

An application of adaptive cluster sampling for estimating total suspended sediment load.

ABSTRACT

Suspended sediment transport in river for a particular period is a timescale finite population. This population shows natural aggregation tendencies in sediment concentration particularly during floods. Adaptive cluster sampling (ACS) can be potentially conducted for sampling from this rare clustered population and estimating total load. To illustrate the performance of ACS in sediment estimation, a comparative study was carried out in the Gorgan-Rood River, Iran, with around a 5 year daily concentration record. The total sediment loads estimated by ACS were statistically compared to the observed load, estimations of selection at list time (SALT) and conventional sediment rating curve with and without correction factors. The results suggest that none of the sediment rating curves produced accurate estimates, while both ACS and SALT showed satisfactory results at a semi-weekly sampling frequency. The best estimation obtained by the rating curves did not show a percent error better than -40%; however, ACS and SALT underestimated the load at less than 5%. The results of this study suggest ACS could improve river monitoring programs.

Keyword: Adaptive cluster sampling; Gorgan-Rood River; Sediment rating curve; Selection at list time; Suspended sediment load.