Geophysical Research Abstracts
Vol. 17, EGU2015-15818, 2015
EGU General Assembly 2015

Effect of waves on delta foreset bedding in synchronism with generation of alluvial cyclic steps: 1D flume experiment

Tomohiro Sekiguchi (1), Kazuho Tanabe (2), and Tetsuji Muto (2)

(1) Center for Research in Isotopes and Environmental Dynamics, University of Tsukuba, Ibaraki, Japan (sekiguchi@ied.tsukuba.ac.jp), (2) Graduate School of Fisheries Science and Environmental Studies [U+3000] Environmental science, Nagasaki University, Nagasaki, Japan (tmuto@nagasaki-u.ac.jp)

Cyclic steps, a kind of upper regime bedforms associated with spatially-periodic hydraulic jumps, autogenically produce distinct cyclicity in delta-foreset bedding. This notion was obtained in our previous series of experiments where discrete packages of sediment accumulation on the foreset slope is synchronized with upstream migration of hydraulic jumps that depart from shoreline, i.e. the topset–foreset break of the delta. In the present series of experiments, conducted within a flume (50 cm $\times$ 50 cm $\times$ 20 m) with a piston-type wave generator at one end, waves were imposed on a prograding delta, the topset surface of which is characterized with the development of alluvial cyclic steps. A particular set of upstream water discharge, sediment feed rate, and water depth was adopted in all runs, and the experimental conditions including wave period and height were kept constant during each run. A mixture of two quartz sands with different colors and sizes was used in order to visualize sediment grain distribution. The experimental results suggest that waves do not affect behavior of hydraulic jumps (occurrence period at the river mouth, and rate of upstream migration), alluvial topset slope, rate of delta progradation, and the synchronism of cyclic foreset bedding with hydraulic-jump that is about to leave the river mouth. When waves were imposed, a foreshore/upper shoreface layer was intercalated between foreset and topset deposits. This layer became thicker and the foreset slopes tended to be gentler as wave height increased.