Materials properties, use and conservation: construction materials and binders

Michele Secco, Caterina Previato, Simone Dilaria

UNIVERSITÀ DEGLI STUDI DI PADOVA
dBC DIPARTIMENTO DEI BENI CULTURALI ARCHEOLOGIA, STORIA DELL'ARTE, DEL CINEMA E DELLA MUSICA
DIPARTIMENTO DI GEOSCIENZE
CIRCe Centro Interdipartimentale di Ricerca per lo Studio dei Materiali Cementizi e dei Leganti Idraulici
CIBA CENTRO PER I BENI CULTURALI
DIAGNOSTICA . RILIEVO . TECNOLOGIE

The professors

Useful information

- **Lectures**: Monday 10.30 - 12.30, Aula 2M/2H, Polo Scienze della Terra
  Tuesday 8.30 - 10.30, Aula 2G, Polo Scienze della Terra

- **Link Zoom**: https://unipd.zoom.us/j/89085463062

- **Moodle**: https://ssu.elearning.unipd.it/course/view.php?id=15451

- **Professors' meeting**: to be agreed via e-mail

- **Michele Secco**: michele.secco@unipd.it, Dipartimento Beni Culturali, Piazza Capitaniato 7

- **Caterina Previato**: caterina.previato@unipd.it, Dipartimento Beni Culturali, Piazza Capitaniato 7

- **Simone Dilaria**: simone.dilaria@unipd.it, Dipartimento Beni Culturali, Piazza Capitaniato 7

Course structure

26 Lectures, 2 hours each (5+1 CFU, 51 hours)

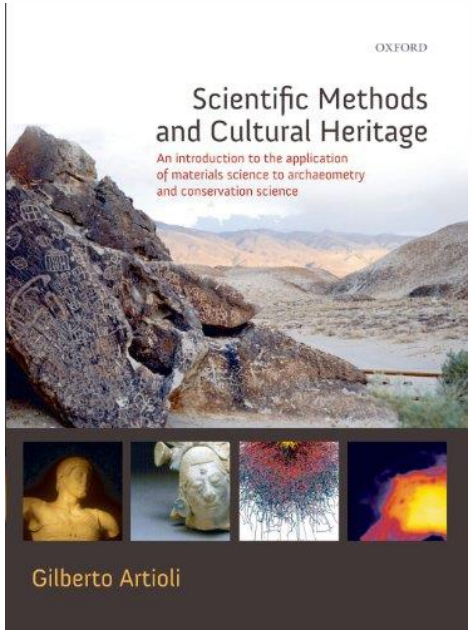
TOPICS

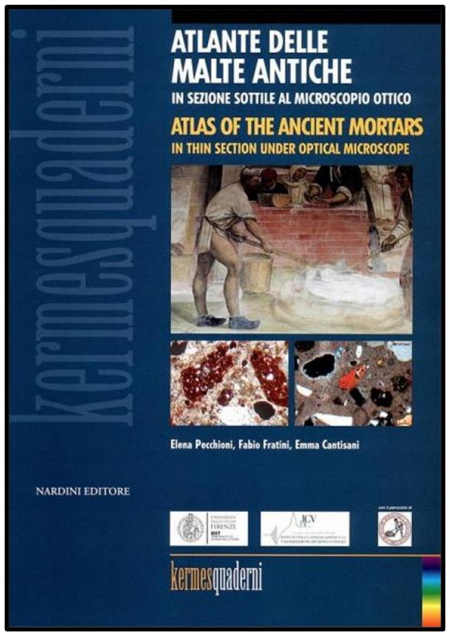
- Archaeometric study of the binding materials used in ancient construction and on the structural composites resulting from their use.
- Examination of the use of binding materials in ancient building sites, with references to available written sources and analysis of the surviving material evidence.
- Study of the sources of supply of raw materials, production techniques and recipes, and the chemical-physical processes responsible for the development of cohesive properties, with in-depth examination of aerial, hydraulic and pozzolanic binders.
- Examination of the analytical techniques commonly applied for the study of these geo-materials.
- Study of techniques and materials commonly used and newly developed for the restoration and conservation of historical and archaeological buildings.

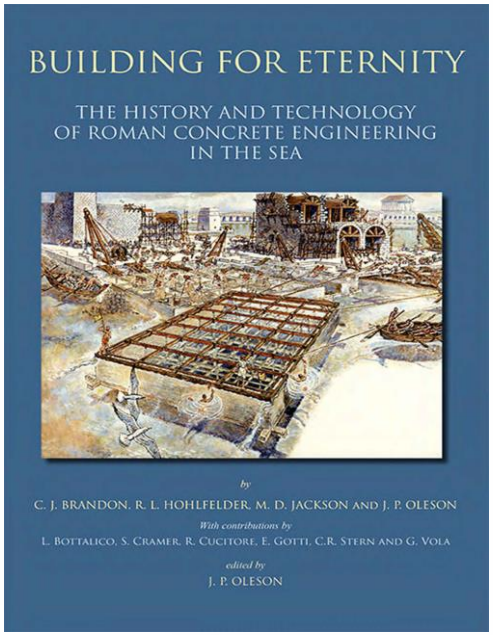
References

- **PDF's of the lectures uploaded on Moodle.**
- **Scientific papers and other relevant materials uploaded on Moodle.**

Suggested textbooxs (not mandatory)







Exam

Oral test consisting in the discussion of one or more of the topics covered during the lectures

Dates

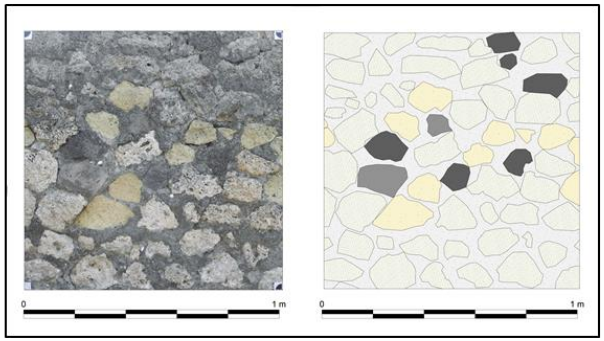
TO BE DEFINED

Aims

Aims

Aims

TIPO 1



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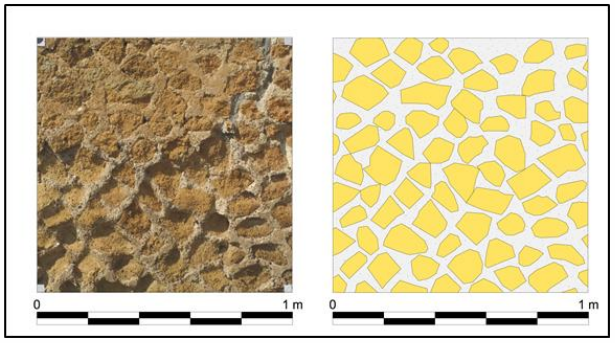

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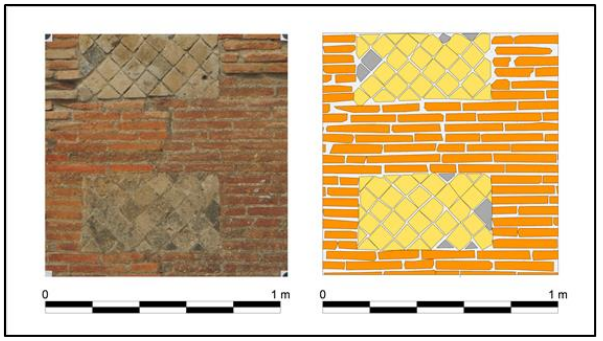

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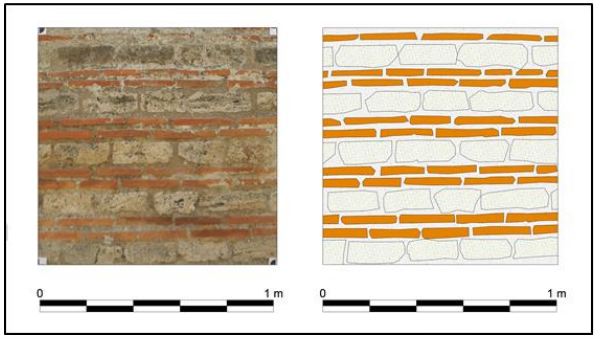

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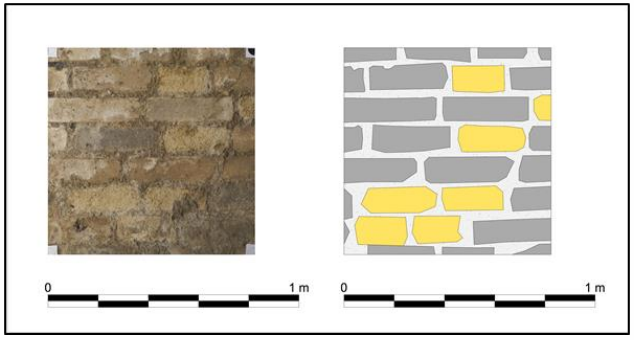

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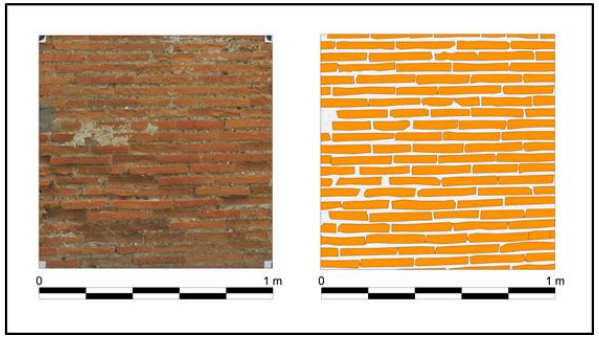
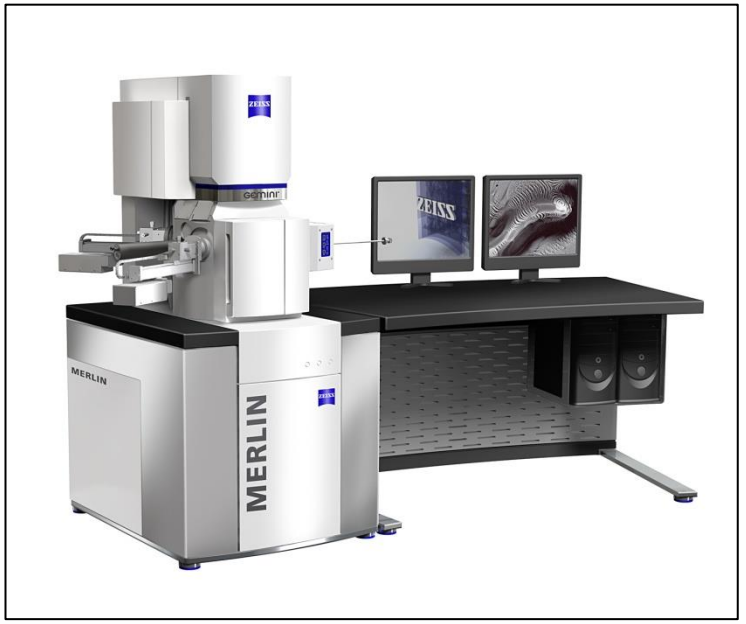


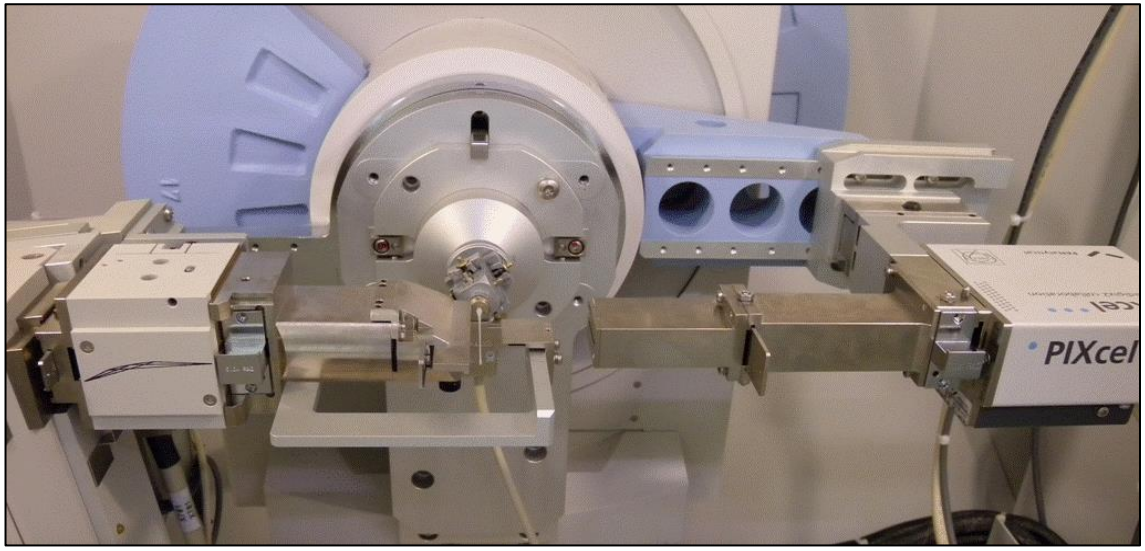
Aims

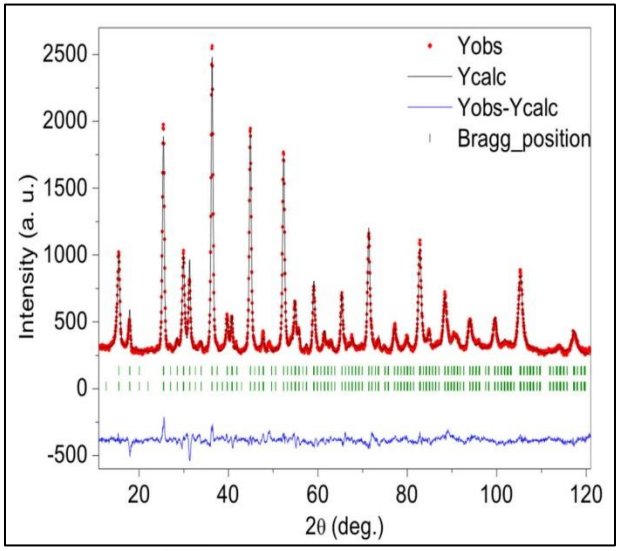
Aims


OLYMPUS
BX61

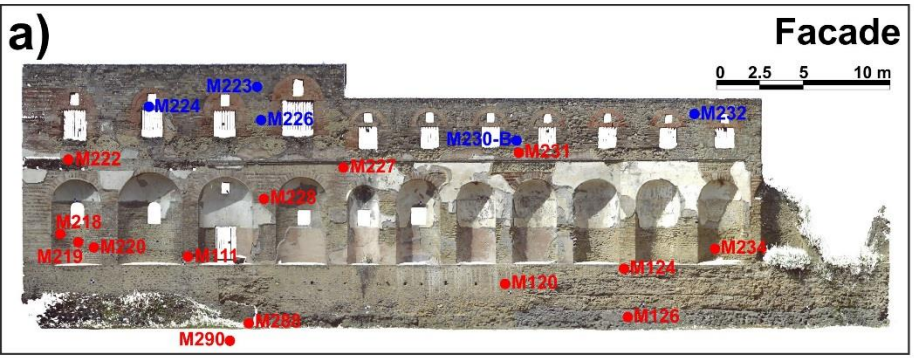

OLYMPUS

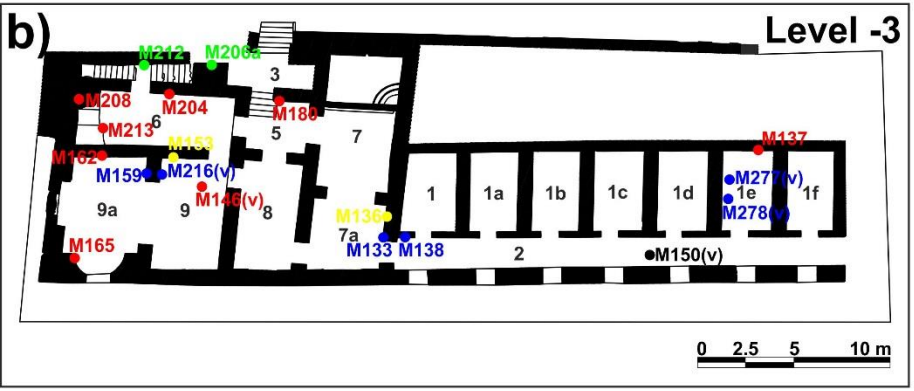

ZEISS
GEMINI
MERLIN
MERLIN

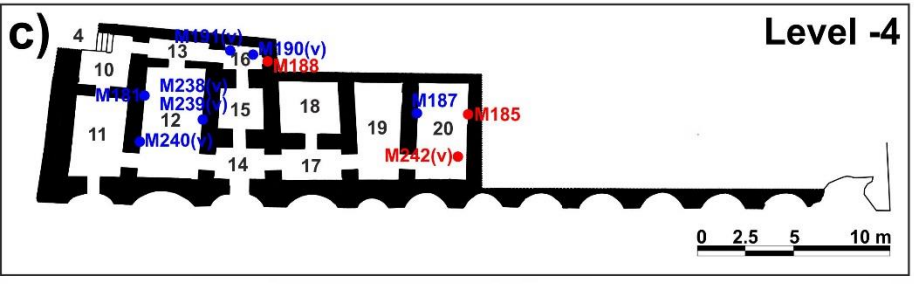

PIXcel

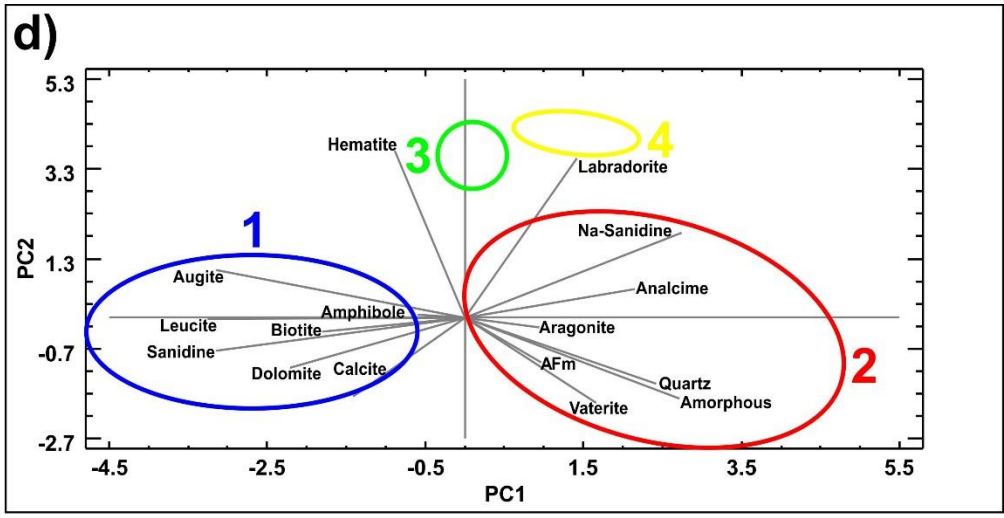

Yobs
Ycalc
Yobs-Ycalc
Bragg_position
Intensity (a. u.)
2θ (deg.)
2500
2000
1500
1000
500
0
-500
20
40
60
80
100
120

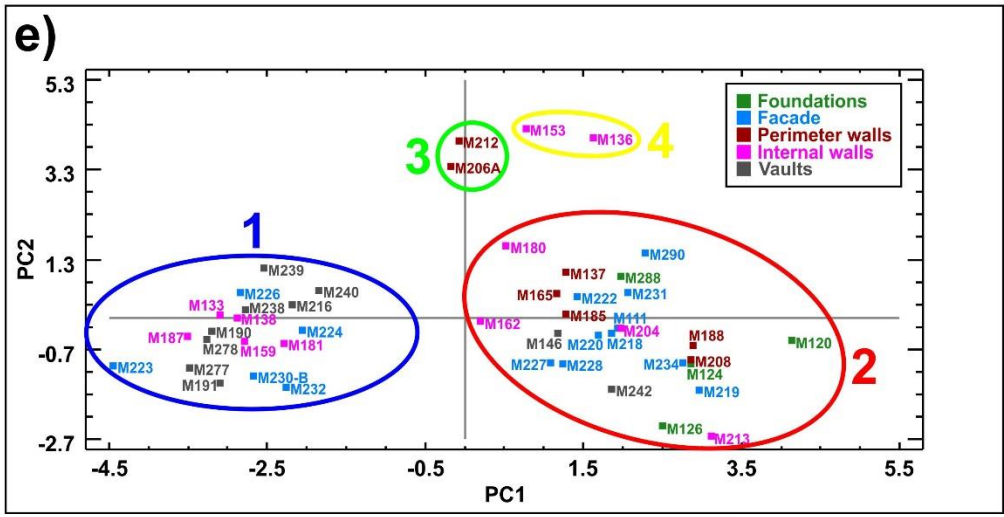
Aims











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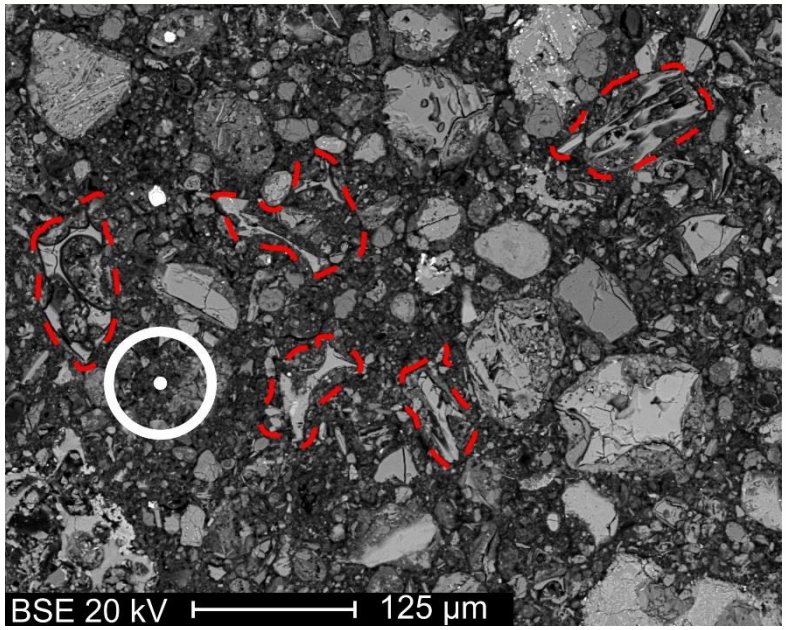
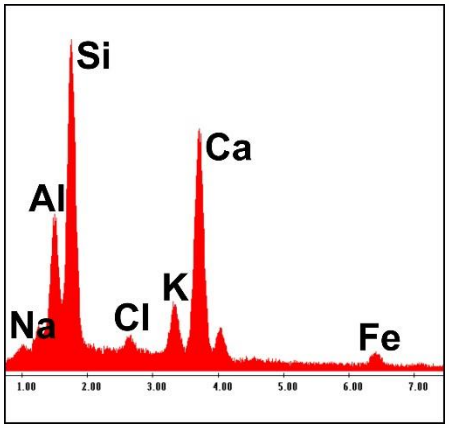
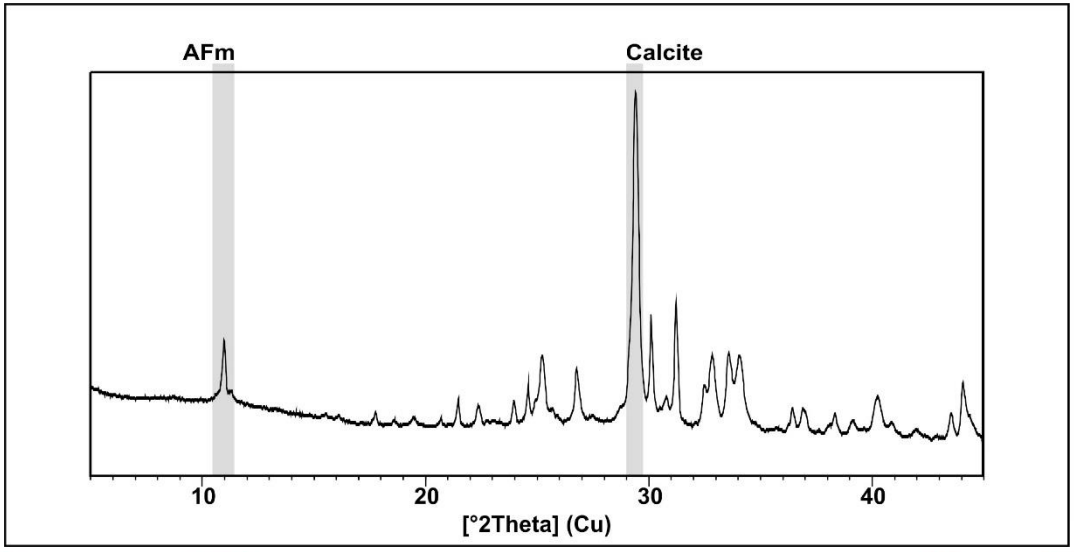
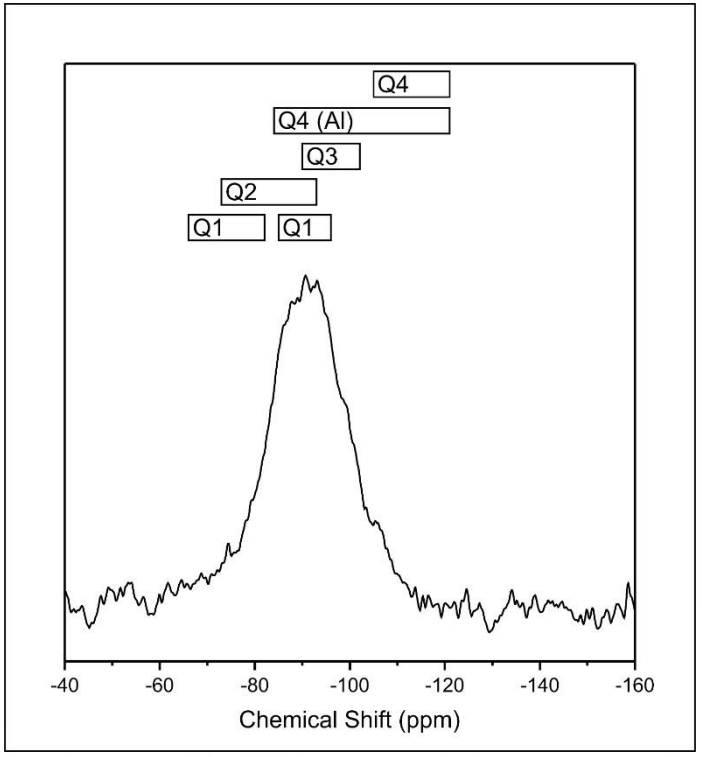
Aims

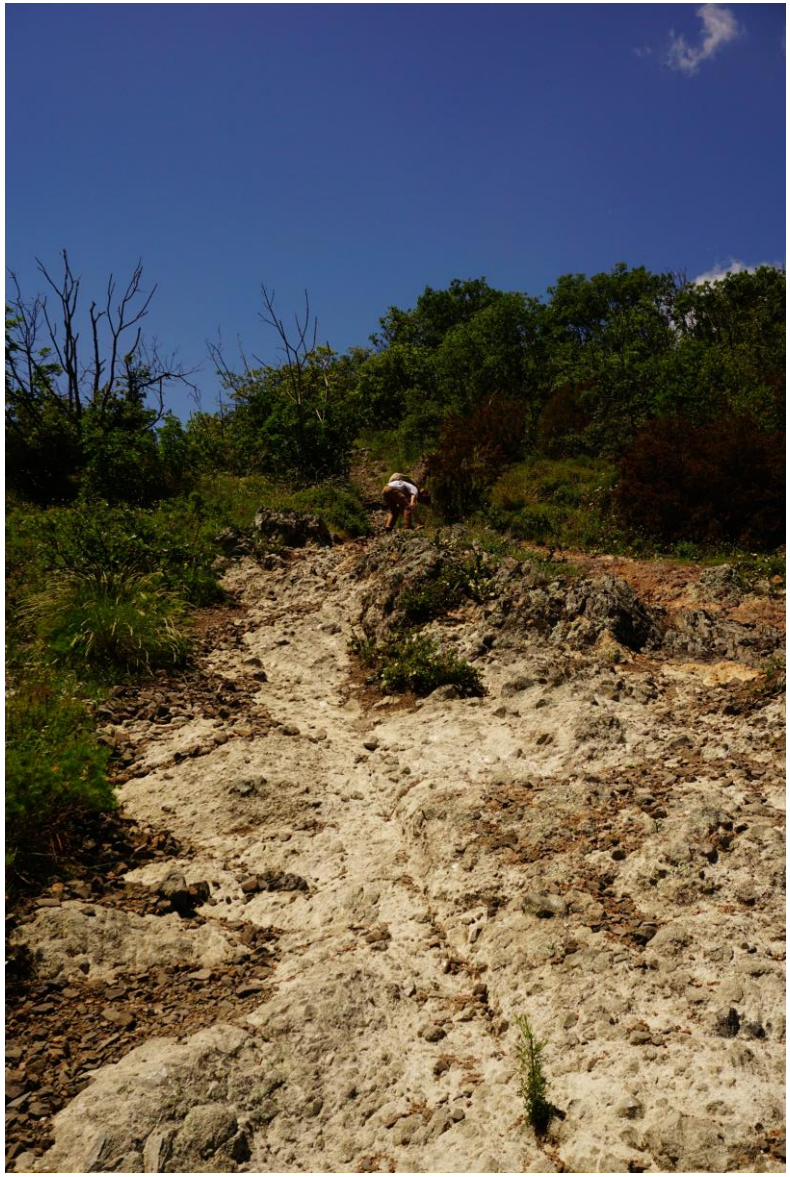

BSE 20 kV
125 µm

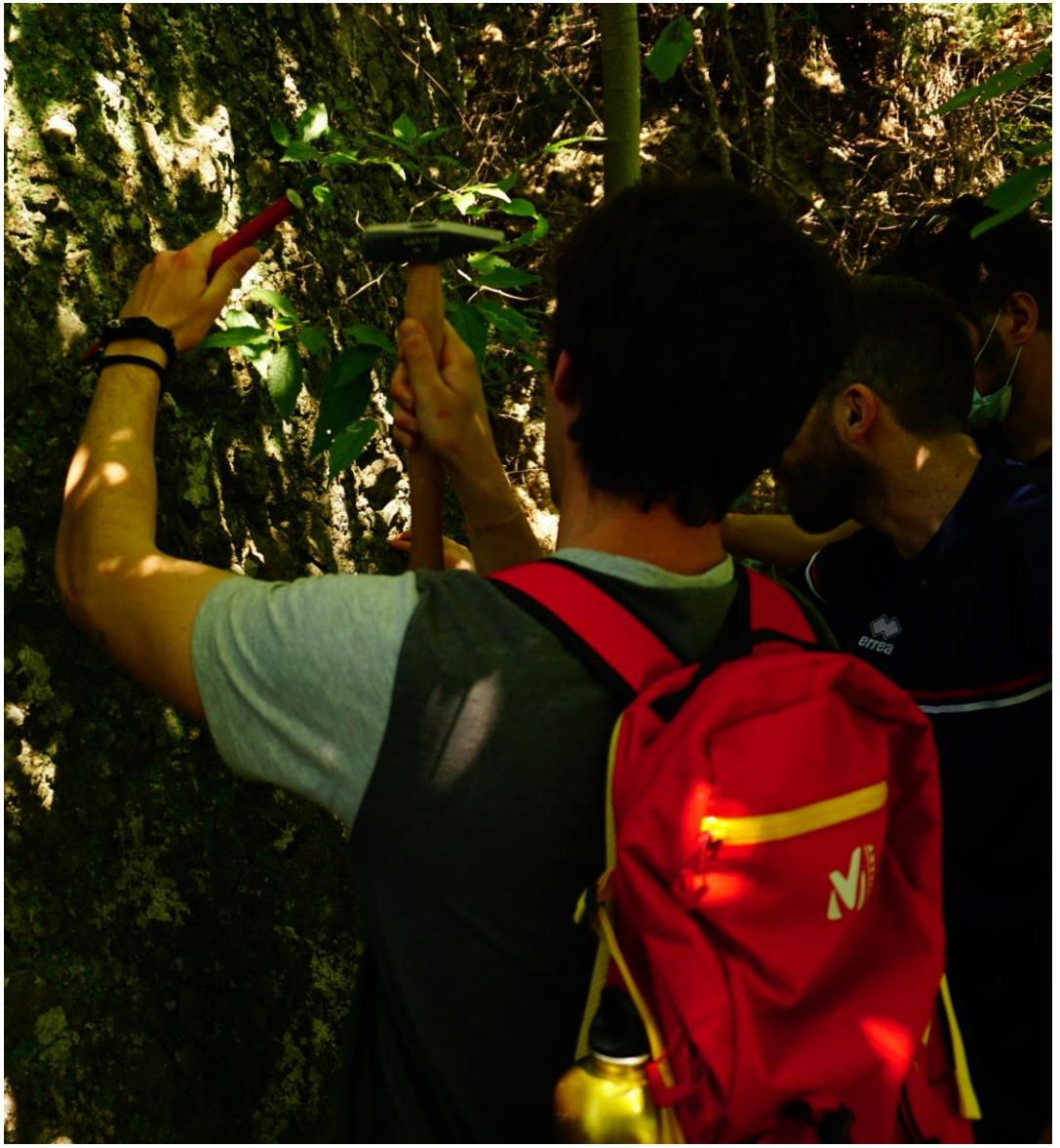

Si
Al
Ca
K
Na
Cl
Fe
1.00
2.00
3.00
4.00
5.00
6.00
7.00


AFm
Calcite
10
20
30
40
[°2Theta] (Cu)


Q4
Q4 (Al)
Q3
Q2
Q1
Q1
-40
-60
-80
-100
-120
-140
-160
Chemical Shift (ppm)

Onsite practical activities





Onsite practical activities

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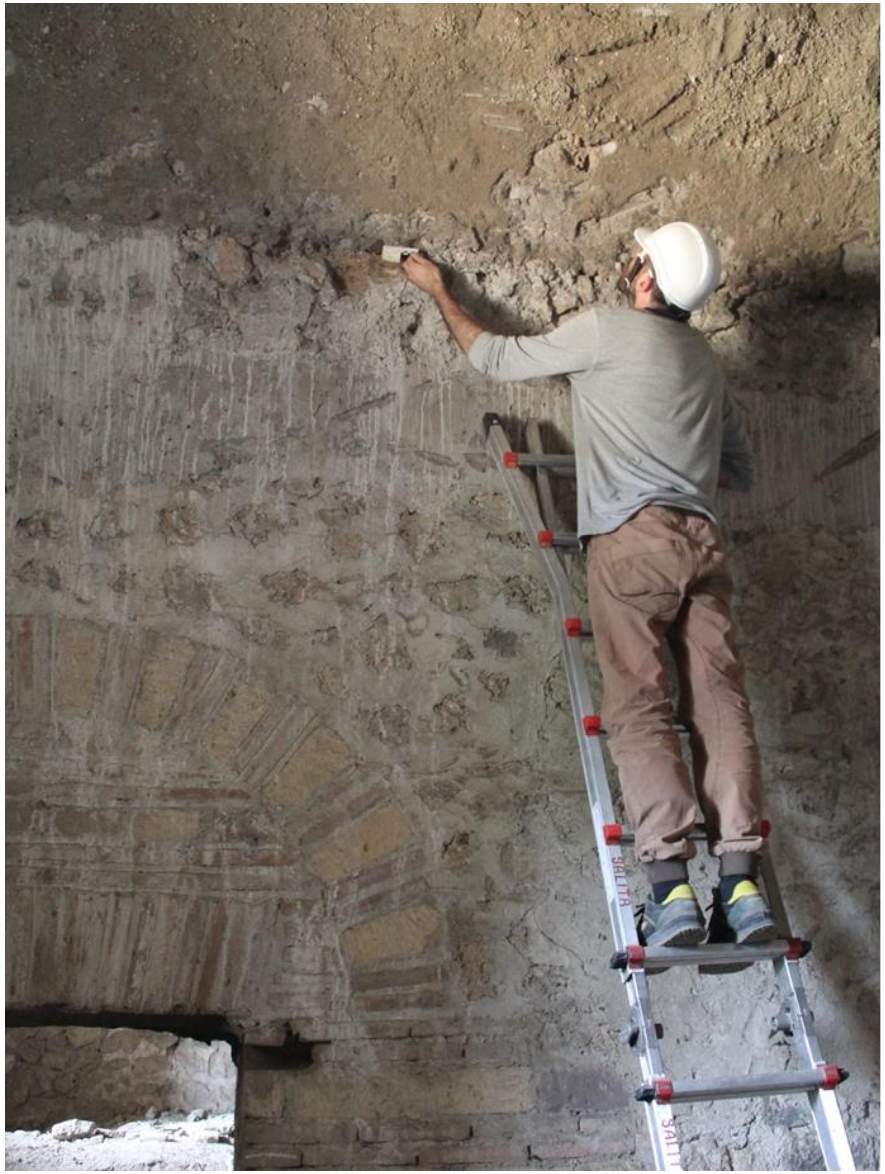
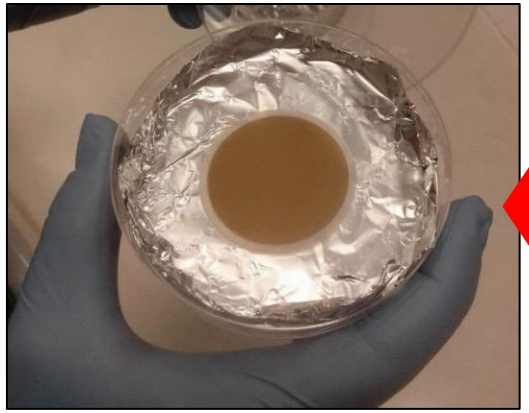
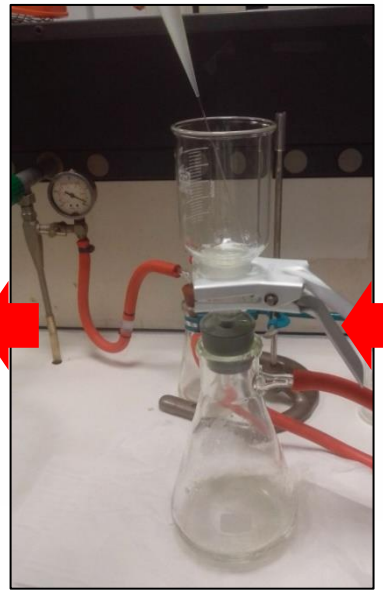


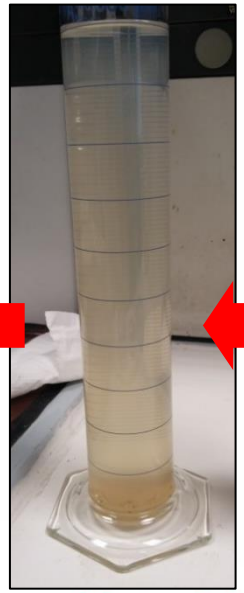
Laboratory activities

MORTAR

PURIFIED BINDER

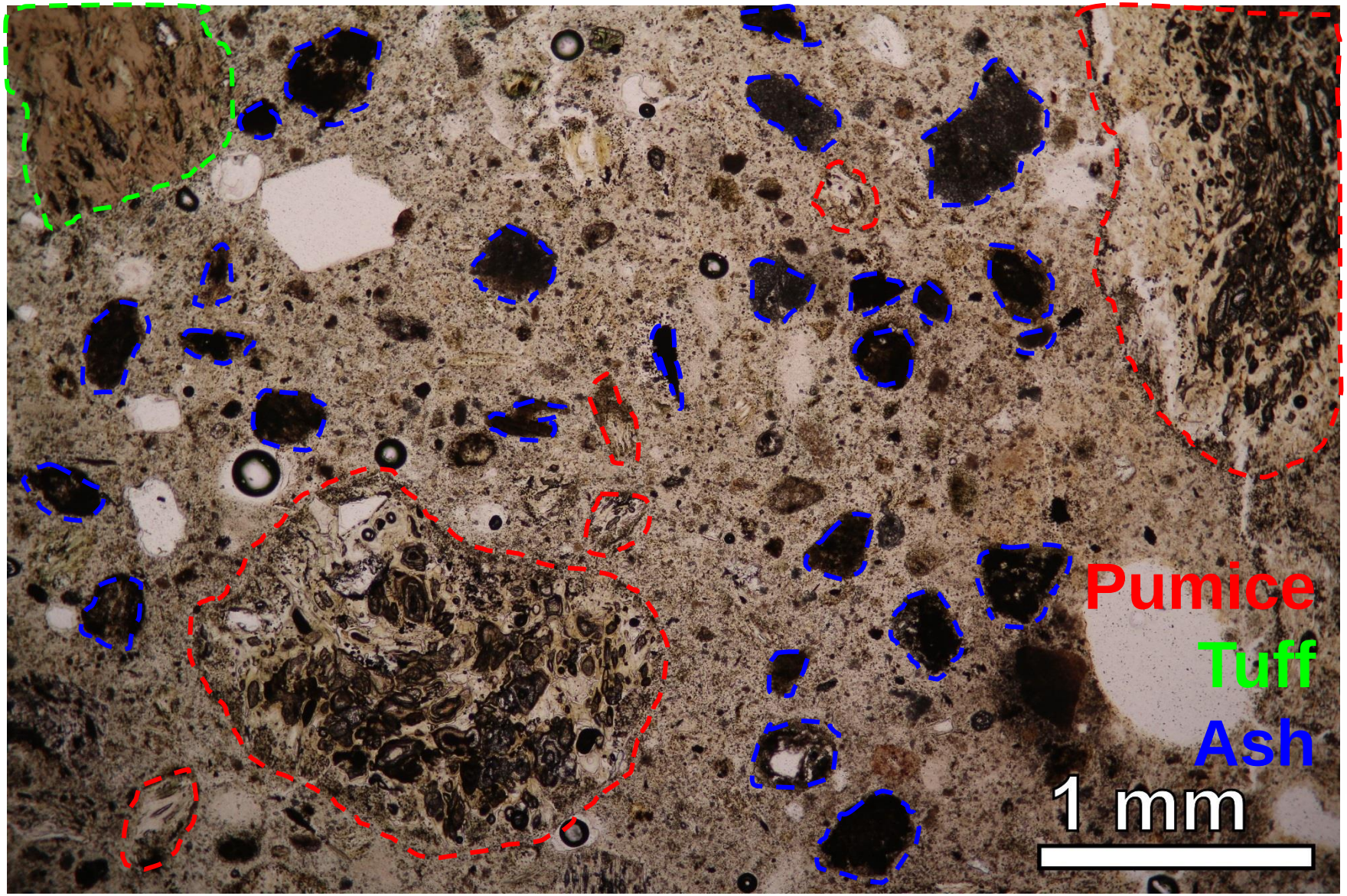




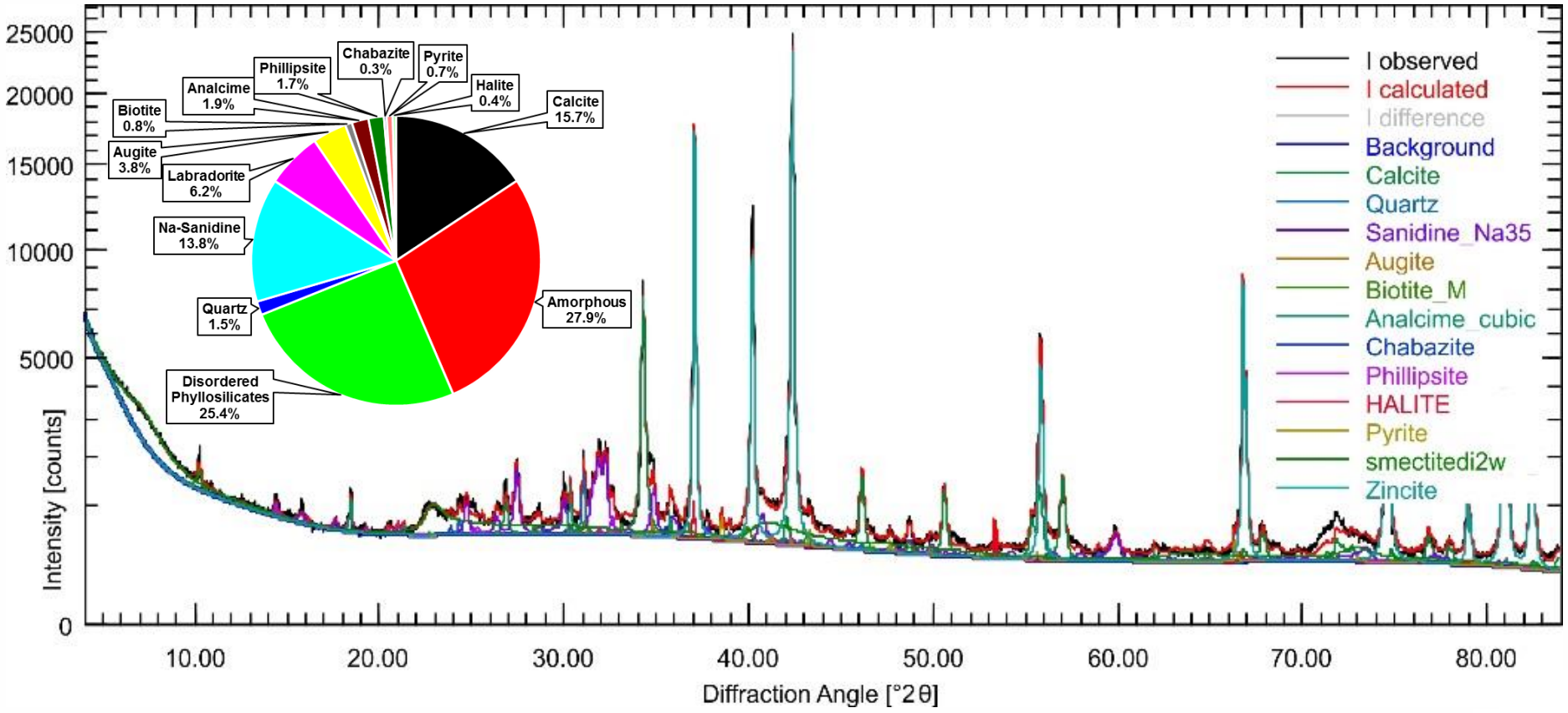


Laboratory activities

Data analysis



Data analysis



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THANK YOU FOR YOUR ATTENTION!

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