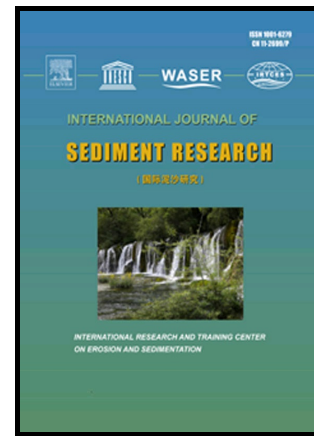


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# Flow structure over a wavy bed with vegetation cover

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## Abstract

On the basis of experiments carried out in flume with a wavy bed with vegetation cover, flow velocity, turbulence intensities and Reynolds stress distributions are investigated. The wavy bed was similar to dune in this study. The fixed artificial dunes were constructed over the bed and artificial vegetation put over them in a laboratory flume. An Acoustic Doppler Velocimeter and spatially-averaged method were applied to determine turbulent flow components and shear velocity. Results were compared with a gravel bedform. It was observed that vegetation cover influences considerably the flow structure and displays clearly the flow separation and reattachment point. The law of the wall was not valid within the vegetation cover, but it was fitted well to the zone above the vegetation cover within the inner layer. For a wavy bed having the same dimensions, shear velocity and friction factor over vegetation cover are 1.7 and 2.6 times of those for the gravel bedform, respectively. The results of laboratory study were compared with those of river study.

Keywords: Wavy bed, Vegetation cover, Turbulence, Flow separation, Gravel

## 1. Introduction

Understanding the flow structure over wavy bed is important for hydrological processes, watershed management and river restoration projects because the flow acts different from that over a flat bed. The main characteristics of flow structure over wavy bed is not universal because vegetation cover prompts turbulence, generates complex flow conditions over wavy bed. In fact, different roughness and flow characteristics over vegetation and gravel cause unusual patterns in different parts of wavy bed with vegetation cover, displaying larger

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