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# A Bridge With MAPS Mineralogy PerGeos v1.7

## 1. Introduction

With the introduction of the Maps Mineralogy™ software suite, the successor of Qemscan, the technology has evolved, thanks to multiple patents bringing novel methods to acquire mineralogical information from digital rock samples with a modern and user friendly interface.

However, given the hardware technology advances and the emergence of new challenges in reservoir rocks, there is a need to fusion the mineralogical image and the back scattered electron image, and to upscale to the microCT data, in order to be able to characterize the mineralogy at a larger scale.

PerGeos brings the image analysis algorithms and workflows to achieve this post processing step in a versatile platform and offers an unprecedented level of repeatability for routine tasks.

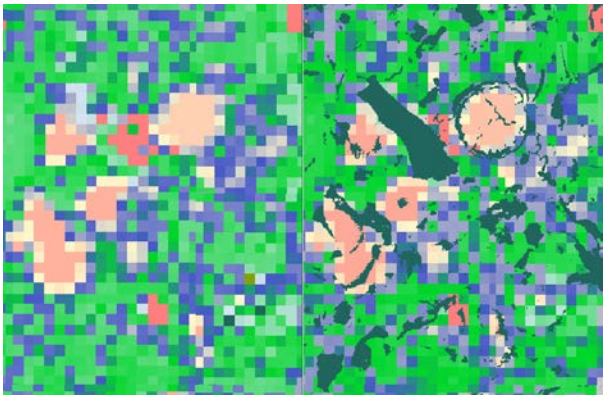

***Figure 1.***

***LEFT: EDS image acquired with Maps Mineralogy.***

***RIGHT: fusioned with BSE with PerGeos workflows.***

*Note: images courtesy Stefan Löhr, Macquarie University*

## 2. Fusioning the BSE and EDS images in PerGeos

Regardless of the image size and resolution, two advanced fusion workflows have been identified :

- A fusion by grains, where the BSE image is split into individual components, and the most representative mineral is assigned to every individual. This allows adding mineralogical information to high resolution analysis of grain based shapes ( orientation, equivalent diameter, volume, area, etc).
- A fusion by pixels, where the high resolution BSE image is enriched with mineralogical information, allowing pore-to-grains boundary mineralogy and high resolution particles determination

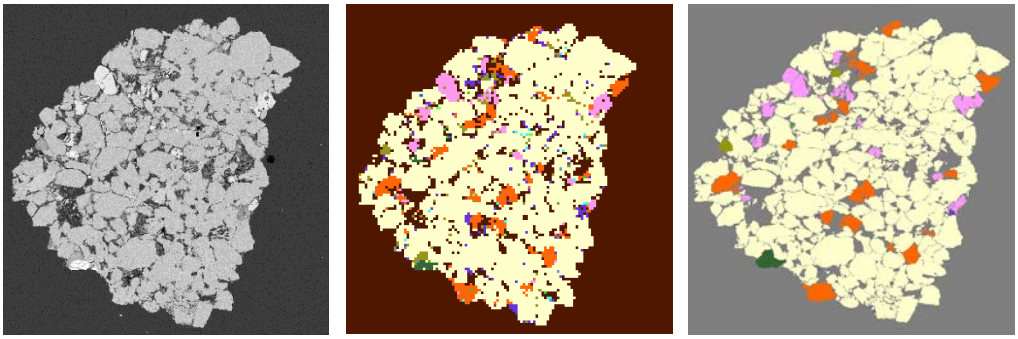

***Figure 2***

***LEFT: BSE image***

***MIDDLE: EDS image***

***RIGHT: fusioned high resolution mineralogy image***

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## 3. Extracting properties from the fusioned image

Thanks to a rich library of image processing algorithms, multiple workflows have been implemented, and are available through recipes, allowing routine tasks such as :

- Minerals bordering the organic matter in shales
- High resolution pyrite extraction
- Pyrite individualization
- Pyrite vs framboïds differentiation
- Mineral grain size distribution
- Shape factor based mineral Classification

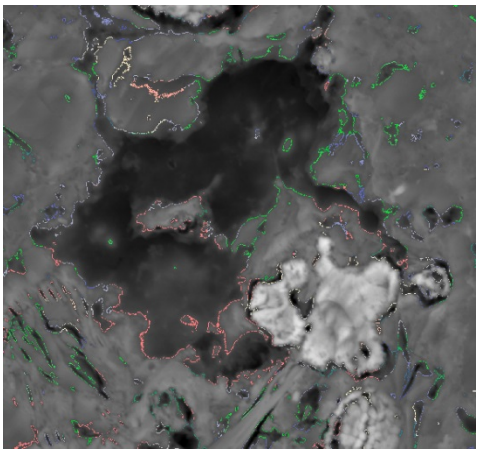

***Figure 3 Mineral pixels bordering the organic matter***

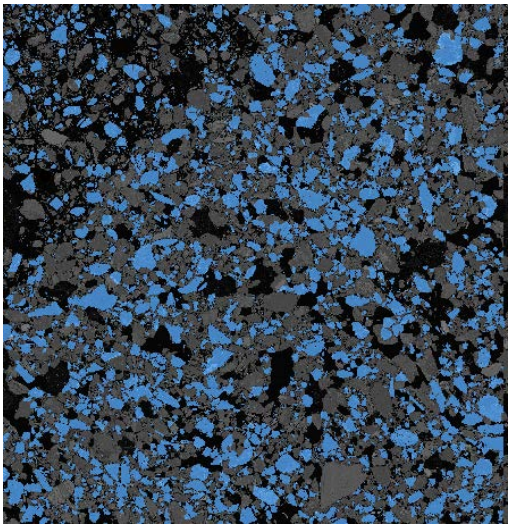

***Figure 4 Quartz grains in a silt-size Loess deposit***

## 4. Upscaling to 3D microCT samples

When the corresponding microCT data is available, the fusion can be performed in the 3d dimension. Registering the mineral image in the corresponding plug offers a way of finding correlation metrics between the identified minerals on the thin section and the crossed rock structure of the microCT data, thus opening the door for a 3D mineralogical mapping.