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## A comparison of flood extent modelling approaches through constraining uncertainties on gauge data

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**Abstract.** A comparison is made of 1D, 2D and integrated 1D-2D hydraulic models in predicting flood stages in a 17 km reach of the River Saar in Germany. The models perform comparably when calibrated against limited data available from a single gauge in the reach for three low to medium flood events. In validation against a larger event than those used in calibration, extrapolation with the 1D and particularly the integrated 1D-2D model is reliable, if uncertain, while the 2D model is unreliable. The difference stems from the way in which the models deal with flow in the main channel and in the floodplain and with turbulent momentum interchange between the two domains. The importance of using spatial calibration data for testing models giving spatial predictions is shown. Even simple binary (eye-witness) observations on the presence or absence of flooding in establishing a reliable model structure to predict flood extent can be very valuable.

**Keywords:** floods, hydraulic modelling, model calibration, uncertainty analysis

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