

汶川地震前后龙门山地区区域构造应力场演化的数值模拟

苏生瑞, 王琦, 李鹏

长安大学地质工程系 西安 710054

NUMERICAL MODELLING OF EVOLUTION OF TECTONIC STRESS FIELD IN STRONG EARTHQUAKE AREA

SU Shengrui, WANG Qi, LI Peng

Department of Geological Engineering, Chang'an University, Xi'an 710054

- 摘要
- 参考文献
- 相关文章

全文: PDF (5708 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 以龙门山地区为研究对象,采用数值模拟方法,通过模拟强震发生前后以及发生时的构造应力场特征,得到了龙门山地区构造应力场变化规律。结果表明,龙门山地区在汶川地震到地震时到地震后的最大主应力和剪应力的数值和方向均发生了改变,最大主应力方向整体上由NEE变为SEE,但在不同地区这种变化表现有所差异。剪应力在震前和震时均有局部区域出现了集中,特别是在映秀附近;但在地震后,区域内剪应力相对均匀分布,而且与地震前相比,剪应力在龙门山前山断裂和龙门山中央断裂分布的值明显减小,在后山断裂附近分布的剪应力数值增大。同时地震后剪应力在龙门山中央断裂上集中的区域逐渐向东北方向移动。应力场变化规律与地震时的地表形变规律和震后余震的分布规律一致。

关键词: 构造应力场 数值模拟 龙门山地区 汶川地震

Abstract: This paper examines the tectonic stress field in the Longmenshan region where the Wenchuan 8.0 earthquake occurred in 2008. The evolution of tectonic stress field before-, during- and after- earthquake is studied with numerical modelling. It is found that from the time before main shock to the time after main shock, the regional stress field experienced complex change process. The magnitudes and orientations of principal stresses and shear stresses changed a great deal. The changes coincide well with the deformation caused by the earthquake and the distribution of the after-shocks.

Key words: Tectonic stress field Numerical modeling Longmenshan region Strong earthquake

收稿日期: 2012-05-20;

基金资助:

国家自然科学基金重点项目(41030749); 国家自然科学基金重点项目(41072223)和中国地质调查局项目(1212010914025)

作者简介: 苏生瑞, 工程地质专业. Email: dcsusr@chd.edu.cn

引用本文:

. 汶川地震前后龙门山地区区域构造应力场演化的数值模拟[J]. 工程地质学报, 2012, 20(5): 715-722.

. NUMERICAL MODELLING OF EVOLUTION OF TECTONIC STRESS FIELD IN STRONG EARTHQUAKE AREA[J]. Journal of Engineering Geology, 2012, 20(5): 715-722.

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