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Geoscientific Model Development Discussions

Interactive comment on "GLOFRIM v1.0 – A globally applicable computational framework for integrated hydrological-hydrodynamic modelling" *by* Jannis M. Hoch et al.

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The Authors wrote that "hydrodynamic models lack an advanced implementation of hydrological processes". Attempts have been made in this direction, in which a full feedback loop between hydrodynamics and hydrology is considered, and deserve to be mentioned (Kim et al., 2012; Viero et al., 2014).

Flooding patterns in populated environments are crucially affected by small-scale, linear features such as artificial embankments (roads, railways, levees of minor channels, etc.). To be applied at the global scale, the spatial resolution of a hydrodynamic model is necessarily coarse with respect to the width of these linear features. How can such a

"coarse" grid account for these effects? For instance, Vacondio et al. (2016) resampled a refined DTM to a coarser grid by retaining the highest terrain elevation, but such a strategy has obvious shortcomings if applied to cell size of the order of 1 km. Certainly, the use of a flexible mesh can be of aid.

Generally speaking, I fear that thinking of flooding "at a global scale" entails the risk of neglecting features and factors that are small from, e.g., a pure geometrical point of view, but play a major role in lowlands hydrodynamics. Modellers should always be aware of such a risk.

References:

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