Do Your Rock Scour DIGIT@L ?

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Rock scour downstream of high-head dams and in unlined channels and stilling basins of dam spillways is more frequently occurring. Climate change and related regulatory requirements during floods generate more frequent functioning of spillways that have been constructed decades ago but were never used, or only for minor discharges. Unlined rock masses downstream of those structures experience more hydraulic stress by action of hydrodynamic pressures at the water-rock interface. Sound prediction of rock scour potential thus becomes more pertinent and necessary, especially for cases where the scour hole may regress towards the dam or spillway foundations. This keynote lecture provides an overview of state-of-the-art historic and recent rock scour prediction methods and their continuously increasing degree of digitalization. Digitalization becomes more present during scour mitigation projects, from data collection to modelling and decision-making processes. This current digital trend is briefly discussed by pointing out its main advantages, but is also challenged by presenting some shortcomings. It is further detailed by novel and unprecedented digital developments and case studies in this field of engineering.