Nat. Hazards Earth Syst. Sci. Discuss., 1, C2891–C2893, 2014
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Natural Hazards and Earth System Sciences
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Discussions

Interactive comment on "Reassessing flood frequency For the Sussex Ouse, Lewes: the Inclusion of historical Flood Information since AD 1650" *by* N. Macdonald et al.

Anonymous Referee #3

Received and published: 28 March 2014

"Reassessing flood frequency for the Sussex Ouse, Lewes: the inclusion of historical flood information since AD 1650" by N. Macdonald, T.R. Kjeldsen, I. Prosdocimi and H. Sangster is a very interesting description of a huge amount of impressive hydrological research and investigative work done by the Authors.

The work was performed in the frame of 'applied hydrology paradigm' by which I mean the conviction that all carefully prepared and checked historic hydrological or paleo-hydrological information can significantly increase our understanding of temporal and spatial patterns of river flow and, in particular, extreme events and improves the estimation of design values generated by statistical models, in this case FFA models. This

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paradigm is extremely important in relation to the general knowledge but should be treated with a big dose of criticism and supplemented by detailed statistical research to confirm or reject assumed gain in quantiles accuracy also taking into account the system of design procedures of water depending structures. List of the sources of documentary data on historical floods available in the UK is enviable and so are the methods of data calibration and harmonisation applied by Authors.

I totally agree with the statement that during the largest flows single stage-discharge relationship can be used, however it has to be noticed that uncertainty of upper limb of the rating curve imposes significant uncertainty of discharge assessment in this case. The Authors express the same opinion on the page 7628 writing that "we will only consider the sampling uncertainty, but acknowledge that especially the data uncertainty and the difference between gauged and historical events could be a significant factor." Moreover, only the part of upper quantiles' MSE – the variance – is estimated. It is obvious that the assessment of the quantiles' bias cannot be done but by MC simulations and this is out of scope of this article. It would be advisable to refer to in the text of this article and in the conclusions. Additionally it is worthy to notice, that strong sensivity of the result to the perception level can be the signal of the bias importance in MSE of estimated upper quantiles.

Other discussion issue is the problem of choosing the distribution of annual maxima in the context true – false distribution. Model misspecification results in bias of parameters, consequently translated to the bias of quantiles estimates. Good asymptotic properties of estimation methods vary significantly when the model is untrue, what is the case in FFA, where we do not know the parent distribution of maxima. Authors' statement that "GLO might not be the true distribution" (p. 7627 and 7628) seems to represent excessive cognitive expectations in relation to models and the role they play. However accepting the saying of René Thom (I quote from memory) "The truth is not limited by the false, but by the lack of significance", it will be better perhaps to think that the model might be not good enough to describe the parent population with sufficient

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accuracy.

My last remark concerns the question: Is this huge and time-consuming work to prepare all historical information worth the reduction in standard deviation of about 6 percentage points? And what about the design quantiles? For the Soussex Ouse at Lewes the 100-year flood is much lower when estimated using historical data than only the AMAX events in gauged record. Which value ought to be taken for the design?

These general remarks together with detailed comments are presented in the supplement.

Please also note the supplement to this comment:
http://www.nat-hazards-earth-syst-sci-discuss.net/1/C2891/2014/nhessd-1-C2891-2014-supplement.pdf

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 7615, 2013.