



## **Surface Exposure Dating on moraines in the Valle Rucachoroi (39°S, Argentina) and on Cerro Fredes Plateau (31°S, Chile)**

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Central Chile (30-40°S) lies at the northern limit of the influence of the southern-hemispheric westerlies. The latitudinal precipitation gradient is extremely steep, ranging from year-round moist conditions south of 38° to arid conditions at 30°S. Past changes in the position and/or the intensity of the westerlies should therefore be recorded in palaeoclimatic archives. Moraines fulfil this purpose, since glaciers depend both on temperature and precipitation. It is unclear up to now whether the glacial advances in Central Chile have been triggered by temperature or by precipitation changes during the last glacial cycle.

Due to the lack of organic material in the northern, arid part of Central Chile, it is very difficult to establish glacial chronologies with radiocarbon dating. Surface exposure dating with  $^{10}\text{Be}$  allows filling this gap. Here we present first results from the Valle Rucachoroi (39°S, Argentina) and the Cerro Fredes Plateau (31°S, Chile).

In Valle Rucachoroi, a total of 13 exposure ages document glacial advances  $\sim 12$  and 30 to 38 ky ago. So far, no moraines could be dated to  $\sim 20$  ky, i.e. synchronous to the global Last Glacial Maximum (LGM). Bedrock samples up-stream suggest that the valley became ice-free by  $\sim 15$  ky. We tentatively conclude that climate conditions were too arid during the LGM to allow for significant glacial advances compared to the more humid conditions before. Cold temperatures were likely responsible for ice stagnation until the onset of rapid warming at 15 ky. Minor late glacial re-advances ( $\sim 12$  ky) could correspond to the Antarctic Cold Reversal or the Younger Dryas. On Cerro Fredes Plateau, four ages range between 70 and 110 ky. A fifth boulder has been dated to 160 ky. The absence of younger moraines indicates that the equilibrium line

altitude was too high to allow for glacial ice accumulation; precipitation was lower compared to the earlier part of the glacial cycle. Following this argumentation, we conclude that glaciation on the Cerro Fredes Plateau might have been triggered by precipitation changes as well. More data are needed in order to verify and improve the glacial chronology. Nevertheless, we already can conclude that past glaciation along the transect was significantly influenced by the availability of moisture, probably related to the position and/or the intensity of the Westerlies.