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Sedimentary record and luminescence chronology of palaeoflood events along the upper Hanjiang River valley, middle Yangtze River basin, China

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ABSTRACT

Palaeoflood slackwater deposits (SWDs) along the river banks have important implications for the reconstruction of the past hydro-climatic events. Two palaeoflood SWD beds were identified in the Holocene loess-soil sequences on the cliff river banks along the upper Hanjiang River by field investigation and laboratory analysis. They have recorded two palaeoflood events which were dated by optically stimulated luminescence to 3.2–2.8 ka and 2.1–1.8 ka, respectively. The reliability of the ages obtained for the two events are further confirmed by the presence of archaeological remains and good regional pedostratigraphic correlation. The peak discharges of two palaeoflood events at the studied sites were estimated to be 16420–17930 m^3/s. A correlation with the palaeoflood events identified in the other reaches shows that great floods occurred frequently during the episodes of 3200–2800, 2000–1700, and 1000–900 a BP along the upper Hanjiang River valley during the last 4000 years. These phases of palaeoflood events in central China are well correlated with the climatic variability identified by $\delta^{18}O$ record in the stalagmites from the middle Yangtze River Basin and show apparent global linkages. Palaeoflood studies in a watershed scale also imply that strengthened human activities during the Shang dynasty (BC 1600–1100) and Han dynasty (BC 156–AD 300) may have caused accelerated soil erosion along the upper Hanjiang River valley.

Keywords: Palaeoflood events; luminescence dating; climatic variability; human activities; middle Yangtze River basin

1. Introduction

Fluvial sediments contain evidence of extreme hydro-climatic events correlated closely

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