

# Turbulent flow over subaqueous bedforms: On the distribution of bottom shear stress and its relation to the sediment flow rate

A. G. Kidanemariam<sup>1</sup> and M. Uhlmann<sup>2</sup>

<sup>1</sup>Department of Mechanical Engineering, The University of Melbourne, Victoria 3010, Australia

<sup>2</sup>Institute for Hydromechanics, Karlsruhe Institute of Technology (KIT), 76131 Karlsruhe, Germany

We have investigated the formation and evolution of sediment patterns in a horizontal channel flow configuration. All the scales of the turbulent flow have been resolved via direct numerical simulation, while the sediment bed has been represented by a large number of freely-moving finite-size spherical particles. The numerical approach employed and the flow configuration considered are identical to our previous study (Kidanemariam and Uhlmann, 2017; Scherer et al., 2020). In this talk, we present results of our further analysis with respect to the characterisation of the evolving flow over the bedforms and the associated particle motion (cf. figure 1). In particular, the spatial variation of the boundary shear stress and its correlation to the local particle flow rate is addressed in detail. The latter is an essential ingredient in sediment transport modelling (Charru et al., 2013).

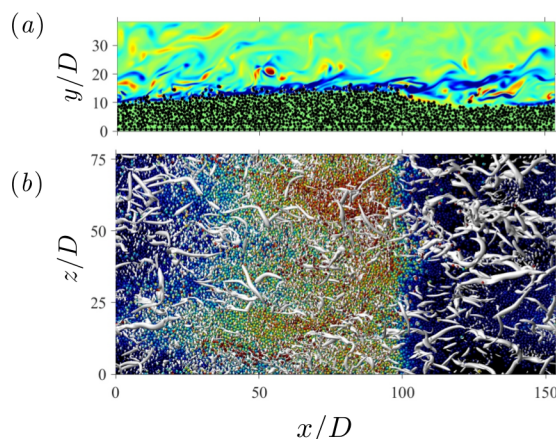


Figure 1: Instantaneous snapshot of the flow field and particle positions. (a) Contours of the spanwise vorticity shown in a streamwise/wall-normal plane. (b) Coherent vortical structures (grey surfaces) along with particles which make up the sediment bed. The particles are coloured based on their wall-normal centre location. Flow is directed from left to right.

## References

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