EFFECTS OF BIMATERIAL INTERFACE ON RUPTURE ALONG STRIKE-SLIP BRANCH FAULTS

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Crustal faults often separate material with differing elastic properties. Dissimilar media around faults has been shown to cause effects on the rupture process along vertical strike-slip faults. Some previous studies suggest that asymmetry in wave propagation across a bimaterial interface can introduce normal stress changes on the fault near the rupture front that can lead to asymmetric bilateral or unilateral propagation. Furthermore, a bimaterial interface can also lead to differences in strain release across a fault interface for a fixed stress drop. Considering the effects caused by bimaterial interface on rupture propagation and since fault systems can be composed of numerous segments, it is worth understanding whether these effects can impact throughgoing rupture across a geometric complexity. In this work we use dynamic rupture simulations to investigate the effects of a bimaterial interface on rupture propagation along branch faults. We assign a zone of stiffer material to one side of the fault system, such that both the main and secondary fault separate dissimilar media. We vary the material contrast (γ) from 0-0.20 in the zone of stiffer material such that the p-velocity in the stiffer material is Vp*(1+γ), where Vp is the p-velocity in the rest of the elastic medium. The results show that when rupture is nucleated on the main fault it is less likely to rupture the secondary segment as the material contrast increases if the main fault and secondary faults have the same sense of slip. If the faults have opposite senses of slip, we find that a larger material contrast promotes rupture propagation on the secondary fault. This could have implications for assessing seismic hazard in regions with complex fault systems which separate dissimilar media.