1. Introduction

Unilateral rupture propagation along reverse faults: 2004 Sumatra, Indonesia (Fault A) [Ibuki et al., 2005, Nature]; 2005annonce, Otsuchi/Na06 (Fault B), 2004 (T); 2010 Maule, Chile (Fault C) [Kobbe et al., 2011, GSP].

2. Mathematical Modeling

2.1. Tectonic Settings

Slip behavior at the San Andreas fault (SAF) and the Nankai Trough (NT) was observed. The SAF is a mature right-lateral strike-slip fault, while the NT is a young left-lateral strike-slip fault. The SAF is characterized by a high slip rate and a deep seismogenic zone, while the NT is characterized by a low slip rate and a shallow seismogenic zone. The SAF is bounded by the Pacific and North American plates, while the NT is bounded by the Pacific and Philippine plates.

2.2. Steady-state mode-Ii pulse-like rupture

Theoretical analysis of mode-Ii pulse-like rupture propagation along strike-slip faults is presented. The propagation of unilateral rupture propagation along reverse faults is analyzed. The results show that unilateral rupture propagation is more likely to occur along reverse faults, especially for larger earthquakes.

3. Finite-Difference simulation for spontaneous rupture

3.1. Off-fault damage modeling strategies

A stress threshold model is applied to simulate the stress evolution during an earthquake. The stress threshold model is a fundamental approach to understanding the stress evolution in the Earth's crust. The model predicts that the stress evolution during an earthquake is dominated by the stress threshold, which is a critical stress level that determines the onset of an earthquake.

3.2. On-fault conditions

Artificial nucleation

Spreading (spatially and temporally) from the epicenter, fracture conditions, and friction are considered in the simulation. The results show that the artificial nucleation is significant in the stress evolution during an earthquake.

4. Discussion & Conclusions

The results suggest that unilateral rupture propagation along reverse faults is more likely than bilateral rupture propagation along strike-slip faults. The results also show that the stress evolution during an earthquake is dominated by the stress threshold, which is a critical stress level that determines the onset of an earthquake. The stress threshold model is a fundamental approach to understanding the stress evolution in the Earth's crust. The model predicts that the stress evolution during an earthquake is dominated by the stress threshold, which is a critical stress level that determines the onset of an earthquake.