



Glacier extent and climate in the Maritime Alps during the Younger Dryas

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The Younger Dryas (YD) is the most recent period (12.9 and 11.7 ka ago) in our planet's history during which a cooling of the order of some degrees affected a large portion of the Earth. One of the most evident effect on the Earth's surface of such cooling is the widespread (re)advancement of glaciers and the deposition of, usually well preserved, frontal moraines. These are the essential ingredient for the reconstruction of former glaciers, which can then be used to extract a palaeo Equilibrium Line Altitude (ELA), which bears crucial information about the palaeoclimate. Up until recent, this kind of research has been rather time consuming, meaning that full reconstructions have usually been limited to the few glaciers/moraines. However, recent GIS advances allow for faster (and therefore larger scale) palaeoglacier reconstructions. These could be incredibly useful not only to better understand the glaciological response to past climate changes, but also to interpret human migrations and interaction between civilisations, and understand fauna and flora dynamics (including extinctions, flora refugia).

Here, we present a moraine in the (European) Maritime Alps newly dated to the YD with cosmogenic isotopes (^{10}Be). We reconstruct the extent of the glacier that deposited such moraine and extract its ELA. The same is applied to another moraine, already dates to the YD, and located some 40 km ESE. The two ELAs are then combined to define an average, regional ELA for the Maritime Alps and this is, in turn, used to reconstruct all YD glaciers (65) that likely covered this large (615 km²) sector of the Alps. A map of the reconstructed glaciers is presented along with morphological evidence demonstrating the validity of the reconstruction. Finally, the regional ELA is used to extract local palaeoprecipitations and to discuss the YD climate across the Alps.