

## ***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.**

**K. Lindenschmidt**

kel@gfz-potsdam.de

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We appreciate the feedback from S. Foerster. With regards to her comments on the feasibility of our polder gate opening times of more than 1 hour, we strongly disagree. The opening times in our model can be set to any value and the purpose of the slower opening times (up to 12 hours) was to control and throttle the flow into the polder to secure a more effective capping of the peak discharge. This throttling can also be achieved by reducing the width of the gate. Regardless how the inflow to the polder is throttled, it remains imperative that the discharge be controlled and if necessary throttled to achieve maximum capping of the peak discharge in the main channel. Otherwise, with opening

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times of less than 1 hour, a dyke breach would have been simulated, which is not the aim of this modelling exercise. These above statements have been confirmed by personal communications with Prof. Markus Disse (Professor of Water Management and Resource Protection, Institute of Hydroscience, University of German Armed Forces, Munich) [cited with permission], who is familiar with our modelling work.

We would question the validity of a modelling exercise that used opening times of 1 hour or less for polder control. With such short opening times, dyke breaches are in actuality being simulated. In this case, the shape of the upstream hydrograph would very well influence the amount of water being diverted from the main channel into the hinterland. However, with a more controlled inflow to the polder, we can vary the duration and amount of flow into the polder to suit the flood wave characteristics, so that the most effective capping is attained. In essence, this is a general purpose of a modelling exercise of this type: to derive the best polder control scheme for the maximum possible peak discharge reduction.

Perhaps the word “effectiveness” in the title does not do justice to the actual goals of the paper and our research. We wish to propose a quasi-2D modelling approach which is suited for subsequent sediment transport modelling in polder systems with minimal computational expense. Hence, the title may read: “A quasi-2D approach for modelling peak discharge capping of floods by polder systems”.

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