

HGM002-04

Room:301A

Time:May 25 17:15-17:30

## Quantitative analysis of lithologic and tectonic influences on the topographic profiles of Danxia landforms

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“Danxia landform” is a landform made up of non-marine red clastic rock and characterized by red walls and red cliff caused by long-term fluvial dissection. Mountains and hilly lands dissected by fluvial processes including Danxia can be characterized by stream longitudinal profiles and valley transverse profiles. Therefore, longitudinal and transverse profiles of Mt. Danxia in China have been extracted from DEMs, and a series of morphometric analyses were conducted to infer lithologic and tectonic influences on landforms. Mt. Danxia is the place where the term “Danxia landform” was coined. Its general topography has been affected by fractures caused by crustal movement. The area is underlain by two formations of sedimentary rocks: the Changba Formation and the Danxia Formation.

The extracted longitudinal profiles for 45 river basins were analyzed using the stream length gradient index (SL index), the slope-area relationship and the concavity index. Abnormally high SL values occur where a river crosses a fault or rock resistance changes significantly. The slope-area relationship often exhibits a pronounced break related to the spatial scale of the drainage basin. The concavity index tends to increase from the western area of the Jinjiang river basin, underlain mainly by the Changba Formation, to the eastern area underlain mainly by the Danxia Formation. The index is relatively high in the center of Mt. Danxia. The morphometric characteristics of the transverse profiles were also examined in relation to lithology and tectonics. The results provide one of the first quantitative geomorphological evaluations of Danxia landforms.

Keywords: Danxia landforms, SL index, Longitudinal and transverse profiles, DEM