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Fast 3D stereo flood simulations in urban areas

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Flood propagation models are essential to study floods as it is problematic to collect data during actual floods. Moreover, models are needed to explore the consequences of additional scenarios above the actual flood itself. The results of these model studies are generally graphs with water levels over time for certain locations or maps with the flood extent in an area for different return periods. A main difficulty with these depictions of flood information is that they do not reflect the seriousness of flood impacts well in terms of life-like human experience. Typically, one needs a (near) flood before measures are implemented. Apparently, a graph or map is not the proper material to convince politicians and policy makers, even if they live in the threatened area. The recent introduction of commercially available 3D stereo projectors and high resolution elevation data make it possible to build life-like visualizations of simulations. In our research we explored using 3D stereo, the recently collected elevation data of the Netherlands (20 laser points per m2!) in combination with aerial photographs, and a new fast 2D flood propagation calculation scheme. This scheme (under construction) is able to simulate floods using such high amounts of data points. The model simulates flood propagation on an irregular grid; at locations with large elevation differences (e.g. in urban areas) and fast flowing water, smaller cells are used compared to flat surfaces where the water is not or hardly flowing. The result of our combination is a very detailed flood simulation model that can be used to simulate floods within a fraction of the current calculation time. The opportunities of models and their results increase enormously with fast calculations and visualizations combined. For example, the model allows on the spot exploration of measures during a flood, with the 3D visualization ensuring that flood impacts become clear for decision makers. We will show the preliminary results of a 3D stereo flood.