



Fractal rock slope dynamics anticipating a collapse

M. Palus (1), D. Novotna (2), J. Zvelebil (3)

(1) Institute of Computer Science, Academy of Sciences of the Czech Republic, Pod vodarenskou vezi 2, 182 07 Prague 8, Czech Republic [mp@cs.cas.cz], (2) Institute of Atmospheric Physics, Academy of Sciences of the Czech Republic, Bocni II/1401, 141 31 Prague 4, Czech Republic, (3) GEO-TOOLS ,U Mlejniku 128, 250 66 Zdiby-Premysleni, Czech Republic

Time series of dilatometric measurements of relative displacements on rock cracks on stable and unstable sandstone slopes were analysed. The inherent dynamics of rock slopes lack any significant nonlinearity. However, the residuals obtained by removing meteorological influences are fat-tailed non-Gaussian fluctuations, with short-range correlations in the case of stable slopes. The fluctuations of unstable slopes exhibit self-affine dynamics of fractional Brownian motions with power-law long-range correlations and are characterized by asymptotic power-law probability distribution with decay coefficient outside the range of stable Levy distributions.

Supported by the Czech Republic "Information Society" project No. T110190504.