

## ***Interactive comment on “Estimation of peak discharges of historical floods” by J. Herget et al.***

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The paper shows interesting details on how the authors have been estimating flood discharges from historical land marks. Not going into details regarding other ways to infer historical flood discharges, it is an interesting paper and deserves publication. The paper is very much focus on the antecedent bibliography on central European cases, and ignores some previous work done in other parts of Europe. Moreover, some confusion on the meaning of palaeofloods and historical floods should be improved, according to comments given below. It is important that the authors also mention the high uncertainties of using Manning equation which assumes uniform flow, which is not common during flood flows.

Specific comments:

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Page 5464 line 23 “Previous floods can be divided into historic and palaeofloods. The difference is based on the duration of historic times with handed down historic documents or descriptions while palaeoflood events took place in prehistoric times.”

This statement is uncertain. Although many palaeofloods occurred during prehistoric times, palaeofloods refers to the type of evidence used to identify or reconstruct the floods, i.e. palaeofloods used geological and botanical evidences and historical/documentary floods used written or observed descriptions. Refer to Brazdil et al., 2006 “Historical hydrology for studying flood risk in Europe” HSJ 51, 739-764. Read page 742.

Page 5475. line 1. delete e.g.

Page 5475. Line 2 to 3. Same comment that above. There is no a time transfer between palaeofloods and historical floods, and in fact there are overlapping in many instances (e.g. Benito et al. 2010. paper in Global and Planetary Change).

Page 5475. Line 9. “palaeofloods... only be estimated using relative chronologies or physical based dating techniques” Palaeofloods may also be dated using numerical dating (radiometric techniques) typically by radiocarbon and optically stimulated luminescence (OSL).

Page 5475. Line 11. Sedimentary records in lakes may also give an annual resolution. Check Corella et al., 2014 QSR.

Page 5475. Line 17 “their relation to recent and near future floods conditions are more obvious than for palaeofloods from geological times.” It is fine you address the reconstruction of historical floods, but as indicated previously, palaeofloods may refer to historic and even modern floods, so not need for this statement. Check for instance paper by Thorndycraft et al 2005 were many of the palaeofloods corresponds to 20th flooding.

Thorndycraft, V., Benito, G., Rico, M., Sopena, A., Sánchez, Y and Casas, M. (2005).

A long-term flood discharge record derived from slackwater flood deposits of the Llobregat River, NE Spain. *Journal of Hydrology* , 313 (1-2), 16-31.

Page 5466. Line 15. I would like to draw your attention regarding the paper by Benito et al. 2003 in the Tagus River, that is probably one of the first papers in Europe deriving peak discharges from historic events based on flood level marks and documentary descriptions combined with step-backwater hydraulic modelling, in a systematic way. The paper provides discharge estimates of 110 historic floods (some started in AD1113) in four sites along the Tagus River. I suggest referring to it.

Benito, G., Díez-Herrero, A., de Villalta, M. (2003). Magnitude and frequency of flooding in the Tagus river (Central Spain) over the last millennium. *Climatic Change*, 58, 171-192.

Page 5467. Line 1 and followings. I am sorry to say that Manning equation assumes uniform flow under normal conditions (read Chow “Open channel hydraulics” book in page 91-92) that is, if there are not flood flows or markedly varied flows caused by channel irregularities. As indicated by Chow (1959) the results of applying the uniform-flow formula to a natural stream are very approximate since the flow conditions is subject to high uncertainty factors, since normal flow rarely occurs in natural channels. You should indicate these facts in the text or discuss about this.

Page 5467. Lines 23-24 “According to own experiences and generally speaking, the units of settled areas, the river channel and the floodplain provide obviously different hydraulic roughness”.

This sentence is strange because is not a problem of experience, it is just a fact that floodplains and river channels have by definition different hydraulic roughness. Even within the floodplain, this may be divided in different sub-areas with different roughness. This is state later in the following lines.

Page 5469. Line 1. change “meter...” by “metres above sea level”

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Lines 1 to 4. The sentence is too long and complicated. I would suggest to short it or to produce two separate sentences.

Page 5469. Line 5. The meaning of this sentence is not clear. What do you mean by the “principle units”??

Page 5485. Figure 3. Scenario 1 and 2 should be written with “c”

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 5463, 2014.

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