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以震源机制类型划分汶川、玉树地震构造块体归属

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Tectonic block attribution of Wenchuan and Yushu earthquakes distinguished by focal mechanism type

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摘要

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摘要 2001年11月14日昆仑山口7.8级地震、2008年3月21日于田7.1级和5月12日的汶川7.9级地震,全部发生在青藏高原新的地震活动组.昆仑山口和汶川地震分别位于巴颜喀拉活动地块的北部和东部边界,于田地震发生在该地块的西端.GPS的分析表明该块体整体向东运动.发生在块体不同部位的昆仑山口、于田和汶川3次大地震震源机制类型体现了巴颜喀拉块体活动的一致性.汶川主震和强余震发生之前,出现于田序列余震的强度和频度显著增高,进一步证实同一活动地块地震之间的内在联系.14日玉树发生6.9级地震,连同1996年11月19日的喀喇昆仑山口6.9级地震和1997年11月18日玛尼7.5级地震,都发生在活动地块的南部边界上,震源机制表现为一致的左旋走向滑动,证实它们属于羌塘块体向东运动的结果.事实表明活动块体具有刚性性质,而整体运动也是两组各自3次大地震成组活动的原因.

关键词: 汶川地震 玉树地震 震源机制 构造块体归属 成组活动 块体整体活动

Abstract: The November 14, 2001 M_w 7.8 Kunlun Mountain Pass earthquake, the March 21, 2008 M_w 7.1 earthquake and the May 12, 2008 M_w 7.9 Wenchuan earthquake all occurred in the middle of Tibet Plateau formed a new seismicity group. The epicenter of Kunlun Mountain Pass Earthquake and Wenchuan Earthquake located at the northern and eastern boundary of Bayankala Block respectively and the Yutian earthquake occurred at the western end of it. GPS observational data indicate that this block moves to east. The rupture characteristics of the three large earthquakes in different parts of the block suggest the mechanical consistency of the Bayankala block motion. The intensity and frequency of Yutian aftershocks significantly increased before the main shock and the stronger aftershock of Wenchuan earthquake, which proves that there is an internal relation between the three large earthquakes. The April 14, 2010 M_w 6.9 Yushu earthquake, the November 19, 1996 M_w 6.9 Karakoram mountain earthquake and the November 18, 1997 M_w 7.5 Mani earthquake all occurred on the southern boundary of Bayankala block, and their focal mechanisms are consistently left-lateral strike slip, which were caused by the eastward motion of Qiangtang block and formed a new strong earthquake group. The results show that the block has the character of rigid body motion which is the common origin of the two large earthquake groups.

Keywords: Wenchuan earthquake Yushu earthquake Focal mechanism Tectonic block attribution activity Rigid body motion

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