

The authors present a comparison between five segmentation techniques applied to the μ -CT images of a thermally treated Carrara marble sample. In particular, they show that the machine-learning based methods provide more accurate results than the other analyzed methods. Moreover, the U-net model is presented as the most efficient one in terms of computational time and accuracy in the fracture-detection goal. The manuscript is well structured and written. In addition, the motivations are clear and provide the readers with a detailed related-literature review. I found this work highly relevant and I would like to recommend it for publication. I just have a few minor comments looking to improve its readability:

1. An introductory paragraph in section 2 might help to separate the 3 subsections here: sample preparation, noise reduction and segmentation methods.
2. Section 2.2: Could the authors please provide information regarding the parameters employed for applying the Non-local mean methods? That is, shape and diameter of the searching windows, similarity value, etc.
3. Sections 2.3.1/2/3. Given that the μ -CT images of the thermally treated Carrara marble sample are open to be access by the community, could the authors provide with the parameters employed to segment the data? Like this, any reader would be able to reproduce the results and work from there on improving the methods.
4. Figure 4: The legend item "Upsampling layer" (purple) is not in the figure. Also, the caption could be a bit more descriptive of the sketched workflow.
5. Sections 2.3.3: The authors might consider improving the explanation of the U-net model. It is the most efficient of the analyzed methods and I found this section a bit difficult to follow.
6. Have the authors tried to resample the raw images by reducing the voxel size? This might help to segment fractures thinner than 2 microns.
7. I'm not sure if this makes sense, but have the authors tried to re-apply the U-net model using the U-net model output as the new GT for training a new model?