

论文

鲜水河断裂带北西段不同破裂源强震震级 ($M \geq 6.7$) 及复发间隔研究

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摘要 鲜水河断裂带是四川西部一条晚第四纪强烈左旋走滑活动的构造带, 历史上发生多次强震. 它与西北侧的甘孜—玉树断裂带一起, 构成青藏高原东部的侧向滑移构造系统中的川滇活动地块的北边界——羌塘地块的东北边界. 鲜水河断裂带北西段可以分成4个段落, 每一段落均可作为一个独立的基本破裂单元而发生地震破裂, 亦有可能发生不同尺度的多段联合破裂. 对鲜水河断裂带北西段不同尺度破裂的震级及复发间隔进行研究. 根据该地区的地质、地球物理、测量及地震等方面的资料, 结合我国强震复发的特点, 分析了拉分盆地内部的滑动速率分布, 以确定各段落的等效长度和倾向宽度, 从而建立适合我国大陆走滑断裂的面波震级与断裂发震面积的关系式; 进而运用地震矩方法, 考虑断层之间的相互作用, 结合专家意见建立了该段的矩平衡断裂破裂模型; 最后, 给出了鲜水河断裂带北西段各破裂源特征化地震的复发间隔、震级大小和不确定性, 以及他与中小地震的联合震级分布. 结果表明, 鲜水河断裂带北西段较易发生单段破裂, 复发间隔在100~150年左右.

关键词 [鲜水河断裂带](#) [破裂源](#) [特征化地震](#) [地震矩](#) [复发间隔](#)

分类号

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Research on the magnitude and recurrence interval of characterized earthquakes with Magnitude ≥ 6.7 along the northwestern portion of the Xianshuihe fault zone in western Sichuan, China

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Abstract The Xianshuihe fault in Sichuan Province, southwestern China is one of the major left-lateral strike-slip faults which emanate from Tibet and seem to play a key role in accommodation of India's penetration into Eurasia. In the northwestern portion of the Xianshuihe fault zone, sixteen earthquakes of $M \geq 5$ occurred since 1700. The northwestern portion of the Xianshuihe fault zone can be divided into four segments based on field investigation of recent earthquake ruptures, studies on time-space distribution and recurrence behaviors of historical ruptures, geometry and structure of fault zones, geophysical background, and recent seismicity. Each segment of the fault is a unit that has produced historical ruptures and able to produce future ruptures independently. To evaluate the magnitude distribution and recurrence interval of the characterized earthquakes along the northwestern portion of the Xianshuihe fault zone, we develop a framework by taking into account new geologic, seismologic and geodetic information, extending the previous analysis through a keener appreciation of the "stress shadow" cast by historical events and the influence, and further developing a moment-balanced model. The result shows that all the recurrence intervals of single-segment ruptures are about 100 to 150 years, which are much shorter than the recurrence intervals of cascade ruptures and the entire fault rupture.

Key words [Xianshuihe fault zone](#); [Rupture source](#); [Characterized earthquake](#); [Seismic moment](#); [Recurrence interval](#)

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