



Did a tsunami accompany the 1737 Chilean earthquake? Contrasting evidence from historical records and coastal sediments

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The Chilean megathrust's Valdivia segment nucleates great earthquakes (M8+), with resulting tsunamis posing local and trans-oceanic hazards. Historical records document four great earthquakes in the last 450 years (Cisternas et al., 2005). While devastating tsunamis accompanied earthquakes in 1575, 1837 and 1960 CE, there is no such record of extreme inundation in 1737. The absence of historical accounts of a major tsunami in 1737 has contributed to the current interpretation of a narrow and deep megathrust rupture. Sparse populations and warfare during this period may, however, influence the completeness of the historical record. We cross-check the documentary evidence using a coastal sedimentary record from Chaihuín, a tidal marsh 15 km southwest of the former colonial forts at Corral and Niebla. Tidal marshes are low energy intertidal settings that may preserve evidence for abrupt coseismic changes in land level and inundation by extreme waves. We used dense transects of hand-driven cores to map three laterally extensive sand layers. Sedimentological and microfossil analyses suggest the sand sheets are of marine origin. Crucially for discounting other extreme wave events including storms and far-field tsunamis, microfossil evidence for abrupt land-level change accompanies each of the three sand layers. A chronology based on radiocarbon dating of fragile plant macrofossils suggests the middle sand sheet is consistent with a previously unrecorded tsunami in 1737. We discuss the consequential implications for understanding the role of this poorly-known rupture within the supercycle that probably commenced in 1575 and culminated with the M9.5 1960 earthquake.