

## ***Interactive comment on “A coupled distributed hydrological-stability analysis on a terraced slope of Valtellina (northern Italy)” by C. Camera et al.***

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Responses to Referee number 3 (HESSD, 10, C2245-C2247)

### NOVELTY OF THE PAPER

As reported in responses to Referees 1 and 2, in this work we have developed an approach that can be used to evaluate stability of the terrace slope at the slope scale; this work takes advantages from the previous study in terms of variables selection and expected processes but required a complete new approach in terms of variables determination (such as DEM and soil depth map) and modelling development. The specific environment of terraced slope makes the change of scale of analysis very difficult because of the reasons already pointed out in the manuscript (above all the

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highly irregular topographical surface, and the high variation of soil depth at the back of the wall over a short spatial scale and the impossibility to use standard methods as the infinite slope, usually adopted for distributed stability analysis). We have proposed a possible mix of techniques and methods that can be used to perform these analyses. The novelty of the paper is not in the models used, but in how they have been adapted, also in terms of the estimation of some input parameters.

## NUMERICAL MODELS

As for Referee 1, we can surely give all of the fundamental equation for both the hydrological and the stability analyses. We avoided doing that giving the references of the methods, anyway we agree that it is better for the reader to have more information directly in the manuscript. Moreover this paper represents the development of the studies authors did on the subject. These studies were performed by collecting many field data and performing many laboratory tests and field monitoring. This work brought to the development of numerical models for groundwater flows (SEEP) and stress-strain behaviour (SIGMA) of these systems, which allowed to deeply investigate very peculiar variables (such as dry stone wall mechanical parameter) and processes (such as formation of perched water table) affecting stability of terraced slope and the failure mechanism (slide, bulging) at the scale of the single or few terraces. As mentioned before this work imply a change of the scale of the analyses requiring a complete new approach that could hardly be done with the models used for single terraces.

## GENERAL COMMENTS

As also suggested by Referee 1, we will re-arranged the results and discussion section of the manuscript by splitting results and discussion in two different section, so to give more readability to the text. We will also clarify the points arisen about the DEM and the soil depth map, as already answered to Referees 1 and 2. Concerning English we are a little bit surprised because the English text has been completely reviewed by a native English speaker (the certificate has been submitted with the manuscript).

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