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# Multiscale variability of sediment load and streamflow of the lower Yangtze River basin: Possible causes and implications

Qiang Zhang (1), Chongyu Xu (2), Vijay P Singh (3), and Tao Yang (4)

(1) Key Laboratory of Environment Change and Natural Hazards, Beijing Normal University, Beijing 100875, China (zhangq68@bnu.edu.cn), (2) Department of Geosciences, University of Oslo, P.O. Box 1047 Blindern, N-0316 Oslo, Norway (chongyu.xu@geo.uio.no), (3) Department of Biological and Agricultural Engineering, Texas A&M University, College Station, TX 77843-2117, USA (vsingh@tamu.edu), (4) State Key Laboratory of Hydrology-Water Resources and Hydraulics Engineering, Hohai University, Nanjing 210098, China (enigama2000@hhu.edu.cn)

Long monthly streamflow and sediment load series observed at the Datong station located in the lower Yangtze River basin were analyzed using the scanning t-test, F-test and coherency analysis techniques. The results indicated that: (1)different changing properties of the first and the second moments of the hydrological series on different time scales were observed, reflecting different driving factors influencing the hydrological processes of the lower Yangtze River basin; (2) a generally decreasing trend can be identified after the mid-1980s. Significant abrupt changes in sediment load were analyzed in the sediment load series. However, more complicated changing patterns can be observed in the changes in streamflow. Generally decreasing sediment load and increasing streamflow gave rise to anti-phase relations between sediment load and the streamflow on longer time scales. In-phase relations between sediment load and streamflow on shorter time scales may imply a considerable influence of the hydrological dynamics on sediment transport; and (3) human activities, particularly the construction of water storage reservoirs, exerted a massive influence on sediment load variations. Construction of a large amount of water reservoirs on the tributaries of the Yangtze River and the Gezhouba Dam on the mainstem of the Yangtze River seem to be the main factors responsible for abrupt changes in the sediment load. Construction of the Three Gorges Dam causes a sharp decrease and unstable variability in sediment load variations, which may pose new challenges for the ecological environment conservation and the deltaic management of the Yangtze Delta region.