



## **Active layer dynamics in three sites with contrasted topography in the Byers Peninsula (Livingston Island, Antarctica)**

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Topography exerts a key role on permafrost distribution in areas where mean annual temperatures are slightly negative. This is the case of low-altitude environments in Maritime Antarctica, namely in the South Shetland Islands, where permafrost is marginal to discontinuous until elevations of 20-40 m asl turning to continuous at higher areas. Consequently, the active layer dynamics is also strongly conditioned by the geomorphological setting.

In January 2014 we installed three sites for monitoring the active layer dynamics across the Byers Peninsula (Livingston Island, South Shetland Islands) in different geomorphological environments at elevations between 60 and 100 m. The purpose was to examine the role of the topography and microclimatic conditions on the active layer dynamics. At each site a set of loggers was set up to monitor: air temperatures, snow thickness, ground temperatures until 80 cm together with the coupling atmosphere-ground temperatures.

During the first year of monitoring the mean annual air temperatures show similar values in the three sites, in all cases slightly below freezing. The snowy conditions during this year in this archipelago have resulted in a late melting of snow, which has also conditioned the duration of frozen conditions in the uppermost soil layers. Topography has a strong influence on snow cover duration, which in turn affects frozen ground conditions. The Domo site is located in a higher position with respect to the central plateau of Byers; here, the wind is stronger and snow cover thinner, which has conditioned a longer thawing season than in the other two sites (Cerro Negro, Escondido). These two sites are located in topographically protected areas favouring snow accumulation. The longer persistence of snow conditions a longer duration of negative temperatures in the active layer of the permafrost.

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