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Origin of the Yellow River

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The Yellow River originating from the Tibetan Plateau, flow eastward through the Chinese Loess Plateau and North China Plain, thus offers a favorable setting where fluvial response to the tectonic uplift, climatic change, and landscape evolution can be evaluated individually. Its formation and evolution process has attracted worldwide attention from geoscience. A series of continuous fluviolacustrine deposits with a chronological framework of >8.3-3.7 Ma were accumulated on the northeastern Tibetan Plateau and the west front of the Luliang Mtns, and regarded as correlated sediments of a Planation Surface leveling the eastern Asian. The statistics of gravel fabric and lithology in these fluviolacustrine sediments reveals that lots of paleo-lakes fed by local streams dominated the Yellow River catchment in this period. Two sets of fluvial gravel layers with local provenance, covered by Red Clay, were distributed discretely on this Planation Surface, along the northern Jinshaan gorge. They were dated prior to 4.9 Ma and 3.7 Ma respectively, indicating a northward flowing stream, which is different from the current Yellow River. The dramatic surface uplift initiating prior to 3.7 Ma not only interrupted the fluviolacustrine sedimentation, but also led to uplift of this Planation Surface. The hypsographic relief was enlarged, resulting in drainage re-organization. Previous fluviolacustrine systems were pirated by the river in the southern Loess Plateau and the North China Plain, creating the main part of the middle and upper Yellow River during the period of 1.2-1.8 Ma. Subsequently, an episode of uplift initiating at 1.2 Ma forced the Yellow River to continuously excavate and extend into the interior Tibetan Plateau. The current drainage pattern of the Yellow River was probably fixed prior to ca.10 ka.