



New Views of Subduction Faults

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Abstract

Because of new observational tools and a global surge of great earthquakes, our views of subduction faults have fundamentally changed over the past 15 years. Much of the classical thinking has been turned up-side-down. Today, we know that all subduction faults are extremely weak, usually represented by apparent friction coefficients lower than 0.05. Smooth faults that have produced giant earthquakes are the weakest. This extreme weakness leads to a fragile state of stress in the forearc that can show dramatic change in response to small perturbations such as stress drops in great earthquakes, for which the rupture-zone average is as small as 2 - 5 MPa. Geometrical irregularities such as subducting seamounts give rise to stronger faults, but these faults creep. The new knowledge has profound implications to understanding seismic and tsunami hazards.

~ All are Welcome! ~