Net precipitation dynamics using a system dynamics modelling approach before and after a wildfire

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Net precipitation dynamics in a cloud forest are presented with special focus in rain, mixed precipitation and fog events. This study presents also the first results of a new approach to model the dynamics of net precipitation before and after a wildfire. First, cumulative totals of measured and modelled net precipitation were modelled using the analytical Gash model. To study the plausible effects of a wildfire on soil water, throughfall was modelled using the advance Gash model, which incorporates changes in LAI, under a system dynamics modelling approach (STELLA v10). Modelled interception after both analytical models performed fairly well with little modifications under the prevailing conditions provided wet canopy evaporation rates used for precipitation events. Thanks to the system dynamics modelling approach, we present the main dynamics of net precipitation for rain events after a wildfire including identified key control variables, emergent behaviour, delays, feedbacks and possible recovery mechanisms. In the future we intend to model the causal changes between water availability for soils, water quality and the human boundary conditions also within a dynamic model environment to be able to gain understanding on the effects of wildfires in the human-hydro-scape.