Geophysical Research Abstracts
Vol. 21, EGU2019-15741, 2019
EGU General Assembly 2019

Division of flow and sediment at two strongly asymmetric bifurcations of a tidal river: consequences for channel stability

Ton Hoitink and Karl Kastner
(ton.hoitink@wur.nl)

The division of sediment at large river bifurcations is complex, as it results from the interaction between the three-dimensional flow, transport of mixed sediments and channel bed morphology. For natural rivers, few field measurements are available, so that the details of these interactions remain poorly understood. We present measurements of the flow and sediment division at two tide-influenced bifurcations of the Kapuas River, a large sand-bedded river in Kalimantan, Indonesia. At both of these bifurcations, a small channel branches off from the side of the main river, so that the planform and sediment division are strongly asymmetric. Flow velocities are measured with a boat mounted acoustic velocity profiler. Sediment concentrations are determined from water samples and inferred from acoustic backscatter. The measurements show, that the bulk of the sediment is transported in suspension. The size distribution of the suspended material reaches from fine sand, which rapidly responds to the temporal variation of the flow velocity over the tidal cycle, to silt and clay, which mostly remain suspended during slack water. At the first bifurcation, the side channel branches off in an outer bend so that sand primarily bypasses the side channel. At the other bifurcation, the side channel branches off in a straight reach and receives proportionally a large amount of sediment. We argue that local variations of sediment size and channel width are key to understand bifurcation stability.