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Tsunamigenic potential of subduction outer-rise normal faults in Central America

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The Middle America trench is formed by the subduction of the Cocos and Rivera plates under the Caribbean and North American plates. The subduction interface presents low coupling in Central America showing its seismicity a high frequency of outer-rise normal fault earthquakes. These outer-rise earthquakes are generated on the inherited structures of the seafloor-spreading fabric during the subducting plate bending. We analyse focal mechanism data in order to obtain the rupture characteristics of the outer-rise earthquakes. In combination with the available structural data of the outer-rise normal faults we define a set of potential tsunamigenic sources. A new empirical scaling relationship is developed to define earthquake magnitudes from normal fault dimensions in the outer-rise context. We numerically model the tsunami wave propagation due to the worst outer-rise tsunamigenic source in the area to estimate its damaging potential. Wave elevations higher than 2 meters are common at coast in front of the fault extent, with maximum wave elevations of 8 meters. The capability of these faults to generate ocean-wide tsunamis is low, however, they can produce significant tsunamis locally.