Such chemical calculations can be used to predict the interferences resulting from an excess of, *e.g.*, fluoride or unwanted major cations (Mg, Ca, Fe), as well as the behavior of the different cations during ion exchange processes. As an example, in our experiences with some of the weakly metamorphosed granites from the Swiss Alps, inclusions and intergrowths of muscovite or epidote are very difficult to separate from the quartz. The presence of just a few of these inclusions can yield, *e.g.*, Mg and Ca in the milligram range, greatly affecting both the column efficiency and the conditions for precipitation. After a quick check of the chemical make-up of the sample solution with the ICP-AES, one can model the extraction steps with a chemical speciation program. In this way one can head off problems by adding additional extraction steps, thus tailoring the preparation uniquely to each sample.

PROBLEMS IN THE CHRONOLOGY OF THE GLACIATIONS OF THE SWISS ALPS ADDRESSED WITH SURFACE EXPOSURE DATING

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Questions about the exact timing of the Last Glacial Maximum (LGM) in Switzerland as well as on the synchroneity of the maxima of the largest glaciers, *e.g.,* the Rhone and the Rhine, remain unanswered. Huge erratics dot the Swiss foreland and mark the furthest extent of the respective glacial lobe. We have begun to exposure date some of these erratics. By using ^{10}Be, ^{26}Al and ^{36}Cl, limitations imposed by rock type are avoided.

The post-LGM glacial collapse was punctuated by a sequence of readvances which left behind moraines of, *e.g.*, the Gschnitz, Clavadel, Daun, and Egesen stands. As a first step we have dated blocks found along the crest of an Egesen moraine at Julier Pass. Egesen moraines are thought to be coupled with the Younger Dryas (11,000 to 10,000 ^{14}C yr ago), based on geomorphological considerations, equilibrium line depression values, regional correlation, and radiocarbon dating. The suite of six boulders we have dated yielded two distinct exposure ages for the double-walled moraine of the Lagrev glacier. The outer moraine has an exposure age of *ca.* 12,000 yr while the inner has an age of 10,300. Taken together the moraine complex has an exposure age of 11,000 yr.

The final stage of the demise of the glaciers was their disappearance from the high mountain passes. We are dating a series of samples from Grimsel Pass to pinpoint the time of its deglaciation. This provides more information about the timing of the warming-up and the rate of deglaciation at the end of the LGM and can be compared with pollen information on influx of pioneer vegetation into the mountain valleys.

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