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ABSTRACT

The objective of this abstract is to present the HOLOANTAR project, a multidisciplinary research project funded by the Portuguese Government that has recently started. The project integrates 16 researchers from different international institutions (Portugal, Spain, Brazil and Uruguay) and will be developed between 2012 and 2015. The main purpose of HOLOANTAR is to infer the palaeoenvironmental evolution and associated climate variability occurred over the last millennia in ice-free areas of the Maritime Antarctica based on the study of lake sediments, with a special focus on the role played by permafrost and active layer on the environmental evolution.

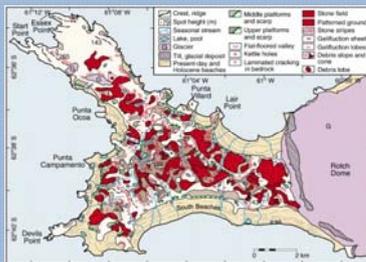
Key Words: Maritime Antarctic, Holocene, permafrost, lake sediments, climate variability, geomorphic processes.

WHERE?

HOLOANTAR is focused on Byers Peninsula, the largest ice-free area in the South Shetland Islands, located in the westernmost part of Livingston island. It is an extremely interesting place for the scientific research of biological (the highest biodiversity in Antarctica), geomorphological and ecological aspects. The relatively flat relief of the plateau and the presence of over-deepened basins produced by glacial erosion have favoured water retention in more than 110 lakes and ponds. Some of these will be studied in detail in this project.



Byers



Geomorphological map of Byers Peninsula (López-Martínez et al., 2011)

WHAT?

The South Shetland Islands (SSI) are located in the northwestern tip of the Antarctic Peninsula, one of the Earth's regions that have experienced a stronger warming signal during the second half of the 20th century. In the ice-free areas of this archipelago the terrestrial ecosystem is supported by permafrost, though its reaction to climate change is still poorly known. However, in the recent years a very important effort took place to monitor the thermal state and characteristics of permafrost in order to study its response to the recent warming trend. Many international teams are involved on several of these long-term monitoring projects, but HOLOANTAR, in addition, pretends to offer a new integrated approach aiming to bridge the gap between contemporary and past changes in permafrost environments.

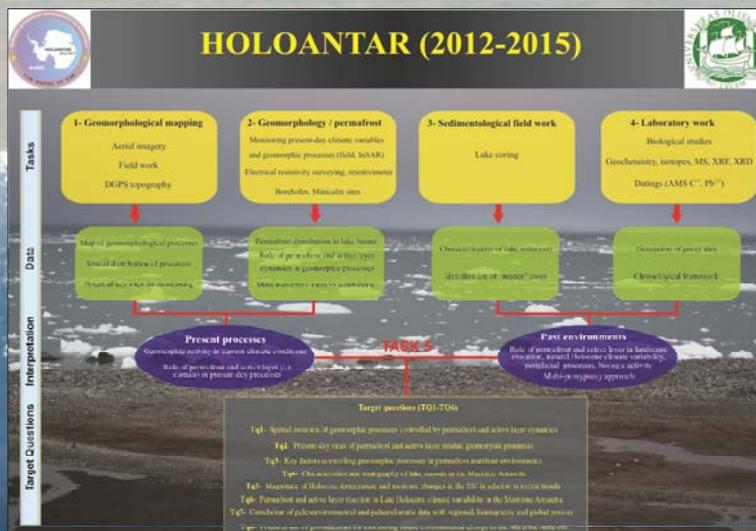
HOLOANTAR project is based on two main hypotheses:

- A multi-proxy analysis of lake sediments will allow reconstructing the palaeoecological evolution in the Maritime Antarctic and the role played in it by permafrost and active layer dynamics,
- The detection of activity rates, spatial patterns and geographical controls of contemporary key-geomorphic processes and permafrost distribution, will allow defining their limiting climatic conditions that will be used to interpret the sedimentary record.

This approach is innovative since it will focus on both present and past geomorphodynamics as keys for understanding the landscape evolution. We will approach the two leading hypothesis in Byers environment by executing five main tasks:

- Task 1** - Geomorphological mapping
- Task 2** - Geomorphological monitoring and permafrost distribution
- Task 3** - Sedimentological field work
- Task 4** - Laboratory analyses
- Task 5** - Palaeoenvironmental reconstruction

HOW?



WHY?

ACKNOWLEDGEMENTS

HOLOANTAR project (PTDC/CTE-GIX/119582/2010) is funded by the Portuguese Science Foundation (FCT).