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ON THE INFLUENCE OF BED FORMS ON FLOOD LEVELS

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Abstract

Flood inundation modelling and flood risk mapping are primary cornerstones of flood risk assessment and management. Modelling activities generally assume that the morphology of the conveyance does not change, which certainly is not true for alluvial rivers. River bed elevations can quickly change during flood events. Flood water can induce different bed-forms (ripples, dunes, plain bed, etc.), which affects the flow resistance and as a result the flood water level. As a result integrating the river bed dynamics in flood risk management has the benefit of providing more realistic representation of flood levels. The paper presents an analysis of a measured dataset of River Rhine in the Netherlands to show the variation of dune heights during a flood in 2004. In another case study a hydraulic model, capable of simulating the changes in bed forms and the corresponding friction, has been developed for the Nzoia River in Kenya. This case study as well shows the development of dunes with flood and the corresponding effects on roughness and flood water level. Both case studies substantiate the importance of incorporating the changes in bed resistance due to the formation of bed forms in flood inundation modelling.

Key words: bed forms, dunes, flood modelling, Nzoia, Rhine, roughness

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