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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Brief communication: 3D reconstruction of a collapsed rock pillar from web-retrieved images and terrestrial LiDAR data – The 2005 event of the West face of the Drus (Mont-Blanc massif)" *by* Antoine Guerin et al.

Anonymous Referee #1

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The article presents an approach for quantifying the volume of rock slides when pre-slide data was not acquired, using post-slide LiDAR scans and pre-slide structure from motion (SfM) tools based on public domain photos. This approach is applicable in many other cases of mass movements, such as coastal retreat, landslides, etc. Especially in areas where there is no constant monitoring of the terrain, and yet there are enough available photos of preceding period prior to the mass movement.

The article is well written and concise. Using SfM and LiDAR is not a new approach to quantifying mass movement, but the presented case study is very interesting and

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Discussion paper

provides a chance to examine the pros and cons of this approach. However the article is lacking discussion on the various possible sources of errors and how to quantify them. In page 5, row 27, it is mentioned that there is a 5% error on the determined volume, but this is only derived from the limited resolution of the SfM method itself. Other error sources are mentioned but not always quantified.

The range of relative error mentioned in page 6, row 5 is calculated as a percentage from the "overestimated" volume when it should be calculated from the comparison volume, so that the percentages should be 10.4% and 23.1% instead of 9% and 19%.

The paper could benefit from a separate discussion about error sources and how much they affect the final result. The right part of figure 3 is a good start – it shows that even in areas where there was no known mass movement, there is still a difference between SfM and LiDAR. This could be used for estimating error per area of scan.

Another point is the volume calculation section – this is one of the thornier problems in many monitoring studies, how to estimate change in 3D volumes. The whole section is somewhat cryptic to me, and while I understand the need to keep the text short, there are no references to a detailed description of the method in the whole section. Did the authors use built-in functionality in 3Dreshaper? I know that many readers will be interested in that particular part of the article so it would be beneficial to expand upon how the volumes are extracted and subtracted, maybe with an accompanying illustration.

Finally, some nitpicking:

Page 1, row 27: "legendary climbing routes" is a term for "basecamp", not for NHESS

Page2, row 12: city of Kathmandu, not Kathmandu city.

Page 3, row 22: when you mention neglecting the snow, do you ignore it completely or mask the snowy parts from the image? And if you ignore it, does it not affect the final image?

Page 4, row 11: Mean density is not always a useful metric, especially if point density is very variable. Please specify the resolution of the final model, the standard deviation or add a point density map. If there are low density zones in critical areas that could affect the final result and become a significant source of error.

Page 5, row 13: by relative error I assume you mean between your 3 SfM models?

Page 5, row 22: what is normal about the difference? Do you mean it is expected?

Page 6, row 29: who are the Bisson brothers?

Figure 1b: The yellow unit is undefined.

Figure 1d: should be “pre-1850”, not “avant”

Figure 3: should have a, b and c for easier referencing.

Figure 4d: please add the dashed scar limit so the comparison with 4c will be easier

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