Geophysical Research Abstracts
Vol. 17, EGU2015-14390, 2015
EGU General Assembly 2015

Preserved stratification from deposition/erosion sequences of progressive and breaking antidunes

Suzanne Leclair, Paul Carling, and Richard Breakspear
Independant researcher, Canada (amiesuzanne@gmail.com; s.leclair@ogq.qc.ca)

Experiments on sedimentary processes allow large amounts of data to be collected, which are oftentime not analyzed entierely as this may be beyond the scope of a particular study. This paper makes second use of Breakspear's video records and photographs of preserved deposits from an experimental investigation on antidunes in sand and gravel. The objective of this study is to better understand the successive patterns of deposition and erosion during antidune migration. Results will 1) bring insights on the preservation potential of sediment deposited during the process, and 2) be further related to Breaksprear's finding on antidune hydrodynamics,
Water and bed surface were drawn from successive still images of video records showing the migration of progressive (not breaking) and breaking antidunes. In addition, image analysis (pixel characteristics) of preserved sediment (photos of sediment peels) was performed, allowing to understand the relative spatial distribution of sand and gravel. Results show that wave-like strata (in flow direction) is commonly preserved, generally thicker and shorter for breaking than progressive antidunes, and that uptream-dipping strata is observed only in the case of progressive antidunes. The successive passage of progressive antidunes creates a planar erosion surface whereas that of breaking antidunes produces bed scour with coarse-grain deposit, which disrupt alongstream wave-like strata. Although the preserved deposit show mixtures of sand ans gravel, the video records indicate that some sand was deposited at a different time-sequence than gravel (subsequent infiltration). These peliminairy findings are potentially usefull of improving our interpretation of the sedimentary record.
Further studies on antidunes should address the effects of mixed sediment size and/or density on antidune processes and deposits in order to better predict reservoir characteristics (e.g. variation in porosity). We also need to improve our understanding of the 3-D complex flow-sediment interaction in order to develop hydrodynamic models, and to recognize antidune signature in field exposures of any orientation; regarding this point, future studies would benefit from computed-tomography (CT-Scanner) technology.

Breakspear, R. (2008) Hydrodynamics and sedimentary structures of antidunes in gravel and sand mixtures. University of Southampton, School of Geography, Doctoral Thesis, 354pp. http://eprints.soton.ac.uk/67551/