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Human-environment relationships in modern and postmodern geography

MARGIT KŐSZEGI¹–ZSOLT BOTTLIK¹–TAMÁS TELBISZ² and LÁSZLÓ MARI²

Abstract

In this article we analyse the human-environment relationships in geographical research from the end of the 19th to the beginning of the 21st century. We highlight paradigms, which affected our way of thinking about man-environment relations. Discussing scientific approaches and paradigms in geography the leading scientists who had influential thoughts and helped the shaping of a paradigm will also be mentioned. The research on human-environment relations has appeared in geography from time to time, but the connecting paradigms had also different stories through time and space. Undoubtedly, the nowadays reviving determinism had the greatest influence, but possibilism has also had a significant impact on our discipline. Research on human-environment relationships reappeared in a new form through the discourse on global climate change. Postmodern, poststructuralist, and postcolonial approaches changed radically the basis of human-environment research. In this paper, we argue that geography needs to renew not only its philosophical basis and theoretical context, but the connections between the two subdisciplines of geography (i.e. between physical and human geography) must be refreshed too.

Keywords: human-environment relations, determinism, possibilism, ecology, climate change

Introduction

Climate change discourse draws the attention again to the relationship between humans and nature. The widely available and diversified information about this issue has had a significant impact on public opinion and political decision making, therefore, the knowledge of the theoretical background of these scientific approaches is very important. Research on human-environment relationships has been present in geography from the very beginning. Definitely, it had great importance in the process of becoming an academic discipline in the 19th century, and it contributed to the duality of geography and brought about the development of anthropogeography (i.e. human geography).

In this paper we analyse the changing contexts of geography from the end of the

19th to the beginning of the 21st century. We highlight paradigms, which ruled our way of thinking about human-environment relations. Undoubtedly, the nowadays reviving determinism has had the greatest influence, but possibilism also had a significant impact on our discipline. Beside theoretical considerations, the actual reason for the present paper is a joint physical and human geographical effort. Our research group works on the exploration of some aspects of the man-environment relationships within selected spatial units (Montenegro in TELBISZ, T. *et al.* 2014a; Gömör-Torna Karst in TELBISZ, T. *et al.* 2014b and the Apuseni Mountains [“Erdélyi-szigethegység” in Hungarian] in TELBISZ, T. *et al.* 2014c). Karst terrains have several special physical characteristics, namely the hy-

¹ Department of Regional Science, Eötvös Loránd University, H-1117 Budapest, Pázmány Péter sétány 1/C. E-mails: koszegimargo@gmail.com, agria@gmx.net

² Department of Physical Geography, Eötvös Loránd University, H-1117 Budapest, Pázmány Péter sétány 1/C. E-mails: telbisztom@caesar.elte.hu, mari.laci@gmail.com

drology, the soils. The relief is different from those of other terrains. Thus, we studied whether and how these physical settings (e.g. the lack of water, natural monuments, poor soils, etc.) influence social features like settlement patterns, population changes, transport network etc. Our approach is modern as we used GIS methodology but the studied problems have a long-standing history in geographical thoughts.

The foundations of scientific thinking: the society–nature dichotomy

Science has a well-defined though not always conscious philosophical view in the background of investigations concerning the relationships between humans and nature: the separation of society from nature. This dichotomy permits the simplification of complex systems and the research of sub-systems (HARDEN, C.P. 2012). According to JUDKINS, G. *et al.* (2008, p. 19) “the separation of humankind from nature, and the search for determinism within this relationship, are mutually constitutive and appear to varying degrees during all moments of human-environment research”.

Investigation of human–environment relations is one of the most basic questions of humankind. We can use the classical phrase that already the ancient Greeks had tried to explain, but we can go back even further, to the old myths of creation too. However, it was only in the second half of the 19th century when this research issue was considered as part of the academic science of geography.

Zoltán HAJDÚ (2007) considers this theme in a wider context. He agrees that this is one of the fundamental questions of geography, and further on, he introduces the evolution of scientific thinking in connection with these relationships. Basically, there are two contrasting viewpoints in science that have accompanied human history. The first is that environment controls social processes (determinism), and the second is that society has its own laws and nature is only the frame

of its activities (nihilism). Ferenc PROBÁLD (2012) pointed out that several variants of determinism can be distinguished according to the supposed range of environmentally controlled historical processes or social phenomena, the degree and (in)directness of environmental impact.

In Hungary, environmental determinism is a common phrase, but nihilism or possibilism is less known either in general or in scientific literature. These three phrases express theoretical ideas in the scientific approach of human–environment research (CASTREE, N. 2011; HARDEN, C.P. 2012; JUDKINS, G. *et al.* 2008; LEWTHWAITE, G.E. 1966; PEET, R. 1985; PROBÁLD, F. 1999).

Postmodern geographical approaches use the contemporary philosophical thought, namely that the nature is a social construction. It also implies that its meaning is under permanent change depending on philosophical approaches and political aspects too (DEMERRITT, D. 2002). We agree that human–environment relations were differently evaluated from time to time; therefore, we present here these changes through time and space.

The aspects of the newly professionalising geography

In the second half of the 19th and early 20th centuries the evolution theory of Darwinism, the deductive research methods and the Newtonian causality largely affected the scientific thought (GROSSMAN, L. 1977). For geography, which was on its way to become an academic discipline, it was a problematic question how to treat the place and role of humans within the great natural system of the Humboldtian synthesis. The research on the relations between humans and environment has resulted in the genesis of anthropogeography.

From a historical perspective, HAJDÚ (2007) claims, that the research on human–environment relations was a basic topic in the forming geographical science. According to István BERÉNYI (1997) this issue is connected to the classic (early) anthropogeography, which an-

alysed the connections between humans and their natural and social surroundings. Tibor MENDÖL (1999), who wrote the history of geography in the middle of the 20th century, gave a different interpretation. According to him, in the end of the 19th century geography was the science of connections and causalities in general. Our research group accepts the opinion of PROBÁLD (1999), who emphasised that the integrated analysis of spatial phenomena and the investigation of human-environment relations are among the most important targets of geographical research.

Discussing the role of scientific approaches and paradigms in geography, scientists who helped the process of paradigm formation should also be mentioned. The research on human-environment relations has appeared in geography from time to time, but the connecting paradigms had different stories through time and space. At the end of the 19th century the German, French, British and American schools were equally engaged in human-environment research and anthropogeography. Four scientists got important positions at different universities at the same time, and they were interested in the research of society within the framework of the new science investigating the features of the Earth (CASTREE, N. 2011). The German Friedrich RATZEL, the French Paul VIDAL DE LA BLACHE, the British Halford MACKINDER and the American William Morris DAVIS determined the scientific thought of human-environment relationships within the new academic discipline of geography.

All of them accepted the concept of unified geography that the research of nature and society is feasible within one discipline. With MACKINDER'S words, they believed, that geography can bridge the gap between physical and social sciences (CASTREE, N. 2011). According to DAVIS the research on the relation between the Earth and its inhabitants is the task of geography, this research issue separate geography from other sciences (LEWTHWAITE, G.R. 1966; HARDEN, C.P. 2012). Their thought was influenced by the evolutionary theory of Lamarck and Darwin

(LIVINGSTONE, D.N. 2011). We can say that it was a compulsion to them to demonstrate the relationship between nature and society.

Ratzel, determinism and their influence on scientific thought

The result of the activity of Friedrich RATZEL from the German School was the determinist paradigm about human-environment relations, which dominated geographical thought for some decades. Due to his work this paradigm got scientific legitimacy, but later on it had a controversial career in history, not only in a scientific meaning. It has been transformed through time and space, but basically it remained the same. According to environmental determinism the environment, the nature controls human activities (LIVINGSTONE, D.N. 2011). As HAJDÚ (2007) commented environment determines the diverse development processes of society. Nature is the independent variable, the cause, while the human evolution and its social features are dependent variables, the answers to the cause (HARDEN, C.P. 2012).

Environmental determinism was not the product of academic geography, discoveries had already made it popular. This idea was propagated by several earlier writings, and especially the influence of climate on people was a popular theory (LIVINGSTONE, D.N. 2002). In the 18th century, philosophers of the Enlightenment already wrote about the connections between the climate and the cultures. Geographic discoveries found various cultures at different latitudes, which were dissimilar from the European culture; therefore, the relation between climate and culture seemed quite obvious (COOMBES, P. and BARBER, K. 2005). Merely a modern science was necessary to legitimate this viewpoint. Geography became an academic discipline more or less the same time when western powers demanded the legitimacy of their colonial aspirations (LIVINGSTONE, D.N. 1992).

At the end of the 19th and early 20th centuries this thought was undoubtedly connected

to geography and the reason for this was the subject of geographical research. According to LIVINGSTONE determinism served as a perfect basis for academic geography to provide an appropriate framework for the research of society. Second, it gave the scientific justification of colonial policies and so the spirit of the age made it successful (LIVINGSTONE, D.N. 2011).

PEET, R. (1985) confirms this view in his article about the social background of environmental determinism; according to him this idea was the entrance of geography to modern sciences. Darwinian thoughts in geography gave a scientific explanation to the question, why it is possible that certain nations are more successful than others in the struggle for world domination (PEET, R. 1985). Consequently, environmental determinism is basically Eurocentric. Even nowadays we can meet scientific works based on the premise, that the formation of European culture was connected to special environmental features, or certain environmental features made non-European nations less resistant mentally and/or physically (BLAUT, J.M. 1999; CASTREE, N. 2011).

RATZEL'S works are deeply inspired by the evolutionary theory; he studied zoology, biology and anatomy in the 1860s (PEET, R. 1985). He was a professor in Munich and later in Leipzig in the 1880s, when power efforts of the united German Empire became stronger; his thoughts gave the legitimacy of these imperialistic desires. According to BERÉNYI (1992), in the works of RATZEL the physical environment determines the possibility of human activities, the spatial movement of people and their spatial distribution; therefore the development of a state is the function of the physical settings. MENDÖL (1999) emphasised that RATZEL had not claimed that every social phenomenon can be explained by environmental reasons; he just wanted to point those social phenomena, which really reflect the impact of environmental factors.

In Ratzelian thought the state is an organism under the rule of biological evolution, like every creature on Earth. Nations live on a given territory, which feed them; therefore, the need for a larger territory or living space

(*Lebensraum*) is instinctively present in their thoughts (ANDERSON, J. 2009). Later on, the living space theory had become notorious and compromised due to the book of Adolf HITLER (*Mein Kampf*), the Nazi ideology and the events of the Second World War. It is one of the reasons why environmental determinism disappeared from scientific thought and geopolitics in the second half of the 20th century.

However, the influence of Ratzelian thoughts is far beyond German geography and geopolitics. In his study about the short history of the 20th century geography PROBÁLD (1999) discussed the predominance of environmental determinism in American geography in the first part of the 20th century too, thanks to the works of Ellen Churchill SEMPLE and Ellsworth HUNTINGTON. SEMPLE WAS RATZEL'S student in the 1890s in Berlin. Her often cited study was published in 1911 (*Influences of Geographic Environment*) and became very influential for decades in the United States (PEET, R. 1985; HARDEN, C.P. 2012). Sometimes, the work of SEMPLE is mentioned as a separate geographical approach as *environmentalism* (LEWTHWAITE, G.R. 1966, PROBÁLD, F. 1999).

In her convincing theory SEMPLE emphasised the vitalising connection between Earth and man. Man cannot be investigated scientifically without the Earth, therefore, the aim of geography is to investigate the influence of natural factors on historical events (PEET, R. 1985). She investigated the effects of environment on human mind; this had involved the demonstration of mental features of nations and races. The basic thought, that the cradle of mankind is the hot zone, but the temperate zone offers the challenges and trigger higher-order development, had already appeared in RATZEL'S works. However, SEMPLE went further: she described with spectacular examples the direct relation between nature and cultures (PEET, R. 1985). As Pál TELEKI (1917/1996), wrote in his seminal work, HUNTINGTON went as far as to claim that the rise of civilisations is possible only in a certain climatic type of the Earth.

In the works of SEMPLE, HUNTINGTON and their followers the environmental factors

were “determinative causes of racial differences, cultural practices, moral values, ingenuity and the ultimate capabilities of any given population” (JUDKINS, G. et al. 2008. p. 20). Looking back, they are criticisable, because they drew consequences without well-documented causes and effects and without systematic research. They generated many stereotypes and legitimated racism too (HARDEN, C.P. 2012). According to PEET, R. (1985) determinism was popular in the United States in the early 20th century, because this theory legitimated the declaration of the superiority of the American nation as well as their spatial expansion over the American continent.

Ratzelian thoughts were echoed in Hungarian geography much later. Research on human-environment relationships appeared only in the early 20th century due to the works of Jenő CHOLNOKY, a prominent physical geographer and Géza CZIRBUSZ known as the Hungarian apostle of anthropogeography. While CHOLNOKY considered humans as one of the natural factors, CZIRBUSZ advanced humankind from nature and he emphasized that other, more important internal effects have a significant role in the life of society (FODOR, F. 2006). CZIRBUSZ considered RATZEL's thoughts and determinism with criticism and he called this theory “geographical fatalism”. Therefore, HAJDÚ (2007) regards CHOLNOKY a deterministic scientist, whereas he considers CZIRBUSZ a possibilistic or even a nihilistic thinker.

The Ratzelian concept of natural barriers was an important argument in the Hungarian struggle for the revision of the borders set by the Treaty of Trianon (1920). PROBÁLD (2012) emphasised the presence of determinism in Hungarian geography between the two world wars. He presented several examples to demonstrate that the works of geographers were differently affected by this idea. Only Ferenc FODOR formulated extremely deterministic thoughts in his late work, when he stated that all functions of the state are deeply rooted in the geographical features of its land. According to him, the character of the nations bears strong imprint even of environments their ancestors lived in many centuries ago.

Nevertheless, other Hungarian geographers, who investigated human-environment relations like Pál TELEKI, Tibor MENDÖL, Gyula PRINZ and András RÓNAI were closer to possibilism and the French School.

Environmental determinism provided a scientific basis for the early 20th century scientists, who studied human phenomena in a changing world (FRENKEL, S. 1992, 1994). According to HARDEN “the concept of environmental determinism, like the theory of continental drift, provided a stepping stone for the advancement of knowledge” (HARDEN, C.P. 2012, p. 740). Nevertheless, determinism got more and more critics within the scientific community from the 1920s that has led to a paradigm shift in geography after the Second World War. However, this over-simplifying theory had great popularity and it influenced political decisions until the fall of colonizer politics (FRENKEL, S. 1992, 1994).

The critic of determinism: the impact of Paul Vidal de la Blache and the French School

The influence of evolutionary theory is noticeable in the works of VIDAL DE LA BLACHE too (he used the expression ‘struggle for existence’), but as a historian he was rather a social scientist. VIDAL DE LA BLACHE accepted the thought of unified geography; nature and society exist in one integrated system in his works, but he examined their relations from the side of the society. TELEKI (1917/1996) quoted his thoughts about geography: according to him geography received many ideas from other disciplines, but equally offers them a lot, because geography has the possibility to consider things together, that were intimately joined by nature and to understand and to make understand the relations of phenomena, which are present in the whole nature including all of us, humans, and the different landscapes.

According to VIDAL DE LA BLACHE humans have a relative autonomy from nature, people rate and use natural resources in different ways (BERÉNYI, I. 1997). His students em-

phased the importance of free will: “man is free to pick and choose between the vast but varying range of possibilities presented by his environment” (LEWTHWAITE, G.R. 1966, p 3; TELEKI, P. 1917/1996). As PROBÁLD (1999) wrote, the natural features could not determine the events of history, but provide a more or less wide range of possibilities. The utilisation of these possibilities depends on the cultural or technical development of the society.

In possibilistic thought the nature is an effective but not deterministic factor in the formation of differences between cultures. Environment gives possibilities to social activities. The humans as actors create their own culture and their environment through this (ANDERSON, J. 2009). The French Jean BRUNHES, a student of VIDAL DE LA BLACHE, emphasised that researchers must concentrate on interrelationships and not on unidirectional relations (LEWTHWAITE, G.R. 1966). According to BRUNHES, as humans become members of their community and accept their culture through socialisation, they exert an impact on nature too. They become factors affecting the environment, but there are many other factors influencing the nature, therefore, influencing humans too (TELEKI, P. 1917/1996). This is the essence of the human-environment relationship. His way of thinking was free from overstatements as it is reflected by his claim that every truth related to human-environment relations can be only approximate, and the overemphasis on precision leads to falsification (BRUNHES, J. 1913).

VIDAL DE LA BLACHE examined smaller spatial units as opposed to the expanding state territories of his age; many landscape monographs were created by him and his followers (TELEKI, P. 1917/1996). He coined the term *genres de vie* (way of life) and he pointed out that spatial behaviour of human groups is primarily affected by cultural features. He did not draw general conclusions, instead he wanted to explore concrete relationships first. That is why he turned back to earlier data collection and classification methodology. He wanted to gather the characteristics of groups with certain ways of life. His re-

search was rather descriptive focussing on the quantitative and qualitative categorisation of all features in a landscape (BERÉNYI, I. 1992; MENDÖL, T. 1999; ANDERSON, J. 2009).

According to BERÉNYI (1997), the possibilism theory was the successor of determinism in time; the Ratzelian thought became an obsolete conception by the turn of the 20th century due to the clear and intense transformation of nature by the upturning manufacturing industry. In fact, VIDAL DE LA BLACHE and RATZEL were active in almost the same time; therefore, it is more appropriate to say that these two viewpoints lived next to each other.

The influence of the French School and VIDAL DE LA BLACHE penetrated to other countries, too. The concept of synthetic geography of TELEKI, the prominent Hungarian geographer of the interwar period was closely connected to this approach. He was enthusiastic about the ingenuity of landscape monographs, but he considered them methodologically primitive (TELEKI, P. 1917/1996). According to him, the mission of geographical description is to introduce the characters of landscapes and the comparison of them, searching for typical differences and similarities (TELEKI, P. 1917/1996).

Possibilism could be used as a kind of scientific support to Hungarian irredentist efforts. Zoltán KRASZNAI (2003) pointed out that using ideas of the French School in the Paris Peace Conference was a tactical step. According to their concept, the Carpathian Basin is a complex of landscapes, which complete each other (GYÖRI, R. 2009). The monograph of the Carpathian Basin is the last product of this idea (BULLA, B. and MENDÖL, T. 1947). The influence of the French School can be recognised in the theoretical studies of István DÉKÁNY and in the works of Tibor MENDÖL, too (HAJDÚ, Z. 2007; GYÖRI, R. 2009).

The predominance of descriptive geography became more and more obvious internationally till the remarkable paradigm shift after the Second World War. In the 1920s, the scientific arguments against determinism in the American geography used the approach of possibilism. These arguments and

the basis of the human ecological approach are connected to Carl SAUER (WILLIAMS, M. 1994; JUDKINS, G. et al. 2008). In addition to the importance of the free will, SAUER emphasised that nature offers or limits certain possibilities, but does not determine the culture (HARDEN, C.P. 2012). He stated that the human behaviour is not dependent on environmental constraints or on logical necessity but rather on the conventions acquired in the culture. His research methodology took into consideration the historical development and used inductive methods like VIDAL DE LA BLACHE, he presented how the culture and the physical environment can be studied in an integrated framework and context. (JUDKINS, G. et al. 2008). Another similarity, that SAUER performed his research using small territorial units too. He called them *cultural landscapes*, emphasising that they are the results of the joint influence of culture and nature (HARDEN, C.P. 2012).

In the American geography, the ecological views appeared in the 1920s starting mainly with the research of SAUER who worked with some anthropologists at Berkeley University. His follower, Harlan BARROWS emphasised that human ecological research can provide the appropriate framework for the unified geography by the exploration of relationships between humans and the environment (GROSSMAN, L. 1977; HARDEN, C.P. 2012). The early ecological studies of SAUER and his school concentrated principally to the prints of the society recognisable in the cultural landscape (GROSSMAN, L. 1977).

Study of human–environment relations in the bipolar world

The new political system formed after the Second World War established different research conditions, ideas and directions in the opposing countries of the capitalist and the communist blocks. We have to study the theoretical and ideological aspects of both sides in order to outline the further evolution of human–environment research in geography.

Communism and human–environment relationships.

According to HAJDÚ (1999) both determinism and nihilism were present in pre-revolution Russian geography, but just after the Soviet takeover possibilism became the dominant approach. Later on, possibilism changed place with nihilism and social determinism due to the building up of the Stalinist system and the ambitious state plans for nature transformations, though communist geographers would have protested against this categorisation. RADÓ, S. (1962) emphasised that Soviet geographers equally rejected the bourgeois environmental determinism, the geographical possibilism and the American environmentalism.

The scientific life of the Soviet Block was under the rule of one exclusive ideology: the dialectical and historical materialism of Marx and Engels. This ideology postulates the mutual relations of phenomena; therefore, it offered an intellectual direction to Eastern Block geographers how to think about human–environment relations (VAVILOV, Sz.I. 1950).

According to MARX, a connecting process, the *work* determines the relationship between humans and nature. This process is associated with humans, who transform the environment and through this themselves. Nature provides different conditions to people. Societies depending on their degree of development use different natural resources during the production. Because of this relationship those territories of the Earth where natural resources are rich do not force people to develop themselves. Several Hungarian scientific works used the thoughts of MARX to explain why the motherland of the capital was not the tropical climate with its overgrowing vegetation, but the temperate zone. Certainly, MARX was influenced by the scientific results of his age (evolutionary theory, information from discoveries), therefore, the dialectical and historical materialism helped to develop deterministic thoughts in geography. However, he unambiguously declared that the work and the production hereby the humans are the motive force of events.

Humans were emancipated from the environment through work and production and the society depending on its degree of development dominates nature (SMITH, N. 1990).

Not only the investigation of human-environment relationships, but even the hard separation of humans and nature became the ideological basis of the Marxist-Leninist geography. Nevertheless, during everyday research practices these ideas were in the service of actual political reasons and they were interpreted as it was advantageous for decision makers. According to ENGEL-DI MAURO (2009), the strict catechism followed by geographers was similar to the parody of Marx's works (ENGEL-DI MAURO, S. 2009). The geographical investigations were under state control, in service of the planned economy. Physical and human geography were separated from each other, and the later was replaced by economic geography, which pointed out the research directions (TIMÁR, J. 2009).

Science must be useful for society and it must serve the resolution of tasks set by the state, therefore, only applied research was favoured in the Eastern Block (VAVILOV, SZ.I. 1950). On the other hand, science in the communist era was based on positivism, searched for objective truth and believed that the world is knowable (VAVILOV, SZ.I. 1950). Eastern Block geographers were rather thinking in a system of geographical sciences because of specialisation processes dissecting geography (RADÓ, S. 1962). Research was structured into two almost completely distinct units: physical and economic geography. Physical geography investigated the scene of production, the natural environment; therefore, it prepared the study of economic geography.

In the Stalinist era, the task of the Soviet science was the service of monumental plans, like industrialisation, military preparations or the notorious environment-transformations (SHAW, D.J.B. and OLDFIELD, J.D. 2007). Practically, it led to the most simplistic interpretation of human-environment relations: society stands above nature and society is able to form and to transform nature in any way according to its needs (SHAW, D.J.B. and

OLDFIELD, J.D. 2007). As geography served the coloniser ambitions of the Western countries earlier, so was it used by the Soviet politics to support the actual nature-transforming state plans. It was a total compulsion for them, they did not have a choice; they had to serve the dictatorship. According to HAJDÚ (1999), the science of geography acted in fact in the propaganda of the works, and not in the formulation of plans. In the 1970s the negative environmental effects of the grand plans became so obvious that it inspired scientists to reconsider human-environment relationships again. Regional landscape research reappeared and new investigations with more qualitative methods as well as research themes from other fields of human geography (not economy) could begin (SHAW, D.J.B. and OLDFIELD, J.D. 2007; TIMÁR, J. 2009).

These developments were also valid for Hungary, where the sovietisation of science and of geography took place at the end of the 1940s. The end of this era when most studies neglected the environment can be assigned to the study of György ENYEDI (1972). He discussed how much environmental factors were ignored in the study of social development. His work indicated the rethinking of nature-society relations in the early 1970s.

The changing Western geography and the nature-society dichotomy

The concept of paradigm shift can explain the ignorance of human-environment relationships in geography after the Second World War (KUHN, T.S. 1984). In the Western world the quantitative revolution and the spatial science approach, which endured till the 1980s pushed human-nature relationships aside during the second half of the 20th century (PROBÁLD, F. 1999).

First, the abovementioned paradigm shift occurred mainly after the Second World War thanks to the specialisation of geographical research. Development of geomorphology, climatology, economic geography and political geography in the early 20th century

was the forerunner of this fragmentation. Specialisation of human geography isolated the environmental studies. Physical geography focussed on Earth surface phenomena, but not in a holistic manner, instead even research on the physical environment was distributed into several sub-disciplines (CASTREE, N. 2011).

Second, the connection of determinism with coloniser efforts, racist views and Nazi ideas made it undesirable to both policy and society. Because of its intolerable situation, scientists discarded environmental determinism in the Anglo-Saxon world. As we mentioned earlier, environmental determinism was the entrance of geography to modern sciences, therefore, geography had to be rebuilt from its basis. The breaking with determinism pushed into background all kinds of research related to human-environment relationships. But there remained a vacuum after it in geographical science, and similar unifying paradigms have never appeared again since that time that would promote the investigation of human-environment relationships (GUELKE, L. 1989).

Besides this, PROBÁLD (1999) explains the decline of determinism by a change of the way of thinking which appeared in the developed countries in the 1950s and 1960s. This new way of thinking is based upon the absolute faith in technical development that cannot accept any controlling act of nature. He did not call it nihilism, but he considered it as a backlash to the earlier deterministic thought. After the Second World War the role of science in society has changed radically and geography also had to adjust to it. The quantitative revolution in geographical science as well as the spatial science approach of the discipline further reduced the connections between physical and human geography (GUELKE, L. 1989).

In the second half of the 20th century the human-environment research was basically ignored in geography but continued in other disciplines. Historians of the French Annales School analysed the relationships of different societies and the space around them

(BRAUDEL, F. 1949; CHAUNU, P. 1966). After the specialisation of ecological research, there appeared some topics, which promoted the investigation of human-environment relationships, like cultural ecology, human ecology or political ecology. Cultural ecology became significant among anthropologists after the Second World War. Besides the relationships between cultures they investigated also the relations between different cultures and their environments (GROSSMAN, L. 1977). The ecological idea enriched the works of archaeologists too (RENFREW, C. and BAHN, P. 1996).

Thanks to possibilism, human-nature research was present in geography too, but in a changed form and not in the focus of scientific attention. The ecological research as we mentioned above has already appeared in the early 20th century in American geography. Cultural and political ecology appeared after the second half of the 20th century; they interpreted the causality between humans and their environment from both directions (HARDEN, C.P. 2012). This idea presumed the correlations between special environmental characters and cultural traditions (JUDKINS, G. et al. 2008).

Cultural ecology became significant particularly in American geography in the 1960s due to the works of Julian STEWARD, Roy RAPPAPORT and Clifford GEERTZ (CASTREE, N. 2011). They investigated the adapting processes of humans to nature (HARDEN, C.P. 2012). They focused on the changing processes caused by human activities (e.g. the effect of soil erosion, burning and cutting of vegetation), and analysed mainly the local features of smaller communities (GROSSMAN, L. 1977).

Political ecology investigated how the political and economic structures explained the interaction between society and its environment (HARDEN, C.P. 2012). According to the approach of structuralism in political ecology, the society is the main determining factor through its institutions (JUDKINS, G. et al. 2008).

As the structuralism appeared in geography, the models of ecosystems worked out by biologists came also into use. These models were a great leap forward, because ecosystem analysis provides a useful framework to the

investigation of mutual human–environment interactions (GROSSMAN, L. 1977). However, instead of ecosystem analyses, the investigation of spatiality, and spatial analysis became dominant in geography. The building of models and macro-regional investigations became characteristic, therefore, the ecosystem analyses, which were used mainly in small scale research, were not adopted.

Nonetheless, the ecological research gave dynamics to the study of man–environment relationships again. Instead of looking for simple casual relationships, it revealed the complexity of links between humans, society and environment (HARDEN, C.P. 2012). These investigations focused mainly on smaller communities and territorial units of developing countries during the second half of the 20th century (HARDEN, C.P. 2012).

New approaches around the millennium

The real breakthrough in human–environment research ensued in the 1990s, when the idea that humans have an influence on recent climate change was accepted (COOMBES, P. and BARBER, K. 2005). The environmental protection movements appeared first in the United States in the 1960s and 1970s and gradually gained political support to study these questions and increased research activities in these fields (HARDEN, C.P. 2012). The global climate change discourse received geopolitical importance and turned the attention to the fragile relation of humans and their environment. The environmental problems emphasised by politicians and the need for solving these problems generated a social claim towards science to study these questions (JUDKINS, G. *et al.* 2008). In the 21st century, investigation of human–environment relationships have become more significant not only in geography but in other social sciences too.

These emerging issues have constituted a real challenge for geography. In the past decades, due to Holocene research and new scientific methods, the investigation of hu-

man impact on natural environment became an important topic (BUILTH, H. *et al.* 2008; LÉPY, É. 2012). The climate change discourse raises again the question that environmental changes can radically transform the life of societies. Many studies indicated correlation between climate change and cultural disasters (COOMBES, P. and BARBER, K. 2005). These studies emphasise the need for understanding these effects in order to reduce, stop or reverse the undesired results (HARDEN, C.P. 2012).

There is a peculiar chapter in human–environment research, the investigation of factors, which mean risks to human communities and society needs protection against them (CASTREE, N. 2011). In this viewpoint, the natural factors are the independent variables again; they influence the life of communities (HARDEN, C.P. 2012). These viewpoints also gained more importance as recent climate change became a favourite subject.

While the once ruling paradigm of environmental determinism was expelled from geography, it appeared again and even flourished (!) in other disciplines (HULME, M. 2011). Biologists, historians, anthropologists and economists also investigate the role of natural factors in social processes and ask even basic questions like why certain nations are richer than others (SCHOENBERGER, E. 2001). While some economists, historians and climatologists formulated extremely deterministic and sometimes absurd statements (e.g. LANDES, D.S. 1998, BEHRINGER, W. 2010), the mainstream geography consistently rejected every sign of environmentalism (e.g. BLAUT, J.M. 1999; JUDKINS, G. *et al.* 2008; O'KEEFE, P. *et al.* 2009). However, we emphasize that geography must react to these environmentalist thoughts, in some cases even by adopting some less strict forms of environmental determinism (DIAMOND, J. 1997; RADCLIFFE, S.A. 2010). If any connection can be observed between environmental change and subsequent cultural transformation, the geographical community is inclined to think about deterministic relations (NUNN, P.D. 2003). Since these investigations are connected mainly to

Quaternary research, the neodeterministic approach appears principally in the works of physical geographers (NUNN, P.D. 2003; O'KEEFE, P. et al. 2009).

The challenges of the future

After we get acquainted with several works about human-environment relations, we can support the significance of this topic in our discipline. It is one of the most basic questions in geography; it gave the basis of becoming an academic discipline, and it greatly influenced its dual character in the 19th century. The nature-society dichotomy resulted different approaches in different periods and places, and it accompanied the whole history of geography.

Recently, research on human-environment relationships reappeared due to the discourse of global climate change. Many scientists have denoted the risks and unscientific nature of classical deterministic thought (e.g. SLUYTER, A. 2003). However, the ecological approaches, used in anthropology and archaeology, give an alternative, which emphasises the active role of people reacting to climate changes being in a dynamic relation with their own environment – they form and transform it (ERICSON, C.L. 1999). At the turn of the millennium the scientific community takes steps for the integration of ecological approaches with an actor oriented viewpoint. They would like to understand how the individuals can manipulate their own situations in the ecological, structural and cultural framework, in which they live (JUDKINS, G. et al. 2008). Despite the popularity of deterministic approach between laics and politicians, the scientific community investigates the human-environment relationships rather from an ecological point of view (BUILTH, H. et al. 2008; LÉPY, É. 2012; RAYMOND, C.M. et al. 2013).

Postmodern, poststructuralist, and postcolonial approaches have radically changed the philosophy of human-environment research in social sciences. According to these viewpoints, every representation of the nature is a

social construction, the manifestation of some kind of social power. Thus, these approaches turn the idea of environmental determinism inside out, and they also point to the fact that the mental separation of nature and society, which is the basic of most human-environment concepts, is a heritage of Western philosophy (CASTREE, N. 2011).

Not only the global problems or the changing ideology of postmodern world induce the science to investigate human-environment relations. Due to the information revolution more effective equipment and better analysis methods are available for the scientific community; therefore, it is worth rethinking the relationships between humans and their environment.

The geographical science has to renew not only its philosophical basis and scientific terms, but the connections between the two subdisciplines of geography (i.e. between physical and human geography) must be refreshed too. The scientific community frequently emphasises the importance of multidisciplinary research and in the case of geography, this multidisciplinary approach can be achieved by coordinating the physical and human geographical investigations. The success of this coordinated research can be a key factor in the survival or renaissance of our discipline. Human-environment studies may have an important contribution to these efforts. Perhaps it is time for geography to reconsider its suspiciousness and hypersensitivity against all variants of determinism.

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Drainage network development in the Pannonian Basin

FERENC SCHWEITZER¹

Abstract

The evolution and development of the greatest rivers in the Pannonian Basin have been investigated for almost 150 years. At the end of the Late Miocene Sub-Epoch (7.5–5.3 Ma BP) and at the beginning of Pliocene Epoch (5.3–4.5 Ma BP) Lake Pannon shrank dramatically, filled up with sediments and completely dried up as a result of global climate change (Bérbaltavarian /Messinian/ Stage). In the basin dominated by dry climate conditions, torrents bordered with riparian forests appeared. During the Lower Pannonian Stage (Eppelsheimium in the Hungarian terminology) the tropic rainforests which previously had covered even regions at higher latitudes contracted to a smaller area around the Equator due to the global climate change. Then under the warm and humid climate of the Middle and Late Pliocene (Csarnotanian and Ruscinian Stages, 4–3 Ma BP) tropic rainforests expanded again and the drainage network development of the Pannonian Basin continuing even today started. During our research, climate-indicating travertine layers covering the terraces, travertine stratigraphy and fauna findings were investigated.

Keywords: travertine stratigraphy, plate movements, global climate change, fluvial and abrasive terraces, pediments, evolution of River Danube

River and history

According to the archives, the word *Danube* was already known as early as in the 7th century BC. The Greek called its lower river section situated between the Iron Gates and the Black Sea *Ister*. After occupying Illyria in 168 BC, the Romans called the river *Danubius* and they established that *Ister* and *Danubius* were the same river. Julius Caesar used the name *Danube* for the first time. The river was worshipped as a deity during the Roman Empire (KÁDÁR, L. 1980). The word *Danube* is of Celtic origin and it means “water”, “river”. It was transmitted into the Hungarian language by the northern Slavic nations. Its foreign versions (*Danube*, *Donau*, *Danubio*, *Dunaj*, *Dunarea*, *Dunav*, etc.) are of ancient origin as well.

The headspring of the river *Danube* has not been known for so long as it would be expected. Herodotus (484–408 BC) believed that the source of the *Danube* was in the Pyrenees. During the Second Punic War (218–201 BC) the Romans realized while they were crossing the lower section of *Rhone* that Herodotus had been wrong. Later, they suspected that the *Danube* originated in the mountains of *Bretagne* away from the Pyrenees. However, that presumption was proved to be mistaken, too. The false assumption was clarified during the Gallic Wars (58–51 BC) waged by the Roman proconsul Julius Caesar who, however, did not manage to find the spring of the *Danube* and assumed that the river originated in the Southern Alps. In the end, the source of the river, namely the Black Forest was discovered only in 14–16 AD.

¹ Professor emeritus, Geographical Institute RCAES HAS, H-1112 Budapest, Budaörsi út. 45.
E-mail: schweitzer.ferenc@csfk.mta.hu

The Danube has been involved in several significant events of world history, just to mention some of them: Attila the Hun, the leader of the Hunnic Empire rushed along the Danube (406–453 AD) as far as the Catalaunian Plains to fight with the Western world. Charlemagne and his troops also marched along the river to put down the reign of the Avars. The Danube is the second longest river in Europe (after the Volga). The total length of the river is 2,860 km, including the Hungarian section as long as 417 km. The 140-km-long river section between Oroszvár and the Ipoly estuary (Szob) marks the border between Hungary and Slovakia. The Danube reaches Hungary as a large river.

The Hungarian section of the Danube

As a result of river regulations, the Hungarian section of the Danube is not entirely navigable. The river regulations carried out at the end of the 19th century and at the beginning of the 20th century converted the natural river into an artificial channel.

The Danube enters the Little Hungarian Plain at the meeting point of the Alps and the White Carpathians at 130 m a.s.l. After flowing through the so called “Porta Hungarica” at Devin (today a district of Bratislava), the Danube reaches the Little Hungarian Plain transporting an immense amount of alluvial sediments (pebbles, sand, silt). The sediment transport mainly results from floods, the frequency of which has decreased significantly since the construction of the Austrian and Slovakian dams (Gabčíkovo Dams).

The largest European island can be found in the Little Hungarian Plain. It is called “Golden Garden”, involving the Szigetköz as the Hungarian part and the Zitny Ostrov (in Hungarian ‘Csallóköz’), as the Slovakian part of the alluvial fan. The vicinity of the two regions is an endless plain, the surface of which is built up of point bars. The Danube flows on the top of the alluvial fan where the main channel had changed its direction

quite frequently before the river regulation works. River bar evolution made the Danube meander and change its flow resulting in the development of several alluvial fans. Thus, the Danube had no main channel even at the beginning of the 19th century.

The archeological findings confirm that the navigable main channel of the Roman era is equivalent to the contemporary Moson Danube. The region also serves as one of the most significant drinking water supply of the northern part of the Transdanubia and the southern part of Slovakia. The gold of the “Golden Garden” is the drinking water itself. The main responsibility of the authorities and the scientific world is to preserve that treasure. It is a fundamental interest to restore the water balance prior to the construction of the Gabčíkovo Dams to maintain and protect the strategic drinking water supplies. The water regime and the water balance of the Danube are controlled mainly by the precipitation received by the catchment areas of the Austrian Alps and Prealps as well as the melt water of snow and glaciers.

Fluvial land-forming processes of the Danube

The immediate vicinity of the river is formed by river-bed changes. The Hungarian section of the river can be characterized by river down-cutting and valley filling. Upper courses are rare along the Hungarian section of the river. Even the Visegrád Gorge cannot be considered as a pure incising valley type as point bars can be observed in several places. Valley filling is not very frequent either, rather a transient type of cutting and filling. There are river sections where river down-cutting is as frequent as valley filling. In that case erosion and deposition alternate each other. That’s why the valley is neither down cut nor filled with alluvium to a great extent. For example, between Bratislava (Slovakia) and Gönyű (Hungary) filling is the most typical river function, therefore, most of the Danube sediment reaching the country are deposited there. The (relatively fast) fluvial deposition resulted in the development of

anabranches. Between Gönyű and Komárom not only deposition but also transportation can be detected since the bedload is partly transported away.

The huge alluvial fan consists of two types: a younger, low-lying alluvial plain, involving Szigetköz, the Moson Plain and the Hanság Plain with the alluvial plain of River Rába. The older and higher situated deltaic and alluvial plain involves, among others, the Parndorf Plain and the Bana Hill (*Figure 1*).

At the northern edge of the Gerecse Hills, the flood plain of the Danube becomes narrower, at Esztergom it widens again, then in the Visegrád Gorge it is only narrow strips following the river banks. Between Vác and Budapest the floodplain of the river is well-defined with clear boundaries, characterized by embayments of various size. It follows the river, especially the left riverbank as far as the southern boundary of the country with a varying width (15–25 km). In many places, both on the right and left riverbanks, extensive depressions occupy the floodplain (BULLA, B. 1941; ERDÉLYI, M. 1955; PÉCSI, M. 1959; SCHEUER, Gy. and SCHWEITZER, F. 1984). Some examples: the Kalocsa and the Baja Depressions on the left riverbank; the Érd, the Adony, the Paks-Tengelic-Sárköz and the

Mohács Depressions on the right riverbank dissected by landslide-effected high bluffs of 40–50 m height. Lots of islands are attached to the feet of the bluffs which are the remnants of larger landslides eroded by the Danube.

The current Danube is flowing from North to South. According to the geomorphologic investigations and radiometric data, during the last interglacial period which was warm and humid, the direction of flow of the Danube was NW–SE, therefore the river was flowing through the Danube–Tisza Interfluve. The direction of flow followed the series of depressions getting younger and younger southwards. However, the Danube changed its direction over time and started to erode the high bluffs of the right Danube riverbank descending in the direction of the Danube–Tisza Interfluve. The area of high bluffs was as wide as 10–15 km and it stretched as far as the western edge of the current Danube–Tisza Interfluve 80,000–100,000 years ago. The Solt Hill and the Tétel Hill are buttes representing the remnants of the former bluff of Mezőföld (*Figure 2*).

The sand dunes of Illancs being an alluvial fan (172 m a.s.l.) also originate from Mezőföld. The alluvial fan had evolved before the Danube changed its direction of flow.

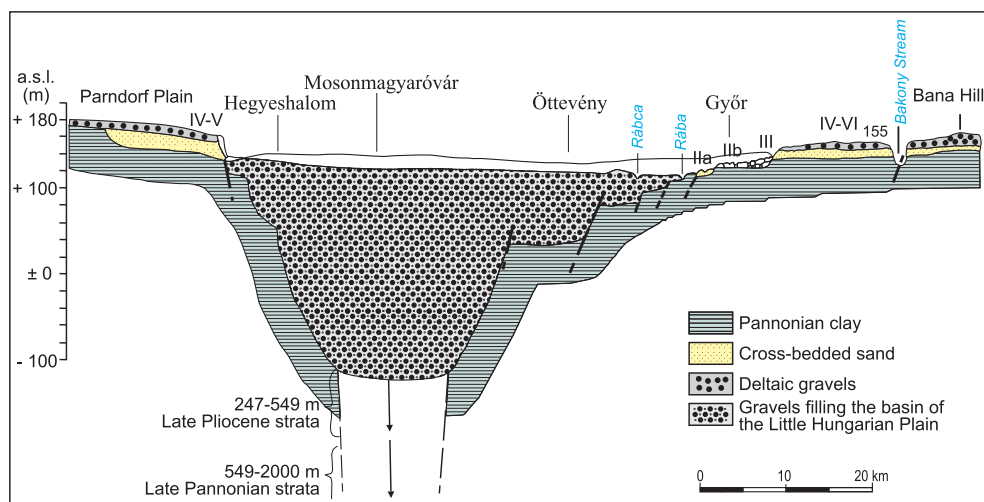


Fig. 1. The area between the Parndorf Plain and the Bana Hill (by Pécsi, M. 1959)

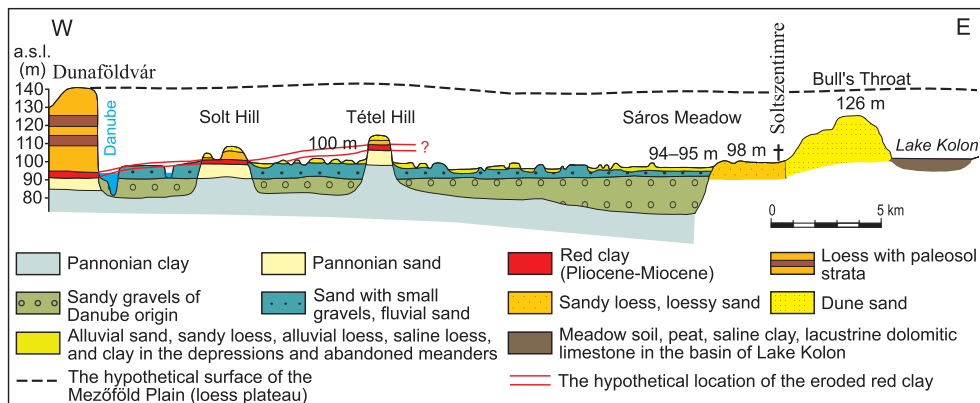


Fig. 2. The terrain and geologic cross-section of the Solt Plain. Based on the data by ERDÉLYI, M. and SÜMEGHY, J. (Ed. by PÉCSI, M. 1959)

The evolution of the Danube in brief

The evolution of the “ancient” Danube as well as that of the current river have taken a long a time, the duration of which cannot be measured in decades and centuries but in geologic time. So it is not a coincidence that the history of Central Europe’s largest river has been investigated for almost 150 years (SÓBÁNYI, GY. 1893; HALAVÁTS, GY. 1898; CVIJIĆ, J. 1908, 1910; LÓCZY, L. 1913; STRÖMPL, G. 1913; CHOLNOKY, J. 1929; NOSZKY, J. 1933; PRINZ, GY. 1936; SZÁDECZKY-KARDOSS, E. 1939; BULLA, B. 1941; MOTTI, M. 1941; MIHÁLCZ, I. 1953; SÜMEGHY, J. 1953; FINK, J. and MAJDAN, H. 1954; KÁDÁR, L. 1955; KÉZ, A. 1956; PÉCSI, M. 1959; SCHEUER, GY. and SCHWEITZER, F. 1988; GÁBRIS, GY. 2006).

During that period several theories have come into being. The aim has been to locate the gravel deposits situated above 300–330 m a.s.l. and below 100–110 m a.s.l. in time according to the relevant scientific disciplines. Most of the syntheses (PENCK, A. 1894) are in connection with theories on climatically induced fluvial terraces classified by Alpine glacial chronology. Geomorphologists associate the evolution of the fluvial terraces of the Danube with the fluvial system changes related to the last four major Alpine glaciations.

The floodplain is supposed to be of Holocene age, the above lying four gravel-covered terraces are probably of Alpine glacial origin, namely the four Alpine glaciations (KÉZ, A. 1934; BULLA, B. 1941, 1956). It was first investigated by CHOLNOKY, J. (1915), later by KÉZ, A. (1934), KRIVÁN, P. (1953) and PÉCSI, M. (1959).

The difficulties of the issue are well-represented in the fact that due to lack of gravels, Márton PÉCSI could not correlate the terraces located at greater height in the Visegrád Gorge (190–210 m a.s.l. and 240–270 m a.s.l.) (PÉCSI, M. 1959). Several scientists dispute even the Danube origin of the pebbles located mostly at a higher level (VADÁSZ, E. - ex verbis, PÉCSI, M. 1959; LÁNG, S. 1955).

First, it was not easy for scientists to identify the period currently known as Pliocene Epoch between the end of the Pannonian Stage and the beginning of the Pleistocene Epoch extending from 5.3 million to 2.5 million years ago. The existence of the river presently known as the “Danube” during the Pliocene Epoch was not an evidence. On the basis of hypotheses by KÉZ, A. (1934), SZÁDECZKY-KARDOSS, E. (1939), BULLA, B. (1941), KÜPPER, H. (1953), KÁDÁR, L. (1955), PÉCSI, M. (1959), FINK, J. (1961) and THENIUS, E. (1978) associated the development of the

river in the Vienna Basin with the beginning of the Pleistocene Epoch including Early, Middle and Late Pleistocene sub-epochs and extending from Günz till Würm according to the Alpine glacial chronology. The lower boundary of the Pleistocene Epoch was identified as the boundary between the Matuyama and Brunhes Chronozones. Only a few scientists suspected that some of the highest-lying terraces covered with gravels could be older and might have developed during the Late Pliocene Epoch, however, their development was not explained by climate change but plate tectonics (BULLA, B. 1941, 1956; PÉCSI, M. 1959).

In the 1930's and 1940's defining the boundary between the Pliocene and the Pleistocene Epochs was a controversial issue. Some scientists suggested that the so called Upper Levantine strata should be reclassified as Lower Pleistocene strata therefore the incision of the Danube at Visegrád could be classified as an Upper Pliocene event. According to the current nomenclature, the Pliocene Epoch started 5.3 million years ago when the Strait of Gibraltar opened. At that time the vast ice sheet which had developed around the South Pole during a glacial period prior to the quaternary glaciation started to melt which resulted in global sea level rise and the opening of the Strait of Gibraltar (HAQ, B.U. *et al.* 1987; SCHWEITZER, F. 2004) (Figure 3). That geological event took place under a warm and humid subtropical climate during the Csarnotian and Ruscinian Stages (4.3–4 Ma BP) (Figure 4).

Owing to the significant amount of precipitation, the fluvial erosion became dominant in the Carpathian Basin. Besides weathering, red clay deposition, valley formation, the dissection of pediments and landslides were typical. The karst systems were filled up with water, the karst groundwater levels rose which resulted in the resurgence of karst springs depositing travertine at the base level. According to PÉCSI, M. (1980), the oldest Danube terraces located at 230–240 m a.s.l., 280–300 m a.s.l. and 300–330 m a.s.l. were formed during the mentioned period (terraces No. VIII, VII, VI).

The Ruscinian-Csarnotian Stages were followed by the so called Late Villafranchian (Villanyian) Stage (3.0–1.8 Ma BP), the fauna and climatic conditions of which suggest similar ecological conditions to those of the Béraltavarian Stage (KRETZOI, M. 1983; KORDOS, L. 1991, 1992). The disappearance of the subtropical fauna of the warm and humid Csarnotian Stage and the quick intrusion of the heat and dry tolerant steppe fauna refers to the dominance of continental climate with little precipitation.

During Villanyian Stage lasting for 1.2 million years, fluvial erosion was not significant because of lack of water. Fluvial terraces did not evolve, only debris cones, “meridionalis pebbles” (Kisláng), wide and shallow wadis developed owing to the low amount of seasonal precipitation.

In the Gerecse Hills fluvial gravels cannot be detected in the substrata of travertine (the lower pediment) situated, according to PÉCSI, on the terraces No. VI–VII. at 200–220 m a.s.l. and 230–240 m a.s.l. due to the warm and dry climate (Figure 5, Photo 1). The sporadic pebbles involve pebbles which eroded from upper levels and redeposited on the lower-lying Villanyian pediment, and flesh-colored, varnish coated, sporadic pebbles which redeposited in the tetarata basin containing the Kisláng fauna.

The paleomagnetic analyses confirmed that the travertine covering the Danube terrace No. V. at 180 m a.s.l. and the underlying terrace material had been developed at the beginning of Matuyama paleomagnetic era and during the Jaramillo geomagnetic events. The relative chronological age of the fossil fauna found in travertine deposits also reinforced the results above (JÁNOSSY, D. 1979; SCHEUER, GY. and SCHWEITZER, F. 1988) (Figure 6).

The Mediterranean Sea started to cool about 2.0–2.2 million years ago (FUNDER, S. *et al.* 1985).

The most obvious first sign of global climate cooling was the appearance of North Sea fauna species in the Mediterranean Sea. The cooling was enhanced by the ice sheet becoming permanent and ever growing around the

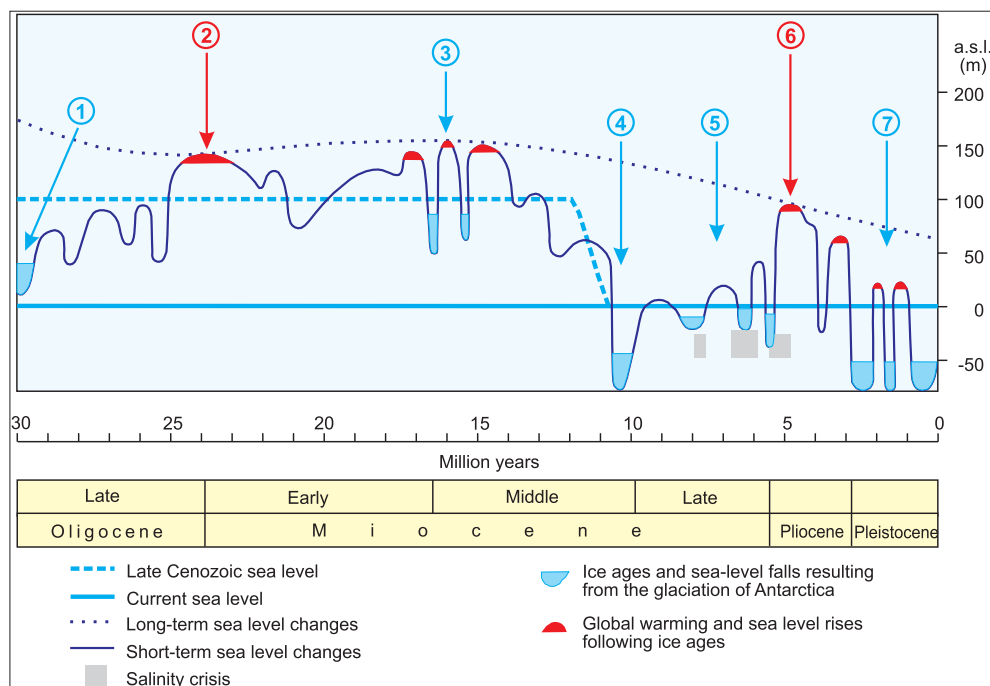


Fig. 3. The possibility of ice ages in the Late Cenozoic (eustatic sea-level changes by SCHWEITZER, F. 2004, based on HAQ, B.U. *et al.* 1987). – 1 = The Antarctica floated to the South Pole and it started to glaciare (32–30 million Ma BP); 2 = According to HAQ, B.U. *et al.* (1987) the average global temperature rose by 3–6 °C; 3 = During the Badenian Stage (17.2 Ma BP, by STEINIGER, F.F. 1999) a significant marine regression and the further glaciation of the Antarctica were likely to take place. Thanks to the continental link between Eurasia and America, *Anchitherium* species (pre-historic horse) migrated into Eurasia from Alaska and after the withdrawal of the Paratethys, *Miomastodon-Zigolophodon* species (mastodon) moved from Africa to Europe; 4 = Further probable glaciation of the Antarctica during the Sarmatian Stage; *Hipparion* invasion from North America across the Bering Strait due to marine regression (“Hipparion Datum”); 5 = Miocene/Pliocene boundary; shifting from brackish-water sedimentation (*Congeria*) to freshwater sedimentation (*Unio*); Lake Pannon was accumulated and it dried up; the re-glaciation of the Antarctica (7–6 Ma BP) referring to global climate change, e.g. the desertification of North China (6.2–5 million Ma BP); 6 = During the Csarnotian-Ruscinian Stages (4.4–3 Ma BP) the Antarctic and the Greenland ice sheets completely melted; the coastal water temperature rose by 8–10 °C; the global sea level was 80–100 m higher than today; 7 = Pleistocene glaciations; the global sea level decreased again; a continental link was re-exposed between North America and Eurasia (2.5–0.01 Ma BP); the development of terrestrial ice sheets (“Equus Datum”)

North Pole. The climax of the process started 1.0–1.2 million years ago (ZUBAKOV, V.A. and BORZENKOVA, I.I. 1990) also representing the boundary between the Upper and Lower Biharian stages introduced by KRETZOI and the starting point of a significant climate cooling in the Carpathian Basin resulting in the development of further Danube terraces (terrace No. IV. /350,000 Th-U years/, No. III.

/190,000 Th-U years/, No. II/b /120–90,000 Th-U years/, No. II/a /30–12,000 C¹⁴ years/, No. I. /11,000 C¹⁴ years /). In 2006 GÁBRIS, Gy. among others, make an attempt to give a new explanation for the evolution and the chronological order of the Hungarian fluvial terraces, including, of course, the Danube terraces for the period starting with the Jaramillo subchron.

European marine biochronology		Terrestrial /mammal/ biochronologies										
Mediterr.	Paratethys	European				Chinese	North American	MY				
		Subepoch	Age	Subage	MN/Q ind.	Ages	Ages					
Tyrrhenian		Danubian	European	Toringian	19	Choukoutien	Rancholabn	1				
Monastirian				Biharian	18		Nihewanian	Irvingtonian	2			
Sicilian				Villányian	17	Youhean	Blancan	3				
Emilian				Villafranchian	16	Jinglean						
Calabrian				Ruscinian	14							
Piacenzian	Pannonian	Catalonian	Barótián	Csarnótián	15	Baodean	Hemphillian	4				
Zanclean				Ruscinian	14			5				
Messinian				Bérbaltavárián	13			6				
Tortonian			Baltavarian /=Turolian	Eppelsheimian /=Vallesian	Hatvanian			12	Bahean	Clarendonian	7	
					Sümeгийн			11				8
					Csákvárián			10				9
					Rhenohassian							
Serravallian			Sarmatian	Bodvaian	9			Tunggurian	12	13		
			Badenian	Hipparion-datum	9							
Langhian				Karpatian	Astaracian			Monacian	8	?	Barstovian	14
	Grivian	7	15									
Burdigalian	Eggenburgian	Aragonian	Orléanien	Sansanian	6	Shanwangian	Hemingfordian	16				
				Pontilevian	5				?			
				Collongian	4							
				Romieviaian	4							
Aquitanian	Egerian			Tuchoricean	3b	Xiejian	Africarean	20				
				Wintershofian	3a				21			
				Laugnacian	2b				22			
Chatthian				Cerandian	2a			23				
				Paulhiacian	1				24			
								25				

Fig. 4. Late Cenozoic biostratigraphic correlation between Asia and Europe (based on the works of KRETZOI, M.)

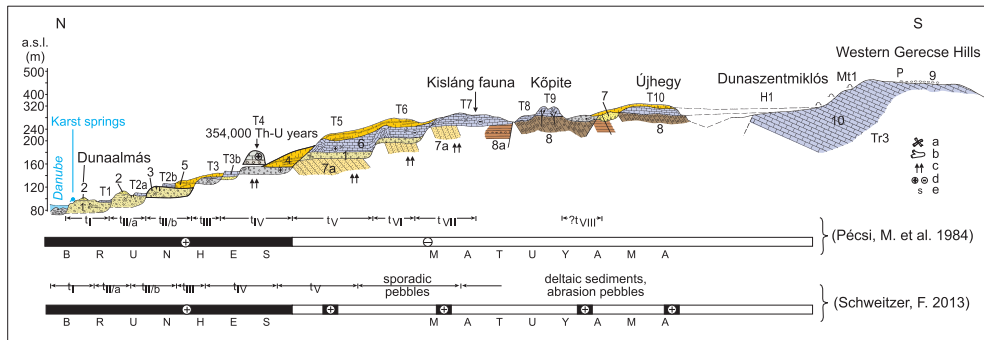


Fig. 5. Geomorphologic levels of Western Gerecse Hills along the section between Dunaalmás and Dunaszentmiklós. Based on figure by PÉCSI, M. *et al.* 1985 (re-edited by SCHWEITZER, F. 2013) – 1 = Fluvial terrace gravels and sand. The gravels of the presumed terrace No. VIII (numbered by PÉCSI, M.) deposited on the Upper Pannonian deltaic gravels by eroding the Upper Pannonian sandy deposits consisting of sand and pea gravels represent erosive discordance; 2 = Quicksand; 3 = Remnants of Pleistocene cryoturbation; 4 = Loess, slope loess; 5 = Fossil soils in loess; 6 = Travertine levels (T1–T10); 7 = Upper Pannonian cross-bedded sand (?), Bértalvarian Stage; 8 = Upper Pannonian clay; 9 = Miocene terrestrial gravels; 10 = Late Triassic limestone; H1 = Remnants of Late Pliocene pediment; at the edge of the pediment. The Upper Pannonian abrasion terrace No. 2 is superimposed; Mt1 = Upper Pannonian abrasion terrace; P = Pre-Tertiary and Tertiary planation surface with Miocene terrestrial gravel patches (?); a = fauna site; b = carbonized tree trunk remnant; c = funnel-shaped traces in travertine and gravels created by thermal spas; d = paleomagnetic polarity; e = sporadic gravels on the lower-lying pediments



Photo 1. The Kisláng fauna having developed during the Olduvai event was embedded in travertine at Dunaalmás) – 1 = Old loess deposited during Olduvai geomagnetic polarity event; 2 = Kisláng fauna site; 3 = Travertine layers (Photo by SCHWEITZER, F.)

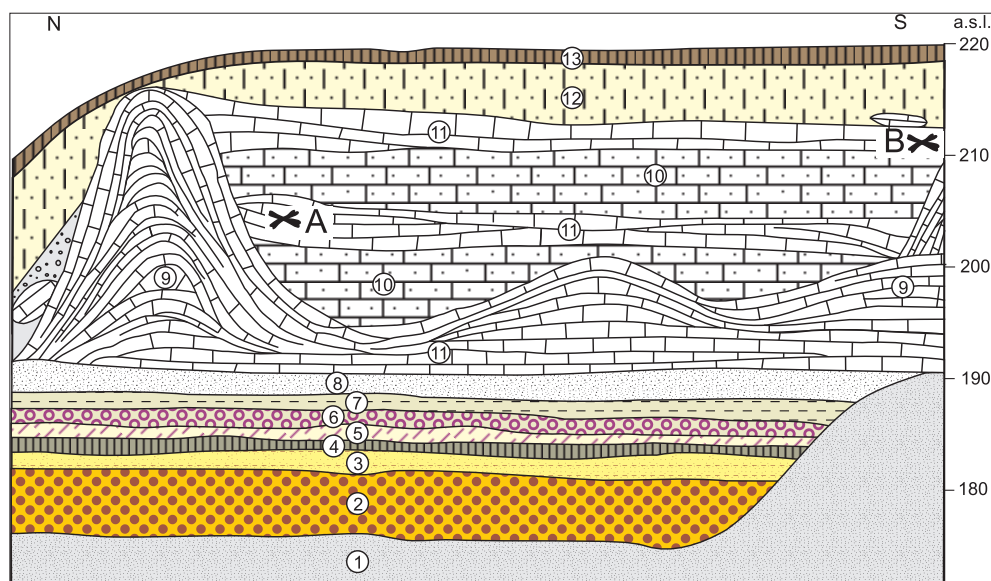


Fig. 6. Travertine level No. V, the exposure of a tetrata basin. The travertine deposited on the Danube terrace No. V. (by SCHWEITZER, F.) – 1 = Upper Pannonian yellow medium sand; 2 = sandy gravels deposited on Danube terrace No. V.; 3 = sand with gravel; 4 = sand; 5 = light yellow clay with embedded travertine and quartz pebbles and travertine layers of 1–5 cm width; 6 = yellowish grey silt with embedded travertine and quartz pebbles; 7 = yellowish grey calcareous, sandy silt; 8 = calcareous sand; 9 = tetrata dams; 10 = fluvial sand, calcareous silt; 11 = travertine bed; 12 = sandy loess; 13 = recent soil; A = *Clemmys méhelyi* Kormos (= *Emys orbicularis* L.), *Megaloceros* sp.; B = *Archidiskodon meridionaris* (*planifrons*) finding, reversed polarity (Jaramillo?)

The ancient Visegrád Gorge

The ancient Danube in the Late Miocene

The Pannonian Sea (later only a lake) having been the last sea in the Carpathian Basin was withdrawing rapidly and it was completely accumulated (Figure 7). As a result of the Pannonian transgression, thick layers of pebbles (Hollabrunn-Mistelbach Formation) originating from the deltaic sediments of rivers flowing into the Pannonian Sea were deposited NEE of Krems (SCHLESINGER, G. 1912; FINK, J. 1961, 1967; THENIUS, E. 1978). The gravel deposits can be found from the Vienna Basin along the northern edge of the Dunazug Hills as far as the Pest Plain (Mogyoród).

The geomorphological situation of gravel deposits in the Vienna Basin is similar to that

of abrasion pebbles, deltaic gravels and travertine (Új Hill, Süttő Hill /*Tapirus Arvernensis*, *Anancus Arvernensis*, *Archidiskodon Meridionalis*/, Kőpíte Hill /*Anancus Arvernensis*/, Muzsla Hill /*Derissena Auricularis*/, Poc-kő Hill) situated at 300–330 m a.s.l. in Gerecse Hills and deltaic gravels in Mogyoród cemented with travertine containing the fossils of *Hipparion*, *Melanopsis aquensis* GRAT, *Viviparius sadleri* PARTSCH, *Bithinia proxima* FUSCH and covered with bentonite deposits of 1–2 m width in some places (SCHEUER, Gy. and SCHWEITZER, F. 1984; SCHWEITZER, F. 1993) (Photos 2–6).

Presumably, the deltaic gravels were not deposited by the ancient Danube but during the accumulation of Paratethys. There were probably flat or low-situated piedmont plains formed and dissected by the anabranching consequent streams of the

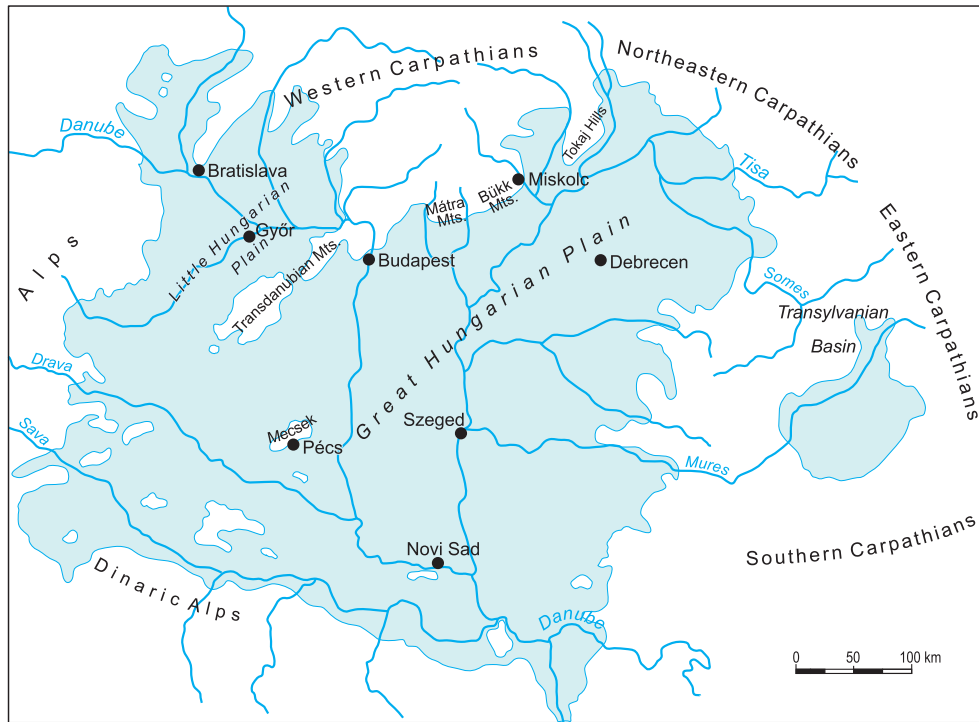


Fig. 7. The greatest extension of Lake Pannon in the Carpathian Basin (by JÁMBOR, Á. *et al.* 1987)

Alps and the Northern Carpathians which deposited deltaic gravels of several meters width (*Photo 7*).

Besides the Vienna Basin (PAPP, A. 1950), gravel deposits can be found at the NNE margin of the Pest Plain, at the northern rim of the Gerecse Hills at Dunaalmás, Süttő, Lábatlan, etc. The deltaic gravel layers deposited at the former base level of erosion are covered or dissected by Upper Pannonian travertine deposits at Öreg Hill in Dunaalmás (330 m a.s.l.), in Dunaszentmiklós (325 m a.s.l.), in Alsóvadács (335 m a.s.l.) or in the Vienna Basin at 360 m a.s.l. and below, for example at Trautmannsdorf where deltaic gravels deposited over *Congeria neum* layers.

Simultaneously, with the basaltic volcanism as old as 7–8 million years, the ridge of the Transdanubian Mountains – Gleichenberg Ridge was raised. As a result of that, Rába changed its direction to the NE, the Danube

and its tributaries changed their directions to the E, flowing along the northern edge of the Gerecse Hills, all together towards the “Visegrád Gorge” which presumably existed 12–13 million years ago. Later, the Danube broke through the strait towards the Hungarian Great Plain and flooded the lowlands (SALAMON, F. 1878; PÉCSI, M. 1985). There are two evidences for the existence of the strait: the remnants of geysers evolved on the geomorphological surface situated at the height of 260–270 m a.s.l., in the vicinity of Szokolya and Magyarkút, and the quartz pebbles located on the right rim of the Szokolya Basin at the height of 310–350 m a.s.l., E-SE of Királyrét. Increasing the distance from Szokolya-Királyrét in the direction of Vác, South of Kismaros, the pebble deposits are getting thinner (*Figure 8*).

A great interfluvial ridge seems to have evolved between Visegrád and Verőce cre-



Photo 2. Deltaic deposit on Upper Pannonian loamy sand at 298 m a.s.l. on the eastern side of Kópité Hill, South of Dunaalmás (Photo by SCHWEITZER, F.)

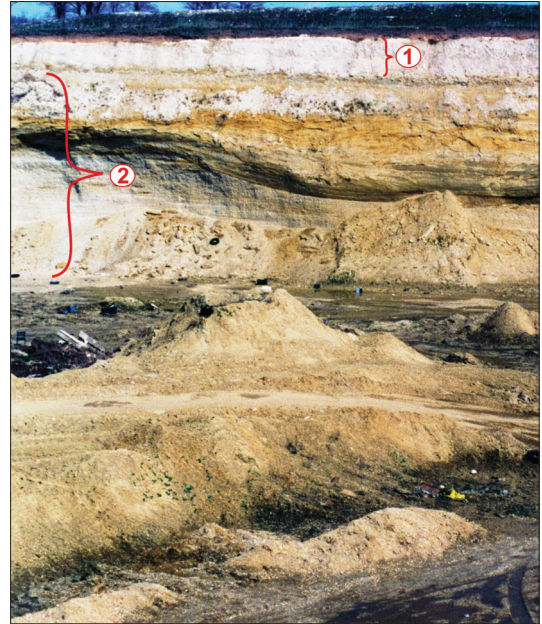


Photo 3. Deltaic deposit (2) covered with thick bentonite layers (1) in the old gravel mine in Kerepestarcsa (Photo by SCHWEITZER, F.)



Photo 4. Deltaic gravel deposit with *Hipparion* fauna cemented with travertine (298 m a.s.l.) (Photo by SCHWEITZER, F.)



Photo 5. Remnants of geyser cones in Magyarkút at 230 m a.s.l. Their evolution is related to post-volcanic activities of andesitic volcanism (Photo by SZEBERÉNYI, J.)



Photo 6. Gravel deposit of 2–3 m thickness made up of mainly rolled quartz pebbles in Királyrét-Nógrád (Photo by SZEBERÉNYI, J.)



Photo 7. Large, rolled, dreikanter-like quartz boulder of 50–60 cm diameter at 290–300 m a.s.l. (Photo by SZEBERÉNYI, J.)

ating a natural barrier hindering the southward opening of “Visegrád Gorge”. Thus, thinking of the strait as a link towards Nógrád through the Szokolya Basin is only a hypothesis (Figure 9, Photo 8).

The interfluvial ridge between Visegrád and Verőce was also formed by headward erosion as it was previously referred to by KÁDÁR, L. (1955) as well. Furthermore, it is remarkable that sporadically occurring pebbles and strath terraces can be observed on the geomorphological surfaces of the Danube Bend at the height of 230–330 m a.s.l. (the northern rim of Gerecse Hills) and at the height of 350–370 m a.s.l. between Dunaalmás and Nagymaros-Visegrád, however, the pebble deposits are completely missing and only young terraces evolved below the height of 180–200 m a.s.l., along the section of Verőce–Dunabogdány–Budapest. The latter ones, nevertheless, can be detected on both sides of the Danube between Dunaalmás and Budafok and they

can also be detected in the cores sampled in the Great Hungarian Plain (Noszky, J. 1933; LÁNG, S. 1953; KÉZ, A. 1956; PÉCSI, M. 1959; RÓNAI, A. 1972) (Figure 9).

There are further evidences for the existence of the ancient “Visegrád Gorge” in Zebegény at the height of 180–190 m a.s.l. where the patches of coarse sand deposited on andesite in several places are good examples for the fact that the shallow coral bays which evolved during the Badenien Stage (13–14 Ma BP) later were covered and temporarily buried either by fluvial sand or under arid, semi-arid climate by fluvial and eolic sand, namely, in the Sarmatian Stage (12–13 Ma BP) and in the upper stages of Late Miocene (7–5 Ma BP).

That’s how the ancient Danube and its tributaries having filled up with sediments the the system of shallow lakes which became brackish and later fresh water lakes during the Late Miocene.

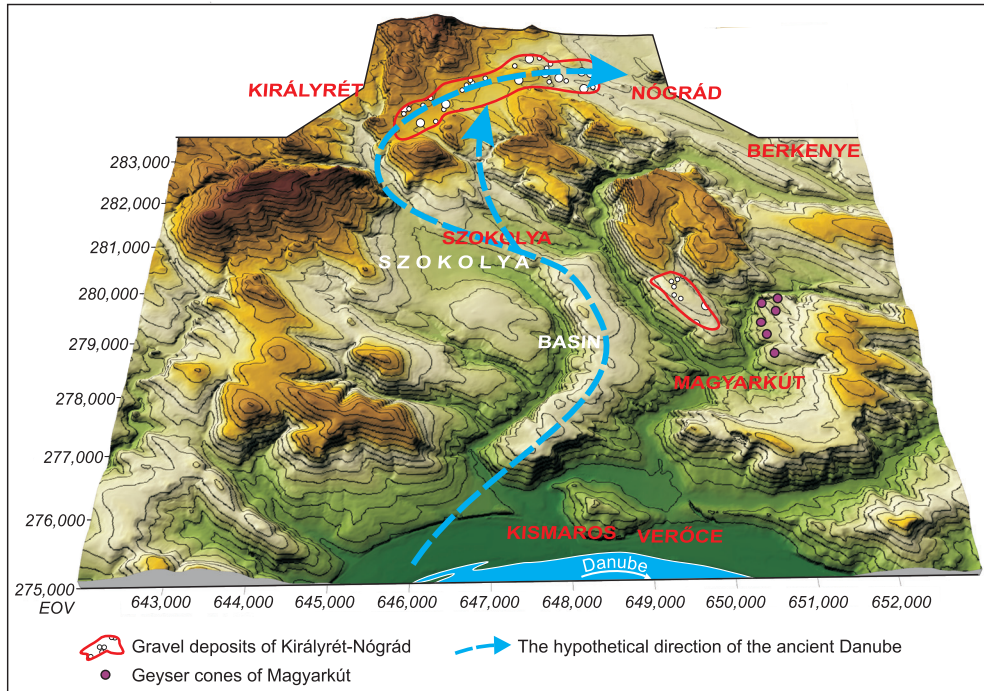


Fig. 8. Locations of gravel deposits of Királyrét-Nógrád, the geysers cones of Magyarkút in the vicinity of Szokolya Basin (based on SCHWEITZER's hypothesis)

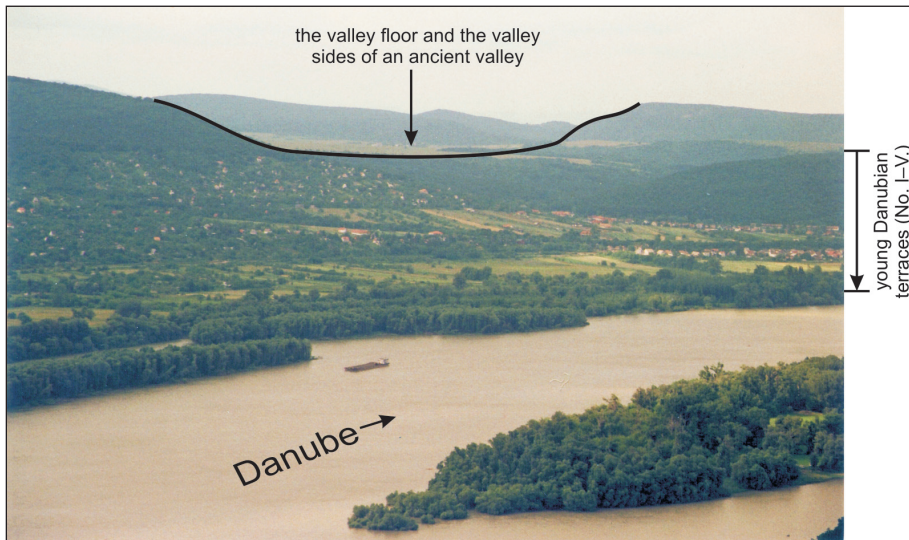


Photo 8. Ancient erosional valley between Nagymaros and Verőce (240–250 m a.s.l.) and 140–150 m relative height above the Danube. It can be followed all along the Morgó Stream in the direction of Szokolya-Királyrét. On the left and right side of the photo the younger Danube terraces can be seen at 180 m a.s.l. and below (Photo by SCHWEITZER, F.)

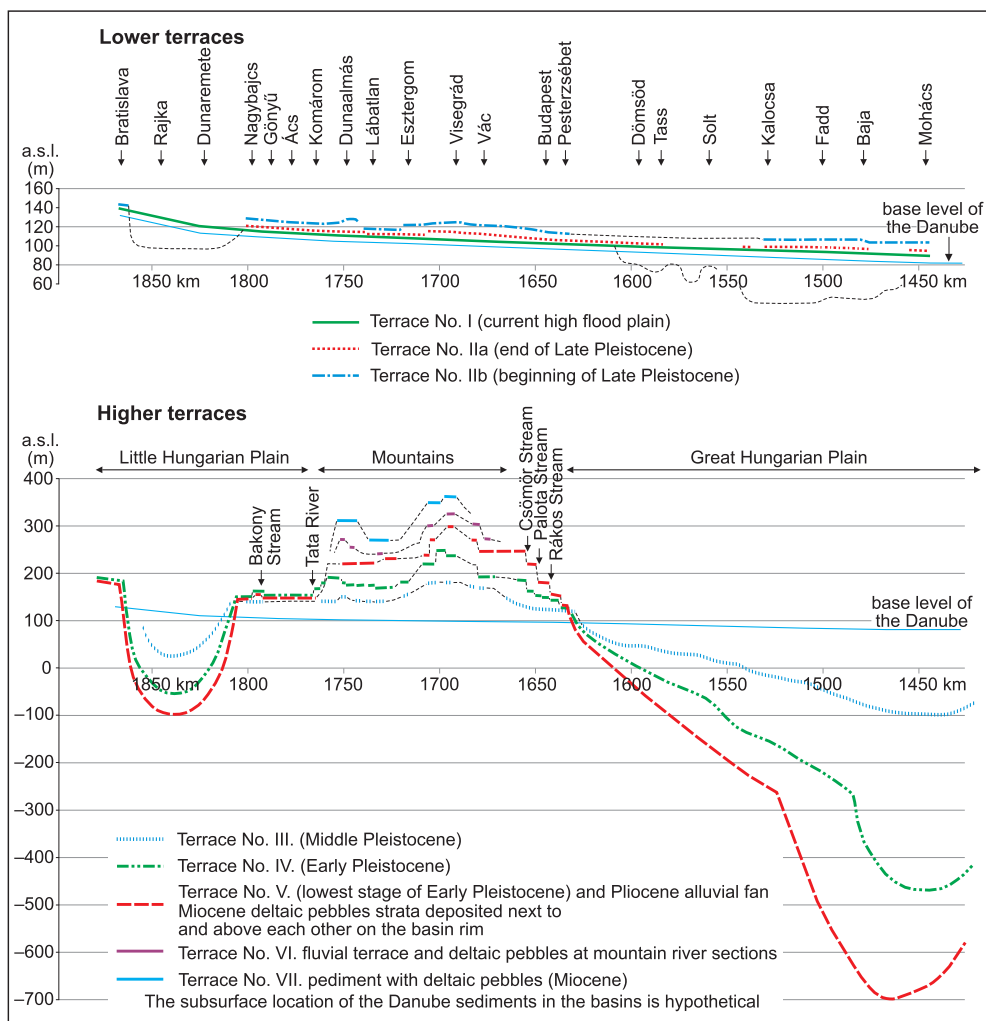


Fig. 9. The locations of Danube terraces along the Hungarian section of the Danube (based on the works of Pécsi, M.)

Drainage system development in the Carpathian Basin

At the end of the Late Miocene Sub-Epoch (7–8 Ma BP) and at the beginning of Pliocene Epoch significant changes took place in the Carpathian Basin. As a result of a dynamic global climate change, the previous warm and humid subtropical climate turned into drier, warmer and more extreme resulting in the dramatic shrinkage, gradual accumula-

tion and dry-up of Lake Pannon. The climax of that period was the so called Béraltavári-an Stage (KRETZOI, M. 1969; KORDOS, L. 1991, 1992; KRETZOI, M. and PÉCSI, M. 1979) which is equivalent to the Messinian salinity crisis considering the international nomenclature of geological timescale (SCHWEITZER, F. 1993, 2004). The fauna findings (birds *Meriones*/, *Giraffidae*, *Hipparion* and *Anthilope* species) of the Carpathian Basin (KORMOS, T. 1911; KRETZOI, M. 1962; KORDOS, L. 1992) (Figure 10) and

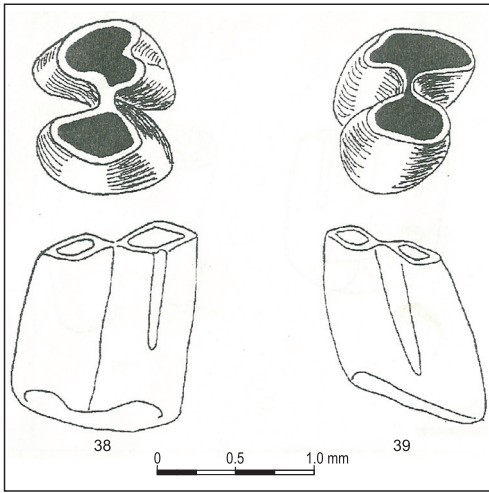


Fig. 10. *Epimeriones (gerbils) molars* found in cross-bedded sand in Egyházasdengeleg (by HIR, J. and MÉSZÁROS, L.Gy. 1995)

its environment provide an evidence for the hot and dry semi-arid climate evolved as a consequence of global climate change.

During the Bérbaltavarian stage a hot and dry semi-arid climate evolved in the Carpathian Basin where large sand dunes

and torrents with riparian forests appeared (MOTTL, M. 1941). Arid and semi-arid areas characterized by sedimentary rock formations with limestone, dolomite and gypsum were dominant in the basin (SCHWEITZER, F. 1993; SCHWEITZER, F. and SZÖÖR, Gy. 1997). Under the hot and dry climate the fragmentation of rocks resulted in the accumulation of huge amount of sand deposited over the mudrocks of Lake Pannon in varying thickness (50–200 m). The investigations pointed out that the torrents crossing the Little Hungarian Plain had been flowing southwards in the direction of Slavonic Basin, then they accumulated the whole Little Hungarian Plain (SZÁDECZKY-KARDOSS, E. 1939; SÜMEGHY, J. 1953). The siliceous crust is an evidence for the arid climate characterized by an annual mean precipitation of only 150–250 mm conducive to the evolution of torrents but not to that of fluvial terraces (SCHWEITZER, F. and SZÖÖR, Gy. 1997).

During the Lower Pannonian Stage (Eppelsheimium in the Hungarian terminology) the tropic rainforests which previously had covered even regions at higher latitudes contracted to a smaller area around

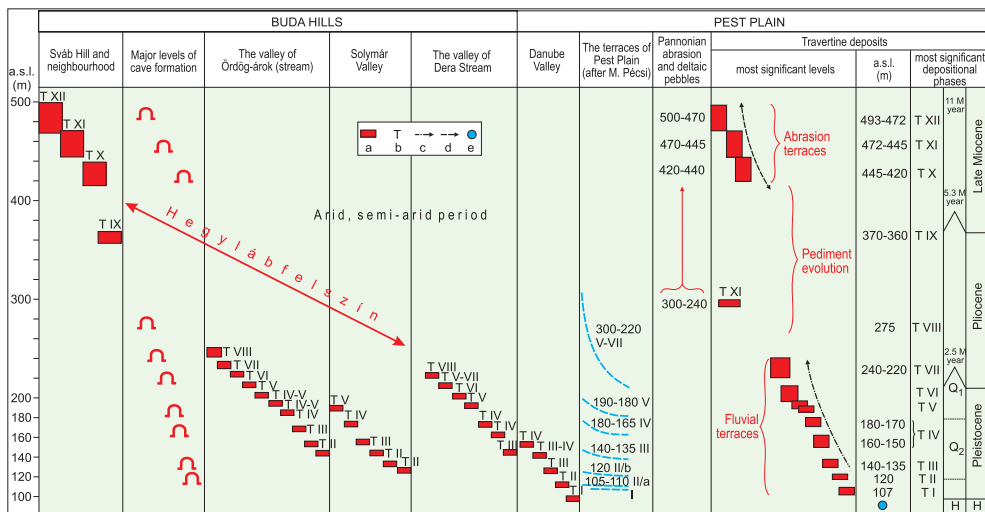


Fig. 11. The evolution and the development of drainage network in the Carpathian Basin based on travertine stratigraphy (by SCHWEITZER, F. 1993–2013). – a = travertine levels (by SCHEUER, Gy. and SCHWEITZER, F. 1984); b = the most important levels of travertine deposition; c = travertine deposition on valley sides; d = the tectonic elevation of János Hill and Sváb Hill; e = the level of resurgence of recent karst springs

the Equator due to the global climate change. Then under the warm and humid climate of the Late Pliocene (Csarnotian Stage, 4–3 Ma BP) favouring red clay development, tropic rainforests expanded again. The development of the drainage system of the Danube and the whole Carpathian Basin lasting until the present time (KRETZOI, M. and PÉCSI, M. 1979; SCHEUER, GY. and SCHWEITZER, F. 1988; SCHWEITZER, F. 1993) (Figure 11) also started and the rivers dissected the pediments which evolved during the warm and dry period of Béraltavarian (Messinian) Stage.

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Changing Ethnic Patterns of the Carpatho-Pannonian Area from the Late 15th until the Early 21st Century

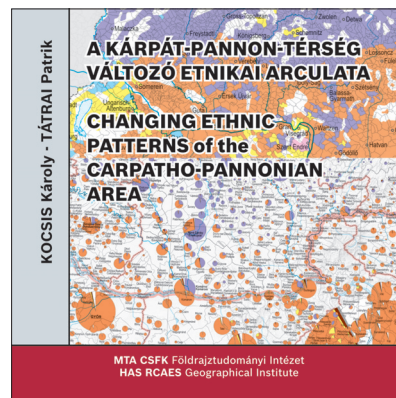
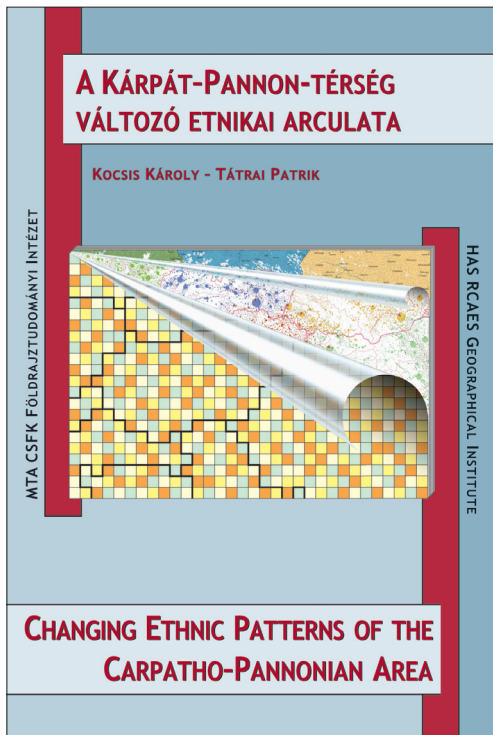
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Landsat imagery applications to identify vegetation recovery from acidification in mountain catchments

JOSEF KŘEČEK and VLASTISLAV KRČMÁŘ¹

Abstract

In the 1980s, headwater catchments of the Jizera Mountains (Czech Republic) were degraded by the extreme acid atmospheric deposition, die-back of spruce plantations (*Picea abies*), and commercial forestry practices. The aim of this study is to evaluate long-term changes in the vegetation canopy within two catchments of drinking water reservoirs Josefův Důl and Souš, using the Landsat imagery archive, 1984–2010. The ground-based evidence of canopy characteristics was carried out in the Jizerka experimental basin on plots 30 × 30 m. The supervised classification of multi-band raster images was found effective to describe long-term changes in the canopy of investigated catchments. The NDVI index can well identify succession of herbaceous communities after the clear-cut. However, NDVI values were not sensitive to detect changes in the canopy structure of dense spruce stands where the horizontal canopy density exceeds 30 percent.

Keywords: forested mountain watershed, canopy density, acid atmospheric deposition, Landsat imagery, normalised difference vegetation index

Introduction

PIKE, R.G. *et al.* (2010) referred to a highly significant role of forest canopy in the run-off genesis, particularly in a mountain catchment. Methods of remote sensing and image interpretation focused on indicating the forest canopy have been used in many projects worldwide (LILLESAND, T. and KIEFER, R.W. 1987; WOLTER, P.T. *et al.* 1995; BURROUGHS, P.A. and McDONNELL, R.A. 1998). Since 1972 Landsat satellites have continuously and consistently archived images of Earth, and the Landsat Programme provides the longest continuous space-based record of Earth's land with applications in many types of environmental studies (NASA 2014). Applications of the Landsat imagery are now supported by NASA (2014) and the Global Land Cover Facility (GLCF, 2014), free to download.

The Jizera Mountains (Czech Republic, 50°40'–50°52'N, 15°08'–15°24'E, humid temperate zone) is part of the so-called "Black Triangle", the epicentre of acid atmospheric deposition in Europe (*Figure 1*).

The region includes a 200 km² forest plateau above 800 m elevation with dominant spruce plantations (*Picea abies*), important particularly for the national water resource recharge. In the 1980s, this area was degraded by acidification, defoliation and die-back of spruce stands, and the commercial forest harvest (KŘEČEK, J. and HOŘICKÁ, Z. 2010).

The association *Junco effusi-Calamagrostietum villosae* became a dominant community there, reported by KŘEČEK, J. *et al.* (2010). Although the reforestation followed immediately after clear-cut, there was relatively slow progress in the forest stand development because of the competition of invasive grasses and the

¹Department of Hydrology, Czech Technical University in Prague, Thákurova 7, CZ-166 29 Prague 6.
E-mail: josef.krecsek@fsv.cvut.cz

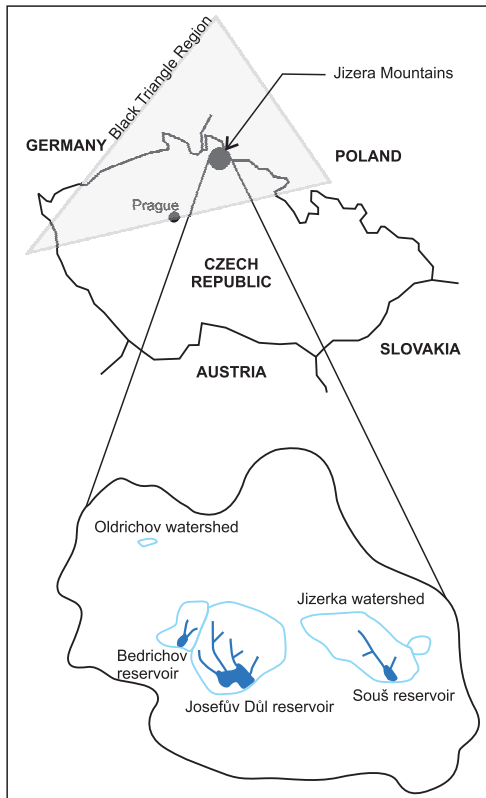


Fig. 1. Focused headwater catchments in the Jizera Mountains

high level of acidification. The aim of this study is to evaluate long-term changes (1984–2010) in the vegetation canopy of three headwater catchments in the Jizera Mountains by analysing the Landsat imagery data, supported by the standard ground survey.

Material and methods

Three headwater catchments with dominant spruce plantations were analysed in this

study: the experimental basin Jizerka (J), and two basins of drinking water reservoirs Josefův Důl (JD) and Souš (S). Basic morphological characteristics of the focused catchments are given in Table 1.

From the archive of Landsat imagery, clear-sky images of summer seasons (June–August) were taken into account. This timing corresponds to recommendations of CHEN, J.M. and CIHLAR, J. (1996) to avoid an underestimating the herbaceous layer. The normalised difference vegetation index (NDVI) was evaluated, and images classified respecting different types of the vegetation cover. The NDVI index was calculated for the spectral reflectance registered in the visible (red) and near-infrared bands, equation (1) according to WEIER, J. and HERRING, D. (2000).

$$NDVI = (NIR - VIS) / (NIR + VIS), \quad (1)$$

where NIR = near infrared radiation (0.7–1.1 μm), VIS = visible radiation (0.4–0.7 μm).

Also the supervised classification of multi-band raster images (Landsat 4,5) was employed. For collected samples (representing distinct sample areas of different canopy) the images were classified by the image analyst (NAGI, R. 2011). The estimated canopy classes were used to extrapolate outcomes of the detailed environmental monitoring at the experimental basin (J) to larger catchments of water reservoirs (JD and S).

In the experimental basin (J), ground-based evidence (squares of 30 x 30 m, corresponding to the Landsat image resolution) of canopy characteristics was carried out annually respecting seasonal patterns of the herbaceous layer (KŘEČEK, J. *et al.* 2010).

The respected canopy classes taking into account by this study included: clear-cut,

Table 1. Characteristics of the basins Jizerka (J), Josefův Důl (JD) and Souš (S)

Basin	Area (A), km ²	Mean elevation (E), m	Mean slope (S), %	Length (L), km	Shape index A/L ² (-)
J	1.03	927	12.00	1.14	0.79
JD	19.64	834	11.90	5.49	0.65
S	13.78	865	14.00	5.06	0.54

herbaceous vegetation (with *Calamagrostis* sp. dominant), reforested areas (mostly by spruce again) respecting the crown closure limit of 0.3, and mature spruce stands. This adopted scheme roughly corresponds with the definition of “forest” used by the United Nations Framework Convention on Climate Change (crown closure > 0.1–0.3 and height > 2–5 m at maturity) (SASAKI, N. and PUTZ, F.E. 2009).

Results and discussion

The distribution of representative canopy clusters in investigated catchments (J, JD

and S) have been shown in *Figure 2*, and the corresponding percentage of class-evidence within watershed areas have been given in *Figure 3* (for time horizons of 1984, 1992, 2002 and 2010).

The analysed changes in vegetation cover show similar trend in all the investigated catchments: high clear-cut evidence (from 30 to 60%) in the 1980s, dominant herbaceous communities in the 1980s and 1990s (included the reforested sites with low crown closure), and intensive recovery of spruce stands in the 2000s (some 20% increase in stands with crown closure over 0.3, during the last ten years).

The *NDVI* index plotted against crown closure (*Figure 4*) shows a negative relationship between *NDVI* values and horizontal density of spruce canopy. Estimated *NDVI* values (0.65–0.76) correspond to the *NDVI* range of 0.6–0.8, introduced for temperate forests by WEIER, J. and HERRING, D. (2000). However, in our study, the grass community shows higher values of *NDVI* (0.72–0.76) against spruce stands (0.65–0.72). Similar results were reported also by GAMON, J.A. *et al.* (1995) finding relatively insensitive *NDVI* values to iden-

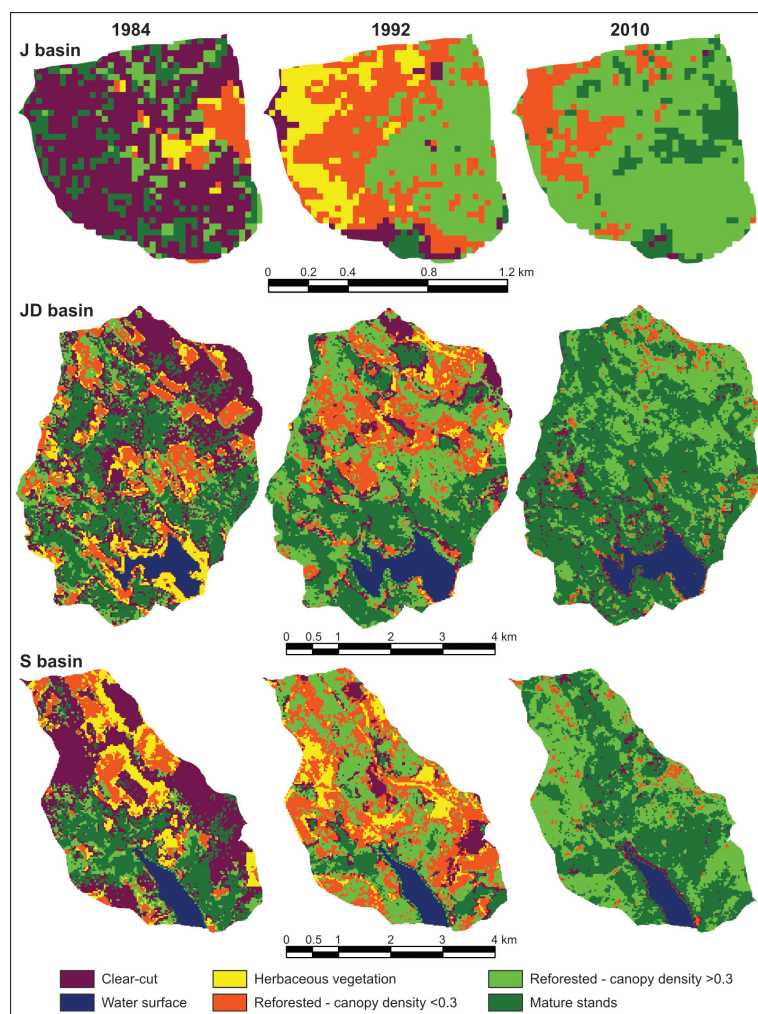


Fig. 2. Changed canopy structure at J, JD and S basins

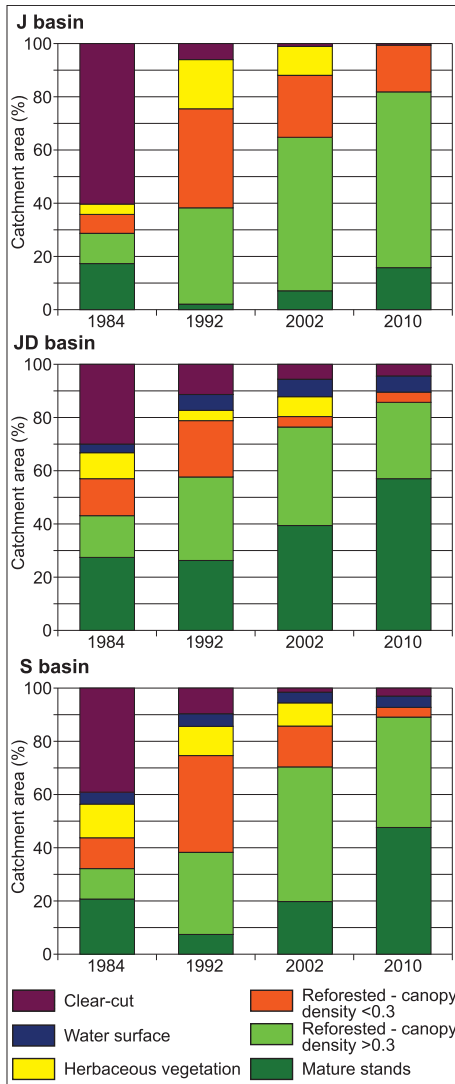


Fig. 3. Changed clear-cut and reforestation in J, JD and S basins

tify changes in the canopy structure of dense shrubs and trees (by leaf area index $LAI > 2$).

The impact of commercial forest clear-cut on runoff genesis was studied in the experimental basin J since 1982. In 1992, after the harvest of spruce plantations, the drainage network extended from 1.5 to 6.6 km/km² (Figure 5). The extended drainage in the basin is a result of skidding the harvested timber by wheeled tractors. Twenty years after, with a spontaneous succession of grasses, and forest recovery, the drainage density was reduced back again to 1.8 km/km².

The development of drainage network described in Figure 5 could be interpreted in an extrapolation of drainage network by the clear-cut class occurrence in watersheds JD and S (see Figure 2).

Conclusion

The supervised classification of multi-band raster images (Landsat 4.5) was found very useful to describe long-term changes in the canopy of mountain watersheds affected by the acid atmospheric deposition. The estimated canopy classes addressed: clear-cut of spruce plantations, dominant herbaceous layer, reforested areas with crown closure below or over 30%, and mature spruce stands (see Figure 3). The identification of clear-cut within a catchment could be used to extrapolate the estimates of drainage network changes, based on the detailed study in the experimental basin (see Figure 5).

The application of NDVI index in this study was limited by the crown closure of spruce (approximately by 0.3) (see Figure 4). The grass

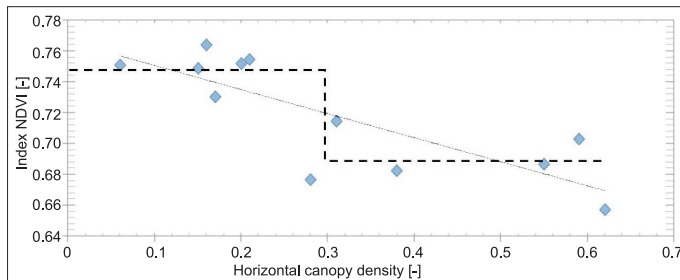


Fig. 4. NDVI index and the horizontal canopy density (estimated by the ground survey)

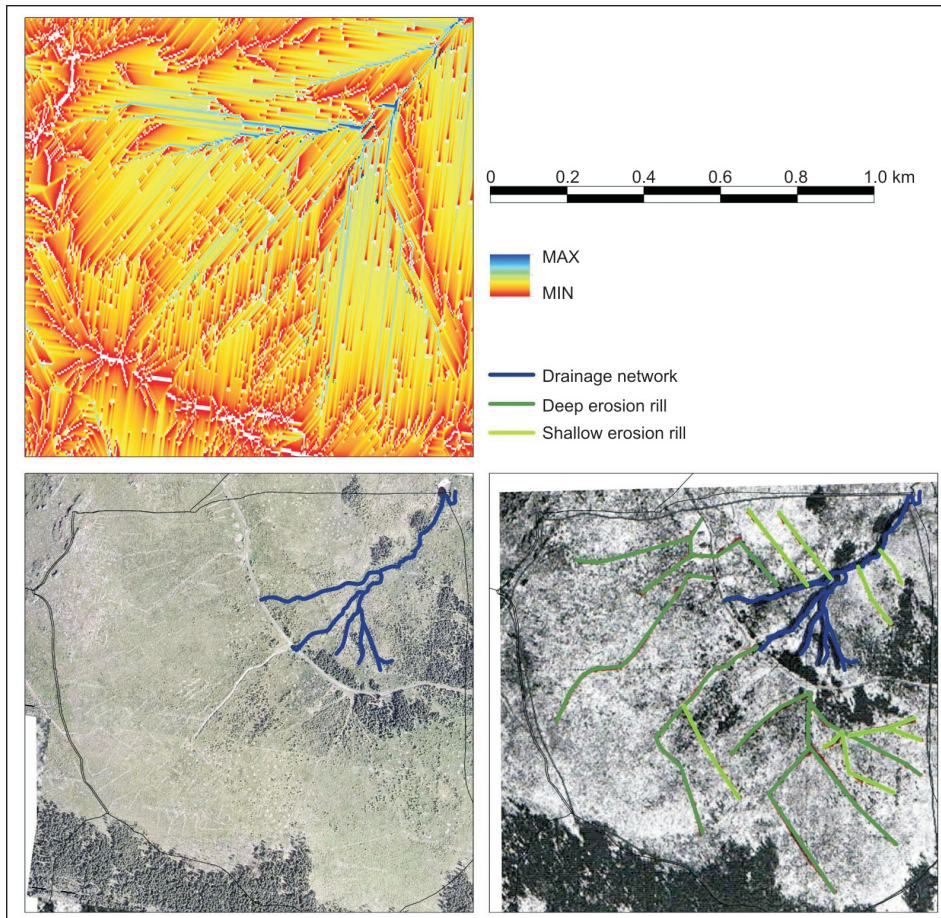


Fig. 5. The risk of concentrated flow from the digital elevation model (on top), and drainage network after the clear-cut of spruce plantations, J basin, 1992 (at the bottom)

community showed higher values of *NDVI* (0.72–0.76) against spruce stands (0.65–0.72). Therefore, *NDVI* values are relatively insensitive to identify changes in the canopy structure of dense spruce stands (by horizontal canopy density over 30%). However, *NDVI* index can well identify succession of herbaceous layers after the clear-cut. It seems to be important, particularly, in indicating the protection of soil surface and recovery of erosion rills.

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Consumer value dimensions of rural tourism in Hungary

NOÉMI KULCSÁR¹

Abstract

Considering the geographical and historical characteristics of Hungary, rural tourism could be one of the key tourism products since the country misses extraordinary natural attractions, seaside or high mountains. Hungary has always been an agricultural country and it is rich in cultural landscape with traditional small villages and rural hospitality. As in Hungary theoretical research on consumer value factors in rural tourism is completely missing the primary aim of our investigation was to conduct a niche survey in rural tourism, which can contribute to the better understanding of the demand side of the market and crystallise the factors with value to tourists. The aim of the pilot study based on qualitative research is to identify and measure consumer value dimensions. In our qualitative research first we completed indicators identified by secondary sources with further indicators, as the result of a small sample consumer survey, then we have refined the created list of indicators on the basis of expert opinions. As the next step of the research we have conducted a quantitative questionnaire-based survey, by which the aim was to identify, interpret and analyse the motivations of rural tourist and the indicator-based consumer value with its major dimensions. In this paper we discuss only the latter phase of our research in more detail. The basis of success of rural tourism in Hungary can be the identification of tourists' motivations, attitudes, as well as factors that carry value for them, since it may reveal useful information both scientifically and practically.

Keywords: consumer value, value dimensions, motivation, rural tourism, Hungary

Introduction

At the beginning of the third millennium we can see that the desire for experiences and intellectual challenges is strengthening and becoming more and more intertwined with the shifting of consumer behaviour from material values towards ethical and intellectual values. This is a clear reaction to the materialistic orientation of the consumer society. Instead of strongly materialistic factors, in the "new economy" intellectual skills and abilities are the major creators of value, in the economic sense. However, a high level of material consumption is also necessary so that post-materialistic values could come forward. Complete industries were built upon these values, such as the production of organic food or sports equipment, as well as rural tourism offering experiences (SZABÓ, K. and HÁMORI, B. 2006).

In global tourism rural tourism is a refreshing phenomenon, which can help domestic and foreign tourists to learn about, better understand and sustain our country, our culture and our traditions, as well as to increase their respect to nature, to meet their desire for authentic experiences, all of which can significantly contribute to economic growth.

Today, the study of the role and opportunities of rural tourism has growing importance in academic research and professional community; however, in the policy of tourism, at national level, it hardly enjoys priority, because of its economic performance. The importance of the issue is also supported by the fact that the number of European conferences organised by the Tourism World Organization has been steadily growing.

This paper seeks to answer the questions in what forms and dimensions value-oriented

¹ School of Tourism, Leisure and Hospitality, BKF University of Applied Sciences, H-1148 Budapest, Nagy Lajos király útja 1–9. E-mail: nkulcsar@bkf.hu

consumption appears in rural tourism, and which value elements have more and which have less relevance. The study is based on a database comprising information on the attitude of 352 Hungarian rural tourists, their consumer values, and their major dimensions.

Theoretical background

Interpretations of rural tourism in Europe

The definition, the identification of rural tourism, as well as the description of its elements have been the target of several research papers. The international literature provides a wide range of definitions for the meaning of rural tourism (ROBERTS, L. and HALL, D.R. 2003). Taking the focus of the supply into account, several other terminologies are available (agro-, eco-, farm-, green-, etc. tourism) regarding tourism based upon the resources of families living in rural areas. The meaning of these definitions may differ from country to country, depending on the local "country" categories, traditions and cultural relations. In the majority of cases, however, the analysis of other content features is also required besides the definition, such as the institutional background, the structure of the countryside and the settlements, geographic features, existing sectoral policies, etc. The drawback of such a multitude of definitions is that uniform regulation is not possible or only with difficulties. The definitions of rural tourism can be rather different regarding the fact that in certain countries the emphasis is laid on the farms and the role of nature, while in other countries on the agricultural activities outside the cities (HALL, D.R. *et al.* 2005).

Based on the motivations of tourists different layers of rural tourism can be crystallised. International practices also point out two levels of rural tourism, which in our assumption are an internal (core) service and an external (supplementary) service (Figure 1).

The above mentioned classification points out that today, regardless of the fact whether

the countries consider this form of their tourism as farm-tourism, agro-tourism, green tourism or rural tourism, etc. basically two topics are in the focus:

– One of the topics which can be found in most cases is *being close to nature*, and the services attached to it (sledging, riding a horse cart, trekking, etc.) and programmes, including sports (cycling, mountaineering, rafting, horse-riding, etc.) and activities encouraging relaxation or learning (walking in nature, animal watching, collecting herbs or picking mushrooms, etc.).

– The other topic is *being in the countryside*, including rural culture, traditions and lifestyle, in which the focus is on rural, village or farm lifestyle, agricultural activities around the house, the role of domestic animals, gastronomic specialities and last but not least the relationship between the guest and the host, which is unique.

Similarly to the approach of PERALES, R. (2002) on traditional-modern rural tourism, we regard the presence of "being in the countryside" as a traditional core service, while ensuring "to be close to nature" as a complementary service. Nevertheless, the weight of the layers in the touristic services i.e. which type of service has a bigger value for the tourists (the traditional or the modern) is questionable. The directions of development and the criteria of success can be identified in possession of this information.

Interpretation of rural tourism in Hungary

The definition of rural tourism applied in Hungary does not clearly define product-type tourism. The interpretation of rural tourism is becoming more and more wide-range, the boundaries of the definition are getting "blurred" and in the Hungarian literature, besides rural, the terminology of countryside or countryside-rural is continually appearing. Its basic characteristic is its complexity and the fact that it embraces several other products. Apart from providing accommodation in a village environment (on the host's



Fig. 1. The direction of tourist motivation in rural tourism of European countries. *Source:* Compiled by the author on the basis of EuroGites 2011, DETTORI, D.G. *et al.* 2004, MAESTRO, R.M. *et al.* 2007, ZOBENA, A. *et al.* 2005, VOFKORI, L. 2004, TURNER, C. 1993.

premises), rural tourism can include cultural offers, gastronomy, wine tourism, walks in the nature, health tourism, horse-riding and children's camps (SZABÓ, G. 2006).

The term "rural tourism", widely used in the European literature can be translated as countryside or village tourism as well, but regarding its direction and content elements, it can mainly be interpreted as the Hungarian – not real value – village tourism (see ANTAL, K. 1996; KOVÁCS, D. 2002; SZABÓ, G. 2006; CSIZMADIA, L. 2011). Similarly to the international literature, the Hungarian interpretation

of village tourism is also extremely colourful. In the Hungarian interpretation there is no clear dividing line between rural and countryside tourism. The National Association of Rural and Agrotourism (FATOSZ²) uses the term "village tourism" as a synonym for the most general form of rural tourism (SZABÓ, G. 2006). The term of "village tourism" known in Hungary does not clearly define a type of touristic product. It is rather its complexity and its

² „Falusi és Agroturizmus Országos Szövetsége” in Hungarian.

feature of embracing other products which can be regarded as a principle feature.

In accordance with the interpretation of the Strategy for the Improvement of Tourism, the narrow definition of rural tourism is "making use of the complex touristic facilities and the supply of the village, jointly offering village lifestyle, local traditions, culture and where it is available, agricultural facilities. In the broader sense of the meaning, rural tourism provides host accommodation anywhere, except for in spa and health resorts, including the village-like parts of any settlement (offering accommodation, catering and programmes) if the location and the activity meet the typical system of requirements of rural tourism" (MNE³ 2011:48). In its supply-side, but also demand-oriented definition, the Ministry emphasizes that experiencing new, authentic adventures, the desire to learn and get the knowledge are the most fundamental touristic motivations today.

Among the definitions found in the Hungarian literature we can find the following features of rural tourism:

- it supplements the family income,
- it is a touristic activity carried out in the countryside, and
- a provision of complex services in catering, accommodation and programmes, attached to agriculture and nature.

On the basis of all these we can assume that the interpretation of rural tourism from the Hungarian point of view is a complex form of tourism, in which village lifestyle and all the attached activities appear as the core (the basic) service of rural tourism, as the supplement of other services offered in the broader environment.

The market of rural tourism has been undergoing significant transformations. On the one hand, due to the processes affecting the countryside, and on the other hand, because of new regulations, and the effects of the new classification and specialisation systems targeting quality growth. The characteristics of

rural tourism in Hungary can be summarised both by the supply and demand sides.

a) Supply side

- Organised rural tourism was operated in Hungary already before World War II. Holidays with full board were possible in several villages. After World War II, the system of rural tourism that had been systematically built up since the 1930s was liquidated. The organisation operating before the war had assisted rural tourism by promotion and professional propaganda of accommodations. The establishment of accommodations was achieved by the integration of villages into the system, the preparation of the hosts and making them interested in the development of their own settlements (SZABÓ, G. 2011).
- In the 1970s there was a shift in the objectives of tourism development in Hungary, when efforts were made to make tourism territorially more balanced in the country by the exploration of new destinations and the creation of new attractions (SZABÓ, G. 2011).
- The new area of village tourism starting from the late 1980s has individual characteristics and important experiences. After that rural tourism development in Hungary shows an interesting example of the diversification of household resources and exploration of hidden or unused local values for tourism development. Spontaneous development, which was the dominant characteristic of those years have been gradually replaced by a more organised and better-managed activity (KOVÁCS, D. 1997).
- In the 1990s a national body (Association for Rural Tourism) was set up with a county level organisational structure established later, now operating as a professional body called National Association of Rural and Agrotourism (FATOSZ). For the qualification and quality assurance of rural tourism accommodations a criteria system was worked out. The effective marketing activities of rural tourism were also born by the end of the 1990s. Figures on the

³ Ministry for National Economy

number of registered hosts and the capacity of accommodation in villages have been available in Hungary since 1998 (Figure 2). Until 2009 the capacity had been rising annually, however, after 2009 the number dropped to about 4 thousand hosts due to the economic crisis, and the generation change. In addition, in accordance with the 239/2009 government decree, rural accommodation is defined as accommodation at a settlement below the population threshold of 5,000 inhabitants, and below the population density of 100 inhabitants/km², thus as a combination of these effects the capacity almost halved after 2010. The number of hosts falling out of the circle of rural tourism for administrative/statistical reasons is considerable. This also meant that due to the new legal regulations beds in settlements with over 5,000 populations, including towns with scattered farmsteads on their outskirts, or rural parts of small towns, were no longer registered as village accommodations in 2010. Due to the changing regulation village tourism can only be registered in settlements below a population density of 100 persons/km². The new administrative rules clearly worsened the positions of rural tourism.

- Providing village accommodation is typical mainly in Northern Hungary, and in the Western and Southern Transdanubia regions, where 60 percent of all the capacity is concentrated, while the figures are the lowest in the Central Hungary region, with only 2 percent of the total capacity (Figure 3).
- To support high quality services a national trade marking system has been established since 2011. Joining the “sunflower” national trademark system is not obligatory, but it contributes to distinguish good quality service providers from non-qualified services, to strengthen consumer consciousness and to provide guidelines for the easier selection of services. The qualification system awards 1 to 4 sunflowers to the village accommodations, depending on the comfort level and the equipment of the accommodation. The number of qualified accommodations was increasing approximately by 200 units per year reflecting the success of system. Currently 765 rural tourism accommodations are officially qualified (FATOSZ 2014).
- In the future, the new system of accommodation classification, as well as the use of National Trademark, the improvement of rural tourism products, and the crea-

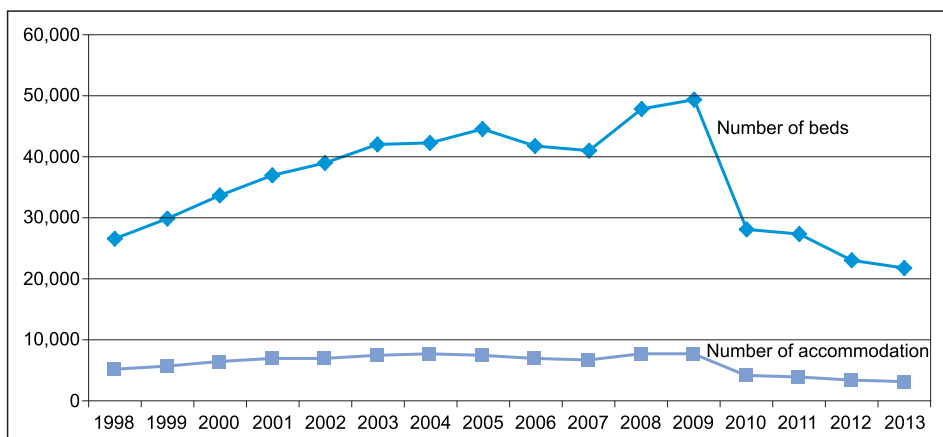


Fig. 2. The amount of rural accommodation and capacity in Hungary (1998–2013). Source: Based of figures by HCSO (2014a)

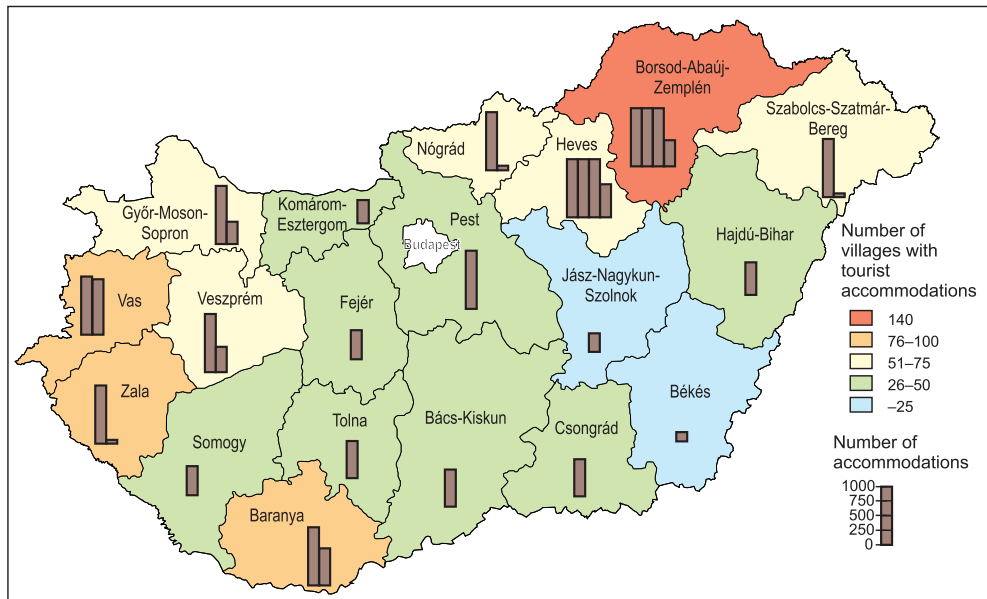


Fig. 3. Distribution of rural accommodation capacity in Hungary (on 1 January 2013). Source: Compiled by the author based on HCSO (2014b)

tion of specialised houses offering special products may all encourage the quality improvement of supply, thus can contribute to the increase of tourism.

b) Demand side

- The demand of rural tourism in Hungary was focused on inexpensive vacations for families with children, but this has changed in the past decade, however, we have to note that the price still determines the guests' decision.
- The demand side of rural tourism is closely related to the general motivation trends of tourism. Tourists show a growing interest towards unspoiled natural landscapes, clean and beautiful nature. The focus is on the desire for complete silence and tranquillity, for "perfect" recreation which may bring about the appreciation of "untouched" rural areas as tourism destinations, too. Another trend is the individualisation,

the appearance of individual demands and desires of the guests. The chances of places with unique image – smaller, friendlier boarding houses – and of destinations suitable for the satisfaction of hobby needs – e.g. nature watch, bird photography – are improving. Similarly, the demand for theme products, products of definite units of offers is increasing. Satisfaction of the hobby needs and the individual requests will become a major demand trend. It is also true, that the positions of hosts who are unique but are also able to meet high quality demands tend to improve. The tourists expect tidy, well-kept and comfortable accommodations and an environment in the destination that offer at least the level of their own homes. This is a great challenge for hosts in the villages. A clear-cut demand is, in addition to the comfortable accommodation, the intimate and family-like atmosphere and the civilised and tidy environment (SZABÓ, G. 2011).

- The peak year of the registered demand in rural tourism in Hungary was 2008 (Figure 4). The number of guest nights in that year exceeded 744,000. In the following years demand gradually shrank, and by 2013 the number of guest nights fell by almost 50 percent, as compared to the peak year (HCSO 2014a).
- In rural areas of the European countries qualified accommodations have moved towards programming and now they have unique, special offers. Hungary also has taken the first steps in this direction. Services also have to adjust to the expectations of the customers (e.g. specialisation of farms: active, equestrian, eco, health, wine).

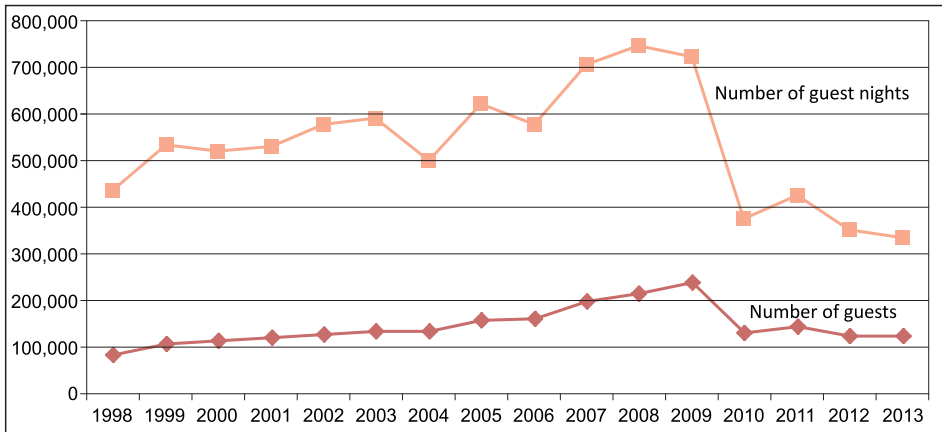


Fig. 4. The number of guests and guest nights in rural tourism in Hungary (1998–2013). Source: Based on figures by HCSO (2014a)

- The decrease had several reasons (SZABÓ, G. 2012): shrinking market due to the economic crisis; the earlier introduced Government Regulation, which regulated the classification of accommodations unfavourably; changes of the tax regulations in 2010, which terminated the tax exemption of rural accommodation provision (up to the income of 800,000 HUF, ca. 3,000 EUR) and also that of the linked services (up to the income of 400,000 HUF).

– The majority of guests in rural tourism (90%) are definitely Hungarians today. While the proportions of foreign and domestic guests were almost equal around the millennium, but since then significant rearrangement has taken place. In 2008, the best year of rural tourism so far, the number of guest nights by domestic guests was approximately six times higher than the number of nights spent by foreigners (SZABÓ, G. 2011).
- Improving the competitiveness of rural tourism enjoys high priority both in Hungary and abroad. The issue of competitiveness and the improvement of the quality of life are important parts of Hungarian strategies focusing on the development of tourism. These strategies place the emphasis on touristic development trajectories that are guided by value-orientation and market demand, the starting point of which is that the values provided by tourism, the experiences and the motivations of tourists are equally considered⁴.

⁴ We use the terminology of experience in a positive sense here. The term experience in English language means the knowledge or practical wisdom gained from what one has observed or a way that creates a memorable event. In Hungarian language separate terms are distinguished for these definitions, but we have to take into consideration that the English term is context-dependent.

The role of consumer value

The concept of consumer value can be examined from different aspects: we can take the approach of product-oriented sales (SCHMITT, B.H. 2003 In: KOZMA, M. 2009), KOTLER's marketing concept (see KOTLER, P. 2003 In: HOU, L. and TANG, X. 2008), as well as the recently introduced CRM⁵, or consumer experience management (SCHULTZ, D.E. 2003 In: KOZMA, M. 2009). According to these new interpretations consumer value reflects the largely subjective (HOFMEISTER, T.Á. *et al.* 2003) or personal opinion of the consumer as to what extent the received product or service meets his expectations (PARASURAMAN, A. *et al.* 1985).

According to CHIKÁN, A. and DEMETER, K. (2004) consumer value is created if the benefit of the consumer from a given transaction exceeds the complete cost of the possession of the received product and the service package.

This subjective definition of value is rather comprehensive, which we can unfold through the definition of value dimensions (GELEI, A. 2006). Value dimensions deconstruct customer value into its elements, showing which major components or dimensions of the received product- or service package can significantly contribute to the growth of customer value (WALTERS, D. 2002 In: GELEI, A. 2006).

As a summary, we can say that the literature defines customer value in one-dimensional and in multi-dimensional sense of the meaning. Researchers defining customer value along one dimension, place the emphasis on the transactional value, where the consumer values the difference between the received product/service and the price paid for acquiring it. Other authors often define customer value as a multidimensional perceived value, describing it as "complex" (LAPIERRE, J. 2000), "having several factors" (BABIN, B.J. *et al.* 1994), "dynamic" (WOODRUFF, R.B. 1997; PARASURAMAN, A. and GREWAL, D. 2000) or "subjective" (ZEITHAML, V.A. 1988).

The analysis of multi-dimensionality is a relevant approach for the unfolding of consumer value dimensions present in tourism. The following dimensions can appear among the components of consumer value:

- on the one hand, dimensions may appear that derive from rational (cognitive) decision and focus on functionality (e.g. the price and quality of the service elements),
- on the other hand, affective dimensions may turn up that have an effect on the consumer product-related perception (such as atmosphere, feelings, relationships, experiences).

The basis of every company's (in this case, touristic service providers) long-term success and competitiveness is the long-lasting satisfaction of their consumers, which occurs if they can create value for them. Therefore, the definition of consumer value components and dimensions is highly critical in tourism as well (YUAN, Y-H.E. and WU, C.K. 2008). In the field of tourism there are relatively few studies on the identification and measurement of consumer value dimensions (SÁNCHEZ, J. *et al.* 2006), nevertheless, we can assume, based on the achieved results, that due to its being so abstract, impossible to conserve, heterogeneous and complex, the one-dimensional (trade-off) model of value would be too simple to define consumer value with. Instead of the functional (mainly price and quality based) approach, the socio-psychological approach might be appropriate (WILLIAMS, P. and SOUTAR, G.N. 2000).

We can say that consumers can acquire values from different types of experiences. Experience value compared to consumer value focuses on value components, which are preserved in the consumer after these experiences. Thus, there are a lot of similarities between experience value and consumer value, yet, research on experience value is rare. YUAN, Y-H.E. and WU, C.K. (2008) used the consumer value concept for the measurement of experience value, since most researchers of the field agree that the major dimensions of consumer value are made up of emotional and functional characteristics.

⁵ Customer Relationship Management

Research methods

Despite the fact that models of consumer value have already been adapted in the literature on tourism, empirical studies are not very widespread. The basis of success of rural tourism in Hungary could be the identification of tourists' motivations, attitudes, as well as factors that carry value for them, since it may reveal useful information both scientifically and practically.

In our quantitative research a double questionnaire survey was carried out. We conducted our survey in cooperation with the National Association for Rural and Agrotourism. Within the frame of this cooperation, the association helped us choose and get in contact with touristic service providers in the regions of Hungary, where the number of guests in rural tourism is outstanding and the activity of the enterprise is successful. Sampling was based on expert recommendation. Using the method of non-probability sampling, we sent questionnaires to 25 touristic businesses distributed in all counties and regions, where they had it completed by their guests with the method of convenience sample. Our aim was to study the characteristics of guests participating in rural tourism at a certain point in time, thus, we must also take caution to not use results from this sample to generalize to a wider population.

We sent out 300 questionnaires altogether. Out of the received 148 questionnaires, we could process 132 questionnaires. When selecting the subjects an important principle was representativeness and randomness, which means that the sample should approximately have the same features statistically as the mass (guests taking part in rural tourism) to be analysed. Nevertheless, since in Hungary the characteristics of the guests are not known, and we do not have exact figures about the basic mass is the conditions of representativeness cannot be controlled.

We forwarded our retrospective online questionnaire (N = 220) to tourists who already took part in rural tourism in the last 3 years and who have valuable observation.

With the double questionnaire survey our aim was to investigate if there is a significant difference in the answers of consumers interviewed on the location and in the form of retrospective online research. The questionnaire consisted of closed, nominal ordinal, semantic differential questions and questions measured on the Likert-scale.

Research results

During the analysis we applied descriptive statistics, primarily frequency analyses, and multi-variant data analysis techniques, cross-tabs-analysis, and factor analysis with the help of SPSS 18 statistical program package.

Based on the major aspects of the analysis, the results of the questionnaires conducted on the field (N = 132) and online (N = 220) were compared, so that we can learn basic differences. It was also important to investigate whether the composition of the samples from two different sources is different or not. Independent two-sample t-test was used to test the significance.

The compared data (gender ($p = 0.074$), sender region ($p = 0.367$), tourist motivation ($p = 0.956$), interpretation of rural tourism ($p = 0.476$) and region of holiday ($p = 0.258$)) confirmed that the composition and preference of the two samples did not contain any significant differences, moreover, they rather tended to strengthen each other, so we will continue to analyse the data together, in a 352 subject sample.

The content and interpretation of domestic rural tourism – Based on consumer responses

In our research we were particularly interested to know how today's touristic trends (ETC 2006) – individual consumption, conscious travelling, the search for authenticity and value, complex touristic packages – can influence Hungarian rural tourism. What is the key motivation of tourists when they choose rural tourism, and what does rural

tourism mean to them? The findings show that in Hungary the consumers of rural tourism choose this form in order to experience the countryside (27.8%), but apart from that, there is a group of consumers for whom undisturbed relaxation in itself is a major motivation (26.1%) (Figure 5).

Examining the motivations by age groups, we can see a significant, medium strong relationship between the variants (Figure 6). On the basis of the findings we can say that 35 percent of young adults and 30.5 percent of the middle age people arrive at the destination with the purpose of experiencing the

countryside in a complex way. Also in the same age groups, the motivation of relaxation is 29.1 and 23.7 percent respectively.

In the group of young adults, relaxing in a peaceful environment has a stronger motivational force (31.1%) than complexity (24.6%). For the elderly generation the major motivation to select rural tourism besides relaxation (17.2%) and complexity (17.2%) is the vicinity of nature (13.8%), experiencing nostalgia (13.8%) and real hospitality (13.8%).

At the level of 95 percent validity we can see a significant correlation between the motivation of consumers and the receiving

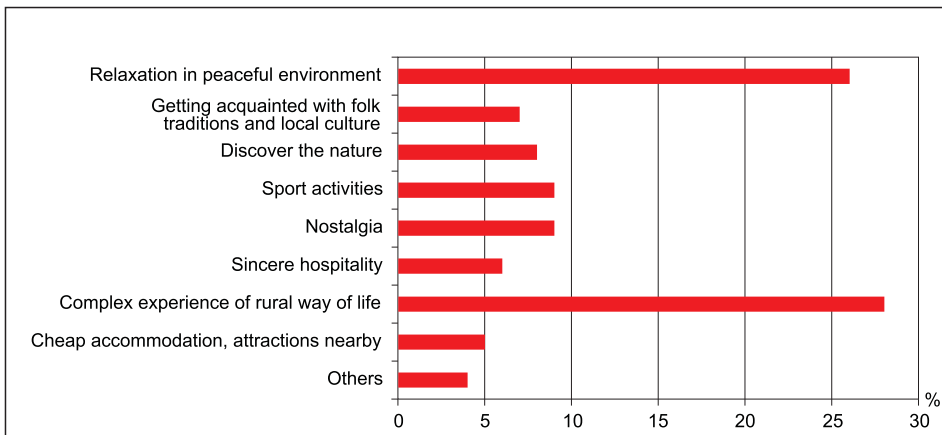


Fig. 5. Distribution of the sample based on motivation, Source: KULCSÁR, N. 2013

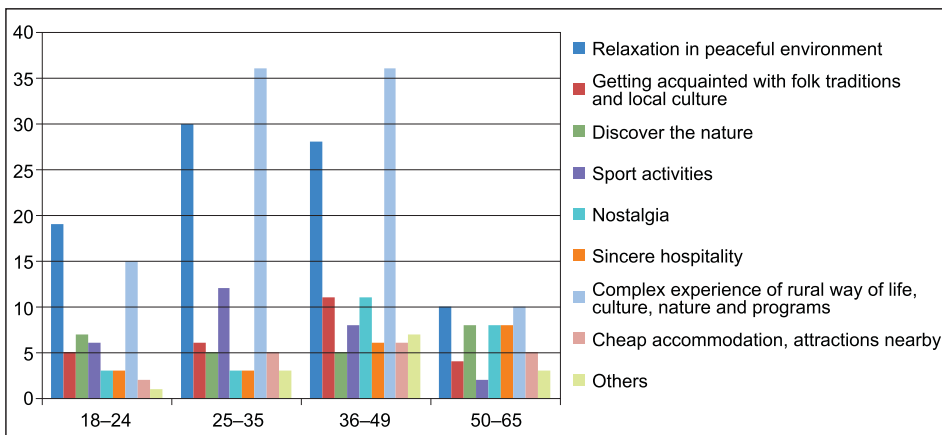


Fig. 6. Distribution of motivations according to age ($\chi^2 = 38.367$; $df = 24$; $p = 0.032$). Source: KULCSÁR, N. 2013

destinations too. Tourists looking for the complex experience of the countryside as well as peaceful relaxation, willingly choose Northern Hungary, Western Transdanubia and Central Transdanubia for the location of their holidays.

Travellers seeking to experience genuine hospitality mostly choose the Northern Hungary region (28.6%). If the guests want to experience a nostalgic atmosphere, they prefer to choose the region of the Southern Great Plain region (32.1%), as well as Northern Hungary. For sports lovers the primary destination is hilly Northern Hungary (21.4%) and Central Transdanubia (17.9%). Regarding most motivational factors (culture, nature, calmness, sport, hospitality), Northern Hungary is the most popular region, yet those travelling to seek nostalgic feelings, usually choose the Southern Great Plain region as their destination.

The order of motivations can change according to age groups, destinations, residence and people travelling together. On the whole, from the findings of the research we can draw the conclusion that in the first place tourists choose rural tourism because of the values of nature and local programmes, while visiting the sights of the surrounding area comes in the second place and in the third place learning about the country lifestyle and activities around the house could be recorded (*Table 1*).

culture, nature and authentic programmes, although the most important for them is discovering the values of nature and recreation in fresh air in a beautiful environment. Thus, a new model of Hungarian rural tourism could be set up based on international practices (see *Figure 1* above) and our pilot study where nature-orientation is in the internal, essential circle, while country lifestyle, culture and heritage belong to the circle of supplementary services.

Consumer value dimensions in rural tourism

In order to identify the latent structures behind the consumer's responses namely the consumer value dimensions of rural tourism, firstly 33 value indicators were identified, and their importance was examined. The consumers indicated on a 1–4 point evaluation scale how important the different indicators are. After all a factor analysis on these value indicators was carried out. The main aim was to measure the dimensions and relevance of these factors, setting up the order of their importance.

The factor analysis was conducted with Varimax rotation. The method serves data compression and the identification of data structure, where the number of initial indicators is contracted into factor variants, which are directly non-observable. The adaptability

Table 1. Order of preference of programs

Ranking	Programme preference	Online	On site	Together
1.	Hiking and discover the nature	544	387	931
2.	Visiting the main attractions of the surrounding area	638	383	1,021
3.	Getting acquainted with farm activities around the house*	802	460	1,262
4.	Participating in traditional programmes**	806	459	1,265
5.	Visiting festivals	814	547	1,361
6.	Silent passive activities***	916	536	1,452

*E.g. vintage, bread baking, canning, **E.g. crafts, folk-dancing, ***E.g. reading, board games.

Source: KULCSÁR, N. 2013

We can conclude that in accordance with the European trends in tourism the majority of consumers in rural tourism travel to experience the complexity of country lifestyle,

of indicators for factor analysis was tested by the Kaiser-Meyer-Olkin (KMO)-criterion, and the variance quotient methods. After the factor analysis of indicators linked to the physi-

cal environment and human interactions, 10 factors were separated⁶:

F1. Host attitude: it is important for the guests that the host is helpful and friendly, and has information about the touristic attractions and events of the area.

F2. Attractive accommodation: it is important for the guests that the accommodation is nicely decorated both inside and outside.

F3. Clean, well-equipped accommodation: it is important for the guests to have clean and well-maintained accommodation, equipped with comfortable furniture.

F4. Interaction and activity at the accommodation: it is important for the guests to have a stay which is rich in impulses, i.e. to have personal contacts and be part of the programmes during their stay.

F5. Authentic accommodation: it is important for the guests that the rural accommodation represents authenticity and has the typical features of traditional folk architecture both inside and outside.

F6. Peaceful relaxation: it is important for the guests that during their holiday they have a harmonious relationship with the local people and with other guests, not disturbing each other's activity.

F7. Presence of animals: it is important for the guests to see domestic and farm animals on the host's premises.

F8. Nicely arranged, clean settlement: it is important for the guests that the accommodation is located in a clean, nicely arranged and peaceful settlement surrounded by nice environment.

F9. Online availability: it is important for the guests also to receive information of the host's services and get in touch with him online.

F10. Cheap accommodation close to a major attraction: it is important for the guests to have a low-priced accommodation, not far from the major tourist attractions of the area.

Finally, after the factor analysis we averaged all factors based on the value of impor-

tance of their indicators⁷. As a result, we got the importance of the given indicator group (factors), from which we drew the conclusion that for guests the most important group of indicators during their rural holiday is the orderliness and cleanliness of the settlement (destination), followed by the neat and attractive arrangement of the accommodation, while the third group of indicators in rank is the personality, preparedness and helpfulness of the host (*Table 2*).

Interpreting the order of the factors we can conclude that for rural tourists indicators linked to the conditions of the physical environment are of greater importance than those linked to the human factors. Apart from this we can see that the strive for "modernisation" is valid for the analysed circle of consumers.

Based on the results of the factor analysis and the ranking regarding value indicators, we conclude that for tourists in rural tourism functional (quality, price) value dimensions are of primary importance, they have a greater value than affective experience dimensions (recreation, human relations and activity, environment) (*Table 3*).

The answer to our research question is that for consumers the most important value dimension in rural tourism seems to be quality, i.e. the functional arrangement of the accommodation and the host. These are followed by factors like peaceful relaxation, and appropriate price in the third place, and experience through personal interactions and programs in the fourth position. The fifth value dimension is the experience in an authentic country environment.

Conclusions

The primary aim of our research was to conduct a survey in rural tourism, which can contribute to the better understanding of the demand side and crystallise the factors with value to tourists, helping the better elaboration

⁶ In our research the method of factor analysis was Principal Component Analysis. The number of factors was determined based on the elbow criterion and the explained variance.

⁷ Importance of indicators come from consumers' responses given to the survey questions with an evaluation scale (1 = not important; 4 = very important).

Table 2. *The order of importance and dimensions of rural tourism's consumer value factors*

Ranking	Value factors	Number of indicators	Mean	Dimensions
1.	Nicely arranged, clean settlement (F8)	2	3.63	Functional (Quality)
2.	Attractive accommodation (F2)	3	3.51	
3.	Host attitude (F1)	7	3.49	
4.	Peaceful relaxation (F6)	3	3.42	Affective (Experience – recreation)
5.	Clean, well-equipped accommodation (F3)	5	3.39	Functional (Quality)
6.	Online availability (F9)	2	3.29	
7.	Cheap accommodation closer to major attractions (F10)	2	3.17	
8.	Interaction and activity at the accommodation (F5)	4	2.98	Affective (Experience – human interactions, activities)
9.	Authentic accommodation (F5)	2	2.89	Affective (Experience – milieu)
10.	Presence of animals (F7)	1	2.64	

Source: KULCSÁR, N. 2013

Table 3. *Order of importance of consumer value dimensions*

Ranking	Consumer value dimensions	Number of factors	Mean
1.	Functional (Quality)	5	3.46
2.	Affective (Experience – recreation)	1	3.42
3.	Functional (Prize)	1	3.17
4.	Affective (Experience – human interactions, activities)	1	2.98
5.	Affective (Experience – milieu)	2	2.77

Source: KULCSÁR, N. 2013

tion of development strategies and matching the supply to consumers' expectations. We believe, the scientific significance of this study lies in the fact that the interpretation and measurement of consumer value seen in rural tourism is going to fill a gap in the literature of tourism management. Based on the research findings, it will be possible to plan the supply or product development and the marketing strategy of the product in practice.

As a conclusion we can also note that the characteristics of Hungarian rural tourists have slightly changed compared to what was seen years ago (see Kiss, K. 2001). According to this earlier qualitative research the participation of city professionals, mainly pensioners or families with small children was significant, but young people without children were also a major segment of demand. In

our current study, the group of elderly professionals represents a smaller proportion, with mainly the middle-aged professionals making up the demand of rural tourism, who travel to seek the countryside atmosphere. The second most important segment is the group of young people wanting to escape from the city, who usually travel with their children. They look for the safe and beautiful countryside, where they can show the flora and the fauna, the features of life outside the city, to their children. In our sample young people who are attracted to the countryside by relaxation and entertainment facilities were under-represented.

We cannot say that rural tourism is mostly chosen by people in favour of traditional values, who do not want to keep up with the accelerated modernisation or are not affected by the idea of globalisation. Guests with pro-

gressive ideas but with less commitment to traditional values are also represented in a similar proportion in domestic rural tourism. On the other hand, we can say that most guests consider themselves materialistic, so for them it is important to buy the service at the lowest possible price, although this does not mean the highest priority. These conclusions are affected, on the one hand, by the type of product, since compared to most touristic products rural tourism offers its services at more favourable prices, but on the other hand, we must not forget that recent unfavourable changes in the world economy also had an impact on tourism.

For our sample it was not of major importance to have authentic accommodation, and that it represents folk style in its architecture or equipment. They prefer to stay in a house which is well-equipped according to contemporary requirements or expectations. Having animals around the house is important for the segment where parents want to show them to their children. In our opinion own local values are losing their significance, which is the effect of the spread of global values, and the fact that today's tourists seek a high level of comfort.

Our findings also showed that although getting the experience is important for rural tourists, in Hungary it does not outrun functional value dimensions. For the interviewed consumers, the most important value dimension was quality, that is, the functional arrangement of the accommodation and the personality of the host. It was followed by peaceful relaxation, then appropriate price in the third place, while in the fourth place we can find the need for experience through personal interactions and programs, and the fifth value dimension is experiencing the authentic environment. In author's opinion, the results in this field were also influenced by the fact that so far only few really creative products have appeared in Hungary and the supply of experience industry is currently under development, so tourists could only see a very low number of thematic experience packages.

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Ukraine in Maps

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*Institute of Geography National Academy of Sciences of Ukraine
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Since the disintegration of the USSR, the Western world has shown an ever-growing interest in Ukraine, its people and its economy. As the second-largest country in Europe, Ukraine has a strategic geographical position at the crossroads between Europe and Asia. It is a key country for the transit of energy resources from Russia and Central Asia to the European Union, which is one reason why Ukraine has become a priority partner in the neighbourhood policy of the EU. Ukraine has pursued a path towards the democratic consolidation of statehood, which encompasses vigorous economic changes, the development of institutions and integration into European and global political and economic structures. In a complex and controversial world, Ukraine is building collaboration with other countries upon the principles of mutual understanding and trust, and is establishing initiatives aimed at the creation of a system that bestows international security.

This recognition has prompted the Institute of Geography of the National Academy of Sciences of Ukraine (Kyiv) and the Geographical Research Institute of the Hungarian Academy of Sciences (Budapest) to initiate cooperation, and the volume entitled “Ukraine in Maps” is the outcome of their joint effort. The intention of this publication is to make available the results of research conducted by Ukrainian and Hungarian geographers, to the English-speaking

public. This atlas follows in the footsteps of previous publications from the Geographical Research Institute of the Hungarian Academy of Sciences. Similar to the work entitled *South Eastern Europe in Maps* (2005, 2007), it includes 64 maps, dozens of figures and tables accompanied by an explanatory text, written in a popular, scientific manner. The book is an attempt to outline the geographical setting and geopolitical context of Ukraine, as well as its history, natural environment, population, settlements and economy. The authors greatly hope that this joint venture will bring Ukraine closer to the reader and make this neighbouring country to the European Union more familiar, and consequently, more appealing.

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The role of slow design elements in managing tourist flow on the example of Bruges, Belgium

BRIGITTA PÉCSEK¹

Abstract

This paper attempts to rethink the tourist flow from the perspective of urban planning solutions, which have potentials of slowing down tourists and dispersing them more evenly in urban areas. It starts with an overview on current urban tourism trends and challenges and with a cross-disciplinary approach the wider contemporary literature is introduced including *citta slow* and *slow design*. The focal point of the analytical part of the paper is the historic city of Bruges and the analysis of its green spaces, land and water related structures that influence tourist mobility. The paper argues that heritage towns like Bruges are not without tools to cope with the tourist 'overflow' and more awareness of tourists' space usage coupled with sound planning might even boost their efficiency to do so. The study also aims to enrich the intellectual debate on slow perspectives and practices in order to help urban destinations manage successfully spatial-temporal crowd movement.

Keywords: urban tourism, urban design, slow design, *citta slow*, Bruges

Introduction

The main aim of this paper is to present the role of urban design, specifically green spaces, land and water related structures in the management of the tourist flow. There is a growing body of literature focusing on urban tourism (BICZÓ, G. 2011; JENSEN, O.B. 2009; MICHALKÓ, G. and RÁTZ, T. 2006; PUCZKÓ, L. and RÁTZ, T. 2003; SENNETH, R. 1994; SZIJÁRTÓ, Zs. 2011), where both the supply and the demand sides of urban tourism are intensely discussed. There has also been a proliferation of research regarding crowd management in urban settings (BRYON, J. 2005; BRYON, J. and NEUTS, B. 2008; POPP, M. 2011; SELBY, M. 2004). However, the relationship between cities' layout and tourist interactions within the context of tourists' mobility has been widely neglected. Since each destination has its own spatial and temporal pattern influenced by landscape and architecture, directly impacting tourist circulation, this theoretical hiatus should be filled.

Cities, the clearest manifestations of turbo capitalism, serve as residential, industrial and commercial areas for locals, while being the epicentre of global urban tourism. Consequently, they have always been a battle-ground where locals and tourists stake their claims. Pausianus (160 B.C.), a seasoned traveller of his time penned the first ever *baedeker*, in which he designed a 2–5 year long "ancient" Grand Tour, including Rome, Greece, Turkey and Egypt in the itinerary (OLDFIELD, P. 2013). Later in the 17th century the classical Grand Tour meant something very similar, a traditional trip of Europe undertaken by wealthy upper-class young European men. Today, cities are easily accessed by both low-cost airlines and superfast trains, therefore, they have become a paradise for weekend travellers. In cities local residents and visitors are intimately linked by motion and have to negotiate their relationship on a daily basis (JENSEN, O.B. 2009). What is more intriguing that tourists themselves fight for the same congested space.

¹ Enyedi György Doctoral School of Regional Sciences, Szent István University, H-2100 Gödöllő, Páter Károly u. 1. E-mail: brigitta.pecsek@gmail.com

This paper starts with an overview of contemporary literature on urban tourism, followed by the discussion of the citta slow initiative drawing upon works of renown international experts (HONORÉ, C. 2005; DICKINSON, J.E. *et al.* 2010; KNOX, P. 2005; LUMSDON, L. and McGRATH, P. 2010), moving onto the description of the slow design concept put forward by STRAUSS, C. and FUAD-LUKE, A. (2008).

The theoretical part is followed by a case-study on Bruges which illustrates how urban design can rearrange the tourist flow in terms of space and time. The paper argues that heritage towns like Bruges are not without tools to cope with the tourist 'overflow' and more awareness and careful planning might even boost their efficiency to do so. The town boasts landscape solutions, water related structures including canals, bridges and quays rebuilt for pedestrian traffic as well as built structures such as passages and towers, which all might influence space consumption pattern. These design solutions slow down movements, break the rhythm, and initiate pause, reflection and engagement that contribute to slower tempo and more rewarding participatory experiences. The ultimate goal of the study is to draw attention to existing urban design solutions that impact urban tourist flows and to generate an intellectual brainstorming among urban geographers, social scientists and tourism planners.

Urban tourism

The World Tourism Organization (UNWTO) refers to urban tourism as trips taken by travellers to cities or places of high population density. The duration of these trips is usually short (1–3 days), therefore, it can be said that urban tourism is closely linked to the short-breaks market (Tourism 2020 Vision, UNWTO 2002). Urban tourism is booming all over the world. The Euromonitor survey indicates that out of the 20 most visited cities in the world, only two (Antalya and Shanghai) suffered a slight loss of arrivals from 2011 to 2012 (*Table 1*).

The former is the capital of the Mediterranean coast in Turkey, and unlike the cosmopolitan Istanbul, it is a transportation hub for international package tourists heading to Mediterranean resorts. Shanghai, the great regional business centre also lost 2 percent of its visitors, however, other Chinese cities such as Shenzhen and Guangzhou compensated for the loss with a growth of 9.6 percent and 1.2 percent respectively. The top 20 list contained 12 Asian and 4 European cities, plus the Eurasian Istanbul, New York as the only American representative, and Dubai with Mecca, both located on the Arabian Peninsula. No African, South American and Australian cities appeared on the list in 2012.

The survey clearly shows a definite shift from Europe-centred tourism towards a more Asia-centred one. The first five positions were exclusively occupied by Asian cities except for London. The most substantial growth was realised in Taipei, Istanbul, Bangkok and Rome, each enjoyed over a 10 percent increase in one year. Apart from China, Turkey and Thailand also had multiple participants: Istanbul and Antalya, Bangkok and Pattaya respectively. In both cases the second city is a hub for SSS (sea, sun, sand) tourists. Only Mecca, the Islamic holy city is a religious centre. Prague was the only representative of Central and Eastern Europe on the list. Overall, it might be concluded that cities enjoyed a robust growth in the examined period, however, Southeast Asia and Western Europe had by far the highest concentration of tourists.

Urban tourism became subject of academic interest during the 1980s. The recent emergence of low cost airlines contributed to a robust growth in the field and increased the interest of researchers even further. Puczkó, L. and RÁTZ, T. (2003) argued that the attraction of cities is due to the fact that as complex, sophisticated tourism products they appeal to a broader market. Metropolitan areas possess a high concentration of sights, therefore, they represent an unmatched good value in contemporary mass tourism. This density of attractions produces a great synergy effect and makes urban destinations less prone to

Table 1. *Euromonitor International's top city destinations ranking in 2012*

Rankings	City	Country	Arrivals in 2012 1,000 persons	Growth from 2011 to 2012 in %
1.	Hong Kong	China	23,770.2	6.5
2.	Singapore	Singapore	21,345.7	7.7
3.	Bangkok	Thailand	15,822.6	14.6
4.	London	UK	15,461.0	2.3
5.	Macau	China	13,360.8	3.4
6.	Kuala Lumpur	Malaysia	13,339.5	6.7
7.	Shenzhen	China	12,100.4	9.6
8.	New York City	USA	11,618.0	8.9
9.	Antalya	Turkey	10,296.6	-1.6
10.	Paris	France	9,780.8	3.3
11.	Istanbul	Turkey	8,820.1	16.5
12.	Rome	Italy	8,670.7	13.9
13.	Dubai	UAE	8,023.0	0.5
14.	Guangzhou	China	7,879.6	1.2
15.	Phuket	Thailand	7,217.0	14.7
16.	Mecca	Saudi Arabia	6,852.9	6.9
17.	Pattaya	Thailand	6,564.3	8.4
18.	Taipei	Taiwan	6,561.2	24.8
19.	Prague	Czech Republic	6,547.7	5.1
20.	Shanghai	China	6,539.7	-2.2

Source: Euromonitor, 2013.

seasonality. The phenomenon is also reinforced by the birth and spread of the experience economy theorized by (PINE, P.J. and GILMORE, J.H. 1999), which has been gradually replacing the traditional service economy.

MICHALKÓ, G. and RÁTZ, T. (2006) pointed out that simultaneously with the urban tourism boom, a falling demand in seaside holidays might also be noticeable, since an SSS holiday with a narrower range of offerings cannot compete with historic cities, which are considered by many as the genuine temporal manifestations of the days gone by. As the source of holiday satisfaction is coming more often than not from the tourists' narrative constructed through the interpretation of experiences instead of the physical resources, cities with vibrant cultures will always have comparative advantages.

Biczó, G. (2011) picks upon the aspects of familiarity, saying that urban tourism provides less challenge to visitors who are mostly city dwellers themselves, even though leaving their residence behind always represents some risks. So, the primary motive of

urban tourists is not necessarily to yearn for the unknown and exotic but to find an exit from daily drag and schedule.

According to SZIJÁRTÓ, Zs. (2011) getting off the treadmill and the relaxation of the brain are the main points of tourism. After getting into the holiday spirit, the hustle and bustle of the destination is no cause for concern anymore. On the contrary, for happy non-participants witnessing locals succumbing to hurry might even be a joyful experience.

NIEDERMÜLLER, P. (2000) also supports the point by saying that urban tourism for city dwellers is a mish-mash of the well-known and the unknown, since each city has familiar non-places such as movies or bankomats, the everyday and the profane, where tourists feel at home and ease. He joins Biczó and SZIJÁRTÓ arguing that urban tourism does not display exoticism, even though each city is a representation of the national culture and always will be distinguishable.

Due to the popularity of city breaks, local governments, urban planners and designers face an unprecedented challenge. According

to the World Health Organization (WHO) 50 percent of the world population (3.5 billion) lived in cities in 2010. The Global Report of City Tourism (2012) estimates that the urban population continues to grow and will reach 61 percent worldwide in 2030, so close to five billion people will live in urban areas. The growth of cities will take place alongside with the further expansion of urban tourism. The report identifies the following set of issues in relation to urban tourism:

- How to manage the increasing number of tourists arriving to cities in a responsible and sustainable way?
- How to use urban tourism to improve the quality of life of the local population?
- How can we make sure that tourism action plans and the city development are part of the decision making process?
- How can we incorporate available information and communication technologies to develop smart cities that are more competitive, sustainable, accessible and human?
- How to measure the economic impact of tourism for the cities?
- How can cities take practical steps to reduce impact on the environment and promote the benefits of greener tourism?

Slow cities

The first grassroots initiative, the slow food was launched by the Italian Carlo PETRINI in Pollenzo in 1984 to protest against the opening of a McDonald's restaurant in Rome. Nowadays, it has followers in 150 countries where locals and visitors enjoy the pleasure of food in a sustainable and responsible way. Slow Food dreams of a world, in which all people can access and enjoy healthy food, which is also good for those who grow it and for the planet as well. They fight against the standardisation of taste and culture, and the omnipotent power of food industry multinationals and industrial agriculture. Their approach is based on three main principles: good, clean and fair food (www.slowfood.com).

The *citta slow* ("slow city") movement (1999) is built upon the slow food ideology and principles to counteract the superfast pace of megacities. SENNETH, R. (1994) argues that fast mobility in cities destroys the sense of place and the function of urban space degenerates into nothing else than providing smooth traffic flow. The *citta slow* movement born at the advent of the millennium aims to give a viable alternative for those who enjoy the perks of the cities (heritage and culture) without the fast space and pollution. It results in the improvement of the quality of life and well-being for locals. Those urban areas create ideal conditions for slow tourism, because a growing number of travellers find the promise of the slower pace attractive.

A lot of towns worldwide have embraced careful urban planning in order to make the place equally enjoyable for locals and visitors alike. However, the movement is only open to towns with a population of less than 50,000. Larger cities need to rethink their spatial and temporal framework by breaking up urban areas into smaller fragments. MICHÁLKÓ, G. (2012) defines them as distinct neighbourhoods milieus, while SZIJÁRTÓ, Zs. (2004) calls them coulisses. These fragmented metropolises then allow visitors to interact with locals, consume local products, enjoy local culture just as much as close-knit country communities do.

The goals of the movement include improving the quality of life in towns by slowing down its overall tempo. There are three categories of membership: *citta slow town* (population less than 50,000); *citta slow supporter* (population over 50,000); and *citta slow friend* (individual or family). In 2014 28 countries had 176 slow cities situated mainly in Europe, however, some of them are located in Canada or New Zealand. Larger cities can become either a supporting member or can transform a certain district of the metropolitan area into a slow city (e.g. Jeonju Hanok district in Jeonju). To become eligible for full membership, a town must score at least 50 percent in a self-assessment test against the set of 55 *citta slow* criteria centred on the following 6 issues:

1. making life better for everyone living in an urban environment,
2. improving the quality of life in the cities,
3. resisting the homogenisation and globalisation of towns around the globe,
4. protecting the environment,
5. promoting cultural diversity and uniqueness of individual cities,
6. providing inspiration for a healthier lifestyle (www.cittaslow.com).

An ever-growing number of destinations implement a variety of citta slow principles in order to enhance the quality of everyday life and to manage the circulation of both locals and tourists more effectively. The following sections present the case of Bruges taking a so far neglected angle, the relationship between urban design and the tourist flow.

Tourism in Bruges

Flemish art cities are considered to be the most attractive tourism products in Belgium and enjoy a dynamic growth in tourism. Data show the latest statistics on urban tourism in the region's six main urban destinations (*Table 2*).

Table 2. Tourism in Flemish cities in 2012

Cities	Overnight stays, million guest nights	Distribution of overnight stays, %
Brussels	6.0	55
Antwerp	1.8	16
Bruges	1.6	16
Ghent	0.9	8
Leuven	0.4	3
Mechelen	0.2	2

Source: Toerismevlaanderen 2013.

Capital cities are the crown jewels of city-breaks. So, not surprisingly, Brussels was by far the most popular destination in 2012, concentrating five million overnight stays in 2008, which went up gradually to over 5.6 million nights. The capital realised the second smallest annual average growth (3.3%) among the cities examined. As for the other five destinations, the compact size of the re-

gion is both a blessing and a curse. The closeness of Brussels might generate extra visitor numbers in nearby cities including Bruges. However, it might also discourage overnight stays. The capital was followed by Antwerp, one of the largest port cities in Europe with 1.5 million nights in 2008, which grew to 1.8 million nights by 2012. The number of nights increased only moderately during the investigated period; in fact this city had by far the slightest increase in the number of nights, only 2.1 percent annual average growth was registered. Bruges came a close third realising 1.6 million nights in 2012 and the city enjoyed a dynamic expansion. The other three cities lagged far behind over the whole period, although the number of nights spent in Leuven and Mechelen rose annually by 6.7 and 6.0 percent respectively. All in all, the conclusion might be drawn that city tourism in Flanders has had great potentials and the trends suggest a further expansion in the future.

The lure of Bruges rests on three main factors: its heritage, cultural offerings and easy accessibility (*Figure 1*). NEMES NAGY, J. (2009) defines accessibility by the distance from the capital, from the closest regional centre, from the closest local centre, from the closest border checkpoint and from the closest highway. The canal-based city has a population of 120,000 and around 45,000 live in the medieval centre. It lies less than a hundred kilometres from Brussels and Antwerp and 40 km from Ghent. Bruges is connected by highways to all important settlements. Border checkpoints (15 km) do not have relevance within the European Union context; a mental border might exist for overseas tourists, though. The whole historic centre of Bruges has been a UNESCO World Heritage Site since 2000 and it was also the "European Capital of Culture" in 2002.

The development of quality tourism dates back to a conference held in 2002 (SULYOK, J. 2002), when the four principles of sustainability were defined: protecting cultural heritage, improving water quality, consensual city planning and efficient management of the

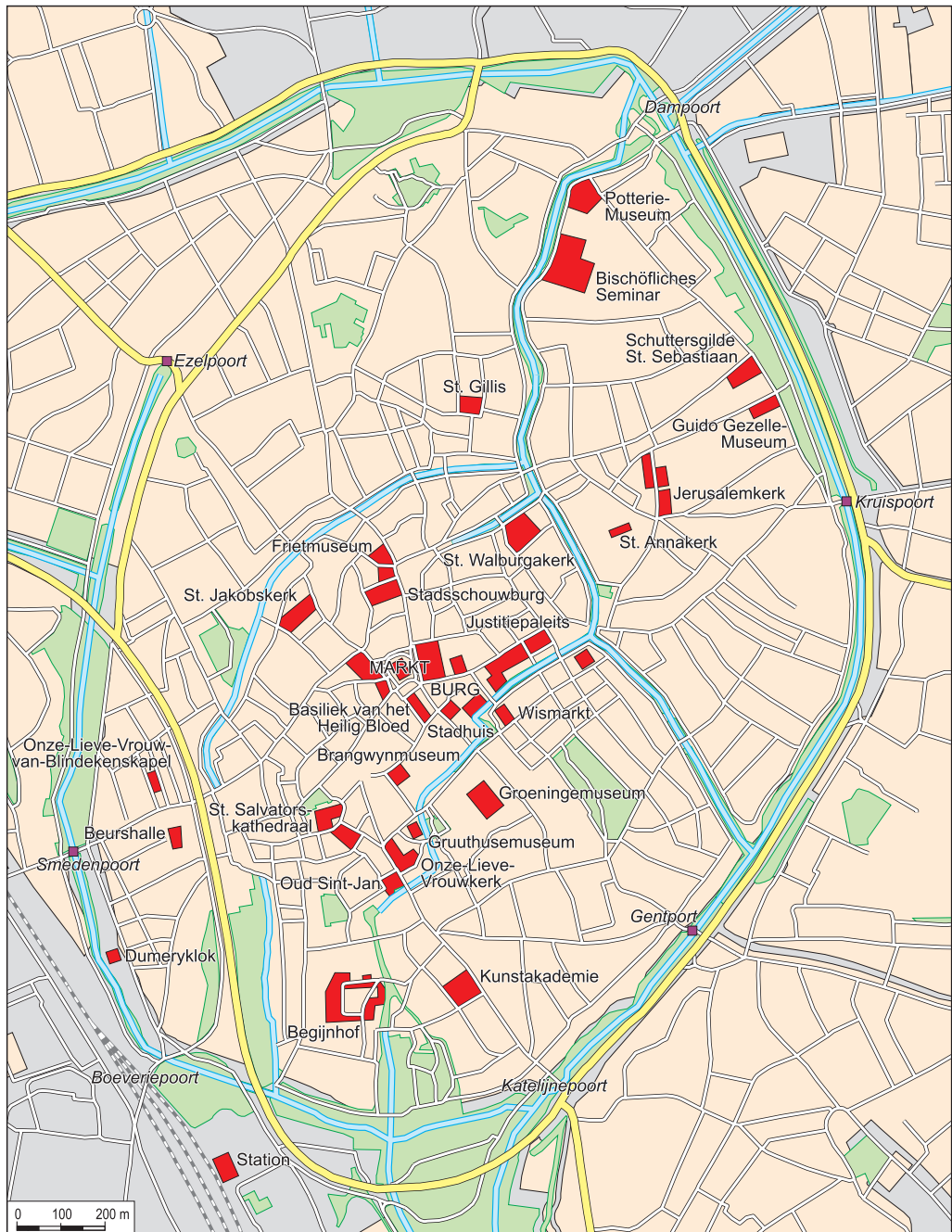


Fig 1. Main tourist attractions in the centre of Bruges. Source: <http://www.planetware.com/>

local community. Furthermore, recognising the need of mutual understanding between residents and visitors, the local government intended to improve both quality tourism and central areas heavily exposed to tourism concurrently. It also aimed to involve all stakeholders: service providers, tourists, tourism organisations, local residents and local government in order to find a consensual development path. *Table 3* shows the main tourism data in Bruges between 2008 and 2012.

Slow design elements in Bruges

“Slow Design is a unique and vital form of creative activism that is delivering new values for design and contributing to the shift toward sustainability” – defined by STRAUSS, C. and FUAD-LUKE, A. (2008). The authors belong to the group of Slowlab, which is an organisation established to promote slow design. This initiative was inspired by the global slow movement and set similar aims:

Table 3. Tourism in the hotels of Bruges, 2008–2012

Indicators	Years						Changes in %		
	2008	2009	2010	2011	2012	from 2011 to 2012	from 2008 to 2012		
	Number of arrivals in 1,000 persons								
Guests									
from abroad	568.8	547.9	595.5	684.8	679.9	-0.71	4.82		
overall total	691.4	675.0	753.8	859.7	866.7	0.82	6.04		
Number of overnight stays in 1,000 guest nights									
Guests' nights									
from abroad	1,086.5	1,024.9	1,096.4	1,241.1	1,245.1	0.33	3.71		
overall total	1,276.9	1,224.9	1,347.1	1,512.4	1,529.2	1.10	4.80		
Average length of stay in days									
Average guests' days									
from abroad	1.91	1.87	1.84	1.81	1.83	1.05	-1.04		
overall total	1.85	1.82	1.79	1.76	1.77	0.29	-1.13		

Source: Toerismevlaanderen 2013

The number of arrivals increased dynamically by 6 percent on average annually. More than 866,000 tourists stayed in hotels in the year of 2012. In terms of overnight stays in hotels, the city realized an annual average growth of 4.8 percent during the examined period, however, foreign visitors contributed more than domestic guests. In 2012 the total number of nights spent in hotels reached over 1.5 million

Looking at the average length of stay the picture is less promising. The growing number of tourists and overnight stays did not translate into longer stay per capita. Although there was a slight rebound from 2011 to 2012, the average annual fall in the average length of stay was more than 1 percent in case of both domestic and foreign hotel guests.

they would like to provide alternatives to our fast-paced postmodern society in the field of design (www.slowlab.net). Besides the definition, authors also identified six main features that slow design has to possess. They are as follows:

Reveal: it reveals experiences in everyday life that are often missed or forgotten, including the materials and processes that can be easily overlooked in an artefact's existence or creation.

Expand: it considers the real and potential “expressions” of artefacts and environments beyond their perceived functionalities, physical attributes and lifespans.

Reflect: it induces reflective consumption.

Engage: it relies on sharing, co-operation and transparency of information so that designs may continue to evolve into the future.

Participate: it encourages users to become active participants in the design process, embracing ideas of conviviality and exchange to foster social accountability and enhance communities.

Evolve: it recognises that richer experiences can emerge from the dynamic maturation of artefacts, environments and systems over time. Looking beyond the needs and circumstances of the present day, slow designs are (behavioural) change agents (STRAUSS, C. and FUAD-LUKE, A. 2008).

The slow design concept elaborated by the authors includes elements that have been expected from good, user-friendly architecture and urban design; therefore, several old landscape solutions and structures in Bruges can be easily qualified as slow design. Below is a table featuring various design elements facilitating slowness in Bruges (Table 4). Sometimes slow design elements are the main attraction (lake), in other cases they are ancillaries (benches) enabling the full enjoyment of the place.

serves as the natural, sound-proof buffer zone that enables visitors to slip into time-out mood and become more in synch with the environment.

According to FÓRIÁN, S. and HAGYMÁSSY, Z. (2009) green spaces in urban setting have primarily an air cleaning role, however, in tourism context their role *expands* way beyond that, including a recreational and an aesthetic role that is experienced through seeing, hearing and smelling. The interpretation of this sensory overload needs *active participation* from tourists. As they proceed and get deeper into the park, *reengagement* with nature and the outdoors occurs. Gradually, nature takes over, and *reveals* itself through the different sizes, shapes, smells and surfaces of plants. Their greenness exudes peace and quiet and oozes freshness. The sounds of nature: the whispering woods, the still water and the chattering birds provide visitors an acute sense of belonging and self-awareness, and the artificial efficiency of the railway station and the clock-time schedule

Table 4. Main touristic places in Bruges with their natural and architectural slow design elements

Places	Attractions	Slow design elements
Minnewater park	Begina cloister, lake	green spaces, lake, bridges, flora and fauna
Canals	waterfront, canal cruise, guide's narrative	waterfront, bridges
Quays	waterfront, canal, water	waterfront, bridges, benches
Squares	monuments	passages, tower

Source: Author's compilation, 2014.

Time and space frame each tourist experience. Even though tourists can leave their clock-time regime behind (DICKINSON, J.E. *et al.* 2013), they often need encouragement to change and revise their spatial-temporal plans and find their *tempo giusto* (PETRINI, C. 2007). Urban design can definitely help with their readjustments. Next I go through all the slow design elements identified and included in Table 4, and analyse them using the 6 main features listed by Slowlab. For visitors in Bruges the railway station functions as the main gate of the city: close enough to walk to the centre but far enough to interfere with the rhythm pattern of the city. Between the centre and the station Minnewater Park

become a fading memory. The great asset of parks is their constant *evolution* even without any human intervention. The authors argue that green spaces represent a touristic value themselves and play a positive role in urban environment.

In Bruges the Minnewater Park is also home to the scenic Lake of Love and the Begina Cloister. The pairing of the natural feature with spirituality reinforces a kind of Zen-like feeling and encourages *reflective* thinking. Most tourists use the same path to leave the city, so the park frames the visitation and ensures the smooth transition from passengers into visitors and vice versa. As for its crowd management role, it forces people

to change space and rhythm. As each person adjusts to a different extent, the park can easily absorb a full train of passengers who as a result reach the centre at different times.

Canals are defined by FALLON, J. (2012, p. 143) as “*historical linear parks, serving as leisure space for boating and walking.*” In terms of the tourist gaze, canals and quays are in parallel relationship, therefore, offer similar possibilities. The key difference lies in the perspective and angle. They both have a compelling pull factor and take visitors away from the confined central area. In the past the role of waterways was mainly to speed up traffic, while in modern urban tourism waterways are usually slowing features. In Bruges canals are not served as public transportation anymore, so they are entirely for the consumption of visitors (*Photo 1*).

Although the canal trip is a compulsory tourist trap, it provides a more intimate, insider perspective and *reveals* angles that otherwise might have been hidden from the tourist gaze. Unpowered water transports like boat

trips always mean slower pace and without the need of navigation and orientation, tourists have time to *reflect* and contemplate.

According to FALLON, J. (2012) slowness is synonymous with canals and in many countries there is a speed limit of four miles per hour as not to make waves. In Bruges only a single type of trip is available and departure is possible from 5 points and the boat returns to the same point without a halt. Due to the well-regulated supply – in terms of the number of boats and frequency – the tourist flow is more predictable and evenly distributed. The uniformity of boats and umbrellas (provided in case of rain) ensure a harmoniously blended environment, thus, enhances aesthetic pleasure. The sailors/guides’ narration *expands* knowledge and invites *engagement* and *participation* in the common narrative creation.

Waterfronts with bridges and benches form an ideal slow design mix and contribute to slowing down and breaking the rhythm of walking. The waterfront along the



Photo 1. Tourists enjoying canal trips in the heart of Bruges

five-km long quay is the key feature in the Hansa town, home to the most sought-after real estates and landmarks. Therefore, waterfronts with their distinctive atmosphere are always a drawback for both locals and tourists. During the stroll, buildings *reveal* their intricate details and ornamentations, by sneaking into courtyards walkers enjoy a more intimate and personal sense of the place. Reading the plaques on the facades promotes a joy of learning and *engages* visitors to recall and expand their school knowledge. Blending the old and new knowledge together, a deeply personal narrative *evolves*. As opposed to the canal trip, strollers are free to choose their own walking speed and can take advantage of the benches placed at regular intervals for their convenience. Bridges and benches both invite visitors to pose and *reflect*. Watching the water full of uniform boats with the Hansa architecture at the backdrop provides a *reflective* and sharing mood. Bridges *expand* way beyond their functionality by *revealing* new angles and perspectives, if strollers stand in the middle. They offer a wider horizon, and inspire people to come up with their own zoom-ins and individual interpretations of the scenery.

In the city centre different solutions are necessary to manage the tourist flow. The two primary squares of the centre are the Markt and the Burg; both are accessed via Steenstraat, the main street of the city. It is a relatively narrow street with plenty of passages giving visitors the chance of leaving the crowd behind and *revealing* hidden corners. These in-between places coupled with the commercial facilities available allow tourists the dichotomy of mobility/immobility (DELEUZE, G. and GUATTARI, F. 2003), while they *engage and participate* in window shopping and/or retail activity. Thanks to these detours and diversions tourists might take a day to finally reach the main square, which is home to a collection of historic buildings, representing almost every era in the history of the city: the gothic Town Hall, the renaissance Holy Blood Basilica, the Old Civil Majesty and the Bishop's palace. Further, the

Market Square features two other landmarks: the Belfry tower and the Provincial Court. These flagship monuments offer some interesting historical and cultural insights to *expand* knowledge and *reflect* upon.

Horizontal scattering of tourists on main squares jam-packed with sights is bordering on the mission impossible. In these cases vertical structures such as church towers offer the chance of slowing down pace. The Belfry tower in Bruges has 366 stairs and enjoying the view at the top is the highlight of each city break. Towers are classical slow structures and their biggest advantage lies in the unavoidable and arduous climbing that is necessary to access the panoramic view at the top. So, towers are the most *engaging and participatory* of all urban attractions, and most visitors take up the challenge. What is so alluring, then? The combination of the climb, the anticipation and finally the view together create such memorable experiences that are worth remembering. The city *reveals* a kind of postcard image unattainable elsewhere and *expands visitors' horizons* in every sense of the word. The sky-perspective gives the sum total of all the mosaic experiences gained on the ground. The view *evolves* not only as a result of the changes in the urban architectural pattern but the city also offers new visual possibilities at different times of the day, season, and year, which encourages repeat viewing.

The above discussed natural and man-made structures provide ideal conditions for slow tourism in urban setting not only because they slow down pace but the experience gained is characterised by less travel, lower carbon consumption and exploration of local culture and patrimony, all included in the slow tourism concept identified by DICKINSON, J.E. *et al.* (2010).

Conclusion

In this paper we examined the link between the tourist flow and urban planning solutions as well as the way the latter might contribute

to slowing down city tourists and dispersing them more evenly in urban areas. The natural and man-made design elements were explained by using the six main features of slow design defined by STRAUSS, C. and FUAD-LUKE, G. (2008). Then, the question was explored how the various urban solutions including green spaces, land and water related structures influence the tourist flow by slowing down pace and enforcing rhythm change. We argue that even historic cities as Bruges with a large number of visitors have design tools in order to redistribute tourists. As a result, visitors leave with more memorable experiences while locals get on with their life with less interference by tourists. The study ultimately aimed to bring together all stakeholders and open an intellectual dialogue on potential design tools to help urban destinations cope successfully with spatial and temporal management of the tourist flow. Further studies should aim to explore the demand side of slow urban tourism, which would give a clearer idea in terms of development and fine-tuning of slow design elements in popular urban destinations.

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LITERATURE

Lóczy, D. (ed.): *Landscapes and Landforms of Hungary*. Springer International Publishing. 2015. Chaem, 294 p.

Within the „World Geomorphological Landscapes” series a brand new title appeared on the early spring of 2015. This series aims to introduce landforms of particular countries, their assemblages and the stages of their development all over the world. Right after the grandiose and impressive countries of India, Brazil, Spain, Namibia, France and South Africa the seventh volume is about Hungary.

The volume is dedicated to the 60th birthday of the editor Dénes Lóczy by the authors. Several books at Springer edited by him proved that he is admitted as an expert of geomorphology on an international level.

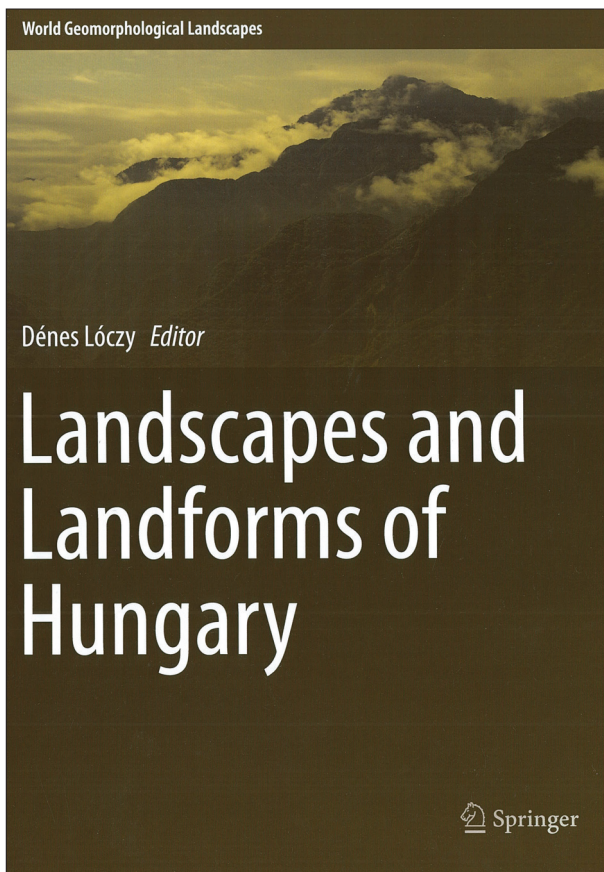
He has organised and controlled the joint work of forty four individual authors to create this spectacular and coherent opus.

The volume is divided to three main parts. The first part presents the background information of the whole country including geology, tectonics, climate and hydrology. Also this part guides the reader through the landscape evolution stages during hundreds of millions of years. This part is authored by the well known experts of Hungarian geosciences as János HAAS, Krisztina SEBE, Gábor CSILLAG and the editor himself.

The second, main part contains the descriptions of the separate landforms. As the editor draws these sites are just a selection from the possibilities without completeness since Hungary has a very diverse and colourful landscape structure. Altogether 26 individual landforms are presented by the experts of the given area. Among others the phenomena and results of karst development, volcanism, fluvial geomorphology, alkalinity and anthropogenic effects are introduced and discussed through the most famous individual example of them in Hungary.

Even though each chapter exceeds the highest scientific level they are clear and interesting also for readers without scientific background. The volume takes special emphasis on visualisation each chapter contains photos for a better illustration of the topic. Most of them also have well organised and informative (geomorphological) maps, and figures. The extent of the chapters varies in a wide range but all of them are adequate for a brief but proper description of the form. Each chapter follows the same structure of the most widespread scientific papers with introduction at the beginning and conclusion at the end.

The third part is about the geoheritage issue and its appearance in Hungary. This chapter briefly describes among others the national nature conservation policy, the National Parks and the



geoparks. Finally, as a practical information the description of the itineraries (countrywide blue tour and Rockenbauer blue tour) are also included in this chapter. That is why it could be a practical tool for supporting geosite propagation for families, classes or even for professional hikers.

In this way this volume is more than a simple field guide, it also tries to present the root cause in the backstage. That is why it would be a useful handbook also for students studying geomorphology. On the other hand, the straightforward but readable style supplemented with the high quality colourful figures, maps and photos make the volume enjoyable for the man in the street too. Anyway, the most useful application of the volume would be reading the related paragraph during a field trip and finding the discussed details in their natural forms. However, the A4 shape and

the very attractive hardcover makes the volume less useful in the field suggesting that this book can not be touched by dusty or even dirty hands.

The price also makes the book untouchable because it can be ordered from the Springer shop for 139.00 EUR. The price of the e-book format is unknown at the moment, but we are not quite sure whether the above mentioned figures and maps will be as perfect in the digital version as they are in the hardcopy. Almost 140 EUR is quite a pretty sum especially for a Hungarian student even though the volume is fantastic. We really do not know if this book shall be profitable for the publisher but we should be grateful for the possibility to have such an amazing collection of the miraculous Hungarian landscapes.

GERGELY JAKAB and ZOLTÁN SZALAI

László Jeney and Dávid Karácsonyi (eds.): Minsk and Budapest, the two capital cities. Department of Economic Geography and Futures Studies, Corvinus University of Budapest; Geographical Institute RCAES, Hungarian Academy of Sciences; Faculty of Geography, Belarusian State University; Institute for Nature Management, National Academy of Sciences of Belarus. Budapest, 2015. 194 p.

While Budapest used to be the bridge between the West and East in Central Europe, Minsk seems to be in a similar role between the Russian and the EU–Polish influence zones, or in other words, both capitals are situated on the frontiers between the Euro-Atlantic and the Euro-Asian macro regions. Besides their situations, their similarity in size renders the comparison and the cooperation obvious to proceed.

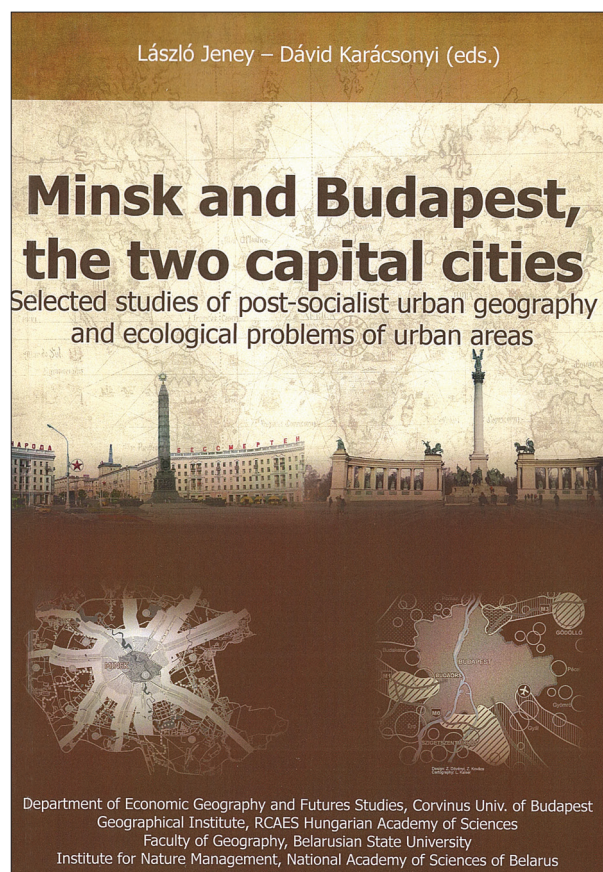
The volume is divided into two parts; the first dealing with the socio-economic development of the two cities and the second with urban climate, environment and ecology.

The first chapter written by Zoltán Kovács introduces Budapest as a Central European metropolis with its historical trajectories and the results of the post-socialist transformation. After a short introduction of the city's past development preceding 1990, the author

identifies administration, economy and housing market as the main factors influencing the post-socialist urban development in Budapest. The main socio-spatial restructuring of the metropolis taking place after 1990 includes the city centre as the result of a business function explosion; the up- and downgrading of the inner-urban residential quarters; the transitional zones of slow conversion; the dangerous heritage of the communist 'flat-factories' that acts as a time-bomb in the housing estates; the space of the newly developing garden suburb zones of the well-to-do; the residential 'villa quarter' areas of the ageing upper-middle class households; and the urban sprawl of the agglomeration zones encircling Budapest. The chapter succeeded in giving a detailed picture of the developing business hub in central Europe with its few upward trajectories and the numerous downward ones characterising it.

Ivan PIROZHNIK, Henryk OZIEM and Vladimir KOROTAYEV wrote about the major issues of spatial structure planning of Minsk in a similar context, describing the past and the present changes taking place in the spatial structure of the metropolis. The trends in the development of the city are analysed in comparison with other European capitals together with the spatial characteristics of the population of Minsk. Special attention is paid to the dynamics of the city's master plan and the evolution of its spatial structure in the post-industrial transition period. In summarising the study we can conclude that post-Soviet and post-industrial renovations in Minsk are in full swing, however the dynamics of present transformation depend on the degree of restrictions of market regulation mechanisms which is thought to 'soften' the extent of spatial differentiation of the urban environment. This is an important difference in the case of Minsk compared to Budapest.

The spatial and temporal differentiation of demographic development of Minsk is characterised by Ekaterina ANTIPOVA and Liudmila FAKEYEVA. The spatial structures of demographic development, population increase and migration factors are analysed in the chapter. Three main types of geodemographic districts are identified in the metropolis: progressive with natural increase and stationary age structure (1); stable with natural increase and regressive age structure (2); regressive with natural decrease and regressive age structure (3). Besides the intensive housing and regressive



sive industrial development of the city, a distinctive feature is manifested in the fact that Minsk has more or less preserved its role as a major industrial centre during the period of transition and post-industrial age after 1993. The study gives an example of how Eastern European metropolises experienced the demographic transformation processes of the post-socialist era.

Balázs SZABÓ and Ágnes ERŐSS wrote about the main features of large housing estates and the results of their rehabilitation in Budapest. The chapter surveys the history of the housing estates with comparison outlooks to other West and Central European cities. Then the authors explore the rehabilitation initiatives carried out in Budapest in the last decade, with special attention to their outcomes and effects. They also examine whether renovations resulted in some new socio-spatial differentiations at large housing estates. The rate of renovation is relatively high in some low status large housing estates built in the 1970's. The renovation is likely to be an instrument that could be used to prevent the declining status and position of such housing estates on the housing market. Achieving that aim could be further enhanced by the renovation efforts of residents. Completely renovated housing estates are hardly found in Budapest, while there are a great number of them without renovation. If the government financed rehabilitation support was concerned, for a longer period, the large non-renovated housing estates would be in a desperate situation, because they are not able to compete with either the smaller estates with good location or the renovated larger ones on the housing market.

The first chapter of the second part of the volume deals with the urban climate of Budapest, the trends and perspectives, written by Ferenc PROBÁLD. The author surveys the milestones of climate research of Budapest; he defines the urban heat island, and the rising heat stress in the city. The metropolitan growth and the climate change have brought about new global ecological conditions and this would require more responsibility in preparing decisions regarding the values of environment. In Budapest the ultra-liberal mayor and city council that led the city between 1990 and 2010 adopted laissez-fair attitude, thus, allowing private companies to get through their interests at the cost of the whole urban community. In order to save the environmental assets of Budapest and to achieve a turn towards a sustainable property development, better governance, comprehensive planning and appropriate regulation measures as well as their rigorous implementation are needed.

The following chapter written by Vladimir LOGINOV focuses on the estimation of the impact of urbanisation on climate and extreme weather phenomena. The chapter includes the survey of the role of urbanisation in the increasing use of South Belarussian thermal resources, the estimation of contribution of urbanisation to regional climate changes and the evaluation of the urban impact on air humidity, fog, heavy rains

and hails. While investigating the impact of anthropogenic heat sources on Belarussian cities and the countries of the world, the calculation shows that in the majority of the countries the anthropogenic fluxes exceed the geothermal flow by times. It is estimated that urbanisation plays an increasing role in the rise of thermal resources in South Belarus. The chapter sheds light on anthropogenic heat fluxes in urbanised areas, the contribution of the heat islands to the temperature changes, the differences of air humidity and temperature between cities and their vicinities.

The integrated assessment of the state of urban environment is examined on the example of Minsk by Valery KHOMICH, Sergey KAKAREKA, Tamara KUKHARCHYK and Ludmila KRAUCHUK. This chapter presents the approaches and results in measuring the condition of air quality, underground water and soil pollution as well as the state of vegetation on the territory of Minsk. The integrated assessment is based on the analysis of monitoring and statistical data, result of geochemical investigation and modelling. The obtained and spatial differentiated and integrated data of urban environment including natural and technogenic factors served as a basis for urban planning, technical, technological and organisational actions that aim at the realisation of planning decisions and ecological regulations. They are manifested in the optimisation of the environment is zones belonging to the most adverse ecological categories outlined in the General Plan of Minsk City.

The last chapter deals with the ecological frame of the environmental planning in urban agglomerations, using the case of Minsk written by Mikhail STRUK. It gives the explanation of optimal environmental planning in the metropolitan area. Due to the growing urban population and anthropogenic pressure recommendations were made to introduce environmental planning for the suburban area to carry out the functions of sanitation, water supply and recreation. It is based on a recommended spatial model of the ecological system providing specialised methods of nature management in different parts of the urban areas.

Ecological and geographical criteria were determined for outlining suburban area boundaries of the natural frame. They are based on the analysis of external matter and energy relations of the city mainly by air and water flows. On the basis of the obtained criteria the external environmental boundaries of Minsk agglomeration could be identified. They cover a more extended territory than the boundaries of suburban and green zones.

The volume serves as a good starting point of an extensive cooperation between Belarussian and Hungarian geographers dealing with social and physical urban environment, the state of which deserves extra attention especially in post-socialist Central and Eastern Europe.

CHRONICLE

Report on the Eleventh International Conference on Environmental, Cultural, Economic, and Social Sustainability

22–23 January 2015, Copenhagen

The conference organised by the “On Sustainability Knowledge Community” was held in the Scandic Hotel. The knowledge community has organised annual conferences since 2005 and in addition to that, it publishes journals and a book series and an online forum provides the possibility to carry out global discussions about sustainability. It has an interdisciplinary character and so the discussions include the relations of the environment to cultural, economic and social conditions. Community members include academics, teachers, administrators, policy makers, and other education practitioners.

The conferences are held in different locations around the world, each with a specific theme in that location. The special focus for the eleventh conference in Copenhagen was “Sustainability Dividends – Development Fault Lines.” In the description of the conference it was clearly stated that “There is widespread consensus that sustainable development pays dividends for posterity. However, the fault lines in developmental processes call for us to rethink methods and approaches with honesty, transparency and integrity. Deep research needs to inform the nexus between the four pillars of social, economic, cultural and environmental sustainability. New models and modalities of participation need to be scoped and developed.”

The conference program included paper presentations, poster sessions and garden sessions. Topics were as follows: 1. Environmental Sustainability; 2. Sustainability in Economic, Social and Cultural Context; 3. Sustainability Policy and Practice, and 4. Sustainability Education.

The program included plenary, parallel and garden sessions as well as talking circles. Plenary sessions were organised once a day. Each morning invited speakers gave a talk on topics of common interest to address a topic for subsequent conversations. The invited speakers were Jacob HARTMAN from the Municipality of Copenhagen, Olaf GERLACH-HANSEN from the Danish Cultural Institute in Edinburgh, UK, Selina JUUL, founder of the Stop Wasting Food movement in Denmark (Stop Spild Af Mad), Elsebeth GERNER NIELSEN, rector of the Kolding School of Design, from Kolding, Denmark and Amareswar GALLA, Chairperson of the

Sustainability Knowledge Community and editor of the sustainability Journal Collection.

The parallel thematic paper sessions of the first day included Food Security, Role of Religion in Environmental Sustainability, Creating Sustainable Spaces, Natural World and Environmental Theories, Policies and Practice in Sustainable Agriculture, Climate Change and Adaptation, Political Security and Sustainability, Sustainable Agriculture, Environmental Education Programs and Activism, Energy Policy and Practice, Waste and Waste Management, Student Knowledge: Educating for Environmental Sustainability, Sustainable Urban Development, Management, and Perception, The Science and Technology of Environmental Sustainability, Rethinking Sustainability, Urban Sustainability: Development Fault Lines, Community Studies in Economic Sustainability, Community Studies in Economic Sustainability, Endemic Urbanism, Sustainability Policy and Discourse and Economic Theory on Sustainability. The long list shows that various aspects of sustainability were discussed at the conference. I will not go into details about the parallel sessions of the second and third day.

The Transitions to sustainability book launch (“About Transitions to Sustainability: Theoretical Debates for a Changing Planet”) took place at the conference reception. The book contains six thematic sections: culture, systems, business, art, rights, and citizenship providing an important contribution to our knowledge on sustainability and environmental change.

The conference was very interesting presenting various aspects of sustainability. The scope was very broad so that participants could learn a lot from the contributions given by the representatives of scientific research, art, engineering, policy making etc. Lively discussions characterised the whole conference, especially the garden sessions. The next meeting of the community will be organised 21–23 January 2016 at Portland State University on “Urban Sustainability: Inspiration and Solution”.

ÁDÁM KERTÉSZ

Report on the Annual Meeting of the Association of American Geographers

21–25 April 2015, Chicago

The Association of American Geographers was founded in 1904 and since then its annual meeting has been held in one of the cities of the US. The latest annual meeting was held in Chicago, Illinois (before that the city hosted the AAG meeting in 2006 last time). Although it was April, the weather was rather cold and windy as usual for the city, even some sleet also occurred. Besides the official conference venue (Hyatt Regency Hotel) some sessions were organised in the neighbouring hotel (Swissôtel). Both of them are located in the downtown of Chicago, which is the third largest city in the United States after New York and Los Angeles. Its metropolitan area called Chicagoland has more than 9.9 million inhabitants. In spite of that, the number of participants did not reach 5,000, which is substantially less than in the previous years.

The annual meetings of the AAG have a great tradition and they are very popular. Because of the

large number of participants, these meetings can be considered the largest in the world for geographers, though more and more non-geographers (e.g. GIS specialists, environmental scientists, researchers from other fields) attend. It is also worthy to mention that the number of foreign participants has also been increasing. Their share was approximately one third in the “Windy City”, Chicago. This means that the annual meetings of American geographers are very attractive for the geography community of the whole world. For first-time attendees there was a special meeting in order to maximise their experience and explore the AAG diverse presentation, event and field trip options. Veterans shared their tips and tricks with newcomers to make the most out of the meeting.

In this short report the emphasis will be put on the introduction of the main themes of the conference since each year the AAG defines a few themes for its annual meeting in order to provide a fresh and engag-



The Conference Hall filled with international audience

ing structure to the conference programme. Attendees also have a possibility to organise a special session on different themes (e.g. which are related to the meeting's location; which are important from political aspect or which demonstrates the major intellectual trends within geography.) Balázs FORMAN (Corvinus University), one of the most active Hungarian participants has also organised some sessions with the following titles:

- Geography of Financial Markets, Institutions and Centers,
- Political and Regional Disparities in Central Europe I–II,
- Regional Development and Planning in International Comparison,
- Transitional Energy Markets after 1990,
- Transport Markets in Core and Periphery after Deregulation.

The main themes of the Chicago Meeting were the following:

1. *Radical Intra-Disciplinarity*. Its aim was to call the attention for the diversity of geography as under the banner of “geography” we do quite different things (e.g. collect soil samples, analyze climate change or socio-economic inequalities, conduct in-depth interviews) and use different methods. The term of “radical” means our discipline's un-disciplined nature.

Several posters and paper sessions were organised to highlight the possibilities and suggest the limitations of our discipline's intra-disciplinarity. The AAG Presidential Plenary organised by the AAG president, Mona DOMOSH also dealt with this topic and brought together physical, human, environmental and geospatial geographers to highlight the creative and radical possibilities that exist in the geography discipline.

2. *Symposium on Physical Geography: Environmental Reconstruction – A Nexus of Biogeography, Climatology and Geomorphology*. The goal of the all-day symposium was to facilitate and enhance the dialog among physical geographers on the challenges, new trends and approaches related to physical geography. The symposium started with two morning sessions of invited presenters around the theme involving – in a broader sense – “the study of past climates, landscapes, and biological systems along with the reclamation of altered environments”. In the afternoon there was a poster session (as part of the symposium) with about 100 posters on all aspects of physical geography. “The Conversation on the Future of Physical Geography” was the second main goal of the symposium and it was held on 24th April. This was the continuation of the dialog from the earlier session on how to enhance physical geography within the AAG, because the majority of sessions focused on human geography.



Book exhibition desks of leading publishers attracted many visitors all the day

One of the most essential themes within physical geography is climate change which is directly and indirectly affects every sector of society. Lately each annual meeting pays a special attention to this theme. In Chicago Julie WINKLER the Past President of AAG delivered a lecture on it entitled “Embracing the Complexity and Uncertainty of Climate Change”. She has emphasized that the complexity of the climate system and the extremely complicated linkages between natural and human systems makes the planning for future change difficult. To change the communication of climate change in a manner that inspires action but also leads to robust decision-making is also a great challenge.

3. *Symposium on International Geospatial Health Research: Creating Synergies*. The main goals of this event were to reveal the new research frontiers in geospatial health research and to foster international networks. Participants could choose from several (25) topics. Of which the most important ones were:

- infectious diseases and their relation to climate change,
- geographic and environmental dimensions of chronic diseases,
- gene-environment interactions,
- disease ecologies,
- mobility and health,
- cancer: genes, epigenetics, and physical and social environment,

- social environment and mental health,
- global health research and public health initiatives.

Otherwise the interest in health-related topics is continuously increasing and many (almost 50) sessions were organised around this theme in Chicago too. Kristian LARSEN and his colleagues tried to answer the question: “Does where you live matter?” According to their research the response is: yes. They have experienced that air pollution influences the development of respiratory diseases in Toronto. Scott SHERIDIAN spoke about his research on heat-related mortality, how hot days have changed over time and whether heat is still as deadly as it once was. Not only the natural environment, but also the social environment can have a great impact on health status. Zachary CHRISTMAN demonstrated the influence of neighborhood factors on obesity among older residents in New Jersey.

4. *GeoHumanities*. The discipline of geography has a long and close relationship with the humanities in both academic and public circles. By now many humanities scholars, artists and writers have integrated geographic concepts, technologies and methods in their work while geographers have also gained new ideas and insights from humanities. Nowadays, the core concepts of geography such as place, space, landscape, scale and mapping permeate literature, the arts, philosophy etc. As a consequence, more attention has to be paid to the study of increasing interactions



Poster sessions were really popular with all the participants (Photos by Gábor MICHALKÓ)

between Geography and the Humanities. This will be served by a new interdisciplinary scholarly journal “GeoHumanities” which was launched by the AAG as the culmination of a decade-long AAG Initiative on Geography and the Humanities. The journal was introduced by the editors during the meeting and it will first appear in fall 2015.

5. *Geography and Online Education*. Teaching geography on different levels is always a central theme of the annual meetings. Online education is an old-new challenge to geographers, therefore, several (49) sessions were organised in order to explore the multifaceted dimensions of geography and online education. Part of them were paper sessions on research topics related to online education while the other part of the sessions were practice-oriented illustrated paper sessions. The background of this theme is that the report of the National Research Council on “Learning to think spatially” has urged the improvements of spatial thinking in the 21st century. The speakers emphasized that the special circumstances of online learning pose special opportunities for “geo-enabled education” including location-aware social media, place-based learning, education administration and research, the future of maps in next-generation textbooks. Garret SMITH described the development and initial marketing of a fully online B.A. in Geography at a large state university. He said that the introduction of the online degree programme was well-received, however, further efforts need to be taken to enlarge the programme. Brian TOMASZEWSKI shared his experiences and lessons learned from a spatial thinking and geospatial technology education innovation programme in Rwanda. According to his opinion it is very important that the developing world is included in online geography education discussions, because developing world also has to face several spatially-oriented issues and because a full, worldwide access to the growing field of online geographic education has to be also established.

6. *Chicago and the Great Lakes Region*. The geography of Chicago is closely intertwined with that of the Great Lakes. The city plays a very important role in the transportation through the Great Lakes and into the Mississippi River watershed. The fact that Chicago is the major transportation and logistical hub for the Great Lakes Region brings several opportunities and challenges. Eight sessions were organized around this theme dealing – on one hand – with resource management, pollution, recreational and industrial usage of the Lakes; and on the other hand, with the income inequality, racism, housing segregation, neo-liberal urban policy, sustainable urban development and the changing agricultural landscapes of the Great Lakes Region. Marisol BECCERA shared her view that Chicago is a good place to study the relationship between brownfield redevelopment and gentrification. She demonstrated how former industrial sites have been redeveloped since 1990. Paul MACKUN focused

on the changes in population between 1980 and 2010 in coastal areas of the Great Lakes. He also identified the most and least populous coastal counties and tried to explain the reasons too.

Besides the main themes many sessions were organised on different topics covering the whole of geography. One of the most interesting presentations was the lecture of Ron BOSCHMA (University of Utrecht) who dealt with the aims and scope of evolutionary economic geography. This is a new direction or a new segment of economic geography which is getting more and more popular among economic geographers. He stressed that the main goal is not only “to explain how economic landscape changes over historical time, but also to reveal how situating the economy in space adds to our understanding of the processes that drive economic evolution”. In other words: “to demonstrate how geography matters in determining the nature and trajectory of evolution of the economic system”. Professor BOSCHMA (as one of the editors) has also called the attention of the audience to “The Handbook of Evolutionary Economic Geography”, which will be published soon.

Year by year there are some Hungarian geographers who can take part at the annual meeting of the AAG. Zoltán Kovács spoke about the political representation and electoral patterns in Hungary after 2010. Lajos BOROS dealt with the identity, commemoration and the production of public space in Budapest. Szabolcs FABULA demonstrated the urban diversity as an asset on the case of Budapest. The title of the presentation of Balázs FORMAN was “Centralized State – Centralized Energy? Comparative Studies of Austria and Hungary”. Judit TIMÁR presented her latest results regarding the economically backward, rural regions of Hungary. The objective of her presentation was to reveal the view of rurality in the migration decision of young women and men. Based on a survey Tamara RÁTZ, Réka KESZEG and Gábor MICHALKÓ analysed the role of memorable travel (school trips’) experiences in national identity building, whereas the presentation of Éva KISS focused on the major changes and new trends in the Hungarian industry after the latest economic crisis.

Taken as a whole, the annual meeting in Chicago was very well-organised, interesting and thought-provoking. The next meeting will take place in San Francisco, California in 2016. Let’s meet there!

ÉVA KISS

GUIDELINES FOR AUTHORS

Hungarian Geographical Bulletin (formerly Földrajzi Értesítő) is a double-blind peer-reviewed English-language quarterly journal publishing open access **original scientific works** in the field of physical and human geography, methodology and analyses in geography, GIS, environmental assessment, regional studies, geographical research in Hungary and Central Europe. In the regular and special issues also discussion papers, chronicles and book reviews can be published.

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