



The South Sandwich "Forgotten" Subduction Zone and Tsunami Hazard in the South Atlantic

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While no large interplate thrust earthquakes are known at the "forgotten" South Sandwich subduction zone, historical catalogues include a number of events with reported magnitudes 7 or more. A detailed seismological study of the largest event (27 June 1929; $M(G\&R) = 8.3$) is presented. The earthquake relocates 80 km North of the Northwestern corner of the arc and its mechanism, inverted using the PDFM method, features normal faulting on a steeply dipping fault plane ($\phi, \delta, \lambda = 71, 70, 272$ deg. respectively). The seismic moment of $1.7 \cdot 10^{28}$ dyn*cm supports Gutenberg and Richter's estimate, and is 28 times the largest shallow CMT in the region. This event is interpreted as representing a lateral tear in the South Atlantic plate, comparable to similar earthquakes in Samoa and Loyalty, deemed "STEP faults" by Gover and Wortel [2005]. Hydrodynamic simulations were performed using the MOST method [Titov and Synolakis, 1997]. Computed deep-water tsunami amplitudes of 30cm and 20cm were found off the coast of Brazil and along the Gulf of Guinea (Ivory Coast, Ghana) respectively. The 1929 moment was assigned to the geometries of other known earthquakes in the region, namely outer-rise normal faulting events at the center of the arc and its southern extremity, and an interplate thrust fault at the Southern corner, where the youngest lithosphere is subducted. Tsunami hydrodynamic simulation of these scenarios revealed strong focusing of tsunami wave energy by the SAR, the SWIOR and the Agulhas Rise, in Ghana, Southern Mozambique and certain parts of the coast of South Africa. This study documents the potential tsunami hazard to South Atlantic shorelines from earthquakes in this region, principally normal faulting events.