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## Influence of rainfall patterns on sediment yield in flood couplets of a check dam on the Chinese Loess Plateau

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Check dam plays a crucial role in controlling soil erosion on the Loess Plateau and reducing sediment loads in the Yellow River. Moreover, sediment deposition in check dams also provides valuable information for understanding of soil erosion on the Loess Plateau. Study on the influence of rainfall patterns on sediment yield in small catchments scale is significant for the reasonable arrangement of soil and water conservation measures, particularly for complex environments such as the wind-water erosion crisscross region. This study estimated sediment yield trapped by the check dam in Laoyeman catchment based on deposited flood couplets formed in erosion rainfall events during the period 1978-2010. All erosive rainfall were divided into three rainfall patterns according to the precipitation, rainfall duration and rainfall erosivity, and the correspondence analysis between sediment yield and rainfall pattern was analyzed. Results showed that there were  $1.1 \times 10^5$  t sediment deposited in the dam filed during the trapping history of the check dam as a whole. It has three obvious change stages, which had sediment yield of  $4.53 \times 10^4$  t during 1978-1988,  $4.48 \times 10^4$  t during 1988-1997, and  $1.68 \times 10^4$  t during 1997-2010, respectively. The stage 1989-1997 had the fastest annual deposition rate of  $4.98 \times 10^3$  t·year<sup>-1</sup>, 20.9% and 286% faster than stage 1978-1988 and stage 1998-2010. For similar rainfall pattern in these three stages, sediment yield and the characteristic of flood couplet change were closely related to both rainfall erosivity and land use types. This was also approved by the significant decrease of sediment yield on condition of similar rainfall pattern in a decade before and after the implementation of Grain for Green project indicated that this project made a great contribution to the control of soil erosion on the Loess Plateau. The impact of rainfall pattern on sediment yield indicated that the largest sediment yield is initiated under short duration and high intensity rainfall events, while the sediment in the reservoir area is mainly deposited under the rainfall pattern of moderate precipitation, erosivity and duration. That is the reason for the wettest year (1995) had relatively low sediment deposition, while the year (1982) had strong rainfall erosivity had the maximum annual sediment yield ( $1.68 \times 10^4$  t).