The use of different geo-chronometers on targets outcrops in the French western Alps : agreements and disagreements

Christian Crouzet*[1], Jean-François Buoncristiani[2], Julien Carcaillet[1], Pierre Valla[1], and Riccardo Vassallo[1]

[1]ISTERRE – Univ.Savoie Mont Blanc, Univ. Grenoble Alpes, CNRS, IRD, UGE – France
[2]Biogéosciences – Univ. Bourgogne, CNRS – France

Résumé

As a recent example of geochronological application, the age of last glacial extent in the French western Alps (Lyonnais ice lobe) has been determined using both optically-stimulated luminescence (OSL) dating and terrestrial 10Be cosmogenic nuclides (Gribenski et al., 2021; Roattino et al., 2022). These ages are still matter of debate as they are in apparent contradiction with older 14C dating and difficult to understand in our currently knowledge of glaciers sources and motion.
In this contribution, we'll present and discuss some results targeting the last glacial extension in the north-western French Alps, and whose chronology appears inconsistent (or not yet understood). We will target several outcrops with a clear chronostratigraphic succession visible and that were investigated using several geochronometers. Among others, two examples are presented here. Along the Dombes border (NE of Lyon city), fluvial to fluvioglacial deposits are well exposed in a quarry. Cross-bedded to massive sand and gravels are overlaid by matrix supported diamict with striated pebbles. Two OSL and two 14C dates where obtained. OSL results provide MIS 4 ages while underlying 14C provide MIS 3 ages (_˜37 ka cal BP). An explanation to this apparent inconsistency is needed and resides in the understanding of the post depositional evolution. In the southern part of the Lyonnais ice lobe, several quarries extract sand and gravels from fluvioglacial deposits. In such one, two OSL samples were collected. In the same area, an erratic boulder was sampled for 10Be cosmogenic nuclide dating. Geomorphological investigations suggest that the boulder should be deposited at a similar time than fluvioglacial sediments. Dating results are apparently not in agreement with geomorphology. Discussion on how can these data may match will be presented.
In each case, a set of data taken individually would have led to misinterpretation. What do the dates mean and what can the XXIth century geologist can do with "old" (ie XXth century) dating, especially 14C? The significance of these results will be discussed in the light of geological investigations and paleogeographic reconstructions. Only stones know.

*Intervenant