

Campania MTO la Mănăstirea Tismana, jud. Gorj,  
1-10 iulie 2014



# Date generale

Locul de desfășurare: Mănăstirea Tismana, jud. Gorj

Perioada: 1-10 iulie 2014

Activități:

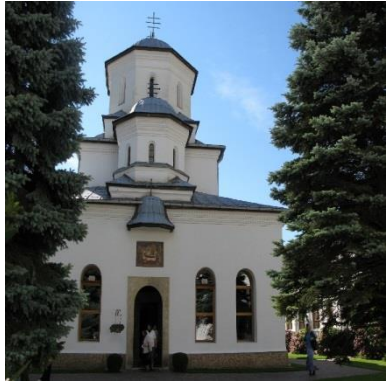
- monitorizare de microclimat
- analiză imagistică multispectrală
- microscopie digitală
- teste de scanare LIF (Laser Induce Fluorescence)
- investigații GPR (Ground Penetrating Radar)
- investigații LDV (Laser Doppler Vibrometry)
- scanare 3 D
- termoviziune
- transmisie video și teleoperare

# Biserica Mănăstirii Tismana

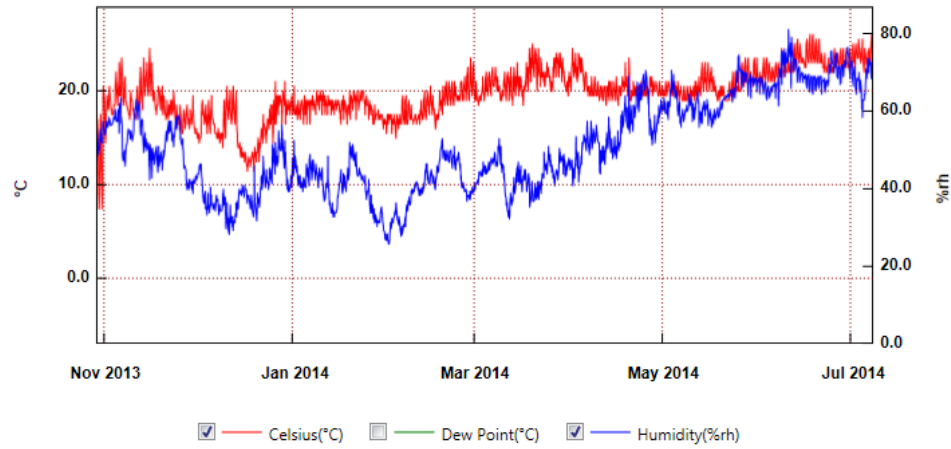
## Analiza temperaturii și umidității relative ale aerului

- monitorizarea a fost realizată printr-o rețea wireless compusă din 17 senzori sincronizați
- amplasarea senzorilor a urmărit controlul parametrilor în punctele cele mai înalte, în punctele cele mai joase (în imediata vecinătate a solului), la deschiderile de pe latura nordică (ferestre și intrări) și simetric pe cea sudică, precum și la înălțimea “nivelul umărului” (1.20m)
- intervalul de înregistrare a măsurărilor a fost de 30 minute, având în vedere că acesta este un interval relevant atât pentru stabilitatea condițiilor, cât și pentru urmărirea eventualelor modificări

# Poziționarea senzorilor în interiorul bisericii mănăstirii Tismana

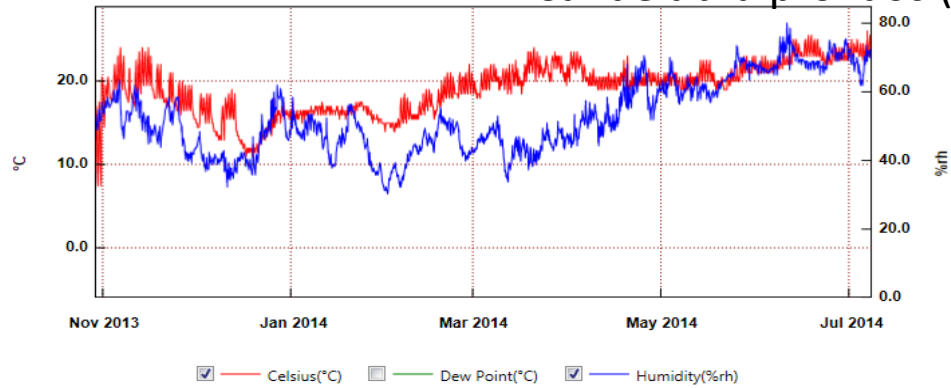


#### s4 Candelabru pronaos



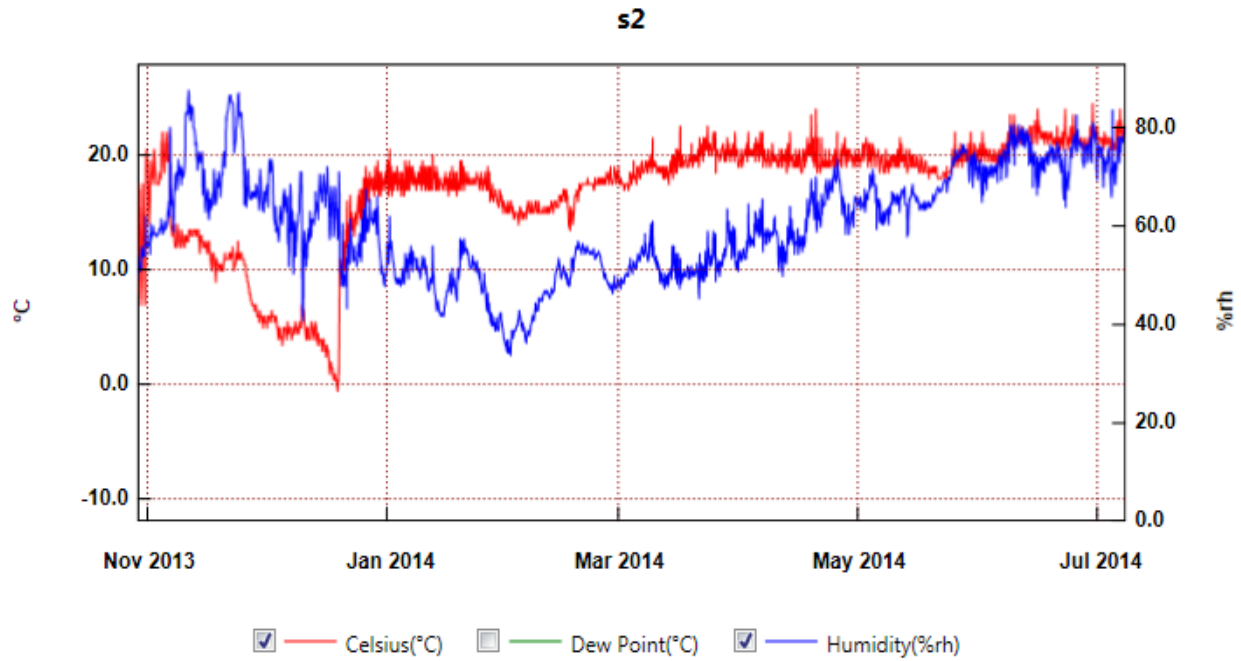
From: Tuesday, October 29, 2013 9:00:00 AM - To: Tuesday, July 08, 2014 11:00:00 AM

#### s6 Candelabru pronaos (nivel 1)



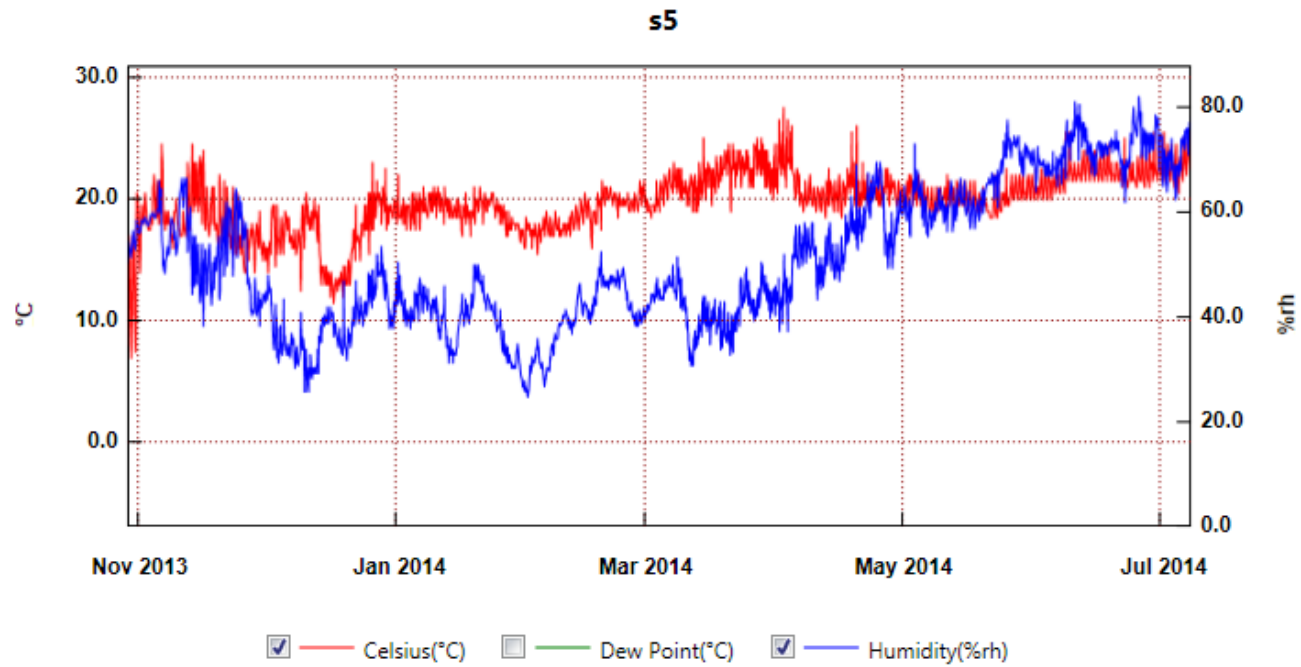
From: Tuesday, October 29, 2013 9:00:00 AM - To: Tuesday, July 08, 2014 1:00:00 PM

# Naos



From: Tuesday, October 29, 2013 9:00:00 AM - To: Tuesday, July 08, 2014 9:30:00 AM

# Usa pronaos

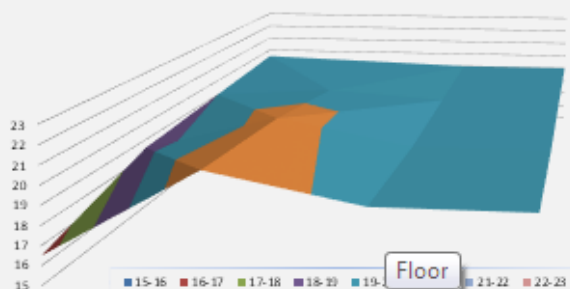


From: Tuesday, October 29, 2013 10:00:00 AM - To: Tuesday, July 08, 2014 11:00:00 AM

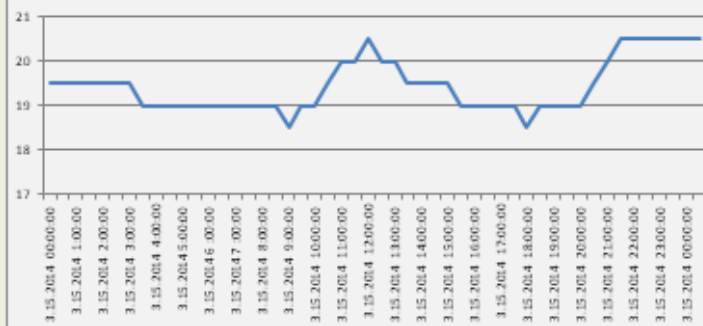
## Tabelul cu valori minime și maxime de temperatură și umiditate relativă

Locatie: <b>Tismana</b> <input type="button" value="GO"/>																					
Data si ora:ncepand cu 15/03/2014 00:00:00 <input type="button" value="Go"/>																					
pana la: 16/03/2014 00:00:00																					
Senzori:																					
<input type="checkbox"/> Statie <input checked="" type="checkbox"/> Senzor 1 <input checked="" type="checkbox"/> Senzor 2 <input checked="" type="checkbox"/> Senzor 3 <input checked="" type="checkbox"/> Senzor 4 <input checked="" type="checkbox"/> Senzor 5 <input checked="" type="checkbox"/> Senzor 6 <input checked="" type="checkbox"/> Senzor 7 <input checked="" type="checkbox"/> Senzor 8 <input checked="" type="checkbox"/> Senzor 9 <input checked="" type="checkbox"/> Senzor 10 <input checked="" type="checkbox"/> Senzor 11 <input checked="" type="checkbox"/> Senzor 12 <input checked="" type="checkbox"/> Senzor 13 <input checked="" type="checkbox"/> Senzor 14 <input checked="" type="checkbox"/> Senzor 15																					
				<b>Temperatura[°C]:</b>																	
				minima:		0.0	18.5	19.5	20.0	19.5	18.0	16.0	18.0	18.0	18.0	18.0	18.0	17.5	18.0	18.0	
				maxima:		0.0	20.5	21.5	23.0	21.5	20.5	17.5	20.0	20.0	20.0	20.0	20.0	19.5	20.0	19.5	
				$\Delta T$		0.0	2.0	2.0	3.0	2.0	2.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0	1.5		
				<b>Umiditate:</b>																	
				minima:		0.0	48.5	41.5	37.5	41.5	47.5	55.5	36.0	36.5	37.0	37.0	36.0	37.0	36.0		
				maxima:		0.0	54.5	47.0	44.0	47.0	52.5	61.0	37.5	37.5	38.0	37.5	37.5	38.5	37.5		
				$\Delta U$		0.0	6.0	5.5	6.5	5.5	5.0	5.5	1.5	1.0	1.0	0.5	1.5	1.5	1.5		

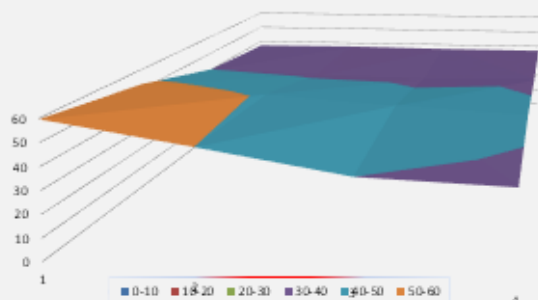
Temperatura la 3/16/2014 00:30



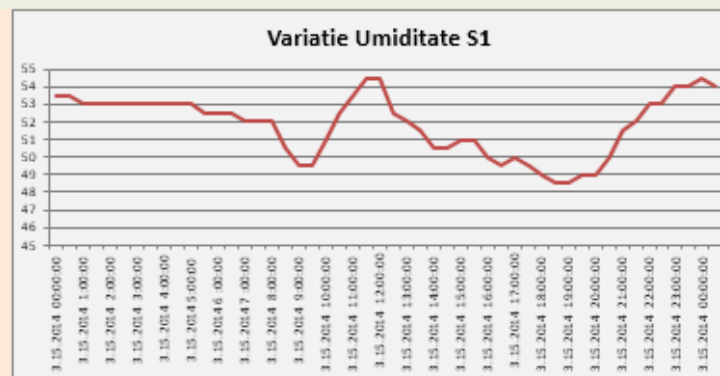
Variatie Temperatura S1



Umiditate la 3/16/2014 00:30



Variatie Umiditate S1

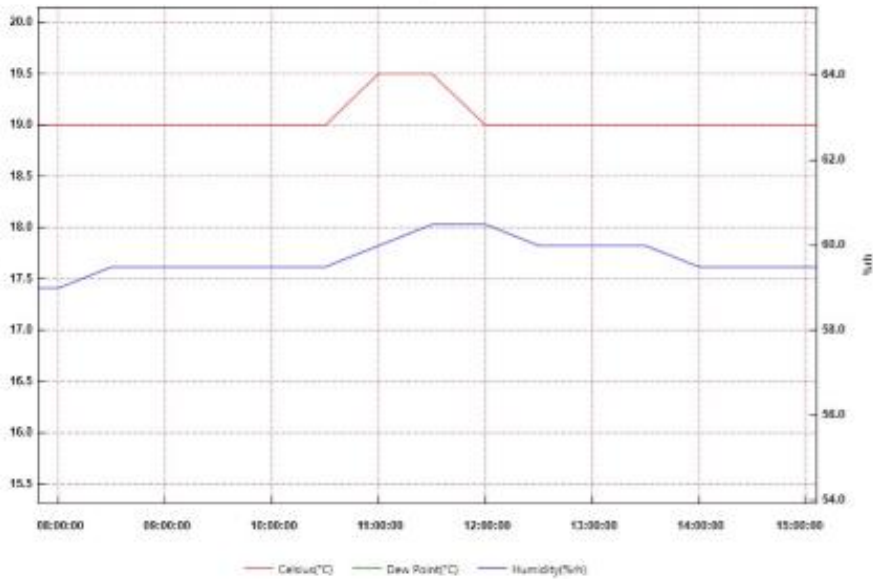


Diagrame 3D pentru microclimat

Grafice reprezentând variațiile de temperatură și RH ale senzorului 1



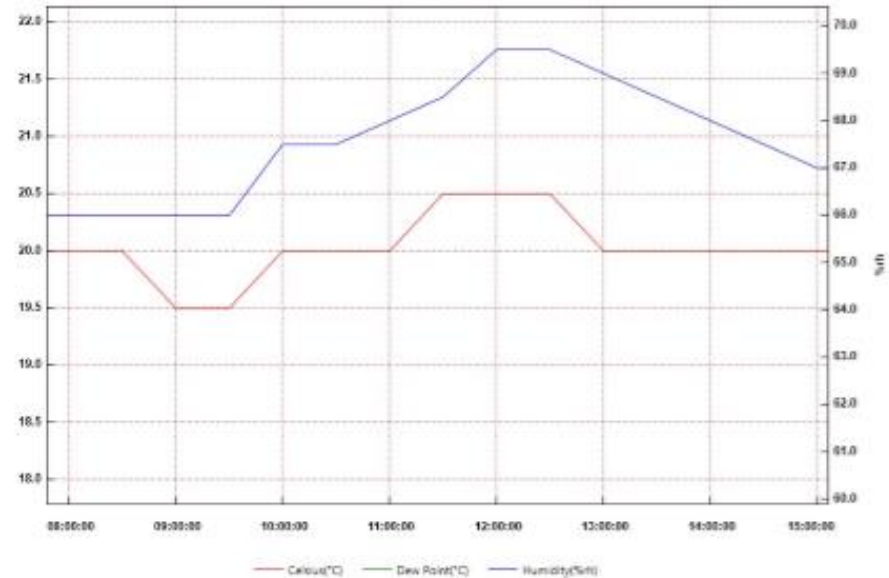
44



From: Wednesday, May 07, 2014 7:48:13 AM - To: Wednesday, May 07, 2014 3:06:38 PM

Grafic ce prezintă variațiile de temperatură și RH înregistrate de Senzorul 4 pe intervalul de timp 08:00 -15.00 de-a lungul unei zile de miercuri, zi în care nu se desfășoară slujbă liturgică

44



From: Sunday, May 04, 2014 7:47:20 AM - To: Sunday, May 04, 2014 3:06:38 PM

Grafic ce prezintă variațiile de temperatură și RH înregistrate de același senzor, pe același interval de timp de-a lungul unei zile de duminică, zi în care are loc o slujbă liturgică

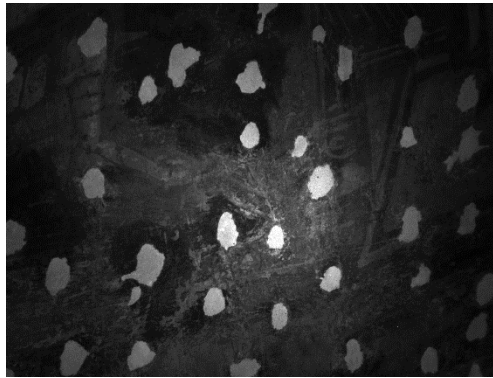
# Biserica Mănăstirii Tismana

## Analiză imagistică multispectrală

### Pictura murală din pronaosul bisericii mănăstirii Tismana

- Scena Buna Vestire,
- Martiriul celor 40 de mucenici din Sevastia,
- Sfânta Mucenică Eufimia (toate situate pe peretele de est)
- timpanul corespunzător nișei de la intrarea în pronaos, decorat cu o reprezentare a Maicii Domnului cu Pruncul (peretele de vest)

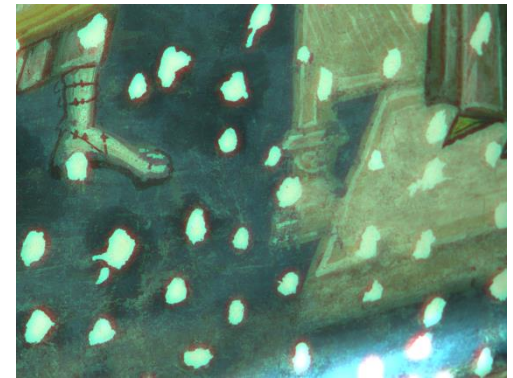
**Scena: Buna Vestire, peretele de Est al pronaosului**



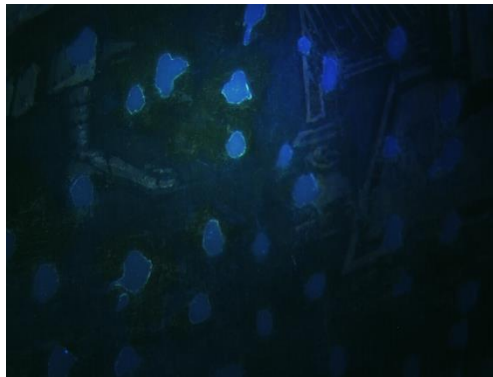
UV reflectanță



Vizibil color



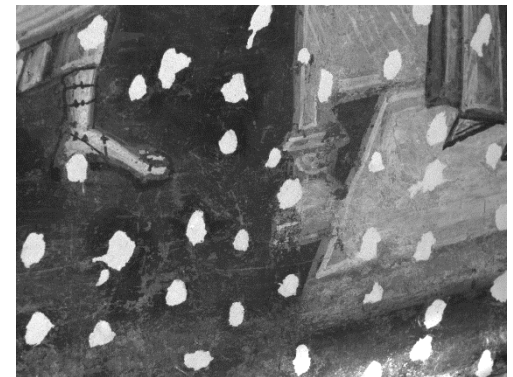
FC IR



UV fluorescență



Vizibil Alb/Negru



NIR 1



NIR 2

## Detaliu

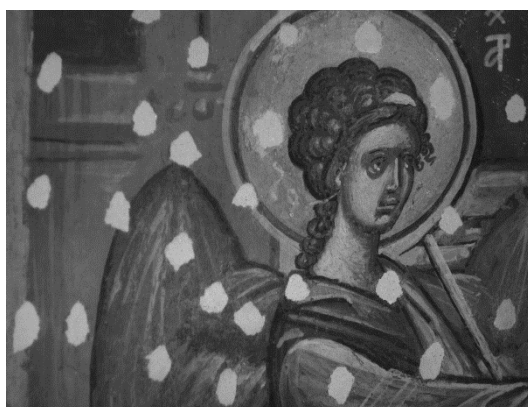
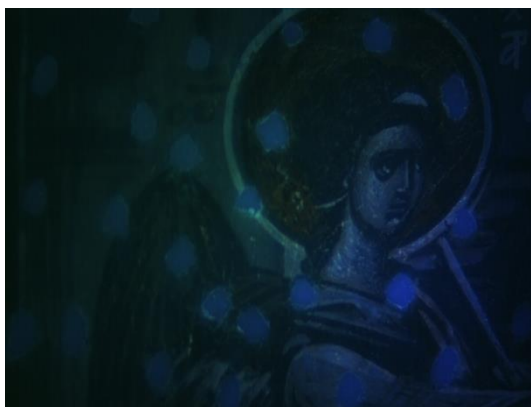
### Observații:

- Pete vizibile pe suprafața stratului pictural (zona pigmentului verde)
- Fluorescente la excitația radiației UV

UV

Vizibil

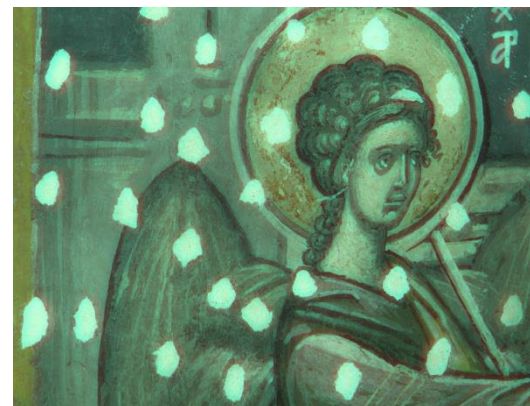
NIR



## Stânga rând 1

### Observații:

- Halouri fluorescente în jurul lacunelor – probabil caseină remanentă provenită din chituirile unei intervenții anterioare ce s-a suprapus stratului pictural
- Petele nu sunt observabile cu ochiul liber



UV



Vizibil



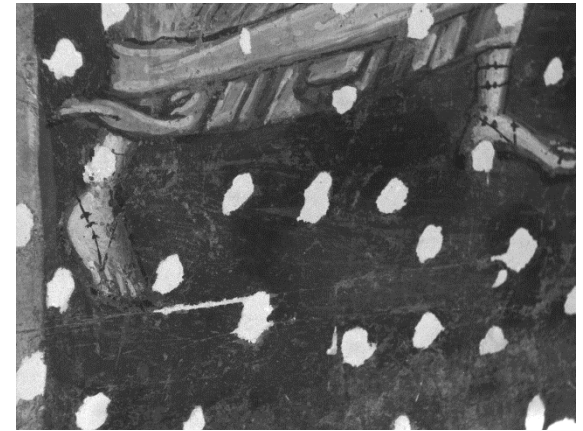
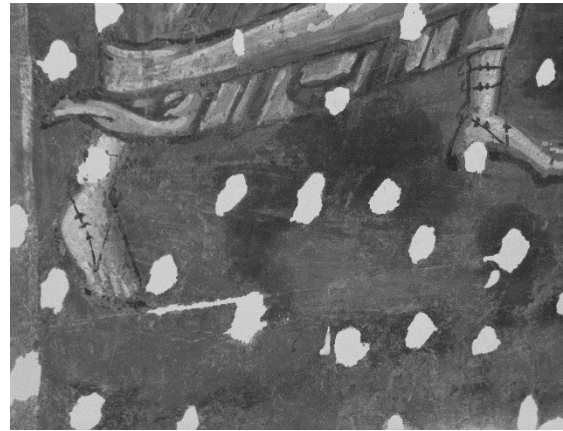
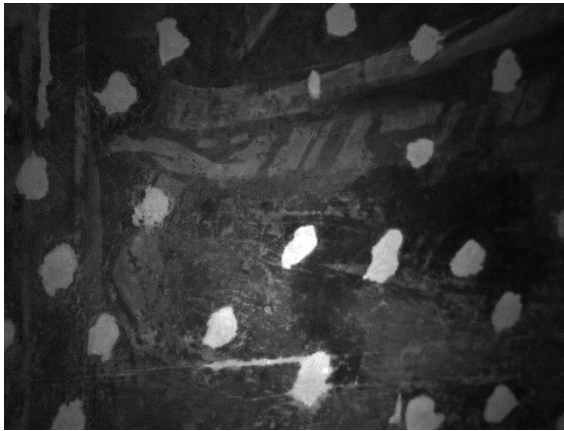
NIR



### Centru rând 1

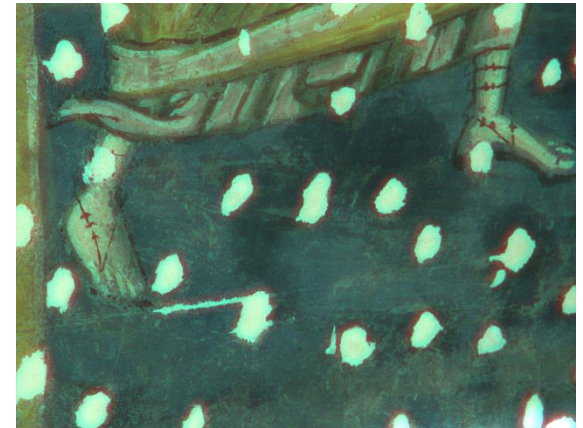
- Fluorescența accentuată a halourilor din zona periferică chituirilor
- Aceleași detalii subliniate și în modul UV de reflectanță unde halourile apar sub forma unor pete caracterizate de o absorbantă puternică a radiației UV

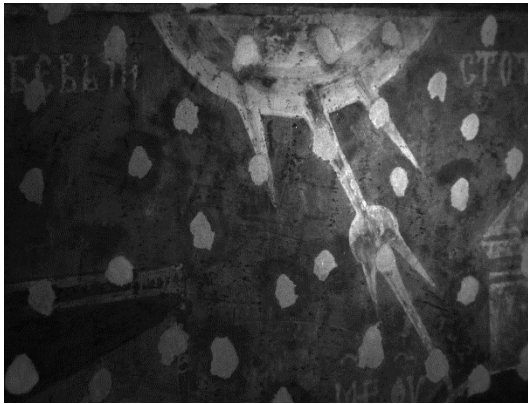
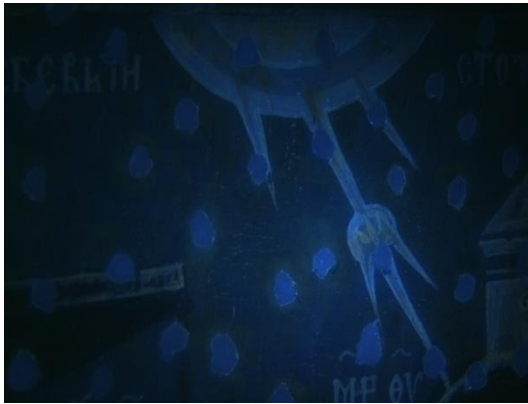




## Colț stânga jos

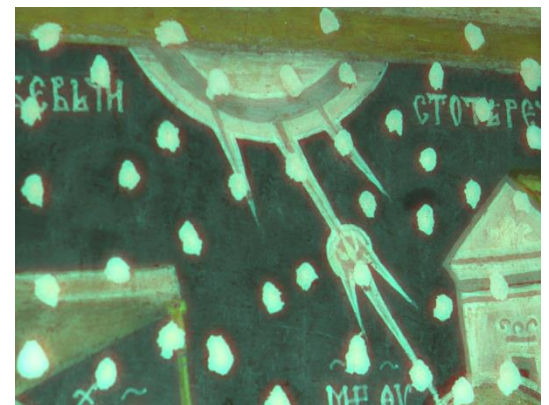
- Modurile UV de reflectanță și NIR 2 evidențiază zonele integrate cromatic (contrast accentuat între pictura originală intervenție)





## Centru sus

- În modul UV de reflectanță sunt observate depuneri pe suprafața stratului pictural. Aceste depuneri, dificil de reperat în modul vizibil, sunt caracterizate de o absorbantă puternică a radiației UV.



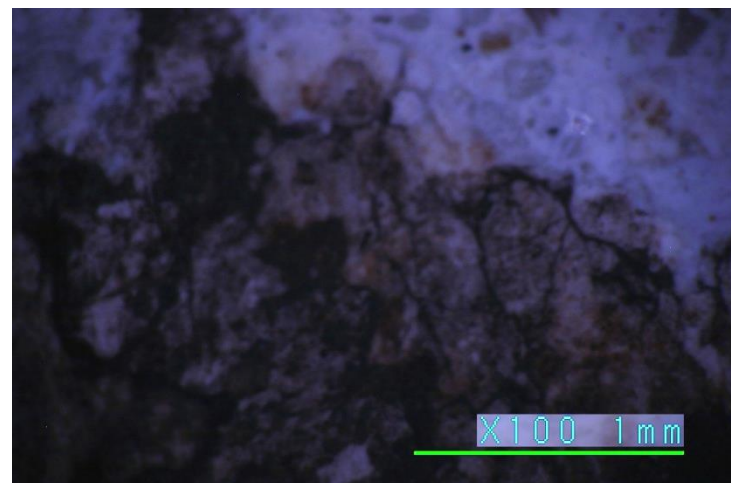
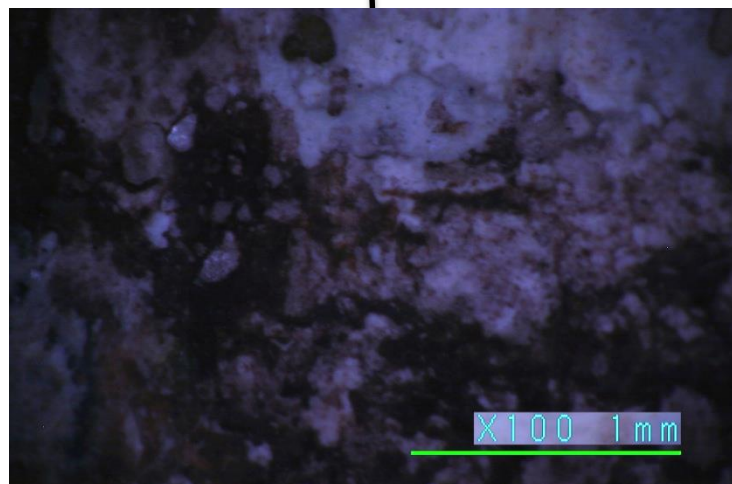
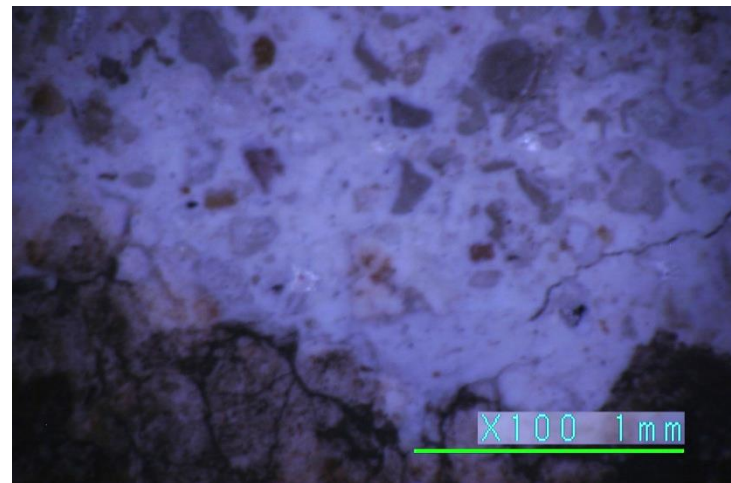




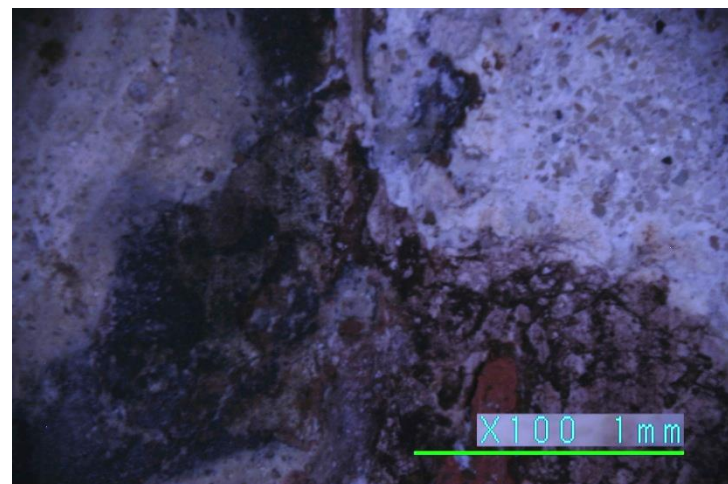
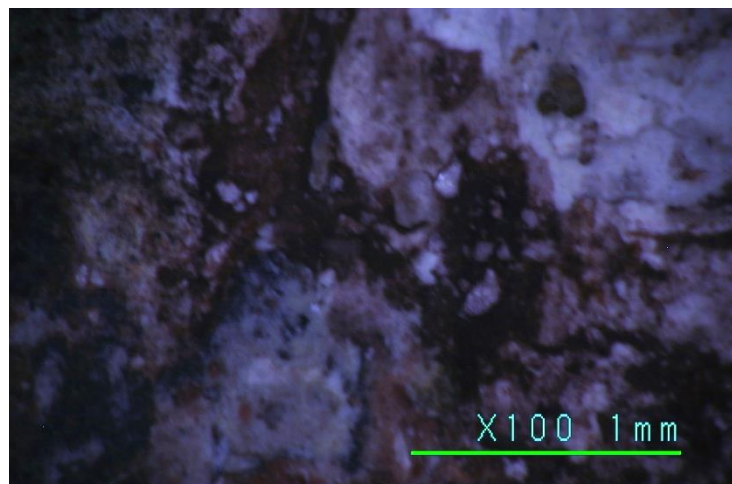
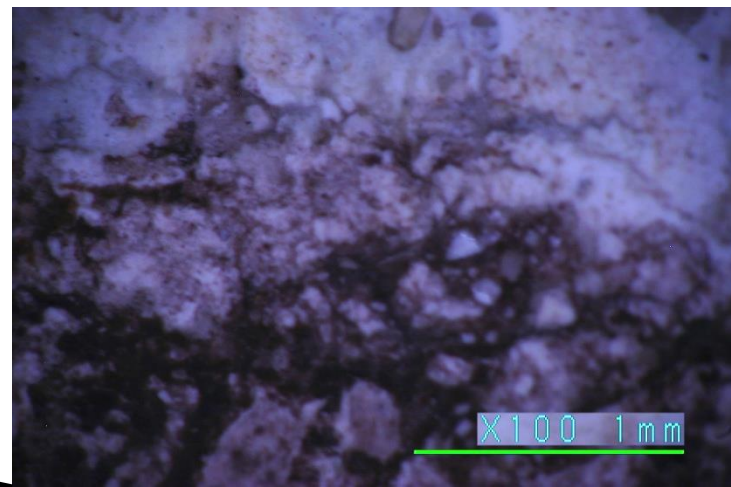
# Microscopie digitală Pictura murală

Campanie Tismana – iulie 2014

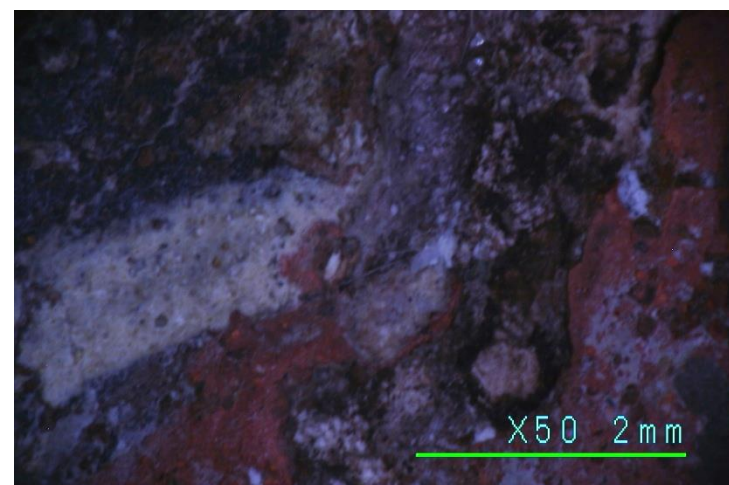
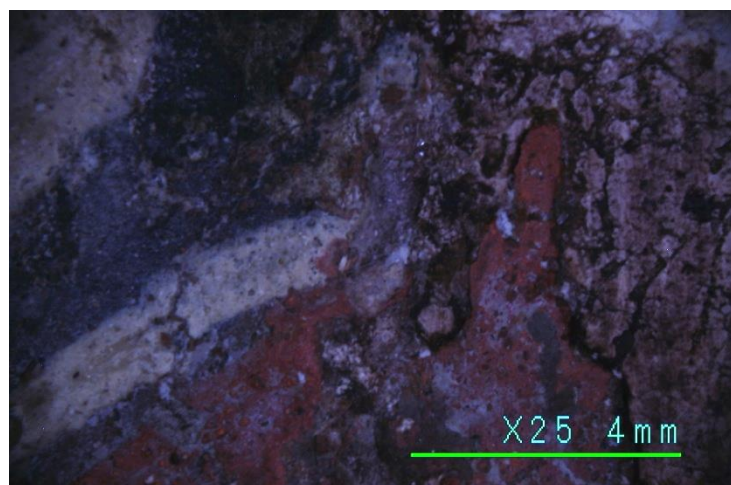
Buna Vestire

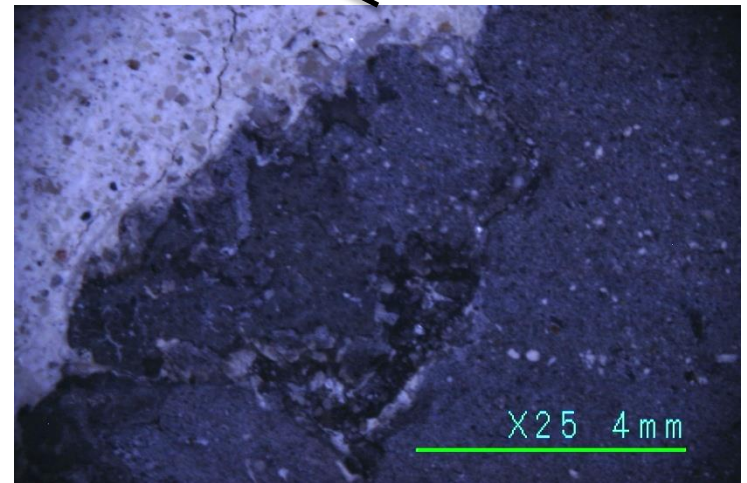
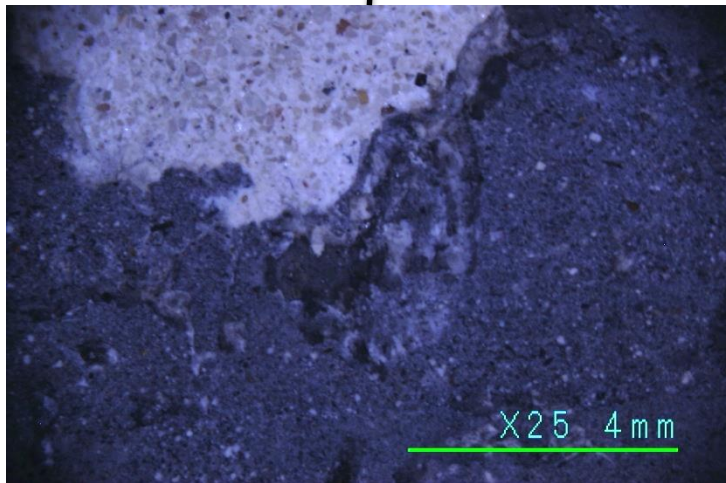
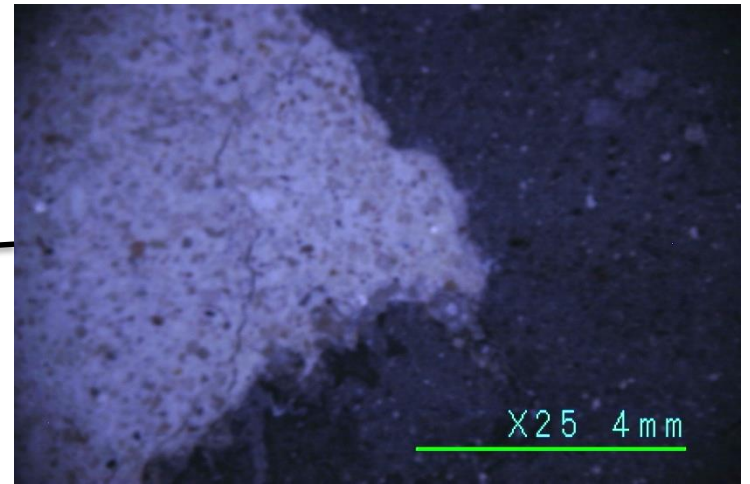
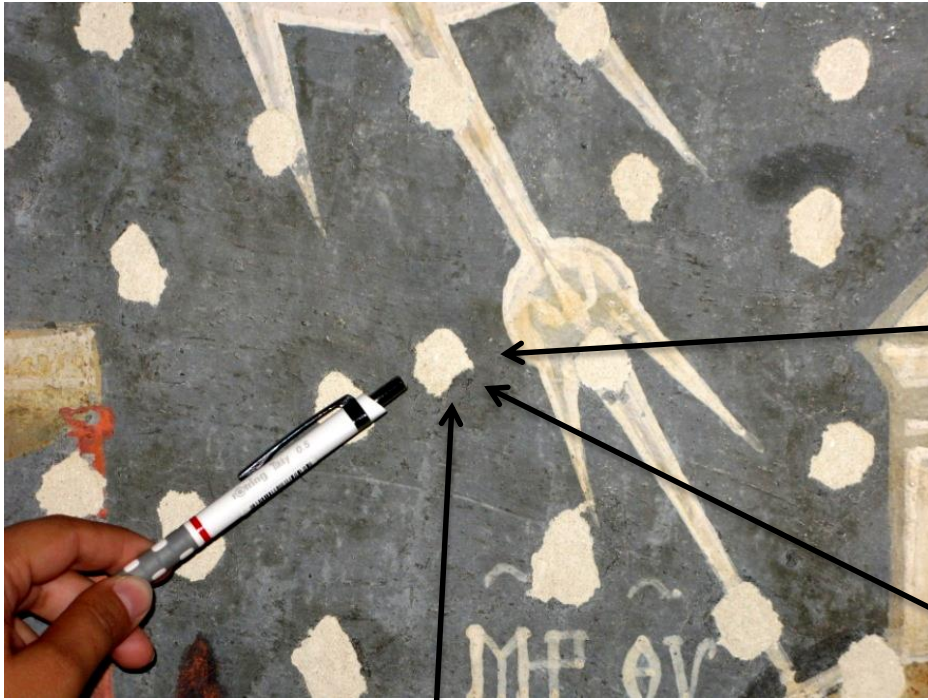


Buna Vestire

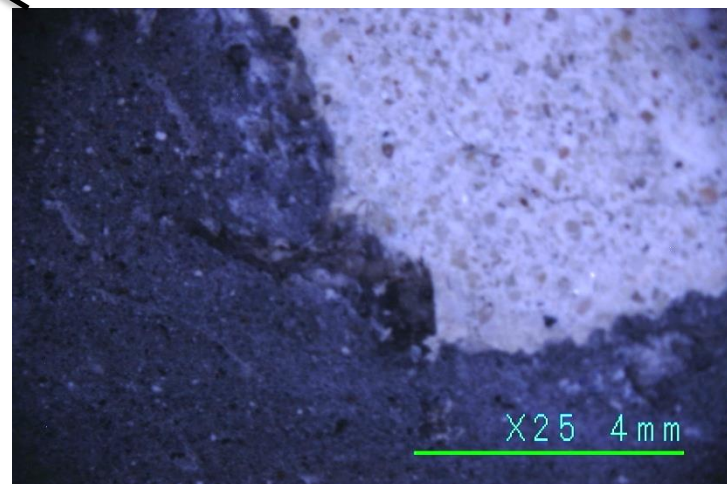
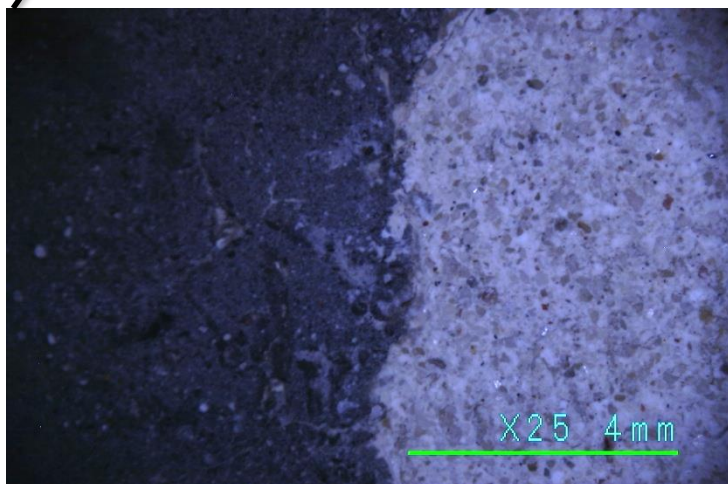
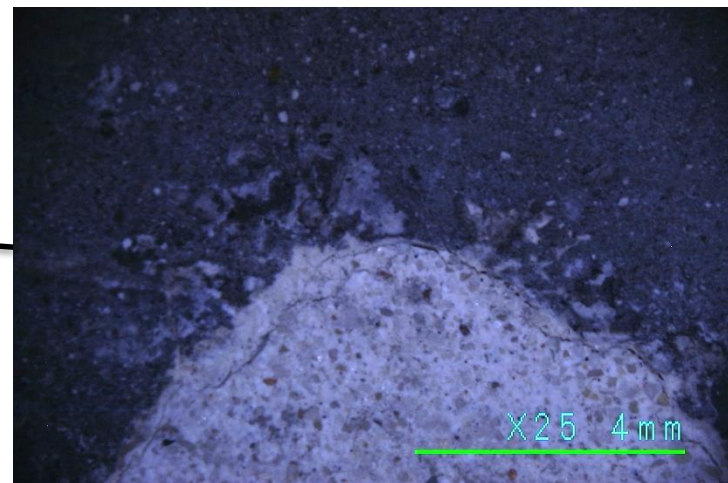
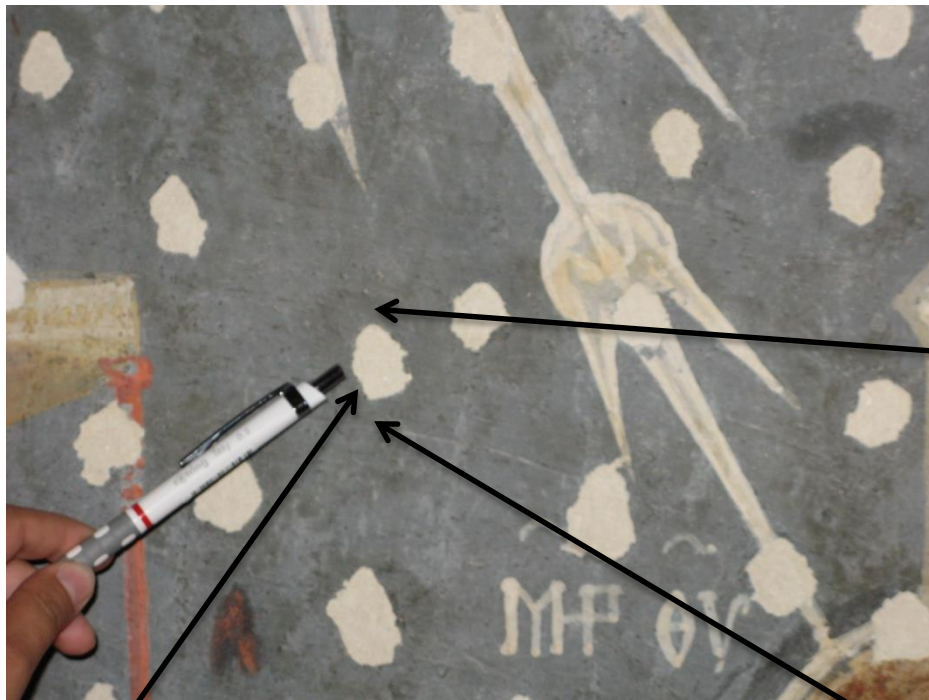


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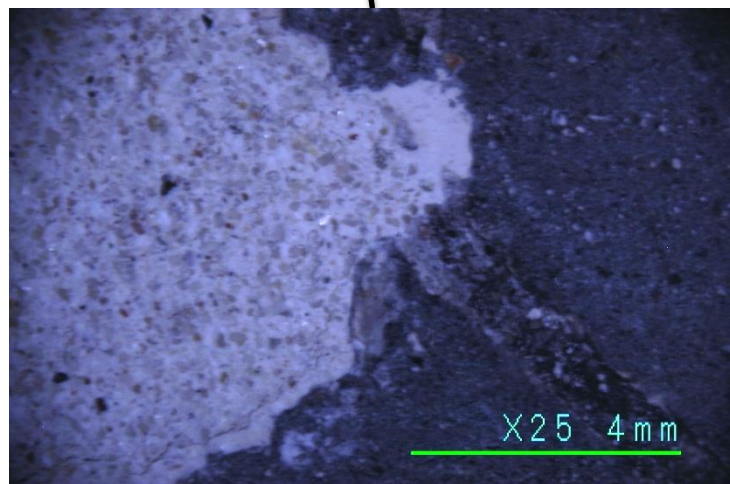
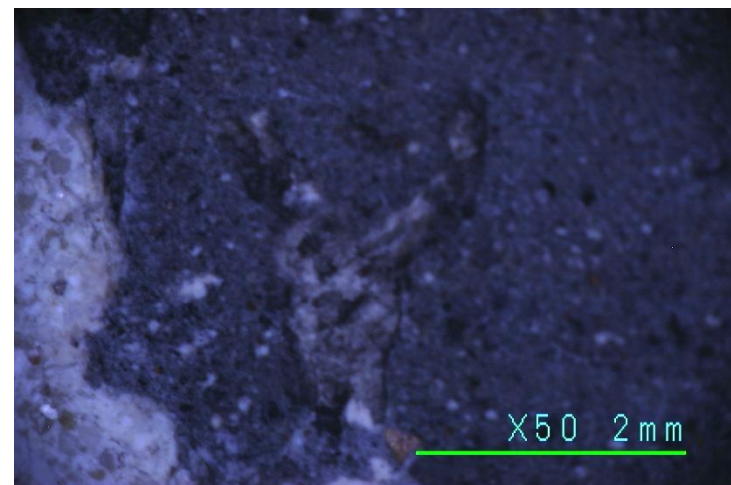
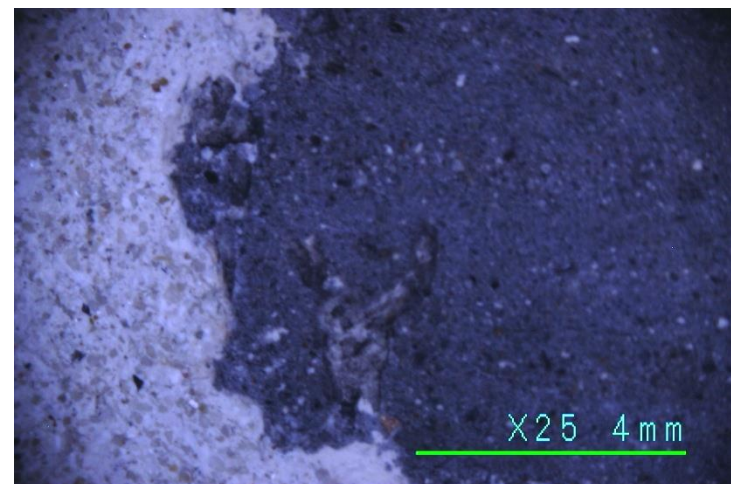




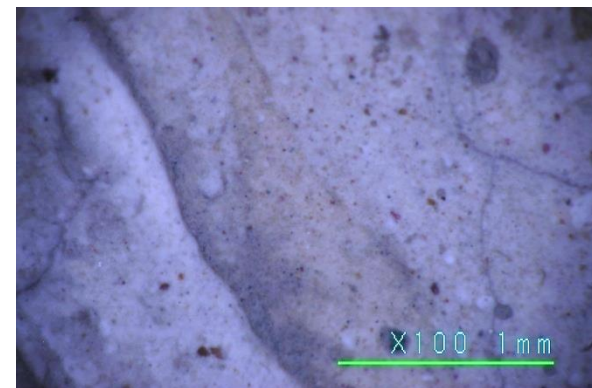
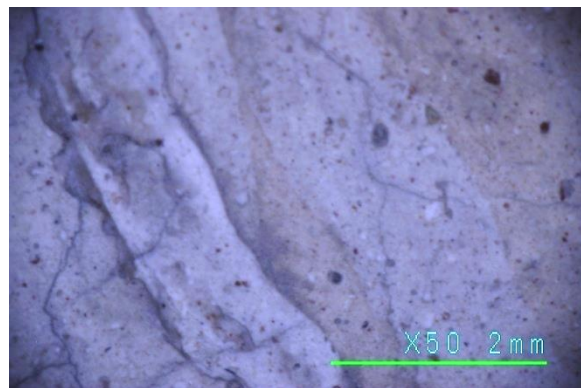
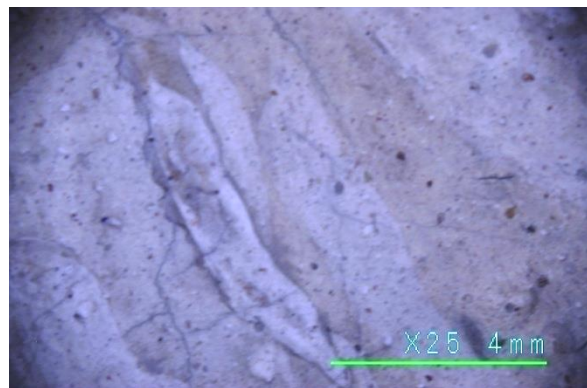
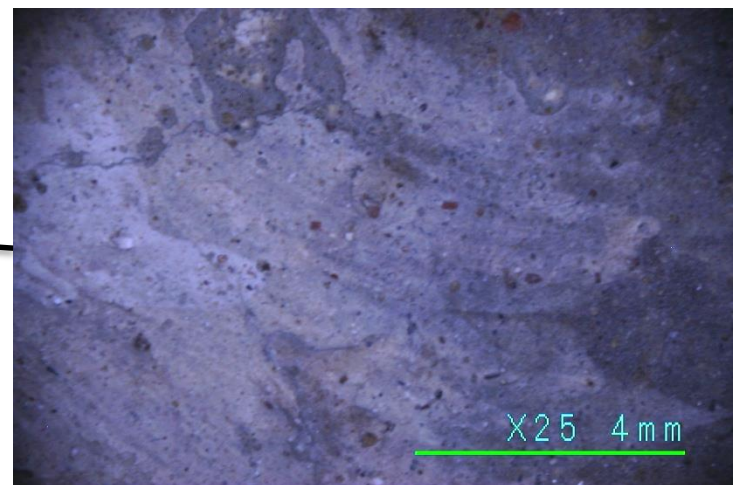
# Buna Vestire



Buna Vestire

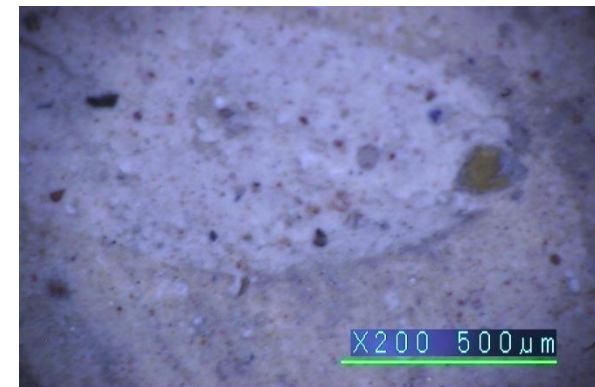
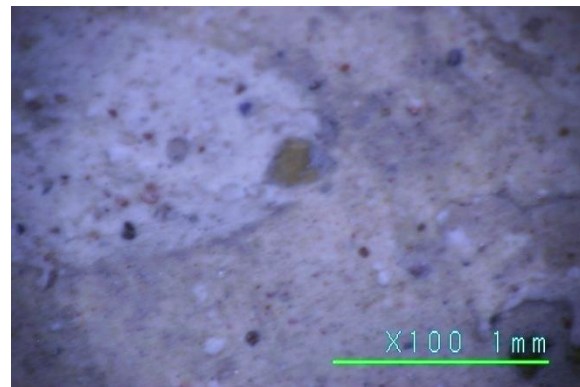
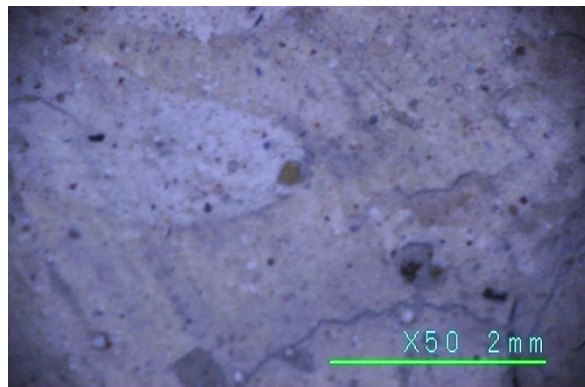
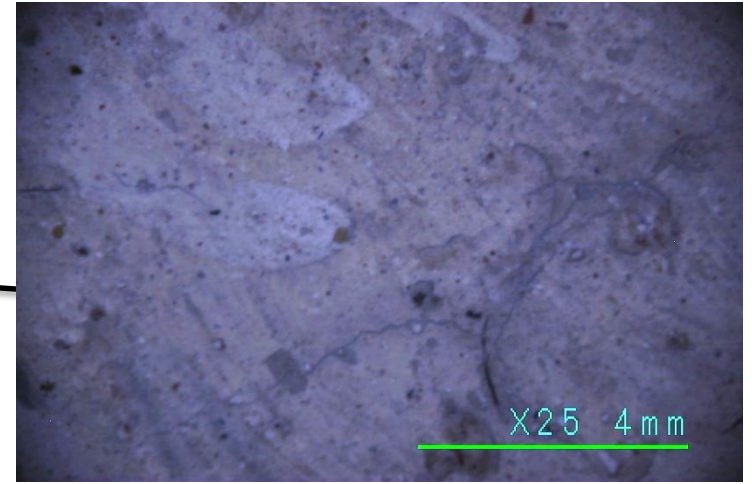


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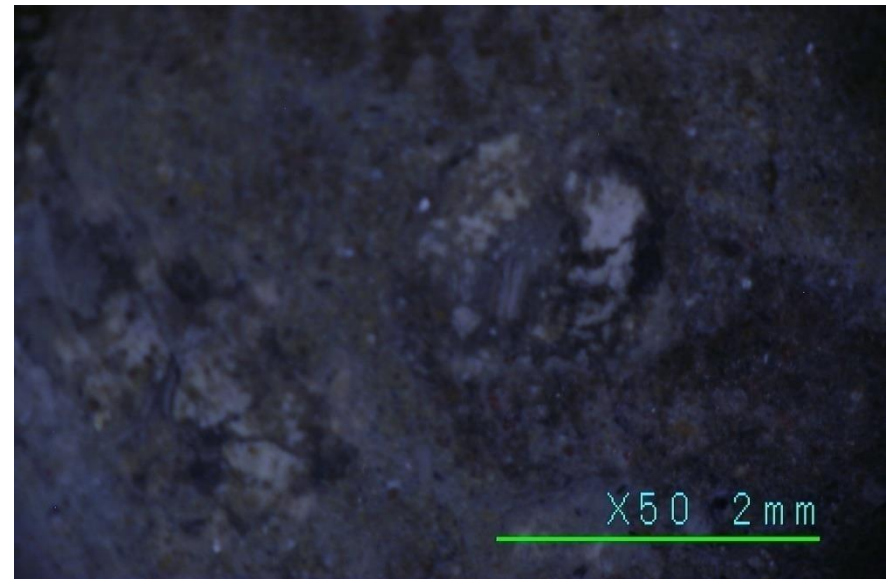
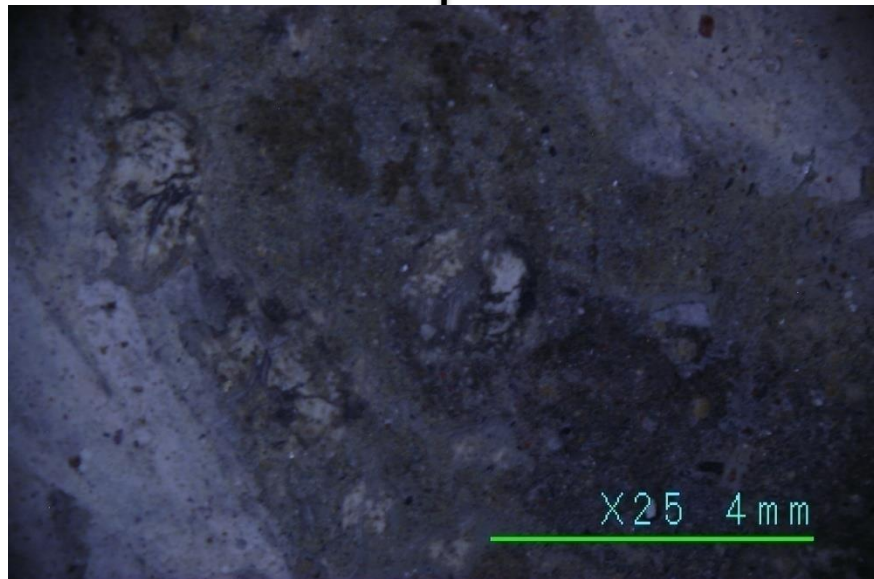




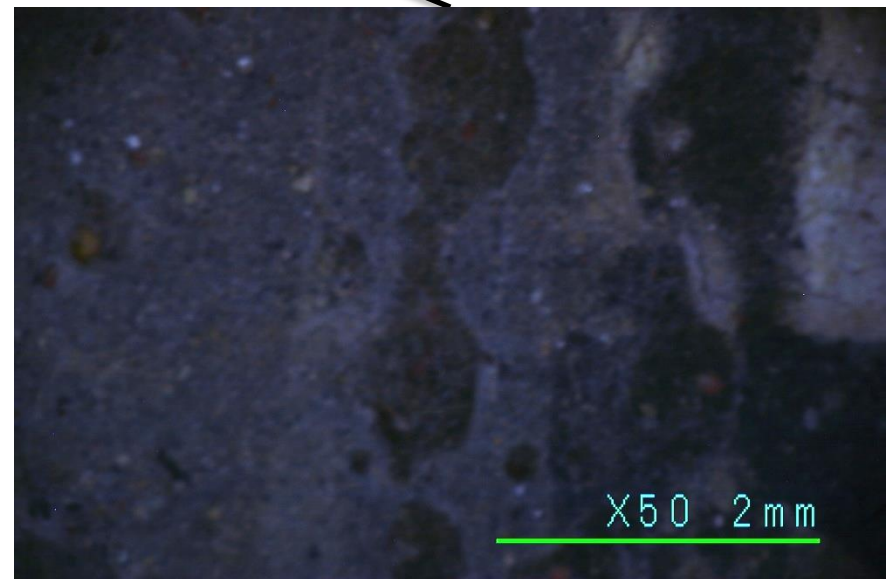
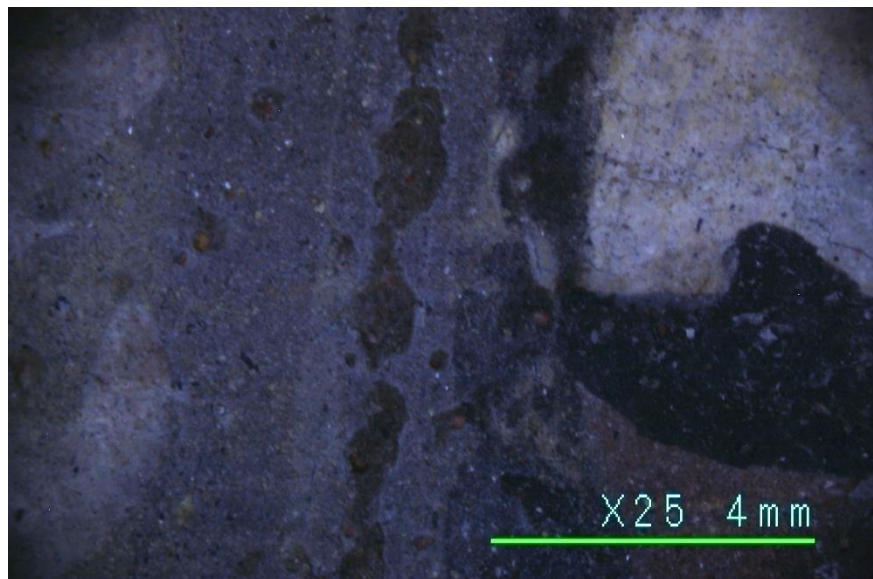
# Buna Vestire - splash



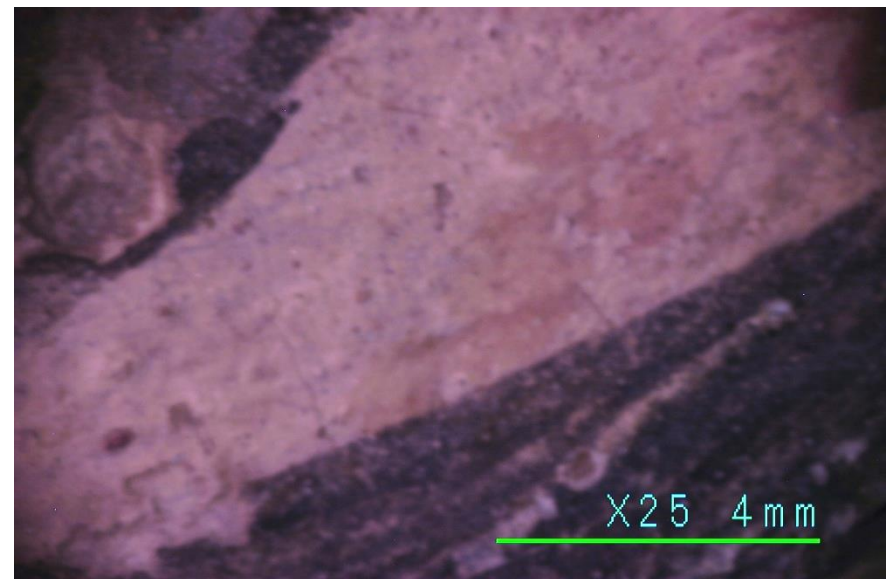
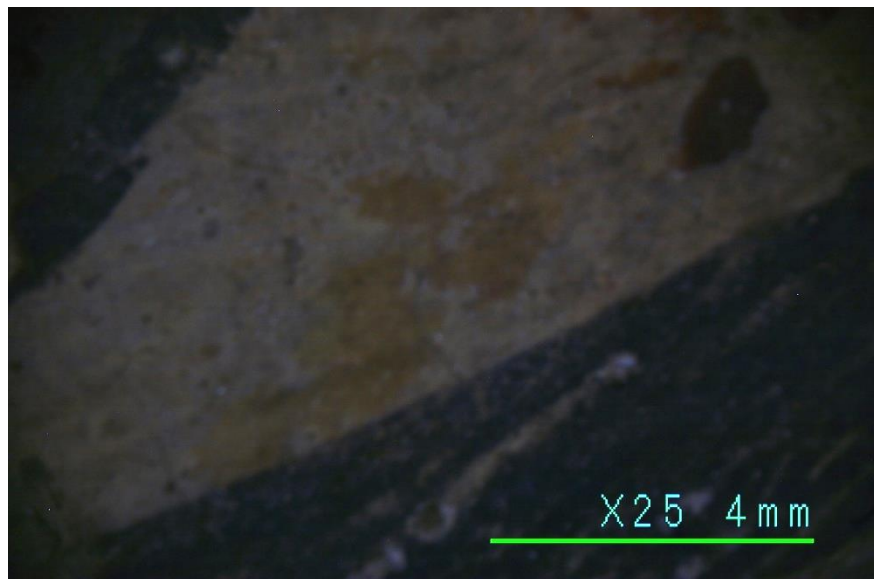
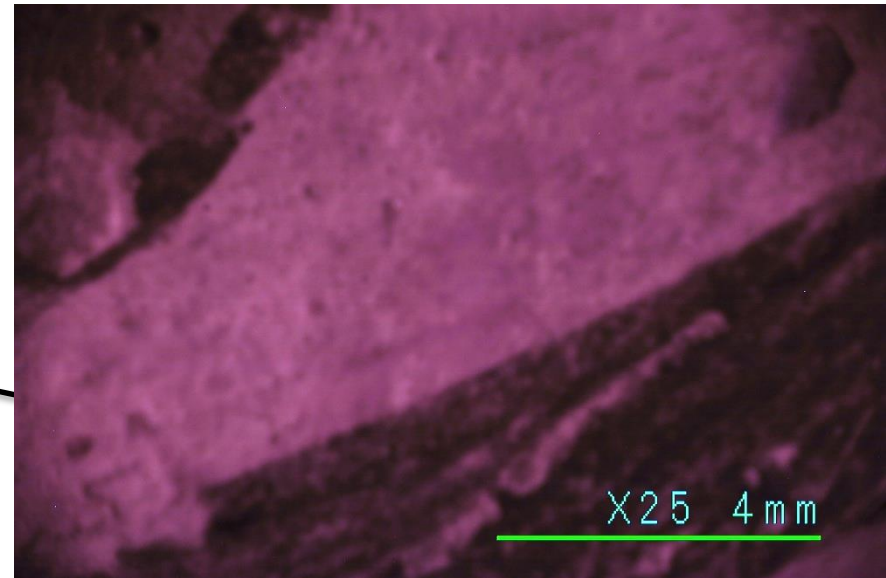
Buna Vestire – punct bărbie



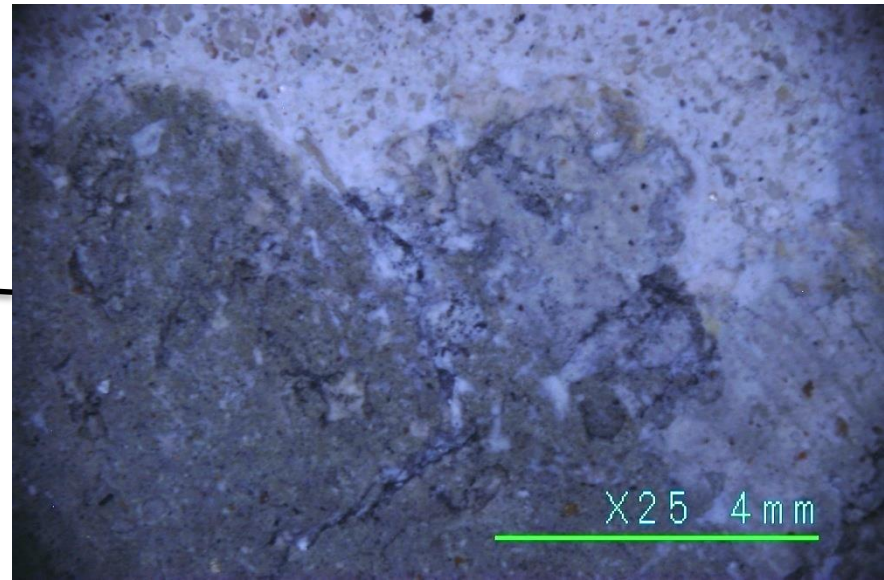
Buna Vestire – linie gât



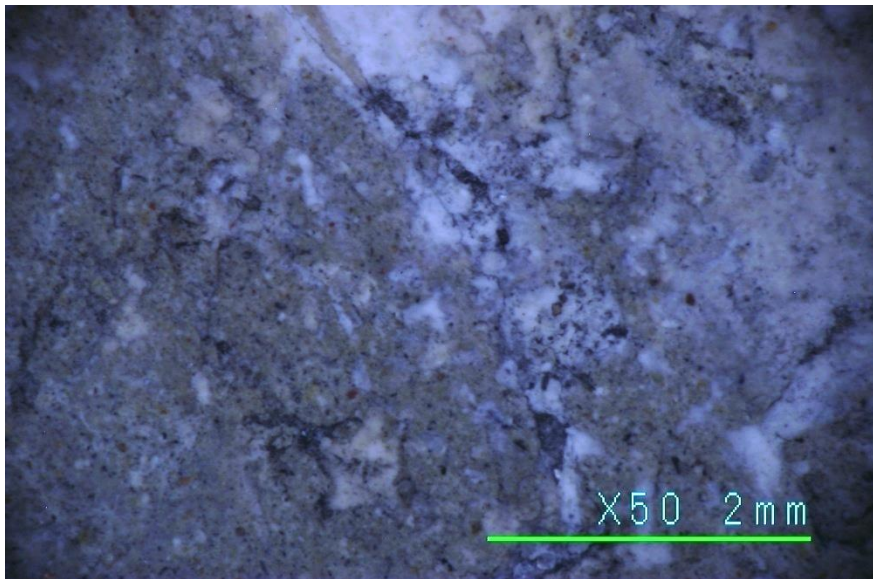
Buna Vestire - aureolă, lângă barbă



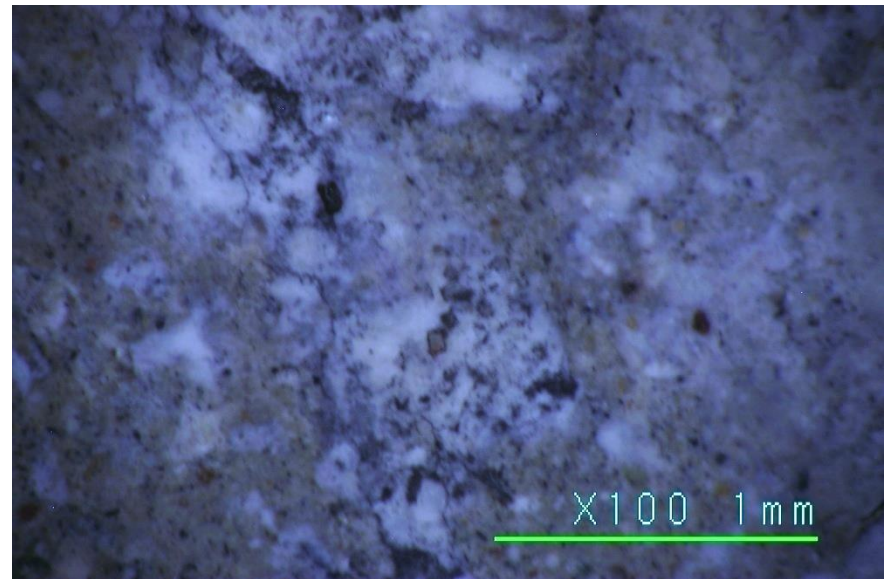
Buna Vestire - margini fluorescente



X25 4 mm

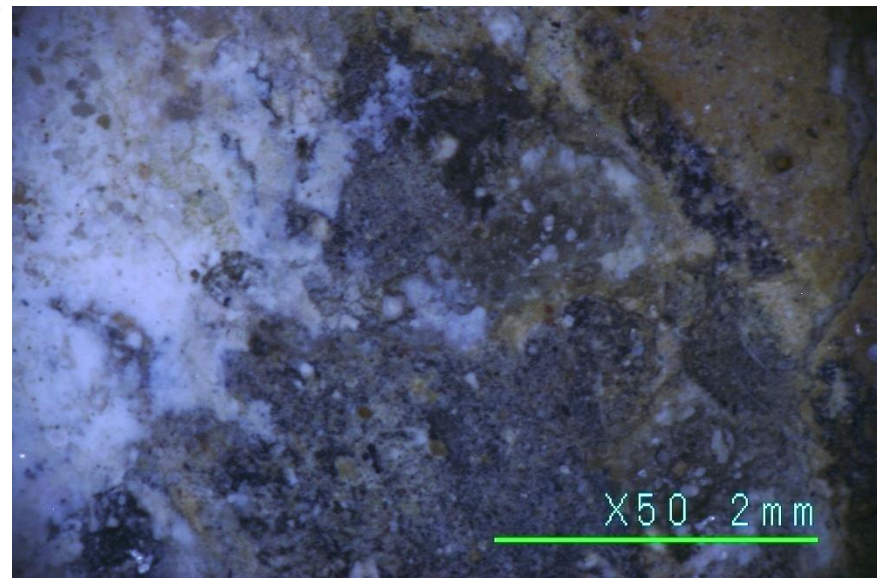
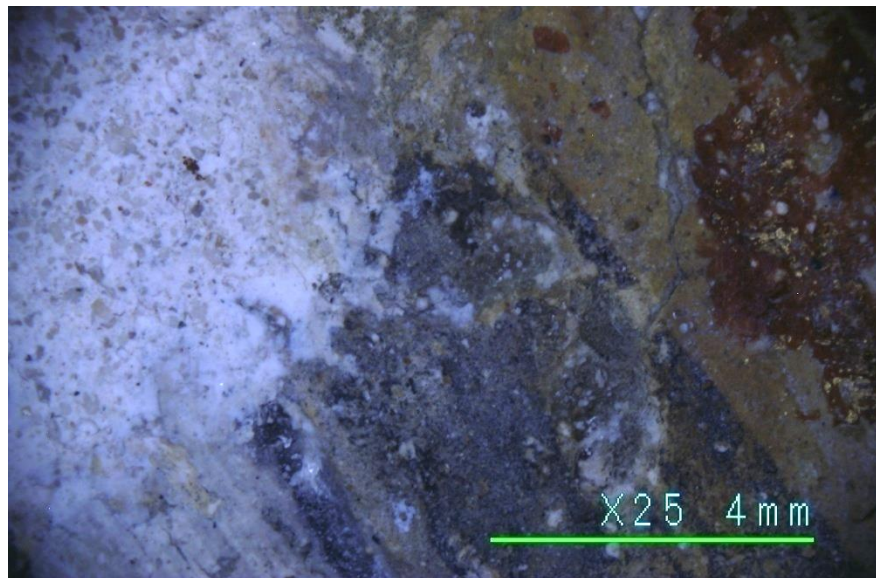


X50 2 mm

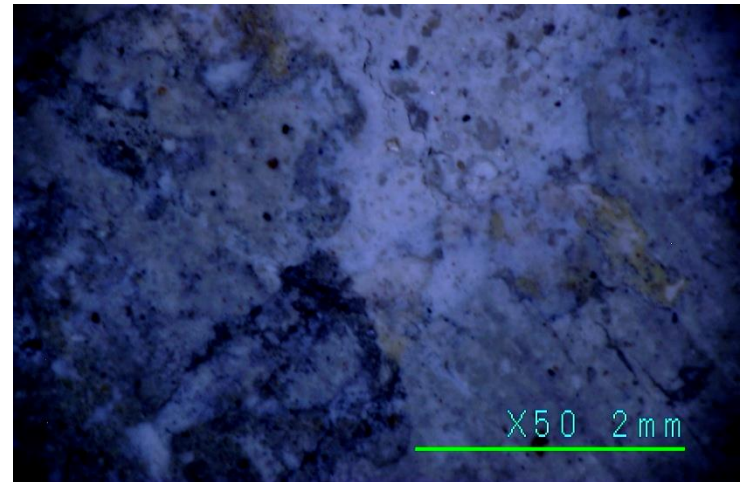
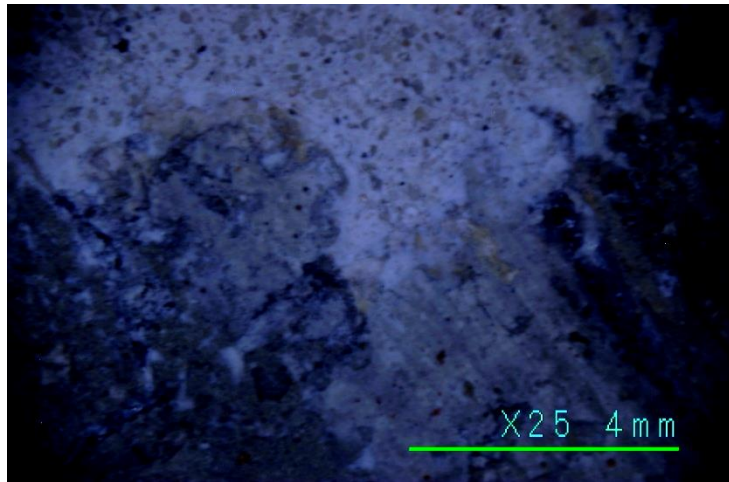


X100 1 mm

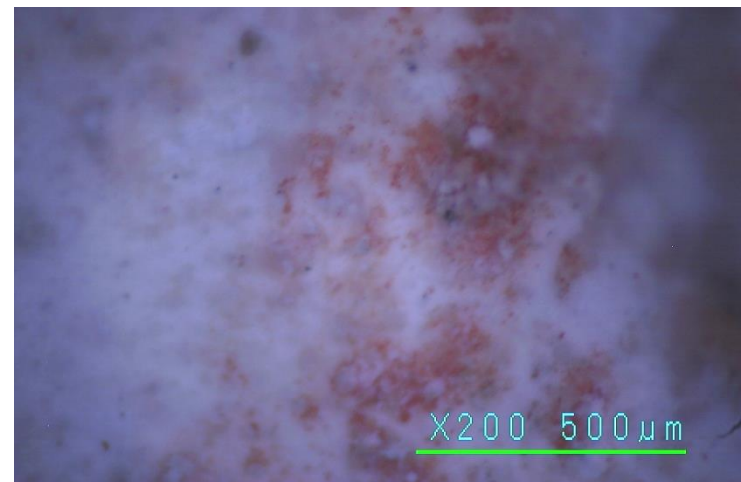
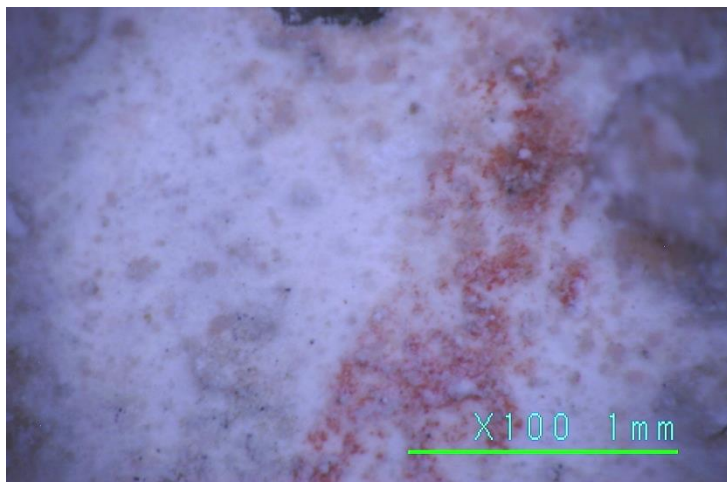
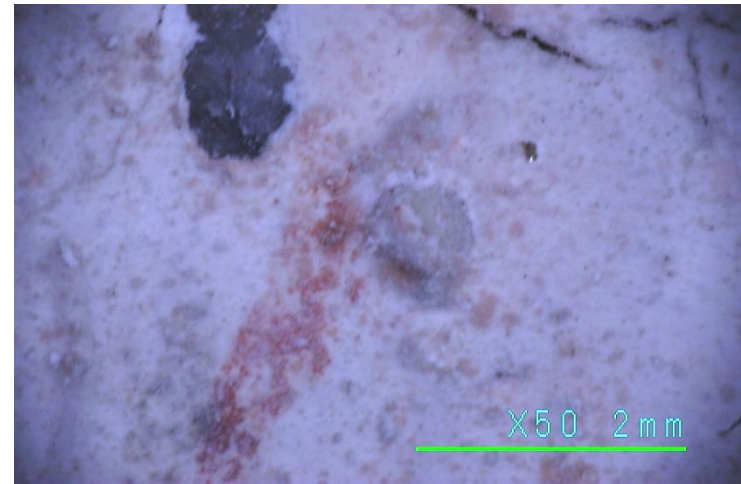
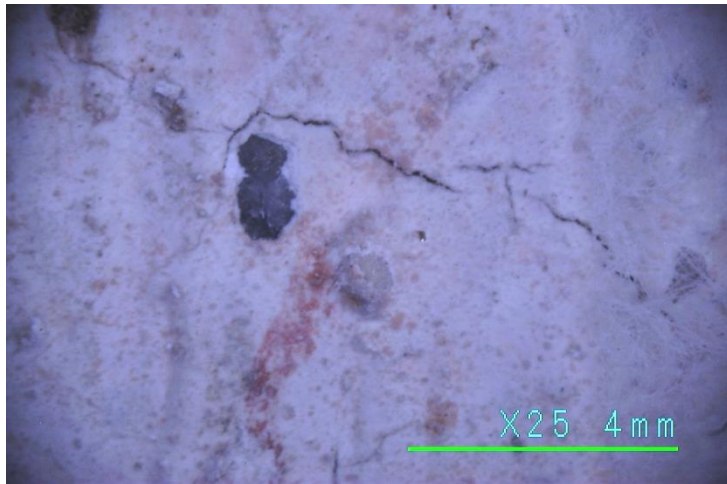
Buna Vestire



Buna Vestire - “peninsula”

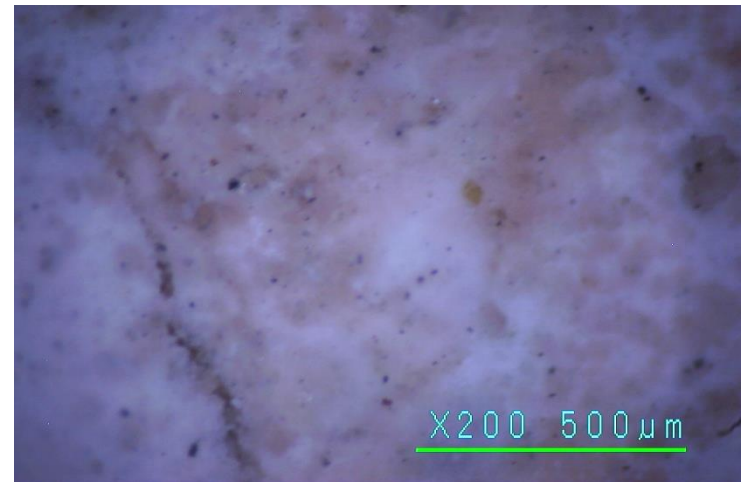
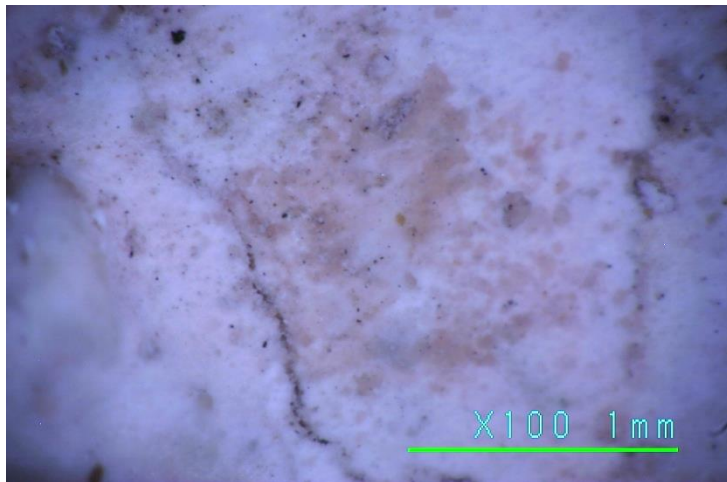
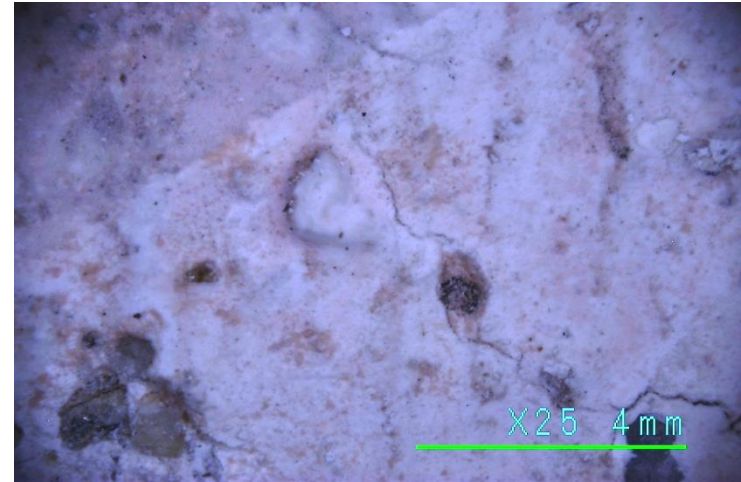
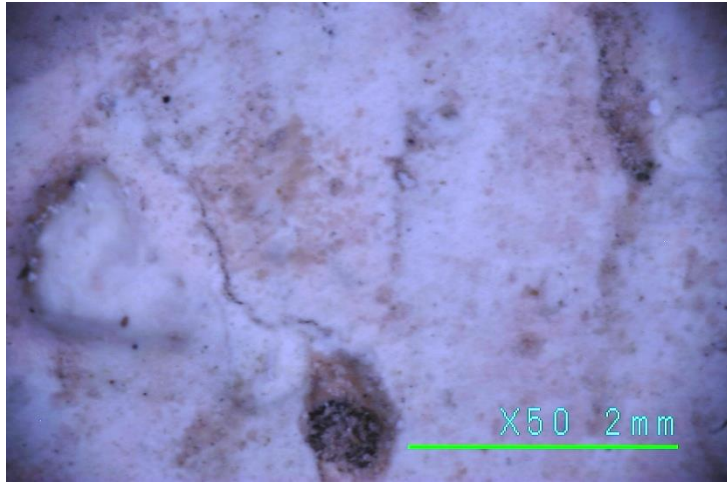


intrados N ușa principală – zona roz 1

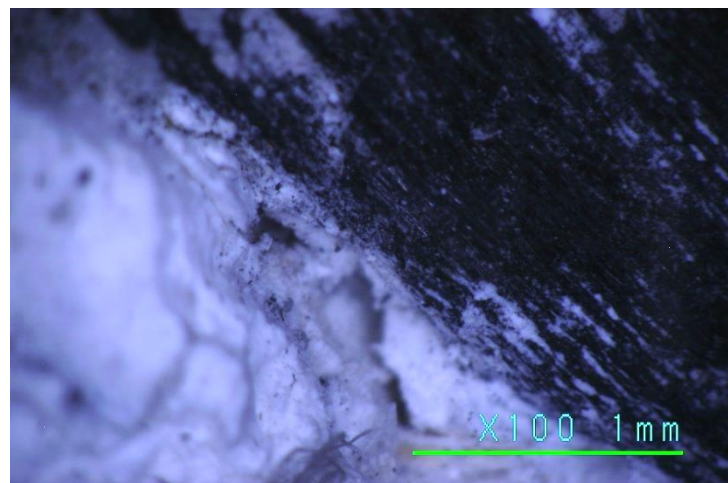
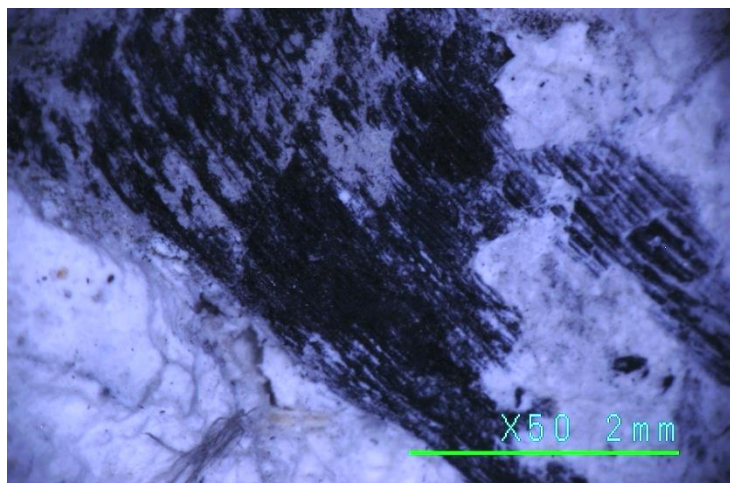
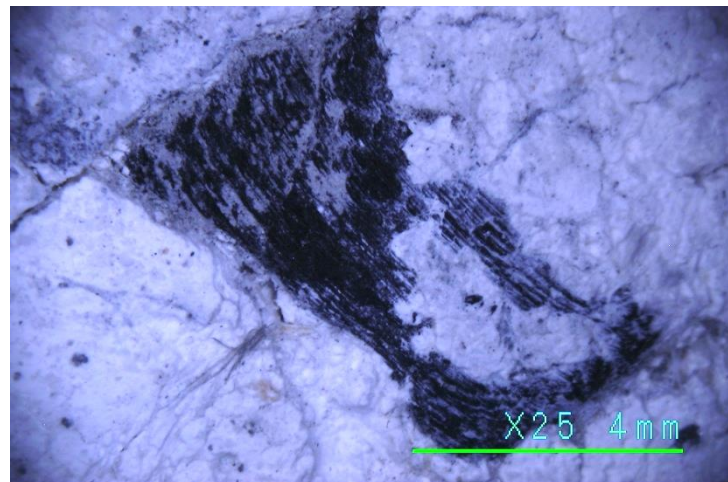
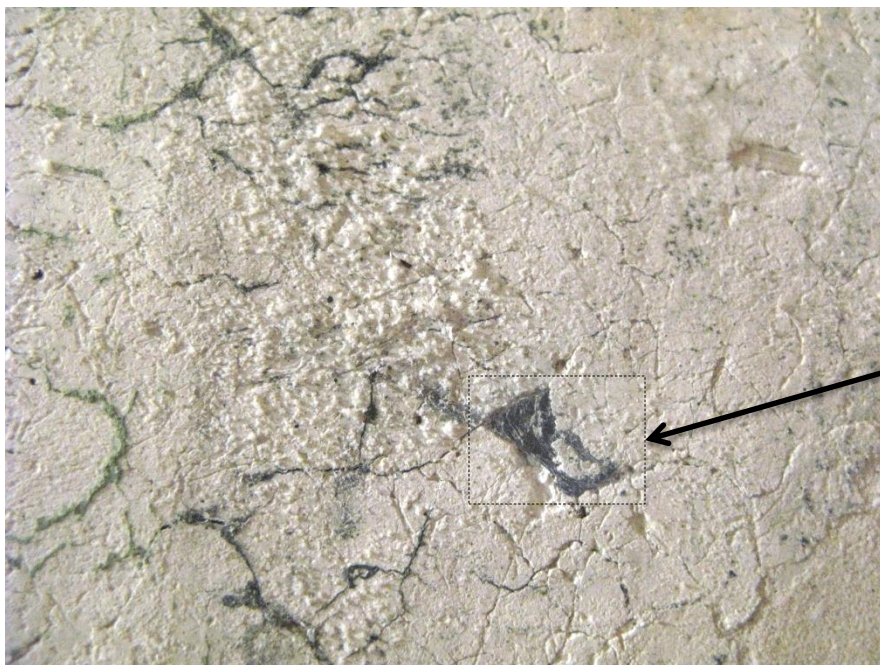




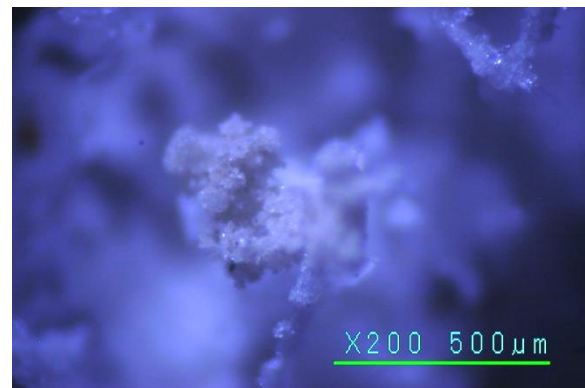
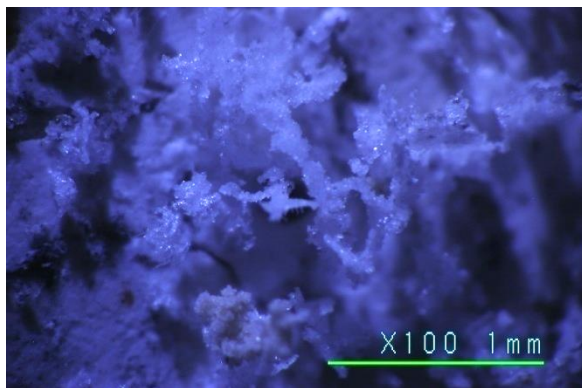
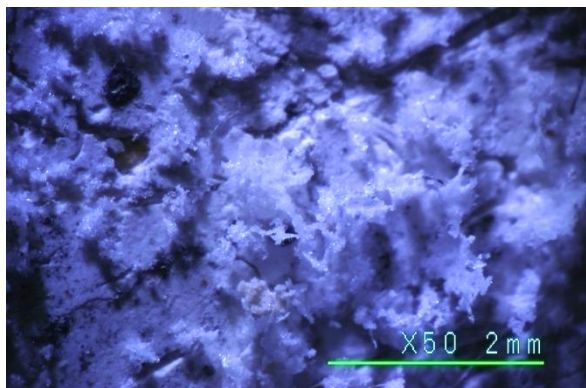
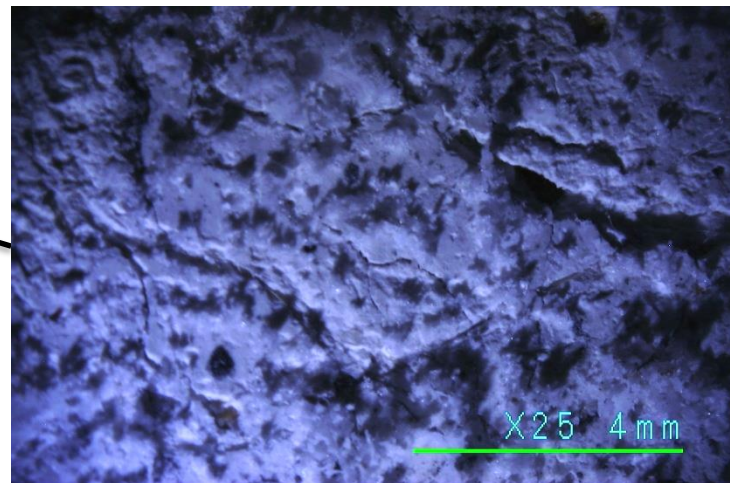
intrados N ușa principală – zona roz 2



perete est pronaos



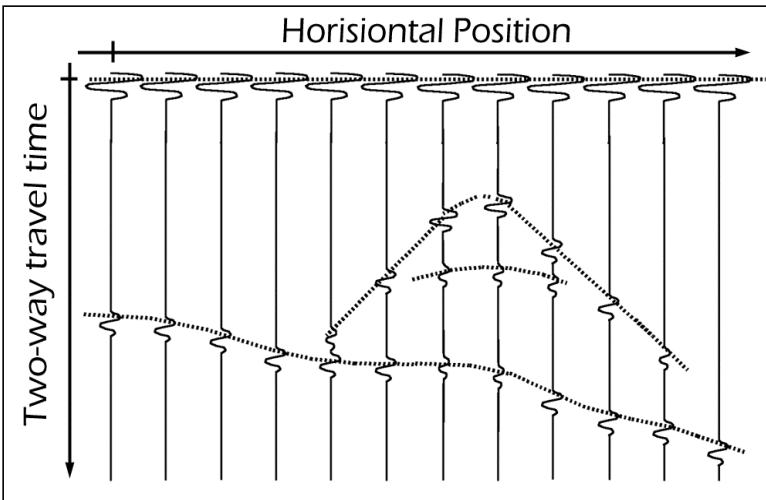
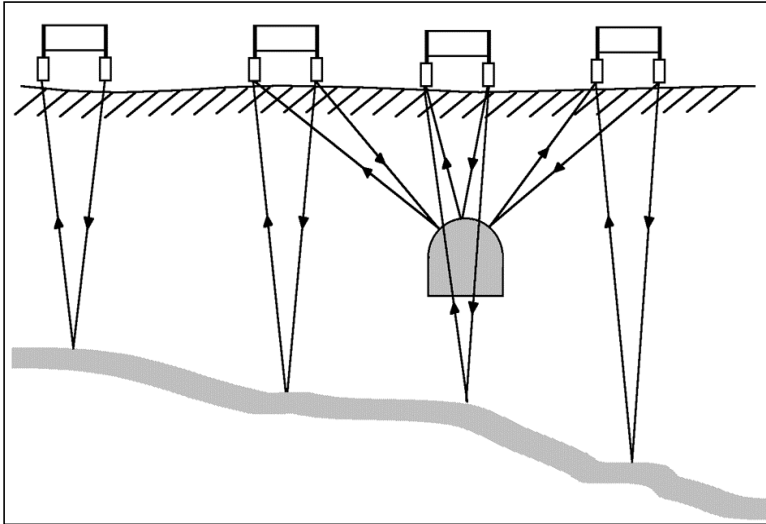
săruri - perete est pronaos



# Cimitirul și Paraclisul mănăstirii Tismana - 2011

Investigații GPR

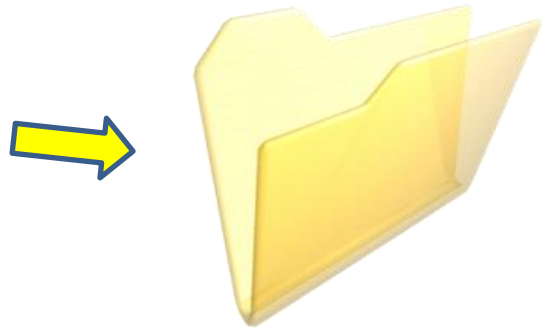
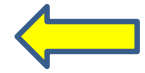
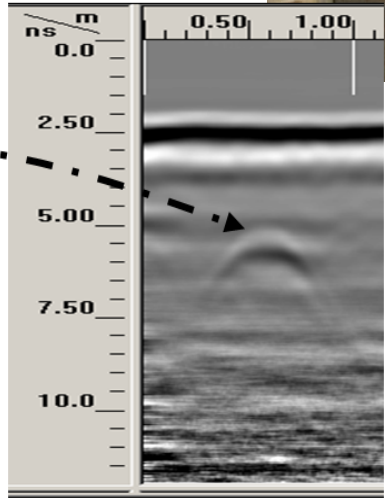
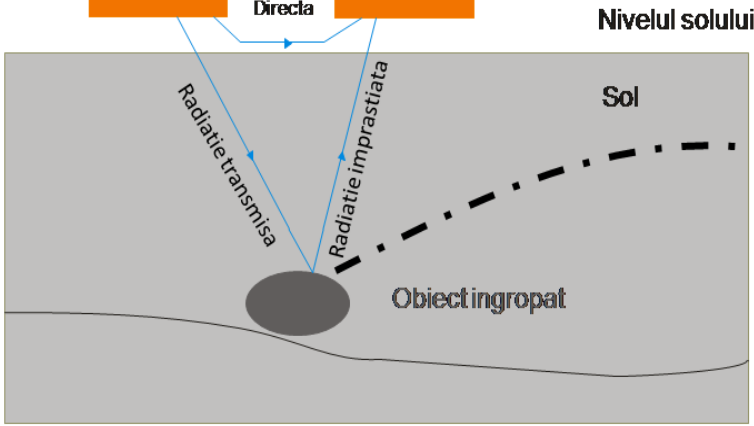
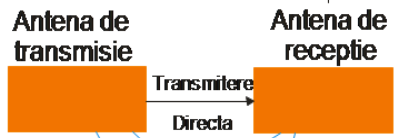
# Tehnica G.P.R (Ground Penetrating Radar)



- Principiul fundamental al tehnicii GPR este similar sistemului radar convențional și implică utilizarea undelor electromagnetice pentru cartografierea și depistarea anomaliilor dintre straturile solului (obiecte îngropate, cavități, etc)

- Este o tehnică non-invazivă și non-distructivă ce transmite pulsuri electromagnetice în sol și apoi măsoară timpul trecut dintre momentul în care semnalul a fost transmis și receptat în urma întâlnirii unui obiect îngropat.

- **Radarul cu penetrare în sol** detectează reflexiile produse la interfața dintre două materiale cu constante dielectrice diferite.



# Studiu de caz: Cimitirul și Paraclisul mănăstirii Tismana



# Achiziția datelor

Antenna Frequency (MHz)	Suitable Target Size (m)	Approx. Depth Range (m)	Approx. MAX. Depth Range (m)
25	1.0	5 - 30	35 - 60
50	0.5	5 - 20	20 - 30
100	0.1 - 1.0	2 - 15	15 - 25
200 - 250	0.05 - 0.50	1 - 10	5 - 15
500	0.04	1 - 5	3 - 10
800	0.02	0.4 - 2	1 - 6
1000	0.01	0.3 - 2	0.5 - 4
1600	0.01	0.2 - 1	0.5 - 2

- Adâncimea de pătrundere a radiației este dependentă de frecvența antenei de emisie-recepție dar și de proprietățile electromagnetice ale materialului întâlnit.

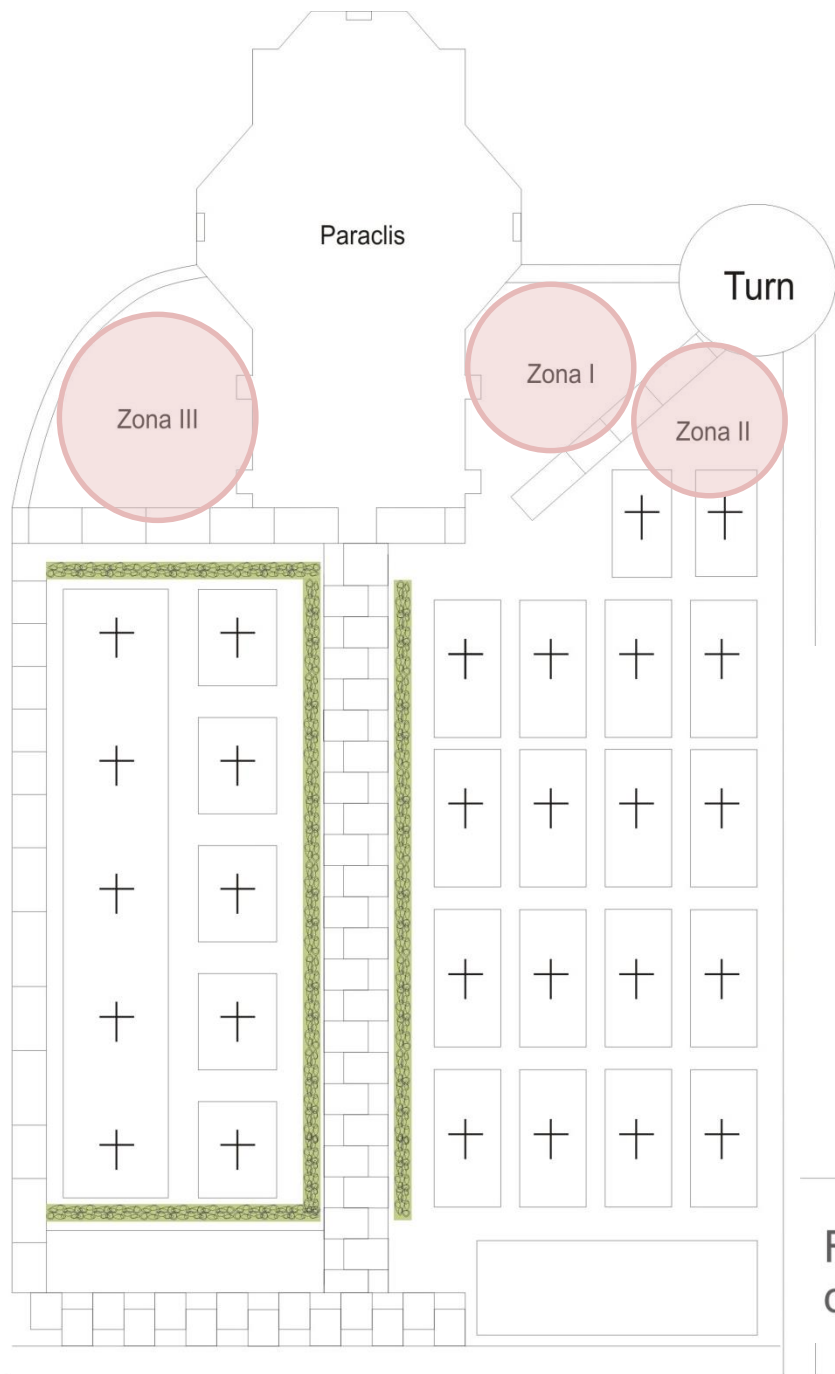


- Rezoluția radargramei rezultate este proporțională cu frecvența radiației folosite, creșterea frecvenței având ca efect îmbunătățirea acesteia.

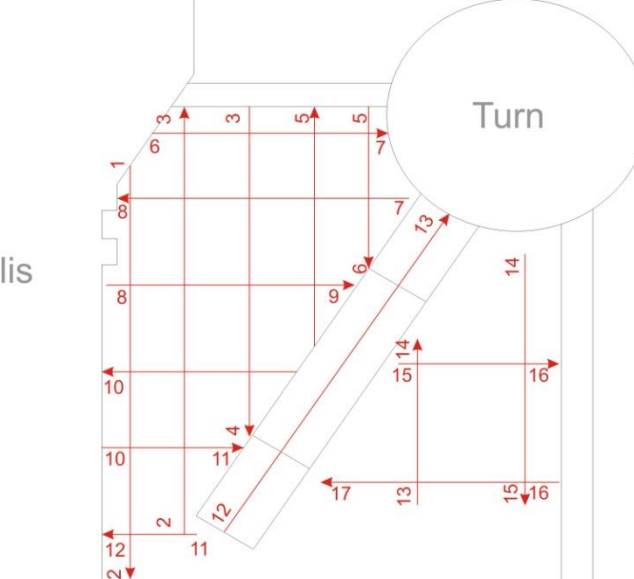
- Răspunsurile mediului, caracterizate prin rezoluție și adâncimea de pătrundere sunt influențate de proprietățile electromagnetice ale materialelor investigate.

Sistemul GPR



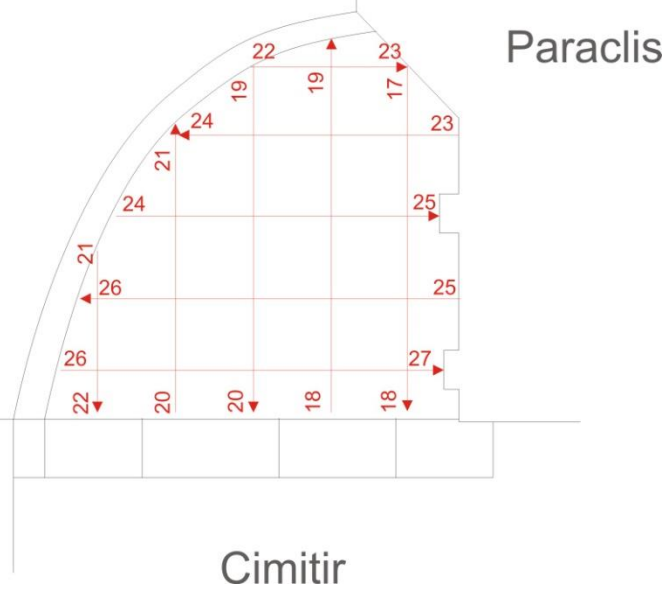


Paraclis



Harta scanărilor GPR  
Antenele de 500 MHz și 800 MHz

Fosta casă  
domnească



Cimitir

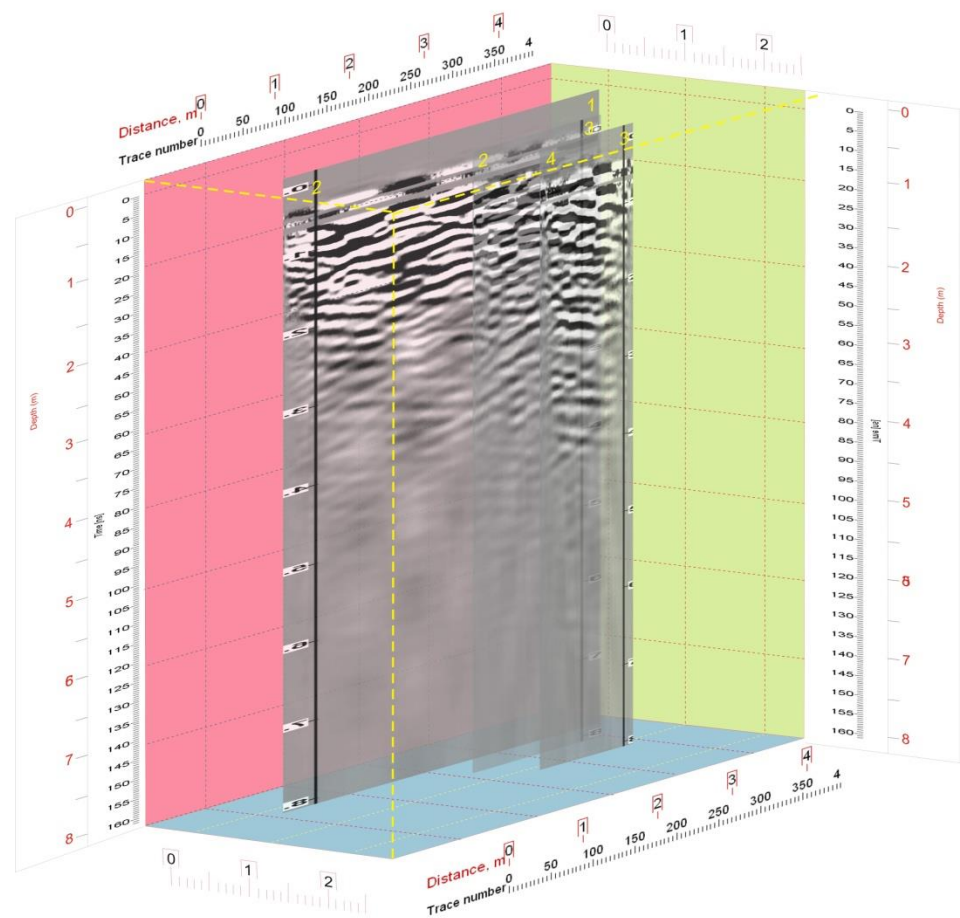
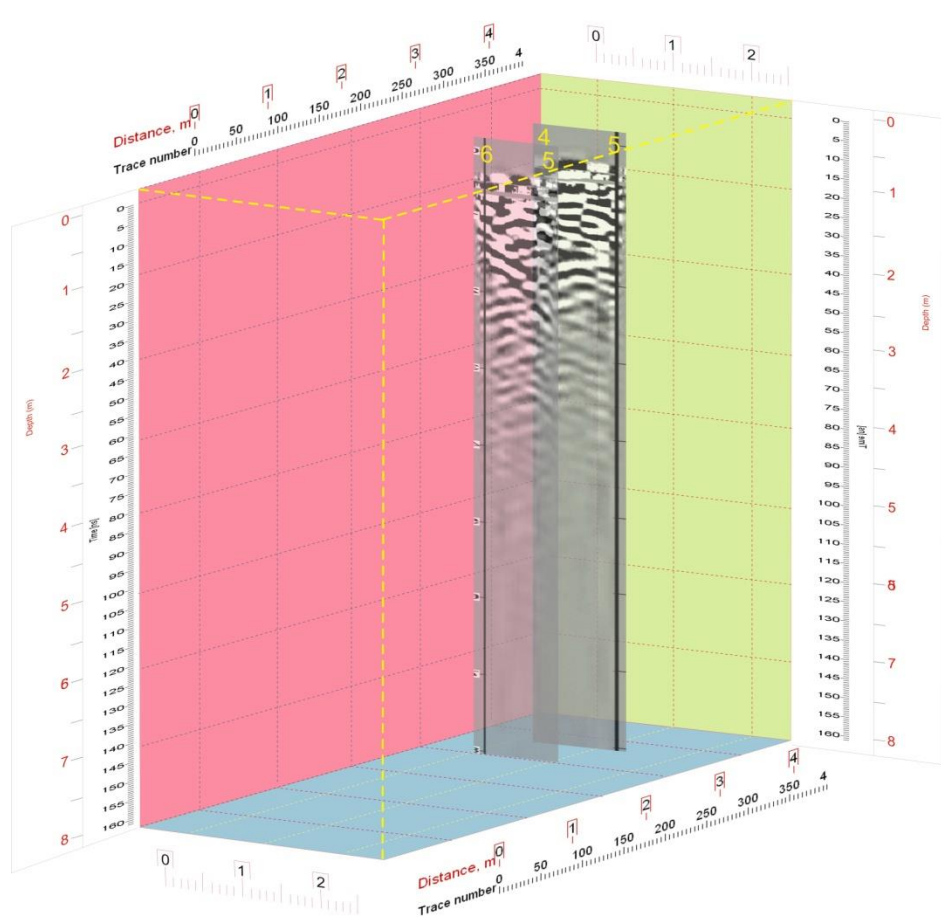
Zona I și II

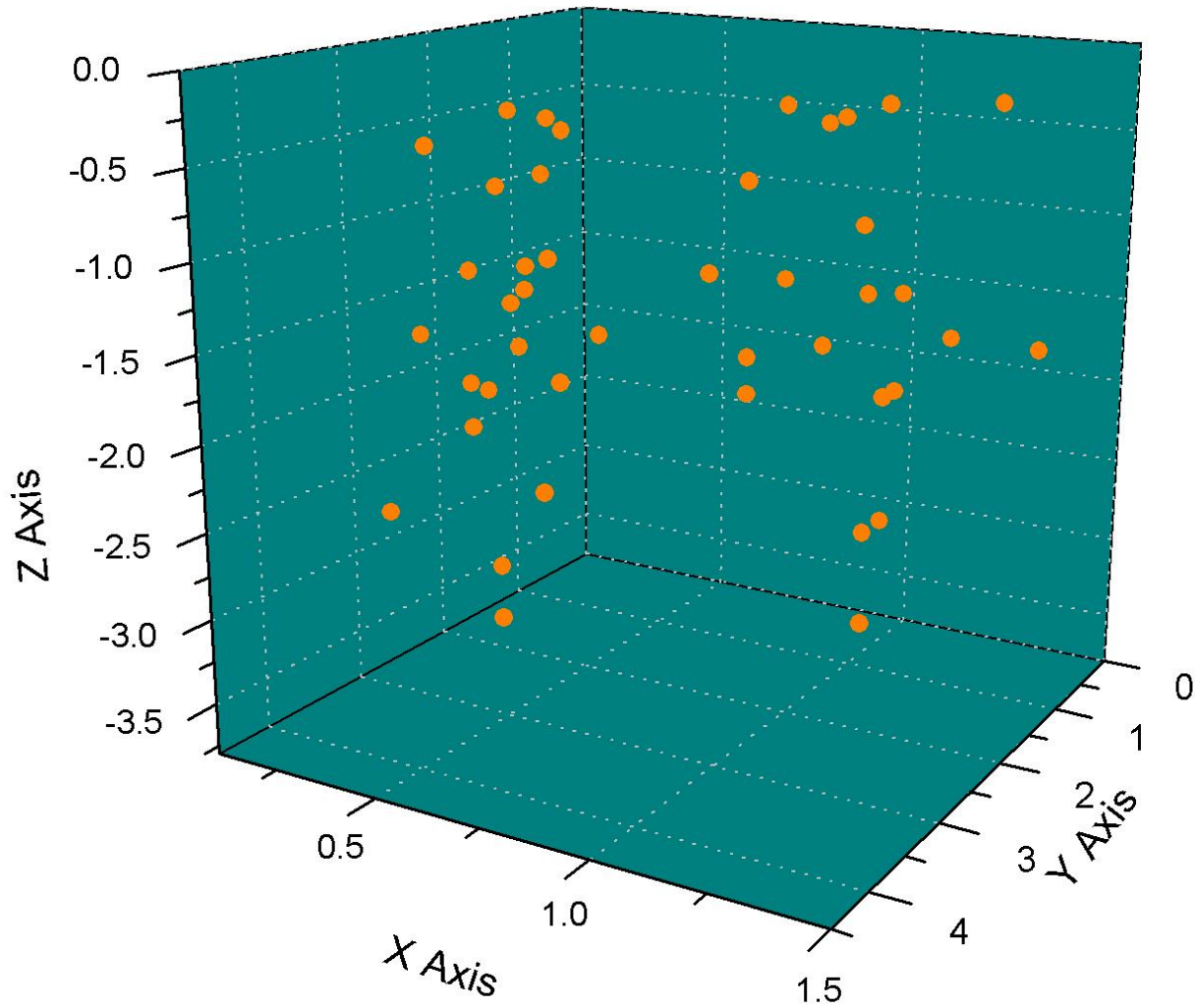


Zona III

# Zona I

# 250 MHz

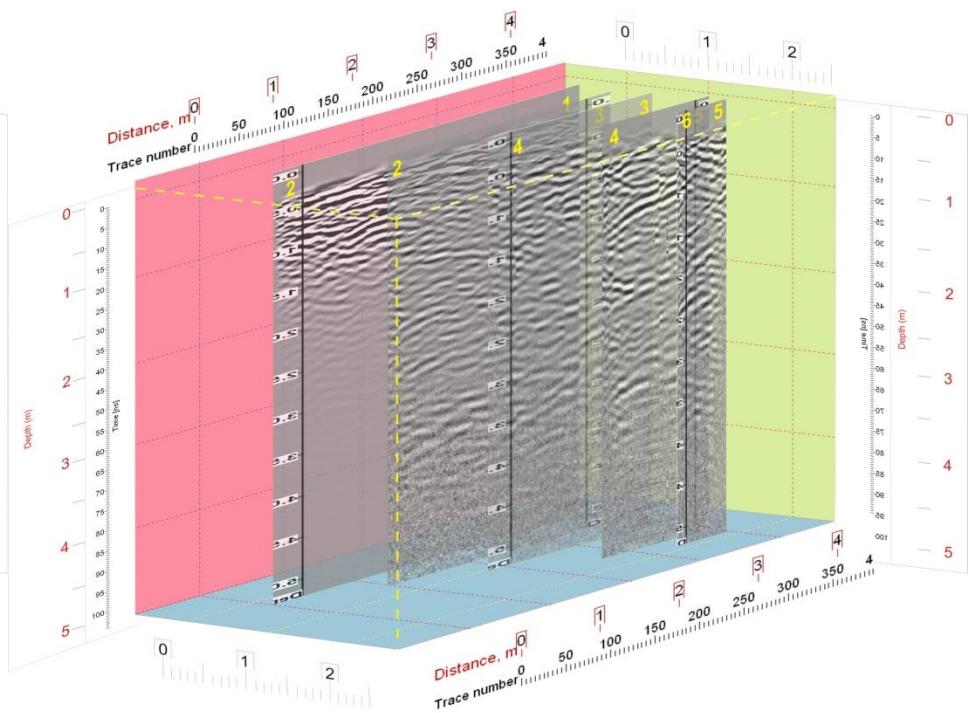
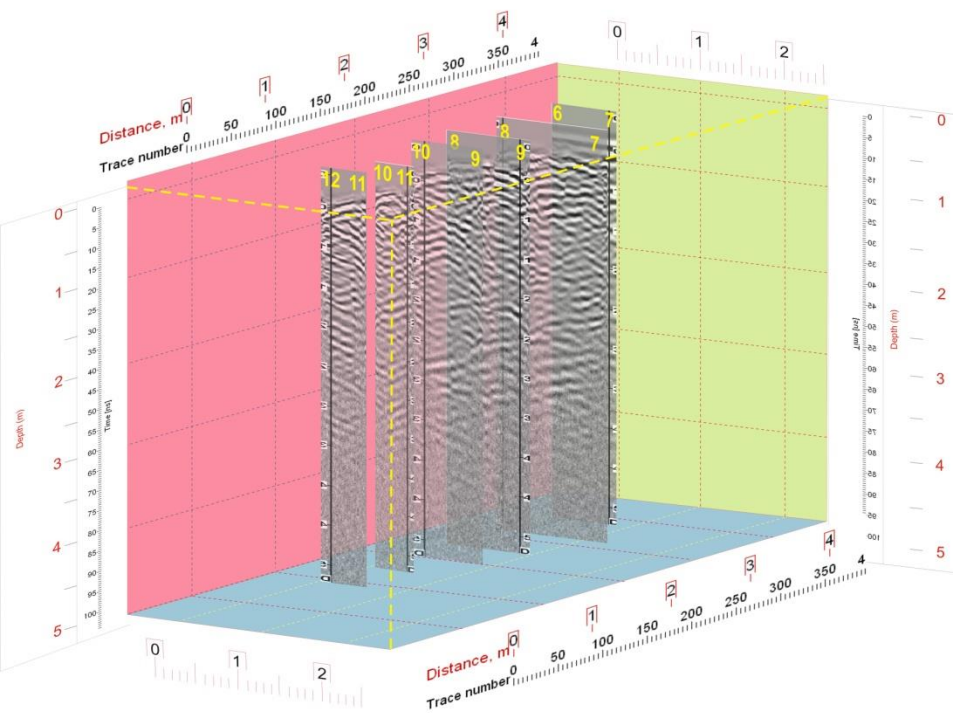


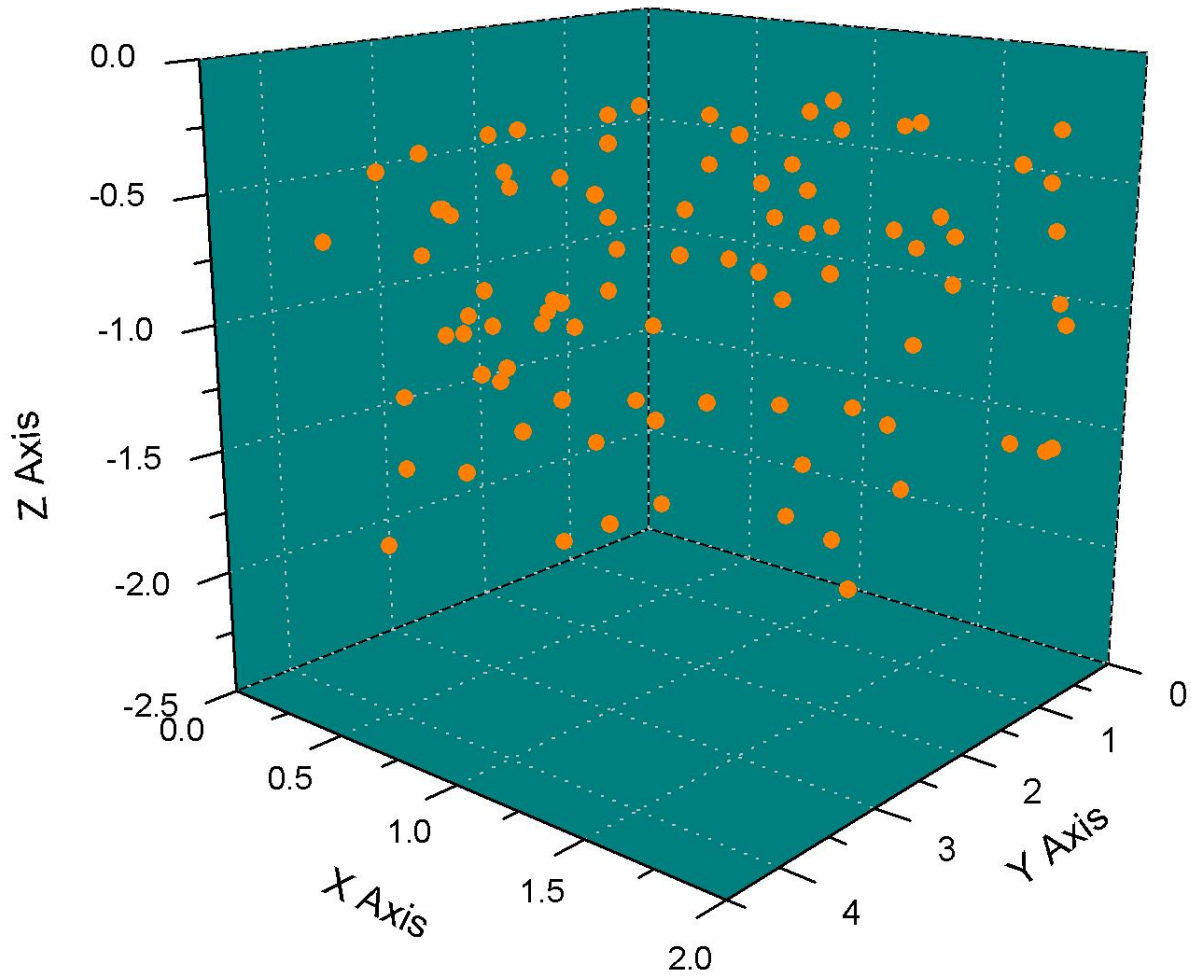


Zona I. Punerea în plan a punctelor de interes – antena 250 MHz

# Zona I

# 500 MHz

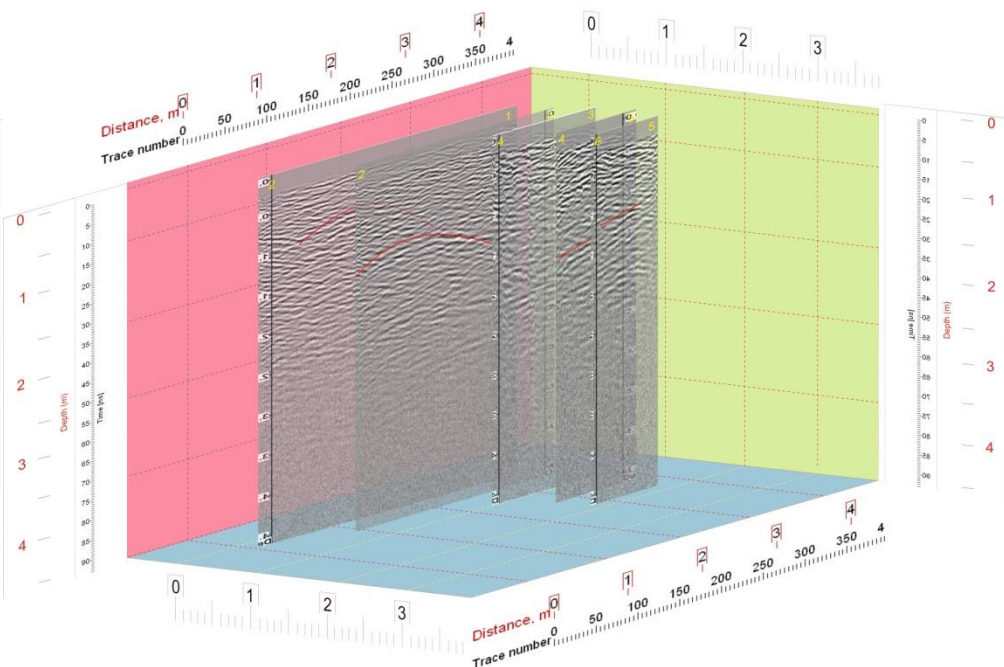
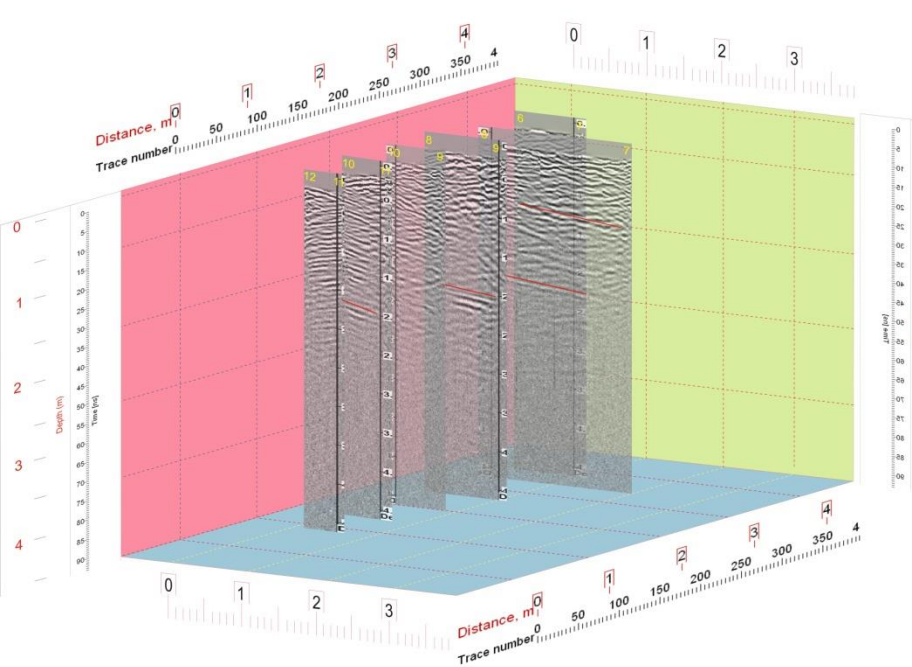


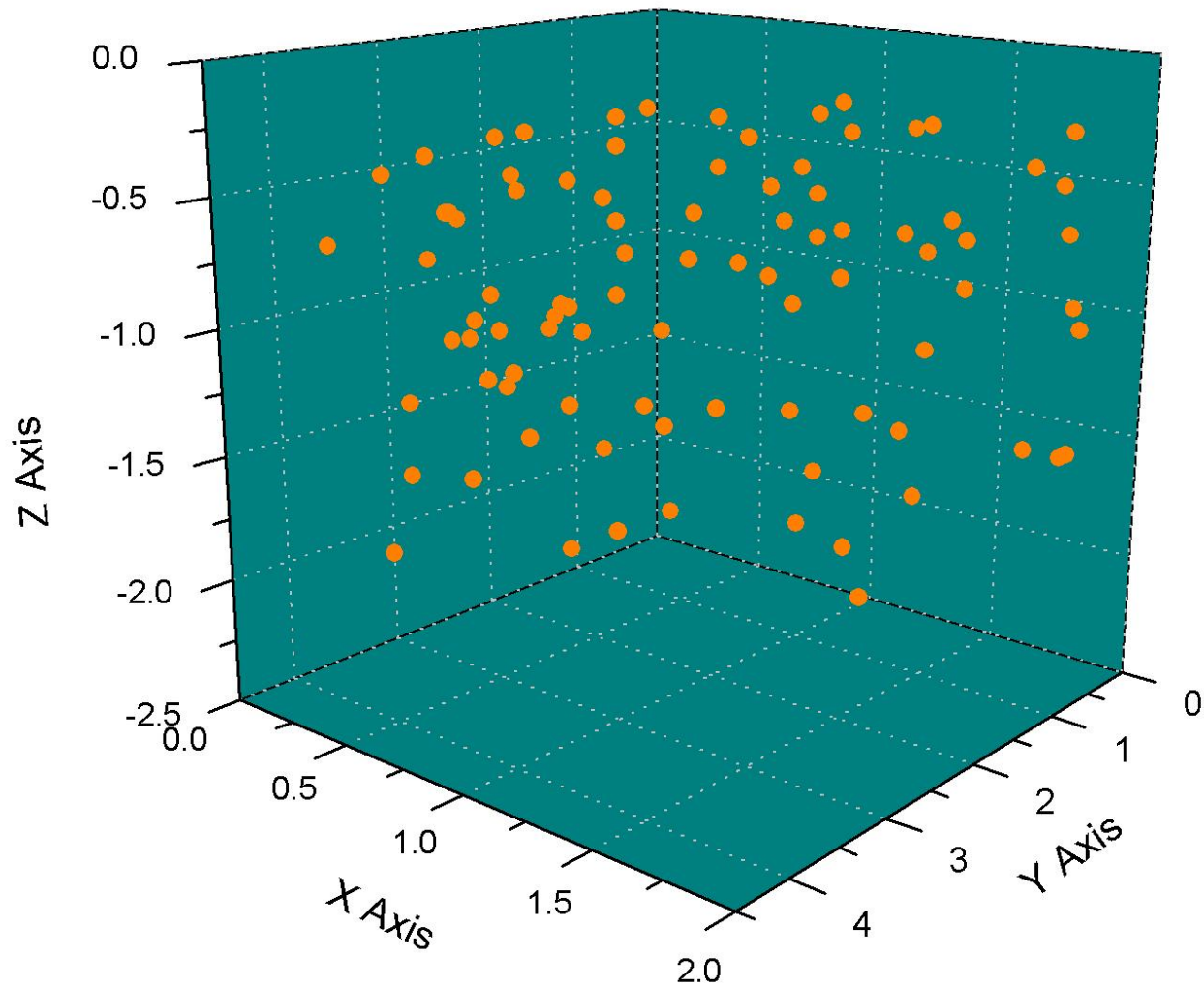


Zona I. Punerea în plan a punctelor de interes – antena 500 MHz

# Zona I

# 800 MHz



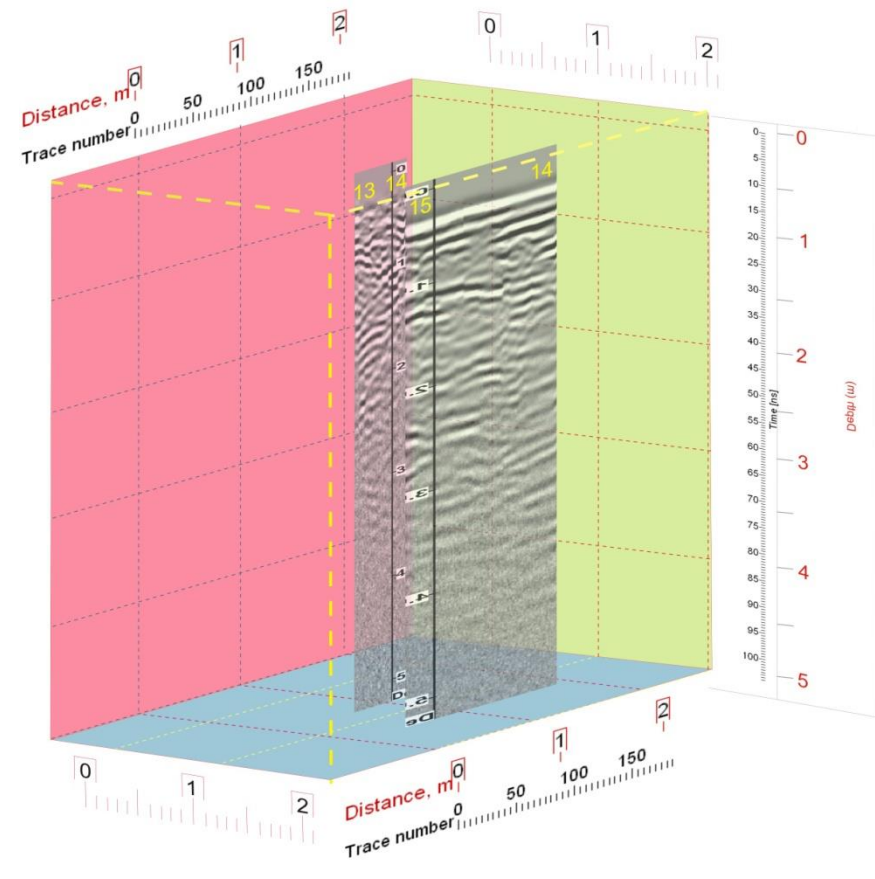
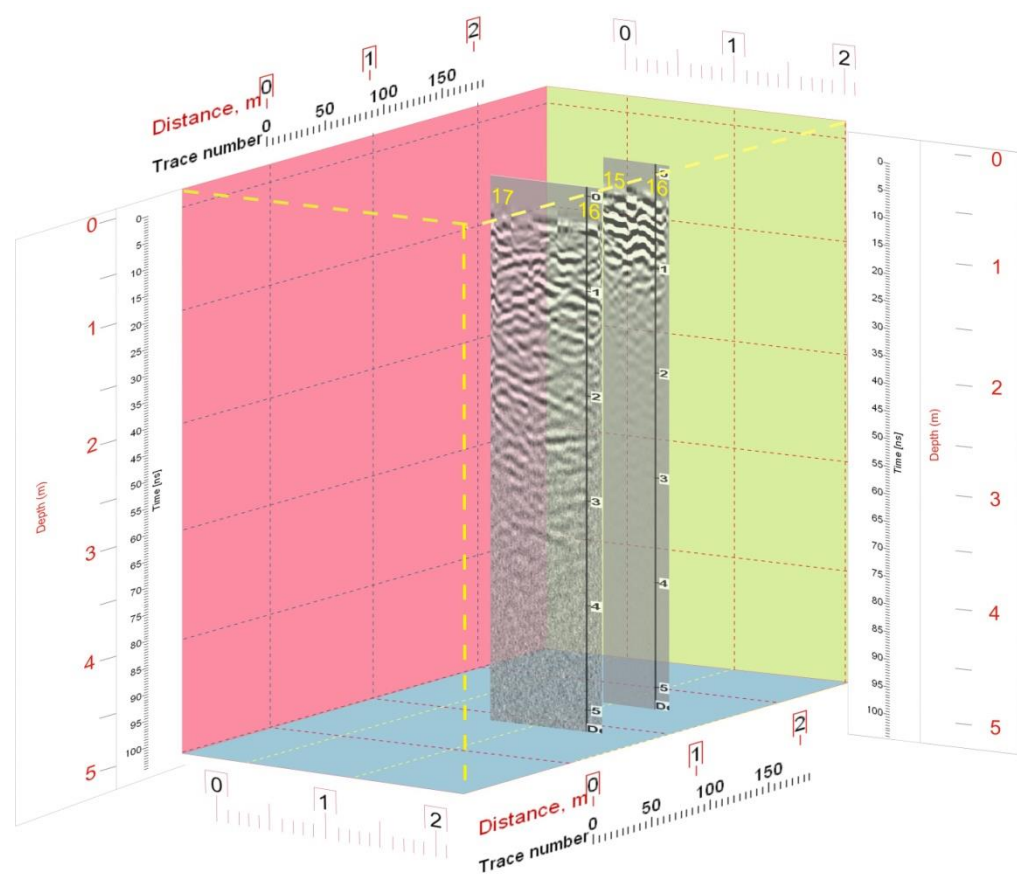


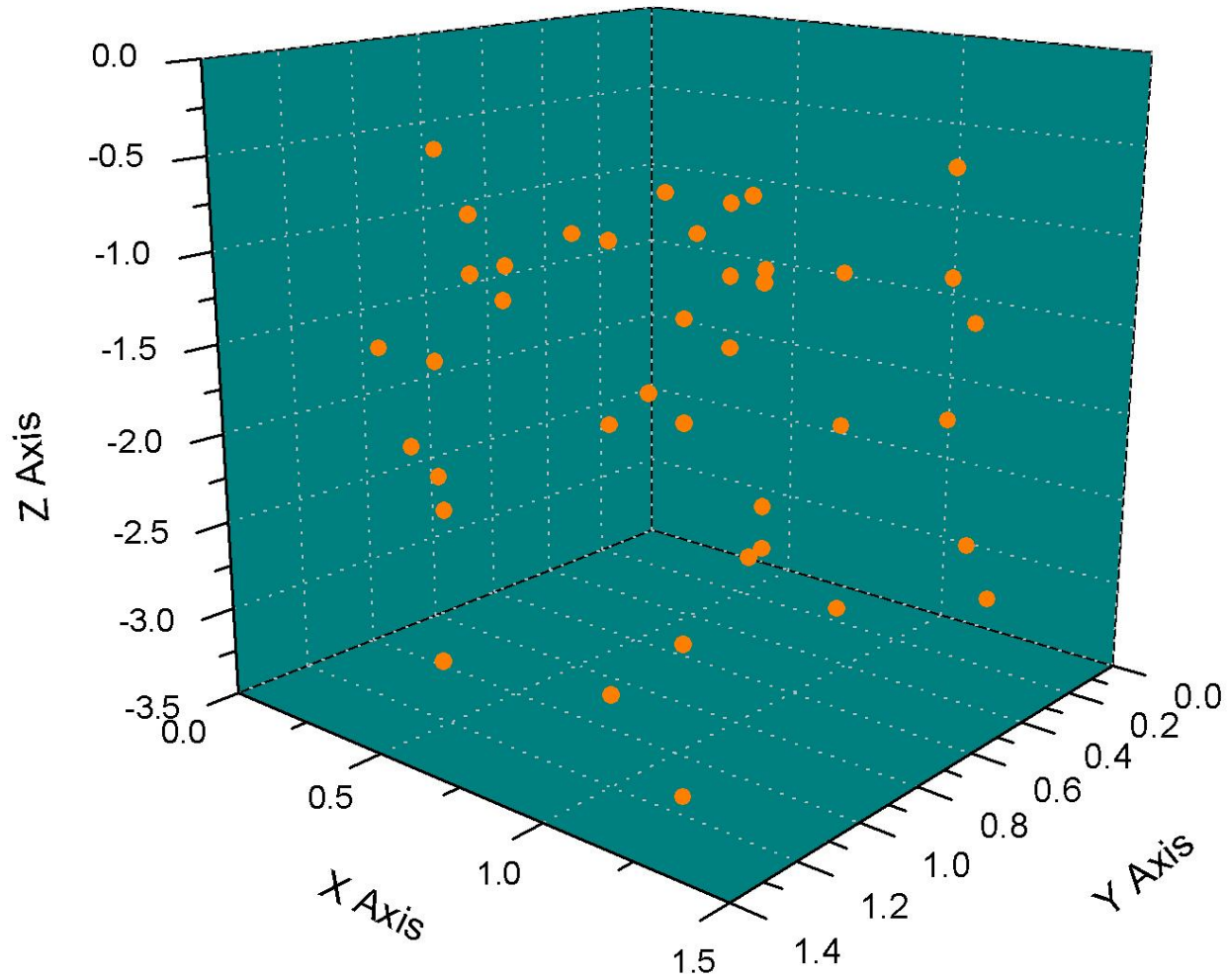
Zona I. Punerea în plan a punctelor de interes – antena 800 MHz



# Zona II

# 500 MHz

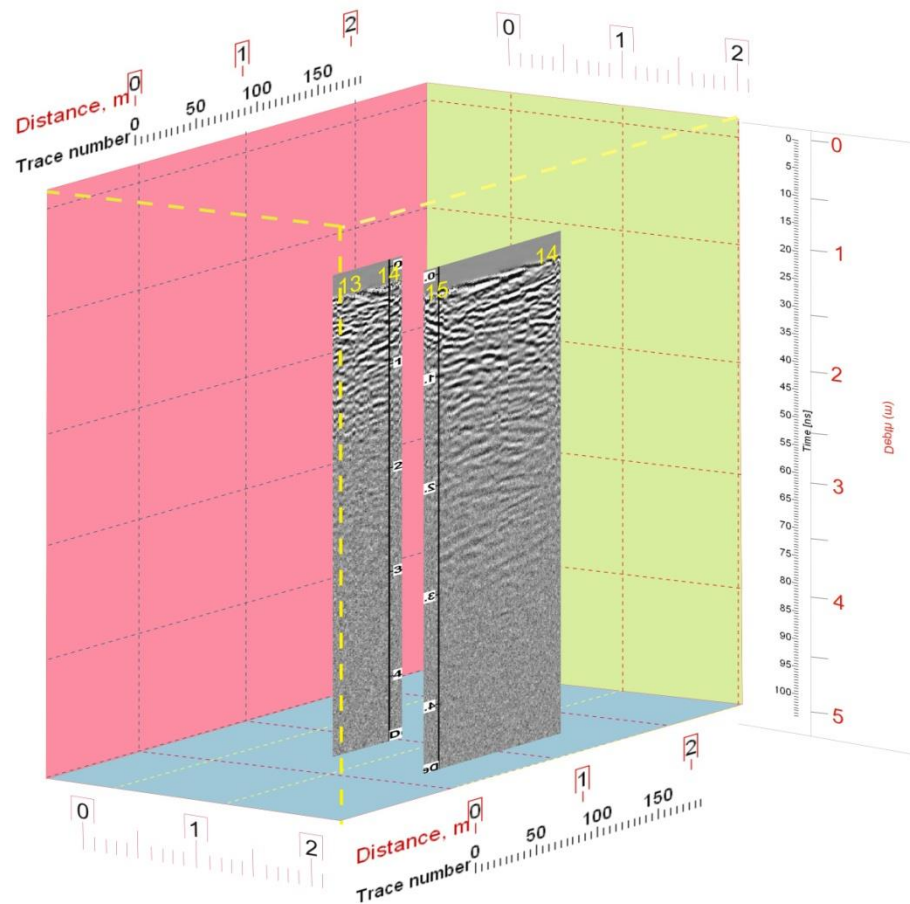
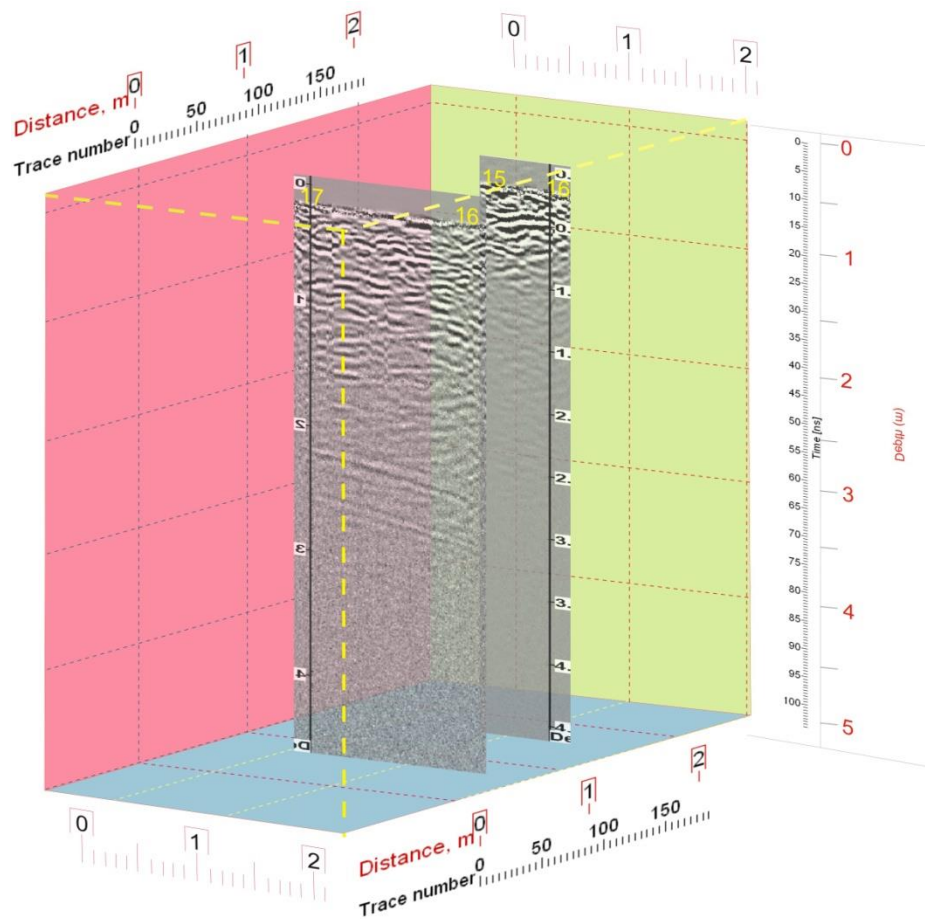


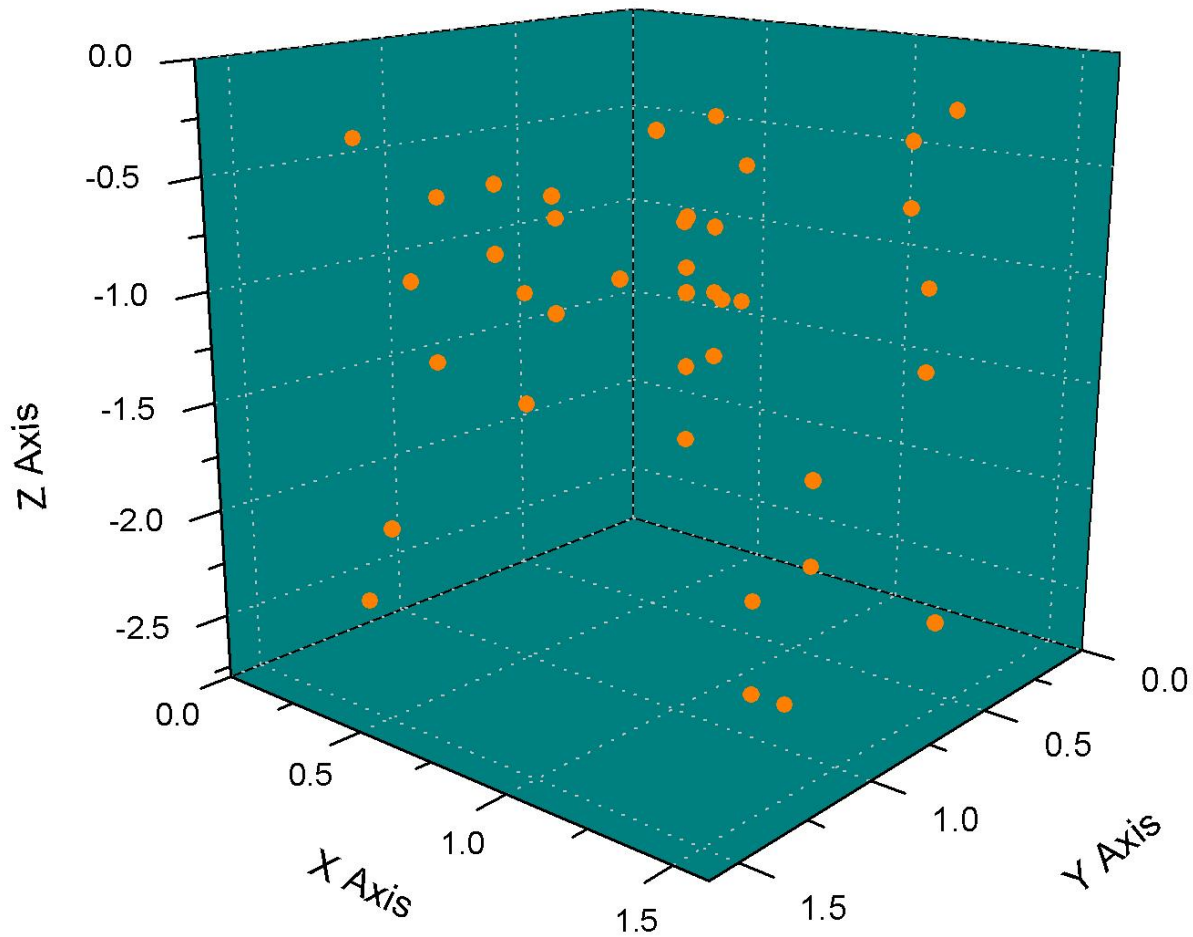


Zona II. Punerea în plan a punctelor de interes – antena 500 MHz

# Zona II

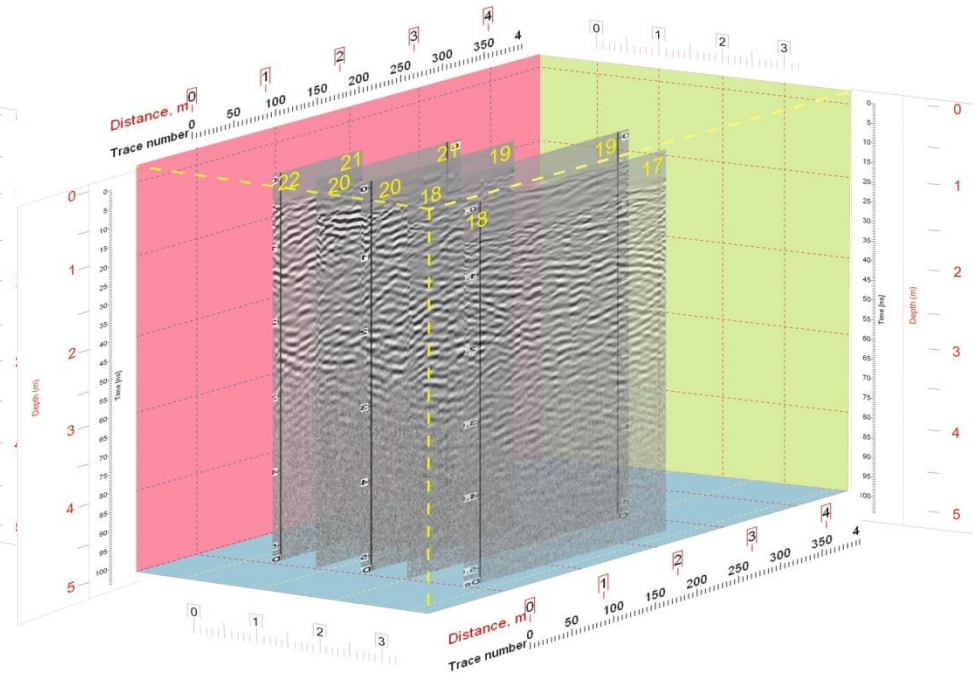
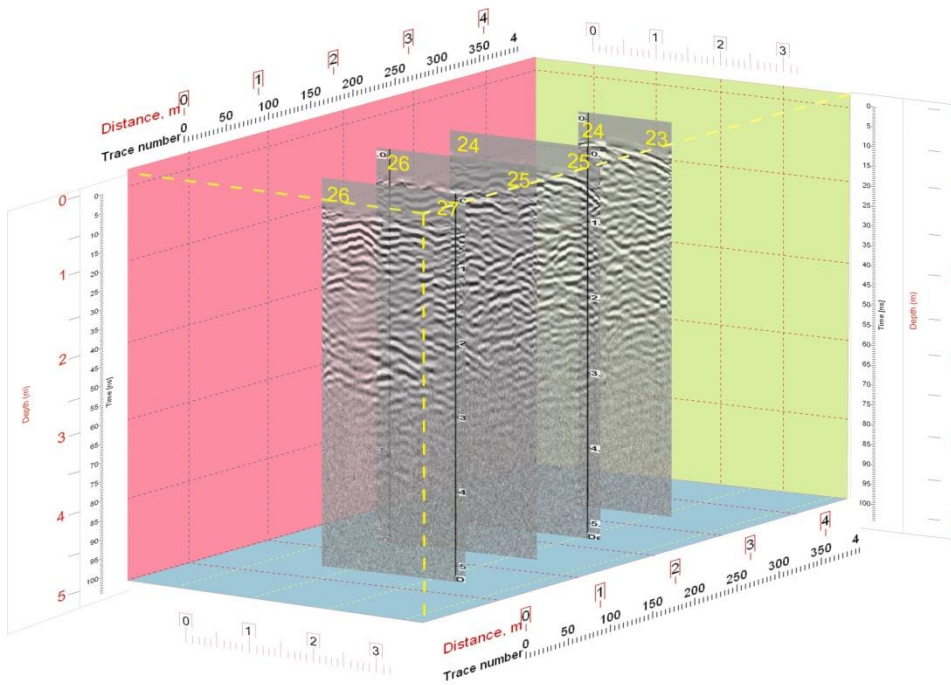
# 800 MHz

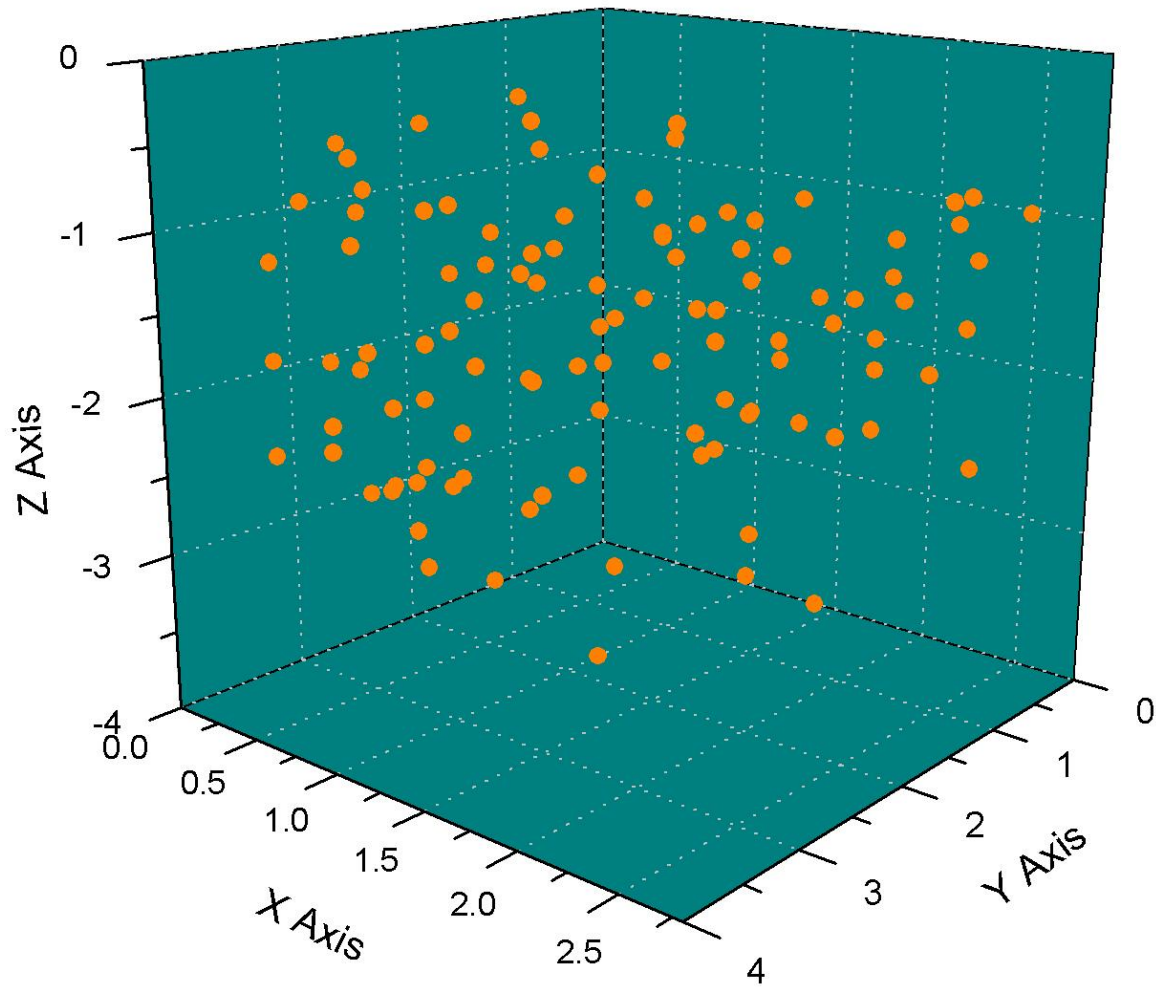




Zona II. Punerea în plan a punctelor de interes – antena 800 MHz

# Zona III 500 MHz

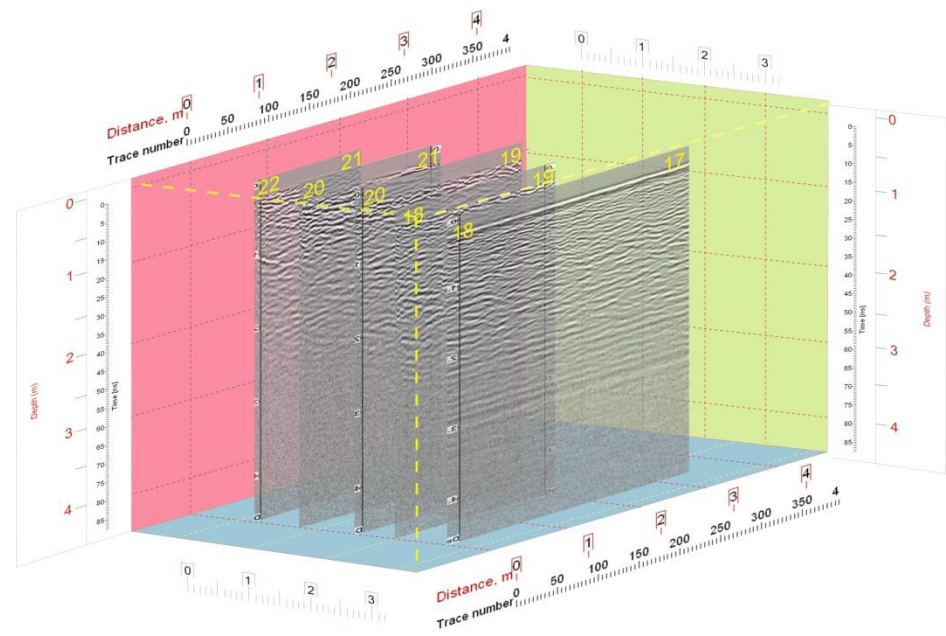
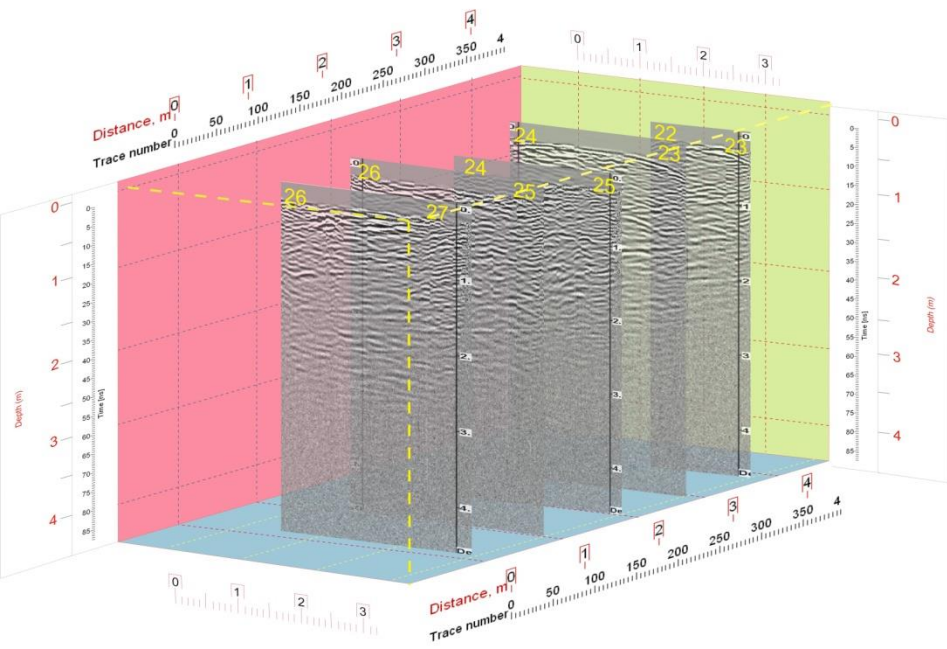


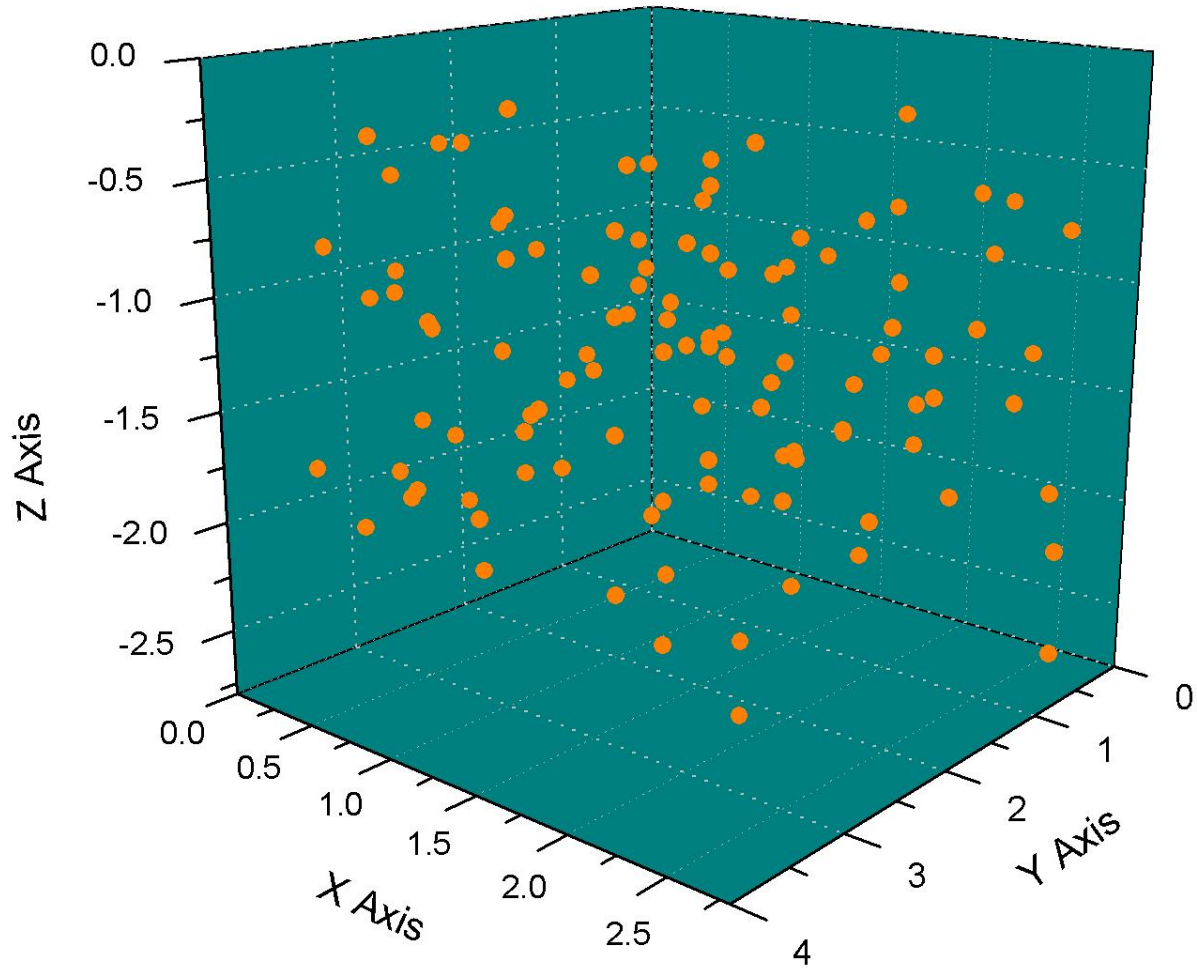


Zona III. Punerea în plan a punctelor de interes – antena 500 MHz

# Zona III

# 800 MHz





Zona III. Punerea în plan a punctelor de interes – antena 800 MHz



# Concluzii:

- Zona I – la o adâncime constantă de aproximativ 2 m sunt observate reflexii puternic pronunțate ale pulsurilor electromagnetice cauzate de modificarea accentuată a valorii constantei dielectrice caracteristică fiecărui mediu de propagare.
- Zona II – ca și în cazul Zonei I de scanare sunt evidențiate la adâncimea de aproximativ 2m reflexii semnificative din punct de vedere al contrastului produs cauzate de modificarea valorii constantei dielectrice a mediului investigat.
- Zona III – sunt semnalate neomogenități importante ale structurii substraturilor solului. Prezența canalului de evacuare a apei indică faptul că asupra acestei zone s-a intervenit relativ recent.
- Achiziția rapidă și de mare acuratețe, efectuată prin mijloace non-destructive, răspunde exigențelor caracteristice ale investigațiilor efectuate asupra monumentelor istorice.

# Investigații GPR efectuate la mănăstirea Tismana

10 Iulie 2014

# Tipuri de prospecțiuni arheologice:

➤ Prospecțiuni aeriene

➤ Prospecțiuni subacvatice

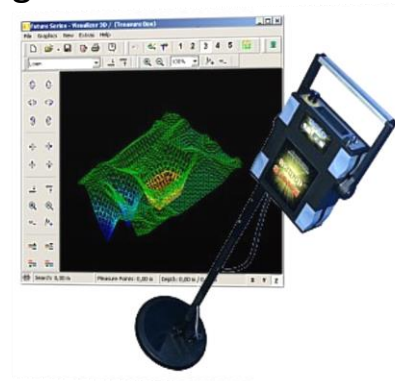
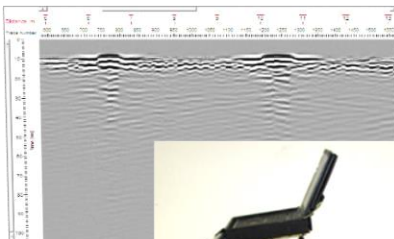
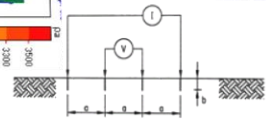
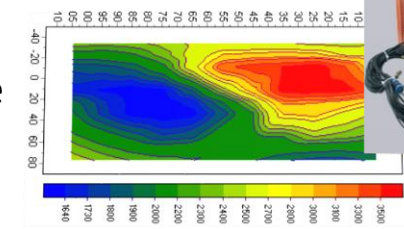
➤ Prospecțiuni terestre

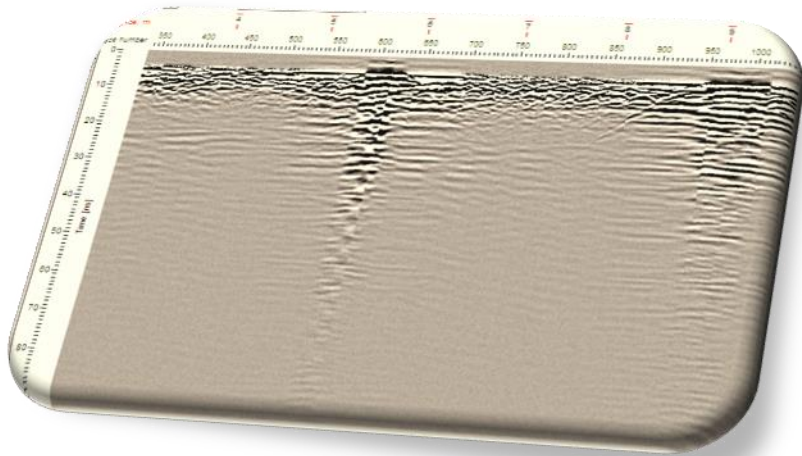
geofizice

magnetice

geochimice

electrice



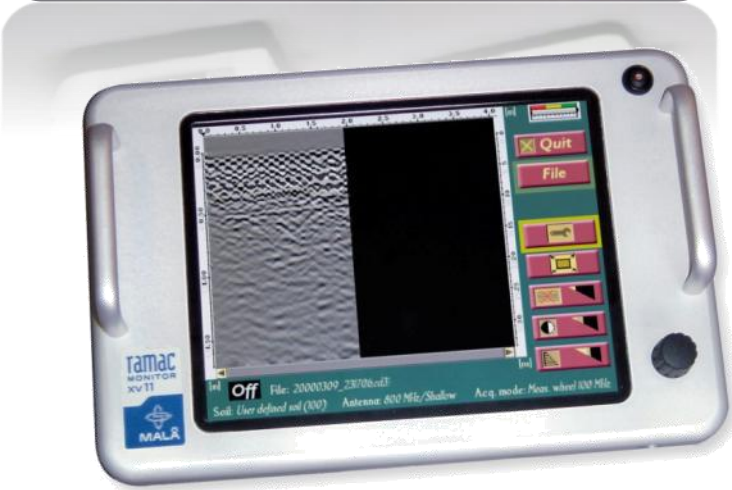


Radarul cu penetrare în sol este o metodă geofizică de investigare a solului prin emiterea și studierea modului de propagare a pulsurilor electromagnetice. Radiația folosită este din spectrul microundelor (UHF/VHF), semnalul fiind reflectat datorită discontinuităților materialelor dielectrice.



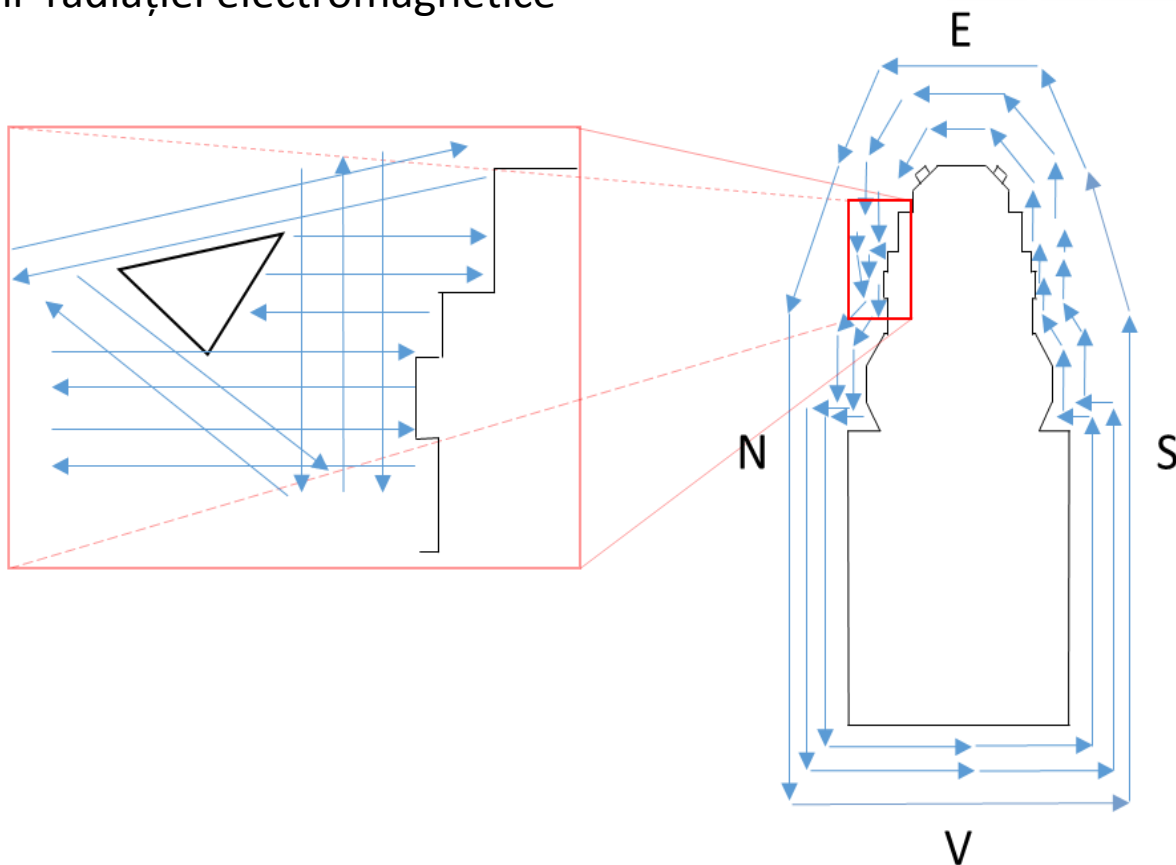
## Sistemul GPR este alcătuit din:

- 1) unitate de control
- 2) antene
- 3) unitate de procesare
- 4) cărucior (opțional)

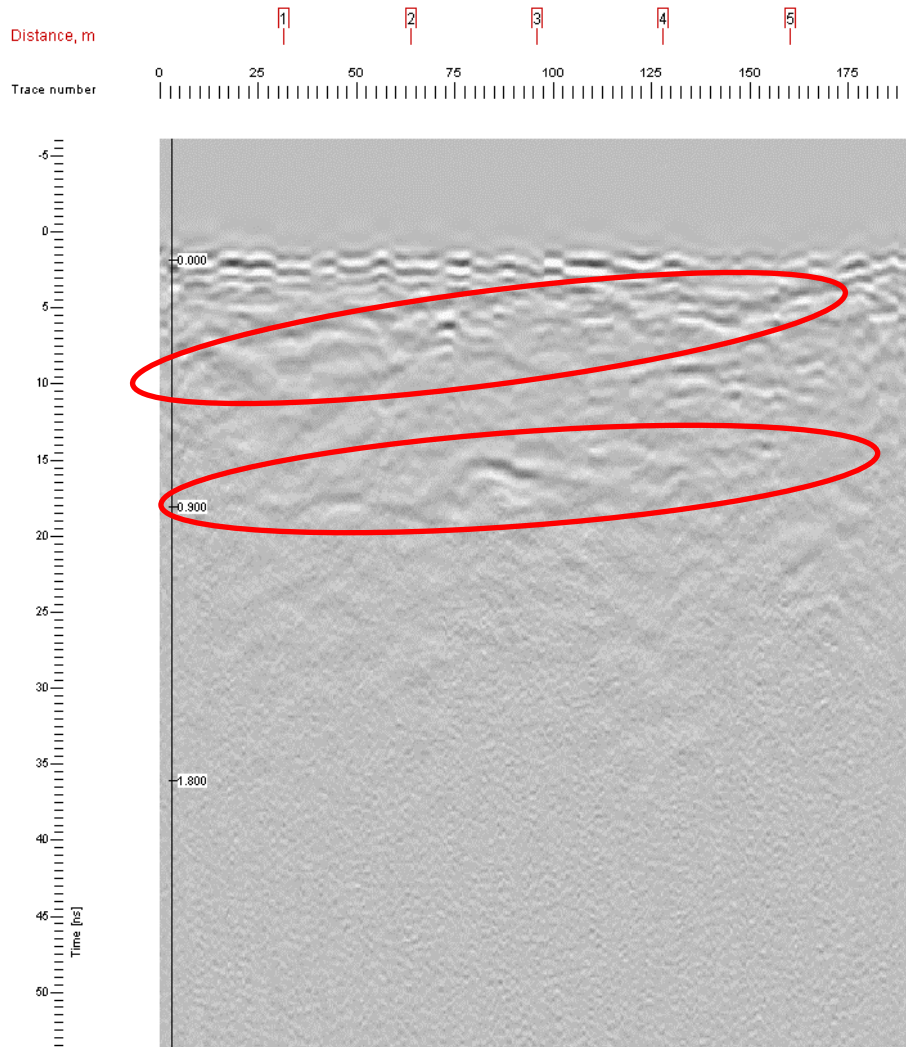


## Investigațiile GPR in jurul bisericii manastirii Tismana

- s-au efectuat 110 înregistrări
- antene de 500 si 800 MHz
- în N-E bisericii se observă apariția mai multor perturbații ale propagării radiației electromagnetice

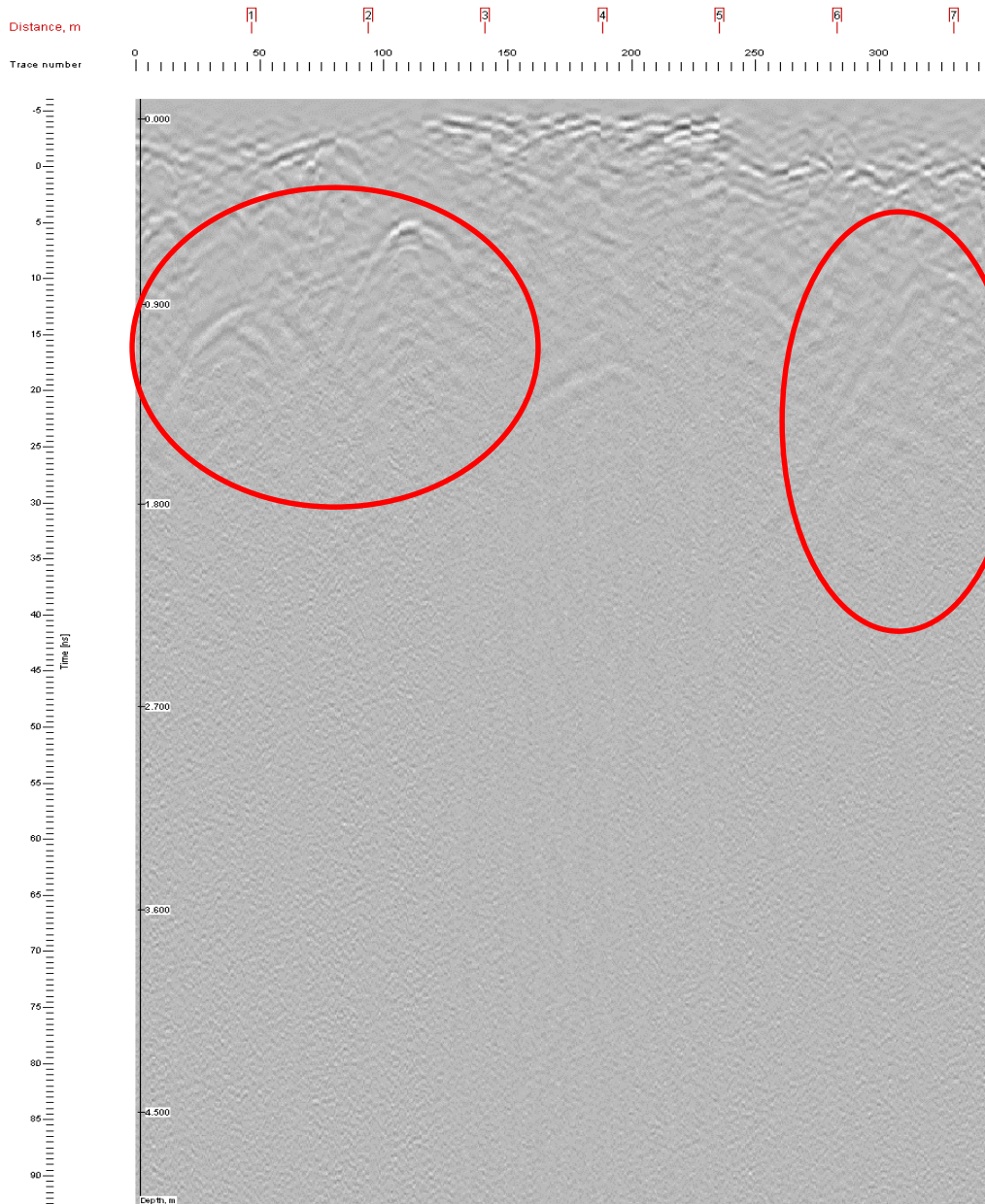


# Zona din N-E bisericii



Diferențe de stratigrafie, zonele selectate reprezintă granițele dintre straturi

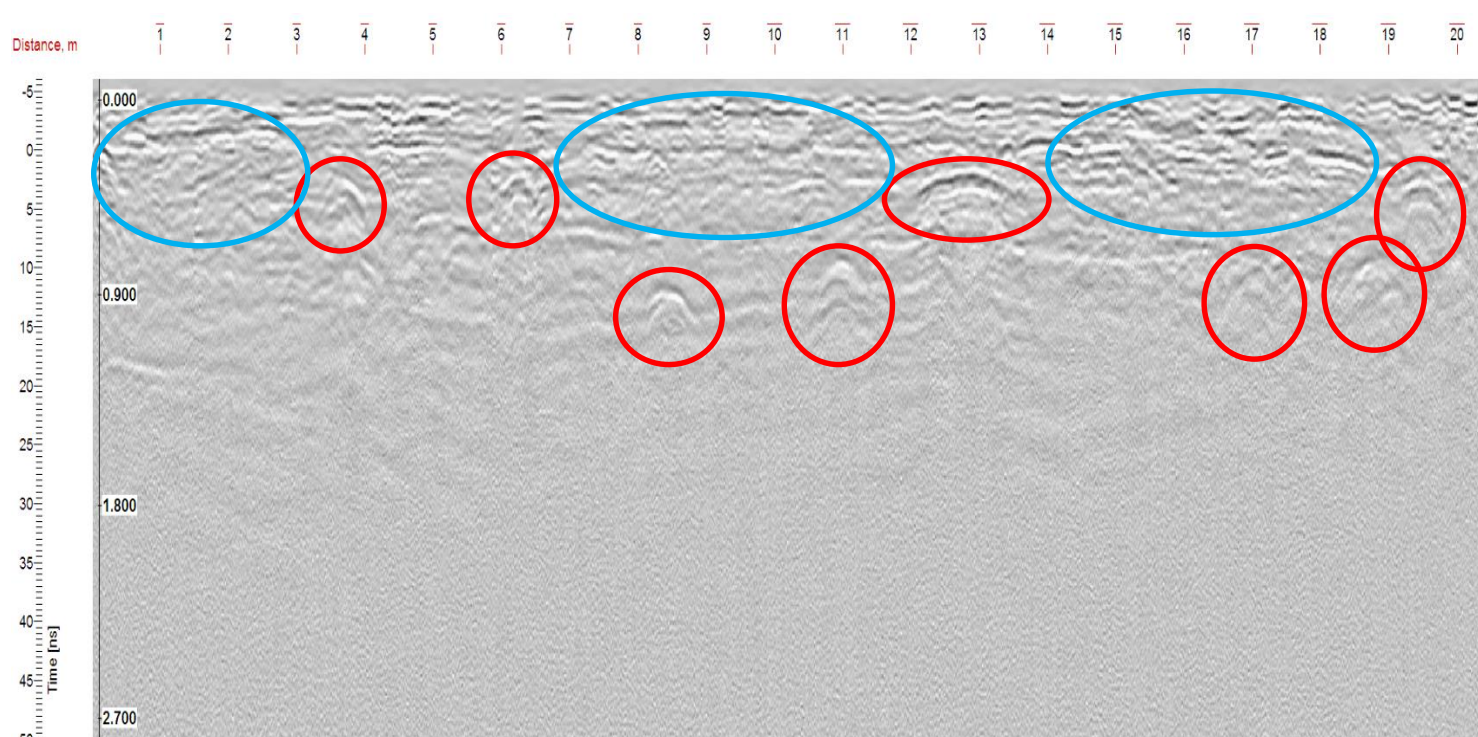
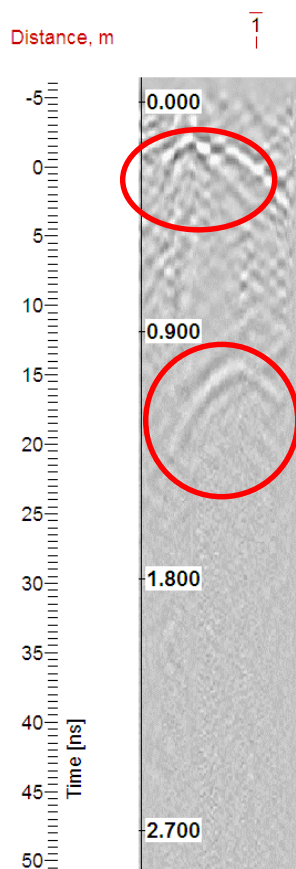
# Zona din N-E bisericii



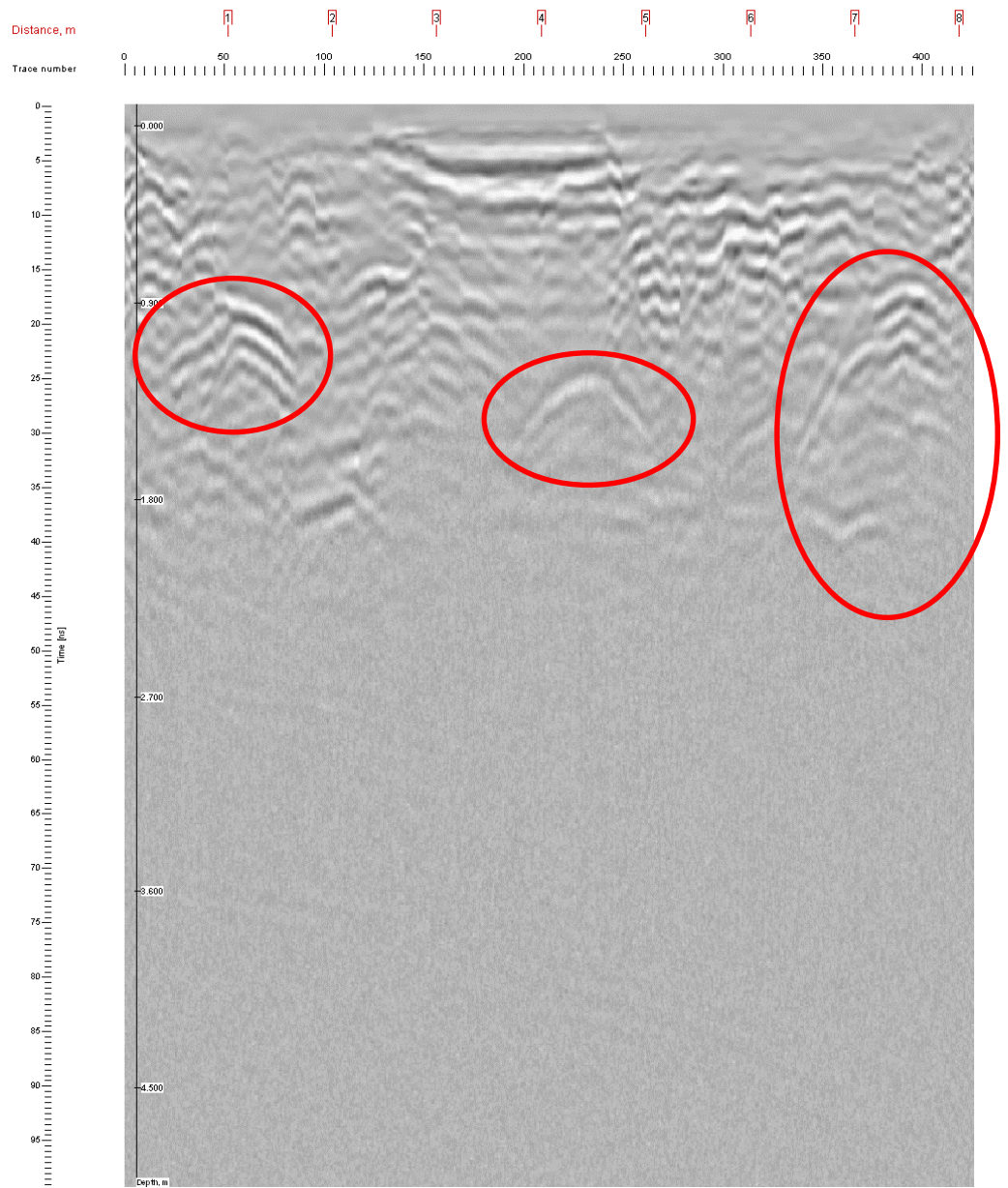
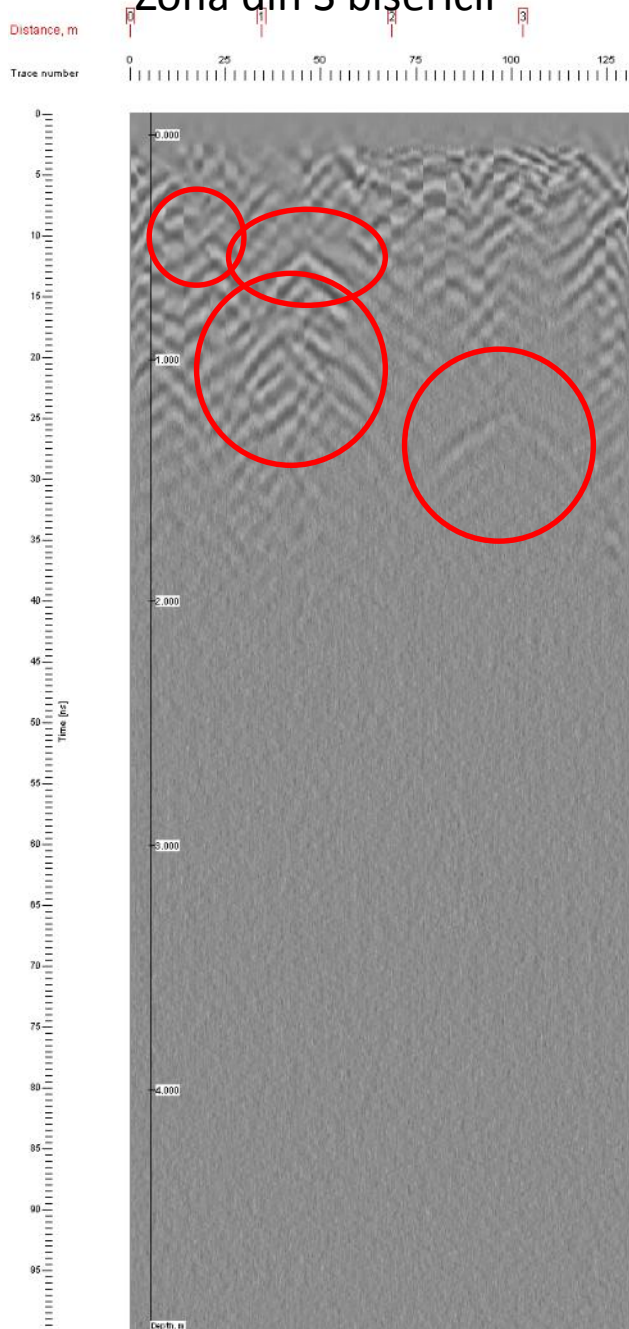
Apariția a 3 hiperbole cu punctul de maxim la adâncimi cuprinse între 0,6 și 0,9 metri.

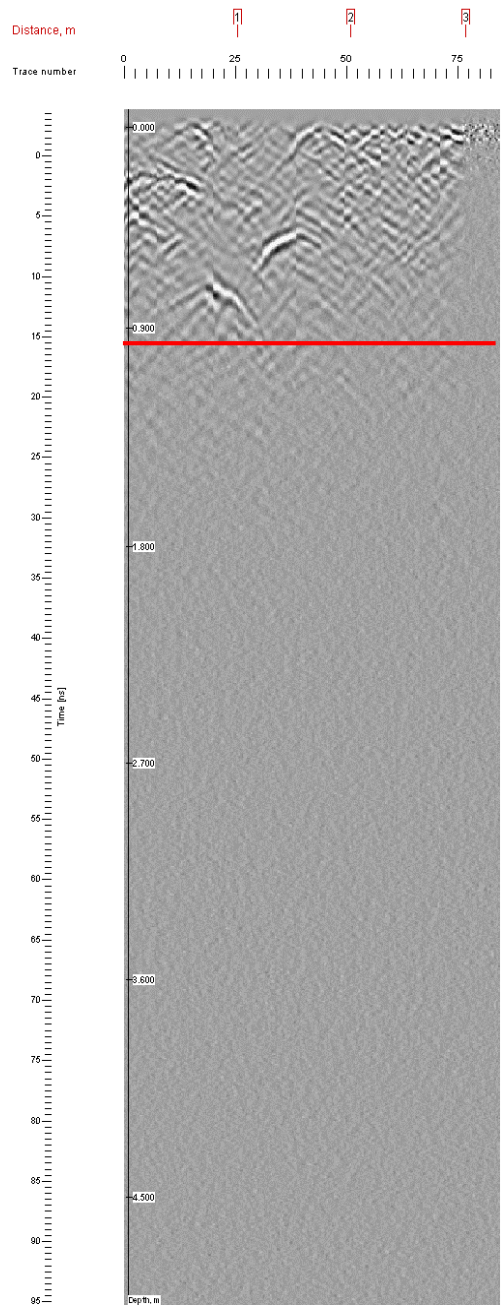
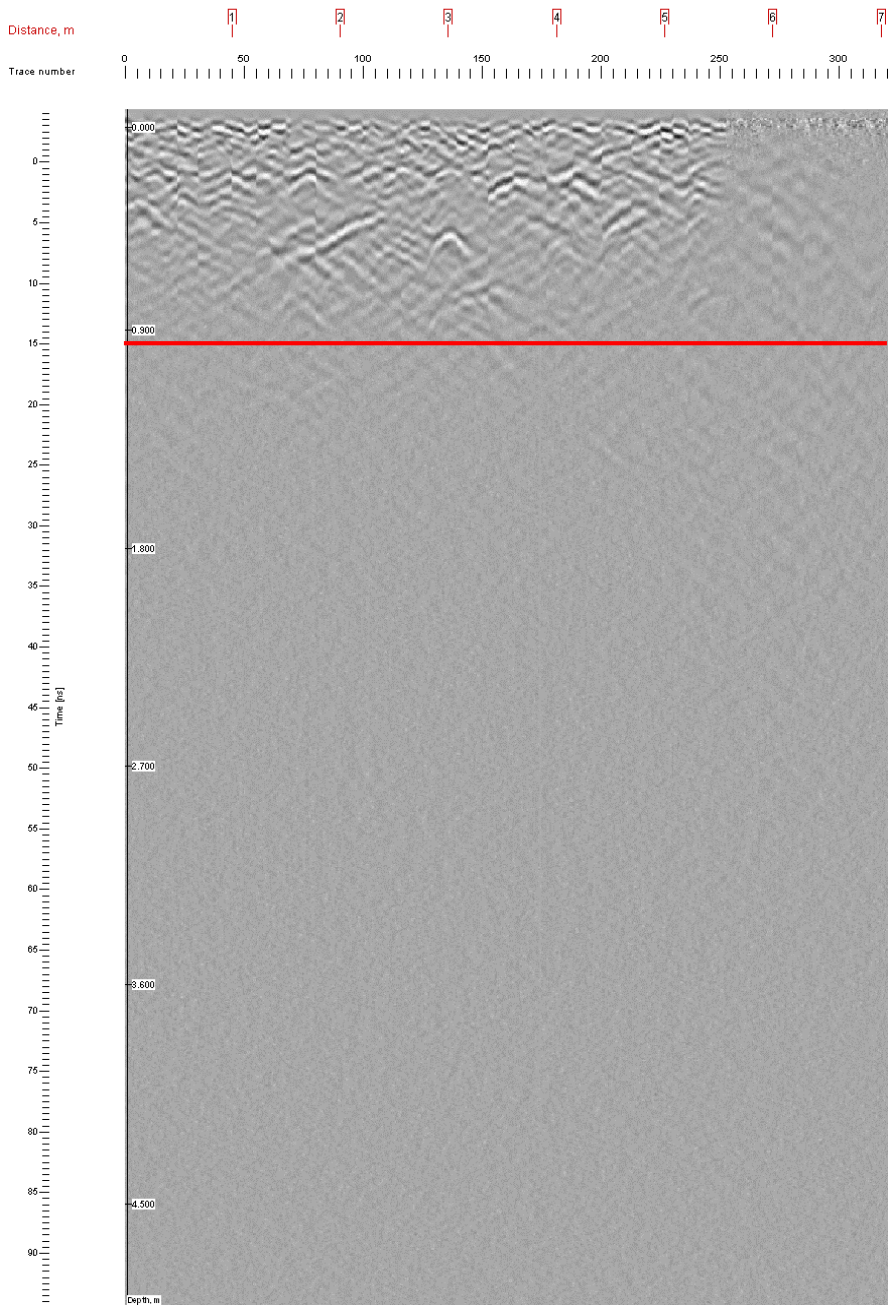


# Reflexii ale radiației electromagnetice sub forma de hiperbole în zona de Sud a bisericii:



# Zona din S bisericii





Evidențierea  
tendinței de  
uniformizare a  
solului la adâncimi  
mai mari de  
0,9 metri.

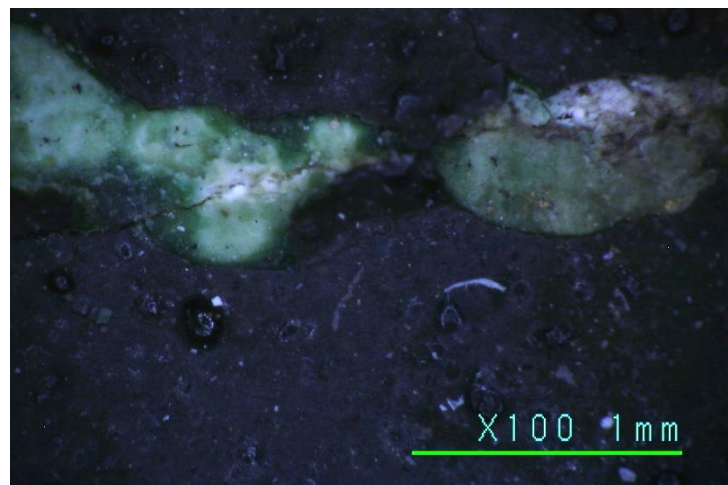
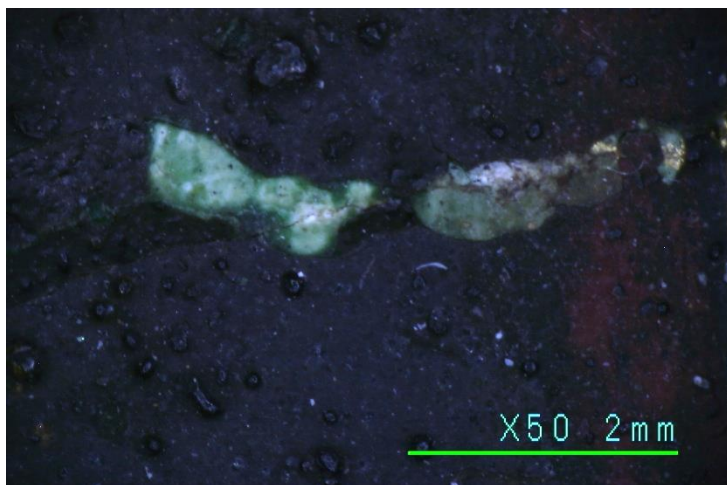


# Microscopie Imagistică multispectrală

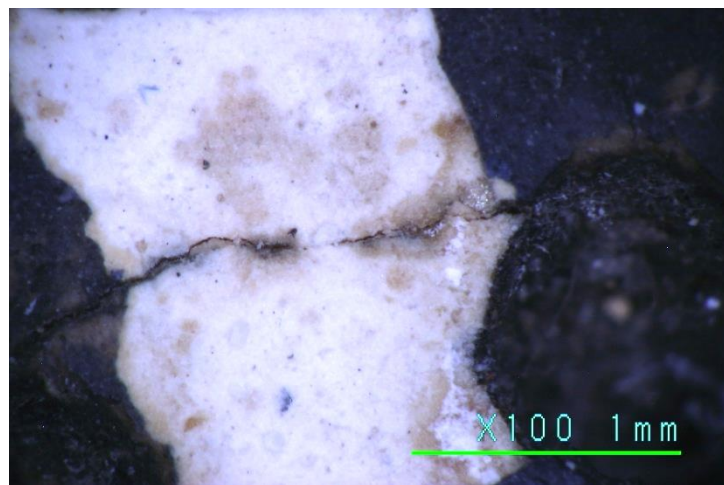
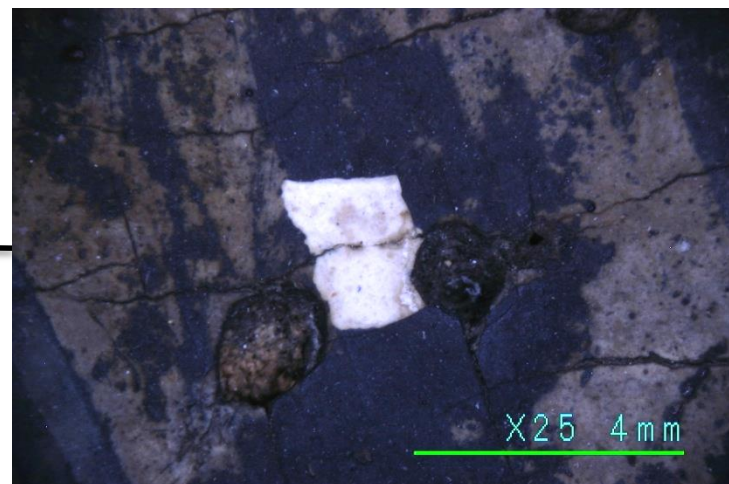
Campania Tismana – iulie 2014

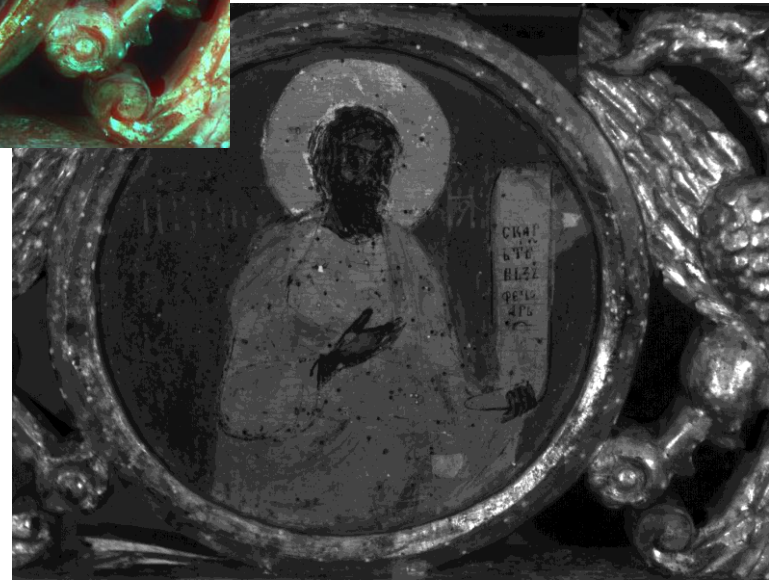
# Registrul Proorocilor – iconostasul bisericii mănăstirii Tismana

441- zona 1



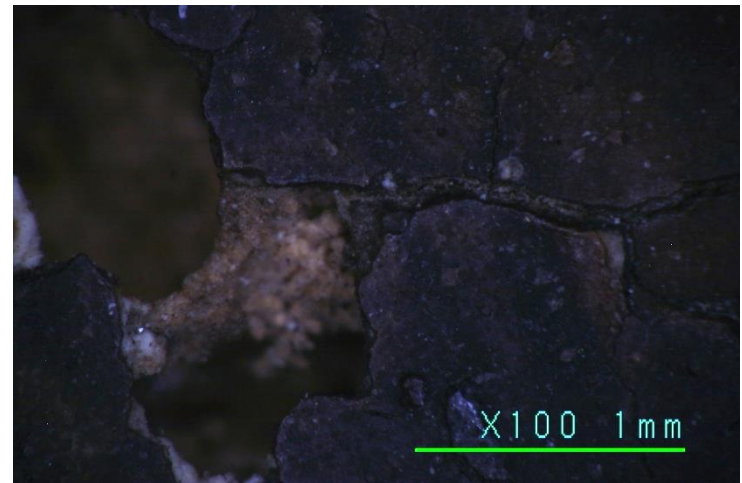
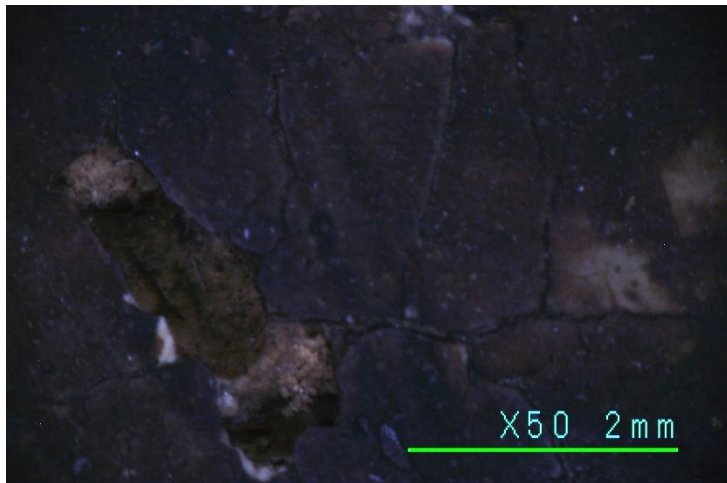
441- zona 2







442 – zona 1





X100 1mm

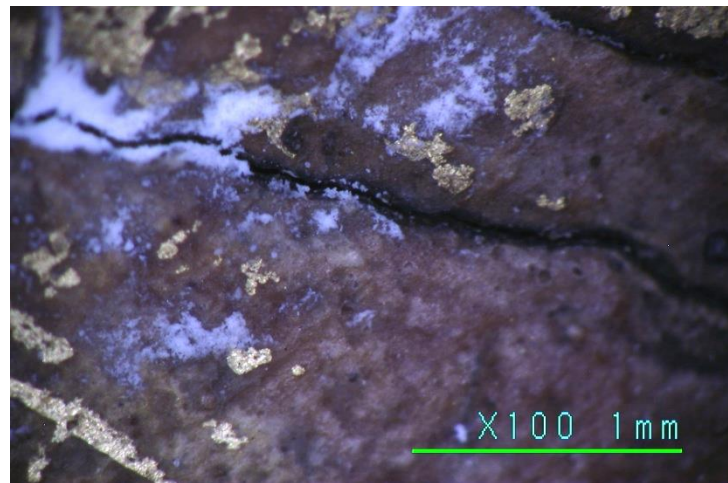
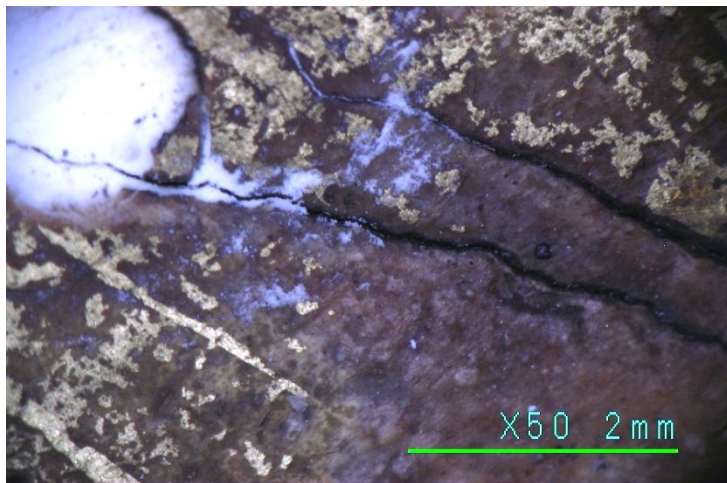


X100 1mm



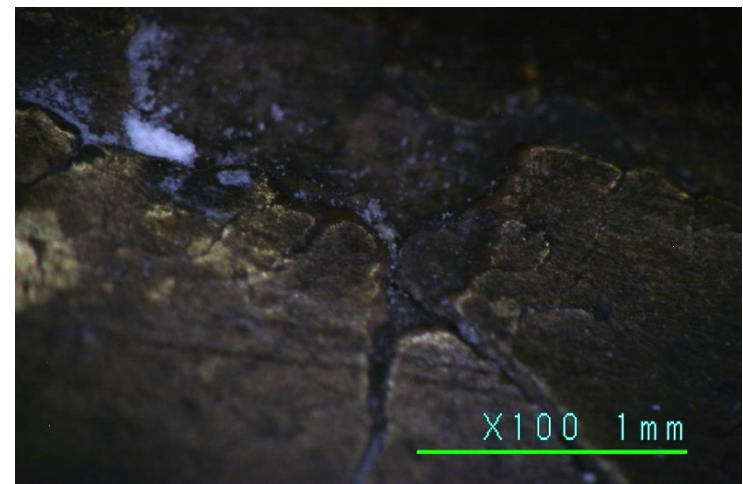
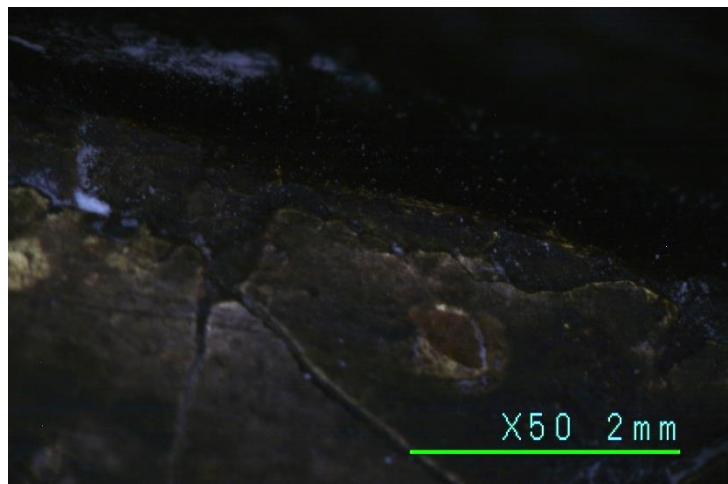
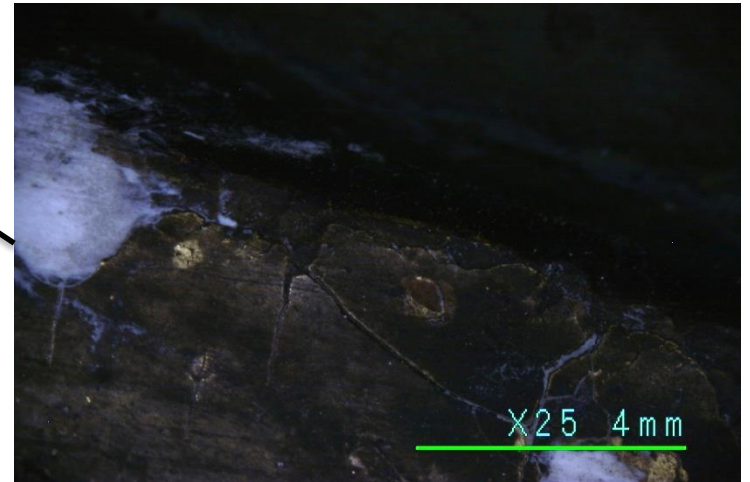
X100 1mm

442 – zona 2

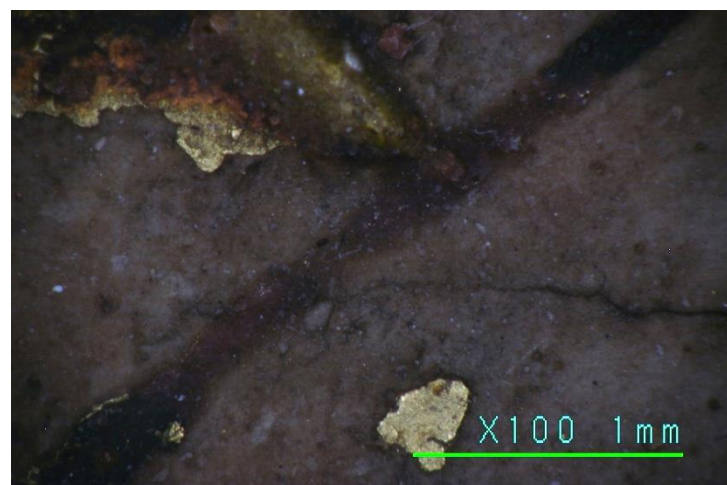
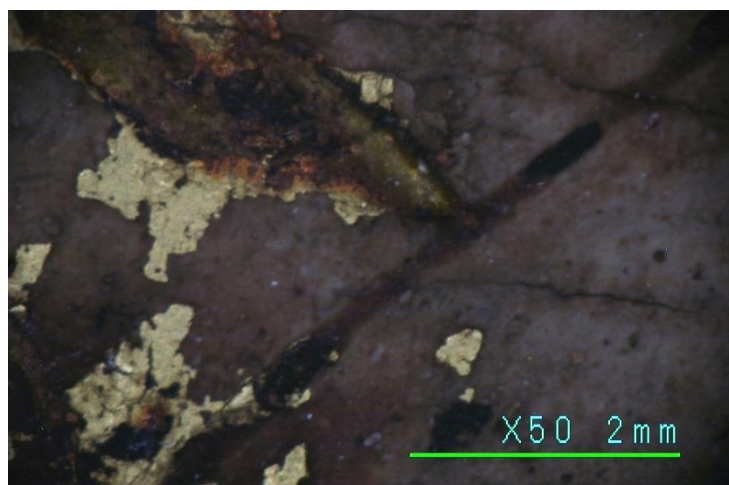
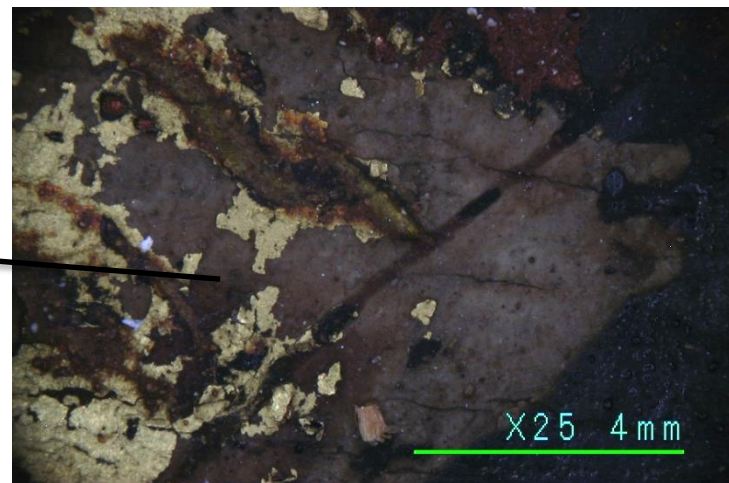




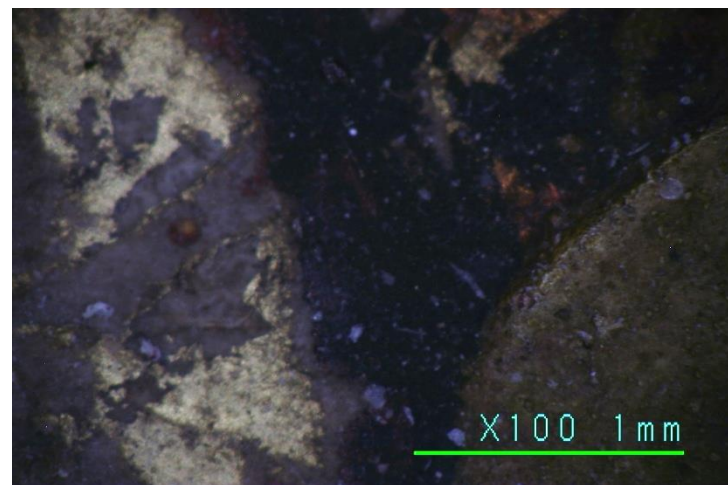
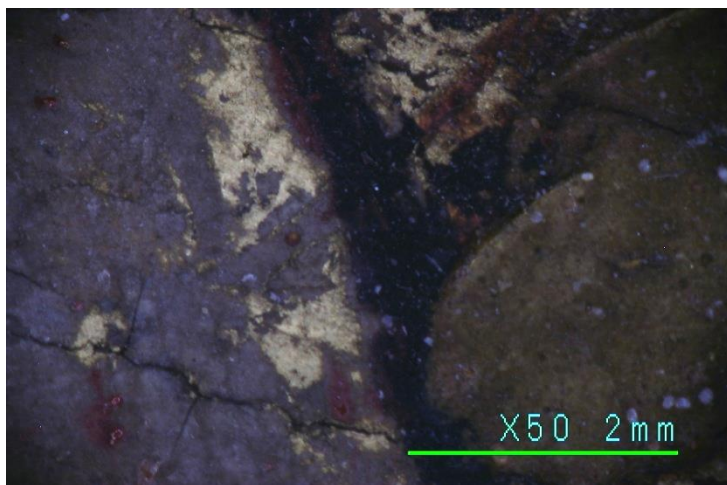
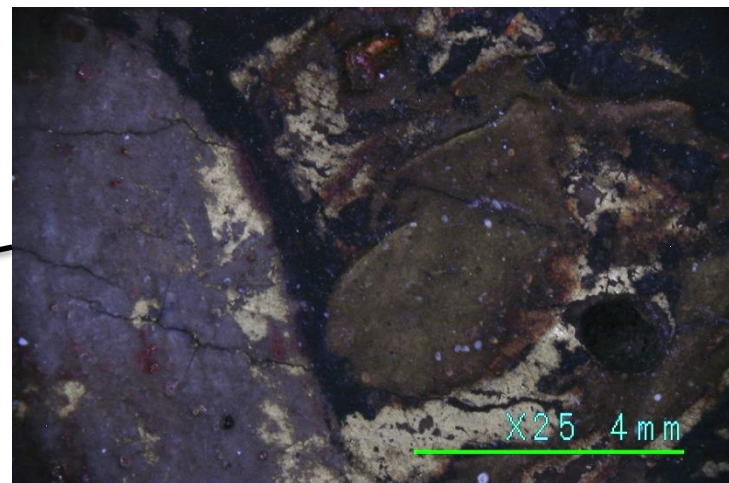
443 – zona 1

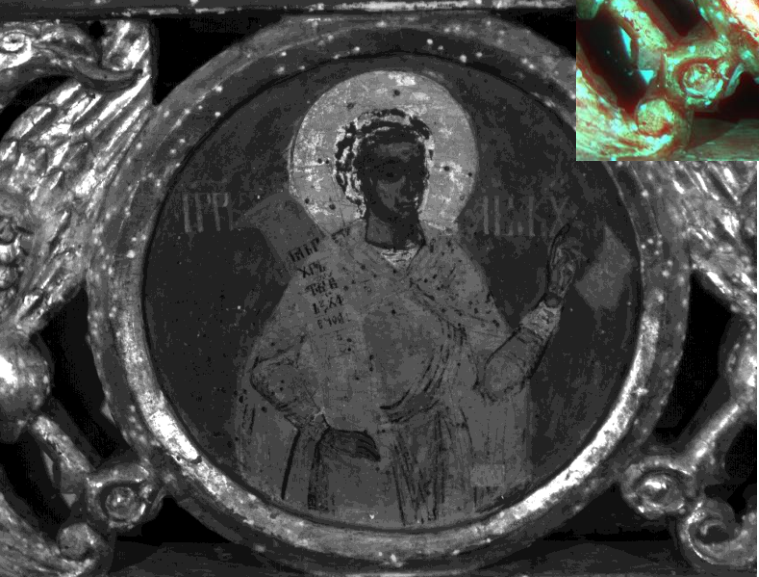


443 – zona 2



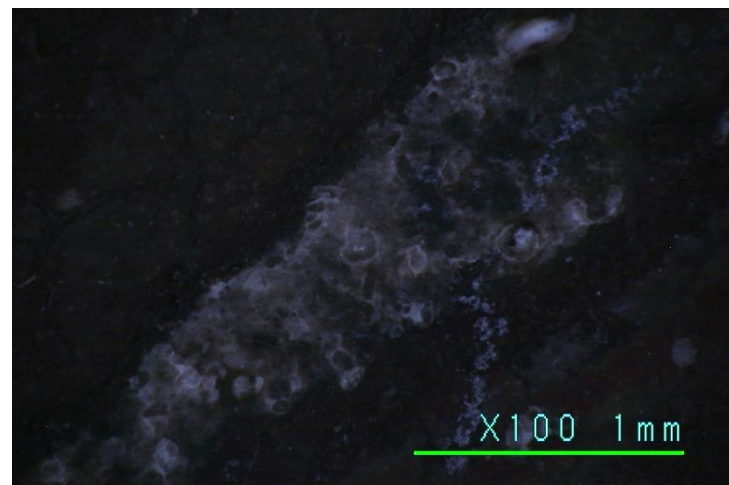
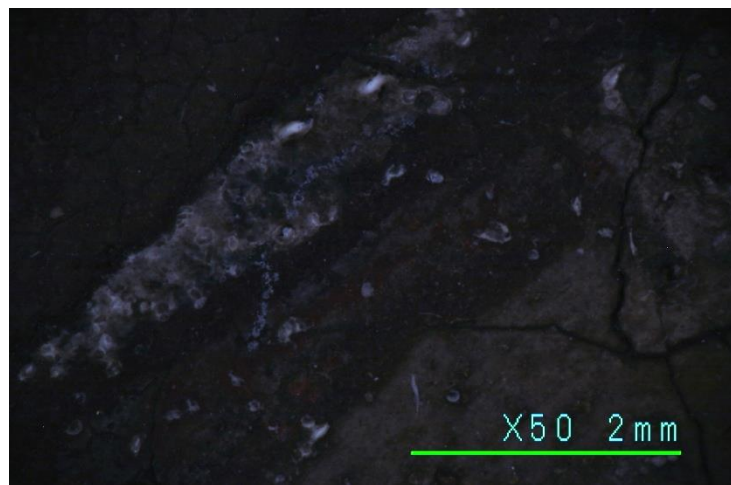
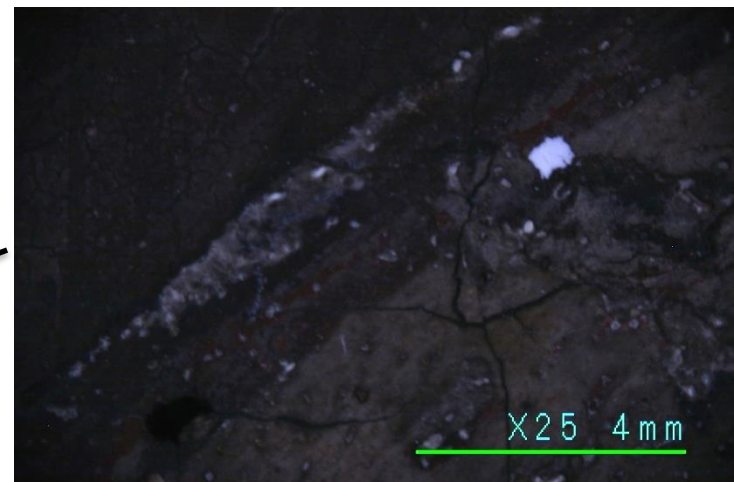
443 – zona 3





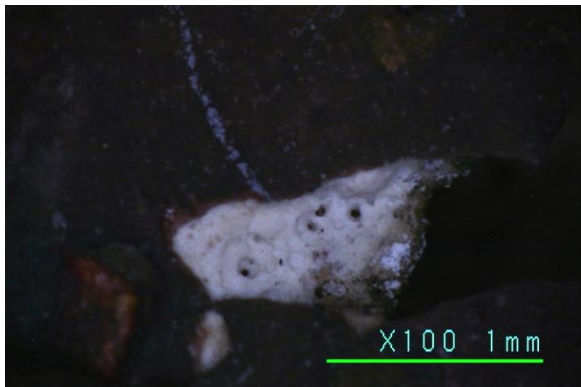


444 – zona 1

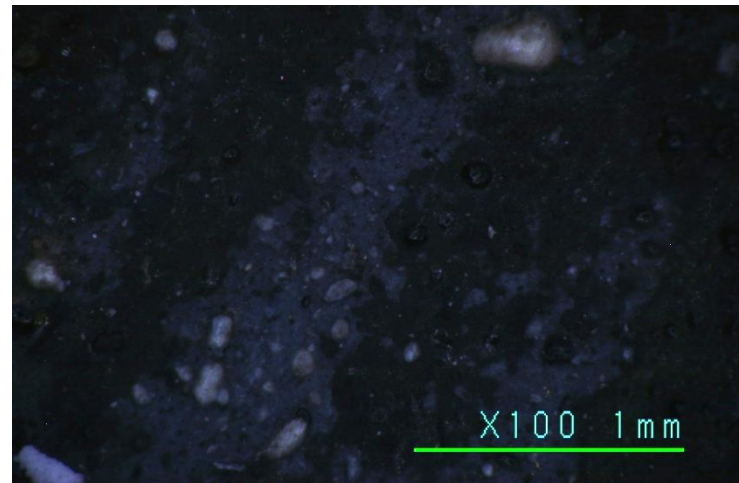
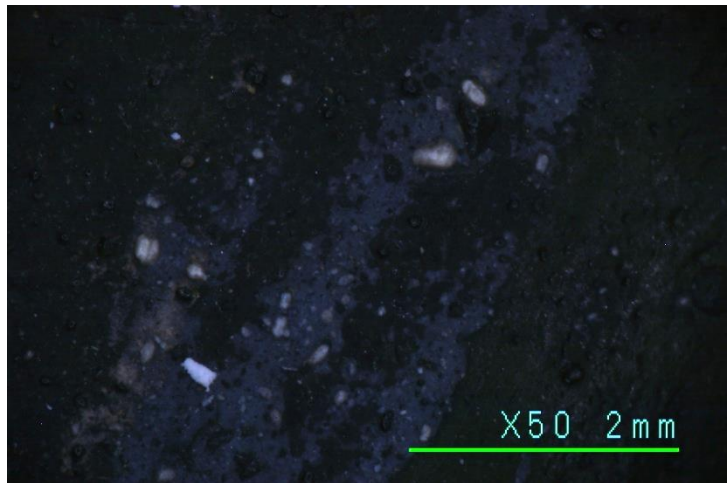
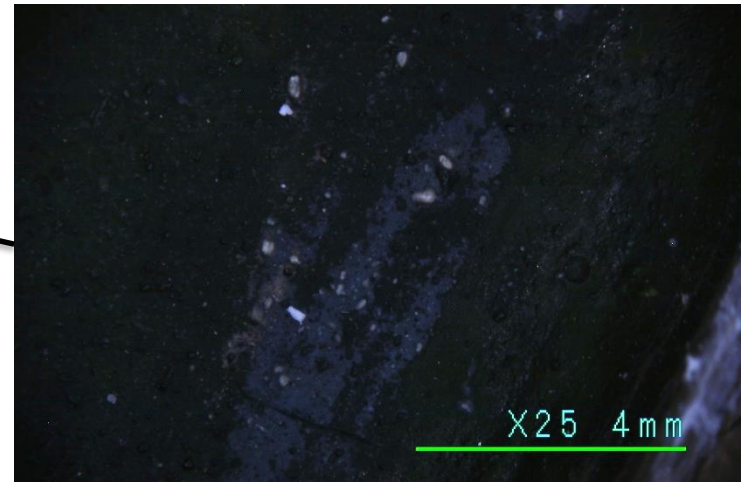




444 – zona 2

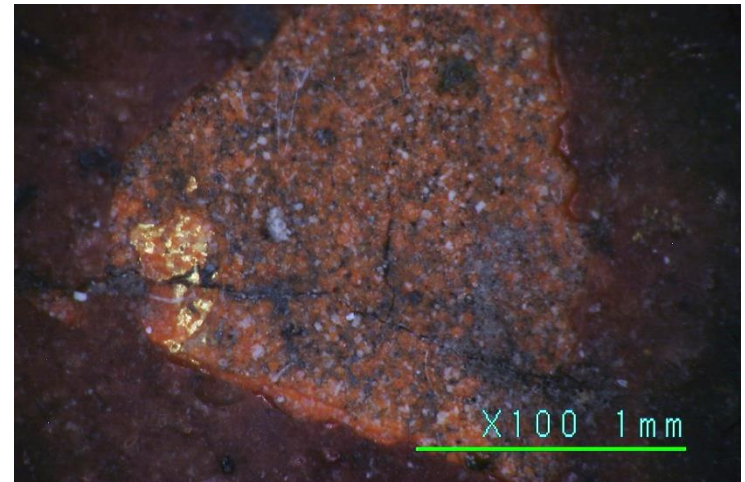
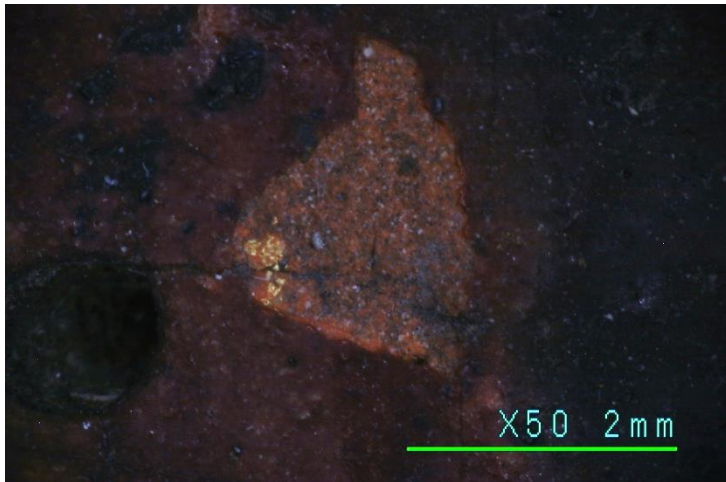
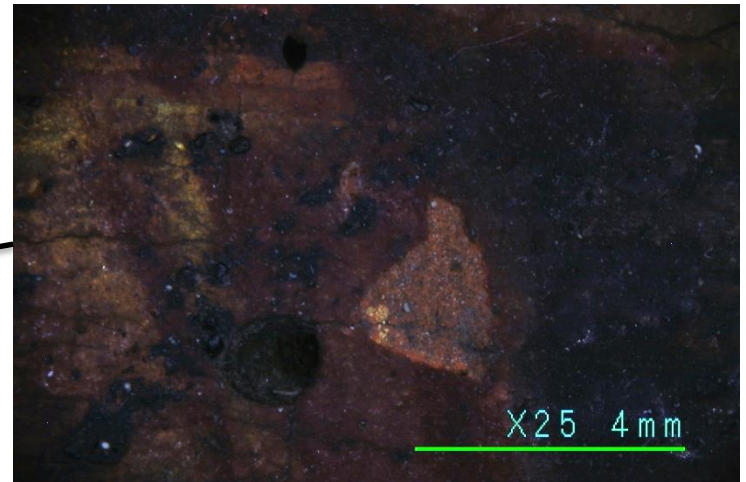


444 – zona 3





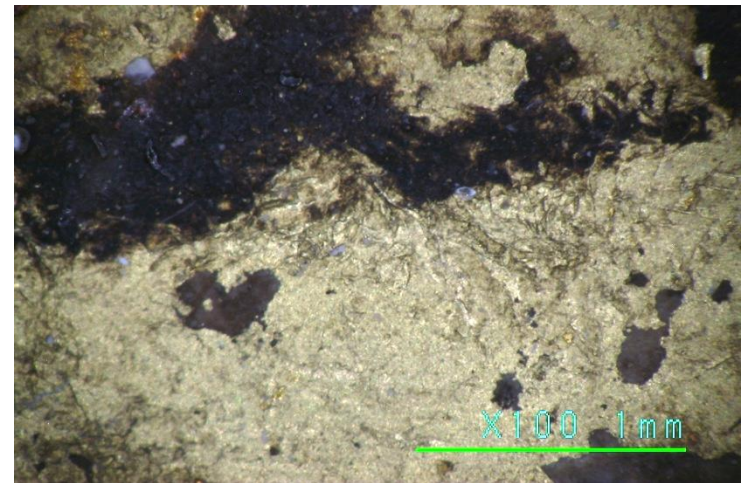
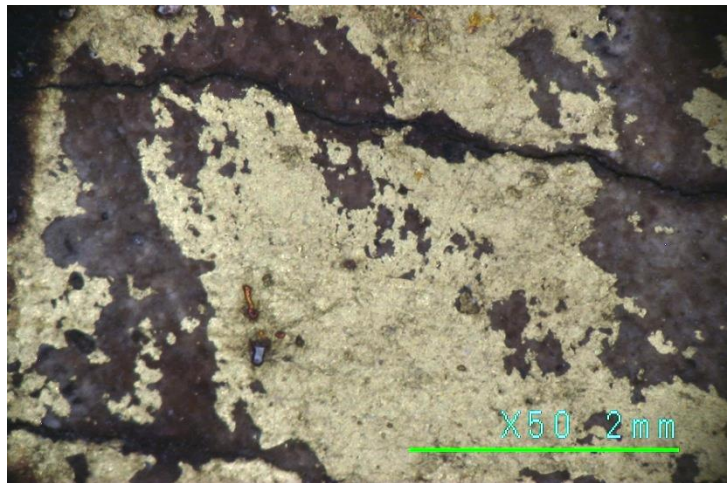
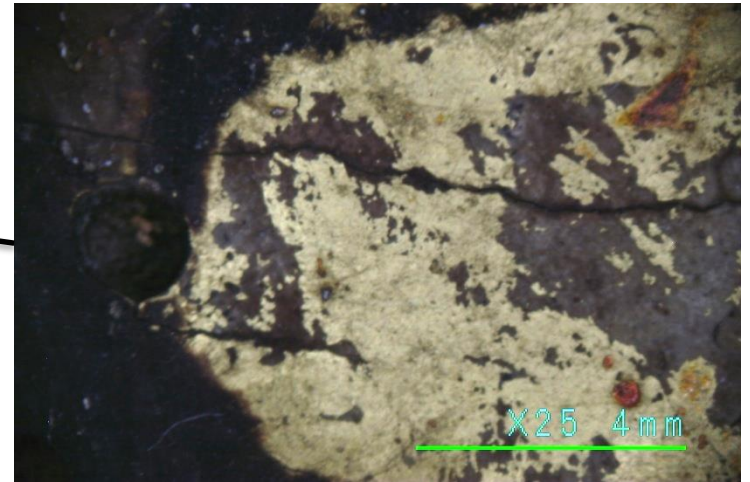
445 – zona 1

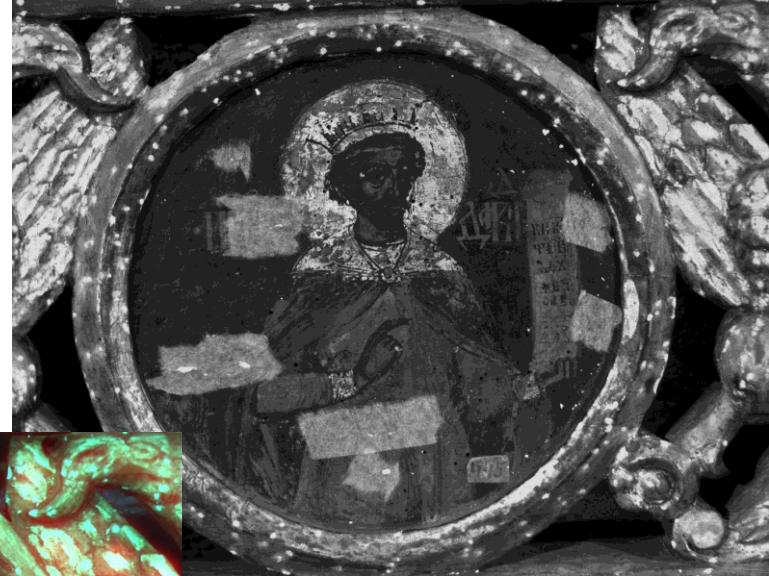


445 – zona 2



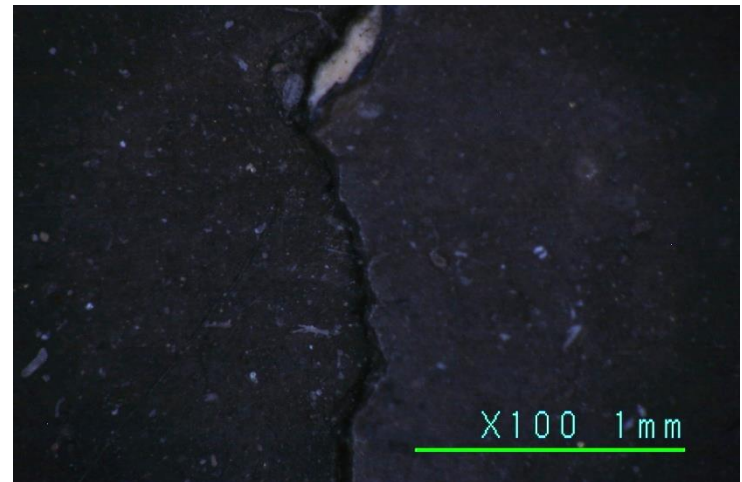
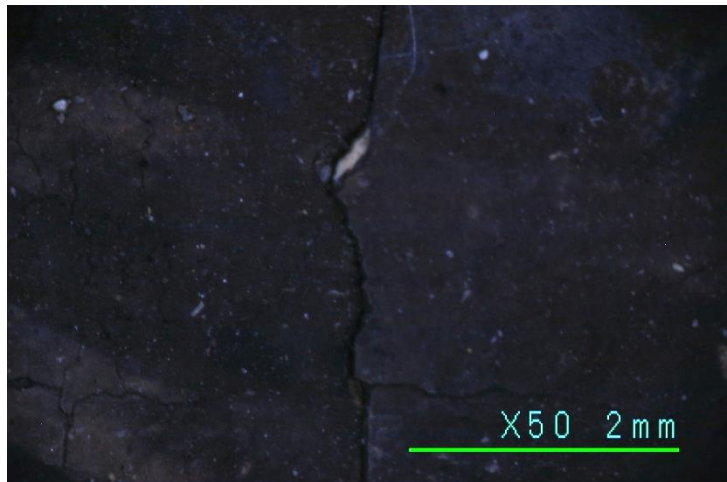
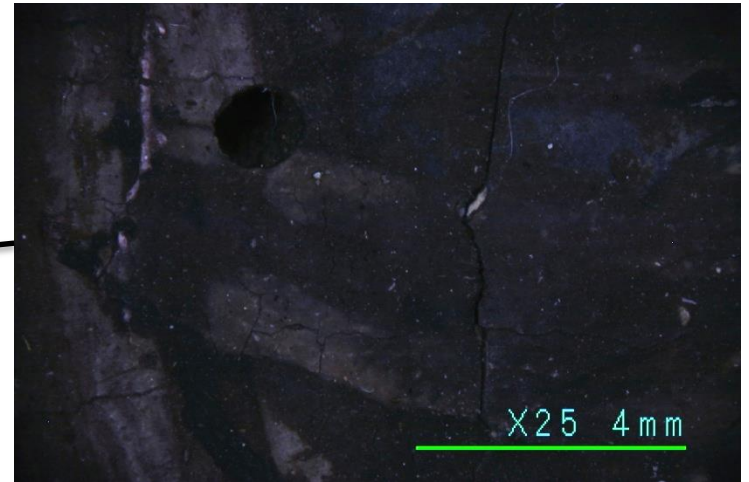
445 – zona 3



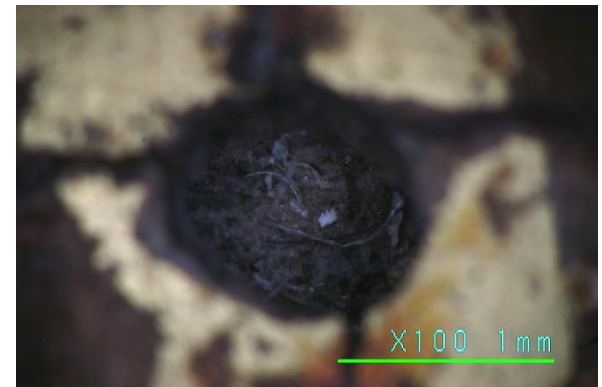
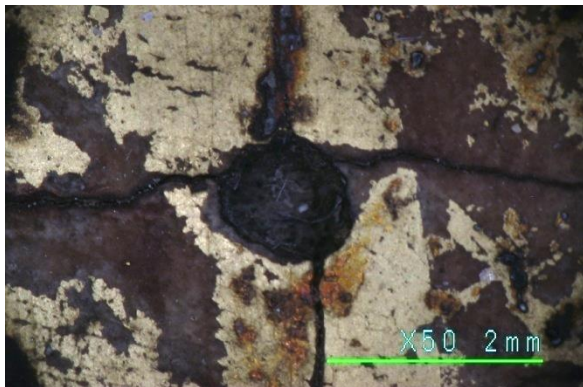




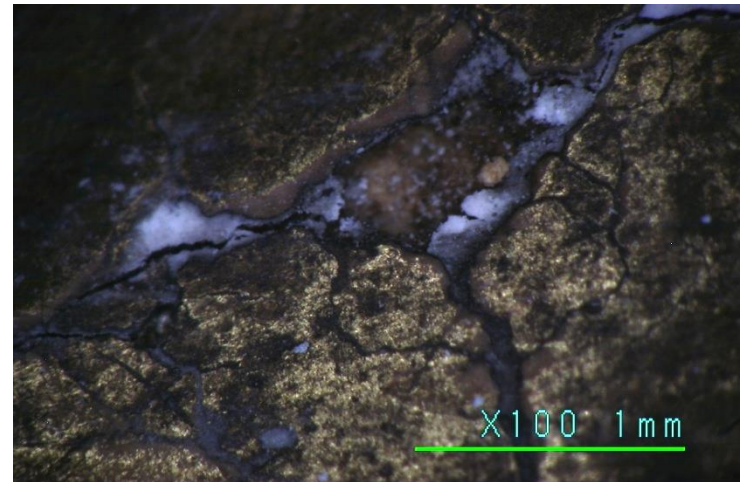
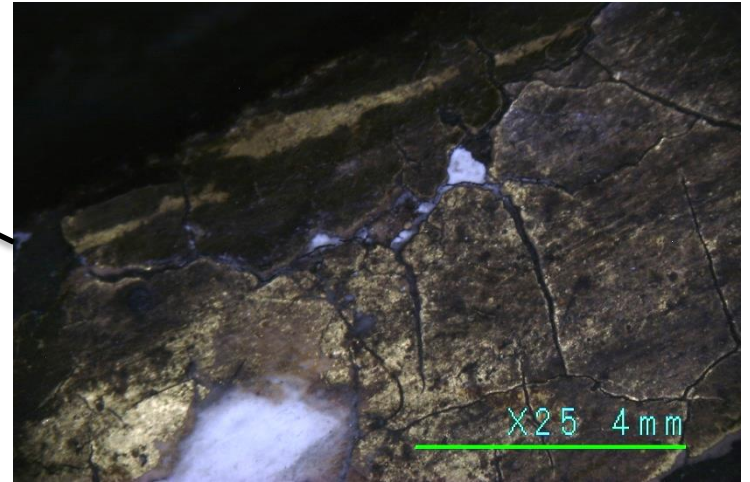
446 – zona 1



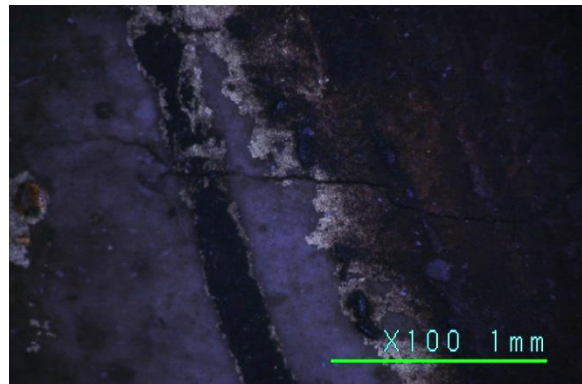
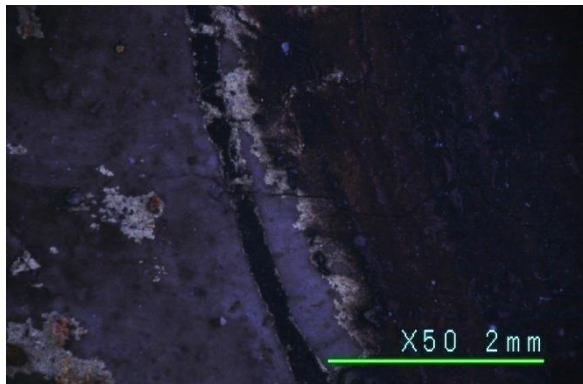
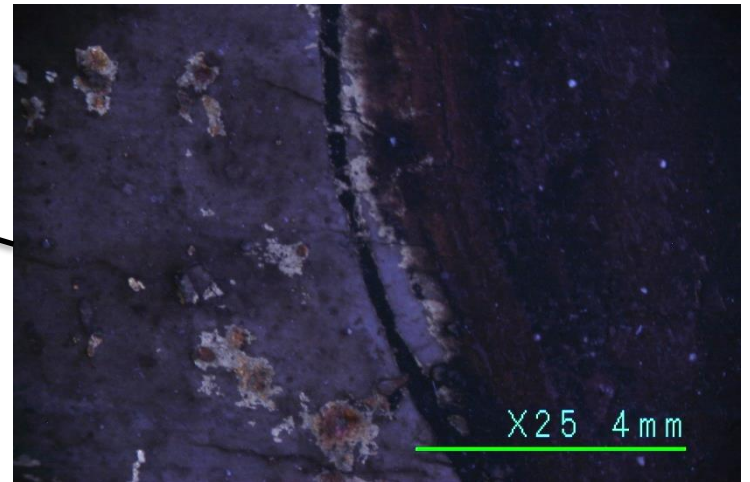
446 – zona 2



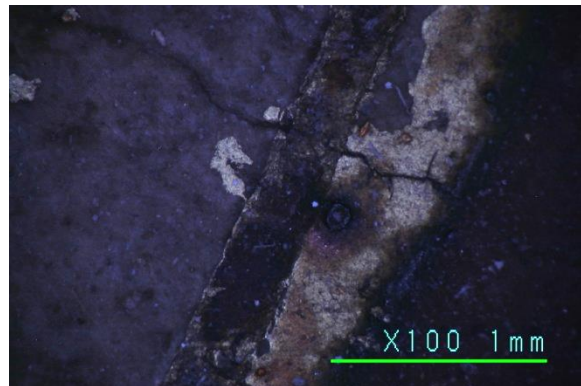
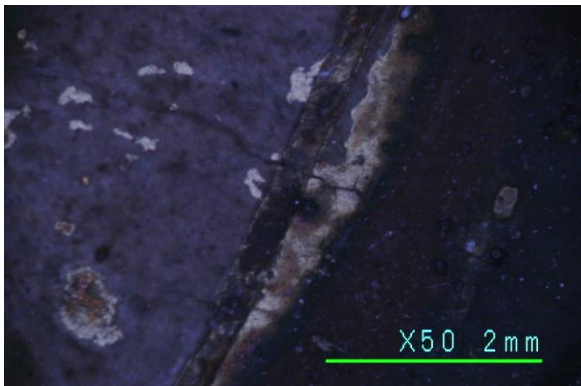
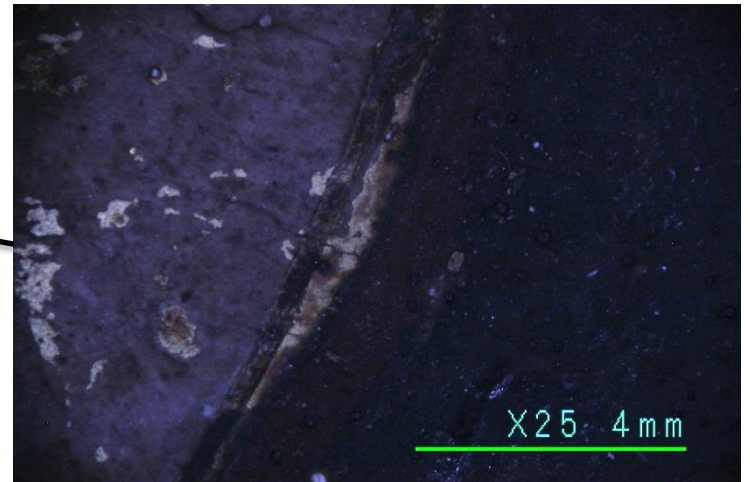
446 – zona 3



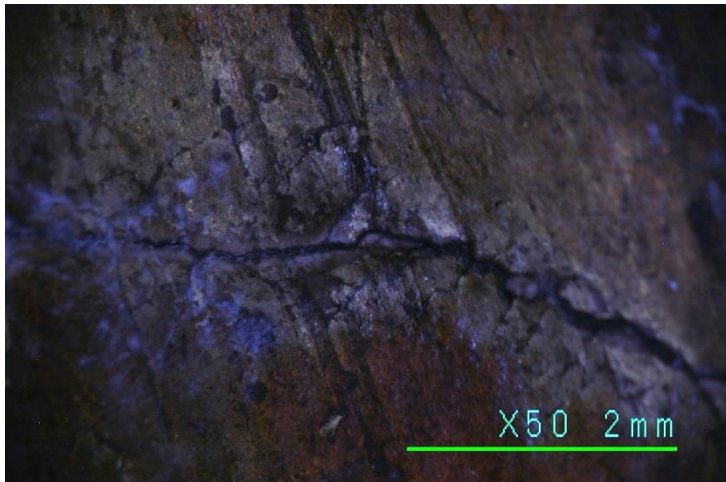
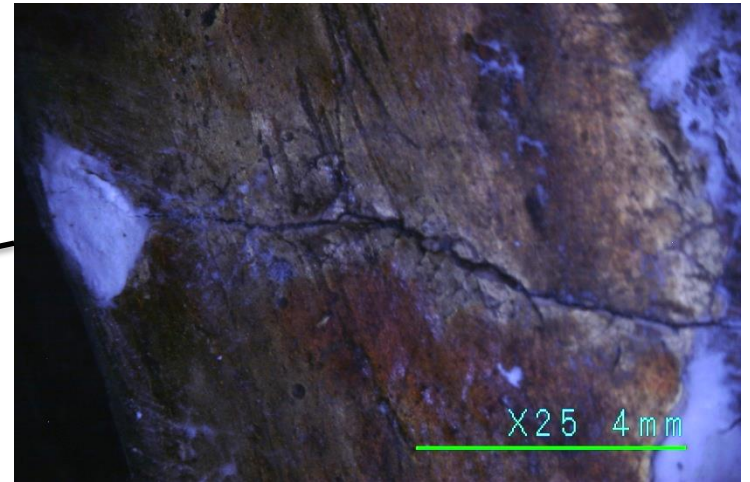
453 – zona 1



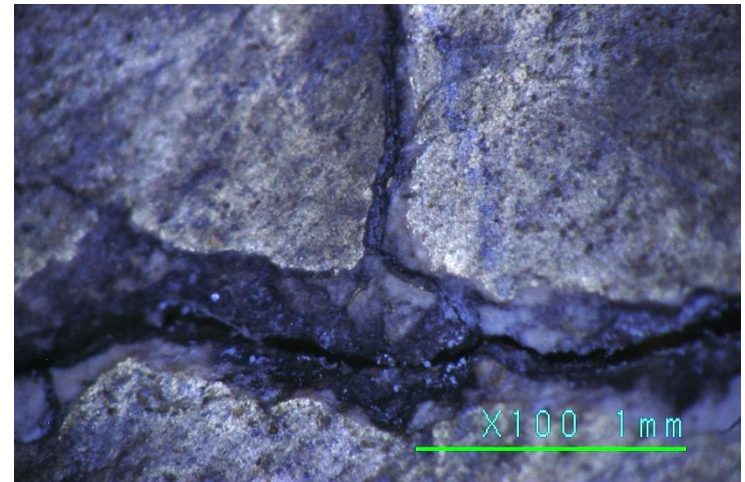
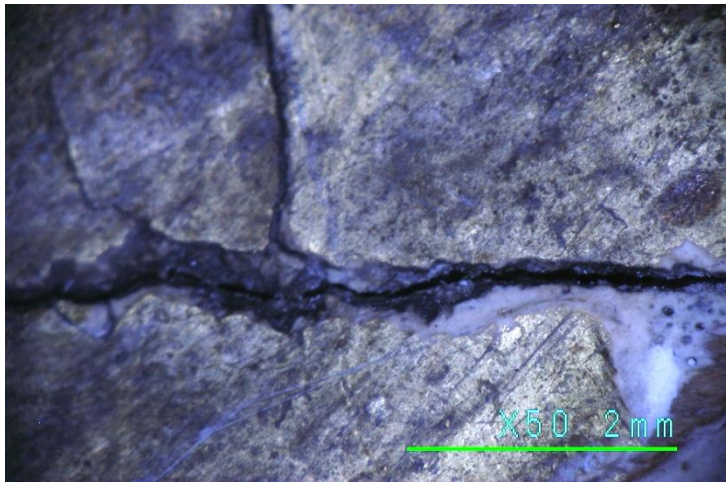
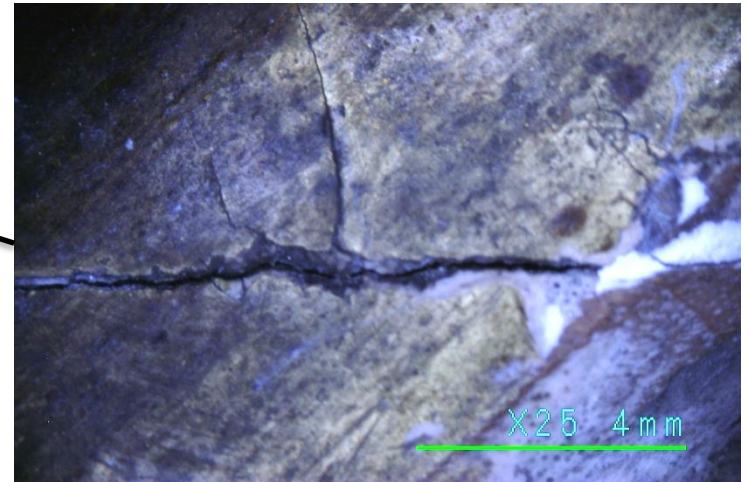
453 – zona 2



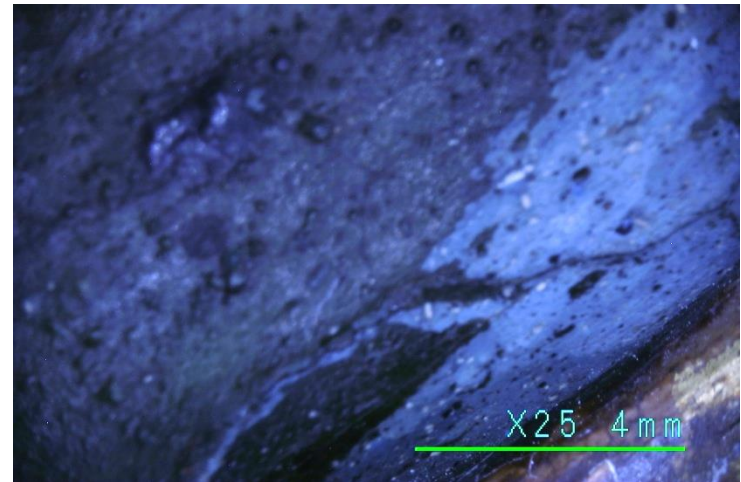
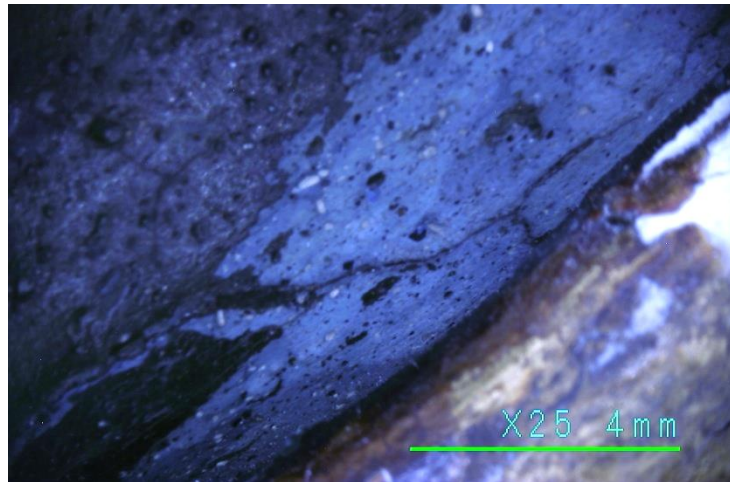
453 – zona 3



447 – zona 1

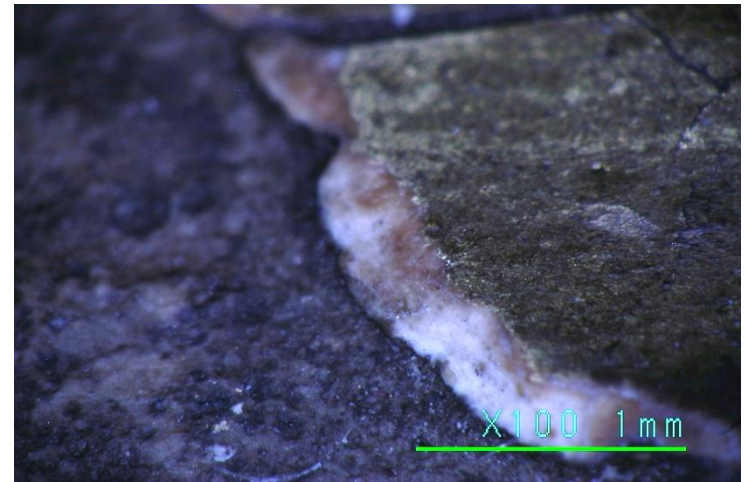


447 – zona 2

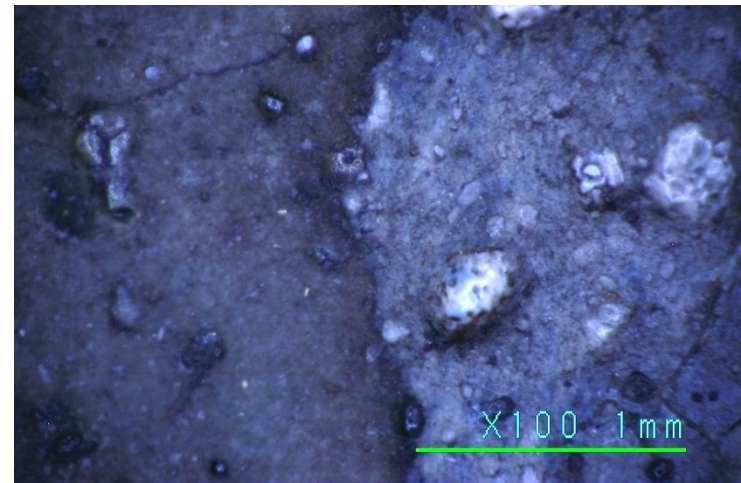
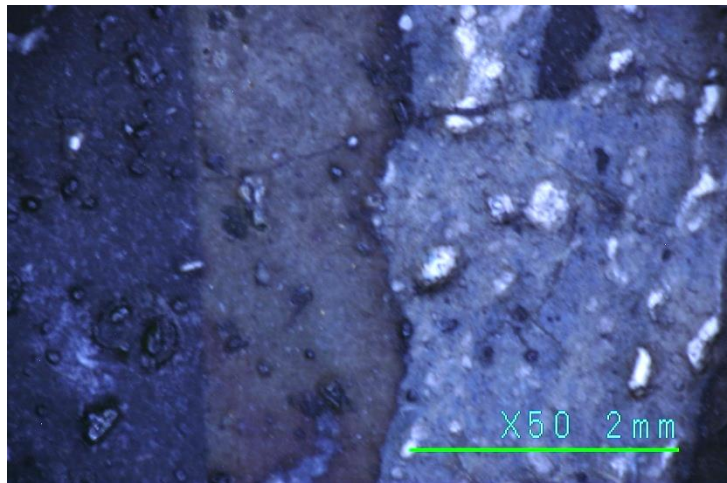
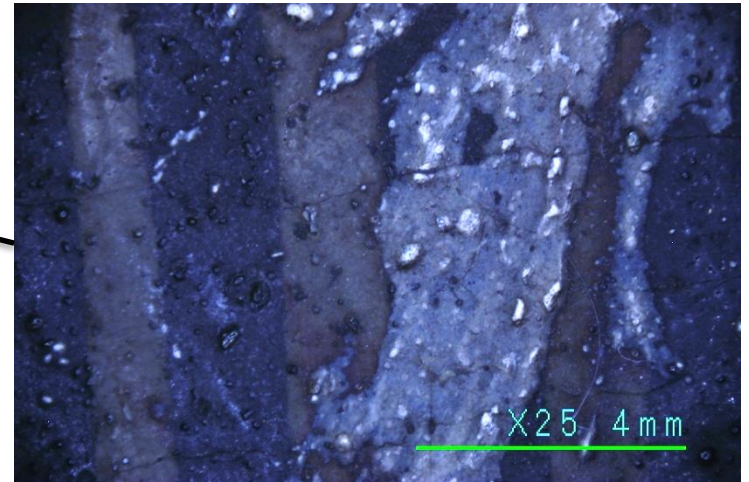




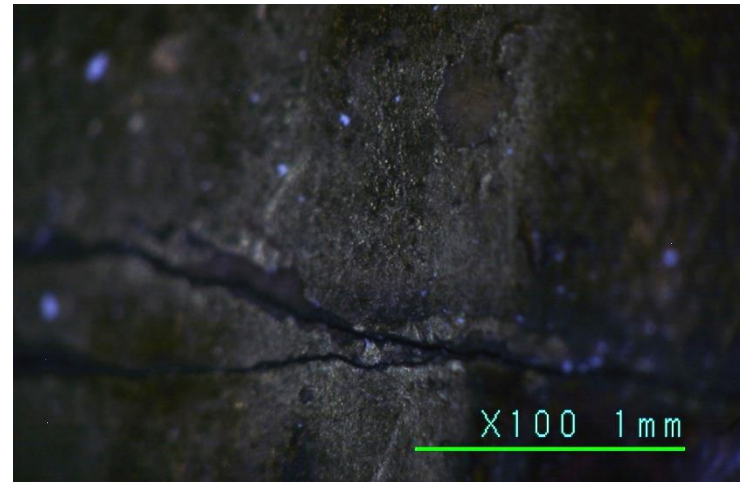
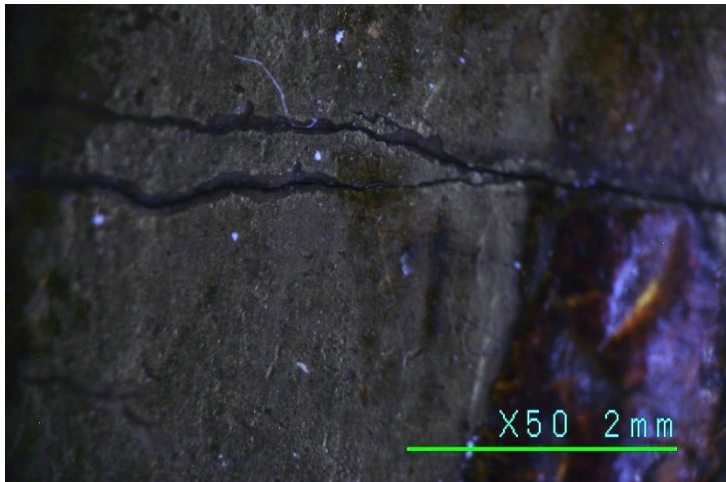
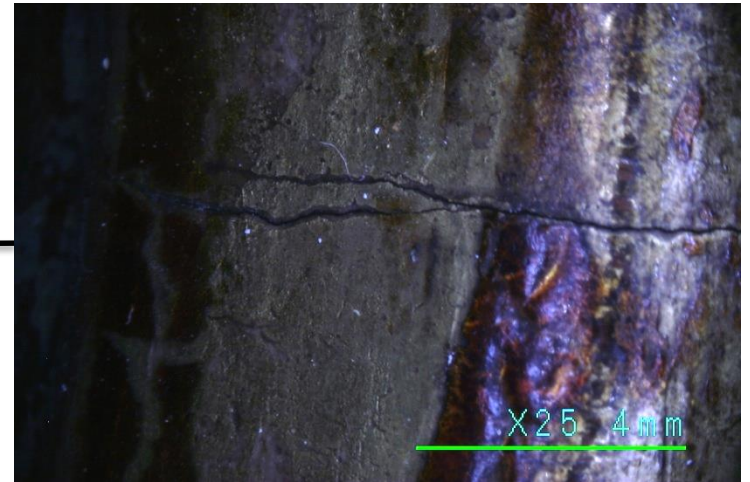
447 – zona 3



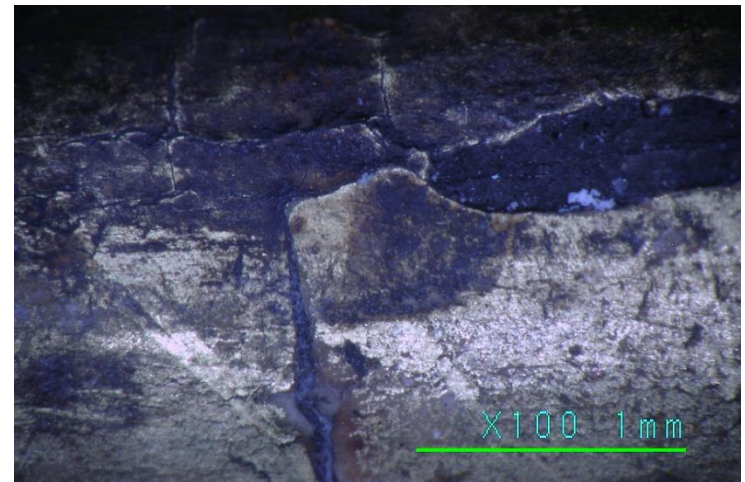
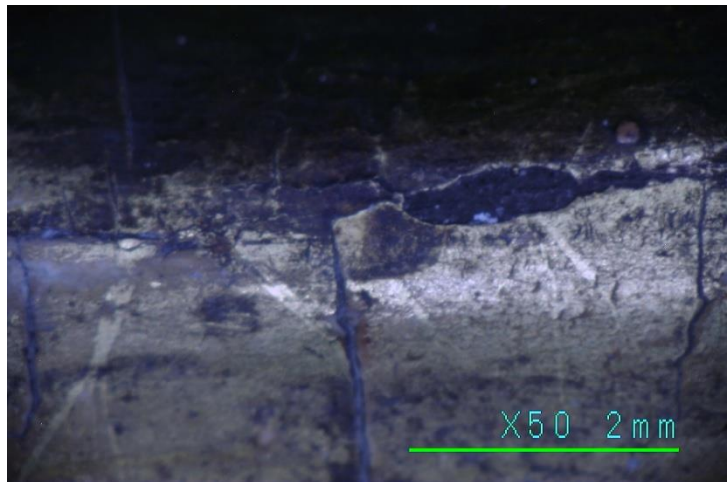
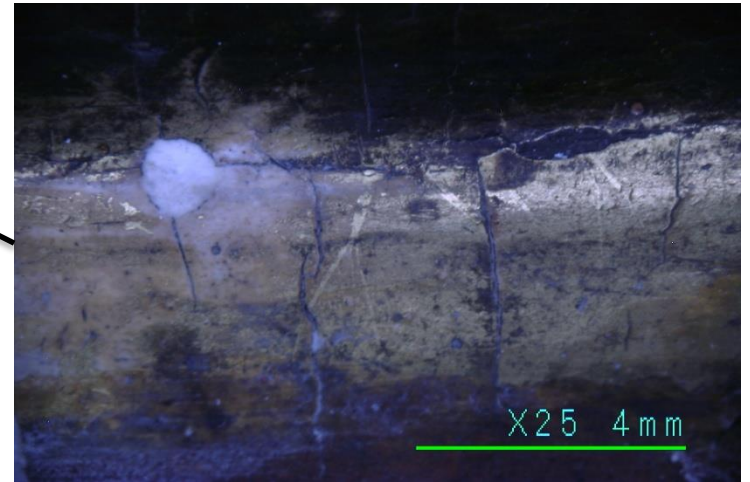
447 – zona 4

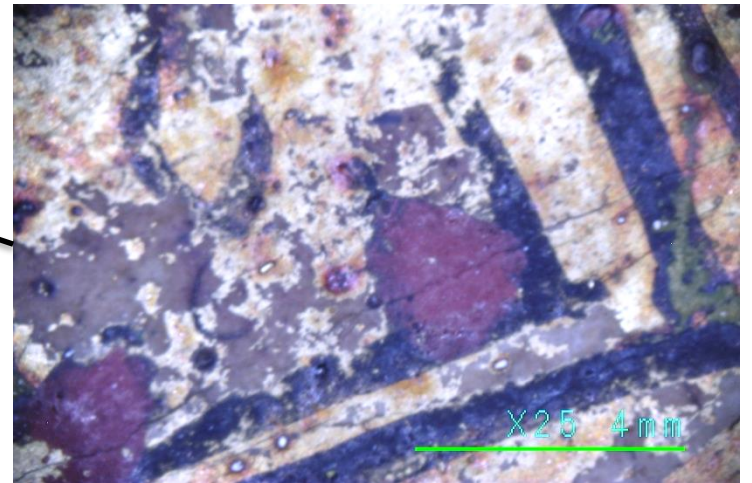


448 – zona 1

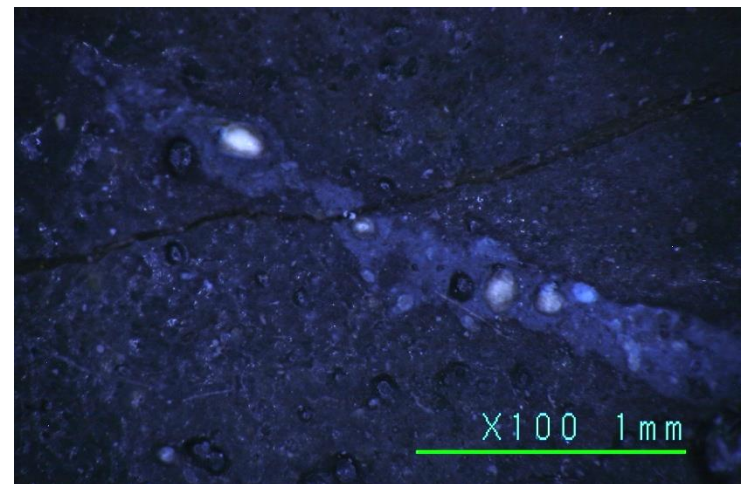
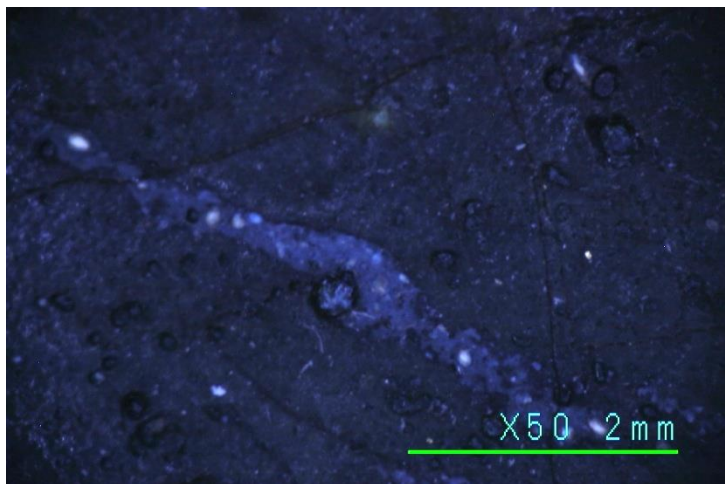
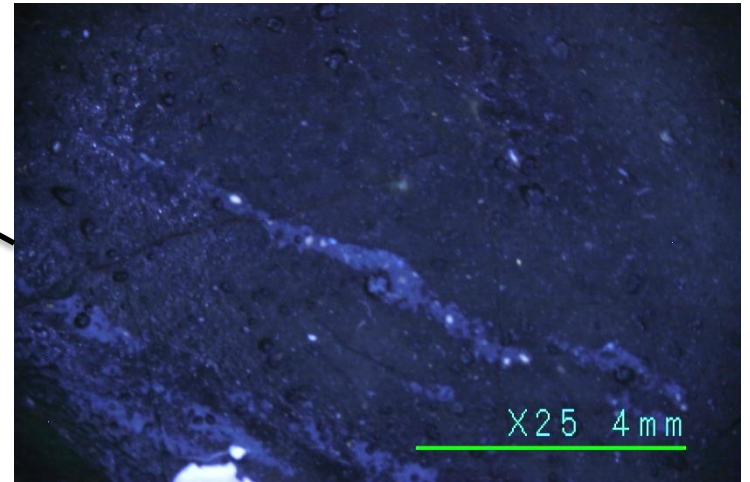


448 – zona 2

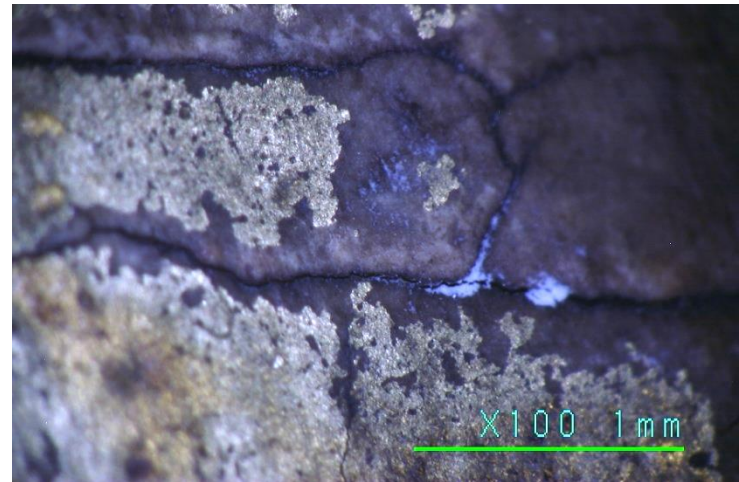




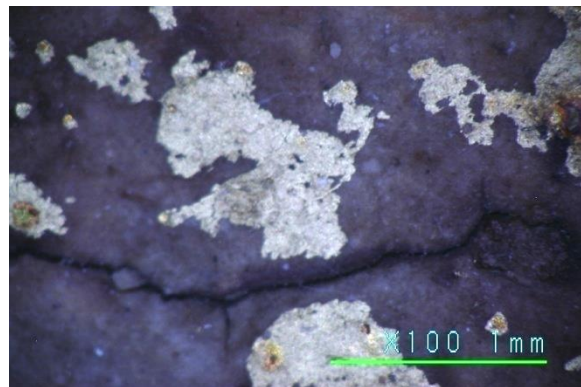
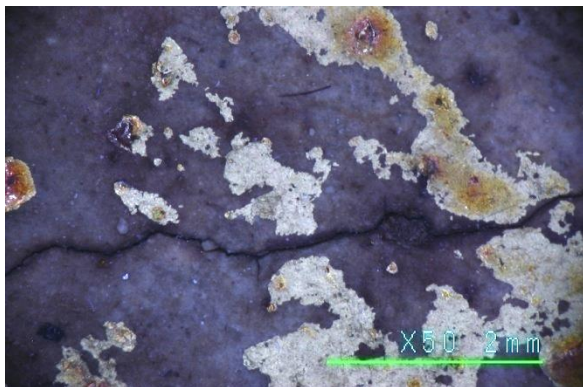
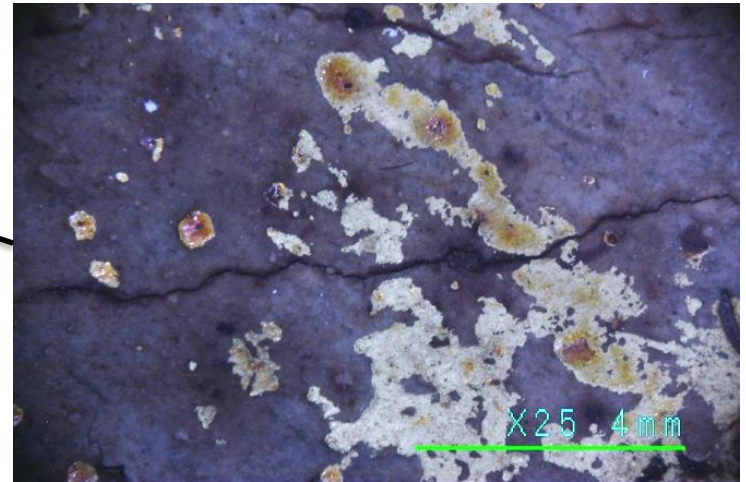
449 – zona 1



449 – zona 2

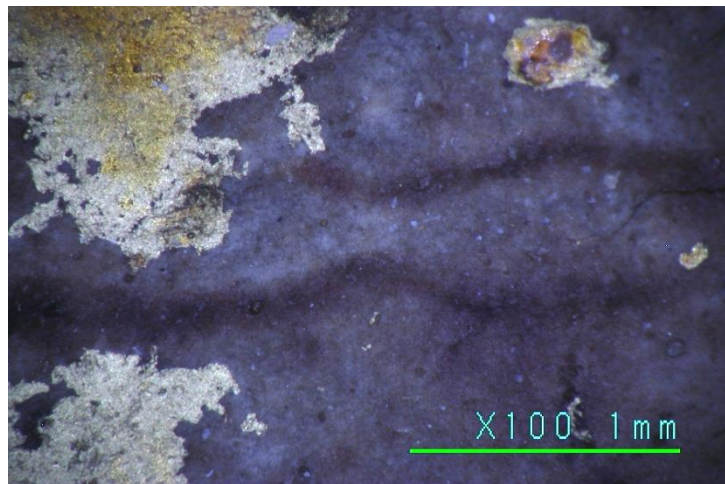
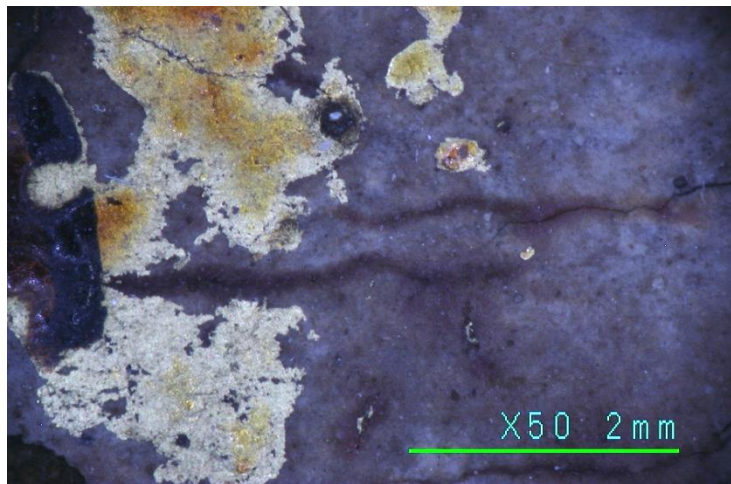
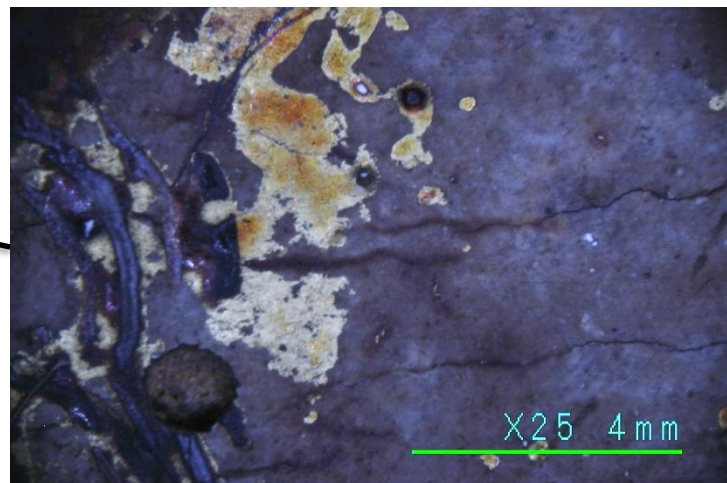


449 – zona 3

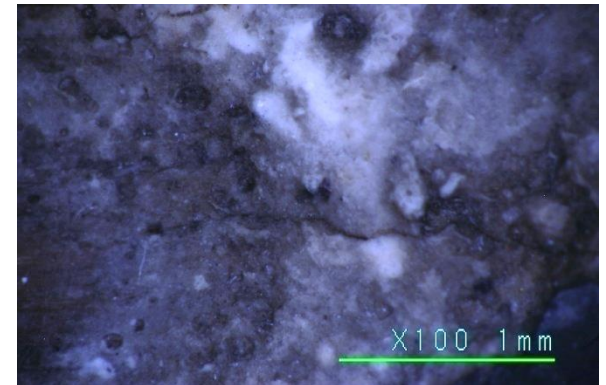
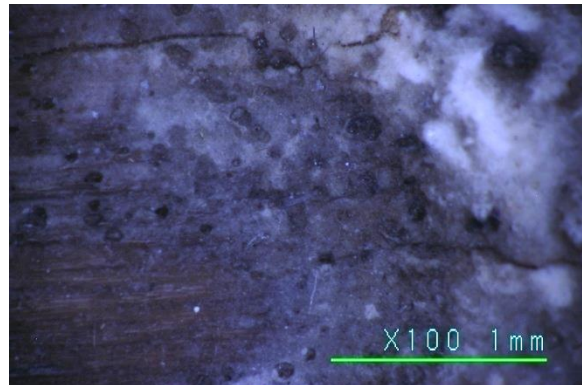




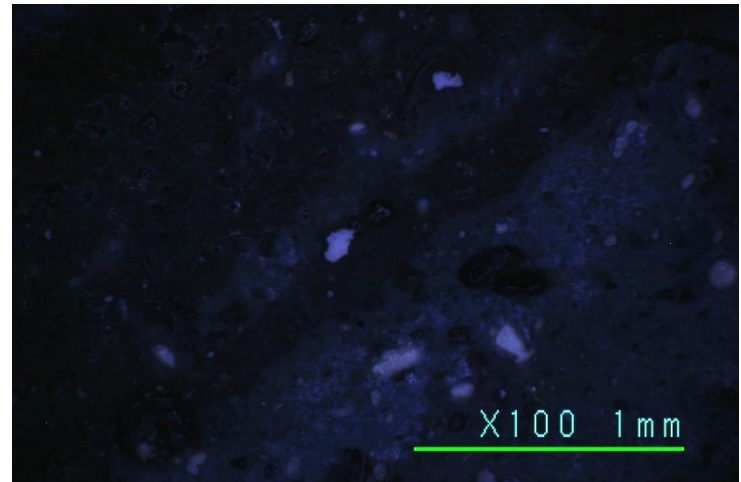
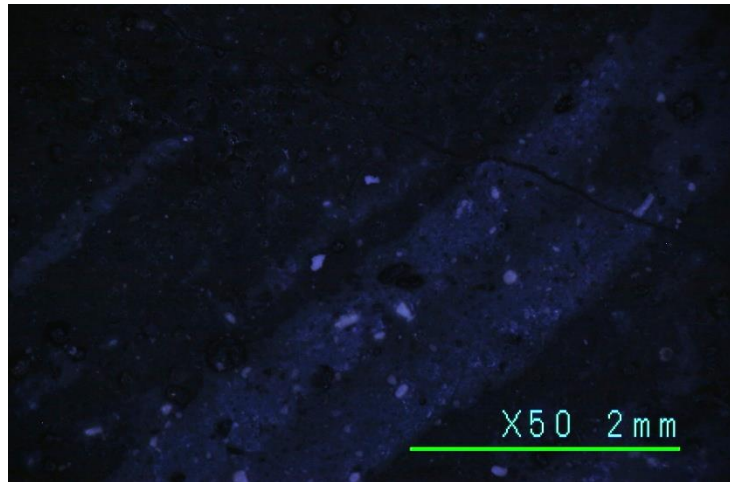
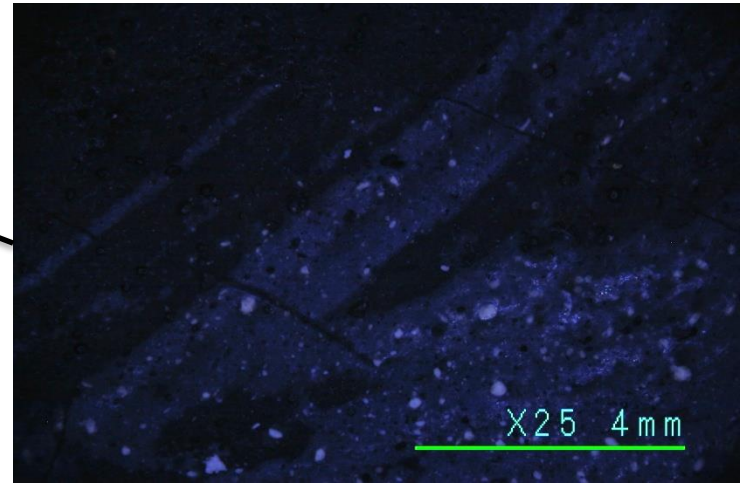
449 – zona 4



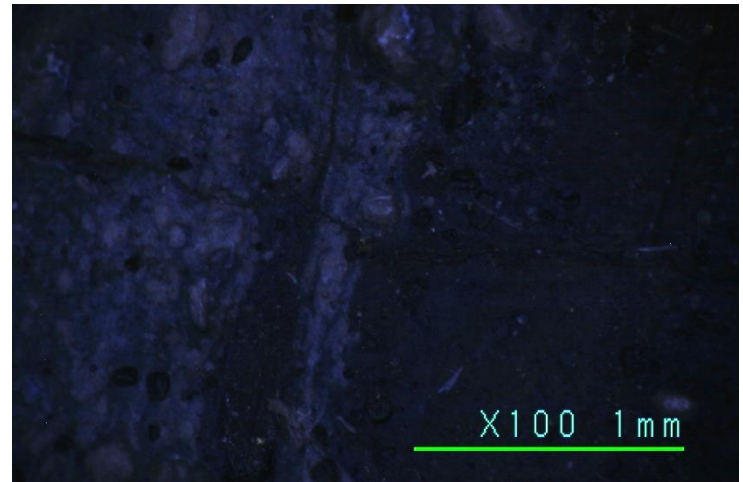
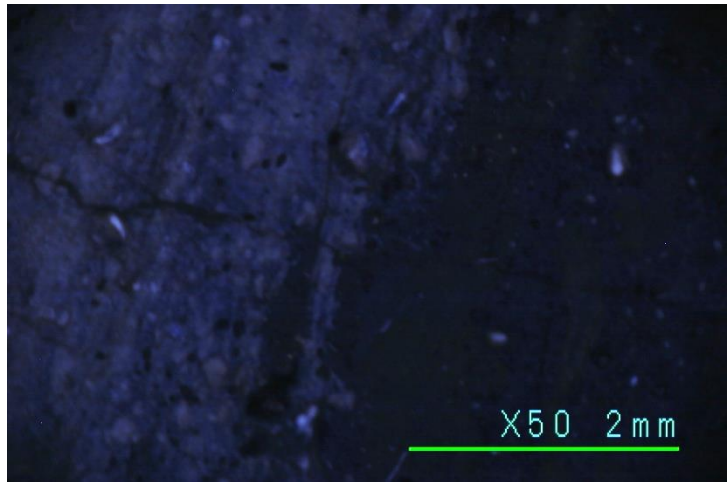
449 – zona 5



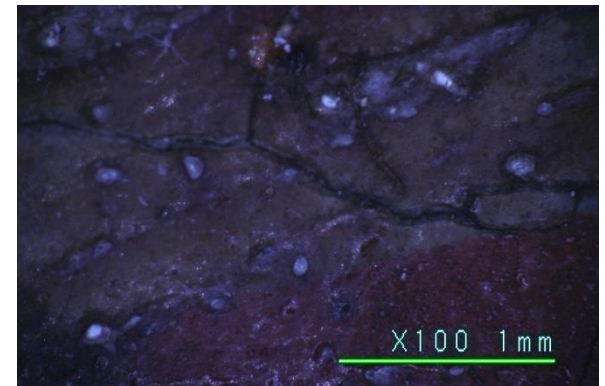
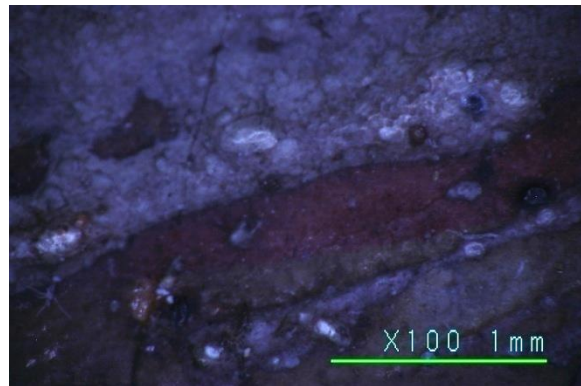
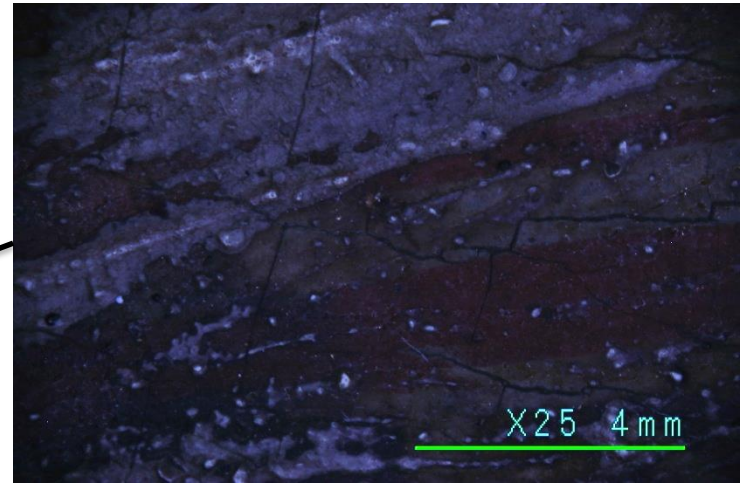
450 – zona 1



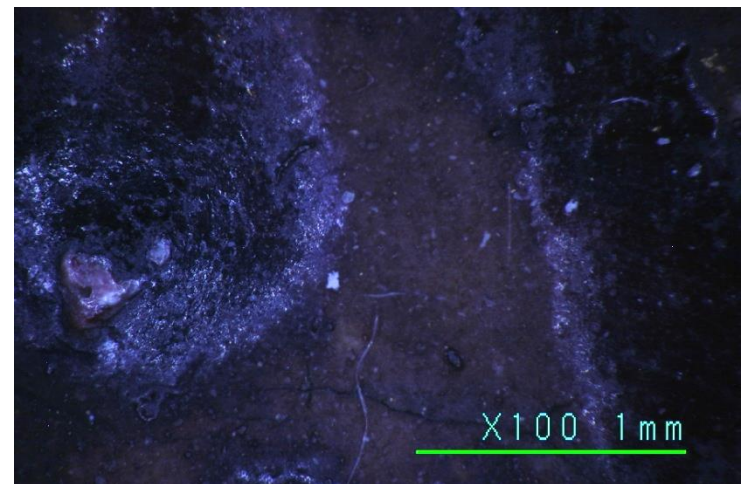
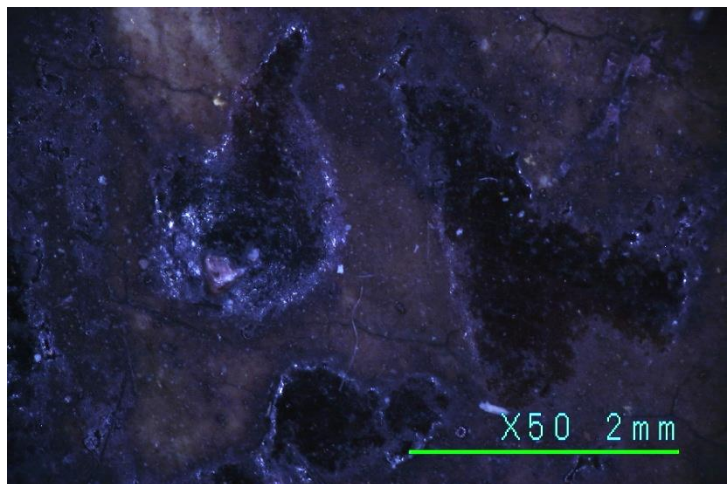
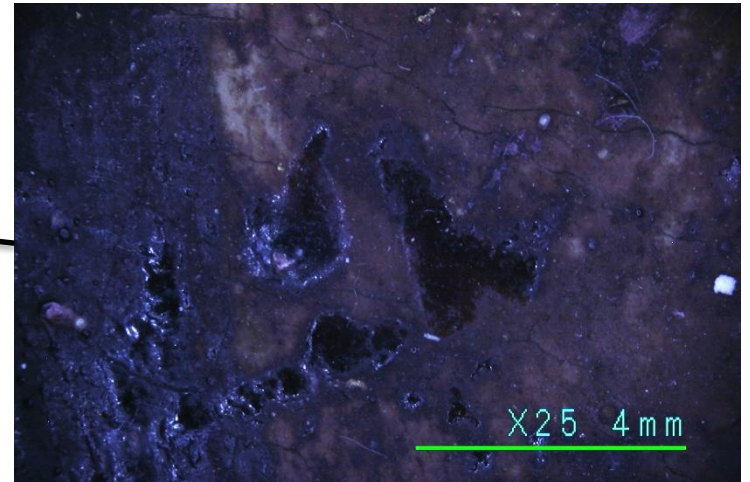
450 – zona 2



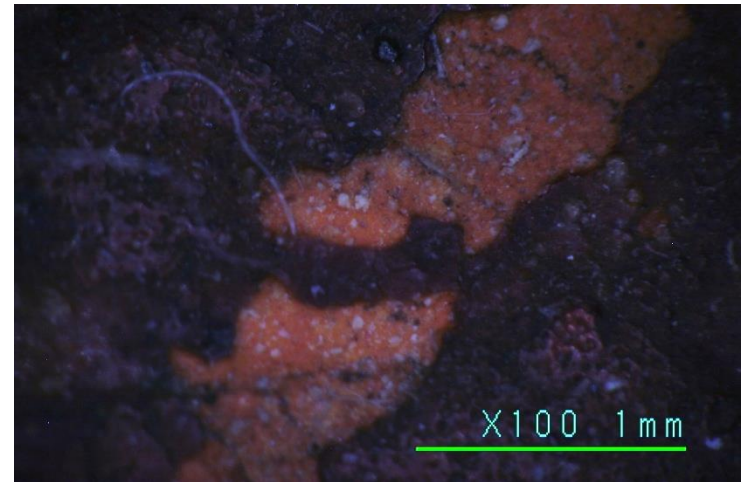
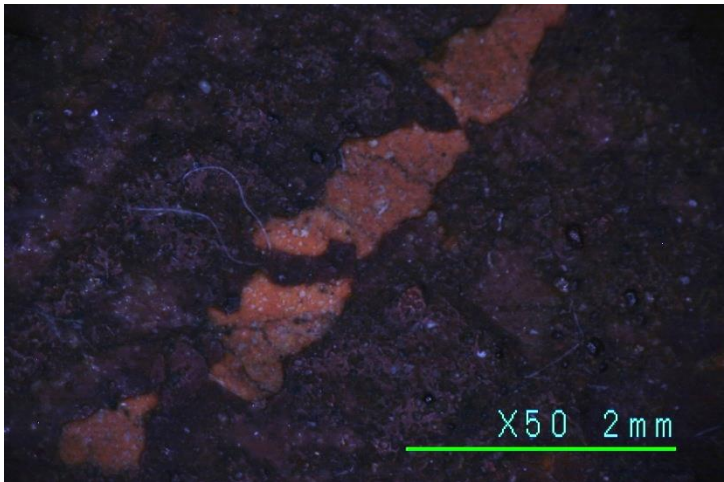
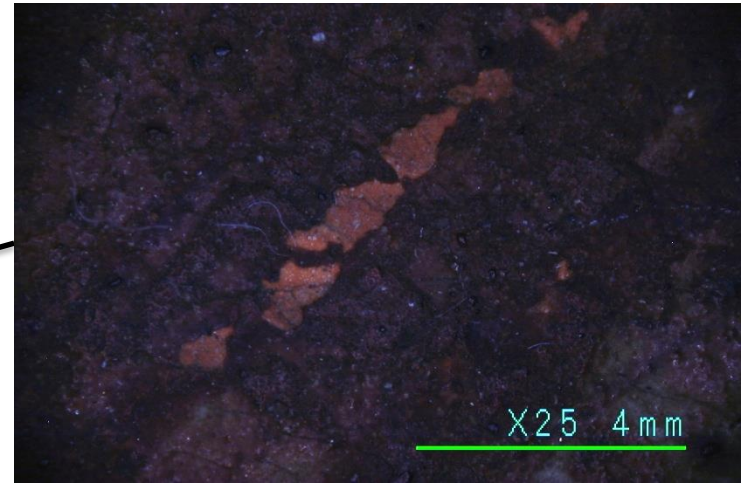
450 – zona 3



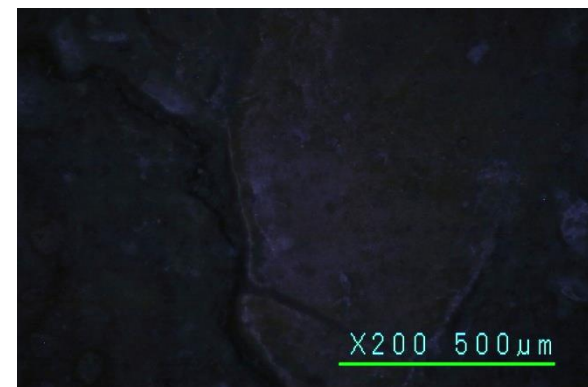
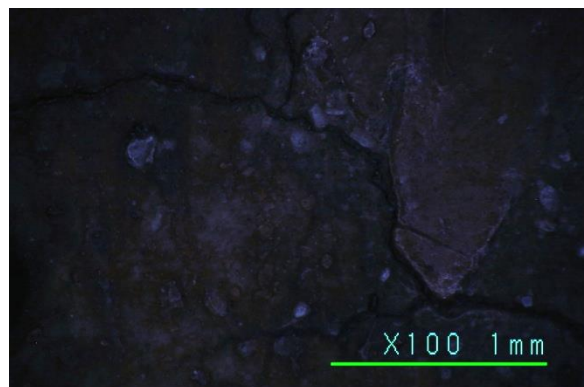
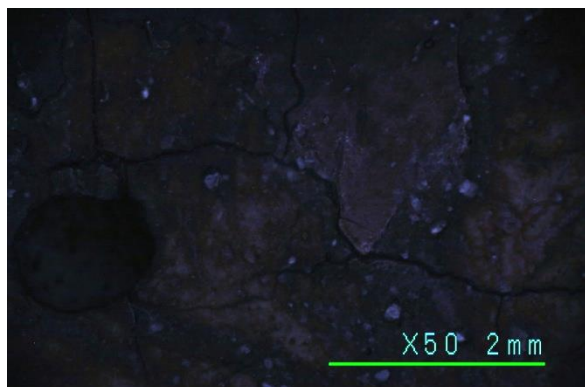
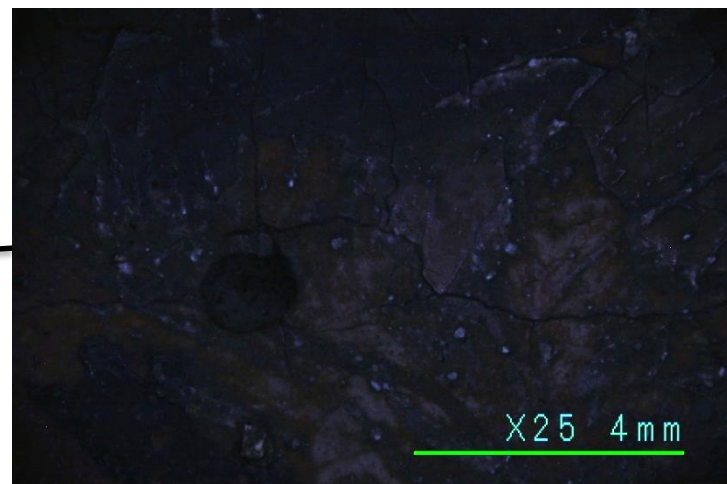
450 – zona 4



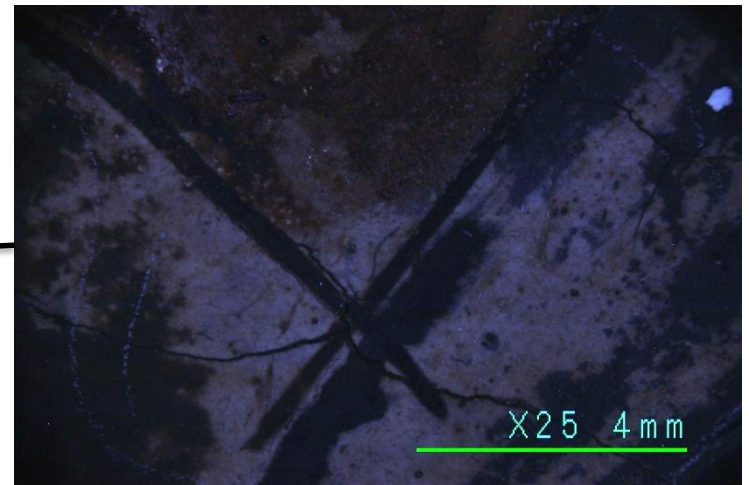
451 – zona 1



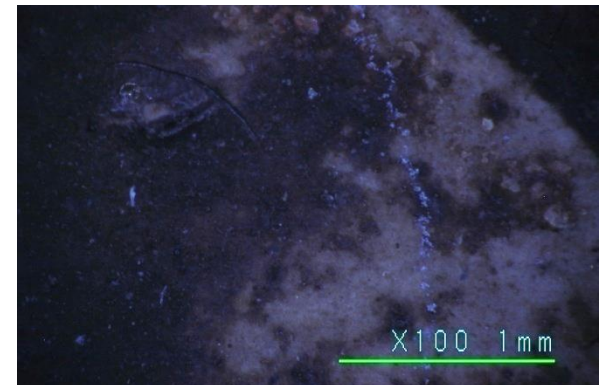
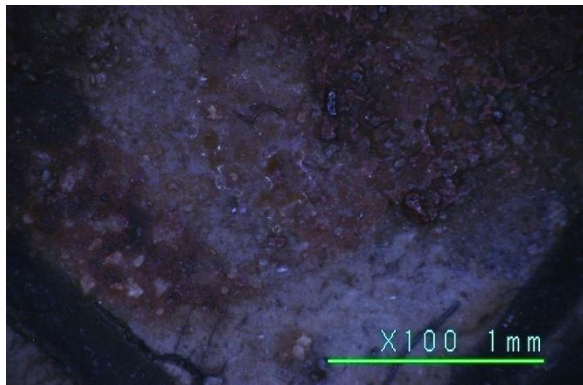
451 – zona 2



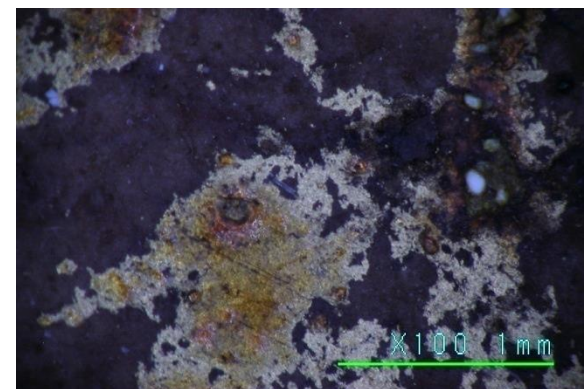
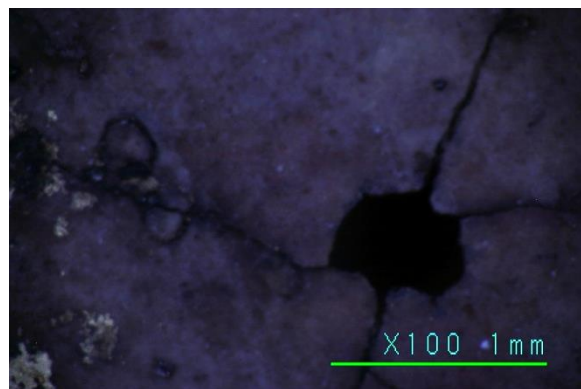
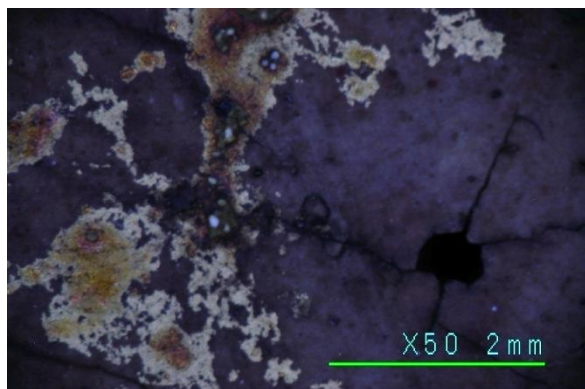
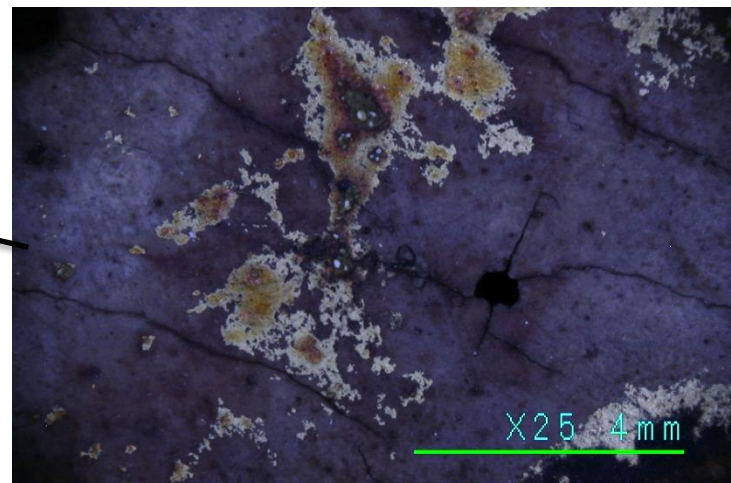




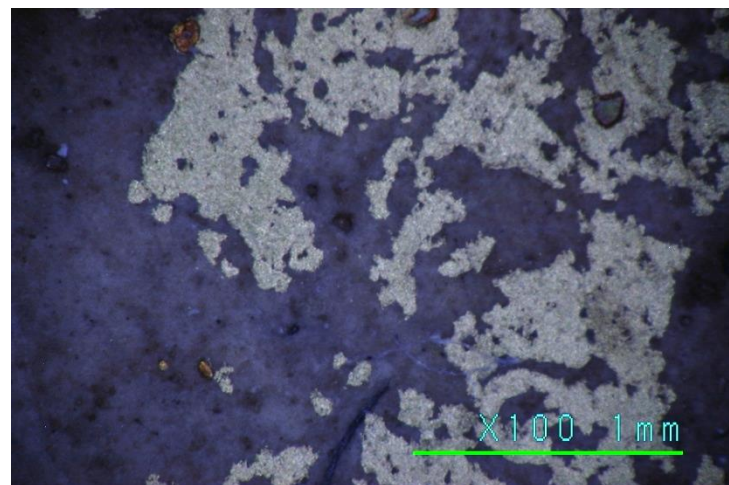
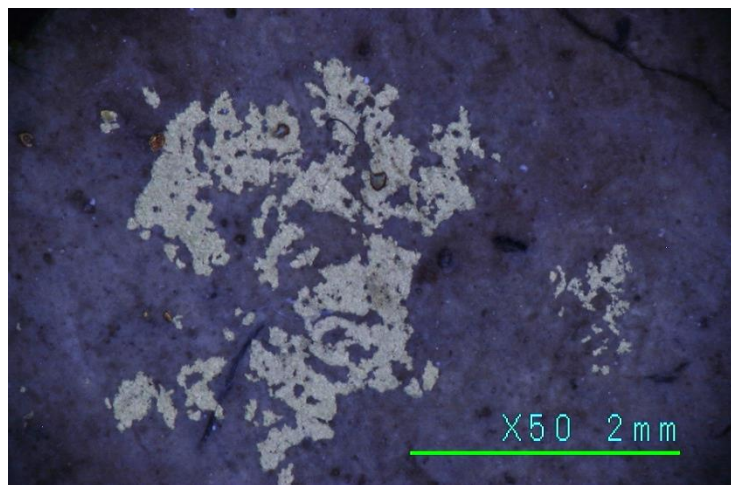
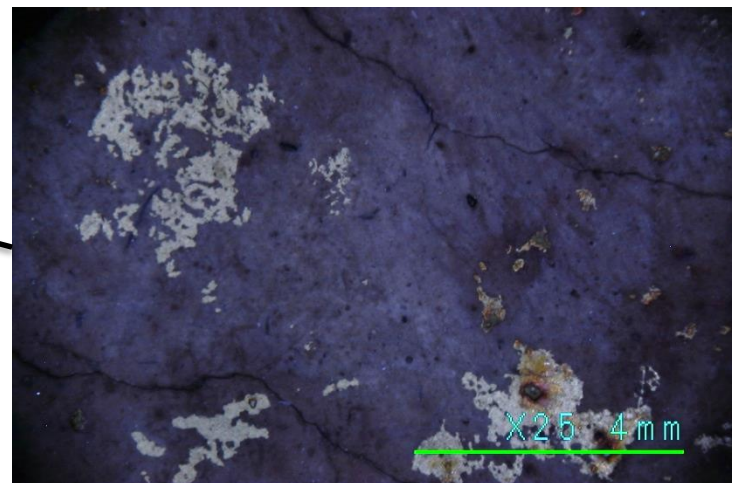
451 – zona 3



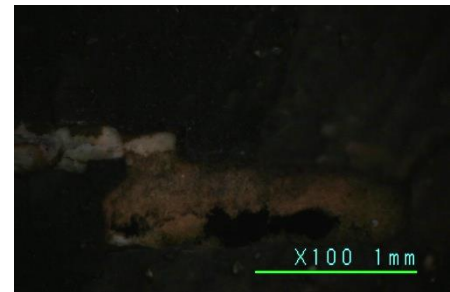
451 – zona 4



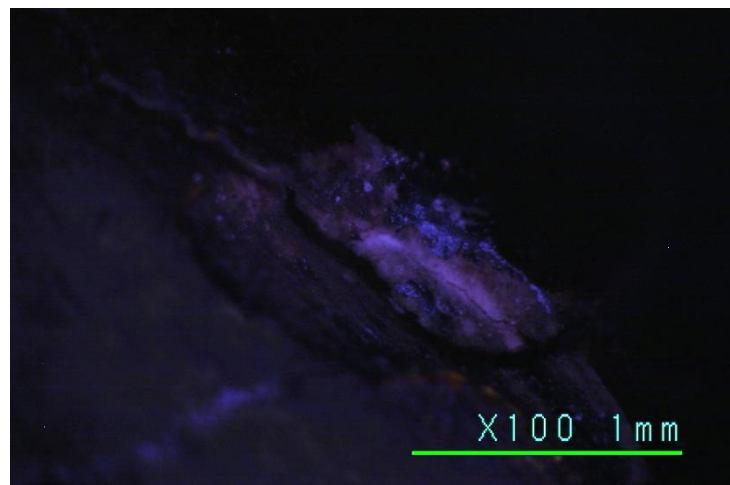
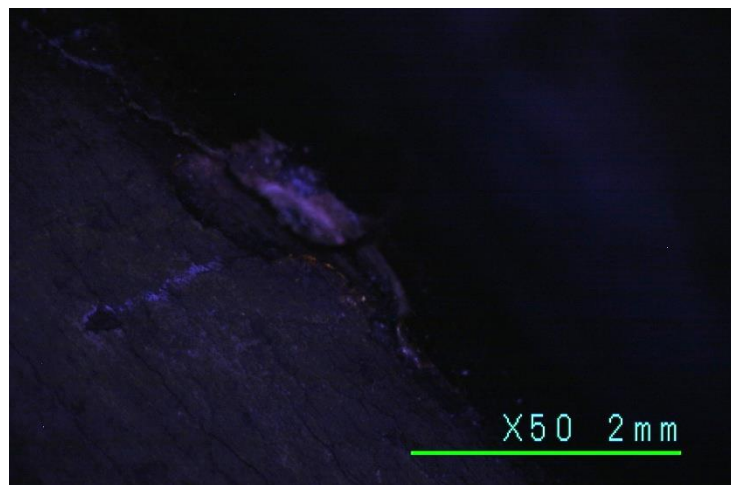
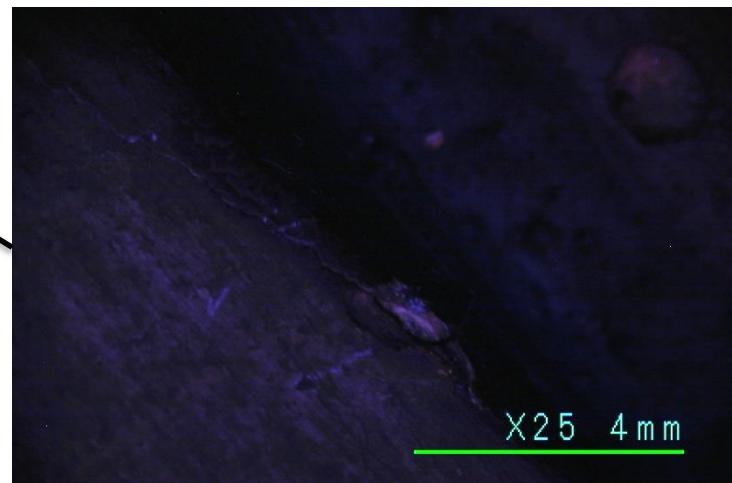
451 – zona 5



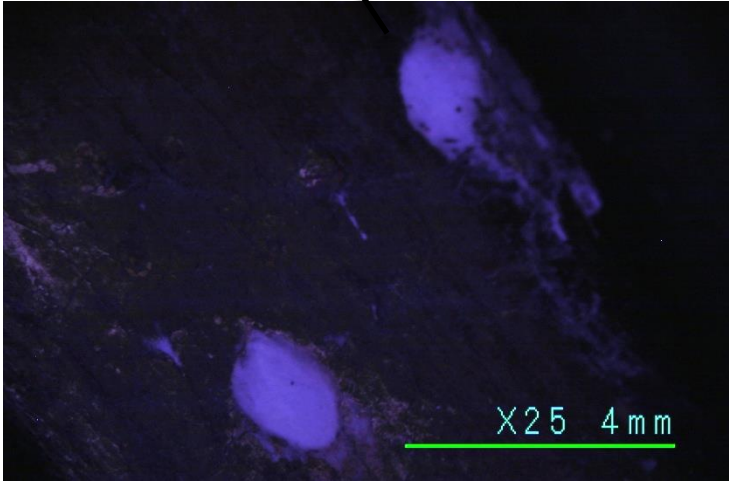
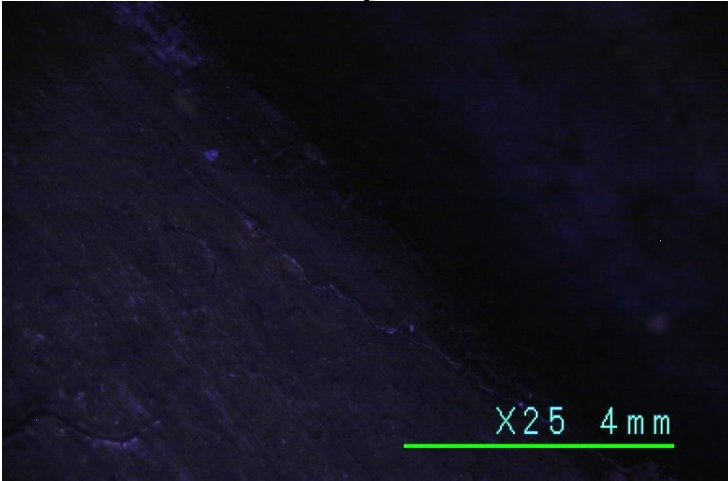
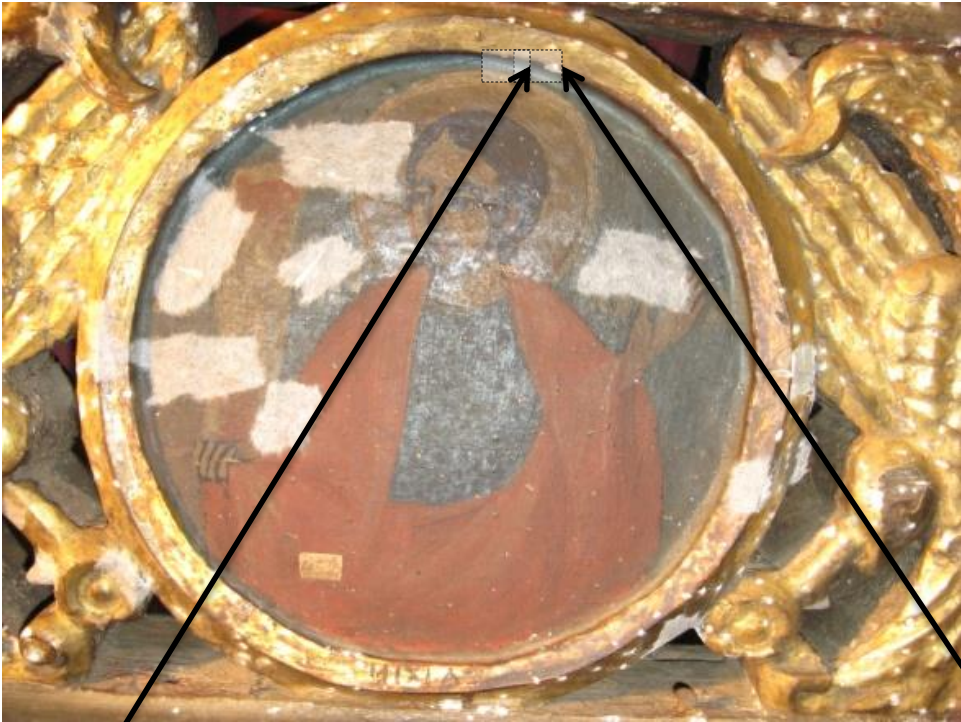
452 – zona 1



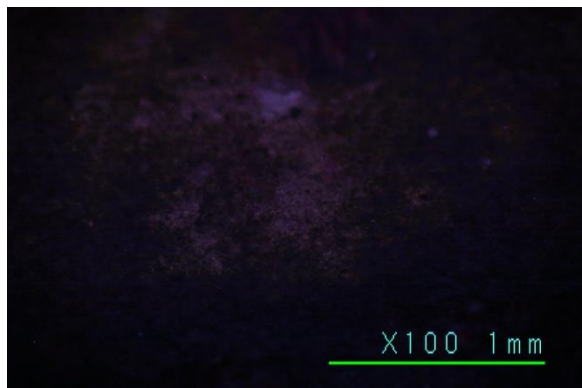
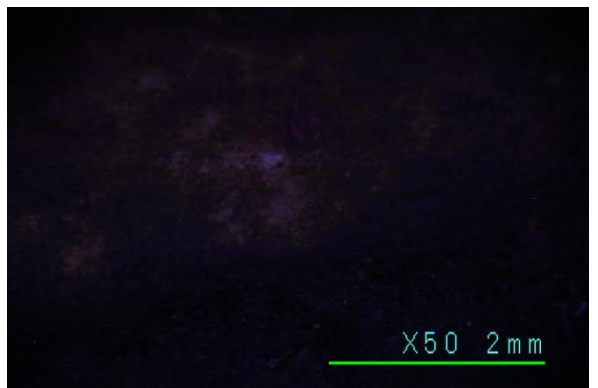
452 – zona 2



452 – zona 2'



452 – zona 3



# Vibrometrie laser Doppler



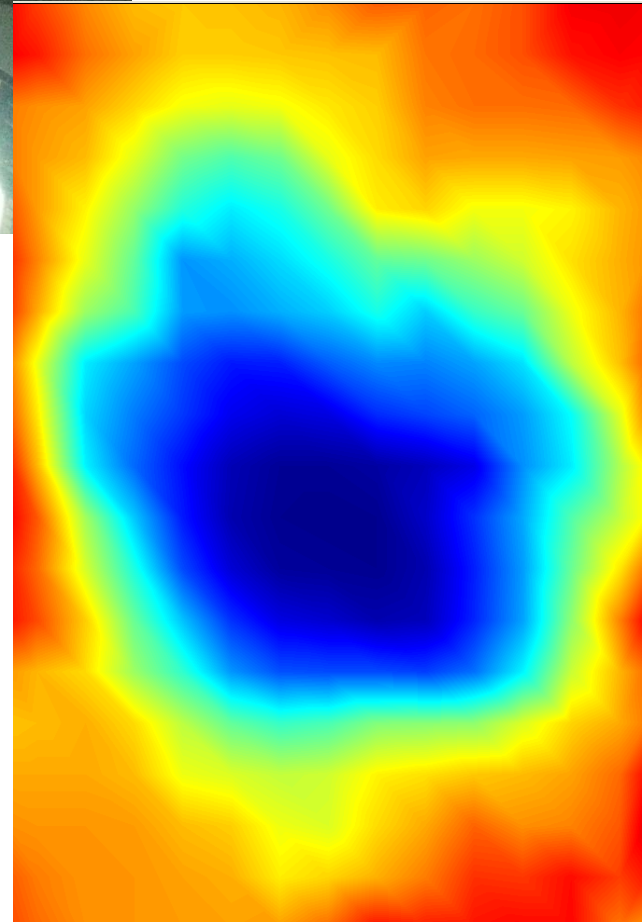


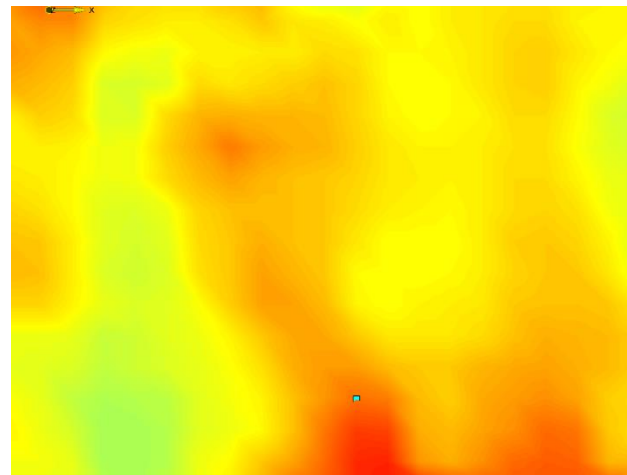
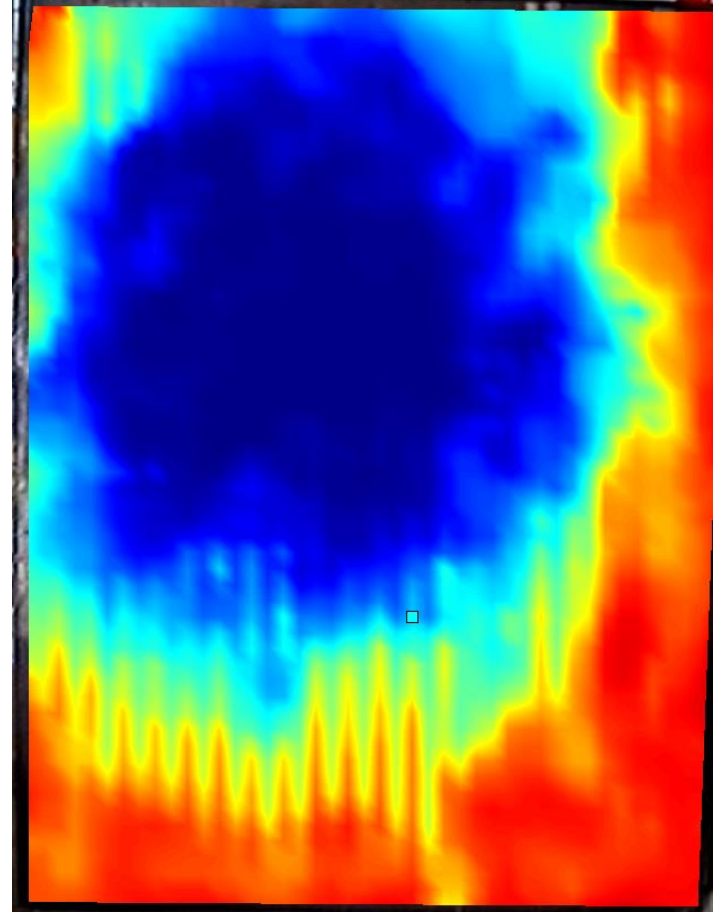
285 Points  
Frequency

Bandwidth:	25 kHz
Bandwidth from:	4 kHz
Bandwidth to:	15 kHz

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Sampling	
FFT Lines:	800
Sample frequency:	64 kHz
Sample time:	32 ms
Resolution:	31.25 Hz
Signal:	White Noise

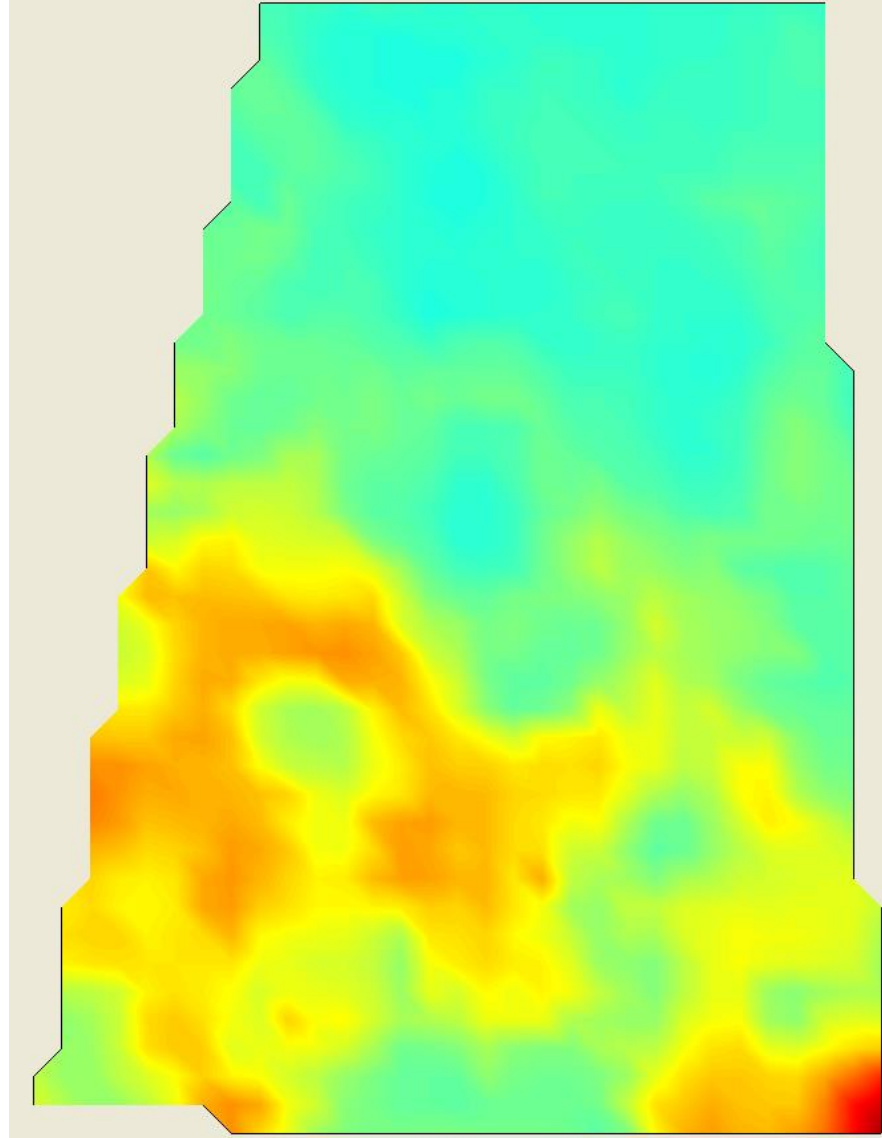






**Scan Points**  
 Total: 1063  
 Acquisition Mode: FFT  
 Averaging: Complex  
 Averaging count: 3  
 Frequency  
 Bandwidth: 5 kHz  
 Bandwidth from: 100 Hz  
 Bandwidth to: 5 kHz

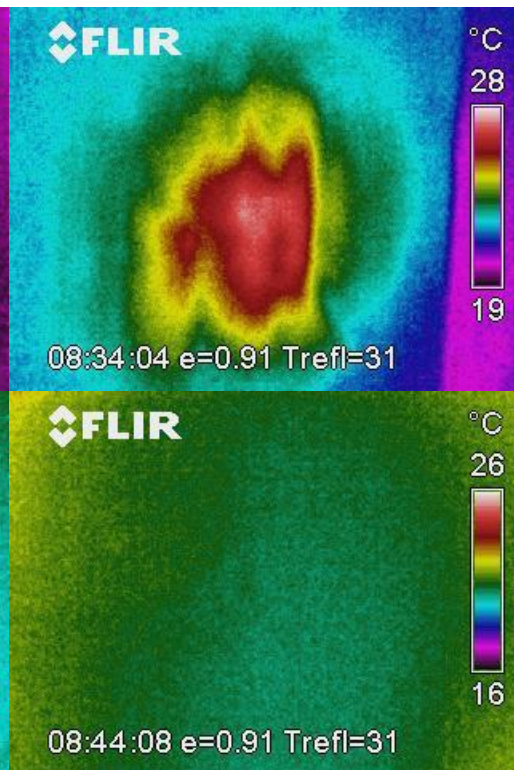
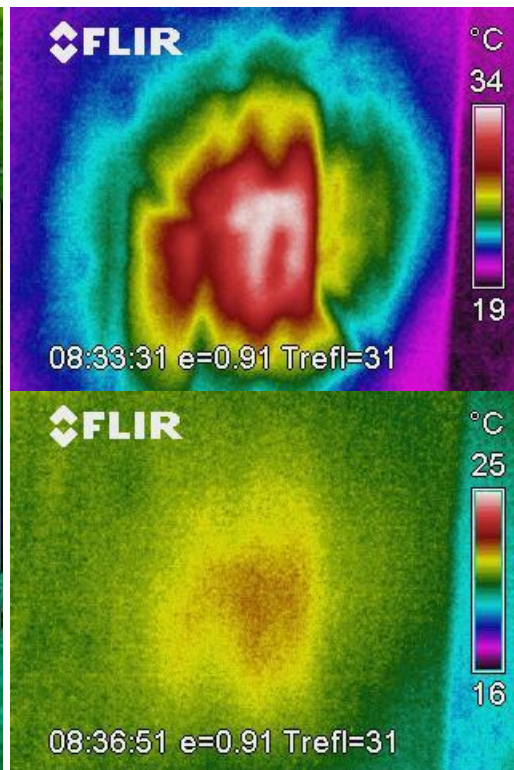
**Sampling**  
 FFT Lines: 400  
 Sample frequency: 12.8 kHz  
 Sample time: 80 ms  
 Resolution: 12.5 Hz  
 High pass filter: 100 Hz



**Function Generator 1**  
 Type: NI 671x  
 Signal: Burst Random  
 Amplitude: 2 V  
 Offset: 0 V  
 Burst start: 50 %  
 Burst length: 90 %  
 Multiple Channels: Off

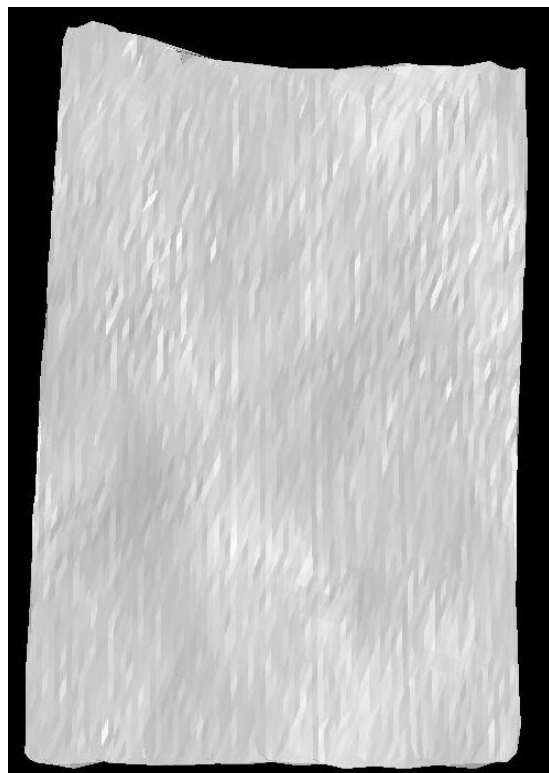
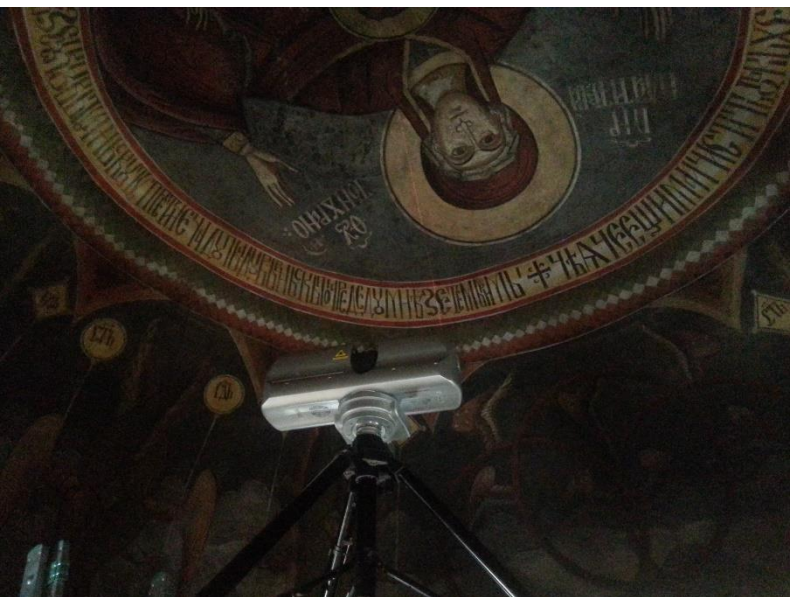
Range: 10 V  
 Impedance: 1 MOhm  
 Quantity: Velocity  
 Calibration factor: 1 (m/s)/V  
 Signal Delay: 1.04e-6 s  
 Filter Type: High Pass  
 Cutoff Frequency 1: 100 Hz  
 Int/Diff Quantity: Velocity  
 Window: Rectangle

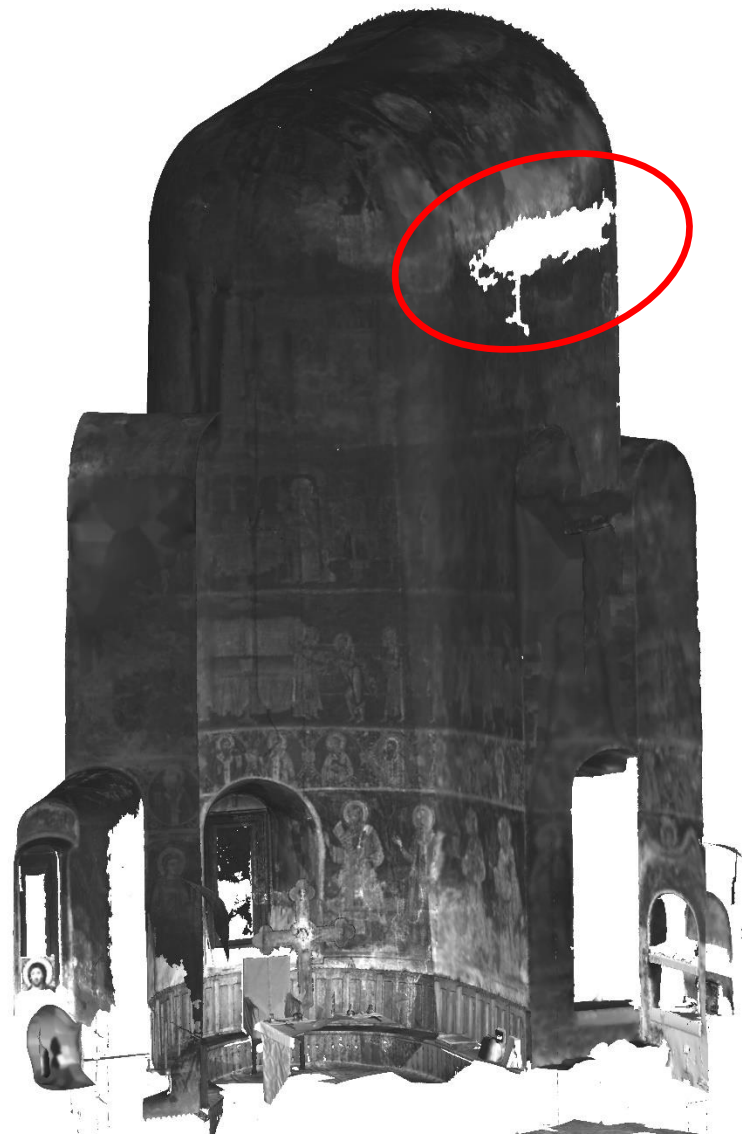
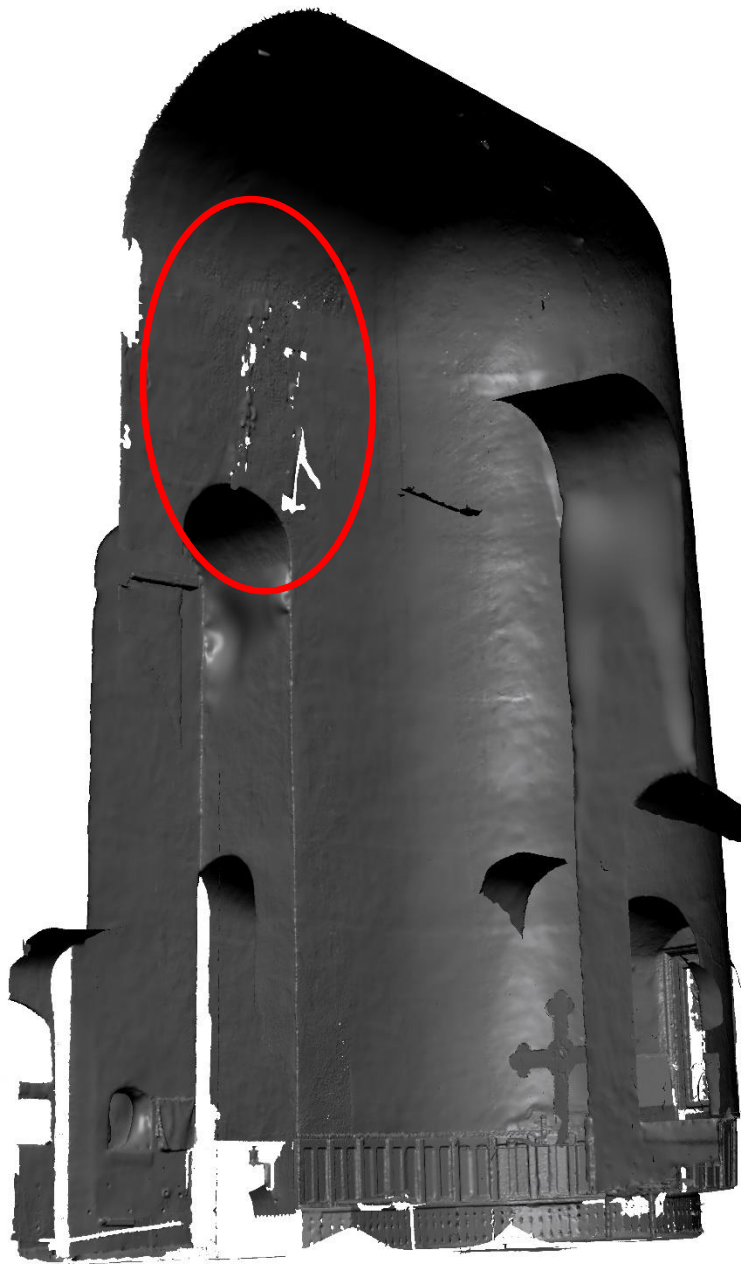
# Termoviziune



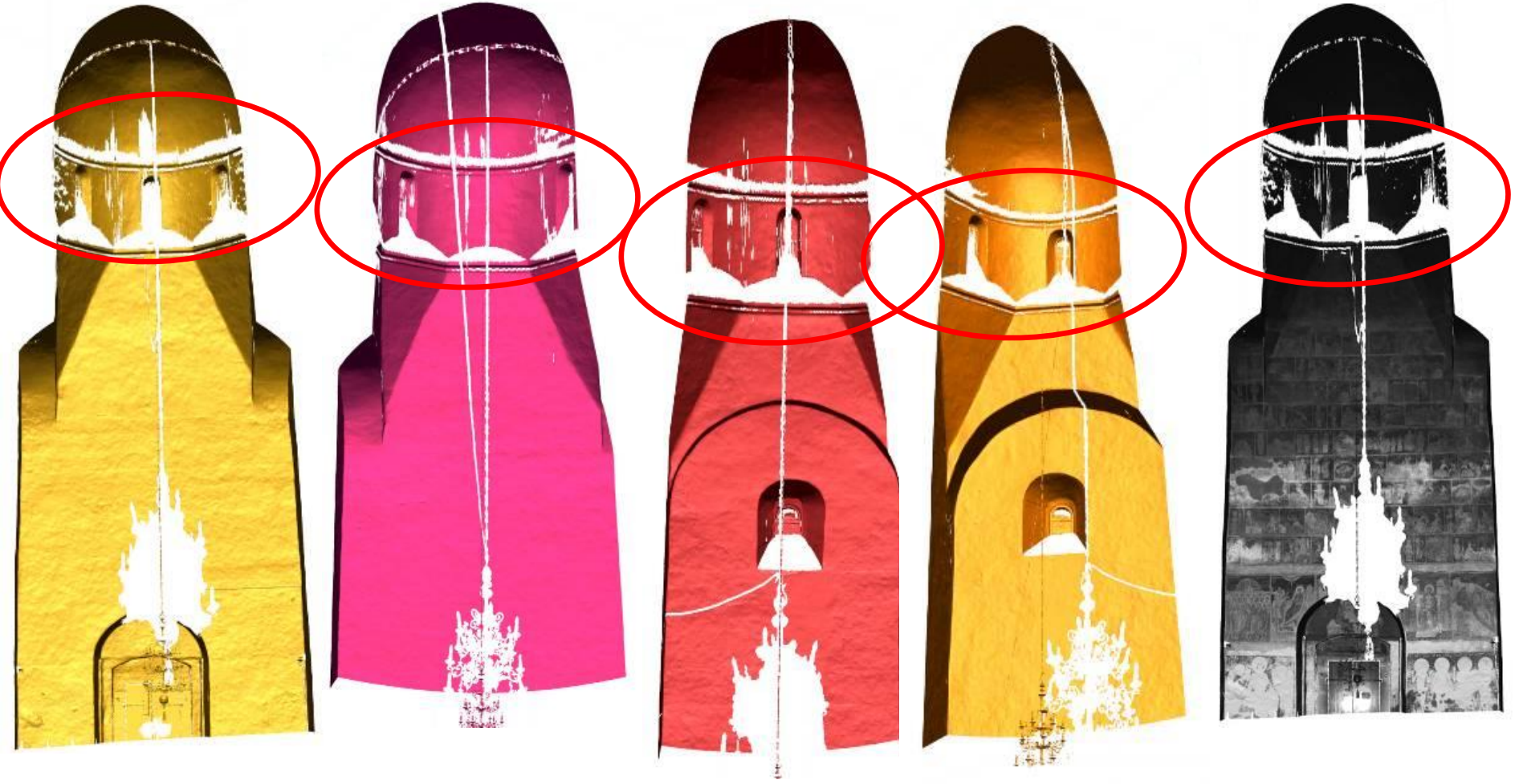
Măsurători realizate pe o icoană de lemn

# Scanare 3D

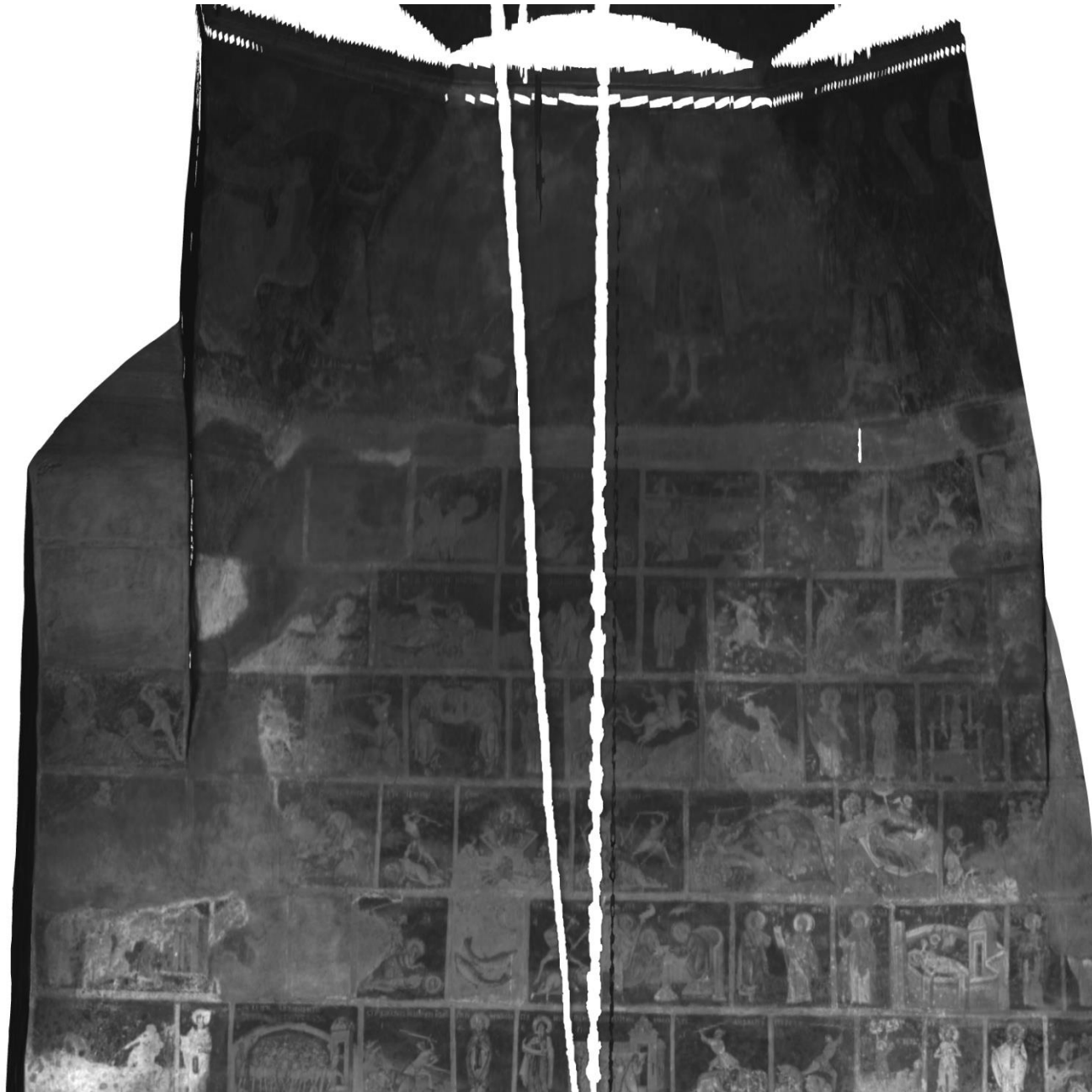




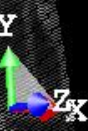
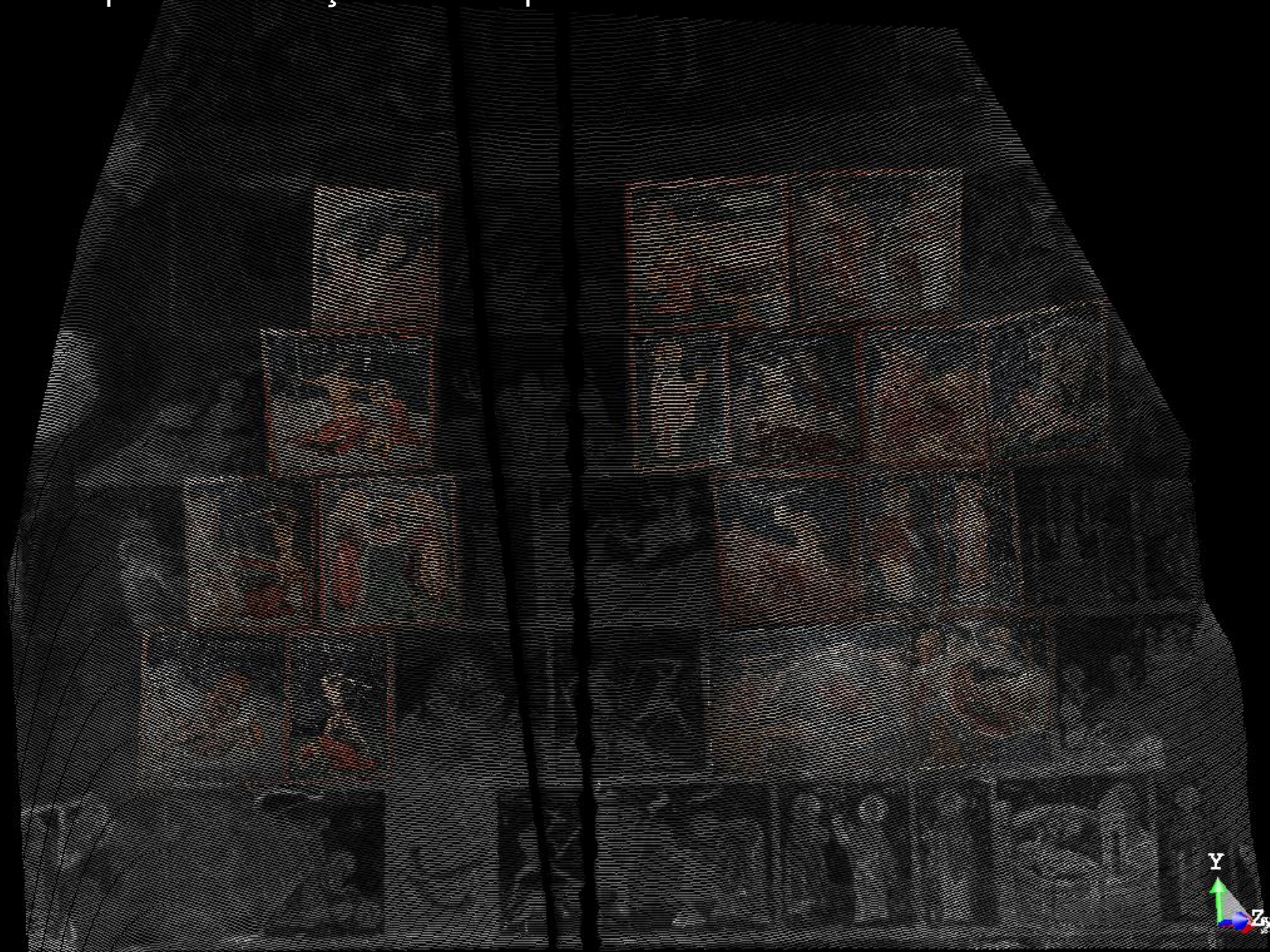




Pronaos – perete est–afișare mesh cu reflectanța înregistrată



# Pronaos – perete est–afișare nori de puncte color



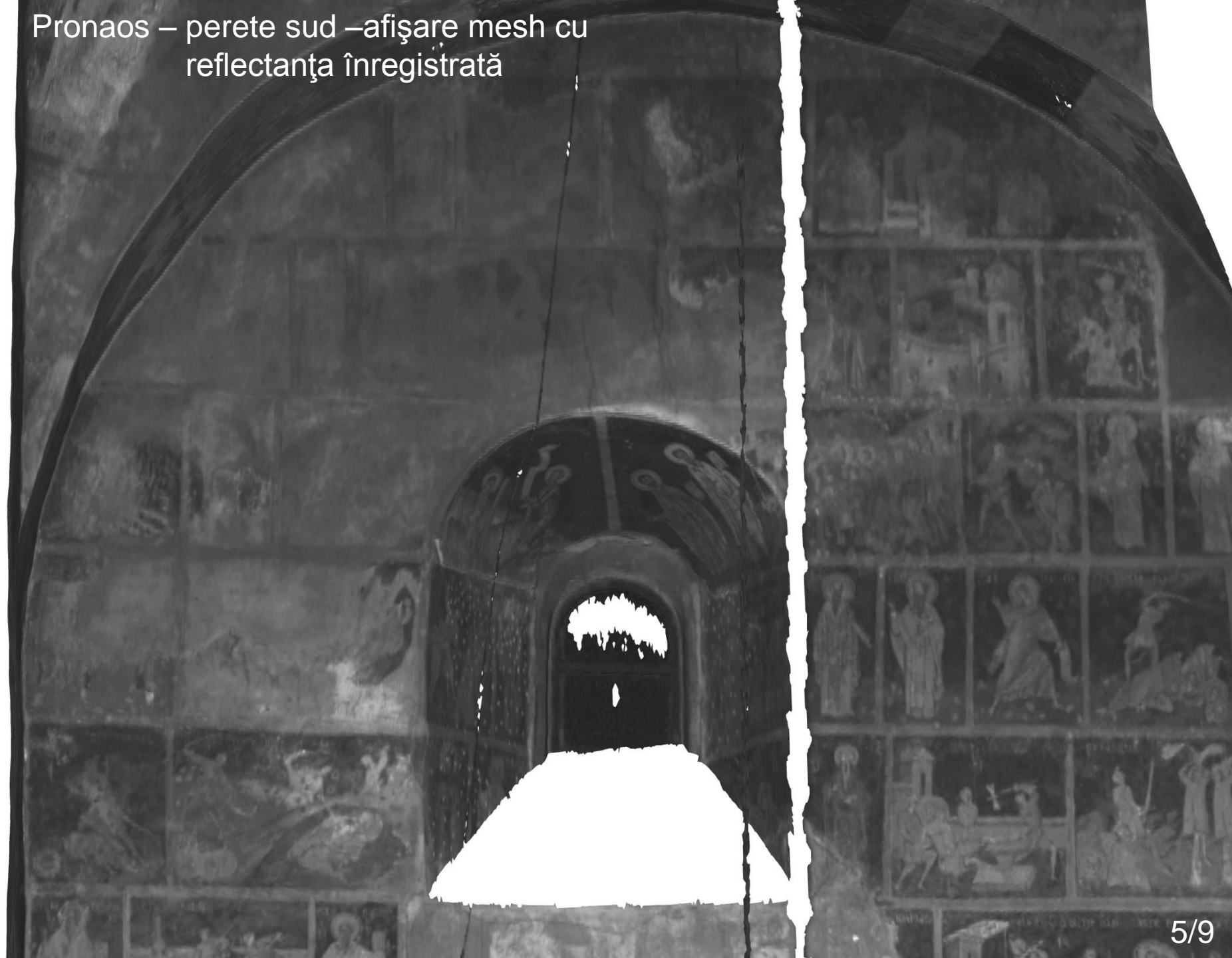
# Pronaos – perete est Registrul III, scena 2



Mesh - texturat



Pronaos – perete sud –afişare mesh cu  
reflectanța înregistrată



# Pronaos – perete sud



# Pronaos – perete sud



Mesh - texturat



Pronaos – perete sud

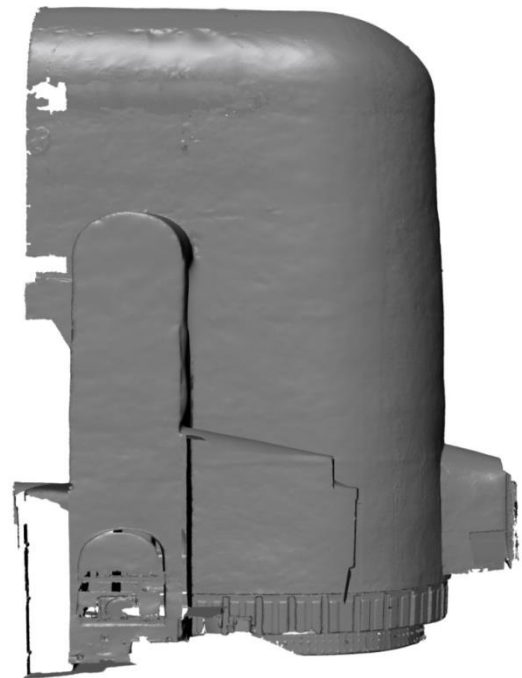
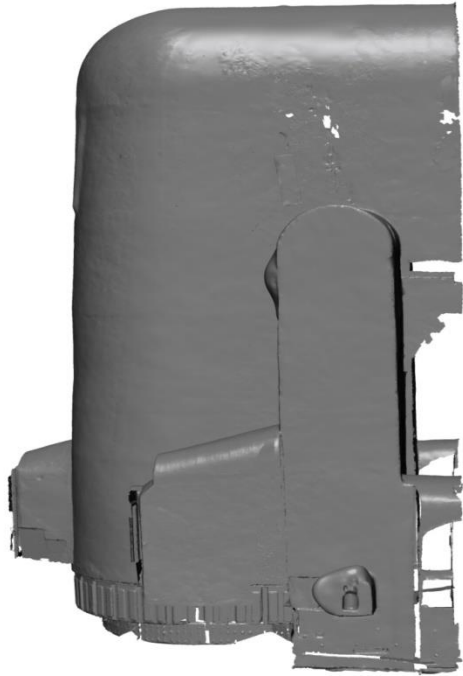


Mesh - texturat

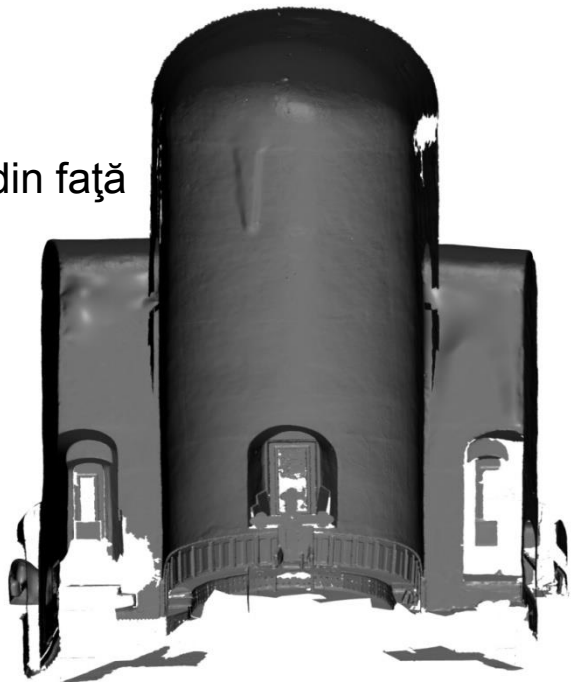




Vederi laterale

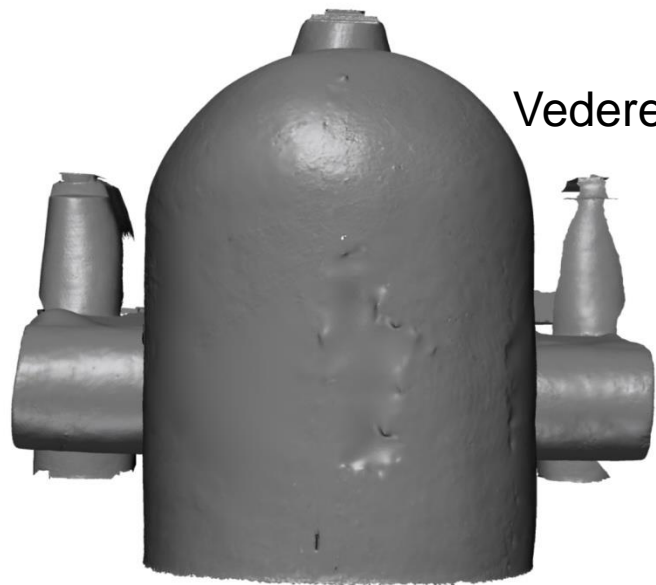


Vedere din față



Altar

Vedere de sus





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Măgurele

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