

## ***Interactive comment on “Integrating large-scale hydrology and hydrodynamics for nested flood hazard modelling from the mountains to the coast” by Jannis M. Hoch et al.***

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This paper looks at the coupling of global hydrologic and hydraulic models to simulate flood hazard in three major river systems.

The paper is generally well written and the topic should be of interest to a wide audience. The coupling of models is definitely an interesting topic.

Several important points need clarification:

Title: Not sure what the word “nested” here implies, please consider removing it. The models are not placed inside another. Rather they are used within a framework as a

C1

one-way coupling.

Abstract: Please only use “are” in the first sentence, three tenses are confusing.

Abstract: The word “physicality” I think is wrong here. Maybe say increase the physics. . .

Introduction: This is an account of GLOFRIM. It would be useful to also give a bit of background literature on other attempts to include floodplain representation in global hydrologic models for instance.

Methods: All three main models are described rather very briefly. More detail is needed here to outline the physics somewhat more clearly. Also, why not use CaMaFlood as a 2D floodplain model – it has a subgrid floodplain representation with simplified local inertia included? What is the added value of LISFLOOD-FP and why use CMF only as a 1D routing here? This needs to be better explained.

Coupling realizations. This may be outside the scope of this paper but the real benefit of any coupling is that the models can communicate in a two-way feedback, in other words, one should ideally be able to use the computed (error) in inundation to adjust or correct inflow to the hydrologic model. I think realizations here are only one-way coupling and this needs to be made clearer. The strength of the GLOFRIM framework is dynamic coupling (but one way) within a plug ‘n play model builder.

Model validation: Validation values NSE and hit rate, and CSI are quite low. An explanation for these relatively low values should be included

Discussion/Conclusion: Again, here the limitations of one-way coupling should be more discussed.

In Fig 5, I believe the model simulation with LFP is missing. Please check.