



Paraglacial rock slope failures and denudation signature in the Cantabrian Mountains

Laura Rodríguez-Rodríguez (1,2), Saul González-Lemos (2), Daniel Ballesteros (2), Pablo Valenzuela (2), María José Domínguez-Cuesta (2), Sergio Llana-Fúnez (2), and Montserrat Jiménez-Sánchez (2)

(1) Laboratoire de Géographie Physique LGP-CNRS, 1 Place Aristide Briand, Meudon, France, (2) Universidad de Oviedo, Departamento de Geología, Oviedo, Spain

Glacial erosion of hillslopes and stress changes induced by the transition from glacial to non-glacial conditions exert a strong influence on slope instability and are considered among the scope of paraglacial geomorphology. Failure mechanisms and coupling between paraglacial rock-slope failures (RSFs) and fluvial erosion are difficult to define. Here we show preliminary spatio-temporal framework of paraglacial RSFs in a small catchment of the central Cantabrian Mountains with dense concentration of RSFs. Preliminary radiocarbon dates obtained from two floodplain sequences deposited upstream from RSFs indicate that their sedimentation started as consequence of valley impoundment by RSFs after glacier retreat (after ca. 16.1 ka), consistently with the deglaciation pattern of nearby valleys. RSFs continued during the Holocene. Glacier erosion, debuitting and stress-release conditions played an important role on slope destabilization as preparatory factors in all cases, and probably triggered the oldest events. However, the long pre-failure endurance (ca. 12 ka) between RSFs points to other factors like rainfalls and fluvial down-cutting of hillslopes as triggers for Holocene events. Future research is needed to define the role of regional seismicity as trigger. Post-glacial fluvial incision rates of 0.2 mm a⁻¹ affected uniformly landslide materials; being comparable to previous regional estimates based on independent proxies. Higher linear fluvial incision rates of 7.6-2.5 mm a⁻¹ were estimated along a RSF toe (3.6 ka) and gullies carved on areas non-affected by RSFs upstream. The San Isidro record provides a quantitative perspective of post-glacial land degradation relevant to understand post-orogenic landscape evolution.

Research funded by MINECO-PGE-FEDER (CANDELA project, reference CGL2012-470 31938). Additional funding was provided by Department of Employment, Industry and Tourism-Government of Asturias (Spain) and the European Regional Development Fund FEDER (GEOCANTABRICA project, reference FC-15-GRUPIN14-044). LRR is grant holder of the postdoc programme Clarín (Ref. ACA-17-19) co-funded by the Government of Asturias and the Marie-Curie COFUND actions.