This is the Authors' reply to comments from Reviewer nº2. We will use blue colour for our reply and black colour for Reviewer nº2 comments.

First of all, the Authors want to thank the Reviewer for the work and comments which without doubt will help to improve the paper.

Interactive comment on "Assessing the impact of uncertainty on flood risk estimates with reliability analysis using 1-D and 2-D hydraulic models" by L. Altarejos-García et al.

Anonymous Referee #2
Received and published: 13 March 2012

Please be advised that my observations on this paper are from a practitioner's perspective with respect to how I see this scientific paper benefiting modeling work that I perform.

The author is suggesting that the Point-Estimate Method (PEM) could be used to validate model parameters, or at least bound the uncertainty, and uses channel roughness as an example. A challenge I see in using PEM for roughness is roughness can vary with flow, but don't see this function being made clear in the results.

We agree with the Reviewer that roughness is complex to assess and that it can vary with flow, and also with some other factors. The hydraulic models used in the paper do not consider a specific relationship between roughness and flow, which on the other hand is a common approach in practical applications. We consider that roughness value depends on several factors and that uncertainty is present on their estimation. PEM method (like Monte Carlo method) is a mathematical technique to estimate how uncertainty in the parameters or variables of a problem is transferred into the results. Considering several random variables (roughness, flow) with correlations between them can be a next step in the research, adding more complexity to the problem.

We will reflect in the paper more clearly that this relationship is not treated specifically.

Does the author intend to show that PEM was reasonable validated for channel roughness, and thus could be used (or should be tested) for other input variables?

Our purpose was to test PEM's capabilities in a relatively simplified but still practical problem. It has inherent limitations to deal with problems with a large number of random variables, but in some specific cases our feeling is that it can be tested if more precise alternatives such as Monte Carlo are not available to the engineer.

Are the test models documented "calibrated" models? This fact is not clear in the paper, and should be stated, or model calibration results referenced if possible. And if the models are calibrated, how well would the PEM method compare to a "calibrated" model if PEM was used blindly to estimate depth values based on defined PDF's for roughness? One would expect the results of such a test would be biased how well the PDF used for the roughness values matched the calibrated values.

The test model used is not calibrated. In this sense, the paper compares results between different methods to deal with uncertainty (same mathematical hydraulic models, different reliability approaches: PEM and Monte Carlo). We will reflect this fact more clearly in the paper.

But the Reviewer remark is of utmost interest. If the model were calibrated, part of the uncertainty in roughness estimation would be removed and a better approximation between defined PDF's and the real, unknown, values of roughness would be obtained. In fact, PEM (and Monte Carlo) could be used to check how an effort in calibration that reduces uncertainty in variables and parameters also reduces uncertainty in the results of the model, from the point of view of flood severity assessment.

We definitely agree with the Reviewer that a poor definition of the roughness PDF would impact negatively the estimation of the results of the model.

One editorial comment: please define PMF used on P1259 line 5

The probability mass function, PMF, is defined on P1258 line 24.