



Slip distribution of the 2013 Mw 8.0 Santa Cruz Islands earthquake by tsunami waveforms inversion

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On February 6, 2013 a Mw8.0 interplate earthquake occurred in the Santa Cruz Islands region. The epicenter is located near a complex section of the Australia-Pacific plate boundary, where a short segment of dominantly strike-slip plate motion links the Solomon Trench to the New Hebrides Trench. In this region, the Australia plate subducts beneath the Pacific plate with a convergence rate of ~ 9 cm/yr.

This earthquake generated a tsunami that struck the city of Lata and several villages located on the main island, Nendo, near the epicenter. The tsunami has been distinctly recorded by 5 DART buoys located in the Pacific ocean.

In this work we present the slip distribution of the earthquake obtained by inverting the tsunami signals recorded by the DART buoys. In order to honour the complex geometry of the subducting plate, we use a fault model that accounts for the variability of the strike and dip angles along the slipping surface. We use the Green's function approach and a simulated annealing technique to solve the inverse problem. Synthetic checkerboard tests indicate that the azimuthal coverage of the available DART stations is sufficient to retrieve the main features of the rupture process with a minimum subfault area of about 20x20 km. We retrieve the slip distribution of the Santa Cruz Island earthquake that, at the first order, is consistent with previous slip models obtained by using teleseismic data.