

Quantitative relationship between sediment storage in dam reservoir and coastal erosion as the basis of future sediment management and planning

*Yoshiyuki Yokoo¹, Keiko Udo²

1.Fukushima University, 2.Tohoku University

Toward comprehensive sediment management and planning in future, the present study investigated quantitative relationship between sediment storage in upstream dam reservoirs and downstream coastal erosion as the basis of future sediment management and planning. Firstly, we mapped sediment storage in 966 dam reservoirs in Japan, where we employed total sediment volume stored since their constructions. Secondly, we estimated volumetric coastal erosion of the 71 Japanese coastal zones between 1903 and 1991. Thirdly, we calculated total sediment storage in dam reservoirs located in the upstream area of a coastal zone for all the coastal zones. And finally, we plotted total sediment storage in upstream dam reservoirs and downstream coastal erosion to find positive and significant correlation between them.

Based on the result that upstream dam sediment storage certainly increase downstream coastal erosion, we then explored a simple methodology to estimate dam sediment storage in future based on the relationship between hourly precipitation intensity and hourly sediment inflow to dam reservoir estimated by water inflow to dam reservoir and its turbidity. We found remarkable correlation between precipitation intensity and sediment inflow; hence we expect that future sediment inflow to upstream dam reservoirs and downstream coastal erosion could be estimated if hourly precipitation, water inflow and its turbidity are continuously monitored in the watershed of dam reservoirs.

Keywords: Dam reservoir, Coastal erosion, Future prediction, Sediment, River flow quantity, Turbidity