

Thank you for your time in reviewing our manuscript. Below you will find our responses in green along with changes made in the revised version of the manuscript.

Abstract:

In my opinion, I would like to see some clarity on the fact that the methods work on larger landslides just like you have in the conclusion that will directly imply that the results are based on larger landslides as well. We have added this information – see response to your comment on line 14.

Line 12: You have to mention the uncertainty for the precursor in line with your discussion. Use word like '**potential**' or '**possible**'

We have added the words in bold to the following sentence at line 11 of the revised manuscript: "We also identified an example where **possible** precursory motion **detected** during the first earthquake in the sequence was later followed by larger scale failure."

Line 14: I assume you mean the sensitivity related to size. Therefore, I think you should be more explicit. This can be rephrased to something like: 'Overall, we demonstrate that, although they are more sensitive to larger landslides, Sentinel-1 amplitude and coherence' .. etc

While size is an important factor determining whether landslides are detectable, it is not the only one. Other relevant factors include pre-event landcover type and slope aspect relative to the SAR sensor. However, since size is one of the most important factors, we have added this information:

"Overall, we demonstrate that, although they are not sensitive to all landslides, Sentinel-1 amplitude and coherence..." at line 12 of the revised manuscript changed to

"Overall, we demonstrate that, although they are not sensitive to all landslides and are more likely to detect larger events, Sentinel-1 amplitude and coherence..."

Introduction:

Line 38: I would add (in bold): 'medium resolution **optical** imagery such as .. ' and potentially remove 'medium resolution' since your reply emphasize the point of difference in what it can capture rather than the spatial resolution. We have added the word "optical" at line 36 of the revised manuscript. The "medium" we have left in since it is relevant – reactivations can be visible in high resolution images (as in Figure 6).

Line 44: Typo in 'introducing noise in a and coherence' This has been changed to "altering the amplitude of SAR images and introducing noise and decreasing coherence in SAR interferograms." At line 43 of the revised manuscript

Line 54: INSAR acronym already defined, not needed again. Thank you for identifying this mistake. At line 50 of the revised manuscript the acronym definition has been removed.

Line 55: Brackets needed for references. Thank you for identifying this mistake. Brackets have been added in the revised version.

Data and Methods

- I would like to see a one sentence addition that highlights how noise factors are differentiated from a landslide in the coherence matrix. This would make it much clearer. Now you say that it provides a more reliable indicator (line 184-185 and 193-197 but it does not seem fully clear how), even after paragraph in line 195-206. Just a one sentence addition could clarify this I think. This puts everything

a bit more in perspective and allows to understand better where potential inaccuracies would come from. At line 168, we have added “All interferograms formed from images spanning the time when the landslide failed will have low coherence, providing a signal that is distinct from other possible causes of noise such as variations in soil moisture and acquisition geometry.”

Line 76: Regarding my initial comment. This sentence is a bit confusing. On the one hand there is no possibility to map landslides, but on the other hand you say that they agree that there is a few landslides. That is confusing. I would adapt it to something like: ‘cloud cover prevented **from comprehensive** landslide mapping’. In fact, neither study mapped any landslides following this first earthquake. However, we have added the word “comprehensive” at line 71 of the revised manuscript as you suggest since it would have been possible in some parts of the study area.

Line 85/86: make sure km² is in superscript. We have corrected this at line 80/81.

Line 116 Brackets needed for the references. We have corrected this at lines 99 and 103

Line 128: Deijns et al., 2022 also uses amplitude to define the timing of landslides. Although they don’t use it to identify the timing of **individual** landslides. Perhaps this is what you mean, but it requires some clarification. We have changed “shallow landslides” to “individual shallow landslides” at line 114 of the revised manuscript. You are correct, Deijns et al. are timing whole inventories of landslides rather than individual events

Line 205: I would relate this to landscape since it is likely more vegetated in contrast to the bare soil after the event. This will make it clearer as to why this is visible. You are correct, thank you for the suggestion. At line 178 of the revised manuscript, we have made the following change:

“Figure 2a shows an example of a coherence matrix for a landslide in the Lombok study area that failed during the 05/08 earthquake” changed to

“Figure 2a shows an example of a coherence matrix for a landslide in a forested part of the study area that failed during the 05/08 earthquake”

Line 208: I would really like to see explained shortly what differentiates coherence loss due to landslide activity from other noise factors (like mentioned in line 186) in the coherence matrix. That would really ease the understanding of the figure. You explain it in your reply but it is not clear from the text. At line 188 of the revised manuscript we have added the following explanation: "Other factors that affect coherence such as changes in soil moisture and acquisition geometry are more variable in time and as such do not result in distinct patches of high and low coherence in the matrix."

Results

Table 1: 05-07 should be changed to 05-08. Thank you for identifying this error, this has been changed in the table.

Line 322: There still seems to be too much confidence from this. Especially given your sentence after that. You should add something like ‘likely’ or ‘potential’ reactivations. At line 311 of the revised manuscript, we have changed “Reactivations” to “These probable reactivations”.

Line 333-334: Maybe add comma for thousands. E.g., 10,000 We have added a comma for numbers 10,000 or higher

Line 338: Explanation of ‘main’ failure is not needed anymore since you explained this earlier. While it is true that this was explained earlier, we find it clearer to reiterate it here to help the reader

understand how we combine the amplitude-derived “main” failure with the “first” and “last” failures derived from coherence.

Fig 4. I have to say that 4c reactivation is not that clear. (blue outline on green) We have changed to a darker shade of green so that the two colours are more distinct in the revised manuscript.

Discussion

Fig. 5.: 1% dashed line is lighter in panel a than panel b, this should be homogenized. Thank you for identifying this, it has been corrected in the revised version.

Line 461: I would like to see mentioned some examples of these inaccuracies for clarity and interpretability of the method.

“While some of these may simply be due to inaccuracies in the SAR methods or manual landslide mapping, there are patterns that suggest that some of them may be explained by differences in what is and is not detectable in SAR and optical satellite imagery” has been changed to

“Inaccuracies in the SAR methods or manual landslide mapping, such as features being mapped as landslides that are in fact something else, may account for some of these disagreements. However, there are patterns that suggest that some of them may instead be due to differences in what is and is not detectable in SAR and optical satellite imagery.” at line 409-410 of the revised manuscript

Line 472 I would use ‘**could**’ or ‘**would**’ suggest that these 29’ etc. to add nuance. We have made the following change at line 421.

“This suggests that these 29 last detected failures were reactivations rather than new failures.”
Changed to “This suggests that these 29 last detected failures could be reactivations rather than new failures.”

Line 491: Section 4.2 highlights that the precursory motions are quite uncertain. I would be a bit more cautious in phrasing this here. Better to phrase it as ‘possible precursory movement, just like you mention in the section 4.2 title. We have added “possible” at line 440.

Line 565: ‘**Potential**’ or ‘**Possible**’ precursory activity to be in line with your discussion. We have added the word “possible” at line 511 and “potential” at line 512.