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Comment on esurf-2021-67

Byungho Kang (Referee)

Referee comment on "Convolutional neural networks for image-based sediment detection applied to a large terrestrial and airborne dataset" by Xingyu Chen et al., Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-67-RC1>, 2021

The paper explores the applicability of CNN-based image segmentation on determining the grain size, which could eventually substitute the pre-existing methods for grain detection. The authors verify the reliability of the proposed grain sizing method by comparing it with hand-measured labels and manual sieving.

Promising as it is, the paper needs a small number of revisions.

- It seems necessary to elaborate the general training process for the U-net (e.g., hyperparameters values, number of epochs for training, what kind of optimization method were used, how the tiles were being selected for training, et Cetra). The inclusion of a section or a table could help.
- Likewise, it would be better to provide more information on manual labeling. Even labeled by two observers, labeling 128,461 grains would take significant hours, and I assume it was based on an auto/semi-automatic algorithm that captures the grains from images.
- It would be better to include information about the number of grains in test images (both for manual labeling and U-net based prediction). This could improve the overall credibility (of error calculation) than merely providing the percentile-based information.
- The comparison between the sieving dataset and other image-based methods(Fig.6a) needs more clarification (e.g., conversion of physical scale (mm to pixels) should be mentioned in section 4, not 5)

Some minor typos at line 244: Fig. 4b should be replaced with Fig. 5b.