

引用本文(Citation):

蒋海昆, 吴琼, 董祥, 苗青壮, 宋金. 不同温压条件下声发射应变能释放特征——加速模型参数物理含义的初步讨论. 地球物理学报, 2009, 52(8): 2064-2073, doi: 10.3969/j.issn.0001-5733.2009.08.015

JIANG Hai-Kun; WU Qiong; DONG Xiang; MIAO Qing-Zhuang; SONG Jin. Behaviors of AE strain release under the different temperature and pressure condition: discussion on the physical meanings of ASR model parameter. Chinese J. Geophys. (in Chinese), 2009, 52(8): 2064-2073, doi: 10.3969/j.issn.0001-5733.2009.08.015

不同温压条件下声发射应变能释放特征——加速模型参数物理含义的初步讨论

蒋海昆¹, 吴琼¹, 董祥², 苗青壮², 宋金^{1*}

1 中国地震台网中心, 北京 100045

2 山东省地震局, 济南 250014

Behaviors of AE strain release under the different temperature and pressure condition: discussion on the physical meaning ASR model parameter

JIANG Hai-Kun¹; WU Qiong¹; DONG Xiang²; MIAO Qing-Zhuang²; SONG Jin^{1*}

1 China Earthquake Networks Center, Beijing 100045, China

2 Earthquake Administration of Shandong Province, Jinan 250014, China

摘要

参考文献

相关文章

Download: PDF (1590KB) HTML 0KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要 利用不同温、压条件下的花岗岩变形实验数据, 研究声发射(AE)事件应变释放特征, 探讨加速模型参数 m 值与温压环境的关系. 常温条件下, 声发射应变显示一定的加速释放特征, 但 m 值随围压增加未显示出趋势性的变化, 表明常温条件下 m 值与岩石强度关系不密切. 围压固定时, m 值随温度升高逐渐变大, 声发射应变从加速释放逐渐过渡到匀速释放, 这意味着不同温度条件下岩石变形过程中内部微破裂形式的差异, 可能导致应变释放类型的较大差异(即 m 值的较大差异). 在浅表地层的温压条件下, 岩石破坏前显示一定的加速释放特征, m 小于1; 在渐进式破坏区段, 应变释放呈逐渐减弱的减速释放态势, m 明显大于1; 在深部温压条件下, 应变释放加速特征明显, m 值明显较低. 此外, 完整岩样破裂前声发射应变加速释放特征显著, 而宏观断裂面的黏滑之前, 声发射应变基本上匀速释放.

关键词 应变加速释放模型, m 值, 岩石变形实验, 声发射, 温度, 围压

Abstract: Using the data of granite deformation experiments under different temperature and confining pressure, the strain release features of AE events have been studied, and the relationship between m -value, the parameter of the accelerating strain release (ASR) model, with the temperature and pressure environmental condition have been discussed. In room temperature, the AE strain shows a certain ASR, but the m -value does not show the tendential variety, this expresses that the m -value does not interrelate to the rock strength tightly. When confining pressure be fixed, m -value increases with the temperature, and the AE strain release changes gradually from accelerating pattern to the linear pattern. This means that the different microfracture modes inside the rock sample during the process of the rock deformation under the different temperature condition probably leads to the different strain release pattern (i.e. different m -values). To simulate the temperature and confining pressure condition in different depths of the crust, a certain accelerating feature had been checked before the rock failure for shallow crust and m -value is smaller than 1. In progressive failure range of the crust, the strain shows a gradual decelerating release and m -value is greater than 1 obviously. For the HT-HP condition in deep crust, the accelerating feature is remarkable and m -value is very small. Besides, the rock status has a big influence on the m -value, the accelerating feature is obvious before the fracture of the symmetrical and integrated rock sample, but it is linear before the stick-slip of the rock sample with macro-cracks.

Keywords Accelerating Strain Release model (ASR model), m -value, Rock deformation experiment, Acoustic

Service

把本文推荐给朋友

加入我的书架

加入引用管理器

Email Alert

RSS

作者相关文章

蒋海昆

吴琼

董祥

苗青壮

宋金