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喜马拉雅东构造结周边地区主要断裂现今运动特征与数值模拟研究

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Study on current movement characteristics and numerical simulation of the main faults around Eastern Himalayan Syntaxis

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摘要

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摘要 本研究通过对东构造结及其周边地区主要断裂进行野外考察,通过GPS观测数据和地质、地球物理资料的综合分析,建立三维有限元模型;运用数值模拟方法对东构造结周边地区主要断裂现今运动特征进行模拟研究,取得一些初步的认识:(1)东构造结北侧和东侧地块总体上围绕构造结发生顺时针旋转,右旋走滑的东南边界断裂不是嘉黎断裂,可能是阿帕龙断裂;(2)野外考察资料、GPS观测及数值模拟结果研究表明,嘉黎断裂不是整体右旋走滑断层,西北段和东构造结顶端附近为右旋挤压性质,东南段运动性质发生了转变,由右旋走滑运动转变为左旋走滑运动;(3)数值模拟结果表明,嘉黎断裂与实皆断裂可能是不相连的,至少不是简单连通的,阿帕龙断裂与实皆断裂可能是相连的;(4)东构造结目前依然起着一定的作用,它与阿萨姆角共同影响着现今区域构造变形,许多断裂活动转换和重要构造事件都发生在它们之间或很近的区域。

关键词: 东构造结 数值模拟 GPS 嘉黎断裂 喜马拉雅

Abstract: Based on the survey of main faults around the Eastern Himalayan Syntaxis (EHS) and its surrounding areas, GPS observation data, the geological and geophysical data, through a comprehensive analysis, we construct a three-dimensional finite element model and study the current movement characteristics of the main faults around EHS by using the method of numerical simulation, at last obtain some preliminary understandings as follows. 1) The northern and eastern blocks of the EHS make clockwise rotation around EHS. The southern boundary of dextral strike-slip is not the Jiali fault, but the Brahmaputra fault and Apalong fault. 2) Field survey data, GPS observation, and numerical simulations show that the Jiali fault is not entirely a dextral strike-slip fault, its northwest section and the section near the top of EHS is dextral strike slip, and the southeast section changes from dextral slip to sinistral strike-slip. 3) Numerical simulation results show that the Jiali fault and Sagaing fault may not be linked, at least not simply connected; Apalong fault and Sagaing fault may be connected. 4) EHS still plays a role at present, and affects the current regional tectonic deformation together with Assam horn. Some faulting conversion and important tectonic events occurred between them or very close to the region.

Keywords: Eastern Himalayan Syntaxis Numerical simulation GPS Jiali fault Himalayan

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