

Accepted Manuscript

Benefits of maximum likelihood estimators for fracture attribute analysis: Implications for permeability and up-scaling

R.E. Rizzo, D. Healy, L. De Siena



PII: S0191-8141(16)30209-7

DOI: [10.1016/j.jsg.2016.12.005](https://doi.org/10.1016/j.jsg.2016.12.005)

Reference: SG 3424

To appear in: *Journal of Structural Geology*

Received Date: 16 August 2016

Revised Date: 29 November 2016

Accepted Date: 7 December 2016

Please cite this article as: Rizzo, R.E., Healy, D., De Siena, L., Benefits of maximum likelihood estimators for fracture attribute analysis: Implications for permeability and up-scaling, *Journal of Structural Geology* (2017), doi: 10.1016/j.jsg.2016.12.005.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

1 **Benefits of Maximum Likelihood Estimators for Fracture Attribute Analysis:**
2 **Implications for Permeability and Up-scaling**

3 R. E. Rizzo^{1*}, D. Healy¹, L. De Siena¹

4 ¹ School of Geosciences, King's College, University of Aberdeen, Aberdeen AB24 3UE United
5 Kindom.

6 * corresponding author: rerizzo@abdn.ac.uk

7 Keywords: fractures, maximum likelihood, fracture networks, up-scaling, permeability
8 tensor

9
10 **Abstract**

11 The success of any predictive model is largely dependent on the accuracy with which its
12 parameters are known. When characterising fracture networks in rocks, one of the main
13 issues is accurately scaling the parameters governing the distribution of fracture attributes.
14 Optimal characterisation and analysis of fracture lengths and apertures are fundamental to
15 estimate bulk permeability and therefore fluid flow, especially for rocks with low primary
16 porosity where most of the flow takes place within fractures. We collected outcrop data
17 from a fractured upper Miocene biosiliceous mudstone formation (California, USA), which
18 exhibits seepage of bitumen-rich fluids through the fractures. The dataset was analysed
19 using Maximum Likelihood Estimators to extract the underlying scaling parameters, and we
20 found a log-normal distribution to be the best representative statistic for both fracture
21 lengths and apertures in the study area. By applying Maximum Likelihood Estimators on
22 outcrop fracture data, we generate fracture network models with the same statistical

Download English Version:

<https://daneshyari.com/en/article/5786357>

Download Persian Version:

<https://daneshyari.com/article/5786357>

[Daneshyari.com](https://daneshyari.com)