

## ***Interactive comment on “Assessing the long-term hydrologic response to wildfires in mountainous regions” by Aaron Havel et al.***

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Received and published: 25 January 2018

Response to anonymous reviewer #2:

The authors of the paper would like to thank the anonymous reviewer for their valuable and insightful comments. We tried to carefully address all of the comments from the reviewer. The details of the revision are brought below:

The introduction section is pertinent review the processes of wildfire induce on hydrologic behavior of catchments, but is not actually appropriate in describing the mathematical approaches. In fact, it lacks to review the state of the art of various modelling approaches that have been widely used in the last 20 years in hydrologic modelling, e.g. Clark et al. 2017 Hydrol. Earth Syst. Sci., 21, 3427–3440. And how this model

C1

can be considered among the variety of approaches so far used.

Thanks for the reminder about the introduction with regard to comparing our approach with the literature. We added some sentences and relevant references to the introduction to address this.

The authors should at least provide more information about the sensitivity of model parameters. In fact, they claim that additional parameters respect to Foy et al. 2015 were introduced following the results of Ahmadi et al., 2014 (that conducted a study also on solute concentrations in another watershed), but no information is actually provided on which parameters were added and which global sensitivities they have found.

With regard to the sensitivity analysis, table A6 is showing the parameters from the sensitivity analysis in the work by Sandhya et al., 2014, Ahmadi et al., 2014; and Foy et al., 2015 (All done in our research group). The eFAST method was used by Sandhya et al. (2014) to derive the sensitivity indices and determine the parameters that model simulations show the highest sensitivity to. 30 parameters were selected based on that study (the study was done on the same watershed as our study). Ahmadi et al. (2014) used the method of Sobol to identify the most sensitive parameters simulating streamflow and nutrients in a different watershed. Based on both studies, 38 parameters were selected for calibration. Table A6 in the appendices shows the selected parameters based on these sensitivity analysis studies for the watershed. Relevant description of the studies were added to the manuscript.

Since here only flow discharge is used as observation data, the authors should comment on the limitations of using a single source of data to calibrate a model

Thanks. We discussed limitations of using a single source of data for calibrating the model.

A key factor controlling the hydrological base flow is the parameterization of the satu-

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rated hydraulic conductivity field, that could be highly heterogeneous at the Hydrologic Soil Group scale, thus it would be useful to show sensitivities to this particular parameter.

Both Saturated Hydraulic Conductivity and soil bed hydraulic conductivity showed to be the most sensitive parameters in this watershed. We added some sentences in the results section explaining the sensitivity of model simulations to saturated hydraulic conductivity.

Figure 2 the terrain slope range is scale is too high (0-9999) and the map display only one colour, please amend the figure.

Thank you. The map was revised to include multiple classes of slope.

Figure 2 the number “3” in the right upper corner is affected by distortion” please correct it.

We were not able to see where that number “3” is that was referred to.

Figure 2 The Watershed Outlet symbol is not visible in this figure and is only visible in fig.1, please correct it.

Thank you. We changed the symbol to make it more visible.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-604>, 2017.