Natural Hazards
and Earth System
Sciences

Discussions

Interactive comment on "Analysing the relationship between rainfalls and landslides to define a mosaic of triggering thresholds for regional scale warning systems" *by* S. Segoni et al.

S. Segoni et al.

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We would like to express our gratitude to the referee for the insightful comments, which we think can contribute to improve the quality of the manuscript. After expressing his appreciation for the manuscript, the reviewer points out two main issues, which we answered hereafter.

–1 TWO KINDS OF PRECIPITATIONS Regarding the two kinds of meteorological events commonly affecting Tuscany, the threshold system is conceived to take into

account both of them: a- In our work we used all events from 2000 to 2009. Therefore, both kinds of meteorological events were used to calibrate and validate the thresholds. b- The two kinds of rainstorms are characterized by different durations. This is indirectly taken into account by the model since the number of landslides triggered by one kind of thunderstorm or another highly influences the determination of the optimal value of the "no rain gap". In a few world, the prevalence of landslides triggered by convective thunderstorms would shorten the no rain gap needed to define a rainfall event in that alert zone. c- The rain gauge network (composed by 332 instruments) has a sufficient spatial density to monitor convective thunderstorms (which can have limited areal extensions). The network is particularly dense in the areas typically affected by these phenomena, included the one reported in the reviewer example. d- The manuscript defines and discuss a set of thresholds to be used in a warning system and does not directly cope with the implementation of the warning system. However, in perspective of the application of the threshold system into a warning system, LAMI forecasts could be used to forecast convective thunderstorms with sufficient lead times and spatial accuracy. About the validation, we did not use rainfall forecasts and we used only the recorded values of rainfall, so as to evaluate only the threshold performance. This is because the purpose of the manuscript is to present and discuss the "landslide segment" of a future warning system, the evaluation of the "rainfall segment", although surely interesting, is behind the scopes of this work.

The referee comments and the explanations provided above will be taken into account to revise the manuscript; in particular the revised version will include an improved meteorological characterization of the study area, introducing the two main kinds of thunderstorms, and a discussion about these two kinds of precipitations and their impact on the warning system.

–2 ALERT ZONES DEFINITION The partitioning of Tuscany into 25 Alert Zones was performed paying attention to the physical features of the territory (especially orography, geomorphology and meteorology). For reasons of space, we synthetized this

process in a single sentence, as we considered this step as a preliminary part of our work. However, we are ready to provide more details in the revised version of the manuscript.

– About the last reviewer observation, we will provide a more recent reference to describe present Tuscany climate.

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