

SEASONAL VARIABILITY OF SEDIMENT FLUX IN THE MIDDLE YANGTZE CATCHMENT, CHINA: MONSOONAL EFFECT

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ABSTRACT

The middle Yangtze River catchment immediately below the 3-Gorges valley consists primarily of typical meandering river pattern and extensive flood plain, where a large interior Dongting lake system is associated. This catchment comprises a drainage basin of 0.68 million km² and river length totals about 1000 km. A great amount sediment source (5.3×10^8 t/a) from the upper drainage basin has been delivered downstream, and to the river mouth and the sea. To study the sediment transport in the region is extremely vital and can highlight: 1) the seasonal sediment yield and siltation in the middle Yangtze reaches; 2) the principal of changes in river/lake morphologies; 3) the quantitative sediment siltation and erosion in the river/lake system during flood and dry seasons; and 4) more importantly, the sediment budget yielded from the middle Yangtze reaches to the river mouth area. A thorough examination of sediment distribution in the light of daily sediment concentration and sediment load recorded in many hydrological gauging stations sited in the middle Yangtze basin has been made on the basis of 50-years hydrological database. Hydrological data obtained from on-site field measurement also supports the present study. Result indicates: 1) about 1.20×10^8 t sediment load has been silted in the large Dongting lake of the middle Yangtze catchment during the flood season (June to September), accounting for about 1/4 of the total sediment budget derived from the upper sediment sources, and 2) about 0.55×10^8 t sediment load has been yielded from the middle Yangtze reaches to the river mouth area during the non-flood season (October to May, of which 2.25×10^8 t is primarily derived from the trunk channels as washing load below the 3-Gorges Dam and 0.30×10^8 t from the Dongting lake, and 3) River channel (about 500 km long) right below the 3-Gorges valley has been suffering from intensive erosion chiefly during the non-flood season (March-May), due to heavy monsoon precipitation in the regions. The finding of the present study will not only provide substantially insight into what will happen after 3-Gorges Damming, but also an analogue for large river study.

Key world: catchment area, sedimentation, hydrological data