

Morphological impacts of the Chilean megathrust earthquake Mw 8.8 on coastal wetlands of high conservation value

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The subduction earthquake Mw = 8.8 on February 27th, 2010 which affected Chile's south-central coast (37°S) produced a co-seismic uplift of ~1.4 m in coastal Tubul-Raqui wetland area, with abrupt morphological changes. In order to determine the magnitude of the changes, in this area of high conservation value, salt marsh morphological features were identified and quantified by mapping the changing extent of the coverage of morphological features before (2009) and after (2011-2012) the tectonic disturbance. Rectified satellite images of seven study sites were created for the three years using Google Earth images and processed in ArcGIS. The results indicate a total decline of 31.7% in the area of the morphological features and the emergence of 1.25 km² of dried area; salt pans and tidal creeks were severely affected, with more than 90% loss. In contrast, there was a slight recovery of the Tubul and Raqui main river channel (12%) and the tidal channels (8.5%) between 2011 and 2012, mainly in the area near the river mouth. The salt marsh (cover by *Spartina densiflora*) showed slight variation after the co-seismic uplift (14.6%), demonstrating high tolerance in the face of high-impact natural disturbances. The changes and later evolution may be explained mostly by the action of the seismic cycle in subduction zones. Continuing to monitor state of the recovery of the salt marsh and other similar environments may help to understand the true role that the seismic cycle plays in the dynamics of coastal ecosystems, as well as its incidence in the recovery process. © 2020 Elsevier Ltd

Coseismic uplift

Geomorphology

Megathrust earthquake

Salt marsh

South America

coastal wetland

coastal zone

disturbance

earthquake

saltmarsh

subduction zone

thrust

Chile

Spartina densiflora