Interactive comment on "Automated reconstruction of rainfall events responsible for shallow landslides" *by* G. Vessia et al.

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General comments

1) Introduction. Authors could preferably give more information about the dataset of 100 shallow landslides by means of a general description of geological and physiographic features as well as descriptive statistics of local bedrock lithology and morphological features of landslides (e.g. histogram for the bedrock lithology; box plots of mean slope angle, slope length, etc.). We accepted the suggestion, and we now provide additional information on the 100 landslide locations and distributions in Italy, including new Figure 5. However, we do not think that a detailed description of the geological and lithological settings for the 100 landslides is useful for this paper. The aim

of the paper is to show how predictive can the new automated method be, when applied to different climatic and physiographic conditions, without other parameters such as geology and morphology. Similarly, (D,E) pairs used to build the empirical rainfall thresholds worldwide by different methods do not take explicitly into account physiographic conditions. In our case, the 100 landslides are extracted from a database of more than 2000 events in Italy, considering different climatic conditions and elevations (see also Tables 1 and 2 below) (Koppen-Geiger system (1) Peel, M. C. and Finlayson, B. L. and McMahon, T. A. (2007). "Updated world map of the Köppen–Geiger climate classification". Hydrol. Earth Syst. Sci. 11: 1633–1644. doi:10.5194/hess-11-1633-2007. ISSN 1027-5606.) 2) Discussion. Besides the significant increase of the slope values for power law trends (D,E), descriptive statistics regarding differences among rainfall events identified by expert and automated procedures, in terms of cumulative rainfall, duration and average intensity, would give a better understanding about the performance of the proposed automated procedure. We maintain that the differences observed for the two trends are not significant. This is clear when the single 100 pair datasets are compared and discussed in Figs. 5a-f.

3) Final remarks. Authors could try to expand this section widening the discussion of the applicability of the automated procedure to different geological contexts in which a different calibration of the minimum change in rainfall intensity (epsilon) is to be expected (e.g. high vs low hydraulic conductivity values of weathering, colluvial or pyroclastic overburdens prone to shallow instability). A possible insight could derive by clustering of the 100 shallow landslides forming the used dataset (preceding point 1) into different classes of bedrock lithology. Some attempts to consider the mentioned parameters (geology and lithology) was considered in previous studies (see e.g. Peruccacci et al. 2012 and Vennari et al. 2014) but no conclusive evidence was found to allow to state with confidence that the empirical rainfall thresholds are influenced by geology and/or lithology. Availability of a large database of D, E pairs may allow to derive more robust statistics and trends with respect to many parameters that can influence the rainfall empirical thresholds.

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Specific comments To substitute the term "cumulated" with "cumulative" throughout the manuscript and figures. The authors, supported by an expert native English speaker , do not think the adjective "cumulative" can be more effective than the past participle "cumulated". The rainfall measures are cumulated because summed up. Line 207: the expression "non-overlapping time windows" seems to not explain clearly the wanted meaning. Probably "moving time windows" could explain better the used algorithm. These windows are actually moved but the considered times are never overlapped. Thus, if the time window is taken 3h, it means that measures will be referred to 3h, 6h, 9h..from the landslide occurrence time. Thus the authors believe that non-overlapping time windows can be more effective to explain the actual steps of the illustrated method.

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/2/C1389/2014/nhessd-2-C1389-2014-supplement.pdf

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