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THESIS BOOK

GEOARCHEOLOGICAL INVESTIGATIONS IN THE SAND
RIDGE AREA OF THE DANUBE TISZA INTERFLUVE
AND THE FLOODPLAIN OF THE KALOCSA SÁRKÖZ
BETWEEN THE SETTLEMENTS OF HAJÓS AND
CSÁSZÁRTÖLTÉS

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Introduction, aims

The aim of the research was to prepare a geoarcheological report via the compilation and collective evaluation of environmental historical as well as archeological records for the vicinity of the settlements Hajós and Császártöltés.

The villages of Hajós and Császártöltés are found at the interface of two major landscapes of the Great Hungarian Plain. Namely, the sand ridge area of the Danube Tisza Interfluve and the adjacent „floodplain” area of the Kalocsa Sárköz offering ideal conditions for the implementation of a multiproxy environmental historical research.

Thanks to our work implemented in the referred area, this so-called white spot in the Hungarian archeological topography is no longer unknown. According to the results gained it has been continuously populated since prehistory. An outcome of our work was the archeotopography of the two settlements and their wider surroundings, yielding a large number of new data on various archeological features and cultures present in the study area during historical times. A collective evaluation of the newly gained archeological data with those of complex paleoenvironmental and environmental historical records enabled us to make inferences regarding the location, spatial distribution and structure of archeological features and sites as well as the endowments of the landscape.

Materials and methods

Materials and methodologies of several distinct science areas have been adopted in our work. Paleoenvironmental reconstructions were based on the investigation of undisturbed core samples taken from the study area. Natural scientific studies involved the complete stratigraphical, geochemical and pollen analytical investigations of the received core samples. ^{14}C dates gained enabled the establishment of an independent chronological framework for the paleoenvironmental data. Among the applied archeological methods, field surveys implemented gave the backbone of the investigations complemented by data processing in the archeological data banks of various museums and institutes as well as probe excavations implemented at two sites identified. Archeostratigraphy of the sites was established using the method of feature typology.

Major results as thesis points of the research

- 1.) Paleoenvironmental reconstructions for the study area were based on the multiproxy analyses of 6 undisturbed core samples. The environmental history could have been captured from the Late Glacial to the Middle Ages with six distinct phases identified: 1. Late Glacial, fluvial phase, 2. Pleistocene/Holocene transition, lacustrine and marshland phase, 3. Middle Holocene peat and reed swamps, 4. Late Holocene tussocks and interdune depressions, 5. Willow marsh phase, 6. Middle Ages.

- 2.) Archeological field surveys implemented in early (Császártöltés) and late 2000 (Hajós) yielded immense data on the settlement structure and archeological features of the site. There has been a ca. sevenfold increase in the number of formerly known archeological sites of 25 yielding a grand total of 183 sites suitable for further analysis. It must be noted that the number of identified sites is not equal with that of identified archeological features. Roughly 50% of the sites contained traces of multiple cultures, mostly 2-3 clearly distinguishable groups. As a result the total number of identified archeological features of the 183 sites is 311. About one third of the sites identified were found in the area of the sand ridges (Homokhát) and the high bluff. In addition, the remaining two-thirds were constrained to the area of the Sárköz.
- 3.) The next stage involved the creation of an archeostratigraphy. According to the observations made, the study area was continuously populated from the Early Neolithic up to the late Middle Ages. The number of sites and features dated to the prehistoric period was quite numerous. Features, artefacts from 15 cultures could have been attested: the Körös, DVK, Lengyel (Neolithic) Cultures; the Tiszapolgár, Bodrogkeresztúr , Baden Cultures (Copper Age); Makó , Nagyrév, Vátya , Burial mound, Gáva Cultures (Bronze Age); Celts (Iron Age); Sarmatians

(Imperial Age); Avars (Age of Great Migrations), early and late Middle Ages.

- 4.) The final stage of the Paleolithic was characterized by a gradual amelioration of the dry, cold, extremely arid climate. The area hosted an actively developing riverbed fringed by horsetail marshlands. The floodplain hosted a mixed taiga vegetation, while the area of the high bluff was characterized by continental steppe elements during this referred period. The steppes of the sand ridge areas were studded by barren sandy surfaces and taiga patches of Scots pine and willow. The proportion of arboreal elements and woodlands reached 90% in the study area during this time. During the Neolithic the dry, warm climate of the Boreal was gradually replaced by the warm, humid and more balanced climate of the Atlantic. The floodplains hosted gallery forests of willow, poplar and hornbeam as well as oak, alder and elm. The sand ridge part of the landscape harbored a warm continental steppe studded by patches of oak forests. This period also hallmarks the appearance of wheat pollen grains marking human activities. The initial stage of the Copper Age witnessed a significant transformation of the environment. A generally cooler and more humid period of the Subboreal emerged. Nevertheless, the area of the Great Hungarian Plain was characterized by drier conditions and higher continentality. This brought about a slow

transformation of the gallery forests of the floodplain. The sandy areas of the ridge were hosting a warm continental steppe studded by stands of oak. The ratio of woodlands gradually decreased. Non-arboreal elements indicating human influences and treading are continuously present. The opening of the Bronze Age marked an increase in precipitation in the Carpathian Basin in general. An increase in rainfall was accompanied by a rise in the temperatures during the middle part of the Subboreal. The end of the period however was characterized by a cooler climate and increased continentality compared to the previous periods. The floodplain hosted gallery forests of hornbeam-oak, hornbeam-beech. The near bank woodlands experienced an increase in alder, birch and willow elements. The intermittent wet and dry meadows were highly treading and grazed. The ratio of grassy areas in the sand ridge part (Homokhátság) was 75-80% at the time. But the formerly intact grasslands were gradually replaced by pasturelands and arables. This period is characterized by increased human activities. The period of the Subboreal was gradually replaced by the somewhat drier and cooler conditions of the Subatlantic from the Middle Iron Age. The most important woodland element of the period was oak (*Quercus*). The sand ridge area was mostly covered by grasslands (75-80%). Human influences were significant. The age of the Sarmatians is coeval with the Subatlantic phase of the Holocene. The floodplain

hosted gallery forests of hornbeam-oak, hornbeam-beech. The woodlands were studded by heavily grazed pasturelands and meadows. The sand ridge hosted a forest steppe of oak being the dominant arboreal elements. The proportion of steppes reached 75-80%. Human influences were also significant during this period. The period of Great Migrations was characterized by a gradual transition in the environment as well hallmarked by the emergence of a drier climate. The dominant arboreal element of mixed woodlands was oak. Within the forest steppes of the sand ridge area grasses were gradually replaced by *Artemisia*. Signs of human activities can be continuously traced. After a minor cooling climatic conditions improved during the period of the Hungarian Conquest. During the Middle Ages, the floodplain hosted mixed oak and oak-hornbeam gallery forests. The sand ridge areas hosted a mixed forest steppe displaying signs of considerable human influences. The proportion of woodlands somewhat increased as well.

- 5.) The Neolithic settlements were confined to the flood-free natural levees accompanying the riverbeds in the area of the Sárköz. No settlements were identified in the areas of the adjacent high bluff and the sand ridges. During the major part of the Copper Age, settlements were similarly confined to the natural highs of the floodplain area of the Sárköz. The first settlements on the

adjacent high bluff appear during the Late Copper Age. A further expansion of human settlements can be inferred for the Bronze Age with some scattered sites occurring even in the area of the sand ridge as well. During the Iron Age settlements were mainly confined to the area of the high bluff with sporadic occurrences in the floodplain areas of the Sárköz as well. During the Sarmatian period, besides the two referred geographical areas the inner parts of the sand ridge were also conquered. This period also hallmarked the peak of human occupance. The most important site of human settlement during the Avar age was that of the Sárköz with some scattered sites located in the adjacent high bluff and sand ridge areas. A major increase in the number and spatial expansion of settlements to all three areas occurred during the medieval times.

- 6.) The location, structure and general distribution of settlement sites seem to follow a slightly varying pattern throughout the period of various archeological cultures in our study site. This variation must reflect differing climatic conditions as well as differing subsistence strategies. The most important site of settlement seemed to be the Sárköz. Settlements were confined to the flood-free natural highs fringing the former riverbeds here forming island like structures. The highest, flood-free part of the floodplain area of the Sárköz, the so-called Homokhegy (Sand

hill) was inhabited during several periods, though not continuously. In certain periods the most important site of settlement was that of the adjacent high bluff. Here the settlements were confined to a small band running along the riverbank. The majority of the villages are confined to the confluence of the high bluff and the derasional valleys. The favorable conditions of the bluff must have attracted settlers yielding a large concentration of sites. Conversely, the areas of the Homokhát (Sand Ridge) directly adjacent of the high bluff seem to be lacking any sites. Hills accompanying the derasional valleys were likewise ideal sites of settlement. In several periods, settlements expanded deeper into the sandy areas of the Homokhátság as well. These settlements must have been linked to the natural temporary or permanent sites of smaller-larger water bodies (ponds, creeks etc.).

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