

# The application of q-statistics to acoustic emissions of compressed construction materials approaching failure

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The activation of internal micro-fractures due to applied compression loads in different kind of materials causes Acoustic Emissions (AE) which may be used to know how the damage accumulates and predict its failure. Statistical investigations of the AEs occurred both in cubic specimens of concrete and basalt subjected to uniaxial compressive cyclic loadings [1] and in cylindrical basalt specimens in triaxial compression with increasing confining pressure [2], will be presented. The complementary cumulative probability density functions of inter-event time series of the AE recordings are analyzed and characterized by means of q-exponential curves typical of the generalized statistics. The resulting curves suggest a possible universal behavior characteristic of different kinds of materials approaching failure.

[1] A.Greco et al. 2019 The European Physical Journal Special Topics, 229, pp 841-849

[2] S. Vinciguerra et al. 2023 Entropy, 25(4) 701