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Reply on RC1

Tayeb Smail et al.

Author comment on "Earthquake-induced landslide monitoring and survey by means of InSAR" by Tayeb Smail et al., Nat. Hazards Earth Syst. Sci. Discuss.,
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Block	Referee's comments	Authors' replies and comments
I	<p>The authors show the application of the differential interferometric technique to evaluate the ground displacements induced by an earthquake. The images processed by the SNAP software application are SENTINEL-1. Finally, they validate their findings with SENTINEL-2 optical image analysis.</p>	<p><i>General comments from the authors</i></p> <p>The purpose of the paper is multifold i.e.:</p> <ul style="list-style-type: none"> - Identify the extend of landslides and geotechnical disorders caused by an earthquake. For this purpose, the methodologies used in the paper are: coherence change detection and phase changes (DInSAR), optical images (Sentinel-2), "historic" data processing (LiCSBAS). - Investigate the accuracy and validity of such identification. The case study concerns regions and seasons during which there was little vegetation and rain. The main event that caused the

landslides and geotechnical disorders is an earthquake Mw5.0 that struck the northeastern part of Algeria (Mila city, August 2020).

II The work has several shortcomings in all its parts and is poorly written. All sections are in need of thorough revision. Some of them could be deleted as they have only two lines.

The authors will thoroughly revise the paper upon request from the Editors. Obviously, the revised paper will take into account the whole comments and remarks raised by the referees and readers.

III Some software is introduced without explaining its usefulness (LiCSBAS, LiCSAR).

LiCSBAS and LIC SAR are detailed in references. [Lazecký et al., 2020b and Morishita, 2021]. They have been used in the present paper in order to process available images collected during two duration periods:

- Long period i.e. 5 years (2015-2020): in order to detect any previous gradual displacements or disorders in the region.

- Short period i.e. 4 months before the main shock and two months after the main shock: in order to analyze the velocity of the changes and disorders.

The analysis for the short period, i.e. the near-event period, was able to detect and catch the subsidence.

IV

Declaring to use SENTINEL-1 images, even reporting tables, the authors do not clarify which images they actually used. The whole iconographic part is illegible and unclear.

Table 1 presents all the images used in the study and they are labeled as IFG-ID, Orbit, and their dates. For the results section, every image contains the description of its source, by IFG-ID or by the image's dates.

V

The results are presented in a confusing manner.

The revised version, upon request of the referees and editors, will modify the structure of the text in order to present clearly the main results, i.e.:

- The Coherence Change Detection and Phase Change were able to detect the extent of the zone that suffered important landslides and geotechnical disorders during the main shock. Two important zones have been identified (Kherba and Grarem)

- The optical images were also able to identify the landslide extend and disorders in Kherba, in which the mean horizontal displacement reached 2.5m. These optical images processing was in accordance with the CCD analysis in terms of zones affected by the disorders and landslides.

- The optical images were unable to detect the disorders in Grarem in which there was no landslide although there were a lot of ruptures and cracks. However, a field inspection has confirmed the results of

the CCD and DInSAR analysis in terms of pattern and limits of the zone affected by the disorders (surface rupture).

The analysis of InSAR images (using specific software, namely LiCSBAS) for the short period, i.e. the near-event period, was able to detect and catch the subsidence in the case of Kherba where the landslide was important.

VI

The citations used in the context of interferometry theory are inadequate as they do not take into account historical works (Hanssen, 2001, Franceschetti et al., 1992, Gabriel et al., 1989....).

Actually, InSAR is widely used, with related developments and works detailed in many articles and books, which we can cite in the bibliography, for the revised version, as suggested by the referee.

VII

Validation with optical data is practically absent.

The validation with optical data is commented in Block V (see Grarem and Kherba) in which the field inspection and optical processing of Sentinel-2 data (Figure 16 dated 30-Jul 2020 and 09-Aug 2020) illustrate the change that occurred in these zones.

VIII

Having said this, I believe that the work should be rejected.

The authors are respectful to the Editors and Referees' decisions and recommendations, as well as the readers' comments. Hopefully, Editors and the

Referees will give a chance for a revised version before possible acceptance.