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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Forecasting flood hazards in real-time: A surrogate model for hydrometeorological events in an Andean watershed" *by* María Teresa Contreras et al.

Anonymous Referee #2

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The authors wrote about three objectives : -develop a"high-fidelity numerical model for inundation" - develop a surrogate model - apply this model for early warning. Apart the quick calculation and the selection of the inputs of the surrogate model, the third part is not developed enough for the reader to understand how this early warning system can operate. Particularly what is the chain from obtaining the input parameters for the surrogate model till the peak water depth at one building in the town? The first part that spreads over 7 pages is quite clear except the introduction of the sediment concentration and particularly, how is chosen the concentration for the 49 events of the data base used later on. Note that concentration cannot be selected independently from the event because for instance, high concentrations are specific from certain kinds of

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Discussion paper

events (snow melting or intense rainfall). Because the grid is sometimes very fine, one can guess that obstacles created by buildings, walls, etc can be taken into account but no word is written about the representation of any building or civil engineering structure. So it is difficult to conclude if it is really a "high fidelity numerical model". Part 2 is the core of the paper and takes more than 10 pages. The reader discovers while reading the paper that they are two surrogate models but only the first one is detailed and I could not understand how works the second one, which is not so important because this second model does not provide reliable results (I (of course) cannot understand why) and the authors should completely change the presentation fo this model if they wish to present it. For the first surrogate model, I understood that they use 48 set of parameters (different for each event) to obtain a mean forecast and a standard deviation. Because the procedure is not a standard one, I am not sure results can be trusted and I expect a comparison with a more standard procedure with, for instance, calibration on 25 events and evaluating results on the 24 other ones. Of course, it requires more time if you wish to test various sets of 25 events. Because I could not understand how concentration was determined for the 49 events, I could not judge the meaning of the results that concentration has no effect on the quality of the results. If the prediction is wrong (4 events out of 49), the authors do not provide what to do (if their model is used for early warning). §4.3 is an extension of the first surrogate model to other points and by this way to the flooded area but if the authors filter by a depth of 10 cm, I am wondering what means the flooded area (area with water depth higher than 10 cm?)and to which area of the finer model it is compared. The discussion (§5) is not structured and some new ideas are not clear (for instance sentence lines 7-8 of page 19 that is found again line 25 of page 21).

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