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DEM-based morphometric analysis of drainage basins in Mt. Danxia, Guangdong Province, China

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Mt. Danxia is where the special term "Danxia landform" was coined. The landform is characterized by red-colored sandstones and steep cliffs, often providing a beautiful scenery. In recent years, the landform has been receiving international attention, and some of them were designated as the UNESCO World Natural Heritage. However, morphometric studies of Danxia landforms have been limited. Geomorphological characteristics of drainage basins in the Mt. Danxia area provide a key to understand the evolution of the unique landscape. Morphometric properties related to basin geometry (area, relief, relief ratio, slope, and hypsometry) of subwatersheds in the study area were quantitatively examined using the ASTER GDEM. We found high spatial variations in their morphometric properties throughout the whole basin. Some possible effects of tectonics and lithology on the basin geometry are inferred. Basin geometry of the subwatersheds can also be related to their relative position within the whole basin, i.e., upstream or downstream along the main stream, perhaps reflecting the geomorphological evolution of the whole basin. The hypsometric curves of the subwatersheds with concave and convex shapes may indicate the differing stages of the subwatersheds, some of which seem to have already reached the equilibrium (mature) stage.

Keywords: Danxia landforms, Morphometry, Hypsometry, DEM