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HUMAN-ENVIRONMENT RELATIONS IN THE GÖMÖR-TORNA (GEMER-TURŇA) KARST AREA AND ITS SURROUNDINGS

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Abstract: A természeti és társadalmi tényezők kapcsolatrendszere régóta a földrajzi érdeklődés homlokterében áll. A 19. században kialakuló földrajzi determinizmus szerint egy terület társadalmi-gazdasági fejlettségét döntően befolyásolják a természeti adottságok. A földrajzi nihilizmus ezzel ellenkezőleg tagadja a természeti tényezők fontosságát. A kettő között áll a földrajzi posszibilizmus, amely szerint a társadalom „választ" a természet felkínálta lehetőségek közül. Napjainkban a földrajzi determinizmus újrafogalmazása vált ki heves vitákat. Kutatásaink során a karsztvidékekre fókuszálva, térinformatikai módszerek segítségével igyekszünk kapcsolatokat keresni természeti és társadalmi tényezők között, jelen tanulmányban vizsgálatunk alanya a Gömör-Tornai-karsztvidék és tágabb környezete, ami jó lehetőséget kínál a karsztos és nemkarsztos területek összehasonlítására.
A Gömör-Tornai-karszt természeti környezetétől nemcsak kőzettani alapon különül el, hanem domborzati karakterisztikái (magasság-eloszlás, lejtőszög-eloszlás) révén is. A település- és népsűrűség térbeli eloszlása teljesen eltérő képet mutat, így ezeket nem lehet azonos módon magyarázni, ám mindkettőt közvetlenül és meglehetősen szorosan (R^2>0,8) befolyásolja a magasság, akár abszolút, akár relatív értelemben számítjuk. A település-sűrűség esetében a magasságnál fontosabb determináló tényező a lejtőszög. Ugyanakkor a karakterisztikus településméret a jelentős vízfolyásoktól mért távolsággal mutatja a legszorosabb kapcsolatot
A Cserehát és a Gömör-Tornai-karszt a népesség eloszlását tekintve nem tér el jelentősen egymástól: mindkét vidék ritkán lakott, de sűrű településhálózatú. A népsűrűség alapján megállapítható, hogy magán a karszton „nem jó lakni", ám annak közvetlen közelében már igen. A környék legsűrűbben lakott része az Érchegység lába, ahol a sokoldalú természeti adottságok kedvezően ötvöződnek egymással. A természeti adottságokra épülő turizmus hatása a népességváltozást tekintve csak nagyon lokálisan, Aggtelek esetében mutatható ki. Az etnikumok és vallások elterjedési területei számos esetben jól kivehető egyezést mutatnak a természeti tájak határaival, ez azonban nem jelent közvetlen ok-okozati kapcsolatot a természeti és társadalmi tényezők között, hanem a periféria területek benépesülési folyamatai, a háborúk, migrációk és más identitás-befolyásoló folyamatok bonyolult együttese hozta létre a jelenleg megfigyelhető képet.

Introduction

Geographic (or environmental) determinism states that environmental conditions decisively constrain the social development. On he contrary, nihilism claims that the environmental conditions are neglectable. The mean between these extreme opinions is the *geographic possibilism*, which states that natural environment provides possibilities, but social factors are also important in the explanation of development (e.g. *BALLINGER* 2011). Accepting the view of possibilism, the geographically relevant question is not „*yes or no*", but to what extent the social development is influenced by environmental factors. The aim of our ongoing research is to find a sophisticated answer to the above question using statistical and GIS methods. This approach is not so typical in recent geographic literature but some good examples are present (e.g. *SMALL–COHEN*, 2004). Of course, it is supposed that the answer to the above question should be variegated according to both space and time.

In our recent research we have tried to find relationships among environmental and social factors focusing on karst terrains (*TELBISZ et al*., 2013). Similarly, the impact of karst on the spatial pattern of society was studied by *MÓGA* (1998) and *LOVÁSZ–GYENIZSE* (2012). In the present paper, the subject of our study is the Gömör-Torna (Gemer-Turňa) Karst area and its larger surroundings (basically the area between the Sajó /Slaná/ and Hernád /Hornád/ rivers including the southern parts of Rudohorie /Érchegység/ Mts.; see *Fig. 1*), because it provides a good opportunity to compare karst and non-karst landscapes.

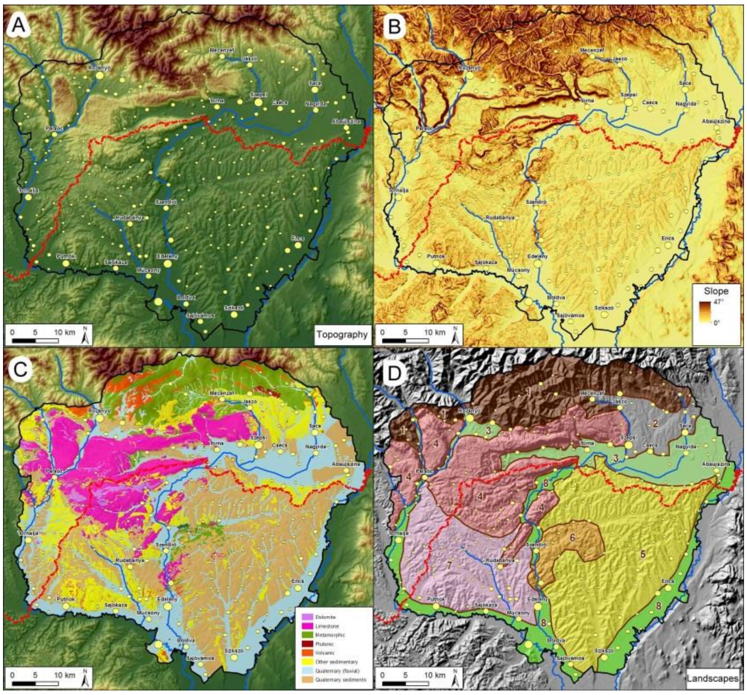

Fig. 1: The study area: topography (A), slope (B), geology (C) and landscapes (D) – 1: Rudohorie, 2: Rudohorie foot, 3: Northern valleys, basins, 4: Gömör-Torna Karst, 5: Cserehát Hills, 6: Szendrő-Rakaca Hills, 7: Putnok Hills, 8: Southern valleys.

1. ábra: A vizsgált terület domborzata (A), lejtőszög-térképe (B), geológiája (C) és tájbeosztása (D) – 1: Érchegység, 2: Érchegység alja, 3: Északi völgyek, medencék, 4: Gömör-Torna-karszt, 5: Cserehát, 6: Szendrő-Rakaca-rögvidék, 7: Putnoki-dombság, 8: Déli völgyek.

Many parameters can be mentioned among both environmental and social indicators (*Table 1*). In many cases, these parameters are interconnected within the group of environmental or social category. For example, in the environmental category: slope correlates with elevation, soil type correlates with surface rock, the spatial pattern of drainage network and springs is influenced by lithology and elevation, vegetation pattern is mostly determined by elevation and climate, etc. In the social category: economic development correlates with demographic changes and ethnic proportions, etc. But the aim of our present study is not the exploration of relationships within the main categories but to find correlations between the main categories. Naturally, it is not possible to present all correlations in a single paper, therefore we focus on some selected parameters and the present state, although we know that the investigation of the main question in a historical context would be also interesting and important. It is important to mention that we do not state that the statistically significant relationships hereafter are always direct „*cause and effect*". On the contrary, in most cases we suppose indirect effect mechanisms. However, the existence of statistically significant relationships are admittedly important from the viewpoint of geographic possibilism.

Table I.
I. táblázat

Important environmental and social factors whose relationships can be studied within the framework of geographic possibilism

Fontos természeti és társadalmi tényezők, melyek kapcsolatát a földrajzi posszibilizmus keretén belül vizsgálni érdemes

	Environmental factors	**Social factors**
in general	Topography, Geology, Pedology, Hydrology, Climate, Biogeography,…	Population, Settlements, Ethnicity, Religion, Economy,…
in this study	elevation → slope → drainage network → landscape pattern → landscape pattern → landscape pattern →	population/settlement density population/settlement density population/settlement density spatial distribution of population ethnic pattern religion pattern

There is abundant literature referring to the study area, but most of them concentrates on selected landscapes of the full study area. We do not mention here the purely phyical geographic publications, but there are several physical geographic works, which deals with the impact of environmental factors on socio-economic conditions (e.g. *SZABÓ J.*, 1984, 1998; *MEZŐSI*, 1985, 1998), as well as social geographic works, which take into account environmental factors, too (e.g. *BELUSZKY*, 1977, 1979). Beside the above-mentioned publications, the relationship of environmental and social factors obviously receives attention in historical geographic studies as well (*DÉNES*, 1998; *MÓGA*, 1998; *DOBÁNY*, 2010a, b).

In the followings we list some pointedly simplified statements, which are considered as working hypotheses and studied later on by statistical methods:

- „Karst landscapes are usually rarely populated terrains due to unfavourable topographic and soil conditions and the insufficiency of surface water."
- „Tourism based on natural attractions may provide favourable conditions for people living in karst terrains."
- „The spatial patterns of ethnicity and religion are mostly the results of social factors and independent of the natural environment."

Data and Methods

As a basis, we used 1:10 000 scale topographic maps. We digitized settlement centres, settlement boundaries and the drainage network. For topographic analysis, we used the SRTM database (*RABUS et al*. 2003), whose ~90 m horizontal resolution is appropriate for the scale of this study. Slope map was derived from the SRTM DEM (*Fig. 1A, B*). Geologic maps (with scale 1:100 000 for Hungary and 1:25 000 for Slovakia) were also digitized and lithology was classified into 8 categories (*Table II*).

Population data (number of inhabitants; distribution of ethnicity and religion for each settlement) come from census 2011 of Hungary and of Slovakia.

GIS-analysis was carried out using both raster and vector tools. Since social data are mostly attributed to points (settlements), the basic units of our study were settlements. Therefore the final boundary of the study area was adjusted to settlement administrative boundaries.

The whole area of the study terrain is 3781 km^2, including 249 settlements and 244 454 inhabitants.

Table II.
Táblázat II.
Rock type distribution according to landscape. L1: Rudohorie, L2: Rudohorie foot, L3: N. valleys, basins, L4: Gömör-Torna Karst, L5: Cserehát Hills, L6: Szendrő-Rakaca Hills, L7: Putnok Hills, L8: S. valleys. Q means Quaternary.
A felszíni kőzetek megoszlása a vizsgált tájakon. L1: Érchegység, L2: Érchegység alja, L3: Északi völgyek, medencék, L4: Gömör-Torna-karszt, L5: Cserehát, L6: Szendrő-Rakaca-rögvidék, L7: Putnoki-dombság, L8: Déli völgyek. Q a negyedidőszak jele.

Rock type	L1	L2	L3	L4	L5	L6	L7	L8
dolomite	0%	0%	0%	5%	0%	0%	0%	0%
limestone	0%	0%	0%	**64%**	0%	12%	1%	0%
metamorphic	**56%**	2%	1%	2%	0%	21%	0%	0%
non-Q sedimentary	11%	**55%**	0%	10%	10%	2%	**37%**	1%
plutonic	1%	0%	0%	0%	0%	0%	0%	0%
Q fluvial	11%	25%	**73%**	7%	16%	15%	22%	**93%**
Q non-fluvial	5%	18%	26%	11%	**73%**	**48%**	**38%**	5%
volcanic	15%	1%	0%	0%	0%	1%	1%	0%
Total Area (km^2)	528	164	337	770	923	124	526	401

Results

Delineation of the larger study units, i.e. the natural landscapes

Taking into consideration the most important physical factors (elevation, slope, lithology) we delineated 8 natural landscapes (*Fig. 1D*). These are the followings: Rudohorie Mts.; Rudohorie foot; Northern valleys, basins; Gömör-Torna Karst; Cserehát Hills; Szendrő-Rakaca Hills; Putnok Hills; Southern valleys. The landscapes defined here are somewhat larger units than in the Hungarian small landscape cadaster (*MAROSI-SOMOGYI*, 1990), but for the present study, it would not be effective to use smaller units.

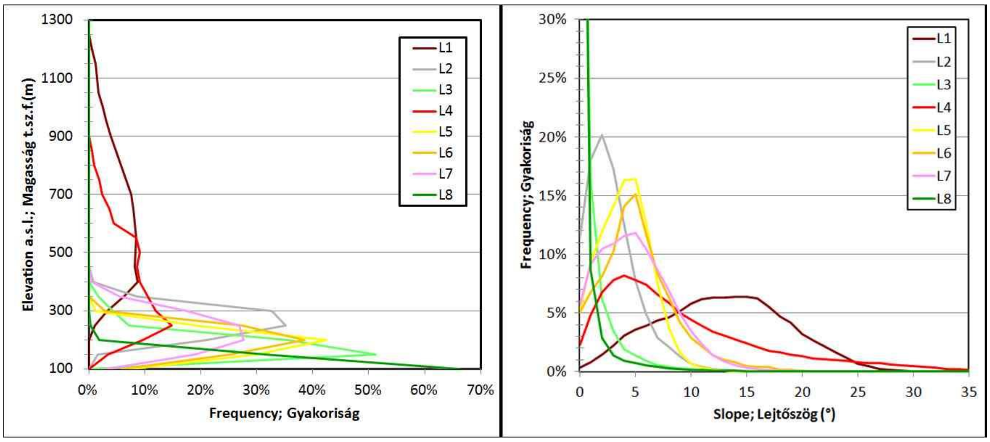

Fig. 2: Histograms of elevation and slope according to landscape. L1: Rudohorie, L2: Rudohorie foot, L3: N. valleys, basins, L4: Gömör-Torna Karst, L5: Cserehát Hills, L6: Szendrő-Rakaca Hills, L7: Putnok Hills, L8: S. valleys.

2. ábra: A vizsgált terület tájainak lejtőszög és magassági eloszlása. L1: Érchegység, L2: Érchegység alja, L3: Északi völgyek, medencék, L4: Gömör-Torna-karszt, L5: Cserehát, L6: Szendrő-Rakaca-rögvidék, L7: Putnoki-dombság, L8: Déli völgyek.

The distribution of elevation, slope and lithology according to landscape is shown by Fig. 2 and Table 2. The elevation histograms present that the Rudohorie Mts (L1) form the highest terrain within the study area with a stretched maximum frequency at elevations between ~400 and 700 m. The Gömör-Torna Karst (L4) is the 2nd highest in elevation with a smaller frequency maximum at ~500 m and a larger maximum at ~250 m. Every other landscape has much lower elevation maximum and much lower range of elevation.

Slope histograms demonstrate the dissected character of Rudohorie Mts, but it is remarkable that the Gömör-Torna Karst has higher frequencies in the steepest (>25°) slope categories than the Rudohorie Mts. It is a typical phenomenon of karst landscapes. The Cserehát, Szendrő-Rakaca and Putnok Hills have more or less similar slope distributions, but the two latters have slightly higher proportions in the steeper categories. The Rudohorie foot area has particularly low slopes, which means that from the viewpoint of relief, this landscape is closer to the almost plain valleys and basins than to the hilly terrains.

The distribution of lithology clearly shows the dominant rock type of each landscape and it also explains why the topographically similar hilly terrains (e.g. Cserehát Hills; Szendrő-Rakaca Hills; Putnok Hills) were classified into different landscapes.

Factors determining the spatial pattern of settlements and population

The spatial distribution of human population can be investigated by analysing the spatial pattern of settlements and also by taking into consideration the number of inhabitants. As *Fig. 3* shows, these two approaches result quite different pictures. Population density (*Fig. 3A*) is higher along the river valleys in both hilly and mountainous terrains. Although the Cserehát Hills, Putnok Hills and some parts of the Gömör-Torna Karst are topographically not so high, the population densities in these areas are as low as in the much higher and much more dissected Rudohorie Mts.

The spatial pattern of settlement density (*Fig. 3B*) is difficult to explain in general. Areas of high settlement density are found along some river valleys (e.g. Szuha valley; Bódva valley – where it crosses the state border; Rožňava/Rozsnyó/ basin), but also in the inner, „closed" parts of Cserehát Hills and along the southeastern boundary of Aggtelek Karst.

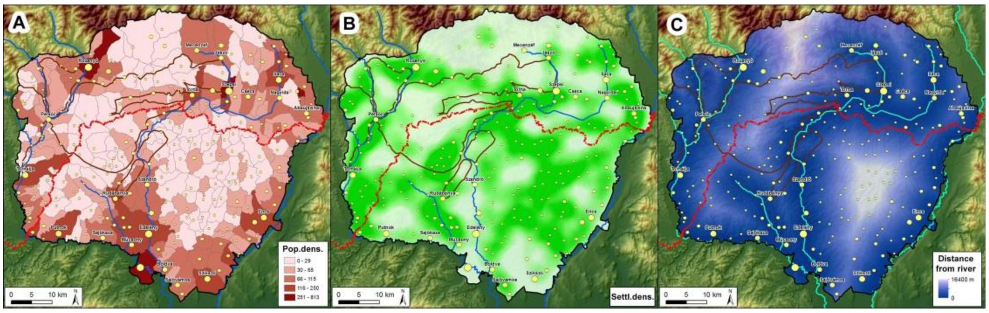

Fig. 3: Spatial distribution of population (A), settlements (B) and distance from the main rivers (C)

3. ábra: Népsűrűség (A), település-sűrűség (B) és a nagyobb vízfolyásoktól mért távolság (C)

Beside mapping population and settlement densities, we also investigated the statistical correlations between population density parameters and the most important topographic factors. Among topographic factors, we took into consideration the absolute (i.e. above sea level) elevation, the relative elevation (i.e. the height calculated as the difference between the given point and the lowermost point of its 4.5 km radius neighbourhood), the mean slope calculated for a 1 km radius neighbourhood around the settlement centre and the distance from the nearest significant river (*Fig. 3C*). Based on each parameter, the study area was distributed into zones. The classwidths for the zones were the followings:

- 50 m for the absolute elevation zones;
- 25 m for the relative elevation (height) zones;

- 1° for the slope zones;
- 1 km for the river zones.

Population densities, settlement densities and characteristic settlement size values were calculated for each zone. Characteristic settlement size was defined as the median of the number of inhabitants in each zone, because the median expresses the characteristic value better than the mean, since this latter value is often distorted due to outliers or non-symmetrical distributions. The results are presented in *Table III*.

Table III.
III. táblázat

R^2-values between environmental and social factors and the function type linked to the best correlation (exp=exponential; log=logarithmic; pow=power; poly2=2nd order polynomial)

R^2-értékek a természeti és társadalmi tényezők közti kapcsolatok alapján és a legjobb korrelációhoz tartozó függvény-típus (exp=exponenciális; log=logaritmikus; pow=hatvány; poly2=másodfokú polinom)

	Population dens.	**Settlement dens.**	**Characteristic settlement size**
Absolute elevation	0.85 (exp)	0.87 (exp)	0.25 (log)
Relative elevation	0.87 (log)	0.83 (pow)	0.22 (log)
Slope	0.75 (pow)	0.93 (poly2)	0.13 (exp)
Distance from river	0.72 (log)	0.15 (exp)	0.74 (log)

Based on the results of regression analysis, it is stated first, that the spatial distribution of population (both the number of settlements and the number of inhabitants) are strongly and similarly influenced by absolute and relative elevation. This result is different from what we got for Montenegro, where the relationship of population and absolute elevation was weak but the relative elevation proved to be a good determining factor (*TELBISZ et al*. 2013). Second, the slope angle is a very influential factor in settlement density. Third, it is observed that none of the direct topographic parameters are closely related with characteristic settlement size. It means that relatively large population settlements are found at higher elevations or on steeper fields as well as tiny villages are present on low, plain terrains, that makes the correlation weak. Therefore the best environmental explanation factor for characteristic settlement size is the distance from the closest significant river. This helps to find natural reasons to explain the existence of typical tiny village areas (like the inner parts of Cserehát Hills) found on terrains where topographic conditions (elevation, slope) are not so unfavourable. However, we think that this natural factor has an *indirect* effect only, by influencing traffic distances from larger settlements, which in turn, have a significant direct effect on the social possibilities of people, therefore on the spatial distribution of population (cf. *BELUSZKY*, 1977).

Another natural factor is the effect of karst. In order to quantify this effect, we created proximity zones based on the distance from karst and calculated population density for each zone (see *Table IV*). Karst terrains are practically uninhabited in the study area. On the other hand, population density jumps to very high values in a very short distance from karst (i.e. near the rock boundary). As distance further increases, the population density decreases, though deviations from this trend are remarkable.

Table IV.

IV. táblázat

Population density vs distance from karstic surface (the outlier values of Moldva nad Bodvou and Rožňava are omitted from the calculation of population density)

Népsűrűség a karsztos felszíntől mért távolság függvényében (Szepsi és Rozsnyó kiugróan magas népességük miatt ki lettek hagyva a népsűrűség számításából)

Distance from karst (m)	**Population density (1/km^2)**
0	2.1
0-250	77.1
250-500	111.2
500-750	*67.1*
750-1000	58.7
1000-1250	20.4
1250-1500	65.1
1500-1750	*41.7*
1750-2000	0.2
>2000	66.8

Distribution of population according to natural landscapes

Fig. 4 presents population density and settlement density according to natural landscapes. Based on this figure, it is obvious again that these two kinds of density are independent factors. The most rarely populated terrains are Cserehát Hills and Gömör-Torna Karst. The other end of the spectrum, the most densely inhabited areas are a bit of surprise, because in the northern parts, the valleys and basins are not the most densely populated terrains. On the contrary, even the Rudohorie Mts have higher population density and the highest population density – for the whole study area – is found in the Rudohorie foot landscape. In fact, this landscape has really favourable environmental conditions: its settlements get mineral resources, forest products and water from the mountains while traffic is not hampered by topographic obstacles, further on agriculturally more favourable plain terrains are also in the close neighbourhood.

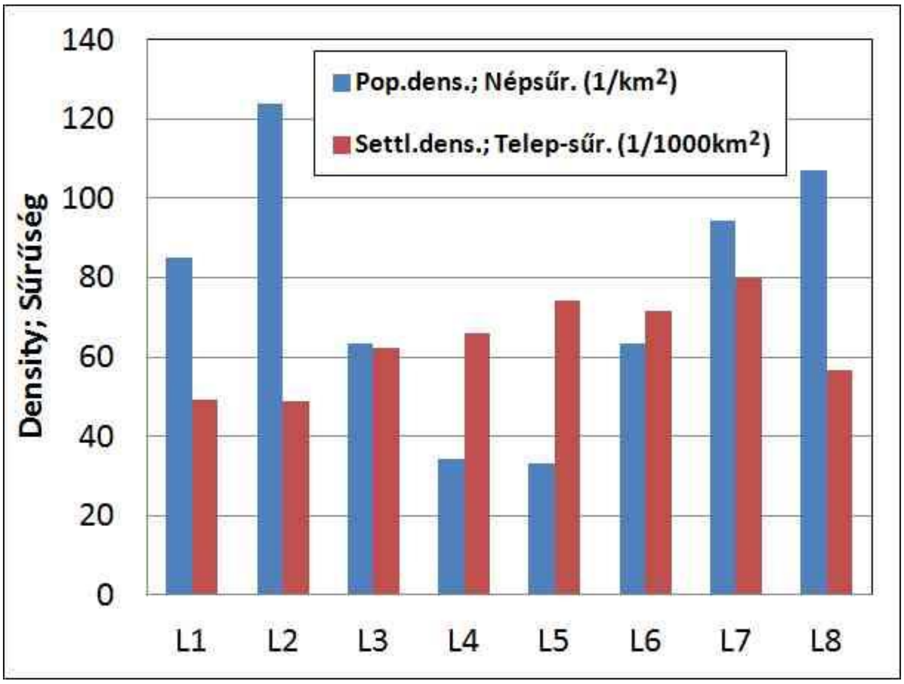

Fig. 4: Population density and settlement density according to landscapes. L1: Rudohorie, L2: Rudohorie foot, L3: N. valleys, basins, L4: Gemer-Turňa karst, L5: Cserehát Hills, L6: Szendrő-Rakaca Hills, L7: Putnok Hills, L8: S. valleys.

4. ábra: Népsűrűség és településsűrűség a természeti tájak szerint. L1: Érchegység, L2: Érchegység alja, L3: Északi völgyek, medencék, L4: Gömör-Torna-karszt, L5: Cserehát, L6: Szendrő-Rakaca-rögvidék, L7: Putnoki-dombság, L8: Déli völgyek.

Settlement density changes more or less inversely with population density. However, it is interesting that the highest settlement density is found in the Putnok Hills, where the population density is also high (as an exception), but thereafter Cserehát Hills, Szendrő-Rakaca Hills and Gömör-Torna Karst are found with high settlement densities and low population densities. These landscapes are homogeneous in a larger scale, but dissected in the small scale. This fact may have contributed to the development of many identical function, small settlements. On the other hand, this larger scale homogeneity with not neglectable dissection hampered the concentration of settlements in a later phase of social development. On plain terrains, this concentration was more effective and in mountainous areas the possible locations were a priori limited, therefore the population concentration is higher in the latter areas.

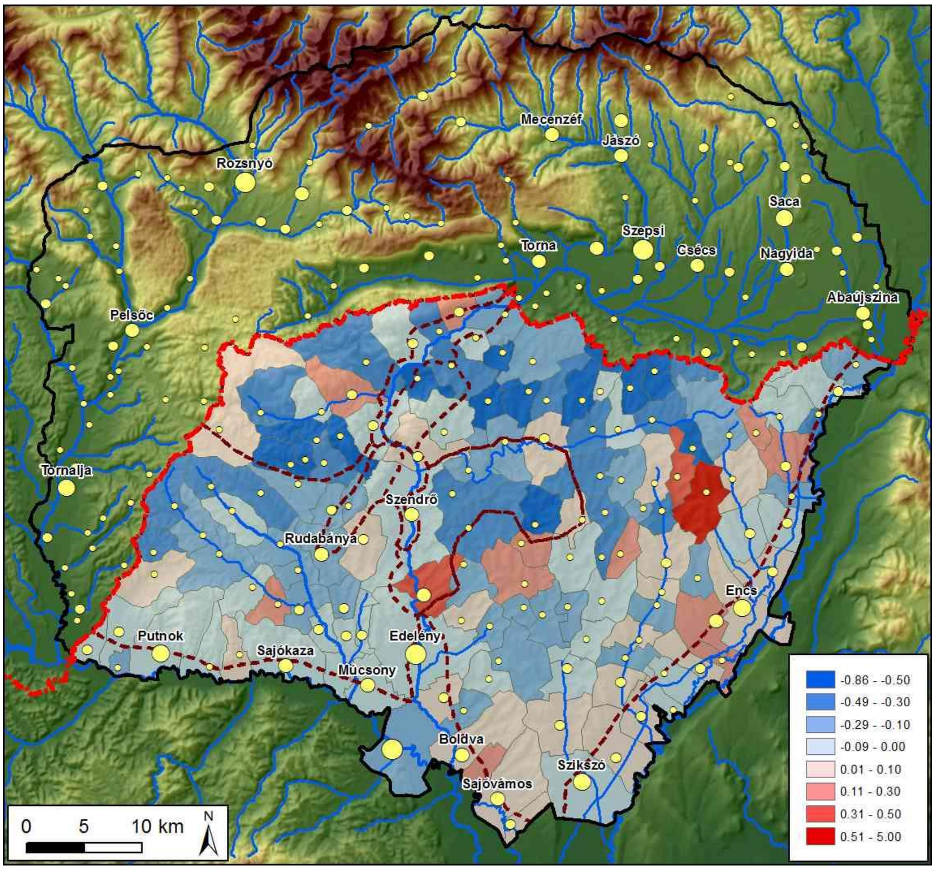

Fig. 5: Population changes between 1991 and 2011
5. ábra: Népességváltozások 1991 és 2011 között

One of our hypotheses was that nowadays, tourism of karst terrains based on natural factors (caves, nature reserves) may have a positive effect on maintaining the population of small villages. However, looking at the map of population changes since the end of communism (*Fig. 5*) it is stated that this positive effect is almost neglectable. The only village of Aggtelek Karst where this effect caused some slight increase in population is Aggtelek. The other settlements where population increase took place (e.g. Szin, Tornanádaska and several villages in Cserehát Hills) are mostly in connection with the high proportion of roma people that is due to either immigration or higher natural increase.

Spatial pattern of ethnicity and religion versus natural landscapes

Considering ethnic data, it is important to mention that at the census 2011 of Hungary it was possible for anybody to classify him(her)self to several ethnic groups. This possibility was chosen by many roma people. It is espacially remarkable in small roma villages, where a high proportion of people identified him(her)self as both Hungarian and Roma. In Slovakia, double ethnicity was not allowed at the 2011 census. This fact must be taken into consideration when data are analyzed.

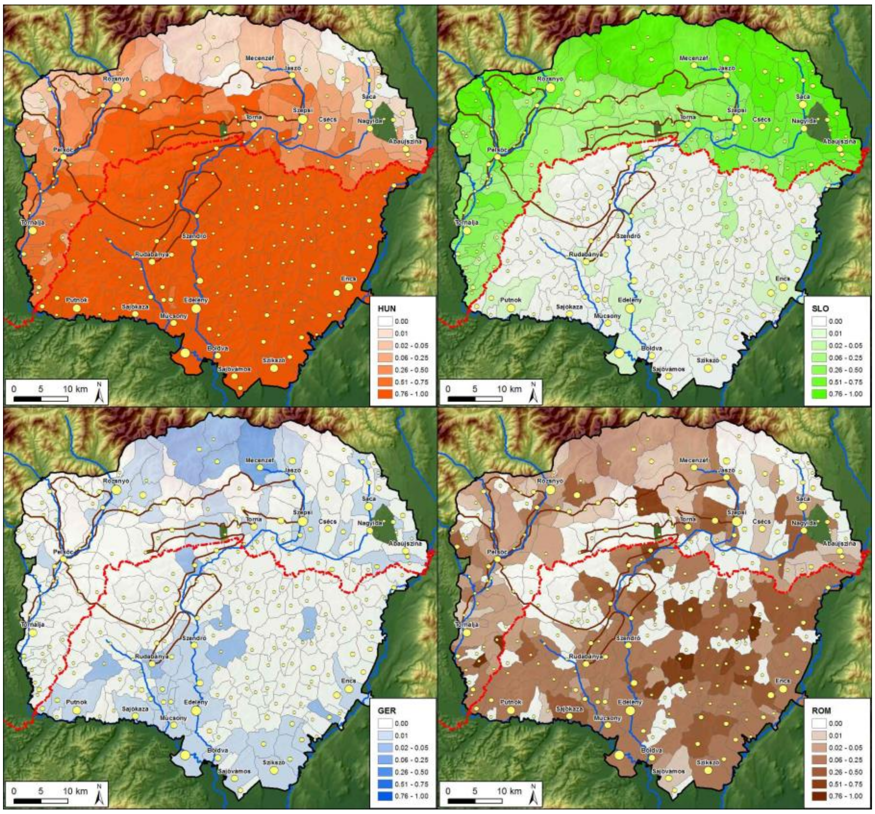

Fig. 6: Spatial pattern of ethnics in the study area (HUN: Hungarians; SLO: Slovaks; GER: Germans; ROM: Romas)

6. ábra: Etnikai térszerkezet a vizsgált területen (HUN: magyar; SLO: szlovák; GER: német; ROM: roma)

When the spatial pattern of ethnicity (*Fig. 6*) is considered, it is observed that the northern boundary of Hungarian ethnic territory more or less matches the northern boundary of Gömör-Torna Karst including the larger basins (western Košice /Kassa/ basin, Rožňava /Rozsnyó/ basin), too. Historical geographic publications (e.g. *KEMÉNYFI*, 1998; *KOCSIS*, 1998; *MÓGA*, 1998) confirm that this ethnic boundary was similar even in the Middle Ages, although the proportions and the ethnic distributions of some settlements were changed during history. It means that the Hungarian „ethnic character" felt himself familiar in the Gömör-Torna Karst, where extended plain terrains are present and the elevation is lower than in the Rudohorie Mts. On the contrary, these latter mountains have never been really populated by Hungarians. At the north-eastern part of the study area the ethnic border crosses the natural landscape that suggests the importance of purely social processes, here. In our earlier research, we found that landscape-independent ethnic borders are also present in Montenegro (cf. *TELBISZ et al*. 2013).

German ethnicity is remarkable only in some settlements of the Rudohorie Mts (mostly in Medzev/Mecenzéf). It goes back to miners' time, which in turn is due to mineral resources, i.e. it is in indirect relationship with environmental conditions. Small german „*patches*" found in the Hungarian part of the study area mean only few people in case of tiny villages. Neglecting these villages, it is found that Germans are found (though in a limited number) in some settlements of the Putnok Hills and Sajó valley, where industrial/mining past was also significant.

The spatial distribution of roma people has a very compound pattern. It is mostly due to social factors, but even the data collection is less reliable in case of this ethnicity. In the Slovakian part of the study area, we can find island-like roma settlements, whereas in the Hungarian side, there are larger roma inhabited zones alternating with purely Hungarian settlements. The highest proportions of roma people are found in the Cserehát Hills and Szendrő-Rakaca Hills (where the mean proportion of roma people in settlements are 22% and 25%, respectively). In the Aggtelek Karst and Putnok Hills, roma people have much lower proportions (10% and 8%, respectively). Since other social factors (e.g. population decrease) have similar trends in the Cserehát Hills and Aggtelek Karst, it is supposed that differences in the proportion of roma people is rather due to the spreading direction of roma ethnicity and not due to different natural conditions in the Aggtelek Karst.

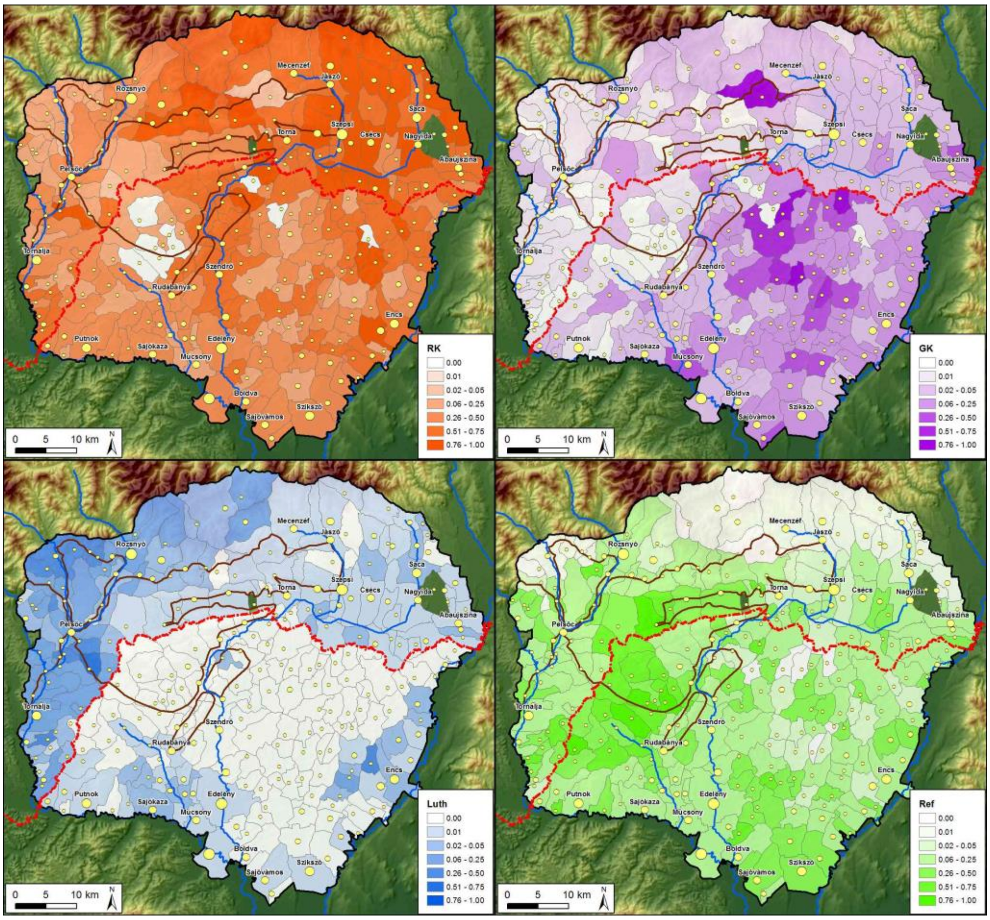

Fig. 7: Spatial pattern of religion in the study area (RK: Roman Catholic; GK: Greek Catholic; Luth: Lutheran; Ref: Reformed)

7. ábra: Vallási térszerkezet a vizsgált területen (RK: római kat.; GK: görög kat.; Luth: Evangélikus; Ref: Református)

To some surprise, the spatial pattern of religion (*Fig. 7*) are in good agreement with natural landscapes at certain locations. Roman catholics live in large numbers mostly in the northeastern part of the study area. Greek catholics are remarkably linked to the Cserehát Hills, but an interesting island is found at Hačava (Ájfalucska), at the head of the Háj (Áji) valley, which divides the Jasovská (Jászói) plateau from the Zádielská (Szádelői) plateau. Here, the natural conditions resulted the isolation of this small village, which helped the preservation of this ethnic-religious island. Once this village was Rusyn. It is hardly detected in the ethnic statistics, but the

Greek Catholic religion remained. It demonstrates that religious identity is more easily preserved than ethnicity. Evangelical-lutheran people live mostly in the western part of the study area, but it is not really connected to natural landscapes. Finally, the reformed calvinist church has the highest proportions mainly at the west-central part of the study area, in the Gömör-Torna Karst and Putnok Hills. In the Carpathian Basin, this religion is principally linked to Hungarians (but the opposite is not true), therefore the spatial distribution of calvinists is related to traditionally Hungarian-inhabited landscapes. Therefore it is indirectly influenced by environmental factors as it was mentioned in the discussion of the spatial pattern of Hungarian ethnicity.

Conclusions

The Gömör-Torna Karst is clearly distinguishable from its surroundings using different topographic characteristics (elevation and slope histograms). The spatial distribution of settlements and that of the population result two quite different maps. However a common factor in the explanation of these spatial patterns is the elevation, since both settlement density and population density are closely (R^2>0.8) related to either absolute or relative elevation. In case of settlement density, the slope is an even more determining factor than elevation. On the other hand, characteristic settlement size has the highest correlation with distance from the closest significant river.

As for the comparison of Cserehát Hills and Gömör-Torna Karst, it is concluded that these terrains are not significantly different from the viewpoint of population distribution. Both landscapes are rarely inhabited, but their settlement networks are dense. Extremely few people live directly on the karst, but many people live very close to the karst. The most densely populated part of the surroundings is the foot of the Rudohorie Mts, where diverse environmental factors result in a „favorable mix”. The environmentally based tourism has only limited effect on the population changes (in the Hungarian part), it is detectable only in case of Aggtelek village. The spatial distribution of ethnicity and religion is in many cases in good agreement with natural landscapes, but the relationship is neither direct nor deterministic.

Planning our further research, we are going to take into consideration more factors of both the environmental (e.g. land cover; water resources) and the social (e.g. economic and traffic parameters) categories.

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