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Saturation excess runoff numerical simulation

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Saturation excess runoff is a relevant process which needs additional experimental and modeling efforts. This work is focused on its numerical modeling. The final objective is the successive interpretation of ongoing experimental monitoring results in two watersheds in different areas of Italy where the saturation excess runoff formation mechanism seems to be important. The numerical solution of the two-dimensional Richards' equation allows the evaluation of the sensitivity to the various influent parameters : rainfall intensity, soil properties, depth and initial water content, slope and hillslope length.

Also the subsurface flow is simulated at the same time, allowing the evaluation of the different characteristic times and dominances of the two processes, namely subsurface and surface runoff. Only steady runoff intensities are considered for the sake of simplifying the results interpretation, but unsteady ones can be easily implemented. The same holds for soil layering.