



Refinement of determination of critical thresholds of stress-strain behaviour by using AE data: potential for evaluation of durability of natural stone

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According to previous studies, evaluation of stress-strain behaviour (in uniaxial compression) of various rocks appears to be effective tool allowing for prediction of resistance of natural stone to some physical weathering processes. Precise determination of critical thresholds, specifically of 'crack initiation' and 'crack damage' is fundamental issue in this approach. In contrast to 'crack damage stress/strain threshold', which can be easily read from deflection point on volumetric curve, detection of 'crack initiation' is much more difficult. Besides previously proposed mathematical processing of axial stress-strain curve, recording of acoustic emission (AE) data and their processing provide direct measure of various stress/strain thresholds, specifically of 'crack initiation'. This specific parameter is required during successive computation of energetic parameters (mechanical work), that can be stored by a material without formation of new defects (microcracks) due to acting stress. Based on our experimental data, this mechanical work seems to be proportional to the resistance of a material to formation of mode I (tensile) cracks that are responsible for destruction of subsurface below exposed faces of natural stone.