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Abstract

The Central Andean coast and the adjacent highlands were a core area for the development of complex societies in the Americas. In this region, a multitude of different environments, each offering a distinct set of exploitable resources, can be found within close proximity. As a result, complex human-environmental relationships developed, which can be regarded as a prerequisite for the manifold cultural achievements of the local pre-Hispanic peoples. The arid climate of the Andean west flank, however, makes water for valley floor irrigation a scant resource and also limits rain-fed agriculture. Likewise, at high altitudes, frosts are a limiting factor. Since already slight absolute fluctuations in precipitation and temperature patterns can significantly alter the potential of agricultural production, several scholars have proposed that climate change may have had a crucial impact on cultural development. The evidence presented in support for this hypothesis is nevertheless often tenuous or ambiguous.

In the present study, pre-Hispanic settlement patterns in the northern Río Grande de Nasca drainage in south Peru (14.5°S) were analyzed and compared for ten cultural phases between 1500 BCE and 1532 CE. By doing so, major changes in settlement structure, the spatial distribution of settlements, socio-political organization, population levels, and general culture were traced. The corpus of data comprised 787 archaeological sites with settlement remains recorded during 15 years of fieldwork by the *Palpa Project*, a joint project of the *German Archaeological Institute* and the *Peruvian Andean Institute for Archaeological Studies*. Based on this material, 1042 settlements were defined and classified according to phase, size, and rank in a settlement hierarchy. A complex database was designed to hold and manage this information but also to perform a variety of statistical calculations allowing for inter-phase comparison.

This database was linked to a geographic information system (GIS), in which spatial analyses were performed, such as the calculation of walking time distances and altitudes relative to the nearest valley floor. Furthermore, the GIS was used for designing distribution maps.

The results of this analysis were compared to a reconstruction of the paleo-climate based on previous studies of local and remote geoarchives carried out by different teams of scientists. By doing so, it was possible to check for temporal correlations between climate change and cultural development. It has been found that during several periods climatic conditions seem to have operated as an amplifier for socio-political processes. In turn, there also seem to have been examples for cultural climaxes under comparatively unfavorable climatic conditions and of severe crises when climate was favorable. This find implies that while climate surely had an impact on cultural development there was no strict causal link between these phenomena. Precipitation amounts only rarely seem to have dropped to a degree where agricultural productivity would have been dramatically lowered for a longer period, causing severe crises to local peasant societies. Given that both the archaeological and the paleo-climatic data show gaps and are of limited temporal resolution it can nevertheless not be ruled out that many short-term correlations between precipitation and cultural development have not been detected. Since no published local high-resolution proxy records are currently available for temperatures, it is also possible that future studies will show that agriculture and settlement history in the highlands were affected significantly by fluctuations in the frequency of frost events. New data gathered by ongoing and future studies will show whether the general trends outlined in the present thesis can be confirmed by more detailed analyses.