

引用本文(Citation):

杨攀新, 陈正位, 张俊, 任金卫. 西藏中南部格仁错断裂张剪性质及其区域动力学意义. 地球物理学报, 2012, (10): 3285-3295, doi: 10.6038/j.issn.0001-5733.2012.10.011

YANG Pan-Xin, CHEN Zheng-Wei, ZHANG Jun, REN Jin-Wei. The tension-shear of Gyaring Co Fault and the implication for dynamic model in South-central Tibet. Chinese J. Geophys. (In Chinese), 2012, (10): 3285-3295, doi: 10.6038/j.issn.0001-5733.2012.10.011

西藏中南部格仁错断裂张剪性质及其区域动力学意义

杨攀新^{1,2}, 陈正位^{1,2}, 张俊³, 任金卫^{2*}

1. 中国地震局地质研究所, 北京 100029;
2. 中国地震局地震预测研究所, 北京 100036;
3. 中国医学科学院药用植物研究所, 北京 100193

The tension-shear of Gyaring Co Fault and the implication for dynamic model in South-central Tibet

YANG Pan-Xin^{1,2}, CHEN Zheng-Wei^{1,2}, ZHANG Jun³, REN Jin-Wei^{2*}

1. Institute of Geology, CEA, Beijing 100029, China;
2. Institute of Earthquake Science, CEA, Beijing 100036, China;
3. Institute of Medicinal Plant Development, Beijing 100193, China

摘要

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摘要 喀拉昆仑-嘉黎断裂带(KJFZ)是青藏高原中南部一条规模宏大断裂带,因其是青藏高原向东运移的南边界,其构造展布和活动性质与高原隆升、侧向挤出和东西向伸展等科学问题关系密切,也是研究高原变形机制和地球动力学重要场所.本文选取该断裂带中部NW向格仁错断裂(GRCF),对断裂沿线进行较详细地质地貌调查,对冲沟位错和断层陡坎等地貌单元进行测量,并进行探槽开挖,结合天然剖面揭示了断裂产状,详细研究断裂活动性质,发现断裂除前人认为的右旋走滑性质外,还具有明显的张性正断性质,断裂向北陡倾,且北盘相对南盘下降,全新世以来右旋走滑速率和正断速率分别为2.98 mm/a和0.2~0.5 mm/a之间.前人在共轭的北东向断裂研究中,也发现除左旋走滑性质外,同样具有正断分量,表明现今高原中南部上地壳除传统认为处东西向张性应力场环境外,南北向也具有明显张性特征.而受印度板块向北东向挤压作用,高原岩石圈总体应处于挤压应力状态.因此,推测现今该区域上下地壳处于应力解耦状态,并尝试建立区域张剪性地壳动力学模型:在南北向挤压应力场的作用下,中下地壳缩短凸起隆升,导致上地壳在各方向都表现为不同程度的张性特征.

关键词 格仁错断裂, 喀喇昆仑-嘉黎断裂带, 青藏高原, 动力学模型

Abstract: Karakorum-Jiali fault zone (KJFZ) is a large-scale fault zone in central-southern Qinghai-Tibet Plateau. Because it is the southern margin of the plateau and the Qinghai-Tibet Plateau moves to the east along this fault zone, its formation, structure and activities are crucial to uplift, lateral extrusion and east-west extension of Tibetan Plateau. Gyaring Co fault (GRCF) is one of faults in middle of KJFZ. By geomorphologic research, measure the dislocation of gorge and scarps along the fault and trench study in the field, the fault is north dip, and its south wall raised up relatively to the north wall. Not only the right-lateral strike-slip is found as the former's studies, but also tensional dip-slip has been found. The rate of the strike-slip and dip-slip is 2.98 mm/a and 0.2~0.5 mm/a respectively during Holocene. At the same time, the former also find the tension besides left-lateral strike-slip in NE conjugated faults north of Bangonghu-Nujiang suture zone(BNS). This extension-shear in the conjugated faults system show upper crust of the south-central plateau is not only the tension in east-west direction with Qiangtang terrance east movement, but also has a significant tension in north-south direction presently. Though the lithosphere is in press state because the Indian plate ram into Eurasia continent in NNE direction, it can be speculated that the stress of upper crust is decoupled from mid-lower crust. As a conclusion, a regional dynamic model of extension-shear is built: the mid-lower crust uplifts under the press stress field in direct of south-north, so the upper crust is in tensional stress in all direction.

Keywords Gyaring Co Fault, Karakorum-Jiali Fault Zone, Tibetan Plateau, Geodynamic model

Received 2011-11-11;

Fund: 中国地震局地震预测研究所基本科研业务专项(0210240201,02091412); 973计划(2008CB425701)共同资助.

Corresponding Authors: 任金卫,男,博士,研究员.E-mail:ren@seis.ac.cn Email: ren@seis.ac.cn

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