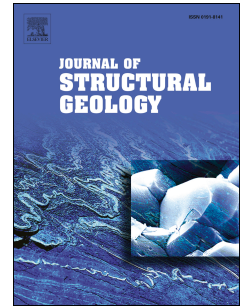


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Along fault friction and fluid pressure effects on the spatial distribution of fault-related fractures

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1 *Along fault friction and fluid* 2 *pressure effects on the spatial* 3 *distribution of fault-related* 4 *fractures*

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10 ***Abstract***

11 Whatever the processes involved in the natural fracture development in the subsurface, fracture
12 patterns are often affected by the local stress field during propagation. This homogeneous or
13 heterogeneous local stress field can be of mechanical and/or tectonic origin. In this contribution, we
14 focus on the fracture-pattern development where active faults perturb the stress field, and are
15 affected by fluid pressure and sliding friction along the faults. We analyse and geomechanically
16 model two fractured outcrops in UK (Nash Point) and in France (Les Matelles). We demonstrate that
17 the observed local radial joint pattern is best explained by local fluid pressure along the faults and
18 that observed fracture pattern can only be reproduced when fault friction is very low ($\mu < 0.2$).
19 Additionally, in the case of sub-vertical faults, we emphasize that the far field horizontal stress ratio
20 does not affect stress trajectories, or fracture patterns, unless fault normal displacement (dilation or
21 contraction) is relatively large.

22 **Keywords:** faults, fractures, geomechanics, stress, friction, fluid pressure

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