

Interactive comment on “Using damage reports to assess different versions of a hydrological early warning system” by D. Defrance et al.

Anonymous Referee #2

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The submitted manuscript deals with a relatively original and interesting topic: the use of indirect measures of flood magnitudes like information available in damage reports, to evaluate the performance of rainfall-runoff models at ungauged sites. The data set used – damage reports of the French alpine “mountain area restoration service (RTM)” – is rich (179 reports over the then last years for 123 watersheds) and new. The ingredients for an interesting contribution are there but the manuscript unfortunately suffers from several important weaknesses. It is not focused on a single scientific issue but tackles too many questions at the same time: 1) improvement of an existing rainfall-runoff (RR) model, 2) regionalization of the RR model for its application at ungauged sites and 3) use of a database of damage reports to evaluate the models. As a result, the presentation appears complex since all the methods are presented and provides

C2541

too few details and, what is even more problematic, little justification for the various methodological choices done. Moreover, the manuscript is poorly structured, which is certainly related to this lack of focus and poorly written. Many sentences are confused due to clumsy formulations and sometimes referring to questions that have not been explicitly raised in the manuscript. Some of the numerous examples selected in the text: beginitemize

P4376L6: “because the database was not comprehensive enough and there were no “non-flood” reports a multi-threshold approach was considered”. The authors should develop the argument: why should they think that a multi-threshold approach is better suited to censored and non-exhaustive databases.

P4379L23: “The catchments in the last two cases were scattered all over the study area, which attests to the problems that can crop up with regionalization”. Apart from the uneasy formulation, do the authors mean that the new version of their model should have better performances in all cases and that the lower performances observed in some cases are the result of the regionalization uncertainties. This has not been demonstrated!

P4381L22: “This strong assumption implies that there are no effects of memory or accumulation and that all events that result in damage are independent”. This necessitates some explanations (why correlation in time could be suspected between damaging events?) and could be tested on the available database (distributions of durations between two successive damaging events).

This manuscript necessitates, to my opinion, an in depth rewriting before it can be published. The major question seems to be the usefulness of the RTM database for the rating of flood magnitudes and hence the evaluation of the performances of RR models. This is far from evident since, as suggested by the authors on page 4381, damages observed somewhere in a small mountainous watersheds may be induced by landslides and debris flows and may not be perfectly correlated to the peak discharge value down-

C2542

stream the watershed. A critical analysis of the RTM database would be very welcome at the beginning of the manuscript before any processing of the data set: frequency of damaging events for each watershed, nature and extent of the damages which is certainly described in the reports, correlation with observed discharges if by chance some of the selected watersheds are gauged. . . The criteria used to evaluate the usefulness of the data base should also be defined at the beginning of the manuscript which remains too empirical and descriptive. Some commented but isolated examples (P4382 for instance) do not make a demonstration. The whole approach lacks a well-defined methodology. A final suggestion, the performances of the RR models on the gauge watersheds should be evaluated with the same methods as the one used for the ungauged catchments. The Nash criterion (fig. 5) is not suited to the objective assigned to the models (detect the exceedance of thresholds). The same ROC graphs could be plotted for the gauged catchments, selecting the largest or the second largest observed discharge as the threshold for instance. This would help gauged an ungauged cases.

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