



Glacial landform assemblages in the Cordillera Blanca (Peru) and paleoclimatic implications

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The Andean Mountains features a wide spectrum of glacier types and corresponding glacial landforms in different environmental settings including large ice fields, outlet glaciers, valley glaciers, hanging glaciers and glacierets. In terms of the diversity of glacial landforms, the study provides new insights on glacial landform assemblages from the tropical high mountains of the Cordillera Blanca (Peru) where the average size of modern glaciers is only about 1 km². The aim of the research project was to set up a typology of the corresponding glacial and paraglacial landforms according to their physiognomy. Individual landform types were classified and considered in their spatio-temporal connection. The glacial landforms were analysed in a genetic succession from the moraine-delimited glacier forefields to the excessive pedestal moraines and taking account of the topographical conditions in the verticality. Their spatial arrangement is depicted in vertical series and summarized in a glacial-morphological altitudinal belt model. The noticeable regularity in the altitudinal distribution of glacial landforms occurs in the Cordillera Blanca as a result of the uniform geological, topographical and climatic conditions as well as due to similar glaciation extents in the individual valleys. Development of the moraine types depend decisively on the Pleistocene relief shaping, distribution of the slope inclinations in the longitudinal valley profiles and the altitudes of the catchment areas. Specific relief-dependent locations of sediment storage are linked to the glacial relief. Thus, the altitude of end moraines has to be used carefully as a paleoclimatic indicator. The sediments are on the one hand in situ deposition forms, and on the other depositions dislocated by mass movements, and represent paraglacial landforms. A regional-scale approach was used to determine the principal moraine types. The empirical basis is based on fieldwork during 2008-2016 in the Cordillera Blanca. Using the example of the Paron Valley in the Artesonraju-Huandoy Massif and neighbouring valleys, the study undertakes a typology of the range of glacial and paraglacial landforms based on a holistic glacial landsystem approach with special reference to pedestal moraines.

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