



The deglaciation of the Sierra Nevada (southern Spain) and derived landforms

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In Sierra Nevada, a mountain range located to the SE of the Iberian Peninsula, moraines corresponding to the last two glaciations have been identified (Messerli, 1967). There are no glaciers at present but the existence of small cirque glaciers during the Little Ice Age (LIA) has been documented (Gómez-Ortiz et al., 2009). The aim of this study is to determine the age of the last glacier expansion of the late Pleistocene occurred and the timing of the deglaciation of the Sierra. We analysed 19 samples from the surface of glacially abraded bedrock steps and from moraine and rock glacier boulders. The samples were taken from four glacial valleys around the Pico del Veleta (37°3'N, 3°21'W; 3398 m asl). Their exposure age was determined by means of cosmogenic ³⁶Cl surface exposure dating.

The results for the moraine boulders associated to the last glacial expansion indicate that in Sierra Nevada the advance took place slightly before the global Last Glacial Maximum but within MIS 2. However, additional dating is necessary to confirm this statement. Moraines formed during an older advance could not be dated through cosmogenic methods due to their significant erosion.

The results from glacial polish on bedrock steps are conclusive. They indicate a generalised retreat from 15/14 ka. Short thereafter, an extensive rock glacier system appeared at the foot of the valley headwalls and lasted until 7 ka. The origin of these rock glaciers is related to the general deglaciation process of the Sierra and to the important geomorphological activity of the cirque walls, and not so much to an extreme periglacial climate. A similar mechanism operated recently in the North face of the Pico del Veleta. There, the degradation of a Little Ice Age glacier has generated a rock glacier within a temperate high mountain climate (Gómez Ortiz et al., 2003).

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