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# Holocene slip rate of northern Gyaring Co Fault along Karakorum-Jiali Fault Zone (KJFZ), in central Tibet

WANG Duo[1, 2, *], YIN Gongming[1], JIANG Yafeng[1, 2], HAN Fei[2] and CHUNG Lingho[3]

*1 Institute of Geology, China Earthquake Administration, Beijing, 100029 China*
*2 China University of Geosciences, Beijing, 100083 China*
*3 Dept. of Geosciences, National Taiwan Univ., Taipei, 10617 Taiwan*

Models for the evolution of the Tibetan plateau interpret observed crustal deformation to be either continuous or rigid/quasi-rigid that are purely established upon limited evidences. A key piece of information needed to evaluate these models is the long-term slip rates on boundaries faults, which can give answer to a fundamental question that the scale of the eastward extrusion. Karakorum-Jiali Fault Zone (KJFZ) has been reported as the southern boundary to accommodate the eastward extrusion material with an estimated rate of ca. 10-20 mm/a. However, we report an estimate Holocene slip rate by ca. 9 mm/a for the northern segment of Gyaring Co Fault, which is one of the most active en echelon secondary faults along KJFZ and has been approved as the right lateral strike-slip faults with striking ca. 300° for a distance of ca. 230km, in the central Tibet. Based on the synthesis of high resolution satellite images such as Google Earth images and field observations, we found 5 or more cumulative offsets (ca. 6, 12, 16, 40, 65 m) and a recent surface breaks (ca. 600 m) cut rivers and alluvial fans surprisingly along the ca. 8 km length of fault zone between northwest of Kong Co and northeast of Zhangnai Co. Here, we detected a Holocene alluvial fan in a right lateral offset by ca. 65m that remarkably shows a minimum slip rate of 6.5mm/a since ca. 10ka. Further southeast at a distance over 50 km along the fault, at the southeast of Zigui Co shore, we measured a displacement of a paleo-lake shoreline (T1) by 18m, OSL ages from corresponding period of the paleo-lake shoreline of the Siling Co and Lingo Co in central Tibet range from 1.7 ka to 2.5 ka, suggest a slip rate by 8.9±1.7mm/a which is consistent with the recent GPS data. These estimated values along with the evidences for low activity of en echelon strike-slip fault on eastern KJFZ, i.e. Beng Co Fault at a slow rate of ca. 1mm/a and Jiali Fault slip rate less than 4mm/a since Holocene, strongly suggest those en echelon strike-slip faults conduct inconsistently and perform overall eastward decrease as the Altyn Tagh Fault which are unlikely to support the rigid models, and in contrast, to suggest a limited eastward extrusion that turn out to back the continuum models.

**Key words**: Gyaring Co Fault, Holocene slip rate, central Tibet

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* Corresponding author. E-mail: wangduo001@126.com

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