



1960 Valdivia earthquake tsunami deposits from two coastal lakes and preliminary results for an extended paleotsunami record of South-Central Chile

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After the large number of victims and the vast damage to infrastructure by tsunamis in the last decade the probabilistic risk evaluation and precautions need to be reconsidered. This reconsideration has to include more detailed studies on recent tsunamis and tsunamis from the historic and pre-historic record to avoid redundancy. Deposits of the 1960 Valdivia Earthquake tsunami and four of its local predecessors were previously identified in the sedimentary record at the estuary of Rio Maullín, (41°S) South-Central Chile (Cisternas et al., 2005). Here, we present side-scan sonar data, pinger seismic data and a multi-proxy analysis of sediment cores of up to 9 m length from two coastal lakes on La Isla Grande de Chiloé (42°S): i.e. Lago Cucao and Lago Huelde. These lakes have 1.2 km and 1.1 km wide and 10 m and 5 m high barriers between the Pacific coast and their shoreline, respectively. Data coverage is ensured by core transects, which correlate to the acoustic datasets. The good spatial control on the data allows a detailed understanding of the distribution of the tsunami deposits in the lakes. The 1960 tsunami hit the West coast of Chiloé with two to four large waves of 10 to 20 m run-up height, inundating both lakes. Multi-layered sand sheet deposits mirror the repeated inundation of wave trains in the otherwise organic-rich lake sediment record. We describe the link between the tsunami wave and its deposit and show two preliminary paleotsunami records comprising 15 events dating back to 3930 ± 90 cal yr BP, thus potentially extending the current paleotsunami record of the Valdivia seismic segment further back in time by at least 2000 years.

References

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