Left-lateral strike slip rates and formation mechanism of Yadong-Gulu rift, southern Tibet

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Abstract

As the largest rift in southern Tibet, the Yadong Gulu rift (YGR) formed in the latest evolution of India-Asian plate collision. We determined the sinistral strike slip rate of the south and north segments of YGR since the late Quaternary. Using cosmonuclide 10Be method, three sites in Pagri graben (southern YGR) with clear left-lateral offset were chosen to determine the exposure dating. By UAV scanning, we obtained the DEM at each site. Combining the accurate age and offset, we calculate the sinistral strike slip rates of the three sites are 0.6±0.1 mm/yr, 3.1±0.2 mm/yr and 2.3±0.1 mm/yr respectively. After superimposing the throws rates of each site, the recalculate EW extension rates are 2.2±0.1 mm/yr, 3.1±0.3 mm/yr and 1.8±0.2 mm/yr respectively. In the northern section, Damxung graben, two moraine with obvious sinistral offset were selected. Their sinistral strike slip rates are 3.2±0.1 mm/yr and 3.7±0.1 mm/yr. Based on the kinematic and chronological characteristics of the YGR, as well as other rifts in southern Tibet, we proposed that the E-W extension in Tibetan Plateau is triggered by a combination of eastward propagation of the Karakorum-Jiali fault zone and divergent thrusting along the curved Himalayan arc. Meanwhile, the sinistral strike slip component of YGR accommodates the northeastern compression of the eastern syntaxis.

Keywords: Tibetan Plateau, 10Be exposure dating, Yadong, Gulu rift, left, lateral strike slip, formation mechanism

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