

Correlation of complex electrical conductivity and acoustic emissions time-series during uniaxial compression of limestone samples

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In the present work, time-series measurements of complex electrical conductivity were carried out in conjunction with acoustic emission (AE) monitoring in limestone samples subjected to different types of uniaxial compressive stress, up to ultimate failure. During linear loading, ac-conductivity obeys the same general self-similar law for critical phenomena that has been reported for the energy release before materials fracture [1]. In all types of uniaxial loading (linear, stepped and sawtooth) ac-conductivity exhibits a strong correlation with AE activity (Fig. 1) due to charge transfer caused by microcracks generation and propagation in limestone. These fracture-induced phenomena are of great importance in searching precursory signals in mechanical damage and in earthquakes prediction [2].

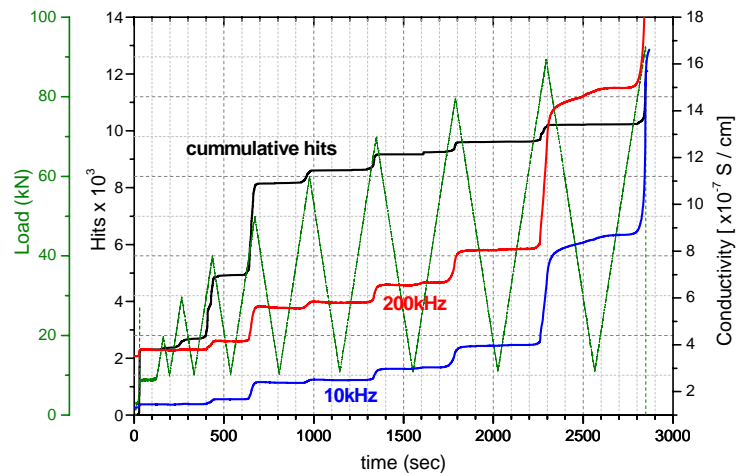


Figure 1: Time-series of ac-conductivity at two selected frequencies (10kHz, 200kHz) and the corresponding AE activity (cumulative hits) during sawtooth uniaxial compression of limestone.

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References

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