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Recent Deglaciation of Darwin Mountains (Tierra de Fuego) after Little Ice Age: monitoring by photogrammetry, lichenometry, dendrochronology and field studies.

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Glaciers from the Darwin mountain range have been retreating since the Little Ice Age (LIA). However, the amount of retreat varies and is minimal for some glacial snouts and substantial for others. Possible explanations for this different behaviour include climatic and glacial dynamic causes. The aim of this work was to analyse the impact of climate change on these glaciers. The research site was the terminus of glacier Pia, which descends to the south of Mount Darwin (2488 m asl, 54°45′S, 69°29′W) and reaches the coastline at the Beagle Channel. The terminus is situated some hundreds of meters above the LIA moraine but, whereas one sector retreated rapidly and then stabilized, another sector has had several advances and retreats leaving a number of moraine arches.

To better understand the origin of this dynamic behaviour, we undertook a study of the evolution of the terminus of glacier Pia over the last 60 years. We used aerial photographs and satellite images to determine the exact location of the glacial terminus in certain years (1943, 1963, 1987, 1990, 2001 and 2006). These results were completed in 2008 and 2009 through field work. We also carried out lichenometric studies of the two most abundant lichen species that rapidly colonize the moraine boulders abandoned by the glacier: Placopsis perrugosa and Rhizocarpon geographicum. By comparing results from field work carried out in 2008 and 2009, we were able to determine the growth rate of these two species (García-Sancho et al. 2011). In addition, we also carried out a dendrochronological study of Nothofagus antarctica and N. betuloides.

The use of the four techniques involved in this study (photogrammetry, lichenometry, dendrochronology and multiyear field work) allowed us to establish the ecesis period of each species as well as their growth curves, from which we can deduce the movements of the glacial terminus from the end of the LIA to the present. From this study we can infer that the different behaviour detected at the Pia glacial terminus results from a combination of climatic factors and elements derived from the dynamics of the glacial flow.

García-Sancho, L. Palacios, D., Green, T.G.A., Vivas, M., Pintado, A. (2011): Extreme lichen growth rates detected in recent deglaciated areas in Tierra del Fuego. Polar Biology, 34 (6): 813-822. DOI: 10.1007/s00300-010-0935-4.

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