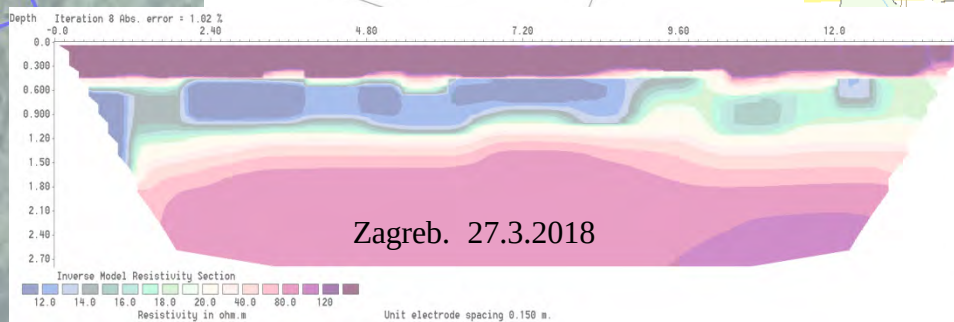


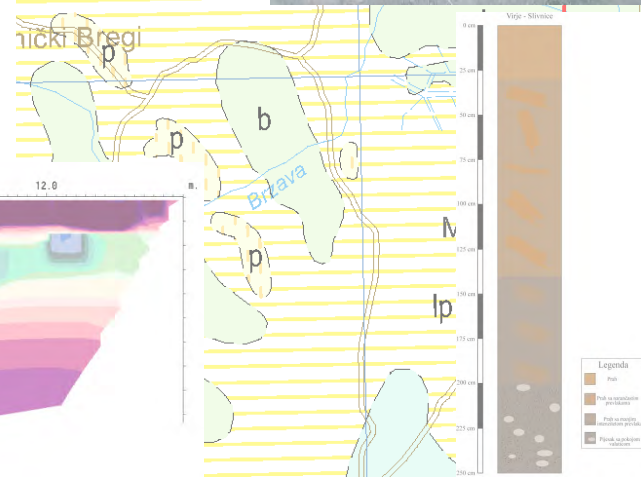
TRANSFER – IRON PRODUCTION ALONG THE DRAVA RIVER IN THE ROMAN PERIOD AND THE MIDDLE AGES: CREATION AND TRANSFER OF KNOWLEDGE, TECHNOLOGIES AND GOODS. THE CASE STUDIES OF VIRJE AND VELIKE HLEBINE.

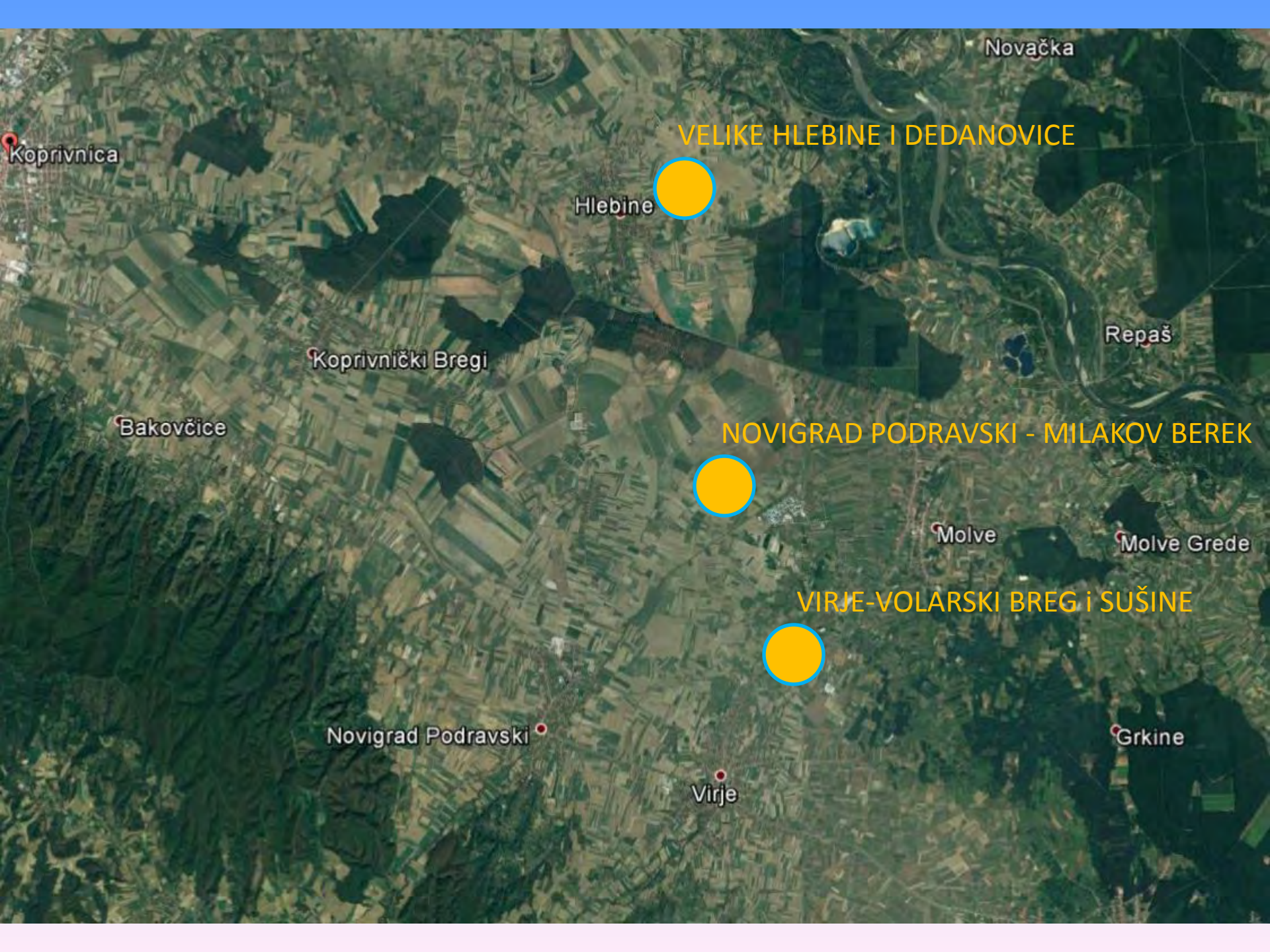
Voditeljica projekta: dr. Tajana Sekelj Ivančan

Branko Mušič, Tajana Sekelj-Ivančan, Sibila Borojević Šošarić, Igor Medarić, Barbara Horn, Stanko Ružičić and Tomislav Brenko



Zagreb. 27.3.2018





Novačka

Koprivnica

VELIKE HLEBINE I DEDANOVICE

Hlebine

Koprivnički Bregi

Repaš

Bakovčice

NOVIGRAD PODRAVSKI - MILAKOV BEREK

Molve

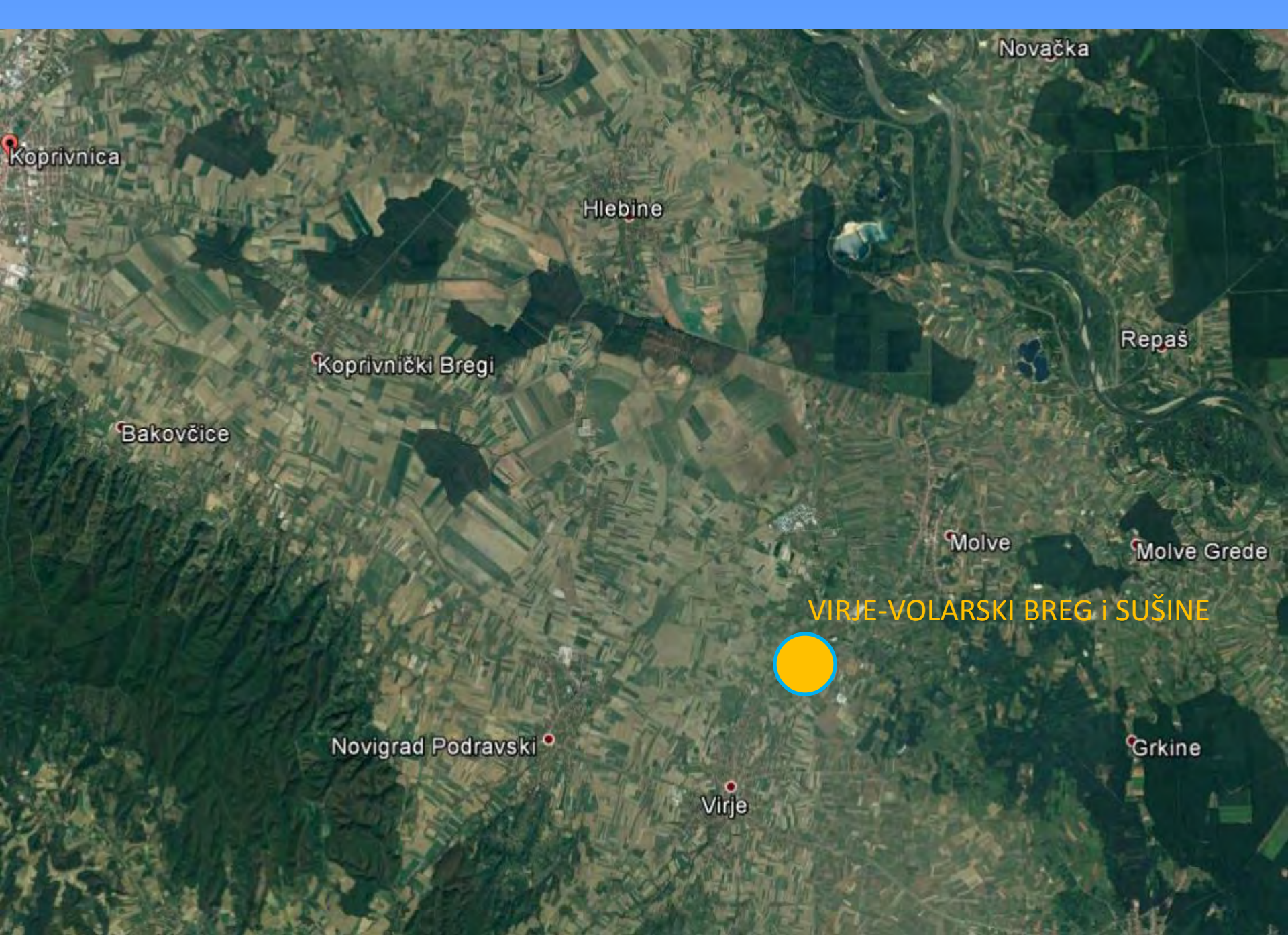
Molve Grede

VIRJE-VOLARSKI BREG I SUŠINE

Novigrad Podravski

Virje

Grkine



Novačka

Koprivnica

Hlebine

Koprivnički Bregi

Bakovčice

Repaš

Molve

Molve Grede

VIRJE-VOLARSKI BREG i SUŠINE

Novigrad Podravski

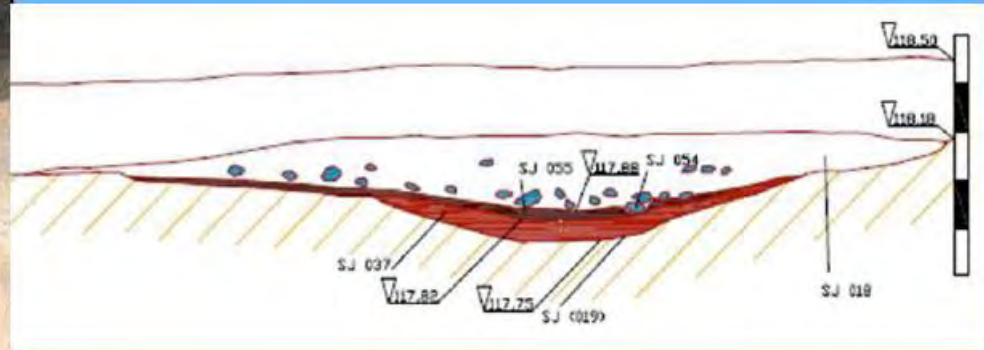
Virje

Grkine

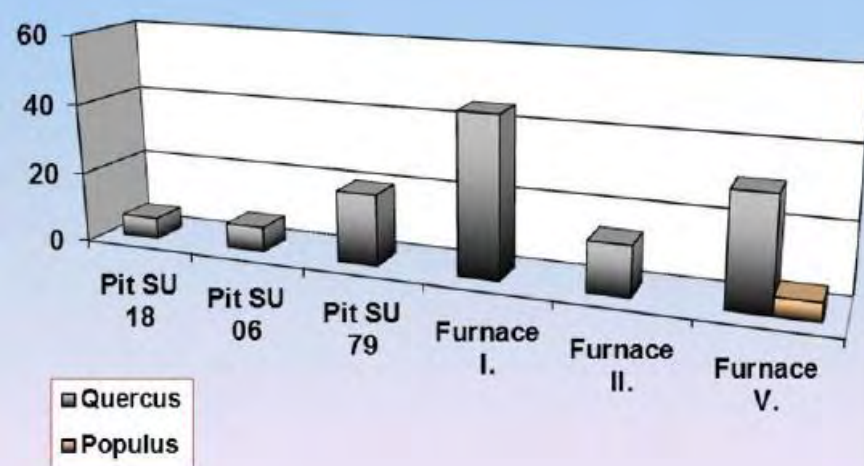
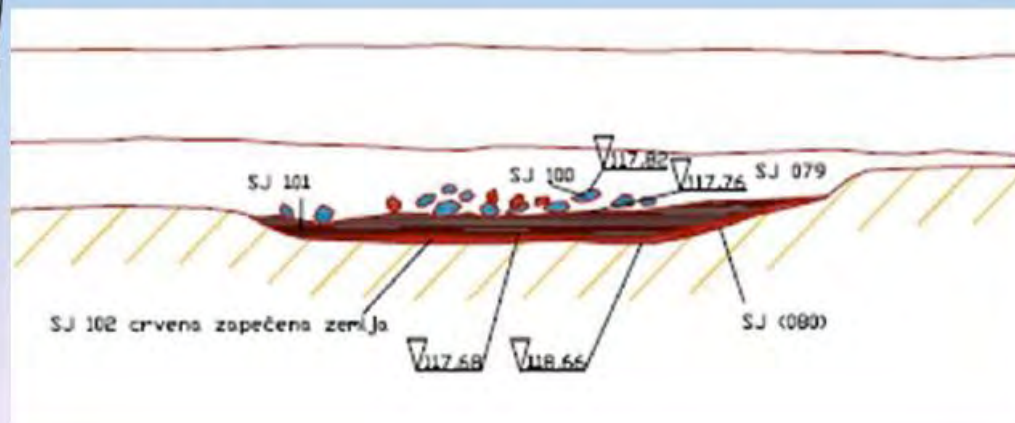
Pits for making charcoal



Pit SU 18

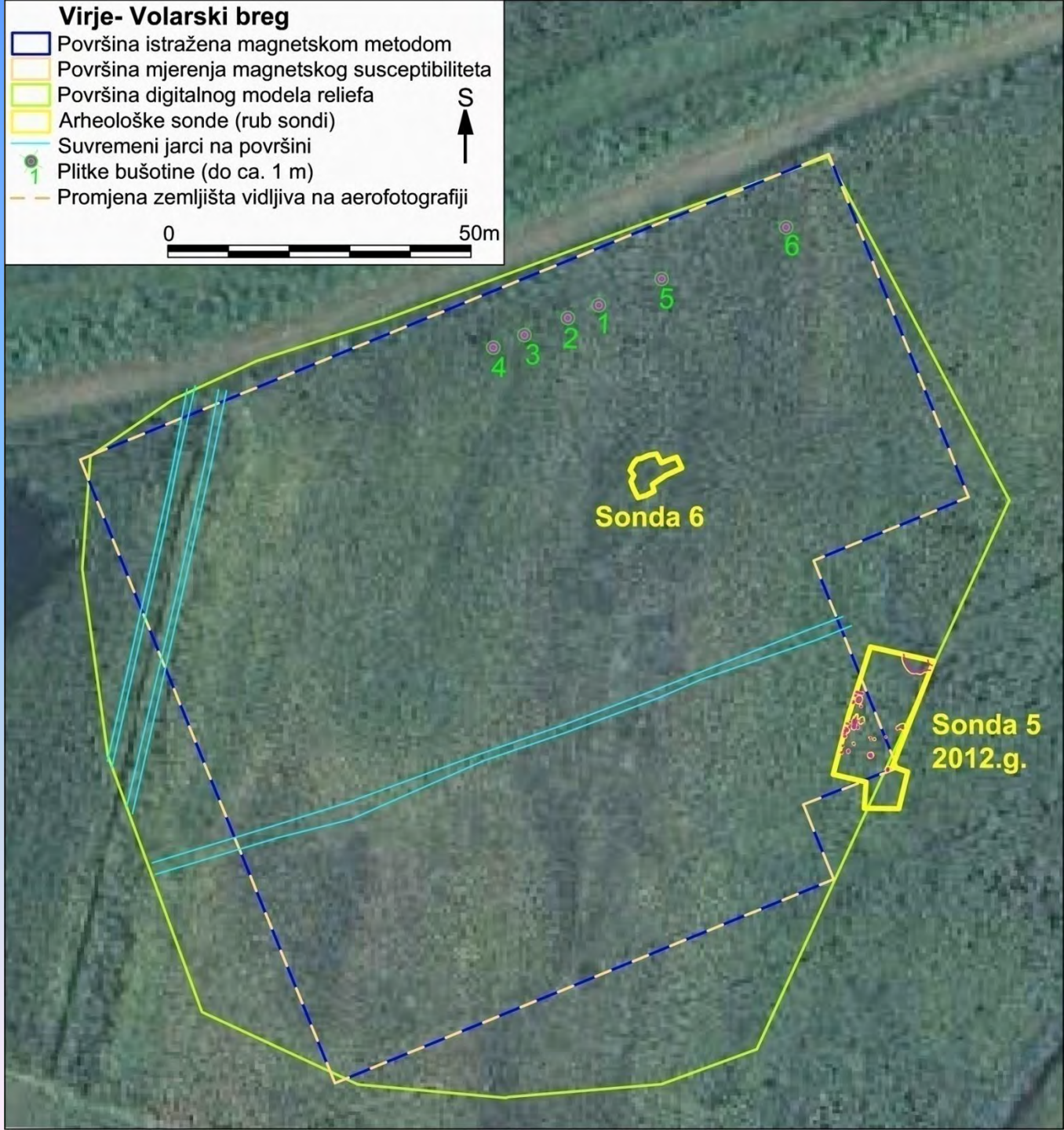
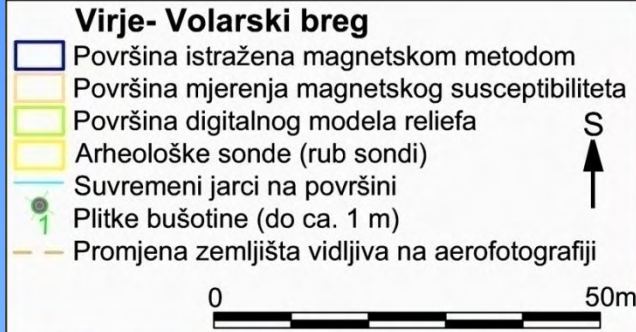


Pit SU 79

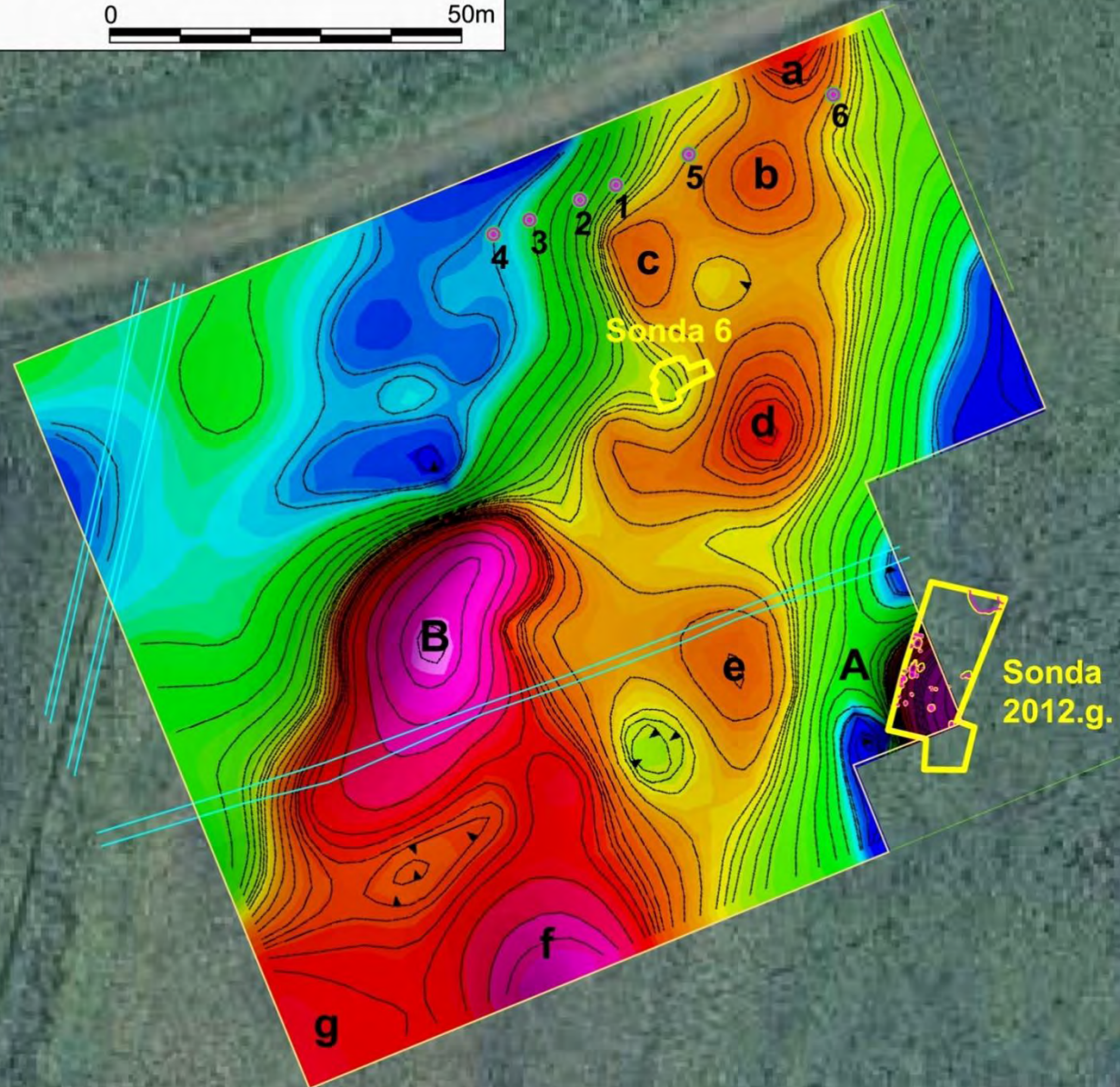
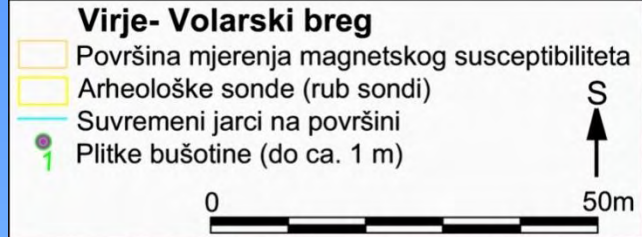




POVRŠINE ISTRAŽENE GEOFIZIČKOM METODOM



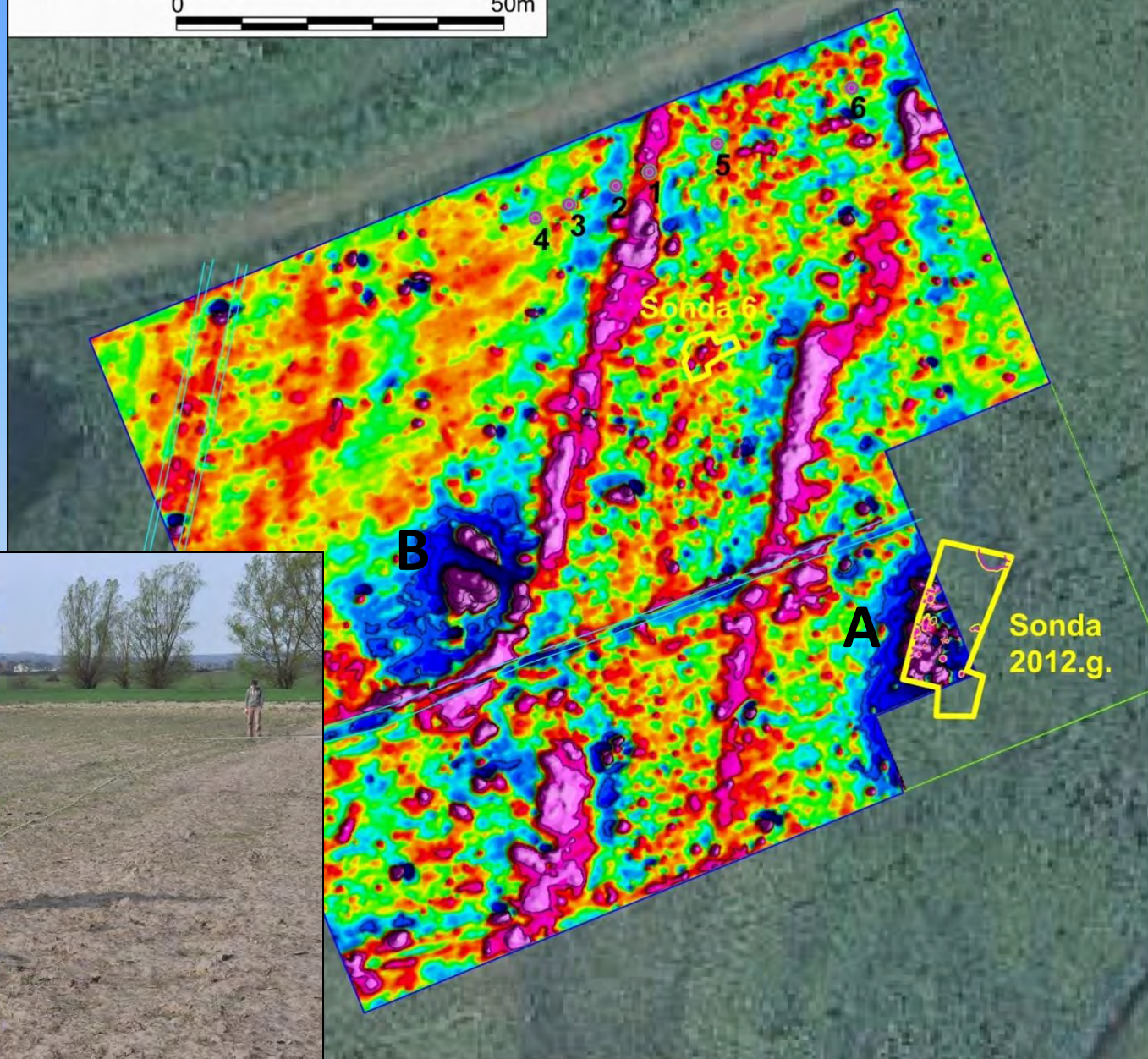
KARTIRANJE MAGNETSKOG SUSCEPTIBILITETA (Kappameter KT-5)

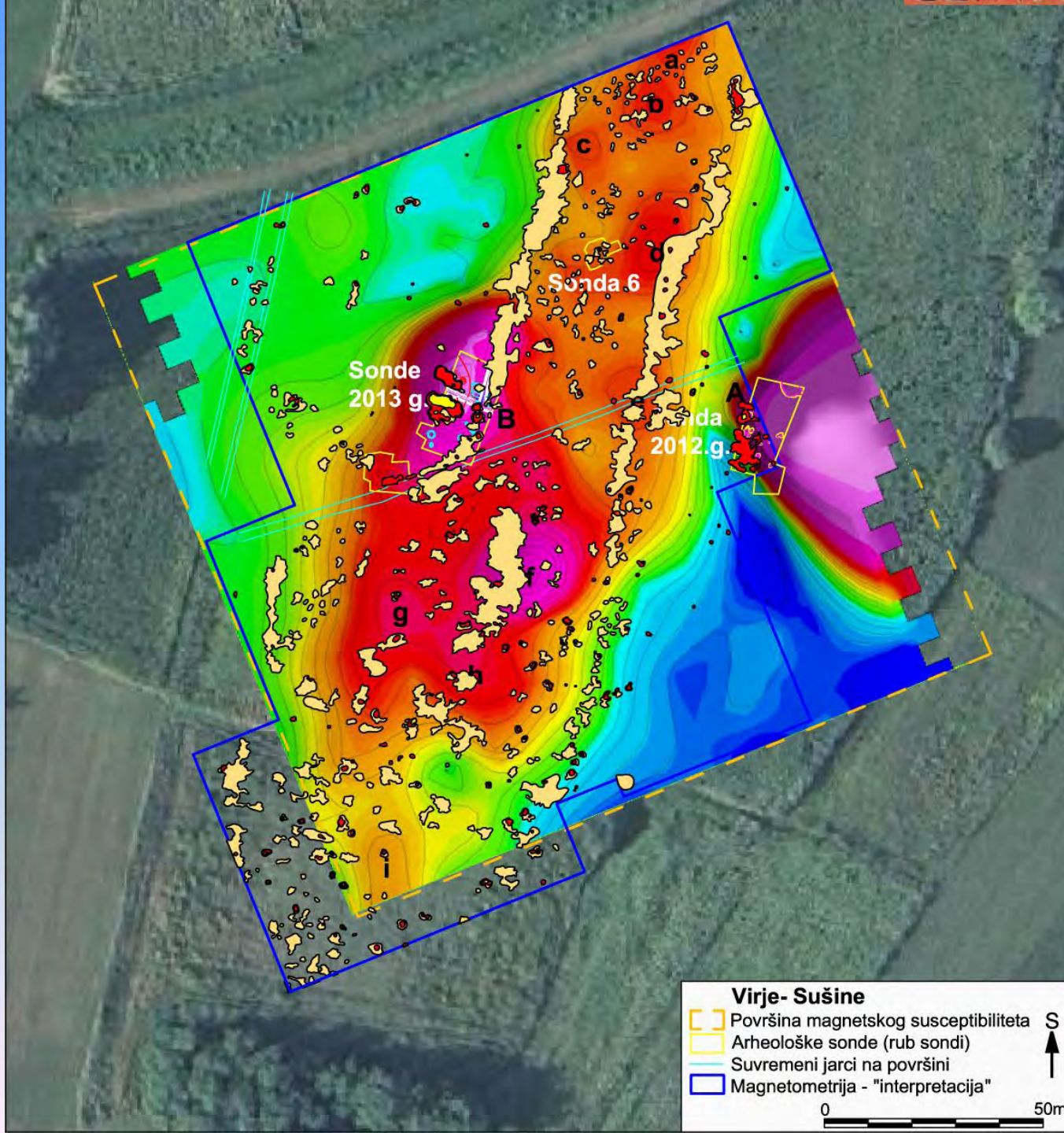


MAGNETSKA METODA

Gradient magnetskog polja

(Geometrics G-858)





Virje- Volarski breg

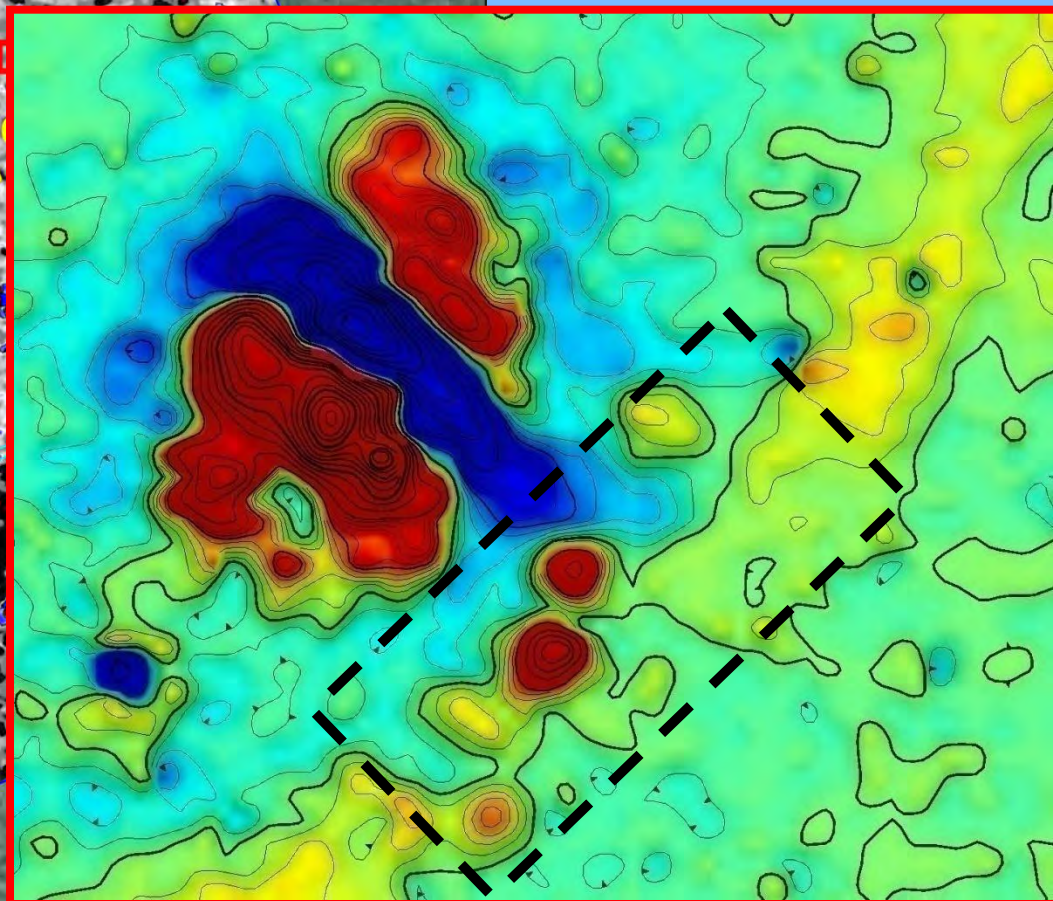
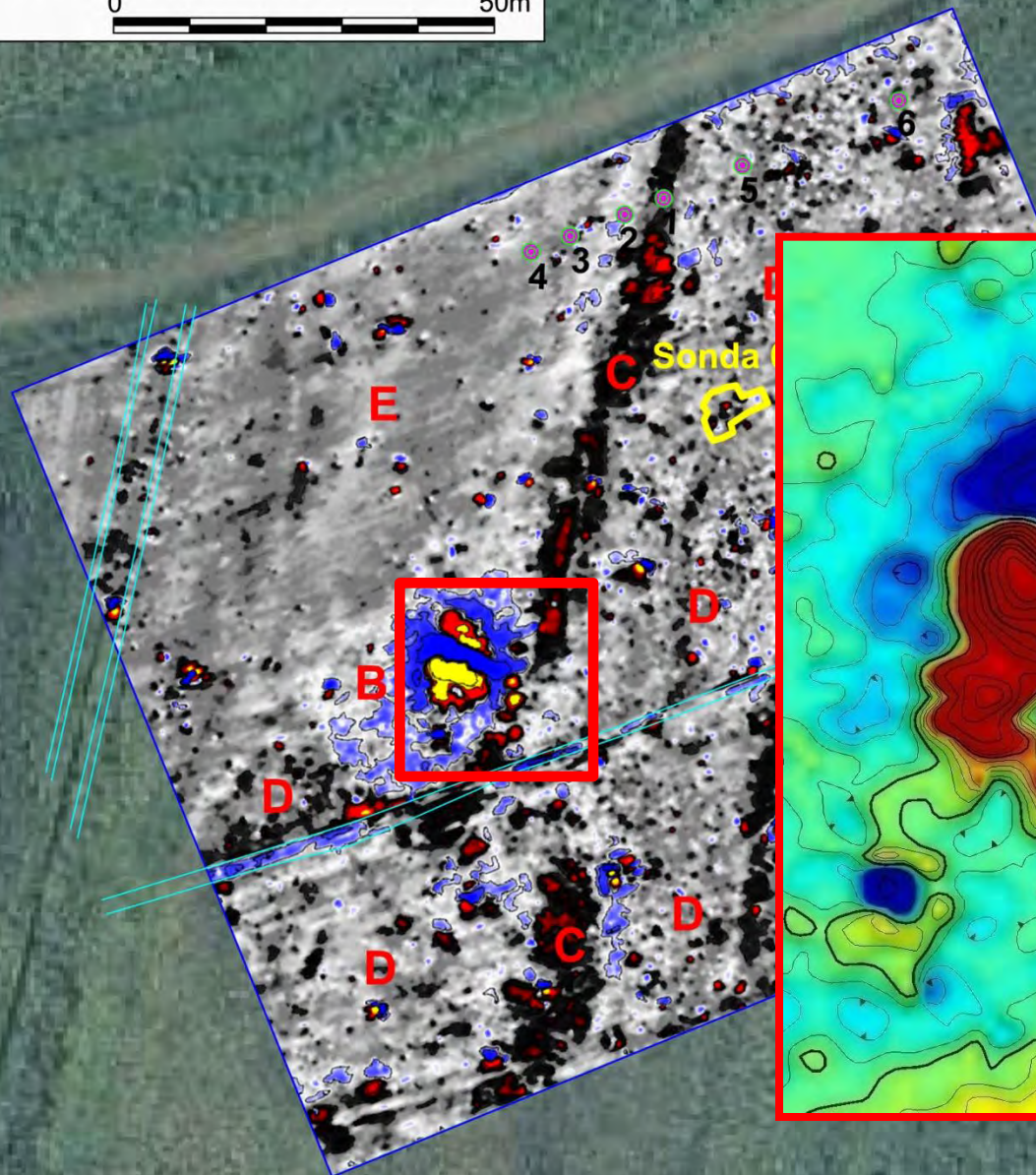
-  Površina istražena magnetskom metodom
-  Arheološka sonda (rub sonde)
-  Suvremeni jarci na površini
-  1 Plitke bušotine (do ca. 1 m)

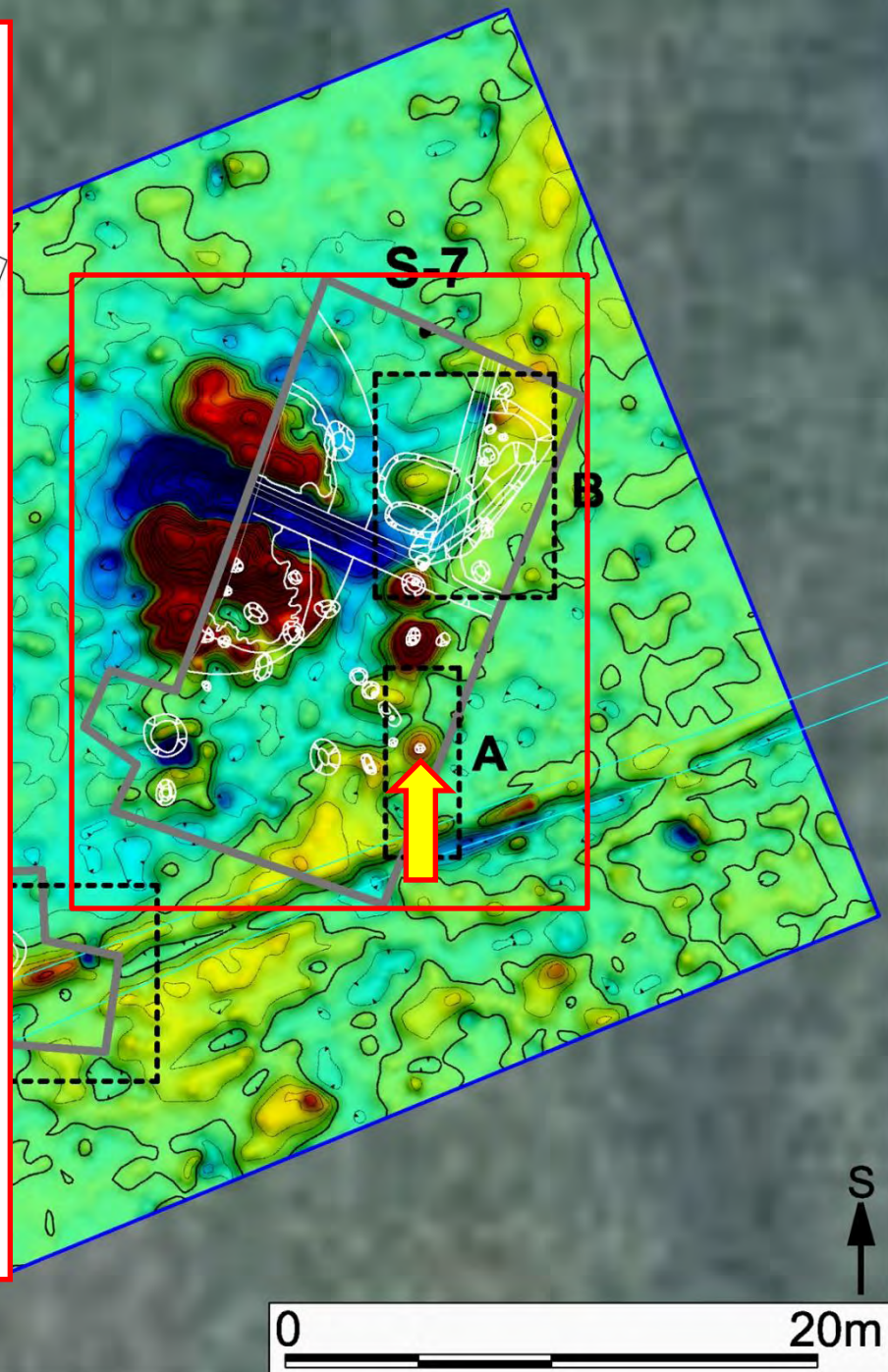
0 50m

S
↑

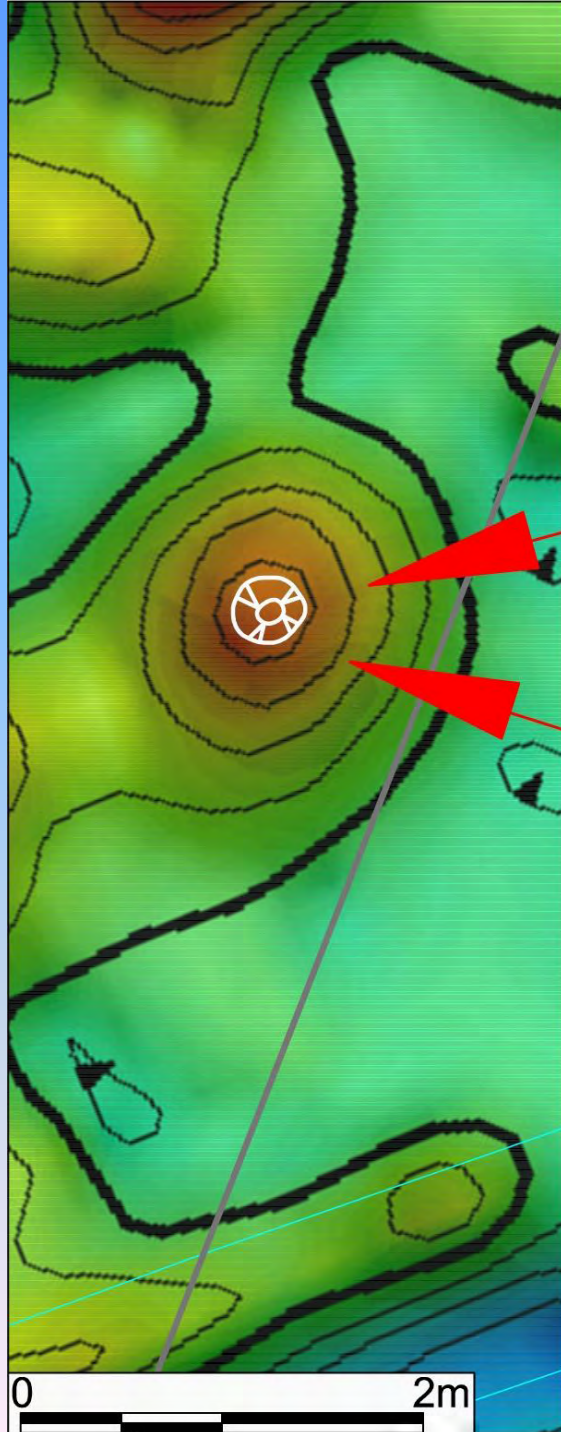
MAGNETSKA METODA

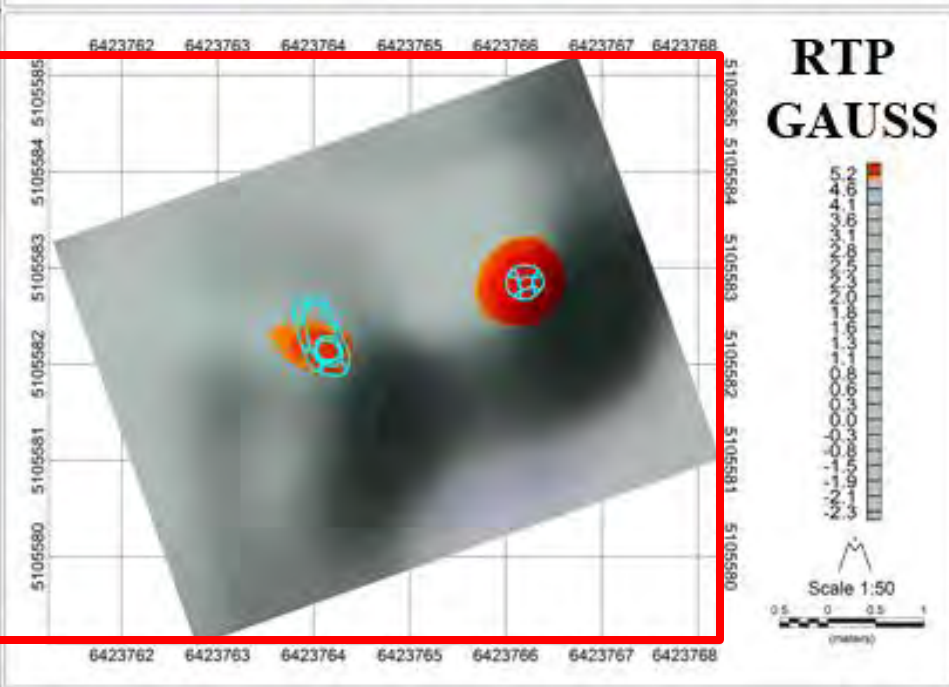
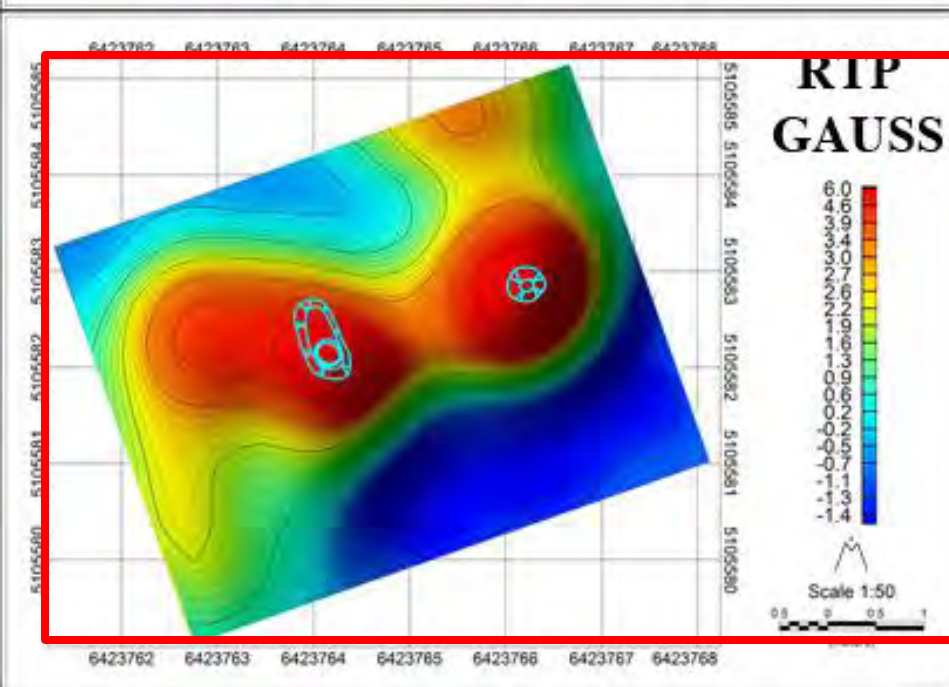
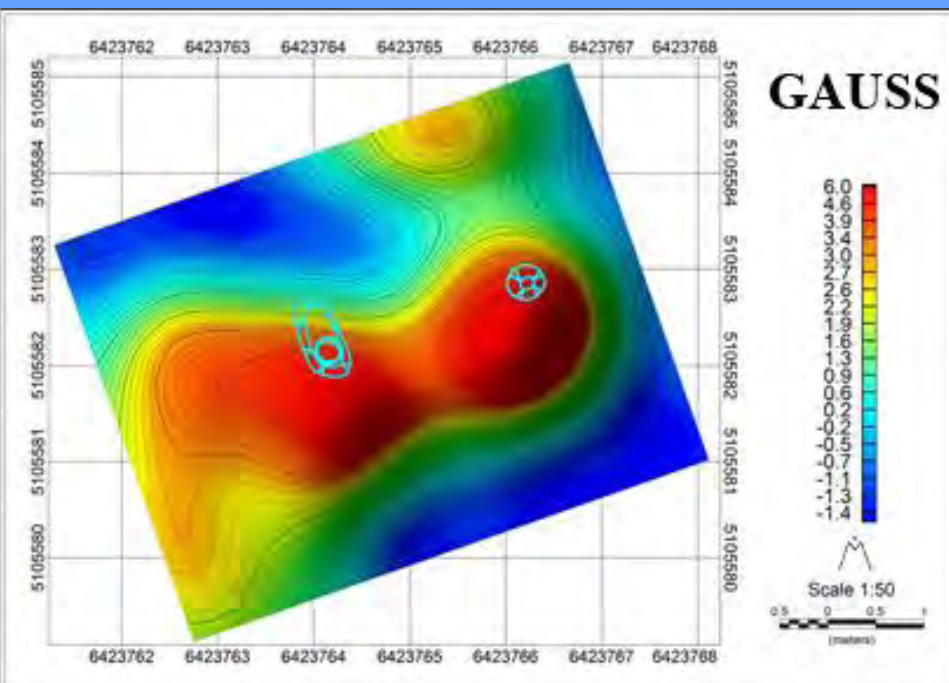
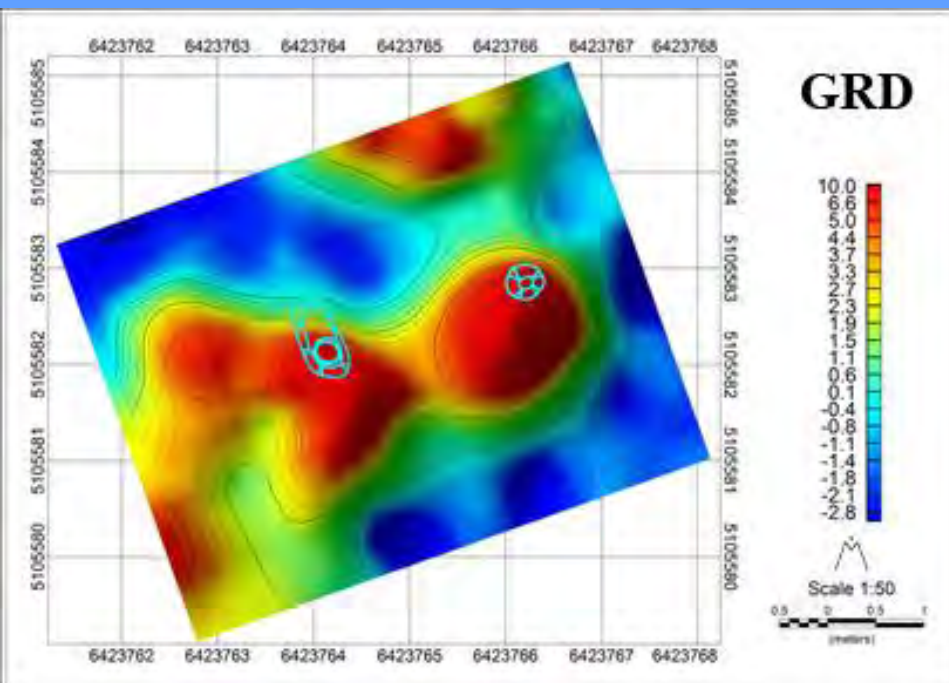
Gradient magnetskog polja
(*Geometrics G-858*)



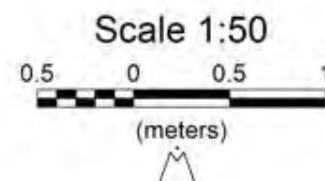
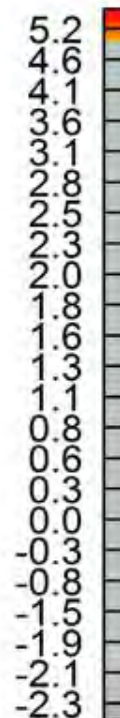


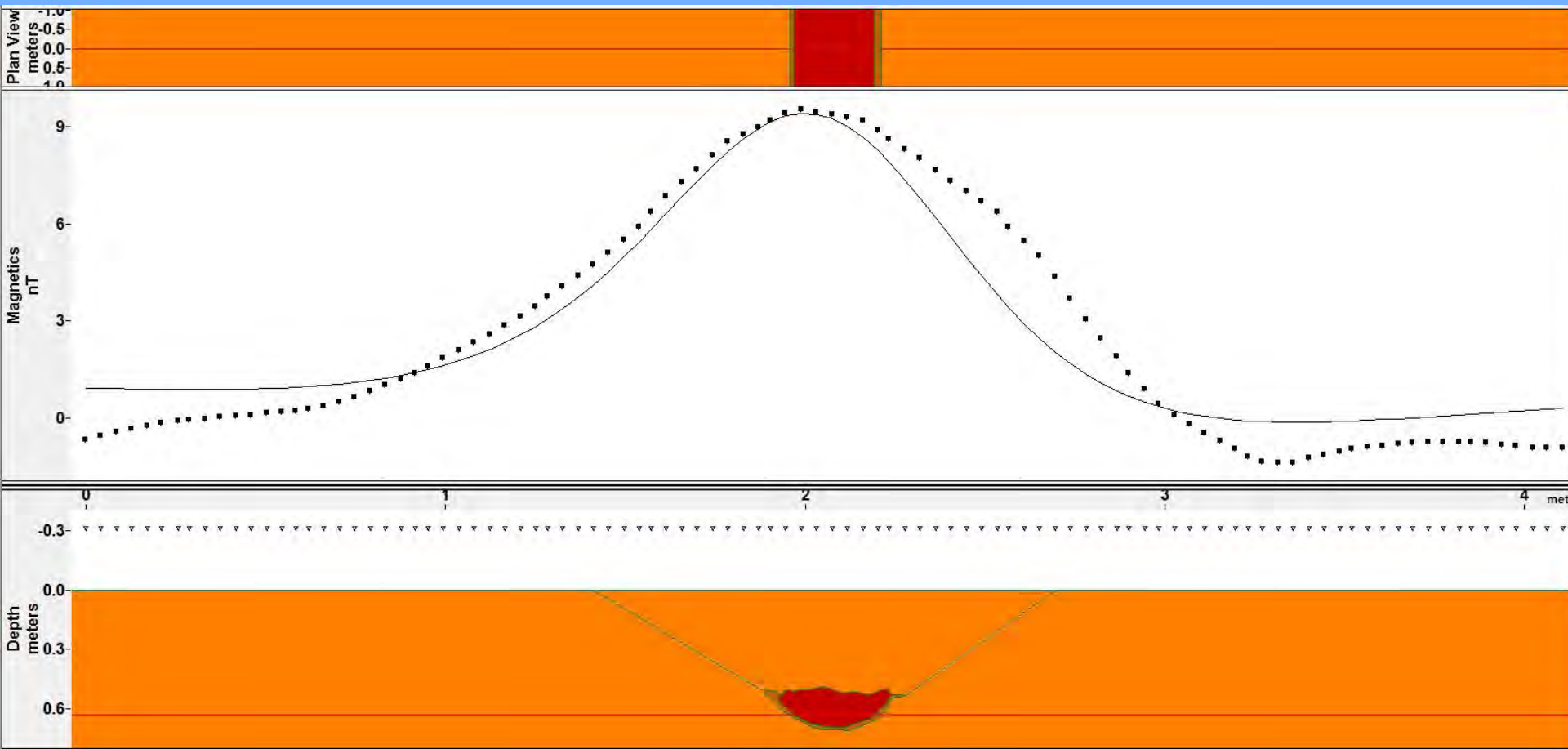


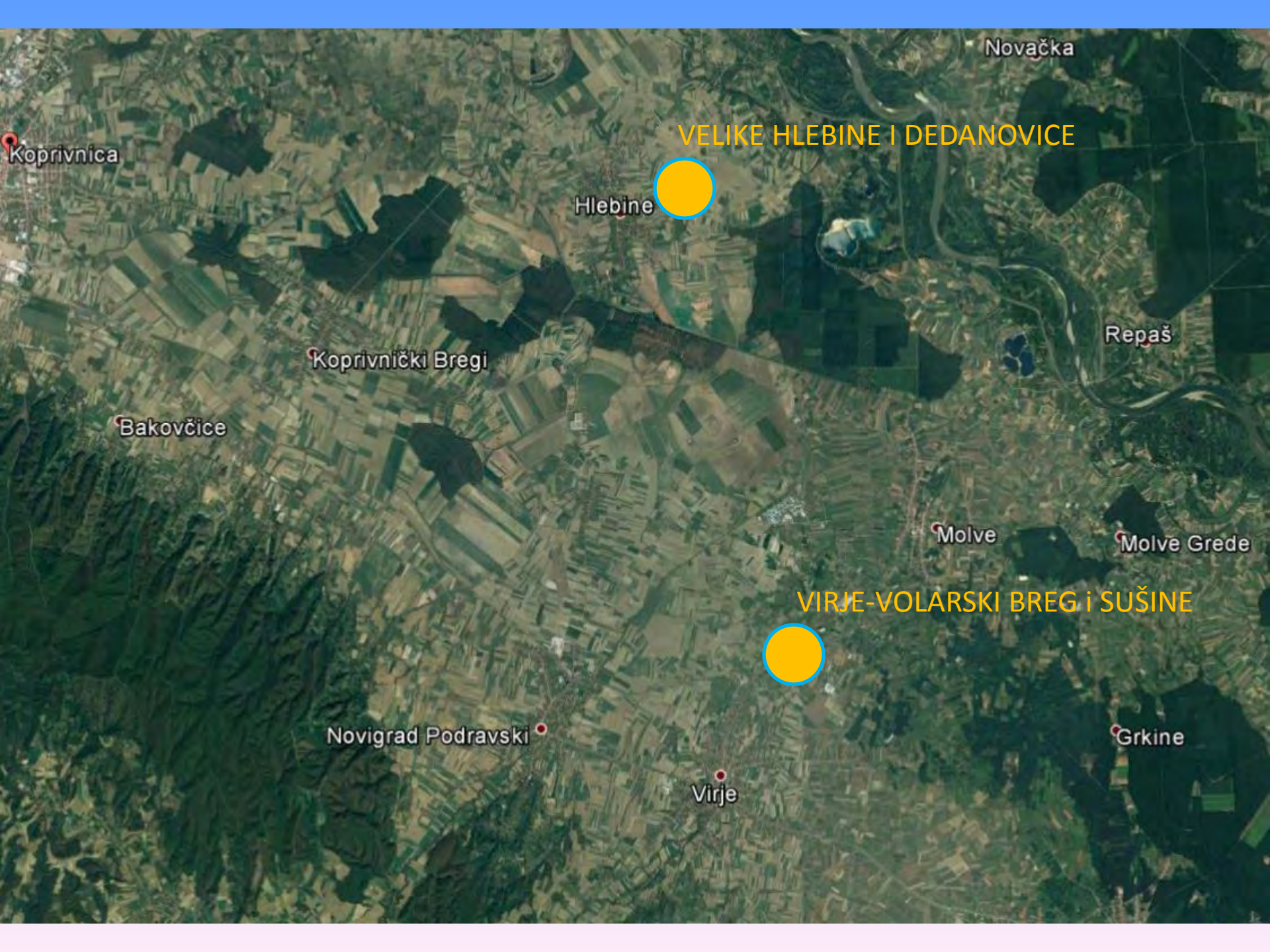




2D PROFIL







Novačka

VELIKE HLEBINE I DEDANOVICE

Koprivnica

Hlebine

Repaš

Koprivnički Bregi

Bakovčice

Molve

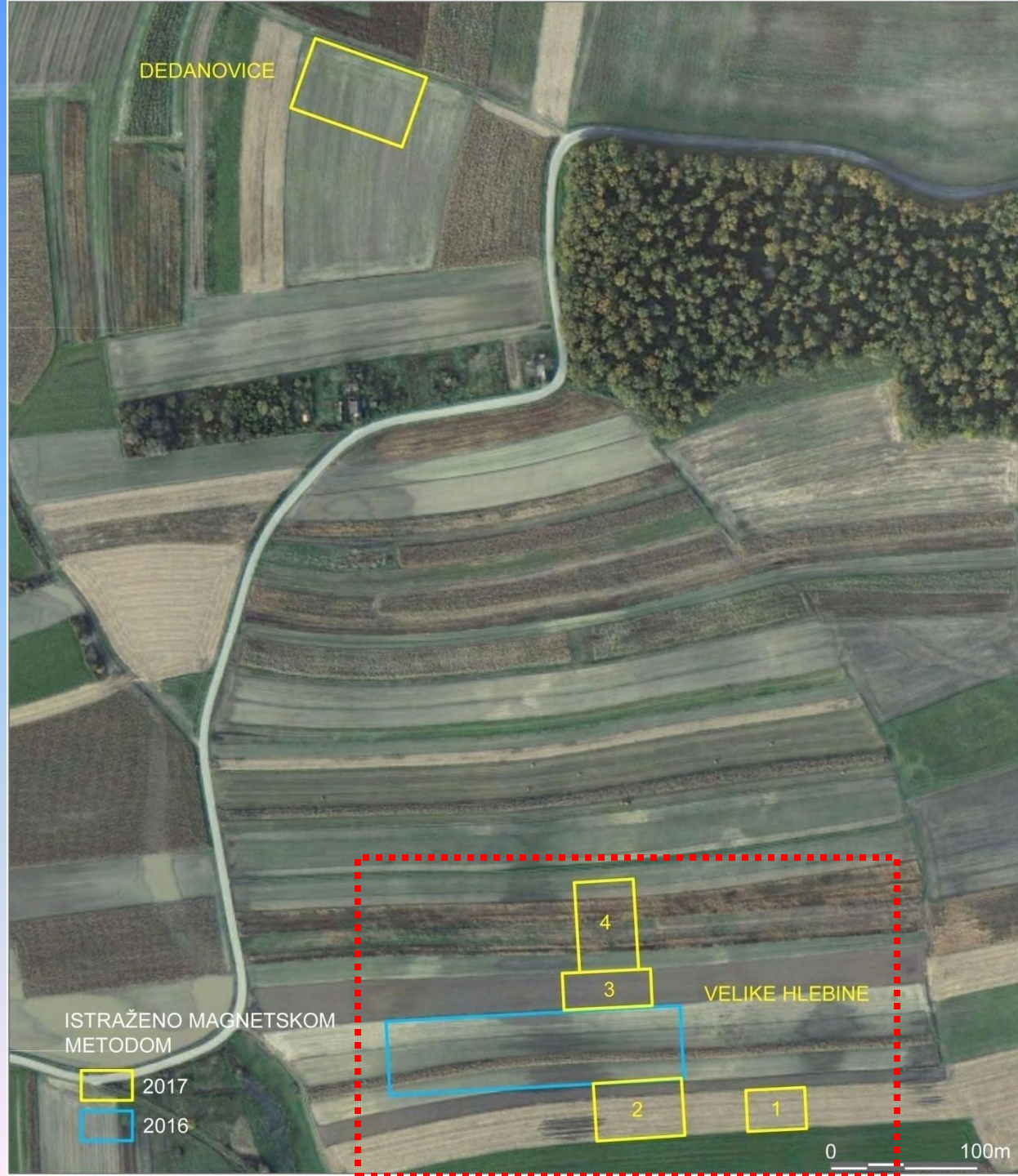
Molve Grede

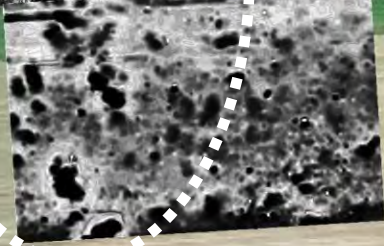
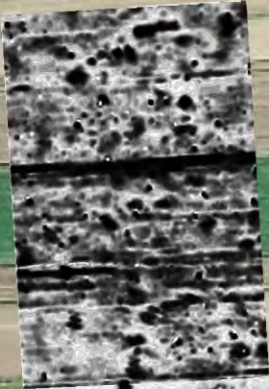
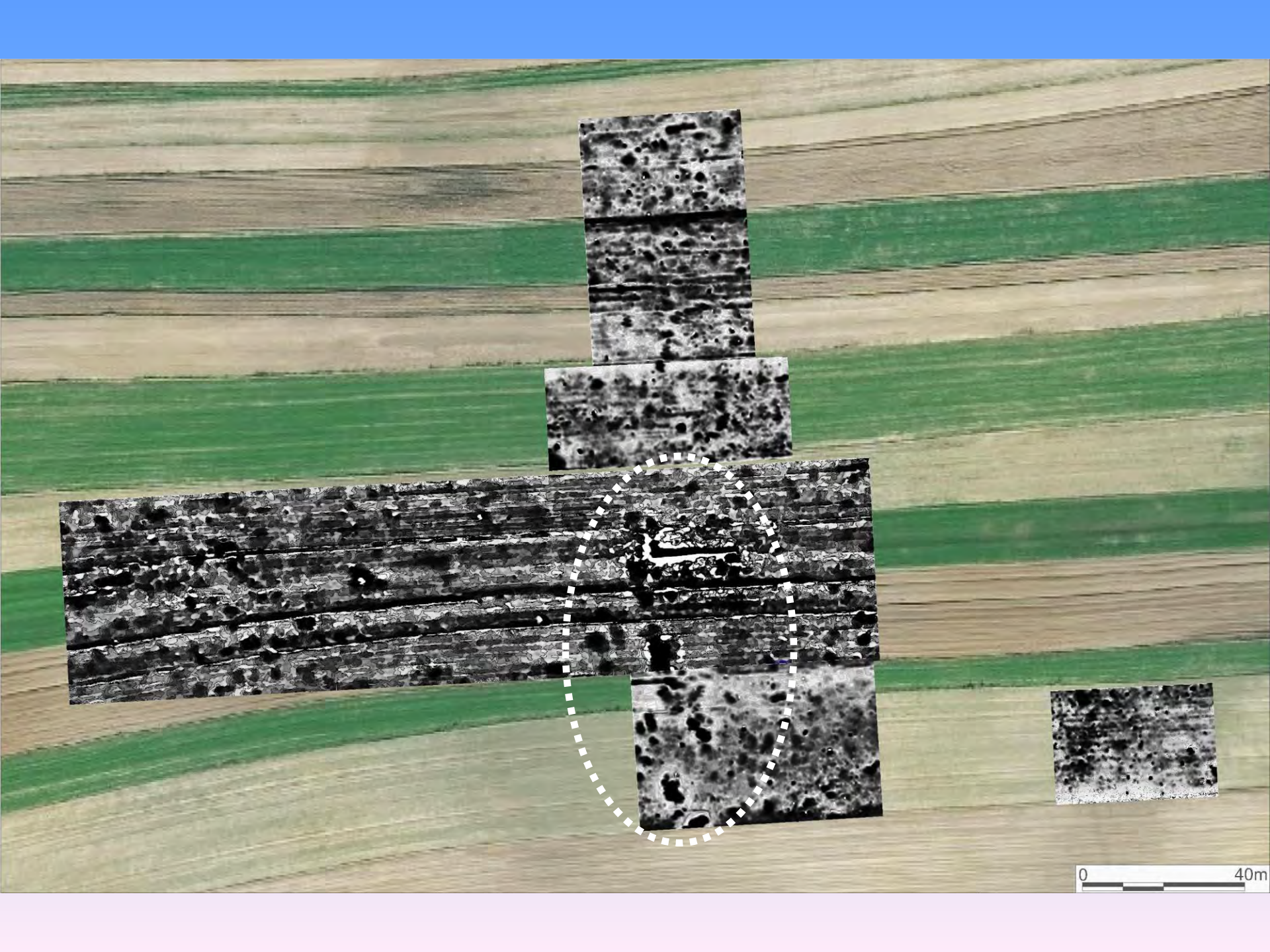
VIRJE-VOLARSKI BREG I SUŠINE

Novigrad Podravski

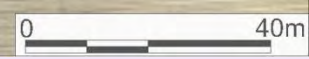
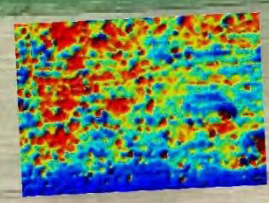
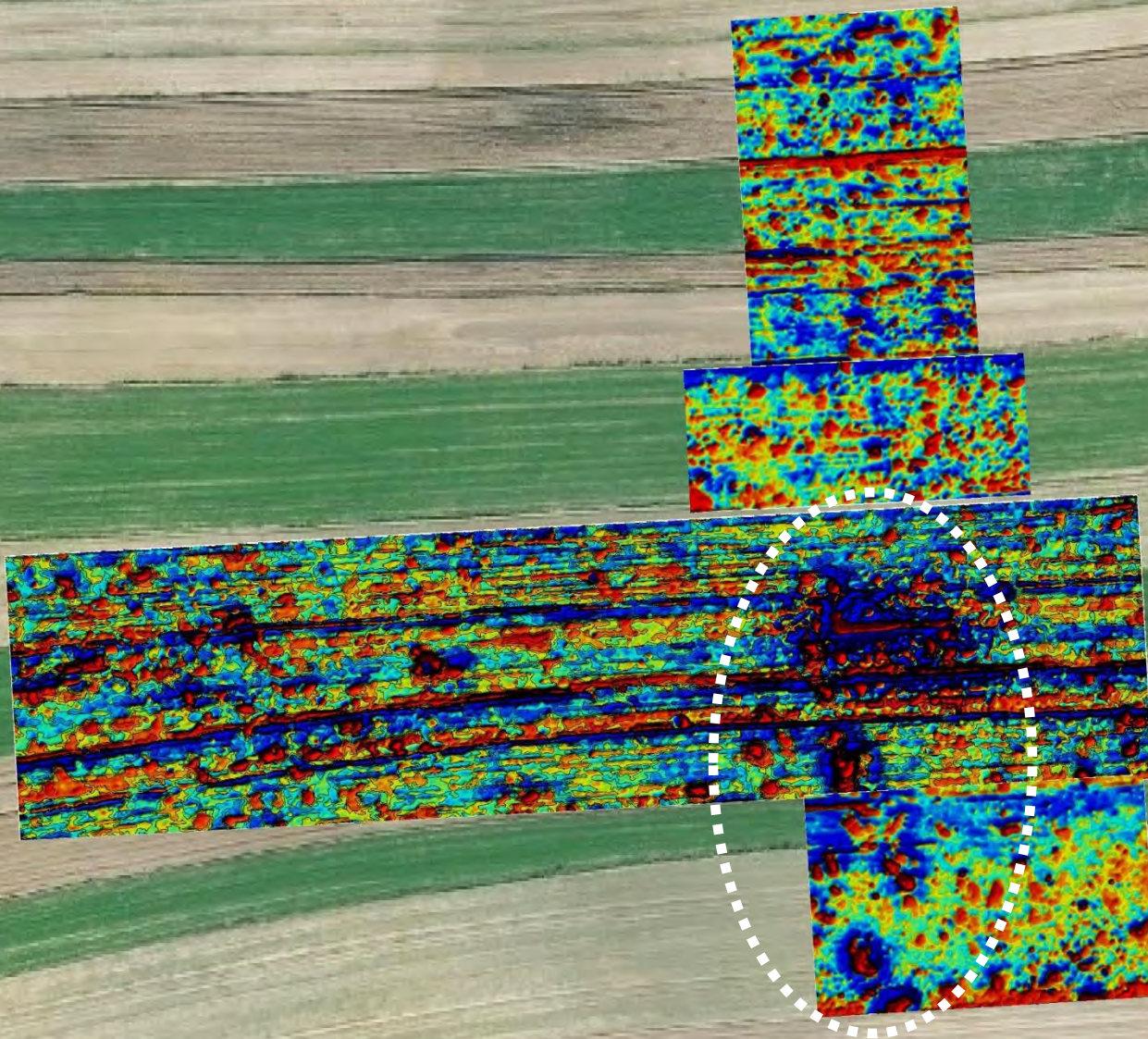
Grkine

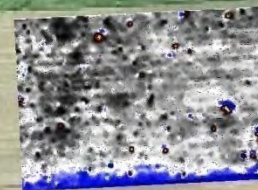
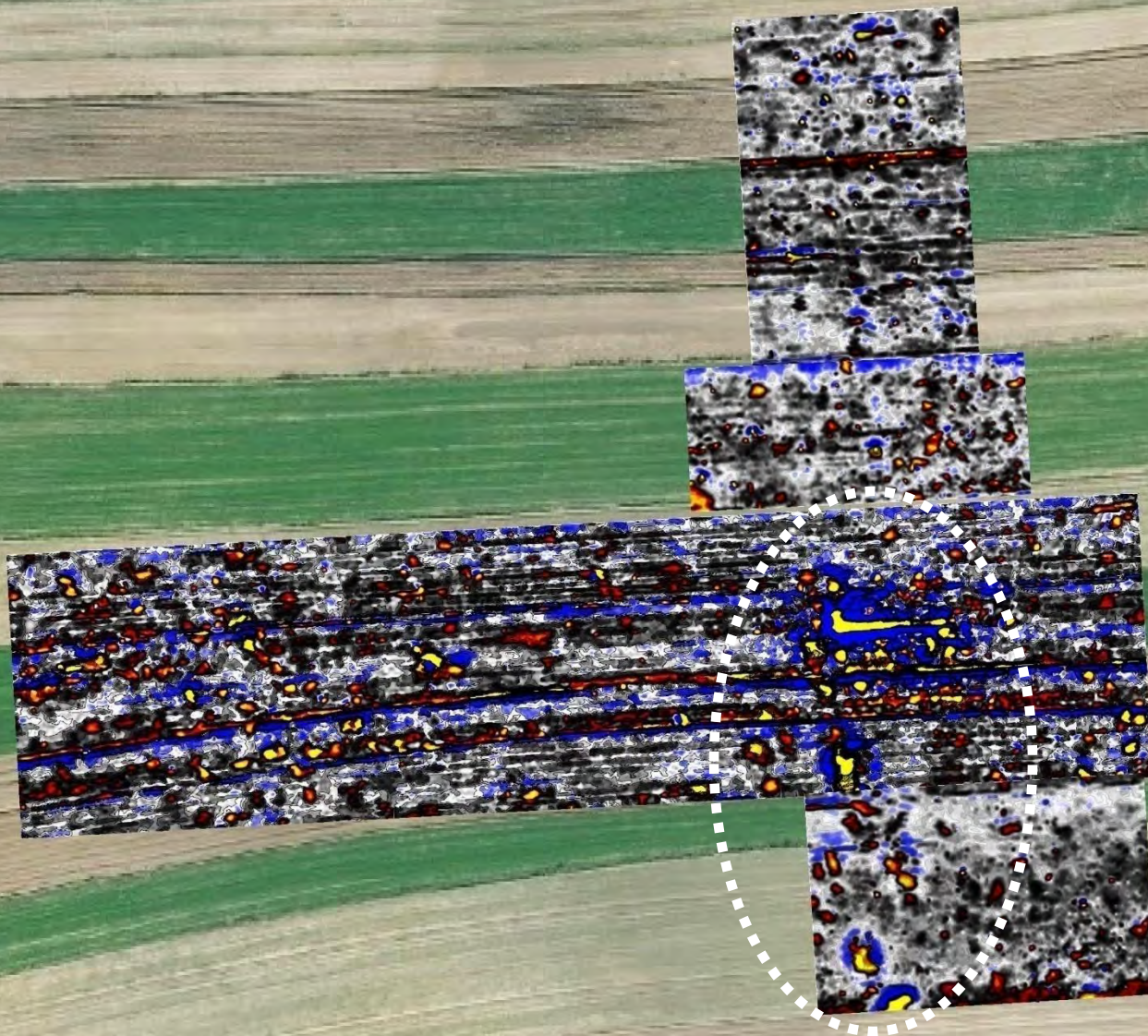
Virje



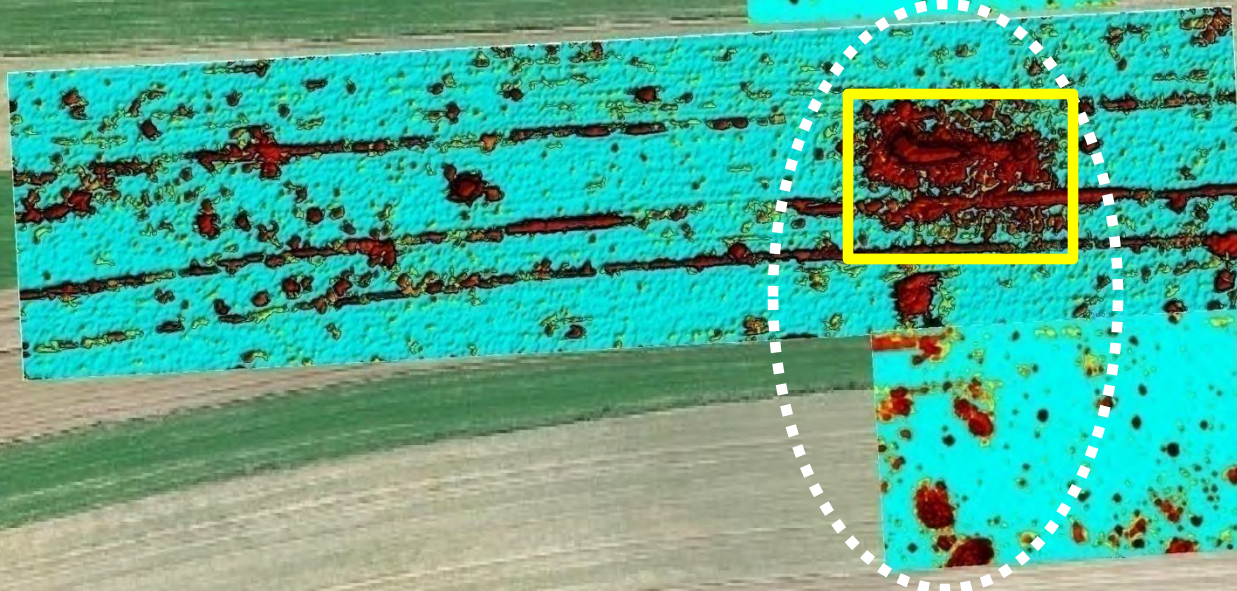
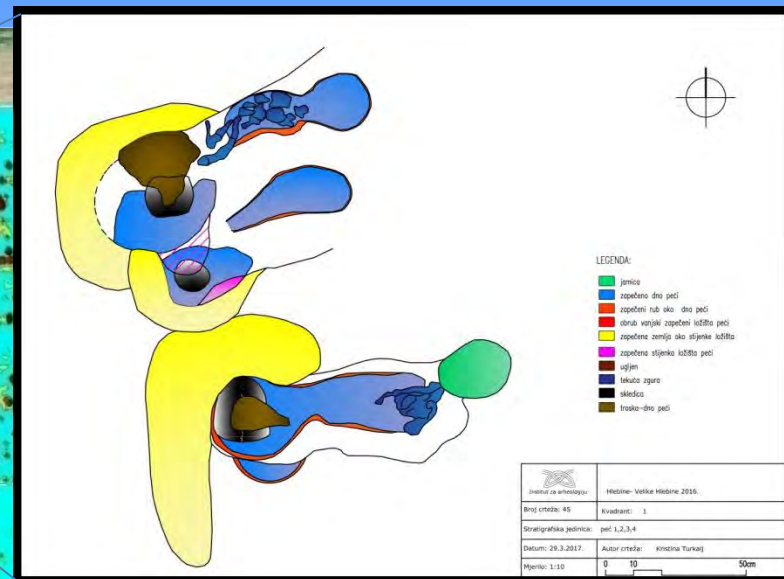
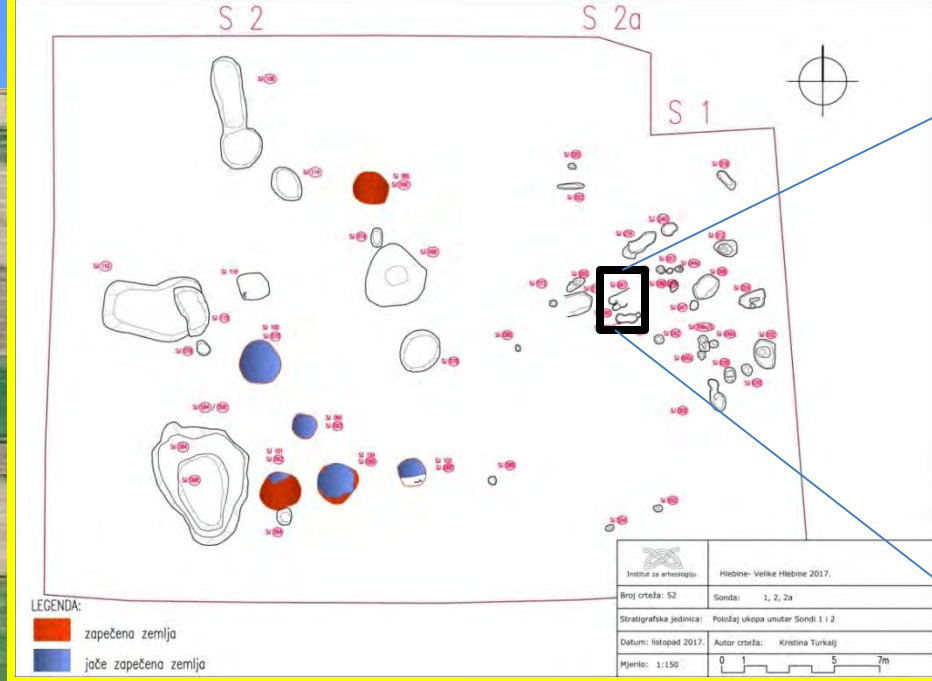


0 40m



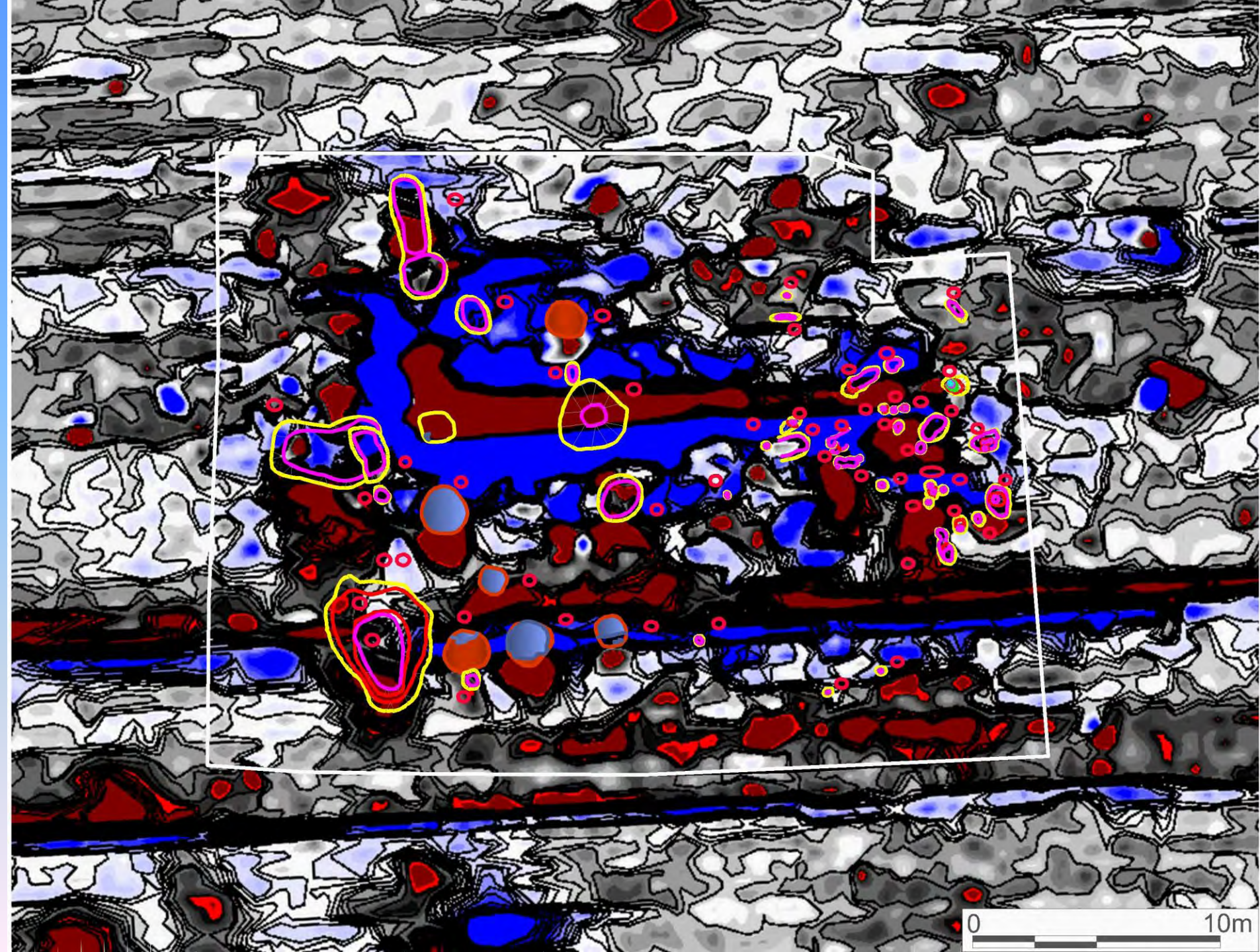


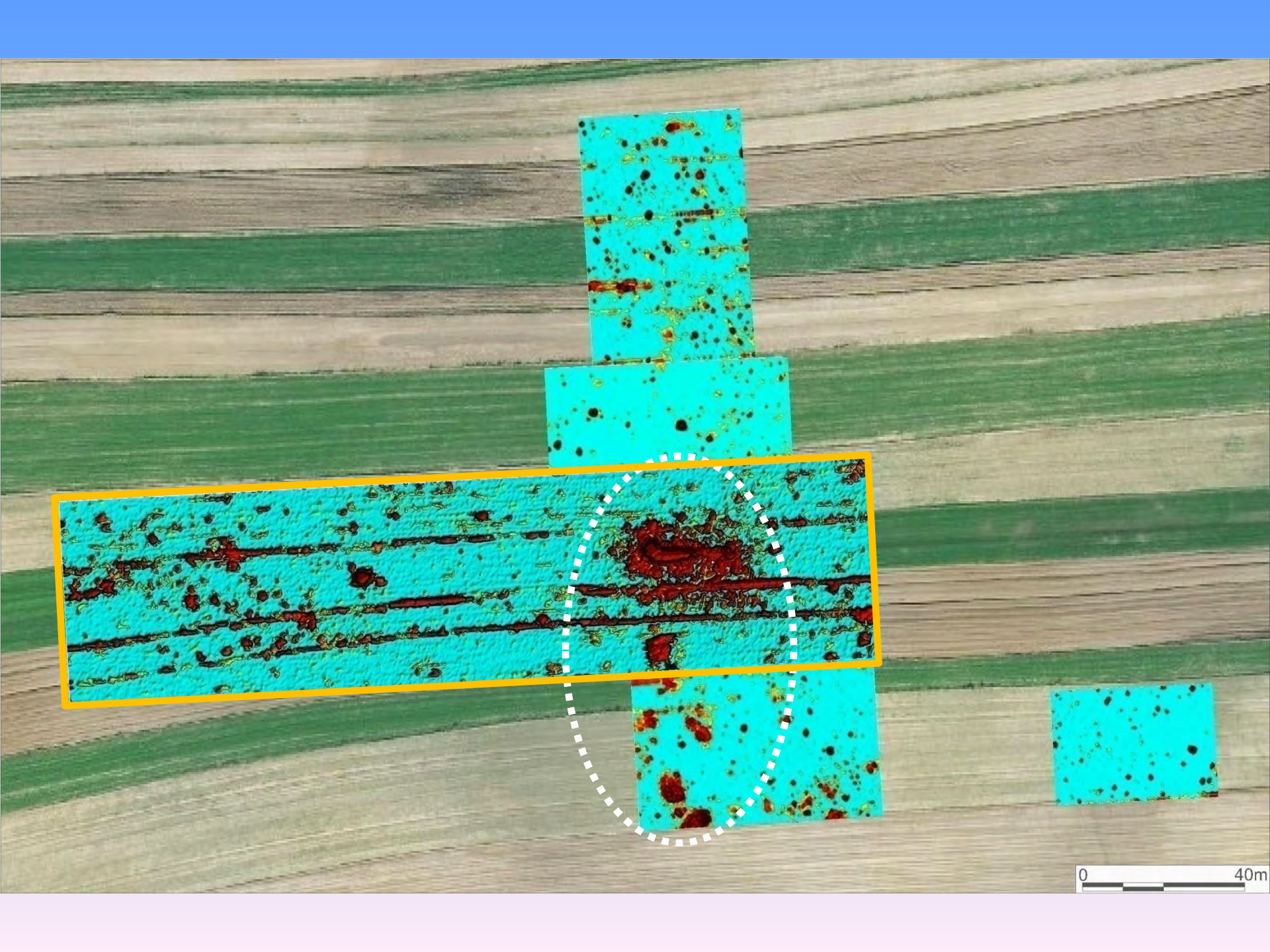
0 40m

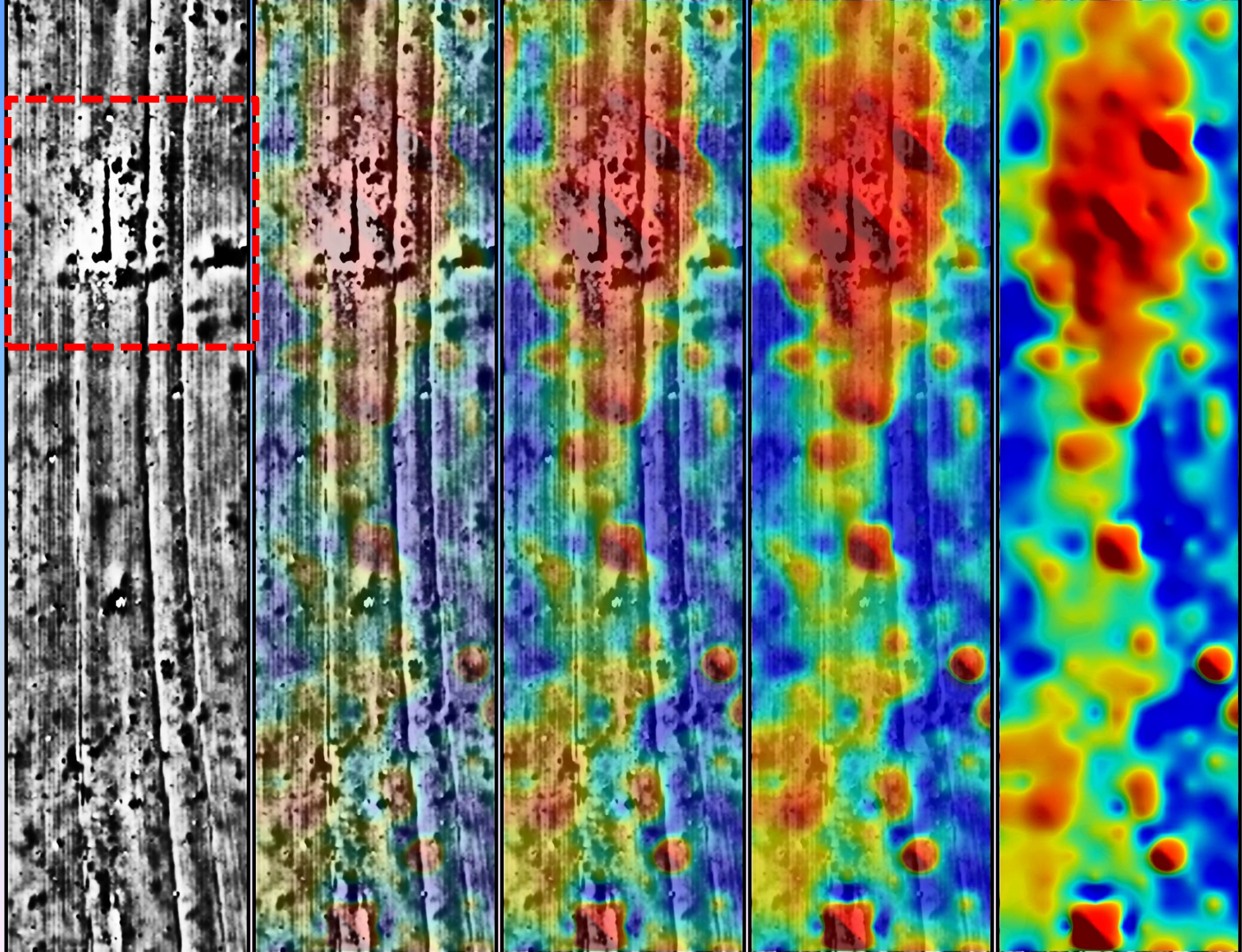


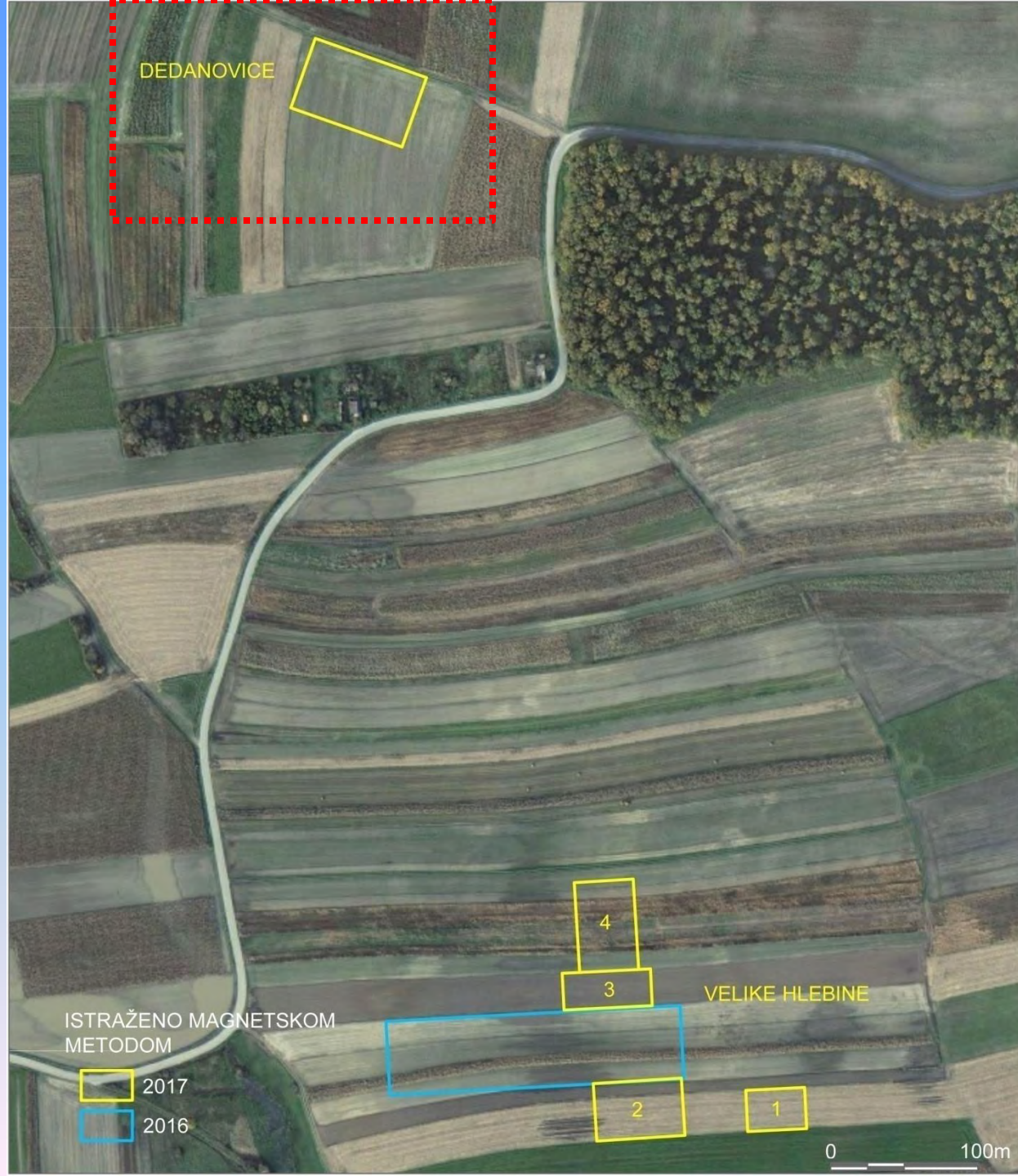
0 40m













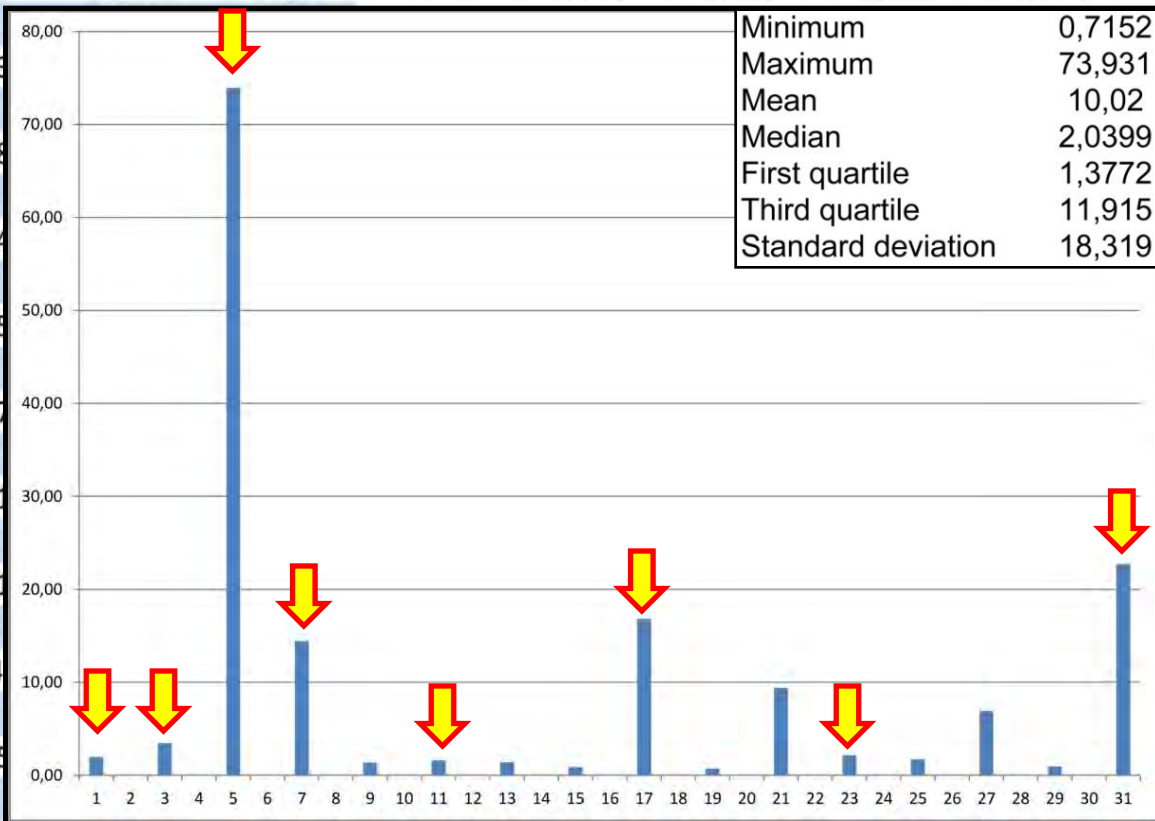




Vrijednosti magnetskog susceptibiliteta po uzorcima

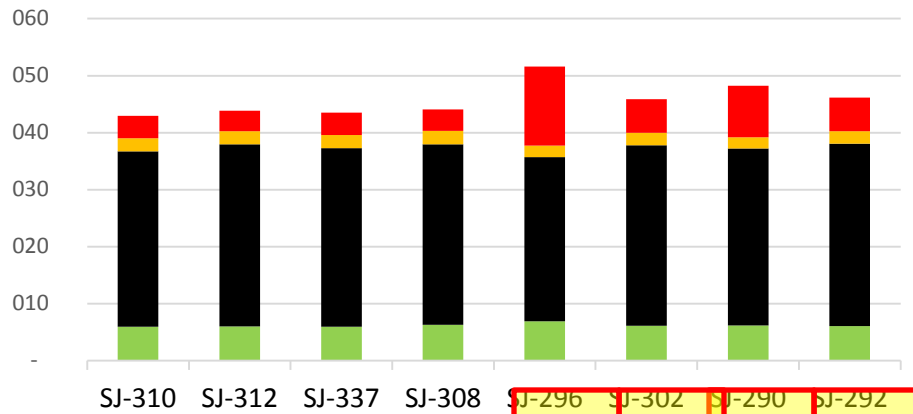
srednja
vrijednost

VIRJE	S7	SJ - 312	U - 185								
1,406	2,48	2,118	2,809	1,469	1,432	2,185	1,581	2,319	1,599	1,94	
VIRJE	S7	SJ - 310	U - 178								
2,233	3,439	3,651	6,468	4,734	2,396	3,714	2,419	3,015	2,524	3,46	
VIRJE	S7	SJ - 296	U - 158								
83,04	56,97	87,94	76,9	74,73	76,44	71,93	66,95	71,86	72,55	73,93	
VIRJE	S7										
15,04	16,43									16,29	14,43
VIRJE	S7										
1,32	1,308									1,293	1,34
VIRJE	S7										
1,393	1,484									1,615	1,61
VIRJE	S7										
1,211	1,285									2,041	1,41
VIRJE	S8										
0,877	0,797									0,789	0,85
VIRJE	S7										
17,17	20,41									15,29	16,80
VIRJE	S8										
0,713	0,711									0,81	0,72
VIRJE	S9										
6,716	9,14									7,334	9,40
VIRJE	S7										
2,011	2,415									2,14	
VIRJE	S7										
1,658	1,604	1,616	1,729	1,641	1,9	1,897	1,513	1,999	1,647	1,72	
VIRJE	S7	SJ - 302	U -154								
8,792	6,206	6,472	5,661	7,207	8,049	6,052	5,454	7,015	8,392	6,93	
VIRJE	S7	SJ - 351	U - 200								
0,968	1,142	0,713	0,76	0,865	1,029	0,881	1,053	0,948	1	0,94	
VIRJE	S7	SJ - 290	U -163								
22,61	21,55	17,05	29,51	22,31	25,29	21,71	21,17	25,11	20,74	22,71	



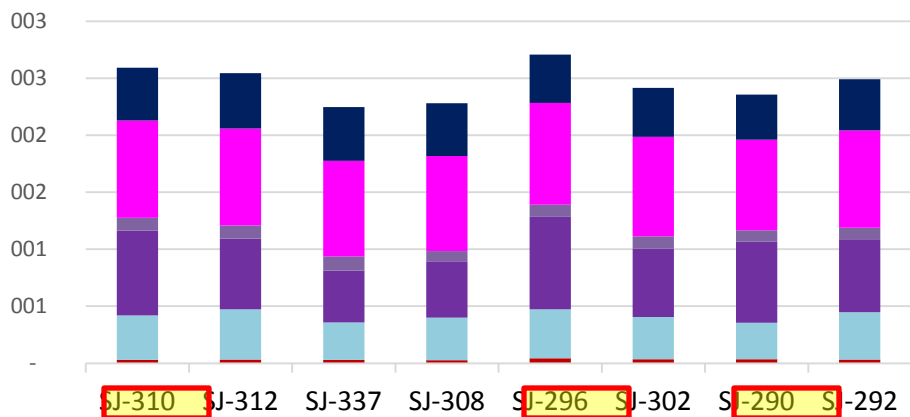
Elements Al, Si, K, Fe (%)

Al % Si % K % Fe %

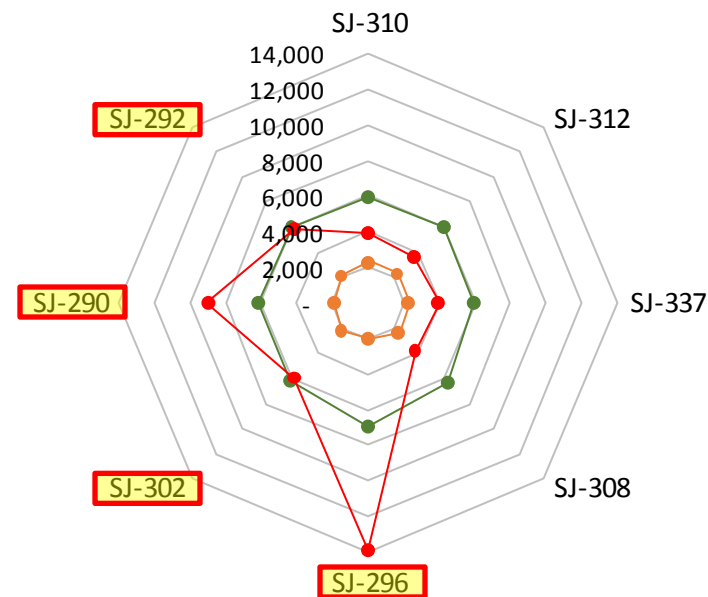


Elements Cl, Mg, P, S, Ca, Ti (%)

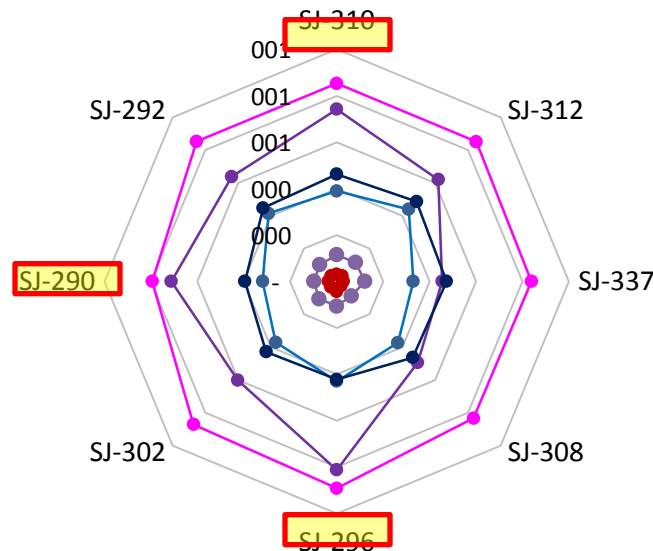
Cl % Mg % P % S % Ca % Ti %



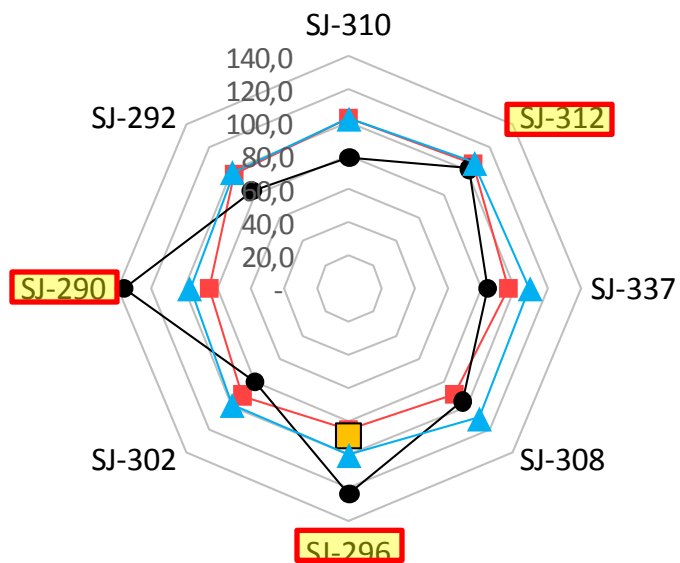
Al % K % Fe %



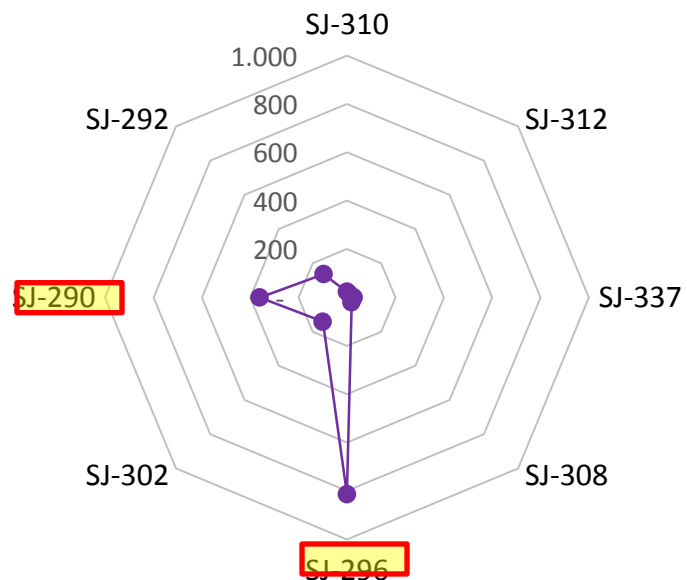
Cl % Mg % P %
S % Ca % Ti %



■ Zn ppm
 ● Cr ppm
 ■ Cu ppm
 ▲ Sr ppm



● As ppm

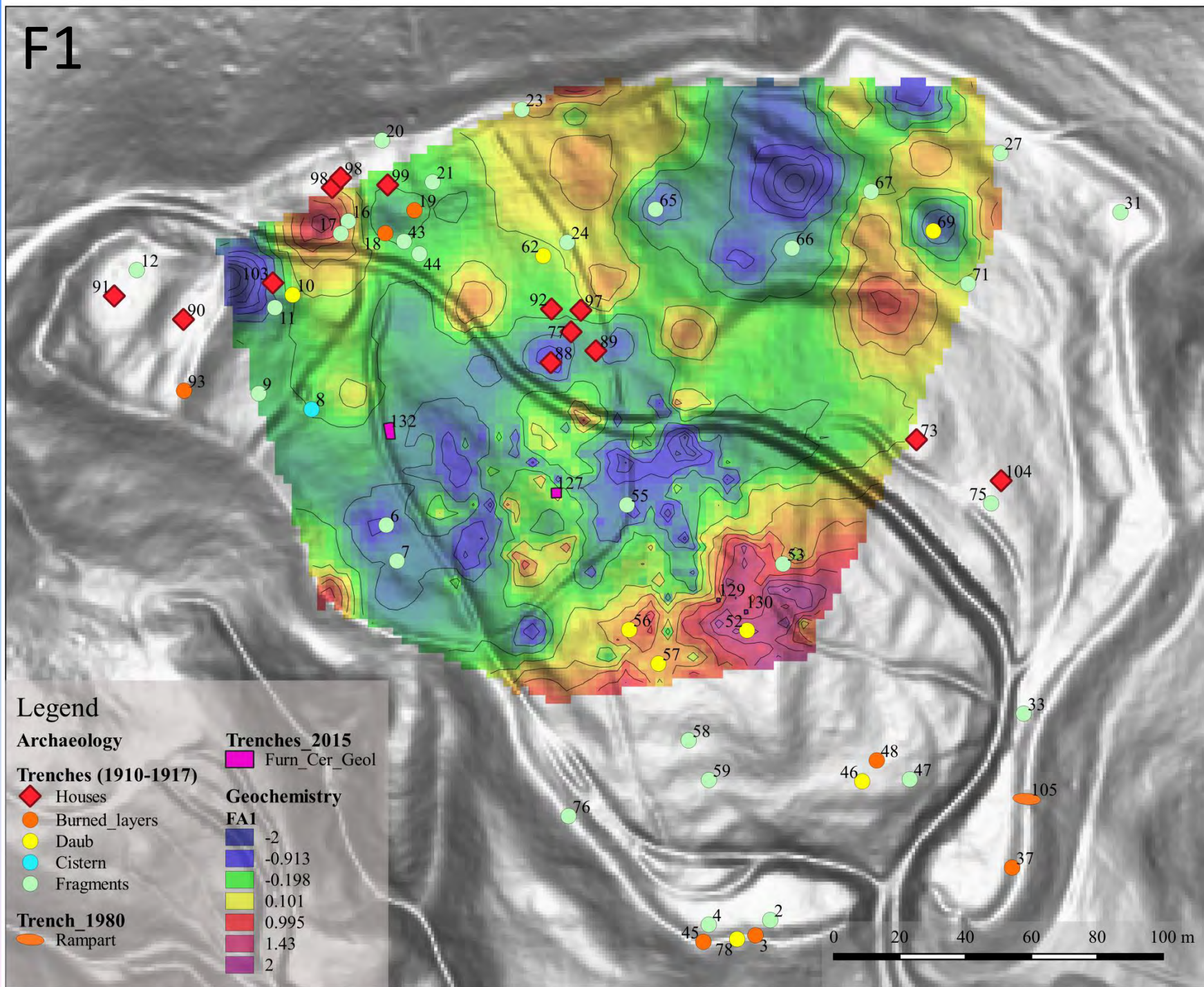


Vrijednosti magnetskog susceptibiliteta po uzorcima										srednja vrijednost
VIRJE	S7	SJ - 312	U - 185							
1,406	2,48	2,118	2,809	1,469	1,432	2,185	1,581	2,319	1,599	1,94
VIRJE	S7	SJ - 310	U - 178							
2,233	3,439	3,651	6,468	4,734	2,396	3,714	2,419	3,015	2,524	3,46
VIRJE	S7	SJ - 296	U - 158							
83,04	56,97	87,94	76,9	74,73	76,44	71,93	66,95	71,86	72,55	73,93
VIRJE	S7	SJ - 292	U - 165							
15,04	16,43	14,84	14,24	13,3	15	12,73	13,1	13,33	16,29	14,43
VIRJE	S7	SJ - 294	U - 167							
1,32	1,308	1,234	1,289	1,438	1,327	1,509	1,289	1,434	1,293	1,34
VIRJE	S7	SJ - 337	U - 174							
1,393	1,484	1,275	1,196	2	2,17	1,927	1,648	1,399	1,615	1,61
VIRJE	S7	SJ - 304	U - 176							
1,211	1,285	1,29	1,318	1,239	1,898	1,236	1,332	1,254	2,041	1,41
VIRJE	S8	SJ - 336	U - 160							
0,877	0,797	0,732	0,72	0,922	0,77	1,263	0,859	0,747	0,789	0,85
VIRJE	S7	SJ - 302	U - 169							
17,17	20,41	16,8	15,23	17,23	19,09	15,6	18,12	13,07	15,29	16,80
VIRJE	S8	SJ - 334	U - 180							
0,713	0,711	0,766	0,824	0,636	0,682	0,687	0,641	0,682	0,81	0,72
VIRJE	S9	SJ - 306B	U - 172							
6,716	9,14	11,52	13,76	13,13	8,641	8,772	5,397	9,583	7,334	9,40
VIRJE	S7	SJ - 308	U - 156							
2,011	2,415	2,062	2,121	2,29	1,906	2,457	2,098	1,962		2,14
VIRJE	S7	SJ - 298	U - 152							
1,658	1,604	1,616	1,729	1,641	1,9	1,897	1,513	1,999	1,647	1,72
VIRJE	S7	SJ - 302	U - 154							
8,792	6,206	6,472	5,661	7,207	8,049	6,052	5,454	7,015	8,392	6,93
VIRJE	S7	SJ - 351	U - 200							
0,968	1,142	0,713	0,76	0,865	1,029	0,881	1,053	0,948	1	0,94
VIRJE	S7	SJ - 290	U - 163							
22,61	21,55	17,05	29,51	22,31	25,29	21,71	21,17	25,11	20,74	22,71

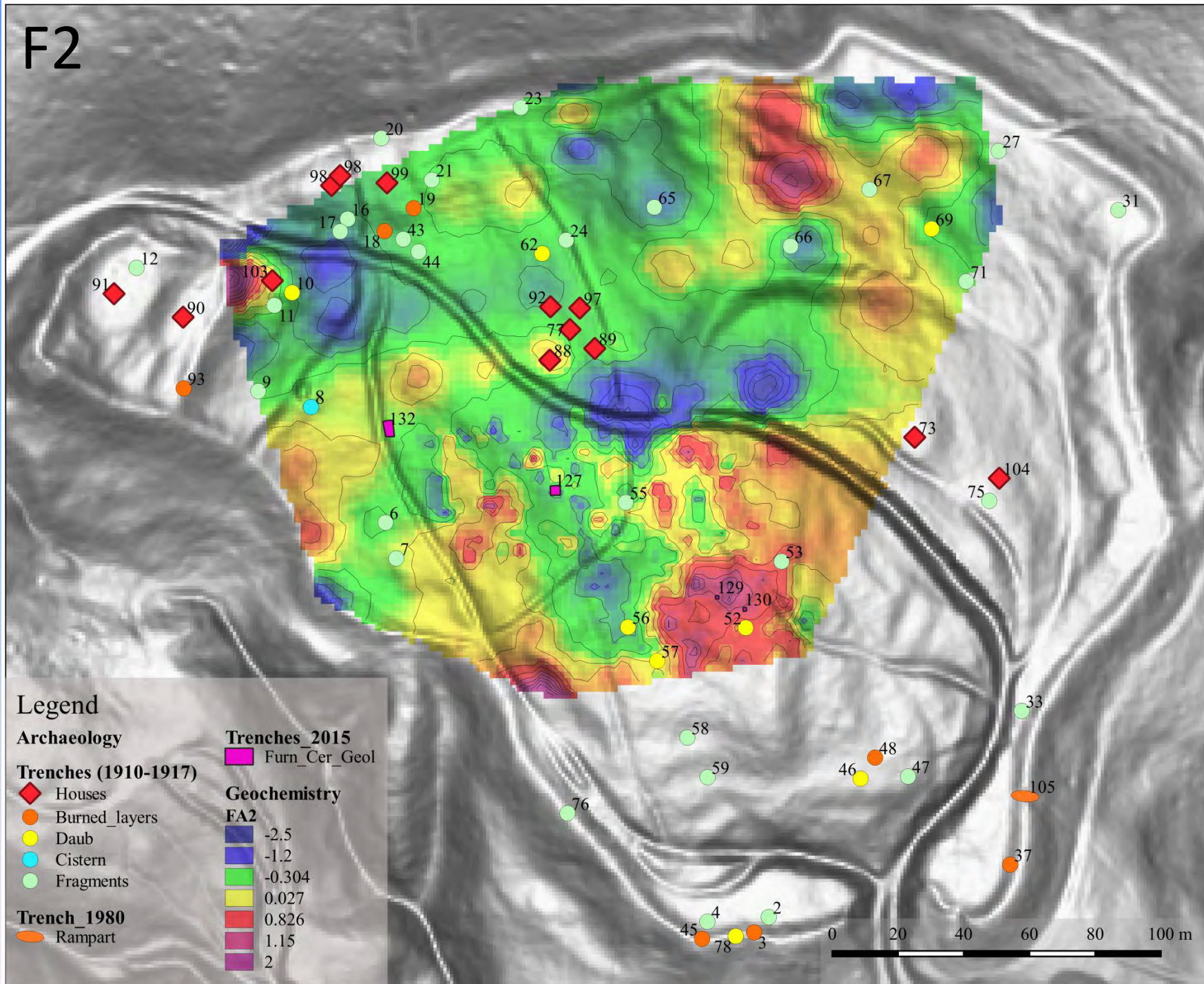
pXRF?



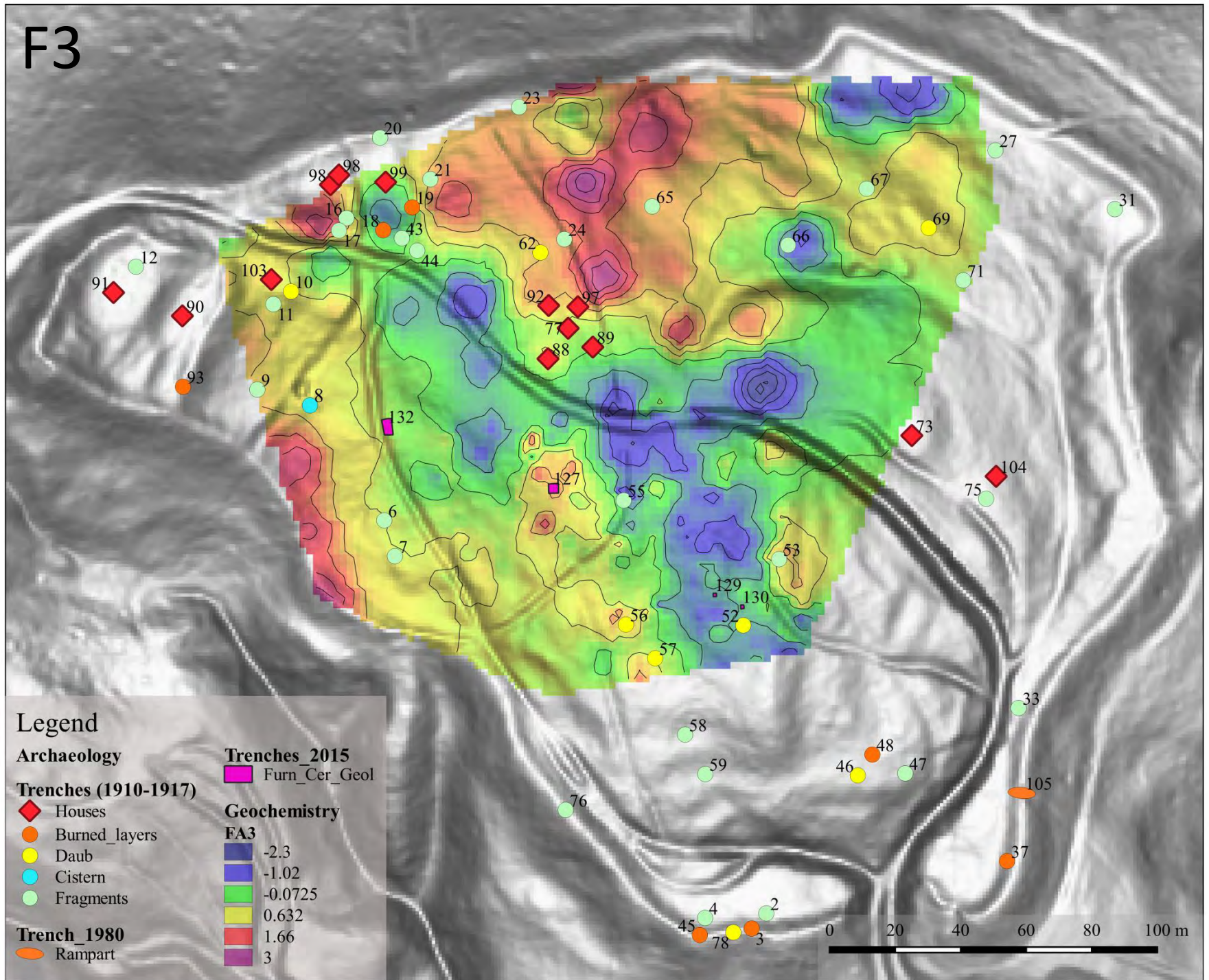
F1



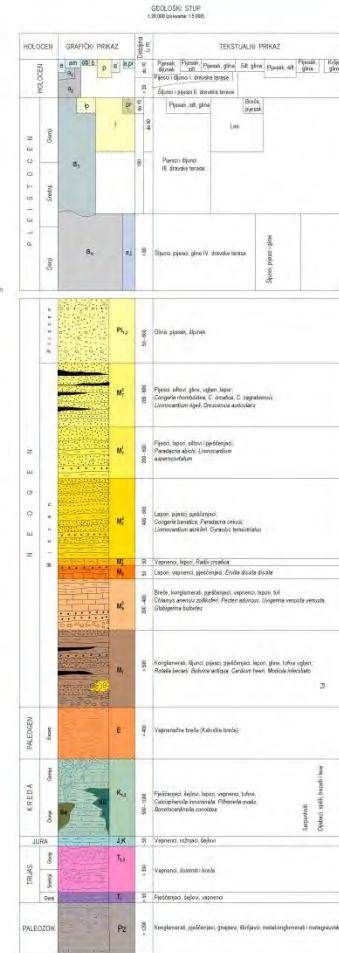
F2



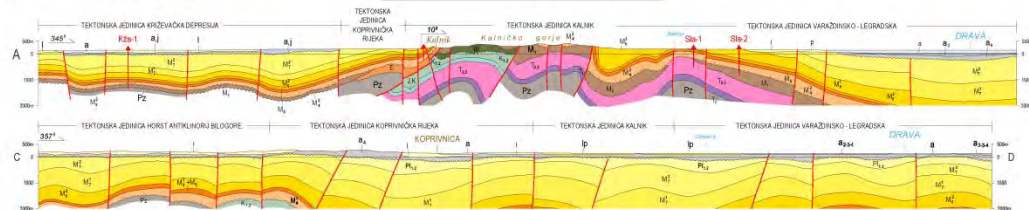
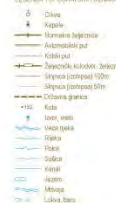
F3

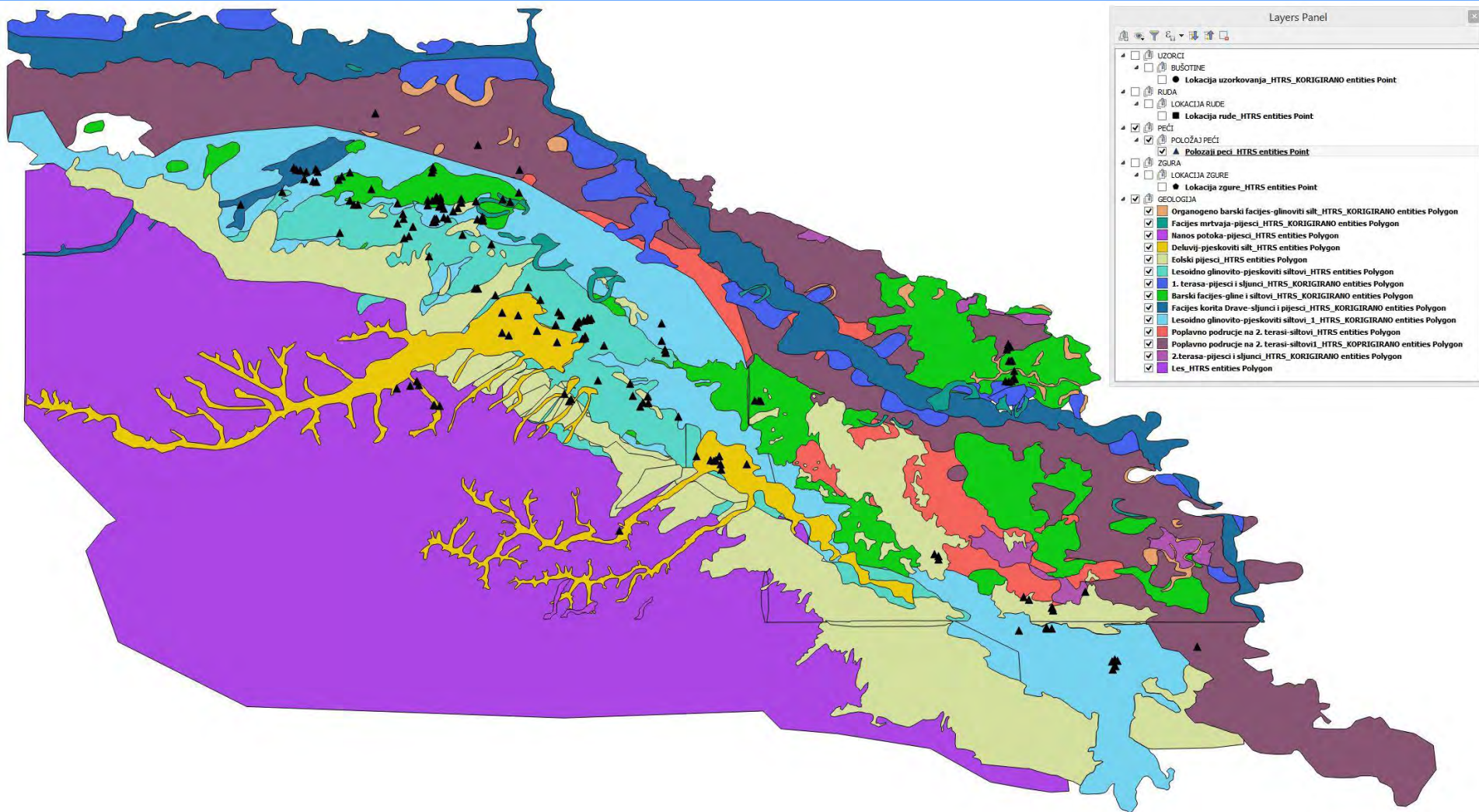


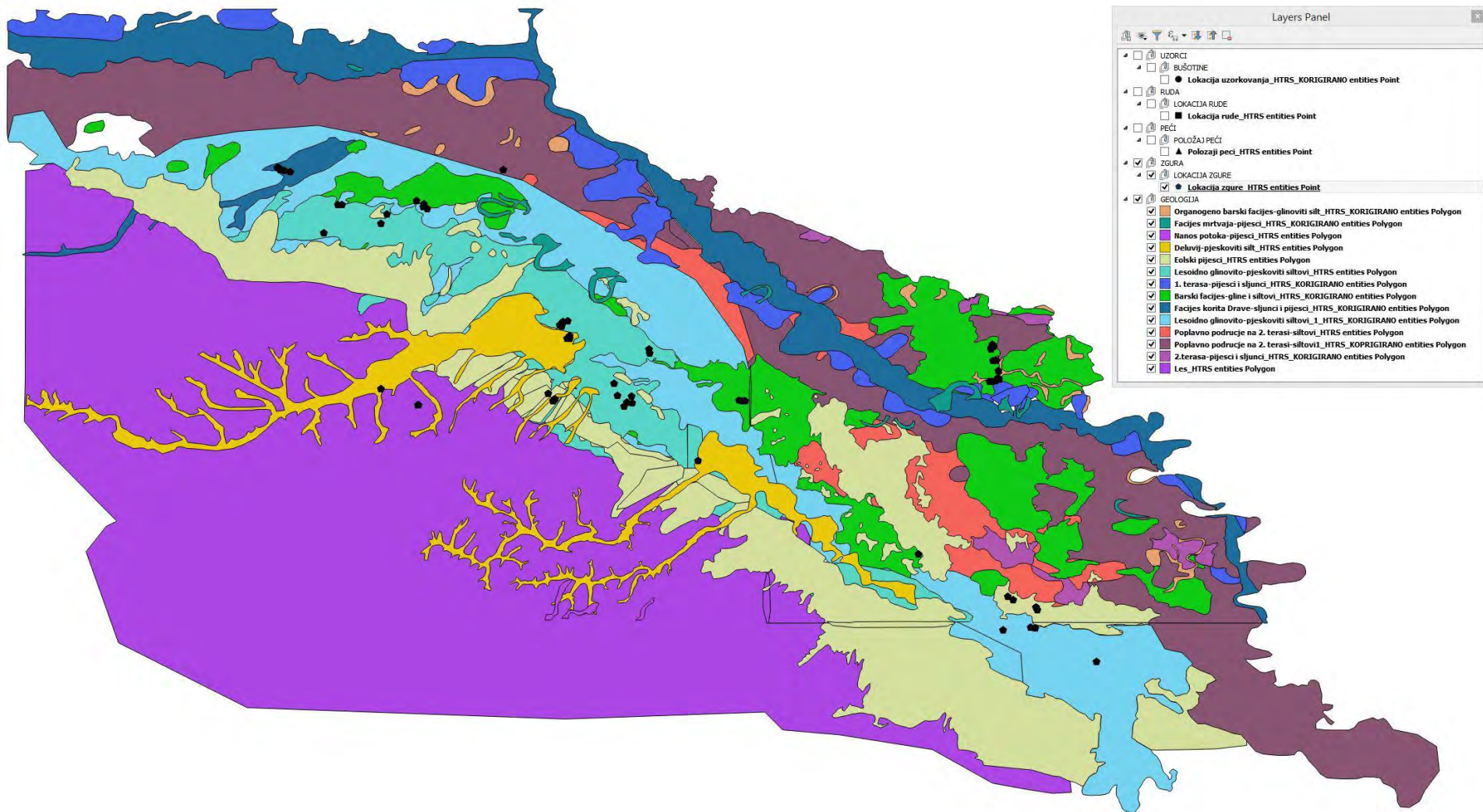
Izdanie Hrvatskoga geološkog instituta, Zagreb, 2011.

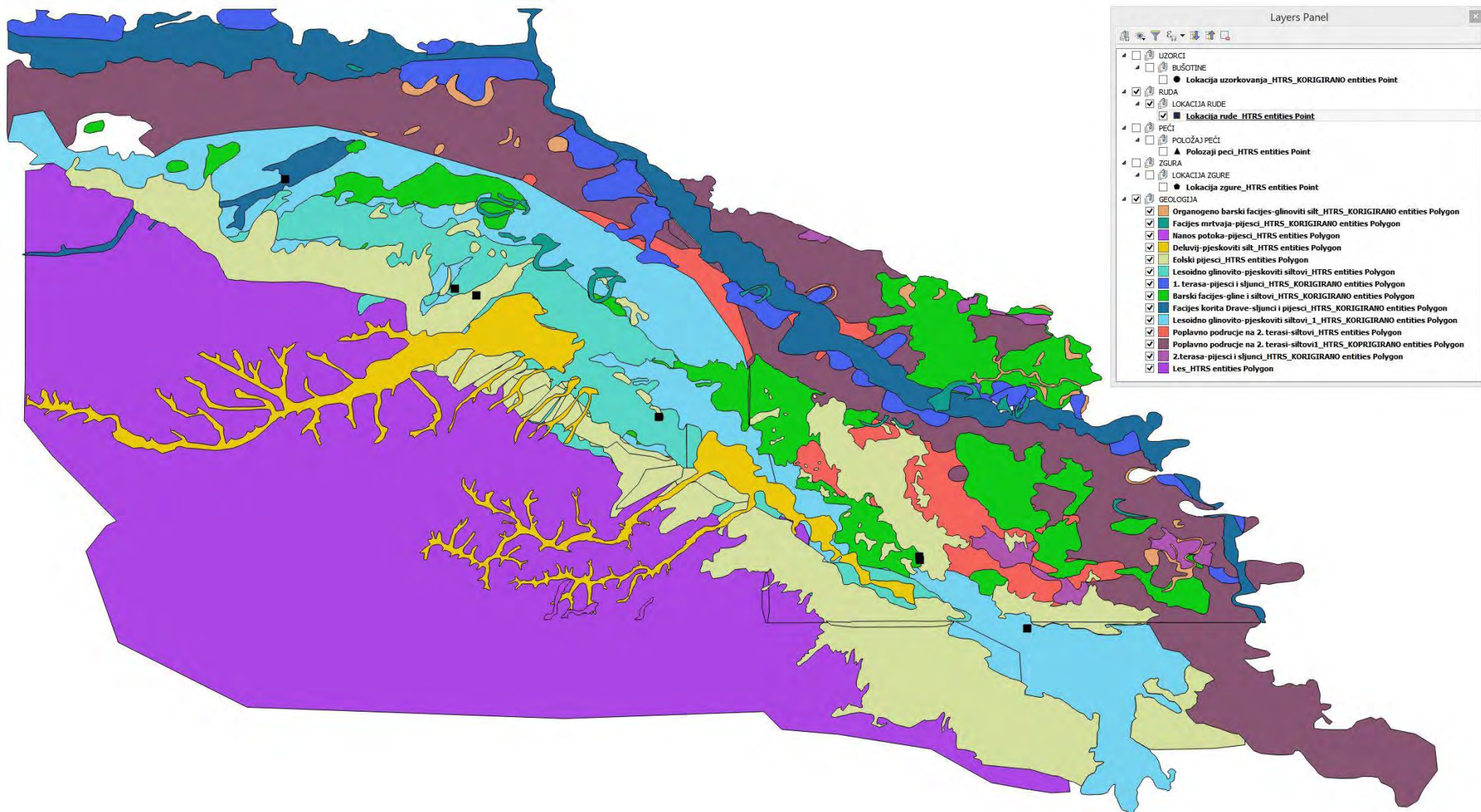


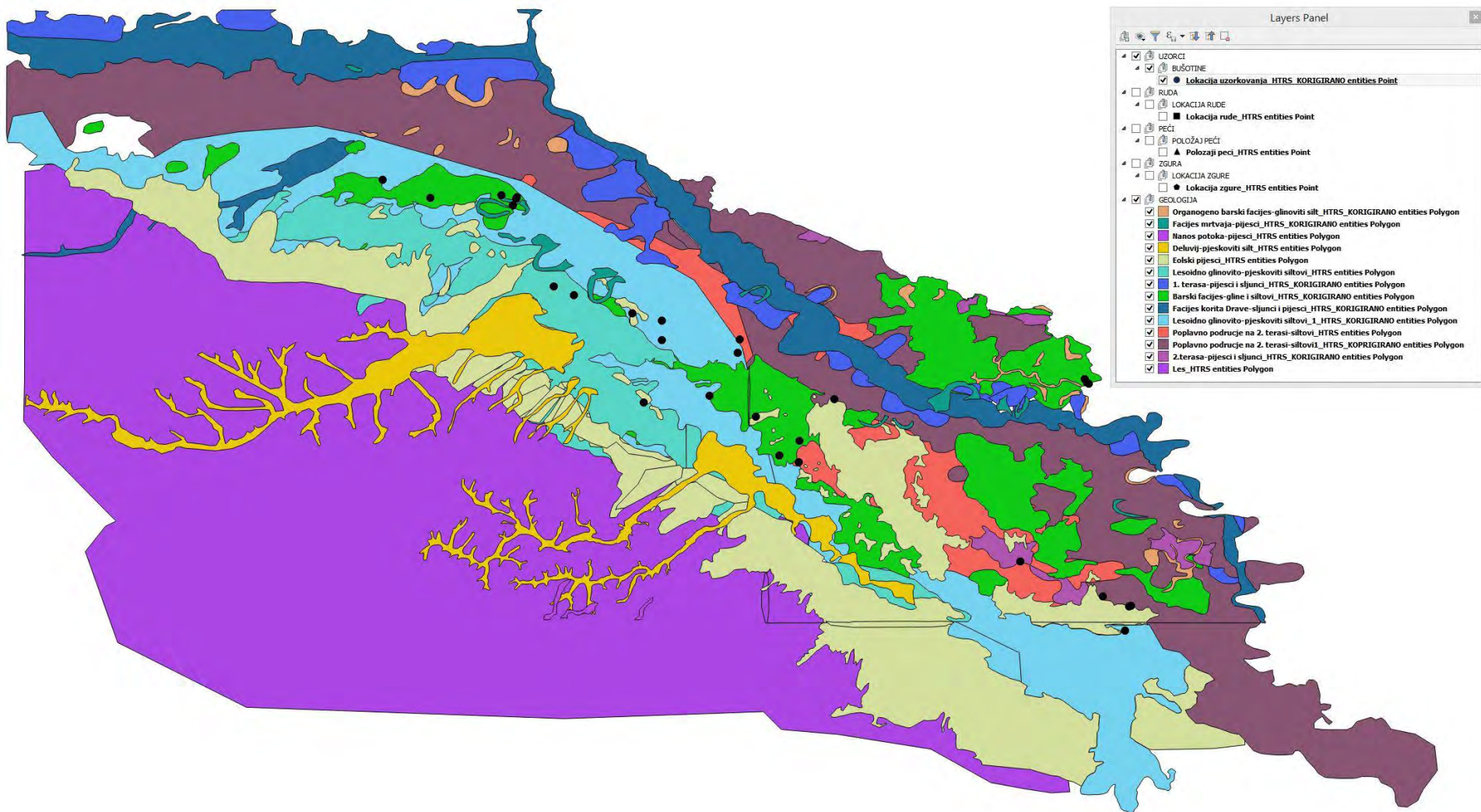
L'ESSENCE DE L'ÉCONOMIQUE CATHOLIQUE

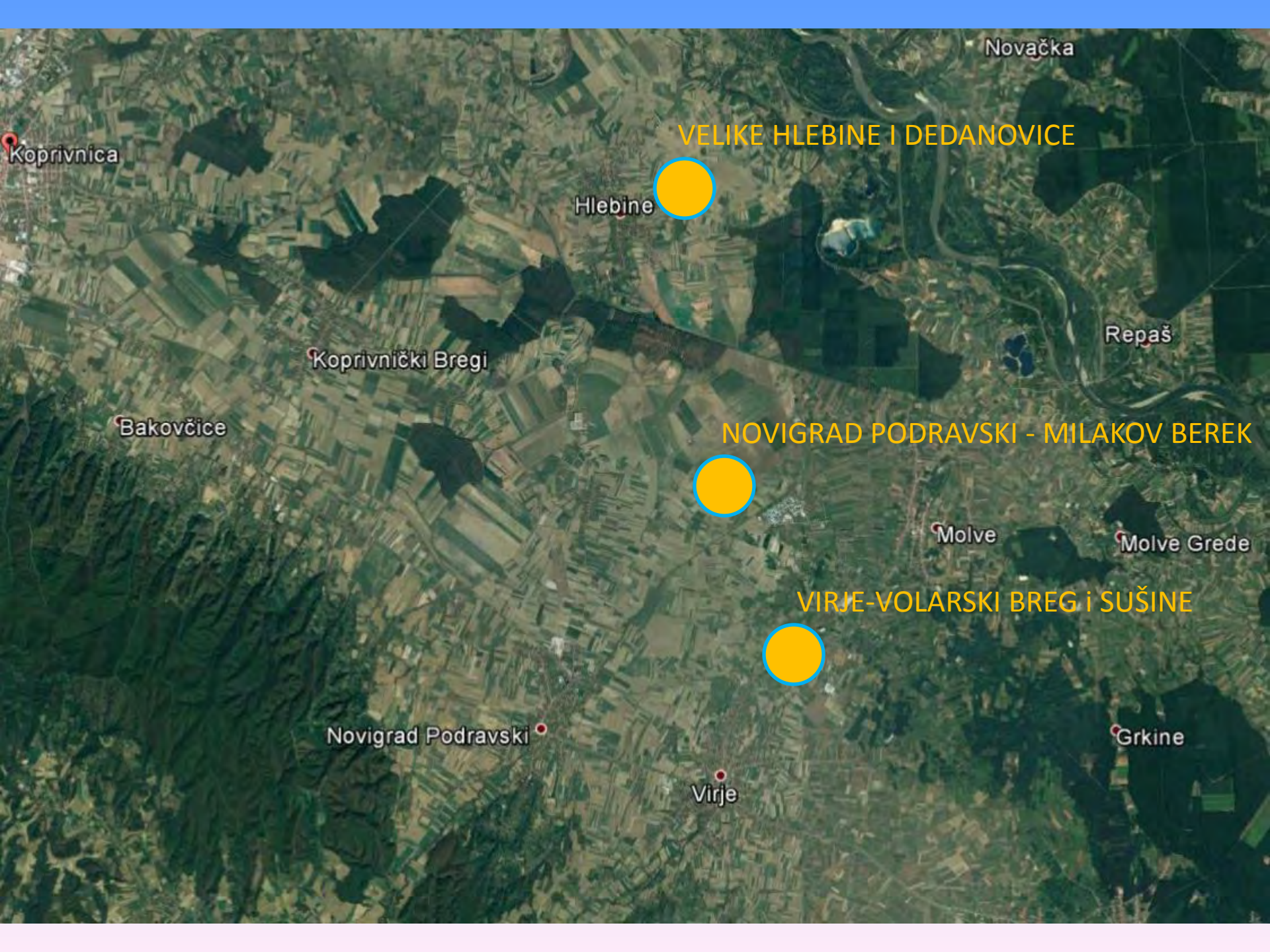












Novačka

VELIKE HLEBINE I DEDANOVICE

Koprivnica

Hlebine

Koprivnički Bregi

Repaš

Bakovčice

NOVIGRAD PODRAVSKI - MILAKOV BEREK

Molve

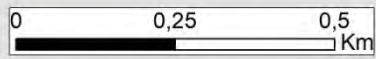
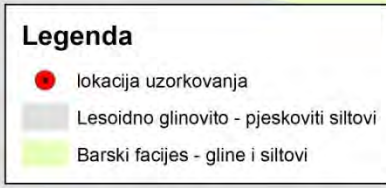
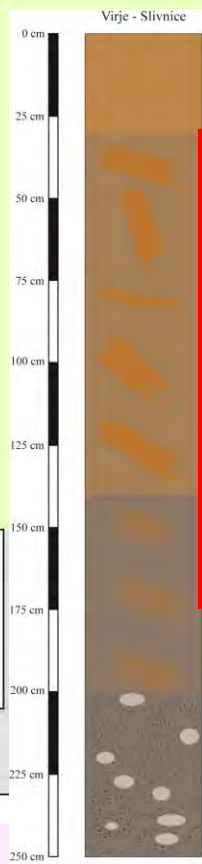
Molve Grede

VIRJE-VOLARSKI BREG I SUŠINE

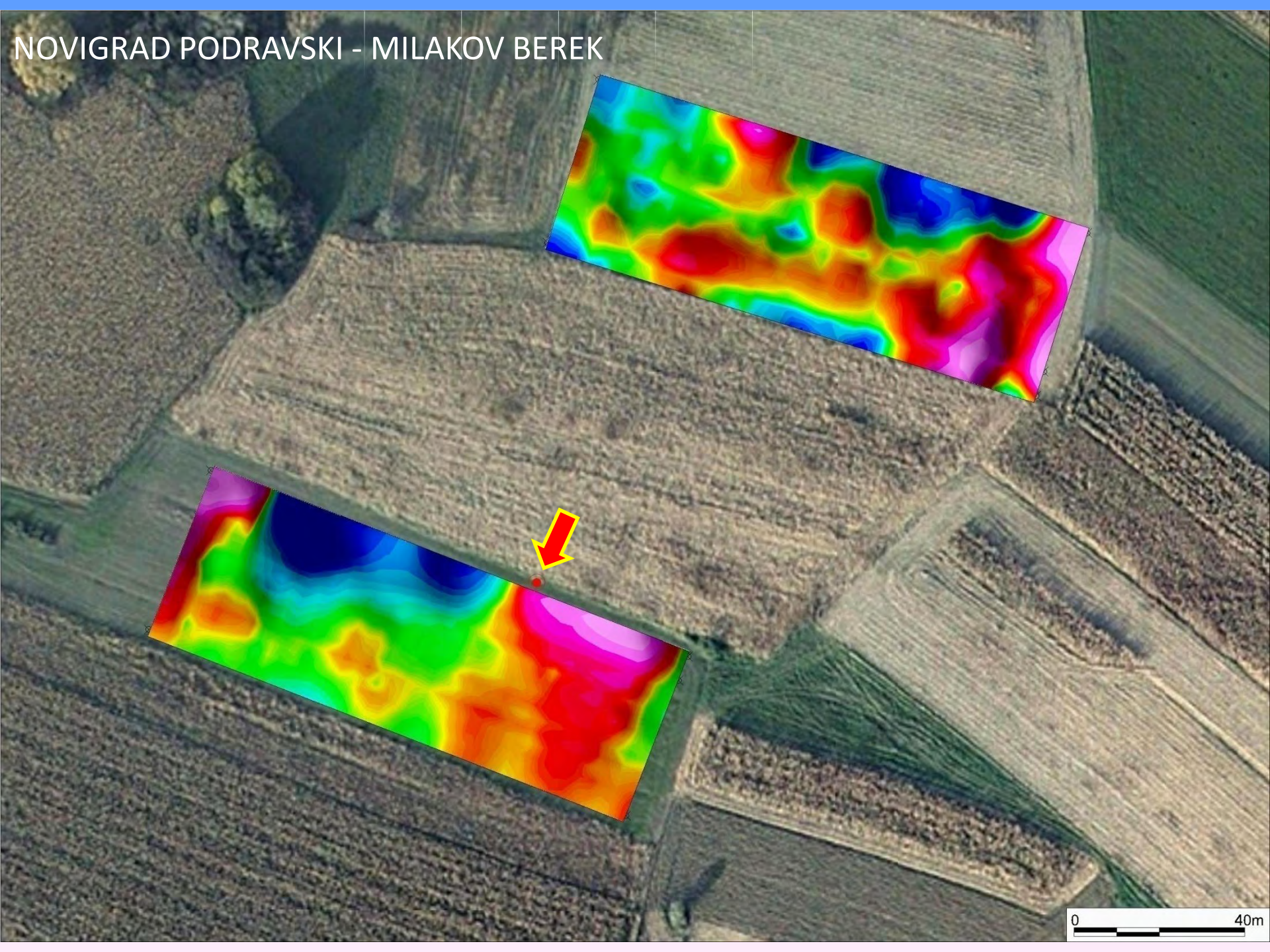
Novigrad Podravski

Virje

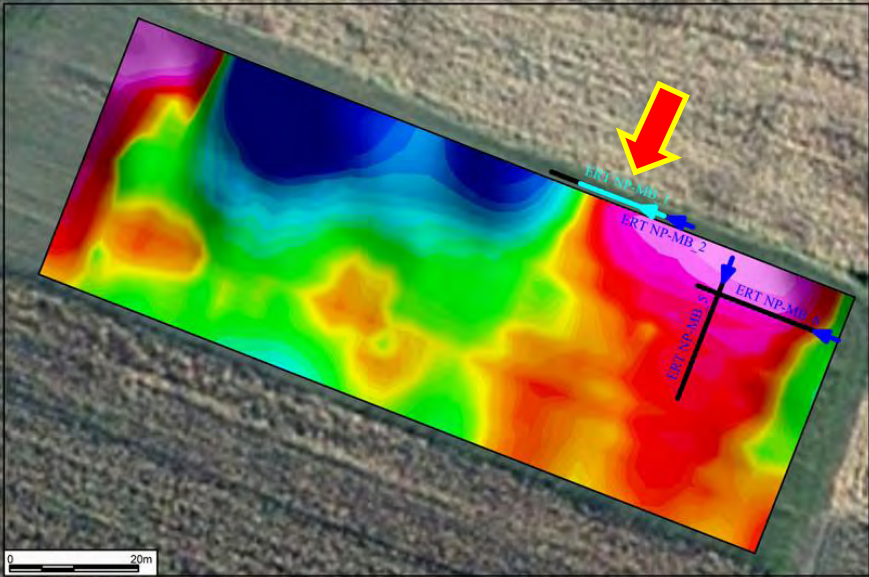
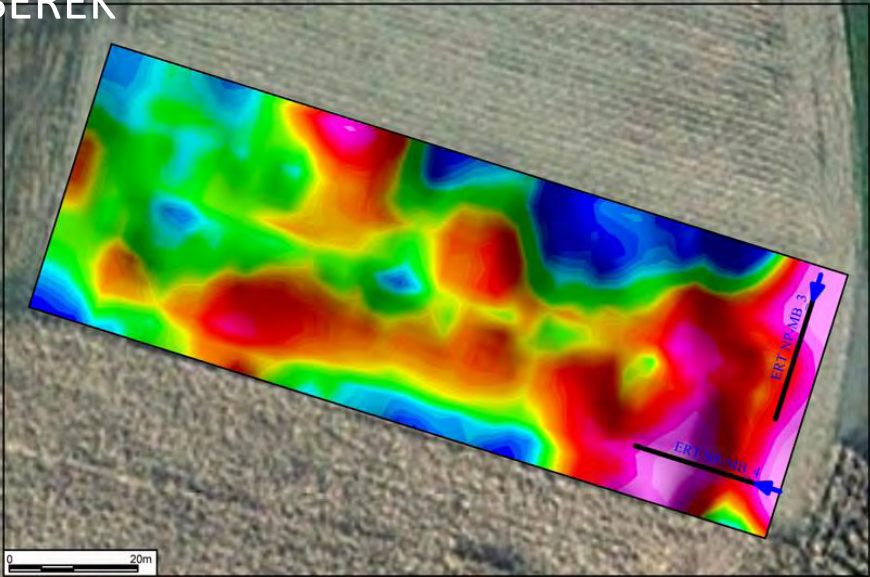
Grkine



NOVIGRAD PODRAVSKI - MILAKOV BEREK

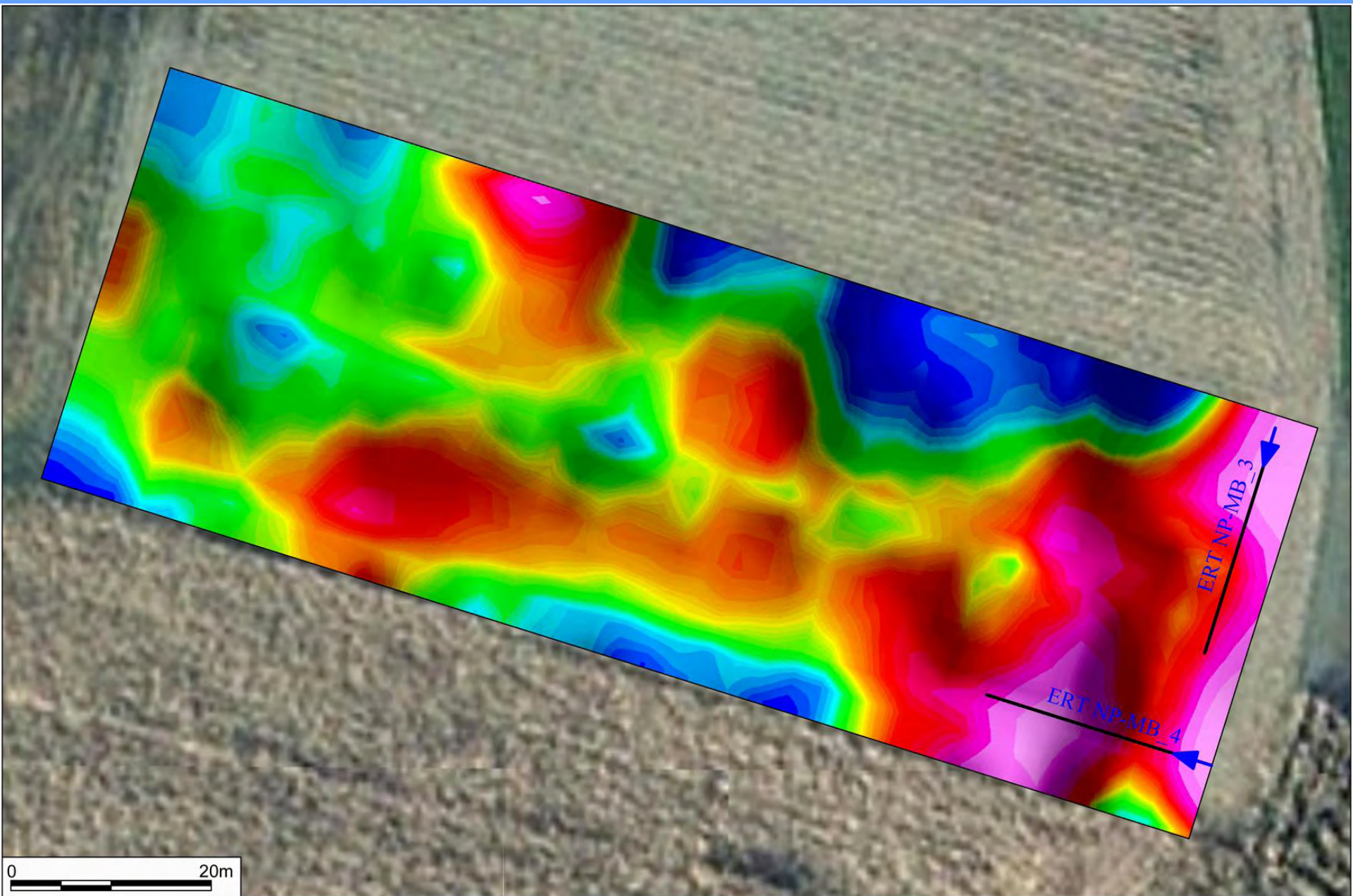


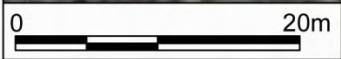
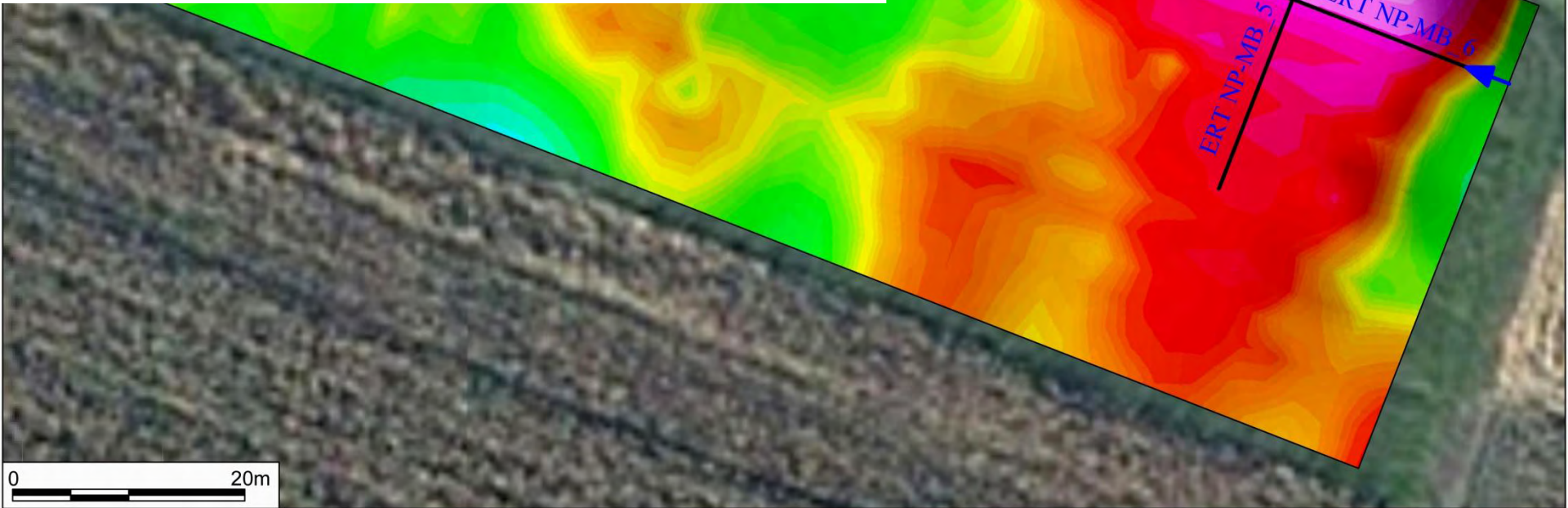
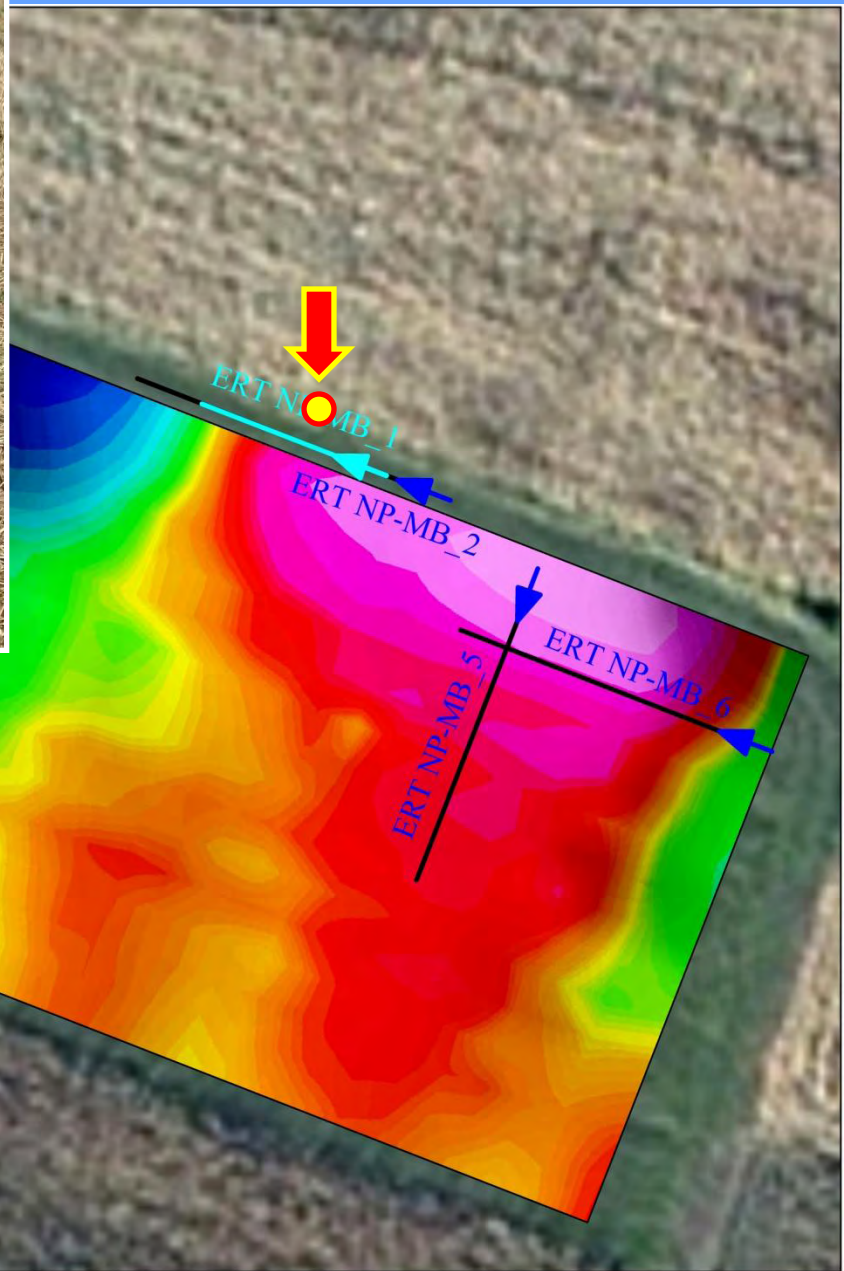
NOVIGRAD PODRAVSKI - MILAKOV BEREK



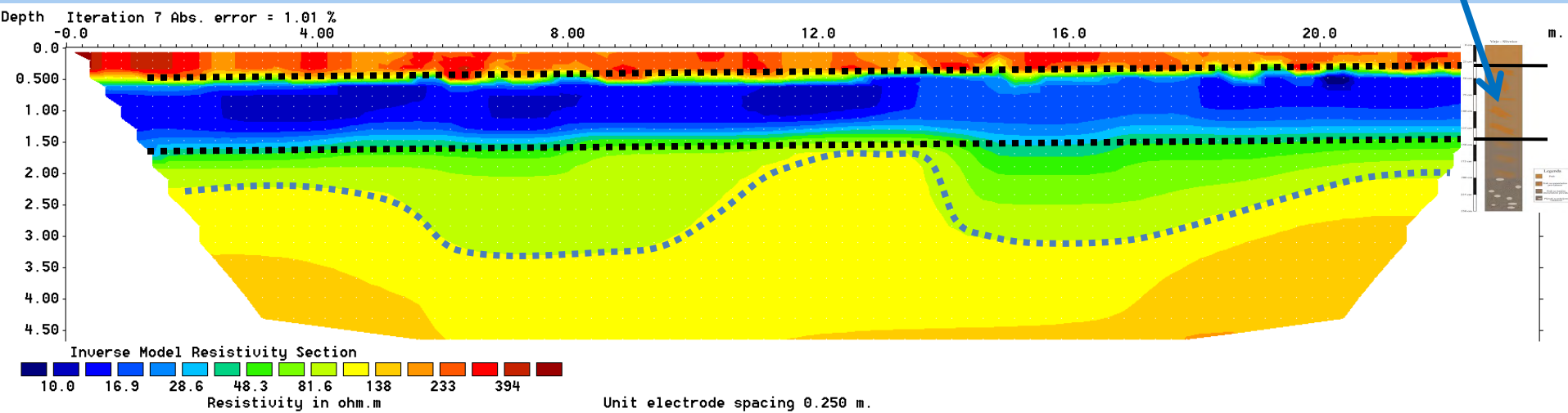
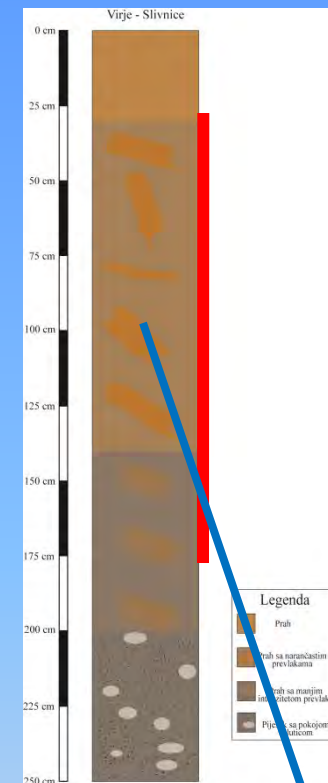
2D resistivity tomography

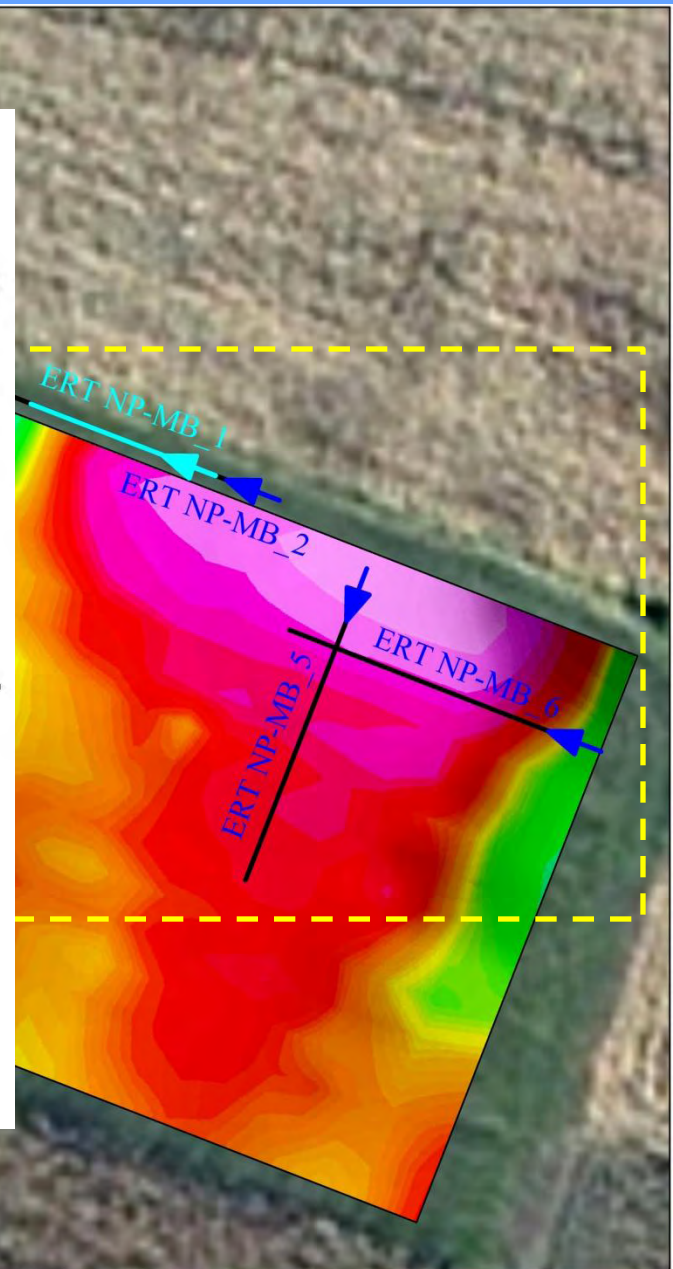
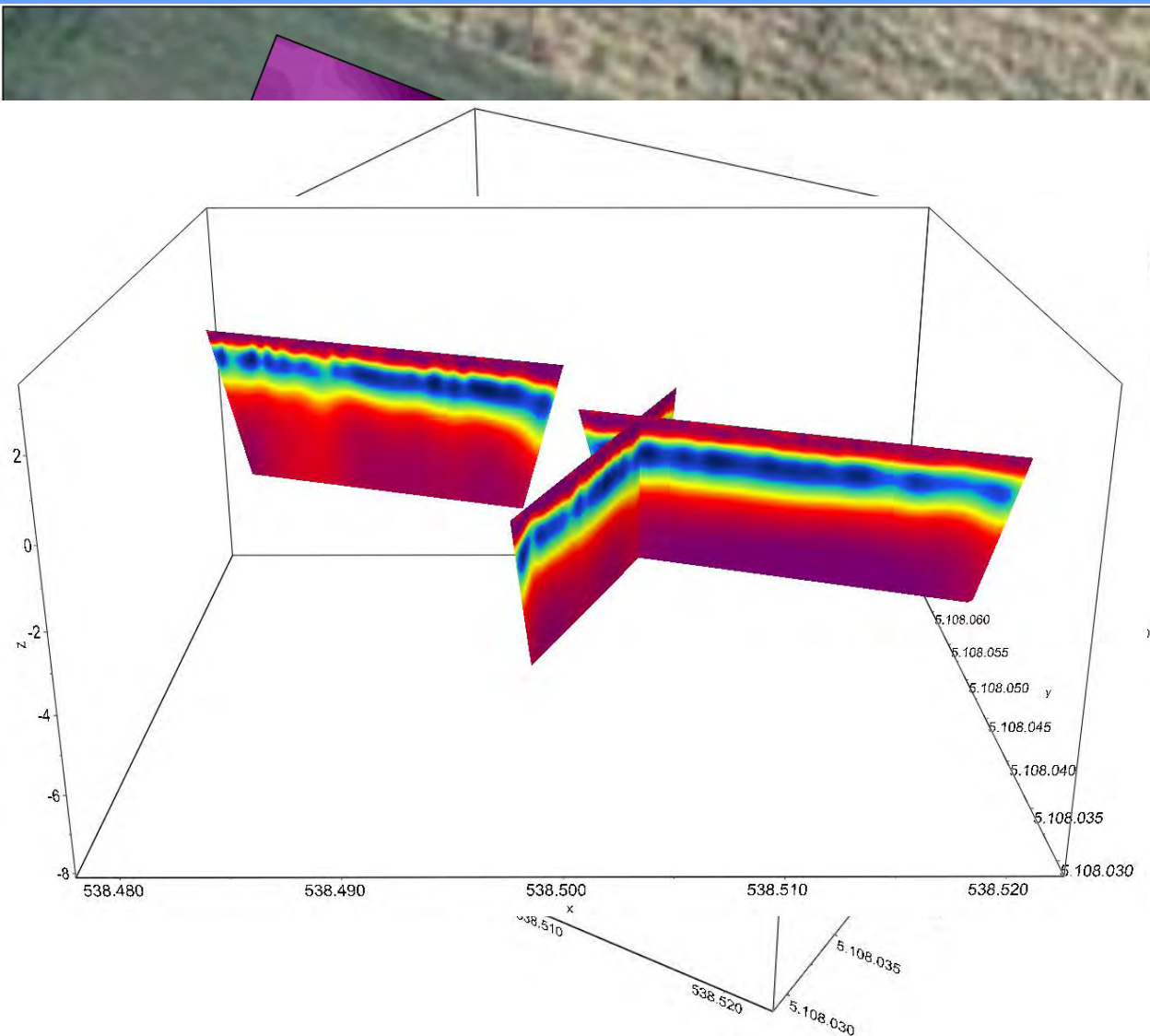




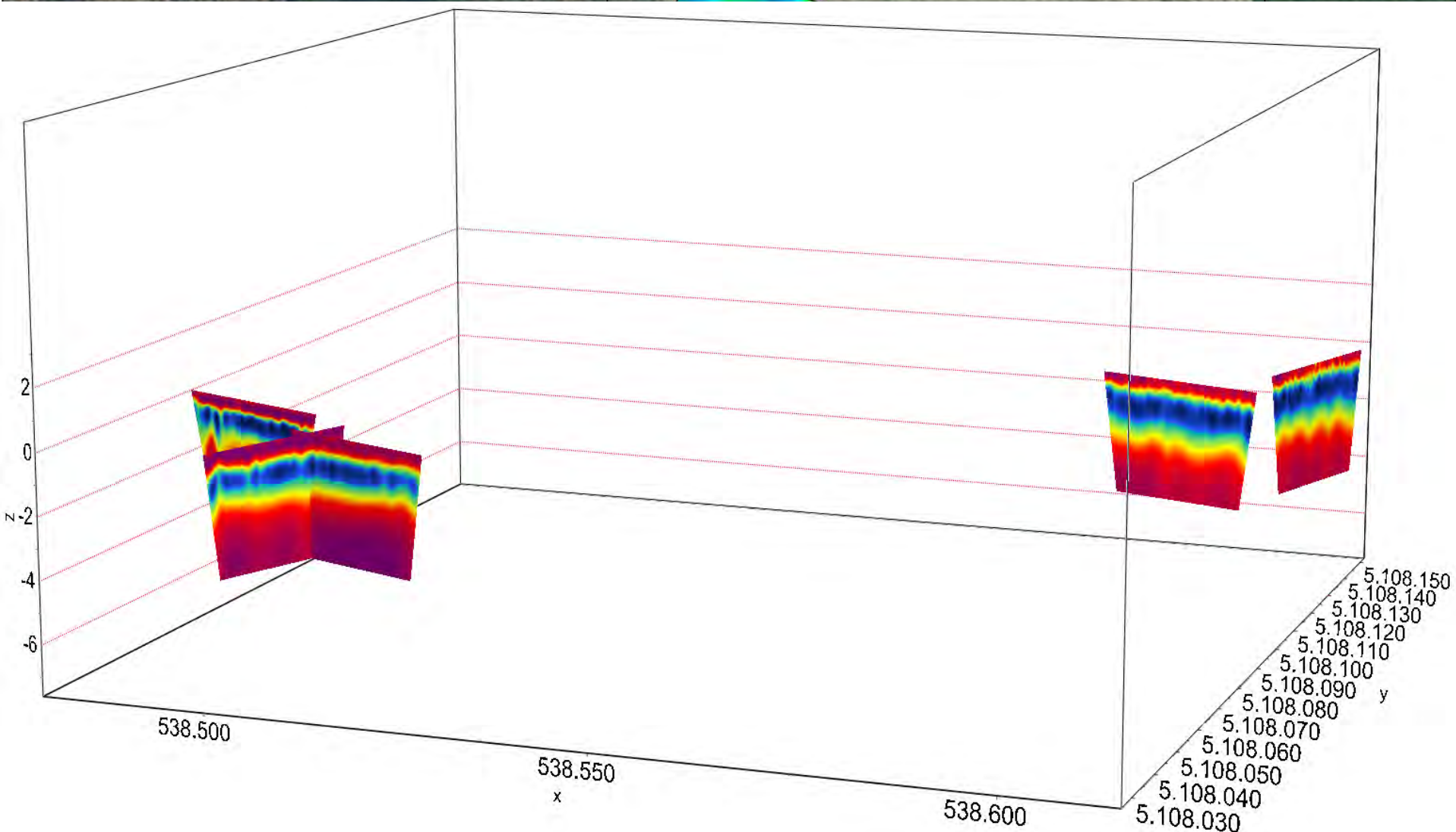


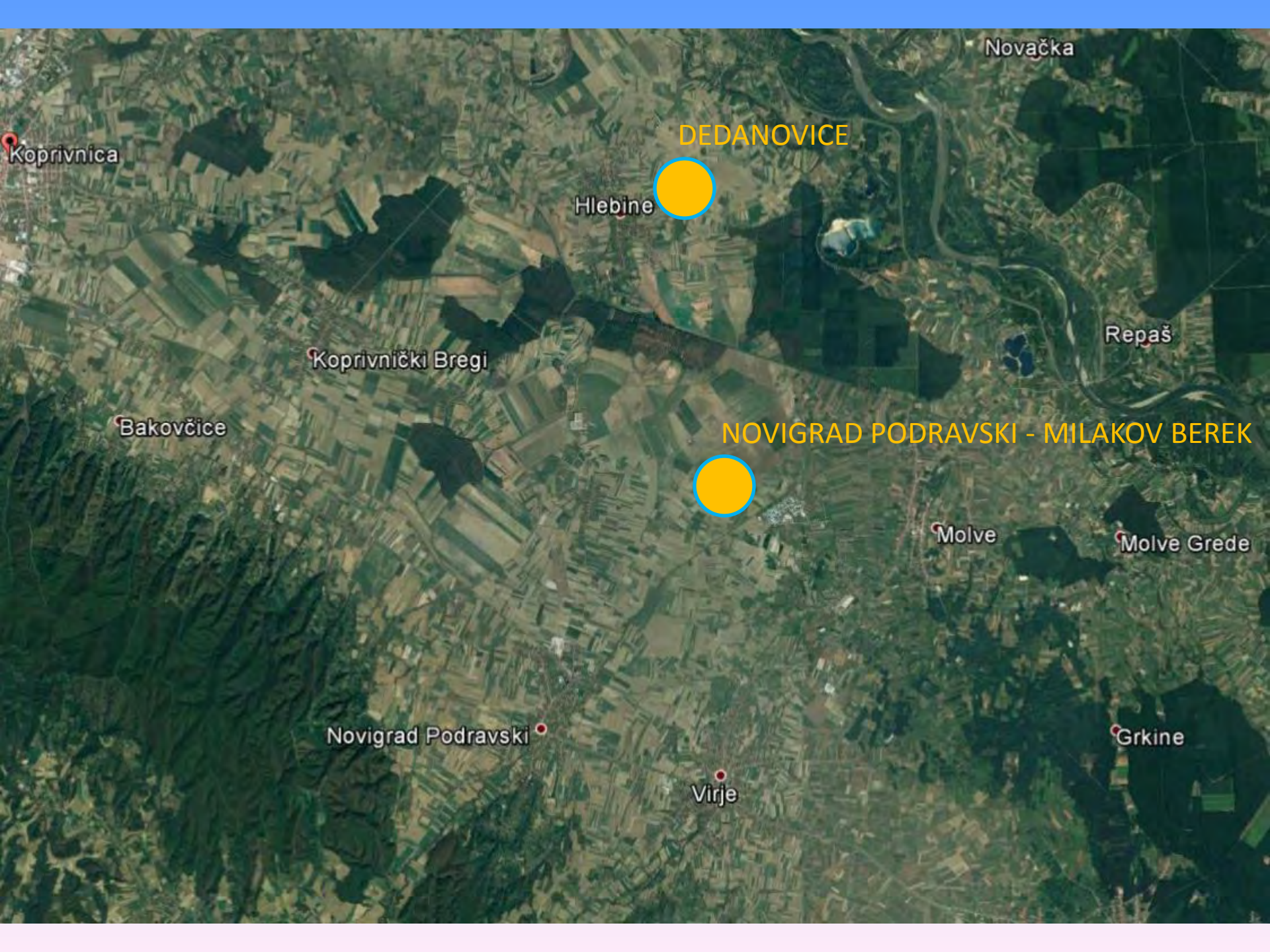
2D RESISTIVITY TOMOGRAPHY





NOVIGRAD PODRAVSKI - MILAKOV BEREK





Novačka

DEDANOVICE

Hlebine

Repaš

Koprivnički Bregi

Bakovčice

NOVIGRAD PODRAVSKI - MILAKOV BEREK

Molve

Molve Grede

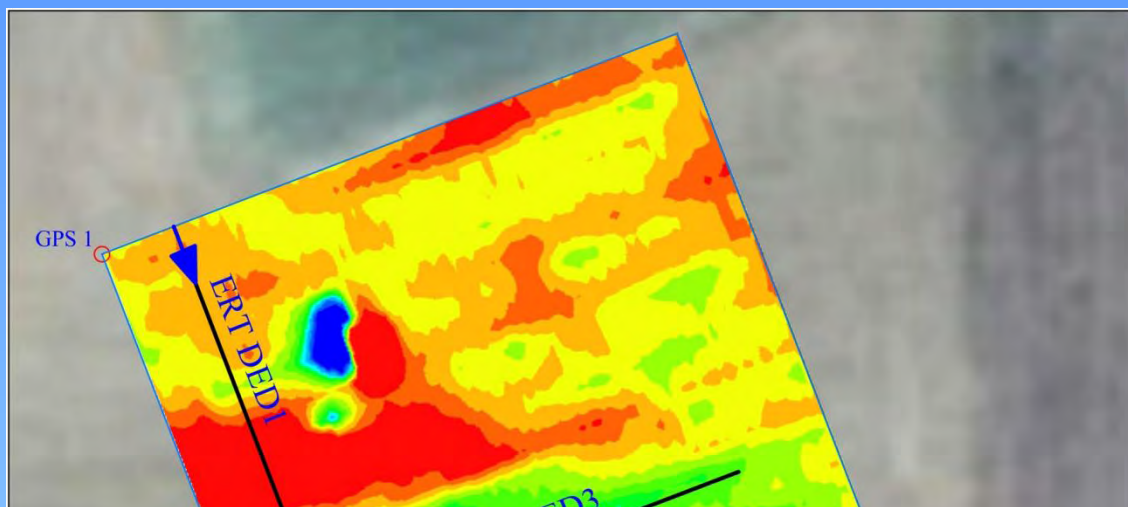
Novigrad Podravski

Virje

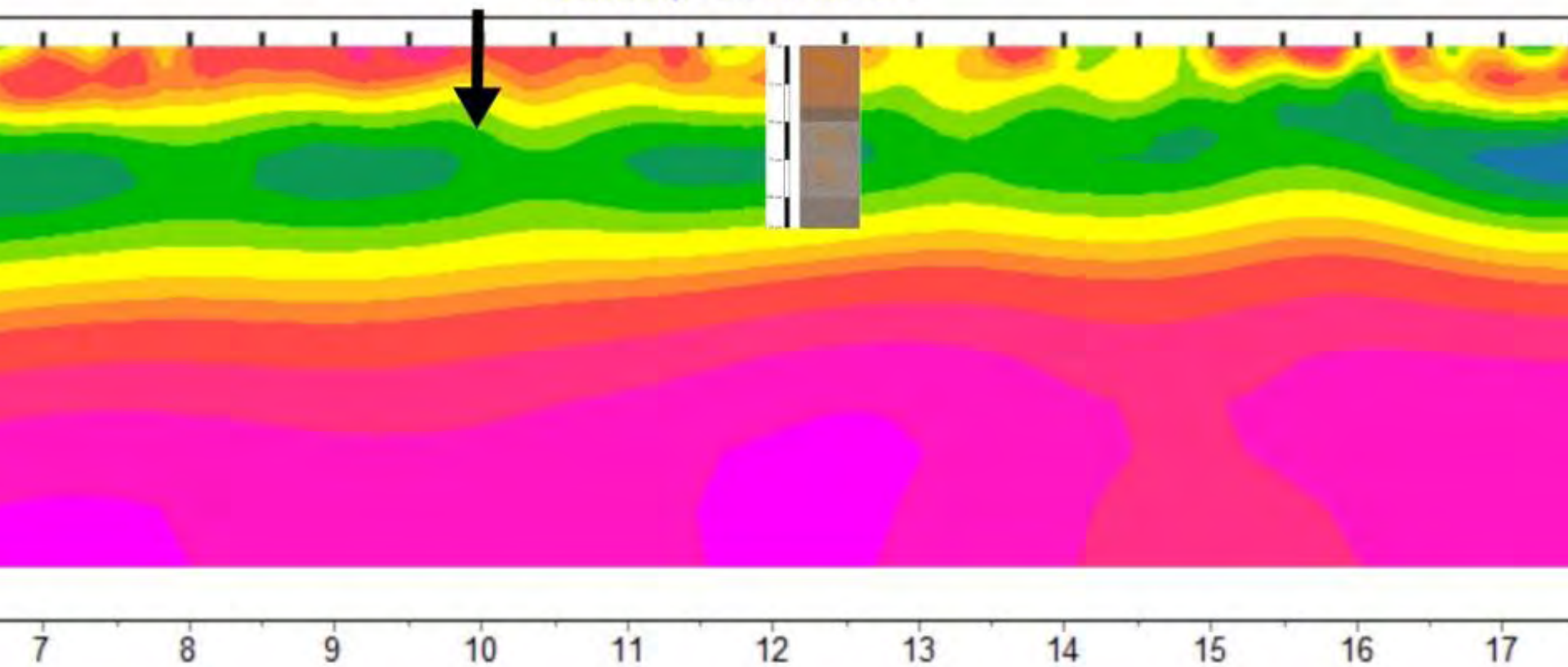
Grkine

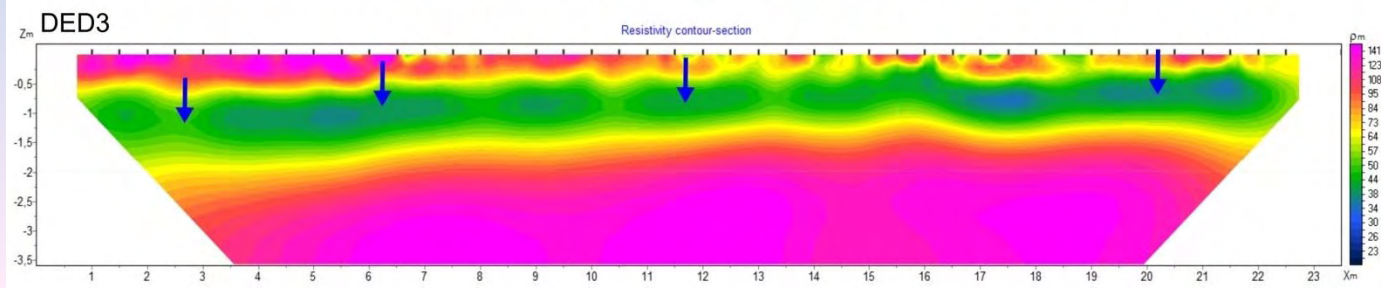
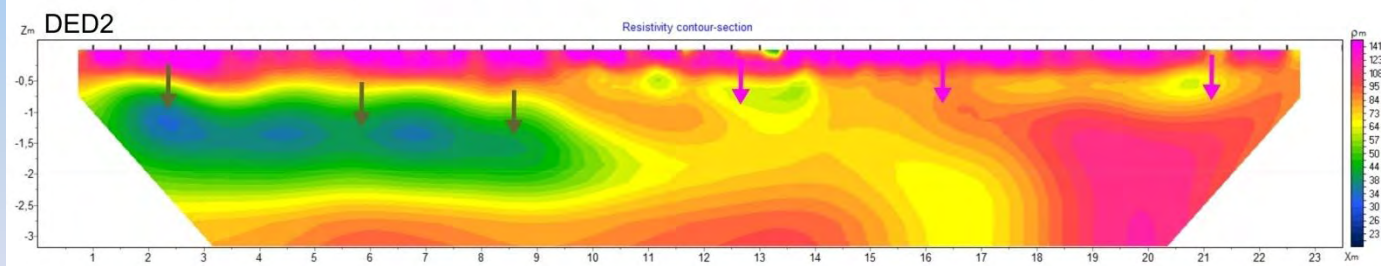
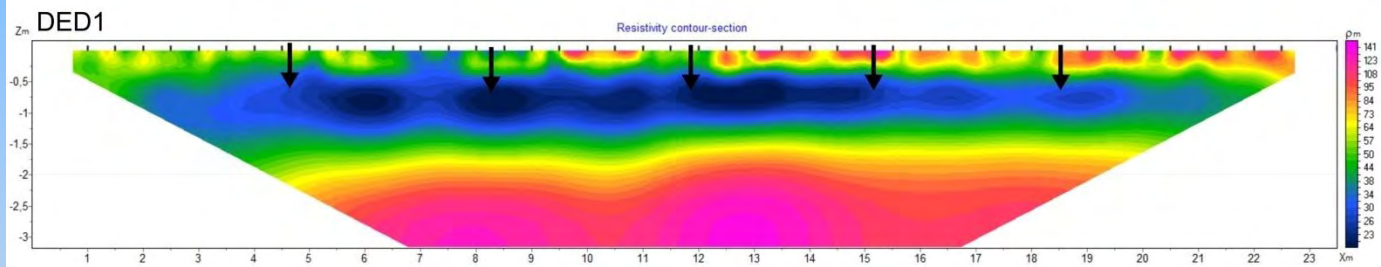
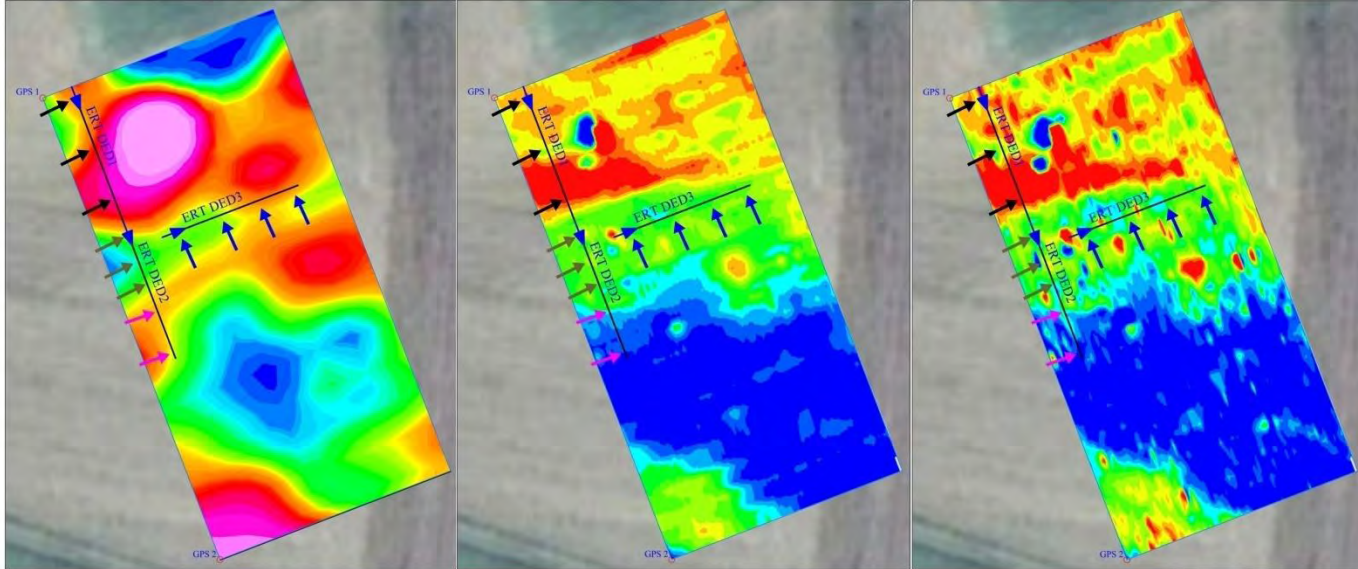
Koprivnica

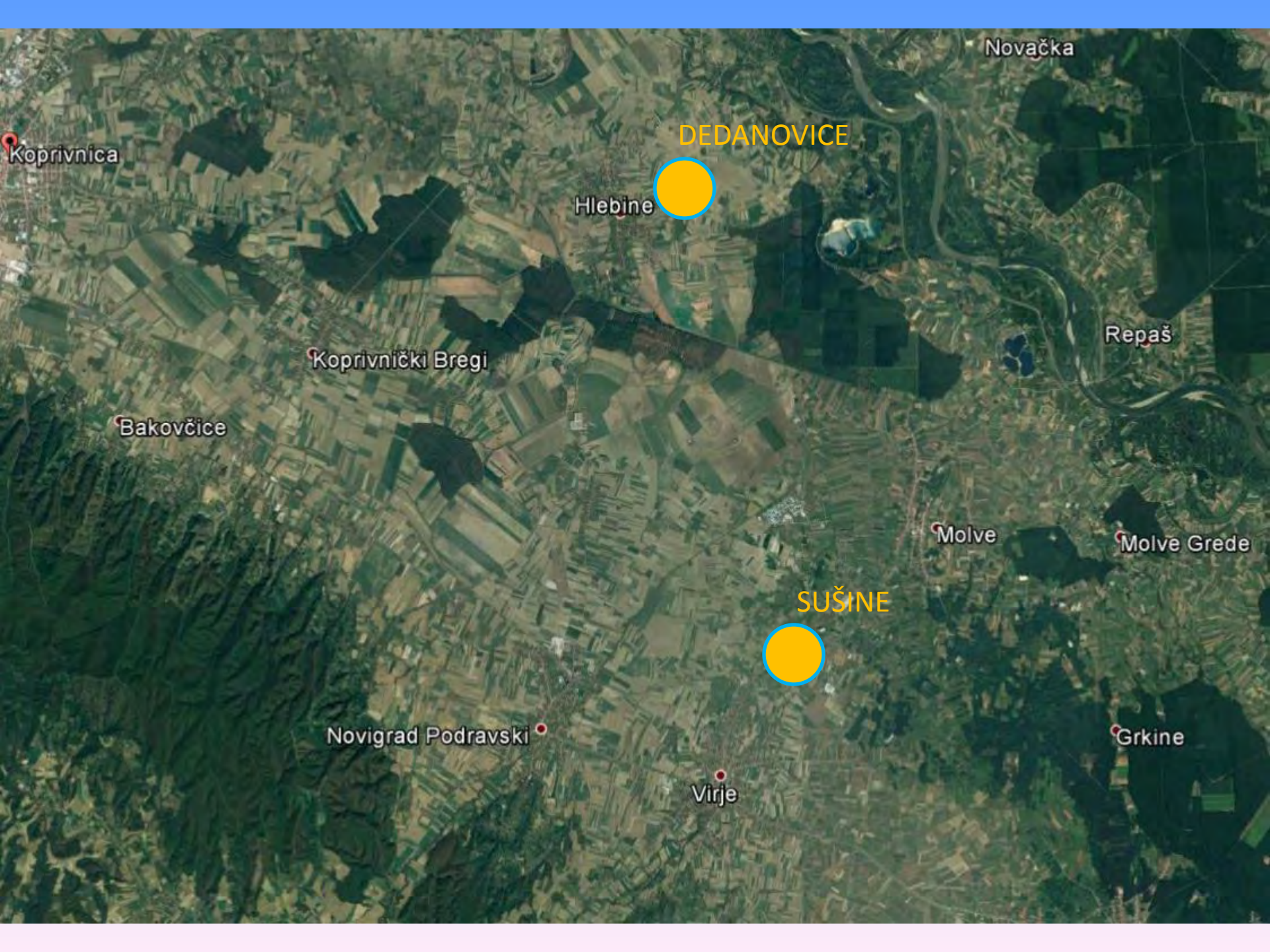




Resistivity contour-section







Novačka

DEDANOVICE

Hlebine

Repaš

Koprivnički Bregi

Bakovčice

Molve

Molve Grede

SUŠINE

Novigrad Podravski

Virje

Grkine

Koprivnica



