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Seafloor geodetic measurements over the Nazca-South America thrust fault: results and implications

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The subduction zone off the west coast of South America marks the convergence of the oceanic Nazca plate and the continental South America plate. High pressure along the thrust fault creates a coupled zone where strain increases and deforms the overriding plate. The surface area of the seismogenic zone controls the magnitude of coseismic release and is constrained by pressure, temperature, sediment type and fluid content. Horizontal deformation measurements from seafloor transponder arrays 20 and 50 km off the coast of Peru were used to model the updip limit of locking on the thrust fault. Shallow locking relates to the potential hazard of tsunamis and cannot be detected by land GPS stations. The results and implications of on and offshore geodetic measurements will be discussed with reference to thermal models, sediment input and pore water content along the plate boundary.