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**KNOWN INDIVIDUALS AND ANALYSIS METHODS OF CRIMINAL
GEOGRAPHY IN HUNGARY**

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1. Introduction

"Public safety is a collective performance for society. The protection of public order and safety cannot be formulated as an official task, there is no authority, there is no authority competence that would leave public security without social assistance. Sin is born in society. The causes of sin arise in society and the members of society also commit crimes. Law enforcement is at the service of society and the authority is given to society. How powerful this authority is, how massive it is that depends on the law-abiding power of this society. It depends on the economic situation. It depends on knowledge, the quality of culture and depends on morality" – said Prof. Dr. Géza Finszter, Professor Emeritus at the National University of Public Service in his presentation by the Civil Guard on crime prevention and public weal, on November 26, 2012. Scientific criminological research have played an important role in recognizing what has been said, such as criminal geography studies, whose practical use can only be the first step in creating good public safety.

2. The history of criminal geographic research in Hungary

In Hungary, Béla Földes was the first associated person with a criminal geographic study (1889). From the period between the two world wars we can highlight the work of lawyers and statisticians. In the 1950s it was not possible to conduct criminological research, because the data of criminal statistics were secret. Criminology only revived in the early 1960s. From the 1980s onwards, more and more work by criminologists investigating the area of crime was born. Geographers can only carry out criminal geographic research since the late 1980s. Zoltán Kovács was the first to draw attention to criminal geography in 1989. He considered the typing of crime, the designation of criminological districts and the creation of crime risk maps to be an important step.

István Vavró examined the territorial differences in crime in several of his studies, including in the Southern Great Plain region (2000). He also found it important to analyze the crime rate when analyzing territorial data, as there is a different detection rate besides the different crime rates of the population.

Klara Kerezsi, Géza Finszter, József Kó and Géza Gosztonyi have examined the districts of Budapest with different crime profiles for crime prevention. The crime maps of the districts were prepared and analyzed in detail. For the purpose of the investigation, they asked the people's opinion who living in the districts and suggestions were made on crime prevention (2003).

György Ritecz and János Sallai have published criminal geographic studies on the state border and border area on several occasions. The particular, special sub-area of criminal geography is the investigation of unlawful acts related to the state border and the border area.

István Kobolka researched the criminal geography of the border, with special regard to the crime of organization, including illegal migration and cross-border crime.

Gábor Michalkó primarily focuses on the specific relationship between tourism and crime, the spatial and temporal relationship of tourism-related crime through social geographic analysis of offenses committed by foreigners and the crime of foreign tourists. One of the first geographers has published a Criminal Geographic Cartographic Chart, an Intensity Cartogram, and a Point Map.

In his studies, Andrea Pődör formulated a comprehensive definition of the purposes of criminal geographic research, and drew attention to the possibilities and significance of the use of GIS in law enforcement and crime prevention.

In addition to the theoretical issues of criminal geography, Antal Tóth focused his research primarily on the unlawful acts revealed by Hajdú-Bihar County and the Border Guard. In addition, it defined the possible territorial dimensions of domestic criminal geography research, whereby it separated six territorial levels to investigate the spatial structure of crime: national or international level, regional level, county level, subregion level, settlement level, and level within the settlement: larger districts, smaller homogeneous neighborhoods, residential districts (TÓTH A. 2007, 21 p.).

Gábor Erdei demonstrated the role of crime analysis in social geography studies, with a historical overview of criminal geographical schools, and the introduction of the most important theoretical findings of foreign researchers and the application of GIS.

Szabolcs Mátyás, besides the investigation of Hajdú-Bihar County, dealt with the criminal geography of Debrecen primarily at the settlement level. In his work, the main indicators of criminal statistics were analyzed and compared for Hungary's regional centers. He also conducted surveys on the ethnic investigation of criminals in Hajdú-Bihar county. At the national level, the topic of several studies and lectures was the geographic comparison of Hajdú-Bihar County and Debrecen as well as Bihar County and Oradea.

Zsuzsa Piskóti-Kovács studied the application possibilities of modern trends in criminal geography at three regional dimension, international, regional and county levels. During her research, he put special emphasis on exploring the socio-economic factors behind crime. Using GIS more complexly, it has highlighted crime prediction as one of the possible directions for domestic crime-related investigations. She found that the most suitable territorial dimension for the application of territorial statistical methods would be the level within the settlement in the future.

Antal Forró, PhD student at the University of Debrecen, carried out an investigation into the spatial appearance of crime in Békés County, highlighting the area of competence of the Gyula Police Department. Particular attention was paid to some socio-economic contexts determining crime, and to estimating latency within the settlement level.

3. Modern criminal geography

3.1 Crime map

The mapping of crime has a history of more than one and a half centuries. "The crime map itself is a thematic map that depicts the geographical location of a feature of crime." During its analysis, we can also see relationships that would distract us.

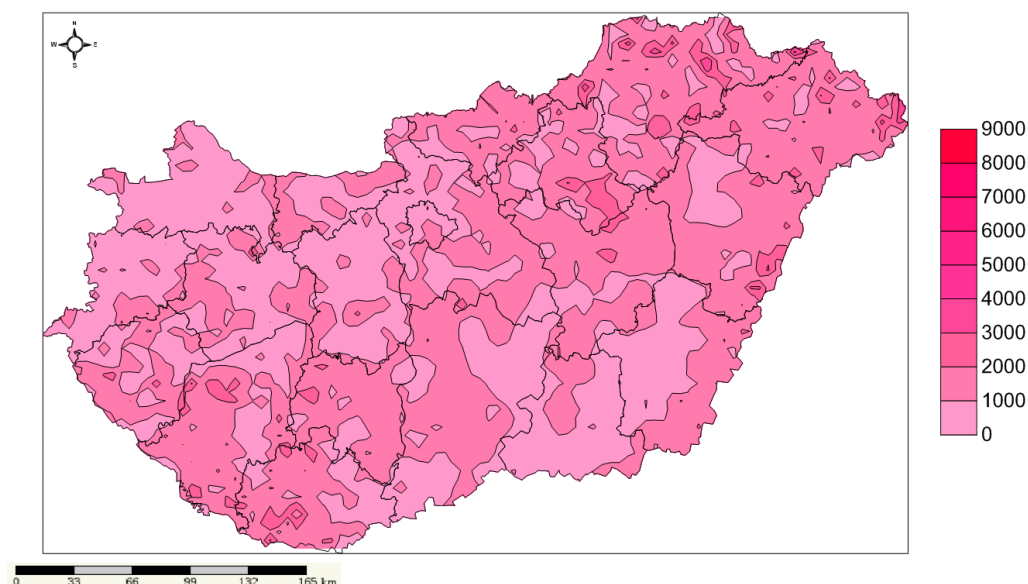
The evolution of the past decades can be best perceived by the use of the so-called "pin-point maps" known by the police around the world (otherwise used in our country to this day). Pin-point maps serve the purpose of clearly seeing where the crimes were committed. "However, there were limitations to its application, since it is not possible to archive these maps, which is why the static is represented by a given duration and condition. It is also difficult to read these maps because they usually represent a variety of crimes that are marked with different colors, but they can be confused." (PÖDÖR A. 2005, 5 p.)



1. Figure: Territorial distribution of crime in the administrative area of Gyula city in the first half of 2016

Database: Based on Robotzsaru-NEO and data from the questionnaire survey (own editing)

The old pin-point maps were replaced by the first computer crime mapping. The first was made in the middle of the 1960s in St. Louis. The "breakthrough" was the widespread of Geographic Information Systems (GIS) in the late 1980s. "In the research, the method of geospatial representation and analysis of statistical data on crime was then increasingly involved." (PISKÓTI-KOVÁCS Zs. 2011, 1 p.; TÓTH A. 2007, 22 p.).



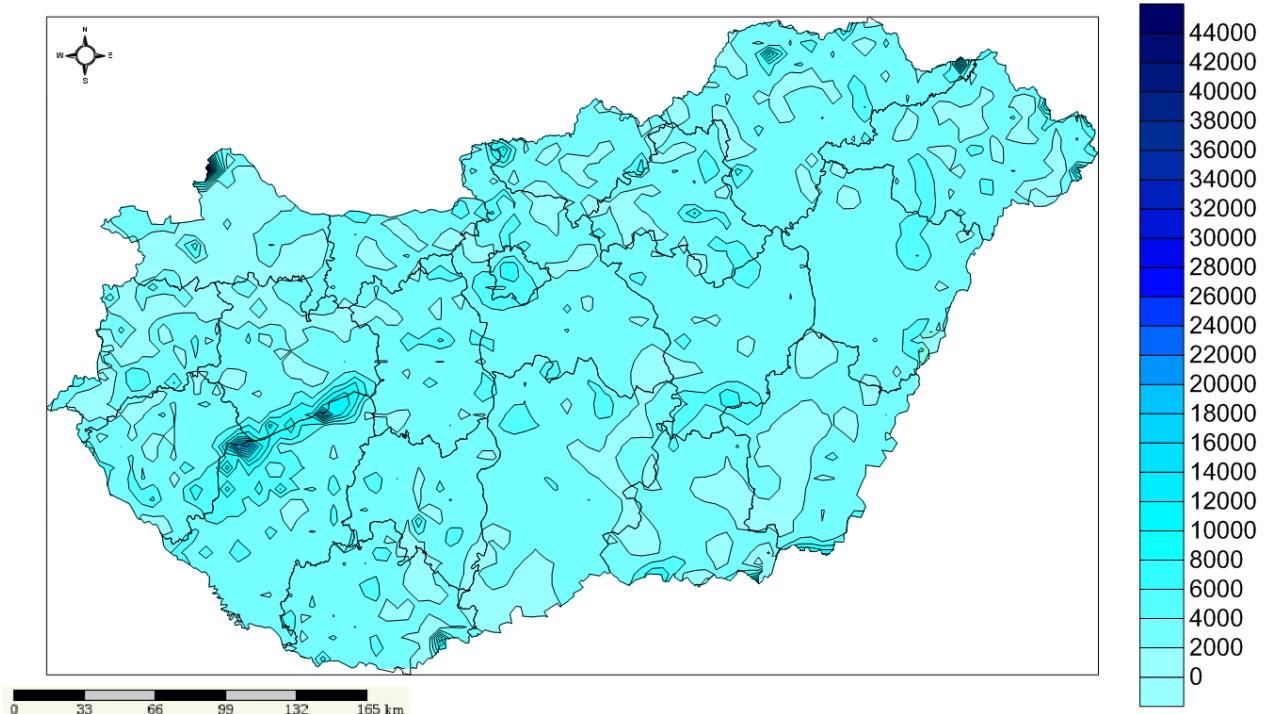
2. Figure: The arithmetic average and the number of registered crime offenders per 100,000 inhabitants in the settlements of Hungary (2001-2010)

Database: Based on data from the United Criminal Investigation and Prosecutor's Office and the Hungarian Central Statistical Office (own editing)

These maps can be used to represent the scene, time, type, and mode of committing the crime; depicting the place of residence of offenders and victims. Introducing patrols controlled by the police officers, illustrating the distance, and detecting serial crimes. It facilitates police work (efficient organization, investigation) and the work of police officers (strategic issues). (TÓTH A. 2007, pp. 24-25.).

3.2 Hot Spots Analysis

With the possibility of computer software, attention has been paid to the analysis of the so-called Hot Spots Analysis. There is no general accepted definition, but it is generally understood to mean areas that are infected with large-scale crime over a longer period of time, where crime is essentially concentrated. "These sites can be points (like a building) or patches (an area)." However, there is still no unanimous view on what criteria should be used to map the spatial distribution of hot spots. One of the characteristics of hot spots is that they change in space and time, and they are cyclical, so they may sometimes move away from smaller distances due to the protection against crime, and even may be retracted as a result of effective measures against crime. (TÓTH A. 2007, 28 p.; HARRIES, K. 1999, pp. 40-50.).

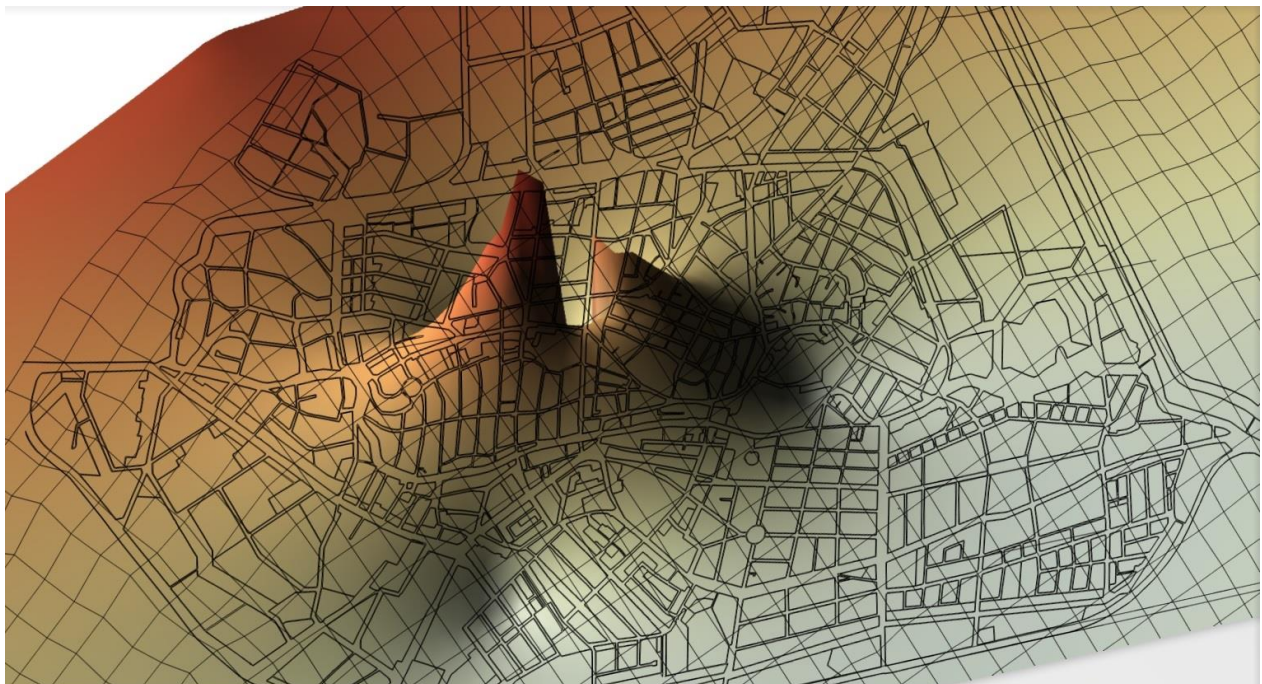


3. Figure: The arithmetic average and the number of registered crimes per 100,000 inhabitants in the settlements of Hungary (2001-2010)

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3.3 Crime Surface Model

The surface model produced from the crime data series is also suitable for the same spatial, surface examinations as crime maps. "Creating a surface model from a crime data series is basically based on the same procedure as for natural geographic factors: the coordinates "x; y" define the "horizontal" position in the same way, but the "z" values do not represent the height but the index of crime - in this case 3-dimensional aggregate map of latent crime in the downtown of Gyula city. The "accuracy" of the surface model could be achieved by densing the dots, but the availability of these data is limited." (PISKÓTI-KOVÁCS Zs. 2014, pp. 64-65.).



4. Figure: 3-dimensional aggregate map of latent crime in the downtown of Gyula city

Database: Based on data from questionnaire survey (own editing)

4. Summary

In conclusion, we can say that criminal geography studies are a novelty of today, as a relatively new trend in social geography which is also an area of interest for the wider public, and an important link of criminal sciences. At the same time, criminal geographic research not only deals with the territorial appearance of crime as a social mass phenomenon, but also with the analysis of its social, economic background, and the creation of a geographic profile that can assist in reconnaissance and develop a comprehensive crime prevention strategy.

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