

New data on the technology of the frescoes from the Cathedral of S.George at Veliki Novgorod

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- The analytical data we present today are part of a research project of the Laboratory of Architectural Archaeology and Interdisciplinary Study of Architectural Monuments of the Institute of Archaeology, Russian Academy of Sciences, in Moscow.
- The research was carried out within the state assignment of Ministry of Science and Higher Education of the Russian Federation (title «Pre-Mongol frescoes in Novgorod: archaeological context and scientific research: The frescoes of the St. George's Cathedral, Yuriev monastery from the 2013/2020 excavations»).
- Agreement № 075-15-2021-576.

Veliki Novgorod : view of the Kremlin



The Yuriev Monastery seen from the Volkhov River





- Inside the Yuriev Monastery there are several churches, like for example this one, but the largest, most important and famous is the Cathedral of St. George

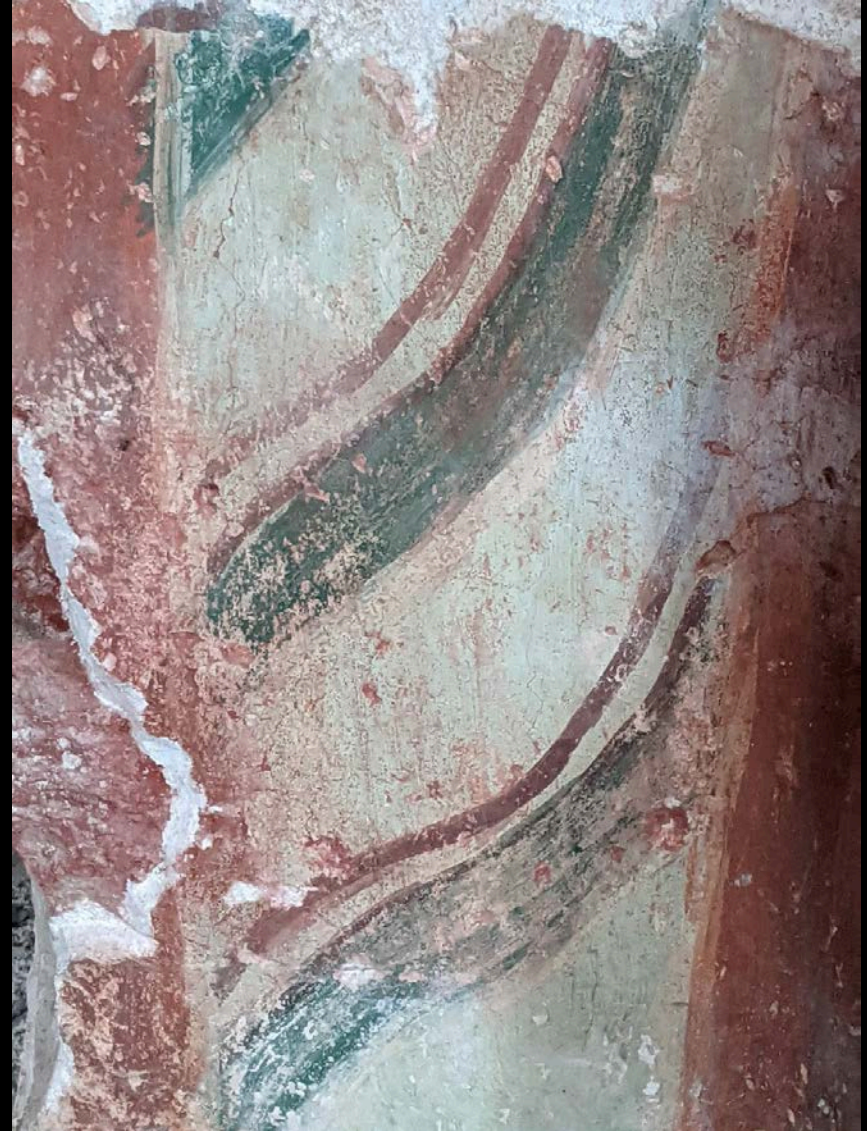
The Cathedral of St George in the Iuriev Monastery at Veliki Novgorod



The Cathedral and its surroundings have been excavated since 2013 and the excavations are still ongoing



Remains of the 12th century frescoes are preserved *in situ* under the latest floor, in the niches of some windows...



... and in the tower



The walls in the Cathedral have 20th century paintings (1902)



- Huge amounts of early fresco fragments were recovered in the excavations of the last 9 years, carried out by the Institute of Archaeology of the Russian Academy of Sciences of Moscow
- This is only one of the deposits



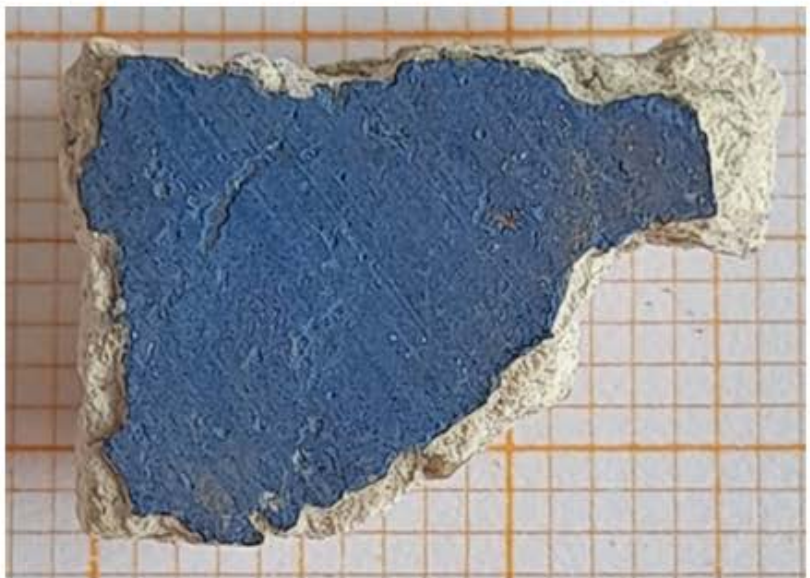
We have tens of thousands of fragments of all sizes. Monochrome, with geometric patterns, some with faces...






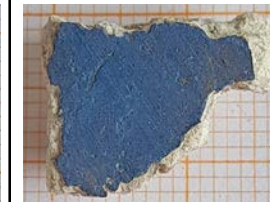


...some with writings or graffiti



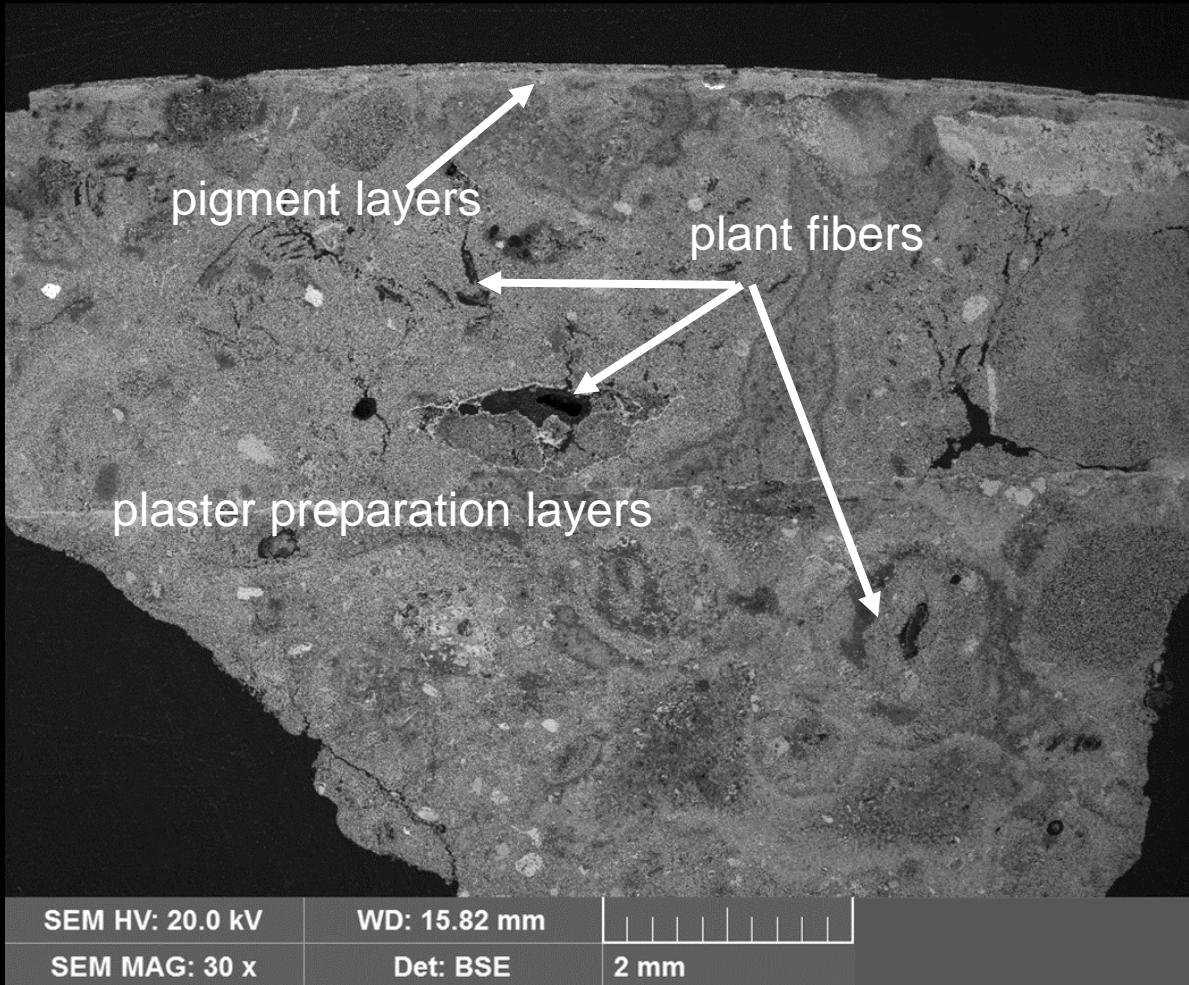
Selection of samples



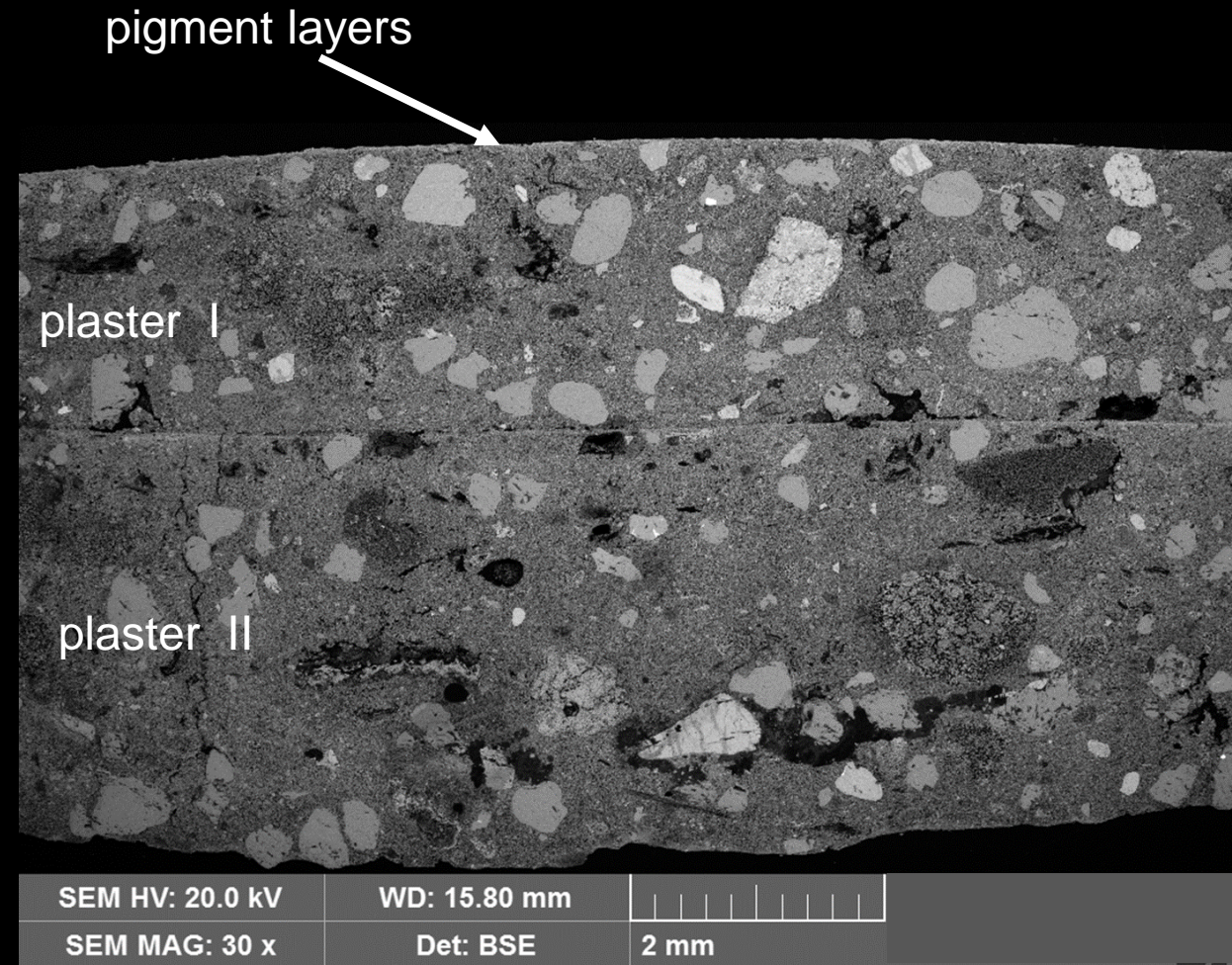
Micro-stratigraphy

						
COLOUR LAYERS						
WHITE PREPARATORY LAYER						
PREPARATORY LAYER WITH CHARCOAL						
PLASTER (II) LAYER WITH PLANT FIBERS						
PLASTER (I) LAYER WITH INORGANIC AGGREGATE						
PLASTER (II) LAYER WITH INORGANIC AGGREGATE						
	A2	B	A1	A1	A1	A1

Micro-stratigraphy

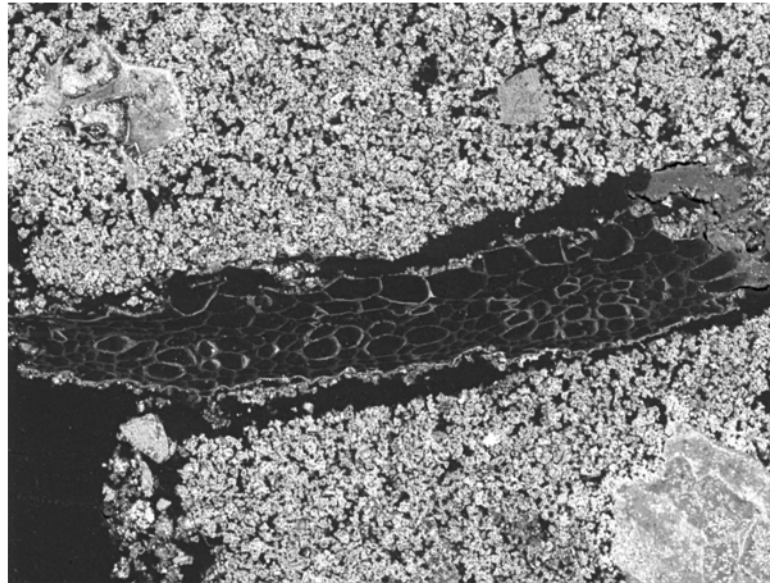


A1: blue pigment

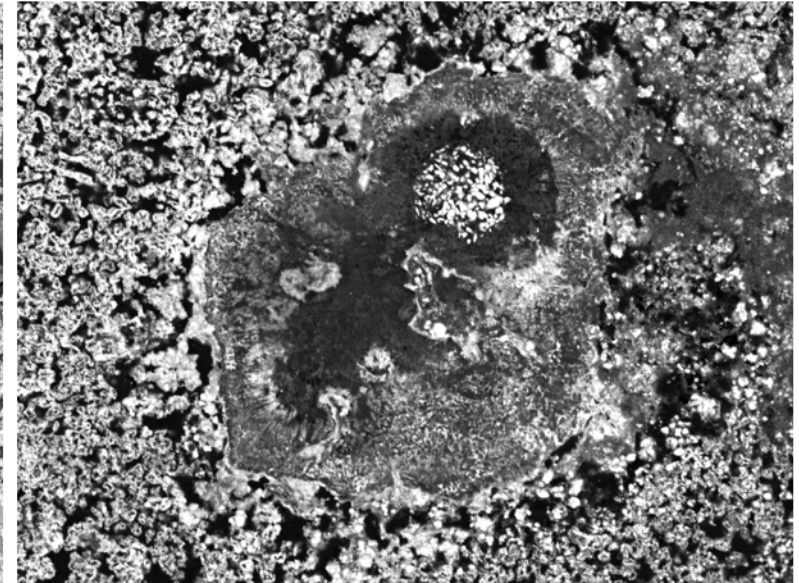


B: pale pink pigment

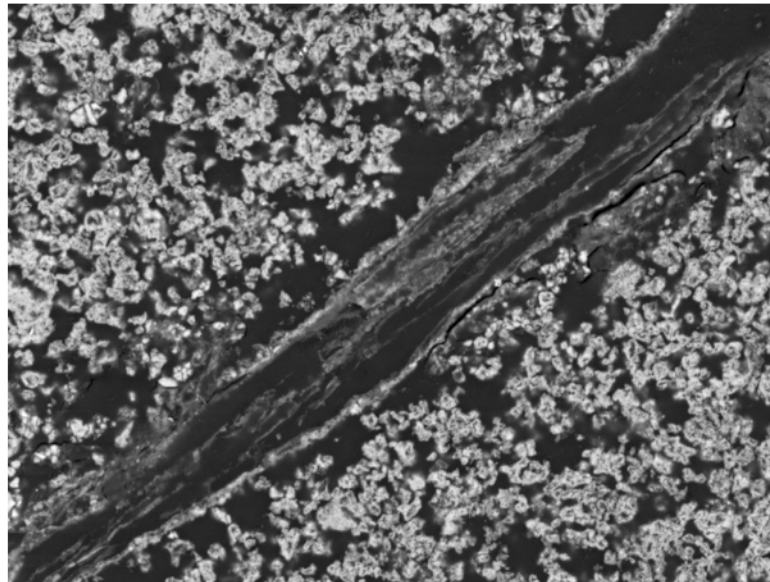
Vegetable fibres



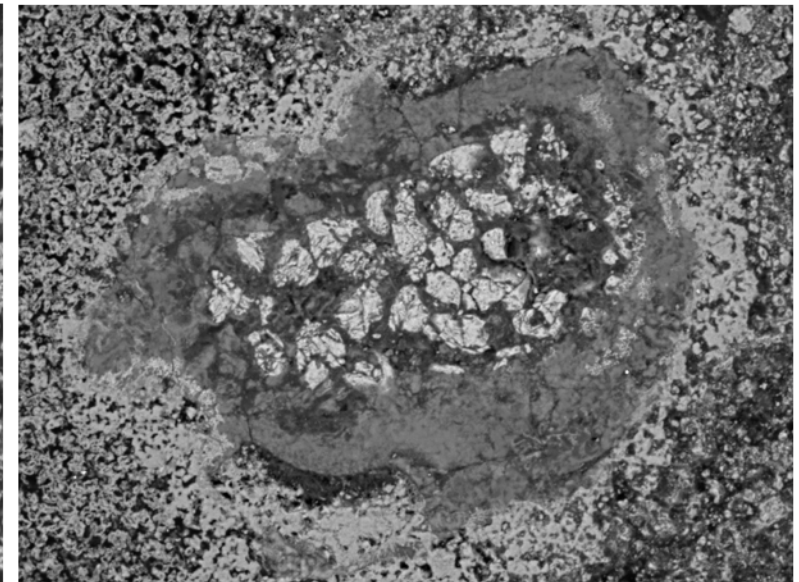
SEM HV: 20.0 kV WD: 15.62 mm
SEM MAG: 400 x Det: BSE 200 µm



SEM HV: 20.0 kV WD: 15.77 mm
SEM MAG: 900 x Det: BSE 100 µm

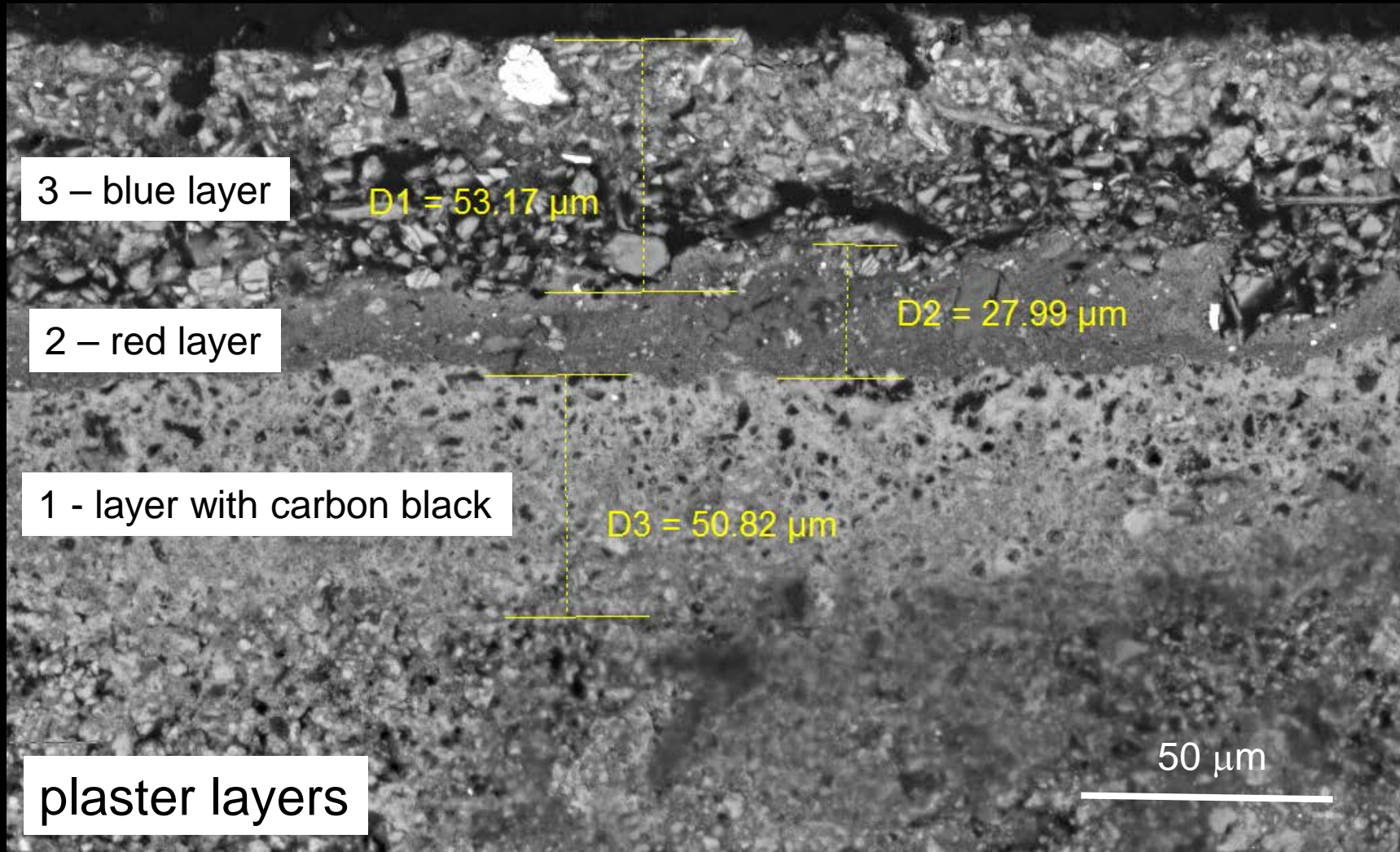


SEM HV: 20.0 kV WD: 15.71 mm
SEM MAG: 1.20 kx Det: BSE 50 µm



SEM HV: 20.0 kV WD: 16.14 mm
SEM MAG: 750 x Det: BSE 100 µm

the color palette: blue

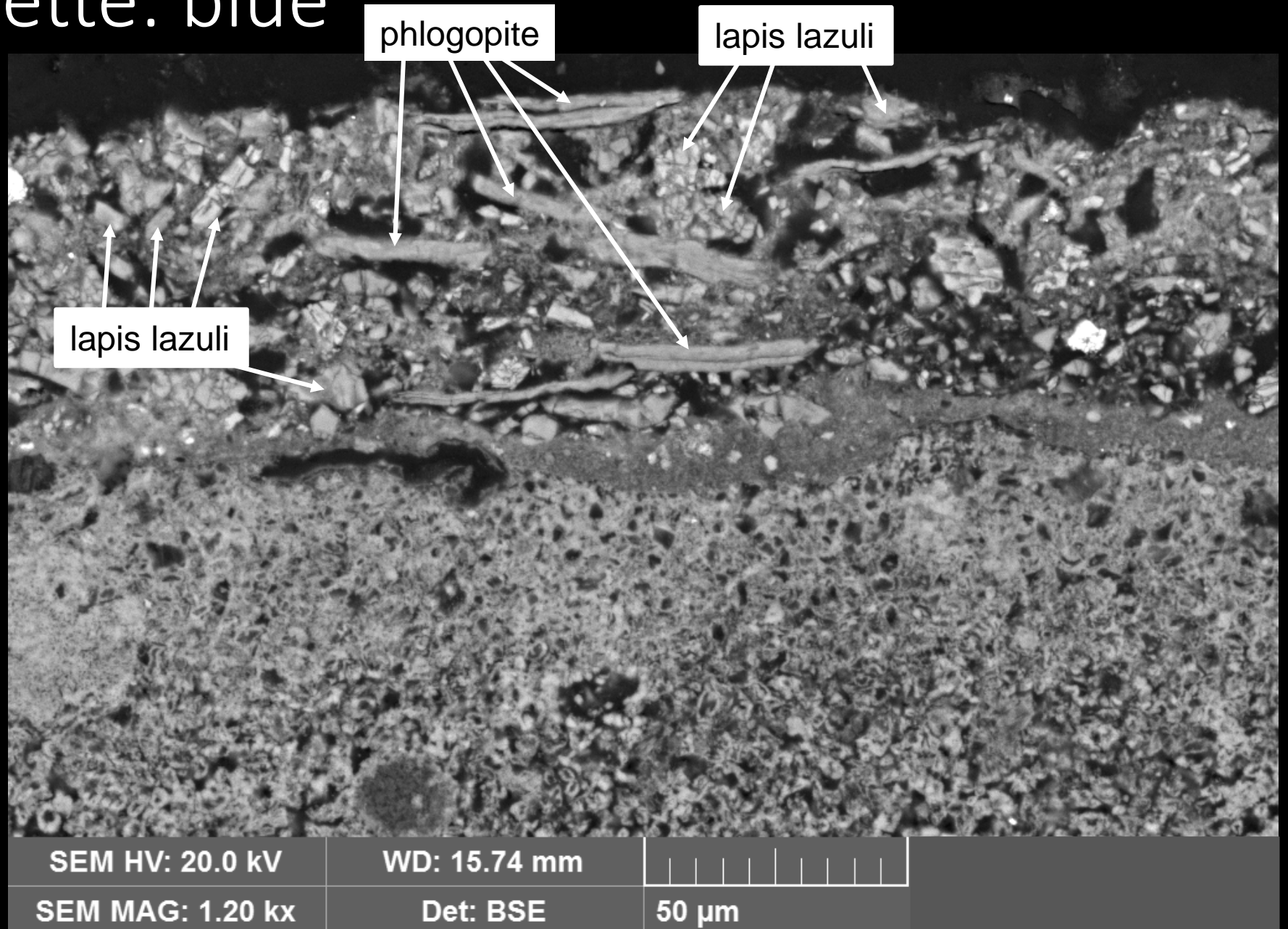


the color palette: blue

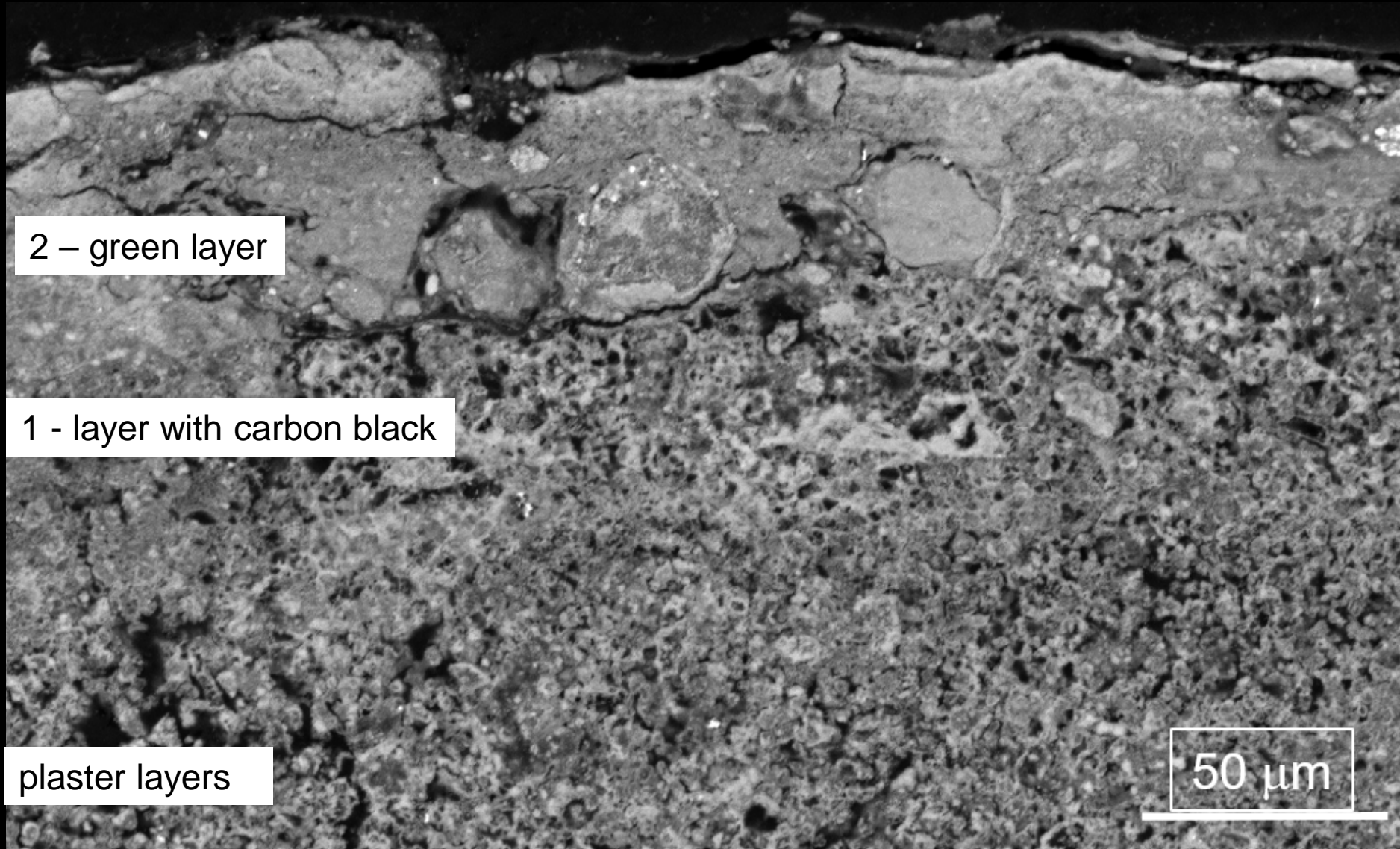
3 – blue layer

2 – red layer

1 - layer with carbon black



the color palette: green



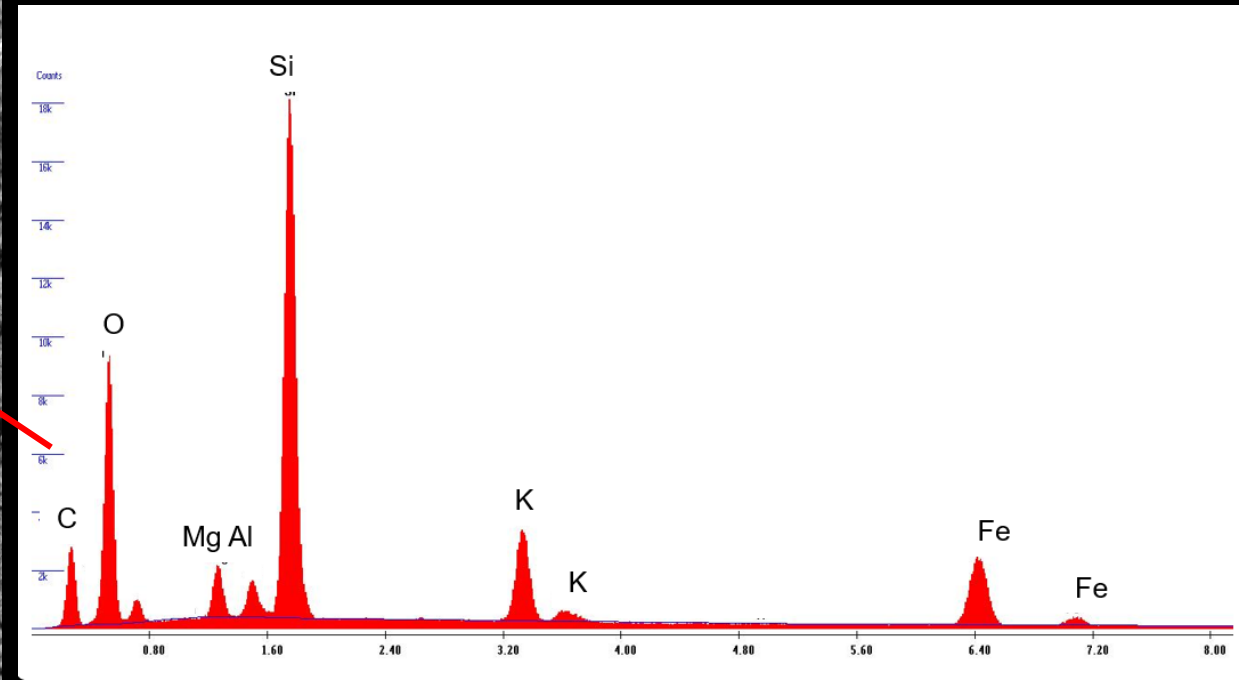
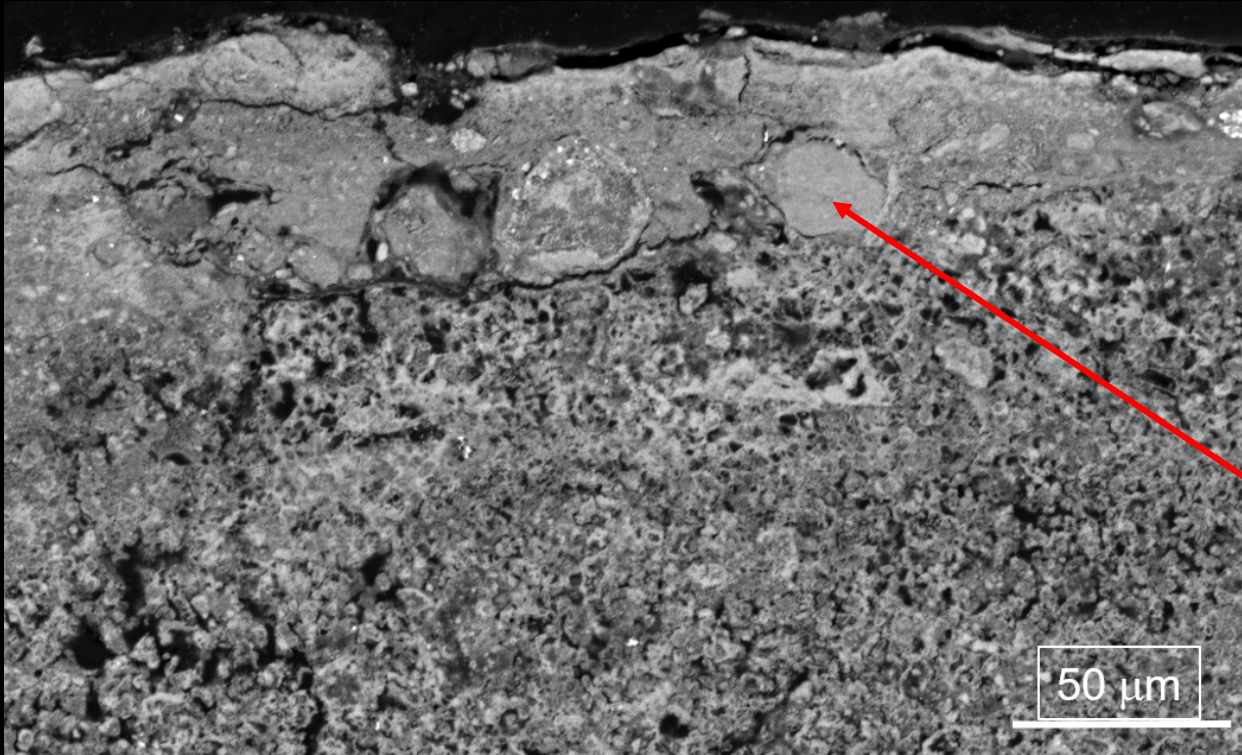
2 - green layer

1 - layer with carbon black

plaster layers

50 μm

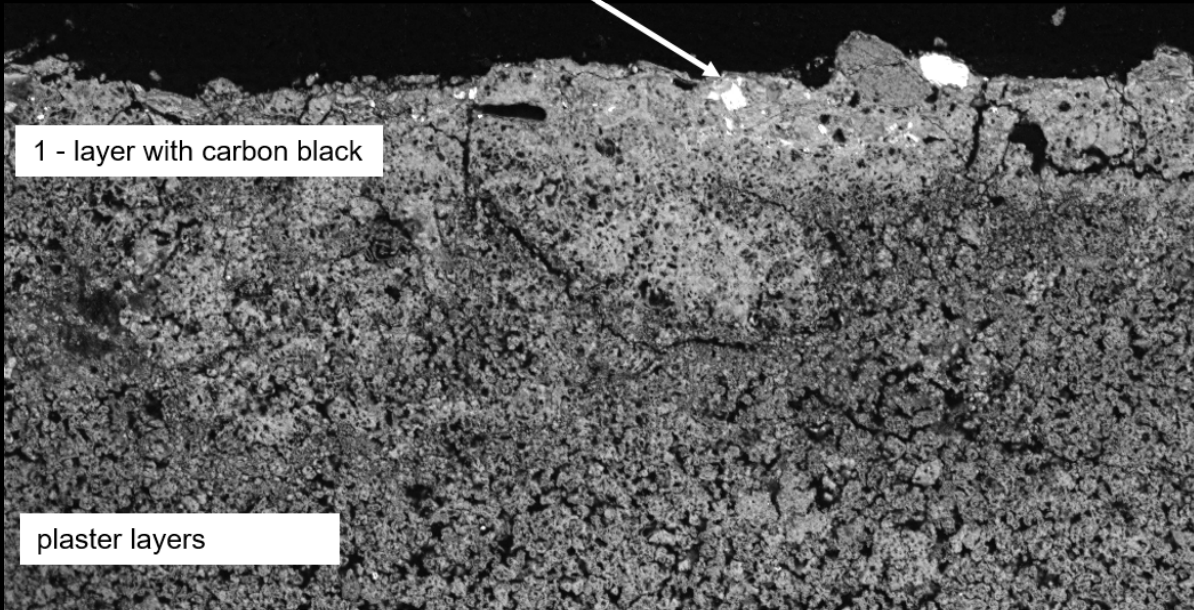
the color palette: green



the color palette: red



2 - red layer



1 - layer with carbon black

plaster layers

SEM HV: 20.0 kV

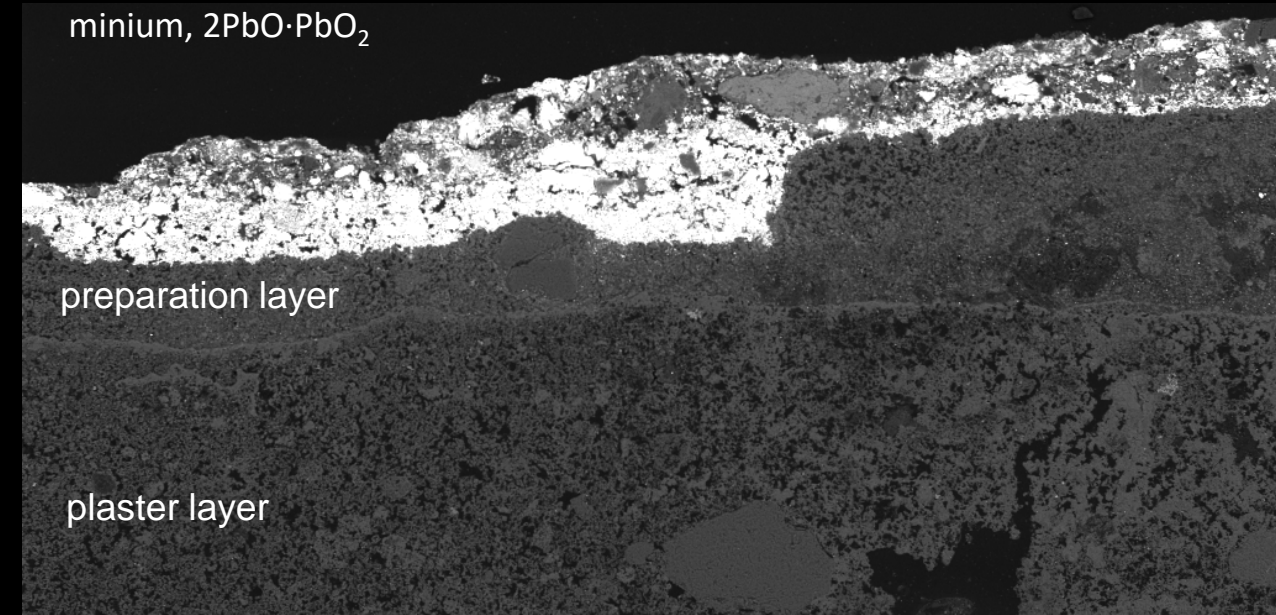
WD: 15.82 mm



SEM MAG: 500 x

Det: BSE

100 μ m



minium, $2\text{PbO}\cdot\text{PbO}_2$

preparation layer

plaster layer

SEM HV: 20.0 kV

WD: 15.80 mm



SEM MAG: 200 x

Det: BSE

200 μ m

CONCLUSIONS

1 – The study of the plaster (or intonaco) and other substrates helps in recognizing the fragments from different periods

2 – The earlier plasters consist of lime mixed with vegetable fibres that render the intonaco more robust and balance the shrinkage of the material in the hardening phase.

3 – the 12th century palette consists of natural pigments, some of which «a fresco» i.e., ochres and green earths. The blue pigment was applied with a more complex technique that enhanced the color of mixed pigments. The minium, is applied «a secco» because this pigment cannot be used on calcium carbonate

4 – the techniques and the materials identified, demonstrate the empirical knowledge about the materials and the skill of the artists that produced the wall-paintings in the St. George Cathedral