



Settlement Distribution patterns as indicators of Climate conditions of the Middle-Late Holocene; A Case study on the Delice Valley (North-Central Anatolia)

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Abrupt climate changes and consequent environmental changes have been repeatedly suggested as driving factors behind the rise and collapse of prehistoric and historical communities. The Near East experienced several major rapid climate changes during the Holocene (10.2 k, 9.2 k, 8.2 k, 4.2 k, and 3.2 k events cal. year BP). The Anatolian Peninsula represents an excellent laboratory for investigating the long-term relationships between these experienced climatic trends and settlement strategies. In this article, based on the analysis of 234 archaeological settlements that were active between the Chalcolithic (c. 6000 BC) and the Iron Age (c. 2600 BC) identified during different surveys carried out in the Delice Valley, the settlement strategies in the region over a period of approximately 3500 years, We examine it in detail in the light of past climatic conditions.

While trying to understand in detail this complex and non-linear relationship network between landscape and society, we aim to answer the following questions. First; What is the relationship between the organization of social groups in the landscape and the climate? Could the strategies (adaptive behaviors and resistances) developed by communities against changing environmental conditions be reflected in organizational changes? Second; Are there differences in the distribution patterns of settlements throughout the landscape? Finally; What are the possible reasons why the research area is settled with low density in some periods? In this study; From the spatial statistics modules of ArcGIS; We modeled the spatial distribution patterns of settlements in the Delice Valley using the Average Nearest Neighbor (ANN) and GrassGIS's r.geomorphon modules.

We modeled the Early-Middle Holocene climate of the Delice Basin using the Macrophysical Climate Model and CHELSA-TraCE21k outputs. The general situation of Delice Valley, which is derived from the paleoclimate model, shows that the region has an arid climate structure and these conditions were settled in the Early Holocene. Although there was no change in the paleoclimatic structure of Delice Valley during the Middle and Late Holocene periods, the presence of significant ups and downs is important. It seems that the Delice Valley was heavily occupied in the middle Holocene. However, the spatial distribution of the settlements differs from each other periodically. It is not possible to interpret the differences in these site preferences independently of the Middle Holocene river activity. It is certain that the severe rise and fall of precipitation in the

Middle Holocene had an important role on the position of ancient communities in the topography and neighborhood relations. Severe peaks observed in precipitation values in the Chalcolithic period forced people to prefer ridges away from the main river bed and exhibit a dispersal distribution pattern. On the contrary, the changes seen in the middle levels in the Early Bronze Age allowed the invasion of the floodplain. Geography and climatic conditions illustrated the settlement strategies of people and the fact of how they organize themselves in the landscape in our model results.

Keywords; Early-Middle Holocene, Paleoclimate, GIS, Delice Valley, Settlement Strategies.