

Reply on RC2

Alessandro Tibaldi et al.

Author comment on "Slope deformation, reservoir variation and meteorological data at the Khoko landslide, Enguri hydroelectric basin (Georgia), during 2016–2019" by Alessandro Tibaldi et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-324-AC3>, 2021

Dear Reviewer 2,

thanks for the very useful suggestions, which have been all taken into account in the new version of the manuscript. The point-by-point replies to all suggestions are listed below. The Editor advised me that we will be allowed to upload the new version of the manuscript only in a successive stage when we will have received all the reviews.

Replies point-by-point:

GENERAL COMMENTS

The manuscript provides continuous data monitored over about three years in a site located along the eastern mountain slope of the Greater Caucasus (Georgia) overlooking the Enguri artificial water reservoir, involved in the active Khoko landslide. In particular, it reports some data about i) the landslide displacement (monitored by two digital extensometers installed next to the head scarp), and ii) the fluctuations of the lake level.

The paper, interesting and well written, aims to provide potentially useful information for risk mitigation measures. Nevertheless, the discussion section is not able to explain the different responses monitored by the two extensometers.

Reply: we added an explanation for this in the new Discussion section "5.2 Behaviour of the landslide and slip planes".

In particular, the Authors do not carefully argue their assumption according to which the landslide activity is almost exclusively governed by the lake levels, while the rainfall-induced direct infiltration does not significantly influence the pattern of deformation.

Reply: we now discussed the possible influence of the rainfall on the pattern of deformation in both the new sections "5.1 Correlation slope deformation - lake level - rainfall" and "5.2 Behaviour of the landslide and slip planes".

SPECIFIC COMMENTS

Line 169. How far is extensometer n.1 from extensometer n.2 ?

Reply: 240 m, we indicated this at the beginning of the chapter "3 Methodology and instrumentation".

Line 190. Some details regarding the about 70 mm starting value, registered on 4th November 2016, should be provided. Is it just an initial extension due to installation ? If it is so, the graph in Figure 5 should start from zero value.

Reply: Yes, it was an initial extension due to installation; we modified Figure 5 in order to have zero as starting value.

Line 201. Such gap should be indicated in Figure 4 and the corresponding (just hypothesized) values should be reported (for instance) through a dashed line.

Reply: We modified figure 6 and 11 by changing the line segment with a dashed line.

Line 210. As already requested for extensometer n.1, some details about the starting value of about 152 mm registered on 18 May 2017 should be provided. If it is due to installation, the graph in Figure 6 should start from zero value.

Reply: we modified Figure 6 in order to have zero as starting value, as well as in Figure 11.

Line 210. "Deformation" should be replaced (here and elsewhere in the text) by "extension", because deformation is, of course, dimensionless.

Reply: the word has been replaced wherever necessary.

Line 240. Could you explain such different responses shown in Trench 1 and Trench 2 ?

Reply: we inserted a possible explanation for this in the new version of the paper.

Line 271 - Discussion. Such section is rather weak. In particular, it is not able to explain the different responses monitored by the two extensometers. Some properly commented figures should be added to highlight the relation between the extension rate data and the lake levels monitored during the infilling and drawdown stages. Figure 10 by itself can not put into evidence such crucial aspect.

Reply: we added an explanation for the different responses monitored by the two extensometers in the new Discussion section "5.2 Behaviour of the landslide and slip planes". We also put some comment/labelling in Figure 11 (previous Fig. 10) in order to

better showing the correlation lake level – extension.

Lines 285-286. Such observation should be furtherly discussed. The represented daily precipitation values are not sufficient to make such observation. Rainfall accumulated over larger periods (for instance, one or more months) could agree with the observed velocity trends. Therefore, a relation between movements and direct rainfall-induced infiltration cannot be excluded.

Reply: we now made an in-depth discussion of the possible influence of rainfall on the measured pattern of extension, in both the new sections "5.1 Correlation slope deformation - lake level - rainfall" and "5.2 Behaviour of the landslide and slip planes". We also calculated the amount of rainfall month by month to better appreciate the rain accumulated over larger periods.

Line 293. Such delay is not clear and should be discussed. In particular, I did not understand why after 29 January 2019 the rate of extension monitored at trench 1 is about 1 mm/month, while deformation monitored at trench 2 is nil.

Reply: we now discussed the possible independence of the two trenches because they are located on two parts of the general landslide that can move separately, also having demonstrated with the new data and geological section that there are different potential slip planes. This may also explain why trench 1 moved slowly in 2019 and trench 2 had null movement.

Figure 10. Such Figure resumes all the data shown by Figure 5, 6, 7, 8 and 9. Therefore, in my opinion, Figures from 5 to 9 could be eliminated and replaced by Figure 10.

Reply: At this stage we prefer to maintain these figures because Figure 11 (previous Fig. 10) is too dense of information, and the various lines can be better appreciated if they stand alone in each graph, especially those referring to daily rain precipitation and temperature, whose details are more difficult to be seen in Figure 11. Moreover, we are putting in Figure 11 the monthly rainfall instead of the daily rainfall, and thus the latter graph must stand alone.

TECHNICAL CORRECTIONS

Some technical corrections are reported by the attached supplement pdf file

Reply: we inserted all these corrections.