

Accepted Manuscript

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PII: S0191-8141(16)30198-5

DOI: [10.1016/j.jsg.2016.11.010](https://doi.org/10.1016/j.jsg.2016.11.010)

Reference: SG 3413

To appear in: *Journal of Structural Geology*

Received Date: 7 July 2016

Revised Date: 4 November 2016

Accepted Date: 24 November 2016

Please cite this article as: Ferrill, D.A., Morris, A.P., McGinnis, R.N., Smart, K.J., Wigginton, S.S., Hill, N.J., Mechanical stratigraphy and normal faulting, *Journal of Structural Geology* (2016), doi: 10.1016/j.jsg.2016.11.010.

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1 **Mechanical stratigraphy and normal faulting**

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9 **Keywords:** Mechanical stratigraphy, normal fault, refraction, dilation, slip tendency, friction,
10 fault tip, monocline.

11 12 **ABSTRACT**

13 Mechanical stratigraphy encompasses the mechanical properties, thicknesses, and interface
14 properties of rock units. Although mechanical stratigraphy often relates directly to
15 lithostratigraphy, lithologic description alone does not adequately describe mechanical behavior.
16 Analyses of normal faults with displacements of millimeters to 10's of kilometers in
17 mechanically layered rocks reveal that mechanical stratigraphy influences nucleation, failure
18 mode, fault geometry, displacement gradient, displacement distribution, fault core and damage
19 zone characteristics, and fault zone deformation processes. The relationship between normal
20 faulting and mechanical stratigraphy can be used either to predict structural style using
21 knowledge of mechanical stratigraphy, or conversely to interpret mechanical stratigraphy based
22 on characterization of the structural style. This review paper explores a range of mechanical
23 stratigraphic controls on normal faulting illustrated by natural and modeled examples.

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