EGU23-16652, updated on 27 Apr 2024
https://doi.org/10.5194/egusphere-egu23-16652
EGU General Assembly 2023

Real-time pluvial urban flood prediction with high spatial and temporal resolution – a case study for a steep catchment.

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Pluvial urban flood events are prone to cause huge damages to infrastructures and can also endanger human lives. A strategy for dealing with natural disasters like urban flood events is to build up detailed models to predict potential implications of an event. These models are commonly physically based hydrodynamic models. Using such models for gaining better understanding of historical and possible future events can be beneficial. For damage mitigation during a storm event, the computational demand of these models is, however, too high. Therefore, substitute models have been developed in recent years, which are fast enough to allow for real time prediction. We present a machine learning model for real-time urban flood prediction with spatial and temporal resolution. The model was tested with promising results for a flat urban catchment. The model is based on a combination of autoencoders and a NARX neural network structure. The spatial resolution is 6 x 6 meters and the temporal resolution is 5 minutes. During the present research we applied the model to a steep urban catchment. Database for training the model was generated with the 1D/2D bidirectional coupled hydrodynamic model Hystem Extran 2D. As input we used design storm events with return periods of up to 100 years.