2004 Western Pacific Geophysics Meeting

Cite as: Author(s) (2004), Title, *Eos Trans. AGU, 85*(28), West. Pac. Geophys. Meet. Suppl., Abstract xxxxx-xx

Search Results

Your query was: **govers**

HR: 15:45h
AN: **T34A-02**
TI: STEPs: Lithosphere Tearing and Mantle Flow due to Slab Edges in the SW Pacific
AU: *** Govers, R**
EM: *govers@geo.uu.nl*
AF: *Earth Sciences Department Utrecht University, P.O. box 80.021, Utrecht, 3508 TA Netherlands*
AU: **Wortel, R**
EM: *wortel@geo.uu.nl*
AF: *Earth Sciences Department Utrecht University, P.O. box 80.021, Utrecht, 3508 TA Netherlands*
AB: Slab edges are currently a relatively common geometrical feature in plate tectonics. Two prominent examples are the north end of the Tonga subduction zone and the southern end of the New Hebrides subduction zone. Near such horizontal terminations of subduction trenches, ongoing tearing of oceanic lithosphere is a geometric consequence. We refer to such kink in the plate boundary as a Subduction-Transform Edge Propagator, or STEP. Other STEPs are the north and south ends of the Lesser Antilles trench, the north end of the South Sandwich trench, the south end of the Hikurangi trench, the south end of the Vranchea trench, and the south Ionian trench. Using 3D mechanical models, we investigate whether STEP faults are stable plate tectonic features and what surface observations may be expected at STEPs. Based on the great variety of plate tectonic contexts in which slab edges occur, we explore various end-member cases for the forcing, geometry and mechanical properties. We conclude that STEP faults in most circumstances are stable features that may exist for several million years. In the (probably rare) cases that the resistance to fault propagation is high, slab break-off will occur. Relative motion along the transform segment of the plate boundary often case is non-uniform, and therefore is by definition not a transform plate boundary in the (rigid) plate tectonics sense of the phrase. At the model surface, substantial paleomagnetic rotations and velocities are predicted, consistent with observations in for instance the south Mediterranean region. Predicted stress orientations agree with seismologically well-constrained focal mechanisms on northern Tonga. Return flow around the slab edge probably cause subduction volcanoes to tap reservoirs outside the mantle wedge region.
DE: 1200 GEODESY AND GRAVITY
DE: 7200 SEISMOLOGY
DE: 8100 TECTONOPHYSICS
DE: 8400 VOLCANOLOGY
SC: T
MN: 2004 Western Pacific Geophysics Meeting

New Search