

Confessional Pluralism in Central and Eastern Europe – a GIS approach

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Received: January 27, 2023 | Revised: March 10, 2023 | Accepted: March 15, 2023

doi: 10.5937/gp27-42461

Abstract

In this recent study, we analyse the religious diversity of Central and Eastern Europe, from the Balkans up to the Baltic region. This region has many religious confessions, without claiming completeness, Roman Catholic, Reformed, Lutheran, Orthodox, Islam, Hussite and many people without any religion. The recent spatial distribution of the religious confessions has been shaped by different drivers across Central and Eastern Europe. We chose a quantitative method to visually interpret the pluralism of the religious confessions and we selected diversity indices. We calculated the diversity of the religious confessions and ethnicities in a very detailed resolution, at municipality level of each country, based on population census data of 2011. We found statistically significant relationship between the diversity of religious confessions and the diversity of ethnicities. We have also shown that near the national borders, the religious pluralism is higher than in another areas. There is statistically significant connection between the former national borders (1900s and 1930s) and the religiously plural areas. The results of this study provide the evidence of the spatial distribution of borderline syndrome and serves as a good basis for further research (theoretical and statistical) of the religion pluralism in Central-Eastern Europe.

Keywords: religious pluralism; religious diversity; GIS; borderline; region; statistical analysis

Introduction

Globalisation and technological progress influencing the spatial distribution of religions and their diversity continuously changing. The measuring of religious diversity is getting more important world-wide (Pew Research Center, 2022; Warf & Vincent, 2007), like in USA (Eck, 2001; Warf & Winsberg, 2008), Asia and Australia (Bouma, Ling, & Pratt, 2010) and also in Europe (Dövényi & Németh, 2014; Ferrari & Pastorelli, 2012; Monnot & Stolz, 2014; Pollack, 2008; Vertovec, 2007). The religious diversity of Central and Eastern Europe, from the Balkans to the Baltic region were examined. Central and Eastern Europe is a geographical subunit of the continent between three seas the Nordic, the Adriatic, and the Black Sea. Gerard Delanty is a well-known historian on the field of Europe (Delanty, 2015, 2018). He developed six subregions across the

continent using two main criteria. The first is cultural, which refers to historical roots, and the second is modernity's unique features. The entire region is one big borderland, culturally influenced by West and East Christianity. Europe is a borderland in the sense that it consists of multiple spatiality in terms of state formation, markets, social and cultural institutions, and identities (Balibar, 2004). According to this viewpoint, any reference to a geopolitical or historical region must acknowledge its connections with other regions. Europe's regions should thus be viewed as hyphenated spatiality rather than separate territories (Delanty, 2018). There are several religious confessions in this region, including Roman Catholic, Reformed, Lutheran, Orthodox, Islam, Hussite, and many others who do not identify with any religion (Cipriani, 2011). Var-

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ious drivers have impacted the recent spatial distribution of religious confessions across Central and Eastern Europe. First and second world wars have the biggest impact on the spatial distribution change of religions in this area. Communism also had a strong effect on the religious denominations, but in a different way (not in the spatial distribution), was influenced by the number of believers.

When it comes to concerns of diversity and pluralism, post-communist states are frequently viewed as a special case. Post-communist Europe is usually defined as an area in which religion has been revitalised in the post-1989 period, and a place in which debates concerning church and state are particularly significant, despite a general understanding of considerable diversity in terms of basic religious landscape. This is mostly due to established Churches' attempts to reclaim its pre-communist public dominance, attempts that contradict the positions and rights of other (minority and new) religions and clash with competing perspectives on secularity in modern Europe. Another, more complex scenario involves countries that have recently had violent conflicts (such as those in post-Yugoslav countries) in which religions, as essential symbols of separate ethnic identities, played a significant social role (Zrinščak, 2014). All of the previously stated historical and recent traumas are not outliers. They represent and demonstrate the enormous significance of collective wounds in CEE societies. Politicians and citizens see their fate through the lens of a wounded collective identity, and they are captivated by natural and phantom pains. For a proper understanding of the region, as well as the presence, distribution and functions of religion in CEE, it is necessary to centre the interpretation on the factor of wounded collective identity (Máté-Tóth, 2019; Szilárdi & Kakuszi, 2022).

The present study attempts to observe the link between the borderline syndrome phenomenon and wounded collective identity effect and religious diversity. Religious diversity is a normal occurrence in Central

and Eastern European countries, as the region includes countries with a wide range of confessional traditions (Catholic, Orthodox, Protestant, Muslim, and so on) that have long existed in the region (Sealy, Magazzini, Modood, & Triandafyllidou, 2021). On the other side, there are countries that are extremely monolithic, with more than 90% of their people belonging to a single confession ('Catholic' Poland and 'Orthodox' Romania), as well as countries with many confessions or a substantial percentage of atheists (Hungary, Czech Republic and Estonia). The crucial thing to remember is that diversity is a historical fact that has not changed over the twentieth century, despite the presence of atheist regimes (Zrinščak, 2014).

To analyse the spatial trends of the religious pluralism in Central-Eastern Europe, it must be visualised spatially. Population census datasets from 2011 for 13 countries at municipality level (LAU1) were collected. To measure the spatial distribution of the religious confessions two diversity indices were chosen: the Richness Index and the Simpson Diversity Index. Both of these indices evaluate diversity and were created by Simpson in 1949 (Simpson, 1949). Other disciplines have adopted this indicator, such as economics' Herfindahl–Hirschman-index (Rhoades, 1993) or the Pew Research Center's Global Religious Diversity Index (Pew Research Center, 2022). Three countries, 'Catholic' Poland, 'Orthodox' Romania and Hungary with many confessions have been selected for further analysis related to present and historical national borders (ANOVA test).

The main goals of this study are the following: (i) to make a unique and unified religion dataset for Central-Eastern Europe and visualise spatially the religious pluralism, (ii) analyse the relationship between religious confessions and ethnicities, (iii) prove the borderline syndrome phenomenon based on the religious diversity and historical national borders. This study also serves as a good basis for further research (theoretical and statistical) of the religion pluralism in Central and Eastern Europe.

Databases and methods

Study area

Regional scale study area covers Central and Eastern Europe from Balkans up to Baltic area (13 countries). This region was the western border of the former Soviet Union and it had a very eventful history in the last century. The national borders changed several times as the population and the religious confessions too. Country scale analysis contains Hungary, Poland and Romania (Figure 1). These countries were chosen because Hungary is very diverse in religious denomina-

tions and ethnicities, inhabitants of Poland are mostly Roman catholic, while Romania is mostly orthodox. All of the three countries' national borders changed according to the years of 1900.

Datasets

The Population and Householding Censuses 2011 give the basis of our research. Every country conducted this census in many topics, the religion and ethnicity related datasheets were selected. All of the

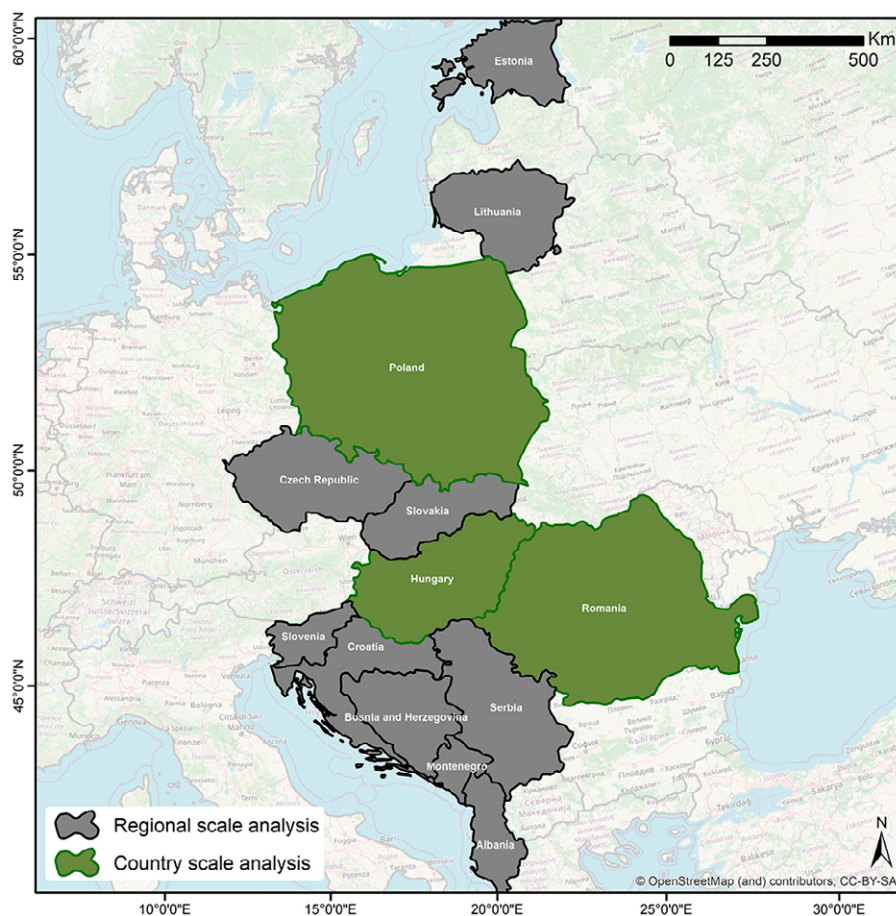


Figure 1. Study area of the analysis, countries highlighted with grey: regional scale analysis, green: country scale analysis

dataset by municipalities is freely available on the census 2011 website of all countries (Table 1). On these websites the methodology of all survey is available. The answered data was used; values of no responses have been excluded. Latvia was not analysed as no public data on religion at the municipal level was available.

The following countries' data have been collected in order from north to south (Table 1).

The GIS dataset of countries' municipality polygons are available on the Eurostat website (Eurostat, 2022). All of datasheets were merged, edited and restructured to make a unified database, which contains more than 7000 units.

Table 1. List of the analysed countries and link to the population and householding census of each country from 2011

| Country name | Link to the dataset webpage |
|------------------------|---|
| Estonia | https://www.stat.ee/en/statistics-estonia/population-census-2021 |
| Lithuania | https://osp.stat.gov.lt/2011m.-visuotinis-gyventoju-ir-bustu-surasymas |
| Poland | https://stat.gov.pl/en/databases/ |
| Czech Republic | https://vdb.czso.cz/vdbvo2/faces/en/index.jsf?page=statistiky#katalog=33476 |
| Slovakia | https://slovak.statistics.sk/wps/portal/ext/themes/demography/census/indicators/ |
| Hungary | https://www.ksh.hu/nepszamlalas/detailed_tables |
| Romania | https://www.recensamantromania.ro/ |
| Slovenia | https://www.stat.si/Popis2011/eng/Popul.aspx?lang=eng |
| Croatia | https://web.dzs.hr/arhiva_e.htm |
| Serbia | https://data.stat.gov.rs/?caller=3102&languageCode=en-US |
| Bosnia and Herzegovina | https://popis.gov.ba/ |
| Montenegro | http://monstat.org/eng/page.php?id=1708&pageid=1708 |
| Albania | http://databaza.instat.gov.al/pxweb/en/DST/ |

Historical national boundaries from 1900 were created by Max Planck Institute for Demographic Research and Chair for Geodesy and Geoinformatics of University of Rostock (MPIDR & CGG, 2013). The year 1900 was chosen as a reference point because it was before the two world wars, which significantly changed the national borders and the demographic composition of Poland and Romania. We wanted to capture the historical diversity of these regions before they were affected by the major political and social upheavals of the 20th century.

GIS and statistical analysis

The unified census dataset has been joined to the municipality polygons to visualise the spatial distribution of religious confessions and ethnicities and conduct spatial analysis. A webmap was created to make our regional scale results available to everyone. The webmap was created in the ArcGis Online application and it contains switchable layers, legends, data charts, export option and pop-up windows with detailed attributes. The webmap can be accessed via the following link: <https://www.convivence.eu/research/projects>.

We chose two diversity indices, Richness Index and Simpson Diversity Index. The measurement of the diversity is coming from the ecology, in 1949, Simpson made this index (Simpson, 1949). Other disciplines have also adopted this index, like in economics, the Herfindahl–Hirschman-index (Rhoades, 1993) or the Global Religious Diversity Index of the Pew Research Center (Pew Research Center, 2022). Richness Index (RI) shows the number of different religious confessions or nationalities in a unit. Simpson Diversity Index (SDI) represents the probability that two individuals randomly selected from a sample will belong to different categories (religion, ethnicity, etc.), the value of this index ranges between 0 and 1, the greater the value, the greater the sample diversity. The calculation was done in Microsoft Excel software for every municipality polygon.

Results

In this chapter our result based on regional and country scale analysis will be presented, dominant religious confessions, spatial distribution of confessions' diversity, relationship between confessions and ethnicities and the importance of historical national borders.

$$SDI = 1 - \left(\frac{\sum n(n-1)}{N(N-1)} \right)$$

- where n=the total number of members in a confession, N= the total number of members in all confessions.

Central and Eastern European diversity calculations at regional scale have been done based on the five most frequent religious denominations at municipality level (Roman catholic, Lutheran, Reformed, Orthodox, Muslim). The statistical analysis of the relationship between religious confessions and ethnicities in country scale (Hungary, Poland, Romania) has been done at municipality level in the IBM SPSS Statistics 20 software. The normality of our dataset has been checked by the Kolmogorov-Smirnov (Smirnov, 1939) and Shapiro-Wilk (Shapiro & Wilk, 1965) test and they resulted that our dataset is not normally distributed. On our non-normally distributed data the non-parametric Spearman rank correlation was used to analyse the relationship between religion and ethnicity (Kendall, 1994). For non-normal datasets, it is recommended to use Spearman correlation instead of Pearson correlation.

We divided the area of Poland and Romania into two parts based on the national borders of the year 1900. One part contains just the municipalities inside the 1900 borders and the other part contains just the left-over municipalities inside the present-day borders. On our municipality dataset, one-way analysis of variance (ANOVA) test (containing religious and ethnicity diversity) was used. The two parts of countries were declared as groups since this analysis can be performed on a dataset with two or more groups. The ANOVA test uses the F distribution to compare the means of groups, the null hypothesis states that all groups' samples have the same mean values (Kaufmann & Schering, 2014).

Religious and ethnicity diversity in Central and Eastern Europe

As it is described in the introduction section, Central and Eastern Europe is very diverse in religious denominations. On the Figure 2A), the dominant religious denominations are nicely outlined, as well as the Roman catholic blocks, like Poland, Lithuania and Croatia. Most of Hungary is Roman catholic, but some regions are dominated by other denominations of Christianity. Orthodox is dominant in Romania (ex-

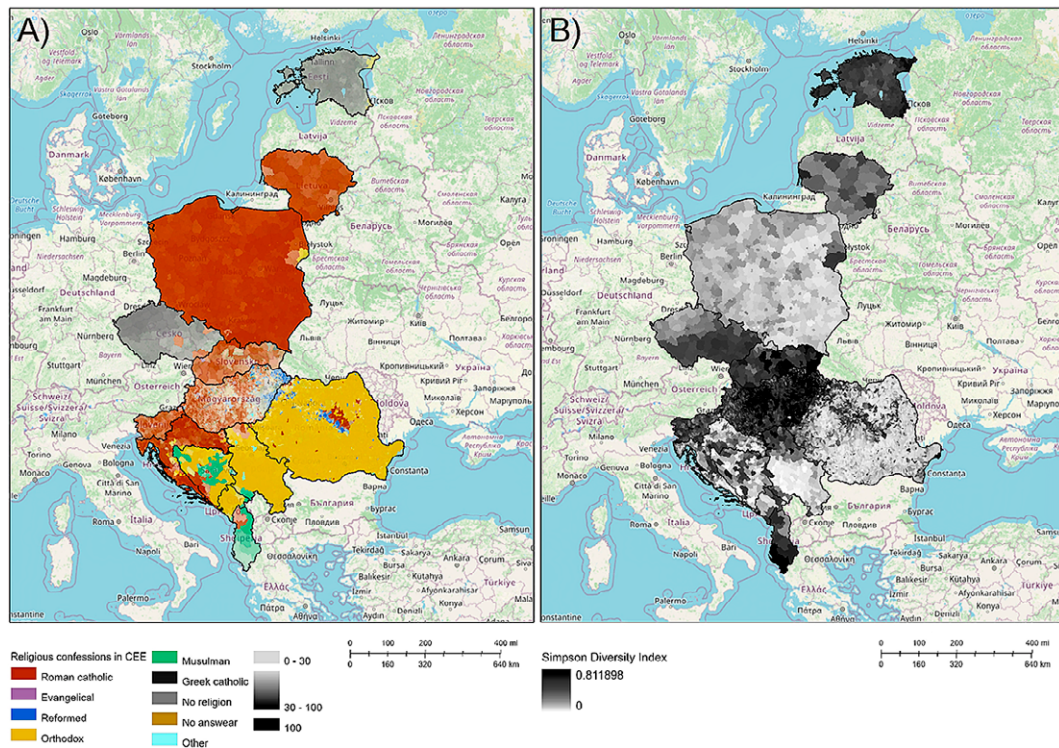


Figure 2. A) Dominant religious confessions at municipality level in Central-Eastern Europe;
B) Diversity of main five religious' confessions (Roman catholic, Lutheran, Reformed, Orthodox, Muslim) at municipality level in Central-Eastern Europe

cept the areas inhabited by Hungarians), Serbia and Montenegro. Muslim is dominant in two countries, Albania and Bosnia Herzegovina, but not homogeneous, Roman catholic and orthodox also appear in some regions. The Czech Republic and Estonia were dominated by people without religion in most of the municipalities.

On the Figure 2B), the spatial distribution of the religious pluralism can be observed based on the Simpson diversity index and it gives a more nuanced picture of the religions across Central and Eastern Europe. In the extremely monolithic countries, such as Poland, Romania and southern Serbia, the diversity index is low or close to the zero value, which means that one religious denomination dominates the municipalities. Albania, Estonia, Hungary and Slovakia show quiet high diversity values in most of their regions.

Religious and ethnicity diversity in Hungary

The Simpson diversity index (SDI) of religious confessions in Hungary shows an unequal distribution, eastern and middle part of the country are the most diverse (highest SDI=0.82), the western part is more homoge-

neous (lowest SDI=0.07) (Figure 3A). The diversity of ethnicities has different spatial distribution, more diverse region take place along the Romanian, Ukrainian and Slovakian borders and in the South-Western part of the country (highest SDI=0.82) (Figure 3B). The lowest SDI of ethnicities is zero, which means that there are settlements inhabited only one ethnicity (most likely Hungarian). Number of religious confessions and the number of ethnicities show very similar spatial distribution in Hungary (Figure 3C, D). The highest numbers of RI (15) can be found in the Hungarian Great Plain and in the capital, Budapest.

We found positive significant correlations between the number of religious confessions and number of ethnicities, see in Table 2 ($r=0.74$, $p=0.01$, $n=3154$). In the Figure 3C, D, it can be clearly observed visually. Correlation between number of ethnicities and Simpson diversity of religious confessions also show positive significant relation ($r=0.305$, $p=0.01$, $n=3154$), but much weaker as in the previous case. The Simpson diversity of ethnicities has no significant correlation with number of religious confessions and neither the Simpson diversity of religious confession, but these are also important result.

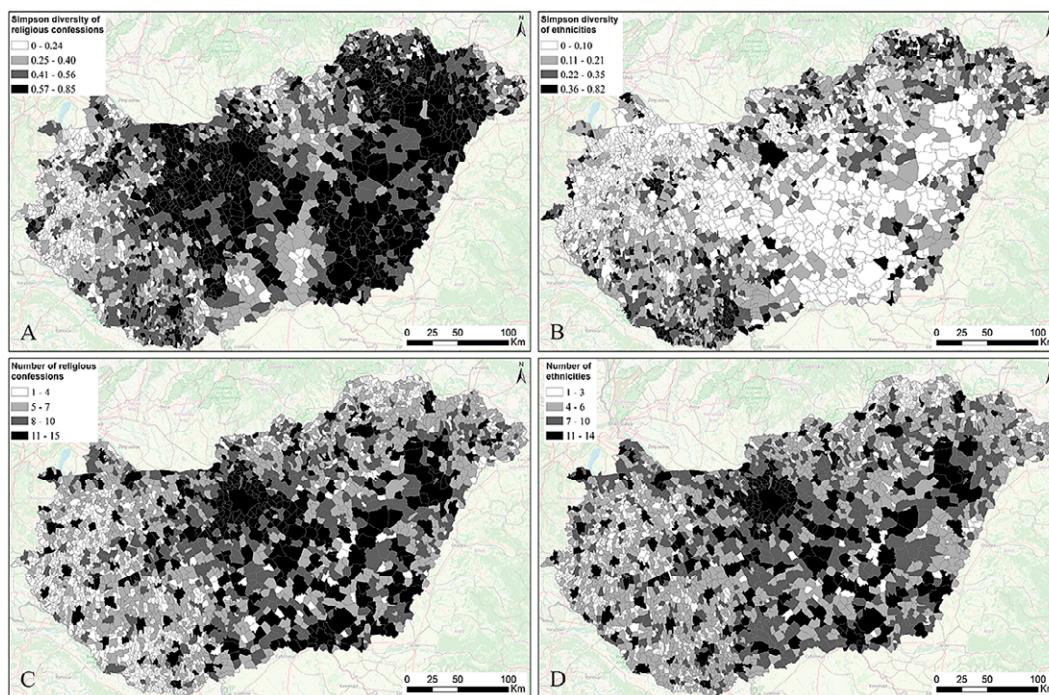


Figure 3. A) Simpson Diversity Index of religious confessions at municipality level in Hungary B) Simpson Diversity Index of ethnicities at municipality level in Hungary C) Number of different religious confessions at municipality level in Hungary D) Number of different ethnicities at municipality level in Hungary; Zero = no diversity; A, B, C and D based on Hungarian Population and Householding Census 2011

Table 2. Results of the Spearman correlation analysis between diversity and number of religious confessions and ethnicities in case of Hungary

| | Number of ethnicities | Simpson diversity of ethnicities | Number of pairs |
|--|-----------------------|----------------------------------|-----------------|
| Number of religious confessions | 0.74** | Not significant | 3154 |
| Simpson diversity of religious confessions | 0.305** | Not significant | 3154 |
| Number of pairs | 3154 | 3154 | |

** Significant at 0.01 level

Religious and ethnicity diversity in Poland

Based on the religious confessions and ethnicities Poland has a homogeneous core area according to Hungary. The spatial distribution of religious confessions' SDI is much higher in the surroundings of the Belarus, Russian, German and Czech Republic borders (Figure 4A). The highest values can be observed in the area of Bielsko-Biala and Białystok (SDI=0.51). In case of the ethnicities SDI, it has a more homogeneous distribution outside of the core area, the most diverse areas are Belarus, Russian, Baltic-See shoreline and Czech Republic borders (Figure 4B). The most diverse hotspots are Białystok, Katowice surroundings (50 km), Suwałki and Gdynia-Gdansk surroundings (50 km) (SDI=0.59). The number of religious confessions is higher in the bigger cities and near the national border, highest number is 12 (Figure 4C). Number of different ethnicities show other spatial distribu-

tion, higher numbers appear near Białystok, Katowice surroundings (50 km), Suwałki, Gdynia-Gdansk surroundings (50 km) and Warsaw (highest number=24) (Figure 4D). According to Hungary in Poland there is no totally homogeneous municipality, minimum number of confessions and ethnicities is 3.

In case of Poland, four positive significant correlation were found between ethnicities and religions (Table 3). The highest correlation ($r=0.73$, $p=0.01$, $n=369$) shows up between number of ethnicities and number of religious confessions. Second highest presented between diversity indices of ethnicities and religious confessions ($r=0.585$, $p=0.01$, $n=369$). Results show two quiet high correlation, first between number of ethnicities and SDI of religious confessions ($r=0.45$, $p=0.01$, $n=369$) and between the SDI of ethnicities and number of religious confessions ($r=0.452$, $p=0.01$, $n=369$).

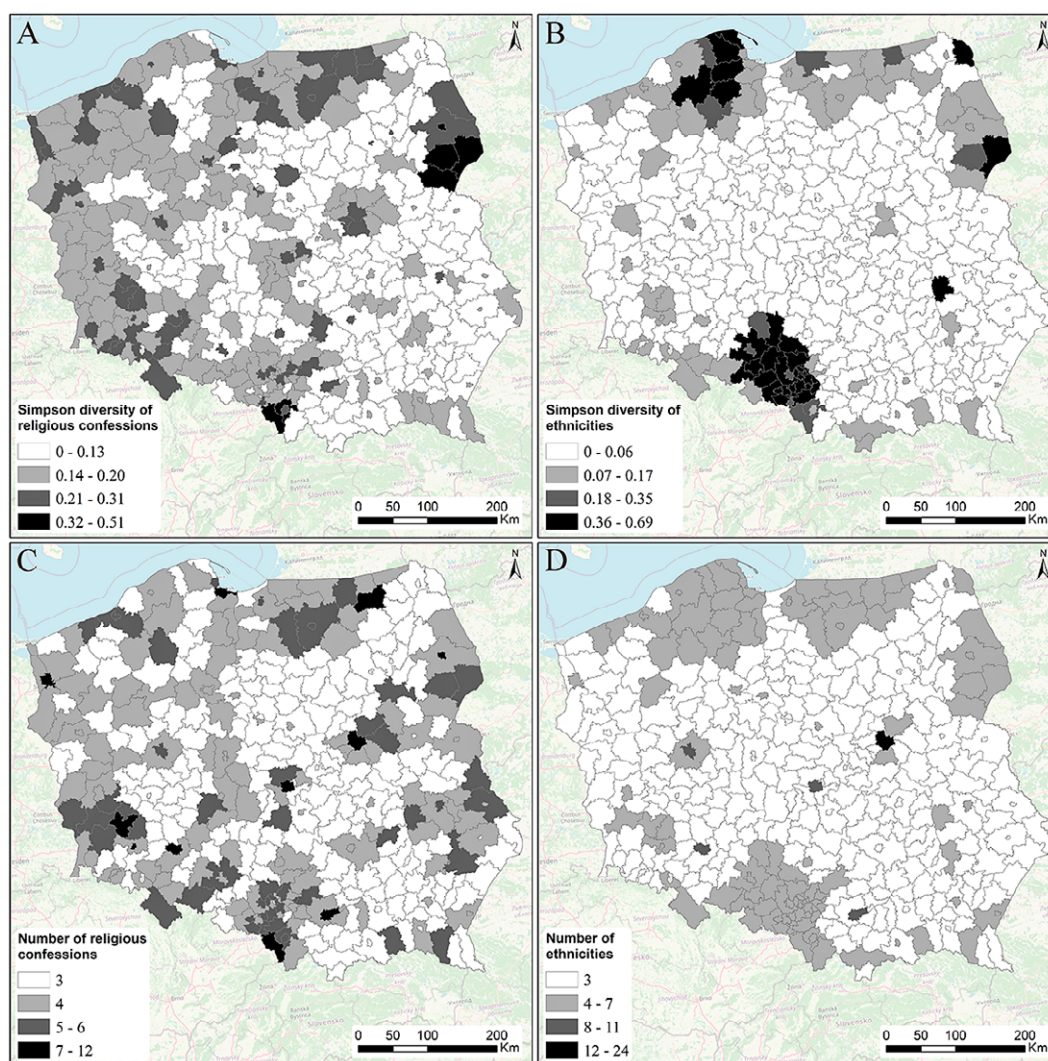


Figure 4. A) Simpson Diversity Index of religious confessions at municipality level in Poland B) Simpson Diversity Index of ethnicities at municipality level in Poland C) Number of different religious confessions at municipality level in Poland D) Number of different ethnicities at municipality level in Poland; Zero = no diversity; A, B, C and D based on Polish Population and Householding Census 2011

Table 3. Results of the Spearman correlation analysis between diversity and number of religious confessions and ethnicities in case of Poland

| | Number of ethnicities | Simpson diversity of ethnicities | Number of pairs |
|--|-----------------------|----------------------------------|-----------------|
| Number of religious confessions | 0.73** | 0.452** | 369 |
| Simpson diversity of religious confessions | 0.450** | 0.585** | 369 |
| Number of pairs | 369 | 369 | |

** Significant at 0.01 level

Religious and ethnicity diversity in Romania

According to the Figure 5A, Romania can be divided into two parts, within the Carpathians and outside of the Carpathians. The SDI of religious confessions is the highest near the Hungarian border and where Hungarians are in majority in Transylvania. The highest SDI value is 0.83 and the lowest is zero. SDI of ethnicities show very similar spatial distribu-

tion as in the previous figure (Figure 5B). The number of religious confessions is higher near the Hungarian border, Serbian border, at the Black Sea shoreline, around Bucharest, Cluj-Napoca, Timisoara and Brasov (Figure 5C). Highest number is 22 and the lowest is zero. The number of ethnicities highest near the triple border between Hungary, Serbia and Romania and Black Sea shoreline. According to the Figure 5D

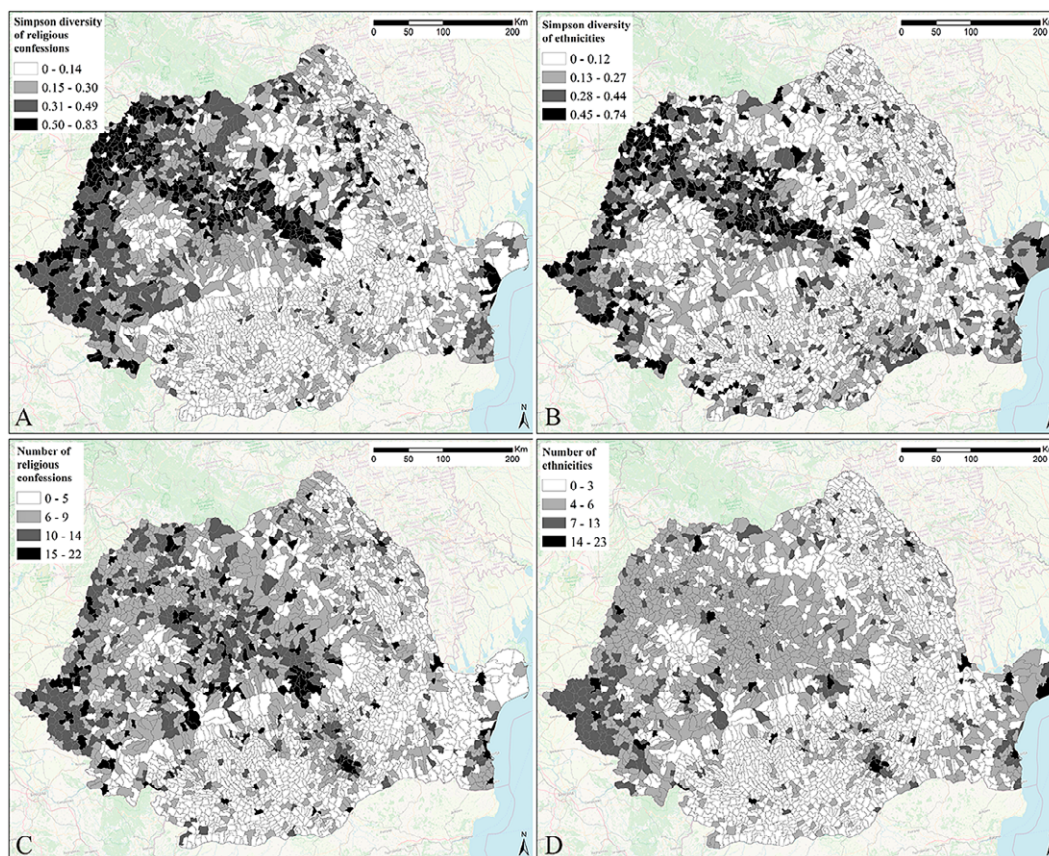


Figure 5. A) Simpson Diversity Index of religious confessions at municipality level in Romania B) Simpson Diversity Index of ethnicities at municipality level in Romania C) Number of different religious confessions at municipality level in Romania D) Number of different ethnicities at municipality level in Romania; Zero = no diversity; A, B, C and D based on Romanian Population and Householding Census 2011

Table 4. Results of the Spearman correlation analysis between diversity and number of religious confessions and ethnicities in case of Romania

| Romania | Number of ethnicities | Simpson diversity of ethnicities | Number of pairs |
|--|-----------------------|----------------------------------|-----------------|
| Number of religious confessions | 0.687** | 0.479** | 2939 |
| Simpson diversity of religious confessions | 0.558** | 0.612** | 2939 |
| Number of pairs | 2939 | 2939 | |

** Significant at 0.01 level

the highest number of ethnicities (33) can be found near the Black Sea shoreline, around Bucharest, Brasov and Timisoara.

In case of Romania, four positive significant correlation was found between ethnicities and religions (Table 4). Highest correlation coefficient represents between Number of ethnicities and number of religious confessions ($r=0.687$, $p=0.01$, $n=2939$). Between SDI of religions and ethnicities have also quiet strong correlation ($r=0.612$, $p=0.01$, $n=2939$). Compared to Hungary and Poland, stronger correlations resulted between number of ethnicities and SDI of religious confessions ($r=0.558$, $p=0.01$, $n=2939$) and between SDI of ethnicities and number of religious confessions ($r=0.479$, $p=0.01$, $n=2939$).

Spatial distribution of religious diversity - historical approach

National border of Poland from 1900 enclose an area, which is religiously homogeneous. Areas outside of the border from 1930 even more clearly delineate the religiously more plural part of the country.

According to our result there is a significant difference in religious diversity [$F(1,378)=24.4$, $p<0.0001$], ethnic diversity [$F(1,378)=8.1$, $p=0.005$] and number of religions [$F(1,378)=11.3$, $p=0.001$] between the two part of Poland based on the historical national border from 1900 (Table 5). The biggest difference between the two parts of the country can be found in the religious diversity, then in the number of religions and finally the ethnicity diversity.

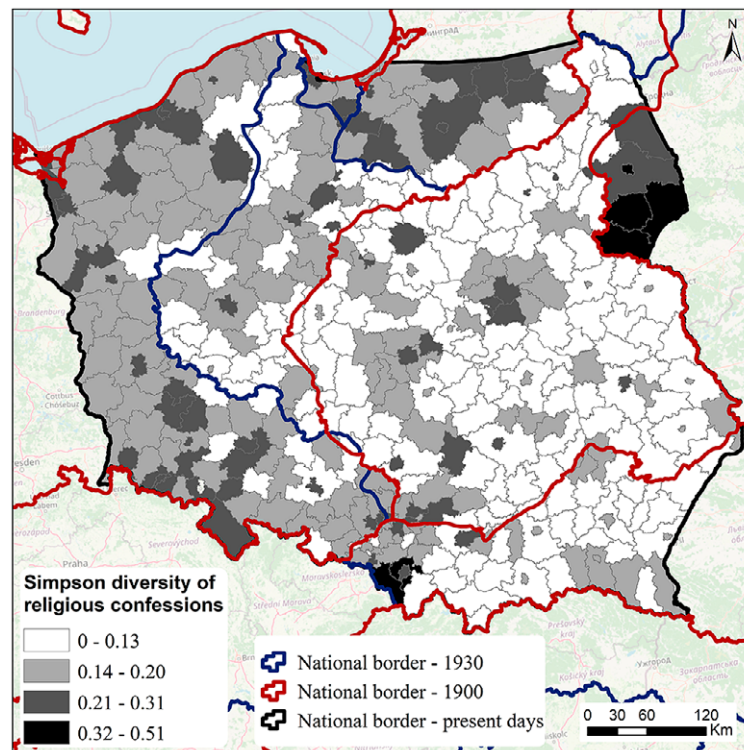


Figure 6. Historical and present-day borders of Poland overlaid on the Simpson Diversity Index map of religious confessions, red line = national border from 1900, blue line = national border from 1930, black line = present-day national border

Table 5. Results of one-way ANOVA test based on the two parts of Poland (inside 1900 border and outside the 1900 border). df means degrees of freedom; F mean F ratio=mean square(between groups)/mean square(within groups).

| | | Sum of Squares | df | Mean Square | F | Sig. |
|-----------------------|----------------|----------------|-----|-------------|--------|----------|
| Religious diversity | Between Groups | 0.115 | 1 | 0.115 | 24.403 | < 0.0001 |
| | Within Groups | 1.774 | 378 | 0.005 | | |
| | Total | 1.888 | 379 | | | |
| Ethnic diversity | Between Groups | 0.206 | 1 | 0.206 | 8.056 | 0.005 |
| | Within Groups | 9.648 | 378 | 0.026 | | |
| | Total | 9.854 | 379 | | | |
| Number of religions | Between Groups | 13.306 | 1 | 13.306 | 11.317 | 0.001 |
| | Within Groups | 444.421 | 378 | 1.176 | | |
| | Total | 457.726 | 379 | | | |
| Number of ethnicities | Between Groups | 6.008 | 1 | 6.008 | 2.670 | 0.103 |
| | Within Groups | 850.463 | 378 | 2.250 | | |
| | Total | 856.471 | 379 | | | |

National border of Romania from 1900 enclose an area, which is religiously homogeneous. Areas outside of the border from 1900 even more clearly delineate the religiously more plural part of the country.

According to our result there is a significant difference in religious diversity [$F(1,2937)=1421.4$, $p<0.0001$], ethnic diversity [$F(1,2937)=701$, $p<0.0001$], number of religions [$F(1,2937)=518.7$, $p<0.0001$] and number of ethnicities [$F(1,2937)=290.2$, $p<0.0001$] be-

tween the two part of Romania based on the historical national border from 1900 (Table 6). Comparing to the Poland ANOVA test the Romanian show much more significant and biggest differences between the two parts of the country. The biggest difference can be observed in case of the religious diversity, on the second place the ethnic diversity, third is the number of religions and finally the number of ethnicities.

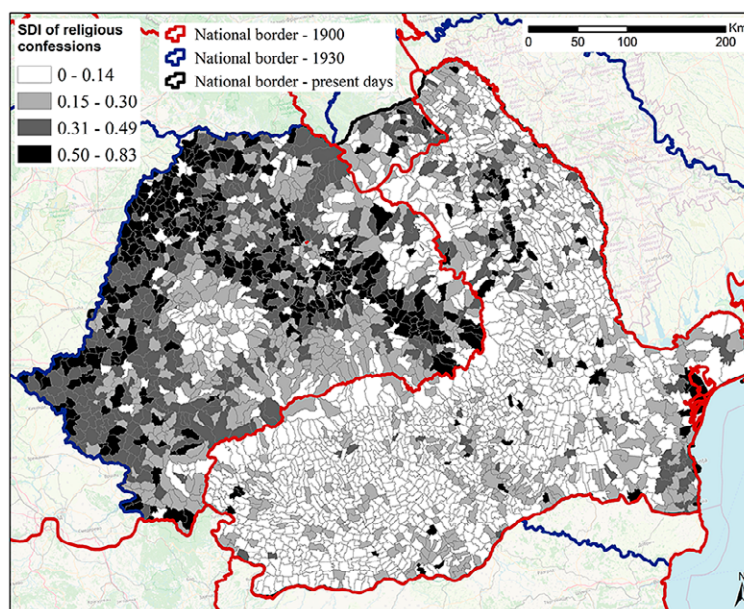


Figure 7. Historical and present-day borders of Romania overlaid on the Simpson Diversity Index map of religious confessions, red line = national border from 1900, blue line = national border from 1930, black line = present-day national border

Table 6. Results of one-way ANOVA test based on the two parts of Romania (inside 1900 border and outside the 1900 border). df means degrees of freedom; F mean F ratio=mean square(between groups)/mean square(within groups).

| | | Sum of Squares | df | Mean Square | F | Sig. |
|-----------------------|----------------|----------------|------|-------------|----------|---------|
| Religious diversity | Between Groups | 30.832 | 1 | 30.832 | 1421.396 | <0.0001 |
| | Within Groups | 63.708 | 2937 | 0.022 | | |
| | Total | 94.540 | 2938 | | | |
| Ethnic diversity | Between Groups | 9050.180 | 1 | 9050.180 | 700.897 | <0.0001 |
| | Within Groups | 37923.348 | 2937 | 12.912 | | |
| | Total | 46973.528 | 2938 | | | |
| Number of religions | Between Groups | 11.438 | 1 | 11.438 | 518.681 | <0.0001 |
| | Within Groups | 64.766 | 2937 | 0.022 | | |
| | Total | 76.204 | 2938 | | | |
| Number of ethnicities | Between Groups | 1571.016 | 1 | 1571.016 | 290.156 | <0.0001 |
| | Within Groups | 15902.058 | 2937 | 5.414 | | |
| | Total | 17473.074 | 2938 | | | |

Discussion

In this study, the spatial distribution of religious pluralism and ethnic diversity were analysed across Central and Eastern Europe and in more detailed in three selected countries, Hungary, Poland and Romania. We also investigated the importance and effect of the historical and present-day borders and our results also support the borderline syndrome theory. However, we know that the data collection and processing of population censuses are so far not flawless, but at this number of units the error is negligible.

One of the main aims of the research was the creation of a unique dataset of the religious confessions in Central and Eastern Europe. This dataset is ready and free for anyone to use. The built webmap give the opportunity to the non-GIS experts to easily use this dataset. In the pop-up window, percentage of the religious confessions and Simpson Diversity values can be checked by municipalities. The infographic tab gives the chance to check the percentage distribution of religions by country. In the print tab anyone can

make and print a professional map (current window extent) in several document type, which also support the non-GIS expert users. This kind of webmap and dataset about Central and Eastern Europe is unique.

Our manuscript provides a comprehensive Central European analysis of dominant religion and religious diversity at the municipality level, compared with other authors who providing similar analyses in just country or state scale (Ahlin et al., 2012; Cnaan & Boddie, 2015; Dövényi & Németh, 2014; Hero, Krech, & Zander, 2008; Pew Research Center, 2022) or only per larger unit at lower resolution (Pew Research Center, 2022; Warf & Vincent, 2007). Diversity of religious confessions researches exist in our country scale study area too, like in Hungary (Bajmócy, n.d.; Bajmócy Péter., 2009; Dövényi & Németh, 2014; Har-rach, 2013; Kocsis, 1996), Poland (Sealy et al., 2021) and Romania (Csala, 2015; Pavel, Moldovan, Kourtit, & Nijkamp, 2020; Vințe, Furtună, & Dârdală, 2017).

Sociological theories of modernization (e.g., Berger, 1981; Pollack, 2008; Pollack & Rosta, 2017) have undoubtedly made it possible to analyse changes in the values of various societies, whether on the European continent or globally, using general indicators. These indicators have demonstrated their ability to forecast the strength and direction of change. It is important to note, however, that in the case of Central and Eastern European societies, the cultural indicators included in the variables of theories lack historical relevance. Since 1990, historical trauma-centred memory and memory politics have played a prominent role in the Central and Eastern European region. For centuries, the hegemonic empire power from the West and East defined the borders and national and state belongings. The region's common sense was emphasised by the region's endless needs for autonomy under the various occupations, which had a formative influence on the region's sensibilities and led to temptations of nationalism and xenophobia. Central and Eastern Europe is a border region that exhibits symptoms of collective borderline

disorder (Szilárdi & Kakuszi, 2022). Our result (diversity, coefficient of variance) also supports this theory that the former national borders and traumas have significant effect on the today religious pluralism in the Central and Eastern European countries and also in more detailed scale, in Hungary, Poland and Romania. Our results can prove that there is a big difference in the religious diversity between the municipalities inside the former borders and inside the present-day borders (Eberhardt & Owsinski, 2015). The borders moved away, but a certain percentage of the population remained in its previous place (Eberhardt & Owsinski, 2015). Kocsis et al. (2015) found similar results in Pannonian area, but our results are supported by significant statistical analysis (ANOVA) (Kocsis et al., 2015). The website of phantomgrenzen.eu also shows differences between current and formal state borders, but more focused on other social processes such as elections. The differences between the parts of the countries can be explained by the ethnicities, as our results show there are positive significant correlations were found between religious confessions (SDI, RI) and ethnicities (SDI, RI), as Dimova & Dimov (2021) in their study also found that different ethnicities have different and stronger religious identity.

Our work applies a quantitative method (diversity indices) to measure and visualize the religious diversity of Central and Eastern Europe (CEE) at a very high resolution (municipality level). To our knowledge, this is the first study that uses this method at this level of analysis for this region. We also explore the relationship between religious diversity and ethnic diversity, as well as historical factors such as former national borders. We believe that our work contributes to a better understanding of how religion shapes national identity and social cohesion in CEE, which is an important topic in light of recent political developments in this region. Our work also serves as a basis for further research on religious pluralism in CEE using other methods or perspectives.

Conclusion

In this study, the spatial distribution of religious pluralism and ethnic diversity was analysed across Central and Eastern Europe and in more detailed in three selected countries, Hungary, Poland and Romania. The importance and effect of the historical and present-day borders was investigated and our results also support the borderline syndrome theory. One of the main aims of the research was the creature of a unique dataset of the religious confessions in Central and Eastern Europe. This dataset is ready and free for anyone to use. The built webmap give the opportu-

nity to the non-GIS experts to easily use this dataset. This kind of webmap and dataset about Central and Eastern Europe is unique. Our manuscript provides a comprehensive Central European analysis of dominant religion and religious diversity at the municipality level. Our results prove that there is a big difference in the religious diversity between the municipalities inside the former borders and inside the present-day borders. Central and Eastern Europe is a border region that exhibits symptoms of collective borderline disorder and our result supports this theory that the

former national borders and traumas have significant effect on the today religious pluralism in the Central and Eastern European countries. This study and pub-

lic dataset (webmap) also serve as a good basis for further research (theoretical and statistical) of the religious pluralism in Central and Eastern Europe.

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