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FracPaQ: a MATLAB™ toolbox for the quantification of fracture patterns

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Abstract

The patterns of fractures in deformed rocks are rarely uniform or random. Fracture orientations, sizes, and spatial distributions often exhibit some kind of order. In detail, relationships may exist among the different fracture attributes, e.g. small fractures dominated by one orientation, larger fractures by another. These relationships are important because the mechanical (e.g. strength, anisotropy) and transport (e.g. fluids, heat) properties of rock depend on these fracture attributes and patterns. This paper describes FracPaQ, a new open source, cross-platform toolbox to quantify fracture patterns, including distributions in fracture attributes and their spatial variation.

Software has been developed to quantify fracture patterns from 2-D digital images, such as thin section micrographs, geological maps, outcrop or aerial photographs or satellite images. The toolbox comprises a suite of MATLAB™ scripts based on previously published quantitative methods for the analysis of fracture attributes: orientations, lengths, intensity, density and connectivity. An estimate of permeability in 2-D is made using a parallel plate model. The software provides an objective and consistent methodology for quantifying

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