

Estimating the Suspended Sediment Load by Using the Historical Hydrometric Record from the Lanyang-Hsi Watershed

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ABSTRACT

The long-term (1950-94) hydrometric data archived by the Water Resources Bureau (WRB) at the gauge station near the Lanyang-Hsi river mouth were re-processed to derive the time-series of suspended sediment load. A bias-corrected rating-curve method was used to estimate the sediment load. The statistical analysis provides a criterion for the construction of adequate rating curves. In most cases, yearly data were used to establish the rating curves. Estimated results showed strong inter-annual variations of sediment loads, ranging from 0.05 to 37 Mt yr⁻¹, which differs from the narrow range (7.9-8.1 Mt yr⁻¹) of long-term averages reported in the Hydrological Yearbooks. Two peaks of sediment load (>15 Mt yr⁻¹) occurred in the years following two road construction events, indicating the exacerbation of erosion in the watershed induced by human activities. This study indicates that WRB's long-term average method smoothes out the temporal fluctuation and, therefore, misses important information borne in the data. Hence, we suggest that historical data can be reprocessed to estimate yearly sediment load, which may lead to a better understanding of the sediment yielding process and its response to human disturbances.

(Keywords: Lanyang-Hsi River, Sediment Load, Taiwan, Rating Curve)

1. INTRODUCTION

Riverine sediment discharge and its associated material fluxes dominate the land to ocean fluxes; consequently, they constitute a major link in global biogeochemical cycles (Allan 1986; Walling 1989; Meybeck 1993; Meybeck 1999). Estimation of suspended-sediment flux thus has become a major goal of biogeochemical studies of land-ocean boundary zones (e.g., LOIS Community Research Programme; Wilkinson et al. 1997). In Taiwan, given growing concern about soil erosion, the establishment of long-term records of sediment load is needed for better

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