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Active layer temperature regimes in Livingston Island (Maritime Antarctic)

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The Antarctic Peninsula region is one of the more sensible areas to climate change. This fact makes it a privileged observatory for monitoring. Nevertheless, its geographic location and extreme climate result in difficulties to obtain measures in a continuous series. On the other hand, the Antarctic is a specially protected area. The use of boreholes is a good solution because ground temperature measurements provide a reliable and comparably inexpensive mean to detect climate change. Since January 2000, our team monitors the evolution of the active layer temperature gradient near the Spanish Antarctic Station in Livingston Island in the Maritime Antarctic region. Ground temperatures are monitored at different depths in two shallow boreholes in Cerro Incinerador and Reina Sofia Hill. The Incinerador borehole is 2.4 m deep and 90 mm diameter in quartzite bedrock with very low water content. In this presentation we will discuss: (a) the data from this borehole from 2000 to 2006, (b) the estimation of the thermal diffusivity during the summer and winter, (c) the ground temperature response to the heat fluxes across the ground surface, (d) and the low-pass filter behaviour of the ground and the periodicities in the temperature regime found out by applying Fourier analysis to the borehole and air temperatures.