



ICG2022-431, updated on 28 May 2023

<https://doi.org/10.5194/icg2022-431>

10th International Conference on Geomorphology

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



Use of historical aerial photographs to study the evolution of saltmarshes in the Tróia sandspit, Sado estuary, Portugal

Ana Cunha^{1,2}, Miguel Inácio^{1,2}, Maria da Conceição Freitas^{1,2}, and Manel Leira³

¹Department of Geology, Faculty of Sciences, University of Lisbon, Portugal (agcunha@fc.ul.pt)

²Instituto Dom Luiz, Faculty of Sciences, University of Lisbon, Portugal

³Biodiversity and Applied Botany Research Group, Department of Botany, Faculty of Biology, University of Santiago de Compostela, Spain

Saltmarshes are a valuable wildlife habitat and play a key role in shoreline protection; given their potential in carbon sequestration and storage, these areas might also play a significant role within mitigation strategies to climate change. Natural saltmarshes can adapt to various disturbances through a series of feedbacks. However, land use changes and human occupation can alter the marsh natural dynamics diminishing their resilience.

Aerial photographs have been used to study marsh vegetation and map its evolution since the late 70's and have proven to be a key source of information. This technique facilitates the study of wetlands on a monthly, yearly, or decadal timescales. Historical photographs can be used to identify past trends and support the implementation of monitoring programs on vast wetland areas.

In the region of the Tróia peninsula in the Sado estuary (SW Portugal), historical aerial photographs are available for the past 70 years. Using these photographs, this work attempts to answer the following questions: (1) How have the saltmarshes of Sado estuary change since the 1940's? (2) How have marsh geomorphology and anthropogenic pressure contributed to these changes? (3) Is the variation of sea level in the Portuguese coast an important factor in marsh evolution?

From the saltmarshes that were studied, only two increase in size; all the other saltmarshes suffer substantial losses in total area. All combined, these saltmarshes shrunk over 30 ha ($\approx 27\%$) in the past 70 years. Availability of accommodation space and level of protection seem to be the key factors in saltmarsh resilience. There appears to be a link between the rise of the mean sea-level and the colonization of terrestrial areas, as well as with the disappearance of the saltmarsh islands. The effect of direct human action on the saltmarshes can also be observed in some of the studied areas.

While this is a regional study – mostly intended to understand how the marshes of this area have evolve - it also serves a larger purpose, to emphasize the importance of aerial historical photographs as a source of information about this environment. Unlike other countries, in Portugal aerial photographs are used mostly for coastal erosion assessment, having been used only a couple of times to study marshes. Considering how many estuaries exist in Portugal, and the importance of these areas for the future of our coasts, it is essential to start using all the tools available in their study and in the creation of conservation, naturalization and recovery plans.

This research was funded by Portuguese Foundation for Science and Technology, I.P./MCTES

through national funds (PIDDAC) – UIDB/50019/2020 + PTDC/CTA-GEO/28412/2017 and Ph.D. Grants PD/BD/106074/2015 + PD/BD/142781/2018.