Geophysical Research Abstracts
Vol. 12, EGU2010-13212, 2010
EGU General Assembly 2010

Timing of deglaciation of the Gotthard Pass area, Central Swiss Alps, based on surface exposure dating with cosmogenic 10Be

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Mapping of glacial trimlines in the Central Swiss Alps showed the existence of two ice domes during the Last Glacial Maximum (LGM), one in the upper Rhone catchment and one in the upper Rhine catchment [1]. Between these ice domes there was an area of major ice accumulation and through-flow at the Urseren Valley. Ice from the Rhone glacier flowed down westward along the Rhone Valley but also eastward over Furka Pass towards the Urseren area. In an LGM-paleoglaciation model Gotthard Pass is a central corridor (pathway) for mass transport from north to south.
Highly polished granitic rocks, crescentic gouges and other small scale glacial erosional features show that ice flowed southward from the Urseren area over the Gotthard Pass (2106 m a.s.l.) towards the Leventina Valley and the Ticino glacier. This is also shown by the continuous decrease of the trimline elevation from north to south, from about 2600 m at the Gotthard Pass to about 2500 m in the Leventina Valley. In the pass a minimum ice thickness of 480-500 m was calculated [1].
We apply surface exposure dating using cosmogenic 10Be to determine when the southward ice flow over Gotthard Pass ceased. This will show when the elevation of ice in the Urseren accumulation area was lower than the Gotthard Pass. We will present surface exposure ages from different altitudes sampled along a transect at the western Pass area. This data will be compared to exposure ages from the nearby Grimsel Pass that indicate that this Pass was ice free no later than ∼14 ka BP [2]. Radiocarbon data from the Rhone Valley also suggest a deglaciation by 14 590-14 020 cal. yr BP [3]. Only slightly older (∼15 000-14 300 cal. yr BP) are radiocarbon ages from the Simplon Pass [4]. Our data will be discussed within the scope of the collapse of the LGM ice domes in the Central Swiss Alps and the timing of the initial Alpine catastrophic deglaciation after the LGM.

References:
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