Influence of The rainfall Time Step on The Thresholds for Separating Erosive and Non-erosive Events

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**Abstract.**

In previous work, Todisco et al. (2019) analyzed 522 rainfall events from 2008 to 2017 at the Masse experimental station (central Italy) to define and evaluate several thresholds of rainfall characteristics able to classify non-erosive and erosive events. Each threshold value was obtained by imposing that the long-term erosivity of the events above the threshold is equal to that of all erosive events observed. The threshold evaluation criteria were based on the percentage of correct selections, CSI (number of erosive events selected to the total number of erosive events) and on the percentage of wrong selection, WSI (number of non-erosive events to the total number of events selected). The analysis was performed on the basis of a 5-min rainfall dataset. In this study, working on the same dataset used by Todisco et al. (2019), we evaluated how the value and performance of the thresholds change when their determination is made based on rainfall records at different time steps. In particular, the original 5-min data were aggregated at 30 minutes, which is one of the typical timesteps of the data provided by the Hydrographic Services.

The results indicate that some rainfall characteristics maintain their effectiveness, passing from a 5-min to a 30-min rainfall dataset. However, the threshold value tends to increase slightly. Among the best thresholds can be mentioned: the total event rainfall, Pe (14.4 and 15.2 mm for the 5-min and 30-min database, respectively), the kinetic energy of the event, E (2.4 and 2.7 MJ ha−1), the rainfall duration above a pre-determined intensity, Drun (0.3 and 0.5 h), and the Maximum rainfall amount in a rain shower, P\_max\_burst (7.6 and 10.2 mm). Other thresholds considered effective working on the 5-min dataset obtained very poor performance on the 30-min database. This happened for some rainfall variables related to the number of runs or showers during the event. This poor performance depends on the fact that as the time step increases, the hyetographs become smoother and not suitable to provide pattern rainfall characteristics relevant for the classification of erosive and non-erosive events.

**References**

Todisco, F., Vergni, L., Vinci, A., Pampalone, V. (2019). Practical thresholds to distinguish erosive and rill rainfall events Journal of Hydrology, 579, art. no. 124173.