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Geometry description of local scouring process in various laboratory water structure models

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ABSTRACT

Water structures are usually used to stabilise river bed, although they also are the cause of the degradation processes like the erosion and scouring. The aim of this study was to correlate scour geometry, characterized by the scour medium and maximal depth and its length with hydraulic and granulometric properties. Study presents results obtained for three laboratory models (with and without weir flow) with partially or totally erodible bed with median grain size $d_{50} = 0.62$ mm in clear-water and live-bed conditions. The experiment duration was sufficient to obtain equilibrium, stable scour shape. Analysed relationships were parametrized using linear and exponential functions. The intensity of the sediment transport was investigated using the modified principle of fluvial hydraulics – the Lane's relation, originally derived from basic rules of the sediment transport as a qualitative expression.