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Transferability of data-driven models to predict urban pluvial floodwater depth in Berlin, Germany.

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Hydrodynamic models are considered the best representation of the physical process of runoff generation and concentration. However, they are computationally expensive. Data-driven models are raising as a potential alternative to surrogate them but the models' transferability in space is still a major challenge. This study compared the performance of random forest (RF) and convolutional neural networks (CNN) based on the U-Net architecture for predicting urban pluvial floodwater depth, the models' transferability in space and whether using transfer learning techniques could improve the models' performance outside the training domains. The results showed that RF models were better for predictions among the training domains, though this may be due to overfitting. The CNN models had a better potential to generalize beyond the training domains and were able to benefit from transfer learning techniques to improve their performance outside the training domains than RF models.