Long term analysis for the evaluation of hydropower plant impacts on solid transport

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Self-governing region Friuli-Venezia Giulia authorizes new small hydropower plants when the maintenance of proper environmental and hydraulic conditions in mountain rivers are guaranteed. To obtain the authorization to integrate a small hydropower generator (93.51 kW) inside an existing dam, region authorities ask for a two-dimensional mobile-bottom morphodynamic model which fully describes the flow rates occurring in different return periods provided by the Italian law. The subject of interest is to evaluate if the implemented structure induces modifications on the water longitudinal profile, river section and hydraulic jump. Topographic elevation data are processed using the BASEmesh plug-in of QGIS, generating a mesh for the present situation, this is secondly elaborated to obtain a second mesh describing the future design situation. In BASEMENT software, soil characteristics of these two meshes are properly described. Both meshes are subjected to the same series of flow rate in order to compare the effects of the designed structure. Flow rate assumed describes year daily fluctuation and long return period wave flood.