

Seasonal variations and yearly trend evaluations of sedimentation loads: a case study at Chalok River, Terengganu, Malaysia

Abstract

The aims of this study were to determine the relationship between seasonal variations (wet and dry periods) on sedimentation loads and to identify the yearly trend of sedimentation loads at Chalok River, Terengganu, Malaysia from 2003 to 2008. It was found that wet and dry periods influenced the transportation of suspended sediment into the river significantly. The highest suspended sediment loads at Chalok River occurred during the wet period when the intensity of rainfall is high. Besides, the rainfall, water level, stream flow and suspended sediment loads also were analysed using Spearman correlation to identify their relationships. The results showed significant positive relationship between suspended sediment loads with rainfall ($r = 0.664$, $p < 0.05$), water level ($r = 0.923$, $p < 0.05$) and stream flow ($r = 0.919$, $p < 0.05$). Multiple linear regressions revealed 63% of high suspended sediment loads at Chalok River can be explained by rainfall, water level and stream flow. The trends of rainfall, water level, stream flow and suspended sediment loads were analysed by using Mann-Kendall trend test where the results showed that there is a significant increasing trend for suspended sediment loads but no significant increase trend for rainfall, water level and stream flow over the studied periods. It is evident that the evaluations conducted in this study are useful in providing better understanding and reliable conclusion on the basis of seasonal variations and other environmental variables that affect the sedimentations loads in the river. Such effort provides holistic information for effective and wise management policy of river basin management in the future.

Keyword: Rainfall; Sedimentation loads; Spearman correlation; Mann-Kendall trend test; Multiple linear regressions