Understanding the Cenozoic evolution of East Asian tectonic-geomorphology: A sediment provenance-based approach

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Drastic changes in the Earth surface processes occurred in Asia and surrounding regions during the Cenozoic. Driven by India-Asia collision and Pacific plate subduction, the Tibet Plateau region gained its high elevation, whereas lithosphere in east China lost its thickness, and West Pacific margin seas opened, all of which led to the establishment of the present-day topography and drainage pattern. Meanwhile, these tectonic-geomorphic processes also interplayed with physical, chemical and bio-geological processes on global scale, altered the northern westerly circulation, initiated the Asian monsoon regime, and intensified the aridity of Asia interior, all functioning together to form the deserts, loess and the dust system.

Production, transportation and deposition of sediments are closely associated with tectonic-geomorphic processes. From the view point of sediments from source to sink, Asia is divided into two halves: sediments in the southern and southeastern half are transported mainly by fluvial systems, whereas the northern and northwestern half is characterized by eolian process. Finger-printing sediments from source to sink provides a mean to understand regional tectonic-geomorphic history. In this paper, we take the Yangtze River [1] and Taklimakan Desert [2] as two examples to show how sediment provenance-based approach is applied in understanding the Cenozoic evolution of East Asian tectonic-geomorphology.

[1] Zheng, et al.(2013) *PNAS* **110(19)**, 7556-7561. [2] Zheng, et al.(2015) *PNAS* **112(25)**, 7662-7667.