



Modelling stochastic sediment delivery to a channel reach

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Bedload transport, the sliding, rolling or hopping motion of sediment particles over a river bed, has long been recognised to be a stochastic process. Here, the Birnbaum-Saunders distribution is proposed as a probability distribution function for the transport rates at a given water discharge. This distribution can be derived from simple assumptions without reference to the specific physics of sediment transport and should thus be widely applicable. The function is successfully tested using a high-resolution bedload transport dataset from the Pitzbach stream, Austria. Using other empirical and semi-empirical equations, I develop a system of equations for modelling stochastic sediment delivery to a channel reach that honour the long-term average fluxes. The equations take into account both bedload and suspended load.