Supplementary Information:

Gutenberg-Richter distribution

As well as generating earthquake distributions using the rupture lengths from measured earthquakes, rupture lengths were assigned at random according to the logarithmic Gutenberg-Richter magnitude relationship. Earthquake magnitudes were converted into lengths using scaling factors based on the earthquake moment. Lengths varied from 100 km at magnitude 8.0 up to an artificially limited maximum rupture length of 1000 km at Mw 9.5 and above due to the lack of naturally-occurring earthquakes existing above this length.

After determining the rupture length, the synthetic earthquake rupture procedure continued as before, placing earthquakes in groups of 13 and rupturing these in sequence along the subduction margin. Earthquakes end points were allowed to rupture unrestricted, or to be restricted by projected subducting topographic features.

The results are similar to those obtained using the measured earthquake rupture zone lengths. At low relief, there is no correlation between rupture endpoints and topography, the observed number of rupture endpoints near to topography is reproducible by random positioning of synthetic endpoints. At moderate topographic heights (1000 – 1200 m) there is good correlation between rupture zone endpoints and a zone up to ~50km away from the topography.