



Correlating sediment aggradation and climate by means of luminescence dating, Valley de Pisco, Peru

D. Steffen, F. Schlunegger and F. Preusser

Institute of Geological Sciences, University of Bern, Switzerland (steffen@geo.unibe.ch)

The Valley de Pisco in Central Peru (13.5°S) is a perfect playground to study the influence of climate change on terrace formation and sedimentation on alluvial fans in hyperarid to arid environments. Essential in correlating sediment aggradation and climate is a precise chronology of the terraces and the alluvial fans. In this study, Optically Stimulated Luminescence (OSL) dating was the method of choice, due to the lack of organic material and the limited time range of radiocarbon dating. Here we present a detailed database of the last 60 ka based on OSL ages from deposits on alluvial fans and fluvial terraces in the Rio Pisco valley.

During measurement procedure a discrepancy between quartz OSL ages and feldspar OSL ages was detected, whereby quartz always underestimates the feldspar age. Therefore several tests were performed on both quartz and feldspar. During these tests, the behaviour of quartz was often anomalous, whereas feldspar behaved nicely throughout the tests, and may be due to the volcanic origin of the quartz. The reasons for this poor behaviour may be a weak fast component, recuperation and/or a strong sensitivity change, all observed in our quartz samples. Anomalous fading of quartz is also not excluded.

Independent age control, as well as the internal coherence of the feldspar ages, and their good behaviour during standard tests, suggests that feldspar ages are more reliable than quartz. OSL ages were therefore measured using feldspar coarse grains.

The data set from the Valley de Pisco allows the comparison of times of formation of fluvial terraces and alluvial fans with well established climate records on the Altiplano. The time of deposition of the cut-and-fill terraces, as well as the alluvial fans, correlate very well with wet periods on the Altiplano (Minchin (47.8-36 ka), Tauca (26-14.9 ka) and Coipasa (11.4-10.2 ka)). Evidence of these wet periods is found in northern Chile,

Bolivia, southern Peru and northwestern Argentina. The correlation of wet periods on the Altiplano and the aggradational phases suggests that aggradation occurred during periods of enhanced precipitation.