

**Propuesta de Tesis doctoral:** Effects on coastal dynamics in the face of climate change and anthropogenic impact in the Central Region of Chile, using remote sensing techniques.

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### Resumen

Coastal dynamics and marine ecosystems are undergoing changes due to the effects of climate change and anthropogenic activities (Jiao et al., 2015). Understanding the processes and scope of these changes is of great importance to achieve integrated management and planning of coastal spaces (Hance et al., 2011). Some of these changes are associated with changes in the local sedimentary regime and others with changes of a global nature. Quantifying the magnitude of these modifications is not always easy and for this reason, indicators that explicit them, such as changes in the coastline, are usually sought (Boak & Turner, 2005). For two decades, a singular effort has been made to develop methods that allow the automatic detection of coastlines based on medium resolution satellite images. Multiple solutions have been tried: the majority assuming the limit that establishes the size of the pixel but using different techniques such as water indices (McFeeters, 1996; Xu, 2018), the methods based on thresholding (Liu *et al.*, 2011) or supervised classification methods (García-Rubio et al., 2015). Other authors have sought to solve it using techniques that aim to achieve automatic detection at sub-pixel scale (Pardo-Pascual et al., 2012; Almonacid-Caballer, 2014; Liu et al., 2017; Pardo-Pascual et al., 2018).

The objective is to analyze the coastal dynamics and the changes that can be induced by climate change and human intervention in the coastal ecosystems of the Central Chile region, specifically the Valparaíso Region using SHOREX, using automatic method of detection of coastline. developed within the CGAT-UPV group (Palomar-Vásquez *et al.*, 2018; Sánchez-García et al., in press).

With the systematic study of changes in the short term (one year) or in the medium term (decades) at a geographical scale of detail (changes in units of 100 m) it is intended to recognize how beaches are and evolve, as well as to establish a diagnosis of their current and future state.

To carry out the work, it is proposed to a) perform a multi-temporal analysis of the changes in the coastline with Landsat satellite images (TM, ETM and OLI sensors) and Sentinel 2, using the SHOREX methodology); b) establish a relationship between morpho-sedimentary parameters and the data obtained from satellite images; and c) determine indicators of change through modeling the evolution of the coast.

**Available resources:** StartUp Fund 2018 granted by the Universidad Mayor for the development of the research line "Monitoring of continental and oceanic water bodies". In addition, the project "Implementation of a monitoring system to analyze the coastal dynamics in the face of the effects of climate change" will be presented in 2019 before CONICYT, fund FONDEF IDeA + R & D 2019, which, if awarded, would have financing for two years.

The analytical tools developed by the CGAT-UPV will be applicable for the Valparaíso region, since the thesis will be developed within said group.



## References

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