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An easy conceptual model for ponding prone areas mapping

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In flat and urbanized areas intense rainfall events could lead to significant ponding. Such events might not be as destructive as flooding or flash flooding events, but their frequency makes them a problem to cope with almost on a daily basis for local and national civil protection. The knowledge of potentially permanent water zones is extremely helpful for civil protection purposes, especially during periods when society is under stress (e.g., during a post-event crisis) and therefore the inefficiencies caused by ponding are magnified.
The mutual interactions between the morphological features of land, slope, soil use and soil type are useful means of identification of ponding prone areas.
In this work a “sandpile” model, a typical SOC model, is modified in order to interpret the above mentioned characteristics through a limited set of parameters. The model is used together with a statistical description of rainfall characteristics to classify ponding prone areas on the Abruzzo Province. The model is implemented at various scales exploiting fine soil use information and evaluating its performances varying the DTM resolution falling down till one meter. Results are validated against recent observed ponding events. Scale problems are addressed focusing on high resolution data usability and consistency with the processes schematization in the model.