



## **Mountain frozen grounds as small amplitude thermal proxy in southern continental Patagonia**

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Frozen grounds are an important element of the cryosphere, covering between a 20-25% of the global area. Frozen grounds are becoming a relevant object of research in the southern hemisphere, being most studies focused mainly on Antarctica. With the exception of seasonally frozen grounds, perennially frozen ground is found in continental South America, for example, in high altitude terrains from 4.600m a.s.l. in central Chile. However, scarce or not information regarding permafrost on Southern Patagonia has been reported.

One of the aims of this study was to establish mountain permafrost existence at 1.200m in the southern limit of the Southern Patagonian Ice-Field, a geographically active area surrounded by different kinds of glaciers on fast retreat.

The area of study presents several features of past cryogenic activity such as undefined polygonal grounds with a thick clast border and sandy-loam interior. A scarce vegetal cover is limited to lichen and moss communities. The analyzed soil does not represent a thermal barrier that may avoid heat wave dynamic along the ground profile.

There was neither significant snow-cover during winter nor a vegetation layer enough to consider as insulation for the analyzed ground.

Oscillations above 0°C were evidenced down to 1.8m depth during winter of 2014, ruling out the existence of permafrost at that lower limit. Year round thermal dynamic down to 1.8m in the ground profile is presented as one result of the monitoring.

Small amplitude temperature fluctuations were registered upon monitoring. These minimal amplitudes were stable throughout several months and as such serve as an interesting proxy for recent and long-term climatic thermal fluctuation. The influence of winds coming from nearby glaciers highly affects near-surface amplitude. This interaction was studied.

The present work is part of an ongoing monitoring network along South America that intends to fill the gap between tropical Andes and the Antarctic Peninsula.