

## Helical Motions Dynamics and Hydraulics of River Channel Confluences

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**Abstract :** River channel confluences are dynamic systems with branching structures that exhibit a high degree of complexity both in natural and man-made open channel networks. Recent and past fields and modeling have investigated the river dynamics modeling of confluent based on a series of over-simplified assumptions (i.e. straight tributary channel with a bend with a 90° junction angle). Accurate assessment of such systems is important to the design and management of hydraulic structures and river engineering processes. Despite their importance, there has been little study of the hydrodynamics characteristics of river confluences, and the link between flow hydrodynamics and confluence morphodynamics in the confluence is still incompletely understood. This paper studies flow structures in confluences, morphodynamics and deposition patterns in 30 and 90 degrees confluences with different flow conditions. The results show that the junction angle is primarily the key factor for the determination of the confluence bed morphology and sediment pattern, while the discharge ratio is a secondary factor. It also shows that super elevation created by mixing flows is a key function of the morphodynamics patterns.

**Keywords :** helical flow, river confluence, bed morphology , secondary flows, shear layer

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