EGU22-4345
https://doi.org/10.5194/egusphere-egu22-4345
EGU General Assembly 2022

Towards Urban Flood Susceptibility Mapping Using Data-Driven Models

Omar Seleem, Georgy Ayzel, Arthur Costa Tomaz de Souza, Axel Bronstert, and Maik Heistermann
Institute of Environmental Sciences and Geography, University of Potsdam, Potsdam, Germany (seleem@uni-potsdam.de)

Both frequency and severity of urban pluvial floods have been increasing due to rapid urbanization and climate change. Hydrological and two dimensional (2D) hydrodynamic models are still too computationally demanding to be used for real-time applications for large urban areas (i.e. flood management scale). As an alternative, data-driven models could be used for flood susceptibility mapping. This study evaluated and compared the performance of image-based models represented by a convolutional neural network (CNN) and point-based models represented by an artificial neural network (ANN), a random forest (RF) and a support vector machine (SVM) with regard to the spatial resolution of the input data. We also examined model transferability. Eleven variables representing topography, anthropogenic aspects and precipitation were selected to predict flood susceptibility mapping. The results showed that: (1) all models were skilful with a minimum area under the curve AUC = 0.87. (2) The RF models outperformed the other models for all spatial resolutions. (3) The CNN models were superior in terms of transferability. (4) Aspect and elevation were the most important factors for flood susceptibility mapping for image-based and point-based models respectively.