

Effect of basin water depth on the morphodynamics of delta distributary channels: A tank experiment

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Recent experimental studies of river deltas have brought a new view that the morphodynamics of distributary channels is seriously affected by basin water depth. In a delta fronting on an extremely deep water, so that the delta cannot prograde, its distributary channels tend to be stabilized in the form of an axial valley and become graded. On the other hand, if the basin water is extremely shallow, the delta's distributary channels keep autocyclic shifting and are never stabilized. These two extreme examples imply that there exist a spectrum of "intermediates" showing different channel behaviors in response to different basin water depths. The present study challenges to find some characteristic forms of "intermediates" and grasp the whole picture of the spectrum, based on the analytical results of a series of experimental runs that were conducted with different basin water depths of 1 cm, 1.5 cm, 2.67 cm, 4.0 cm and 20 cm, but with the same basement configuration, the same water discharge and the same sediment supply rate. The results of the runs suggest that with moderately deep basin water in front, there can develop a single, quasi-stabilized major channel accompanied by multiple minor channels which are also quasi-stabilized.

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