

CHANNEL RESPONSE TO CHANGE OF SEDIMENT LOAD

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When the sediment load changes at the upstream site, both the flow and stream morphology respond. That is, if the sediment supply increases, it is likely that the flow depth decreases and the channel slope steepens, which results in increasing the sediment transport capacity of the channel. On the contrary, if the sediment supply decreases, the flow depth increases with lowered bed slope. This will reduce the sediment transport capacity of the stream. This paper presents relationships for the flow depth and bed slope at equilibrium when the sediment supply changes at the upstream boundary. The relationships are given in terms of discharge, sediment load, particle size, and etc. Numerical experiments are carried out to test the proposed relationships for equilibrium flow depth and bed slope. The quasi-steady model, based on the assumption that the flow is steady and the morphological change is time-dependent, is used for numerical simulations. It is shown that the proposed relationships predict the flow depth and bed slope at equilibrium successfully when compared with profiles simulated by the numerical model.

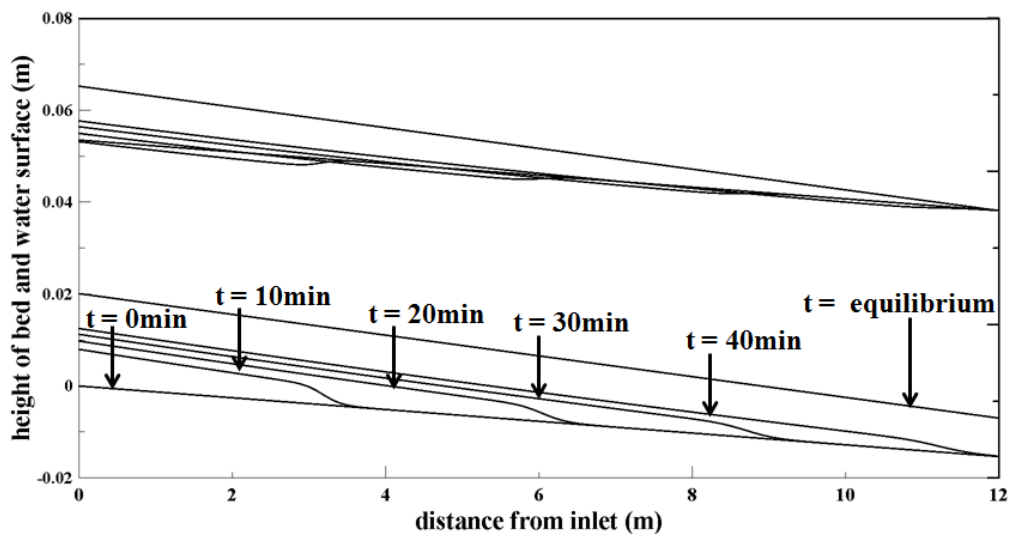


Figure. 1 Channel adjustment due to over-supply of sediment load

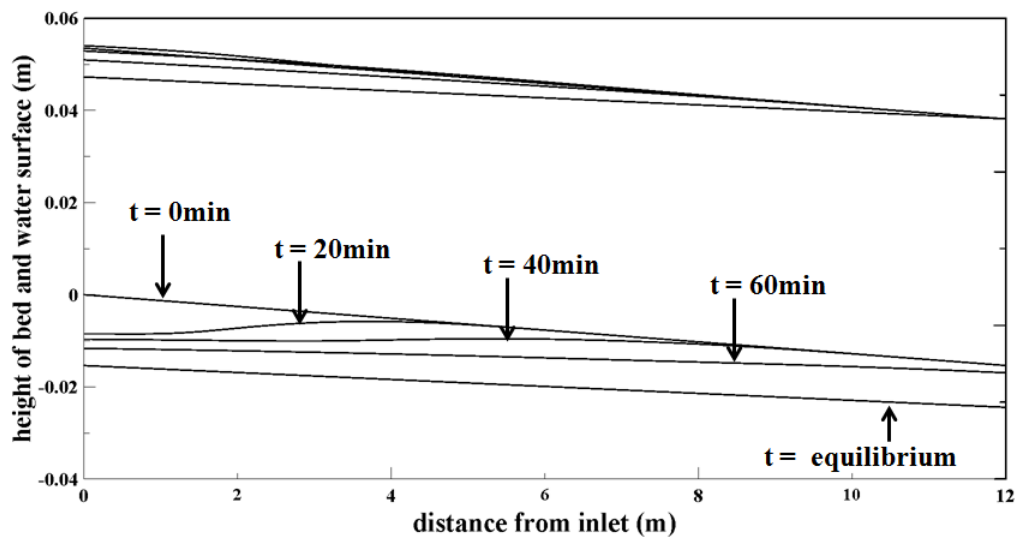


Figure. 2 Channel adjustment due to under-supply of sediment load