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An initial assessment of bed destabilization risk past vegetation patches using instrumented particles

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Instream vegetation may alter the mean and turbulent flow fields leading to destabilizing riverbed surface, under certain flow conditions. In particular, recent research on instream vegetation hydrodynamics and ecohydrogeomorphology has focused on how energetic flow structures and bulk flow parameters downstream a vegetation may result in riverbed destabilization. This study, demonstrated the application of a 20mm novel instrumented particle in recording entrainment rates downstream simulated vegetation patches of distinct densities, at various distances downstream these. A patch of 6mm acrylic cylinders is used to simulate the emergent vegetation having the same diameter (12cm) and different porosities or densities (void volume equal to 1.25%, 3.15%, 6.25%, 11.25%, and 17.25%). The flow velocity near the instrumented particle is recorded using acoustic Doppler velocimetry (ADV) with appropriate seeding, under clear water conditions. Preliminary results are presented with focus on the effect of vegetation patch density on the flow field and subsequent effects on particle entrainment rates and implications for bed surface destabilisation.