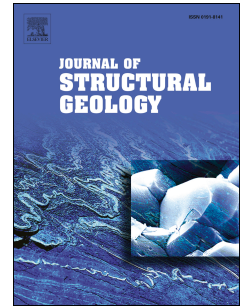


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Present-day stress inversion from a single near-surface fault: A novel mathematical approach

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# 1 Present-day stress inversion from a single near-surface fault: A novel

## 2 mathematical approach

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## 10 Keywords

11 Stress; Stress inversion; Active faults, Fault displacement

## 12 Abstract

13 A novel numerical approach enables determining contemporary stress states at a single fault  
14 near the ground surface using three dimensional fault displacement data, i.e. displacements  
15 that include movement component perpendicular to the fault surface. This approach is  
16 restricted to specific near-surface conditions and is based on three assumptions: (i) the near-  
17 surface faults contain apertures and the blocks can move in all directions at a sub-millimetric  
18 scale, so the movement is not restricted only to the fault plane; thus the stress vector (traction)  
19 acting on the fault surface has the same direction as the fault displacement vector, (ii) the  
20 isotropic component of the stress tensor near the ground surface is negligible, and (iii) one of  
21 the principal stress orientations must be vertical as being close to the ground surface. These  
22 generalizations enable distinct formula simplification and the reduced stress tensor  
23 calculation. Input data for the mathematical solution are the orientation of the fault surface

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