



Spatial distribution and characteristics of permafrost in Hurd Peninsula, Livingston Island, Maritime Antarctic

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The Antarctic Peninsula is one of Earth's regions experiencing a faster increase on temperatures, with Mean Annual Air Temperatures (MAAT) rising ca. 2.5 °C in the last 50 years. The northerly location of the Antarctic Peninsula in respect to the Antarctic and its oceanic setting originate a milder and moister climate than in the Antarctic continent.

The Northern Antarctic Peninsula is roughly located between the isotherms of MAAT of -1 °C to -8 °C at sea-level and therefore the northern tip and especially the South Shetlands are close to the limits of permafrost occurrence. If the observed warming trend is to continue in the near future, the region might suffer widespread permafrost degradation. Research on the permafrost environment of Hurd Peninsula has been taking place with systematical measurements by our group since January 2000 and currently we are able to provide a good overview of the spatial distribution and characteristics of permafrost terrain in Hurd Peninsula. Our research is based on shallow boreholes (<2m) with a time series of 8 years (30 and 275m asl) and on a series of boreholes with 1 year data: a 25m borehole in Reina Sofia Peak (275m), a 15m borehole in the vicinity of Reina Sofia Peak near Hurd Glacier (269m), a 5m borehole at the CALM-S near Ohridski Station (136m) and a 4m borehole at Papagalo (147m). Other shallow boreholes (1.5m) are being monitored at Incinerador point (25m) and Collado Ramos (115m). In 2006 Electrical Tomography Resistivity and refraction seismic profiles have been performed, providing us with a good overview of the general conditions of the permafrost terrain in the area. Air temperatures are measured at different sites accounting for altitude since a few years and during 3 summer campaigns the radiation balance was monitored continuously at two sites. Detailed geomorphological mapping of periglacial features has been conducted at a scale 1:5,000 providing important information about the geomorphological dynamics. Using the data gathered since 2000 it is now possible to present the general characteristics of the permafrost distribution in Hurd Peninsula as a first step towards a more comprehensive approach that is now starting that involves empirico-statistical modeling, remote sensing, as well as downscaling of mesoscale climate data.