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# Hydraulic and sedimentary influences on the catastrophic drift of stream invertebrates

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Benthic invertebrates enter the water column and drift downstream for a number of reasons. Many studies have shown that drift rates increase dramatically during periods of elevated discharge and this has given rise to the term 'catastrophic drift'. Despite much interest in catastrophic drift as an ecological response to physical disturbance events such as high flows, the triggers that cause animals to leave the stream bed have remained only vaguely known. Understanding these triggers is important because, as well as providing insights into the role of disturbance in natural communities, they are a potential mechanism through which hydropower releases in regulated rivers impact biota.

Here we describe experiments in which we used a novel portable flume to manipulate hydraulic conditions and initiate sediment movement and invertebrate drift within an upland gravel bed river (Ribera Salada, NE Iberian Peninsula). We show that in the absence of bedload transport, the loss of animals from the bed equates to the normal background drift rate. Once shear stress reaches the threshold that initiates sediment movement, loss of animals from the bed increases exponentially. Thus, sediment movement appears to be the trigger which initiates so-called catastrophic drift. However, our data indicate that even low rates of bedload transport can lead to rapid depletion of the benthos and, within a short period, drift may become supply-limited. This has important implications for sampling of drift during flood events, as it suggests that samples collected at the flood peak may underestimate drift magnitude.