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Geomorphological changes and tsunami risk in a coastal wetland post-earthquake in south-central Chile

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In the central Chilean region (33°-38.6°S), the Mw=8.8 earthquake of February 27, 2010, and the associated tsunami generated widespread devastation along 600 km of shoreline. This event caused strong morphologic, environmental and social changes. Coastal uplift larger than 2 m on the west coast of Arauco Peninsula (37°-37.7°S) produced the outcropping of shore platforms, changes in the intertidal zone, and the drying of wetlands. One of the most affected coastal wetlands was the Tubul-Raqui where important geomorphological, ecological and socio-territorial changes were generated. Here, the uplift magnitude was 1.4m. In the 1960s, a group of fishermen and algae (*gracilariachilensis*) gatherers was organized, forming a settlement of about 2000 residents. This was severely affected by the tsunami of February 27, 2010. In this context, the inundation risk due to tsunami in Tubul, Arauco Gulf was evaluated. The risk of tsunami inundation is analyzed for an extreme event in the town of Tubul (37°S), Bio-Bio Region. Three scenarios were identified for risk assessment, in all of which numerical simulation was applied. Two of the three scenarios were local tsunamis, the events of 1835 and 2010, and the event of 1877 was included to determine the effects of a far field tsunami. The tsunami of 1835 was determined as an extreme event, which gave inundation heights of 10m and run-up of 10m. Vulnerability was analyzed from physical, socioeconomic and educational points of views. Two levels of vulnerability were defined, namely medium and high. These levels were selected based on the poor housing materials, the vulnerable socioeconomic profiles of the population, low educational levels and the population's reactions to these tsunami events. The results show that natural risk is obtained at the high level in the whole town. These results were also compared with the current reconstruction plan.

Biography

Carolina Martínez is a PhD in Geography. She is a Professor at the Geography Institute at the Pontificia Universidad Católica de Chile (PUC). Her area of research is geomorphology and coastal environment dynamics, coastal and natural risk management. Her recent works are focused on analyzing factors of change on tectonic coasts that are recently affected by natural disturbances such as earthquakes, tsunamis and swells. She also studies the socio-territorial effects on coastal locations.

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