Type
PhD research

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Summary of the research
The research focusses on the evolution of river dunes under high, low and varying flow conditions. Knowledge of the development of dunes under high flows is important to understand the interaction between the flow and the river bed. The dunes, large bed forms, induces enhanced bed roughness. A better understanding of this process enables river managers to predict flood levels with a higher certainty. At low flows remaining dunes decrease the maximum navigable water dept, this is determined by the highest bed form respective to the water level. Predictions of the development of dune fields may help the fairway manager to decide where and when additional fairway management, dredging, is needed. These decisions are nowadays made based on measurements, however a model may increase the effectiveness of the maintenance.

The research consist of four parts. In the first part two large datasets of bed measurements will be combined and analysed. This analysis will result in a better understanding of the development of the dunes under varying flow conditions. In the second part this knowledge will be used to improve a current model, for this model also knowledge of bed form induced roughness will be implemented. The third and fourth part consist of using the gained knowledge and model to make predictions of water levels under high flows and navigability under low flows respectively. Both cases will have a look through towards 2100 including several scenarios for climate change.

Keywords
river, bed-forms, river dunes, morphology, modelling, data analysis, extreme flow conditions, climate change,