



GLACIER ACTIVITY IN THE CENTRAL ALPS DURING THE EARLY HOLOCENE: INSIGHTS FROM ¹⁰BE EXPOSURE DATING

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Alpine glacier advance connected to the Younger Dryas cold event resulted in deposition of "Egesen Stadial" moraines throughout the Western and Eastern Alps. The final phase of the Younger Dryas or "Kromer Stadial" refers to moraines formed at the Younger Dryas/Preboreal transition. Traditionally, it has been assumed that the "Kartell Stadial" in the Ferwall group is the equivalent to the "Kromer Stadial" in the neighbouring Silvretta group. Moraines formed as early Preboreal glaciers (i.e. Kartell Stadial) advanced in the Ferwall group are situated about 1 km down-valley from the LIA moraines and about the same distance up-valley from the youngest local Egesen moraines. They show some post-depositional deformation due to rock glacier flow. The equilibrium line altitude (ELA) drop was -120 m relative to the LIA ELA. ¹⁰Be exposure ages range between 9.4 and 10.5 ka. Whether the Kartell advance was caused by an increase in accumulation after the rather dry final phase of the Younger Dryas or by a temperature drop such as the Preboreal Oscillation remains unclear. We note that a feature transitional between a rock glacier and a moraine, at the terminus of the Julier/Lagrev moraine complex has also yielded a ¹⁰Be exposure age in the early Preboreal range (right around 10 ka). At the type locality in the Kromer valley, Kromer Stadial moraines are situated a few hundred metres down-valley from the LIA moraines. Under balanced conditions, the ELA of the glacier was about 60 m lower than during the LIA. By comparison, the ELA during the Younger Dryas maximum advance in the Kromer valley was 380 m lower than during the LIA. Clear signs of rock glacier development are absent. Similar moraines are widespread features in the western Silvretta Mountains and elsewhere in the Alps. ¹⁰Be exposure ages from five boulders range between 7.9 to 8.4 ka years. Thus it seems that the moraines in the

Kromer valley are roughly 2,000 years younger than the moraines of the Kartell Stadial. Low ^{10}Be measurement errors and the fact that both the Kartell moraine and the Kromer moraine are at similar latitude and altitude make such a comparison possible, production rate unknowns notwithstanding. The obtained ages indicate glacial advance to the Kromer moraine position may correspond to the 8.2 ka cold event as recorded in the Greenland ice cores and in lake sediments in the Alpine Foreland.