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Rock glacier initiations in recently deglaciated or deglaciating areas? New insights from the central Andes of Chile

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In the mediterranean and semi-arid (central) Andes of Chile, rock glaciers constitute a prominent component of the landscape above elevations of 3000 m a.s.l., where they may completely fill glacially-shaped cirque and hanging valleys. Glacier-rock glacier interactions are extremely frequent; in particular, between 32 and 35ºS, various striking features can be observed with signs of possible rock glacier initiation in the lower part of decaying glaciers/debris-covered glaciers. The observation of such currently producing transition of dynamics and forms – from glacial realm to permafrost realm, at the human life scale – in shifting mountain landscapes has almost never been reported and documented. We state that the current geomorphological transitions will produce rock glaciers under three conditions: (i) achievement of the typical morphology of rock glaciers; (ii) longitudinal movement; and (iii) permafrost occurrence through the landforms. In this session, we present the preliminary results of the work we run on the issue. In particular we present the case of the Navarro II site, Juncal massif, Chilean Andes of the Río Aconcagua (32.88ºS, 70.03ºW). The Navarro II site, located in a SW-facing hanging cirque between 3800 and 4000 m a.s.l., corresponds to a debris-covered glacier with rock glacier-transitional features in its lower part: debris flow lobes, neat frontal margins, and surface ridges. Together with geomorphological mapping, we present the methodology to be developed on the site. On the basis of field observations and contemporanean and former aerial and spatial images, we draw the lines of a first cryospheric-hydrologic model for the case studied. Finally, we discuss the possibility of complete achievement of a rock glacier from the present feature.