

地震学★地球动力学★地热学

试论岩石破裂和破坏的差异对地震模拟及前兆研究的影响

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摘要 本文分析讨论了实验地震学研究中很少论及的岩石破裂和破坏的很大差异, 指出仅以岩石破坏实验模拟地震特别是前兆研究存在诸多不足. 建议以岩石破裂来模拟地震特别是前兆研究, 由此可给出较为完整的地震活动图像. 岩石破坏前兆已研究的相当多, 但大破裂前则未必出现如破坏那样的前兆. 大破裂前兆特征比破坏前兆更能反映地震前兆的复杂性, 其识别更难, 更符合实际. 同时提及以岩样的整体黏滑模拟地震研究特别是前兆研究的不足. 建议加强对局部现象——大破裂(或黏滑)的前兆特征、预测方法的深入仔细研究.

关键词 [岩石破裂和破坏](#) [破裂和破坏前兆](#) [模拟地震及其前兆研究](#)

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A discussion on the influence of the difference between the rock fracture and failure to the earthquake simulation and the precursor studies

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Abstract First the difference between the rock fracture and failure was analyzed and discussed from the definition and distinguishing criteria. Further we compared the sequences of rock fracture and earthquake, waveform recordings of fracture and earthquake, focal mechanism, stress drops of rock failure and fracture and stress drops of earthquake, rock breaking and the scaling ratio between the maximum dislocation and rupture length. It is affirmed that only taking the rock failure experiment to simulate the earthquake, especially the precursor study, is not enough, and with many shortcomings. Therefore it is suggested that taking the rock fracture to simulate the earthquake, especially for the precursor study. Thus fairly integrated seismicity patterns would be obtained. The precursor of the rock failure has been studied a lot. However the precursor of failure does not necessarily appear before a great fracture. Comparing with the failure, the precursor feature of the great fracture and its distinguishing can better reflect the complexity of the earthquake precursor and difficulty of the precursor distinguishing and are more suitable to the practicality. Meanwhile the shortcomings of taking the whole stick slip of the rock sample to simulate the earthquake, especially for the precursor study, are discussed. It is suggested that the local phenomenon, the precursor study of the great fracture (or stick slip) and the study of the forecast method should be strengthened.

Key words [Fracture and failure of the rock](#); [Precursor of the fracture and failure](#); [Simulation earthquake and its precursor study](#)

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