

Interactive comment on “A semi-automatic procedure to support the detection of rapid-moving landslides using spaceborne SAR imagery” by Giuseppe Esposito et al.

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Received and published: 13 May 2020

General comments:

The paper entitled “A semi-automatic procedure to support the detection of rapid-moving landslides using space-borne SAR imagery” presents a semi-automatic procedure, exploiting Sentinel-1 SAR images, which evaluates changes of backscattering signals associated to land cover changes due to landsliding.

The manuscript represents a solid and valuable contribution to the current state-of-the-art landslide mapping and detection during in post-emergency phases. The scientific

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and the applied methods are excellently depicted and supported by a robust bibliographic background. The results are sound and consistent and supported by a very good statistical analysis, which makes the results very interesting and noteworthy. The discussion of the results in the general framework of the current literature is accurate and addresses all the concerns. The overall quality of the manuscript is very good, with an appropriate number of figures and written in an excellent English, to me.

I have just a few questions which may be addressed in the discussion of the paper and which can be clarified by the authors.

Specific comments:

Title:

The use of rapid landslide in the title can be ambiguous, since the definition of landslide magnitude can be obtained by assessing the intensity or the velocity. It is indeed a movement triggered by sudden events such as earthquakes, however, considering the current timespan between two S1 images. The same aspect should be clarified when using this expression throughout the text. Dataset: I think that more information about the dataset used should be provided. A short reference within the text or by adding a table, along with the frame outline to be inserted in Figure 2, would be more appropriate. Speaking of the dataset, what about the geometry of acquisition? Did you use ascending or descending images? Moreover, do you expect differences in the final results by using both geometries? I also think a short comment on the potential geometric distortions of SAR imagery should be added in the text, if in somehow this may affect the goodness of the results. Structure of the paper: I find ambiguous to write about the results when speaking of the test site. I find more appropriate to separate the result section from the paragraph 3, by adding a fourth paragraph which should address only the results obtained.

Results:

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Do you think all the changes detected, even those within the ground truth landslides, can be attributed to landslides? Are there any other land cover changes that can be identified (e.g. deforestation, river deviation, noise, etc.)? You write, indeed (line 301), that many segments outside landslide areas are not attributable to landslides, however, it is possible to find these segments within the ground truth landslides? Do you think is sufficient to discriminate landslide and non-landslide pixels by their number? I think the classification of the detected segments is still a main challenge, which, of course, could be addressed in future work. In this sense, do you think that a validation/comparison with other techniques and other data (e.g. PolSAR, OBIA, InSAR, DTM change detections) may help to better classify land cover changes segments?

Technical comments:

Line 96: please, specify that slightly better than 5 m by 5 m spatial resolution is when dealing with StripMap acquisition mode.

Figure 2: as I said in a previous comment, SAR dataset frame could be added here to have a complete overview of the study area.

Figure 4: please, add a color bar where necessary and the source of the optical image used.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-55>, 2020.

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