Inhomogenity →

"Perfect" crystals

Crystal-scale phenomena, e.g. twinning (diffraction-based techniques are more suitable)

"Homogenous" rocks

Fracture-dominated behaviour

"Heterogenous" rocks

Inclusion-dominated behaviour (e.g. porosity, inclusions)

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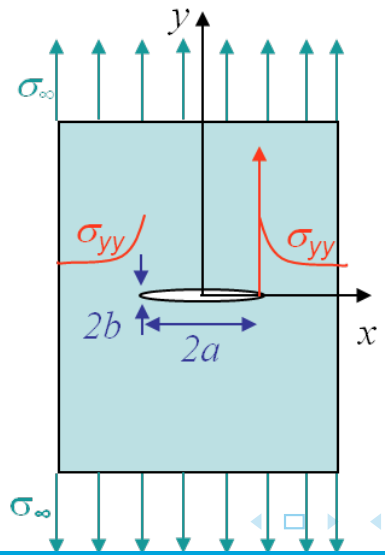
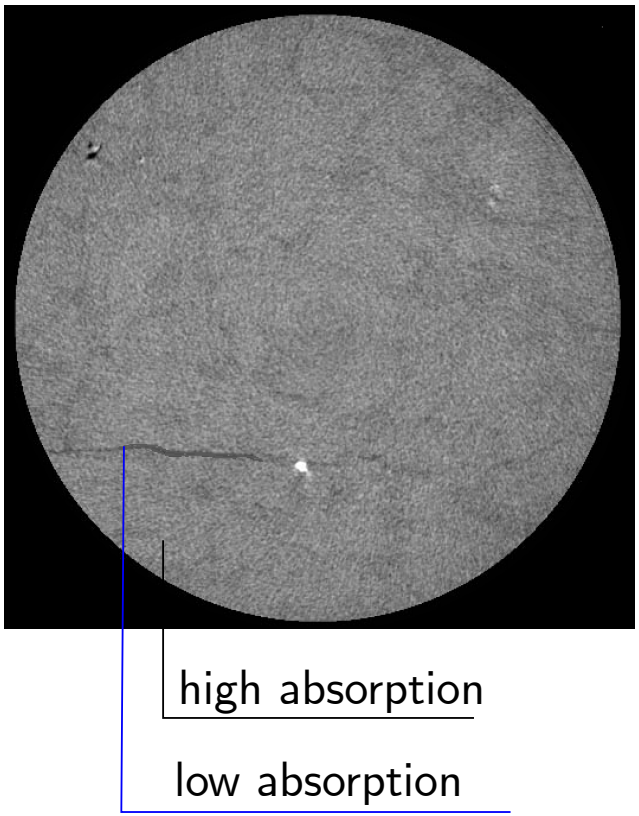
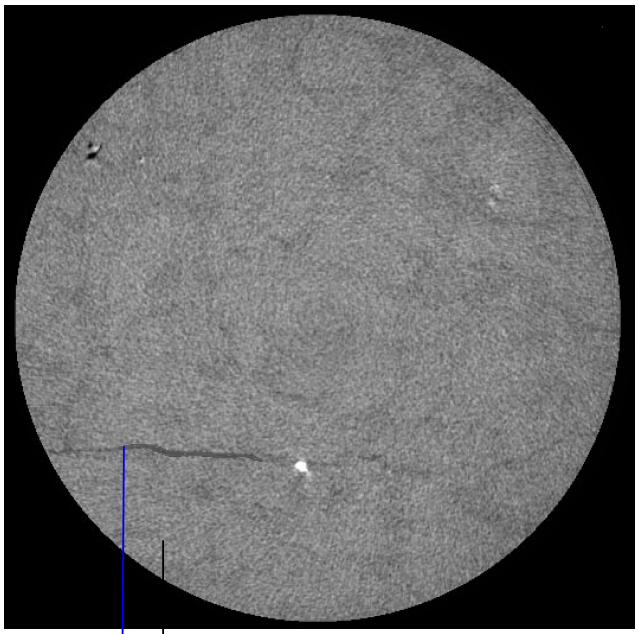


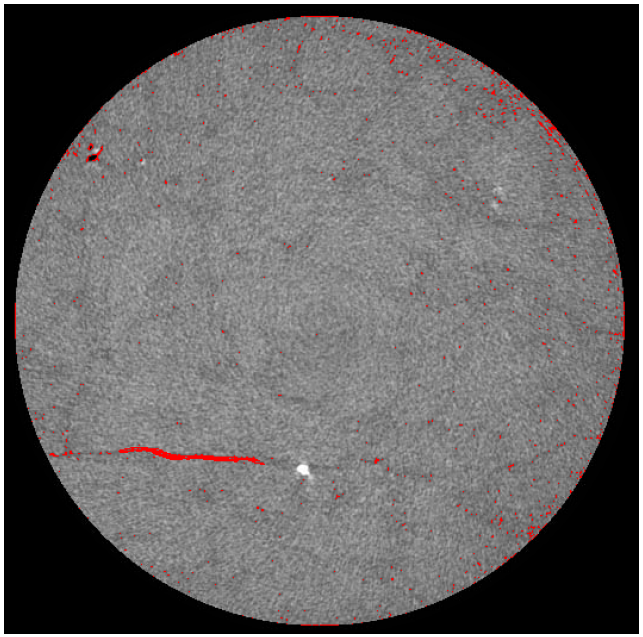

high absorption
low absorption

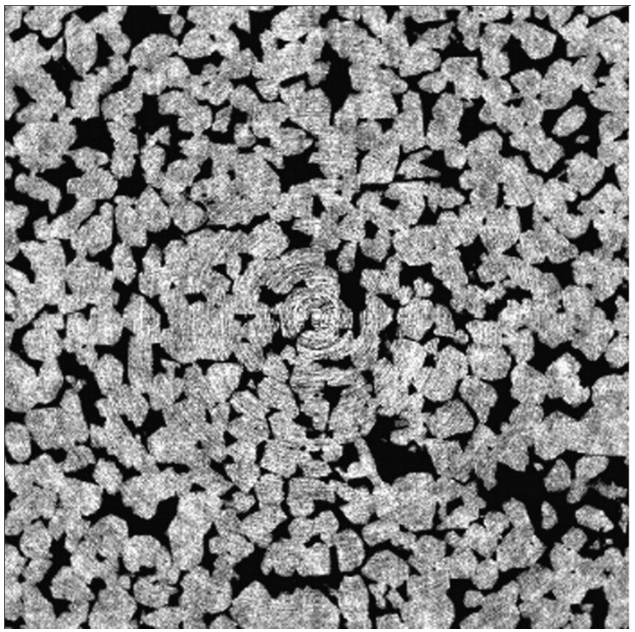


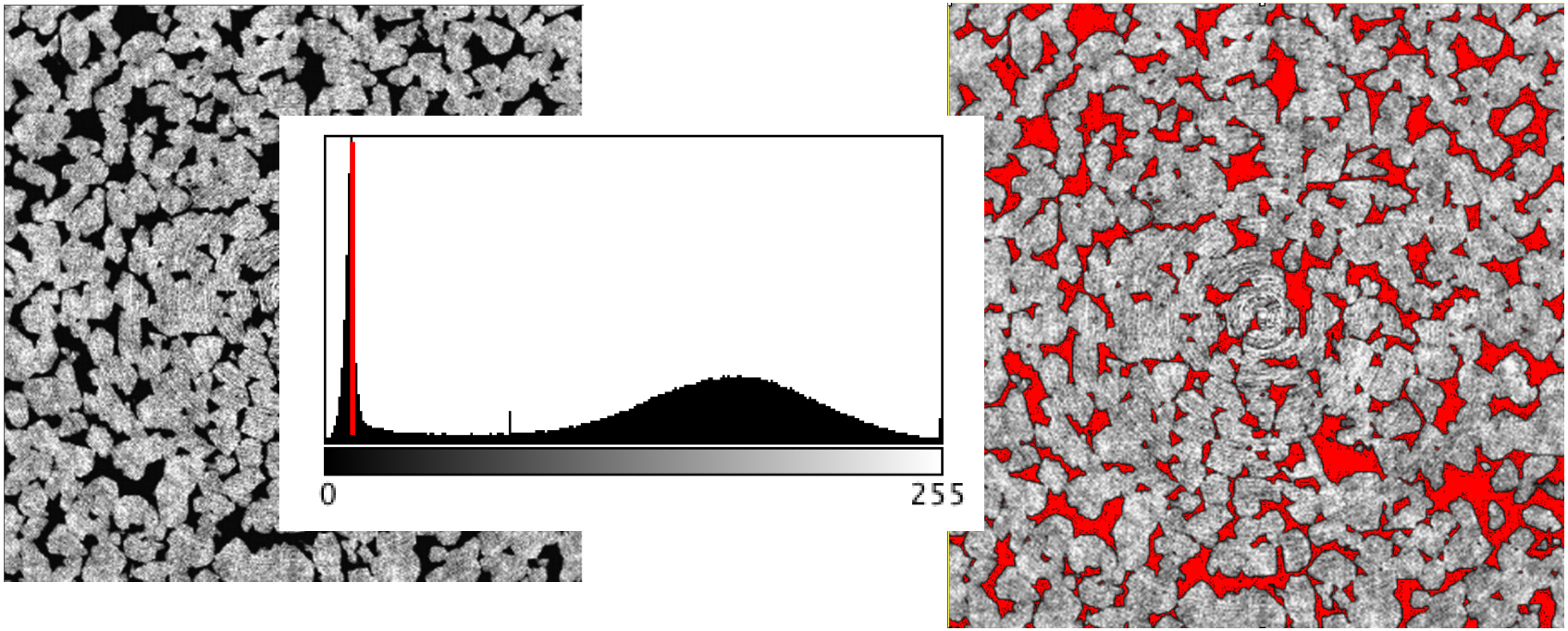
high absorption

low absorption

gray-level
tresholding



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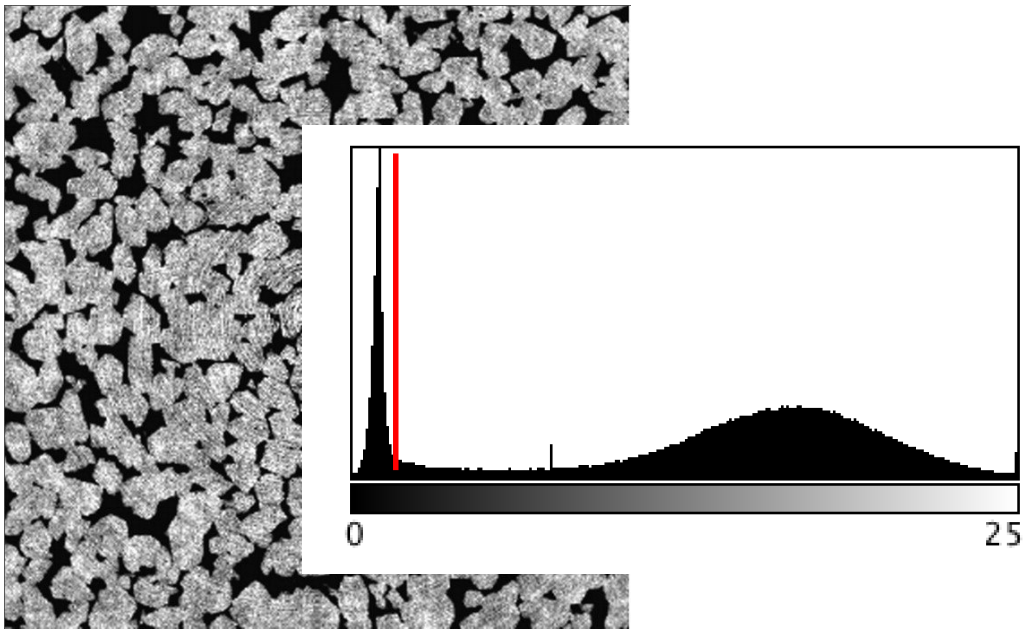
255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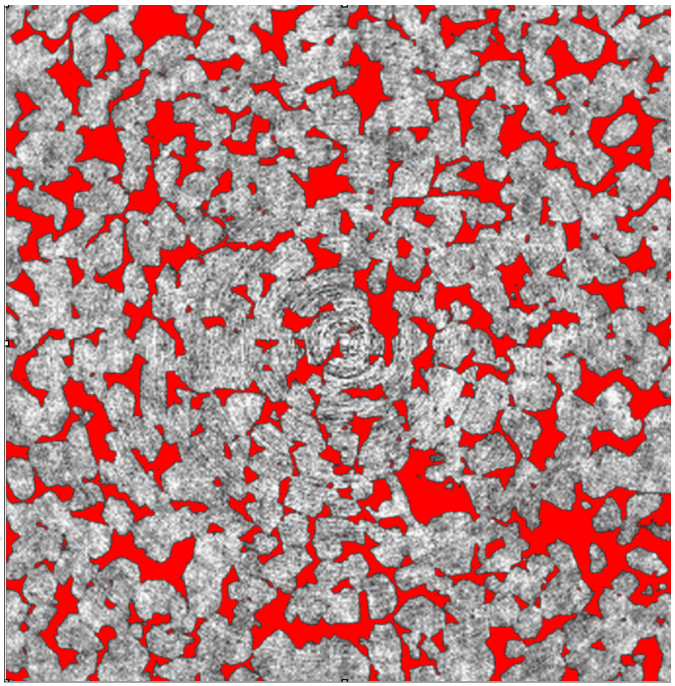

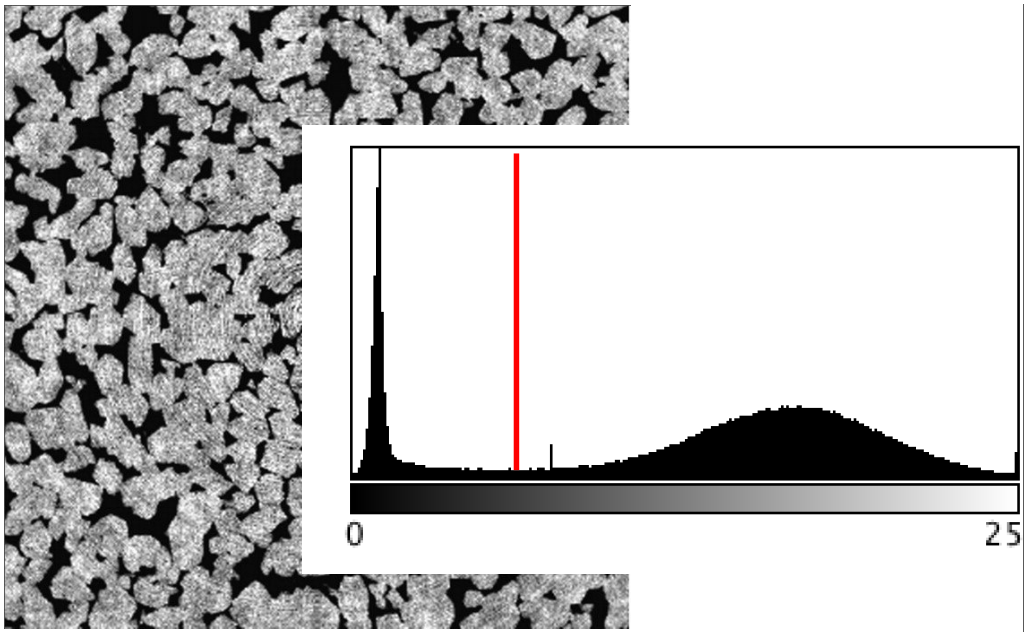
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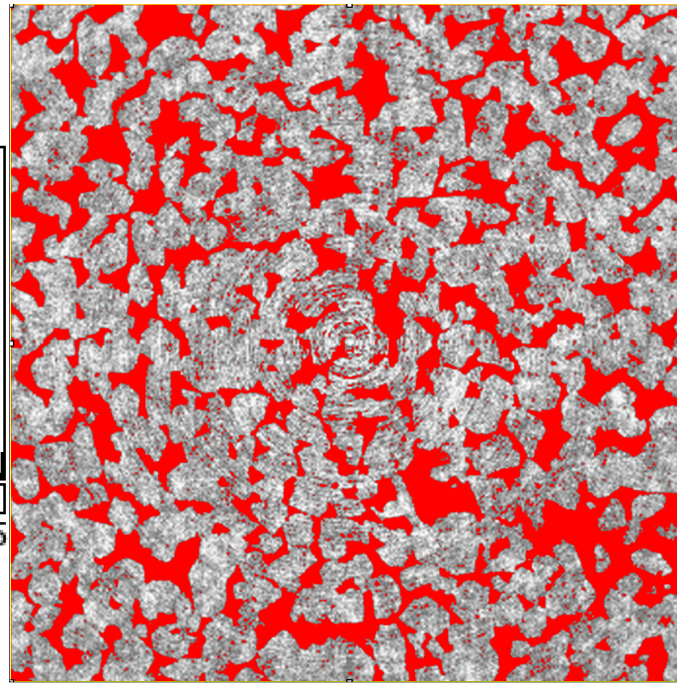
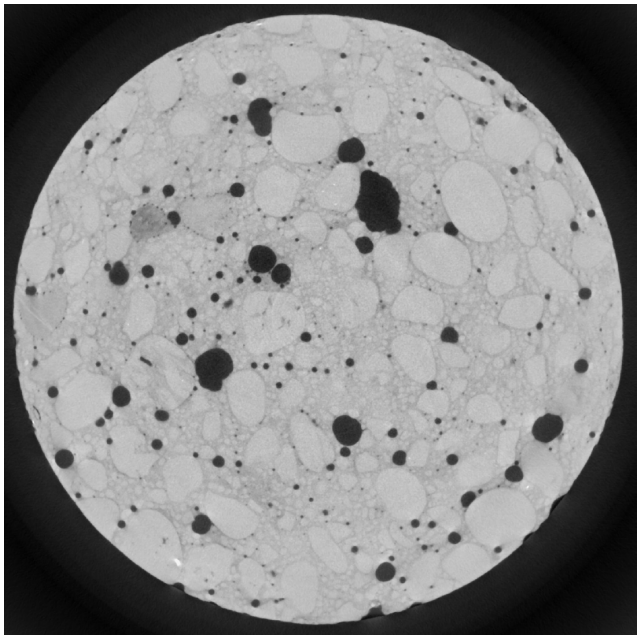
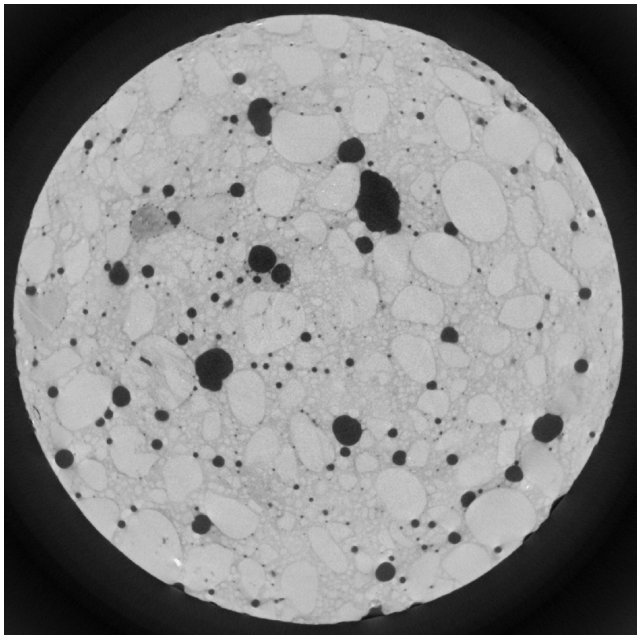


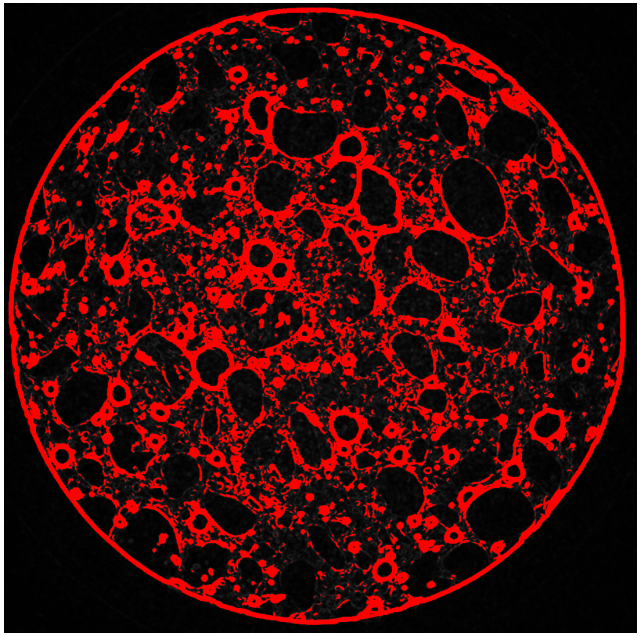
How do we define this threshold?

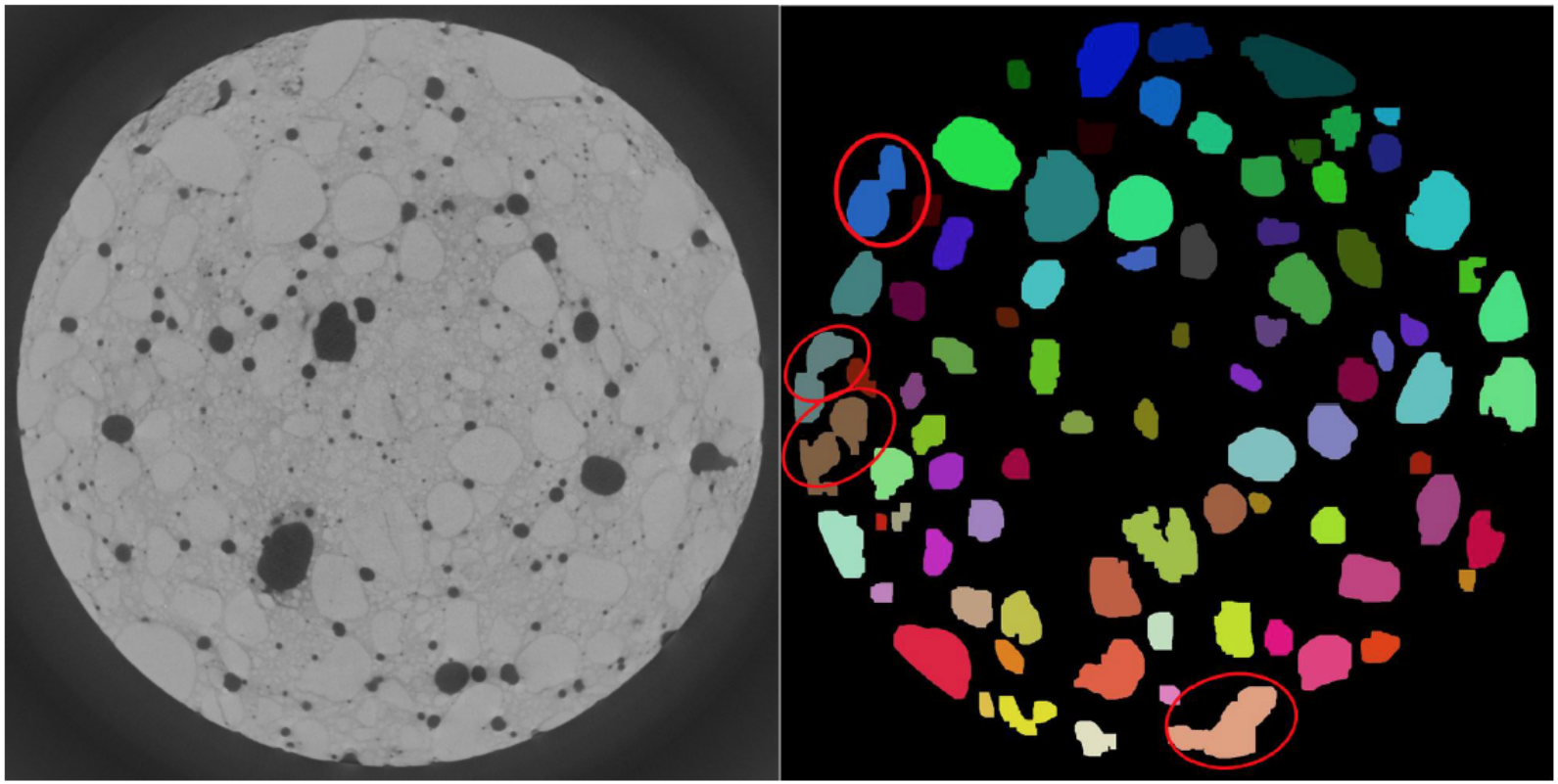
- "by eye" $\rightarrow$ NOT quantitative....and user dependent. (The study of its evolution *can* still be quantitative if consistent.)
- *a-priori information* such as the total porosity (I still get its distribution!)
- Categorizing thresholding methods (local+global)
  - Histogram shape-based methods
  - Clustering-based methods (e.g. Otsu, which minimizes the intra-class variance)
  - Entropy-based methods
  - Object Attribute-based methods
  - ...





edge detection
(e.g. variance).





(a) Grey scale image (b) Segmented aggregate labelled image

The Pandora's box of segmentation....which one to use?

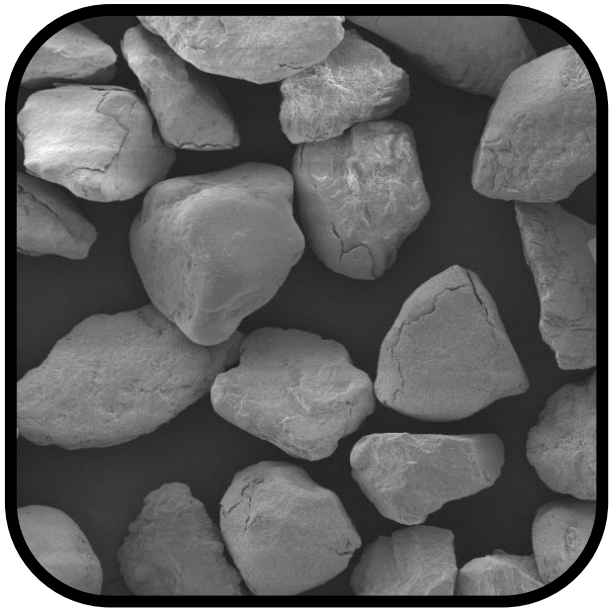
- Histogram-based methods
- Edge detection
- Watershed transformation
- Level set methods
- Trainable segmentation
- Region-growing methods
- Compression-based methods
- Clustering methods
- Dual clustering method
- Partial differential equation-based methods
- ....

3**personal take: any method is a-priori fine, as long as one is aware of the induced error and is able to quantify it using ground-truth reference cases.**

Continuum

e.g. granite,
basalt, marble...

Discrete



e.g. sand,
powders, clay...