

Prediction of sediment flow to Pleikrong reservoir due to the impact of climate change

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Abstract

Pleikrong reservoir with a concrete gravity dam that impound more than 1 billion cubic meter storage volume is one of the largest reservoir in Central Highland of Vietnam. Sedimentation is a major problem in this area and it becomes more severe due to the effect of climate change. Over time, it gradually reduces the reservoir storage capacity affecting to the reliability of water and power supply. This study aims to integrate the soil and water assessment tool (SWAT) model with 14 bias-corrected GCM/RCM models under two emissions scenarios, representative concentration pathway (RCP) 4.5 and 8.5 to estimate sediment inflow to Pleikrong reservoir in the long term period. The result indicated that the simulated total amount of sediment deposited in the reservoir from 2010 to 2018 was approximately 39 mil m³ which is a 17% underestimate compared with the observed value of 47 mil m³. The results also show the reduction in reservoir storage capacity due to sedimentation ranges from 25% to 62% by 2050, depending on the different climate change models. The reservoir reduced storage volume's rate in considering the impact of climate change is much faster than in the case of no climate change. The outcomes of this study will be helpful for a sustainable and climate-resilient plan of sediment management for the Pleikrongreservoir.