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Spatial pattern and influencing factors of Slope Length and Steepness Factors (LS) in Qinghai Xizang Plateau

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Topography is the result of geological tectonic movement and land erosion development, which is min factor for slope processes such as surface runoff and soil erosion. At present, there is insufficient research on the spatial pattern and influencing factors of Slope Length and Steepness (LS) factors in the Qinghai-Tibet Plateau (QTP). Based on the 30m resolution SRTM (Shuttle Radar Topography Mission) digital elevation data, we calculates the Hack profile and area-elevation integral parameters, extracts the slope, slope length and LS factor, and analyze their relationship with the elevation. The results show that: 1) the slope and LS factor are small in the centre area of the plateau, and LS decreases from southeastern to the northwestern. The terrain inside the plateau is flat, surrounded by high mountains, and the slope, slope length and LS value are large in areas with large topographic relief; 2) The Hack profiles of the six main rivers including , etc, in the QTP are convex, and the hypsometric curve of the rivers is close to convex. The geomorphic evolution of the region is in its youth stage as a whole, indicating that the neotectonics of the Qinghai-Tibet Plateau is active. This geomorphic feature makes the LS value distributed in Hengduan Mountains, Western Sichuan Plateau, Yarlung Zangbo River Grand Canyon, etc; 3) The overall dominent of LS in the QTP is slope steepness, while in the steep areas on the edge of the plateau is slope length, and the gentle areas centre QTP is slope; 4) The distribution characteristics of LS are consistent with soil erosion types. The extremely steep slope areas are mainly affected by glacier erosion, while the steep slope areas such as Southeast Tibet are greatly affected by water erosion, The transition zone between the plateau surface and marginal mountains is mainly water erosion and freeze-thaw erosion, and in the dry Qiangtang plareau has strong wind erosion The geomorphic and erosive topographic characteristics of the QTP discussed in the paper, will be a theorical base for the extraction of topographic factors in soil erosion and hydrology, and also has implications for research of multispherical interactions in Tibetan Plateau's earth system.