



Splay fault triggering by great subduction earthquakes inferred from finite element models

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We have investigated the influence that megathrust earthquake slip has on the activation of splay faults using a 2D Finite Element Method (FEM), taking into account the effects of gravity and variations in the frictional strength properties of splay faults. We simulated both landward-dipping and seaward-dipping splay fault geometries, and imposed depth-variable slip distributions of subduction events. Our results indicate that the two types of splay fault exhibit a similar behavior, with variations in frictional properties along the faults affecting only the seismic magnitude. The triggering process is controlled by a critical depth. Megathrust slip concentrated at depths shallower than the critical depth will favor normal displacement, while megathrust slip concentrated at depths deeper than the critical depth is likely to result in reverse motion. Our results thus provide a useful tool for predicting the activation of secondary faults and may have direct implications for tsunami hazard research.