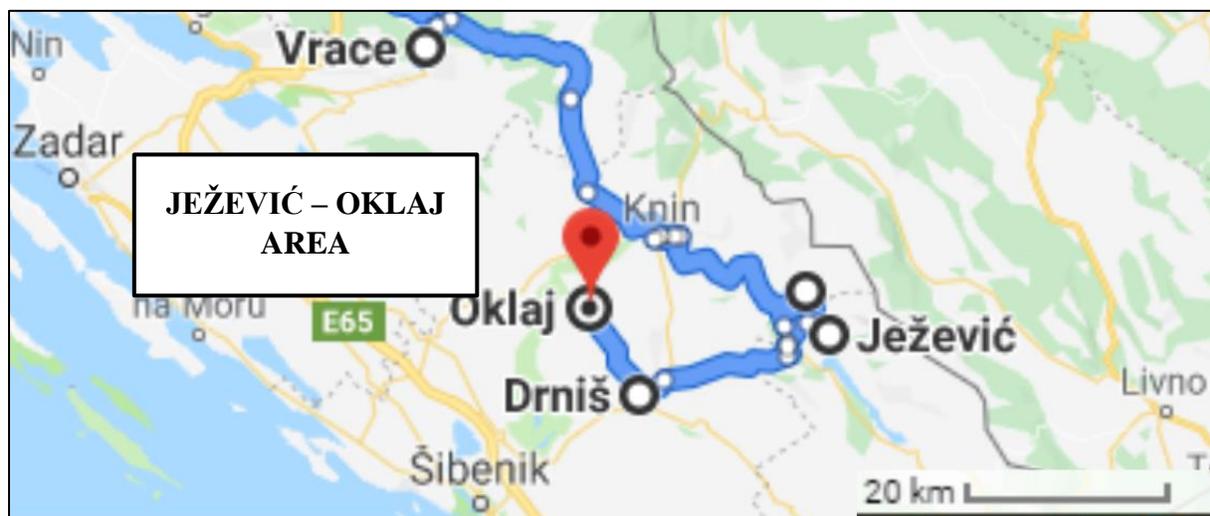


Figure 7. Map showing part of the trip: Ježević - Oklaj

- **FIELD TRIP STOP 2 – TOŠIĆI – DUJIĆI***
- estimated duration: 12:45 – 14: 15 h



Figure 8. Tošići – Dujići bauxite deposit

The bauxite deposit Tošići – Dujići (Figure 8) is situated within former exploitation field Čveljo dolac in the Oklaj area (Figure 9). The deposit is of upper Eocene lying over lower-middle Eocene foraminiferal limestone. The bottom rocks frequently feature karstic paleorelief. The bauxite was excavated by open pit mining back in 1980s, and the remaining reserves account roughly for 14500 tones (for underground mining). Čveljo dolac is the largest bauxite field within Šibenik-Knin county (1840 ha) which was extensively exploited both by open pit and underground mining. Mining operations ceased in late 1980s and early 1990s. The estimated exploitation reserves of the field are around 2 mil. tones. Average mineral composition is made of boehmite, gibbsite, hematite, goethite, anatase and kaolinite.

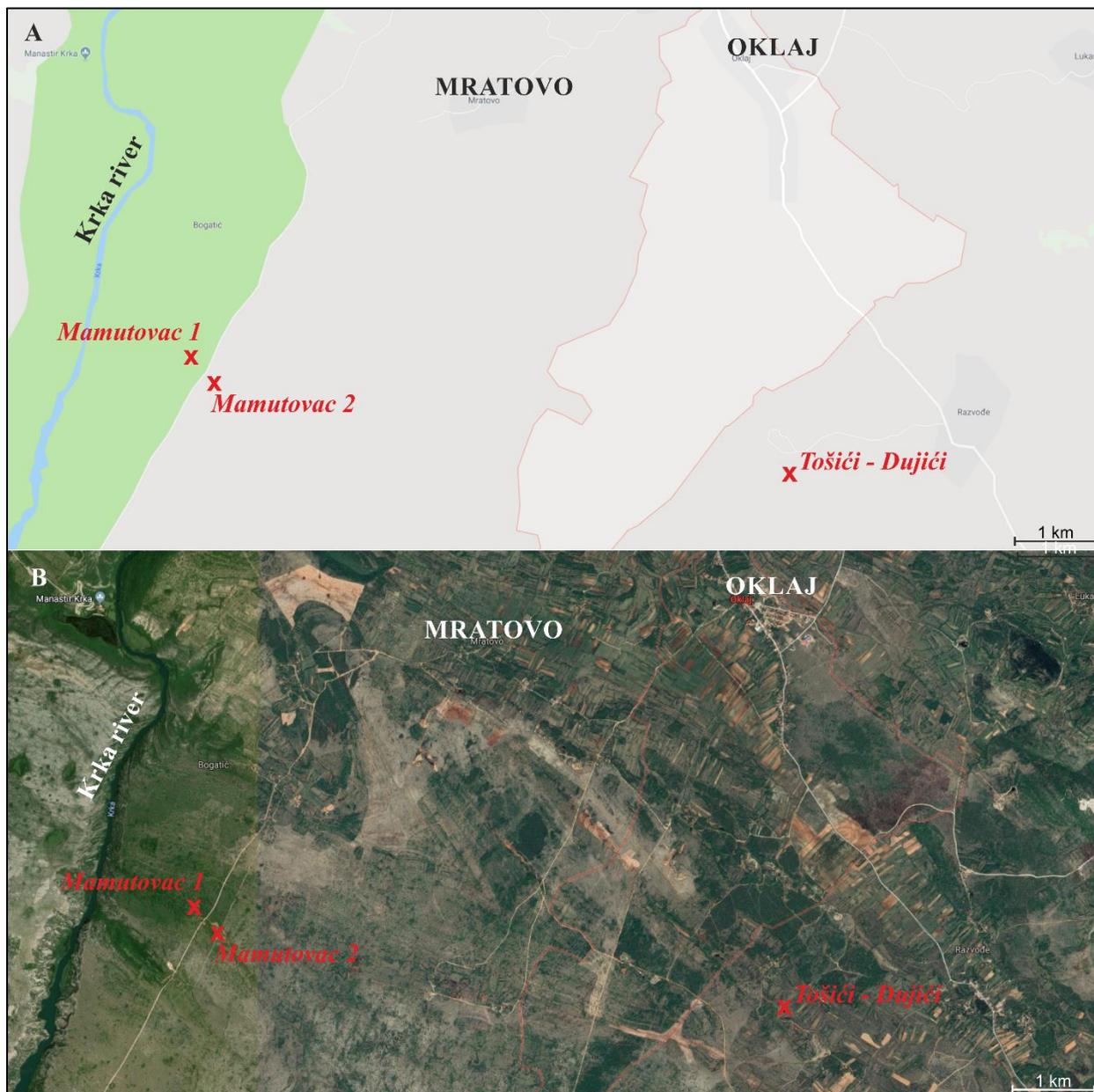


Figure 9. Enlarged Oklaj area with locations of bauxite deposits Tošići – Dujčići and Mamutovac 1 and 2: (a) map; (b) satellite image

- **FIELD TRIP STOP 3 – MAMUTOVAC 1***
- estimated duration: 14:30 – 15:30 h

The Mamutovac deposit (Figure 10, Figure 11) is situated within the exploitation field of the same name (596 ha, remaining exploitation reserves estimated at 290 000 t) near the village Bogetić along the road Čitluk-Roški slap (Figure 9). The bottom rocks are upper Cretaceous limestones. The bauxite deposit is covered by Promina limestones interchanging with conglomerates (upper Eocene). Exploitation reserves are estimated at 112 000 tones.

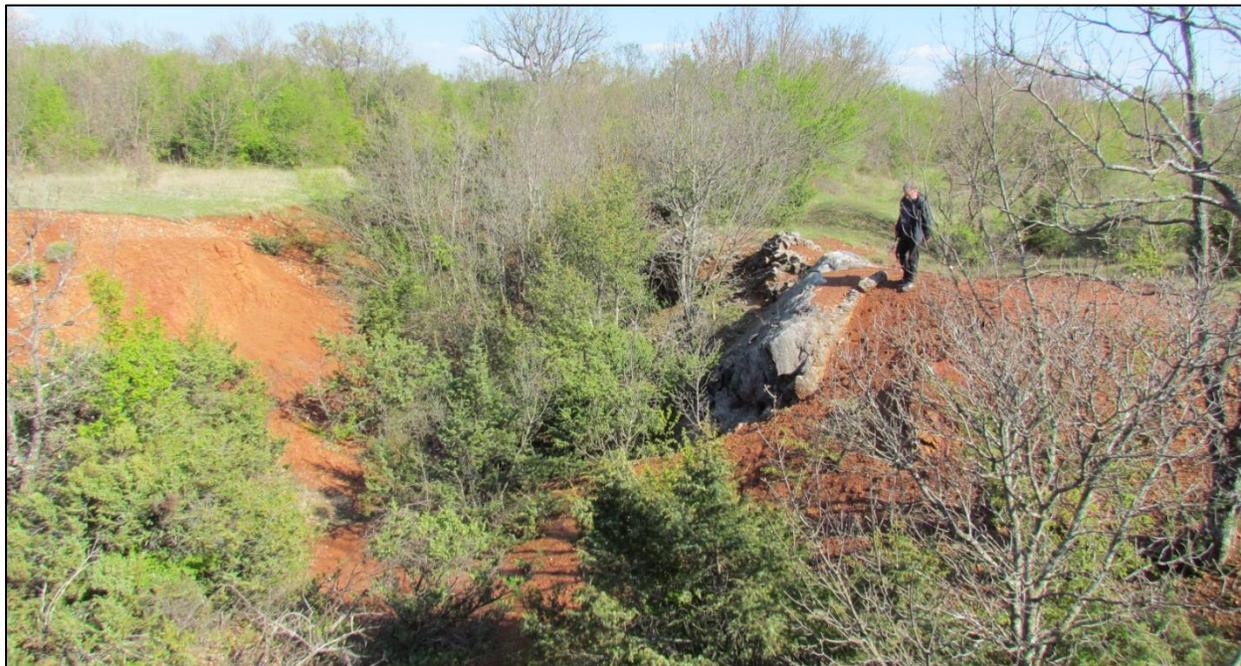


Figure 10. Mamutovac 1 bauxite deposit



Figure 11. Mamutovac 2 bauxite deposit with Mt. Promina in the background

- Lunch break: restaurant Amfora (Family farm Etnoskelin at Drinovci) (15:45 – 16:45 h)
- Departure for Zagreb (16:45 h)
- 20 min break at bus stop Krka (approximately 17:30 – 17:50 h) – magnificent view to Krka river estuary and the Adriatic sea (**karst geological feature 2**)
- Trip and arrival at Zagreb in the evening (approximately 21:00 h, Figure 12)

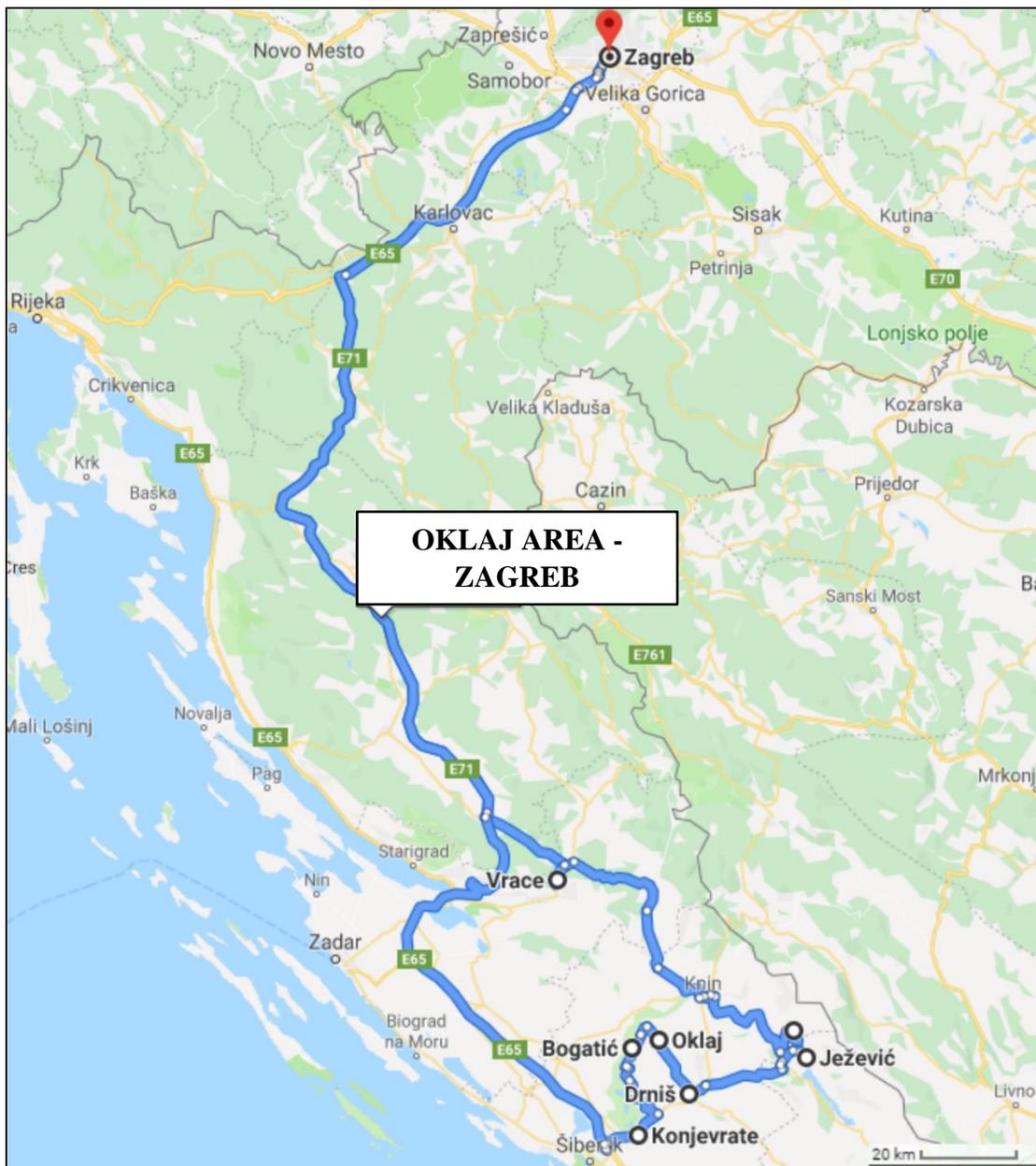


Figure 12. Map showing part of the trip: Oklaj - Zagreb