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Local and non-local effects of spanwise finite perturbations in erodible river bathymetries MIRKO MUSA, CRAIG HILL, MICHELE GUALA, University of Minnesota — Laboratory experiments were performed to study the effect of axial-flow hydrokinetic turbine models on an erodible river bed under live-bed conditions. Results indicate that the presence of an operating turbine rotor creates a blockage in the mean flow which produces a remarkable geomorphic signature in the migrating bedforms. These impacts affect a local area downstream of the turbines when placed symmetrically with respect to the cross section of the channel. On the other hand, more interesting results are observed with an asymmetric installation of the turbines. This configuration demonstrates a stronger effect on the mean flow, resulting in a larger plan-wise distortion of the mean topography and differential migration patterns of bedforms. Different turbine installation arrangements and hub heights above the mean bed were investigated, focusing mainly on the perturbation of sediment transport characteristics influenced by the turbine wake. Additional results with spanwise modulated submerged walls explore the possibility to control river topography harvesting this type of geomorphic destabilization.

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