



Extremely eroded or incredibly young – ^{10}Be depth profile dating of moraines in the Swiss Midlands

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During the Pleistocene, glaciers advanced repeatedly from the Alps into the Swiss Midlands. The exact extent and timing are still under debate, even for the last glacial advances. Decalcification depths, for example, increase from west to east in the western Swiss Midlands and have been interpreted to indicate that the Valais (Rhône) glacier may have been less extensive during the global Last Glacial Maximum (LGM) at 20 ka than assumed so far [1]. In an attempt to provide more quantitative age control, we applied ^{10}Be depth profile dating [2] on moraines at two locations. Steinhof has previously been dated to the global LGM based on exposure ages from four boulders [3], and Niederbuchsiten presumably lies outside the last glacial ice extent [1]. The ^{10}Be concentrations at both sites decrease consistently with depth, but are very similar. Assuming only a few decimeters of erosion since moraine deposition, we obtain apparent exposure ages of ~ 20 ka. Niederbuchsiten would thus be unexpectedly young, implying a much more extensive extent of the LGM glacier than assumed so far. Alternatively, if the till at Niederbuchsiten was deposited during or before the penultimate glaciation (>130 ka), the surprisingly low ^{10}Be concentrations indicate several meters of erosion during the last glacial cycle and/or the Holocene, which seems to be at odds with the deep and intensive soil formation.

References:

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