THE IMPACT OF NET AGGRADATION UPON VERTICAL SORTING IN RIVER DUNES

Blom, A.

E-mail: a.blom@utwente.nl

University of Twente, Water Engineering & Management, P.O.Box 217, 7500 AE, Enschede, the Netherlands.

Through affecting the small scale morphology (e.g., dune dimensions, bed surface composition, and bed roughness), sediment sorting processes affect sediment transport, changes in mean bed level, and water levels. In a morphodynamic river model, the interaction among grain size selective sediment transport, sorting processes and changes in mean bed level is described in terms of sediment continuity models. Recent progress in the development of these models was made by Blom & Parker (2004, J. Geophysical Research, 109), who developed a framework for sediment continuity without discrete bed layers for conditions dominated by dunes. Instead of discrete bed layers, the framework is based on a probability density function of active bed surface elevations, which indicates the likelihood of a certain bed elevation being exposed to the flow. The framework is founded on (1) the Parker et al. framework for sediment continuity (Parker, Paola & Leclair, 2000, J. Hydr. Eng., 126), (2) a step length formulation, (3) a lee sorting function, and (4) a method to account for the variability in dune dimensions. The resulting model was calibrated against flume experiments. Present research by the author involves extension of the model to conditions with net aggradation and degradation of the river bed. Sorting fluxes through net aggradation of a size fraction are assumed to be distributed over active bed elevations as a linear function of the elevations' exposure to the flow. The time evolution of both the net aggradation of the river bed and the resulting vertical sorting profile is studied numerically for the case of a backwater curve. It appears that vertical sorting through bed form migration predominates the effects of net aggradation upon the vertical sorting profile.