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Bedforms migration and interactions: a PIV investigation G. BLOIS, J.L. BEST, J.M. BARROS, K.T. CHRISTENSEN, Univ. of Illinois — Bedforms, such as ripples and dunes, are ubiquitous in natural environments in which solid particles are immersed in a moving fluid that is above the critical bed shear stress for sediment movement. The mutual interactions between flow and bed topography result in processes in which both flow and bed morphology are unsteady and dynamic. Bedforms with different sizes, shapes and migration rates produce bedform superimposition and amalgamation whose marks are left in the rock record as a specific stratigraphic signature. We investigate the flow associated with amalgamating mobile bedforms using a narrow (5 mm width) flume coupled with PIV, which allows the behavior of quasi two-dimensional bedforms to be observed and quantified. Simultaneous measurements of both the morphology and flow during amalgamation provide a tool to assess validity of current theory and shed new light on the physics of this fundamental problem. Shear layer interactions between adjacent bedforms, leeside erosion and downstream bedform stalling due to the sheltering effect of an upstream bedform are found to be the key aspects of the amalgamation process. The implications of these processes with respect to flow resistance and transition between bedform states are discussed.

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