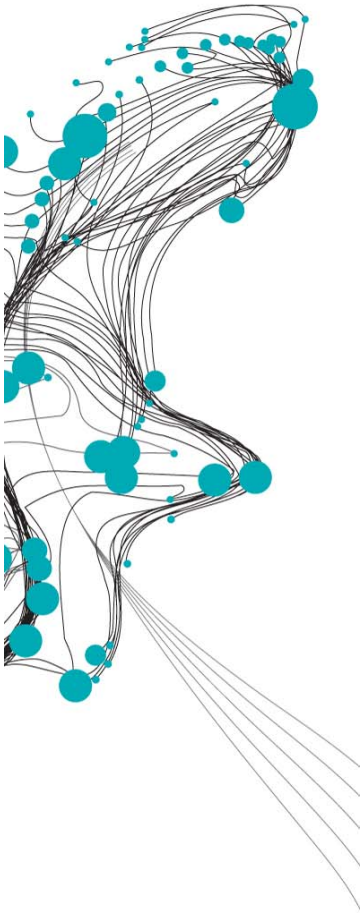

APPROXIMATING RIVER BED LEVEL AROUND RIVER BIFURCATIONS IF DATA IS SCARCE

This study has focused on finding parameters that determine the zone where a river bifurcation determines the shape of the river bed level. Data of several scenarios of a bifurcation modelled with Delft3D are used to analyse the effect of river width, curvature, discharge distribution and change in water depth, on this transition zone. Bars and pools are observed in the data, these occur at the start and end of the transition zone. The effect of the parameters on the bars and pools is analysed as well. A relationship between upstream river width and curvature and the upstream transition zone length is identified. The difference in water depth between start and end of the transition zone may have an relationship with the downstream transition zone. No other strong relationships are found for this. The length of bars and pools is strongly related to the transition zone length. The size of these bars and pools has no strong relationship with any analysed parameter.

Zervakis (2015) has developed a rapid assessment tool for approximating river bed level in a single river branch. In order to assess full river systems the tool is extended in such a way that river bifurcations can be assessed as well. This is done by implementing the identified relationships to determine the start and end of the transition zone. The river bed level in the transition zone is approximated by four different interpolation methods: Single step method, linear interpolation where the bed level changes in a single step at the bifurcation, Gaussian error function interpolation and linear interpolation including bars and pools. The performance of the four methods is analysed by applying the extended rapid assessment tool on three study cases.

The bifurcations in the study cases are the Pannerdensche Kop, the IJssel kop and, the Danube – Bala bifurcation. Two methods of determining the accuracy of the interpolation methods have been used. The bed level outside the transition zone is based on the physics based model and on measured data. The error in the transition zone is similar to the error caused by the physics based error. The linear interpolation method performs best overall, including bars and pools increases the accuracy in one case but decreases it in another case. Figure 1 shows the bed level at the Pannerdensche Kop using linear interpolation including bars and pools, Figure 2 shows the error map.

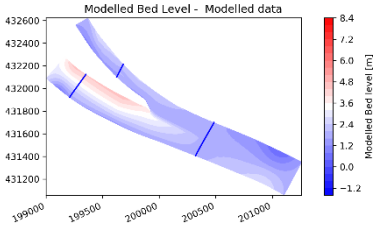

Figure 1: Modelled bed level around the Pannerndensche Kop

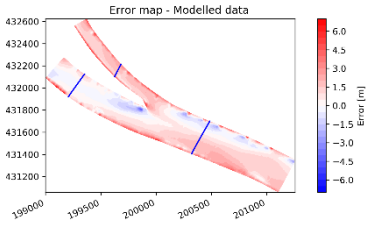

Figure 2: Error map between measured and modelled bed level

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Zervakis, D.I. (2015). Combining a physics -based model and spatial interpolation of scarce bed topography data in meandering alluvial rivers. Master's thesis, Delft University of Techonology

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