



The state of permafrost surrounding “Gabriel de Castilla” Spanish Antarctic Station (Deception Island, Antarctica): Studying the possible degradation due to the infrastructures heating effect.

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Permafrost degradation is one of the effects of the global warming. Many studies reveal the increase of active layer and reduction on permafrost table thickness, also in Antarctica. However, these trends on permafrost can be accelerated by the human activities, as the heating produced by the Antarctic stations infrastructures when they are not properly isolated from the ground.

In Deception island, South Shetland Archipelago, we started 3 years ago a monitoring program at the 26 years old “Gabriel de Castilla” Spanish Antarctic Station (SAS). It is focused on charactering the state of permafrost, since in the coastal scarps at tens of meters from the station an increase on erosion had been detected. Although the main cause of the erosion of this coastal volcanoclastic materials is the 2 meters thick icefield which forms during the winter in the inner sea of this volcanic island, we want to detect any possible contribution to the coastal erosion caused by the permafrost degradation related to the SAS presence.

We present our preliminary analysis based on three years of continuous ground temperature data, monitored at a shallow borehole (70 cm deep) in the SAS edge, together with the active layer thickness measured around the station and their vicinities in two thawing seasons. We complete this study with the analysis of the continuous temperature data taken inside the SAS and the air and ground temperatures below the station, acquired during the last Antarctic Campaign (December 2014-February 2015).

These preliminary results are fundamental 1) to discard any contribution from the SAS presence, and to help to improve its thermal isolation, 2) to help improve our knowledge about the thermal state of permafrost in the area, and 3) to help to understand the causes of the coastal erosion in the volcanic Deception Island.