



Spatial patterns and variations of suspended sediment transport in the upper- and mid-stream Yarlung Tsangpo River, China

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The Yarlung Tsangpo River (YL River), flowing from west to east across the southern section of the Tibetan Plateau, is the longest river and as well an important activity center for Tibet Autonomous Region of China. The suspended sediment in the river is an important proxy for regional erosional severity and ecological environment. However, the sediment transport in the river is rarely reported under data scarcity due to the harsh climate conditions, high elevation, and intensive area. Under the interaction of monsoon climate and topography variability, what are the spatial patterns and variations of the suspended sediment in the YL River and how to explain the spatial pattern and variation? Based on the analysis of monthly discharge and suspended sediment concentration data from four mainstream stations, spatial patterns and variations of suspended sediment in the upper- and mid-stream YL River are studied. The results of spatial distribution analysis show that high erosion intensity occurred in the upper area of the mid-stream reaches while there is a large deposition area located at the end of middle stream. On the whole, the annual sediment yield transported at the end of mid-stream is 1043×10^4 t with average specific sediment yield of 54.4 t/km²/yr which illustrates that the sediment contribution is at a relative low level from the upper- and mid-stream YL River. The sediment transport mainly occurs in the three months of Jul. to Sep., as just the time of rainy season, flood season, and intensive melting time period of glaciers, accounting for 79%~93% of the annual gross yield (more concentrated for upstream). Finally, the spatial variations of suspended sediment are comprehensively analyzed and explained in terms of the sediment rating curve, climate, hydrology, and riverbed morphology characteristics.