Analysis of Sedimentation Rates in the Densu River Channel: The Result of Erosion and Anthropogenic Activities in the Densu Basin

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Abstract

Sediment is important in determining the morphology of river systems. The Densu basin has come under intense anthropogenic activities such as farming, sand winning, bushfires, among others, which are impacting on the fluvial processes, forms and channel morphology of the river. The study investigated sedimentation of the river channel in the light of these human activities along its banks. Fluvial processes include erosion and deposition particularly at the lower and middle courses, which is fashioning the morphology of the river channel. Data on river sedimentation was determined through sediment load analysis. The results of bed load show well-graded particles, particularly results of low flows throughout the river's course. Generally, the percentage of coarser materials (gravels, sediments > 5 mm) was low, while the percentage of sand in the bed material was high in all the stations at high flows, over 80% in Ashalaja, 70% in Mangoase and moderate at Akwadum (about 50%). Clay particles were low or absent in the sampled stations during high flows. Fluvial sediment transport for suspended load during high flows was high and low for the low stages. The highest suspended sediment discharge was 475.641 tonnes/day at Akwadum at 2.18 m and the lowest was 0.492 tonnes/day at 0.53 m also at Akwadum. Sediment discharge increased downstream from Akwadum to Ashalaja at both low and high flows, which was attributed to a number of variables such as a reduction in vegetative cover and increase in discharge downstream. The middle course experienced active channel erosion whilst deposition (channel braiding) was prevalent at the lower course.