Abstract Submitted
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Fractal geometry of fracture patterns in rocks simulated with a stochastic Laplacian growth model[1] ALEJANDRA AGUILAR-HERNANDEZ, Posgrado en ciencias de la Tierra, UNAM, GUILLERMO RAMIREZ-SANTIAGO, Instituto de Fisica, UNAM (MEXICO) — We investigate the fractal properties of 2D-patterns generated from a stochastic two-dimensional Laplacian growth model (SLGM) and 2D-patterns obtained from rock's fracture binary images. The SLGM is defined in terms of a conformal nonlinear mapping that depends on two parameters. One of them a $(0 < a < 1)$ defines the form of the object, a strike or a bump, that attaches to the cluster that at the end generates the patterns. It was found that the pattern's fractal dimension and roughness exponent values depend on a. A detailed analysis of the patterns structures indicates that the fractal dimensions of capacity, information, and correlation, decrease monotonically as a increases. When $a \lessapprox 1$ the values of these fractal dimensions become closer to each other, suggesting that the patterns are self-similar. In addition, analyzes of the scaling of the patterns roughness exponent for $a = 0.9$, suggests a self-affine structure. For this value of a, the roughness exponent values are found to be in a range that is characteristic of rock's fractures.

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