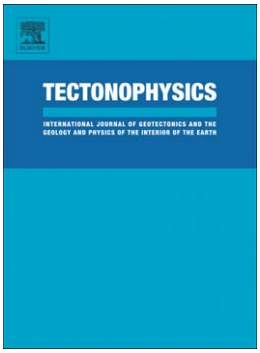

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Constraints on fault and crustal strength of the Main Ethiopian Rift from formal inversion of earthquake focal mechanism data

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Abstract

We evaluate the frictional strength of seismogenic faults in the Main Ethiopian Rift (MER) by inverting the available, well-constrained earthquake focal mechanisms. The regional stress field is given by $-119.6°/77.2°$, $6.2°/7.6°$, $97.5°/10.2°$ for trend/plunge of σ_1, σ_2 and σ_3, respectively agrees well with previous fault kinematic and focal mechanism inversions. We determine the coefficient of friction, μ, for 44 seismogenic faults by assuming the pore pressure to be at hydrostatic conditions. Slip on 36 seismogenic faults occurs with $\mu \geq 0.4$. Slip on the remaining eight faults is possible with low μ. In general, the coefficient of friction in the MER is compatible with a value of μ of 0.59 ± 0.16 (2σ standard deviation). The shear stresses range from 16 to 129 MPa, is similar to crustal shear stress observed in extensional tectonic regimes and global compilations of shear stresses from major fault zones. The

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