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Quaternary glacial geomorphosites from the Cantabrian Mountains (northern Iberian Peninsula): the Redes Natural Reservation and Picos de Europa Regional Park

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The Cantabrian Mountains is a mountain range 480 km-long and up to 2,648 m altitude (Torre Cerredo Peak) trending parallel to the Cantabrian Coastline between Pyrenees and the northwest corner of the Iberian Peninsula ($\sim$43^{o}N 5^{o}W). This mountain range is an outstanding area to research the climatic patterns across South Europe during the Quaternary glaciations since well-preserved glacial features evidence the occurrence of past mountain glaciations in a climatic environment marked by the transition from a maritime climate (Atlantic) to Mediterranean one across the mountain range. The available studies in the Cantabrian Mountains stand that the regional glacial maximum recorded here is prior to ca 38, and that glaciers were in some locations remarkably retreated by the time of the global Last Glacial Maximum (Jiménez-Sánchez et al., in press; Serrano et al., in press).

This study is focused on an area about 800 km^2 that includes 36 peaks over 2,000 m (Pico Mampodre; 2,192 m) and partially covers the Redes Natural Reservation and Picos de Europa Regional Park. A geomorphologic database in ArcGIS was produced for this area as a previous step to reconstruct in detail the extent, flow pattern and chronology of the former glaciers (PhD under progress). Here we present a selection of 18 glacial geomorphosites classified according to genetic criteria in sites that show: (i) a nicely preserved moraine sequence recording the transition from glacial to periglacial conditions; (ii) glacial erosion features; (iii) glacial and ice related deposits (like moraines, ice-dammed deposits, erratic boulders or fluvio-glacial deposits); (iv) slope instability related to glacial debuttressing (complex landslides and rock avalanches); and (v) the interaction between the landscape and human activity. The interest of the geomorphosites is supported by its good quality of preservation, allowing its use as a basis to reconstruct the glacial and paraglacial processes in this region during the Quaternary glaciations, especially after the last local glacial maximum.

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