

# Resolving the puzzles of the last glaciation in central Patagonia

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## Project summary

Several recent studies<sup>1,2,3</sup> reported full glacial conditions in the southern mid-latitudes well before the global Last Glacial Maximum (~26-18 ka). The timing and magnitude of the early glacial maxima varies<sup>1,2,3</sup>, and so far the evidence does not support a 'uniform' local Last Glacial Maximum. This raises a question about the causes of southern hemisphere glaciation and past climate. Well-dated glacial chronologies, when compared to other palaeo-proxies, allow us to test hypothesis about the drivers and propagation of climate change. This project aims to constrain the timing and extent of glacial advances over the last glacial cycle at an understudied site in central Patagonia (Lago Belgrano) with a well-preserved moraine record.

We use cosmogenic exposure dating in conjunction with geomorphological mapping (from satellite imagery and field mapping) to construct a chronology of glacial advances. Cosmogenic exposure dating of lake palaeo-shorelines, optically stimulated luminescence (OSL) dating and sedimentological work are used to constrain the palaeo-lake and deglaciation history.

The latter was the focus of my second field trip (2017) to Patagonia facilitated by a BSG grant.

## 2017 Field work and results

During the second field trip, I ground-truthed geomorphological mapping done from satellite imagery, mapped former shorelines and carried out sedimentological work. I collected samples from palaeo-shorelines for cosmogenic exposure analysis and samples from glaciolacustrine sediments for OSL dating. Samples from shorelines and glaciolacustrine sediments agree well with the <sup>10</sup>Be ages obtained from moraine boulders and support rapid deglaciation following the culmination of the LateGlacial re-advance.



Figure 1 A palaeo-shoreline sampled for cosmogenic exposure analysis.

Results were presented at the EGU 2018 and the Nordic Cosmogenic Meeting 2018. I'm currently preparing two publications, one on the early glaciation and one on the LateGlacial.

## Acknowledgements

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Figure 2: Left: An example of a sample taken from a shoreline for cosmogenic exposure analysis. Right: Sampling glaciolacustrine sediments for OSL.

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