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Interactive comment on "GA*SAKe*: forecasting landslide activations by a genetic-algorithms based hydrological model" *by* O. G. Terranova et al.

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Authors are grateful to the Referee #1 for his/her precious suggestions and comments. Below, please find the changes to the text and replies for each issue raised. A more readable version of our replies is attached.

1) runoff for unsaturated soils (pag. 1227, line 23), a discussion could be useful with reference to the suction-runoff dependence highlighted by Cuomo and Della Sala (2013, Eng. Geol. Journal) and similar contributions.

Following referee's suggestion, we propose to modify the text as specified below. At

page 1227, line 20, after “evapo-transpiration and runoff processes”, add: “The combination of rainfall infiltration and runoff may cause different types of mass-movements (either slope failure or erosion processes) depending on intensity and duration of rainfall and on soil suction (Cuomo and Della Sala, 2013)”. At page 1231, line 12: at the end of the sentence “..looks less important.”, add: “As underlined by Cuomo and Della Sala (2013), in unsaturated shallow deposits, time to runoff, time to failure and runoff rates strongly depend on water characteristic curves and initial conditions of soils, besides rainfall intensities and slope angles. Moreover, depending on soil mechanical parameters, the time to failure can result either shorter or longer than time to runoff.”

2) definition of "medium-scale" landslides is not provided. Do you mean medium-size landslide or what? Please refer to any landslide classification for basic definitions.

Actually, we meant a medium-size landslide (all the occurrences in the text have been accordingly modified). In addition, by following Hutchinson’s proposal (1995), the “deep-seatedness” of the case study could be classified as “intermediate” (the estimated maximum vertical depth of the surface of rupture from the ground surface, Vmax, is ca. 25 m). At page 1244, lines 15-18: please change “The rock slide shows a medium-scale size (maximum width = 200 m, length > 650 m), and involves Late Miocene conglomerate..” into “The rock slide is of medium-size (maximum width = 200 m, length > 650 m, estimated maximum vertical depth = 25 m), with a deep-seatedness factor (sensu Hutchinson, 1995) that may be classified as “intermediate”. It involves Late Miocene conglomerate..”

Page 1226, line 15: replace “medium-scale” with “medium-size”. Page 1228 line 22: replace “medium-scale” with “medium-size”. Page 1245, line 20: replace “medium-depth” with “medium-size”. Page 1245, line 26: replace “medium-scale” with “medium-size”. Page 1249, line 5: replace “medium-scale” with “medium-size”. Page 1250, line 13: replace “medium-depth” with “medium-size”.

3) a special characteristic of shallow soil covers in Campania region is not much evi-

GMDD
8, C479–C481, 2015

denced: that is the unsaturated conditions of soils, whose suction is seasonally variable. For this issue, you can summarise the main results of Cascini et al. (2014, Landslides) about the seasonal effects of rainfall and soil suction for slope stability

At page 1241, after line 23, add: “In the study area, rainfall-induced shallow landslides are widespread in the volcanoclastic soils covering the bedrock. Among the factors affecting the spatial distribution and the type of slope instabilities, rainfall conditions and consequent seasonal variations of soil suction play a significant role (Cascini et al., 2014). Commonly, from November to May, when the suction is low and frontal rainfall events occur, widespread first-time shallow landslides can be triggered, and propagate downslope as debris flows; on the other hand, from June to October, when the suction is high and convective events occur, erosion phenomena are triggered along the slopes, often turning into hyperconcentrated flows.” At page 1242, line 25, add: “The shallow landslides in Table 1 occurred from November to March, i.e. within the rainy season characterised by medium/low suction values (Cascini et al., 2014).”

References: Cascini, L., Sorbino, G., Cuomo, S., Ferlisi, S.: Seasonal effects of rainfall on the shallow pyroclastic deposits of the Campania region (southern Italy), Landslides, 11, 779–792, 2014. Cuomo, S. and Della Sala, M.: Rainfall-induced inïňĄltration, runoff and failure in steep unsaturated shallow soil deposits, Eng. Geol., 162, 118-127, 2013. Hutchinson, J.N.: Deep-seated mass movements on slopes, Mem. Soc. Geol. It., 50, 147-164, 1995.

Please also note the supplement to this comment:
http://www.geosci-model-dev-discuss.net/8/C479/2015/gmdd-8-C479-2015-supplement.pdf

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Interactive comment on Geosci. Model Dev. Discuss., 8, 1225, 2015.