Dynamic consequences of slab edges in the Calabrian subduction region

Karin Ruckstuhl, Rob Govers and Rinus Wortel

Department of Geosciences, Utrecht University The Netherlands

Slab edges are a relatively common feature in plate tectonics. 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. We investigate the consequences of slab edges and STEP faults on the dynamics of the lithosphere and the uppermost mantle by solving for mechanical equilibrium using a 3D Lagrangian finite element model. The area of focus is the central Mediterranean, where subduction of the narrow Ionian slab is associated with roll back of the trench and the formation of the Tyrrhenian back arc basin. Data from different fields (tomography, seismology, gravity, heat flow, gps) is used to constrain the modeling geometry, forcing and material properties. The model includes STEP faults on both the northern and southern ends of the Tyrrhenian Sea. The STEP's and the subduction fault plane through the lithosphere are modelled through slippery nodes. The preliminary result we present are based on a linear visco-elastic rheology. We investigate the response to density sinking of the slab in the full-load model combined with the observed plate velocity between continental Africa and Europe.