Response file to comments

1. Response to referee #1, Byungho Kang

Byungho Kang:
The test used in this study for validating the method is indeed impressive.

It would be better to include some information about the size of original images used for training and validation (though it seemed to have varying image sizes depending on the dataset) and add a little about how the method could work adaptively on different image sizes.

Response:
Thanks. **We added the original image size information in L95 – L96.**
Yes, the image sizes vary depending on the dataset. The end-to-end image-based grain size measurement depends on not only the grain detection algorithms (like our GrainID), but also the collection of grain images. The important questions include (1) what image resolution/size we should use for a specific flume/field measurement, and (2) how the image resolution/size influence the predictive ability of our GrainID model.
For the first question, the image resolution depends on your research need, the finer grain to be detected, the higher resolution needed. The image size should be large enough to capture the grain size distribution even with the presence of environmental elements in the image (L137).
For the second question, to account for the varying input image size, we split the original images into image tiles, and applied the overlap-tile strategy to compensate the split error and achieve seamless prediction (L170-L179). In section 5.2, we discussed the influence of image tile size on grain detection ability by varying the image tile size (64*64, 128*128, 256*256, 512*512, 768*768, 1024*1024) while maintaining the raw image resolution. In addition, we discussed the influence of image resolution on grain size detection by down-sampling the original image resolution of 0.45 mm/pixel up to 4.5 mm/pixel and comparing the results of down-sampled images to the sieving results.
The analysis above shows how the image resolution and tile size influence the predictive ability of GrainID. However, we realized that the analysis in Section 5.2 is based on a small dataset, which limits the application to greater variety of environments. **We added content in section 5.5 (L456 - 457) to address this limitation in the revised manuscript.**