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Interannual active layer thermal and dynamics evolution at the crater Lake CALM site, Deception Island (Antarctica).

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Deception Island, is an active strato-volcano on South Shetland Archipelago of Antarctica (62° 55′ 0″ S, 60° 37′ 0″ W), is a cold region with harsh remote and hostile environmental conditions. The permafrost and active layer existence, and the cold climate conditions together with volcanic material with height water content inside made this region of the Earth a perfect site to study the active layer and permafrost evolution involved in the Circumpolar Active Layer South (CALM-S) program. The active layer is measured in late January or firs february (during the end of the thaw period) at the "Crater Lake" CALM site (62º58'06.7"; 60º40'44.8") on Deception Island, Antarctica, at the period 2006 to 2014 we obtained a mean annual value of 29,7±2 cm. In this paper, we describe the spatial active layer thickness distribution and report the reduction on the mean thickness between February 2006 and 2014. Below the active layer, permafrost could be also reported (with a mean thickness of 4.5± 0.5 m.) based on the temperature data acquired by sensors installed at different depth inside the soil; three different shallow boreholes was drilled (1.0 m., 1.6 m., 4.5 m. in depth) and we have been registered its temperature gradient at the 2010 to 2013 period. Here we use all those data 1) to describe the thermal behavior of the permafrost at the CALM site, and 2) to describe its evolution (aggradation/degradation) along fourteen years of continuous measurements. We develop this study, to known the thermal behavior of the permafrost and the active layer related with the air/soil interaction being one of the most important factors the snow layer that was measured by the installation of termo-snowmeters with the complement of an automatic digital camera during the 2008 to 2014 period. On the other hand, the pyroclastics soil materials has a very high values of water content then the latent heat in the freezing/thawing process controls the active layer evolution and the free boundary movement that follows the Stephan solution. Finally, our study could provide information about the aggradation of the permafrost table during the measuring period.