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# *Interactive comment on* "Rainfall events with shallow landslides in the Entella catchment (Liguria, Northern Italy)" *by* Anna Roccati et al.

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(1) For each rainfall condition, we estimated the cumulated event rainfall, please provide the estimate method more detail. We estimated the cumulated event rainfall as the cumulative (total) rainfall measured during the rainfall event, determined measuring the period between the time of the landslide(s), set to coincide with the end-time of the rainfall event, and the time when the rainfall started in the rainfall record, set to coincide with the start-time of the rainfall event, as described in section 5, line numbers 202-207

(2) For the landslide inventory, in the text 0f the type, number, and distribution of the event landslides, how to get the landslide occurred time, how to determine the time resolution, for example, which hour did landslide occur? As described in section 3, we



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Discussion paper

obtained the landslides information from different sources, which can report the number of soil slips, their location and time of occurrence of the shallow landslides with different geographical and temporal accuracy. When the sources reported accurate information about the time (known or inferred) of initiation of the landslide, we determined the landslide triggering time with an hourly accuracy. For landslides for which only the date was known, we set the time of initiation of the landslide to coincide with the time of the last rainfall measurement of the day in which the slope failure occurred, with a daily accuracy (see section 5).

(3) How many landslide occur in the normal rain period (for example, rain in several hours, or one day)? the paper focus on three main rain events? The threshold is the same or not? Information available from the sources is not always accurate and reliable about the type and the number of the landslides triggered in each rainfall event. In many case, the sources reported indefinite or approximate descriptions, e.g. "a number of landslides" or "multiple slope failures" or simply "landslides". Moreover, for each rainfall event the number of shallow landslides that really occurred cannot be determined exactly. A larger (or much larger) number of landslides may have occurred (including e.g., landslides occurred in forested or remote areas), and were not reported by the sources. As shown in Table 1, we classified the abundance of the landslide as "single" or "multiple"; on the basis of the available information, the exact number of slope failures occurred in a given rainfall period remains unknown.

The paper analyses the 29 rainfall events occurred in the 15-year period between 2002 and 2016 (see Table 1) and focuses on the three main rain events, in terms of ground effects, damage and loss of human lives. As reported in sections 4 and 6, to define the rainfall thresholds we considered the 17 rainfall events (among the 29 listed events) for which the time and location of the slope failures were known with sufficient geographical and temporal accuracy (see Table 3), including the three main events discussed in detail.

(4) One geology rock type map shall be help For a simple and immediate interpreta-

tion of the complex geological setting of the study are, we adopted a simplified geo-lithological map, shown in Figure 1B.

Turin, 24 January 2018

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