



Late Quaternary landscape evolution in the coastal desert of southern Peru

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Understanding late Quaternary landscape evolution in southern coastal Peru is hampered by the paucity of accurately dateable geoarchives. Therefore, local conditions remain obscure for much of the Quaternary. Key questions for paleoenvironmental reconstructions in this region are the persistence of hyperarid conditions throughout the Quaternary and particularly the Holocene, the occurrence and frequency of intensive local precipitation (commonly linked to El Niño events) and links between climatic conditions of the high Andes and the coast. While sedimentary sequences have been used to reconstruct flood and debris flow events in a number of studies from southern Ecuador, Peru and Chile, they rarely extend back into the Pleistocene.

Here we present a last Glacial sedimentary record of intensive local precipitation in the coastal desert (represented by coarse-grained autochthonous Quebrada deposits) and extremes in discharge of the exoreic Rio Grande de Nazca linked to precipitation in the Cordillera Occidental (represented by fine-grained flood deposits). The stratigraphy at the location allows the reconstruction of a sequence of deposition and erosion related to local and regional-scale precipitation and discharge events. Four charcoal samples taken at the location were used for radiocarbon dating. Three of the dates bracket a main phase of fluvial aggradation more than seven metres above the recent river bed; one date provides a minimum age for the end of debris flow deposition on the remnant landform.

A phase of exoreic flood sediments during the LGM was preceded and followed by phases of debris flow activity in the local catchment. Debris flow deposition ceased after 18.9-9.9 ka BP and before 2040 BP and was followed by Quebrada incision. Both debris flows and Quebrada incision require substantial amounts of local precipitation; the transition from accumulation to incision can therefore not be taken as a direct

indicator for precipitation changes. Final river incision occurred after the Quebrada had incised to a level approximately 6 m above the recent river bed. It is shown that river incision was at most 8 m during the past 30 ka.