



Global change impacts on the unsaturated zone and downslope and downstream hydrological processes

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Global change (i.e. climate and land use changes) induce major changes on soil hydrological properties, such as soil porosity, infiltration capacity, organic matter content, hydraulic conductivity, moisture content and soil moisture patterns to quote only a few.

These are expected to change the connectivity of hydrological processes both at slope scale and in the transition from the slope to the stream and river channel, which completely alters the patterns of overland flow generation, with major implications for its amount and continuity at slope scale, along with a change of patterns in slope water transmission to the stream and river channels and therefore on peak flow formation.

To gain an improved insight on the implications of global change on hydrological processes, two case studies will be presented:

- a) Forest fires, increasingly frequent under a hotter and dryer climate, which sharply changes soil property patterns and therefore enhance overland flow generation and stream peak flows;
- b) Urban sprawl, also with important changes on soil surface, with an increasing on impervious area, and therefore a higher connection and concentration of fast surface hydrological processes, which will result in faster and more abrupt peak flow.

Therefore, changes on the unsaturated soil zone as a result of global change, may induce a higher flood risk downstream.