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# Post-Last Glacial Maximum ice thinning and glacier dynamics in the Hurd Peninsula ice cap (Livingston Island, South Shetland Islands, Antarctic Peninsula)

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In the Antarctic Peninsula (AP), the small ice caps distributed across its periphery and surrounding islands have recorded important ice volume changes since the end of the Last Glacial Cycle. These volume changes have occurred in the form of surface extent shrinking and ice thinning. The latter has been investigated only at a reduced number of locations. In this context, nunataks constitute key spots to assess the environmental evolution of deglaciated areas as they offer the opportunity to track the deglaciation history and reconstruct past ice losses by using Cosmic-Ray Exposure (CRE) dating. Indeed, nunataks are supposed to have played a prominent role in the vegetal and animal colonization of Antarctica.

The South Shetland Islands archipelago is one of the AP areas where past ice thinning has been least investigated, with only one study conducted in King George Island. In order to shed some light on the last deglaciation and its associated ice thinning, we apply $^{10}$Be CRE dating to vertical sequences of glacially polished outcrops on two palaeonunataks and one nunatak distributed across the ice-cap covering part of the Hurd Peninsula (SW of Livingston Island): Reina Sofía Peak (62°40'8" S, 60°22'51" W, 273 m a.s.l.), Moores Peak (62°41'21" S, 60°20'42" W, 407 m a.s.l.) and Napier Peak (62°40'18"S, 60°19'31" W, 382 m a.s.l.).

Most of the resulting exposure ages provided a logical chronological sequence and allowed reconstructing past vertical changes of the ice surface. The uppermost surfaces of the Moores and Reina Sofía peaks became deglaciated during the Last Glacial Maximum (LGM), between ~24 ka and ~20 ka. Following the LGM, between ~20 and ~14 ka (Termination-1), a massive deglaciation occurred. This trend was especially exacerbated at around ~14 ka, triggering the onset of the deglaciation at other nunataks, such as the Napier Peak, in good agreement with the coetaneous global melt-water pulse 1a. From our results, we infer that ice shrinking during the Holocene must have been very limited compared to the post-LGM period.

Nevertheless, some of the exposure ages were either anomalously old or inconsistent, such as those found at the summits of the Reina Sofía and Moores peaks or at the base of the Napier nunatak. These artifacts suggest the occurrence of nuclide inheritance and are indicative of the conservation of previously exposed surfaces. These ages allow to qualitatively infer cold-based regimes characterized by basal ice frozen to bed, with slow mobility and inefficient subglacial erosion due to the gentle slope gradient, not capable of removing inherited nuclides accumulated during former exposure periods. But, as a whole, the dataset adds valuable knowledge on the polythermal character of the Hurd Peninsula Ice cap.

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