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Experimental determination of flood wave and sediment flow transformation in a small regulated stream on agriculture catchment

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The contribution presents methodology and results of an artificial flood experiments conducted on agriculture experimental catchment Nucice (0,5 km2, Central Bohemia, Czech Republic). There were three research questions formulated for the experiment: i) What is retention effect of stream channel during flood wave propagation; ii) How is the flood wave transformed depending on stream channel conditions; iii) How much sediment deposited within the stream channel from previous erosion events can be resuspended by flood wave propagation.
Two series of experiments were done in contrasting initial conditions: (a) summer conditions, dry stream banks , negligible baseflow , the channel fully overgrown with vegetation; (b) early spring conditions, almost saturated stream banks , baseflow above the yearly average, vegetation not present. Three succeeding flood waves, each of an approximate volume of 16 m3, were released into the upper part of the channel within each of both campaigns. The flood wave transformation and sediment transport regime within an approximately 500 m long channel were monitored by means of measuring the discharge, suspended sediment concentration (turbidity) and electrical conductivity in three profiles along the experimental section of the stream.
Based on the results it was concluded, that there is considerable amount of the deposited sediment in the channel that can be re-mobilized even by small floods and its amount decreases with succeeding waves as the stream channel is cleaned. The flood waves initiated in dissimilar initial and boundary conditions progressed differently. The amount of discharged sediment was much smaller than during extreme precipitation events, when surface runoff and soil erosion take place at the catchment. Detailed quantification of all observed parameters will be presented within the contribution together with generalization of results in the means of proportion of resuspension process on total sediment transport during erosion events.
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