



## **Exceptional events in the Erlenbach, Switzerland**

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Sediment transport in the Erlenbach, a small stream with step-pool geometry in the canton of Schwyz, Switzerland, has been monitored for more than twenty years. During this time three exceptional events have impacted the stream and partly or completely destroyed the step-pool geometry. In the aftermath of the events, transport rates at a given discharge and total sediment yield remained elevated for about a year or longer. For the last event, dated on the 20th June 2007, observations on boulder mobility and step destruction are used to discuss channel stability. Boulders with diameters up to 135 cm and estimated weights of more than 2.5 tons moved during the 2007 event. Using hydraulic observations and shear stress calculations boulders up to 65 cm in diameter are predicted to have been fully mobile in peak conditions, even if form resistance and increased critical stresses needed for the initiation of motion in steep streams are taken into account. For two of the events, estimated peak shear stresses at the bed exceeded 1000 Pa, calculated both from observations of the flow hydraulics and from boulder mobility. This suggests that highly energetic flows occur relatively frequently in small, steep streams and that large boulders can be transported by fluvial processes in such streams.