

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

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Reply to referee Gerardo Benito

Beyond some details on language and expressions (cf. below) the referee focuses on the two aspects of a) confusion about differing between palaeofloods and historic floods and b) missing emphasis of the critical postulation of uniform flow by the application of the Manning equation.

As authors we are aware of a more strict and according to our analysis more logical differentiation between palaeofloods and historical floods than in several previous publications. We did not discuss this aspect as terminology is not the topic of this space limited manuscript, but are pleased to be able now to talk about it in further details. By a closer look, “palaeo” and “historical” are terms respectively adjectives describing

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a status in time. While “historical” obviously is related to historic times, “palaeo” with its old-Greek origin “palaios” meaning “old” summarizes the pre-historic time including the entire geological timescale. In earth sciences, this prefix is frequently established in this context like for the disciplines of palaeoclimatology or palaeohydrology. As the referee mentions and explains by the reference to Brazdil et al. 2006, 742, systematic palaeoflood studies were initiated in USA where the historic flood record from times before the installation of gauges but with detailed descriptions is rather short (down to missing at all) and indirect methods have to be applied. Unfortunately, the term palaeoflood therefore became related to studies where flood analysis is related to the application of indirect methods like e.g. the estimation of discharge by the Manning-equation. Consequently, all flood events – even recent ones! – quantified by indirect methods due to missing gauges are called palaeofloods which is not useful considering the term itself. Finally, recent floods occurring in remote areas without gauges are not palaeofloods just because their quantification has to be estimated by indirect methods due to missing gauging stations. As explained above, we prefer our strictly temporal differentiation between palaeo- and historical floods. To avoid the confusion the referee mentioned, we suggest to add a short sentence explaining that previously also recent floods quantified by indirect methods were called palaeofloods including the references mentioned by the referee.

The referee is right, that we do not mention the postulated uniform flow conditions by using exactly the term “uniform”. On the other hand, we characterized this aspect in even more details as one-dimensional and steady (p. 5467 l. 16) instead of summarizing these characteristics as uniform. Further on, the heterogenic flow conditions during a flood event are considered by analysing specifically the peak discharge (so no temporal variations during the event; cf. “steady” above) and the differentiation of the flooded cross-section area into several (more or less) homogeneous units (p. 5467 l. 19f) where flow velocities and discharges are estimated individually and finally are summarized. Even though the hydraulic conditions are significantly simplified comparing to natural conditions, we are able to quantify the resulting mistake in discharge

estimation by the comparison with gauge data analysing recent flood events. Consequently, the modelling of uniform flow conditions seem to be sufficiently discussed in the manuscript. Anyhow, we suggest to add the term “uniform” at p. 5467 l. 16 to be consistent with previous publications focusing on this term.

The further details mentioned by the referee are easy to be considered by addition. So varved lake sediments as flood indicators with annual resolution (p. 5475 l. 11), 14C and OSL as examples for physical based dating techniques (p. 5475 l. 9) and first flood quantifications based on historical data in Spain (p. 5466 l. 15) will be added to the manuscript. Without getting into details, the additional comments on spelling mistakes (Fig. 3. Tab. 1, . . .), too complicated sentence structures and less clear expressions will be improved based on the honoured dedicated review by the referee.

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