The medieval environment of the lake Baláta area in the light of geology and documentary sources

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Abstract

Despite the increasing research by Hungarian experts on certain fields (land usage, climate and woodland studies) of medieval landscape, the local environmental studies achieved by palaeoenvironmental, archaeological and historical methods cooperatively are nearly lacking in medieval environmental research.

In the case of the Lake Baláta (Hungary) survey, a palaeoenvironmental investigation including sediment, pollen and molluscan analyses was carried out during 2004 and 2005. Its results concerning medieval (pre-16th-century) climatic processes are among the first data derived from the medieval layer of a sediment core extracted at a Hungarian site and call the attention to the great importance of regional studies in order to refine further the local variations of climate conditions.

Furthermore, the environmental data are put into the context of the documentary sources and the socio-economic transformations in order to parallel features and procedures acting upon the landscape and at the same time being results of several disciplines.

The question which is rather raised than answered in the paper is how the different emphases of the various research attitudes, particularly those of natural sciences and history can be integrated for a relevant and successful research.

Keywords: medieval environment, medieval climate, geology, documentary sources, Lake Baláta

Introduction

In Hungary, the palaeoenvironmental investigations of the last decades ranged between two extreme research strategies. One is geoarchaeological corings for palaeoenvironmental analyses on available deposits without any relation to archaeological sites or the idea of anthropogenic activity. On the other hand, there is environmental sampling at archaeological sites (most of the time sampling plant and faunal remains from wells or ditches), which mostly remains supplementary data for archaeological results and can hardly be put into broader environmental context. Archaeological and palaeoenvironmental research recently started to take into account the importance of integrated on-site and off-site studies, meaning palaeoenvironmental investigations carried out both at the inner area of the archaeological site and at its environment. However, the results of these initial investigations remain mostly unpublished (Pálóczi Horváth 2004).

Recently, the results of palaeoenvironmental studies have given a major impulse to medieval environmental research, as they can provide data from sediment layers before the 16th century, as carried out at Hungarian sites (Gál et al. 2006; Zatykó et al. 2007).

In the following I will present a study on the Lake Baláta survey, where a palaeoenvironmental investigation including geoarchaeological, pollen and molluscan analyses was carried out. The results concerning medieval (pre-16th-century) climatic processes are among the first data derived from the medieval layer of a sediment core extracted at a Hungarian site.

Although this was an off-site palaeoenvironmental survey without integrated archaeological research, in the following, I will attempt to put the environmental data about medieval

climate, vegetation and anthropogenic impacts into the context of the documentary sources and the socio-economic and settlement transformations that occurred around the turn of the 13th–14th centuries.

In the course of the paper I intend to illustrate the difficulties one often faces during interpretation or transformation of data, methods, attitudes and questions of various disciplines. The question which is rather raised than answered here is how the different emphases of the various research attitudes, particularly those of natural sciences and history can be integrated for a relevant and successful research.

Lake Baláta – Palaeoenvironmental results

Lake Baláta lies south of Lake Balaton, within the townships of Szenta and Kaszópuszta. It is situated among depressions and holes in a shifting sand area in the Inner Somogy region (Fig. 1). The lake and its environs were one of the first areas in Hungary to be taken under protection, the territory has been a Nature Protection Area since 1942. For a long time it was under the control of the Hungarian People's Army, inaccessible for the public. As a result of this, the approximately 1.5-km^2 ancient marsh survived almost untouched.

In the case of the Lake Baláta survey, a palaeoenvironmental investigation including geoarchaeological, pollen and molluscan analyses was carried out in the marginal territory of the medieval village, Szob. Pál Sümegi and his colleagues extracted eighteen undisturbed cores from the southern part of the frozen lake in January 2004. Five peat samples were sent to the radiocarbon laboratory of Poznań in Poland and the upper three of the five samples are from medieval layers (Sümegi 2007; Sümegi & Szántó 2007).

The pollen and macrofossil analyses of the sediment samples from the lake allow for the following environmental reconstruction as regards the 9th–13th centuries (Jakab & Sümegi 2007; Juhász 2007; Sümegi 2007): According to Pál Sümegi and his colleagues' estimations, the climate became warm in the 11th century, and summer as well as winter temperatures increased. In July it might have been 1°C and in January 3°C warmer than today's average. Alder, thriving on wet, waterlogged soils declined parallel to the expansion of birch, oak, possibly holm oak, grape and walnut, indicating a warming climate (Juhász 2007, p. 246; Jakab & Sümegi 2007, p. 252).

Regarding agriculture, the most significant data is the number of the growing degree days above 5°C, which increased when

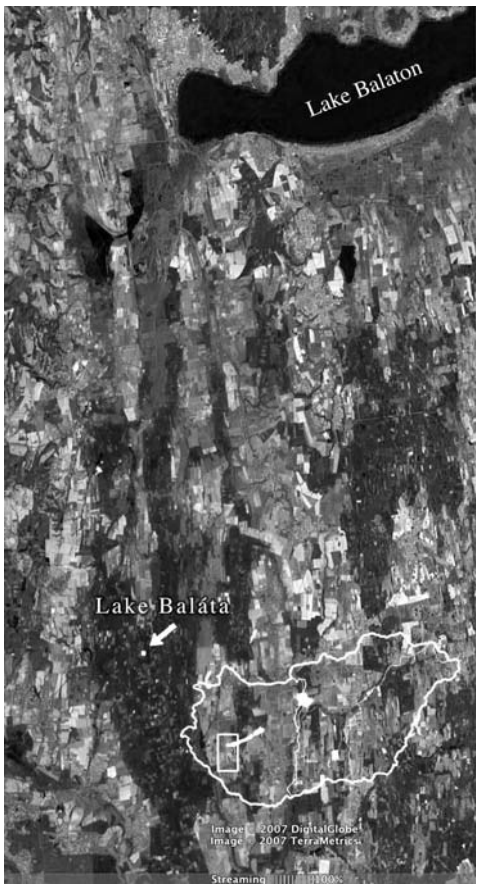

Fig. 1 The location of Lake Baláta.

compared to the average of the 20th century. Growing degree days are a tool in phenology that takes aspects of local weather into account and allow to predict the plants' pace toward maturity. This data follows not from the warmer summers, but rather from the milder winters with fewer frosty days. Because of the milder winters and the decrease of frosty days in springtime, the growing season became longer, which is favourable for cereal cultivation as well as for woodland.

Although the amount of precipitation increased during autumn and winter, evapotranspiration increased following the higher temperature which led to a drier climate and a drop in the water-level of the lake by the turn of the 11th–12th centuries.

The expansion of birch and oak led to reforestation: the medieval forest cover was the most extensive during this period. Even though the forest cover became denser there is evidence for arable and grazing, for example the appearance of rye, wheat, sorrel or ribwort plantain (Juhász 2007, p. 246).

The warmer and drier climate reflected in vegetation changes and water level fluctuation coincides with the so-called Medieval Climatic Optimum (MCO), which is supposed to have been characterised by a warmer and wetter climate. In the Carpathian Basin this change can be generally dated between the 9th and the early 13th centuries (Rácz 1993, 2003; Pálóczi Horváth 1998). In contrast to the generally wetter character of the MCO period, in the case of Lake Baláta a drier climate can be established in the same era. This emphasises the importance of regional studies in order to refine the local variations of climatic conditions.

The core section reflecting a warm and dry period until the turn of the 13th–14th centuries was followed by a section with burnt seeds, caused by a small fire, which was either natural or induced by humans. From about the middle of the 14th century the temperature, particularly in the winter, decreased, and at the same time the amount of precipitation increased in summer. Apparently the summer season was influenced by Atlantic climate, while the winter season by Continental climate (Pál Sümegi personal communication). The cold and dry winters as well as the cool and wet summers led to a rise in the water-level of the lake. The forest canopy opened from the mid-14th century, and weeds indicating human activity also increased, parallel to the rise of wheat and rye (Juhász 2007; Jakab & Sümegi 2007).

Summing up the palaeoenvironmental results, it must be emphasised that the warmer climate around the lake in the 9th-mid-14th centuries was not primarily caused by the warmer summers, but rather the milder winters with fewer frosty days. By means of equalization between the summer and winter seasons and of the elongation of the growing season, the circumstances for farming became more stable and presumably the village community had the chance to be less exposed to unfavourable climatic conditions.

Lake Baláta – Documentary sources

In the following, let us see some characteristics of the environment and landscape as they appear in documentary sources: the perambulation charter of the neighbouring area, issued in 1330 (MOL Df 236478; Borsa 1996, p. 68) allows a glimpse into some features of the medieval landscape around Lake Baláta (Zatykó 2007, pp. 261-262).

In the course of the perambulation process, people walked around the piece of land in question near the lake in order to assert and record its boundaries. The process started from the north, from the boundary between Segesd and Szob and passed the outskirts of the surrounding settlements. By means of identifying rivers, roads, deserted or existing settlements mentioned in the document, the presumed area covered by the perambulation has been established on the First Military Survey from 1783 (**Fig. 2**).

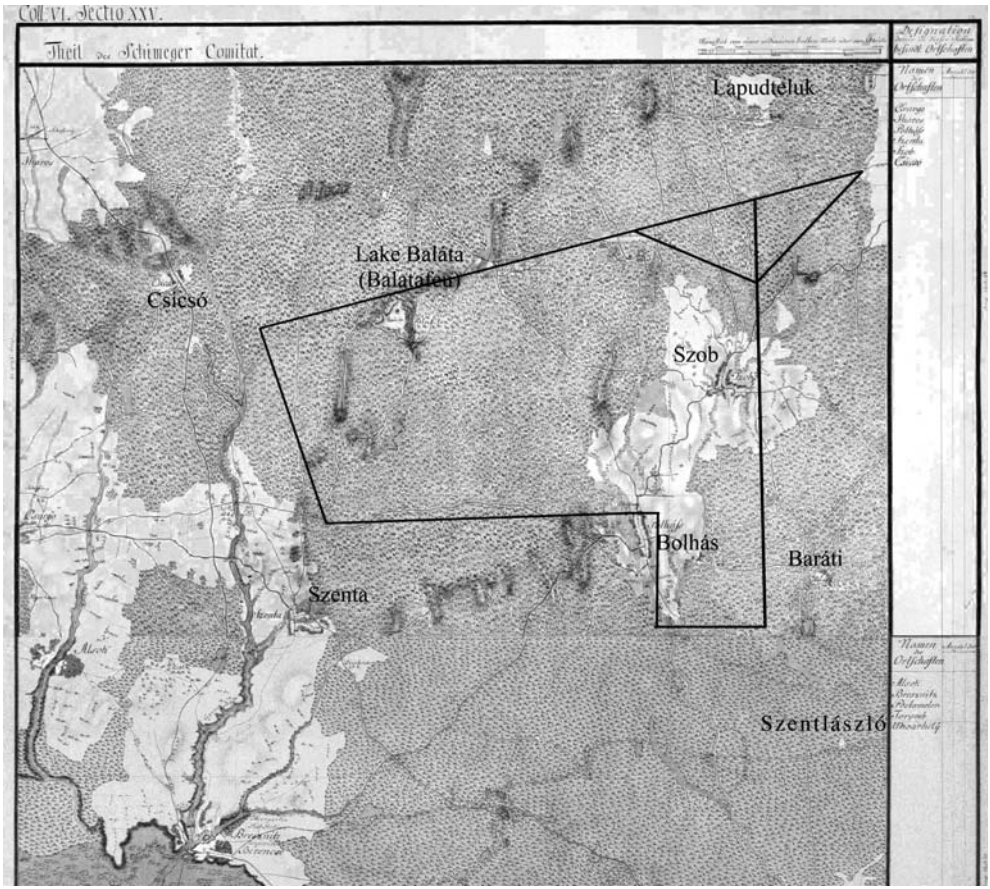

Fig. 2 Settlements and the presumed area of the perambulation issued in 1330, located on the First Military Survey (1783).

Concerning the landscape, the first and most frustrating observation is that the least detailed part of the otherwise informative document is the area around the lake. The document says: *"they went to the boundary of Szenta and Szob. Turning north, they reached the boundary of Csicsó and Szob, and then they proceeded eastwards to a lake (stagnum) called Balatafeu. Moving eastwards, they first arrived at Naagieer [Nagyér] Stream"*

One of the explanations for this lack of detail can be found in the topographical situation of the lake. The settlements (villages or farmsteads) lay along the bends of the river and the territory of the lake was far from their core area. As a result, the lake might not have been as familiar as the inner areas or simply not important for the people attending the perambulation.

The document mentions the lake as *Balatafeu-stagnum*, a name deriving from the Slavic word *"balata"*, which means marshland or mud. This can shed light on the conditions of the marshy lake at the time it was given its name.

Another interesting phrase regarding the muddy landscape is the Latin word *nemus* that is used in the charter to describe a piece of land between Szob and Segesd. Péter Szabó argued that its meaning corresponded to that of Hungarian *berek* used for describing wetter areas (Szabó 2005, pp. 63–66).
Trees are mentioned at four locations: three oak trees, two birch trees and an elm tree, whose presence was noted in the pollen record, too.
Ploughland shows up only once in the charter, probably because the cultivated fields lay in more easily accessible areas rather than near the boundary of a particular settlement.
To provide a broader context for the aforementioned palaeoenvironmental features and the data of the perambulation, I briefly summarize the socio-economic and settlement transformation processes that took place in the environs of the lake during the discussed period.
At the end of the 13th century, Lake Baláta, within the township of Szob, was part of the queen's Segesd estates. Similarly to other areas of Hungary, the first larger corpus of documents comes from the 13th century, a period characterised by the disintegration of royal estates and the transformation of manorial economies. Without going into details about the socio-economic background and consequences of this transformation, let us emphasize that the outcome was that the peasantry was gradually transformed into a legally uniform dependent population (*iobagio*) taxed according to plots and their holdings.
One of King Béla IV's reforms in the middle of the 13th century was that he initiated the settling of western settlers (*hospites*) on the royal estates, who received a specific amount of ploughland and meadow in addition to their plots, and were taxed for these. The *hospes* privileges and taxation methods served as a model and stimulated the spread of the peasant tenant system. A charter issued in 1248 mentions the legal status of the *hospites* of the Segesd estate and shows that the procedure was probably well underway by the mid-13th century.
The socio-economic transformation inspired among others by western settlers led not only to the uniformisation of the peasants' obligations but, as a new system of peasant plots was developed, also to changes in the settlement structure. In addition, improvements in cultivation techniques and the use of heavy ploughs enabled the cultivation of larger areas. The heavy plough induced a new ploughing technique, giving rise to long, narrow strips and leading to changes in the field pattern. The emergence of a regulated system of crop rotation is reflected in the 1389 perambulation charter of Inke, a settlement near Lake Baláta. This document lists the ploughlands, the manured fields and the pastures as *terris arabilibus, fimatis, campestribus* (MOL Dl 7043; Borsa 2000, no. 460).
The range of the plants grown in the neighbourhood appears in a charter issued in 1469. The document records that a peasant from Csicsó broke into a house in Bélavár, and stole four barrels of wine, one hundred *cubuli* of wheat, one hundred *cubuli* of spring wheat, the same amount of oat, ten *cubuli* of flour, ten *cubuli* of flour made from spring wheat and one hundred dried fish (MOL Dl 16819). The differentiation of wheat and spring wheat may suggest the use of a three-field rotation system.

Conclusions

The collation of the palaeoenvironmental records, documentary sources and the socio-economic and settlement structural changes will raise many more questions than it will answer, however, it is hoped that it will provide at least an inspiration to refine and evolve the research.
Up to about the middle of the 14th century the environmental conditions seemed to be more stable and favourable for cereal cultivation and for woodland. By the turn of the 13th–14th

centuries the process of the transformation of the settlement pattern and agriculture towards a more regulated system got probably underway or even finished on the neighbouring estates. Whilst the climate became cooler, human activity, cereal cultivation and forest clearance to increase ploughland can be noted in the 14th century.

At this point of the research, no causality between the different processes can be sensibly demonstrated; however, it is worth comparing them for a better understanding of the possible relationships between the various procedures. More regional studies need to be carried out to provide comparable cases to increase the level of confidence regarding the interpretations.

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