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Earth Surface Dynamics Discussions

Interactive comment on "A Structure from Motion photogrammetry-based method to generate sub-millimetre resolution Digital Elevation Models for investigating rock breakdown features" *by* Ankit K. Verma and Mary C. Bourke

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Overview

The paper presented proposes a method of generating sub-millimetre accurate DEM from data collected in the field. Its main focus is the use of a triangular coded control target to scale resulting SfM models. This target is proposed as a more user-friendly, less time-consuming and cheaper alternative to other field methods. The authors present an experimental design to test the capability of SfM to generate accurate

and find optimal settings, which they then apply in the field. Their field data suggests the triangular coded control target method is successful.

Specific comments The paper discusses the difference between zoom and fixed focus lenses and finds no significant difference between them, which is interesting. It would be worth noting that the risk with zoom lenses is that the focal length can change by accident and this might affect the lens internal geometry.

The camera in the paper's experiments is set to autofocus. In theory, this could change the internal geometry of the camera between pictures, especially between the wider shots and the close range ones. Although Agisoft is now quite good at dealing with it and I have found little difference I would like to see some discussion on the topic, as Mosbrucker recommends these changes be minimised for "High Accuracy work". Were fixed focus tests done?

Table 2, was gradual selection used at all after image matching to remove tie-points with high errors? It would be worth discussing this option, as it might improve models.

In the field (4.1), what were the distance the pictures were taken? I can see from the pictures to some extend, but it would be useful to know what "all around" and "close range " mean.

In 4.1, 11, white balance is fairly immaterial for RAW images, as it can be changed in post.

In 4.1, 13-14, using autofocus does not increase depth-of-field, aperture does that. Using autofocus means the correct focal plane is chose so depth of field is optimised.

Conclusion I found the paper interesting and it contributes to the scientific discussion around SfM. It provides an actionable method for working with SfM in the field and provides some good practical advice for the different permutations of processing SfM data.

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