



TELECONNECTIONS BETWEEN BOREAL COOLING AND TROPICAL GLACIERS IN THE CORDILLERA BLANCA (PERU)

Jose Úbeda^{1,2}, Javier de Marcos¹, Irene Schimmelpfennig³ Estibene Vásquez⁴, Ronald Concha⁵, Régis Braucher³, Pablo Masías⁴, Mariette Bustamante², Rossella Gómez², ASTER Team³, Joshua Iparraguirre⁶, Ítalo Barrientos⁴, Gonzalo Luna⁴, Igor Astete⁴

¹Departamento de Geografía. Universidad Complutense de Madrid, Spain (joseubeda@ucm.es). ²Guías de Espeleología y Montaña, Spain. ³Centre de Recherche et d'Enseignement de Géosciences de l'Environnement, France. ⁴Instituto Geológico Minero y Metalúrgico, Peru. ⁵Instituto Nacional de Investigación en Glaciares y Ecosistemas de Montaña, Peru. ⁶Universidad Nacional del Callao, Peru.

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30 samples have been collected for the cosmogenic dating of expanding and shrinking glacial phases southwesternward of Nevado Hualcán (9°, 12'S; 77°, 31'W, 6122 m), in the Cordillera Blanca (Peru). The set includes 28 moraine boulder surface samples and 2 polished bedrock surface samples. The resistivity of 3 samples of moraine boulder surfaces, measured in the AMS facility ASTER, did not allow us to estimate the accumulation of ¹⁰Be. Therefore, it was not possible to estimate the exposure age of these samples. However, it was possible to obtain 27 ¹⁰Be glacial ages: 25 boulder ages from 5 moraine sets (M5-M1) and 2 polished bedrock ages (between M2-M1). 5 boulder ages seem too high, probably because of cosmogenic inheritance. Nevertheless, despite the uncertainties, the remaining 22 ages seem consistent with their geomorphological context. Nowadays, the oldest moraines (M5) are higher than younger moraines, because they define a glacial paleo-valley cut by the current valley in which the other groups of moraines (M4-M1) are becoming younger and younger and in higher altitudes. M5 ages (~132-61 ka) suggest the existence of at least two glacial phases long before the Last Glacial Maximum (LGM). The oldest phase could be traced back to the beginning of the Last Glacial Cycle (LGC). The M4-M1 moraines chronologies seem to correlate with paleolake transgressions in the Bolivian Altiplano. They can be interpreted as a reflection of wetter paleoclimatic phases than the current phase, and are linked to cooling periods in the Northern Hemisphere (Placzek et al., 2013). This link suggests the existence of a boreal/tropical teleconnection through a large shift towards the south of the Inter-Tropical Convergence Zone (Kelly et al., 2012) and/or of the Bolivian High (Martin et al., 2018). The M4 moraines define the maximum glacier advance on the south-west area of Nevado Hualcán. Their ages (~32-24 ka) are consistent with the early LGM, shown by various proof around the world (Clark et al., 2009). The M3 and M2 moraines show smaller and thinner readvances than previous moraines. Their ages (~20-12 ka and ~13-11 ka) are contemporaneous to Tauca (~18-14 ka) and Coipasa transgressions (~13-11 ka; Blard et al., 2011). The deglaciation after M3 could be the results of a weakening of tropical circulation related to boreal heating Bølling-Allerød. In that period (ages ~3-1 ka), the glaciers retreated to above their current limit. The M1 moraines pinpoint the last glacier advances, whose exposure ages without cosmogenic inheritance (~1.0-0.3 ka) are consistent with lichenometry-based dating in nearby valleys (Jomelli et al., 2008) and the ITCZ southward shift during the Little Ice Age (Sachs et al., 2009).

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