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Applying global approaches on regional scale: Is coastal flood modelling more sensitive to elevation data or flooding approaches?

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Modelling coastal flooding on global scales has been limited to simple approaches, such as the bathtub approach, due to restricted computing capacity and the lack of data. In recent years, hydrodynamic models have been applied on continental scales to assess flood extent. However, on these scales hydrodynamic models are fed with global or continental digital elevation models (DEMs), with horizontal and vertical resolution of 100 and 1 m respectively. In this work, we quantify the influence of DEM resolution and modelling approaches on the estimation of flood extent. For the German Baltic Sea coast, we compare flood extent estimated using regional DEMs derived from LiDAR (Light detection and ranging) data and global elevation datasets for both, the bathtub approach and a hydrodynamic model (LISFLOOD). Furthermore, we analyse the effect of using different retention times in the hydrodynamic model.
Preliminary results show the flood extent calculated with the use of the hydrodynamic model to be smaller than the respective one calculated with the bathtub approach. Additionally, flood extent estimated using the global elevation data is smaller than the one based on regional elevation data. Differences due to the elevation datasets appear to be larger than the differences resulting from the use of the hydrodynamic model and the bathtub approach, possibly due to the relatively low surge heights in our study area.