



Electric signal relaxation under constant stress on abruptly stressed rocks and on constantly compressed rocks in the vicinity of failure

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Laboratory experiments on rock samples (marble and amphibolite) verify that the application of uniaxial compression is escorted by the appearance of weak electric signals (Pressure Stimulated Currents – PSC).

In this work PSC is detected after the application of an abrupt uniaxial stepwise stress. After the stress reaches its final value the PSC initially decays fast and then at a slower rate until getting to background level. The slow decay obeys an exponential law with a relaxation time related to the applied stress. At higher compression levels relaxation times increase. This behaviour is more profound when the sample deviates from linearity regarding its mechanical properties and the relaxation time increases significantly.

Additionally, PSC emissions were detected in rock samples kept in a regime of constant uniaxial stress in the vicinity of fracture for a long time. A significant PSC peak related to the opening of a major crack that guides the failure plane of the sample is also shown up. Both materials used seem to behave similarly.

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