



Temporal and Spatial Distributions of Suspended Sediment in Upper Steam of Yarlung Zangbo River and Its Main Tributaries

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Abstract: The Yarlung Zangbo (Brahmaputra) River is the longest river in Tibetan Plateau and the highest river in the world. It flows from west to east across the southern section of the plateau, stretching 2057 km in length and 240480 km² in area, with mean elevation being 4621 m a.s.l. On one hand, the fragile ecology and poor soil development, under the extreme environmental factors coupling freezing and thawing, weathering, and precipitation, provides a lot of materials for erosion. On the other hand, a large amount of runoff from glaciers and melting snows with considerable drop height keeps flushing and transporting the crushed materials. For these reasons, the soil erosion in the region is widely distributed. The annual runoff volume is reported as 1395.1×10^8 m³ and shows a gradually increasing trend from upstream to downstream. The precipitation distributions show significant differences and the average annual precipitation ranges at 136-290mm, 150-250 mm, 300-400 mm, and above 600 mm for source region, upstream, midstream, and downstream, respectively. The large spatial variability in its climate condition, topographical features, and runoff processes will inevitably lead to significantly different soil erosion intensity and variable sediment distribution from upstream to downstream regions of the basin. In the study, field investigation and data collection was carried out for suspended sediment distribution in upper stream of the Yarlung Zangbo River and three main tributaries. The temporal and spatial distributions of river suspended sediments were presented, as well as the event-based responses to precipitation and runoff. The results will be helpful for identification of critical erosion areas and understanding erosion features in the region.