

## ***Interactive comment on “The effectiveness of polder systems on peak discharge capping of floods along the middle reaches of the Elbe River in Germany” by S. Huang et al.***

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Investigating the effectiveness of the proposed polder system along the Elbe River is certainly an interesting application that may provide useful information for the actual flood risk management in the area. Huang et al. investigate this “effectiveness” for the case of one specific flood event. However, the effectiveness of the polder system is strongly affected by the flood wave characteristics. In our own study of the same polder system we found that the hydrograph shape is particularly important for the capping effect. In section 4.4 the authors state that the capping effect is not influenced by the upstream dike breach. This may be the case for the specific dike breach referred

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to in the paper, but cannot be generally concluded.

Models of different complexity levels and hence computational effort may be used for investigating the polder system as described by the authors in section 1. They have chosen the quasi-2D model DYNHYD as it allows subsequent sediment transport simulations and secures short computational times as required for Monte Carlo simulation runs. However, if one is only interested in studying the effectiveness of the polder systems in capping the peak discharge in the Elbe River, a simple 1D model for the river coupled with a storage reservoir for the polder would suffice. This has been demonstrated in our own study to be published soon (by Chatterjee, Förster and Bronstert).

DYNYHD has problems in handling the flooding and drying process. In order to handle the flooding and drying, the authors have allowed a small amount of water to leak through the weir from the river into the polder. Though the authors state that this volume is very minute, considering the large areal extent of the polders, it would be helpful if the errors in the simulations were quantified. The problems will be further compounded when the emptying process of the polders is simulated.

In section 2.2 the authors state that the opening of the weir takes about 12 hours which is in fact not practically feasible. The practical opening time in general should not be more than 1 hour and this in turn has a considerable effect on the reduction in the peak discharge. Thus, an opening time of 12 hours would result in a significant difference in the results of peak discharge capping.

In the figures of section 4.1 and 4.2, the authors state that there is a good agreement between the observed water levels and those obtained from the model. However, this is only based on a visual inspection. It would be helpful to show the closeness of agreement between the two water levels by conducting statistical tests.

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