High-precision ^{10}Be-dating of moraines and the exploration of pro-glacial bedrock as climate archive using the new *in situ* ^{14}C/^{10}Be tool

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Methodological and analytical progress in cosmogenic nuclide techniques has surged in recent years, fueled in part by the CRONUS inititatives. One example is the increase in sensitivity of the ^{10}Be and the *in situ* ^{14}C methods that affords new perspectives on glacier fluctuations in response to past climate change. Moraine records around the globe can now be dated with unprecedented precision and pro- and subglacial bedrock can be explored as climate archive for past warm periods.

Here we present published and unpublished glacier chronologies from southern and northern mid-latitudes. The chronologies show centennial resolution of past glacier advances. The proglacial bedrock data yield complementary informations about periods of smaller-than-today glaciers.

We discuss the climatic implications of these data sets, focusing on (i) the chemical and analytical protocols behind this advance, (ii) the high internal consistency of the chronologies and the underlying reasons, and (iii) perspectives towards further methdo progress and its relevance for climate science.

Modeling of alteration processes in the Ringelbach granitic research catchment (Vosges, France)

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A geochemical modeling approach has been used to characterize the nature of weathering processes occuring within the Ringelbach granitic catchment (Vosges, France). The main springs were regularly sampled over the 2004-2006 period and analysed for major and trace element concentrations and Sr and U isotope ratios. Water samples from two 150-m deep boreholes drilled within the watershed were also used and analysed for this study; Geochemical characteristics of the waters are systematically different among the springs (depending on their elevation along a same slope) and deep boreholes (Chabaux *et al*. this issue).

The coupled transport/reaction model KIRMAT [1, 2] allows us to discuss and constrain the origin of such a systematic geochemical variation. The KIRMAT model combines geochemical reactions and one dimension mass transport equations to simulate the reactive transport of a fluid through a rock along a given water pathway. It was also designed to incorporate ideal solid solutions for the precipitation of clay minerals [3]. In the case of the Ringelbach weathering, the model simulates the transport of rainwaters along a 1-D water pathway crossing the different weathering levels of the granitic bedrock, from the surface saprolite level to the deep fresh granite. The long-term simulations (30ky) lead to weathering mineralogical sequences and to porosity evolution of the granitic bedrock consistent with field observations. They also point out that the geochemical characteristics of the water samples collected on the Ringelbach catchment depend on both the lithological level in wich the waters circulate and on the duration of the water transfert within each lithological level. The latter is certainly a key parameter to be further addressed in future studies.

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