

## Political and social statistics geodatabase

József Mészáros<sup>1</sup>, István Szakadát<sup>1</sup>, Ferenc Speiser<sup>2</sup>, Norbert Solymosi<sup>3</sup>  
mj@eik.bme.hu, i@syi.hu, speiserf@mail.aut.vein.hu,  
solymosi.norbert@gmail.com

<sup>1</sup> University of BME, H-1111, Budapest Stoczek u. 2.

<sup>2</sup> University of Veszprém, H-8200, Veszprém Egyetem Str. 10.

<sup>3</sup> Szent István University, H-1078, Budapest István Str. 2.

### THE SYSTEM

Since 1991 there has been a database on geoinformatics being built at the Budapest University of Technology and Economics (Department of Sociology and Communication). Primarily it stores data of the Hungarian elections concerning various descriptive data about social and settlement statistics of voter citizen groups integrated to a certain extent into a single database system.

From the beginning to 2005 the system has been running on the same application platform (Oracle RDBMS, Arc/Info GIS), while the hardware and OS-platform has changed several times (Sun-unix, Silicon-unix, Sun-Solaris, Intel P4-WinXP).

The components of the system have been placed on free software basis from 2005 on (Linux, PostgreSQL, PHP). The whole database has been transformed into a portal over the Internet on the score of a unique integrated datamodel. With the system the opportunity presents itself to visualize data in form of maps with the assistance of open-source on-line geoinformatic software (UMN MapServer + Chameleon).

### THE MAPPING

What do we think about our world? A thematic mapping system can widely influence our way to seeing things or just support our hypotheses and the assumptions of data that we can only suspect by the facts concealed behind the prepared maps. It depends on us, how we use it...

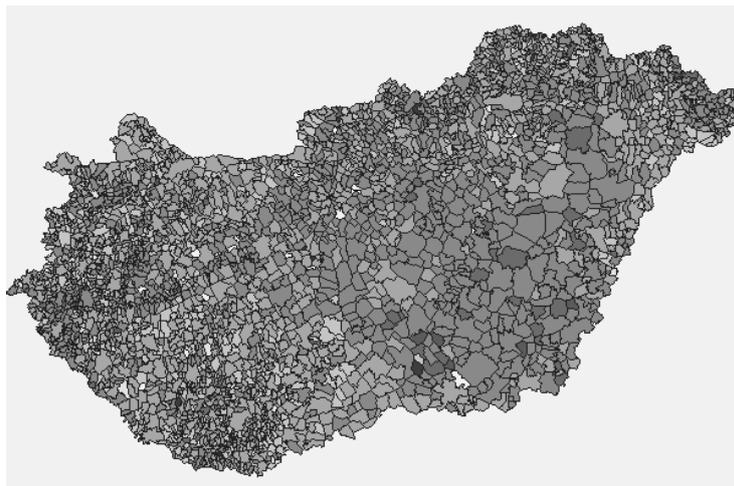


Figure 1: 1997, NATO-membership, yes votes

However, the most important and interesting question is what kind of data we can draw on a map. To interpret the answer we have to know, how these maps can be produced. The essential property of the management (production) of digital maps, is that we always need two types of digital data. On the one hand, we need the data we want to represent in connection with its spatial attributes – generally these are numerical data enumerated in simple database tables. On the other hand, we need digital map-files. Its objects (districts, countries, towns) can be related to the current record of the represented database table.

Unfortunately, one condition of this dual requirement of the availability of digital maps is often not fulfilled. However, more and more (and even better) digital maps have been available in Hungary nowadays, although we still do not have as much digital data as needed (and we have not concerned the difficulties of the access to the existing maps). Certainly our statement above is only exact if we say that only a few satisfactorily detailed and accurate digital maps are available. An important property of digital maps is the resolution and the accuracy of the production that can naturally define how detailed data can be represented on them. For the spatial presentation of data it is necessary to correctly handle the polygon borders corresponding to its aggregation and/or collection level - namely it should be represented on the current map.

Of course, for the sake of fair visualization of the data over maps but even more for the interpretation it is not enough to harmonize the data aggregation level and the districts of the digital maps, it is also desired and important to collect and aggregate data on as low level as possible. The bigger the area of the aggregated data is, the less valuable it is.

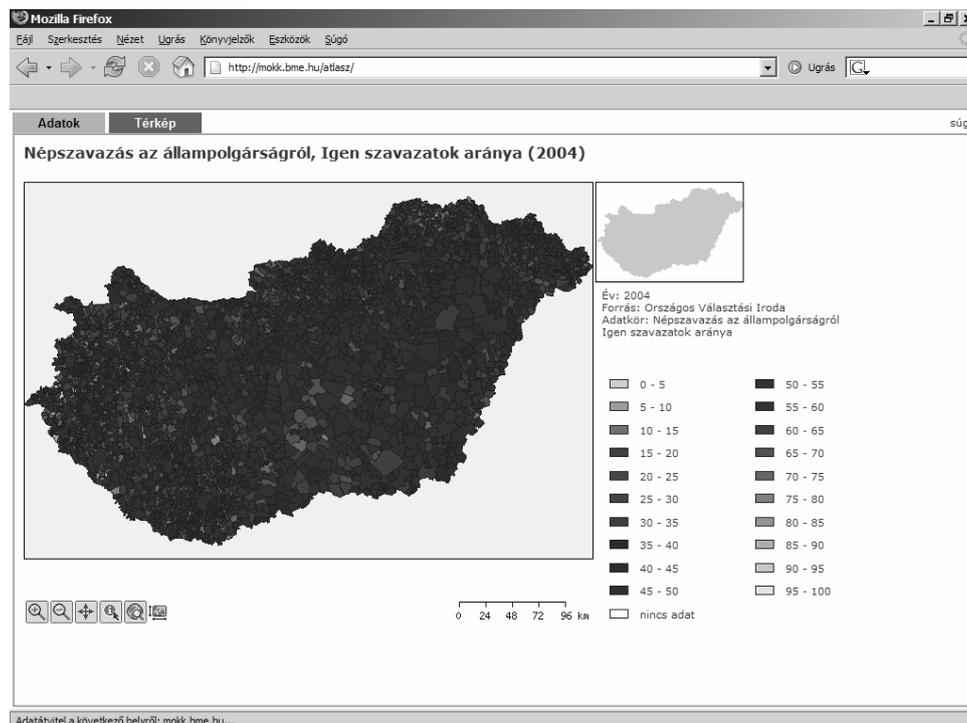


Figure 2: Mapping user interface

### **DATA PRESENTED**

We present certain group of data from the territorial statistical database of the Central Statistical Office of Hungary 1995-2001. Election data was collected from data archives of the Election Office of the Ministry of Interior. Among data on religion those related to census were obtained by arranging the data of the relevant database of Census Department of the Central Statistical Office (KSH).

The data are presented according to settlements, election wards and census units. We digitized the needed maps, these are inaccurate in some instances, but instead of the geography accuracy we rather placed emphasis on compatibility with the present state.

### **THE GOALS**

From the beginning we have aspired to the data and databases being at our disposal be loaded into a unified and consistent system. This – continuously strong – intent to integrate (and the conversion and datacleaning work completed during the years) resulted in the system, which contains data from various sources stored and represented in uniform spatial- and time-coordinate system.

On this base, by giving the appropriate parameters, it was possible to achieve immediately newly generated maps without time consuming work. For this of course, we need to fit it to this uniform and integrated database a spatial software system (mapserver), that can draw the maps constructed from the database and the stored information in the files of digital maps.

The goal is to incorporate the highest number of social statistics and political data in this system with the most details. In the case of certain settlements these data can be displayed to include details of the settlement. For this to happen the maps of the settlements have to be appropriate for computer processing (they have to be digitalized). During this work two types of data – the census and the elections – were given primary importance. The census data are displayed at the level of counting commissioner communities, where each community has an average of 125 people residents, while the election wards, where each ward contains maximum of 1200 people with the right to vote.

In the case of both election and social statistics, the national maps are displayed in a series of settlements that means approx. 3150 settlements are displayed on the map during the years from 1990 to 2005. In the case of bigger cities and the capital the election data displayed according to election wards, while the census data are displayed at the level of counting commissioner communities. This means that within cities one election ward means one block as regards the election data, and each census counting commissioner community displays one house, that is the people's political preferences and major social statistics characteristics can be presented from block to block and house to house.

The purpose of this webpage is to show the great regional differentiation of election results between the settlements and within some settlements e.g. Budapest, Debrecen, Szombathely, Miskolc, Pécs. Frequently the political preferences of two neighbouring settlements show great diversity, and even within the same settlement, the residents of two neighbouring block may have substantially different political views.

We believe that with the help of some social statistics data an attempt can be made at interpreting the election results. The maps carry information on the fact that political preferences of some of the voters follow historical traditions, while the attitude of others may change from election to election.

We hope our website will be useful to those who read it, we strongly recommend it to those interested because we believe that results of elections and related issues should be of interest not only

to politicians. In our opinion election results are a consequence of complicated socio-cultural processes, it can help understanding several other social phenomena. Thus, the portal can be really useful with the presentation of future election results and Hungarian political traditions.



*Figure 3: 1990 election, partylist, HSP (MSZP)*

#### **POSSIBILITY OF OBSERVATION**

On the basis of the built database it is possible to make analysis, observation on demographic, social election and census data-themes, to prove a thesis of their relation and confirm it with the facts delivered by maps. In the next section we give an example of spatial analysis.

#### **Example 1**

The first example is a quite simple relation between religion and political orientation. There is a correlation between the ratio of denominationally affiliated voters and the supporters of Fidesz-MDF party as the maps show. Fidesz and MDF formed together the conservative block in 2002.

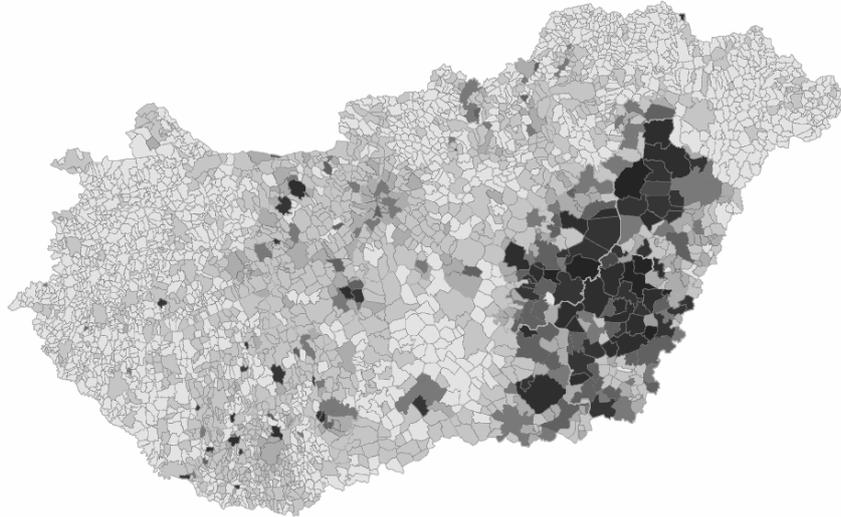


Figure 4: 2001, Census, Ratio of denominationally affiliated

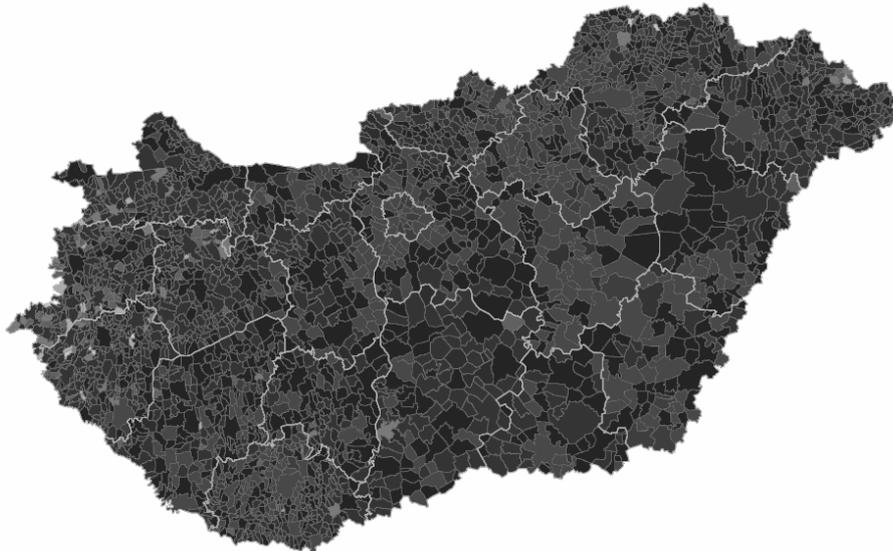


Figure 5: 2002, Fidesz-MDF party list

### Example 2

In its present form, the political system of Hungary took shape between 1988 and 2004. Political parties were first able to gauge their real backing during the elections in 1990. The seats in the parliament formed in spring of 1990 were shared by six parliamentary parties that identified themselves as heirs of three main political traditions. With the help of the maps generated by the

website the transformation, merging into different blocks, and cessation of parties belonging to these three traditions can be analysed.

During the elections in 1990, MDF, FKGP and KDNP constituted the “conservative” block. The spatial patterns of the combined results of the block show that the distribution of these parties was not uniform. The data reveal the fact that by and large the spatial distribution of the conservative block remained stable whilst the parties constituting the block transformed, Fidesz took over the role of the three former parties and during the European elections in 2004 it already represented this role on its own.

In our analysis we have examined the spatial distribution of the three major political blocks, the parties were categorised according to their self-definitions. In 1990 and 1994, the trio of MDF, FKGP, KDNP, and in 1998, 2002 and 2004, the former together with Fidesz, constituted the conservative block. The data clearly reveal that the distribution of the political parties is strongly clustered, and within the clustering, Fidesz had replaced the former trio in their role.

Our analysis leads to similar conclusions as to the so-called Left. There is a very strong spatial autocorrelation in the combined election results of the Socialist Party (MSZP) and the Munkáspárt. The value of autocorrelation is also very high. Not surprisingly, the spatial patterns of the socialist block fill out on the whole the results on the rightist block. The data of the liberal block clearly show the strong autocorrelation with decreasing expectancy; that is to say, the autocorrelation is strong while the scatter of the data increases too. It is obviously connected to the melting away of the block. (From almost thirty per cent in 1990 to five per cent in 2004.) The map the supporters of SZDSZ concentrate in end around Budapest in 2002 and 2004, while the party had strong backing in various regions of the country in 1990.

#### **FURTHER DEVELOPMENT**

In focus of our present development stands that we publish our database through the Internet, the way next to the bare data, we can attain the map representation of it also. For obtain this, it is important to find appropriate navigation methods among the data in the system to make the choice easier and more comfortable for the users. The other goal is to develop a web application that can use R-statistical environment for making further statistical analyses and computations with the use of this webinterface.

The aim is that everybody can make a map suitable for all their needs, based on its theme and the topics that is desired. Should somebody feel like making their own maps, type the <http://mokk.bme.hu/atlasz> URL into the address line of a browser and give it a try!

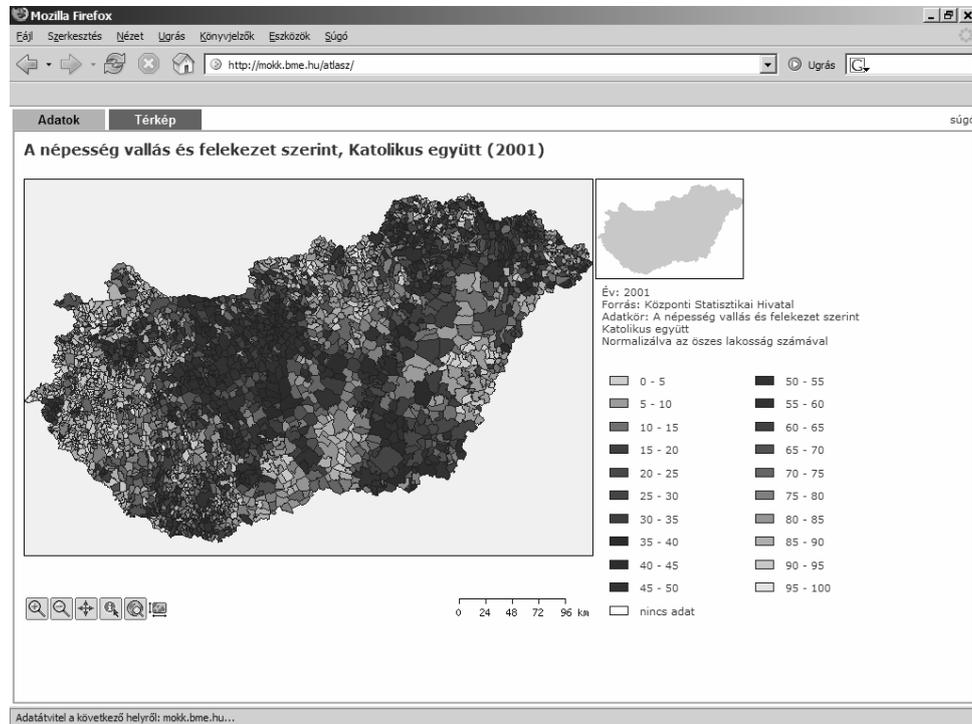


Figure 6: 2001, Census, Ratio of Roman Catholic

## BIBLIOGRAPHY

Speiser Ferenc – Mészáros József – Szakadát István, 2005: "Tér-kép(elem)zés" In: Mészáros József, Szakadát István. 2005. Magyarország Politikai Atlasza 2004 Gondolat Kiadó, Hungary, Budapest ISBN: 963 9510 01 1 p.11-16.

Mészáros József – Solymosi Norbert – Speiser Ferenc, 2005: Pártok területi eloszlása In: Térinformatika 2004 NYME GEO, Hungary, Székesfehérvár ISBN: 963 9364 45 2