

# **Sediment regime changes in Hekou-Longmen region of the Yellow River under climate and anthropogenic activities, Loess Plateau, China**

Peng Gao<sup>a,b</sup>, Xingmin Mu<sup>a,b</sup>, Fei Wang<sup>a,b</sup>, Guangju Zhao<sup>a,b</sup>, Wenyi Sun<sup>a,b</sup>

<sup>a</sup> Institute of Soil and Water Conservation of Northwest A&F University, 712100, Yangling, Shaanxi, P. R. China

<sup>b</sup> Institute of Soil and Water Conservation of Chinese Academy of Sciences and Ministry of Water Resources, 712100, Yangling, Shaanxi, P. R. China

**Abstract:** The middle reaches of the Yellow River Basin transport the vast majority of sediment (>85% of the basin's total available sediment load), which has had profound effects on the characteristics of the middle and lower reaches of the Yellow River. Since late 1950s, especially after 1970s, soil and water conservation measures have been extensively implemented in the Loess Plateau, China, over the last six decades, which have resulted in large-scale land use and land cover changes. And the Yellow River Basin has experienced significant sediment regime fluctuations. In this study, data from 22 catchments in the regions from Hekouzhen to Longmenzhen of the Loess Plateau were analyzed to investigate the responses of sediment regime to the land use/cover changes. The Mann-Kendall test and Pettitt test were used to identify trends and change point in the sediment discharge records. All 22 catchments had significant decreasing trend in annual sediment discharge. Change point year occurred between 1971 to 1994, and 17 catchments concentrated from 1978 to 1984. Meanwhile, erosive rainfall exhibits an increasing but not significant trend. Compared to rainfall, land use/cover changes caused by soil and water conservation, including biological measures (e.g., revegetation, planting trees and grass) and engineering measures (such as fish-scale pits, horizontal trenches, and sediment-trapping dams) play an important role in reduction of the sediment discharge. In order to reduce soil erosion and sediment yield, more attention should be paid to changes in land use pattern and the impacts of soil and water conservation.