

JOINT EVENT

5th World Conference on **Climate Change**

&

16th Annual Meeting onOctober 04-06, 2018
London, UK**Environmental Toxicology and Biological Systems****Coastal erosion and storm: the new natural hazards in Chile**Carolina Martínez¹, Mauricio Villagrán¹, Patricio Winckler², Manuel Contreras-López³, Pablo López⁴, Matías Gómez¹ and Cesar Esparza²¹Pontifical Catholic University of Chile, Chile²University of Valparaíso, Chile³University of Playa Ancha, Chile⁴Bristol University, United Kingdom

The Chilean coast is characterized by the development of recurring natural hazards on the coast, including major earthquakes, tsunamis and alluviums. To these, coastal erosion is now added, aggravated by intense storms, which since 2015 have generated great impact in the coastal zone. Among these effects is the violent loss of mass in the sandy littoral, changes in the morphodynamics of the beaches, loss of human lives and considerable damage to the coastal infrastructure. The purpose of this research is to explore the stability condition of the sandy littoral in central-southern Chile and to guide conservation, adaptation or mitigation measures. Satellite images and topographic surveys were used in order to determine spatio-temporal changes in the shoreline. These changes were linked to the long-term behavior of oceanographic variables such as wave climate and mean sea level. To determine changes in the relative shoreline position, DSAS 4.3 (USGS) extension for GIS was used. Erosion/accretion processes for each beach were classified according to Rangel-Buitrago et al., (2015). Changes in profile were determined by topographic survey of beach profiles, with which volumetric and granulometric changes were obtained. The behavior of the historical swell and its relationship with the morphological changes of the beaches was analyzed, as well as the relationship between ENSO phases and the recurrence of storms. The results to date, establish an erosive tendency and accelerated by the storms in the majority of the sandy systems, which present different magnitude. A direct relationship between warm phases ENSO and recurrence of tidal waves was determined. In all cases, erosion rates increased due to the level rise of up to 30 cm observed during ENSO warm phases and an increase in the frequency of extreme storms, which shifted from nearly 5 events per year in the 1960s to more than 20 in recent years.

Recent Publications

1. Jiménez J, Sancho-García A, BosomE, Valdemoro E, Guillén J. (2012). Storm-induced damages along the Catalan coast (NW Mediterranean) during the period 1958–2008. *Geomorphology* 143-144: 24–33.
2. Luo S, Cai F, Liu H, Lei G, Qi H, Su X. (2015). Adaptive measures adopted for risk reduction of coastal erosion in the People's Republic of China. *Ocean & Coastal Management* 103: 134-145.
3. Martínez C, Rojas D, Quezada M, Oliva R, Quezada J. (2015). Post-Earthquake coastal evolution and recovery of an embayed beach in central-southern Chile. *Geomorphology* 250: 321-333.
4. Rangel-Buitrago N, Anfuso G, Williams A. (2015). Coastal erosion problems along the Caribbean Coast of Colombia. *Ocean & Coastal Management* 114: 120-144.
5. Rangel-Buitrago N, Anfuso G, Williams A, Bonetti J, Gracia A, Ortiz J. (2017). Risk assessment to extreme wave events: Barranquilla - Ciénaga, Caribbean of Colombia Case Study. In: Botero, C.; Cervantez, O. & Fink, C (Eds.). *Beach Management Tools: Concepts, Methodologies and Case Studies*. Chapter 23. Springer International Publishing, Amsterdam.

**Biography**

Carolina Martínez is a Professor at the Geography Institute at the Pontificia Universidad Católica de Chile (PUC). Associate Researcher at the Research Center for Integrated Disaster Risk Management (CIGIDEN) and member of the Ibero-American University Association for Post Graduate Studies in Integrated Coastal-marine Management (IBERMAR-AUIP Network). Her area of research is geomorphology and coastal environment dynamics, coastal and natural risk management. Her recent works are focused on analysing 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.

camartinezr@uc.cl