

Replies to referee #2

In section 2.2., time series window 1 to 90 days is considered based on what condition?

The 90 days window is often used as the upper limit window size in the study of antecedent precipitation before landslides. Some example below:

Zêzere, J.L., Vaz, T., Pereira, S. et al. Rainfall thresholds for landslide activity in Portugal: a state of the art. *Environ Earth Sci* 73, 2917–2936 (2015).

<https://doi.org/10.1007/s12665-014-3672-0>

Bevacqua, E., De Michele, C., Manning, C., Couasnon, A., Ribeiro, A. F. S., Ramos, A. M., et al. (2021). Guidelines for studying diverse types of compound weather and climate events. *Earth's Future*, 9, e2021EF002340.

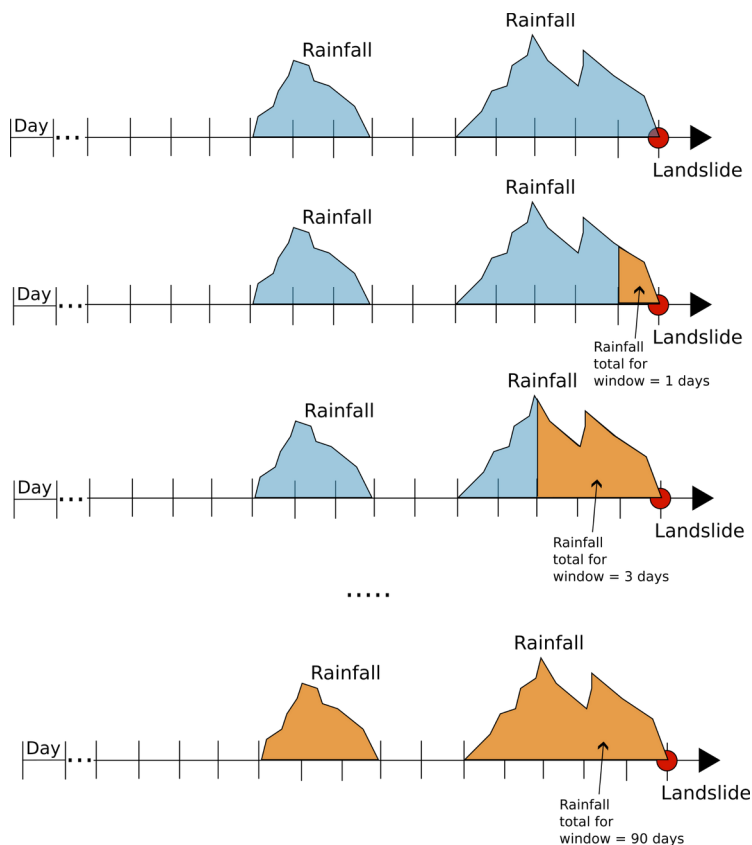
<https://doi.org/10.1029/2021EF002340>

In addition a good correlation of this time window with landslide activity was found in North Carolina by Fuhrmann et al (2008).

Christopher M. Fuhrmann , Charles E. Konrad & Lawrence E. Band (2008)
Climatological Perspectives on the Rainfall Characteristics Associated with Landslides in Western North Carolina, *Physical Geography*, 29:4, 289-305, DOI: [10.2747/0272-3646.29.4.289](https://doi.org/10.2747/0272-3646.29.4.289)

In line 109, “(iv) the precipitation total preceding the landslide events, for windows of 1 to 90 days ending the day of the event, is computed”. Could this be explained?

We hope the graphic representation may make it clearer. The idea is to cumulate precipitation falling before the landslide events. Each time we cumulate more precipitation up to 90 days of precipitation.



Section 2.4. “we computed the presence of rainfall clustering preceding the second event with the modified series”. How is the presence computed?

We used the method explained in section 2.3 built upon a count-based procedure and a statistical test. The idea is that the number of precipitation events inside a window is Binomially distributed if there is no temporal clustering. The Binomial distribution is the discrete probability distribution of the number of successes in n independent trials. Each trial can have only two outcomes, yes or no, and the probability of having a yes in each individual trial is equal to p . The parameters of the distribution are therefore p and n . In this case each day is a trial and the outcome for each day is wet (yes) or dry (no). The probability of having a yes or no in a day is independent from the same probability in the other days, as an example, if day i is wet, it is not more probable that the following days are wet. This is true if the precipitation events are not clustered. If they are clustered, then, if day i is wet, it is more probable that the following days are wet. The assumptions of the binomial distribution are therefore not respected.

Fig 9 legend symbols doesn't match the given plot

Thanks for pointing this out. We will change it in the revised version.

Section 4.2 Details about the connection of evaporation and precipitation

clusters?

If a strong evaporation occurs between two consecutive rainfall events belonging to the same cluster, then the effect of the first event is not seen in the second one. So it is like it occurred isolated.

Section 4.3. "In general, only newsworthy content is reported by newspapers, which means that landslides that caused human damage or occurred in an urban environment are usually highlighted. For this reason, only landslides with a rainfall threshold with a return period of more than 3 years were used. The main aim was to reduce the possibility of including landslides with a triggering factor other than rainfall (e.g. human activity). Landslides with critical rainfall combinations with a return period of less than 3 years were assumed not to have been triggered by rainfall"

Thanks for the modification, we will introduce it into the text.