THE HISTORIC-GEOGRAPHICAL METHODS USED IN RECENT RESEARCH OF LONG-TERM CHANGES IN CULTURAL LANDSCAPE

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Abstract
This paper deals with the recent methodological approaches in historic-geographical research orientated on monitoring landscape changes in Slovakia and Czech Republic. The historic-geographical methodology is affected not only by the interdisciplinary nature of this field, but also by the "theoretic-methodological results" that achieved close highly specialized, sciences. The most widely used methods in the study of landscape transformation are connected with the historical land use and the multitemporal analysis.

Key words: historical geography, methodology, land use, cultural-landscape layer

1 Introduction

Historical Geography (hereafter HG), besides its own geography, one of the oldest sciences, whose object of research is to study the process of the natural landscape transformation to the cultural landscape and also the cultural landscape transformations in modern history to the present. Interdisciplinary nature of HG predetermines the use of a wider variety of methodologies, as is used in Historiography and Geography.

The landscape and its transformation, or overall patterns of its existence, are considered also in another sciences, particularly natural, and therefore in the HG are increasingly using procedures and techniques (and results of research) of related disciplines. Especially those of science and humanities, the landscape is the object of research as a complex system (landscape ecology), or either branch of the geographical environment (e.g., geology, pedology, climatology), or a man and anthropogenic activities that are closely tied to landscape exploitation (notably economic history, history of agriculture, mining history, agroethnology, toponomastics, etc.). Here we can count on disciplines (methods and results of their research), which examine temporal and spatial aspects of a specific human activities (e.g., urban planning, spatial sociology, sociology of landscape, economy)

The aim of this paper is to point out the recent and most commonly used methodological approaches in historic-geographical research in Slovakia and Czech Republic, and also briefly to evaluate their possibilities or limitations.

2 Methodological approaches in current research of the landscape transformation

The process of environmentalization, especially since the 70's of 20th century, is more often focus on practical needs (Chromý, 2001). There's evident effort to know the background state of the landscape, its origin and evolution and thus to revise the understanding of environmental issues that have direct relevance to the formation of the man - nature (landscape) relations in the course of history. On the other hand, shall also examine changes to the geographic environment caused by "natural forces" (such as climate fluctuations), to which a man could not sometimes to respond adequately. The purpose of this research is to interpret the historic cultural landscape changes resulting from the interaction between social
and natural forces, and seeking answers to the causal questions (cause - result) (Chromý - Jeleček, 2005).

Prerequisite for the success of research is in fact the field research (direct empirical observation of the examined landscape, or also the lifestyle of the local population). Within the terrain research can be done also detailed geomorphological mapping (Hartvich et al., 2007), an archaeological survey (surface survey method) or mapping of real vegetation (Kuna, M. et al., 2004). The part of the fieldwork is the creation of photographic documentation and mapping of structure changes of the landscape (compared to the state, which is captured on recent topographic maps of the territory), but also the searching and identification of historic landscape structures. The historical landscape structures are indicators of past economic and other human activities in the area. They represent the time-spatial "layers", which are substantial remains of the historic landscape.

Without the detailed knowledge of the area and of analytical maps (geological map, map of soil types, real vegetation map, etc.) it is not possible to accede to the causal analysis of geo-ecological landscape structure. This analysis is the initial analysis, which shows the "phenomenon of the natural-environment offers" (Chrastina - Boltižiar, 2006), the potential of the area, which significantly marked man's relationship to the landscape, respectively decided on the differentiation of human activities in the area. Also gives us the information how man is able to use specific features of the landscape and also how the territory marked the way of life, employment and thinking of the local community. It includes sub-analysis of individual geospheres of examined area, their functioning and interactions. This analysis can be considered as one of the entry procedures for the research of the landscape transformation. It’s mainly used by professionals having the geographic education.

One of the most widely used and historically the oldest method which has its firm place in the portfolio of Historical Geography, is the cartographic method. It deals with the procedures of acquiring knowledge from maps and the map-content analysis and interpretation of maps, but also the construction and the production of maps. From the map-content analysis is possible to construct geomorphological profile and make different graphic-mathematical analysis (Pravda, 2003). One of the outcomes of historic-geographical research is the thematic historical (reconstructive) map, which has the universal known map-language and can zoom the state of landscape structure, respectively of its selected parts in the monitored period of time. A good example of such map is the map of supposed former channel of the arm-stream called Humér, which was created by synthesis of geomorphological, historical (archival) and toponymical evidence (Pišút, 2007).

As a special large group of methods, we can allocate the methods associated with the use of geo-information technologies. These are the methods, techniques and procedures that benefit mainly from the technical (computerized) possibilities of GIS, the Remote Sensing systems (hereafter RSS) or databases, and geographical positioning systems. In particular, GIS is so user friendly that many activities, particularly the processing and the evaluation of spatial data, perform specially designed programs, also called "desktop mapping" (Kusendová, 2001). At this point I will mention only some of the methodological procedures used for the purposes of historic-geographical research, especially those whose proper use is significantly affected by researcher:

- digitising of spatial data (analogue maps, satellite and aerial photographs),
- geo-referencing in GIS environment (unification of all kinds of spatial data),
- identification and interpretation of landscape structure (or build a selective interpretative key and creation of a specific land use map legend),
- method of vectorization of elements in GIS environment (qualitative analysis),
- statistical and quantitative analysis of spatial data.
Some experts between the above-mentioned procedures add methodology of multitemporal analysis of remote sensing data, but about it I will discuss separately. The importance of using remote sensing data with GIS support for the study of the landscape changes has already been evaluated in a collective monograph (Feranec et al., 1997) and therefore at this point I will give a brief assessment. The GIS is a good platform for creating and processing of comparable databases and the creation of geographical time-space models of the landscape from different time horizons, which can be operatively analysed. The GIS plays an important role especially in analyzing and interpretation of the analogue old maps and data obtained through remote sensing. Output products are not only the large-scale thematic maps of land use classes (mostly in scale 1: 25 000), but also statistical data on the area of each of classes. Thus obtained statistical (numerical) information about landscape elements, in contrast to classic statistics, it is possible to accurately identify in the space. The resulting maps have a uniform scale, they can be each other compared and statistically evaluated. The outputs are applicable for landscape planning and the proposition of future trends in land use transformation.

With the implementation of computer technology in Geography is related the rise of historic-geographical subdiscipline "Historical Land Use," which monitor the development of secondary landscape structure through changes in land use. It also serves to analyze the relationships between anthropogenic and landscape-ecological (natural) systems in the area (Jeleček, 2007).

The multitemporal analysis is focused on the evaluation the dynamics of land use and current research is the close follow-up procedures performed with the support of GIS (Chrastina, 2009). It is the monitoring of different of land use classes in area changes within certain time periods for a particular region, but also the spatial relationships analysis and changes in the size of each land use classes. The backgrounds of the multitemporal analysis are thematic maps of land use classes and statistics on the area of individual land use forms. Output of this analysis also has its numerical and graphical expression. The part of the multitemporal analysis is also comparison of spatial data (comparative method). At comparative analysis, for the purposes of HG, are compared data from different sources: from maps, old photos, aerial photos, ortophotos, secondary literature, statistics or the commemorative narrative. When comparing only the maps one another as "reference surface“ may serves either the scene and dominant landscape elements, which captured the cartographers on maps in appropriate time, or the current landscape view (shown on the most recent topographic map or orthophoto).

One of the newest methods for research on the historical landscape and its use in the past is the study of profile (-s) of a cultural-landscape layer of a local area that allows to monitor not only horizontal and vertical linkages in the landscape, but also the relation of anthropogenic activities (exploitation of the territory) and human works to natural components in different time horizons (Lukáč - Chrastina, 2011; Chrastina, 2011). This methodological approach also indicates the formation and gradual transformation of a selected segment of the landscape with their characteristics and anthropogenic use. The results of this method are reconstructed models of the cultural landscape (or their profile) from the selected time periods (Fig. 1 and 2).

The modeling process of the profile of cultural-landscape layer is based on the methodology of complex physical (geo-ecological) profile, which has its roots in the environment of Geography, and later was developed by Landscape Ecology. It is essential to create a relief profile of the area, which passes chosen profile line. To the profile are then "bound" geographical components of local landscape, whether they are more stable (in particular geological substrate, hydrosphere and pedosphere) or those which are more sensitive to changes in natural conditions or under the influence of man (especially
vegetation). To these layers are then connected mapping signs of objects and phenomena that reflect the state of the historic land use (represented by the classes of land use – CLU) and selected historic/prehistoric landscape structures (HLS/PHLS) for studied historical time horizon. The result is a "profile of cultural-landscape layer" which represents a simplified model of cultural landscape of area considered for a specific period.

**Fig. 1** The profile of cultural-landscape layer from y. 1782, area of the city Nováky (Chrastina - Lukáč, 2011)

By the creation oh the profile of cultural-landscape layer is as a source of information (on land use of local landscape) primarily used cartographic, written and pictorial sources of HG, which give information on the historical land use from the appropriate period. Firstly are are used large-scale topographic maps. Great significance have also the results of field research focusing on identification of historical landscape structures (material sources) and knowledge of the current status of land use along the profile line.
3 Conclusion

The methodology of HG is significantly affected not only by the interdisciplinary nature of this scientific field, but also by the nature of the HG sources and "theoretic-methodological results" that achieved close, often highly specialized, sciences. New possibilities brought the introduction of computer technology in scientific research (statistical and quantitative analysis), and in particular the creation and development of Geographic Information Systems. The most widely used methods in the study of landscape transformation are connected with the historical land use and the multitemporal analysis.

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