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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Impact of rainfall spatial aggregation on the identification of debris flow occurrence thresholds" *by* Francesco Marra et al.

Anonymous Referee #2

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General Comments

In this manuscript the authors investigate the effects of spatial aggregation of precipitation on the power law Total Raingall-Duration thresholds for debris flow. The study is based on 11 storms inducing 99 debris flow events in a region in the North of Italy and uses 5-min radar data with a spatial resolution of 1 km2. The spatial aggregation ranges from 1 to 20 km cells, corresponding to resolutions typical of remote sensing data. Additionally the authors compare the results of the spatial aggregation with those obtained with a synthetic raingauge network of different densities (1/10 up to 1/100 km2). Overall the paper is well written, with a clear structure and objective. I believe it could benefit from some more elaborations on some of the aspects presented, mentioned here below. I recommend minor revisions before publication on the journal.

Specific Comments

P5 L27-31: The authors conclude from Figure 4 and the increase of the log-residuals' standard deviation with decreasing synthetic raingauges network density that "debris flow occurrence thresholds derived using very high density networks (1/10 km-2) are comparable to the ones obtained using aggregation scales of 20-km grid size, corresponding to averaging areas as large as 400 km2". This conclusions seems to be based on the relative error of the alpha parameter with p=5% (ca. 25% underestimation for both 20-km grid size and 1/10 km2 network density) and therefore be true only for this specific method chosen (following Brunetti et al., 2010). For instance the alpha for p=50% for 20km grid size corresponds roughly to 1/100km2 density.

P6 Conclusions: on the same line of the comment above, the authors could elaborate a bit more on the effect of the specific choice of method made and its effects on the conclusions. For instance, how do the authors believe the results would changing when applying a different method for the definition of the thresholds? Already the choice of p seems to affect the conclusions. Furthermore, how would the results change when applying a method that accounts not only for triggering events, but also non-triggering events?

Technical Corrections

P4 L1: should be Figure 2b

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