Geophysical Research Abstracts
Vol. 15, EGU2013-10707, 2013
EGU General Assembly 2013

The HOLOANTAR project: Holocene environmental change in the Maritime Antarctic. Interactions between permafrost and the lacustrine environment

Marc Oliva (1), Gonçalo Vieira (1), Carla Mora (1), Alexandre Trindade (1), Joao Agrela (1), Vanessa Batista (1), António Correia (2), Carlos Schaefer (3), Felipe Simas (3), Miguel Ramos (4), Miguel Angel De Pablo (4), Manuel Toro (5), Dermot Antoniades (6), Luis Galan (7), Santiago Giralt (8), Ignacio Granados (9), Sergi Pla (10), and Enrique Serrano (11)

(1) University of Lisbon, Institute of Geography, Lisboa, Portugal (oliva_marc@yahoo.com), (2) Department of Physics, University of Évora, Portugal, (3) Department of Soils, Federal University of Viçosa, Viçosa, Brasil , (4) Department of Physics, University of Alcalá de Henares, Alcalá de Henares, Spain , (5) Centro de Estudios y Experimentación de Obras Publicas (CEDEX), Madrid, Spain , (6) Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay, (7) Instituto Geológico y Minero de España (IGME), Madrid, Spain, (8) Institute of Earth Sciences Jaume Almera (CSIC), Barcelona, Spain, (9) Parque Natural De Peñalara, Centro de Investigación y Gestión, Madrid, Spain, (10) Centre d'Estudis Avançats de Blanes (CEAB), Blanes, Spain, (11) Department of Geography, University of Valladolid, Spain

The objective of this abstract is to present the HOLOANTAR project, a multidisciplinary research funded by the Portuguese Government. The project integrates 16 researchers from different international institutions (Portugal, Spain, Brazil and Uruguay).. 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.

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) 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,
b) 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. In Byers Peninsula (Livingston), the largest ice-free area in the South Shetland Islands, where the environment is dominated by permafrost and active layer dynamics, climate variability should have induced modifications on the erosion rates at the slopes, mass movements, active layer thickness, biological activity, etc. In a context of fast rate of current change in mean annual air temperatures, it is possible that by studying similar features at different altitudes, different movement rates and an altitudinal/climatic boundary for their activity may be found, thus providing important applications for the palaeoenvironmental reconstruction. We will approach the two leading hypothesis in Byers environment by executing five main tasks: geomorphological mapping, geomorphological monitoring and permafrost distribution, sedimentological field work, laboratory analyses and palaeoenvironmental reconstruction.

During the first field work campaign that took place in November-December 2012, up to four lakes were sampled. Future studies of these sediments will allow reconstructing the environment in Byers since the deglacia-

tion of westernmost part of Livingston island.