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10Be depth-profile dating of glaciofluvial sediments in the northern Alpine Foreland

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10Be depth-profile dating is based on the fact that nuclide production is decreasing as an exponential function of depth. This method requires collecting at least four sediment samples in a vertical profile. The obtained nuclide concentrations are plotted against depth and fitted depth-profiles to the measured dataset. The age is then calculated based on the best-fit. The requirements for this method are the following: sampling geological units in artificial outcrops with minimum thickness of soil (less than around 80 cm), preferably with a flat-topped landform in order to guarantee that the uppermost surface of the deposit remains as unmodified as possible and is related to a defined geomorphologic process. Additionally at least one sample, preferably three, from the uppermost one meter of the profile as the exponential decrease mainly occurs around this depth. No sample is collected from the overlying soil.

In this study, we aim to establish the chronology of the oldest Quaternary sediments in the northern Alpine Foreland using depth-profile dating with 10Be. These ages contribute to the understanding of the Quaternary landscape evolution of the Alpine Foreland. Here, we unravel the chronology of five sites at different morphostratigraphic positions: Mandach and Ängi (canton Aargau), Stadlerberg and Irchel (canton Zurich) and Rechberg (Germany, 4 km from the border to Switzerland). All sites are abandoned gravel pits and at each site we collected between four and seven sediment samples. First results yielded chronologies between 0.8 and 2 Ma for these glaciofluvial deposits. Our study shows that this relatively new method is successful when the geological setting matches the methodological requirements.