## Experimental study of upper regime bedforms and the associated modes of bedload transport.

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Upper regime bedforms are important to the interpretation of the stratigraphic record and the study of river floods, coastal storms and turbidity currents but how they form remains poorly defined. Two different upper plane bed configurations are described in the literature, one with long wavelength, small amplitude downstream migrating bedforms, the other with nearly flat beds under a transport layer of colliding grains few tens of grain diameters thick –the sheet flow layer. We performed laboratory experiments to study the interactions between flow hydrodynamics, mode of bedload transport and bedform geometry of the emplaced deposit in these upper regime plane bed configurations. The experiments showed that in the absence of suspended load two upper plane bed configurations exist for increasing values of the bed material transport capacity. The upper plane bed with long wavelength and small amplitude bedforms occurs for a relatively small bed material transport capacity. As the bed material transport capacity, the bed flattens out and the sheet flow layer forms. This change in bed configuration is associated with a change in the mode of bedload transport, from *standard bedload transport* with a two-three grain diameter thick bedload layer to *bedload transport in sheet flow mode*, and flow resistances.

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