



Pleistocene glacial evolution of Fuentes Carrionas (Cantabrian Range, NW Spain)

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Fuentes Carrionas is a massif situated at the N of Spain, between Castilla y Leon and Cantabria regions. It is the second highest mountain massif of the Cantabrian Range after Picos de Europa, with peaks over 2500 m.a.s.l. and valleys well over 1000 m.a.s.l. Fuentes Carrionas was glaciated during Quaternary, and even during the Holocene and as far as Little Ice Age the presence of glaciers, or at least permafrost is controversial.

Results from glacial geomorphology analysis of Fuentes Carrionas Massif are presented. Based on the interpretation of glacial landforms, glacial evolution since the Last Glacial Maximum until Pleistocene deglaciation is described. Four different glacial equilibrium phases are identified, the last one divided into two pulsations. Deglaciation process took place between 36 ka BP and 11 ka BP. Local Last Glacial Maximum is dated back to 36-38 ka. BP, therefore earlier than LGM. Glaciers reached 15 km. long and occupied valleys down to 1250 m.a.s.l. during this phase. By European LGM (20-18 ka.BP) glaciers had substantially retreated to fronts about 1700 m.a.s.l. A final stage with two marked pulsations shows only small glaciers located at cirques above 2000 m.a.s.l. and, finally, only small cirque glaciers at North and Northeast orientation above 2200 m.a.s.l. Both these phases have been correlated to Oldest and Younger Dryas, although no dates have been done yet.

A palaeoenvironmental reconstruction is proposed, based on ELA (Equilibrium Line Altitude) rise. ELA has been calculated with the AAR method and 0.67 ratio. This reconstruction shows that temperatures ranged between 9^oC and 10^oC lower than present ones at the end of Pleistocene, depending on a precipitations variation between 30% higher and 20% lower than current ones. Further research will focus on these retreat phases, especially on Younger Dryas identification and reconstruction for this site and the rest of Cantabrian Range.