1. Abstract

The Quepos Plateau subducts beneath the Caribbean Plate on the Pacific Coast of Costa Rica. A number of high and low-intermediate apparent stress values exist on the subducting plate that may affect plate coupling and earthquake rupture.

2. Introduction

Features such as seamounts, ridges, plateaus, and rises and graben structures protrude from a subducting plate and may interact with the overlying plate to cause changes in normal stress due to interplate coupling.

To learn more about how these factors affect the earthquake rupture process at subduction zones, apparent stress (a measure of stress drop that can be related to plate coupling levels) was estimated for 179 events at the Osa Peninsula, Costa Rica, using seismic coda techniques.

3. Study Area

The Quepos Plateau subducts beneath the Caribbean Plate on the Pacific Coast of Costa Rica. A number of high and low-intermediate apparent stress values exist on the subducting plate that may affect plate coupling and earthquake rupture.

4. Method

Seismic coda (the scattered energy following the direct wave arrival of an earthquake) was analyzed to estimate apparent stress for events at the Osa Peninsula. The horizontal components of displacement seismograms were formed into narrowband frequency envelopes from which seismic coda was identified and processed to obtain apparent stress values.

5. Preliminary Results

Preliminary results for 179 events at the Osa Peninsula, Costa Rica, indicate a median apparent stress value of 0.48 MPa and an average apparent stress value of 0.67 MPa for events along the trend of the subducting Quepos Plateau. This average is more than two times the global average for thrust-faulting events in oceanic subduction zones [Pearce and Stauder, 1995]. Nearly 18% of the events along the trend of the subducting Quepos Plateau were found to have apparent stress values between 1.0 and 2.0 MPa, suggesting areas of strong interplate coupling between the subducting and overriding plates.

6. Conclusions

- Apparent stress values between 0.1 and 3.0 MPa were found for 179 events at the Osa Peninsula, Costa Rica.
- Nearly 18% of the events along the trend of the subducting Quepos Plateau were found to have apparent stress values between 1.0 and 2.0 MPa.
- These high apparent stress values indicate areas of strong interplate coupling between the subducting and overriding plate due to the subduction of the Quepos Plateau.
- A non-constant source scaling relationship was found for events at the Osa Peninsula, although further analysis is required to verify this result.

7. Acknowledgments

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