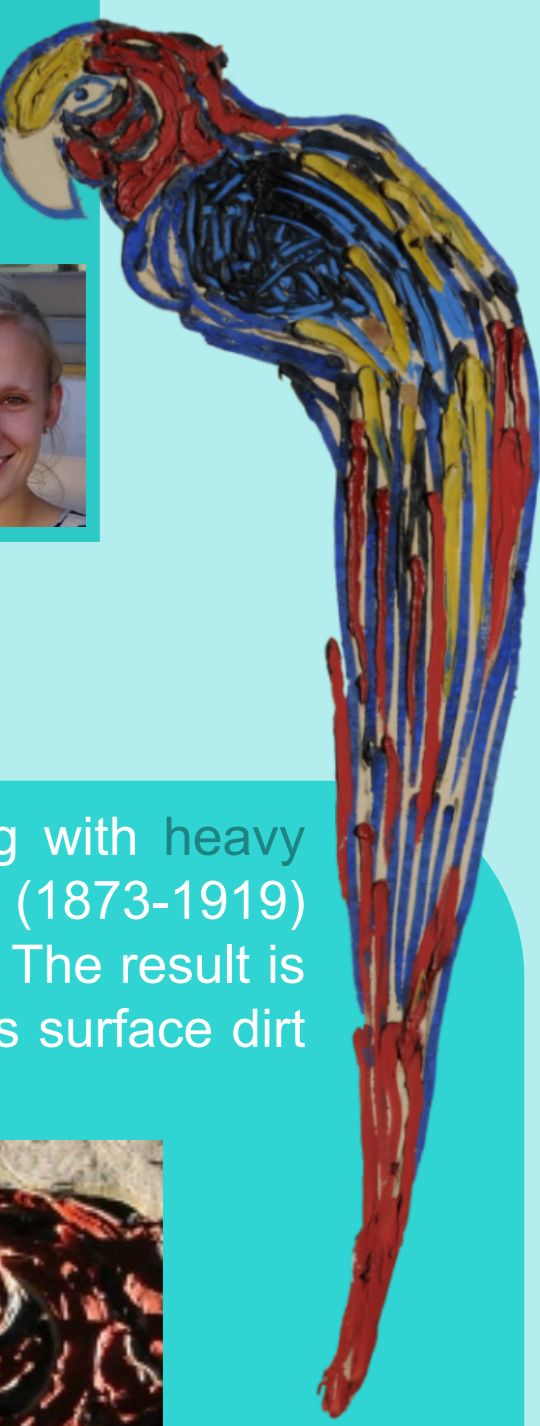


Statistical Evaluation of Surface Roughness Measurements to Evaluate Rigid and Mouldable Hydrogels for Cleaning Unvarnished Oil Paint with Heavy Impasto



inp

CENTRE DE RECHERCHE ET DE RESTAURATION DES MUSÉES DE FRANCE



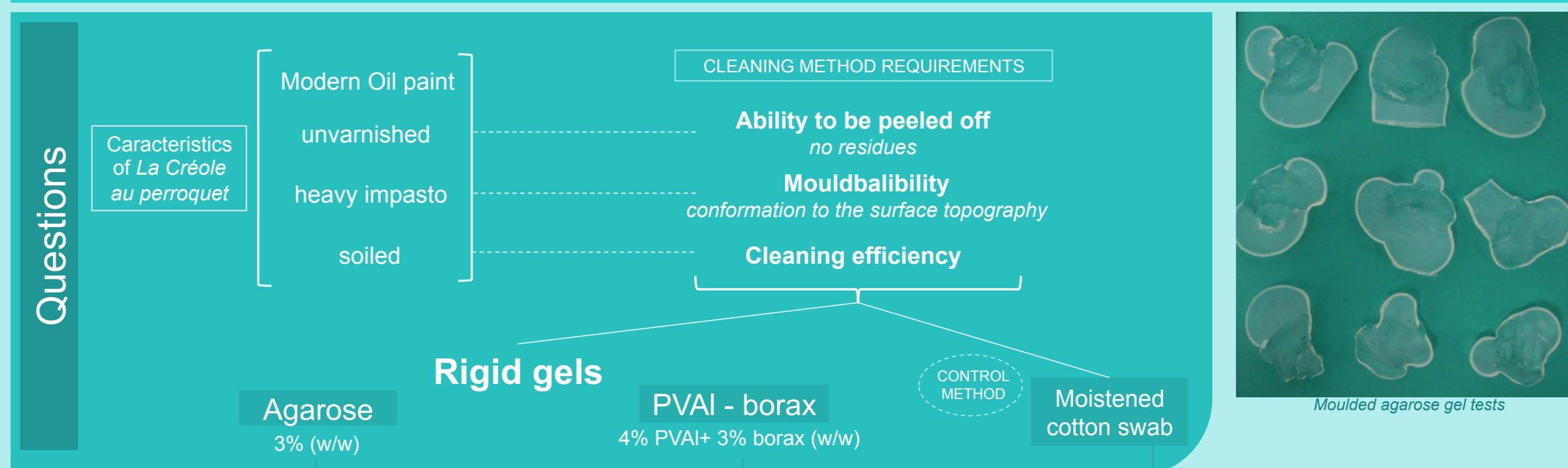
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 Pauline Hérou-de La Grandière }
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Dated c.1910, *La Créole au perroquet* (Creole with a Parrot) is an unvarnished oil painting with heavy impasto which presented challenges for cleaning. French painter Alexis Mérodack-Jeaneau (1873-1919) was one of the first artists to squeeze paint directly from the tube onto the pre-primed canvas. The result is a boldly impasted but unvarnished painting, which now exhibits a significant layer of tenacious surface dirt adsorbed directly into the paint surface.



Different cleaning approaches were explored in order to find a safe and effective procedure for carrying out surface cleaning on this complex surface. Typical conservation cleaning approaches involving solvents applied with cotton swabs or dry cleaning methods were unsuitable for the impasted passages, where accumulated dirt was often inaccessible within interstices of the paint. Cleaning materials such as gels that have the potential to conform to the surface topography of impasto, restrict water diffusion into materials, and can be removed without leaving residues, were therefore explored.



La Créole au perroquet, Alexis Mérodack-Jeaneau, circa 1910, 130,5 x 97,5 cm, oil paint on canvas, musée des Beaux-Arts d'Angers, France

Find an adequate method to control the cleaning efficiency of rigid gels of an unvarnished heavy impasto surface

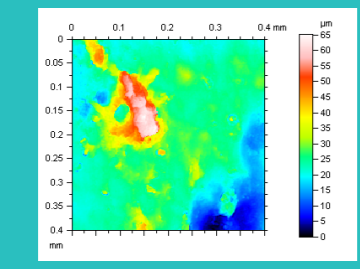
Cleaning action Surface preservation

CONTROL

Topographical measurements at a microscopical scale => **ROUGHNESS CONTROL**

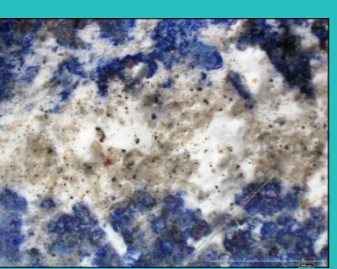
MICROTOPOGRAPHY

Wavelength scanning => chromatic coding
STIL® Micromesure*



3D MICROSCOPY

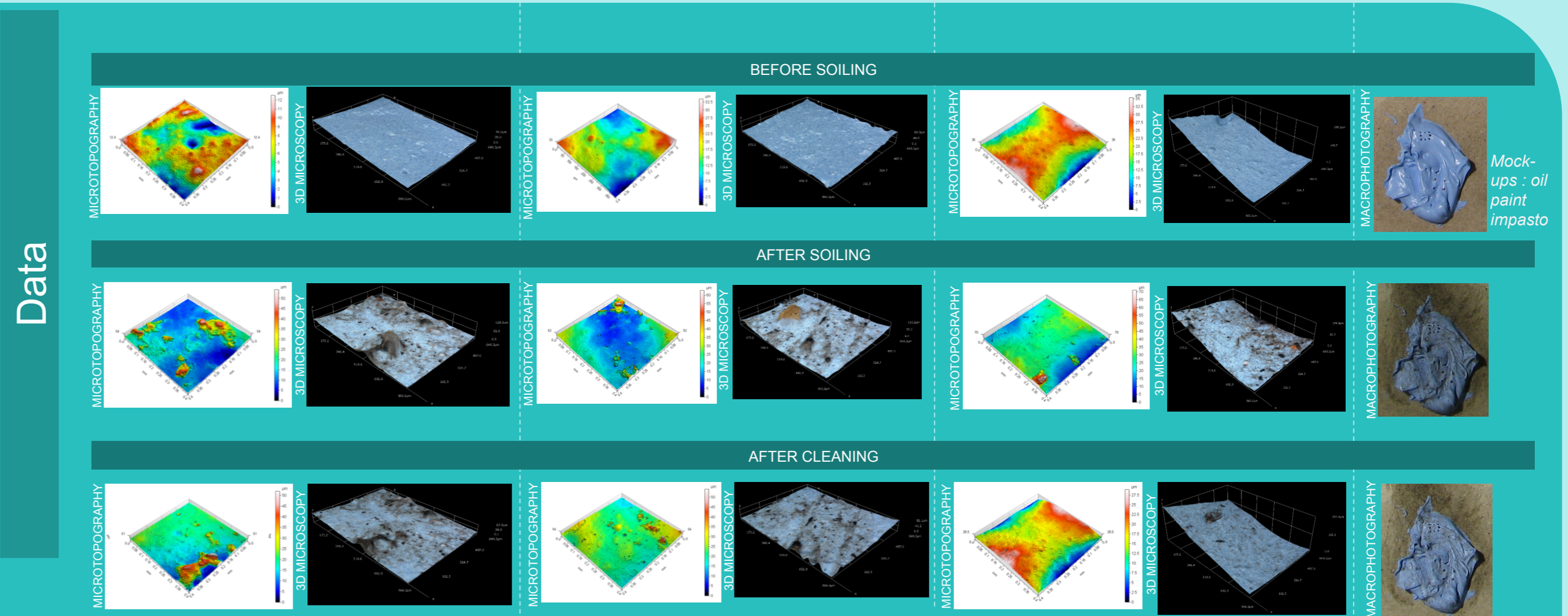
digitally enhanced 3D image
Hirox®*



Those two methods are non invasive and possible *in situ*.

*Both available at the Centre de Recherche et de Restauration des Musées de France (C2RMF), Paris, France. Special thanks to Nicolas Mélard, archaeologist and curator, C2RMF.

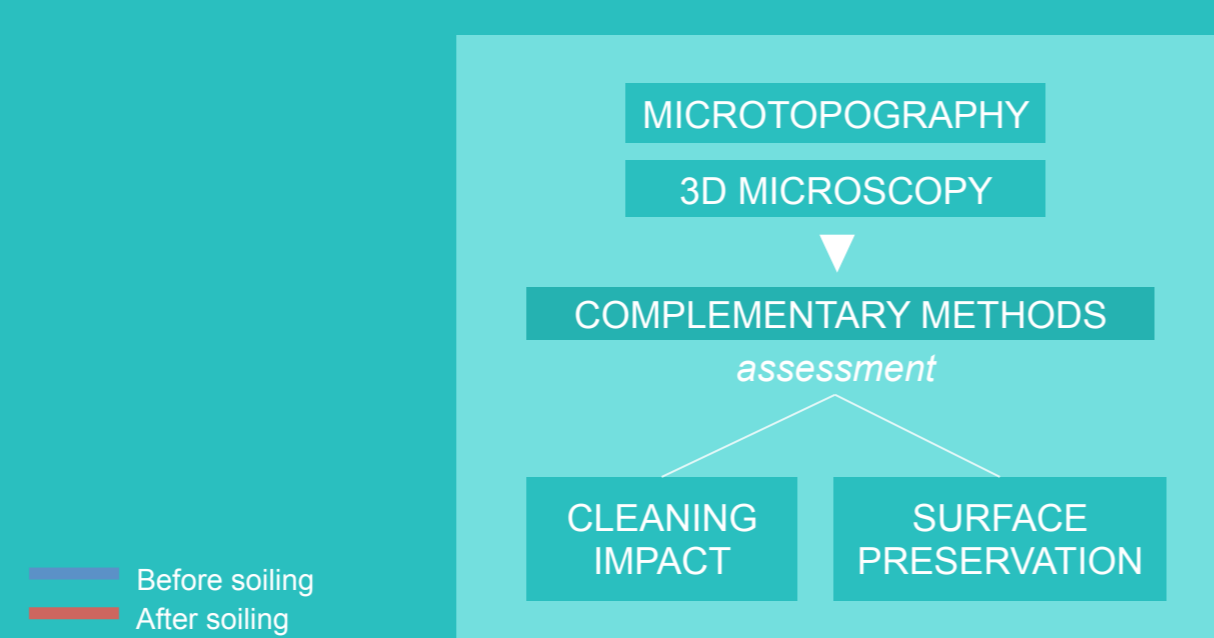
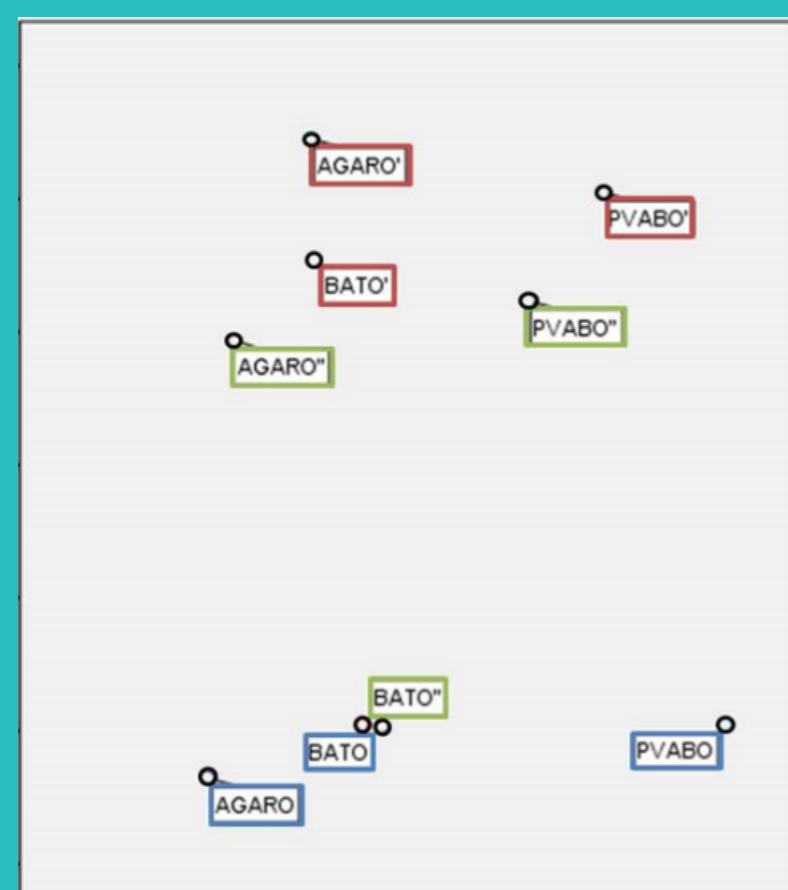
Modus operandi



Data processing



data reduction
visualization
description



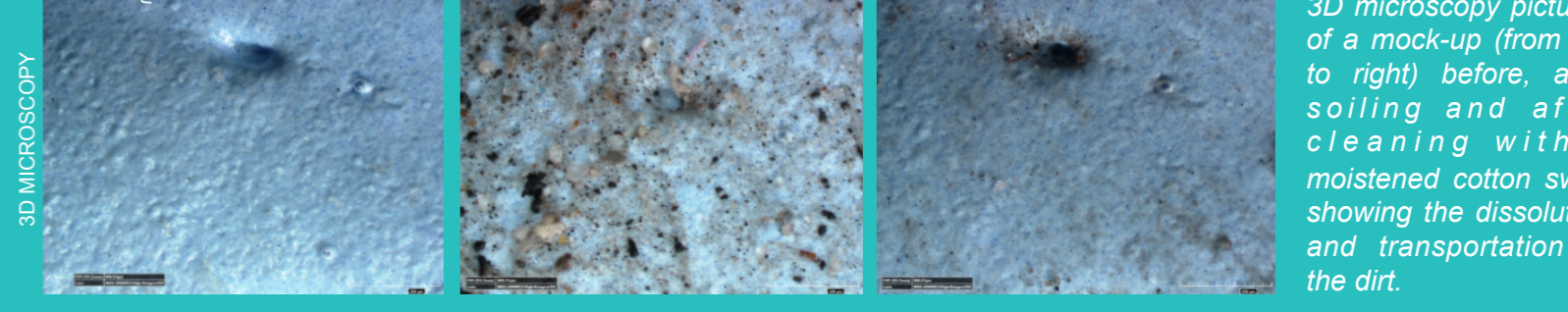
PCA illustrating changes in roughness, before soiling (blue), after soiling (red) and after cleaning (green). AGARO = mock-ups cleaned with agarose, PVABO with PVAI/borax, and BATO with a moistened cotton swab.

Results

	Mouldability	Peeling off	Surface preservation	Cleaning action
Agarose	●●●●	●●●●	●●●●	●●
PVAI - borax	●●	●	●●●●	●
Moistened cotton swab	—	—	✗	●●●●

● Positive action ✗ Negative action — Irrelevance

most similar roughness value before soiling and after cleaning
3D microscopy images showed a surface that was even dirtier after cleaning, due to the dissolution and the transportation of dirt by the cotton swab



Conclusions

This study demonstrated the benefit of coupling roughness measurements and microscopic surface examination for evaluating cleaning of impasted paint using mouldable gels. Unfortunately, it revealed that the hydrogels tested were not sufficiently effective at cleaning the impasted paint mock-ups, which was confirmed by tests conducted on the artwork. The impasted areas were finally cleaned with a Velvessil Plus silicone gel carrying 5-10% water.

