The authors are very grateful to the Editors and Associate Editors for the kind consideration and possible publication of our article in the Natural Hazards and Earth System Sciences. The authors would like to thank all reviewers for suggesting improvements for the manuscript. Point-wise reply/answer to each comment is provided below (comments are shown in ***green bold font****, answers are shown as black font). All suggestions have been addressed, but still, the authors are open for further explanations and cooperation in term of manuscript improvement. Furthermore, the authors appreciate the editors and reviewers for the timely handling of the review process. After reviewer's evaluation, we have the clear idea how to correct and improve our manuscript to be publishable in NHESS. This mainly includes:*

- *Rewriting the introduction to highlight the novel aspect of the manuscript because in the present form, the novelty of the work is not clearly visible (rewriting according to the reviewer 2 suggestion)*
- *The literature review will be moved into material and methods sections (according to the reviewers 2 suggestion, shorten a little however, this literature review will be kept because as the reviewer 3 stated this is a strong part of the introduction)*
- *According to reviewer 2 suggestion, time series of the PS points will be presented together with the discussion about presented deformation mechanism*
- *According to reviewer 1, some sentences will be rewritten to improve readably and some confusing aspect (thresholding, slope reprojection, PS technique limitation etc.) will be deeply discussed.*

Authors

REVIEWER 1

The main scope of this work is to investigate the activity state of the landslides mapped in the 'SOPO' Database in the Malopolskie Municipality (Poland) area. The PSI approach is selected to measure displacements (Ferretti, et al. 2000) while the state of activity is obtained through a PSI-based matrix assessment (Cigna et al., 2013), and the potential damages to vulnerable elements using the method proposed in Mansour et al. (2011).

General Comments:

Despite a potential interest in some of the results of the analysis, the overall quality of the paper is well below the acceptable standards.

The paper is difficult to read: the English language is not of good quality; quite a few sentences are confounding and, here and there, the technical language is not precise or appropriate. The written would need a deep review.

Actually, the manuscript has been checked by the native speaker before submission. Nevertheless, we will try to improve the English and we will send it again for another proof-check and we will attach the certificate.

Furthermore, more care should have been put in the submission because paragraph numbering and figures numbering are both wrong.

It was an unfortunate when preparing the manuscript according to the Copernicus NHESS template. This will be of course corrected.

The applied methods are used apparently without any, or sufficient, contextualization to the local characteristics, so, the assumptions are nor outlined properly, neither verified.

The applied methodology is widely used in the literature in various papers. Below we provide works which used similar approach as we used (similar because not all authors investigated all aspect → RI index, Cindex, slope reprojection etc)

PSI based matrix for activity state:

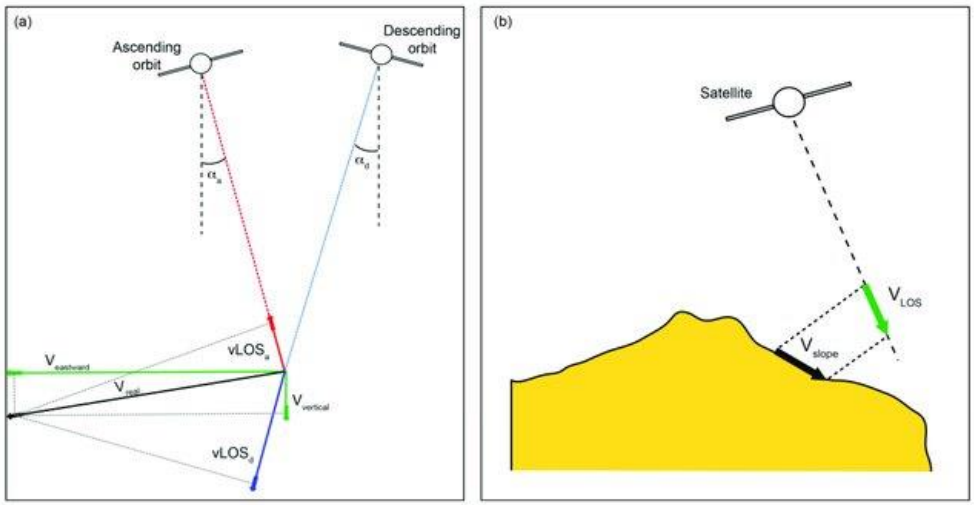
PSI based matrix using Envisat data → Del Ventisette et al. (2014); Bianchini et al. (2013)
Threshold of v_{LOS}= -2mm used in → Del Ventisette et al. (2014) and threshold of v_slope = -5mm used in Bianchini et al. (2013)

PSI-based matrix for intensity scale:

In general, tree various thresholds exist in literature to distinguish slow moving and extremely slow moving landslide.
Righini et al.2011 used v_{LOS}=-10mm to distinguish slow up to extremely slow mowing landslides
Bianchini et al. (2012) used v_{LOS}=10mm to distinguish slow up to extremely slow mowing landslides
Cigna et al. (2013) used v_{slope} =13mm to distinguish slow up to extremely slow mowing landslides
Kalia (2018) used v_{slope} =16mm to distinguish slow up to extremely slow mowing landslides
Cruden and Varnes (1996) recommended to used 16mm to distinguish between extremely slow landslide and slow landslide. Extremely slow landslides have velocity smaller than 16 mm/yr and very slow landslides have velocity between 16 mm/yr and 1.6 m/yr),

How representative of the real displacement are the projections?

Projections are limited by the DTM accuracy, that is pretty good because we use LiDAR DTM.
Slope velocities are higher than LOS displacement. This reprojection has been used by Cigna et al. (2013) and Kalia (2018).Deformation in slope direction are generally mathematical scaling of LOS deformation. Below, we provided the picture, which represents reprojections representation from Béjar-Pizarro et al.2017.



Source: *Béjar-Pizarro, M., Notti, D., Mateos, R. M., Ezquerro, P., Centolanza, G., Herrera, G., ... & Fernández, J. (2017). Mapping vulnerable urban areas affected by slow-moving landslides using Sentinel-1 InSAR data. Remote Sensing, 9(9), 876.*

How much does the DEM resolution impact in equations 1 and 2 and then on the final results?

It depends on the length of the slope. For long slopes with almost constant slope angle, the DEM resolution can be lower. However, this issue seems to be not investigated in the literature yet, but it is possible to assess this impact by means of the error propagation rule. Appropriate calculations will be provided in the improved version of the manuscript. Thank you for this remark.

Is the minimum number of PSs landslide size-independent? landslide body part independent? No matter how PSs are clustered in the landslide body?

To some extent yes, because if a specific landslide is the complex one this landslide is divided into the smaller parts homogeneous in terms of morphology, type of the movement etc. (this was made by geologists in the field while creating the national landslide inventory map). Therefore, we would like to be consistent and we update the activity state of this specific homogeneous landslide parts. We didn't used any clustering etc. because activity state is presented for the whole landslide body rather than some specific part of it, thus we are interested in general if something is moving inside the landslide body. A similar approach (using 4 points within landslide body) has been utilized by Bianchini et al. (2013); Cigna et al. (2013). In literature, there are also examples of even 3 points within landslide body → Cascini et al. (2013)

Are the different velocity thresholds applied in the literature consistent with the local settings? The same for the expected damages.

We do not understand what is meant "local setting". We considered speed of the landslide movement in order to correctly use presented method. Parameters of the processing are not adjusted to the specific local setting because due to the persistent scatterers limitation PSI-based matrix approach can be used only for small and very small moving landslide. Therefore, we have investigated landslide documentation over the study area, to be sure that PSI based matrix approach can been used for landslide activity assessment in this study area. The same was stated by other authors that this methodology cannot be applied for fast and rapid landslide. We will give more clarification connected with this issue when revising the manuscript.

Furthermore, I think that the conclusions are not supported by evidence because the 'field validation' does not seem to answer questions like the temporal relationship between damages and activity,

Damages in presented study was used for the evaluation/prove of the activity state (active, not active) because buildings and infrastructures damages are a direct sign/evidence of ground movement. When some infrastructure/building damage exists within the landslide body we can directly conclude that this landslide is active. Of course, this field investigation has been performed for specific time. This means that for each of the multi-temporal map (ALOS/SENTINEL-1A/SENTINEL-1A/1B), three various field campaigns have been performed For ALOS-> year 2010, for Sentinel1a-> each 2016 and for Sentinel1a/b ->year 2017.

but in particular, it is definitely biased by the analysis conducted only on one alleged class, and the analysis does not take enough seriously the impact of the assumptions and the meaning of getting different activity states according to the different used imagery.

We investigated active and not active states, but we presented the photos and some specific example for active landslide only. If there are no evidences (damage) for not active (dormant/stabilized) landslide then there is no point to present the photos taken in field.

How to use 3 different (and uncombined) results?

These 3 different results are used for multi-temporal landslide activity state generation. The multi-temporal means that when we have landslide database in any GIS software, we have landslide object and we can check the attributes connected with activity for various year. For instance, we can see that landslide X was active in 2010 then in 2016 not active and in 2017 again active. This will facilitate another studies for instance evaluation of the precipitation threshold/amount which makes this landslide active. This is especially important aspect in Polish Carpathians because this is the main driving force of the landslide activity in this specific region.

Specific Comments:

Title Is Multi-temporal related to investigation?

Yes, because we investigated various time spans:

For ALOS it is 31/01/2008-27/12/2010
For sentinel-1A it is 29/11/2014-24/12/2016
For sentinel-1A/B it is 2/01/2017-31/12/2017

Abstract

5-10 "activity state verification of existing landslide inventory maps": it sounds like the state of activity of a map.

For clarification, we investigated landslide activity state. If this sentence is misleading, we will correct it when revising the manuscript.

10-15"overcome": perhaps mitigate.

Yes, this word can be changed as you suggested, when revising manuscript.

"allows to homogenize the results from diverse acquisition modes and to compare displacement velocities": not always the displacements are along the steepest slope direction, this is an assumption.

Yes, but we reprojected them into the steepest slope in order to have ascending and descending results in one database, because using LOS we cannot combine results from ascending and descending geometry.

15-20 'intensity': Is this a standard way to define the motion rate?

Yes, we use standard nomenclature, e.g.
Cigna, F., Bianchini, S., Casagli, N. 2013. How to assess landslide activity and intensity with Persistent Scatterer Interferometry (PSI): the PSI-based matrix approach. Landslides, 10(3), 267-283. https://doi.org/10.1007/s10346-012-0335-7.

1 Introduction

20-25 'cumulative': in what sense?

This word will be removed when revising the manuscript.

'LIM': not all the inventories provide all the information.

That's true, it depends on the country. In Poland, we can find various information in landslide inventory database. This issue will be addressed in the revisited version of the manuscript.

'past and current landslides': what is the difference?

It is desirable to systematically update landslide databases. Especially, this should be made after each catastrophic event (heavy precipitations) when a lot of new landslide were activated. In Poland, we had two such important catastrophic events: in 2001 and in 2010. We will think how to rewrite this sentence to be more clear.

"Martha el al., 2010; Martha et al., 2012; Li et al., 2016": a bit surprised, these works are usually cited in relation to the (very good) results obtained using OBIA.

Yes, you are right. But this object-oriented approach is used for optical images therefore these works can also be used for citations related to landslide mapping using satellite images.

I suggest to develop more the concept about the type of landslides that are tackled here.

Slow-moving landslides usually need a stereoscopic view for being properly mapped.
Information about the landslide type is presented in section 2.1. However, we can try to add some information here.

30-35 landslide detection': actually in most of the cases is the detection of displacements: :
:May I also suggest to verify the use of DInSAR and InSAR here and there?
'limitations': for example?

We have InSAR, DInSAR and PSInSAR. PSInSAR is a specific modification of DInSAR, which minimizes atmospheric artefacts. DInSAR is similarly specific modification of InSAR, which is used for deformation estimation. Since landslides located in our study area are slow and extremely slow moving landslide, the movement of few mm/y will be not visible in DInSAR results. This is mostly

because of atmospheric artefacts and another DInSAR limitation. PSInSAR thanks to its possibility of atmospheric phase screen modeling, has the ability to increase accuracy of deformation estimates.

45-50 'ambiguous': is it referred to the wrapped phase?

Yes

'it is challenging, if not impossible': I suggest to rephrase the sentence and say when it is impossible.

We will add this information when revising the manuscript

'For example...': I suggest to better introduce the cited works.

We will correct it

'millimetre precision': referred to?

Referred to PSI technique, we will add this information in the revised version.

50-55 'these methods': I think this is correct and better than the list in 30-35, I suggest to try & merge the two.

We will try to merge these two into the one section, however another reviewer suggests to move literature review into the method section. Therefore, we will try to only present here the possibility and limitation of InSAR technique for monitoring of landslides.

'the state': of?

Activity state, the word of "activity" will be added

60-65 'for updating the landslide inventory': about the polygons or activity?

About the activity not boundary. We will clarify this.

65-70 'specific thresholding.. are performed': I suggest to better explain this concept.

We will add, info about thresholds used by various authors and we will provide short discussion.

1) *For landslide activity:*
   v_{LOS}= -1.5mm Envisat, → Del Ventisette et al. (2014)
   v_{LOS}= -2mm,Envisat , →Bianchini et al. (2013)
   v_{slope} = -5mm, Envisat , →Bianchini et al. (2013)
   v_{slope} = -5mm, ERS, Radarsat 1&2, → Cigna et al. (2013)
   v_{slope} = -10mm, Sentinel-1 → Kalia (2018)
2) *For various intensity. In general, tree various threshold exists in literature to distinguish slow moving and extremely slow moving landslide.*

Righini et al.2011 used v_{LOS}=-10mm,
Bianchini et al. (2012) used v_{LOS}=10mm
Cigna et al. (2013) used v_{slope} =13mm.
Kalia (2018) used v_{slope} =16mm.

As can be noticed, higher threshold are used in case of v_{slope} (velocity reprojected into the steepest slope). In our study, we decided to used v_{slope} =16mm similarly to Kalia (2018) but the most important reason is that this threshold is presented in well-know, old and widely respected literature (4218 citations) of Cruden and Varnes (1996). They stated that extremely slow landslide has velocity < 16 mm/yr and very slow landslides (16 mm/yr < velocity < 1.6 m/yr), Having considered abovementioned issues, we decided to applied threshold of v_{slope} =16mm.

70 – 75 'applied': ?

We will change the word into "used" or "utilized"

75-80 'sensitivity to measure deformation over the study area': a 'collective' sensitivity? Not sure I understand this sentence correctly.

"sensitivity to measure deformation over the study area". Since the radar technique is not appropriate in each case (it depends on the sensor geometry and terrain slope and aspect). Thus we wanted to assess if specific sensor can be used for landslide monitoring in specific regions. We will try to clarify this issue when revising our manuscript.

'difference in landslide activity updated': again, not sure I understand properly: different updates according to the different measures? But the activity is one… I guess.

Activity state. It means active, dormant stabilized etc. we will add this information for more clarification.

1 Materials and Methods

2.1 Study area and existing landslide database

90-95 'around … occurrence': there is a mix of 3 different concepts here: area affected by landslides, most active landslides, and frequency of landslide occurrence. Please, better sort out or connect all the pieces.

We will try to rewrite it as area mostly affected by landslides

"The region is known for its frequent landslide occurrence." **-->** *we will rewrite it as region is known for its landslide density and serious damages caused by landslides*

95-100 'seven times': what does it mean? 7 events? Seven maps?

Seven times means 7 catastrophic events, such as mentioned before about the precipitation. Generally, heavy precipitation "can create" new landside in the study area. We will try to rewrite it in revised version.

100 – 105 'catastrophic landslide activity damaged': the term activity can generate confusion here, I suggest to change it.

It will be rewritten as "Recently, landslides have caused catastrophic damage due to abundant rainfall and flooding in 1997 and 2010."

2.1.1 Geological and hydrological settings of the study area

In my copy, the paragraph is repeated twice...

Unfortunately, when coping our plain text into the Copernicus NHESS template we copied this twice. It will be corrected of course.

115 – 120 '10o to 35o': degrees

Degree symbol will be used

2.1.2 Landslide types and distribution

Again, in my copy, this paragraph is repeated twice.

Unfortunately, when coping our plain text into the Copernicus NHESS template, we copied this twice. It will be corrected.

130-135: 'among': in?

The word "among" will be changed into "in the" or "within"

'hydro-geological conditions such as rock stratification and precipitation.': not sure I would label precipitation as a condition.

We will try to label precipitation with another word rather than condition

'Catastrophic landslide activity occurred in 2010': again, I suggest not to use here activity. I also suggest to better contextualize this sentence because these landslides cannot be monitored using DinSAR (and in most of the cases it does not make sense at all). Probably this sentence wants to introduce the following one but it should be better connected.

The direct driving force of landslides in this region is precipitation. When abundant rainfalls occurred, then a lot of landslide started to be active. Thus, we are using this word. We will try to be more clear in the revisited version of the manuscript.

2.1.2 Pre-existing landslide inventory map

150-155 'the project': or the results of the project?

We think that there is not wrong to use the project if it means that this is the goal of the project. But we can use also the results of the project.

2 Methods

2-1 Radar data and PSI processing

170-175 'traditional': just to make it sure. Is this referred to as bi-temporal analysis or single interferograms?

Yes, by using 'traditional' we mean single interferograms, not advanced methods based on interferogram stacking like PS or SBAS

Anyway, if this is to justify the choice of the method, I suggest to move it in the discussion, together with the considerations related to the penetrating capacity of the X band, here only the method should be described.

This can be moved into the discussion section when revising our manuscript

2.2 PS post-processing phase

2.2.1 PS suitability analysis

2.2.2 PS velocity projection along the steepest slope

230-235 'Herrera et al. (2013)': they say: 'a minimum absolute value for cos β = 0.3 is fixed for this study area'. Are the Authors sure that the same value can be used in a different area?

Yes, because these thresholds do not depend on the study area bur rather it depends on geometrical limitations. This approach was already applied by Bianchini et al. (2013) Kalia (2018). The C coefficient is the fraction of the 3D displacement that can be measured by PS targets and β the angle between the steepest slope and the LOS direction. Several limitations of this method must be taken into account: when β is almost 90°, C is close to 0 and V_{SLOPE} tends to infinity. Following the work done by Herrera et al. 2013, an absolute maximum value of β = 72° corresponding to cos β = 0.3 is fixed and, as a result, V_{SLOPE} cannot be higher than 3.33 times the V_{LOS}. This threshold corresponds to the condition number of 15 proposed by Cascini et al. 2010 as the number for the inversion matrix solving the algebraic system used for the projection process. In order to reduce any V_{SLOPE} exaggeration, it is assumed C = −0.3 when −0.3 < C< 0 and C = 0.3 when 0 < C < 0.3. Whereas PS V_{SLOPE} values turn positive (V_{SLOPE} > 0) they are discarded. This is because the positive V_{SLOPE} would represent uphill movement.

2.2.3 Velocity thresholding for activity state estimation – PSI based matrix approach

240-245 'Commonly, the average of LOS velocity estimates': I don't understand. Is it when more PSs are in a single landslide?

Yes, the average of at least 4 points have been used.

Based on the literature review, we decided to used 4 points, similarly to other authors Bianchini et al. (2013); Cigna et al. (2013). Also the average of these at least 4 points has been used similarly to authors of Bianchini et al. (2012); Bianchini et al. (2013); Cigna et al. (2013).

In the revised version we will implement the following improvement. Based on at least 4 points we will calculate the trimmed mean, removing two values; the smallest and the largest one. This will allow us to reduce outliers influence.

'Therefore, for activity state estimation, we applied 5 mm/yr as the Vslope threshold': I

can't follow the reasoning. Did the Authors obtained the distributions and verified that they were like in the citations?

They were like in the citations.

v_{LOS}= -1.5mm Envisat, → Del Ventisette et al. (2014)

v_{LOS}= -2mm,Envisat , →Bianchini et al. (2013)

v_{slope} = -5mm, Envisat , →Bianchini et al. (2013)

v_{slope} = -5mm, ERS, Radarsat 1&2, → Cigna et al. (2013)

v_{slope} = -10mm, Sentinel-1 → Kalia (2018)

Since for v_{slope} = -5mm is usually applied, we decided to use this threshold.

Landslide intensity estimation

255-260

'landslides with sufficient information': when is the information sufficient? Is it only related to the PS availability?

Yes, this means, if at least 4 points inside the landslide body is detected (after removing these with high C value), then the activity state could be evaluated for his specific landslide. This has been written in the manuscript as "At least four PS points within a landslide body were set up as the threshold" (lines 273-274)

3 Results

3.1 Landslide activity state and intensity map generation

270-275 'At least four PS points within a landslide body were set up as the threshold': the choice should be better justified. No matter what size, and other variables are? Is the distance among PSs taken into account? How were the different (at least 4) PS values combined to obtain Activity and Intensity maps?

As we previously mentioned ,we followed the procedure presented by other authors in Bianchini et al. (2012); Bianchini et al. (2013); Cigna et al. (2013) with small modification. Complex landslides have been divided into the specific part based on their morphology. I was made officially by geologist in the field. We applied the procedure used to particular landslide parts. Thus we add the information in text as". A number of landslides in the study area are complex landslides. Such landslides are divided into parts and represented in SOPO databases as separate objects. In this case, the mentioned threshold is related to each landslide object." However, we will try to clarify this while revising the manuscript.

290-295 'Therefore there are also landslides, which activity state has been updated based on historical or pre-existing data (SOPO database) if an insufficient number of PS were detected on the landslide object (compare also Fig. 5).': this step cannot be dumped this way… more details are needed.

As previously mentioned, we will clarify this.

3.2 Possible hazard assessment

General Comment: this is not a hazard assessment.

Ok, according to Mansour et al. (2011) it is called: „Expected damage from displacement." Thus, we label this subsection as „Expected damages."

300-305 'Based on a literature review' conducted by the authors or by Mansour et al. (2011)) in which there is at least a try to characterize the vulnerable elements)?

Based on the authors' literature review. We will clarify this aspect.

305-310 'possible damages caused by mass movements in the study area are presented for three diverse PSI processing results.': so, how a decision-maker should read the maps? There are a few landslide areas that experience all the 3 classes, minor, moderate, and major damages. What should they expect?

This tree various maps are muli-temporal. More specifically, estimated for various time spans. Thus, the most recent one is generated for sentinel-1a and 1b data. However, old maps for instance generated based on ALOS data was used to show the past landslide activity states and possible damage generation. Therefore, in the subsection connected with field validation, we show specific landslides with velocities and activity estimated for instance for ALOS for the time span 31/01/2008-27/12/2010 and photos taken at 9/29/2010. Based on past demonstration, we can see the relationship between PS velocities (activity state) and real damages.

3.3 Field validation

General comment: I can't understand how the list of the 'field verification' examples could verify the results. What I see in the figures are damages associated with some PSs, most of which with a velocity higher than 100mm /year. Shall I deduce the activity from the level of damage?

Yes, you can deduce that this is active landslide assessed based on PS. However in the manuscript, we described multi-temporal activity state for each landslide for instance: "This landslide was assessed as active (in 2010), dormant (2014-2016) and reactivated (in 2017) based on the PSI-based matrix approach. There are expected moderate damages in 2010 and 2017 and minor damages in 2016 due to landslide activity." Thus, one don't need to deduce, one can read it in the text or we see the colour of the landslide (red polygon). For better clarification we will write in the figure caption that the red colour represents activity state (active).

315-320 'confidence degree': what is it?

This is some kind of the evaluation of the achieved results. We evaluated that some landslides are active and we want to check if some evidence of this activity are present in the field. For more clarification we will try to rewrite this sentence.

'measured displacements represent landslide dynamics': what does it mean? Landslide dynamic in the PS position? Or the entire landslide dynamic?

We mean landslide activity state. This sentence will be corrected.

'reality assessment': ??

By reality assessment we want to prove/show evidence that activity state updated by using PS has the reflectance in the field. Since we don't have any other measurements (GNSS etc.), we could not evaluate our results direct. We can make it directly by the investigation/searching of the building and infrastructure damage. We interpreted this is a direct sign/indicator that specific landslide is active.

'moderate damage': why this choice? This for sure can create a bias in the investigation

We followed the recommendation and study of Mansour et al. (2011). They assess that landslide with velocity higher than 10mm will generate moderate damages to the buildings and infrastructure.

'Activity states have been confirmed for 43 landslides': I guess the class, how did the expert confirmed the moderate class?

We compare activity state (active vs. not active (dormant, stabilized)) by investigation of the damage. Thus, when we see the damage of a building in the specific time we can confirm that this landslide is active or not. We did not evaluate the level of the damage (moderate small etc.) or the level of intensity (slow moving or extremely moving) because for these we will need another data for instance (for intensity we will need GPS measurements or another levelling or total station that will give us quantitative information about the speed of the landslide). Thus, field validation is only used for the activity state verification.

Landslide 'just-Tegoborze,' SOPO ID 23374

330 – 335 'Landslides tend to develop and increase activity over a large area.': the 23374 or in general?

This specific landslide called Just-Tegoborze with the id of 23374 in landslide database.

Landslide 'Zbyszyce' SOPO ID 73253

Landslide 'Liie-Jelna' SOPO ID 73194

360 – 365 'When reactivated, this landslide covered about 80% of the landslide area': what does it mean?

This means that some new movement were recorded for the 80% of the landslide body.

Landslide 'Wola Kurowska' SOPO ID 73254

Landslide 'Bartkowa-Posadowa' SOPO ID 72917

We left this SOPO id because, the SOPO database is open and we added the link to this dataset. Therefore, when somebody is interested, can use the link type the landslide id and see this specific landslide in national landslide database.

4 Discussion

405-410 'landslide occurrence': Landslide occurrence or landslide monitoring? This sentence is a bad mix of different concepts.

We will improve this sentence.

'mostly connected': I suggest to relax the concept: 'can be largely connected...'

It will be corrected according to your recommendation

410 -415 'it was demonstrated that increasing the temporal sampling rate': I disagree, it was not formally demonstrated because the two series (12 and 6 days) don't overlap.

That's true that time span is not the same, but somehow based on PS density we can see the increase in PS density.

415 – 420 'the slope movement in a NE-SW direction represents only a small percentage of the real occurred displacements in LOS displacement rates...': This means that it is not only a matter of PS density… I think this point should have been taken into account more, both in the activity evaluation and in the discussion.

We will add this limitation into the text, probably (1) in the section of PS suitability analysis, (2) in section connected with results of the RI index and figure 4 when we present RI index for PS analysis. And (3) discussion section.

420-425 'homogenise landslide velocity': This is a (perhaps reasonable) assumption that needs to be verified. It can't come only from homogenization needs…

'real displacement rate can be much higher..': so how can a decision-maker trust and use this analysis?

The estimated velocity by using PS techniques cannot be lower for sure. But due to the ambiguous nature of the observation, if some "big" deformation appears (e.g. meters) then the coherence is lost and the real velocity cannot be estimated. This is the reason why this approach can only be used for slow to very slow-moving landslide. This is connected with underestimation so when PS shows as 100mm/year it can be a situation that there is a place within the landslide body with the speed of 200mm/year. So, we can have underestimated values but rather than overestimated values. Thus, it needs to be kept in mind that the real displacement can be higher than this estimated using PSI/

We will try to add this additional information when revising the manuscript.

430 – 435 'landslide activity states were evaluated by field': actually only a class was 'verified', so the evaluation is incomplete.

That true only a class active not active were evaluate. We will classify this issue.

I am not an expert in damages, so I can't say whether they were moderate or not.

As was previously mentioned, the expected range of damage was assessed based on Mounsour's thresholding, not based on our expertise. We will try to add extra information connected with this to be sure that reader knows that this was not evaluated by our "damage expertise".

'It can also support mentioned by Kroch..': I can't understand

We mean that Kroh et al.,2017 also stated that despite the high landslide activity and density in this region there is still big pressure for urbanization and this should be minimized. We will try to clarify this when revising the manuscript.

Kroh, P. (2017). Analysis of land use in landslide affected areas along the Łososina Dolna Commune, the Outer Carpathians, Poland. Geomatics, Natural Hazards and Risk, 8(2), 863-875.

Conclusions