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Cyclic steps formed by bedrock incision

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Step-like morphology is formed on slopes composed of cohesive soil where erosion dominantly takes place (erosional cyclic steps), and slopes composed fine sediment where both erosion and deposition take place (transportational cyclic steps). The step-like morphology is called cyclic steps, and studied by many researchers by means of experiments, theory, and numerical simulation. The studies have elucidated the formation processes, the formative conditions, and the scales of cyclic steps in terms of several non-dimensional parameters. It has been known that similar step-like morphology is observed in bedrock rivers. Though it is suspected that these are a kind of erosional cyclic steps, the erosion processes of bedrocks are expected to be different from that of cohesive soil. In this study, the erosion processes of bedrocks are simply formulated, and the formation of cyclic steps due to bedrock incision is studied theoretically.

Keywords: cyclic step, bedrock, erosion, hydraulic jump