ACTA GEOGRAPHICA SLOVENICA

GEOGRAFSKI ZBORNIK

2017

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57-1

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ZNANSTVENORAZISKOVALNI CENTER
SLOVENSKE AKADEMIJE ZNANOSTI IN UMETNOSTI
GEOGRAFSKI INŠTITUT ANTONA MELIKA
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RESEARCH CENTRE OF
THE SLOVENIAN ACADEMY OF SCIENCES AND ARTS
ANTON MELIK GEOGRAPHICAL INSTITUTE

ACTA GEOGRAPHICA SLOVENICA

GEOGRAFSKI ZBORNIK

57-1

2017

ZALOŽBA ZRC

LJUBLJANA
2017

ACTA GEOGRAPHICA SLOVENICA

57-1
2017

ISSN: 1581-6613
COBISS: 124775936
UDC/UDK: 91

Published by/izdajatelj: Geografski inštitut Antona Melika ZRC SAZU
Issued by/založnik: Založba ZRC
Co-issued by/sozaložnik: Slovenska akademija znanosti in umetnosti

Address/Naslov: Geografski inštitut Antona Melika ZRC SAZU, Gosposka ulica 13, SI – 1000 Ljubljana, Slovenija

The papers are available on-line in English and Slovenian language/prispevki so v angleškem in slovenskem jeziku dostopni na medmrežju:
http://ags.zrc-sazu.si (English internet version ISSN: 1581-8314/slovenska internetna različica ISSN: 1581–8314)

Ordering/naročanje:
Založba ZRC
Novi trg 2, p. p. 306, SI – 1001 Ljubljana, Slovenija
Phone/telefon: +386 (0)1 470 64 64
Fax/faks: +386 (0)1 425 77 94
E-mail/e-pošta: zalozba@zrc-sazu.si

Annual subscription/letna naročnina: 20 € for individuals/za posameznike, 28 € for institutions/za ustanove.
Single issue/cena posamezne številke: 12,50 € for individuals/za posameznike, 16 € for institutions/za ustanove.

Cartography/kartografija: Geografski inštitut Antona Melika ZRC SAZU
Translations/prevodi: DEKS, d. o. o.
DTP/prelom: SYNCOMP, d. o. o.
Printed by/tiskarna: Collegium Graphicum d. o. o.
Print run/naklada: 400 copies/izvodov

The journal is subsidized by the Slovenian Research Agency/revija izhaja s podporo Javne agencije za raziskovalno dejavnost Republike Slovenije.

The journal is indexed in also/revija je vključena tudi v: SCIE – Science citation index expanded , Scopus, JCR – Journal Citation Report/Science Edition, ERIH PLUS, GEOBASE Journals, Current geographical publications, EBSCOhost, Geoscience e-Journals, Georef, FRANCIS, SJR (SCImago Journal & Country Rank), OCLC WorldCat, and Google scholar, CrossRef.

Front cover photography: The Sečovlje saltpans along the Piran bay are the landscape hotspot between land and sea. (photograph: Bojan Erhartič).
Fotografija na naslovnici: Sečoveljske soline ob Piranskem zalivu so pokrajinska vroča točka med kopnim in morjem. (fotografija: Bojan Erhartič).

ACTA GEOGRAPHICA SLOVENICA

ISSN: 1581-6613
UDC – UDK: 91
Number – številka: 57-1
Year – leto: 2017

Contents – Vsebina

Special issue – Geographical Names

Acta geographica Slovenica, 57-1, 2017, 7–29

DETERMINATION OF LANDSCAPE HOTSPOTS OF SLOVENIA

DOLOČANJE POKRAJINSKIH VROČIH TOČK SLOVENIJE

Drago Perko, Mauro Hrvatin, Rok Ciglič

The landscape hotspot around Kamnik, as seen by the painter Franz Kurz zum Thurn und Goldenstein (1807–1878). The original painting is kept at the National Museum of Slovenia.
Pokrajinska vroča točka okoli Kamnika, kot jo je videl slikar Franz Kurz zum Thurn und Goldenstein (1807–1878). Izvirnik slike hrani Narodni muzej Slovenije.

Determination of landscape hotspots of Slovenia

DOI: http://dx.doi.org/10.3986/AGS.4618
UDC: 911.52(497.4)
COBISS: 1.01

ABSTRACT: Based on digital data on relief, rock, and vegetation, the most significant elements of the internal structure of Slovenian landscapes, and their external appearance, a geographic information system was used to calculate landscape diversity of Slovenia. Areas with high landscape diversity are landscape hotspots, and areas with low landscape diversity are landscape coldspots. One-tenth of Slovenia with the highest landscape diversity was defined as landscape hotspots, and one-tenth of Slovenia with the lowest landscape diversity was defined as landscape coldspots. Most landscape hotspots are located in the Alpine part of Slovenia (more than two-thirds of their total area), and most landscape coldspots in the Dinaric part of Slovenia (almost half of their total area).

KEY WORDS: geography, relief, rocks, vegetation, landscape diversity, landscape hotspot, landscape coldspot, geographic information system, Slovenia

The editorial board received this article on May 25th, 2016.

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1 Introduction

Increasingly more researchers are dealing with the evaluation and importance of landscape diversity (Runhaar and Udo de Haes 1994; Bailey 1996; Bunce et al. 1996; Bastian 2000; Mücher et al. 2003; Loveland and Merchant 2004; Šímová and Gdulová 2012; Mocior and Kruse 2016). Areas where there is a mix of various natural factors are important for biodiversity, habitats, and species diversity (Dramstad et al. 2001; Hou and Walz 2013; Walz and Syrbe 2013).

Areas with landscape diversity may also have an advantage in economic development, especially in tourism, because *»human perception respects diversity, complexity, patterns, and local character«* (Erhartič 2012). Gray (2004) believes that the significance of diverse types of relief and richness of terrain details for the popularity of tourism areas is greatly underestimated. On the other hand, areas where various natural influences mix can also be areas where it is not simple to transfer best practices because of the varying responses of the landscape to human intervention.

The landscape diversity of an area may therefore offer some advantages, but also some disadvantages and challenges. High landscape diversity mainly characterizes areas at the junction and interweaving of different landscape types. Analysis of various geographical classifications of Europe shows that the most diverse areas are located in southern Scandinavia and on the margins of the Pyrenees and the Alps. Slovenia is also included in these very diverse areas (Ciglič and Perko 2013).

The main purpose of the study is to determine the contiguous areas in Slovenia with the greatest and least landscape diversity, which is related to certain economic and other advantages or disadvantages. The article presents the first part of the study, which is primarily a quantitative approach to defining areas with increased natural landscape diversity. In the future, evaluation based on actual data, field research, and expert assessment will define the role of natural landscape diversity for the risk of natural hazards. It will also be used in relation to settlement patterns (i.e., spatial planning), agriculture, tourism, and the economy overall. The defined evaluation system for landscape heterogeneity can potentially be used in various areas around the globe.

2 Methods

Three natural landscape elements are the most significant for the internal structure, function, and appearance of Slovenian landscapes: relief, rocks, and vegetation. They are so strongly linked with other natural landscape elements that a natural-geographical regionalization or typology of appropriate quality can only be created by considering these three landscape elements (Perko, Hrvatin, and Ciglič 2015).

Because Slovenia has sufficiently accurate digital data on relief, rocks, and vegetation at its disposal, it is possible to use a geographic information system to determine landscape diversity as well as landscape hotspots and coldspots.

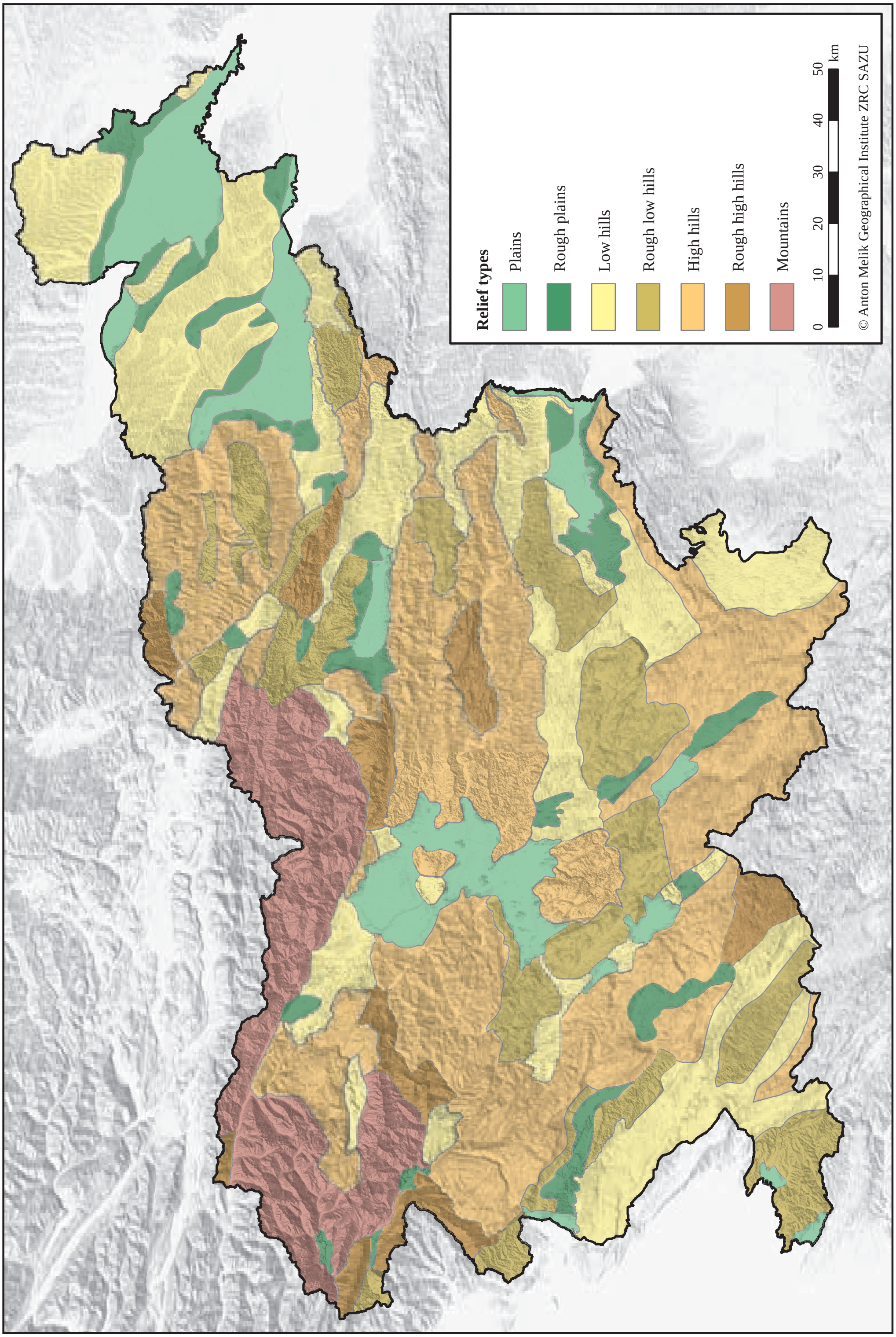
As a base layer in a geographic information system, a geomorphologically tested 25 m digital elevation model (Podobnikar 2002, Digitalni model višin … 2014) was used, which provides 32,436,693 square cells with a baseline of 25 m and an area of 6.25 ares.

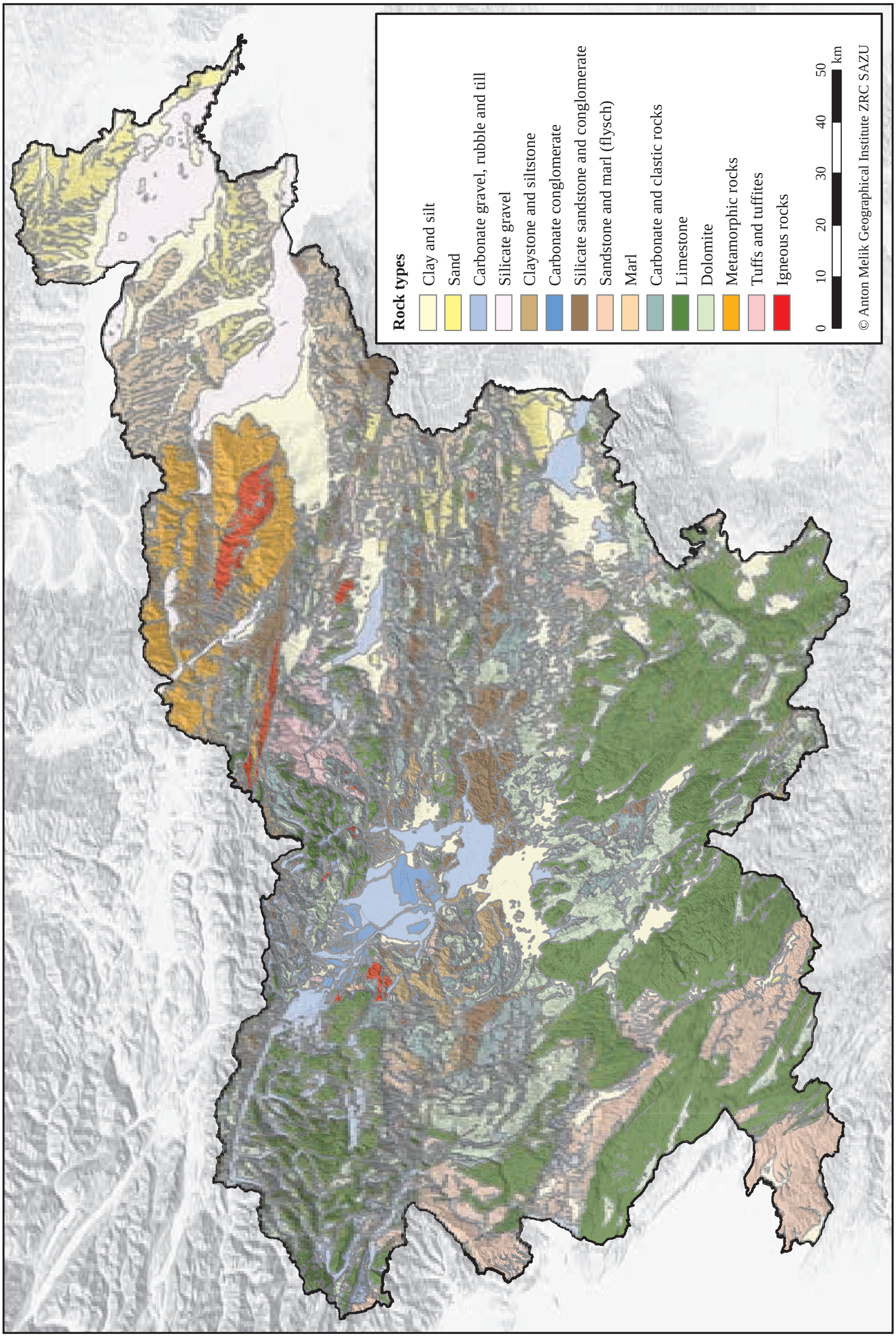
Vector layers with relief, lithological, and vegetation types were added. They were transformed from vector format to 25 m raster format because the remainder of the study used geoinformation tools for processing raster data layers.

The relief layer (Figure 1) is based on a 1:400,000 map of morphological units (Perko 2001). The map has 195 units, which were combined into seven relief types (Perko, Hrvatin, and Ciglič 2015):

- Plains;
- Rough plains;
- Low hills;
- Rough low hills;
- High hills;
- Rough high hills;
- Mountains.

Figure 1: Relief layer with seven types. ➤ p. 10
Figure 2: Lithology layer with fifteen types. ➤ p. 11


Relief types
Plains
Rough plains
Low hills
Rough low hills
High hills
Rough high hills
Mountains
0 10 20 30 40 50 km
© Anton Melik Geographical Institute ZRC SAZU


Rock types
Clay and silt
Sand
Carbonate gravel, rubble and till
Silicate gravel
Claystone and siltstone
Carbonate conglomerate
Silicate sandstone and conglomerate
Sandstone and marl (flysch)
Marl
Carbonate and clastic rocks
Limestone
Dolomite
Metamorphic rocks
Tuffs and tuffites
Igneous rocks
0 10 20 30 40 50 km
© Anton Melik Geographical Institute ZRC SAZU

The lithology layer (Figure 2) is based on a vector map of rock types of Slovenia (Litostratigrafska karta Slovenije 2011), which was produced by the Geological Survey of Slovenia and primarily based on 1:25,000 vectorized geological maps of Slovenia. The map has 938 units, which were combined into fifteen lithological types (Perko, Hrvatin, and Ciglič 2015):

- Clay and silt;
- Sand;
- Carbonate gravel, rubble, and till;
- Silicate gravel;
- Claystone and siltstone;
- Carbonate conglomerate;
- Silicate sandstone, and conglomerate;
- Sandstone and marl (flysch);
- Marl;
- Carbonate and clastic rocks;
- Limestone;
- Dolomite;
- Metamorphic rocks;
- Tuffs and tuffites;
- Igneous rocks.

The vegetation layer (Figure 3) is based on a 1:400,000 map of potential natural vegetation (Zemljevid potencialne naravne vegetacije 1998), which was produced by the ZRC SAZU Jovan Hadži Biology Institute. The map has sixty-two different units, which were combined into fifteen vegetation types (Perko, Hrvatin, and Ciglič 2015):

- Downy oak, European hophornbeam;
- Downy oak;
- Durmast;
- European hornbeam, oak, occasional black alder;
- Oak, occasional elm;
- European hornbeam, fir;
- European hornbeam;
- Beech;
- Beech, fir;
- Beech, European hophornbeam, occasional European hophornbeam;
- Beech, chestnut, oak;
- Fir;
- Spruce;
- Red pine;
- Dwarf pine and other highland vegetation.

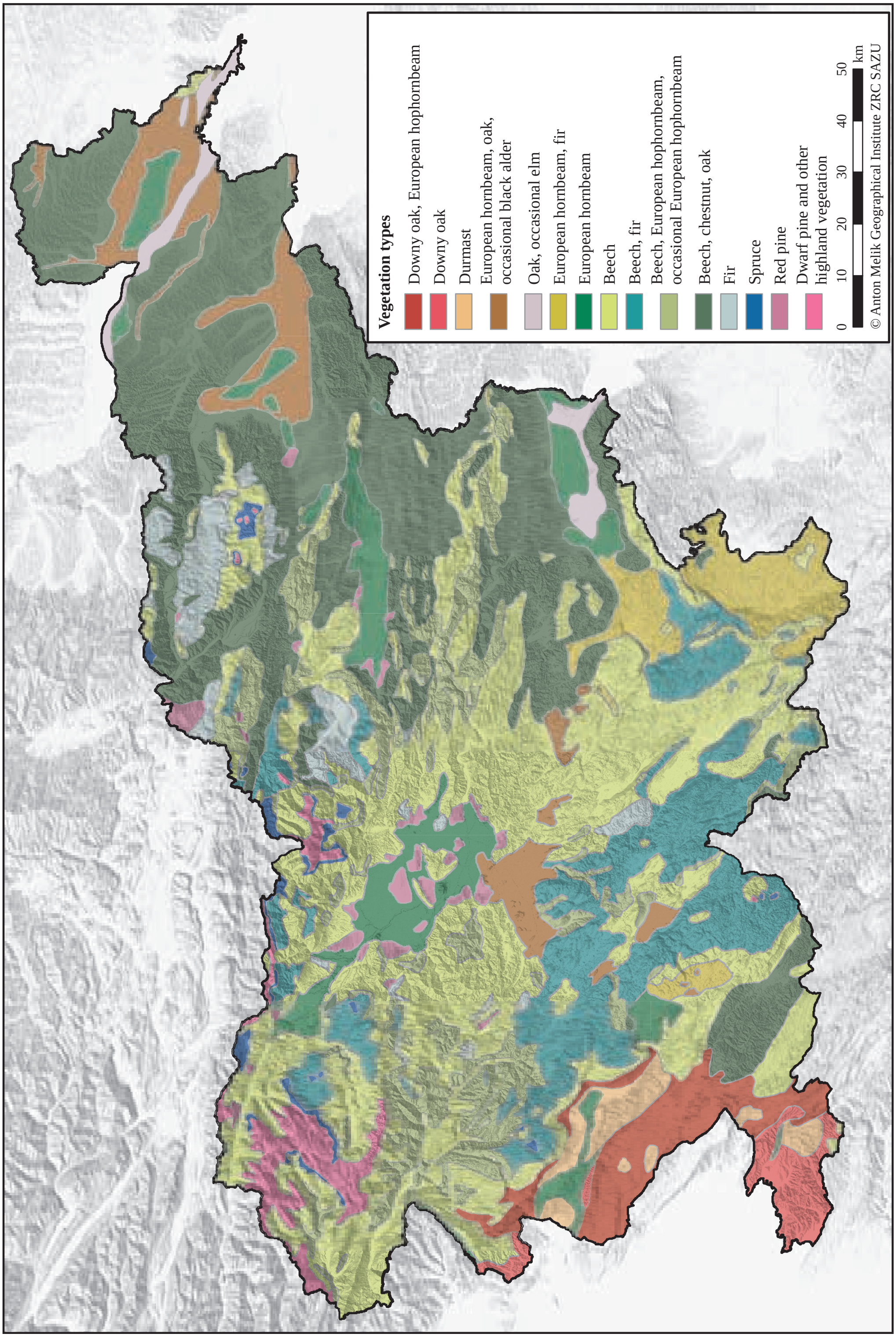
First, we calculated the relief diversity (Figure 5). Using a moving window, we calculated the ratio between the number of relief types that occur within a radius of 1 km and the total number of relief types for each cell. The number of all relief types is seven, so the minimum ratio is 1:7 or 0.1429 if only one relief type occurs in a 1 km radius, and the maximum ratio is 7:7 or 1.0000 if all seven relief types occur in a 1 km radius.

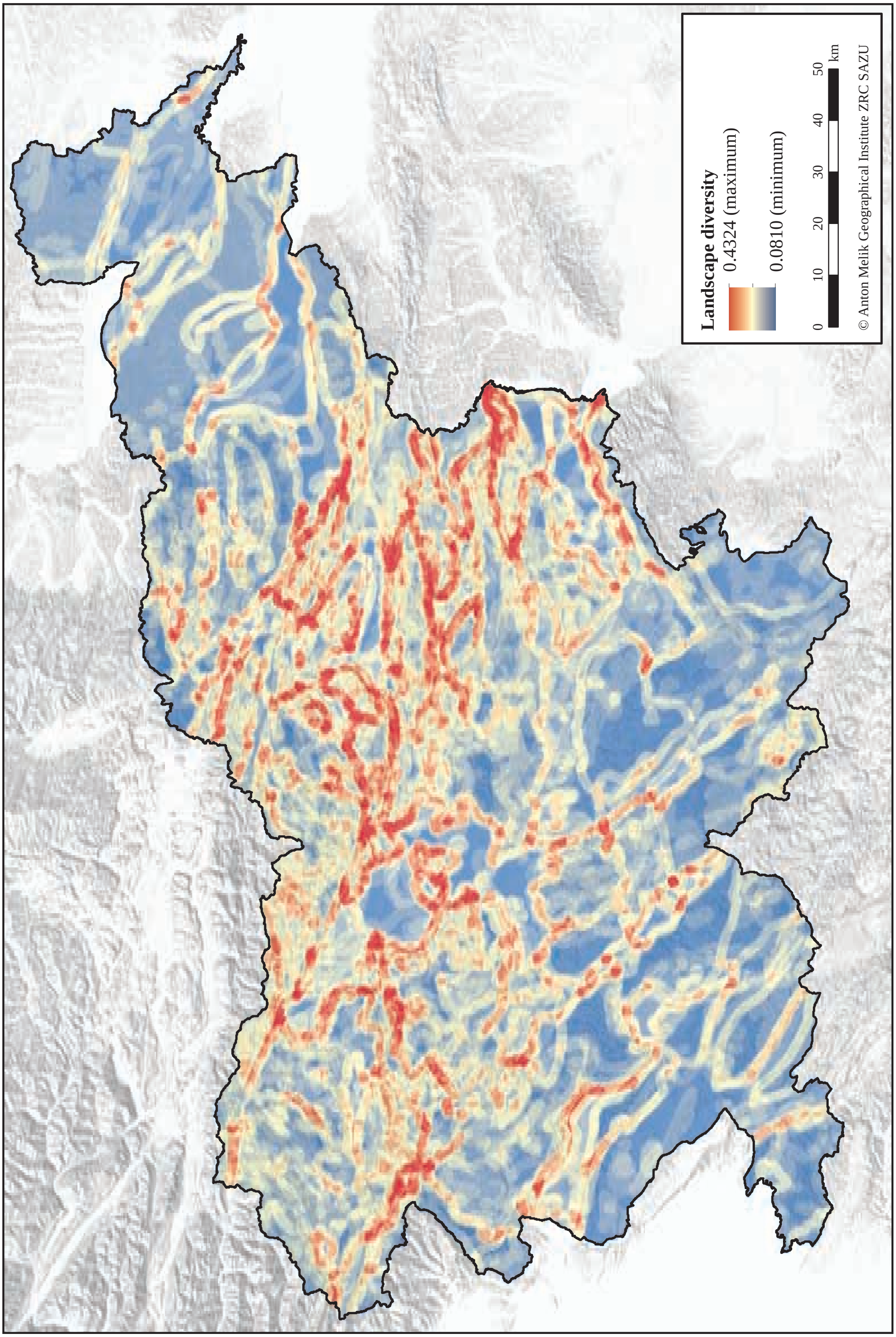
We calculated the lithological and vegetation diversity in the same way. Their minimum ratio is 1:15 or 0.0667 if only one lithological or vegetation type out of a possible fifteen occurs in a 1 km radius.

Finally, we calculated the average of these three partial diversities. This is the landscape diversity (Figure 4). The minimum ratio is 3:37 or 0.0810 if only one relief type, one lithological type, and one vegetation type occur in a 1 km radius, and the maximum ratio is 37:37 or 1.0000 if all seven relief types, fifteen lithological types, and fifteen vegetation types occur simultaneously in a 1 km radius.

For example, a landscape diversity of 0.2500 means that 25% or a quarter of all thirty-seven possible relief, lithological, and vegetation types occur in a 1 km radius.

Figure 3: Vegetation layer with fifteen types. ➤
Figure 4: Landscape diversity of Slovenia. ➤ p. 14


Vegetation types
Downy oak, European hophornbeam
Downy oak
Durmast
European hornbeam, oak, occasional black alder
Oak, occasional elm
European hornbeam, fir
European hornbeam
Beech
Beech, fir
Beech, European hophornbeam, occasional European hophornbeam
Beech, chestnut, oak
Fir
Spruce
Red pine
Dwarf pine and other highland vegetation
0 10 20 30 40 50 km
© Anton Melik Geographical Institute ZRC SAZU


Landscape diversity
0.4324 (maximum)
0.0810 (minimum)
0 10 20 30 40 50 km
© Anton Melik Geographical Institute ZRC SAZU

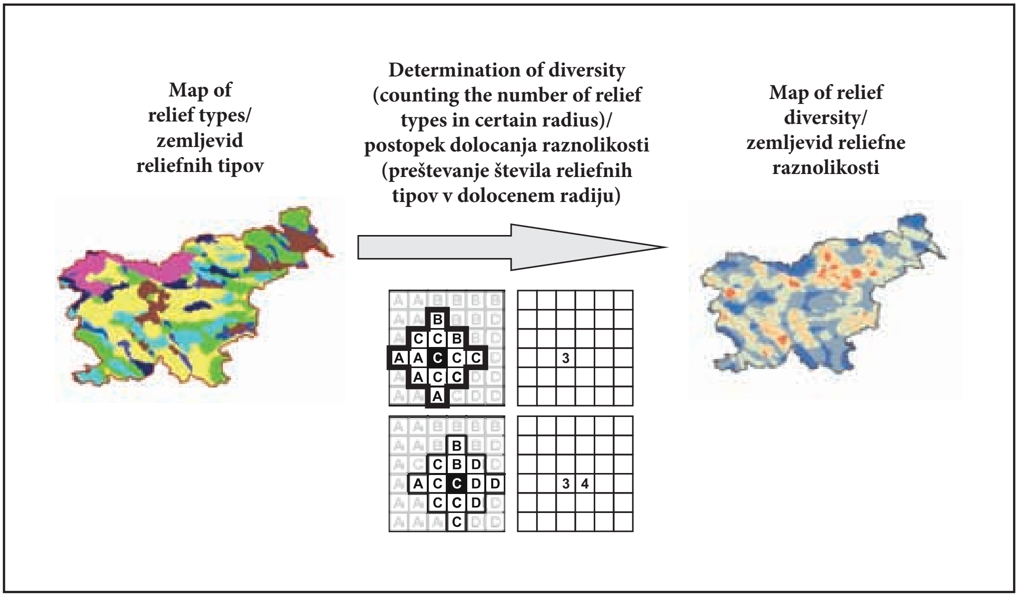


Figure 5: Schematic presentation of the determination of landscape diversity.

3 Landscape hotspots and landscape coldspots

Areas with high landscape diversity are landscape hotspots, and areas with low landscape diversity are landscape coldspots.

One-tenth of Slovenia with the highest landscape diversity was defined as landscape hotspots, and one-tenth of Slovenia with the lowest landscape diversity was defined as landscape coldspots (Figure 6).

The number of landscape hotspots is 912 and the number of landscape coldspots is 681, which is 25% less. The total area of the hotspots is 1,688.85 km² and the total area of coldspots is 1,805.69 km², which is 7% more. The average size of the hotspots is 185 ha and the average size of the coldspots is 265 ha, which is 43% more. The largest hotspot covers 12,453 ha and the largest coldspot covers 16,187 ha, which is 30% more.

Most landscape hotspots are located in Alpine Slovenia, encompassing more than two-thirds of their total area, and the fewest in the Mediterranean Slovenia, corresponding to barely one-tenth of their total area. Most landscape coldspots are located in Dinaric Slovenia, encompassing almost half of their total area, and the fewest in Alpine Slovenia, corresponding to one-sixth of their total area.

The ratio between landscape hotspots and coldspots varies greatly between landscape types. On the Mediterranean plateaus, the area of hotspots is almost one hundred times less than the area of coldspots. In the Alpine mountains, the area of hotspots is ten times greater than the area of coldspots (Table 1).

4 Conclusion

The results have applicability in various fields, such as tourism (development and promotion of tourist destinations), spatial planning (transfer of good practices), environmental protection, education, and research (Gray 2004; Erhartič 2012). Biodiversity is a common topic in environmental studies. Peters and Goslee (2001) stated that maintenance of biodiversity requires management at higher levels of organization, particularly

Figure 6: Landscape hotspots and coldspots of Slovenia. ➤ p. 16

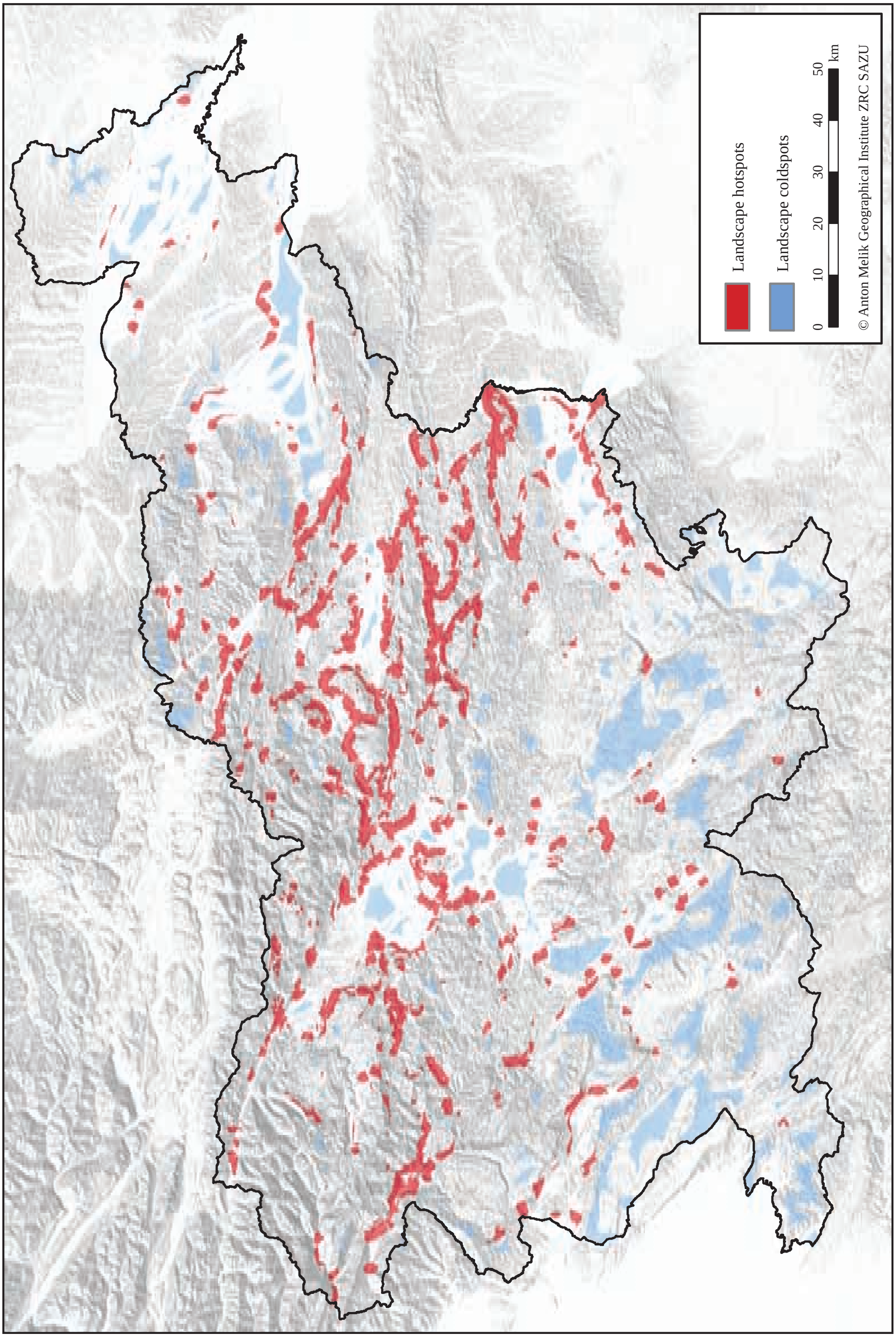

Landscape hotspots
Landscape coldspots
0 10 20 30 40 50 km
© Anton Melik Geographical Institute ZRC SAZU

Table 1: Area of landscape hotspots and coldspots by landscape types in Slovenia.

Landscape types	Area of hotspots (%)	Other areas (%)	Area of coldspots (%)	Total (%)
Alpine mountains	12.46	86.33	1.21	100.00
Alpine hills	14.10	82.55	3.35	100.00
Alpine plains	15.84	72.79	11.37	100.00
Pannonian hills	6.31	89.90	3.80	100.00
Pannonian plains	5.31	77.71	16.98	100.00
Dinaric plateaus	3.20	80.43	16.37	100.00
Dinaric plains	5.17	82.92	11.90	100.00
Mediterranean hills	3.86	81.95	14.18	100.00
Mediterranean plateaus	0.29	72.24	27.46	100.00
Slovenia	8.33	82.76	8.90	100.00
Alpine mountains	22.59	15.75	2.05	15.10
Alpine hills	38.90	22.93	8.65	22.99
Alpine plains	7.68	3.55	5.16	4.04
Pannonian hills	11.18	16.04	6.30	14.77
Pannonian plains	4.07	6.01	12.20	6.40
Dinaric plateaus	7.22	18.26	34.55	18.79
Dinaric plains	5.81	9.38	12.51	9.36
Mediterranean hills	2.43	5.18	8.34	5.23
Mediterranean plateaus	0.12	2.90	10.24	3.32
Slovenia	100.00	100.00	100.00	100.00

at the landscape scale. Mocior and Kruse (2016) proved that spatial heterogeneity or diversity is the most important criteria of landscape features (both biotic and abiotic) for evaluating educational values. Landscape diversity also plays an important role in various studies that include sampling. In homogeneous areas, the monitoring or sampling network may be smaller, but in diverse areas it must be denser (Bonar, Fehmi, and Mercado-Silva 2011)

Thus high importance is given by the European Union to landscape diversity. Diversity is also regarded as an important natural resource by European landscape convention (2000), which acknowledges that »*the quality and diversity of European landscapes constitutes a common resource, and that it is important to co-operate towards its protection, management and planning.*« Diversity was also emphasized in the older EU document »Pan-European Biological and Landscape Diversity Strategy«, which was published in 1996 (Pan-European … 1996).

As this is an ongoing research, in the next phases we will identify, analyze, classify, and evaluate Slovenia's landscape hotspots. Fieldwork will be of great importance in verifying the theoretical findings on particular landscape hotspots.

ACKNOWLEDGEMENT: The authors acknowledge financial support from the Slovenian Research Agency and the Slovenian Academy of Sciences and Arts (project no. L6-6852: Landscape Diversity and Hotspots of Slovenia).

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Določanje pokrajinskih vročih točk Slovenije

DOI: http://dx.doi.org/10.3986/AGS.4618
UDK: 911.52(497.4)
COBISS: 1.01

IZVLEČEK: Na temelju digitalnih podatkov o reliefu, kamninah in rastlinstvu, ki so najpomembnejše sestavine notranje sestave slovenskih pokrajin in hkrati njihove zunanje podobe, smo z uporabo geografskega informacijskega sistema izračunali pokrajinsko raznolikost Slovenije. Območja z visoko pokrajinsko raznolikostjo so pokrajinske vroče točke, območja z nizko pokrajinsko raznolikostjo pa pokrajinske mrzle točke. Kot vroče točke smo opredelili desetino Slovenije z najvišjo pokrajinsko raznolikostjo, kot mrzle točke pa desetino Slovenije z najnižjo pokrajinsko raznolikostjo. Največ pokrajinskih vročih točk leži v alpskem delu Slovenije (več kot dve tretjini njihovih površin), največ pokrajinskih mrzlih točk pa v dinarskem delu Slovenije (skoraj polovica njihovih površin).

KLJUČNE BESEDE: geografija, relief, kamnine, rastlinstvo, pokrajinska raznolikost, pokrajinska vroča točka, pokrajinska mrzla točka, geografski informacijski sistem, Slovenija

Uredništvo je prispevek prejelo 25. maja 2016.

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1 Uvod

Vse več raziskovalcev se ukvarja z vrednotenjem in pomenom pokrajinske raznolikosti (Runhaar in Udo de Haes 1994; Bailey 1996; Bunce s sodelavci 1996; Bastian 2000; Mücher s sodelavci 2003; Loveland in Merchant 2004; Šímová in Gdulová 2012; Mocior in Kruse 2016). Območja, kjer se prepletajo različni naravni dejavniki, so pomembna za biodiverziteto ter raznolikost habitatov in vrst (Dramstad s sodelavci 2001; Hou in Walz 2013; Walz in Syrbe 2013).

Pokrajinsko pestra območja imajo lahko prednost v gospodarskem razvoju, še posebej v turizmu, saj »… *človekovo zaznavanje ceni raznolikost, kompleksnost, vzorce in lokalni značaj* …« (Erhartič 2012). Gray (2004) meni, da je pomen različnih tipov reliefnih oblik in bogastva površinskih detajlov za priljubljenost turističnih območij močno podcenjen. Po drugi strani pa so območja, kjer se prepletajo raznoliki naravni vplivi, lahko tudi območja, kjer prenos dobrih praks zaradi različnega odziva pokrajine na človekove posege ni preprost.

Pokrajinska raznolikost nekega območja lahko torej ponuja nekaj prednosti, pa tudi slabosti in izzivov.

Velika pokrajinska raznolikost je značilna predvsem za območja na stiku in prepletu različnih pokrajinskih tipov. Analiza različnih geografskih členitev kaže, da pokrajinsko najbolj raznolika območja v Evropi ležijo v južni Skandinaviji ter na obrobju Pirenejev in Alp. Med najbolj raznolika območja spada tudi Slovenija (Ciglič in Perko 2013).

Glavni namen raziskave je torej poiskati pokrajinsko najbolj in najmanj raznolika zaokrožena območja v Sloveniji, na katere se navezujejo gospodarske in druge prednosti ali pomanjkljivosti. V članku predstavljamo prvi del raziskave, to je predvsem kvantitativen način določanja območij s povečano pokrajinsko raznolikostjo. S pomočjo vrednotenja, ki bo temeljilo tako na dejanskih podatkih, terenskemu delu kot tudi na ekspertni oceni bomo v prihodnje opredelili še pomen pokrajinske raznolikosti za na primer pogostost in vrste pojavljanja naravnih nesreč, za poselitev (prostorsko načrtovanje), kmetijstvo, turizem in gospodarstvo nasploh. Tako vzpostavljen sistem vrednotenja pokrajinske heterogenosti bo mogoče uporabiti na različnih območjih po svetu.

2 Metode

Za notranjo sestavo, delovanje in zunanjo podobo slovenskih pokrajin so najpomembnejše tri naravne pokrajinske sestavine: relief, kamnine in rastlinstvo. Z ostalimi naravnimi pokrajinskimi sestavinami so povezane tako močno, da lahko dovolj kakovostno naravno regionalizacijo ali tipizacijo izdelamo samo z upoštevanjem teh treh pokrajinskih sestavin (Perko, Hrvatin in Ciglič 2015).

Ker so v Sloveniji na razpolago dovolj natančni digitalni podatki o reliefu, kamninah in rastlinstvu, je mogoče s pomočjo geografskega informacijskega sistema določiti pokrajinsko raznolikost ter pokrajinske vroče in mrzle točke.

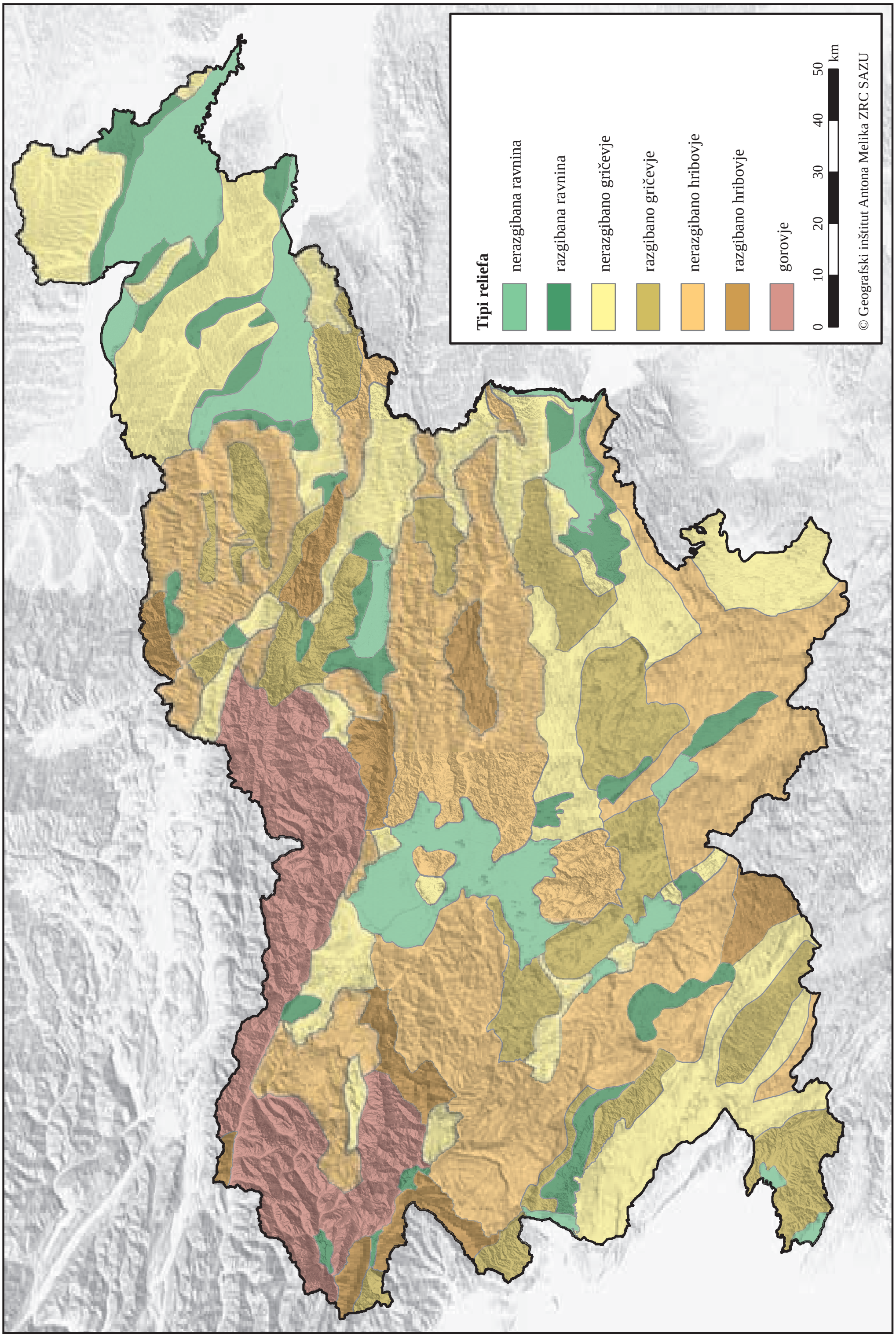
Kot temeljni sloj v geografskem informacijskem sistemu smo uporabili geomorfološko testirani 25-metrski digitalni model višin (Podobnikar 2002, Digitalni model višin … 2014), ki nudi kar 32.436.693 celic z osnovnico 25 m in površino 6,25 ara.

Dodali smo vektorske sloje z reliefnimi, litološkimi in vegetacijskimi enotami oziroma tipi ter jih rasterizirali na 25-metrski rastrski zapis, saj smo uporabili geografska informacijska orodja za obdelavo rastrskih podatkovnih slojev.

Reliefni sloj (slika 1) temelji na zemljevidu enot razgibanosti površja v merilu 1 : 400.000 (Perko 2001). Na zemljevidu je 195 različnih enot, ki smo jih smiselno združili v 7 tipov reliefa (Perko, Hrvatin in Ciglič 2015):

- ravnine,
- razgibane ravnine,
- gričevja,
- razgibana gričevja,
- hribovja,
- razgibana hribovja,
- gorovja.

Slika 1: Reliefni sloj s 7 tipi. ➤ str. 22


Tipi reliefa
nerazgibana ravnina
razgibana ravnina
nerazgibano gričevje
razgibano gričevje
nerazgibano hribovje
razgibano hribovje
gorovje
0
10
20
30
40
50
km
© Geografski inštitut Antona Melika ZRC SAZU

Litološki sloj (slika 2) temelji na vektorski Litostratigrafski karti Slovenije (Litostratigrafska karta Slovenije 2011), ki jo je izdelal Geološki zavod Slovenije, predvsem na podlagi vektoriziranih geoloških kart Slovenije v merilu 1 : 25.000. Na zemljevidu je 938 različnih enot, ki smo jih smiselno združili v 15 tipov kamnin (Perko, Hrvatin in Ciglič 2015):
- glina in melj,
- pesek,
- karbonatni prod, grušč in til,
- silikatni prod,
- glinavec in meljevec,
- karbonatni konglomerat,
- silikatni peščenjak in konglomerat,
- peščenjak in laporovec (fliš),
- laporovec,
- karbonatno-klastične kamnine,
- apnenec,
- dolomit,
- metamorfne kamnine,
- tuf in tufit,
- magmatske kamnine.

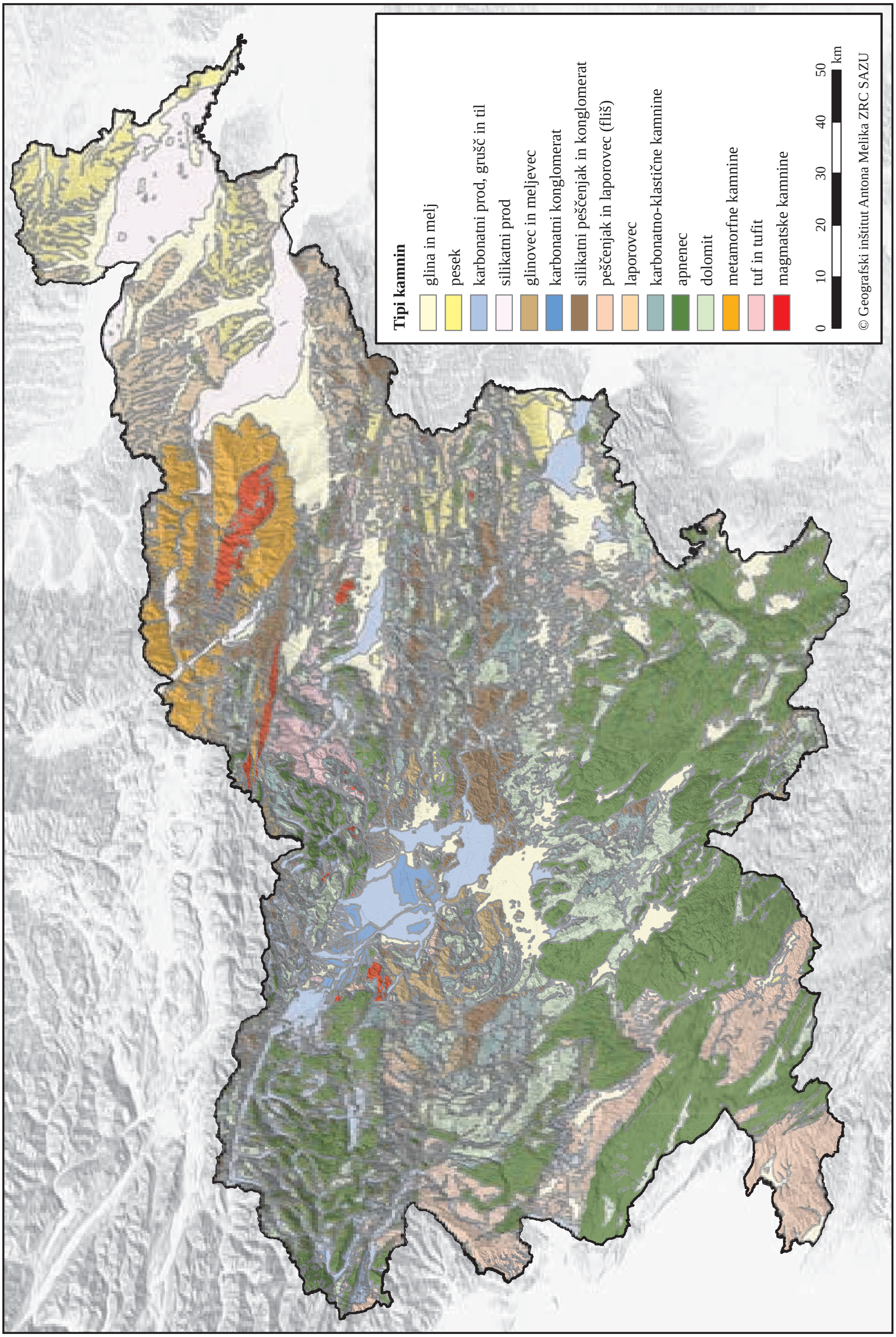
Vegetacijski sloj (slika 3) temelji na zemljevidu potencialne naravne vegetacije (Zemljevid potencialne naravne vegetacije 1998), ki ga je v merilu 1 : 400.000 izdelal Biološki inštitut Jovana Hadžija ZRC SAZU. Na zemljevidu je 62 različnih enot, ki smo jih smiselno združili v 15 tipov potencialne vegetacije (Perko, Hrvatin in Ciglič 2015):
- puhasti hrast, gabrovec,
- puhasti hrast,
- graden,
- beli gaber, dob, ponekod črna jelša,
- dob, ponekod z brestom,
- beli gaber, jelka,
- beli gaber,
- bukev,
- bukev, jelka,
- bukev, gabrovec, ponekod gabrovec,
- bukev, kostanj, hrasti,
- jelka,
- smreka,
- rdeči bor,
- ruševje in drugo visokogorsko rastje.

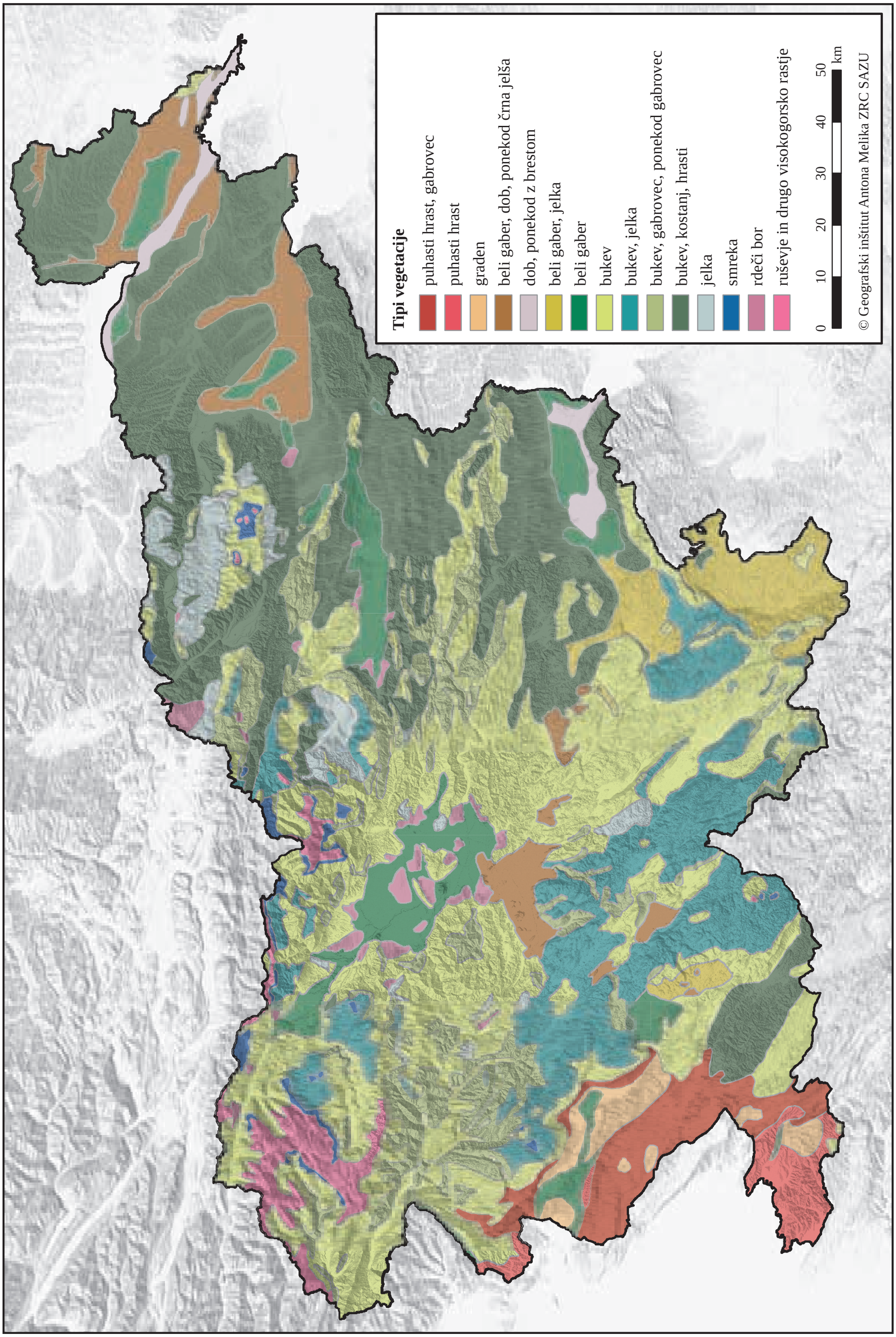
Najprej smo izračunali reliefno raznolikost (slika 4). Za vsako celico smo s pomočjo premičnega okna izračunali razmerje med številom reliefnih tipov (enot), ki se pojavljajo v radiju 1 km, in številom vseh reliefnih tipov (enot). Število vseh reliefnih tipov je 7, zato je najmanjše možno razmerje 1 proti 7 ali 0,1429, če se v kilometrskem radiju pojavi le 1 reliefni tip, največje možno razmerje pa 7 proti 7 ali 1,0000, če se v kilometrskem radiju pojavi vseh 7 reliefnih tipov.

Na enak način smo izračunali tudi litološko in vegetacijsko raznolikost. Pri njiju je najmanjše možno razmerje 1 proti 15 ali 0,0667, če se v kilometrskem radiju pojavi le 1 litološki ali vegetacijski tip od 15 možnih.

Na koncu smo izračunali povprečja teh treh delnih raznolikosti. To je pokrajinska raznolikost (slika 5). Najmanjše možno razmerje je 3 proti 37 ali 0,0810, če se v kilometrskem radiju pojavi le po 1 reliefni, litološki in vegetacijski tip, največje možno razmerje pa 37 proti 37 ali 1,0000, če se v kilometrskem radiju pojavi hkrati vseh 7 reliefnih tipov, 15 litoloških tipov in 15 vegetacijskih tipov.

Slika 2: Litološki sloj s 15 tipi. ➤ str. 24
Slika 3: Vegetacijski sloj s 15 tipi. ➤ str. 25


Tipi kamnin
glina in melj
pesek
karbonatni prod, grušč in til
silikatni prod
glinovec in meljevec
karbonatni konglomerat
silikatni peščenjak in konglomerat
peščenjak in laporovec (fliš)
laporovec
karbonatno-klastične kamnine
apnenec
dolomit
metamorfne kamnine
tuf in tufit
magmatske kamnine
0 10 20 30 40 50 km
© Geografski inštitut Antona Melika ZRC SAZU


Tipi vegetacije
puhasti hrast, gabrovec
puhasti hrast
graden
beli gaber, dob, ponekod črna jelša
dob, ponekod z brestom
beli gaber, jelka
beli gaber
bukev
bukev, jelka
bukev, gabrovec, ponekod gabrovec
bukev, kostanj, hrasti
jelka
smreka
rdeči bor
ruševje in drugo visokogorsko rastje
0 10 20 30 40 50 km
© Geografski inštitut Antona Melika ZRC SAZU

Na primer pokrajinska razlika 0,2500 pomeni, da se v kilometrskem radiju hkrati pojavi 25 % ali četrtina od vseh 37 možnih reliefnih, litoloških in vegetacijskih tipov.

Slika 4: Shematičen prikaz določanja pokrajinske raznolikosti.
Glej angleški del prispevka.

3 Pokrajinske vroče in mrzle točke

Območja z visoko pokrajinsko raznolikostjo so pokrajinske vroče točke, območja z nizko pokrajinsko raznolikostjo pa pokrajinske mrzle točke.

Kot vroče točke smo opredelili desetino Slovenije z najvišjo pokrajinsko raznolikostjo, kot mrzle točke pa desetino Slovenije z najnižjo pokrajinsko raznolikostjo (Slika 6).

Pokrajinskih vročih točk je 912, pokrajinskih mrzlih točk pa 681, kar je 25 % manj. Skupna površina vročih točk meri 1688,85 km^2, mrzlih točk pa 1805,69 km^2, kar je 7 % več. Povprečna velikost vročih točk je 185 ha, mrzlih točk pa 265 ha, kar je 43 % več. Največja vroča točka meri 12.453 ha, največja mrzla točka pa 16.187 ha, kar je 30 % več.

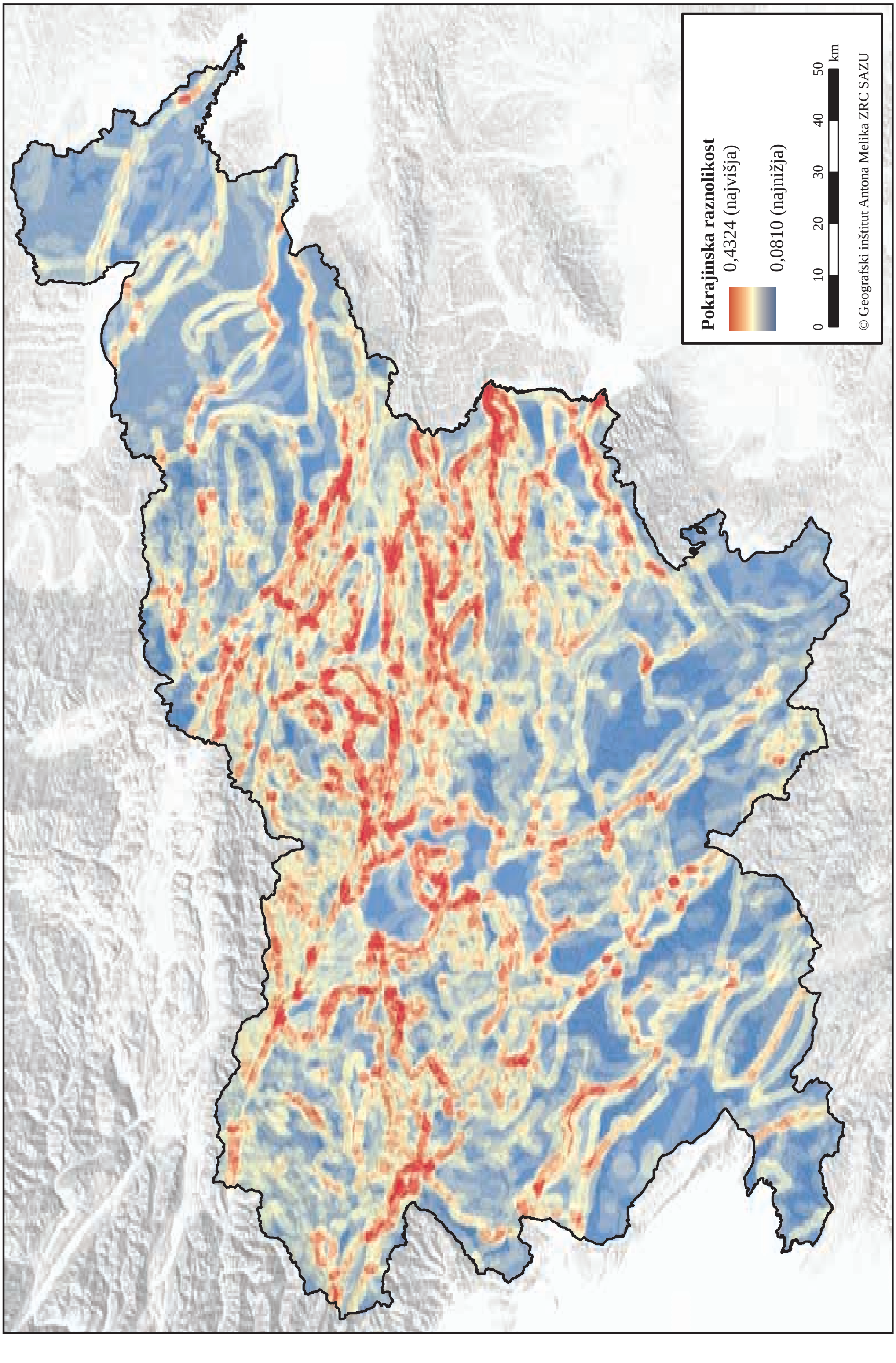
Največ pokrajinskih vročih točk leži v alpski Sloveniji, več kot dve tretjini njihovih površin, najmanj pa v sredozemski Sloveniji, komaj slaba desetina njihovih površin. Največ pokrajinskih mrzlih točk leži v dinarski Sloveniji, skoraj polovica njihovih površin, najmanj pa v alpski Sloveniji, šestina njihovih površin.

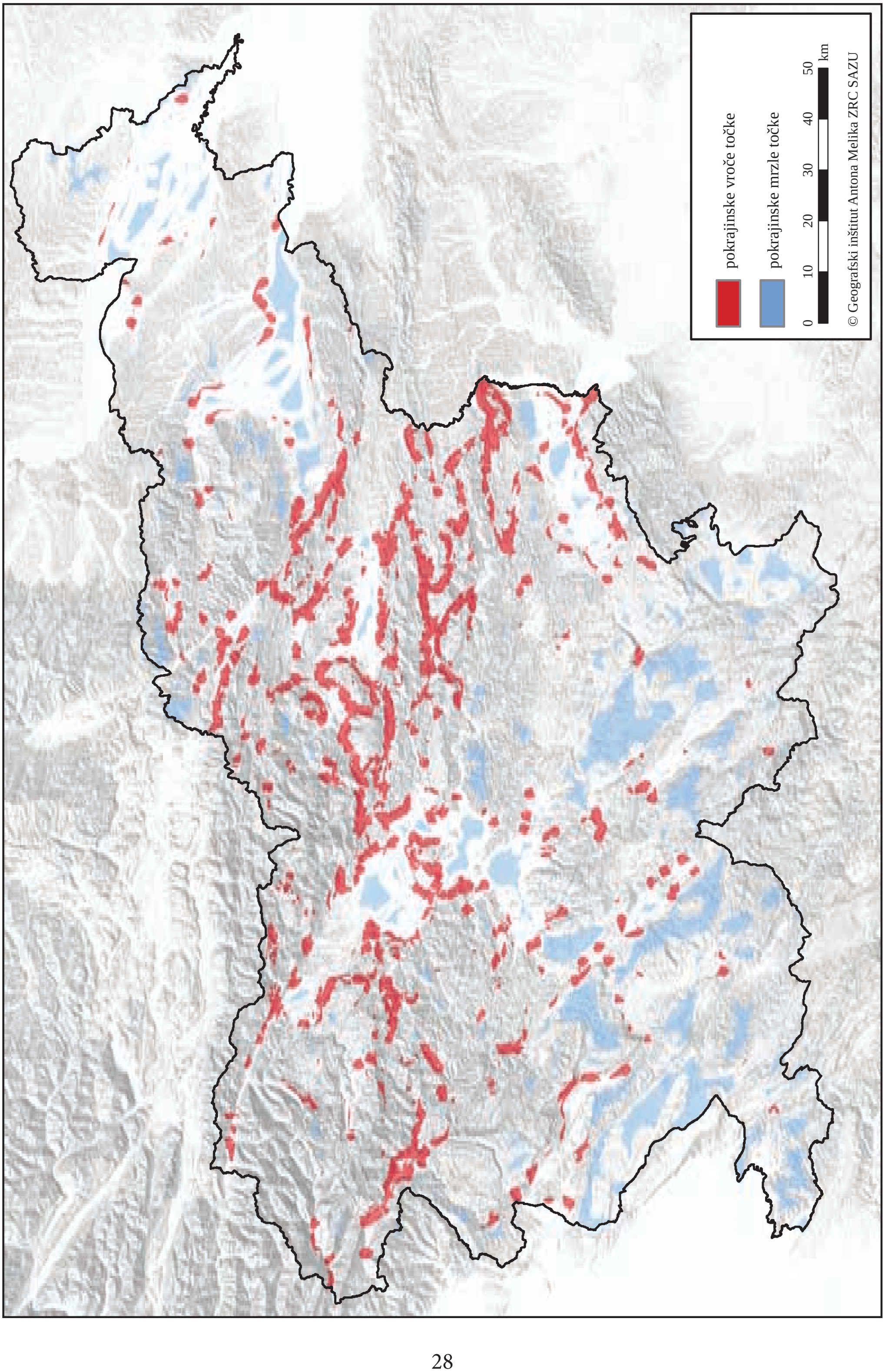
Razmerje med pokrajinskimi vročimi in mrzlimi točkami je med pokrajinskimi tipi zelo različno. Na sredozemskih planotah je površina vročih točk skoraj stokrat nižja od površine mrzlih točk, v alpskih gorovjih pa je površina vročih točk desetkrat večja od površine mrzlih točk (preglednica 1).

Preglednica 1: Razporeditev pokrajinskih vročih in mrzlih točk po pokrajinskih tipih v Sloveniji.

pokrajinski tipi	površina vročih točk (%)	ostale površine (%)	površina mrzlih točk (%)	skupaj
alpska gorovja	12,46	86,33	1,21	100,00
alpska hribovja	14,10	82,55	3,35	100,00
alpske ravnine	15,84	72,79	11,37	100,00
panonska gričevja	6,31	89,90	3,80	100,00
panonske ravnine	5,31	77,71	16,98	100,00
dinarske planote	3,20	80,43	16,37	100,00
dinarska podolja in ravniki	5,17	82,92	11,90	100,00
sredozemska gričevja	3,86	81,95	14,18	100,00
sredozemske planote	0,29	72,24	27,46	100,00
Slovenia	8,33	82,76	8,90	100,00
alpska gorovja	22,59	15,75	2,05	15,10
alpska hribovja	38,90	22,93	8,65	22,99
alpske ravnine	7,68	3,55	5,16	4,04
panonska gričevja	11,18	16,04	6,30	14,77
panonske ravnine	4,07	6,01	12,20	6,40
dinarske planote	7,22	18,26	34,55	18,79
dinarska podolja in ravniki	5,81	9,38	12,51	9,36
sredozemska gričevja	2,43	5,18	8,34	5,23
sredozemske planote	0,12	2,90	10,24	3,32
Slovenia	100,00	100,00	100,00	100,00

Slika 5: Pokrajinska raznolikost Slovenije. ➤
Slika 6: Pokrajinske vroče in mrzle točke Slovenije. ➤ str. 28


Pokrajinska raznolikost
0,4324 (najvišja)
0,0810 (najnižja)
0 10 20 30 40 50 km
© Geografski inštitut Antona Melika ZRC SAZU


pokrajinske vroče točke
pokrajinske mrzle točke
0 10 20 30 40 50 km
© Geografski inštitut Antona Melika ZRC SAZU

4 Sklep

Rezultati so uporabni na različnih področjih, kot so na primer turizem (razvoj in promocija turističnih destinacij), prostorsko planiranje (prenos dobrih praks), varstvo okolja, izobraževanje in raziskovanje (Gray 2004; Erhartič 2012). Pogosto se na področju ved o okolju omenja biodiverziteta. Peters in Goslee (2001) sta omenila, da je za ohranjanje biodiverzitete treba pravilno ukrepati tudi na višji ravni, ravni pokrajine. Mocior in Kruse (2016) sta v svoji raziskavi dokazali, da je raznolikost pokrajine najbolj pomemben dejavnik pri ocenjevanju izobraževalnega pomena pokrajine oziroma njenih prvin. Raznolikost pokrajine je pomembna tudi pri marsikateri raziskavi, kjer se uporablja vzorčenje. Na homogenih območjih je lahko mreža za opazovanje ali vzorčenje redkejša, na raznolikih območjih pa mora biti gostejša (Bonar, Fehmi in Mercado-Silva 2011).

Evropska unija daje zaradi navedenih in drugih vzrokov pokrajinski raznolikosti že od nekdaj velik pomen, saj se pokrajinska raznolikost (pestrost) kot pomemben naravni vir omenja v Evropski konvenciji o (po)krajini (European landscape convention 2000), ki izpostavlja, »*… da sta kakovost in pestrost evropskih krajin skupen vir in da si je treba skupaj prizadevati za njegovo varstvo, upravljanje in načrtovanje …*«. Raznolikost (pestrost) poudarja tudi predhodni dokument »*Pan-European Biological and Landscape diversity strategy*« iz leta 1996 (Pan-European … 1996).

V nadaljevanju raziskave bomo pokrajinske vroče točke Slovenije opredelili, analizirali, razvrstili in ovrednotili. Pomembno bo terensko delo s katerim bomo preverjali teoretične rezultate.

ZAHVALA: Prispevek temelji na raziskovalnem projektu Pokrajinska raznolikost in vroče točke Slovenije (L6-6852), ki sta ga sofinancirali Javna agencija za raziskovalno dejavnost Republike Slovenije ter Slovenska akademija znanosti in umetnosti.

5 Literatura

Glej angleški del prispevka.

Acta geographica Slovenica, 57-1, 2017, 31–49

DROUGHT ANALYSIS USING THE STANDARDIZED PRECIPITATION INDEX (SPI)

ANALIZA SUŠNIH RAZMER S POMOČJO STANDARDIZIRANEGA PADAVINSKEGA INDEKSA (SPI)

Urša Šebenik, Mitja Brilly, Mojca Šraj

MOJCA ŠRAJ

Effects of drought on agricultural land.
Posledice suše na kmetijskih površinah.

Drought Analysis Using the Standardized Precipitation Index (SPI)

DOI: http://dx.doi.org/10.3986/AGS.729
UDC: 556.167(497.4)
551.577.38(497.4)
COBISS: 1.01

ABSTRACT: Drought indices are commonly used for detection, monitoring and evaluation of drought events. One of the most commonly used drought indices is the Standardized Precipitation Index (SPI). This paper presents the effect of theoretical distribution selection on SPI values, and the analysis of drought events for five selected meteorological stations in Slovenia. We found that the SPI on the annual time scale shows a similar pattern of occurrence of dry and wet periods at Ljubljana-Bežigrad, Novo mesto, and Trieste meteorological stations; something similar can be said for the Celje and Maribor-Tabor stations. The analysis of the correlations between the standardized data river discharge and precipitation data for the selected river basin of the River Pesnica shows the strongest correlation between the SPI-2 and standardized discharges.

KEY WORDS: geography, drought, precipitation, probability analysis, Standardized Precipitation Index (SPI), standardized river discharge data, the River Pesnica, Slovenia

The article was submitted for publication on 12th February, 2014.

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1 Introduction

Drought results from a combination of meteorological, physical, and human factors (Natek 1983; Sustainable Water Use 2001; Sušnik 2006). Drought events, in comparison with other natural disasters, differ in several aspects (Wilhite 2003; Wilhite and Buchanan-Smith 2005):

- There is no accurate, universal and objective definition of drought. Consequently, this leads to doubts about whether or not drought conditions are present in a given period, and if it is established that they are present, what is their intensity. This leads to indecision and lack of action from the competent authorities.
- It is difficult to determine when a drought event began and when it ended. Usually, its consequences accumulate slowly throughout a long period of time, and can remain present in an area for several years.
- Drought impacts do not have a one-off effect and are spread over a large geographical area. These characteristics of drought have hindered the development of accurate, reliable, and timely estimates of severity and impacts and, ultimately, the formation of drought preparedness plans.
- Problems in the quantification of drought impacts and providing disaster relief. Drought must be considered a relative, rather than an absolute condition, since it reflects a deviation from the long-term average over a long period of time.

Drought events differ in the following aspects: intensity, duration, and spatial coverage (Wilhite 2003; Wilhite and Buchanan-Smith 2005). The intensity of a drought event refers to the degree of precipitation deficit and/or the severity of impacts. The spatial extent and impact of a drought event depend mostly on the time of the onset of precipitation deficit, its intensity, and duration. The impacts and consequences of drought can be direct and indirect. For example, loss of crops due to drought is a direct impact. The consequences of this impact (i.e. loss of crops) include loss of income, damage claims from farmers; these are indirect impacts, i.e. secondary or tertiary impacts. The impacts of drought can be economic (energy industry, tourism industry, fishery production, water supplies), environmental (loss of biodiversity, degradation of environment, erosion of soils, water quality and quantity effects) and social (food shortages, increased groundwater depletion, loss of natural and cultural heritage, decreased quality of life; Wilhite 2003).

In order to implement adequate and timely measures, it is necessary to know the characteristics of drought and how it affects the different levels of society and its functioning. Today, drought indices are indispensable tools to detect, monitor and evaluate drought events (Niemeyer 2008). One of the most commonly used indices is the Standardized Precipitation Index (SPI) (Guttman 1999), distinguished by simplicity and temporal flexibility, due to which the index can be used over different time scales.

The purpose of this paper is to identify drought conditions, i.e. to analyse and compare drought periods using the SPI for the five selected sites, and try to describe hydrological drought events in the selected river basin using standardized monthly river discharge data and the SPI.

2 Methods

2.1 Data

The only input data for calculating the SPI are monthly precipitation data. We selected four meteorological stations in Slovenia (Ljubljana-Bežigrad, Maribor-Tabor, Celje, and Novo mesto) and one station in Italy (Trieste), which are evenly spaced and for which long-term data series are available (ARSO 2011a; UL FGG 2012) (Table 1).

Table 1: Features of the selected meteorological stations (ARSO 2009).

Meteorological station	Elevation (AMSL)	Latitude	Longitude	Considered period
Ljubljana-Bežigrad	299	46°04'	14°31'	1853–2010
Maribor-Tabor	275	46°32'	14°39'	1876–2010
Celje	240	46°15'	15°15'	1853–2010
Novo mesto	220	45°48'	15°11'	1951–2010
Trieste	32	45°38'	13°45'	1851–2004

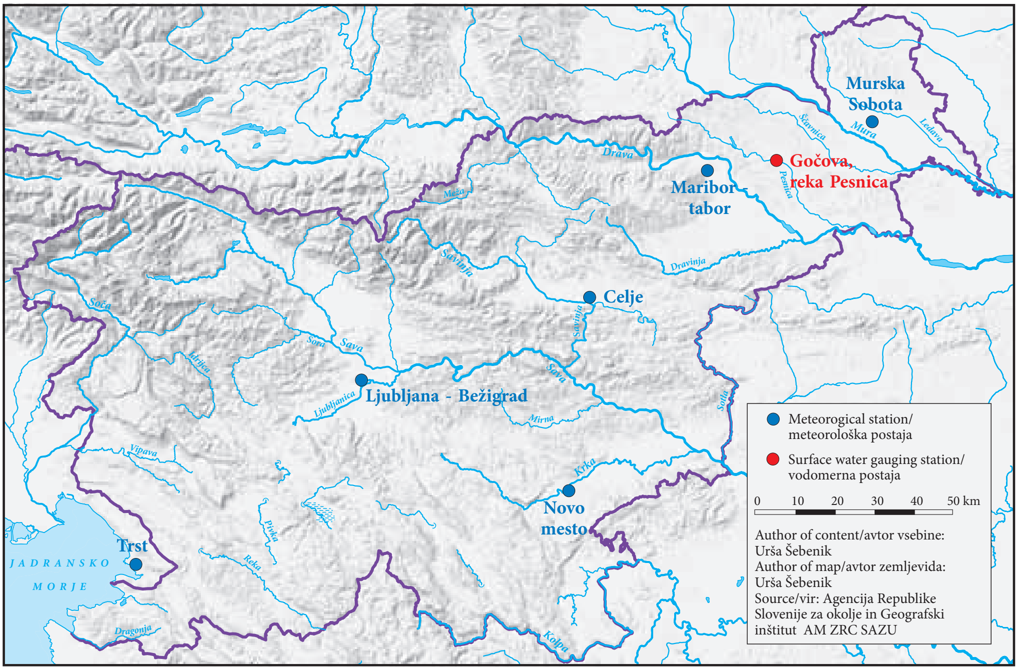


Figure 1: Locations of the selected meteorological stations and the Gočova gauging station located on the River Pesnica.

SPI values were calculated for six different time scales: one-month (SPI-1), two-month (SPI-2), three-month (SPI-3), six-month (SPI-6), nine-month (SPI-9), and twelve-month, i.e. annual, (SPI-12) time scales for the entire observation period of the selected meteorological stations as well as for the cross-sectional period (1951–2004).

We chose the River Pesnica with a rain-snow regime for the comparison between the SPI and river discharges. The Maribor-Tabor station was used for SPI calculation. The comparison was made using mean monthly river discharge data from the Gočova gauging station for the longest available period (1970–2009) (ARSO 2011b).

2.2 Standardized Precipitation Index (SPI)

SPI was developed by McKee et al. (1993) as a relatively simple index to be used for determining precipitation deficit or excess. Through SPI, we can also determine the frequency of extremely dry or wet events for a certain time scale for any location where precipitation data series are available (Gregorič and Ceglar 2007). The standardized nature of the index allows us to obtain comparable data on drought frequency for any location (Guttman 1999).

The first step in calculating the SPI index is to determine the probability density function for selected precipitation series. The distribution most commonly used in calculating the SPI is the gamma distribution (McKee et al. 1993; Hayes et al. 1999; Guttman 1999; Hayes 2000; Lloyd-Hughes and Saunders 2002; Ceglar and Kajfež-Bogataj 2008). Guttman 1999, Vicente-Serrano and Lopez-Moreno (2005) as well as Blain (2011) used Pearson III distribution in their analysis. Guttman (1999) compared the SPI values calculated with different distributions and found that the gamma and Pearson III distributions fitted data the best. The distribution function of each monthly amount of precipitation for the given time scale is then computed. Distribution function is then normalized into a standard normal random variable Z, which represents the value of SPI index (Lloyd-Hughes and Saunders 2002); this quantifies the drought intensity (Table 2).

Table 2: Drought classification by SPI value and corresponding event probabilities (Lloyd-Hughes 2002, 67).

SPI value	Category	Probability (%)
2.00 or more	Extremely wet	2.3
1.50 to 1.99	Severely wet	4.4
1.00 to 1.49	Moderately wet	9.2
0.00 to 0.99	Mildly wet	34.1
0.00 to –0.99	Mildly drought	34.1
–1.00 to –1.49	Moderate drought	9.2
–1.50 to –1.99	Severe drought	4.4
–2 or less	Extreme drought	2.3

McKee et al. (1993) established the criteria for determining the beginning and the end of a drought event. A drought event begins when the SPI is continuously negative and reaches the value of –1 or less. The event ends when the SPI value becomes positive.

2.3 Standardized river discharge data

Water resources, such as watercourses, groundwater, snow cover, etc., are highly dependent on the amount of precipitation. The response of individual components of the hydrological cycle to the time period for which the SPI is calculated varies. In order to determine the relationship between precipitation and river discharges, we have to use a normal distribution to standardize mean monthly discharge data for each gauging station (Vicente-Serrano and Lopez-Moreno 2005; Gregorič and Ceglar 2007).

3 Results and analysis

3.1 Effects of probability distribution selection on SPI values

We calculated the index values for the Ljubljana-Bežigrad meteorological station using Gumbel distribution (G) and Pearson III distribution (P3) in addition to the two-parameter gamma distribution (G2). Results are compared using Pearson's correlation coefficient (Table 3).

Table3: Correlation coefficients between selected distributions, for SPI-1 to SPI-12 (Šebenik 2012).

	SPI–1 G	SPI–1 P3	SPI–2 G	SPI–2 P3	SPI–3 G	SPI–3 P3	SPI-6 G	SPI-6 P3	SPI-9 G	SPI-9 P3	SPI-12 G	SPI-12 P3
SPI-1 G2	0.992	0.987										
SPI-2 G2			0.997	0.997								
SPI-3 G2					0.994	0.988						
SPI-6 G2							0.986	0.9961				
SPI-9 G2									0.988	0.876		
SPI-12 G2											0.993	0.539

Unlike Pearson III distribution, Gumbel distribution closely correlates with the gamma distribution on all time scales. All correlation coefficients reached at least 0.98. Pearson III distribution has higher variability. It correlates better on longer time scales than on shorter ones (Table 3). All SPI calculations below referred to the gamma probability distribution.

3.2 SPI values for individual meteorological stations for the entire measurement period

Annual SPI values for the Ljubljana-Bežigrad meteorological station show (Figure 2) three severe drought events before 1900, i.e. in 1858, 1865, and 1877. Between 1900 and 1950, the SPI-12 shows four extreme drought events. The first extreme drought event was detected between 1920 and 1922, as confirmed also by archival drought records in Slovenia (Trontelj 1997). Drought events were followed by wet periods, but then again dry periods were detected in 1943, 1947, and 1949. Only shorter time scales show a slightly higher frequency of extreme drought in Ljubljana in the second half of the 20th century, which occur more frequently after 1990. The year 2003 definitely stands out after 2000 and is detected on all time scales. 2006 and 2007 are also identified as years with negative deviations, as was noted also by Sušnik and Gregorič (2008), and by Zorn and Komac (2011).

Data analysis for the Maribor-Tabor meteorological station (Table 1) shows that extreme SPI values appear only on shorter time scales (Šebenik 2012). Before 1900, the SPI-12 scale shows two severe drought events with the lowest value (–1.52) in 1877. In the first half of the 20th century, annual index values indicate three moderate drought events with the minimum value of the SPI-12 (–1.64) in December 1921. The total annual precipitation for the same year was only 725 mm, which is lower than the long-term average (i.e. 1032 mm) (Trontelj 1997). After 1950, drought events occurred more frequently and reached the highest frequency of occurrence in the last decade of observation (2000–2010). Annual index values for these years do not significantly exceed the limits specified for moderate drought, with the exception of December 1971 (–1.75) and December 2003 (–1.68). Index values for the year 2003 differ significantly less on shorter time scales. Since only short-period precipitation totals are taken into account in the calculation of SPI values at shorter time scales, such index values do not reflect past long-term drought conditions, which began already in 2000 and continued in 2001 and 2002, as confirmed also by Kobold (2003).

The annual time scale for the Celje meteorological station (Table 1) shows a long period of negative deviation between 1854 and 1859. A longer period of negative deviation repeated between 1861 and 1864 and also from 1865 to 1866, and from 1883 to 1885. Longer drought periods with constant negative index values occurred again during 1920–1922, in 1924, and 1925. Shorter negative deviations were followed by wet periods, which reached extreme index values in 1937 and 1938. Wet periods were again followed by two long drought periods lasting from 1941 to 1944, and from 1945 to 1948. The year 1946 stands out, when virtually all months of the year had negative index values. The exception after 2000 was the year 2003, when the SPI reached values indicative of severe drought.

The lowest values for the Novo mesto meteorological station (Table 1) on the annual time scale were within the limits of moderate or severe drought (Table 2). However, short periods of negative deviation occurred quite frequently (Šebenik 2012). Longer periods of precipitation deficit were more common in the last three decades. In 2007, negative deviation persisted throughout the year.

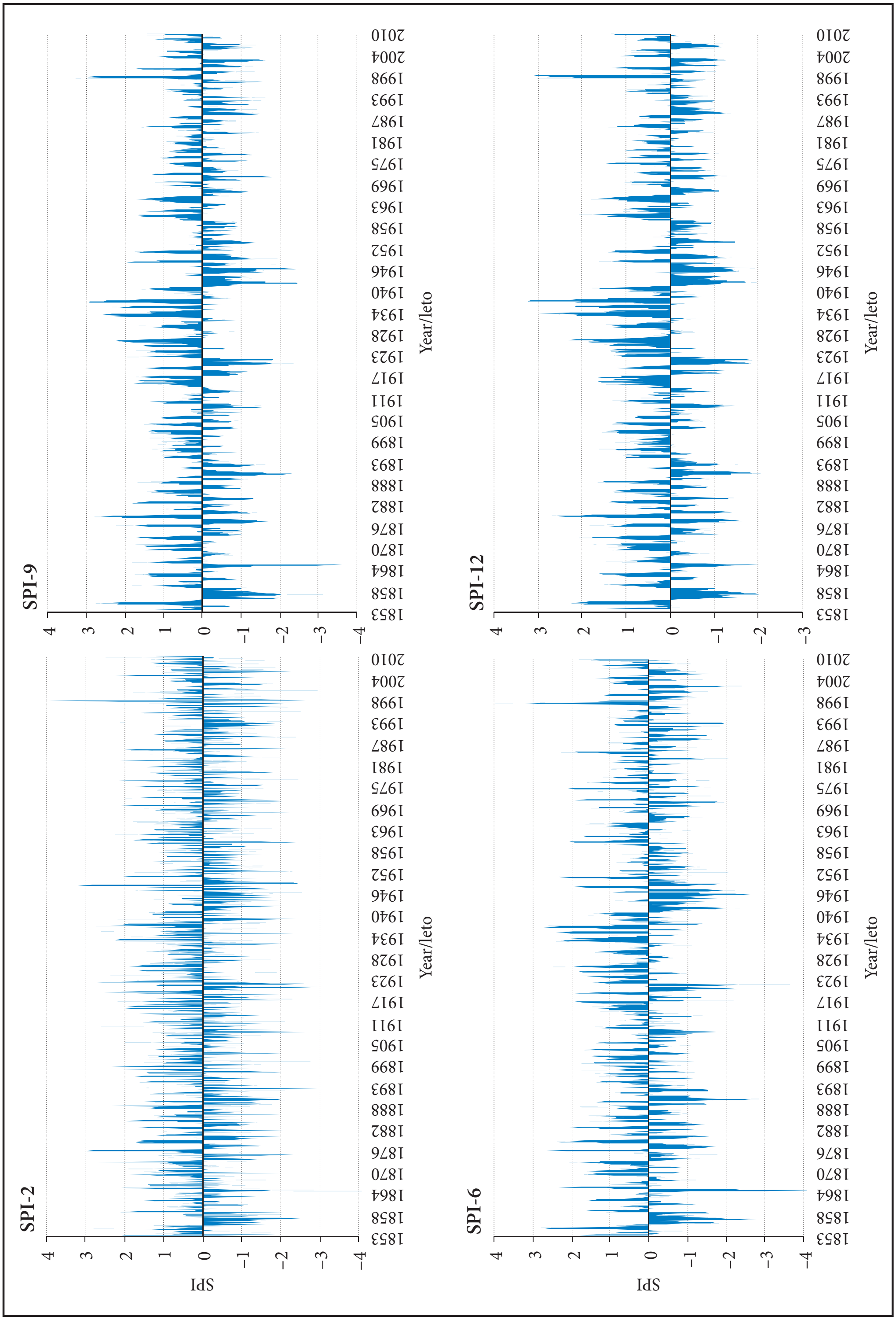
The calculations of the SPI-12 for the Trieste meteorological stations (Table 1) show that drought events were not particularly severe, since the lowest SPI value in the whole observation period is –1.01. Several long periods of negative deficits appear on the 12-month time scale before 1900, alternating with distinctively wet periods with extreme index values. It continued in a similar way in the 20th century, reaching the lowest index values in 1946. A similar pattern can also be observed in the second half of the 20th century. 2003 stands out from the last analyzed years, as it has extreme index values on all shorter time scales.

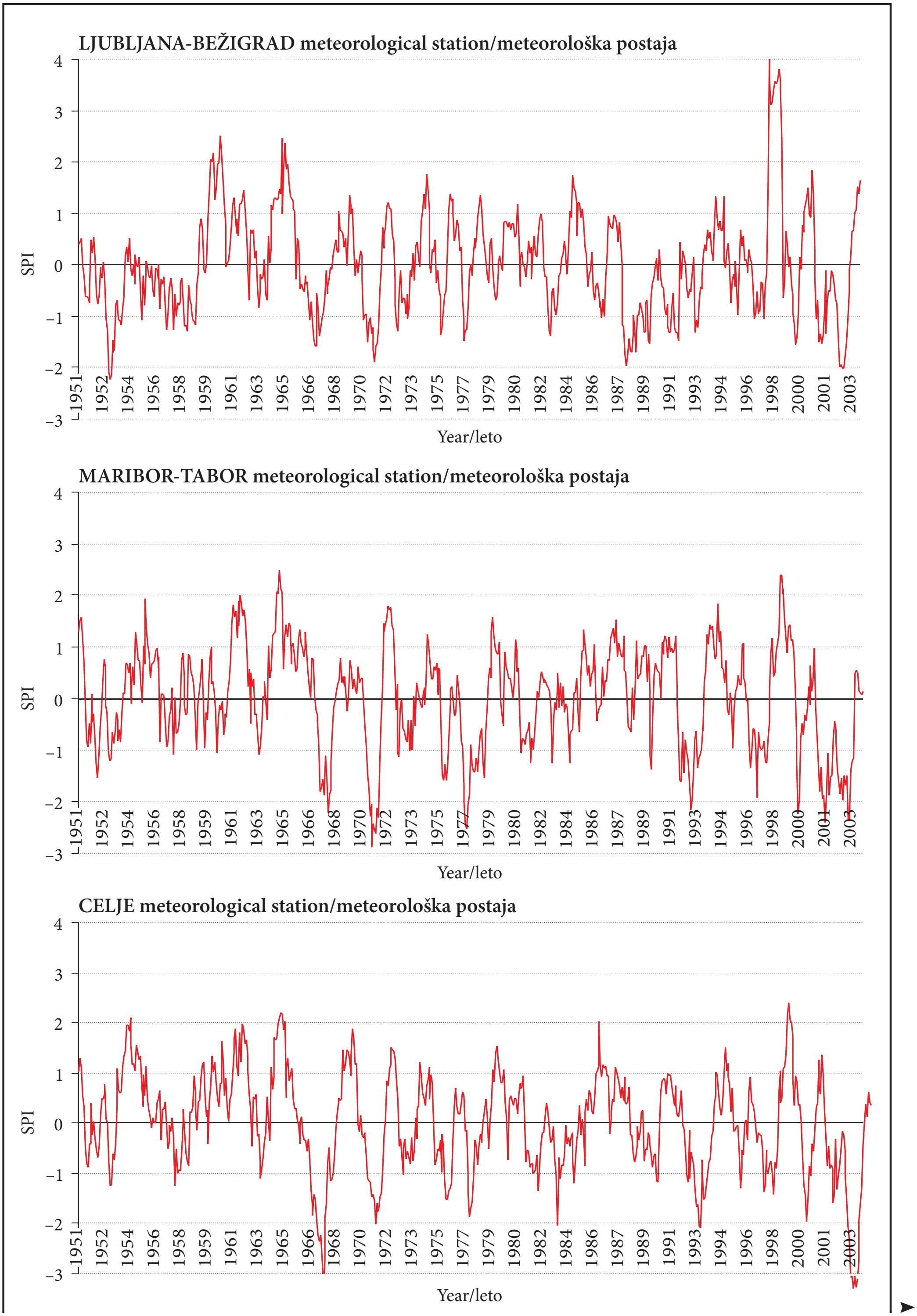
We can see that the year 2003 definitely stood out among all observed meteorological stations in the last observed decade. The 2003 extreme drought event in Europe caused EUR 8.7 billion in losses (Commission of the European Communities 2007). The substantial damage caused by drought relative to the total damage caused by natural disasters in 2003 in Slovenia, was as high as 83.3% (Zorn and Komac 2011).

3.3 SPI comparison between selected meteorological stations for the common period of measurement 1951–2004

SPI values for all selected meteorological stations and all time scales were also compared for the common measurement period. On longer time scales values for all stations have a similar distribution of major dry and wet periods (Figure 3). A major difference between stations occurred in 2002 when Trieste stood out with a distinctively wet year, while data for the other four stations already indicated extreme drought conditions, which later affected all the selected sites in 2003. If we examine the data for this period more

Figure 2: SPI-2, SPI-6, SPI-9 and SPI-12 for the Ljubljana-Bežigrad meteorological station for the 1853–2010 period (Šebenik 2012). ►


SPI-2
SPI-6
SPI-9
SPI-12
SPI
Year/leto


LJUBLJANA-BEŽIGRAD meteorological station/meteorološka postaja
SPI
4
3
2
1
0
−1
−2
−3
1951 1952 1954 1956 1958 1959 1961 1963 1965 1966 1968 1970 1972 1973 1975 1977 1979 1980 1982 1984 1986 1987 1989 1991 1993 1994 1996 1998 2000 2001 2003
Year/leto
MARIBOR-TABOR meteorological station/meteorološka postaja
SPI
4
3
2
1
0
−1
−2
−3
1951 1952 1954 1956 1958 1959 1961 1963 1965 1966 1968 1970 1972 1973 1975 1977 1979 1980 1982 1984 1986 1987 1989 1991 1993 1994 1996 1998 2000 2001 2003
Year/leto
CELJE meteorological station/meteorološka postaja
SPI
4
3
2
1
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−1
−2
−3
1951 1952 1954 1956 1958 1959 1961 1963 1965 1966 1968 1970 1972 1973 1975 1977 1979 1980 1982 1984 1986 1987 1989 1991 1993 1994 1996 1998 2000 2001 2003
Year/leto

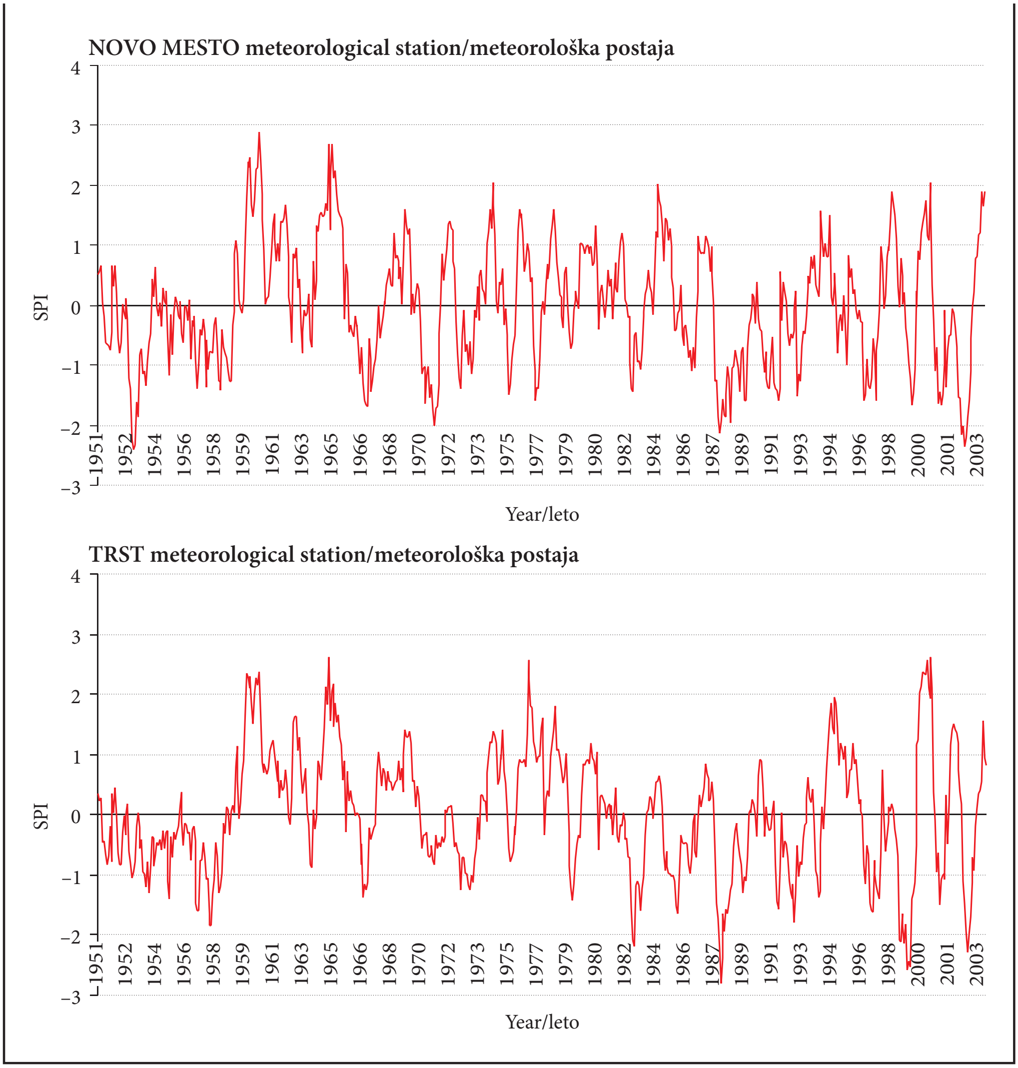

Figure 3: SPI-12 for the selected meteorological stations and the common measurement period 1951–2004.

closely, we can see that, in most cases, the Ljubljana-Bežigrad, Novo mesto and Trieste meteorological stations share a similar pattern of occurrence of dry and wet periods, and something similar can be said for the Celje and the Maribor-Tabor stations (Šebenik 2012). Differences within each group lie in drought severity (SPI values occasionally differ by more than one classification scale) and in the duration and the onset of a drought event, which differ by one or two months between the stations, in each group. Drought never affects the whole Slovenian territory evenly, which confirms the claim that drought is a regional phenomenon (Kobold 2003). During the last period the frequency and intensity of extreme events increased.

The results of the SPI-12 calculations for the entire period of observation for each station and selected common period show that the values of the correlation coefficient for all stations and all periods calculated are higher than 0.95, which means that, as regards the selected meteorological stations, the length of data series does not have a significant effect on SPI values (Šebenik 2012).

3.4 The relationship between the SPI and the standardized mean monthly discharge of the Pesnica river basin

The analysis of the results for the 1970–2009 period showed that the correlation between the standardized series of river discharge data and the SPI for the River Pesnica is positive for all time scales, but the value of Pearson correlation coefficient varies between different time scales. It is also evident that higher correlation coefficients were obtained on shorter time scales in late spring, summer (July and August), and autumn (September, November) (Figure 4).

The September SPI-2 and the September standardized discharge had the strongest correlation (= 0.754) (Figure 5). The results show that mean monthly discharges of the River Pesnica depend highly on precipitation amounts of the current and the past month, which means that the river's watercourse or basin responds quickly to rainfall. The primary water surplus of the River Pesnica occurs in April (Kolbezen 1998). It means that the River Pesnica responds quickly to increased amounts of water resulting from snowmelt or abundant precipitation. The secondary water surplus occurs in November (Kolbezen 1998), which also has high correlation with the index values at shorter time scales. Summer months have higher correlation

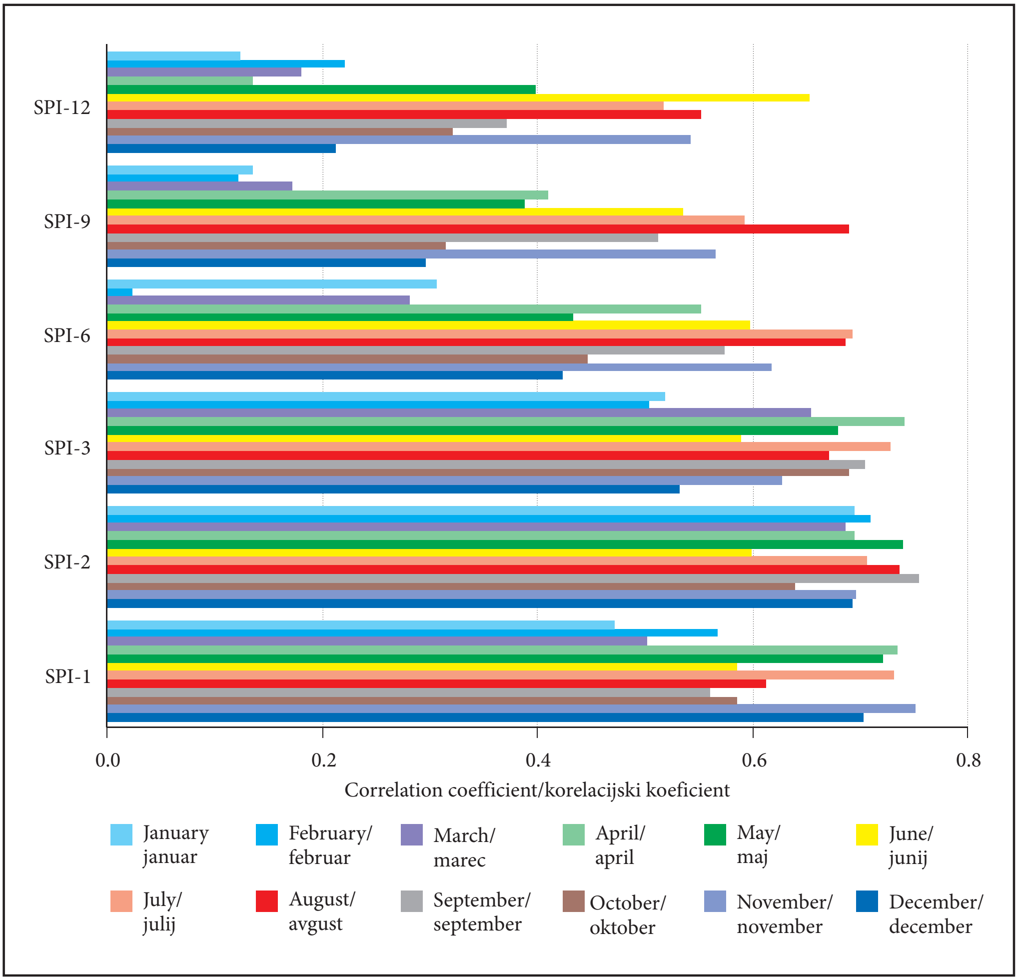

Figure 4: Representation of monthly correlations between standardized discharge data and the SPI.

coefficient values on longer time scales, where precipitation totals include early spring and winter months, which have higher precipitation levels. Extreme standardized discharge values coincide with extreme SPI-2 values, but the former are slightly higher than the latter.

4 Discussion

Analysis showed that the SPI at shorter time scales has high variability and shows more short-term drought events. Drought events occur less frequently, but last longer on longer time scales. Longer SPI time scales do not necessarily detect all the negative deviations that are evident on shorter time scales. It is also evident that SPI values at shorter time scales show slight increases in precipitation during dry periods, which do not necessarily reflect an improvement in drought situation on a longer time scale. When analyzing past periods, we have to keep in mind that several consecutive months of negative index values do not necessarily indicate drought. Negative index values actually identify the months with less precipitation compared against the long-term comparative period.

Precipitation deficit is one of the main causes of drought onset, but not the only one (Vicente-Serrano et al. 2010), since evapotranspiration, temperature, wind speed, water retention capacity of soil and human impacts also significantly influence the development of drought. Precipitation deficit in winter months is problematic with regard to groundwater recharge and recharge of other water resources, which are among the important factors affecting the status of drinking water supply in Slovenia. The SPI is based mainly on precipitation data, therefore, in order to analyze individual types of drought in more detail, we have to use other instruments: drought indices which include other variables in addition to precipitation, water balance models, low-flow analysis, etc. In particular, the SPI provides the first important information regarding drought conditions (Hayes et al. 1999).

In order to identify drought events, we also have to analyze long-time scales of SPI, which are also indicators of hydrological drought conditions of surface and groundwater sources (McKee et al. 1993; Hayes et al. 1999). The index value calculated at a specific time scale must be representative of the drought status in a hydrological system to be operative for water resources management purposes. The strongest

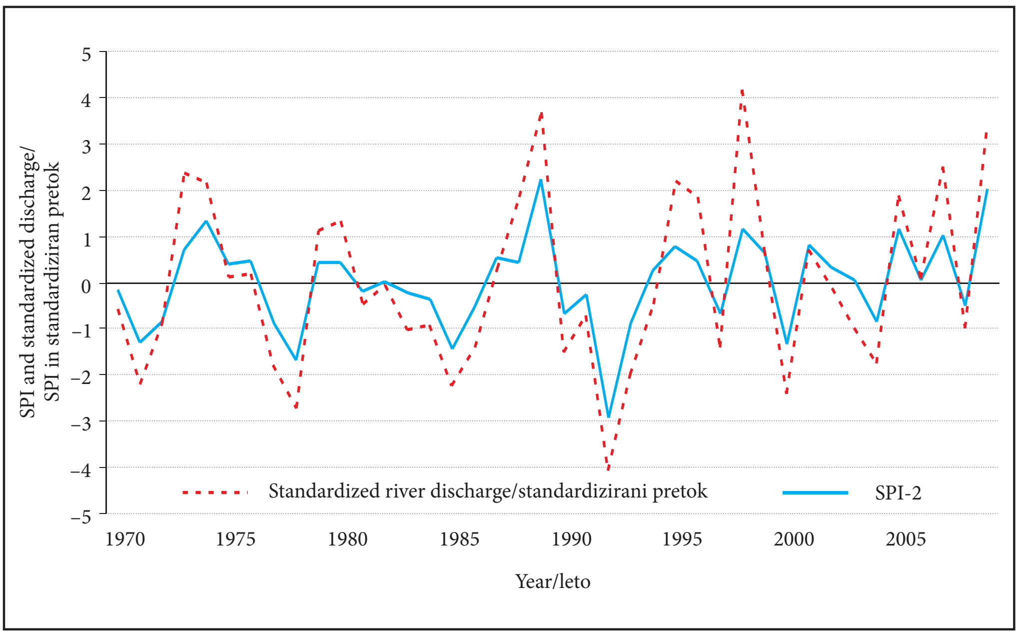

Figure 5: Standardized discharge and the SPI at two-month time scale in September.

correlations between standardized discharge data and the SPI were detected on the two-month time scale for the River Pesnica. This case shows that it is necessary to identify the most suitable scale for calculation, since hydrological, meteorological and terrain characteristics differ significantly between river basins. For the same reason, the results could not be generalized to the whole territory of Slovenia. To date, there have not been many studies conducted in this area and not many definite relationships were found between different drought monitoring periods and water resources.

We standardized discharge data using a normal distribution to achieve greater comparability and more accurate evaluation of correlations between the SPI and standardized discharge data, and thus facilitate the comparison between meteorological and hydrological variables. It would be possible to obtain even more accurate results if discharge data had been standardized using any other distribution function.

5 Conclusion

Droughts and associated water shortages are a global challenge, and Slovenia is no exception. Nevertheless, Slovenia is relatively abundant in water resources. However, despite the high total amount of rainfall, the timing of precipitation is often unfavourable for various activities (high-quality crop production, drinking water supply, hydroelectric power generation) (Gregorič and Sušnik 2008). In recent years, drought losses have reached extremely high levels in Slovenia also (Zorn and Komac 2011). The results show that the largest share (48.6%) of total losses in the period 2000–2005 was caused by drought (2007 Audit Report: Performance Audit of Drought Preventing and Drought Recovery in Agriculture by the Republic of Slovenia). The data therefore suggest that Slovenia, too, should seriously tackle drought-related problems.

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Analiza sušnih razmer s pomočjo standardiziranega padavinskega indeksa (SPI)

DOI: http://dx.doi.org/10.3986/AGS.729
UDK: 556.167(497.4)
551.577.38(497.4)
COBISS: 1.01

IZVLEČEK: Za zaznavanje, spremljanje in oceno sušnih razmer se danes pogosto uporabljajo sušni indeksi. Eden izmed najpogosteje uporabljenih je standardizirani padavinski indeks (SPI). V prispevku je predstavljen vpliv izbire teoretične porazdelitve na vrednosti SPI ter analiza sušnih obdobij za pet izbranih meteoroloških postaj v Sloveniji. Ugotovili smo, da SPI na letni ravni kaže podoben vzorec pojavljanja sušnih in mokrih obdobij za meteorološke postaje Ljubljana-Bežigrad, Novo mesto in Trst. Podobno lahko rečemo tudi za meteorološki postaji Celje in Maribor-Tabor. Analiza povezanosti standardiziranih pretokov in padavin za izbrano porečje reke Pesnice kaže najvišjo korelacijo med standardiziranim pretokom in SPI-2.

KLJUČNE BESEDE: geografija, suša, padavine, verjetnostna analiza, standardizirani padavinski indeks (SPI), standardizirani pretok, Pesnica, Slovenija

Uredništvo je prejelo prispevek 12. februarja 2014.

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1 Uvod

Suša je rezultat združevanja vremenskih, naravnih in človeških dejavnikov (Natek 1983; Sustainable Water Use 2001; Sušnik 2006). Suša se od drugih naravnih nesreč razlikuje v več vidikih (Wilhite 2003; Wilhite in Buchanan-Smith 2005):

- Ne poznamo univerzalne in objektivne opredelitve suše. Posledično nastane dvom, ali suša v danem obdobju sploh obstaja in kakšna je njena intenzivnost, kar po navadi vodi v neodločnost in neukrepanje.
- Začetek in konec suše sta težko določljiva dogodka. Posledice se običajno kopičijo skozi daljše časovno obdobje in lahko obstajajo več let.
- Vplivi suše nimajo enkratnega učinka in so razširjeni prek večjega območja. To ovira razvoj zanesljive in pravočasne ocene intenzivnosti in vplivov suše ter tudi pripravo načrta pripravljenosti na sušo.
- Težave so pri količinski opredelitvi vplivov suše in zagotavljanju pomoči. Sušo upoštevamo v relativnem in ne absolutnem smislu, saj je izražena na podlagi odklona od dolgoletnega povprečja v daljšem časovnem obdobju.

Posamezne suše se med seboj razlikujejo po: intenzivnosti, trajanju in prostorski razsežnosti (Wilhite 2003; Wilhite in Buchanan-Smith 2005). Intenzivnost sušnega dogodka se nanaša na stopnjo primanjkljaja padavin in/ali resnost učinkov. Kakšen obseg in vpliv ima suša, je odvisno predvsem od časa nastopa primanjkljaja padavin, njegove intenzitete in trajanja. Vplivi in posledice suše so lahko neposredni in posredni. Izguba pridelka je primer neposrednega vpliva, katerega posledice so: izguba v dohodku, odškodninski zahtevki kmetov. To so posredni oziroma sekundarni ali terciarni vplivi. Govorimo tudi o vplivih suše na gospodarstvo (energetika, turizem, ribištvo, oskrba z vodo), okolje (zmanjšanje biotske pestrosti, degradacija okolja, erozija prsti, kakovost in količina vodnih virov) in družbo (pomanjkanje hrane, izčrpavanje podzemne vode, izguba naravne in kulturne dediščine, zmanjšana kvaliteta bivanja; Wilhite 2003).

Za ustrezno in pravočasno ukrepanje je nujno poznavanje značilnosti suše ter njenih vplivov na različne ravni delovanja družbe. Nepogrešljivo orodje za zaznavanje, spremljanje in oceno sušnih razmer so sušni indeksi (Niemeyer 2008). Eden izmed najpogosteje uporabljenih je standardizirani padavinski indeks (SPI) (Guttman 1999), ki ga odlikuje predvsem preprostost in časovna prilagodljivost. To omogoča njegovo uporabo na različnih časovnih lestvicah.

Namen članka je opredeliti sušne razmere oziroma narediti analizo in primerjavo sušnih obdobij s pomočjo SPI za pet izbranih lokacij in poskušati opredeliti tudi hidrološko sušo na izbranem porečju s pomočjo standardiziranega mesečnega pretoka in SPI.

2 Metode

2.1 Podatki

Edini vhodni podatek za izračun SPI so mesečne padavine. Za analizo smo izbrali štiri meteorološke postaje v Sloveniji (Ljubljana-Bežigrad, Maribor-Tabor, Celje in Novo mesto) in postajo iz sosednje Italije (Trst), ki so prostorsko enakomerno razporejene in za katere so na voljo daljši časovni nizi padavinskih podatkov (ARSO 2011a; UL FGG 2012) (preglednica 1).

Slika 1: Lega izbranih meteoroloških postaj ter vodomerne postaje Gočova na reki Pesnici.
Glej angleški del prispevka.

Preglednica 1: Značilnosti izbranih meteoroloških postaj (ARSO 2009).

meteorološka postaja	nadmorska višina [m]	zemljepisna širina	zemljepisna dolžina	obravnavano obdobje
Ljubljana-Bežigrad	299	46° 04'	14° 31'	1853–2010
Maribor-Tabor	275	46° 32'	14° 39'	1876–2010
Celje	240	46° 15'	15° 15'	1853–2010
Novo mesto	220	45° 48'	15° 11'	1951–2010
Trst	32	45° 38'	13° 45'	1851–2004

Izračun SPI smo izvedli na šestih časovnih lestvicah: enomesečni (SPI-1), dvomesečni (SPI-2), trimesečni (SPI-3), šestmesečni (SPI-6), devetmesečni (SPI-9) in dvanajstmesečni lestvici (SPI-12) za celotno opazovano obdobje posameznih meteoroloških postaj ter njihovo presečno obdobje (1951–2004).

Za primerjavo med SPI in pretoki smo izbrali reko Pesnico z dežno-snežnim rečnim režimom. Za izračun SPI smo uporabili podatke meteorološke postaje Maribor-Tabor. Primerjava je bila narejena s podatki srednjega mesečnega pretoka za vodomerno postajo Gočova za najdaljše dostopno obdobje meritev (1970–2009) (ARSO 2011b).

2.2 Standardizirani padavinski indeks (SPI)

SPI je razvil McKee s sodelavci (1993) kot razmeroma preprost indeks za ugotavljanje primanjkljaja oziroma presežka padavin. Omogoča določanje pogostosti ekstremno suhih oziroma ekstremno mokrih obdobij na določeni časovni lestvici za katerokoli lokacijo, za katero obstaja niz padavinskih podatkov (Gregorič in Ceglar 2007). Standardizirana narava indeksa omogoča primerljivost frekvenc sušnih dogodkov na katerikoli lokaciji (Guttman 1999).

V prvem koraku izračuna SPI določimo gostoto verjetnosti izbranega vzorca padavin. Najpogosteje uporabljamo gama porazdelitev (McKee in ostali 1993; Hayes in ostali 1999; Guttman 1999; Hayes 2000; Lloyd-Hughes in Saunders 2002; Ceglar in Kajfež-Bogataj 2008). Guttman (1999), Vicente-Serrano in Lopez-Moreno (2005) ter Blain (2011) pa so uporabili Pearsonovo III porazdelitev. Guttman (1999) je primerjal vrednosti SPI več porazdelitev, in ugotovil, da se podatkom najbolje prilagajata gama in Pearsonova III porazdelitev. V naslednjem koraku za mesečno vsoto padavin in izbrano časovno lestvico izračunamo porazdelitveno funkcijo. To nato normaliziramo v standardizirano normalno slučajno spremenljivko, kar predstavlja vrednost indeksa SPI (Lloyd-Hughes in Saunders 2002), s katerim ovrednotimo intenziteto suše (preglednica 2).

Preglednica 2: Klasifikacija suše ter pripadajoča verjetnost pojava sušnega dogodka pri določenem SPI (Lloyd-Hughes 2002, 67).

SPI	klasifikacija	verjetnost [%]
2,00 ali več	ekstremno mokro	2,3
1,50 do 1,99	zelo mokro	4,4
1,00 do 1,49	zmerno mokro	9,2
0,00 do 0,99	normalno	34,1
0,00 do –0,99	normalno	34,1
–1,00 do –1,49	zmerna suša	9,2
–1,50 do –1,99	huda suša	4,4
–2 ali manj	ekstremna suša	2,3

McKee in sodelavci (1993) so določili tudi kriterij za določitev začetka in konca sušnega dogodka. Ko je indeks SPI dalj časa negativen in doseže vrednost –1 ali manj, govorimo o začetku sušnega dogodka, ki se konča, ko vrednost indeksa postane pozitivna.

2.3 Standardizirani pretok

Vodni viri, kot so voda v vodotokih, podzemna voda, snežna odeja, so ključno povezani s količino padavin. Odziv posameznih komponent hidrološkega kroga na časovna obdobja izračuna indeksa SPI je različen. Če želimo ugotoviti povezavo med padavinami in pretoki, moramo tudi podatke srednjega mesečnega pretoka za posamezno vodomerno postajo standardizirati z normalno porazdelitvijo (Vicente-Serrano in Lopez-Moreno 2005; Gregorič in Ceglar 2007).

3 Rezultati in analiza

3.1 Vpliv izbire verjetnostne porazdelitve na vrednost SPI

Za meteorološko postajo Ljubljana-Bežigrad smo poleg dvoparametrske gama porazdelitve (G2), uporabili še Gumbelovo (G) in Pearsonovo III (P3) porazdelitev ter rezultate primerjali s pomočjo Pearsonovega korelacijskega koeficienta (preglednica 3).

Preglednica 3: Korelacijski koeficienti izbranih porazdelitev za SPI-1 do SPI-12 (Šebenik 2012).

	SPI–1 G	SPI–1 P3	SPI–2 G	SPI–2 P3	SPI–3 G	SPI–3 P3	SPI-6 G	SPI-6 P3	SPI-9 G	SPI-9 P3	SPI-12 G	SPI-12 P3
SPI-1 G2	0,992	0,987										
SPI-2 G2			0,997	0,997								
SPI-3 G2					0,994	0,988						
SPI-6 G2							0,986	0,996				
SPI-9 G2									0,988	0,876		
SPI-12 G2											0,993	0,539

Gumbelova porazdelitev se v nasprotju s Pearsonovo III porazdelitvijo na vseh časovnih lestvicah dobro ujema z gama porazdelitvijo, saj korelacijski koeficienti dosežejo vrednost vsaj 0,98. Pearsonova III porazdelitev kaže večjo variabilnost. Bolje korelira na krajših kot na daljših časovnih lestvicah (preglednica 3). V nadaljevanju so vsi izračuni SPI narejeni z uporabo gama verjetnostne porazdelitve.

3.2 SPI za posamezne postaje za celotno obdobje meritev

Vrednosti SPI na letni ravni za meteorološko postajo Ljubljana-Bežigrad kažejo (slika 2) pred letom 1900 tri pomembnejša sušna obdobja in sicer v letih 1858, 1865 in 1877 (Šebenik 2012). Med letoma 1900 in 1950 SPI-12 kaže štiri ekstremna sušna obdobja. Prvega je zaznati med letoma 1920 in 1922, kar potrjujejo tudi arhivski zapisi o suši v Sloveniji (Trontelj 1997). Sledijo krajša mokra obdobja, tem pa zopet sušnejša v letih 1943, 1947 ter 1949. V drugi polovici dvajsetega stoletja so bila v Ljubljani ekstremna sušna obdobja le na krajših časovnih lestvicah, ki so pogostejša po letu 1990. Po letu 2000 po sušnih razmerah izstopa leto 2003, ki ga zaznajo vse časovne lestvice. Tudi v letih 2006 in 2007 SPI kaže negativno odstopanje, kar ugotavljajo tudi Sušnik in Gregorič (2008) ter Zorn in Komac (2011).

Slika 2: SPI-2, SPI-6, SPI-9 in SPI-12 za meteorološko postajo Ljubljana-Bežigrad za obdobje 1853–2010 (Šebenik 2012).
Glej angleški del prispevka.

Analiza podatkov za meteorološko postajo Maribor-Tabor (preglednica 1) je pokazala, da se ekstremne vrednosti SPI pojavljajo le na krajših časovnih lestvicah (Šebenik 2012). Pred letom 1900 nam SPI-12 kaže dve sušni obdobji z minimalno vrednostjo (–1,52) leta 1877. V prvi polovici dvajsetega stoletja letni indeks kaže tri zmerna sušna obdobja z minimalno vrednostjo SPI-12 (–1,64) decembra 1921. V tem letu je padlo le 725 mm padavin, kar je precej manj od dolgoletnega povprečja, ki je 1032 mm (Trontelj 1997). Po letu 1950 sledi večje število sušnih obdobij, z največjo pogostostjo v zadnjem desetletju (2000–2010). Vrednosti SPI-12 po klasifikaciji v teh letih bistveno ne presegajo meje zmerne suše, razen decembra 1971 (–1,75) in decembra 2003 (–1,68). Indeksi na krajših časovnih lestvicah imajo za leto 2003 bistveno manjše odklone. Ker upoštevajo le krajše obdobje vsot padavin, se v njih ne odražajo daljše pretekle sušne razmere, ki so se začele že leta 2000 in nadaljevale v leto 2001 in 2002, kar potrjuje tudi Kobold (2003).

Za meteorološko postajo Celje (preglednica 1) je na letni časovni lestvici opazen daljši negativen odklon med letoma 1854 in 1859. Daljše obdobje negativnega odklona se ponovno pojavi med letoma 1861 in 1864 ter se ponovi v obdobjih od leta 1865 do 1866 ter od leta 1883 do 1885. Sušna obdobja smo zaznali še v letih 1920 do 1922, 1924 in 1925. Krajšim negativnim odklonom sledijo namočena obdobja, ki dosežejo ekstremne vrednosti v letih 1937 in 1938. Sledita daljši sušni obdobji med letoma 1941 in 1944 ter med letoma 1945 in 1948. Izstopa leto 1946, ko so praktično vsi meseci imeli negativni indeks. Po letu 2000 izstopa leto 2003, ko vrednost indeksa po klasifikaciji doseže mejo hude suše.

Najnižji indeksi za meteorološko postajo Novo mesto (preglednica 1) se na letni časovni lestvici po klasifikaciji gibljejo v mejah zmerne do hude suše (preglednica 2). Krajša obdobja negativnega odklona so precej pogosta (Šebenik 2012). V zadnjih treh desetletjih so pogostejša tudi daljša obdobja primanjkljaja padavin. V letu 2007 se negativen odklon kaže skozi celo leto.

Izračuni SPI-12 za meteorološko postajo Trst (preglednica 1) kažejo, da obdobja s primanjkljajem ne dosegajo velike intenzivnosti, saj je minimalna vrednost indeksa v celotnem analiziranem obdobju enaka –1,01. Do leta 1900 se na letni časovni lestvici kaže predvsem izmenjava daljših ekstremno mokrih obdobij s krajšimi sušnejšimi obdobji. Podobno se nadaljuje tudi v dvajsetem stoletju z najnižjimi vrednostmi v letu 1946. Tudi v drugi polovici 20. stoletja se kaže podoben vzorec. V zadnjih analiziranih letih izstopa leto 2003, ki ga zaznajo vse lestvice krajšega trajanja.

Ugotovimo lahko, da v zadnjem analiziranem desetletju na vseh obravnavanih postajah izstopa leto 2003. V tem letu je ekstremna suša v Evropi dosegla enormne stroške v višini 8,7 milijarde evrov (Commission of the European Communities 2007). V Sloveniji je škoda zaradi suše glede na celotno škodo zaradi naravnih nesreč v letu 2003 znašala kar 83,3% (Zorn in Komac 2011).

3.3 Primerjava SPI med izbranimi postajami za enotno obdobje meritev 1951–2004

Izračunane vrednosti SPI za vse izbrane postaje in vse časovne lestvice smo primerjali tudi za enotno obdobje meritev. Na daljših časovnih lestvicah vse postaje kažejo podobno razporeditev glavnih suhih in mokrih obdobij (slika 3). Do večje razlike pride v letu 2002, kjer izstopa Trst z izrazito mokrim letom, na ostalih meteoroloških postajah pa se v tem času že nakazujejo ekstremne sušne razmere, ki so v letu 2003 prizadele vse obravnavane lokacije. Podrobnejša analiza je pokazala, da meteorološke postaje Ljubljana-Bežigrad, Novo mesto in Trst kažejo podoben vzorec pojavljanja sušnih in mokrih obdobij, podobno pa bi lahko rekli tudi za meteorološki postaji Celje in Maribor-Tabor (Šebenik 2012). Razlike znotraj vsake skupine se kažejo v intenzivnosti suše, ki se lahko razlikuje za cel razred ter trajanju in začetku sušnega obdobja, ki se lahko razlikuje za mesec ali dva. Suša nikoli ne zajame enakomerno celotne Slovenije, kar potrjuje trditev, da je suša regionalen pojav (Kobold 2003). V zadnjem obdobju se število ekstremnih dogodkov povečuje in hkrati intenzivira.

Primerjava rezultatov SPI-12 za celotno obdobje meritev posamezne postaje in za izbrano enotno obdobje je pokazala, da so vrednosti korelacijskega koeficienta za vse postaje nad 0,95, kar pomeni, da časovno obdobje v primeru izbranih meteoroloških postaj ne vpliva v veliki meri na vrednosti SPI (Šebenik 2012).

Slika 3: SPI-12 za obravnavane meteorološke postaje za enotno obdobje meritev 1951–2004.

Glej angleški del prispevka.

3.4 Razmerje med SPI in standardiziranim srednjim mesečnim pretokom za porečje Pesnice

Analiza rezultatov za obdobje 1970–2009 je pokazala, da je medsebojna povezanost standardiziranih pretokov za reko Pesnico in SPI za vse časovne lestvice pozitivna, vendar se vrednosti Pearsonovega koeficienta korelacije spreminjajo glede na dolžino časovne lestvice. Ugotovimo lahko, da so korelacijski koeficienti višji na krajših časovnih lestvicah in da se pojavljajo pozno spomladi, poleti (julij in avgust) in jeseni (september, november) (slika 4).

Slika 4: Prikaz mesečnih korelacijskih koeficientov med standardiziranimi pretoki in SPI.

Glej angleški del prispevka.

Najvišja korelacija (= 0,754) je med septembrskim SPI-2 in septembrskim pretokom (slika 5). Rezultati kažejo, da na srednje mesečne pretoke reke Pesnice v večji meri vplivajo padavine tekočega in preteklega meseca, kar kaže na hiter odziv vodotoka oziroma porečja na padavine. Primarni višek vode reke Pesnice praviloma nastane v mesecu aprilu (Kolbezen 1998). Takrat se reka Pesnica hitro odzove na večjo količino vode zaradi taljenja snega ali obilnejših padavin. Sekundarni višek nastane v novembru (Kolbezen 1998), kar se ravno tako dobro ujema z indeksom SPI na krajših časovnih lestvicah. Poletni meseci kažejo boljše ujemanje na daljših časovnih lestvicah, ko so v vsotah padavin všteti tudi meseci zgodnje pomladi in zime, ko je količina padavin večja. Ekstremne vrednosti standardiziranega pretoka se časovno dobro ujemajo z ekstremnimi vrednostmi SPI-2, so pa nekoliko višje.

Slika 5: Standardizirani pretok in SPI na dvomesečni časovni lestvici v septembru.

Glej angleški del prispevka.

4 Razprava

SPI na krajših časovnih lestvicah kaže veliko variabilnost in večje število krajših sušnih dogodkov. Sušne razmere na daljših časovnih lestvicah so manj pogoste, vendar trajajo dlje. Daljše časovna lestvice ne prepoznajo nujno vseh negativnih odklonov, ki so vidni na krajših časovnih lestvicah. Prav tako krajši padavinski skoki na krajših časovnih lestvicah ne pomenijo nujno izboljšanja sušnih razmer na daljši lestvici. Pri analizi preteklih obdobij se je treba zavedati, da več zaporednih mesecev z negativnimi vrednostmi indeksa ne pomeni nujno sušnega obdobja. Negativna vrednost indeksa namreč predstavlja mesece, ko je padla manjša količina padavin v primerjavi z dolgoletnim primerjalnim obdobjem.

Pomanjkanje padavin je eden od glavnih vzrokov nastanka suše, vendar ne edini (Vicente-Serrano in ostali 2010), saj so pomembni vplivni dejavniki za razvoj suše tudi evapotranspiracija, temperatura, hitrost vetra, vodozadrževalna sposobnost tal ter vplivi človeka. Pomanjkanje padavin v zimskih mesecih je problematično z gledišča bogatenja podtalnice in drugih vodnih virov, ki so pomembni dejavniki pri oskrbi s pitno vodo v Sloveniji. SPI upošteva samo padavine, zato je treba za podrobnejšo analizo posamezne vrste suše uporabiti še druga orodja: sušne indekse, ki poleg padavin vključujejo tudi druge spremenljivke, vodnobilančne modele, analizo nizkih pretokov rek ipd. SPI zato predstavlja predvsem prvo informacijo o sušnih razmerah (Hayes in ostali 1999).

Za identifikacijo sušnih razmer smo analizirali tudi daljša obdobja, ki so hkrati kazalci hidroloških sušnih razmer na površinskih in podzemnih vodnih virih (McKee in ostali 1993; Hayes in ostali 1999). Indeks, primeren za operativno rabo pri upravljanju z vodnimi viri, mora biti reprezentativen za sušne razmere v hidrološkem sistemu na določeni časovni lestvici izračuna. Za reko Pesnico smo najvišjo korelacijo med standardiziranimi pretoki in SPI zaznali na dvomesečni časovni skali. Primer kaže, da je treba za vsako porečje posebej določiti najprimernejšo lestvico izračuna, saj se hidrološke, meteorološke in reliefne značilnosti bistveno razlikujejo. Iz istega razloga rezultata ne moremo posplošiti za celo Slovenijo. Na tem področju do sedaj še ni bilo veliko raziskav in ugotovljenih gotovih povezav med različnimi časovnimi obdobji spremljanja sušnih razmer in vodnimi viri.

V študiji smo pretoke standardizirali po normalni porazdelitvi zaradi večje primerljivosti ter boljše ocene medsebojne povezanosti SPI in standardiziranega pretoka, kar omogoča lažjo primerjavo meteoroloških in hidroloških spremenljivk.

5 Sklep

Suša in z njo povezano pomanjkanje vode se kažeta kot izziv za celoten svet, pri tem pa tudi Slovenija ni izjema. Slovenija se sicer uvršča med države, ki so z vidika vodnatosti relativno bogate. Vendar pa je kljub visokim skupnim količinam dežja za različne dejavnosti (kakovostna kmetijska pridelava, oskrba s pitno vodo, proizvodnja električne energije) časovna razporeditev padavin pogosto neugodna (Gregorič in Sušnik 2008). V preteklih letih je tudi v Sloveniji škoda zaradi suše dosegla visoke zneske (Zorn in Komac 2011). Rezultati kažejo, da je daleč največji delež (48,6 %) v celotnem obsegu ocenjene škode v letih od 2000 do 2005 povzročila prav suša (Revizijsko poročilo … 2007). Podatki nam torej kažejo, da moramo tudi v Sloveniji na sušo resno računati.

6 Literatura

Glej angleški del prispevka.

Acta geographica Slovenica, 57-1, 2017, 51–63

FOREST FIRE ANALYSIS AND CLASSIFICATION BASED ON A SERBIAN CASE STUDY

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SOURCE: NASA (HTTP://WWW.NASA.GOV/MISSION_PAGES/FIRES/MAIN/WORLD/20120827-SE-EUROPE.HTML)

Aqua/MODIS Forest Fires observations in South-East Europe, August 26th 2012.

Forest fire analysis and classification based on a Serbian case study

DOI: http://dx.doi.org/10.3986/AGS.918
UDC: 91:614.841.42:630(497.11)
COBISS: 1.01

ABSTRACT: A recent forest fire in the Republic of Serbia is discussed concerning classification, legislative framework and fire management, giving a detailed analysis of the forest fire occurrence. Analysing past and predicting future fires are crucial for policy development and forest management practices to prevent and mitigate fires. Fire hazard is discussed through several fire protection and prevention legislative documents. The nonparametric Mann-Kendall test was used to analyse resent forest fire data in an attempt to find causality in occurrences and frequency. The meteorological data and fire statistics provided by the Serbian Hydro-meteorological Service and the Ministry of Interior/Sector for Emergency Management of the Republic of Serbia were used to calculate the Forest Fire Weather Indices, along with deficit or surplus of precipitation for the case study of Tara Mountain. The paper highlights the need for better hierarchical classification of fire hazards and its harmonisation along with standardisations presented by leading international research institutions. A significant correlation between meteorological parameters and forest fire occurrence was found. This opens a possibility for further investigation and analysis of geophysical and anthropogenic driven factors that can influence disaster occurrence.

KEY WORDS: geography, natural hazards, forest fires, classification, forest fire weather indices, Tara mountain, Serbia

The article was submitted for publication on October 10th, 2014.

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1 Introduction

While natural hazards present threat to humans and their environment, they do not necessarily result from natural and environmental processes and causes alone. Processes of interaction between natural and anthropogenic systems also bring about hazards. Improved understanding of these interactions alters our comprehension of natural hazards, shifting it from an area of pure natural phenomena to the domain of social and psychological occurrence (Lukić et al. 2013).

In the era of pronounced climate variability, understanding past and predicting future fire activity are scientific challenges crucial to the development and implementation of sustainable forest management practices and policies. However, such objectives are difficult to achieve in practice because existing meteorological data and general fire statistics are only available for a short period of time. Accordingly, uncertainties concerning future fire activity limit the range of variability and occurrence patterns that can be determined (Girardin et al. 2013).

Forests occupy an area of nearly 4 billion hectares, covering about 30% of Earth's land surface. Worldwide, more than 50,000 forest fires occur annually (Aleksić, Krstić and Jančić 2009), on average destroying more than 40 million hectares of forestry, claiming human casualties, and resulting in wildlife losses and displacement on approximately 400,000 km^2 (Internet 1). Fire and heat not only destroy trees and plants, but change the forestry structure, forest biology and soil performance (Zhong, Fan and Wang 2000).

Different authors give different definitions of forest fires classification, while diverse legislations also classify it in their own terms (Subošić and Mlađan 2013). Harmonising the definition of forest fire hazards as an integral part of a wider natural hazard topic, would contribute to an improved understanding thereof, and hopefully lead to a more effective classification, identification, prediction, and mitigation.

The National fire protection association (NFPA) categorises fires by classes: A, B, C, D, K. According to this classification, forest fires belong to class A. In terms of hazard, NFPA classifies fire-prone areas as light (low), ordinary (moderate) or extra (high) hazardous (Internet 2).

Alexander (2008) proposed a rating methodology for fire hazard in forests and rural areas, to be used in fire management. The fire hazard class is derived from the Fire Weather Index (FWI) System as low; moderate; high; very high and extreme.

The Centre for research on the epidemiology of disasters (CRED) and Munich reinsurance company (Munich RE) with their respectable International databases – EM-DAT and NatCatSERVICE – treat forest fires as »wildfire« hazards (main-type) within the generic climatological hazard group (Below, Wirtz and Guha-Sapir 2009).

Markov, Jovičić and Ristić (2010) base their classification on the type of material burned, whereby forest fires are classified as underground and ground fires (burning roots, humus and peat); above-ground or low fires (burning the upper layer of organic forest litter and shrubs); treetop or high fires and a single tree fire.

2 Forest fires in Serbia between legislation and application frameworks

The forestry area in Serbia decreased from over 2,000,000 ha in 2001 to 1,962,335 ha in 2012, now covering 22.2% of the country's territory. State owned forests extend to over 927,773 ha and privately owned ones to 1,034,562 ha (Statistical yearbook … 2012).

Several fire protection and prevention documents address fire hazards. These acts cover systems of prevention, mitigation, protection, rescue and rehabilitation:

The Fire Protection and Prevention Act treats the fire hazard mainly as a physical phenomenon: »*A process of uncontrolled combustion that can threaten human health and lives, or cause other damages on a larger scale endangering material goods and environment*« (Zakon … 2009). There is no clear distinction between a forest fire hazard and a general fire hazard. This classification differs from the contemporary classification of natural hazards proposed by highly regarded institutions such as CRED or Munich RE (Table 1).

The Law on Emergencies of the Republic of Serbia defines a natural hazard as: »*Phenomena of hydro-meteorological, geological or biological origin, caused by natural forces like: earthquakes, flooding, flash floods, heavy rains, lightning, hail, drought, rock falls and landslides, snowdrift and avalanches, extreme air temperatures, ice formation on water courses, epidemics of contagious diseases, epidemics of cattle-related contagious diseases,*

Table 1: Wild fire hazard classification within harmonized EM-DAT and NatCatSERVICE databases (adapted after Below, Wirtz and Guha-Sapir 2009).

Hazard generic group	Hazard group	Hazard Main-Type	Hazard Sub-Type	Hazard Sub-sub Type
Natural hazard	*Climatological*	*Wild fire*	*Forest fire* *Land fires* (grass, scrub, bush etc.)	*None*

and occurrence of pests and other natural phenomena on a large scale that can threaten human health and lives, or cause other damages on a larger scale« (Zakon … 2009). The above mentioned classification of natural hazards doesn't deal with wild fire nor forest or land fires, again in contrast with the practices of CRED and Munich RE.

The National Strategy of Protection and Rescue in Emergencies of the Republic of Serbia (Nacionalna … 2011) proposes a more detailed hierarchical classification of natural hazards, provides general data, including frequencies, and proposes monitoring and mitigation measures. An integral part of this Strategy is the document »Study on Economic Benefits of RHMS (Republic hydrometeorological service of Serbia)« (Dimitrijević 2005) in which the authors observe that forest fires were not taken into account in the analysis of the vulnerability of weather-dependent economic sectors.

A clearer and a more uniform hazard classification in Serbia, aligned with international classifications (e.g. CRED and Munich RE), are prerequisites for improved standardisation, both legislative and applicative (Lukić et al. 2013).

3 Forest fire trend analysis – general observation

Two statistical tests, both widely used in environmental sciences (e.g. Hrnjak et al. 2014) are applied:
- Linear trending of fire hazards in Serbia in the period 2000/2001–2012;
- Fires trending based on Mann-Kendall test (Kendall 1938; Mann 1945; Gilbert 1987).

For the trend data processing, XLSTAT's statistical analysis software was employed (Internet 3). Furthermore, two hypotheses were tested:
- the null hypothesis: that there is no trend;
- the alternative hypothesis: that there is a trend for a given significance level. Probability was calculated to determine the level of confidence.

By calculating trends from the total number of fire hazards and forest fires, two equations were obtained:

$$y = 1286.2\,x + 12113,_{\,(1)}\ \ p = 0{,}005_{\,(2)} \tag{1}$$

$$y = 27.6\,x + 425.7,_{\,(1)}\ \ p = 0{,}638_{\,(2)} \tag{2}$$

where y is either the total number of fires (in equation $(1)_1$), or the number of forest fires only in equation $(2)_1$, x is time in years, p is probability and significance level $\alpha = 0.05$ is the same in both cases.

Figure 1 illustrates equation $(1)_1$ and shows a positive trend. As the value $(1)_2$ is lower than the significance level $\alpha = 0.05$ the null hypothesis does not seem valid. The risk to reject the null hypothesis as true is less than 0.54%. Conversely, there is a 99.46% confidence in a positive trend concerning total number of fires in Serbia.

This analysis is not entirely conclusive. Figure 1 shows the total number of fire hazards, irrespective of the cause, ranging from explosions to technical traffic interventions. It is difficult to determine if this positive linear trend was a result of improved reporting of fire occurrences, or of a genuine increase in their frequency. More extensive future research will be needed to clarify this.

Figure 2, produced from equation $(2)_{1,}$ shows a positive trend in number of forest fires. However, as the value $(2)_2$ is greater than the significance level ($\alpha = 0.05$), one cannot reject the null hypothesis here. Hypothesis testing will prove whether this statement is true or not. The risk to reject the null hypothesis as true is 36.15%. Although the number of forest fires increased noticeably, evaluation of the Mann-Kendall test estimates that there is no trend in the number of forest fires in Serbia with probability of 63.85%.

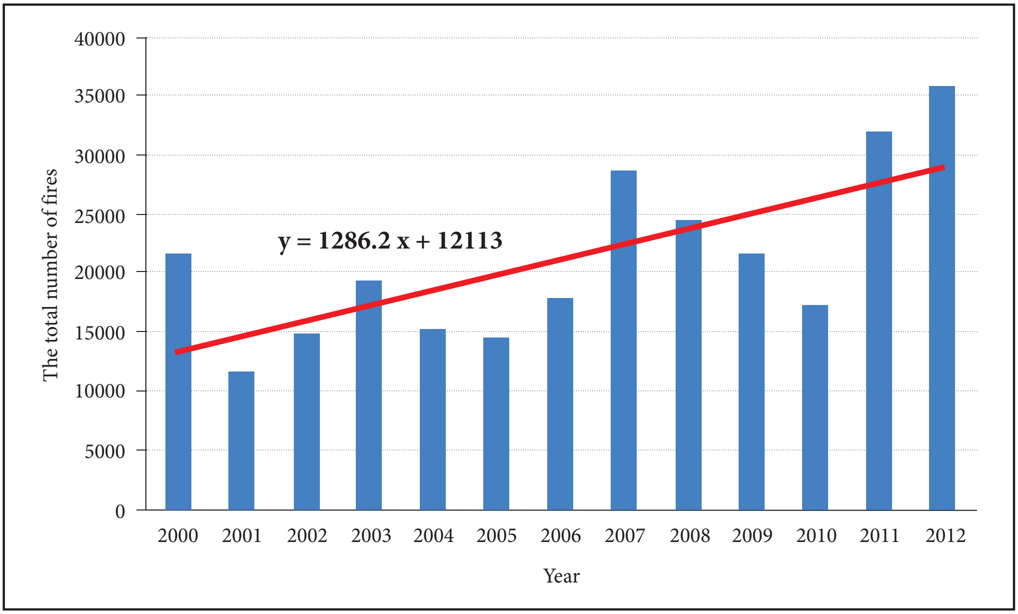

Figure 1: The total number of fires per year and linear trend curve from 2000 to 2012 in the Republic of Serbia.

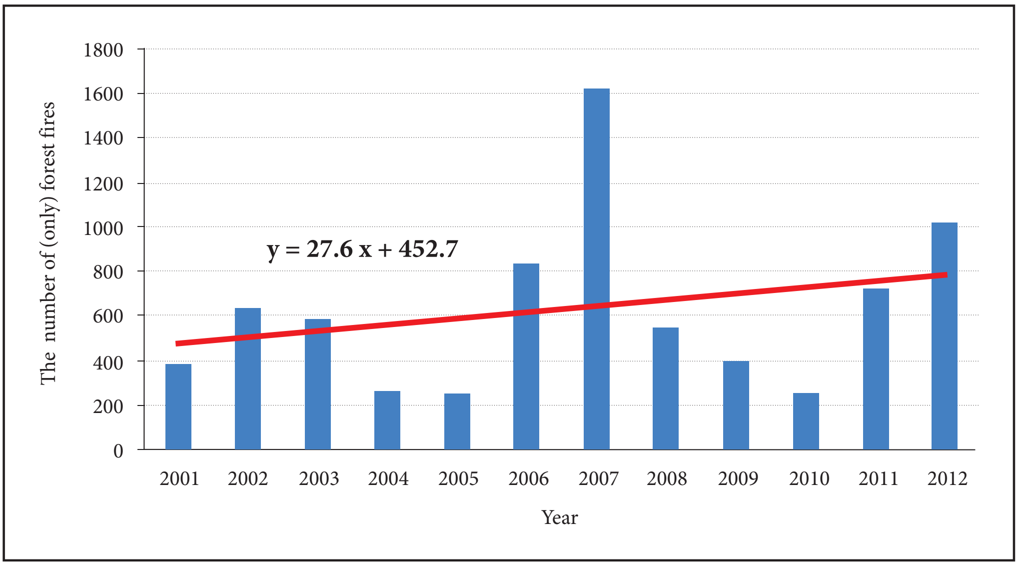

Figure 2: The number of (only) forest fires and linear trend curve from 2001 to 2012 in the Republic of Serbia.

According to Unkašević and Tošić (2011; 2014), the last few decades in Europe is characterised by the steepest temperature increase since the beginning of the twentieth century. Extreme events related to intensive heating significantly affects natural hazards, socio-economic and health activities in Europe, as shown by the exceptional summer heat wave in 2003 (Schär et al. 2004; Trigo et al. 2005). During the summer of 2007, heat waves registered in the Balkan region (Founda and Giannakopoulos 2009), including Republic of Serbia

(Unkašević and Tošić 2011), were primarily responsible for the largest fire-damaged area – the number of forest fires reached 1,600 (Figure 2). The year 2012 saw the longest heat waves during summer and the worst drought since the beginning of observations in Serbia, more than 1,000 forest fires occurred during that time (Figure 2). Data provided by the Ministry of interior, Sector for emergency management of the Republic of Serbia illustrates and corresponds to the findings of respectable authors mentioned above (Figures 1 and 2).

Authors recognise that factors other than geophysical (e.g. anthropogenic) must be taken into account when analysing the forest fires trends. The 2012 Tara Mountain case study shows that the frequency of forest fires, strongly influenced by climatic conditions, was above Serbian average.

4 Forest fires in the Republic of Serbia 2012 – Tara Mountain Case Study

The number of forest fires in Serbia increased to 1,028 in 2012, as registered by the Ministry of interior, Sector for emergency management of the Republic of Serbia. Their distribution is shown in Figure 3.

Quality data sets are available for the Tara mountain fires. Tara mountain is located in western Serbia with elevations between 1000 and 1500 meters. It forms a part of Serbian natural heritage and the forestry is highly sensitive to wild fires. The period from 23 August to 5 September 2012 was characterised by particularly high frequency of forest fire occurrences. Wildfires have burned 2,150 ha of mountain area, while the estimated damage costs reached up to 170,000 Euros.

4.1 Risk indices

A simple index for fire assessment is the Swedish Angstrom index (Willis et al. 2001). The index is based on the statistical relationships between the reported number of fire events and several antecedent-weather-related data. A weather-based index can only predict an area-averaged risk of fire, because the only input is obtained from the point measurements at a weather station (Onderka and Melicherčík 2009).

The Angstrom index is calculated from air temperature and relative humidity and provides an indication of the likely number of fires in a given day. The index, I, is calculated as follows (Skvarenina et al. 2003):

$$I = \frac{R}{20} + \left(\frac{27 - t}{10}\right) \tag{3}$$

where R is daily average relative humidity (%), and t is daily average air temperature (°C). As can be seen from the equation (3), I decreases with the relative humidity and increases with the air temperature. A reduced index indicates a higher risk of fire. The use of the index for risk categorisation is shown in table 2.

In 1949, Nesterov (Shetinsky 1994) proposed a fire-risk rating index. This index establishes a range of discrete fire risk levels. The Nesterov Index is calculated as:

$$NI = \sum_{i=1}^{w} \left(T_i - T_i^{dew}\right) T_i \tag{4}$$

where, NI denotes the Nesterov index, w is the number of days since the last rainfall exceeding 3 mm per day, T_i is the temperature (°C) on a given day, T_i^{dew} is the dew point temperature (°C). The intrinsic characteristic of the Nesterov index is that it is reset to »zero« when daily rainfall exceeds 3 mm per day (Shetinsky 1994). The original risk levels proposed by Nesterov are shown in Table 2.

Table 2: The values of Angstrom index (I) and Nesterov index (NI) translated into fire risk probability of fire (Skvarenina et al. 2003; Shetinsky 1994).

Angstrom index (I)	Probability of fire	Nesterov index (NI)	Probability of fire
$I > 4$	Fire occurrence unlikely	$NI < 300$	No risk
$4 < I < 3$	Fire occurrence unfavourable	$301 < NI < 1000$	Low risk
$3.0 < I < 2.5$	Fire conditions favourable	$1001 < NI < 4000$	Medium risk
$2.5 < I < 2.0$	Fire conditions more favourable	$4001 < NI < 10000$	High risk
$I < 2.0$	Fire occurrence very likely	$NI > 10000$	Extremely high risk

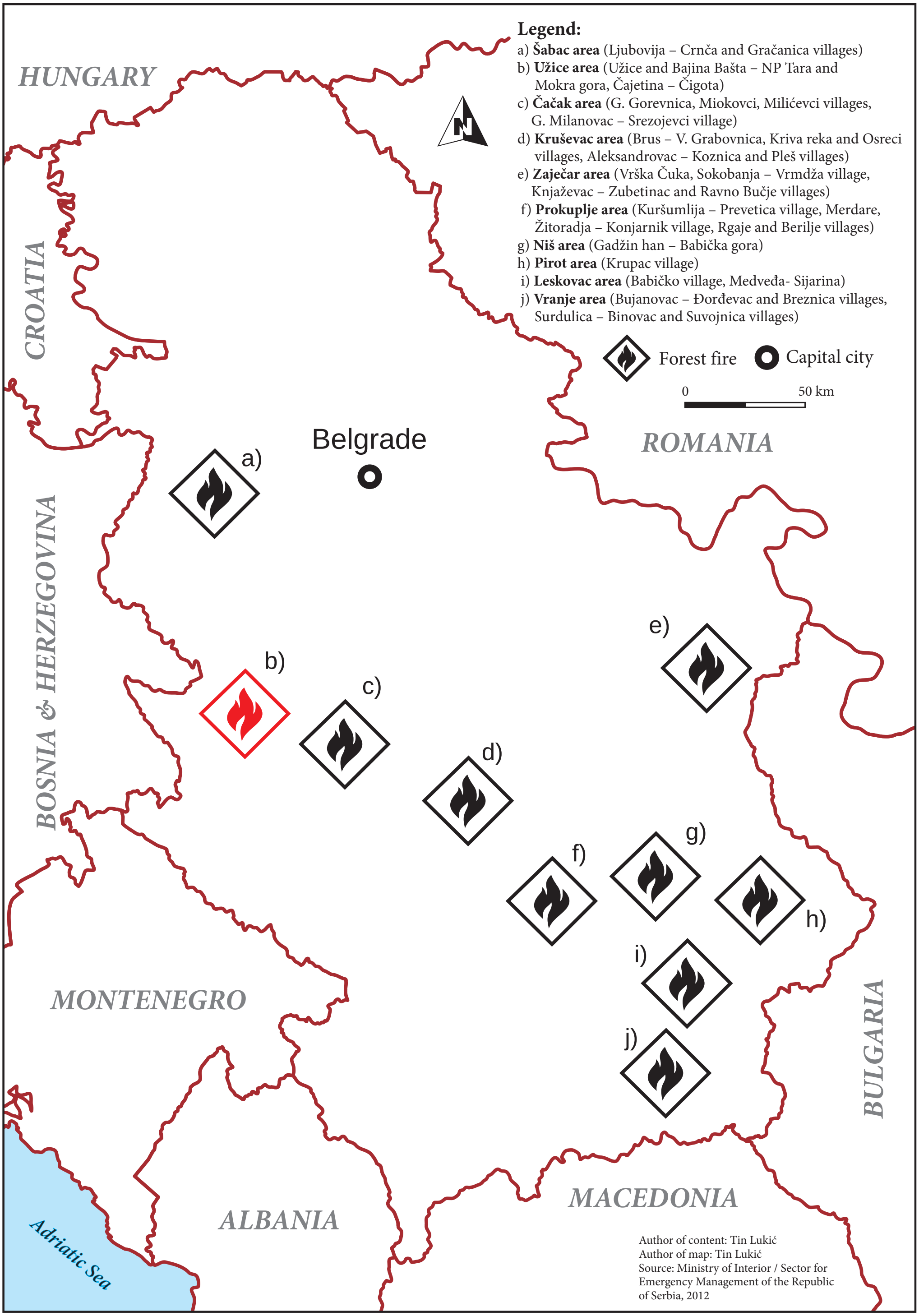

Figure 3: Distribution of main forest fires in the Republic of Serbia in 2012 (the case study area is under section »b« on the map – Užice area).

According to the Angstrom index, the risk of fire was very high (*values of the index lower than 2.0*) for the period from 23 to 25 August, and on 31 August. The values of index ranging between 2 and 2.5 were registered on 26 August, 30 August and 1 September, and between 2.5 and 3.0 on 29 August, 2 and 4 September. On other dates, values of *I* were above 3. The Nesterov index (*NI*) calculates only two risk levels for the period: »low risk« from 23 to 26 August and between 30 August and 1 September, and »no risk« in the periods from 27 to 29 August and 2 to 5 September.

Figure 4 shows the daily fluctuation of the Angstrom (*I*) and Nesterov (*NI*) indices during the observed period, as well as correlation between the two indices. The Pearson correlation coefficient is –0.97. This shows that there is a correlation between the two indices, which could be expected considering that the same meteorological parameters are used in their calculation. The values of both indices are normalised; they range between 0 and 1 (*the values of the Nesterov index are shown in a reversed order*).

The values of the Angstrom and Nesterov indices can be correlated with the maximum temperature and relative humidity. The weather factors that could have an influence on forest fire indices are depicted in Figure 5.

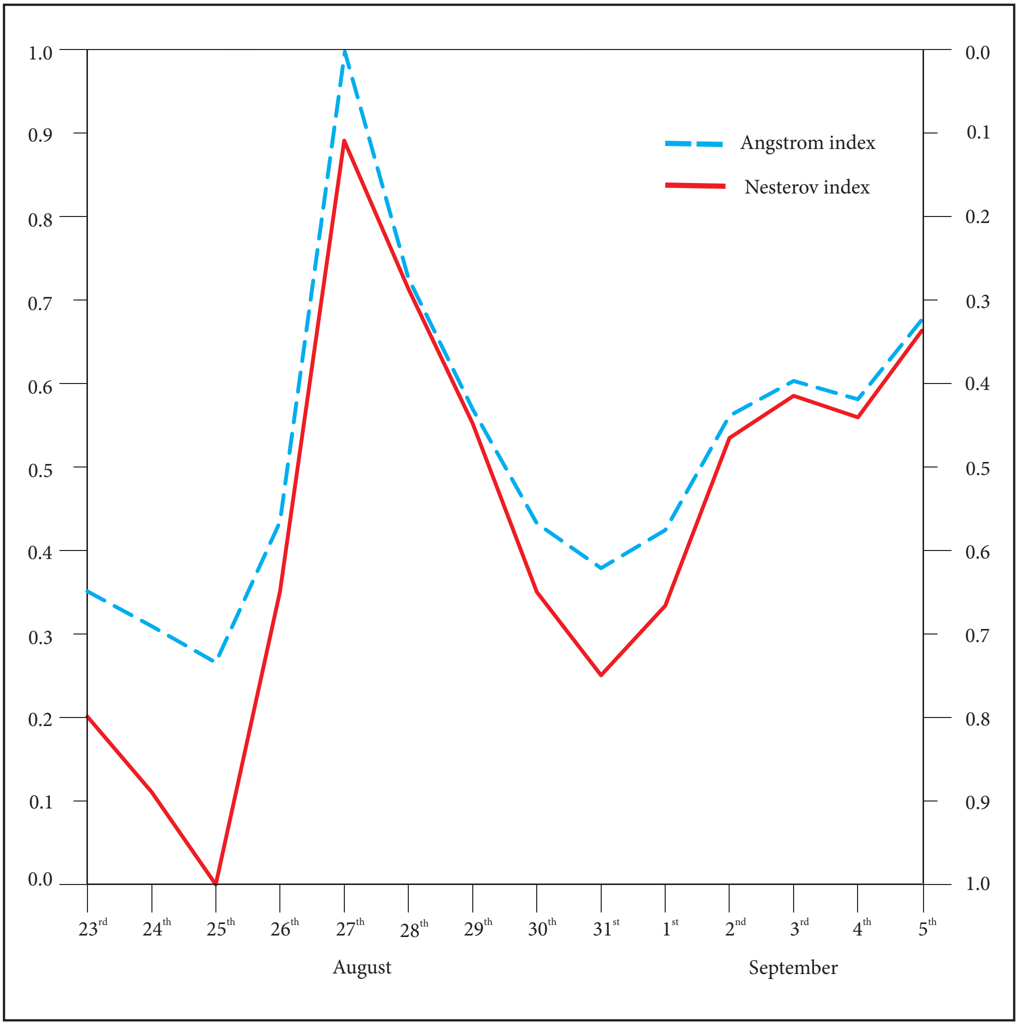

Figure 4: Correlation between Angstrom index (*I*) and Nesterov index (*NI*).

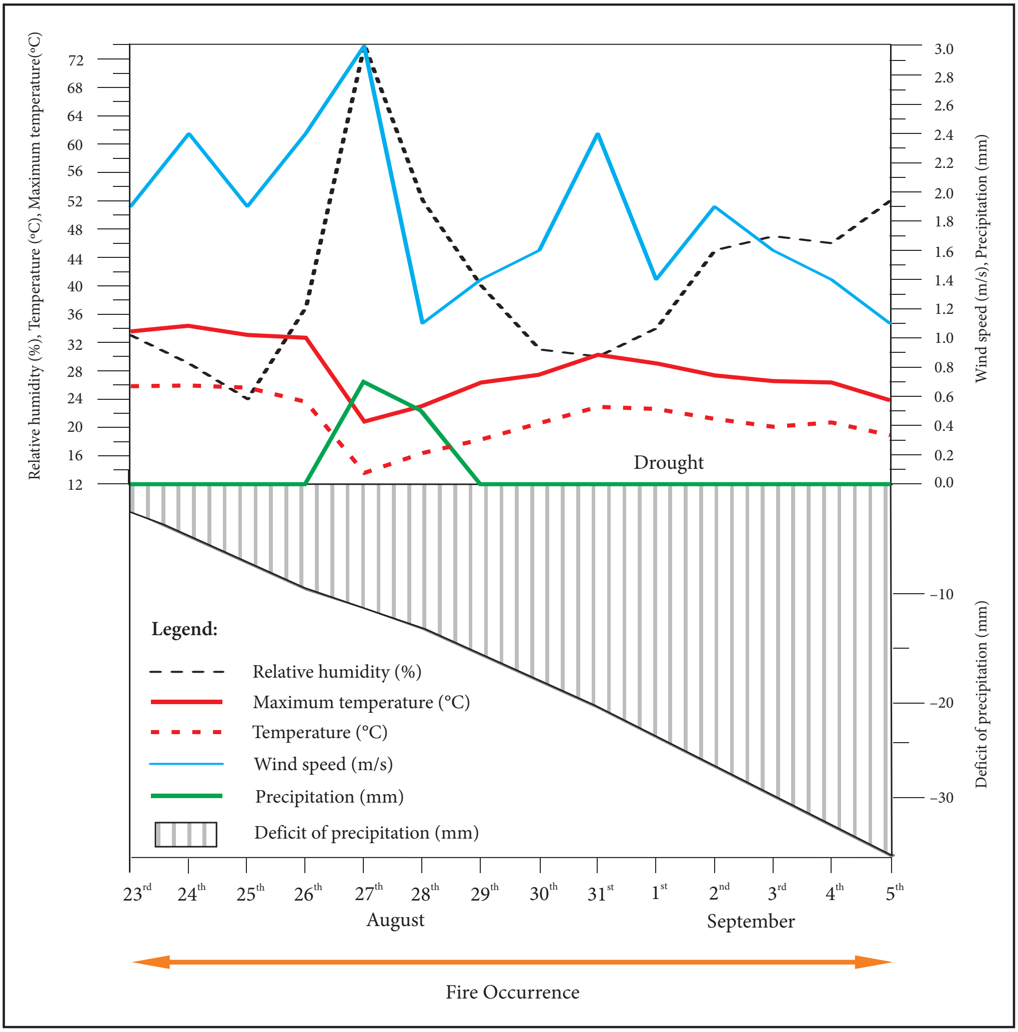

Figure 5: Graphical comparison of the deficit of precipitation, maximum temperature, daily temperature, wind speed and relative humidity in the Tara Region in 2012.

The Angstrom index presented the highest correlation of 0.98 with relative humidity. In addition, the correlation coefficient showed a highly negative correlation of –0.93 between maximum temperature and Angstrom fire index. This suggests that the values of Angstrom index (*I*) will decrease with increased temperature and reduced relative humidity, in which cases fire occurrence would increase.

The results for the Nesterov index are similar. A high negative correlation between the Nesterov index (*NI*) and relative humidity is recorded (–0.93), while coefficient of correlation with maximum temperature shows a highly positive correlation (0.94).

4.2 Precipitation

Precipitation is another factor that affects fire risk. The percent of normal precipitation is a simple measure of rainfall in a location. Radinović (1979) proposed a method for calculating the deficit and surplus of precipitation (DSP) as a continuous function of time.

The daily deficit and surplus of precipitation can be expressed by the equation:

$$\left(D_d\right)_i = \left(T_d\right) + \sum_{i=1}^{n} \left(P_d + \overline{P}_d\right)_i \quad (5)$$

where T_d is daily deficit or surplus transferred from the previous month (mm), P_d is observed daily amount of precipitation (mm), $\overline{P}_d$ is the expected quantity of daily precipitation (mm), i-1, 2 … and n is representing days in a month (Ćurić and Živanović 2013).

The mean daily precipitation amounts $(\overline{P}_d)_i$ ($i = 1, 2, \ldots, 365$) were calculated by interpolation from the monthly mean precipitation amounts in the period of thirty years, between 1977 and 2006. These values are considered as the normally expected daily precipitation amounts (Table 3).

Table 3: Daily deficit of precipitation in the period from 23 August to 5 September.

Date	$(P_d)_i$	$(\overline{P}_d)_i$	$(D_d)_i$
23 August	0	2,4	−2,4
24 August	0	2,4	−4,8
25 August	0	2,4	−7,2
26 August	0	2,4	−9,6
27 August	0,7	2,4	−11,3
28 August	0,5	2,4	−13,2
29 August	0	2,4	−15,6
30 August	0	2,4	−18
31 August	0	2,4	−20,4
1 September	0	2,7	−23,1
2 September	0	2,7	−25,8
3 September	0	2,7	−28,5
4 September	0	2,7	−31,2
5 September	0	2,7	−33,9

A deficit of precipitation occurred through the entire analysed period (Figure 5). According to the definition, drought is a period of five or more successive days without or ≤ 0.3 mm precipitation (Bordy et al. 2004). The remainder periods are non-drought periods. Droughts can occur in both »deficit« and »surplus« precipitation periods. The likelihood of forest fire is greater during periods of low precipitation, but it is usually affected by other factors such as the presence of an ignition source.

6 Conclusion

Forest fires are considered in several legislative documents of Republic of Serbia. However, the authors maintain that a hierarchical classification of fire hazards with their sub-types, as suggested by CRED and Munich RE, should be added to the legislative and other documents regulating the area of natural hazards. This would strengthen the legislative function and other frameworks used for risk management, and improve prevention and mitigation of forest fires.

Fire risk rating indices, based on empirical relationships between pre-event meteorological conditions and the number of observed fire outbreaks, can be a useful tool towards understanding forest fire hazards. The Angstrom index and Nesterov index were used to forecast the risk of fire occurrence in this study. These are perceived as tools that can assist forest managers to take preventive measures. The use of the indices, as a fire occurrence likelihood measure, was illustrated here in forest fire case study in the Tara region of Serbia. The results from this study can be used for creation of the platform for fire management operational framework that can be used as a tool for decision making prevention, detection and monitoring of forest fire hazards at both the local and national levels in the Republic of Serbia. Such a programme would be in line with the forest fire risk assessment and management practices that are currently being developed internationally.

ACKNOWLEDGEMENT: This research paper is financed by Project 176020 of the Serbian Ministry of Education, Science and Technological Development.

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Acta geographica Slovenica, 57-1, 2017, 65–75

INTERRELATED ASPECTS OF RESIDENTIAL SUBURBANIZATION AND COLLECTIVE QUALITY OF LIFE: A CASE STUDY IN CZECH SUBURBS

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Suburban house and resident in the hinterland of Czech city Olomouc.

Interrelated aspects of residential suburbanization and collective quality of life: A case study in Czech suburbs

DOI: http://dx.doi.org/10.3986/AGS.909
UDC: 911.375.1:316.728(437.3)
COBISS: 1.01

ABSTRACT: Most people moving to suburban municipalities seek to enhance their quality of life. However, residential suburbanization may contribute to spatial separation of the population and adversely affect the collective quality of life. This article focuses on socio-geographical aspects of quality of life in the context of suburbanization from a theoretical perspective and also based on a case study in the countryside around the Czech city of Olomouc. Due to the complex nature of this issue, a range of qualitatively oriented methods was applied in the municipalities most affected by residential suburbanization. The findings of the case study show that quality of life for people living in these suburbs is influenced by geographical conditions as well as relations within the community and residents' participation in public life in the municipality.

KEY WORDS: human geography, suburbanization, collective quality of life, community, suburbs of Olomouc, Czech Republic

The article was submitted for publication on September 17th, 2014.

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1 Introduction

Suburbanization is often labeled the main process transforming the character of the landscape and the shape of municipalities in the countryside around cities in central Europe (e.g., Ravbar 1997; Kok 1999; Sýkora and Ouředníček 2001; Gašperič 2004; EEA 2006; Kontuly and Tammaru 2006; Couch et al. 2007; Krisjane and Berzins 2012). However, it is also a controversial phenomenon. Most people move to the suburbs following a dream to improve their quality of life by changing their housing and environment. Nevertheless, residential suburbanization may produce the opposite effect. New suburban residents may lose their social contacts and may not adapt to their new environment, resulting in deterioration of their overall quality of life (Jackson 1985; Fishman 1989; Baldassare 1992; Jensen & Leven 1997; and, in the Czech context, Potočný 2006; Galčanová and Vacková 2008; Biolek and Andráško 2011).

In the Czech Republic there is also potential for the growth of spatial separation of people voluntarily moving to the suburbs (Brabec and Sýkora 2009), but the negative results of this process adversely affect the collective quality of life in these localities. Although suburbanization may contribute to social homogenization of parts of communities, at a higher level it instead lowers social cohesion and inclusion (Šafr, Bayer and Sedláčková 2008). The sense of belonging to a place of residence and social relationships in the municipality may thus be key circumstances that substantially influence quality of life (e.g., Harris and Larkham 1999; Cicognani et al. 2008). In addition to the impacts of a specific environment, it is especially important to pay attention to the extent and form of participation by newcomers and old residents (e.g., Baldassare 1992; Putnam 2001). This article also reflects these tendencies and offers a new view on socio-geographical links to quality of life in the suburbanization process, both from the theoretical perspective and based on applied research.

This article interprets selected findings of a case study on the collective quality of life in Czech suburbs on August 2012. The municipalities investigated – Hlušovice, Dolany, Velký Týnec, and Křelov–Břuchotín – are some of the ones most affected by residential suburbanization in the countryside around the city of Olomouc (Biolek and Andráško 2012). Bearing in mind the complex nature of this issue, we applied a multiphase qualitatively oriented research design and carried out participant observation, mental mapping, and especially semi-structured interviews with local stakeholders and inhabitants. The outputs of the case study thus emphasize a broad spectrum of socio-geographical aspects of collective quality of life in relation to suburbanization, such as describing the influence of local planning on collective life, or how local schools foster social integration.

2 Theoretical background

Rather than offering an exhaustive definition of collective quality of life or a comprehensive conceptualization of this phenomenon, this section outlines perspectives that open the path to the research. Because there is a great range of theoretical concepts, the terminology used to discuss quality of life is often ambiguous and vague, especially when one seeks to overcome the dichotomy between the quality of life of an individual and that of a specific socio-geographical group of inhabitants (e.g., van Kamp et al. 2003; Phillips 2006). In a simplified manner, quality of life can be understood as a qualitative evaluation and interpretation of the life of a person or a certain group of people, which is a product of a person's or social group's mutually influential external and internal factors (Andráško 2008). Thereby, the key precondition of socio-geographical research on quality of life is understanding the mutual interaction between people and their environment (Pacione 2003; Andráško 2009).

According to many experts (e.g., Felce and Perry 1995; Bowling 1995; Massam 1999; Pacione 2003), for research purposes quality of life can be divided into partial domains, dimensions, or components (e.g., health aspects and influence of family). Nevertheless, the structuring of external and internal factors into partial domains and their expression by means of indicators may distance researchers from understanding mutually influential relations that create the nature of individual or collective quality of life. Instead of this conceptualization, we instead focus on the actors and, following a qualitatively oriented research design, we describe their relations that contribute to quality of life.

A first glance shows collectives of people living in suburban municipalities; that is, local communities related to a specific place of residence and defined geographically as neighborhoods (Wellman and

Leighton 1979). However, can one speak about a local community anchored in a suburban municipality and perform research on quality of life in such a neighborhood? According to Wilkinson (1991), most people spend time where they live and become involved in most social interactions in such places. Inside such neighborhoods, social contacts take place in community interaction fields, or nodal integration points. However, Wellman and Leighton (1979) argue that a community defined as a network of social relations does not necessarily have to be bound to a particular place. The question is whether it is possible to speak about a united community in the instance of heterogeneous socio-geographical groups of suburban municipalities. In our opinion, there are instead various social groups or sub-communities of people connected by sociocultural interests (Fishman 1989; Baldassare 1992), as shown in this case study.

When studying community interaction, one must not forget a role of social institutions and organizations in municipalities, such as schools, preschools, sports clubs, cultural centers, or maternity centers. Lockwood (1999) argues these are the specific collective actors initiating social interactions and developing the social inclusion of new residents, especially in the suburbs. As demonstrated based on the examples, these institutions play a crucial role in local inhabitants' involvement in a municipality's sociocultural life.

These perspectives omit non-human factors (e.g., influence of the physical environment, infrastructure). The reduction of the research topic to human actors and their relations considerably limits the understanding of the collective quality of life. Inspired by actor-network theory (Latour 2005), we define the »collective« as all the actors with relevant involvement in the socio-geographical network of suburban municipalities. Therefore, elements of infrastructure and municipal facilities, houses, cars, and, of course, the mutual relations of these objects and people should also be included. For instance, interdependence between people and cars can be one of the most important relations transforming the environment and social life in the suburbs (e.g., Newman & Kenworthy 1999).

Thereby, our research design is based on a socio-geographical approach to collective quality of life. Under these circumstances, it is necessary to interpret how people's lives are influenced by newly reconstructed infrastructure or regular cultural events in the municipality and, on the other hand, how the inhabitants themselves contribute to their organization.

3 Research methodology

The research was carried out in the municipalities of Hlušovice, Velký Týnec, Dolany, and Křelov–Břuchotín as a continuation of a survey that widely mapped the countryside around Olomouc in terms of the impacts of suburbanization on various life domains of local communities (Biolek and Andráško 2012). The main objectives of the research design were to capture the relations between inhabitants and environment in terms of suburbanization. In order to understand and interpret the facts that form quality of life and its perception, we used a qualitatively oriented research method.

The type of case study selected also reflected the need to describe specific aspects of suburbanization in various localities. The research was carried out in a flexible manner until the point of saturation; that is, until a sufficient amount of information was obtained that was necessary for a thorough description and interpretation of the case (Yin 1984). The various living environments in municipalities affected by suburbanization (in terms of the number of inhabitants, population structure, or building types) not only offered perspectives for comparison, but also increased the demands for synthesis and interpretation of qualitative data about the life of the local communities.

After the pre-research phase of participant observation and testing the interview methodology and mental maps in August 2012, we chose stakeholders in selected municipalities (mayors, representatives, organizers of cultural events) with a certain influence on political, social, and cultural affairs. Semi-structured interviews were recorded with these people regarding the perception of socio-spatial aspects of quality of life, social affairs in the municipality, interpersonal relationships, and relations to the local environment, all in the context of the suburbanization process. At the end of the semi-structured interviews, the informants could suggest other people involved in social affairs in the municipality for subsequent interviews (i.e., the snowballing method).

The next phase focused on citizens that did not participate in the previous phase. The informants were both old residents and newcomers (defined as those that had lived less than ten years in the municipality). The selection and contents of the questions were influenced by the duration of residence, relation to the

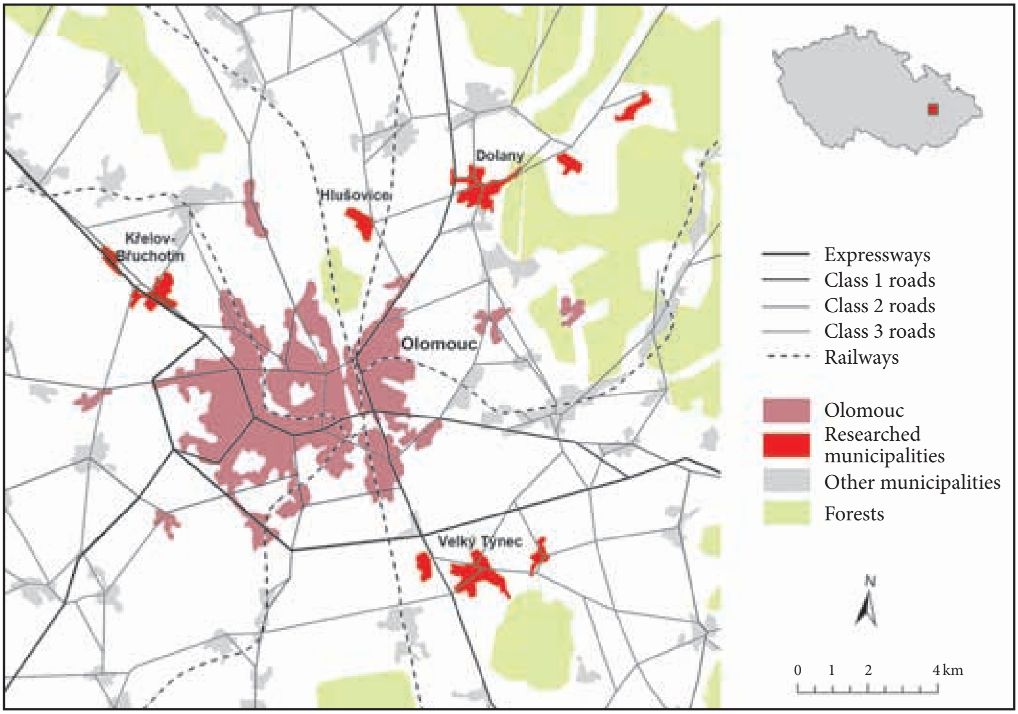

Figure 1: Location of the municipalities studied.

municipality and other inhabitants, and other factors. We first asked about satisfaction with housing and various life domains in the municipality and about informants' own definition of quality of life. Other questions were oriented toward community relationships or participation in social life in the municipality. After the semi-structured interviews (totaling eighty-two, or approximately twenty interviews per municipality), the informants were asked to sketch out their residence in the context of the neighborhood and its features. The sketches were deciphered and interpreted by using the various conceptual approaches of Lynch (1960), Appleyard (1973), or Tuan (1975). The last phase of the research was acquiring missing information by means of alternative methods (e.g., content analysis of local documents about social affairs), which complemented data from interviews and mental maps. All of the interviews were recorded and anonymized, and all of the data have been filed in the authors' archive.

The fieldwork was followed by an analytical phase in which it was necessary to decipher, operationalize, and sort the information. In the case study, we first applied an open coding method to analyze the transcribed interviews. Some information from the interviews was labeled using analytical codes with a precise description of data using research terms (e.g., history of housing construction in a given municipality, role of the pump effect or physical barriers, importance of sociocultural events, and contacts in preschools or schools) or by in vivo codes (e.g., descriptions such as »only place to sleep« or »a millionaire district«; Cloke et al. 2004). We thus generated a complex map of open codes in which we looked for semantic interrelations.

The codes on the map were systematically joined and categorized on the basis of the key attributes of collective quality of life in the context of the suburbanization process. We thus defined categories that represent and connect emergent thematic aspects of suburban collective life (housing construction and local planning, transportation and spending time in the municipality, physical barriers and social inclusion, social relations and conflicts between sub-communities) and then analyzed them. Similarly, in vivo codes were systematically incorporated into the categories (some of them were also used in the following section). The codes within the groups were semantically linked, and these connections were described with axial labels expressing various kinds of relationships (similarity, difference, contradiction, example or cause of another code). For instance, codes related to social inclusion and community interactions (such as social and cultural events, preschools, schools, or other nodal integration points) were linked together and, consequently, relations between them were interpreted according to factual transcriptions of the interviews (e.g., presence of physical barriers in closer municipalities in contrast to more distant ones, or the social inclusion function of social and cultural events for families with children but not for teenagers). In this phase, emphasis was mostly placed on differences between information from old residents and new residents (or sub-communities).

Finally, we sorted all of the semantic groups using thematic operationalization and synthesized them into relevant interpretable outputs based on our theoretical background. Regarding the collective quality of life in the suburbs, relevant information was selected according to the aims stated earlier in this article. Thus, core thematic groups of codes needed to interpret the collective quality of life were identified and systematically linked to approaches that were not only varied and specific, but especially to significant socio-geographical aspects of the suburban municipalities (following the line of interpretation from local planning and environmental aspects to barriers of social inclusion and nodal integration points between new residents and old residents).

4 Case study findings

The municipalities studied are located in the countryside around Olomouc, which is the largest city in central Moravia with a population of about 100,000. These municipalities were selected based on a previous analysis according to the indicators of migration and new home construction (Biolek and Andráško 2012). However, this case study more closely examines social relations in the municipality, the sense of belonging to the municipality, the extent to which residents participate, and other characteristics of the collective quality of life.

It is important to describe the development and forms of residential suburbanization in the municipalities investigated. The first municipality, Dolany, was affected by the earliest wave of suburbanization in the second half of the 1990s, whereas Hlušovice and Křelov–Břuchotín were affected shortly after 2000. At that time there were no land-use plans or they were obsolete, and therefore the municipalities could only regulate construction with great difficulty and construction work was quite chaotic. In most cases, the sale of building plots and construction were initiated by the plots owners and builders, and the construction work was not coordinated. The construction of infrastructure networks, for which builders themselves are responsible, was delayed or insufficient in many cases, especially in development projects. Among the municipalities selected, Velký Týnec is an exception. Housing construction started there in 2008, and the locations were established at the initiative of the municipality. Regulation by the municipality has also been more apparent than in other settlements. However, the construction of some projects is continuing in all the municipalities even though the local authorities are trying to limit further development or at least direct it to more favorable locations (e.g., into built-up areas).

An obvious negative environmental aspect of construction is the use of agricultural land (Kahn 2000). Especially in the vicinity of Olomouc, the area of fertile land is decreasing (Burian, Miřijovský and Macková 2011; Biolek and Andráško 2012). All of the municipalities are also in a non-flood area, which is a significant geographical factor influencing construction and in-migration. In all of the municipalities, there are newly built neighborhoods on the outskirts of the settlements. Another problem is deteriorating housing and abandonment of old houses in built-up areas of the municipality in contrast to the development of the outskirts, disturbing the rural character of the municipality. For financial reasons or simplicity, it is easier to build a house on a greenfield site instead of renovating an existing house (Harris and Larkham 1999).

Individual vehicular traffic is the prevailing type of transport between Olomouc and suburban municipalities. Many people have two or more cars, and so regular commuting certainly influences local people's participation in social affairs. Municipal residents with better accessibility to Olomouc (from Křelov–Břuchotín) have greater motivation to go to Olomouc to take advantage of a wider variety of leisure activities. In this case, transport causes a »pump effect« and people therefore lose the motivation to participate in collective life.

Not only a high socioeconomic class in Olomouc is moving to suburban municipalities, but also other social groups from neighboring towns and villages, and therefore the socio-geographical structure of new-

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Figure 2: A detached house behind a high fence with unfinished infrastructure in Dolany.

comers is varied. Nevertheless, new buildings are characterized by the old residents as »a millionaire district« even though there are very few real millionaires and most newcomers buy their homes using a mortgage. The diversity of the local population also influences the level of social integration and inclusion (Raphael et al. 2001). The integration of newcomers into the local community increases over time and the old residents start to respect and accept them more. One respondent from Křelov–Břuchotín expressed the relationship between old residents and newcomers like this: »it takes ten years for you to stop being an unwanted newcomer and another five years to be considered a local.« However, some newcomers have been living in the municipalities for more than ten years without integration and they only use their place of residence as a »place to sleep.«

The case study shows that it may be difficult to overcome barriers between old residents and newcomers and to make contacts. Many new residents remain shut inside their houses and seldom engage in social interaction with the environment. The type and character of buildings also plays an important role; that is, people dwelling in houses behind high fences socialize less and have fewer contacts with neighbors than residents living in terraced houses. Although social differences partially fade away as a result of the relatively varied socio-geographical structure of the population in suburban municipalities, the character of buildings – and thus a different physical environment – emphasizes borderlines between residents.

As previous studies (Potočný 2006; Biolek and Andráško 2012) showed, rather than increasing social communication between these two groups and decreasing social cohesion in the municipality, an overall transformation of social relations prevails, forming new sub-communities (within the group of newcomers or between both groups). Most informants allege they have either neutral or slightly positive relations with the other group. Within the community of new residents, some new intimate relationships and firm social connections may also appear (depending on the character of built-up area). Especially in Hlušovice, it was obvious that newcomers are a more involved part of the population. They organize cultural and sports events and participate more in the social life of the municipality.

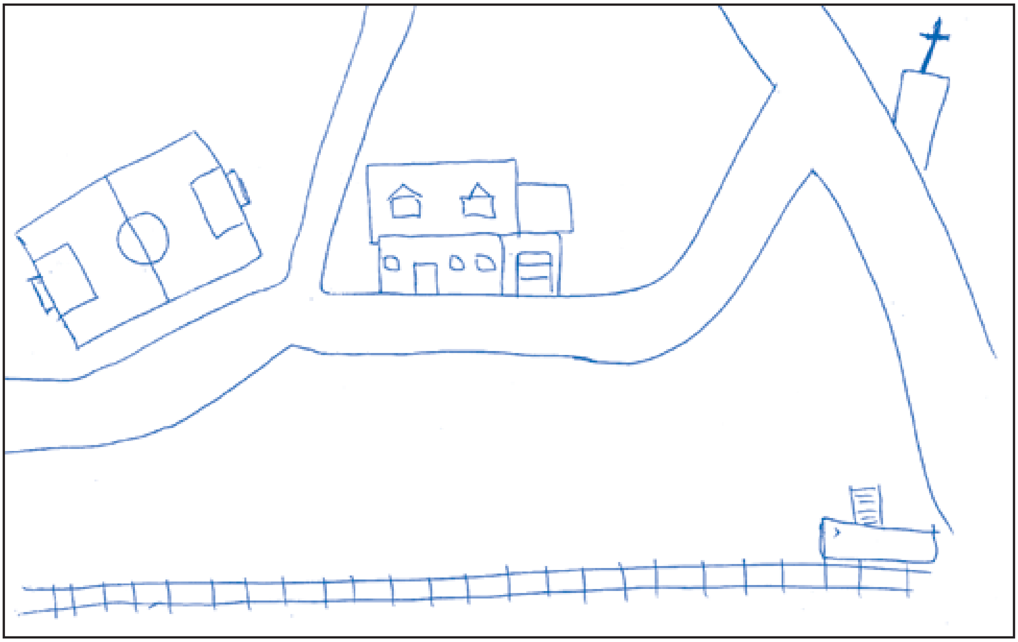

Figure 3: An example of the mental map of Hlušovice made by a newcomer.

Cultural, sports, and other social events are an important social bridge between newcomers and old residents. Social events in the selected suburbs can be viewed in terms of the main nodal integration points in which social inclusion of the municipality's inhabitants has developed (Wilkinson 1991). People in the selected municipalities are well aware of this, and by supporting cultural associations they attempt to provide a wide range of social events (dances, banquets, and other festivities). Social events are mostly adapted for parents with children as well as for young mothers. Those organized by children's clubs or women's clubs are the main events where people can make new contacts with other inhabitants and can overcome social barriers. On the other hand, for other social groups, especially for teenagers, the municipalities do not offer enough entertainment.

Intensification of social contacts occurs through of social events and through institutions for children (preschools and schools). Nevertheless, the growing number of children in the municipalities studied is creating a problem because of the insufficient capacity of preschools. Preschool management is forced to select children according to certain criteria, which may raise doubts or cause possible disputes among parts of the community. On the other hand, primary schools, which are supposed to foster social integration, are often not attended by newcomers' children. There are several reasons for this, from the practice of taking children to primary schools in Olomouc when commuting to the negative reputation of local schools. This limits the opportunity to make new contacts and for children and their parents to integrate.

It is easier for new residents to integrate and make new contacts in smaller municipalities because in larger settlements there are greater socio-spatial differences between old and new residents, or a more »depersonalized environment.« Therefore, the collective quality of life in these municipalities depends not only on the character and quality of social relations, but also on the size and structure of the community (Raphael et al. 2001) or on the type of built-up area with indirect influence (Rowland and Mitchell 2012).

5 Conclusion and discussion

It is difficult to incorporate different views on quality of life and create a cohesive picture to describe the collective quality of life of the residents of a certain locality in a complex way. However, this research reflected on these perspectives and interpreted the quality of life of residents in selected suburban municipalities with an emphasis on socio-spatial relations.

Although the municipalities studied are facing problems connected to social inactivity and socio-spatial separation, the newcomers have been gradually integrating. The main integration element is children and social events connected with them. During activities at various children's clubs and preschools, mothers that are newcomers and old residents make contacts and create social bonds. On the other hand, one of the obstacles to social inclusion in these municipalities is a low percentage of newcomers' children in local primary schools in contrast to the great demand for placement of children in preschools.

Regarding environmental aspects, most informants perceive their environment to be important; they consider suburban municipalities suitable for rearing children and the opportunity to spend time outdoors as a relevant factor for their quality of life. The character of built-up areas influences social contacts and relations in the community and consequently quality of life (Biolek and Andráško 2012). Although the inhabitants of the selected municipalities do not explicitly connect their quality of life with the sense of belonging to the place they live, they consider the development of necessary infrastructure, for example, to be the key factors for enhancing quality of life.

Although suburban residents' satisfaction with their current life depends on satisfying material needs, quality of life still depends on the quality of their socio-geographical environment (Pacione 2003). In other words, the collective quality of life of people that actively participate in their community may also positively affect their individual lives. On the other hand, if people distance themselves from social life, the impacts of collective factors are limited. Their quality of life is instead influenced by other factors (e.g., material and economic) and these people may not reach such a level of satisfaction with the environment as inhabitants in the first case (Fishman 1989; Putnam 2001). Thus, the interrelation of collective and individual quality of life in suburban municipalities can partially be explained by the principle of complementarity (Andráško 2010).

This study has also shown that geography has an effect on relations in a socio-geographical environment and has an impact on quality of life in suburban municipalities. This study should initiate a discussion about research on collective quality of life (and not only in suburbs in central Europe) as well as the application of qualitatively oriented methodology.

ACKNOWLEDGEMENTS: This study was funded by the following project of the Czech Science Foundation: »Urban and Suburban Quality of Life: A Geographical Perspective« (P404/11/1811). The authors are grateful for this support.

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Acta geographica Slovenica, 57-1, 2017, 77–96

CHANGING DENOTATIONS OF SELECTED SLOVENIAN CHORONYMS

SPREMINJANJE DENOTATA IZBRANIH SLOVENSKIH POKRAJINSKIH IMEN

Matjaž Geršič

JERENJA FRIDL

The boundary stone between Styria and Carniola along the main road from Ljubljana to Celje.
Mejni kamen med Štajersko in Kranjsko na magistralni cesti med Ljubljano in Celjem.

Changing denotations of selected Slovenian choronyms

DOI: http://dx.doi.org/10.3986/AGS.4600
UDC: 91:81'373.21(497.4)
COBISS: 1.01

ABSTRACT: This article discusses changes in the territory identified by individual choronyms, or regional toponyms. The most frequent choronyms listed by respondents include the names of Austria-Hungarian lands and their parts, which in the past referred to precisely delineated administrative units. Today their borders are largely impossible to define, but they can be determined using cognitive maps and geographic information systems. The findings presented in this article show that the denotation of these names has changed over time and that in the case of informal names it is not clearly defined.

KEYWORDS: geography, region, choronym, onomastics, Slovenia

The article was submitted for publication on July 13th, 2016

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1 Introduction

One of the features of a standardized written language is that it changes over time because it is a living structure subject to change (Smole 2004). Changes within a language should not be understood only in the sense of changes in grammatical rules, in how certain words are written, and in linguistic style, because the meaning of an individual word may also change. In terms of such changes, geographical names are no exception.

Such names only constitute a special linguistic category in terms of how they are written and the fact that they do not have a general meaning and only serve to identify unrepeatable realities (Snoj 2009). In addition, they are special because they are considered the oldest testimony of the Slovenian language (Pogorelec 2011). One of the main features of proper nouns is reflected in the object of naming, which proves to be denotative: the meaning must be known to both the creator and the addressee. Without this, the name does not mean anything (Šimunović 2009). The denotation of geographical names also includes the extent or delimitation of the named object.

Geographical names can be divided into several types: microtoponyms, oronyms (mountain names), hydronyms (water names), toponyms, the names of countries, and so on. A special category within this typology also includes choronyms, or names of regions. In terms of their definition, these names are somewhat more complex because the definition of the notion of a region is not entirely uniform, neither in geography nor in related disciplines. In addition, individuals also perceive this concept in a somewhat idiosyncratic manner.

This article conceives of a region as an area with an idiosyncratic mix of natural and social elements that make it different from neighboring regions and that has a proper name or is perceived as a region and is identified with by its residents. With regard to changes in geographical names over time, one also needs to highlight the changes in the spatial extent of the named elements or their denotations.

In their onomastic studies, geographers largely focus on foreign geographical names (Kladnik 2007, 2009; Crljenko 2014) and on geographical names as levers of political power (Kladnik and Pipan 2008; Urbanc and Gabrovec 2005).

The main research issue discussed in this article is how the denotation of selected Slovenian choronmys has changed over time.

2 Methods

Maps are among the most commonly used means for presenting geographical names (Peršolja 2003), and they can be divided by content and scale (Vrišer 2002). Regardless of the map scale and type, and in addition to mathematical, natural-geography, and social-geography cartographic elements, »other« elements also form an important part of modern maps, the most important of which are various geographical names (Vrišer 2002). They are vital for understanding a specific region, and they also place a considerable burden on the map from the technical and visual viewpoints. They take up a great deal of space, often to the detriment of other cartographic designations that must be omitted. Cartographers have dealt with this challenge in different ways in the past (Gašperič 2007). Geographical names must be written out in a legible, comprehensive, and aesthetic manner, they must be properly distributed, and so on. A map that has too many names is difficult to read and other topographic designations on it may be neglected (Vrišer 2002). Maps are among the most frequently used means for presenting geographical names, but due to generalization and technical restrictions they do not include all of the geographical names in a specific region (Peršolja 2003).

A detailed study hence requires a broader selection of geographical name sources. Even the oldest explorers of geographical names also collected data in the field. In the past, fieldwork actually constituted the basic data source. It continues to be vital especially in dialectology studies (Klinar et al. 2012; Klinar and Geršič 2015) and some other onomastics studies in Slovenia (e.g., Furlan and Kladnik 2008) and abroad (e.g., Senft 2008). Field research on geographical names is also promoted by the linguistic community (Šivic-Dular 2014; Möller 2015), and thus this data-collection method was also selected for studying the choronyms in this article. In order to reach as many residents in an individual region as possible, the names were collected with a survey. Questionnaires were sent out to five thousand respondents. The sample selected from the Central Population Register (CPR) was prepared by the Slovenian Statistical Office. The respondents, who were between seventeen and seventy-five years old, were selected randomly. To facilitate data processing, Slovenia was divided into east and west, and 2,500 questionnaires were sent to each half. Eastern Slovenia included the Carinthia, Savinja, Central Sava, Lower Sava, Drava, Mura, and Southeast Slovenia statistical regions, and western Slovenia covered the Upper Carniola, Gorizia, Coastal–Karst, Inner Carniola–Karst, and Central Slovenia statistical regions.

In addition to generally known types of survey questions, the questionnaires in this survey also included instructions for creating cognitive maps.

2.1 Cognitive maps

»A cognitive map is a technique used for obtaining a picture of spatial relations and environmental characteristics and people's views on them« (Polič 2002, 39), or a cognitive concept of the information that individuals have about a specific environment (Golledge and Stimson 1997). These types of maps began to be used in the 1960s for analyzing structural and identity elements in the environment (Lynch 1960). They can also serve as a means for obtaining data important for spatial planning (Polič 2002). One distinguishes between individual drawing of cognitive maps and drawing done in groups at workshops (Golobič 2006). In an individual's imagination, the map is created slowly, depending on the environment and the individual's experience and educational background (Kaplan, Kaplan and Ryan 1998). There is no perfect cognitive map. Each contains information relevant for whoever draws such a map (Polič 2002). Therefore, the information on it is usually considerably simplified (Polič 2002) because it is the result of the individual's desires and imagination (Kos 2002). A cognitive map is a product of one's thoughts and, as such, it is invisible to others. One way to communicate the content of a cognitive map is drawing (Polič 2002). Golobič (2006, 161) refers to this type of information acquisition as graphic surveying.

Polič (2002, 38) lists the following five cognitive map types: 1) Lynch-type cognitive maps, 2) social-spatial forms, 3) mental maps, 4) personality constructs and distance estimation, and 5) multidimensional scaling.

With the first map type, respondents are first offered individual existing symbols or an outline of the area. They can draw paths, borders, and other landscape elements in it. The results obtained can be compared in terms of various respondent characteristics (Polič 2002; Staut, Kovačič and Ogrin 2007). Drawing these types of maps presupposes that the respondents are able to adjust the ratios between the points presented and the points on the map, can minimize a large space, can create geometric projections, and are familiar with cartographic symbols (Levy-Leboyer 1982, cited in Polič 2002). In some way, the first three assumptions could also be described as the ability to georeference the conditions in the environment onto the cognitive map.

Social-spatial forms are more structured forms of cognitive maps. Respondents are asked to delimit an area on the map that they consider their own, that they like, and so on (Polič 2002).

Mental maps are indirect cognitive maps, in which respondents rank a specific element according to a selected characteristic (Polič 2002).

Personality constructs are the result of the analysis of comprehensive networks that respondents create by arranging selected phenomena and establishing differences between them.

The last type of cognitive map listed makes it possible to establish subjective distances between places (Polič 2002).

Cognitive maps play an important role in geography. Studying cognitive maps was given a special place in the 1960s with the establishment of behavioral geography; cognitive maps were one of its main methods (Klemenčič 2002).

Respondents were given an A3 1:650,000 map of Slovenia as the basis for their graphic expression. The map contained the national border, major towns (Ajdovščina, Bovec, Celje, Črnomelj, Idrija, Ilirska Bistrica, Jesenice, Kamnik, Koper, Kranj, Krško, Litija, Ljubljana, Maribor, Murska Sobota, Nova Gorica, Novo Mesto, Postojna, Ptuj, Ravne na Koroškem, Ribnica, Rogaška Slatina, and Velenje), the basic river network, and Mount Triglav as the highest Slovenian mountain.

Respondents were asked to draw or delimit the Slovenian regions and name them. They were given the following instructions: »Draw the Slovenian regions that you know on the map« and »Name each region drawn.«

The cognitive maps created, which contained both the regions' borders and names, were first scanned and then digitized. Digitization was carried out manually: the demarcated areas were copied into a geographic information system. The data obtained and the thematic maps were analyzed using ArcMap 10.3.1. The following operations were used: 1) Polygon to Raster, 2) Zonal Statistics – Sum, 3) Zonal Statistics – Majority, 4) Zonal Statistics – Variety, 5) and Raster Calculator – Divide/Sum/Minus.

3 Results

The questionnaires were completed by 12.7% of those they were sent to. The number of completed questionnaires obtained from western Slovenia was 309 and the number from eastern Slovenia was 326. However, not all of the questionnaires returned contained a cognitive map made in line with the instructions. Individual cognitive maps were missing some elements. Therefore, all of the cognitive maps received were divided into four groups: those containing the borders and names of regions, those containing only one of these two categories, questionnaires without a cognitive map, and cognitive maps containing elements that were not requested in the instructions (these were classified under »Other«).

The respondents from western Slovenia delimited a total of 2,027 areas and those from eastern Slovenia delimited 2,147. An average respondent divided Slovenia into nine to ten regions. In the calculations, all of the areas were taken into account, including those not named by the respondents. There were 283 (7.5%) unnamed areas on all of the maps, and 3,769 areas had names ascribed to them. A total of 170 versions

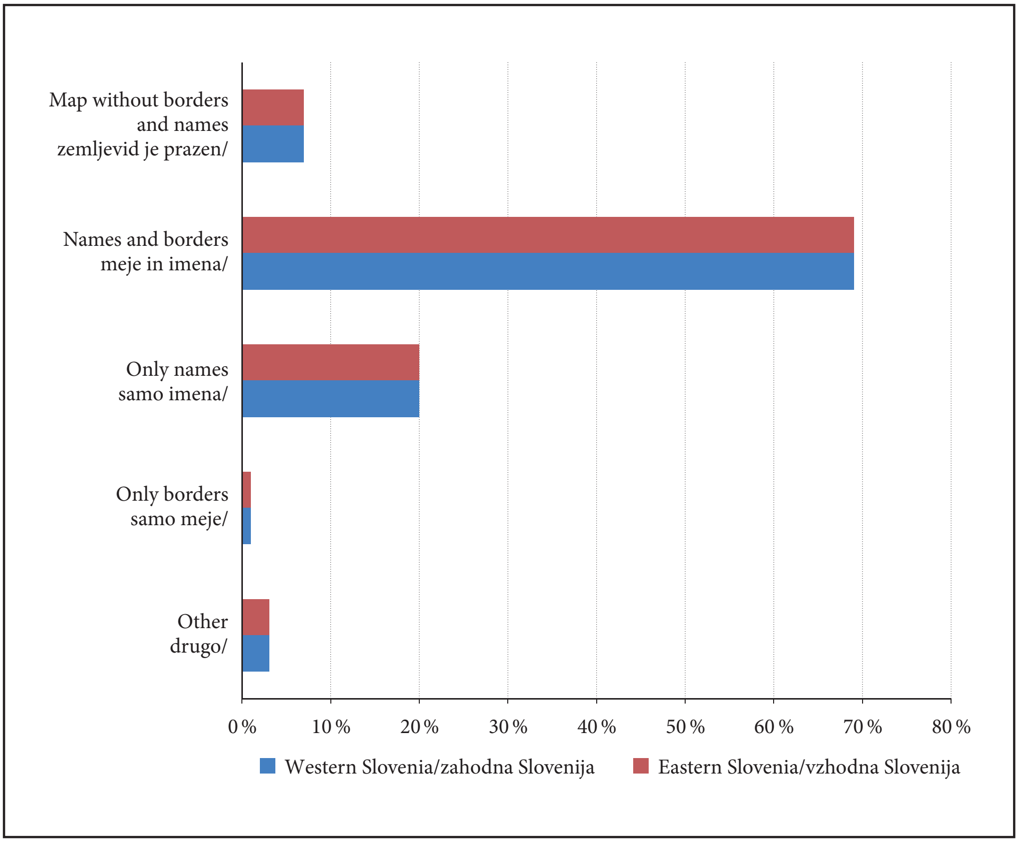

Figure 1: Share of individual map categories.

of regional names were identified. To simplify the analysis, some names were combined into the same name category (e.g., *Prekmurje* and *Prekmurska* 'Prekmurje', *Zasavje* and *Zasavska* 'Central Sava region', and *Savinjska dolina* and *dolina Savinje* 'Savinja Valley'). The most frequent names provided for regions included *Gorenjska* 'Upper Carniola', *Dolenjska* 'Lower Carniola', *Koroška* 'Carinthia', *Štajerska* 'Styria', *Prekmurje/Prekmurska* 'Prekmurje', *Primorska* 'Littoral', and *Notranjska* 'Inner Carniola' (Table 1).

Table 1: The most frequently drawn and named regions on the cognitive map.

Choronym	Western Slovenia	Eastern Slovenia	Total
Gorenjska 'Upper Carniola'	200	205	405
Dolenjska 'Lower Carniola'	198	189	387
Koroška 'Carinthia'	176	199	375
Štajerska 'Styria'	188	178	366
Prekmurje/Prekmurska 'Prekmurje'	182	172	354
Primorska 'Littoral'	185	166	351
Notranjska 'Inner Carniola'	171	172	343
Total	1,300	1,281	2,581

The greatest difference in the names of regions among the respondents from eastern and western Slovenia was for the names for the Sava Valley and Carinthia. Choronyms for both of these were used by several respondents from eastern Slovenia. Compared to those from western Slovenia, among the respondents from eastern Slovenia the names for Prlekija and the Savinja Valley stand out, whereas the Littoral and White Carniola stand out among the respondents from western Slovenia. More precise ratios for the names where the difference between both parts of Slovenia is ten or more are presented in Table 2.

Table 2: Differences in the frequency of named regions by respondents' place of residence

Choronyms	Place of residence		Difference
	Western Slovenia	Eastern Slovenia	
Primorska 'Littoral'	185	166	19
Bela krajina 'White Carniola'	83	67	16
Štajerska 'Styria'	188	178	10
Prekmurje/Prekmurska 'Prekmurje'	182	172	10
Ljubljanska pokrajina 'Ljubljana region'	21	11	10
Podravje/Podravska 'Drava Valley'	14	25	−11
Goriška/Goriško 'Gorizia region'	34	48	−14
Obalno kraška (Obala-Kras) 'Coastal-Karst region'	5	19	−14
Not given	133	150	−17
Pomurje/Pomurska 'Mura Valley'	16	35	−19
Savinjska 'Savinja region'	18	38	−20
Prlekija	11	31	−20
Koroška 'Carinthia'	176	199	−23
Posavje/Posavska 'Sava Valley'	27	50	−23

Among all the named areas, the predominant names were isolated (by taking into account their absolute value), after which the named areas were delimited using geographic information systems, resulting in eight predominant regions (Figure 2).

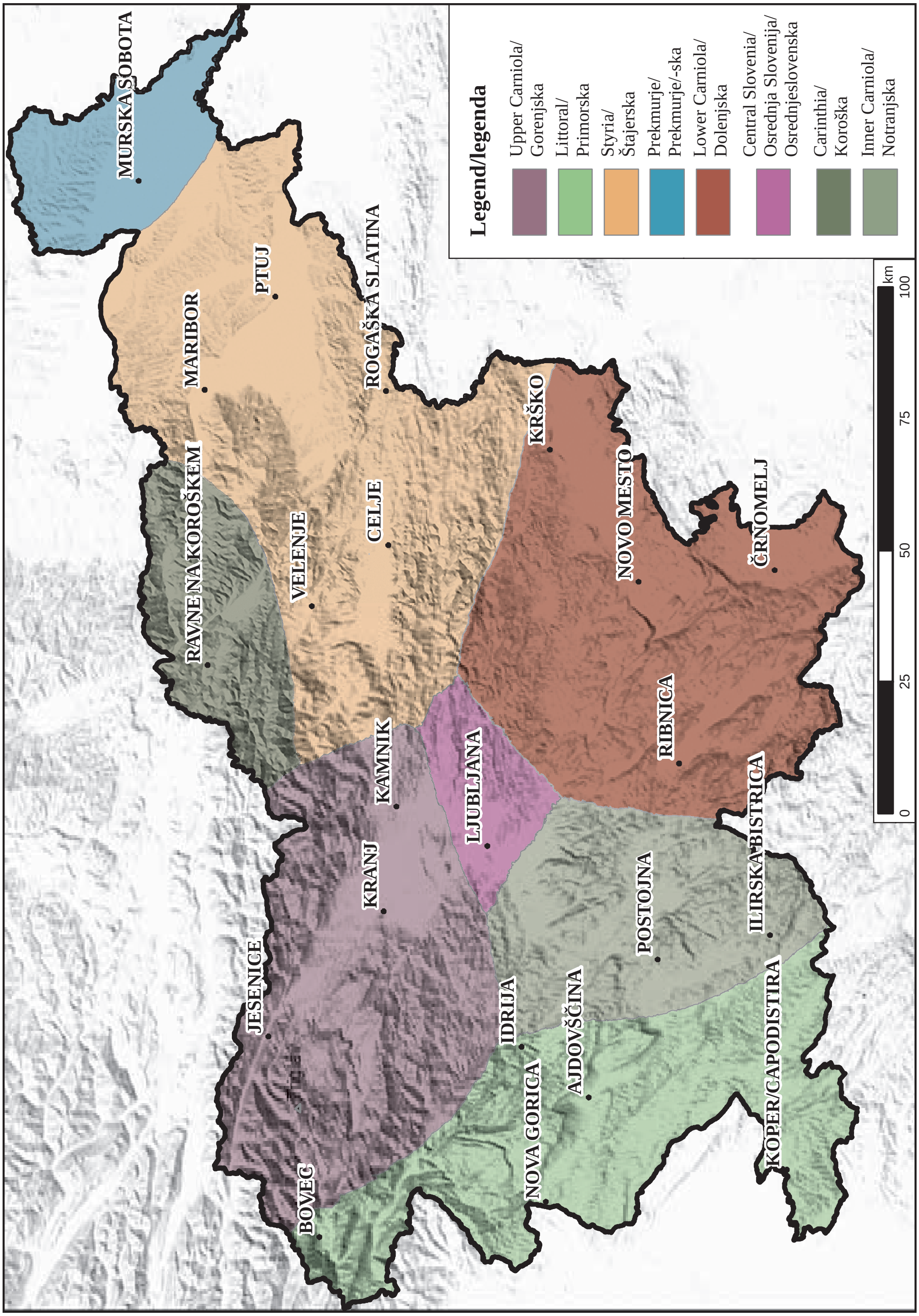

Figure 2: The most frequently named Slovenian regions and their delimitations.

4 Discussion

It can be established that the names based on the former Austrian lands and their components clearly predominate; the only exception is the area between Ljubljana and Vrhnika, which according to the majority of respondents should constitute a separate region (in terms of its name).

In certain places, the borders of the former lands differ significantly from the extent of the current regions with the same name as defined through the cognitive maps and geographic information systems.

Considering that the names of the former Austrian lands and their parts predominate in the respondents' consciousness, they serve as an excellent example for determining the changes in their denotations. Under Austria-Hungary, these names were used for precisely delimited regions, whereas today, with only a few exceptions (the Upper Carniola, Carinthia, and Gorizia statistical regions), one could hardly speak of any official delimitation using these names.

The choronyms for Carinthia, Upper Carniola, Lower Carniola, Inner Carniola, Styria, and Prekmurje were used to analyze changes and to compare the areas that they referred to in the past and present. The current municipalities were selected as the basic spatial unit.

In the case of Carinthia, the former Austrian land in Austria-Hungary covered the current municipalities of Črna na Koroškem, Jezersko, Mežica, Prevalje, and Ravne na Koroškem, and the northwestern part of the Municipality of Dravograd. The current Carinthia Statistical Region covers all of these municipalities except Jezersko, plus the municipalities of Mislinja, Muta, Podvelka, Radlje ob Dravi, Ribnica na Pohorju, Slovenj Gradec, and Vuzenica. Carinthia, as delimited by the respondents on their cognitive maps, slightly deviates from the actual extent of the statistical region. Except for the Municipality of Mislinja, it involves a slightly larger area than the statistical region because the respondents also included the northeastern part of the Municipality of Solčava, the northern edges of the municipalities of Ljubno, Luče, and Šoštanj, and the northwestern parts of the municipalities of Lovrenc na Pohorju and Selnica ob Dravi in it. As already mentioned, the only exception is the Municipality of Mislinja, the southern part of which was defined as being part of Styria by the majority of respondents.

The second case had to do with Upper Carniola, which was not a separate land under Austria-Hungary, but part of Carniola.

Under Austria-Hungary, Upper Carniola included the territory of the current municipalities of Bled, Bohinj, Cerklje na Gorenjskem, Domžale, Gorenja Vas–Poljane, Gorje, Jesenice, Kamnik, Komenda, Kranj, Kranjska Gora, Ljubljana, Lukovica, Medvode, Moravče, Preddvor, Radovljica, Šenčur, Škofja Loka, Tržič, Vodice, Zagorje ob Savi, Železniki, and Žirovnica. In addition, it included the northern part of the Municipality of Dol pri Ljubljani, the northwestern part of the Municipality of Litija, the extreme northwestern part of the Municipality of Trbovlje, the extreme east of the Municipality of Cerkno, the majority of the Municipality of Dobrova–Polhov Gradec, the extreme northwest of the Municipality of Žiri, and the Italian ward of Fusine in Valromana, which is not part of Slovenia, but once belonged to Carniola (i.e., Upper Carniola). The territory of the statistical region of the same name is significantly smaller. It is composed of only sixteen municipalities described above and the Municipality of Jezersko, which belonged to Carinthia under Austria-Hungary. However, in people's minds the territory of Upper Carniola is more different yet. In the west, it extends to the eastern edges of the municipalities of Bovec, Kobarid, and Tolmin, and also includes the entire Municipality of Cerkno, and in the east it covers the western parts of the municipalities of Gornji Grad, Luče, and Solčava. In addition to the municipalities within the Upper Carniola Statistical Region, it also covers the majority of the Municipality of Kamnik, the northern part of the Municipality of Dobrova–Polhov Gradec, the municipalities of Komenda, Medvode, Mengeš, and Vodice, and parts of the municipalities of Domžale and Lukovica. Compared to the Upper Carniola of 1914, Upper Carniola as perceived by the respondents has acquired some additional territory to the east and west, and lost territory to the south and southeast.

The changes in the denotation of other identified names can only be established based on their extent under Austria-Hungary and the respondents' delimitations. The fewest changes can be determined in the case of Prekmurje. The fact that the border between two regions runs along a river is clearly a stronger delineating factor than a border running along mountain ridges, even though mountains are more difficult to pass through. The greatest changes were determined in the case of Styria. The present name refers to a smaller territory than it used to in the past. Changes are especially visible in the northwestern part of the region, to which Carinthian identity spread. Namely, the respondents placed the municipalities of Muta, Podvelka,

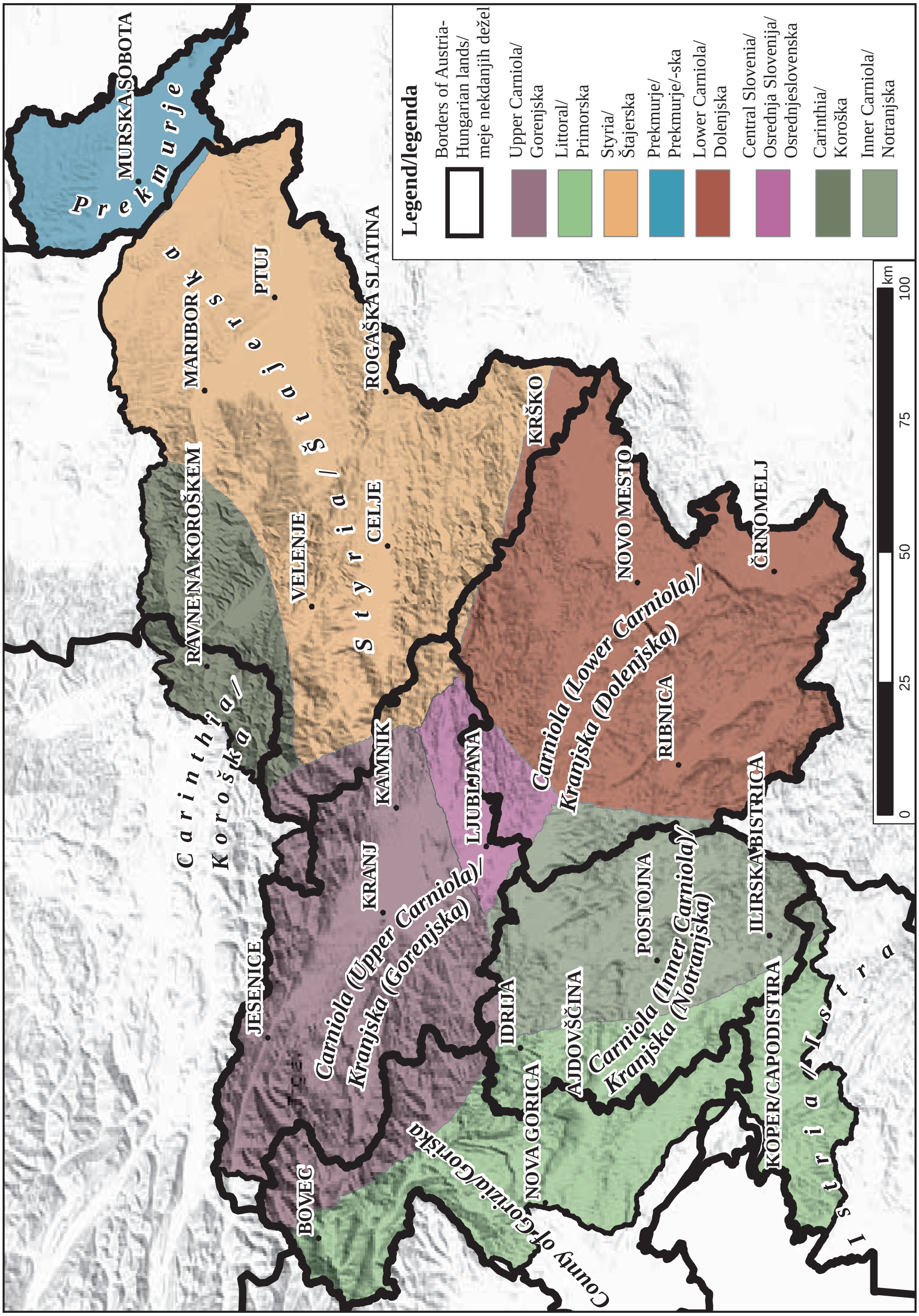

Figure 3: Comparing the past and present extent of regions bearing the same name.

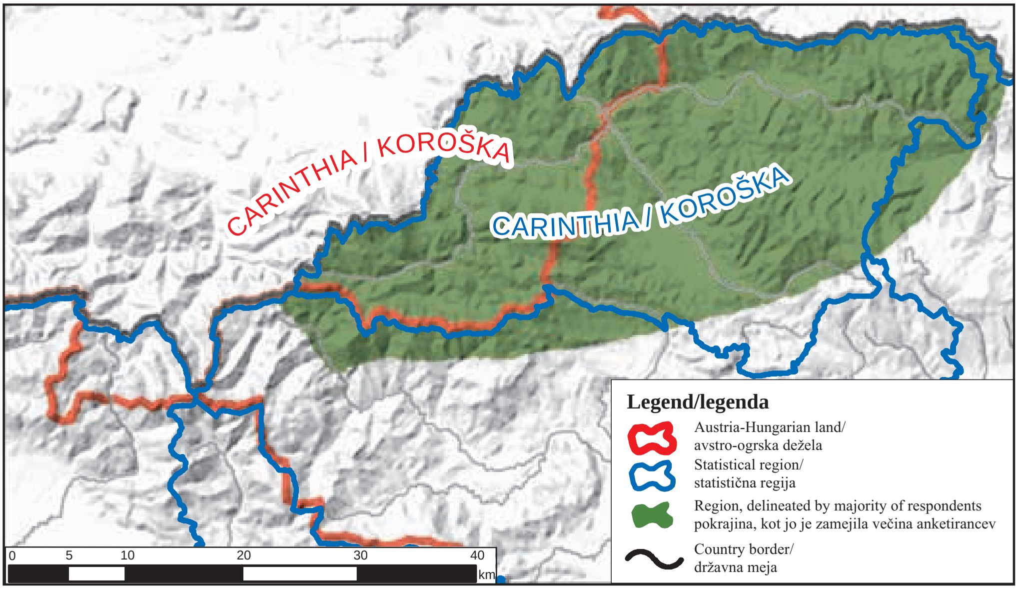

Figure 4: Various delimitations of Carinthia.

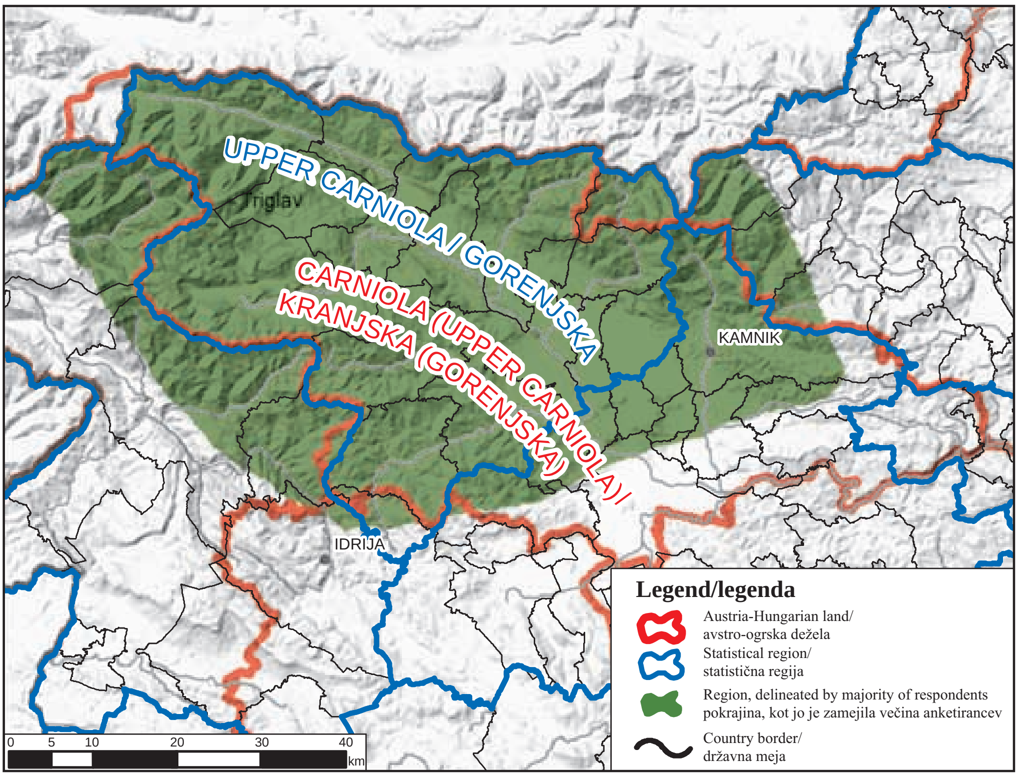

Figure 5: Various delimitations of Upper Carniola.

Radlje ob Dravi, Ribnica na Pohorju, Slovenj Gradec, and Vuzenica, and parts of the municipalities of Ljubno, Lovrenc na Pohorju, Luče, Mislinja, Selnica ob Dravi, Solčava, and Šoštanj, which used to belong to Styria, under Carinthia; part of the Municipality of Dravograd already belonged to Carinthia under Austria-Hungary. The respondents ascribed part of the Municipality of Solčava to Upper Carniola, as well as parts of the municipalities of Gornji Grad and Luče, which used to belong to Styria. The designation »Styria,« however, spread to the territory of the former Upper Carniola in the municipalities of Kamnik, Lukovica, Trbovlje, and Zagorje ob Savi. Minor changes can also be observed on the border between Styria and Lower Carniola. Parts of the municipalities of Hrastnik and Trbovlje, which used to belong to Lower Carniola, are now identified as being part of Styria, whereas Lower Carniolan identity spread to the territory of the former Styria along the lower reaches of the Sava River in the municipalities of Brežice, Krško, and Sevnica.

Lower Carniola once also included parts of the municipalities of Grosuplje, Litija, Ljubljana, Škofljica, and Šmartno pri Litiji, which the respondents placed under Central Slovenia, as well as parts of the municipalities of Brezovica, Grosuplje, Ig, Ljubljana, Loški Potok, Škofljica, Sodražica, and Velike Lašče, which the respondents identified as part of Inner Carniola. Inner Carniola thus moved slightly towards the east, whereas the respondents defined some Inner Carniolan municipalities on the region's western edges as being part of the Littoral. These included the municipalities of Ajdovščina, Divača, Idrija, Ilirska Bistrica, Pivka, Postojna, Sežana, and Vipava.

In conclusion, the names *Osrednja Slovenija* or *Osrednjeslovenska* 'Central Slovenia' and *Primorska* 'Littoral' should be mentioned. The former refers to the area around the Slovenian capital and the latter roughly combines the territories of the former Gorizia region, Istria, and Trieste, or the former Austrian Littoral, parts of which are now part of Slovenia. The name *Primorska* 'Littoral' most definitely also became established because it referred to the territory west of the Rapallo border, which cut it off from the bulk of Slovenian ethnic territory, and because of the local population's struggle against Fascism during the interwar period (Kacin Wohinz 2005).

5 Conclusion

A proper noun's referential nature is what makes it different from any other signifier, which means that it cannot be replaced by any series of descriptions. Proper nouns and hence also geographical names perform a fairly simple language function: they ensure identity over time (Kripke 2000).

As part of geographical names, choronyms are a relatively complex object of study; this is due to their complex philosophical basis on the one hand, and, on the other hand, regional diversity (Ciglič and Perko 2013) and the non-uniform definition of the notion of a region (Gams 2007). It can be established that Kripke's thesis does not apply in this case; with selected choronyms, identity has not been fully preserved over time, but instead has partly changed in spatial terms.

This research showed that, among various choronyms, the names of the former Austrian lands and their component parts are most deeply rooted in people's consciousness.

A comparison of the extent of territory that carried a name in the past and still carries it in the present, either as an administrative unit (using the example of two statistical regions) or an informal region, shows that it has changed. Hence, one of the basic features of choronyms is that their denotation changes over time.

Another feature of choronyms is that their denotation is not clearly defined when speaking of choronyms that do not identify a specific region in the sense of an administrative or other administratively defined unit.

Determining the extent or denotation of individual choronyms is important primarily due to regional identity, which can be mirrored in different ways, such as in brand names or the names of businesses. Using the methodology presented, the geographical origin of a specific product can be established with great certainty, whereby a choronym can be added to a common noun as a left attribute, such as »Carinthian honey,« even if the bees foraged around Selnica ob Dravi, which belonged to Styria under Austria-Hungary.

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Spreminjanje denotata izbranih slovenskih pokrajinskih imen

DOI: http://dx.doi.org/10.3986/AGS.4600
UDK: 91:81'373.21(497.4)
COBISS: 1.01

IZVLEČEK: V članku je obravnavano spreminjanje obsega ozemlja, ki ga identificira posamezno pokrajinsko ime. Najpogostejša pokrajinska imena, ki jih navajajo anketiranci, so imena avstro-ogrskih dežel in njihovih delov, s katerimi so bile v preteklosti poimenovane natančno zamejene upravne enote, danes pa jim v večini primerov ne moremo določiti administrativnih meja, lahko pa jih določimo s pomočjo spoznavnih zemljevidov in geografskih informacijskih sistemov. Ugotovili smo, da se je denotat teh imen skozi čas spremenil in da v primeru neformalnega poimenovanja ni jasno določen.

KLJUČNE BESEDE: geografija, pokrajina, pokrajinsko ime, imenoslovje, Slovenija

Uredništvo je prejelo prispevek 13. junija 2016.

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1 Uvod

Ena od lastnosti normiranega in zapisanega jezika je, da se skozi čas spreminja, saj je živa tvorba, ki je dovzetna za spremembe (Smole 2004). Sprememb v jeziku ne smemo razumeti le v smislu spreminjanja slovničnih pravil, zapisa posameznih besed in jezikovnega sloga, temveč se lahko spremeni tudi pomen posamezne besede. Kar se tiče spreminjanja, zemljepisna imena niso nobena izjema.

Posebna jezikovna kategorija so le z vidika načina zapisovanja in tega, da nimajo občega pomena ter služijo identifikaciji neponovljivih stvarnosti (Snoj 2009). Posebna so tudi zato, ker veljajo za najstarejše pričevalce slovenskega jezika (Pogorelec 2011). Ena od glavnih funkcij lastnih imen se kaže s predmetom poimenovanja, ki se izkazuje se denotativno (zaznamovalno). Pomen mora biti znan tako tvorcu kot naslovniku. Brez poznavanja pomena ime ne pomeni nič (Šimunović 2009). Del denotata pri zemljepisnih imenih je zagotovo tudi obseg oziroma zamejitev poimenovanega objekta.

Zemljepisna imena delimo v več tipov: ledinska, gorska, vodna, imena naselij, imena držav in tako naprej. V tej tipologiji so kot posebna kategorija zastopana tudi imena pokrajin oziroma pokrajinska imena. Ta so z vidika definicije nekoliko bolj zapletena, saj opredelitev pokrajine ni docela poenotena niti znotraj geografije niti pri sorodnih vedah. Na do določene mere svojski način pa pojem pokrajine dojemajo tudi posamezniki.

V prispevku pokrajino razumemo kot območje s svojskim prepletom naravnih in družbenih prvin, ki se zaradi teh lastnosti razlikuje od sosednjih pokrajin in ima lastno ime ali pa jo kot pokrajino dojemajo in se z njo poistovetijo njeni prebivalci. Pri spremembah zemljepisnih imen skozi čas je treba izpostaviti tudi spreminjanje prostorskega obsega poimenovanega, torej denotata.

Večinoma so predmet imenoslovnih raziskav pri geografih tuja zemljepisna imena (Kladnik 2007 in 2009; Crljenko 2014) in zemljepisna imena kot vzvod politične moči (Kladnik in Pipan 2008; Urbanc in Gabrovec 2005).

Temeljno raziskovalno vprašanje v pričujoči razpravi pa je, kako se je spreminjal denotat izbranih slovenskih pokrajinskih imen.

2 Metode

Med najbolj uveljavljenimi sredstvi za posredovanje zemljepisnih imen so zemljevidi (Peršolja 2003), ki jih delimo glede na vsebino in merilo (Vrišer 2002). Ne glede na merilo in vrsto zemljevidov so poleg matematičnih, naravnogeografskih in družbenogeografskih kartografskih prvin del sodobnih zemljevidov tudi tako imenovani ostali elementi, med katerimi so najpomembnejši različna zemljepisna imena (Vrišer 2002). Nujna so za razumevanje pokrajine, hkrati pa so za zemljevid s tehničnega in vizualnega gledišča precejšnje breme. Zavzemajo namreč veliko prostora, pogosto na račun izpuščanja drugih kartografskih znakov. S tem izzivom so se na različne načine spopadali kartografi že v preteklosti (Gašperič 2007). Zapisana morajo biti čitljivo, razumljivo in estetsko, biti morajo pravilno razporejena in podobno. Zemljevid, ki ima preveč imen, je nepregleden in so lahko na njem drugi topografski znaki zapostavljeni (Vrišer 2002). Čeprav so zemljevidi med najbolj uveljavljenimi sredstvi za posredovanje zemljepisnih imen, zaradi posploševanja in tehničnih omejitev ne vsebujejo vseh zemljepisnih imen v pokrajini (Peršolja 2003).

Poglobljena raziskava zato terja širši nabor virov zemljepisnih imen. Že najstarejši raziskovalci zemljepisnih imen so podatke zbirali tudi na terenu. V preteklosti je bilo terensko delo dejansko temeljni vir podatkov. Posebej pomembno je še vedno pri dialektoloških (Klinar s sod. 2012; Klinar in Geršič 2015) in nekaterih drugih imenoslovnih raziskavah pri nas (na primer Furlan in Kladnik 2008) in v tujini (na primer Senft 2008). Terensko raziskovanje zemljepisnih imen spodbuja tudi jezikoslovna stroka (Šivic-Dular 2014; Möller 2015), zato smo se za takšno metodo zbiranja odločili tudi pri raziskovanju pokrajinskih imen v tej raziskavi. Z željo doseči kar najširši krog prebivalcev posamezne pokrajine, smo zbiranje imen izvedli s pomočjo anketiranja. Ankete so bile poslane 5000 anketirancem. Vzorec, izbran iz Centralnega registra prebivalstva (CRP), je pripravil Statistični urad Republike Slovenije. Anketiranci v starosti med 15 in 75 let so bili izbrani naključno. Zaradi lažje obdelave podatkov smo Slovenijo razdelili na vzhodno in zahodno in na vsako območje poslali 2500 anket. V vzhodno Slovenijo smo vključili statistične regije koroško, savinjsko, zasavsko, spodnjeposavsko, podravsko, pomursko in jugovzhodno Slovenijo, v zahodno pa gorenjsko, goriško, obalno-kraško, notranjsko-kraško in osrednjeslovensko.

Poleg splošno znanih tipov anketnih vprašanj, iz katerih so bili sestavljeni tudi anketni vprašalniki v pričujoči raziskavi, so bila v njih tudi navodila za izdelavo spoznavnih zemljevidov.

2.1 O spoznavnih zemljevidih

»*Spoznavni zemljevid je tehnika za ugotavljanje slike prostorskih odnosov in okoljskih značilnosti ter stališč do njih pri ljudeh*« (Polič 2002, 39) oziroma miselna predstava podatkov, ki jih imajo posamezniki o določenem okolju (Golledge in Stimson 1997). Tovrstne zemljevide so začeli uporabljati v šestdesetih letih 20. stoletja za analizo strukture in identitetnih prvin v okolju (Lynch 1960). Lahko so tudi sredstvo za pridobivanje podatkov, pomembnih za načrtovanje v prostoru (Polič 2002). Razlikujemo med individualnim risanjem spoznavnih zemljevidov in skupinskim, ki poteka na delavnicah (Golobič 2006). V posameznikovi domišljiji zemljevid nastaja počasi in je odvisen od okolja ter posameznikovih izkušenj in izobrazbe (Kaplan, Kaplan in Ryan 1998). Popolnega spoznavnega zemljevida ni. Na vsakem so namreč podatki, pomembni za tistega, ki riše takšen zemljevid (Polič 2002). Zato so informacije na njem običajno precej poenostavljene (Polič 2002), saj so posledica posameznikovih želja in domišljije (Kos 2002). Spoznavni zemljevid je tvorba v naših mislih in kot tak sogovorniku neviden. Eden od načinov sporočanja vsebine spoznavnega zemljevida je risanje (Polič 2002). Golobičeva (2006, 161) tak način pridobivanja informacij označi za grafično anketiranje.

Polič (2002, 38) navaja pet različnih tipov spoznavnih zemljevidov. Razlikuje med:

- spoznavnimi zemljevidi Lynchevega tipa,
- družbeno-prostorskimi obrazci,
- miselnimi zemljevidi,
- osebnostnimi konstrukti ter presojo razdalj,
- večrazsežnostnega lestvičenja.

Pri prvem tipu zemljevidov anketirancu najprej ponudimo posamezna obstoječa znamenja ali obris območja. Na ta zemljevid lahko vrisuje poti, meje in druge pokrajinske prvine. Dobljene rezultate lahko medsebojno primerjamo glede na različne lastnosti anketirancev (Polič 2002; Staut, Kovačič in Ogrin 2007). Risanje takšnih zemljevidov predpostavlja anketirančevo zmožnost usklajevanja razmerja med zastopanimi točkami in točkami na zemljevidu, sposobnost pomanjšanja velikega prostora, možnost izdelave geometričnih projekcij in poznavanje kartografskih simbolov (Levy-Leboyer 1982; cv: Polič 2002). Prve tri predpostavke bi na nek način lahko označili tudi kot sposobnost georeferenciranja stanja iz okolja na spoznavni zemljevid.

Družbeno-prostorski obrazci so bolj strukturirana oblika spoznavnih zemljevidov. Anketiranci morajo na zemljevidu zamejiti območje, ki ga imajo za svojega, jim je všeč in podobno (Polič 2002).

Miselni zemljevidi so posredni spoznavni zemljevidi, pri katerih anketiranec razvrsti določeno prvino glede na neko lastnost (Polič 2002).

Osebnostni konstrukti so rezultati analize preglednih mrež, ki jih anketiranci sestavijo z razvrščanjem izbranih pojavov in ugotavljanjem razlik med njimi.

Zadnji tip spoznavnih zemljevidov omogoča ugotavljanje subjektivnih razdalj med kraji (Polič 2002).

V geografiji imajo spoznavni zemljevidi pomembno vlogo. Posebno mesto je raziskovanje spoznavnih zemljevidov dobilo v šestdesetih letih 20. stoletja z utemeljitvijo behavioristične geografije; spoznavni zemljevidi so bili namreč ena od njenih osrednjih metod (Klemenčič 2002).

Anketiranci so kot podlago za svoje grafično izražanje prejeli zemljevid Slovenije formata A3 in merila 1 : 650.000. Podlaga za spoznavni zemljevid je vsebovala državno mejo, večja mesta (Ajdovščina, Bovec, Celje, Črnomelj, Idrija, Ilirska Bistrica, Jesenice, Kamnik, Koper/Capodistria, Kranj, Krško, Litija, Ljubljana, Maribor, Murska Sobota, Nova Gorica, Novo mesto, Postojna, Ptuj, Ravne na Koroškem, Ribnica, Rogaška Slatina in Velenje), osnovno rečno mrežo in Triglav kot najvišjo slovensko goro.

Anketiranci so morali narisati oziroma zamejiti slovenske pokrajine in jih poimenovati. Dobili so naslednji navodili: »*Na zemljevid vrišite slovenske pokrajine, ki jih poznate*« in »*Vsako narisano pokrajino tudi poimenujte.*«

Izdelane spoznavne zemljevide, ki so vsebovali tako meje pokrajin kot tudi imena, smo najprej skenirali in nato digitalizirali. Digitalizacija je potekalo ročno; poligone smo prerisali v geografski informacijski sistem. Analize pridobljenih podatkov in tematski zemljevidi so bili izvedeni s programsko opremo ArcMap 10.3.1. Uporabili smo naslednje operacije:

- pretvorba poligona v raster (Polygon to Raster),
- seštevanje možice prekrivajočih se rastrov (Zonal Statistics – Sum),
- iskanje najbolj pogoste vrednosti v množici prekrivajočih se rastrov (Zonal Statistics – Majority),
- štetje različnih vrednosti v množici prekrivajočih se rastrov (Zonal Statistics – Variety) in
- razne običajne matematične operacije z rastri (Raster Calculator – Divide/Sum/Minus).

3 Rezultati

Na poslane anketne vprašalnike je odgovorilo 12,7 % naslovnikov. Iz zahodne Slovenije smo prejeli 309 izpolnjenih vprašalnikov, iz vzhodne pa 326. Vsi vrnjeni vprašalniki pa niso vsebovali spoznavnega zemljevida, narejenega skladno z navodili. Posameznim spoznavnim zemljevidom so namreč manjkali določeni elementi. Zato smo vse prejete spoznavne zemljevide razdelili v 4 skupine, takšne, ki vsebujejo meje in imena pokrajin, takšne, ki vsebujejo le eno izmed omenjenih kategorij, anketne vprašalnike brez narisanega spoznavnega zemljevida ter spoznavne zemljevide z vrisanimi posameznimi elementi, ki jih v navodilih nismo zahtevali; takšne smo umestili v kategorijo drugo.

Slika 1: Delež posamezne kategorije zemljevidov.
Glej angleški del prispevka.

Anketiranci iz zahodne Slovenije so skupaj zamejili 2027 poligonov, iz vzhodne pa 2147. Povprečni anketiranec je Slovenijo razdelil na 9 do 10 pokrajin. Pri preračunavanju smo upoštevali vse poligone, tudi tiste, ki jih anketiranci niso poimenovali. Takšnih je bilo na vseh zemljevidih 283 (7,5 %), 3769 pa jih je imelo pripisana imena. Skupno smo identificirali 170 imenskih različic pokrajinskih imen. Zaradi lažje analize smo nekatere združili v skupno imensko kategorijo (na primer Prekmurje in Prekmurska, Zasavje in Zasavska, Savinjska dolina in dolina Savinje). Najpogosteje poimenovane pokrajine so Gorenjska, Dolenjska, Koroška, Štajerska, Prekmurje/Prekmurska, Primorska in Notranjska (preglednica 1).

Preglednica 1: Najpogostejše vrisane in poimenovane pokrajine na spoznavnem zemljevidu.

pokrajinsko ime	zahodna Slovenija	vzhodna Slovenija	skupaj
Gorenjska	200	205	405
Dolenjska	198	189	387
Koroška	176	199	375
Štajerska	188	178	366
Prekmurje/Prekmurska	182	172	354
Primorska	185	166	351
Notranjska	171	172	343
skupaj	1300	1281	2581

Največja razlika pri poimenovanjih pokrajin med anketiranci iz vzhodne in zahodne Slovenije je pri imenih Posavje/Posavska in Koroška. Obe pokrajinski imeni je navedlo več anketirancev iz vzhodne Slovenije.

Preglednica 2: Razlike med pogostnostjo poimenovanih pokrajin glede na lokacijo bivanja anketiranca.

	pokrajinsko ime lokacija bivanja		
	zahodna Slovenija	vzhodna Slovenija	razlika
Primorska	185	166	19
Bela krajina	83	67	16
Štajerska	188	178	10
Prekmurje/Prekmurska	182	172	10
Ljubljanska pokrajina	21	11	10
Podravje/Podravska	14	25	–11
Goriška/Goriško	34	48	–14
Obalno kraška (Obala-Kras)	5	19	–14
ni podatka	133	150	–17
Pomurje/Pomurska	16	35	–19
Savinjska	18	38	–20
Prlekija	11	31	–20
Koroška	176	199	–23
Posavje/Posavska	27	50	–23

Pri anketirancih iz vzhodne Slovenije sta v primerjavi s tistimi iz zahodne izpostavljeni še imeni Prlekija in Savinjska, pri tistih iz zahodnega dela države pa Primorska in Bela krajina. Natančna razmerja pri imenih, kjer je razlika med obema deloma Slovenije deset ali več, so prikazana v preglednici 2.

Med vsemi poimenovanimi poligoni smo izločili prevladujoča poimenovanja (pri čemer upoštevamo absolutno vrednost), poimenovana ozemlja zamejili s pomočjo geografskih informacijskih sistemov in dobili osem izstopajočih pokrajin (slika 2).

Slika 2: Najpogosteje poimenovane slovenske pokrajine in njihova razmejitev.
Glej angleški del prispevka.

4 Razprava

Ugotavljamo, da nesporno prevladujejo poimenovanja po nekdanjih avstrijskih deželah in njihovih sestavnih delih; izjema je le območje med Ljubljano in Vrhniko, ki bi po mnenju večine anketirancev moralo biti (glede na poimenovanje) ločena pokrajina.

Meje nekdanjih dežel se ponekod precej razlikujejo od obsega istoimenskih sodobnih pokrajin, kot smo jih določili s spoznavnimi zemljevidi in geografskimi informacijskimi sistemi.

Slika 3: Primerjava obsega istoimenskih pokrajin v preteklosti in sodobnosti.
Glej angleški del prispevka.

Glede na to, da v zavesti prebivalcev kot pokrajinska imena prevladujejo imena nekdanjih avstrijskih dežel in njihovih delov, so le-ta odličen primer za ugotavljanje spremembe denotata. V času Avstroogrske so bile namreč s temi imeni poimenovane točno zamejene pokrajine, danes pa, z nekaterimi izjemami (gorenjska statistična regija, koroška statistična regija, goriška statistična regija), le stežka govorimo o uradni zamejitvi.

Za primer analize sprememb smo vzeli pokrajinska imena Koroška, Gorenjska, Dolenjska, Notranjska, Štajerska in Prekmurje ter jih primerjali z območji, ki se nanje navezujejo v preteklosti sodobnosti. Kot temeljno prostorsko enoto smo izbrali zdajšnje občine.

Na primeru Koroške je znotraj Republike Slovenije avstrijska dežela v času Avstro-ogrske obsegala zdajšnje občine Jezersko, Mežica, Prevalje, Ravne na Koroškem, Črna na Koroškem in severozahodni del občine Dravograd. Sodobna koroška statistična regija obsega vse omenjene občine, z izjemo Jezerskega, ter še občine Slovenj Gradec, Mislinja, Ribnica na Pohorju, Vuzenica, Muta, Radlje ob Dravi in Podvelka. Koroška, kot so jo zamejili anketiranci na spoznavnih zemljevidih, malenkostno odstopa od obsega statistične regije. Z izjemo občine Mislinja gre za nekoliko večje območje kot pri statistični regiji. Vanjo namreč anketiranci uvrščajo še severovzhodni del občine Solčava, severne obronke občin Luče, Ljubno in Šoštanj ter severozahodna dela občin Lovrenc na Pohorju in Selnica ob Dravi; izjema, kot rečeno, je občina Mislinja, katere južni del je večina anketirancev označila kot del Štajerske.

Slika 4: Različne zamejitve Koroške.
Glej angleški del prispevka.

Drugi primer je Gorenjska, ki v času Avstro-Ogrske ni bila samostojna dežela, ampak del Kranjske.

Slika 5: Različne zamejitve Gorenjske.
Glej angleški del prispevka.

Gorenjska oziroma zgornji del Kranjske je v času Avstro-Ogrske obsegala območja zdajšnjih občin Bled, Bohinj, Cerklje na Gorenjskem, Domžale, Gorenja vas – Poljane, Gorje, Jesenice, Kamnik, Komenda, Kranj, Kranjska Gora, Ljubljana, Lukovica, Medvode, Moravče, Preddvor, Radovljica, Šenčur, Škofja Loka, Tržič, Vodice, Zagorje ob Savi, Železniki in Žirovnica. Poleg tega je h Gorenjski spadal tudi severni del občine Dol pri Ljubljani, severozahodni del občine Litija, skrajni severozahodni del občine Trbovlje, skrajni vzhodni del občine Cerkno, večji del občine Dobrova – Polhov Gradec, skrajni severozahodni del občine Žiri, zunaj ozemlja Republike Slovenije pa je ostala občina Fužine (Bela Peč), ki je nekdaj pripadala Kranjski oziroma

Gorenjski. Območje, ki ga označuje istoimenska statistična regija, je precej manjše. Sestavlja ga le 16 od zgoraj navedenih občin ter občina Jezersko, katere ozemlje je v času Avstro-Ogrske pripadalo Koroški. V zavesti ljudi pa je obseg Gorenjske še nekoliko drugačen. Na zahodu sega na vzhodne obronke občin Bovec, Kobarid in Tolmin, vključuje tudi celotno občino Cerkno, na vzhodu pa zahodne dele občin Solčava, Luče in Gornji Grad. Poleg občin znotraj gorenjske statistične regije zajema še večji del občine Kamnik, severni del občine Dobrova – Polhov Gradec, celotne občine Medvode, Vodice, Komenda in Mengeš ter deli občin Domžale in Lukovica. Gorenjska, kot jo dojemajo anketiranci, je v primerjavo z Gorenjsko iz leta 1914 pridobila nekaj ozemlja v vzhodnem in zahodnem delu, izgubila pa ga je v južnem in jugovzhodnem delu.

Spremembo denotata ostalih identificiranih imen lahko ugotavljamo le na podlagi njihovega obsega v času Avstro-Ogrske ter zamejitve anketirancev. Ugotovimo lahko, da je najmanj sprememb pri Prekmurju. Očitno je v primeru, da meja med deželama teče po reki, ta okoliščina na nek način močnejši zamejitveni dejavnik kot pa meja potekajoča po gorskih grebenih, čeprav je gorski svet težje prehoden. Do največje spremembe pri opredeljevanju je prišlo pri Štajerski. Z imenom Štajerska se v sodobnosti označuje manjše območje kot nekoč. Spremembe so očitne predvsem v severozahodnem delu pokrajine, kamor se je razširila koroška identiteta. Anketiranci so namreč občine Slovenj Gradec, Vuzenica, Muta, Radlje ob Dravi, Podvelka, Ribnica na Pohorju ter dele občin Solčava, Luče, Ljubno, Šoštanj, Mislinja, Lovrenc na Pohorju in Selnica ob Dravi, ki so nekdaj pripadale Štajerski, označili s pokrajinskim imenom Koroška; del občine Dravograd je h Koroški spadal že v času Avstro-Ogrske. Del občine Solčava so anketiranci pripisali Gorenjski, prav tako dele občin Luče in Gornji Grad, ki sta bili del Štajerske. Se je pa poimenovanje Štajerska na ozemlje nekdanje Gorenjske razširilo na območjih občin Kamnik, Lukovica, Zagorje ob Savi in Trbovlje. Manjše spremembe so opazne tudi na meji med Štajersko in Dolenjsko. Del občin Trbovlje in Hrastnik, ki so spadale k Dolenjski, je zdaj označen kot Štajerska, medtem ko se je dolenjska identiteta razširila na ozemlje nekdanje Štajerske ob spodnjem toku Save, v občinah Krško, Sevnica in Brežice.

Nekdaj so k Dolenjski spadali tudi deli občin Škofljica, Ljubljana, Grosuplje, Šmartno pri Litiji in Litija, ki so jih anketiranci uvrstili v Osrednjo Slovenijo, ter deli občin Ig, Škofljica, Grosuplje, Velike Lašče, Sodražica, Loški potok, Ljubljana in Brezovica, ki so jih anketiranci označili kot del Notranjske. Ta se je tako pomaknila nekoliko proti vzhodu, medtem ko so nekatere notranjske občine na njenem zahodnem robu anketiranci opredelili kot del Primorske. Gre za občine Idrija, Ajdovščina, Vipava, Postojna, Divača, Sežana, Pivka in Ilirska Bistrica.

Na koncu omenimo še imeni Osrednja Slovenija oziroma Osrednjeslovenska ter Primorska. Prvo poimenuje območje okrog slovenskega glavnega mesta, drugo pa v grobem združuje ozemlja nekdanjih Goriške, Istre in Trsta oziroma Avstrijskega primorja, ki so na ozemlju Republike Slovenije. Zagotovo se je ime Primorska uveljavilo tudi zato, ker je bilo to ozemlje zahodno od Rapalske meje, ki ga je odrezala od matične domovine, in boja tamkaj živečega prebivalstva proti fašizmu med svetovnima vojnama (Kacin Wohinz 2005).

5 Sklep

Tisto, zaradi česar lastno ime ni enakovredno vsakemu drugemu besednemu označevalcu, je dejstvo, da je njegova narava referenčna, kar pomeni, da ga ne more zamenjati nobena serija opisov. Lastno ime, torej tudi zemljepisno ime udejanja dokaj preprosto funkcijo jezika, namreč, zagotavljanje identitete skozi čas (Kripke 2000).

Pokrajinska imena kot del zemljepisnih imen so zaradi zapletenega filozofskega podstata na eni strani ter pokrajinske pestrosti (Ciglič in Perko 2013) in neenotne opredelitve pojma pokrajina (Gams 2007) na drugi razmeroma kompleksen in zapleten predmet raziskovanja. Ugotovimo lahko, da Kripkejeva teza v tem primeru ne zdrži; identiteta se pri izbranih pokrajinskih imenih namreč skozi čas ni v celoti ohranila, ampak se je prostorsko deloma spremenila.

V raziskavi smo ugotovili, da so v zavesti ljudi med pokrajinskimi imeni najbolj zakoreninjena imena nekdanjih avstrijskih dežel in njihovih sestavnih delov.

Če primerjamo obseg ozemlja, ki je bil z istim imenom poimenovan v preteklosti in sodobnosti, bodisi kot administrativno enoto (na primeru dveh statističnih regiji) bodisi kot neformalne pokrajine, lahko ugotovimo, da se je spremenil. Sklenemo lahko, da je ena od temeljnih značilnosti pokrajinskih imen ta, da se njihov denotat skozi zgodovino spreminja.

Druga lastnost pokrajinskih imen je, da njihov denotat ni jasno določen, če govorimo o pokrajinskih imenih, ki ne identificirajo pokrajine v smislu upravne ali druge administrativno določene enote.

Določanje obsega oziroma denotata posameznih pokrajinskih imen je pomembno predvsem zaradi pokrajinske identitete, ki se lahko zrcali na različne načine, na primer v blagovnih znamkah ali imenih podjetij. S pomočjo predstavljene metodologije lahko za nek izdelek z veliko gotovostjo določimo geografsko označbo ali poreklo in njegovemu občnemu imenu dodamo pokrajinsko ime, ki nastopa v vlogi levega prilastka, na primer: koroški med, četudi so se čebele pasle v okolici Selnice ob Dravi, ki je v Avstro-Ogrski spadala k Štajerski.

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SLOVENICA
GEOGRAFSKI ZBORNIK
2017

SPECIAL ISSUE
Geographical Names

EDITORS:
Drago Perko
Peter Jordan
Blaž Komac

Acta geographica Slovenica, 57-1, 2017, 99–107

EXONYMS AND OTHER GEOGRAPHICAL NAMES

Drago Perko, Peter Jordan, Blaž Komac

MATJAŽ GERŠIČ

Slovenia as an exonym in some languages.

Exonyms and other geographical names

DOI: http://dx.doi.org/10.3986/AGS.4891
UDC: 91:81'373.21
COBISS: 1.02

ABSTRACT: Geographical names are proper names of geographical features. They are characterized by different meanings, contexts, and history. Local names of geographical features (endonyms) may differ from the foreign names (exonyms) for the same feature. If a specific geographical name has been codified or in any other way established by an authority of the area where this name is located, this name is a standardized geographical name. In order to establish solid common ground, geographical names have been coordinated at a global level by the United Nations Group of Experts on Geographical Names (UNGEGN) since 1959. It is assisted by twenty-four regional linguistic/geographical divisions. Among these is the East Central and South-East Europe Division, with seventeen member states. Currently, the division is chaired by Slovenia. Some of the participants in the last session prepared four research articles for this special thematic issue of *Acta geographica Slovenica*. All of them are also briefly presented in the end of this article.

KEY WORDS: geographical name, endonym, exonym, UNGEGN, cultural heritage

This article was submitted for publication on November 15th, 2016.

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1 Introduction

Nouns are divided into common and proper nouns. In most languages, common nouns, such as *river*, *mountain*, and *city*, are not capitalized, whereas proper nouns (names), such as *Danube*, *Mount Everest*, and *Ljubljana*, are capitalized. Proper nouns also include geographical names.

A **geographical name** or toponym (from Greek *tópos* »place« and *ónyma*, a dialect variant of *ónoma* »name«) is a proper name of a geographical feature. The discipline dealing with geographical names is called toponymy. The entire body of geographical names in all the languages around the globe is divided into endonyms and exonyms, if geographical names are regarded under the aspect of the spatial relation between the community using the name and the geographical feature assigned by it. »Endonym« and »exonym« are status categories of geographical names. Depending on the spatial relationship between the user community and a feature, the same name can assume the status of an endonym or an exonym. Thus, the endonym/exonym divide results from a space-related or geographical view on place names.

An **endonym** (from Greek *éndon* »inside«) is a geographical name accepted and used by the local community. An **exonym** (from Greek *éksō* »outside«) is a geographical name used by an external community that is different from the endonym (Jordan 2016). Simply put, an endonym is the local (or original) name of a geographical feature and an exonym is a foreign name for the same feature (Kladnik 2009).

Thus, for example, *Ljubljana* is the Slovenian endonym and *Laibach* is the German exonym for the Slovenian capital city. In turn, *Dunaj* is the Slovenian exonym and *Wien* is the German endonym for the Austrian capital, Vienna, which is the English exonym. On the other hand, *London* is neither the Slovenian nor the German exonym for English *London* because, despite their different pronunciation, the Slovenian and German transcriptions of this geographical name are the same as in English.

The issue still remains how geographical names that are originally written in a different alphabetical, syllabic, or logographic script should be written in Roman script. Converting geographical names into Roman script is called Romanization (or sometimes Latinization). Here one distinguishes between transliteration and transcription (Kladnik and Perko 2013). In **transliteration**, the same character in the original script is always replaced with the same Roman character, often combined with a dot, line, tilde, or some other diacritic above or below the letter. In **transcription**, the sounds of the source language are rendered as faithfully as possible in the target language. This means that the phonetically transcribed forms of the same original geographical name may differ from one language to another. Thus, for example, the Russian river *Печора* is transcribed in Slovenian as *Pečora*, in German as *Petschora*, and in English as *Pechora*. In principle, it would be best to have an atlas of the world in which every name were written in both its original form and the form adapted to a given language, but unfortunately the lack of space on printed maps renders this impossible.

If a specific geographical name has been codified or in any other way established by an authority of the area where this name is located, this name is a **standardized geographical name**. Such names are usually presented in official gazetteers issued by an authority, such as the Geodetic Survey in Slovenia (Perko 2001).

2 United Nations Group of Experts on Geographical Names

At the global level, geographical names are overseen by the United Nations. In 1959, it founded the United Nations Group of Experts on Geographical Names (UNGEGN), which is one of the seven expert bodies of the United Nations Economic and Social Council (ECOSOC). Some of the main goals of UNGEGN are to encourage national and international geographical name standardization, to promote the international dissemination of nationally standardized geographical names, and to adopt individual Romanization systems. UNGEGN's goal for every country is to decide on its own nationally standardized names through the creation of national names authorities or recognized administrative processes (Internet 1).

The first two UNGEGN meetings were held in 1960 and 1966 in New York. They were followed by twenty-nine sessions. The first was held in 1967 in New York, and the latest in 2016 in Bangkok, Thailand. The thirtieth session in 2017 is being hosted by New York again (Internet 2).

2.1 Regional linguistic/geographic divisions

UNGEGN is supported by regional linguistic/geographic divisions. Countries decide for themselves which division they wish to belong to; some belong to more than one division. Currently, there are twenty-four divisions that guide the work of UNGEGN during and between its sessions (Internet 3):

1. Africa Central Division: Angola, Burundi, Cameroon, the Central African Republic, Chad, Congo, the Democratic Republic of the Congo, Equatorial Guinea, Gabon, Rwanda, and São Tomé and Príncipe;
2. Africa East Division: Botswana, Burundi, Djibouti, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, the Seychelles, Sudan, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe;
3. Africa South Division: Botswana, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe;
4. Africa West Division: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo;
5. Arabic Division: Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen;
6. Asia East Division (other than China): Japan, North Korea, and South Korea;
7. Asia South-East Division: Bhutan, Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam;
8. Asia South-West Division (other than Arabic): Afghanistan, Azerbaijan, Cyprus, Iran, Pakistan, Tajikistan, Turkey, and Turkmenistan;
9. Baltic Division: Estonia, Latvia, Lithuania, Poland, and Russia;
10. Celtic Division: France and Ireland;
11. China Division: China;
12. Dutch- and German-speaking Division: Austria, Belgium, Germany, the Netherlands, South Africa, Suriname, and Switzerland;
13. East Central and South-East Europe Division: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Georgia, Greece, Hungary, Macedonia, Montenegro, Poland, Serbia, Slovakia, Slovenia, Turkey, and Ukraine;
14. Eastern Europe, Northern and Central Asia Division: Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Ukraine, and Uzbekistan;
15. East Mediterranean Division (other than Arabic): Cyprus and Israel;
16. French-Speaking Division: Algeria, Belgium, Bulgaria, Burkina Faso, Cameroon, Canada, Congo, Côte d'Ivoire, the Democratic Republic of the Congo, France, Guinea, Lebanon, Madagascar, Morocco, Niger, Romania, Senegal, Spain, Switzerland, Togo, and Tunisia;
17. India Division: Bangladesh, Bhutan, India, Nepal, and Pakistan;
18. Latin America Division: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Spain, Suriname, Uruguay, and Venezuela;
19. Norden Division: Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, and Sweden;
20. Pacific South-West Division: Australia, Fiji, Nauru, New Zealand, Papua New Guinea, Samoa, the Solomon Islands, Timor-Leste, Tonga, and Vanuatu;
21. Portuguese-speaking Division: Angola, Brazil, Cape Verde, Guinea-Bissau, Mozambique, Portugal, São Tomé and Príncipe, and Timor-Leste;
22. Romano-Hellenic Division: Andorra, Belgium, Canada, Cyprus, France, Greece, Holy See, Italy, Luxembourg, Moldova, Monaco, Portugal, Romania, Spain, Switzerland, and Turkey;
23. United Kingdom Division: Guyana, Jamaica, New Zealand, South Africa, and the United Kingdom of Great Britain and Northern Ireland;
24. USA/Canada Division: Canada and the United States.

2.2 East Central and South-East Europe linguistic/geographical division

Slovenia is part of the East Central and South-East Division, which has seventeen members. The first session of the division was held in 1971 in Prague and the last one in 2015 in Ljubljana (Internet 4). Slovenia has presided over this section twice: the first time from January 22nd, 1998 to September 4th, 2002, and again from August 9th, 2012 to August 16th, 2017. The division mainly deals with the transliteration and transcription of geographical names from non-Roman scripts into Roman and with exonyms, which most of the participants addressed at the last meeting in Ljubljana.

3 Geographical names in the world

Place names have always been studied for diverse reasons and by several disciplines, especially by linguistics (Taylor 1998). Until recently, they were approached predominantly as »windows into the past«. Research in this area has been very productive and continues to be advanced by a number of researchers (Conedera et al. 2007; Kathrein 2009).

Recently, however, one can observe an important development in place name research across the social sciences, namely in anthropology and geography, which represents a break with the past. The new approaches emphasize the contemporaneity of place names (while not ignoring their historical roots) and study them in relation to the political situation and contestations of place, landscape, and identity.

Initial propositions of these new perspectives on place names have been put forth by Tuan (1977; 1990; 1991) within geography and Basso (1988; 1996) in cultural anthropology. Both argue that naming is a very fundamental social and existential practice whereby people establish their relationship with the space they occupy and use. Tuan showed that human spatial perception is structured by language, and that place names play an important role in the perception and representation of the environment. Basso specified place naming as a way of writing or making history and relating to the world at a very fundamental, existential level, with place names closely tied to identity.

However, there is yet another dimension to place names: power. People are not, and never have been, in equal positions to name places, neither individually nor collectively. Place names may constitute cultural heritage and may be important for establishing and reproducing social identities, but they are also loaded with emotions, alternative interpretations, and contested histories–and, as such, they are not politically innocent. As Tuan shows, they must be understood in the context of current power relations, which (strive to) reproduce themselves through various material and non-material practices, one of them being place names. It is precisely this focus on the politics of place naming that »critical toponymy« has developed (Rose-Redwood, Alderman and Azaryahu 2010). Critical toponymy is a lively current in contemporary place name research that critically examines the relationship between toponymy and power. It analyzes the ways in which political regimes and movements use place names to claim territories, erase linguistic traces of original populations, gain political legitimacy, delegitimize other political forces, naturalize certain versions of history, and silence dissent.

UNGEGN, which was described above, focuses on the standardization of geographical names. In principle it is a political body, although it is composed of an interdisciplinary set of scholars with a predominance of linguists, geographers, and cartographers. However, there are two additional global forums concerned with research on geographical names: the International Council of Onomastic Sciences (ICOS) and the joint commission on toponymy of the International Cartographic Association (ICA) and International Geographical Union (IGU). ICOS was founded in 1949 and deals with all kinds of proper names; that is, not only place names, but also names of persons and animals. However, place names play a growing role in ICOS activities, as documented by its triannual congresses and by its journal *Onoma*, which has been published since 1950. The Joint ICA/IGU Commission on Toponymy was founded in 2012 by the two global umbrella organizations of cartography and geography as a joint venture. Its initiation was also strongly supported by UNGEGN because the necessity was felt that the rather formal and political discussions in UNGEGN had to be supplemented by cartographic and geographical research. As a matter of fact, many UNGEGN experts are also active in this commission. The commission holds toponymy sessions as part of ICA and IGU congresses and conferences, and it also holds separate symposia on specific topics such as place-name changes and publishes proceedings. The themes of critical toponymy and the symbolic power of place names are very much in the foreground of its current activities.

4 Geographical names in Slovenia

Slovenian geographers have been dealing with geographical names for a long time. Already in the sixteenth century, Slovenian Baron Sigismund von Herberstein (1486–1566) from Vipava dealt with exonyms, transcription and transliteration. He contributed to knowledge about Russia, and his work *Rerum Moscoviticarum commentarii* (Notes on Muscovite Affairs) contained the first detailed maps of the European part of Russia, entitled *Moscovia* (Kladnik 2012).

Much later, the watershed year of 1848 awakened and strengthened the consciousness of European ethnic groups, including the Slovenians. *Atlant*, the first world atlas in Slovenian (1869–1877), prepared by Matej Cigale (1819–1889), is important for Slovenian exonyms. Cigale Slovenianized over four thousand foreign geographical names (Urbanc et al. 2006; Kladnik et al. 2006). For Slovenian endonyms, Peter Kosler's (1824–1879) map of Slovenian ethnic territory at a scale of about 1:600,000 (1853) is important. He collected over five thousand Slovenian names (Kladnik 2012).

However, real accelerated and systematic development in the field of geographical names and their standardization came about after Slovenia's independence in 1991.

Since 1990, the Commission for the Standardization of Geographical Names of the Government of the Republic of Slovenia has been responsible for geographical names in Slovenia. Since 1995, it has been headquartered at the Anton Melik Geographical Institute of the Research Centre of the Slovenian Academy of Sciences and Arts. It consists primarily of experts in geography, linguistics, cartography, and history as well as representatives of relevant ministries.

In 2001, the commission prepared the *Concise gazetteer of Slovenia* (Perko 2001) with standardized geographical names on the 1:1,000,000 *National Map of the Republic of Slovenia*. To date, the commission has also standardized the Slovenian names of countries and their main appertaining territories (Kladnik et al. 2013), as well as nearly five thousand geographical names in Slovenia recorded on the 1:250,000 *National Map of the Republic of Slovenia* (Furlan et al. 2008).

Slovenian geographers have also contributed to scholarly discussions on critical toponymy. Examples of problematic treatment of geographical names, such as the historical evolution of names for the Bay of Piran, have been presented and thoroughly discussed (Kladnik 2008; Kladnik, Pipan and Gašperič 2014). This geographic name is important for building the social identities and it is filled with emotions because it lies in the area of a border dispute between Slovenia and Croatia.

5 Articles in this special issue

For this special thematic issue of the journal *Acta geographica Slovenica*, some of the participants in the last session of the East Central and South-East Europe linguistic/geographical division prepared four research articles, which are briefly presented in this introductory chapter.

The first two articles deal with exonyms. The article »A comparison of Croatian and Slovenian exonyms« (Kladnik et al. 2017) compares exonyms in the two languages. Croatian and Slovenian are very closely related South Slavic languages, but during their historical development they came under the influence of various other languages and various language policies determined by the broader framework of Hungary and Austria.

A quick overview of exonyms in both languages reveals that many of them are completely identical, some differ in details only, and only a few differ significantly; for example, Vienna (German *Wien*, Slovenian *Dunaj*, Croatian *Beč*), Venice (Italian *Venezia*, Slovenian *Benetke*, Croatian *Venecija*), or the Rhine (Romansh *Rein*, German *Rhein*, French *Rhin*, Dutch *Rijn*, Slovenian *Ren*, Croatian *Rajna*).

The two Slovenian and two Croatian authors tested the existing Slovenian typology of exonymization and its applicability in Croatian. This led them to improve the methodology by adding a missing category and to look for suitable examples of exonymization for all categories in both languages–which could be identical, could differ, or could appear in only one of the two languages. The final result is a new typology of exonymization with twelve levels of Slovenianization and Croatization from the smallest to greatest degree of adaptation.

The article »Slovenian exonyms in North America« (Perko and Kladnik 2017) notes that the number of Slovenian exonyms around the world decreases with distance from Slovenia. However, this applies less so to North America, where their density is twice as high as in South and Central America, which is associated with the above-average global role of North America in the last century and the emigration of Slovenians in past centuries.

This quite remote part of the world was presented to Slovenians relatively early through Frederic Baraga (1797–1868), a Slovenian Catholic missionary to the United States and a grammarian of Native American languages (Kladnik 2012).

The authors prepared a spreadsheet with 3,819 exonyms and thirty-five thematic fields. For the analysis of Slovenian exonyms in North America, they considered all of the names on three maps (divided into three sections) at a scale of 1:50,000,000 that fall within Canada and the United States (excluding Greenland and Central America) and without names of undersea features (all three maps are included in the article). The final number of these names is 204, and the final number of names from the list of 3,819 names without undersea features is 3,316.

The analysis shows that in North America marine hydronyms (21.1%) are the most numerous semantic type of exonyms, and completely translated names (77.9%) are the most numerous Slovenianized type of exonyms. Among the original languages of exonyms, English completely prevails (97.1%).

The most commonly used Slovenian exonyms from North America in Slovenian texts are the names of countries and their administrative units. The next most commonly used Slovenian exonyms are *Dolina smrti* »Death Valley«, *Veliki kanjon* »Grand Canyon«, *Niagarski slapovi* »Niagara Falls«, *Skalno gorovje* »Rocky Mountains«, and *Aleuti* »Aleutian Islands« (Perko and Kladnik 2017).

The third article, »Microtoponyms as an important part of Slovenian cultural heritage« (Škofic 2017), deals with oeconyms and other microtoponyms in Slovenia. Geographical names are important part of the cultural heritage of every nation. For small nations with a small but diverse territory like Slovenia (Ciglič and Perko 2013; Perko, Ciglič and Hrvatin 2017; Perko, Hrvatin and Ciglič 2015), microtoponyms are a particularly important component of the cultural heritage. The author stresses that they often reflect the geomorphological, historical, biological, geological, and social characteristics of a country, as well as the historical development of the spoken language. People use microtoponyms to designate the space where they live and work, and to make orientation in it easier.

The author presents a methodology for data collection and documentation of microtoponyms in the Upper Carniolan dialect of Slovenian based on video and audio recordings. The author states that linguistic analysis and its consideration of the dialect characteristics of toponyms can help in reconstructing their naming motivation and origin.

A very interesting category of microtoponyms are oeconyms, also known as house names and farm names. The author determines oeconym as a toponym that denotes an occupied or unoccupied house with a street number in a settlement, a farm with or without land, farm outbuildings (e.g., grain mills, sawmills), or communal village buildings (e.g., a church, rectory, school, inn, or fire station). Oeconyms remain connected to houses and estates even after the original owners move on and may remain unchanged for centuries.

The author says that many of these names are of Slavic origin, but many of them are loanwords from various contact languages, mostly German and Italian. Oeconyms and other microtoponyms are mainly one-word toponyms. More complex structured toponyms are quite rare (Škofic 2017).

The first three articles link history with the present; however, the last article is based more on the current situation and the future. Its title is a question: »Does Google serve as a model for using place names?« (Gercsák and Mikesy 2017). Printed maps, names indexes, legends, and several traditional tools that have helped in correctly understanding and interpreting place names seem to be disappearing from everyday use. The authors say that, in the world of computers, most map users are turning to online methods or mobile applications when they need spatial information.

The article examines the reliability of geographical names published on various internet platforms in the case of Hungarian place names. The most common mistakes found by the authors are missing diacritics, use of historical names without modern equivalents, use of names never approved, false linking of exonyms, and automatic translations of place names.

With regard to automatic translations, the authors say that strange names typically appear on web pages for Austrian and Slovenian territories. The following are some examples:

- The Austrian name *Leitersdorf im Raabtal* »Leitersdorf in the Rába Valley« near Feldbach was replaced by the name *Rábakarmestere*, which means »conductor of the Rába River«;
- Instead of the Austrian name *Raabau* »Rába River floodplain« one finds *Rábaakadálymentes*, which roughly means »obstacle-free Rába River«;

- The Hungarian exonym for the southern Austrian settlement of *Ehrenhausen* (literally, »home of honesty«) is *Élőbecsület*, which means »living honesty«;
- The name *Radkersburg/Gornja Radgona* (literally, »Radger Castle«) on the Austrian-Slovenian border is translated as *Kerékerősítővár*, which means »wheel-strengthening castle«; and
- The nearby village of Podgrad (literally, »below the castle«) on the Slovenian side is *Keréknekfel*, which means »up on the wheel«.

The author says that the birth of false geographic names in large numbers in the popular media represents a considerable linguistic, cultural, informational, and economic challenge, partly because the false names are mixed with relevant data. They believe it is very important for the responsible geographical name authorities and the developers of online maps to cooperate and monitor the use of place names on the internet (Gercsák and Mikesy 2017).

6 Conclusion

Geographical names are such an important feature of geographical space that they may be seen as one of the foundations of every civilization. Through them, the land is »filled« with meanings. Spatially related identities can evolve only after a place has been given a name. Because geographical space is also a place of contact between different cultures, the same area may have different or overlapping geographical names. Through such contacts, the need for discussion and standardization of geographical names is quickly established. In international relations, standardization only became possible in the framework of the United Nations after the Second World War, when some common ground was established. Research on geographical names is based on official gazetteers or official lists of geographical names that have been established and mostly deal with the problems of exonyms and endonyms, as well as social aspects of geographical names, such as power relations. They refer to the positional power of societies and nations, can be used as referential power to attract people and build loyalty, and are related to expert power (Morgan 1986).

Geographical names may thus be seen as one of the last nation-building aspects of geography.

This special issue offers some insight into the discussion on the important area of geographical names. This introductory article briefly presents the main terms (geographical name or toponym, endonym, exonym, transliteration, transcription, and standardized geographical name) and then discusses the formal framework of their standardization within UNGEGN. The modern approaches and main research globally and in Slovenia are then discussed, followed by four examples. The examples comprise a discussion of Croatian and Slovenian exonyms, Slovenian exonyms in North America, microtoponyms as a part of Slovenian cultural heritage, and Google as a model for using place names. We believe that this special issue will contribute to scholarly discourse and perhaps even foster a new discussion.

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Acta geographica Slovenica, 57-1, 2017, 109–118

A COMPARISON OF CROATIAN AND SLOVENIAN EXONYMS

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DRAGO KLADNIK

The names for South Africa in Croatian and Slovenian are completely different exonyms. The photo shows a border crossing with Lesotho.

A Comparison of Croatian and Slovenian exonyms

DOI: http://dx.doi.org/10.3986/AGS.4653
UDC: 91:811.163.6'373.21
91:811.163.42'373.21
COBISS: 1.01

ABSTRACT: Croatian and Slovenian are very closely related South Slavic languages, but during their historical development they came under the influence of various other languages and various language policies determined by the broader framework of Hungary and Austria. This fact makes the comparative study of exonymization in both languages very interesting. Croatian and Slovenian exonyms are not only part of the cultural heritage of both nations, but also part of global cultural heritage. The article presents a comparative analysis of exonyms in both languages carried out as part of a bilateral project lasting a year and a half. The analysis is based on an improved typology, which was adjusted to the manner of exonymization for borrowed foreign geographical names in both of these related languages.

KEY WORDS: exonym, country name, intangible cultural heritage, Croatia, Slovenia

The article was submitted on 10th July, 2016.

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1 Introduction

Croatian and Slovenian are very closely related South Slavic languages (Comrie, Matthews and Polinsky 1999; Šekli 2013), but during their historical development they came under the influence of various other languages and various language policies determined by the broader framework of Hungary and Austria (Weber 2013). This fact makes the comparative study of exonymization in both languages very interesting.

Exonyms are part of the vocabulary of every language (Kadmon 1997; Kladnik et al. 2013), and their use changes constantly, just like the language itself. Therefore, it is vital to know the role of exonyms in both Slovenian and Croatian. Exonyms are an important component of both languages and thus not only part of the cultural heritage of both nations, but also part of global cultural heritage.

Although exonyms have already been studied in both Slovenian (e.g., Kladnik 2007, 2009; Kladnik and Bole 2012; Perko and Kladnik 2017) and Croatian (e.g., Crljenko 2014), this article presents the first comparative analysis of this linguistic phenomenon.

2 Methods

The Croatian-Slovenian bilateral project presented below lasted a year and a half, which was too brief for the participating researchers to carry out a comprehensive analysis of exonyms in the two languages. This was especially due to the fact that only Slovenian exonyms had been systematically collected and processed up until that point. Croatian researchers are relying on the Slovenian researchers' experience and their systematically arranged *The Gazetteer of Slovenian Exonyms* (Internet 1; Kladnik and Perko 2013; Kladnik and Geršič 2014).

Croatian researchers also revised the Croatian exonyms listed in Slovenian list of exonyms. The Croatian exonyms that do not have a corresponding Slovenian exonym and are only used as endonyms in Croatian are missing from the gazetteer. On the other hand, it also includes several Slovenian exonmys without a corresponding Croatian exonym.

Because it is impossible to compile a comparable detailed collection of Croatian exonyms (Crljenko 2016) in the short time available during the project (in Slovenia eighteen comprehensive sources were consulted), the Croatian researchers opted for a thematically differentiated approach. Hence, they began by collecting the names of the continents, countries, capital cities, and dependent territories, followed by the names of regions and certain major natural geographical features, such as hydronyms, as well as cities. The Croatian exonyms included in the text are based also on data available from Wikipedia.

We developed a typology of country names with six possible combinations of results from their comparative analysis. Throughout, we paid particular attention to the existing Slovenian typology of exonymization (Kladnik et al. 2013: 68–70; Kladnik and Perko 2013) and also tested its applicability in Croatian. This led us to improve the methodology for the missing category and to look for suitable examples of exonymization for all categories in both languages, which could be identical, could differ, or could appear in only one of the two languages.

Exonyms were mainly collected from atlases and professional literature dating from the second half of the nineteenth century to the Second World War. The first Slovenian atlas was prepared by the editor Matej Cigale, who issued it in individual volumes (Cigale 1869–1877; Fridl et al. 2005). At that time, only Kozenn's high-school atlas had been published in Croatian (Kozen 1887; Blasius Kozenn (in Slovenian Blaž Kocen) was a major cartographer with Slovenian roots, active in Moravia and Vienna). This atlas was also used by Slovenian high-school students in the absence of other such literature. A full twenty editions of this atlas were published in Croatia between 1887 and 1943 (Bratec Mrvar et al. 2011, 105; Crljenko 2014).

3 Croatian-Slovenian bilateral project

The main purposes of the project were:

a) to establish a unique exonym classification typology according to the intensity and variety of name adaptation, and

b) to analyze various social, political, and linguistic influences on different process of adaptation (exonymization) in two closely related South Slavic languages (Crljenko 2016). Comparing Croatian and Slovenian exonmys provides a basis for analyzing the motives for exonymization in the early stages of adapting foreign geographical names.

Among the goals of their research efforts, the researchers working on this project in both countries also highlighted the presentation of the project and its preliminary findings at the Zagreb conference of the Working Group on Exonyms (Kladnik 2015) and the joint preparation of research articles.

Informally, the paths of both research teams had already crossed prior to this, while preparing seminal lexical works in both countries (i.e., general world atlases, school atlases, and encyclopedias), in which the use of exonyms adapted to international UN resolutions, their proper transcription, and the appropriate transcription of endonyms (taking into account the applicable romanization systems in the case of their transliteration into the Roman alphabet) are key for successfully implementing projects.

4 Main results

A quick overview of exonyms in both languages reveals that many of them are completely identical, that some only differ in details, and that the ones that differ significantly in both languages account for the smallest share. Examples of the last group are provided in Table 1. The papers that have been prepared by the project partners address the strength of influences on the exonymization process in both languages and investigate differences between them.

Table 1: Comparison of selected Croatian and Slovenian exonyms that differ significantly.

Endonym	Semantic type	Croatian exonym	Slovenian exonym
Arctica	region	Arktik	Arktika
Bălgarija	country	Bugarska	Bolgarija
Brasil	country	Brazil	Brazilija
France	country	Francuska	Francija
Zhōngguó	country	Kina	Kitajska
Côte d'Ivoire	country	Obala Bjelokosti/Bjelokosna Obala	Slonokoščena obala
Muang Thai	country	Tajland	Tajska
Algérie / al-Jazā'ir / Dzayer	country	Alžir	Alžirija
Elláda	country	Grčka	Grčija
Guiné-Bissau	country	Gvineja Bisau	Gvineja Bissau
Wien	settlement	Beč	Dunaj
Venezia	settlement	Venecija	Benetke
Napoli	settlement	Napulj	Neapelj
Bucureşti	settlement	Bukurešt	Bukarešta
Rio Amazonas / Solimões	land hydronym	Amazona	Amazonka
Rhein / Rhin / Rijn	land hydronym	Rajna	Ren
Lake Huron	land hydronym	Huron	Huronsko jezero
Český les / Böhmischer Wald	land relief form	Češka šuma	Češki gozd
Rocky Mountains	land relief form	Stjenjak	Skalno gorovje
Ostriv Zmiyinyy / Insula şerpilor	island relief form	Zmijski otok	Kačji otok
Victoria Island / Kitlineq	island relief form	Otok Victoria	Viktorijin otok

A second aspect of comparison focuses on studying the types of adaptation of exonyms in the two languages. Here it is necessary to observe that both geographers and linguists deal with exonyms in Croatia, whereas in Slovenia this is almost exclusively the domain of geographers. Several typologies have already been prepared in Slovenia, but none of them have been tested by linguistic experts. Cooperation between linguists in the Croatian-Slovenian research group is an excellent aid in creating a better typology that could be used to compare the features of exonyms in the two languages. Because the meetings of the UNGEGN Working Group on Exonyms have shown interest in such a universally applicable classification, this would also be useful for the categorization of exonyms in other related languages.

The basic research on the most recent and best-developed version of the Slovenian exonymization types (Kladnik and Geršič 2014) showed that the existing types are also perfectly acceptable for analyzing Croatian exonyms. Additional findings by the Croatian linguists confirmed the Slovenian research efforts to date that have not yet been adequately analyzed by Slovenian linguists. Their detailed analyses revealed the need to add another type to the existent exonymization types, which in terms of the degree of exonymization is ranked eighth (labeled H):

Phonetic form of roots with Croatianized and Slovenianized endings from the Latin suffixes *-ia*, *-ea* (Ide. *- iā-, *-ēa). This group includes names of some countries, continents, major regions, islands, and island groups, which are usually formed from roots adapted to Croatian/Slovenian pronunciation and the Croatianized/Slovenianized ending *-ija* or *-eja*, which derives from the Latin suffixes *-ia* and *-ea*. Examples: Cro: *Australija*, Sln: *Avstralija* »Australia«; Sln: *Španija* »Spain« (*España*); Sln: *Francija* »France«; Cro: *Austrija*, Sln: *Avstrija* »Austria« (*Österreich*); Cro/Sln: *Eritreja* »Eritrea« (*ʾErtrā/Iritrīyā*); Cro/Sln: *Gvineja* »Guinea« (*Guinée*); Cro/Sln: *Belgija* »Belgium« (*België/Belgique*); Cro/Sln: *Azija* »Asia«; Cro/Sln: *Cezareja* »Caesarea«; Cro/Sln: *Lombardija* »Lombardy« (*Lombardia*); Cro/Sln: *Sicilija* »Sicily« (*Sicilia*); Cro/Sln: *Katalonija* »Catalonia« (*Cataluña/Catalunya*); Cro/Sln: *Tasmanija* »Tasmania«, and Cro/Sln: *Polinezija* »Polynesia«.

Together, we developed a new shared typification based on Moder's classification (Moder 1972), which includes twelve types instead of eleven that are ordered from the smallest to greatest degree of exonymization:

A. **Exonym from translated common name and original proper name.** Typical examples are the following names: Cro: *jezero Titicaca* »Lake Titicaca« (*Lago Titicaca*); Cro: *vrh Windom* »Windom Peak«; Cro: *planina Kenya* »Mount Kenya« (*Kirinyaga/ Mount Kenya*); Cro: *rt Henry* »Cape Henry«; Sln: *otoki Bounty*, Cro: *otočje Bounty* »Bounty Islands«; Sln: *globel Meteor* »Meteor Deep«; Sln: *hrbet Sala y Gómez* »Sala y Gómez Ridge« (*Cadena de Sala y Gómez*); Sln: *jezero Hanka* »Lake Khanka« (*ozero Xanka*); Sln: *mizasta gora Sylvania* »Sylvania Tablemount/Bikini Guyot«; Sln: *plošča Nazca* »Nazca Plate«; Sln: *prelom GOFAR* »GOFAR Fracture Zone«; Sln: *rt Correnti* »Cape Correnti« (*Capo delle Correnti*); Sln: *zemeljska ožina Kra* »Kra Isthmus/Isthmus of Kra« (*Khokhok Kra*).
B. **Exonym from translated common name and more or less Croatianized/Slovenianized proper name.** Typical examples: Cro: *nizina Gangesa* »Ganges Plain«; Cro: *delta Inda* »Indus Delta«; Cro: *poluotok Aljaska* »Alaska Peninsula«; Sln: *gora Fudži* »Mount Fuji« (*Fujisan*); Sln: *jarek Ob* »Ob Trench«; Sln: *jezero Abaja* »Lake Abaya« (*Abaya Hayk*); Sln: *oaza Karga* »Kharga Oasis« (*el-Ḵarga*); Sln: *gora Kenija* »Mount Kenya« (*Kirinyaga/ Mount Kenya*); Sln: *polotok Šantung* »Shandong Peninsula« (*Shāndōng Bàndǎo*); Sln: *rt Komorin* »Kanyakumari« (*Kanniyākumāri*); Sln: *slana puščava Lut* »Lut Desert« (*Dasht-e Lūt*); Sln: *prekop Majna–Donava*, Cro: *kanal Majna-Dunav* »Main–Danube Canal« (*Main-Donau-Kanal*); Cro/Sln: *jezero Tanganjika* »Lake Tanganyika/Lac Tanganyika«.
C. **Exonym from adopted secondary original name.** These include geographical names that differ from the official original names and can be borrowed in an unchanged, non-adapted form as colonial names, names from the past, names in the neighbouring languages, and names from Slavic languages. Since they became widely used, they have been used exclusively or largely in this version, whereas the official forms of the names are only used for their unambiguous identification. Typical examples of this type of adaptation include the following names: Cro: *Pečuh* »Pécs«; Sln: *Benares* »Varanasi« (*Vārānasi*); Sln: *Bistrica* »Haliacmon River« (*Haliákmōn*); Sln: *El Obeid* »Al-Ubayyid« (*Al Ubayyiḍ*); Sln: *Harkov* »Kharkiv«; Sln: *Kanton* »Guangzhou« (*Guǎngzhōu*); Sln: *Lemnos* (*Limnos*); Sln: *Sinkiang* »Xinjiang« (*Xīnjiāng*); Sln: *Tripolis* »Tripoli« (*Ṭarābulus*); Cro/Sln: *Armenija* »Armenia« (*Hayastan*); Cro/Sln: *Cejlon* »Sri Lanka« (*Śrī laṃkāva*); Cro/Sln: *Peking* »Beijing« (*Běijīng*); Cro/Sln: *Kijev* »Kiev«(Kyïv). Cro/Sln: *Kosovska Mitrovica* »Kosovska Mitrovica« (*Mitrovicë*); Cro/Sln: *Tirana* (*Tiranë*).
D. **Exonym from original name with omitted special characters and diacritics.** Also in this adaptation type, the main principle is to remain as faithful to the original form as possible, but here the main issue is the letter, accent, and diacritics, which are omitted due to simplifications in printing and tradition, but here the main issue is that a letter, accent or diacritic is omitted due to simplifications in Croatian/Slovenian printing, tradition, and pronunciation. For example Sln: *Reykjavik* »Reykjavík«(*Reykjavík*); Sln: *Gdansk* »Gdańsk« (*Gdańsk*); Sln: *Narjan Mar* »Naryan-Mar« (*Nyar'yana marq*); Cro/Sln: *Iran* »Iran« (*Īrān*); Cro/Sln: *Riga* »Riga« (*Rīga*); Cro/Sln: *Bogota* »Bogotá« (*Bogotá*); Cro/Sln: *Islamabad* »Islamabad« (*Islāmabād*); Cro/Sln: *Sana* »Sana'a« (*Ṣan»ā«*); Cro/Sln: *Agadir* »Agadir« (*Aġadīr*).
E. **Exonym from transliterated original name with simplified letters and diacritics.** This includes a large group of names that are transferred from non-Roman scripts (e.g., Cyrillic, Arabic, Hebrew, Devanagari,

Chinese, and Japanese) into the Roman alphabet. In this process, we skip the intermediary language (French, English, German, and Russian) and any unusual phonetic representation (*sh*, *sch*, *ch* = *š*; *oo*, *ou* = *u*); for example, we write Cro/Sln: *Pandžab* instead of Punjab, Cro/Sln: *Sečuan* instead of Sichuan/Szechwan (*Sìchuān Shěng*). We also omit any long or short syllables markings, as already mentioned with the Roman alphabet: for example Cro: *Juba*, Sln: *Džuba* »Juba« (*Dzhūbā*); Cro/Sln: *Asuan* (*Aswān*); Cro/Sln: *Tokio* (*Tokyō*); Cro/Sln: *Bengazi* »Benghazi« (*Binġāzī*). Even greater adaptation linked to the written form has become common in the pronunciation of these names. They are pronounced like Slovenian or Croatian names, without any foreign flavour.

F. **Exonym from transcribed original name with Croatianized/Slovenianized ending.** This group of exonyms is composed of »hybrids« partly resulting from the Croatianization/Slovenianization tendencies present in the previous two groups. It includes names with a Croatianized/Slovenianized ending (e.g., *Tirana* [*Tiranë*]), the root (e.g., in the pronunciation of Cro/Sln: *Ostende* »Ostend« [*Oostende*]), especially if the root is commonly known (e.g., from a personal name, e.g. Sln: *Ptolemaida* [Ptolemais/Tolmeta/Āthār Ṭulmaythah]) or it does not belong to the same language group (Indian and Spanish cities in North America, and native names in the former British, French, Portuguese, and Spanish colonies. They also include names such as Cro: *Prag*, Sln: *Praga* »Prague« (*Praha*); Cro/Sln: *Pariz* »Paris«; Cro/Sln: *Varšava* »Warsaw« (*Warzsawa*). The following basic principle applies to the entire group: the better the name is known, the longer it is present in Slovenian consciousness, and the more frequently it is used, the smaller the likelihood that its pronunciation will strictly copy the original form; instead it is simplified (especially the endings), which makes it easier to decline and to form its adjectival form.

G. **Exonym from borrowed and adapted name.** This group includes names borrowed from another language, Croationized/Slovenianized, and adapted to Croatian/Slovenian pronunciation (e.g., Cro/Sln: *Abesinija* »Abyssinia« [from Italian *Abissinia*]) or Croatian/Slovenian usage: Sln: *Šensi* »Shanxi Province« (*Shănxī Shěng*); Sln: *Velika Vlaška* »Wallachia Mayor/Muntenia« (*Țara Românească*); Sln: *Hongkong* »Hong Kong« (*Xiānggǎng*); Sln: *Peč* »Peć« (*Pejë/Peja*); Sln: *Kašgar* »Kashgar« (*Kāshí/Qeșqer*); Sln: *Japonske Alpe* »Japanese Alps« (*Nihon Arupusu*); Sln: *Mizijski Olimp* »Mysian Olympus« (*Uludağ*); Cro: *Dnjestar*, Sln: *Dnester* »Dniester« (*Dnister/Nistru*); Sln: *Spitsbergi* »Svalbard«; Cro/Sln: *Nahičevan* »Nakhchivan« (*Naxçıvan*); Cro/Sln: *Irtiš* »Irtyš« (*Irtyš/Ertis/É'ěrqísī hé*).

H. **Exonym with phonetic form of the roots and Croationized/Slovenianized endings from the Latin suffixes *-ia*, *-ea* (Ide. *-iā-, *-ēa)** (already described in detail above).

I. **Exonym with phonetic form of the root and Croatian/Slovenian ending (like -ska/-ška/-čka, -je, -i etc.).** The next stage of adaptation is best seen in the names of numerous countries, continents, settlements, regions, and island groups. Here, an ideal harmony is achieved between the foreign root and Slovenian pronunciation, which means that the root is written completely phonetically and the endings are completely Croatian or Slovenian. Examples: Cro: *Francuska* »France« (*France*); Sln: *Portugalska* »Portugal«; Sln: *Pomorjanska* »Pomerania« (*Pommern/Pomorze*); Sln: *Kurili* »Kuril/Kurile Islands« (*Kuril'skie ostrova/Chishima-rettō*); Sln: *Porenje*, Cro: *Porajnje* »Rhineland« (*Rheinland*); Cro: *Falačka*, Sln: *Pfalška* »Palatinate« (*Pfalz*); Cro: *Bukarešt*, Sln: *Bukarešta* »Bucharest« (*București*); Cro/Sln: *Afrika* »Africa«; Cro/Sln: *Amerika* »America«; Cro/Sln: *Bretanja* »Brittany« (*Bretagne*); Cro/Sln: *Apalači* »Appalachians/Appalachian Mountains«; Cro/Sln: *Pireneji* »Pyrenees« (*Pirineos/Pyrénées*).

J. **Exonym from fully translated name.** This group includes full translations of endonyms. This stage no longer involves original official names that preserve the root, but only in the semantic sense. Examples: Sln: *Skalno gorovje* »Rocky Mountains«; Sln: *Plitvina lososov* »Salmon Bank«; Cro: *Crveno more*, Sln: *Rdeče morje* »Red Sea« (*al-Baḥr al-Aḥmar*); Cro: *Rt dobre nade*, Sln: *Rt dobrega upanja* »Cape of Good Hope«; Cro/Sln: *Nizozemska* »Netherlands« (*Nederland*); Cro/Sln: *Veliko slano jezero* »Great Salt Lake«. These names also include generally and partly borrowed foreign names, such as Sln: *Pacifik* »Pacific«; Sln: *Mediteran* »Mediterranean«, and roots of heavily Croationized/Slovenianized geographical names, such as Cro: *Novi Zeland*, Sln: *Nova Zelandija* »New Zealand«; Cro: *Zapadna Australija*, Sln: *Zahodna Avstralija* »Western Australia«; Cro: Zapadnosibirska nizina, Sln: *Zahodnosibirsko nižavje* »West Siberian Plain« (*Zapadno-Sibirskaja ravnina*); Cro/Sln: *Nova Škotska* »Nova Scotia«.

K. **Exonym from traditionally Croationized/Slovenianized name with a trace of the original root.** This group is comprised of names in which the root can still be traced in places. Examples: the exonym Sln: *Lipnica* »Leibnitz«; Cro: *Firenca*, Sln: *Firence* »Florence« (*Firenze*); Cro: *Konstantinopol*, Sln: *Konstantinopel* »Constantinople« (*Konstantinopolis/Constantinopolis*); Cro/Sln: *Apulija* »Apulia« (*Puglia*); Cro/Sln: *Rim* »Rome« (*Roma*).

L. **Exonym from Croatian/Slovenian name.** In the last group the root can no longer be traced because the names have been developed in Croatian or Slovenian themselves (due to their historical connections with the named places). Typical examples include Cro: *Jakin* »Ancona«; Sln: *Celovec* »Klagenfurt«; Sln: *Videm* »Udine«; Cro: *Beč*, Sln: Dunaj »Vienna« (*Wien*); Cro: *Mleci*, Sln: *Benetke* »Venice« (*Venezia*); Cro: *Željezno*, Sln: *Železno* »Eisenstadt«; Cro/Sln: *Carigrad* »Istanbul« (*İstanbul*).

4.1 Comparison of country names

Because the Croatian partners have not yet completed the selection of all exonyms from all available sources, we made a comparison based only on the semantic type »country names.« We divided these into six different groups adapted to the data:

- Endonym;
- Endonym in only one of the two languages;
- Same endonym in both languages;
- Minor differences in exonymization (difference in capitalization or individual letters);
- Major differences (different ending or different root, several different letters, different translation of generic component); and
- Different name.

Based on the comparison, we determined (Figures 1 and 2) that nearly half of the country names in the two languages use the same exonym. In terms of numbers, these are followed by completely different names (e.g., Cro: *Kina* vs. Sln: *Kitajska* »China«), names with major differences in the degree of exonymization (e.g., Cro: *Španjolska* vs. Sln: Španija »Spain«), names with minor (only orthographic) differences in the degree of exonymization (e.g., Cro: *Austrija* vs. Sln: *Avstrija* »Austria«), and country names for which both languages use the endonym (e.g., Cro/Sln: *Angola*), followed distantly by country names for which the endonym is used in only one of the two languages – while in the other a translation of conjunction is used (e.g. Cro: *Bosna i Hercegovina* vs. Sln: *Bosna in Hercegovina* »Bosnia and Herzegovina«).

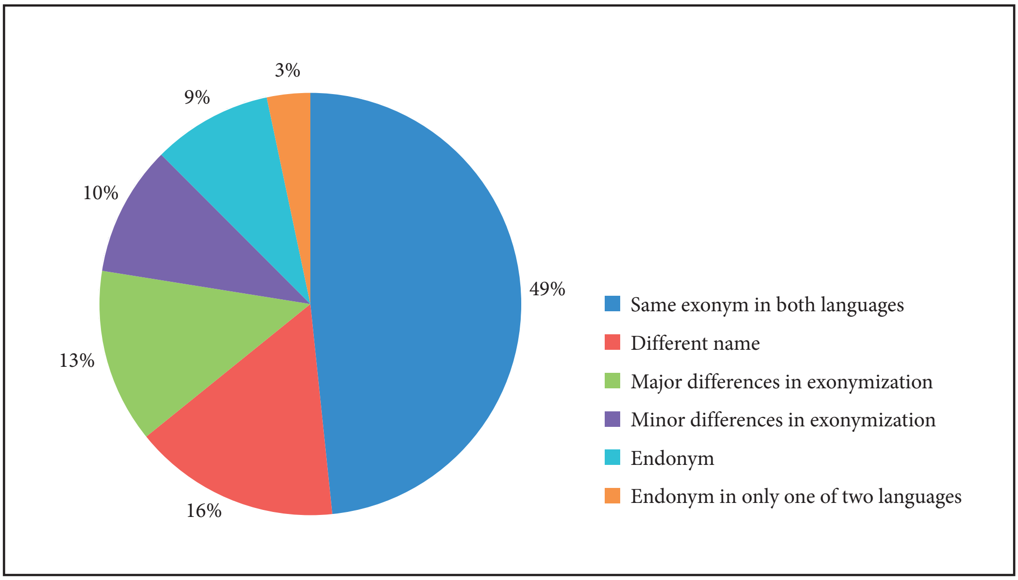
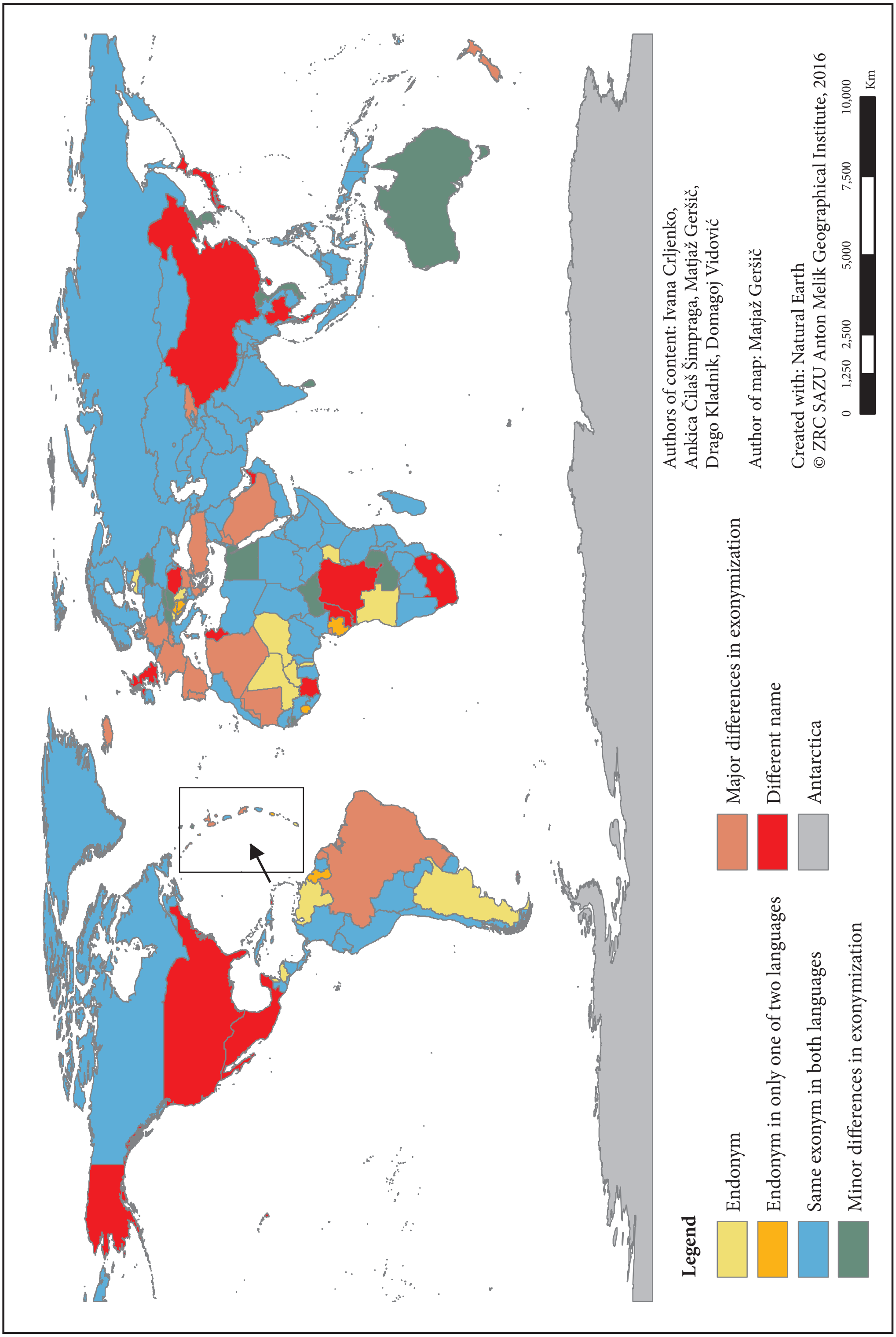


Figure 1: Share of names by groups base on a comparison between their names in Croatian and Slovenian.

Figure 2: Countries of the world divided into groups based on comparison between their names in Croatian and Slovenian. ➤ p. 116


Legend
Endonym
Endonym in only one of two languages
Same exonym in both languages
Minor differences in exonymization
Major differences in exonymization
Different name
Antarctica
Authors of content: Ivana Crljenko, Ankica Čilaš Šimpraga, Matjaž Geršič, Drago Kladnik, Domagoj Vidović
Author of map: Matjaž Geršič
Created with: Natural Earth
© ZRC SAZU Anton Melik Geographical Institute, 2016
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5 Conclusion

Detailed studying of Croatian and Slovenian exonyms provides greater insight into exonymization in two related languages that have nonetheless developed differently under the influence of historical circumstances. The comparison of country names showed that nearly half have the same exonym in both languages, which points to their closely connected linguistic development. One-sixth of the names are completely different, and for the remainder the names contain greater or lesser differences. Endonyms are rarely used in either language.

In this regard, ideas have arisen that similar studies could also be conducted at the multilateral level. Studies including some West Slavic languages, for which lists of exonyms have already been prepared (Hajčiková and Kováčová 1997; Beránek et al. 2006; Internet 2), might prove especially interesting because they would not require any time-consuming systematic collection of exonyms. Within the context of these languages, it would also make sense to compare types of exonymization, considering that this most likely took place in a relatively similar manner.

ACKNOWLEDGEMENT: The Bilateral project BI-HR/14-15-049 was financed by Ministry of Science, Education and Sports of the Republic of Croatia and Slovenian Research Agency.

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Acta geographica Slovenica, 57-1, 2017, 119–139

SLOVENIAN EXONYMS IN NORTH AMERICA

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Section of the map of North America from *Atlant* (1869–1877), the first world atlas in Slovenian.

Slovenian exonyms in North America

DOI: http://dx.doi.org/10.3986/AGS.4777
UDC: 91:811.163.6'373.21
COBISS: 1.01

ABSTRACT: The number of Slovenian exonyms around the world decreases with distance from Slovenia. This applies less so to North America, where their density is twice as high as in South and Central America. Based on a comparative analysis of geographical names from all important world atlases in Slovenian, we prepared two spreadsheets of Slovenian exonyms. The extensive spreadsheet has 5,038 names and the concise spreadsheet has 3,819 names. Each exonym has thirty-five thematic fields.
In North America, marine hydronyms (21.1%) are the most numerous semantic type of exonyms, and completely translated names (77.9%) are the most numerous Slovenianized type of exonyms. Among the original languages of exonyms, English completely prevails (97.1%).
The most commonly used Slovenian exonyms from North America in Slovenian texts are *Dolina smrti* »Death Valley«, *Veliki kanjon* »Grand Canyon«, *Niagarski slapovi* »Niagara Falls«, *Skalno gorovje* »Rocky Mountains«, and *Aleuti* »Aleutian Islands«.

KEY WORDS: geographical name, endonym, exonym, Slovenian, Slovenianization, North America, United States, Canada

The article was submitted for publication on November 15th, 2016.

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1 Introduction

A geographical name or toponym (from Greek *tópos* »place« and *ónyma*, a dialect variant of *ónoma* »name«) is a proper name of a geographical feature.

An **endonym** (from Greek *éndon* »inside«) is the geographical name of a feature in one of the languages spoken in the territory of the feature. An **exonym** (from Greek *éksō* »outside«) is the geographical name of a feature in one of the languages that are not spoken in the territory of the feature, if different from the endonym of this feature (Kadmon 2000). Simply put, an endonym is the local (or original) name of a geographical feature and an exonym is a foreign name for the same feature (Kladnik 2009).

Slovenian endonyms are Slovenian geographical names within Slovenian ethnic territory, and Slovenian exonyms are Slovenian geographical names in all other territories if they differ from the endonyms there.

In the narrow sense of the word, Slovenian exonyms only include Slovenian geographical names that are completely different from the original endonyms (e.g., *Nemčija* for *Deutschland* »Germany«); in the broader sense, they also include Slovenianized and translated geographical names (e.g., *Pariz* »Paris« and *Rumena reka* »Yellow River«, Chinese *Huang He*).

The average density of Slovenian exonyms per million km² is 103 in Europe, eighteen in Asia, fourteen in Africa, eight in North America, five in South America, and four in Central America.

The number of Slovenian exonyms around the world decreases with distance from Slovenia. This applies less so to North America, where the density is twice as high as in South and Central America, which is associated with the above-average global role of North America in the last century and the emigration of Slovenians in past centuries.

2 Methods

We collected geographical names from fourteen Slovenian world atlases, including Cigale's *Atlant* (Atlas, 1869–1877), the first world atlas in Slovenian (Urbanc et al. 2006; Kladnik et al. 2006), as well as some important encyclopedias (*Veliki splošni leksikon* … 1997–1998) and the Slovenian Orthography (*Slovenski pravopis* 2001).

Based on a comparative analysis of the names collected, we prepared two spreadsheets of Slovenian exonyms. The extensive spreadsheet contains 5,038 names (Internet 1) and the concise one has 3,819 names (Kladnik et al. 2013). Each exonym has thirty-five thematic fields (Table 1):

- 1) Nominative form of the Slovenian exonym;
- 2) Genitive form of the Slovenian exonym;
- 3) Adjectival form of the Slovenian exonym;
- 4) Original geographical name (endonym);
- 5) Language of the original geographical name;
- 6) Exonym location (continent, ocean);
- 7) Exonym location (country, sea);
- 8) Semantic type of the exonym;
- 9) Latitude of the exonym;
- 10) Longitude of the exonym;
- 11) Degree of Slovenianization of the exonym;
- 12) Status of the exonym according to standardization;
- 13) Recommended use of the exonym (necessary, recommended, less recommended, not recommended or unnecessary, inappropriate);
- 14) Alternative exonym (allonym);
- 15–24) Versions of the Slovenian exonym in atlases and other sources;
- 25–32) English, French, German, Spanish, Russian, Italian, Croatian, and Hungarian form of the exonym;
- 33) Etymology of the exonym;
- 34) Notes about the exonym;
- 35) Coordinates of the exonym on the map.

For exonyms from the list of 3,819 names, we produced several maps (at a scale of 1:50,000,000 for the entire world, and at some more detailed scales for certain parts of the world, especially Europe, where the density of Slovenian exonyms is higher).

Table 1: List of Slovenian exonyms in Canada and the United States.

	Exonym, slovenized name	Endonym, original name	Original language	Semantic type	Degree of slovenization	Location (continent, ocean)	Location (country, sea)	Latitude	Longitude	Location on map
1	Akadija	Acadie/Acadia	French/English	Historical region	H	North America	Canada	46° 08' N	65° 21' W	II 2D
2	Aljaska	Alaska	English	Natural landscape	F	North America	USA	63° 35' N	154° 30' W	VII 1A, 1B
3	Aljaska	Alaska	English	Administrative unit	F	North America	USA	63° 35' N	154° 30' W	VII 1A, 1B
4	Aljaški polotok	Alaska Peninsula	English	Coastal relief form	J	North America	USA	63° 35' N	154° 30' W	I 1A
5	Aljaško gorovje	Alaska Range	English	Land relief form	J	North America	USA	62° 31' N	152° 48' W	I 1A, 1B
6	Aleuti	Aleutian Islands	English	Island relief form	I	North America	USA	54° 49' N	164° 02' W	I 2A
7	Aleutsko gorovje	Aleutian Range	English	Land relief form	J	North America	USA	60° 29' N	152° 45' W	I 2A
8	Aleksandrov arhipelag	Alexander Archipelago	English	Island relief form	J	North America	USA	56° 40' N	134° 05' W	I 2B
9	Alleghenyjska planota	Allegheny Plateau	English	Land relief form	J	North America	USA	41° 16' N	79° 05' W	II 2D
10	Amerika	America/Amérique	English/French	Continent	F	North/Central/South America	–	13° 32' N	86° 07' W	II 3C, 3D
11	Amundsenov zaliv	Amundsen Gulf	English	Sea hydronym	J	Arctic Ocean	Beaufort Sea	70° 27' N	122° 21' W	IV 1B
12	Angloamerika	Anglo-America	English	Continent	F	North America	Canada/USA	44° 11' N	98° 22' W	II 2C, 2D
13	Apalači	Appalachians/Appalachian Mountains	English	Land relief form	I	North America	Canada/USA	36° 36' N	81° 41' W	II 2D
14	Arktični ocean	Arctic Ocean/Océan Arctique	English/French	Sea hydronym	J	Arctic Ocean	–	86° 32' N	135° 00' W	IV 1A, 1B
15	Arktika	Arctica/Arctique	English/French	Sea hydronym	F	Europe/Asia/North America	–	87° 48' N	1° 15' E	II 1C, 1D
16	Atlantsko obalno nižavje	Atlantic Coastal Plain	English	Land relief form	J	North America	USA	33° 47' N	79° 41' W	II 2D
17	Otok Axla Heiberga	Axel Heiberg Island	English	Island relief form	J	North America	Canada	79° 32' N	90° 58' W	II 1C
18	Baffinov zaliv	Baffin Bay/Baffin Bugten	English/Danish	Sea hydronym	J	Arctic Ocean	–	70° 41' N	62° 38' W	V 1D
19	Baffinov otok	Baffin Island/Qikiqtaaluk	English/Inuit	Island relief form	J	North America	Canada	69° 26' N	71° 52' W	II 1D
20	Bakerjev in Howlandov otok	Baker and Howland Island	English	Administrative unit	J	Oceania	USA	0° 29' N	176° 32' W	VII 3A
21	Bakerjev otok	Baker Island	English	Island relief form	J	Oceania	USA	0° 12' N	176° 29' W	I 3A
22	Banksov otok	Banks Island	English	Island relief form	J	North America	Canada	72° 56' N	121° 15' W	I 1B
23	Barrowov preliv	Barrow Strait	English	Sea hydronym	J	Arctic Ocean	–	74° 19' N	94° 24' W	V 1C
24	Bathurstov otok	Bathurst Island	English	Island relief form	J	North America	Canada	75° 46' N	98° 52' W	II 1C
25	zaliv Fundy	Bay of Fundy	English	Sea hydronym	A	Atlantic Ocean	–	44° 55' N	65° 58' W	V 2D
26	Beaufortovo morje	Beaufort Sea	English	Sea hydronym	J	Arctic Ocean	Beaufort Sea	72° 10' N	137° 39' W	IV 1B
27	Belcherjevi otoki	Belcher Islands	English	Island relief form	J	North America	Canada	56° 11' N	79° 19' W	II 2D
28	Beringov preliv	Beringov proliv/Bering Strait	Russian/English	Sea hydronym	J	Arctic/Pacific Ocean	–	65° 55' N	168° 46' W	IV 1A
29	Beringovo morje	Beringovo more/Bering Sea	Russian/English	Sea hydronym	J	Pacific Ocean	Bering Sea	57° 38' N	175° 30' W	IV 2A
30	polotok Boothia	Boothia Peninsula	English	Coastal relief form	A	North America	Canada	71° 02' N	94° 33' W	II 1C
31	Britanska Kolumbija	British Columbia	English	Administrative unit	J	North America	Canada	54° 28' N	124° 58' W	VII 2B
32	Brooksovo gorovje	Brooks Range	English	Land relief form	J	North America	USA	67° 54' N	150° 38' W	I 1A, 1B
33	Kalifornija	California	English/Spanish	Natural landscape	H	North America	USA	36° 44' N	119° 26' W	VII 2B
34	Kalifornija	California	English	Administrative unit	H	North America	USA	36° 44' N	119° 26' W	VIII 2C
35	Kanada	Canada	English/French	Country	F	North America	Canada	55° 53' N	96° 23' W	VIII 2C, 2D
36	Arktični arhipelag	Canada Archipelago	English	Island relief form	L	North America	Canada	73° 54' N	92° 24' W	II 1C, 1D
37	Kanadski ščit	Canadian Shield	English	Natural landscape	J	North America	Canada	52° 50' N	87° 50' W	VIII 2C, 2D
38	Bathurstov rt	Cape Bathurst	English	Coastal relief form	J	North America	Canada	70° 38' N	128° 15' W	I 1B
39	rt Canaveral	Cape Canaveral	English	Coastal relief form	A	North America	USA	28° 27' N	80° 32' W	II 3D
40	Charlesov rt	Cape Charles	English	Coastal relief form	J	North America	USA	52° 13' N	55° 38' W	III 2E

	Exonym, slovenized name	Endonym, original name	Original language	Semantic type	Degree of slovenization	Location (continent, ocean)	Location (country, sea)	Latitude	Longitude	Location on map
41	Chidleyjev rt	Cape Chidley	English	Coastal relief form	J	North America	Canada	60° 29' N	64° 39' W	II 1D
42	rt Cod	Cape Cod	English	Coastal relief form	A	North America	USA	41° 50' N	69° 59' W	II 2D
43	rt Flattery	Cape Flattery	English	Coastal relief form	A	North America	USA	48° 23' N	124° 43' W	I 2B
44	rt Hatteras	Cape Hatteras	English	Coastal relief form	A	North America	USA	35° 15' N	75° 32' W	II 2D
45	rt Mendocino	Cape Mendocino	English	Coastal relief form	A	North America	USA	40° 26' N	124° 25' W	I 2B
46	Rt waleškega princa	Cape Prince of Wales	English	Coastal relief form	J	North America	USA	65° 39' N	168° 07' W	I 1A
47	rt Race	Cape Race	English	Coastal relief form	A	North America	Canada	46° 40' N	53° 04' W	III 2E
48	rt Sable	Cape Sable	English	Coastal relief form	A	North America	Canada	43° 24' N	65° 37' W	II 2D
49	rt Sable	Cape Sable	English	Coastal relief form	A	North America	USA	25° 10' N	81° 08' W	II 3D
50	Kaskadno gorovje	Cascade Range/Cascades	English	Land relief form	J	North America	USA	47° 34' N	121° 13' W	I 2B
51	Osrednje nižavje	Central Lowlands/Central Plains	English	Land relief form	J	North America	USA	39° 21' N	90° 54' W	II 2C, 2D
52	Kanalski otoki	Channel Islands	English	Island relief form	J	North America	USA	33° 21' N	119° 16' W	II 2C
53	Chesapeaški zaliv	Chesapeake Bay	English	Sea hydronym	J	Atlantic Ocean	–	37° 36' N	76° 05' W	V 2D
54	Obalno gorovje	Coast Mountains/Coast Range	English	Land relief form	J	North America	Canada/USA	50° 20' N	123° 25' W	I 2B
55	Obalne gorske verige	Coast Ranges	English	Land relief form	J	North America	USA	40° 34' N	123° 42' W	I 2B
56	Kolorado	Colorado	English	Administrative unit	F	North America	USA	38° 53' N	105° 39' W	VIII 2C
57	Koloradska planota	Colorado Plateau	English	Land relief form	J	North America	USA	37° 00' N	109° 36' W	II 2C
58	Kolorado	Colorado River/Río Colorado/'Aha Kwahwat	English/Spanish/Mojave	Land hydronym	F	North America	USA/Mexico	31° 39' N	114° 44' W	V 2C
59	Kolumbijsko gorovje	Columbia Mountains/Columbia Range	English	Land relief form	J	North America	Canada/USA	50° 16' N	117° 15' W	II 2C
60	Kolumbijska planota	Columbia Plateau	English	Land relief form	J	North America	USA	44° 09' N	118° 05' W	II 2C
61	Kolumbija	Columbia River	English	Land hydronym	H	North America	Canada/USA	46° 15' N	124° 02' W	V 2C
62	Cumberlandska planota	Cumberland Plateau	English	Land relief form	J	North America	USA	36° 35' N	84° 12' W	II 2D
63	Čukotsko morje	Čukotskoe more/Chukchi Sea	Russian/English	Sea hydronym	J	Arctic Ocean	Chukchi Sea	69° 38' N	171° 07' W	IV 1A
64	Davisov preliv	Davis Strait/Davisstrædet	English/Danish	Sea hydronym	J	Atlantic Ocean	–	66° 27' N	57° 35' W	VI 1E
65	Dolina smrti	Death Valley	English	Land relief form	J	North America	USA	36° 32' N	116° 56' W	II 2C
66	Kolumbijsko okrožje	District of Columbia	English	Administrative unit	J	North America	USA	38° 55' N	77° 01' W	VIII 2D
67	Dixonov preliv	Dixon Entrance	English	Sea hydronym	J	Pacific Ocean	–	54° 21' N	132° 20' W	IV 2B
68	Otok Ellefa Ringnesa	Ellef Ringnes Island	English	Island relief form	J	North America	Canada	78° 34' N	101° 52' W	II 1C
69	Ellesmere	Ellesmere Island	English	Island relief form	G	North America	Canada	79° 36' N	80° 19' W	II 1D
70	Foxejeva kotlina	Foxe Basin	English	Sea hydronym	J	Arctic Ocean	–	66° 13' N	78° 12' W	V 1D
71	Foxejev preliv	Foxe Channel	English	Sea hydronym	J	Arctic Ocean	–	64° 17' N	79° 27' W	V 1D
72	Foxejev polotok	Foxe Peninsula	English	Coastal relief form	J	North America	Canada	64° 46' N	76° 47' W	II 1D
73	Rooseveltovo zajezitveno jezero	Franklin Delano Roosevelt Lake/Lake Roosevelt	English	Land hydronym	J	North America	USA	47° 56' N	118° 41' W	V 2C
74	Frobisherjev zaliv	Frobisher Bay	English	Sea hydronym	J	Atlantic Ocean	Labrador Sea	62° 34' N	65° 55' W	V 1D
75	Gaspeški polotok	Gaspésie/Péninsule de la Gaspé	French	Coastal relief form	J	North America	Canada	48° 39' N	65° 26' W	II 2D
76	Georgija	Georgia	English	Administrative unit	F	North America	USA	32° 38' N	83° 22' W	VIII 2D
77	Veliki kanjon	Grand Canyon	English	Land relief form	J	North America	USA	36° 06' N	112° 08' W	II 2C
78	Grantova dežela	Grant Land	English	Natural landscape	J	North America	Canada	82° 07' N	77° 47' W	VIII 1D
79	Velika kotlina	Great Basin	English	Land relief form	J	North America	USA	38° 56' N	117° 07' W	II 2C
80	Veliko medvedje jezero	Great Bear Lake	English	Land hydronym	J	North America	Canada	65° 57' N	120° 33' W	IV 1B
81	Velika jezera	Great Lakes	English	Land hydronym	J	North America	Canada/USA	45° 13' N	83° 38' W	V 2D
82	Velike planjave	Great Plains/Prairies	English	Land relief form	J	North America	Canada/USA	44° 58' N	103° 49' W	II 2C

	Exonym, slovenized name	Endonym, original name	Original language	Semantic type	Degree of slovenization	Location (continent, ocean)	Location (country, sea)	Latitude	Longitude	Location on map
83	Veliko slano jezero	Great Salt Lake	English	Land hydronym	J	North America	USA	41° 03' N	112° 23' W	V 2C
84	Veliko suženjsko jezero	Great Slave Lake	English	Land hydronym	J	North America	Canada	61° 31' N	114° 12' W	V 1C
85	Zalivsko nižavje	Gulf Coastal Plain	English	Land relief form	J	North America	USA	31° 01' N	91° 59' W	II 2C
86	Aljaški zaliv	Gulf of Alaska	English	Sea hydronym	J	Pacific Ocean	–	58° 29' N	145° 27' W	IV 2B
87	Boothijski zaliv	Gulf of Boothia	English	Sea hydronym	J	Arctic Ocean	–	70° 27' N	90° 15' W	V 1C, 1D
88	Mehiški zaliv	Gulf of Mexico/Golfo de México	English/Spanish	Sea hydronym	J	Atlantic Ocean	Gulf of Mexico	25° 16' N	90° 55' W	V 3C, 3D
89	Zaliv svetega Lovrenca	Gulf of Saint Lawrence/Golfe du Saint Laurent	English/French	Sea hydronym	J	Atlantic Ocean	–	48° 04' N	62° 27' W	V 2D
90	Harneyjeva kotlina	Harney Basin	English	Land relief form	J	North America	USA	43° 15' N	119° 03' W	II 2C
91	Havaji	Hawaii/Hawai'i	English/Hawaiian	Administrative unit	I	Oceania	USA	21° 09' N	157° 13' W	VII 3A
92	Havaji	Hawaiian Islands/Mokupuni o Hawai'i	English/Hawaiian	Island relief form	I	Oceania	USA	21° 09' N	157° 13' W	I 3A
93	preliv Hecate	Hecate Strait	English	Sea hydronym	A	Pacific Ocean	–	53° 15' N	131° 05' W	IV 2B
94	Howlandov otok	Howland Island	English	Island relief form	J	Oceania	USA	0° 48' N	176° 37' W	I 3A
95	Hudsonov zaliv	Hudson Bay	English	Sea hydronym	J	Arctic Ocean	Hudson Bay	59° 04' N	85° 35' W	V 1C, 1D, 2C, 2D
96	Hudsonov preliv	Hudson Strait	English	Sea hydronym	J	Arctic Ocean	–	62° 12' N	71° 20' W	V 1D
97	Jamesov zaliv	James Bay/Baie James	English/French	Sea hydronym	J	Arctic Ocean	Hudson Bay	53° 36' N	80° 35' W	V 2D
98	Johnstonov atol	Johnston Atoll	English	Island relief form	J	Oceania	USA	16° 44' N	169° 32' W	I 3A
99	Jonesov preliv	Jones Sound	English	Sea hydronym	J	Arctic Ocean	–	75° 56' N	86° 20' W	V 1D
100	polotok Kenai	Kenai Peninsula	English	Coastal relief form	A	North America	USA	60° 13' N	150° 05' W	I 1A, 1B
101	Otok kralja Viljema	King William Island/Qikiqtaq	English/Inuit	Island relief form	J	North America	Canada	69° 07' N	97° 19' W	II 1C
102	Kuskokwimski zaliv	Kuskokwim Bay	English	Sea hydronym	J	Pacific Ocean	Bering Sea	59° 27' N	162° 41' W	IV 2A
103	Kuskokwimsko hribovje	Kuskokwim Mountains	English	Land relief form	J	North America	USA	63° 28' N	155° 00' W	I 1A
104	Labradorsko morje	Labrador Sea	English	Sea hydronym	J	Atlantic Ocean	Labrador Sea	57° 50' N	52° 22' W	VI 2E
105	Athabaško jezero	Lake Athabasca	English	Land hydronym	J	North America	Canada	59° 17' N	109° 21' W	V 2C
106	Eriejsko jezero	Lake Erie	English	Land hydronym	J	North America	Canada/USA	42° 10' N	81° 18' W	V 2D
107	Huronsko jezero	Lake Huron	English	Land hydronym	J	North America	Canada/USA	44° 41' N	82° 22' W	V 2D
108	jezero Manitoba	Lake Manitoba	English	Land hydronym	A	North America	Canada	50° 32' N	98° 22' W	V 2C
109	Meadovo zajezitveno jezero	Lake Mead	English	Land hydronym	J	North America	USA	36° 08' N	114° 27' W	V 2C
110	Michigansko jezero	Lake Michigan	English	Land hydronym	J	North America	USA	43° 29' N	87° 06' W	V 2D
111	Nipigonsko jezero	Lake Nipigon	English	Land hydronym	J	North America	Canada	49° 44' N	88° 35' W	V 2D
112	jezero Okeechobee	Lake Okeechobee	English	Land hydronym	A	North America	USA	26° 56' N	80° 48' W	V 3D
113	Ontarijsko jezero	Lake Ontario	English	Land hydronym	J	North America	Canada/USA	43° 36' N	77° 46' W	V 2D
114	Powllovo zajezitveno jezero	Lake Powell	English	Land hydronym	J	North America	USA	37° 03' N	111° 18' W	V 2C
115	Gornje jezero	Lake Superior	English	Land hydronym	J	North America	Canada/USA	47° 39' N	87° 02' W	V 2D
116	Winnipeško jezero	Lake Winnipeg	English	Land hydronym	J	North America	Canada	52° 45' N	98° 01' W	V 2C
117	Lancastrov preliv	Lancaster Sound	English	Sea hydronym	J	Arctic Ocean	Baffin Bay	74° 08' N	86° 59' W	V 1D
118	Lavrencijsko višavje	Laurentides/Laurentian Highlands	French/English	Land relief form	J	North America	Canada	49° 28' N	69° 19' W	II 2D
119	Malo suženjsko jezero	Lesser Slave Lake	English	Land hydronym	J	North America	Canada	55° 27' N	115° 14' W	V 2C
120	Liverpoolski zaliv	Liverpool Bay	English	Sea hydronym	J	Arctic Ocean	Beaufort Sea	69° 49' N	129° 51' W	IV 1B
121	Mackenziejev zaliv	Mackenzie Bay	English	Sea hydronym	J	Arctic Ocean	Beaufort Sea	69° 19' N	137° 12' W	IV 1B
122	Mackenziejevo gorovje	Mackenzie Mountains	English	Land relief form	J	North America	Canada	63° 06' N	127° 45' W	I 1B
123	Mackenziejeva reka	Mackenzie River	English	Land hydronym	J	North America	Canada	68° 43' N	135° 23' W	IV 1B
124	Malaspinin ledenik	Malaspina Glacier	English	Land hydronym	J	North America	USA	59° 59' N	140° 31' W	IV 1B

	Exonym, slovenized name	Endonym, original name	Original language	Semantic type	Degree of slovenization	Location (continent, ocean)	Location (country, sea)	Latitude	Longitude	Location on map
125	McClintockov preliv	McClintock Channel/M'Clintock Channel	English	Sea hydronym	J	Arctic Ocean	–	72° 04' N	103° 11' W	V 1C
126	McClurejev preliv	McClure Strait/M'Clure Strait	English	Sea hydronym	J	Arctic Ocean	Beaufort Sea	74° 42' N	117° 51' W	V 1C
127	Melvillov zaliv	Melville Bugt/Qimusseriarsuaq	Danish/Inuit	Sea hydronym	J	Arctic Ocean	Baffin Bay	75° 35' N	61° 33' W	V 1D
128	Melvillov otok	Melville Island	English	Island relief form	J	North America	Canada	75° 21' N	111° 51' W	II 1C
129	Melvillov polotok	Melville Peninsula	English	Coastal relief form	J	North America	Canada	68° 22' N	83° 39' W	II 1D
130	Srednji zahod	Middle West/Midwest	English	Historical region	J	North America	USA	37° 48' N	88° 02' W	VIII 2C, 2D
131	otoki Midway	Midway Islands	English	Island relief form	A	Oceania	USA	28° 13' N	177° 21' W	I 3A
132	Misisipi	Mississippi	English	Administrative unit	F	North America	USA	32° 42' N	89° 35' W	VIII 2C, 2D
133	Misisipijeva delta	Mississippi Delta	English	Coastal relief form	J	North America	USA	29° 16' N	89° 21' W	II C3, D3
134	Misisipi	Mississippi River	English	Land hydronym	F	North America	USA	29° 00' N	89° 09' W	V 2C
135	Misuri	Missouri	English	Administrative unit	F	North America	USA	38° 21' N	92° 23' W	VIII 2C
136	Misuri	Missouri River	English	Land hydronym	F	North America	USA	38° 49' N	90° 07' W	V 2C
137	Naresov preliv	Nares Strait/Nares Strædet	English/Danish	Sea hydronym	J	Arctic Ocean	Baffin Bay	78° 28' N	73° 35' W	V 1D
138	Novi Brunswick	New Brunswick	English	Administrative unit	J	North America	Canada	46° 29' N	66° 33' W	VIII 2D
139	Nova Anglija	New England	English	Historical region	J	North America	USA	44° 08' N	70° 13' W	VIII 2D
140	Nova Mehika	New Mexico	English	Administrative unit	J	North America	USA	34° 27' N	106° 05' W	VIII 2C
141	Nova Fundlandija	Newfoundland	English	Island relief form	J	North America	Canada	48° 36' N	56° 06' W	III 2E
142	Nova Fundlandija in Labrador	Newfoundland and Labrador	English	Administrative unit	J	North America	Canada	52° 07' N	56° 29' W	IX 2E
143	Niagarski slapovi	Niagara Falls/Onguiaahra	English/Iroquoian	Land hydronym	J	North America	Canada/USA	43° 05' N	79° 04' W	V 2D
144	Severna Amerika	North America/Amérique du Nord	English/French	Continent	J	North America	–	39° 16' N	100° 36' W	II 2C
145	Severna Karolina	North Carolina	English	Administrative unit	J	North America	USA	35° 42' N	79° 12' W	VIII 2D
146	Severna Dakota	North Dakota	English	Administrative unit	J	North America	USA	47° 27' N	100° 20' W	VIII 2C
147	Severni Saskatchewan	North Saskatchewan River	English	Land hydronym	J	North America	Canada	53° 14' N	105° 05' W	V 2C
148	Severozahodna ozemlja	Northwest Territories	English	Administrative unit	J	North America	Canada	64° 13' N	119° 51' W	VIII 1C
149	Nortonov zaliv	Norton Sound	English	Sea hydronym	J	Pacific Ocean	Bering Sea	63° 50' N	163° 35' W	IV 1A
150	Nova Škotska	Nova Scotia	Latin	Coastal relief form	J	North America	Canada	44° 51' N	63° 48' W	II 2D
151	Nova Škotska	Nova Scotia	Latin	Administrative unit	J	North America	Canada	44° 51' N	63° 48' W	VIII 2D
152	Pobarvana puščava	Painted Desert	English	Natural landscape	J	North America	USA	34° 56' N	109° 46' W	VIII 2C
153	Parryjevi otoki	Parry Islands	English	Island relief form	J	North America	Canada	76° 43' N	112° 56' W	II 1C
154	polotok Ungava	Péninsule d'Ungava	French	Coastal relief form	B	North America	Canada	59° 20' N	73° 28' W	II 1D
155	Pensilvanija	Pennsylvania	English	Administrative unit	H	North America	USA	40° 45' N	77° 24' W	VIII 2D
156	Barrowov rt	Point Barrow/Nuvuk	English/Inuit	Coastal relief form	J	North America	USA	71° 23' N	156° 29' W	I 1A
157	Pribilovovi otoki	Pribilof Islands	English	Island relief form	J	North America	USA	56° 51' N	169° 54' W	I 2A
158	Polotok princa Alberta	Prince Albert Peninsula	English	Coastal relief form	J	North America	Canada	72° 25' N	116° 43' W	II 1C
159	Otok princa Charlesa	Prince Charles Island	English	Island relief form	J	North America	Canada	67° 45' N	76° 04' W	II 1D
160	Otok princa Edvarda	Prince Edward Island	English	Island relief form	J	North America	Canada	46° 19' N	63° 19' W	II 2D
161	Otok princa Edvarda	Prince Edward Island	English	Administrative unit	J	North America	Canada	46° 19' N	63° 19' W	VIII 2D
162	Morje princa Gustava Adolfa	Prince Gustaf Adolf Sea	English	Sea hydronym	J	Arctic Ocean	–	78° 21' N	107° 20' W	V 1C
163	Otok waleškega princa	Prince of Wales Island	English	Island relief form	J	North America	Canada	72° 34' N	98° 44' W	II 1C
164	Otok princa Patricka	Prince Patrick Island	English	Island relief form	J	North America	Canada	76° 39' N	119° 27' W	I 1B
165	Otoki kraljice Šarlote	Queen Charlotte Islands/Haida Gwaii	English/Haida	Island relief form	J	North America	Canada	53° 01' N	132° 02' W	I 2B
166	Preliv kraljice Šarlote	Queen Charlotte Strait	English	Sea hydronym	J	Pacific Ocean	–	50° 45' N	127° 13' W	IV 2B

	Exonym, slovenized name	Endonym, original name	Original language	Semantic type	Degree of slovenization	Location (continent, ocean)	Location (country, sea)	Latitude	Longitude	Location on map
167	Otoki kraljice Elizabete	Queen Elizabeth Islands	English	Island relief form	J	North America	Canada	76° 19' N	96° 52' W	II 1C
168	Jezero severnih jelenov	Reindeer Lake	English	Land hydronym	J	North America	Canada	57° 33' N	102° 12' W	V 2C
169	Skalno gorovje	Rocky Mountains	English	Land relief form	J	North America	Canada/USA	50° 32' N	115° 12' W	II 2C
170	Otok svetega Lovrenca	Saint Lawrence Island	English	Island relief form	J	North America	USA	63° 30' N	170° 25' W	I 1A
171	Morska pot svetega Lovrenca	Saint Lawrence Seaway/ Voie maritime du Saint-Laurent	English/French	Land hydronym	J	North America	Canada	44° 59' N	74° 51' W	V 2D
172	Otok svetega Mateja	Saint Matthew Island	English	Island relief form	J	North America	USA	60° 24' N	172° 44' W	I 1A
173	Reka svetega Lovrenca	Saint-Laurent/Saint Lawrence River	French/English	Land hydronym	J	North America	Canada	47° 58' N	69° 38' W	V 2D
174	Sveta Peter in Mihael	Saint-Pierre-et-Miquelon	French	Administrative unit	J	North America	French	46° 48' N	56° 15' W	IX 2E
175	Prelomnica svetega Andreja	San Andreas Fault	English	Land relief form	J	North America	USA	35° 07' N	119° 39' W	I 2C
176	Sargaško morje	Sargasso Sea	English	Sea hydronym	J	Atlantic Ocean	Sargasso Sea	29° 00' N	64° 30' W	V 3D
177	Sewardov polotok	Seward Peninsula	English	Coastal relief form	J	North America	USA	65° 24' N	163° 46' W	I 1A
178	Somersetski otok	Somerset Island	English	Island relief form	J	North America	Canada	73° 20' N	93° 27' W	II 1C
179	Sonorska puščava	Sonoran Desert/Desierto de Sonora	English/Spanish	Natural landscape	J	North America	USA/Mexico	30° 04' N	112° 17' W	VIII 2C, 3C
180	Južna Karolina	South Carolina	English	Administrative unit	J	North America	USA	33° 42' N	80° 47' W	VIII 2D
181	Južna Dakota	South Dakota	English	Administrative unit	J	North America	USA	44° 26' N	100° 16' W	VIII 2C
182	Južni Saskatchewan	South Saskatchewan River	English	Land hydronym	J	North America	Canada	53° 14' N	105° 05' W	V 2C
183	Southamptonov otok	Southampton Island/Salliq	English/Inuit	Island relief form	J	North America	Canada	64° 30' N	84° 24' W	II 1D
184	Južno indijansko jezero	Southern Indian Lake	English	Land hydronym	J	North America	Canada	57° 06' N	98° 36' W	V 2C
185	Preliv Juana de Fuce	Strait of Juan de Fuca/ Juan de Fuca Strait	English	Sea hydronym	J	Pacific Ocean	–	48° 14' N	123° 38' W	IV 2B
186	Floridski preliv	Straits of Florida/Estrechos de Florida	English/Spanish	Sea hydronym	J	Atlantic Ocean	–	24° 13' N	80° 36' W	V 3D
187	Sverdrupovi otoki	Sverdrup Islands	English	Island relief form	J	North America	Canada	79° 13' N	98° 44' W	II 1C
188	Teksas	Texas	English	Administrative unit	F	North America	USA	31° 56' N	99° 41' W	VIII 2C
189	planota Ozark	The Ozarks	English	Land relief form	L	North America	USA	36° 47' N	92° 29' W	II 2C
190	Ungavski zaliv	Ungava Bay/Baie d'Ungava/ Ungava kangiqluk	English/French/Inuit	Sea hydronym	J	Arctic Ocean	Hudson Strait	59° 39' N	67° 29' W	V 1D, 2D
191	Združene države Amerike	United States of America/United States	English	Country	J	North America	USA	38° 35' N	98° 27' W	VIII 2C, 2D
192	Vancouvrov otok	Vancouver Island	English	Island relief form	J	North America	Canada	49° 36' N	125° 38' W	I 2B
193	Viktorijin otok	Victoria Island/Kitlineq	English/Inuit	Island relief form	J	North America	Canada	70° 36' N	108° 55' W	II 1C
194	Viktorijin preliv	Victoria Strait	English	Sea hydronym	J	Arctic Ocean	–	69° 09' N	100° 48' W	V 1C
195	Virginija	Virginia	English	Administrative unit	H	North America	USA	37° 25' N	78° 40' W	VIII 2D
196	Melvillov preliv	Viscount Melville Sound	English	Sea hydronym	J	Arctic Ocean	–	74° 00' N	109° 00' W	V 1C
197	Washington	Washington, D.C.	English	Settlement	G	North America	USA	38° 54' N	77° 02' W	VIII 2D
198	Wellandski prekop	Welland Canal	English	Land hydronym	J	North America	Canada	43° 01' N	79° 13' W	V 2D
199	Zahodna Virginija	West Virginia	English	Administrative unit	J	North America	USA	38° 35' N	80° 39' W	VIII 2D
200	Wranglovo gorovje	Wrangell Mountains	English	Land relief form	J	North America	USA	61° 47' N	143° 14' W	I 1B
201	Yellowstonsko jezero	Yellowstone Lake	English	Land hydronym	J	North America	USA	44° 27' N	110° 22' W	V 2C
202	Jukonska planota	Yukon Plateau	English	Land relief form	J	North America	Canada	62° 04' N	138° 21' W	I 1B
203	Jukon	Yukon River	English	Land hydronym	F	North America	Canada/USA	62° 36' N	164° 47' W	IV 1A
204	Jukonsko ozemlje	Yukon/Yukon Territory	English	Administrative unit	J	North America	Canada	63° 29' N	136° 19' W	VII 1B

For the analysis of Slovenian exonyms in North America, we considered all of the names on the three maps (divided into three sections) at a scale of 1:50,000,000 (Figure 1) that fall within Canada and the United States (excluding Greenland and Central America) and without names of undersea features. The final number of these names is 204, and the final number of names from the list of 3,819 names without undersea features is 3,316.

3 Semantic types of exonyms

We defined sixteen semantic types, which are adapted to global dimensions and the standard division of geographical features:

- **Continent**: in North America, the number of such exonyms is three (1.5%; e.g., *Severna Amerika* »North America«, *Angloamerika* »Anglo-America«) compared to eleven (0.3%) in the rest of the world (e.g., *Afrika* »Africa«, *Evropa* »Europe«).
- **Country**: in North America, the number of such exonyms is two (1.0%; e.g., *Kanada* »Canada«, *Združene države Amerike* »United States of America«) compared to 171 (4.7%) in the rest of the world (e.g., *Francija* »France«, *Finska* »Finland«).
- **Settlement**: in North America, the number of such exonyms is one (0.5%; e.g., *Washington* »Washington, DC«) compared to 432 (12.0%) in the rest of the world (e.g., *Rim* »Rome«, *Atene* »Athens«).
- **Historical settlement**: in North America there are no such exonyms (0.0%) compared to 102 (2.8%) in the rest of the world (e.g., *Troja* »Troy«, *Bizanc* »Byzantium«).
- **Land relief form**: in North America, the number of such exonyms is twenty-eight (13.7%; e.g., *Dolina smrti* »Death Valley«, *Jukonska planota* »Yukon Plateau«) compared to 420 (11.6%) in the rest of the world (e.g., *Andi* »Andes«, *Turansko nižavje* »Turan Lowland«).
- **Land hydronym**: in North America, the number of such exonyms is thirty-four (16.7%; e.g., *Niagarski slapovi* »Niagara Falls«, *Velika jezera* »Great Lakes«) compared to 346 (9.6%) in the rest of the world (e.g., *Mrtvo morje* »Dead Sea«, *Beneška laguna* »Venetian Lagoon«).
- **Sea hydronym**: in North America, the number of such exonyms is forty-three (21.1%; e.g., *Mehiški zaliv* »Gulf of Mexico«, *Hudsonov preliv* »Hudson Strait«) compared to 341 (9.4%) in the rest of the world (e.g., *Indijski ocean* »Indian Ocean«, *Rossova ledena polica* »Ross Ice Shelf«).
- **Undersea feature**: these exonyms are not included in the article (e.g., *Filipinski jarek* »Philippine Trench«, *Agulhaška planota* »Agulhas Plateau«).
- **Island relief form**: in North America, the number of such exonyms is thirty-four (16.7%; e.g., *Nova Fundlandija* »Newfoundland«, *Otok svetega Lovrenca* »Saint Lawrence Island«) compared to 353 (9.8%) in the rest of the world (e.g., *Azori* »Azores«, *Veliki koralni greben* »Great Barrier Reef«).
- **Coastal relief form**: in North America, the number of such exonyms is twenty-four (11.8%; e.g., *Aljaški polotok* »Alaska Peninsula«, *Misisipijeva delta* »Mississippi Delta«) compared to 176 (4.9%) in the rest of the world (e.g., *Apeninski polotok* »Apennine Peninsula«, *Donavina delta* »Danube Delta«).
- **Natural landscape**: in North America, the number of such exonyms is six (2.9%; e.g., *Pobarvana puščava* »Painted Desert«, *Kanadski ščit* »Canadian Shield«) compared to 304 (8.4%) in the rest of the world (e.g., *Dežela kraljice Maud* »Queen Maud Land«, *Sahara*).
- **Historical region**: in North America, the number of such exonyms is three (1.5%; e.g., *Akadija* »Acadia«, *Nova Anglija* »New England«) compared to 100 (2.8%) in the rest of the world (e.g., *Abesinija* »Abyssinia«, *Burgundija* »Burgundy«).
- **Administrative unit**: in North America, the number of such exonyms is twenty-six (12.8%; e.g., *Južna Karolina* »South Carolina«, *Nova Škotska* »Nova Scotia«) compared to 221 (6.1%) in the rest of the world (e.g., *Bavarska* »Bavaria«, *Južna Osetija* »South Ossetia«).
- **Historical administrative unit**: in North America there are no such exonyms (0.0%) compared to 101 (2.8%) in the rest of the world (e.g., *Galicija* »Galicia« in the former Austria-Hungarian Empire, *Otomansko cesarstvo* »Ottoman Empire«).
- **Others**: the names of river dams and sluices, parts of settlements, defensive walls (e.g., *Kitajski zid* »Great Wall«), archaeological sites, tectonic plates, isolated points on the Earth's surface (e.g., *Južni tečaj* »South Pole«), abbreviated compound geographical names (e.g., *Beneluks* »Benelux«), and so on; in North America there are no such exonyms (0.0%) compared to thirty-four (0.9%) in the rest of the world.

4 Original language of exonyms

The original language of Slovenian exonyms from North America is mostly English: in 166 cases (81.4%) alone and in thirty-two cases (15.7%) in relation to other languages:

- French eleven times (e.g., *Zaliv svetega Lovrenca* »Gulf of Saint Lawrence«, French *Golfe du Saint Laurent*);
- Spanish five times (e.g., *Sonorska puščava* »Sonoran Desert«, Spanish *Desierto de Sonora*, belonging to the United States and Mexico);
- Inuit six times (e.g., *Otok kralja Viljema* »King William Island«, Inuktitut *Qikiqtaq* in Canada);
- Danish three times (e.g., *Baffinov zaliv* »Baffin Bay«, Danish *Baffin Bugten* in the Arctic Ocean);
- Native American languages three times (e.g., *Niagarski slapovi* »Niagara Falls«, Iroquoian *Onguiaahra* on the border between the United States and Canada);
- Russian three times (e.g., *Beringovo morje* »Bering Sea«, Russian *Beringovo more* in the Pacific Ocean);
- Hawaiian two times (e.g., *Havaji* »Hawaii«, Hawaiian *Hawai»i* in Oceania).

French is the original language three times (e.g., *Gaspeški polotok* » Gaspé Peninsula«, French *Peninsula de la Gaspé* in Canada), Latin two times (e.g., *Nova Škotska* »Nova Scotia« in Canada), and Danish once in combination with Inuit (*Melvillov zaliv* »Melville Bay«, Danish *Melville Bugt*, Greenlandic *Qimusseriarsuaq* in the Arctic Ocean).

5 Degree of Slovenianization of exonyms

Studying the degree of Slovenianization is demanding and partly subjective. The main problem in developing such typologies is classifying a specific exonym into a single type; due to simplifications, which should ensure sufficiently clear categories, some types overlap and therefore individual names can be classified under several groups.

We determined twelve typological groups of Slovenianization from the smallest to greatest degree of adaptation (Kladnik et al. 2017):

- **Exonym from translated common name and original proper name (type A)**: in North America, the number of such exonyms is seventeen (8.4%; e.g., *jezero Manitoba* »Lake Manitoba«, *rt Canaveral* »Cape Canaveral«) compared to 183 (5.1%) in the rest of the world (e.g., *globel Meteor* »Meteor Deep«, *plošča Nazca* »Nazca Plate«).
- **Exonym from translated common name and more or less Slovenianized proper name (type B)**: in North America, the number of such exonyms is one (0.5%; e.g., *polotok Ungava* »Ungava Peninsula«) compared to seventy (1.9%) in the rest of the world (e.g., *gora Fudži* »Mount Fuji«, Japanese *Fujisan*; *prekop Majna–Donava* »Main–Danube Canal«, German *Main-Donau-Kanal*).
- **Exonym from adopted secondary original name (type C)**: in North America there are no such exonyms (0.0%) compared to 245 (6.8%) in the rest of the world (e.g., *Armenija* »Armenia«, Armenian *Hayastan*; *Kanton* »Guangzhou«, Chinese *Guǎngzhōu*).
- **Exonym from original name with omitted special characters and diacritics (type D)**: in North America there are no such exonyms (0.0%) compared to seventy-three (2.0%) in the rest of the world (e.g., *Gdansk* »Gdańsk«; *Iran* »Iran«, Farsi *Īrān*).
- **Exonym from transliterated original name with simplified letters and diacritics (type E)**: in North America there are no such exonyms (0.0%) compared to 298 (8.2%) in the rest of the world (e.g., *Pandžab* »Punjab«; *Tokio* »Tokyo«, Japanese *Tokyō*).
- **Exonym from transcribed original name with Slovenianized ending (type F)**: in North America, the number of such exonyms is fifteen (7.4%; e.g., *Aljaska* »Alaska«, *Kolorado* »Colorado«) compared to 191 (5.3%) in the rest of the world (e.g., *Tirana* »Tirana«, Albanian *Tiranë*; *Pariz* »Paris«).
- **Exonym from borrowed and adapted name (type G)**: in North America, the number of such exonyms is two (1.0%; *Ellesmere* »Ellesmere Island«, *Washington* »Washington, DC«) compared to 128 (3.5%) in the rest of the world (e.g., *Abesinija* »Abyssinia«, Italian *Abissinia*; *Nahičevan* »Nakhchivan«, Azerbaijani *Naxçıvan*).
- **Exonym with phonetic form of the roots and Slovenianized endings from the Latin suffixes *-ia*, *-ea* (type H)**: in North America, the number of such exonyms is six (2.9%; e.g., *Kalifornija* »California«, *Kolumbija* »Columbia River«) compared to 185 (5.1%) in the rest of the world (e.g., *Francija* »France«, *Azija* »Asia«).

- **Exonym with phonetic form of the root and Slovenian ending (type I)**: in North America, the number of such exonyms is four (2.0%; e.g., *Aleuti* »Aleutian Islands«, *Apalači* »Appalachians« or »Appalachian Mountains«) compared to 220 (6.1%) in the rest of the world (e.g., *Afrika* »Africa«, *Pireneji* »Pyrenees«).
- **Exonym from fully translated name (type J)**: in North America, the number of such exonyms is 159 (77.9%; e.g., *Skalno gorovje* »Rocky Mountains«, *Veliko suženjsko jezero* »Great Slave Lake«) compared to 1,877 (51.9%) in the rest of the world (e.g., *Nizozemska* »Netherlands«, *Rt dobrega upanja* »Cape of Good Hope«).
- **Exonym from traditionally Slovenianized name with a trace of the original root (type K)**: in North America there are no such exonyms (0.0%) compared to forty-eight (1.3%) in the rest of the world (e.g., *Rim* »Rome«, Italian *Roma*; *Benetke* »Venice«, Italian *Venezia*).
- **Exonym from Slovenian name (type L):** in North America there are no such exonyms (0.0%), compared to ninety-seven (2.7%) in the rest of the world (e.g., *Dunaj* »Vienna«, *German* Wien; Nemčija »Germany«, German *Deutschland*).

6 Discussion

The frequency of the current use of Slovenian exonyms was checked in the Gigafida database (Internet 2), which contains 1.2 billion words from publicly available printed texts (84.4%) and web texts (15.6%) published between 1990 and 2011 in Slovenian.

The most commonly used Slovenian exonyms from North America in Slovenian texts are the names of countries and their administrative units.

There are more than five hundred occurrences of *Misisipi* »Mississippi« (510), *Aljaska* »Alaska« (572), *Kolorado* »Colorado« (726), *Teksas* »Texas« (1,597), *Havaji* »Hawaii« (1,819), *Kolumbija* »Columbia« or »Colombia« (1,899), *Kalifornija* »California« (2,136), *Kanada* »Canada« (9,174), and *Združene države Amerike* »United States of America« and *ZDA* »USA« (over 10,000).

However, the frequency of names for »Mississippi«, »Colorado«, and »Columbia«/»Colombia« is problematic because it conceals the frequencies of the state/district, independent country, and river.

The next most commonly used Slovenian exonyms from North America in Slovenian texts are *Dolina smrti* »Death Valley« (133), *Veliki kanjon* »Grand Canyon« (121), *Niagarski slapovi* »Niagara Falls« (109), *Skalno gorovje* »Rocky Mountains« (96), and *Aleuti* »Aleutian Islands« (57).

The exonyms *Misisipi* »Mississippi«, *Aljaska* »Alaska«, *Kolorado* »Colorado«, *Teksas* »Texas«, and *Kanada* »Canada« belong to type F (exonym from transcribed original name with Slovenianized ending), the exonyms *Kolumbija* »Columbia«/»Colombia« and *Kalifornija* »California« to type H (exonym with phonetic form of the roots and Slovenianized endings from Latin suffixes *-ia*, *-ea*), the exonyms *Havaji* »Hawaii« and *Aleuti* »Aleutian Islands« to type I (exonym with phonetic form of the root and Slovenian ending), and the exonyms *Združene države Amerike* »United States of America«, *Dolina smrti* »Death Valley«, *Veliki kanjon* »Grand Canyon«, *Niagarski slapovi* »Niagara Falls«, and *Skalno gorovje* »Rocky Mountains« to type J (exonym from fully translated name).

In its original form, the name *Death Valley* appears fifty-two times, *Grand Canyon* 253 times, *Niagara Falls* twenty-nine times, *Rocky Mountains* eighty-two times, and *Aleutian Islands* never.

This means that in modern Slovenian texts, among these five geographical names only the exonym *Veliki kanjon* »Grand Canyon« occurs less often than the original name *Grand Canyon*. That means it has not yet been fully established, but the remaining four cases are firmly established Slovenian exonyms.

Among the 3,316 Slovenian exonyms examined from around the world, 204 (6.2%) occur in North America (i.e., in Canada and the United States). In a comparable Czech list of exonyms (Beránek et al. 2006), out of 2,300 exonyms 1,250 (5.4%) occur in North America.

Two Polish lists were examined. In the older one (Krauze-Tomczyk and Kondracki 1994a; Krauze-Tomczyk and Kondracki 1994b), out of over six thousand exonyms 245 (3.9%) were found in Canada and the United States, whereas a somewhat smaller share was found in the most recent Polish publications of geographical names (Internet 3), where, out of 53,000 geographical names and about ten thousand Polish exonyms (Kladnik et al. 2013), 250 (2.5%) were found in North America.

Figure 1: Map of Slovenian exonyms in Canada and the United States (author: Manca Volk, projection: WGS84, made with Natural Earth, © GIAM ZRC SAZU). ➤ p. 130–138

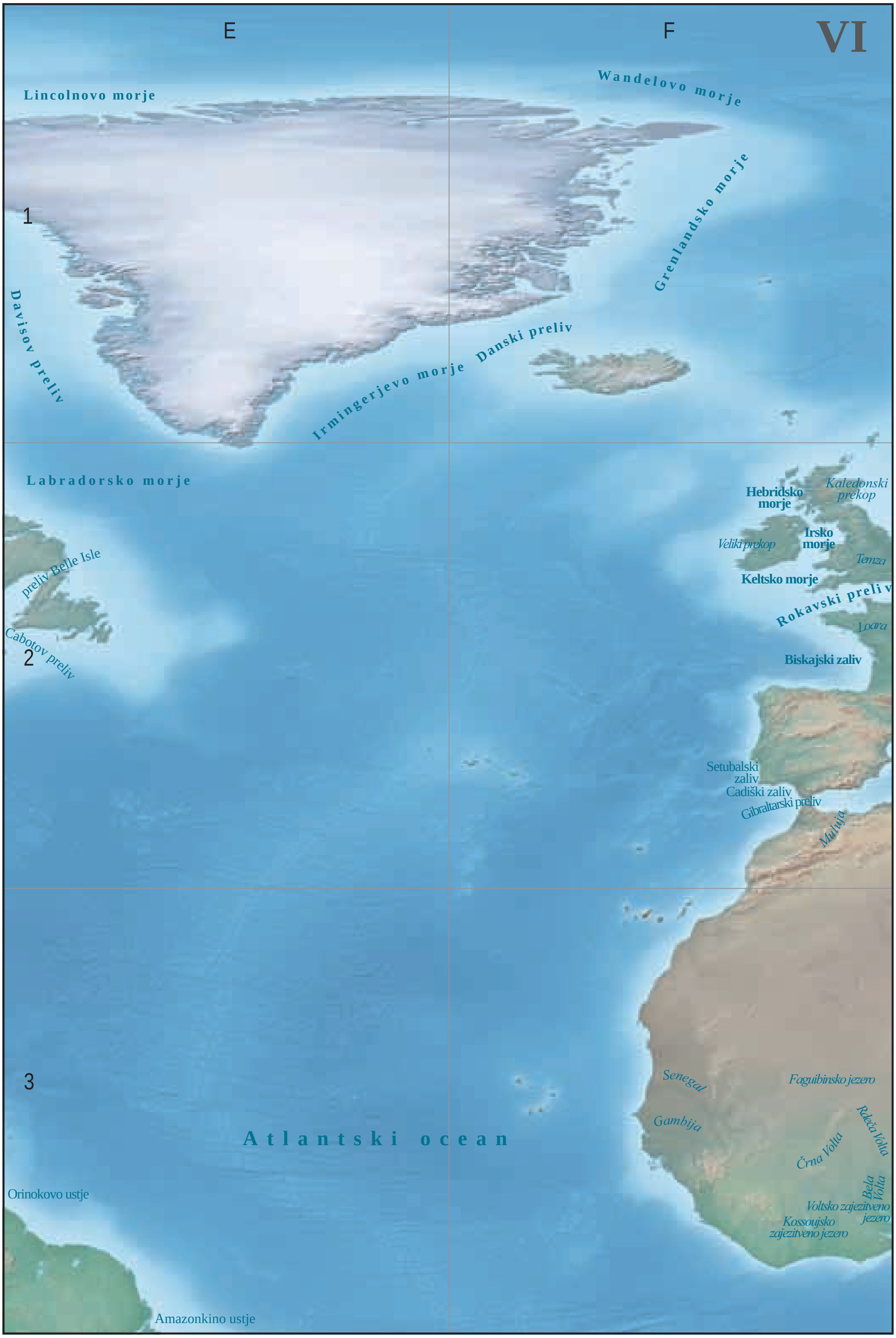

A
B
I
1
2
3
Otok princa Patricka
Banksov otok
Vranglov otok
Barrowov rt
Bathurstov rt
Brooksovo gorovje
Čukotski polotok
Dežnjovov rt
Rt waleškega princa
Sewardov polotok
Aljaški polotok
Kuskokwimsko hribovje
Aljaško gorovje
Mackenziejevo gorovje
Jukonska planota
Wranglovo gorovje
polotok Kenai
Otok svetega Lovrenca
Otok svetega Mateja
Pribilovovi otoki
Aleutsko gorovje
Aleuti
Aleksandrov arhipelag
Otoki kraljice Šarlote
Obalno gorovje
Vancouvrov otok
rt Flattery
Kaskadno gorovje
rt Mendocino
Prelomnica svetega Andreja
Obalne gorske verige
otoki Midway
Havaji
Johnstonov atol
Howlandov otok
Bakerjev otok


II
A r k t i k a
C
D
1
2
3
Parryjevi otoki
Otok Ellefa Ringnesa
Otok Axla Heiberga
Sverdrupovi otoki
Ellesmere
Hayesov polotok
Otoki kraljice Elizabete
Bathurstov otok
Melvillov otok
A r k t i č n i a r h i p e l a g
Somersetski otok
Otok waleškega princa
Polotok princa Alberta
Viktorijin otok
Otok kralja Viljema
polotok Boothia
Baffinov otok
Melvillov polotok
Otok princa Charlesa
Southamptonov otok
Foxejev polotok
polotok Ungava
Chidleyjev rt
Belcherjevi otoki
S k a l n o g o r o v j e
Kolumbijsko gorovje
V e l i k e p r e r i j e
Kolumbijska planota
Harneyjeva kotlina
A n g l o a m e r i k a
S e v e r n a A m e r i k a
Lavrencijsko višavje
Gaspeški polotok
Otok princa Edvarda
Akadija
Nova Škotska
rt Sable
rt Cod
Alleghenyjska planota
Velika kotlina
Koloradska planota
Dolina smrti
Veliki kanjon
O s r e d n j e n i ž a v j e
planota Ozark
Cumberlandska planota
A p a l a č i
Atlantsko obalno nižavje
rt Hatteras
Bermudski otoki
Kanalski otoki
Zalivsko nižavje
Misisipijeva delta
rt Canaveral
Kalifornijski polotok
Zahodna Sierra Madre
Mehiška planota
Vzhodna Sierra Madre
rt Sable
Bahamsko otočje
Rt svetega Luke
Marijini otoki
rt Corrientes
rt Catoche
Rt svetega Antona
Kuba
otočje Caicos
otočje Turks
A n t i l i
Zavetrni otoki
Deviško otočje
Angvila
Jukatan
Kajmanski otoki
V e l i k i A n t i l i
Jamajka
Hispaniola
Portoriko
Sveti Martin
Sveti Krištof
Antigva
Vulkanska Kordiljera
Južna Sierra Madre
Tehuantepeška zemeljska ožina
Revillagigedovi otoki
K a r i b i
Karibski otoki
Monserat
Gvadelup
Privetrni otoki
Mali Antili
Martinik
Sveta Lucija
Sveti Vincencij
Grenadine
rt Gracias a Dios
A m e r i k a
rt Gallinas
polotok Guajira
Clippertonov otok
Panamska zemeljska ožina
Otoki biserov
Meridska Kordiljera
Obalna Kordiljera
Orinokova delta
Kokosov otok
Zahodna Kordiljera
Srednja Kordiljera
Vzhodna Kordiljera
Gvajansko višavje


E
F
III
1
2
3
Rt Morrisa Jesupa
Severovzhodni rt
G r e n l a n d i j a
Brewsterjev rt
Islandija
Ferski otoki
Shetlandski otoki
rt Farvel
Orkneyjski otoki
Hebridi
Severozahodno višavje
Grampiansko gorovje
Britansko otočje
Hadrijanov zid
otok Man
Velika Britanija
Irska
Kambrijsko gorovje
Charlesov rt
otoki Scilly
Kanalski otoki
Armorikansko gorstvo
Nova Fundlandija
rt Race
Francosko nižavje
Akvitanska kotlina
Kantabrijsko gorovje
Ibersko gorovje
Kastilsko gorovje
Azori
Pirenejski polotok
Betijsko gorovje
Rif
Madeirski otoki
Srednji Atlas
Atlas
Visoki Atlas
Antiatlas
Kanarski otoki
Tenerifa
rt Juby
rt Bojador
Beli rt
Zelenortski otoki
Zeleni rt
otočje Bijagós
Obala popra
Slonokoščena obala
Rt palm
Rt treh rtičev
Hudičev otok
Čeri svetega Petra in Pavla


A
B
IV
1
2
3
Arktični ocean
Beaufortovo morje
Liverpoolski zaliv
Amundsenov zaliv
Mackenziejev zaliv
Čukotsko morje
Mackenziejeva reka
Beringov preliv
Veliko medvedje jezero
Anadirski zaliv
Nortonov zaliv
Jukon
Malaspinin ledenik
Beringovo morje
Kuskokwimski zaliv
Aljaški zaliv
Dixonov preliv
preliv Hecate
Preliv kraljice Šarlote
Preliv Juana de Fuce
Severni Tihi ocean
Tihi ocean


C
D
V
1
2
3
Morje princa Gustava Adolfa
McClurejev preliv
Melvillov preliv
McClintockov preliv
Viktorijin preliv
Barrowov preliv
Jonesov preliv
Lancastrov preliv
Naresov preliv
Melvillov zaliv
Baffinov zaliv
Boothijski zaliv
Foxejeva kotlina
Foxejev preliv
Hudsonov preliv
Frobisherjev zaliv
Ungavski zaliv
Hudsonov zaliv
Jamesov zaliv
Veliko suženjsko jezero
Athabaško jezero
Malo suženjsko jezero
Severni Saskatchewan
Južni Saskatchewan
Jezero severnih jelenov
Južno indijansko jezero
Winnipeško jezero
jezero Manitoba
Rooseveltovo zajezitveno jezero
Kolumbija
Yellowstonsko jezero
Veliko slano jezero
Powllovo zajezitveno jezero
Meadovo zajezitveno jezero
Kolorado
Misuri
Misisipi
Nipigonsko jezero
Gornje jezero
Velika jezera
Michigansko jezero
Huronsko jezero
Ontarijsko jezero
Eriejsko jezero
Niagarski slapovi
Wellandski prekop
Morska pot svetega Lovrenca
Reka svetega Lovrenca
Zaliv svetega Lovrenca
zaliv Fundy
Chesapeaški zaliv
Sargaško morje
Mehiški zaliv
jezero Okeechobee
Floridski preliv
Jukatanski preliv
Kalifornijski zaliv
Campečejski zaliv
Privetrni preliv
Jamajški preliv
Monski preliv
Honduraški zaliv
Tehuantepeški zaliv
Karibsko morje
Managovsko jezero
Nikaragovsko jezero
Moskitski zaliv
Panamski prekop
Gatunsko jezero
Darienski zaliv
Nicoyski zaliv
Panamsk zaliv
Orinoko
Angelov slap


E
F
VI
Lincolnovo morje
Wandelovo morje
Grenlandsko morje
1
Davisov preliv
Danski preliv
Irmingerjevo morje
Labradorsko morje
Hebridsko morje
Kaledonski prekop
Irsko morje
Veliki prekop
Temza
Keltsko morje
Rokavski preliv
preliv Belle Isle
Loara
Cabotov preliv
2
Biskajski zaliv
Setubalski zaliv
Cadiški zaliv
Gibraltarski preliv
Muluja
Senegal
Faguibinsko jezero
3
Gambija
Rdeča Volta
Atlantski ocean
Črna Volta
Bela Volta
Orinokovo ustje
Voltsko zajezitveno jezero
Kossoujsko zajezitveno jezero
Amazonkino ustje


A
B
VII
1
2
3
A l j a s k a
A l j a s k a
Jukonsko ozemlje
Britanska Kolumbija
Kalifornija
Havaji
Bakerjev in Howlandov otok


C
D
VIII
1
2
3
Grantova dežela
Washingtonova dežela
Severozahodna ozemlja
K a n a d a
Kanadski ščit
Severna Dakota
Južna Dakota
Otok princa Edvarda
Novi Brunswick
Nova Anglija
Nova Škotska
Z d r u ž e n e d r ž a v e A m e r i k e
Pensilvanija
Srednji zahod
Zahodna Virginija
Washington
Kolumbijsko okrožje
Kolorado
Misuri
Virginija
Kalifornija
Pobarvana puščava
Severna Karolina
Južna Karolina
Nova Mehika
Bermudi
Misisipi
Georgija
Teksas
Sonorska puščava
Bahami
Havana
Kuba
Otoki Turks in Caicos
Mehika
Jukatan
Kajmanski otoki
Dominikanska republika
Haiti
Britanski Deviški otoki
Antigva in Barbuda
Portoriko
Angvila
Jamajka
Deviški otoki Združenih držav
Monserat
Sveti Krištof in Nevis
S r e d n j a A m e r i k a
Gvadelup
Gvatemala
Gvatemala
Moskitija
Dominika
Martinik
Sveta Lucija
Salvador
Sveti Vincencij in Grenadine
Nikaragva
Trinidad in Tobago
Kostarika
Panama
Panama
Bogota
Kolumbija


IX
E
F
1
2
3
Pearyjeva dežela
Dežela Myliusa Erichsena
Dežela kronskega princa Kristijana
Severna Grenlandija
Dežela Knuda Rasmussena
Dežela kralja Friderika VIII.
G r e n l a n d i j a
Dežela kralja Viljema
Zahodna Grenlandija
Dežela kralja Kristijana X.
Jamesonova dežela
Vzhodna Grenlandija
Dežela kralja Kristijana IX.
Dežela kralja Friderika IX.
Obala kralja Friderika VI.
Islandija
Ferski otoki
Edinburg
Združeno kraljestvo
Irska
Severozahodna Evropa
Nova Fundlandija in Labrador
Sveta Peter in Mihael
Lurd
Španija
Stara Kastilija
Jugozahodna Evropa
Portugalska
Nova Kastilija
Lizbona
Kordova
Azori
Tanger
Tetuan
Oran
Kenitra
Rabat
Fez
Casablanca
Maroko
Madeirski otoki
Safi
Marakeš
Agadir
Kanarski otoki
Severozahodna Afrika
Zahodna Sahara
erg Šeš
Mavretanija
Zelenortski otoki
Timbuktu
Nigrova notranja delta
Senegal
Gambija
Zahodna Afrika
Gvineja Bissau
Gvinejski zaliv
Gvineja
Slonokoščena obala
Zgornja Gvineja
Gana
Liberija
Akra
Abidžan
Gvajana
Surinam
Francoska Gvajana

The level of exonymization for all geographical names in the world is therefore lower in Czech than in Slovenian, and for Polish is considerably greater, although the share of Polish exonyms for North America among all Polish exonyms is considerably smaller than the same share of Czech and especially Slovenian exonyms, which once again confirms the greater importance of Slovenian exonyms from North America, which would be expected given the distance of this continent from Slovenia.

ACKNOWLEDGEMENT: The authors acknowledge financial support from the Slovenian Research Agency and the Slovenian Academy of Sciences and Arts (project no. L6-0111: Slovene exonyms: methodology, standardization, GIS, and program no. P6-0101: Geography of Slovenia).

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Acta geographica Slovenica, 57-1, 2017, 141–152

MICROTOPONYMS AS AN IMPORTANT PART OF SLOVENIAN CULTURAL HERITAGE

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Plaque with the oeconym *Pr Píž* in Lancovo.

Microtoponyms as an important part of Slovenian cultural heritage

DOI: http://dx.doi.org/10.3986/AGS.4670
UDC: 811.163.6'373.21(497.4)
COBISS: 1.01

ABSTRACT: This article presents a methodology for data collection and documentation of microtoponyms in the Upper Carniola / Gorenjsko dialect of Slovenian based on visual and audio recordings. Special attention is placed on transcription (phonetic or simplified phonological transcription and standardization), which should be based on a morphological analysis of the toponyms examined. Linguistic analysis and its consideration of the dialect characteristics of toponyms can help reconstruct their naming motivation and origin. The article presents selected toponyms lexicographically and cartographically.

KEY WORDS: microtoponyms, linguistic analysis, standardization of dialect names, orthography, lexicography, geolinguistic presentation of toponyms, Upper Carniola / Gorenjsko dialect, Slovenia

The article was submitted for publication on September 5th, 2016.

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1 Introduction

Slovenia ratified the Convention for the Safeguarding of Intangible Cultural Heritage, adopted by UNESCO in 2003 in Paris, on December 19th, 2007. With this ratification, Slovenia committed itself to protecting oral traditions and vocabulary, including language as a bearer of intangible cultural heritage. From this point of view, dialect forms of microtoponyms in the broad sense (including oeconyms and cadastral toponyms) that are used in everyday life by local people are also an important part of Slovenian cultural heritage.

An oeconym (also known as a house name, farm name, etc.) is a toponym that denotes an occupied or unoccupied house with a street number in a settlement, a farm with or without land, farm outbuildings (e.g., grain mills, sawmills, etc.), or communal village buildings (e.g., a church, rectory, school, inn, fire station, etc.). Oeconyms remain connected to houses and estates even after the original owners move on and may remain unchanged for centuries. A microtoponym in the narrow sense (also known as a cadastral toponym, field name, etc.) is a non-settlement-related toponym in the narrow (toponymic) and wider (geonymic) senses, denoting parts of the land used for cultivating crops or fodder, fields, orchards, vineyards, meadows, pastures, and forests (agronyms); water areas (hydronyms); small slopes and mountains (oronyms); paths; and orientation points (overlooks, signs, wayside crosses, mountain cabins, etc.). They often reflect the geomorphological, historical, biological, geological, and social characteristics of a country, as well as the historical development of the spoken language. People use microtoponyms to designate the space where they live and work, and to make orientation in it easier.

Slovenian oeconyms and microtoponyms are of great interest to linguistics, and so many onomastics articles have been published on this topic in recent years (this article draws upon Šivic-Dular 1988, 2000; Merkù 1993; Furlan, Gložančev and Šivic-Dular 2000; Škofic 2001, 2007, 2009; Keber 2002; Čop 2007; Šekli 2008; Snoj 2009). In recent years, many projects have also been carried out to collect oeconyms and microtoponyms. »Their collection and research was unsystematic, spatially dispersed, and used varying research methodologies. Regarding the researchers' profiles, these types of issues were at the center of interest of not only professionals from various scholarly disciplines, but also individual amateur researchers« (Klinar and Geršič 2014, 414).

This article presents oeconyms that were collected by RAGOR (the Northwest Upper Carniola Development Agency) in cooperation with the author of this article in projects such as »Nomen vulgare« and others (Klinar 2013) and in the cross-border project »FLU-LED – Kulturni portal ledinskih in hišnih imen« (The Cultural Portal of Microtoponyms and Oeconyms), which is being carried out as part of the EU's 2007–2013 Slovenia–Austria Operational Program in the border area of southern Carinthia and Upper Carniola (Klinar et al. 2012; Internet 1). In this project, the methodology for recording microtoponyms was set up and presented in the volume *Metode zbiranja hišnih in ledinskih imen* (Methods for Collecting Oeconyms and Microtoponyms; Klinar et al. 2012). The results were published in special booklets titled *Kako se pri vas reče?* (What's the Name of Your House?; Klinar 2011; Škofic 2011), on printed and e-maps of the FLU-LED project (Klinar and Škofic 2015a, 2015b, 2015c) and also on some internet portals (for more about collecting and marking oeconyms in these projects, see Klinar and Geršič 2014).

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Figure 1: Booklets in the series *Kako se pri vas reče?* (What's the Name of Your House?).

2 Methods and transcription

Not only contemporary dialect information from local people but also historical sources are important for collecting and recording oeconyms and microtoponyms: »An overview of written sources is a good basis for fieldwork, in which the selection of good informants is vital« (Klinar and Geršič 2014, 415).

Because Slovenian is an inflective language, the nouns and adjectives in a toponym must be documented in the various forms they appear in; namely, in the nominative case, the bare genitive (as a subject in negative clauses or as a negated direct object), and in the locative, accusative, genitive with a preposition (corresponding to *where at? where to? where from?*). Names that are prepositional phrases must be recorded as well.

In the next stage of research (transcribing the material collected), the collaboration of linguists is also of great importance because they can offer advice on how to design a simplified dialect transcription that can be used by local people and non-linguists, even though linguists and dialectologists need more precise information about the pronunciation of oeconyms and microtoponyms. In Slovenian dialectology (and in this article) a standardized Slovenian phonetic transcription is used (see Kenda-Jež 2016) to mark all qualitative and quantitative features of the spoken language and its phonemes (e.g., *Pər Matí:jọu̯c, Matí:jọu̯čọu̯ vò:x*). Unlike IPA transcription, this simplified transcription uses only the Slovenian alphabet, a special letter for schwa (*ə*), three diacritics to mark accent (acute, grave, and circumflex), and the IPA length mark. Careful consideration is needed for deciding how to write or mark accents, the length and quality of accented vowels, syncopated and reduced vowels, and semivowels. One should also consider other dialect developments of vowels and consonants, means of preserving morphological word-formation, and syntactic features as preserved in names (such as *Pər Matíjovc, Matíjovčov vóh*, to repeat the same two examples).

A third possibility for writing these names is to standardize them on the basis of careful linguistic (morphonological) analysis; for example, *Pri Matijevcu* and *Matijevčev log* (to repeat the same two examples). In Slovenian onomastics, the practice is to standardize oeconyms only at the phonetic and orthographic levels (because people can identify with them easily), whereas microtoponyms and other toponyms used by the general public are standardized in line with etymological and historical principles (e.g., [špá:nove ní:ve] is written as *Španove njive*, and not **Županove njive*).

3 Linguistic analysis and presentation

3.1 The motivation, origin, and structure of oeconyms and microtoponyms

Oeconyms often have one of the following naming motivations: the surname of the first owner (*Klinar*, *Potočnik*, etc.), the first name of the first owner (*Balont* »Valentin«, *Jernač* »Jernej«, *Matevžek* »Matej/Matevž«, *Šema* »Simon«, *Jerca* »Jera, Gertruda«, etc.), a nickname of the first owner, which may have arisen from characteristics of the property (*Vretena* »spindle«, *Loden* »shop (cf. Germ. *Laden*)«, *Oštarija* »inn (cf. It. *osteria*)«, etc.), typical foods (*Štrukelj* »dumpling«, *Klobasa* »sausage«, *Kašar* »porridge«, *Zabela* »butter, fat, lard«, *Prata* »smoked pork«, etc.), typical plants (*Smrekar* »spruce«, *Podlipnik* »linden«, *Žavbla* »sage«, etc.), typical animals (*Volk* »wolf«, *Komar* »mosquito«, *Zajček* »rabbit«, *Muren* »cricket«, *Miška* »mouse«, etc.), physical characteristics of the owner (*Kobala* »bowlegged«, *Ta dolgi* »long«, etc.), psychological characteristics of the owner (*Fovšaritnica* »envious«, *Alelojovka* »alleluia«, *Tajč* »German (cf. Germ. *Deutsch*)«, etc.), or the geographical origin of the owner (*Kropar* »Kropa«, *Dražgošan* »Dražgoše«, *Korošček* »Carinthia«, *Bohinjec* »Bohinj«, *Rezijan* »Resia«, *Amerikanc* »America«, etc.). Oeconyms are also frequent that have arisen from the profession of the owner (*Kovač* »blacksmith«, *Šuštar* »shoemaker«, *Žnidar* »tailor«, *Mlinar* »miller«, *Fadajinka* »noodle-maker«, *Skirar* »ax-maker«, etc.), the social status of the owner (*Špan* »mayor«, etc.), the position of the house (*Na Skalci* »rock«, *Podgradovc* »castle«, *Mostar* »bridge«, etc.), the function of the house (*Mežnarija* »sexton«, *Šola* »school«, etc.), and so on.

Microtoponyms often have one of the following naming motivations: position (*Zgornji*/*Srednji*/*Spodnji konec* »upper/middle/lower part«, *Za krajem* »at the end«, etc.), geomorphological characteristics (*Čelce* »forehead«, *Ojstra peč* »sharp rock«, *Zjavka* »cave«, *Galerije* »gallery«, *Frtala* »to spin«, *Vilice* »fork«, *Podplatasta skala* »rock like a sole«, etc.), typical color (*Črni vrh* »black peak«, *Črni potok* »black stream«, etc.), plant names (*Bukovlje* »beech«, *Pod Lipo* »linden«, *Brezovica* »birch«, *Hrinovec* »horseradish«, etc.), animal names

(*Jančevica* »steer«, *Jagnjevica* »lamb«, *Petelinovec* »rooster«, *Konjski britof* »horse boneyard«, *Gamsov skret* »chamois dung area«, *Medvehka* »bear«, etc.), structures (*Zgornji bajer* »upper pond«, *Za mlinom* »mill«, *Skakalnica* »ski jump«, *Pri stogu* »hayrack«, *Pretvornik* »convertor«, *Kapelica* »wayside shrine«, *Plac* »market square«, *Mala gasa* »little alley«, etc.), personal names (*Na Jernaškem* »Jernej«, *Pri Marijici* »Marija«, *Petrovec* »Peter«, *Boštjanov bošt* »Boštjan«, *Mihovčev strmec* »Miha«, *Martinček* »Martin«), owned properties (*Koničarjev travnik* »Koničar's meadow«, *Klofčarjev graben* »Klofčar's ravine«, etc.), and people's activity (*Za Dolgo njivo* »long field«, *Streljavnica* »to shoot«, *Dekliški tomf* »maiden pool«, *Mili pogled* »gentle view«, *Tam, kjer je ta mrtvi ta živega ubil* »Where the dead one killed the living one«, *Žegnan studenec* »blessed well/spring«, etc.).

As can be seen, many of these names are of Slavic origin, but many of them are loanwords from various contact languages (mostly German and Italian). Oeconyms and microtoponyms also have different structures because these »are mainly one-word toponyms with masculine, feminine, or neuter gender, in the singular or plural. Quite common are also noun phrases with left attributes that specify possession, position, and other characteristics of the places named. Special attention is given to prepositional and compound names, which are interesting because of their polymorphic structure; such toponyms are often in a process of formation (*nomina propria in statu nascendi* »developing proper names«), and so these names often show an intermediate stage between common and proper name, pointing to their false propriety (pseudo-propriety or proto-propriety)« (Škofic 2016, 220). Toponyms with more complex structures (such as a sentence) are quite rare.

3.2 Lexicographic and cartographic presentation of oeconyms

This subsection presents the microstructure of entries in the dictionary of Slovenian dialect oeconyms (Škofic 2014).

Although many names have the same root, it is necessary to present not only the root but also all derivative forms with various suffixes in their Proto-Slavic forms.

The standardized form of an oeconym (formed on the basis of morphological analysis, in which the phonetically abstracted name, following the phonetic rules of the dialect, is followed by its Proto-Slavic equivalent and by its derivational predecessors or sources from foreign languages) is followed by the symbol ▸ and an identification of the name (i.e., places/villages with house numbers) with the dialect form of the oeconym accented and standardized (in square brackets). This is followed by the standardized and dialect names for the male and female head of the property (following the symbols ♂ and ♀) in the nominative and genitive as well as the corresponding adjective in standardized and dialect variants (in the masculine, feminine, and neuter forms). Each identification unit may also have a documentary section (after the symbol ❖), stating the name in its historical sources: FK = the Franciscan cadaster (Protocols … 1823–1896); SA = *Status animarum* (parish family records; Parish … 1750–1950; Škofic 2013, 2014).

kovač- ⇨ Kovač, Kovaček, Kovačevec, Kovačič, Kovačijovec, Kovačnica ← **kov-a-č-ь* (»smith«) ← **kov-a-ti kuj-ǫ* »to forge«

Pri Kovaču < **pri* »at« + **kov-a-č-ь*
▸ HN Bašelj 14: *Pri Kováču* [pər kováːč], ♂ *Kováč* [kováːč -a], ♀ *Kovačíca* [kovačíːca -e], adj. *Kováčov* [kováːčou̯ -ova -ou̯] ❖ FK 1827 Kovatsch, SA 1771 Kovazh, SA 1880 Kovač
▸ HN Begunje na Gorenjskem 109: *Pri Kováču* [pər kováːč], ♂ *Kováč* [kováːč -a], ♀ *Kovačíca* [kovačíːca -e], adj. *Kováčov* [kováːčou̯ -ova -ou̯] ❖ SA 1750–1859 Kovazh, SA 1750–1873 Kovazh
▸ HN Bistrica (Naklo) 16: *Pri Kováču* [pər kováːč], ♂ *Kovàč* [koˈvəč kováːča], ♀ *Kovačíca* [kovačíːca-e], adj. *Kováčov* [kováːčou̯ -ova -ou̯] ❖ /
▸ HN Bled, hamlet of Rečica, Triglavska cesta 5: *Pri Kováču* [pər kováːčo], ♂ *Kováč* [kováːč -a], ♀ *Kovačíca* [kovačíːca -e], adj. *Kováčov* [kováːčou̯ -ova -ou̯] ❖ /
▸ HN Bodešče 22: *Pri Kováču* [pər kováːč], ♂ *Kováč* [kováːč -a], ♀ *Kovačíca* [kovačíːca -e], adj. *Kováčov* [kováčou̯ -ova -ou̯] ❖ FK 1827 Kovatsch, SA 1900–1910 Kovač
▸ HN Bohinjska Bela 118: *Pri Kováču* [pər kováːč], ♂ *Kováč* [kováːč -a], ♀ *Kovačíca* [kovačíːca -e], adj. *Kováčov* [kováːčou̯ -ova -ou̯] ❖ SA 1900–1910 Kovač

▸ HN Bohinjska Bela 24: *Pri Kováču* [pər ková:č], ♂ *Kováč* [ková:č -a], ♀ *Kovačíca* [kovačí:ca -e], adj. *Kováčov* [ková:čou̯ -ova -ou̯] ❖ FK 1827 Kovatsch, SA 1900–1910 Kovač
▸ HN Bohinjska Češnjica 73: *Pri Kováču* [pər ková:čo], ♂ *Kováč* [ková:č -a], ♀ *Kovačíca* [kovačí:ca -e], adj. *Kováčov* [ková:čou̯ -ova -ou̯] ❖ FK 1827 Kovazh, SA 1831 Kovazh, SA 1882 Kovač
▸ HN Brezje 52 and 76: *Pri Kováču* [pər ková:č], ♂ *Kovàč* [ko'vəč ková:ča], ♀ *Kovačíca* [kovačí:ca -e], adj. *Kováčov* [ková:čou̯ ou̯] ❖ /
▸ HN Češnjevek 29: *Pri Kováču* [pər ková:č], ♂ *Kováč* [ková:č -a], ♀ *Kovačíca* [kovačí:ca -e], adj. *Kováčov* [ková:čou̯ -ova -ou̯] ❖ /

Pri Kovačku < **pri* »at« + **kov-a-č-ьk-ъ*
▸ HN Begunje na Gorenjskem 131: *Pri Kovačkù* [pər kovač'ko], ♂ *Kovačèk* [kova'čək -č'ka], ♀ *Kovačkôva* [kovačkó:va -e], adj. *Kovačkôv* [kovačkó:u̯ -ó:va -ó:u̯] ❖ SA 1750–1859 Kovazhik, SA 1750–1873 Kovazhik
▸ HN Koroška Bela, Cesta Ivana Cankarja 14: *Pri Kovačkú* [pər kovačkọ:], ♂ *Kovačkóv* [kovačkó:u̯ -ga], ♀ /, adj. *Kovačkóv* [kovačkó:u̯ -ọ:va -ó:u̯] ❖ /

Pri Kovačevcu < **pri* »at« + **kov-a-č-ev-ьc-ь*
▸ HN Bohinjska Češnjica 8: *Pri Kovačévcu* [pər kovačẹ:u̯co], ♂ *Kovačévc* [kovačẹ:u̯c -a], ♀ *Kovačévka* [kovačẹ:u̯ka -e], adj. *Kovačév* [kovačẹ:u̯ -ẹ:va -ẹ:u̯] ❖ FK 1827 Kovazhouzh, SA 1831 Kovazheuc, SA 1882 Kovačevc

Pri Kovačiču < **pri* »at« + **kov-a-č-it́-ь* (< surname *Kovačič*)
▸ HN Slovenski Javornik, Pionirska ulica 11: Pri *Kováčiču* [pər ková:čič], ♂ *Kováčič* [ková:čič -a], ♀ /, adj. *Kováčičev* [ková:čičou̯ -ova -ou̯] ❖ /

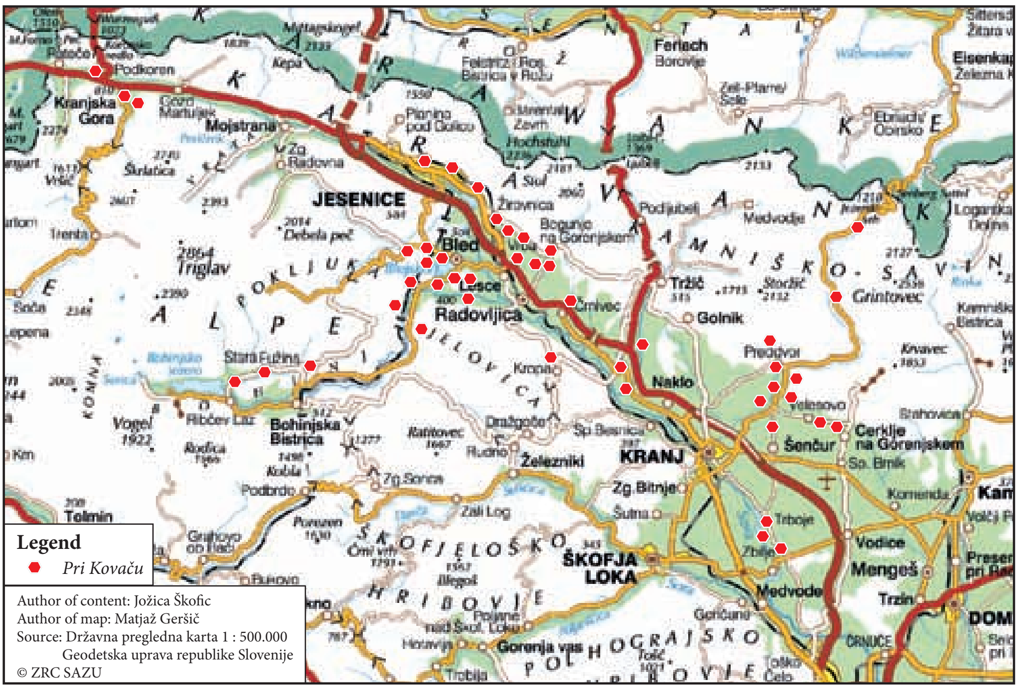

Figure 2: Spatial distribution of the oeconym *Pri Kovaču* in Upper Carniola. It is interesting that there are no oeconyms motivated by the profession smith (Slov. *kovač*) in Kropa. Kropa is known for its traditional iron forging and smithies, and almost all of the inhabitants made their living by hammering and blacksmithing, so any naming motivated by this activity would not be useful.

Pri Kovačijovcu < **pri* »at« + **kov-a-č-(ij)-ov-ьc-ь*
▸ HN Begunje na Gorenjskem 31: *Pri Kovačíjovcu* [pər kovačí:jou̯c], ♂ *Kovačíjovc* [kovačí:jou̯c -a], ♀ *Kovačíjovka* [kovačí:jou̯ka -e], adj. *Kovačíjev* [kovačí:jou̯ -ova -ou̯] ❖ SA 1750–1859 Kovashijouz, SA 1750–1873 Kovashijouz

Na Kovačnici < **na* »on« + **kov-a-č-ьn-ic-a* »smithy«
▸ HN Bohinjska Češnjica 95: *Na Kováčnici* [na ková:čənce], ♂ /, ♀ /, adj. / ❖ /
▸ HN Jereka 34: *Na Kováčnici* [na ková:čənc], ♂ *Kovačíčən* [kovačì:čən] ♀ /, adj. / (*s Kováčənce*) ❖ /

Many of the oeconyms in the Upper Carniola dialect have their origin in male proper names (1030/5450 or 18.9%), whereas the percentage of oeconyms originating in female proper names is much lower (87/5450 or 1.6%); the most common female proper names are *Katra* (9), *Jera* (6), *Majda*/*Magdalena* (7), *Alenka*/*Lenka* (5), and *Johana* (5).

The most common male proper names from which Upper Carniolan oeconyms are derived are *Jurij* (59), *Janez* (52), *Anton* (43), *Matija* (41), *Jakob* (40), *Miha* (40), *Peter* (40), *Martin* (37), *Marko* (35), *Tomaž* (32), *Andrej* (30), *Urban* (30), *Gregor* (30), *Blaž* (31), *Jožef* (29), *Simon* (28), *Klemen* (27), *Luka* (24), *Jernej* (22), *Štefan* (20), *Lovrenc* (18), *Franc* (17), *Matevž* (16), *Pavel* (15), and *Valentin* (14, plus *Tine* with 10), and the rarest are *Adolf*, *Karl*, *Maks*, *Mohor*, *Metod* (all only once), and *Ciril* (twice).

The most frequent suffixes in oeconyms derived from male proper names are: *-Ø* (e.g., *Pri Alešu*, *Filipu*, *Luku*), *-ač* (e.g., *Pri Mrtnaču*, *Vožbaču*, *Jernaču*, *Milaču*), *-ak* (e.g., *Pri Klemenaku*), *-ček* (e.g., *Pri Andrejčku*, *Štefančku*, *Jančku*, *Martinčku*, *Petrčku*, *Tinčku*), *-e* (e.g., *Pri Bvažetu*, *Anžetu*), *-ec* (e.g., *Pri Jakcu*, *Lukcu*, *Markcu*, *Šmoncu*, *Toncu*, *Rbancu*), *-ečman* (e.g., *Pri Anžečmanu*), *-ej* (e.g., *Pri Toneju*, *Jurčeju*, *Miheju*, *Tineju*), *-ejček* (e.g., *Pri Tonejčku*), *-ejovec* (e.g., *Pri Tonejovcu*), *-ek* (e.g., *Pri Pavleku*, *Anžku*, *Francku*), *-elj* (e.g., *Pri Franceljnu*, *Gusteljnu*, *Lojzeljnu*, *Miheljnu*, *Vrbanceljnu*), *-eljc* (e.g., *Pri Anzeljcu*), *-eljič* (e.g., *Pri*

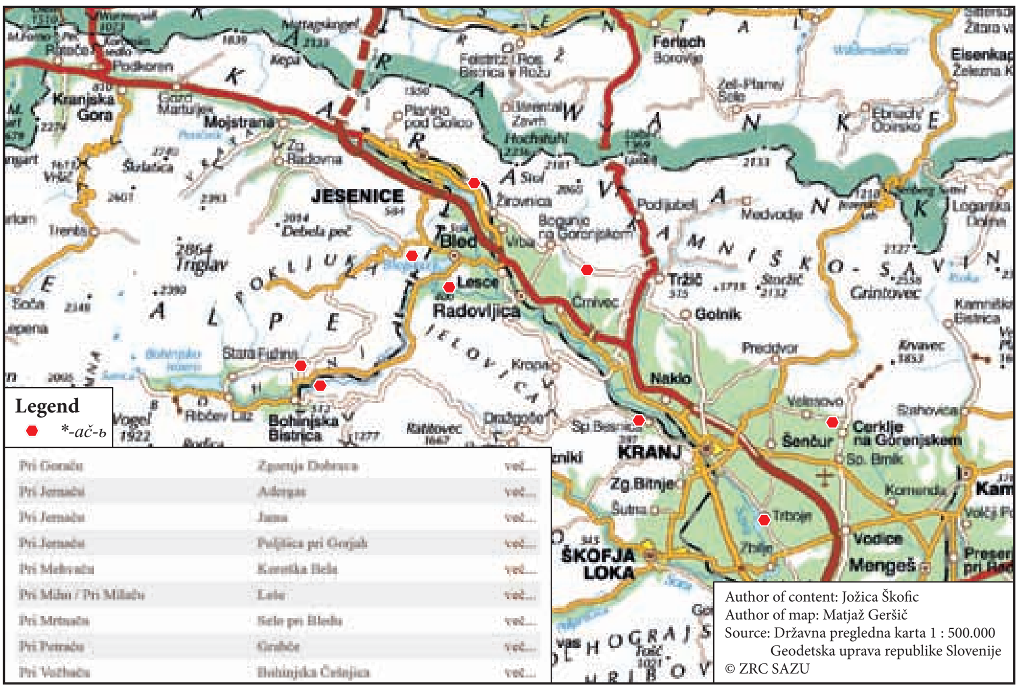

Figure 3: The suffix *-ač* in oeconyms derived from male proper names.

Markoteljču), *-ež* (e.g., *Pri Matiježu, Pavležu, Tinežu, Vertežu, Učežu*), *-ežek* (e.g., *Pri Učešku*), *-i* (e.g., *Pri Pepiju, Poldiju; Pri Žanitu*), *-ic* (e.g., *Pri Petricu*), *-ič* (e.g., *Pri Uriču, Jakobču, Jožefču, Lenarču, Petrču*), *-iček* (e.g., *Pri Anžičku*), *-in* (e.g., *Pri Gregorinu, Tomažinu*), *-ko* (e.g., *Pri Andrejkotu*), *-kulež* (e.g., *Pri Anžkuležu*), *-lin* (e.g., *Pri Anžlinu, Marklinu*), *-man* (e.g., *Pri Jožmanu, Jurmanu, Lešmanu*), *-nik* [-nek] (e.g., *Pri Tomažneku, Bvažneku, Jožneku*), *-ovček* (e.g., *Pri Udamovčku*), *-ovec* (e.g., *Pri Grogorjovcu, Matevžovcu, Mihovcu, Petrovcu*), *-ovi* (e.g., *Pri Jakupovih, Jurjovih, Petrovih*), *-uc* (e.g., *Pri Štefucu*), *-uč* (e.g., *Pri Mrkuču*), *-ulič* (e.g., *Pri Bažulču*), *-un* (e.g., *Pri Bvažunu, Martunu*), and *-uš* (e.g., *Pri Markušu*).

Some examples of the lexicographic and cartographic presentation of oeconyms derived from male and female proper names:

Vid- ⇨ Bid, Bidec, Bisc, Vidic, (Videc) ← Lat. *Vitus* (+ Germ. *Wido*, *Witto*, *Wito*)

Pri Bidu < **pri* »at« + (*Vid*)-ъ
▸ HN Črnivec 26: Pri Bídu [pər bìːt], ♂ Bídovc [bìːdou̯ -ga], ♀/, adj. Bídov [bìːdou̯ bìːdova bìːdou̯] ❖ /

Pri Bidcu < **pri* »at« + (*Vid*)-ьc-ь
▸ HN Zgornje Gorje 39: Pri Bídcu [pər bìːsco], ♂ Bídec/Bísc [bìːdəc/bìːsc bìːsca], ♀ Bíhka [bìːxka -e], adj. Bíščev [bìːščou̯ -ova -ou̯] ❖ FK 1827 Widitz, SA 1759–1877 Vidiz, SA 1790–1905 Vidic (Bisc), Kunstelj 1954 Bidac
▸ HN Bled, Zagoriška cesta 13: Pri Bídcu/Pri Bíscu [pər bìːsc], ♂ Bídec [bìːdəc bìːsca], ♀ Bíhka [bìːxka -e], adj. Bíščev [bìːščou̯ -ova -ou̯] ❖ FK 1827 Widitz, SA 1769–1869 Vidiz
▸ HN Bled, Partizanska cesta 1: Pri Bídcu [pər bìːsco], ♂ Bídec [bìːdəc bìːsca], ♀ Bíhka [bìːxka -e], adj. Bíščev [bìːščou̯ -ova -ou̯] ❖ FK 1827 Widetz, SA 1771–1869 Vidiz, SA 1799–1869 Vidic
▸ HN Podhom 20: Pri Bíscu [pər bìːsc], ♂ Bídec [bìːdec bìːsca], ♀ Bíhka [bìːxka -e], adj. Bíščev [Bìːščou̯ -ova -ou̯] ❖ FK 1827 Widitz, SA 1790–1905 and SA 1900 Vidic, Zupan 1995 Bisc

Figure 4: The suffix *-ovi* in oeconyms derived from male proper names.

Pri Biscu < **pri* »at« + (*Vid*)-ьc-ь
▸ HN Kamnje 15a: Pri Bíscu [pər bìːsc], ♂ Bísc [bìːsc -a], ♀ Bíhka [bìːxka -e], adj. Bíščev [Bìːščoṷ -ova -oṷ] ❖ FK 1827 Widtz, SA 1891 Bisz, SA 1910
▸ HN Ravne v Bohinju 5: Pri Bíscu [pər bìːsc], ♂ Bísc [bìːsc -a], ♀ Bíhka [bìːxka -e], adj. Bíščev [Bìːščoṷ -ova -oṷ] ❖ SA 1910 Bisc

Pri Vidicu < **pri* »at« + surname *Vidic* < (*Vid*)-ьc-ь
▸ HN Srednji Vrh 11: Pri Vídicu [pər vìːdic], ♂ Vídic [viːdic -a], ♀ /, adj. / ❖ SA 1903 Vidic
▸ HN Slovenski Javornik, Terenska ulica 10: Pri Vídicu [pər vìːdic], ♂ ♂ Vídic [viːdic -a], ♀ /, adj. / ❖ /

Katr- ⇨ Katra, Katrnek, Katrnjek, Katerinc, Katračnek, Katrjačnek, Katričnek ← *Katarina* ← (Germ. *Catarina*) ← Lat. *Caterina* (← Gr. *Aikaterine*)

Pri Katri < **pri* »at« + **(Katr)-a*
▸ HN Bistrica pri Tržiču 43: Pri Kátri [pər kàːtrə], ♂ Kátərən [kàːtərən -ga], ♀ Kátra [kàːtra -e], adj. Kátrən [kàːtrən kàːtərna kàːtrən] ❖ /
Pri Katrnek < **pri* »at« + **(Katr)-ьn-ik-ъ*
▸ HN Spodnje Gorje 56: Pri Kátrneku [pər kàːtərnek], ♂ Kátrnek [kàːtərnek -a], ♀ /, adj. Kátrnekov [kàːtərnekoṷ -ova -oṷ] ❖ Kunstelj 1954 Katrnek
▸ HN Zgoša 45: Pri Kátrneku [pər kàːtərnek], ♂ Kátrnek [kàːtərnek -a], ♀ Kátrnca [kàːtərənca -e], adj. Kátrnekov [kàːtərnekoṷ -ova -oṷ] ❖ SA 1750–1859 and 1750–1873 Katernjek, Sinobad 1998 Katernek
▸ HN Zvirče 12: Pri Kátrneku [pər kàːtərnek], ♂ Kátrnek [kàːtərnek -a], ♀ /, adj. Kátrnekov [kàːtərnekoṷ -ova -oṷ] ❖ SA 1767–1856 (1846) Katernik, SA 1792–1912 (1869) Katernek
Pri Katrnjek < **pri* »at« + **(Katr)-ń-ak-ъ*

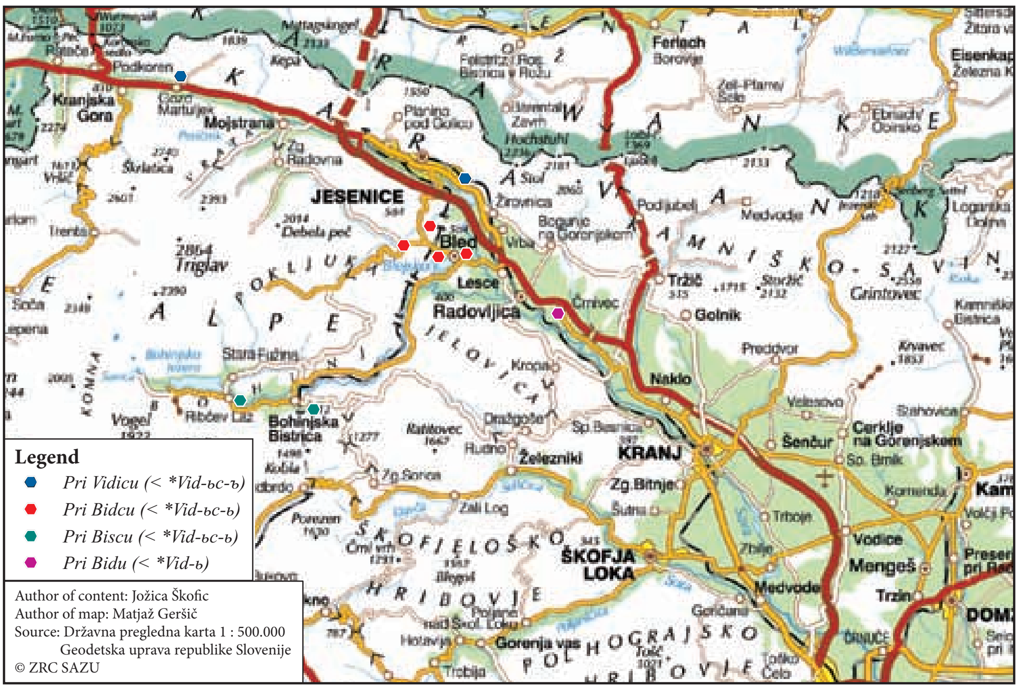

Figure 5: Spatial distribution of the oeconym *Pri Vidicu/Pri Vidu/Pri Bidcu/Pri Biscu* in Upper Carniola. Phonological variants of oeconyms motivated by the male proper name *Vid*.

▸ HN Studor 38: Pri Kátrnjeku [pər kà:tərnjeko], ♂ Kátrnjek [kà:tərnjek -a], ♀ /, adj. Kátrnjekov [kà:tərnjekou̯ -ova -ou̯] ❖ FK 1827 Katerneg, SA 1821 Katernek

Pri Katerincu < **pri* »at« + **(Kater)-in-ьc-ь*

▸ HN Rateče 66: Pri Katerincu [pər katerì:nc], ♂ Katerínčnjak [katerì:nčnjak -a], ♀ Katerínca [katerì:nca -e], adj. Katerínčən [katerì:nčən -čna -čən] ❖ FK 1827 Cartarinz, SA 1846 Katarinz

Pri Katračneku < **pri* »at« + **(Katr)-ač-ьn-ik-ъ* (← surname *Katrašnik* (SA 1900–1910))

▸ HN Bodešče 7: Pri Katráčneku [pər katrà:čnek], ♂ Katráčnek [katrà:čnek -a], ♀ Katráčnica [katrà:čənca -e], adj. Katráčnekov [katrà:čnekou̯ -ova -ou̯] ❖ SA 1900–1910 Katračnik

Pri Katrjačneku < **pri* »at« + **(Katr)-j-ač-ьn-ik-ъ* (maybe adjectival derivation, like *Martin-j-i*)

▸ HN Velesovo 42: Pri Katrjáčneku [pər kətərjà:čnek], ♂ Katrjáčnek [kətərjà:čnek -a], ♀ Katrjáča [kətərjà:ča -e], adj. Katrjáčnekov [kətərjà:čnekou̯ -ova -ou̯] ❖ FA 1827 Katerjazhnek, SA 1789–1816 Katriazhnek, SA 1785–1887 (1879) Katerjačnik

Pri Katričneku < **pri* »at« + **(Katr)-it́-ьn-ik-ъ*

▸ HN Bohinjska Bela 70: Pri Katríčneku [pər katrì:čnek], ♂ Katríčnek [katrì:čnek -a], ♀ Katríčnca/Katríška [katrì:čənca -e/katrì:ška -e], adj. Katríčnekov [katrì:čnekou̯ -ova -ou̯] ❖ SA 1900–1910 Katričnjek

Jer- ⇨ Jera, Jerca, Jerčnek, Jerčini ← *Gera* ← OHG *Gertrud* (← Lat. *Gertrudis*)

Pri Jeri < **pri* »at« + **(Jer)-a*

▸ HN Praše 5: Pri Jéri [pər jẹ̀:r], ♂ Jérnik [jẹ̀:rnək -a], ♀ Jérnica [jẹ̀:rənca -e], adj. Jérin [jẹ̀:rən -rna -rən] ❖ SA 1907 Stari Zlekar (Pri Jeri)

▸ HN Rateče 74: Pri Jêri [pər jè:r], ♂ Jêrin [jè:rən -ga], ♀ Jéra [jè:ra -e], adj. Jêrin [jè:rən -rna -rən] ❖ /

▸ HN Trstenik 6: Pri Jéri [pər jẹ̀:r], ♂ Jérnik [jẹ̀:rnek -a], ♀ Jéra [jẹ̀:ra -e], adj. Jérin [jẹ̀:rən -rna -rən] ❖ /

Pri Jerci < **pri* »at« + **(Jer)-ic-a*

▸ HN Prihodi 1: Pri Jérci [pər jẹ̀:rc], ♂ Jércən [jẹ̀:rcən -ga], ♀ /, adj. Jércin [jẹ̀:rcən -cna -cən] ❖ /

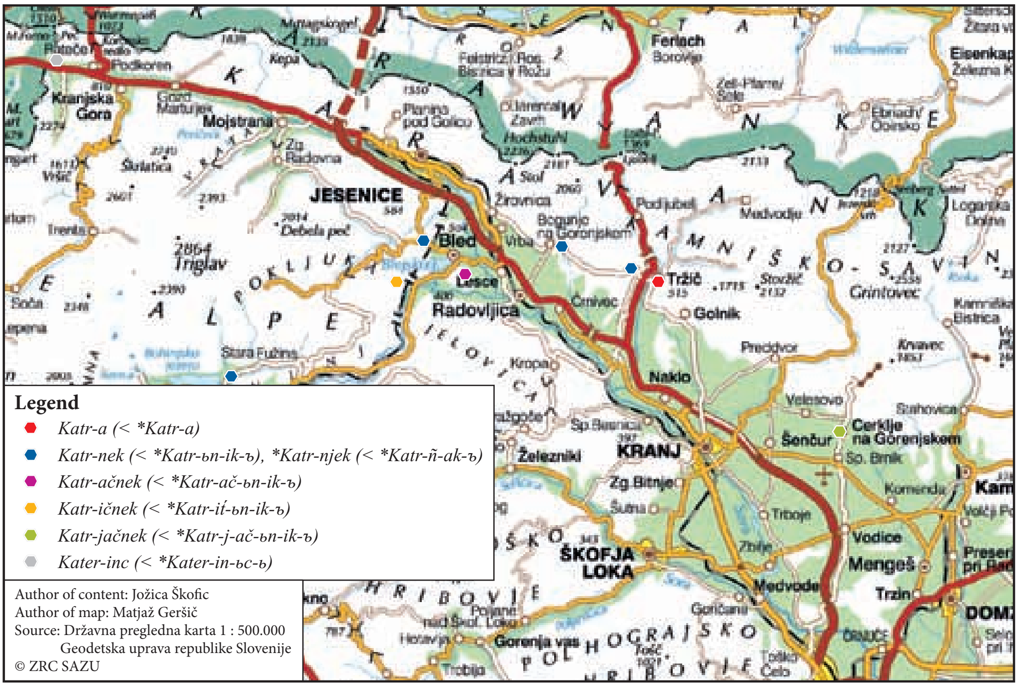

Figure 6: Suffixes of oeconyms derived from the female proper name *Katr-a: -a, -nek (< -ьn-ik-ъ), -njek (< -ń-ak-ъ), -ačnek (< -ač-ьn-ik-ъ), -ičnek (< -it́-ьn-ik-ъ), -jačnek (< -j-ač-ьn-ik-ъ), -inec (-in-ьc-ь)*

Pri Jerčnih < **pri* »at« + **(Jer)-ič-in-ъ* (< *Jer-ic-a)*
▸ HN Podreča 2: Pri Jérčnih [pər jẹ̀ːrčnəx], ♂ Jérčenk [jẹ̀ːrčənk -a], ♀ Jérčna [jẹ̀ːrčna -e], adj. Jérčin [jẹ̀ːrčən -čna -čən] ❖ /
Pri Jerčneku < **pri* »at« + **Jer-ič-ьn-ik-ъ* (< *Jer-ic-a)*
▸ HN Poljšica pri Gorjah 31: Pri Jérčneku [pər jẹ̀ːrčneko], ♂ Jérčnek [jẹ̀ːrčnek -a], ♀ /, adj. Jérčnekov [jẹ̀ːrčnekou̯ -ova -ou̯] ❖ SA 1900 Pri Jeri, Kunstelj 1954 Jernek
Pri Jeriču < **pri* »at« + **Jer-iť-ь*
▸ HN Bašelj 5: Pri Jeríču [pər jeríːč], ♂ Jerìč [jeˈrəč jeríːča], ♀ Jeríčka [jerìːška -e], adj. Jeríčov [jeríːčou̯ -ova -ou̯] ❖ FK 1827 Jeretsch, SA 1771 Jerezh, SA 1880 Jerič
▸ HN Spodnje Gorje 11: Pri Jeríču [pər jeríːčo], ♂ Jerìč [jeˈrəč jeríːča], ♀ Jeríčka [jerìːška -e], adj. Jeríčov [jeríːčou̯ -ova -ou̯] ❖ FK 1827 Jerizh, SA 1771 1759–1877 (1836) Jerizh, SA 1790–1905 Jerič

4 Conclusion

Microtoponyms, and especially oeconyms, are an important part of national cultural heritage and are interesting not only to their local users but also to various disciplines: geography, history, ethnology, and linguistics. One can study various connections between the linguistic viewpoints on the toponyms presented in this article and the geographical locations in a specific area. Geographical and historical data about named places can help linguists understand naming motivations and, vice versa, linguistic information can help geographers understand how toponyms have developed through time. From the linguistic point of view, the recorded dialect form of oeconyms and microtoponyms is especially valuable because it provides information about the pronunciation, inflection, and historical development of a language and its local dialects. Proper names can be compared to common nouns (synchronically and diachronically) and presented in a specially designed dictionary of toponyms as well as geolinguistically on maps. This article offers some solutions for such presentations of these toponyms.

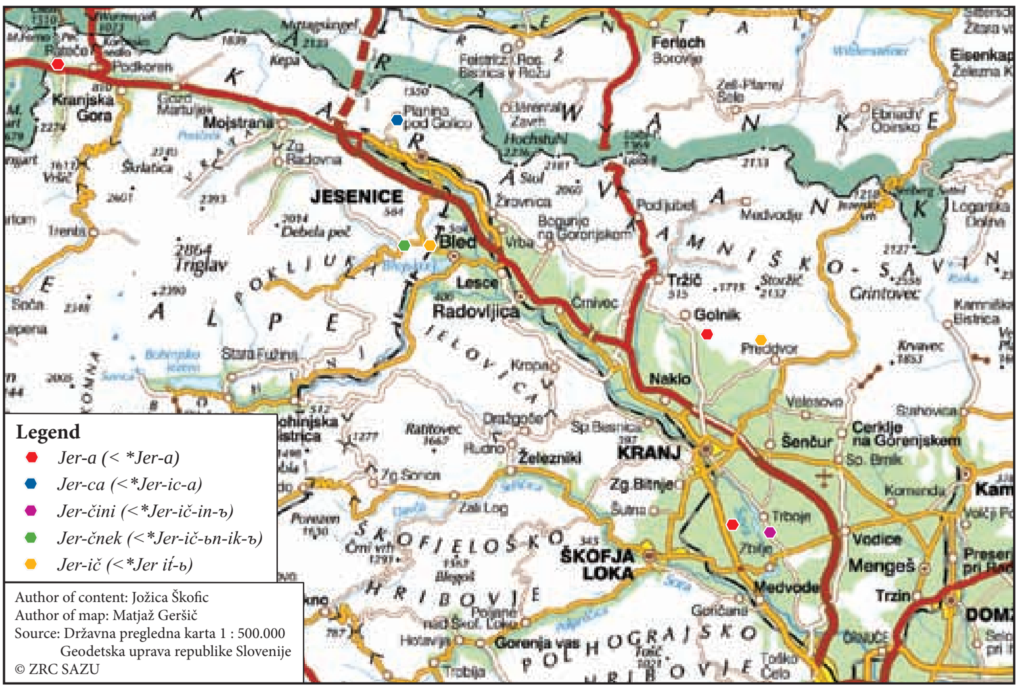

Figure 7: Suffixes of oeconyms derived from the female proper name *Jer-a: -a, -ca* (< *-ic-a*), *-č-in-i* (< *-ič-in-ъ*), *-č-nek* (< *-ič-ьn-ik-ъ*), *-ič* (< *-iť-ь*)

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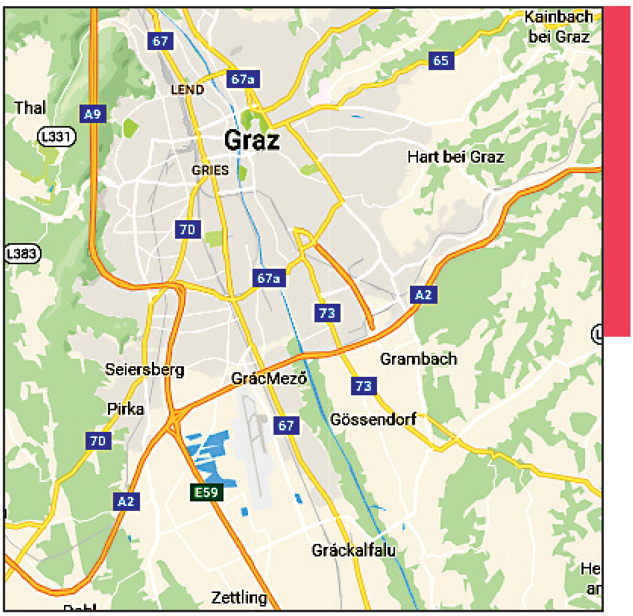
Acta geographica Slovenica, 57-1, 2017, 153–159

DOES GOOGLE SERVE AS A MODEL FOR USING PLACE NAMES?

Gábor Gercsák, Gábor Mikesy



GrácMező instead of Feldkirchen bei Graz.

Does Google serve as a model for using place names?

DOI: http://dx.doi.org/10.3986/AGS.4668
UDC: 91:811.511.141'373.21
811.511.141'373.21:004.738.5
COBISS: 1.01

ABSTRACT: This paper examines the reliability of geographical names published on various internet platforms and seeks to improve the place-name content of internet maps. Hungarian examples of incorrect place names from various online maps draw attention to the need for cooperation between those that provide internet maps or map-based applications and relevant national or professional institutions.

KEY WORDS: geographical name, Hungarian name, place name, toponymy, internet, Google

The article was submitted for publication on August 30th, 2016

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1 Introduction

Not only have printed maps been losing importance, but several traditional tools that help in correctly understanding and interpreting place names on maps, such as names indexes and legends, also seem to be disappearing from everyday use. In the world of computers, most map users are turning to online methods or mobile applications when they look for any spatial information. This approach has also become the primary source of information for places and place names. Unfortunately, automatic and non-critical acceptance of names from the web is everyday practice; therefore, it is very important that the names available from these sources be reliable and correct in all aspects, including linguistics, science, and administration, and that the names be professionally verified.

2 Examples of misused place names

This article presents the most common types of names arranged according to type of mistake. These examples are mostly taken from Google Maps and Google Earth pages and from applications based on them accessed from Hungarian IP addresses. These place names demonstrate a lack of critical use of sources or distortions of names due to various technical reasons. The most common mistakes are missing diacritics, use of historical names without modern equivalents, use of names never approved, false linking of exonyms, and automatic translations of place names.

2.1 Missing diacritics

The name of the Hungarian village *Kővágószőlős* appears in the form *Kovágószolos* (Figure 1), although the correct spellings of all town and village names can be accessed freely and without any restriction (e.g., from the homepage of the Hungarian Central Statistical Office). It is worth mentioning that no other alphabet uses the letter *ő* but the Hungarian alphabet.

2.2 Historical names without modern equivalents

The name of the capital city of the Italian region Piedmont is unanimously *Torino* in Hungarian today. This form has been used consistently in the press, schoolbooks, and atlases. Only well-educated people and the older generation with some knowledge of German can match the form *Turin* (Figure 2) on this Google Earth map with *Torino*.

Similarly, a major historical site for Hungarians is *Rodostó* in Turkey, but *Tekirdağ*, the Turkish form, has geographical relevance. There are several similar cases. The Croatian town of Opatija has always been a popular holiday resort for Hungarians. Its exonym is *Abbázia*, which obviously exists for Hungarians,

Figure 1: Kővágószőlős with incorrect diacritics. Meanwhile, this mistake has already been corrected on the internet (Internet 1).

Figure 2: Turin; the old Hungarian form of Torino. This mistake has already been corrected on the internet (GoogleEarth, 4. 10. 2013).

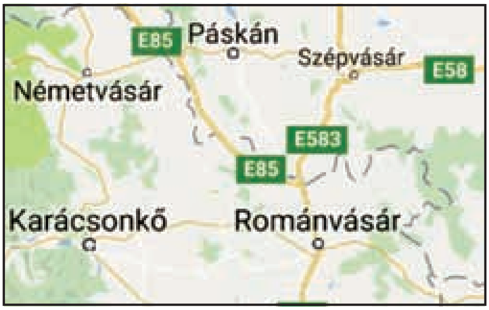

Figure 3: Only historical names in Moldavia (Internet 2).

Figure 4: Kisjenő in place of Chişinău (Internet 3).

but is passing out of use (this exonym is not listed in the official catalogue of approved place names; Pokoly 2012). It is interesting to note that some town names that reflect German and Italian influence and belong to the same name type appear in Hungarian (*Zára* for Zadar and *Zengg* for Senj), whereas others are shown without their historical exonyms (*Raguza*, *Trau*, and *Spalato*) and only the modern Croatian names appear (*Dubrovnik*, *Trogir*, and *Split*, respectively). These examples demonstrate the inconsistent use of place names.

Hungarian names used in medieval sources are revitalized in those areas of Romania that were outside the territory of historical Hungary (e.g. *Karácsonkő* for Piatra Neamţ, or *Németvásár* for Târgu Neamţ; Figure 3). These forms do not respect the requirement of correct information and they also do not follow the modern use of these geographical names by the Hungarians living in Romania (Mikesy 2014, 219).

It seems that the use of historical names depends on the country concerned. We found that name forms that can be considered either exonyms or historical exonyms are less frequently shown, although their appearance would be much more reasonable for Hungarian readers (e.g. *Boroszló* for Polish Wrocław, *Lemberg* for Ukrainian Lviv, *Drinápoly* for Turkish Edirne, or *Spárta* for Greek *Spárti* »Sparta«).

2.3 Names never approved

Newly created Hungarian names have begun to appear on online maps (Hlács 2015). Some of them come from false etymologies or incorrect associations. Reliable sources indicate that the Moldovan town of Chişinău never had a Hungarian exonym, although the form *Kisjenő* (Figure 4) can be seen increasingly frequently today. This name is based on a false etymology.

However, the historically ethnically Hungarian settlement of *Kisjenő* in Transylvania has an official Romanian name, *Chişineu*, which is indeed spelled almost in the same way as the name of the capital city of Moldova (Kiss 1987, 230). The Hungarian name comes from the ancient Hungarian tribal name *Jenő* and the modifier *kis* »little«.

Figure 5: Ónfalva in place of Oneşti/Onyest (Internet 4).

Figure 6: Magyarsárvár in place of Uherský Ostroh (Internet 5).

The Romanian settlement of Oneşti is a place with a considerable number of Hungarian speakers. Its Hungarian forms *Onest* and *Onyest* are justified by old documents. The name *Ónfalva* (with the meaning »tin village«) appeared in the first half of the past century, but there are no historical or folk data to confirm this name as an exonym (Figure 5). The Hungarian ethnographer Pál Péter Domokos presumed that the first part of *Onest* includes *ón*, the Hungarian word for »tin« (Domokos 1987, 179). The new name was developed from this explanation. The renowned etymologist Lajos Kiss derived it from the personal name *Ion* (Kiss 1988, 746).

The name *Magyarsárvár* (Figure 6) can be found in place of the Czech settlement Uherský Ostroh. The Czech word *uherský* means »Hungarian« and relates either to the nearness of the Hungarian border or to the fact that the place was controlled by the king of Hungary for a short time at the end of the fifteenth century. The use of the Hungarian exonym is justified by nothing else than an association based on the meaning. There are no traces of any Hungarian population here or in the area that could have provided the name. The common word *ostroh* »enclosed place«, »fence« was replaced by Hungarian *sárvár* »mud castle« because an early medieval chronicle mentions a place called *saruuar* (Anonymous c. 1200) that might have been located there. However, this name had no any relevance in later documents. The new name is a combination of a vaguely justified anterior constituent and a questionable medieval item.

2.4 False linking of exonyms

Urziceni is an important Romanian place north of Bucharest in Ialomiţa County. Its name on the internet is *Csanálos* in Hungarian (Figure 7). However, there is a Hungarian village named *Csanálos* (»nettle place«) near Carei in the Romanian part of the former Hungarian Szatmár County (Figure 8); its name was directly translated into Romanian as *Urziceni*, which is an officially established name. Because the makers of the electronic map probably had no available sources that would have provided coordinates for the location of *Csanálos*, they applied it to both places named *Urziceni*.

A similar mistake was made in the case of two Ukrainian settlements, both named *Новоселиця* (*Novoselytsya*). One of them lies in Zakarpattia Oblast, in the area of historical Hungary, and the other in Chernivtsi Oblast. The former settlement has the Hungarian name *Taracújfalu*; however, it is not shown there (Figure 9) but on the other side of the Carpathian Mountains (Figure 10). The Hungarian name of the place was incorrectly assigned to another place due to their identical forms in Ukrainian.

2.5 Automatic translations?

The question mark in the header of this section indicates that the authors can only guess at the reasons for the creation of sometimes comic Hungarian names, which absolutely depart from correct Hungarian place-name practice. These strange names typically appear on the web pages of Austrian and Slovenian territories. For instance, the Austrian name Leitersdorf im Raabtal near Feldbach was replaced by the name *Rábakarmestere*, which means »conductor of the Rába River«; instead of Raabau one finds *Rábaakadálymentes*, which roughly means »obstacle-free Rába River« (Figure 11); the name Radkersburg/Gornja Radgona on

Figure 7: Csanálos in place of Urziceni (Internet 6).

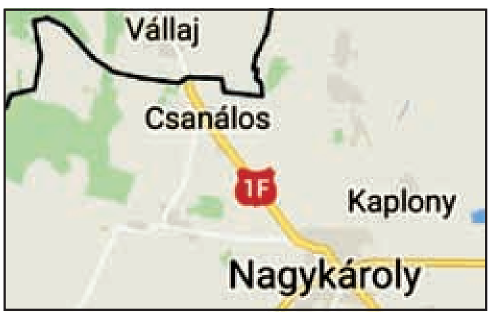

Figure 8: Csanálos in the correct location (Internet 7).

Figure 9: Only the Ukrainian form for Taracújfalu (Internet 8).

Figure 10: Taracújfalu in the incorrect place (Internet 9).

Figure 11: Incorrect names for Raabau and Leitersdorf im Raabtal (Internet 10).

Figure 12: Incorrect names for Radkersburg and Gornja Radgona (Internet 11).

the Austrian–Slovenian border is translated as *Kerékerősítővár* (»wheel-strengthening castle«), and the name Podgrad on the Slovenian side is *Keréknekfel* (»up on the wheel«) in Hungarian (Figure 12).

Another strange example is the Hungarian exonym *Élőbecsület* (»living honesty«) for the southern Austrian settlement of Ehrenhausen (Figure 13). The meaning of certain elements of the original names can be identified in unjustified Hungarian forms; therefore, it may be presumed that a translation program was active in the background when the Hungarian names were uploaded, and these names were generated by a computer. In any case, a map with this »Hungarian« place name comes up with the hits for *Ehrenhausen*.

The major problem here is that the names were not checked at all. When we searched for further information on the false names above, it turned out that various applications using computer procedures disseminate these names; for instance, we were able to find offers for transportation services to the »aforementioned« places (Internet 13; Internet 14).

Figure 13: Incorrect name for Ehrenhausen (Internet 12).

3 Conclusion

It is no exaggeration that, based on the examples discussed above, the birth of false geographic names in large numbers in popular media represents a considerable linguistic, cultural, informational, and economic danger, partly because the false names are mixed with relevant data. The authors believe it very important that there should be institutional contact between the responsible geographical name authorities and the developers of online maps. It is advisable to monitor and examine the use of place names on the internet. Geographical name committees and national cartographic services will do the most to disseminate and popularize correct forms of geographic names if they make increasingly more standardized databases of such names freely available on the internet.

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- **Abstract:** introduce the topic clearly so that readers can relate it to other work by presenting the background, why the topic was selected, how it was studied, and what was discovered. It should contain one or two sentences about each section (introduction, methods, results, discussion, and conclusions). The maximum length is 800 characters including spaces.
- **Key words:** include up to seven informative key words. Start with the research field and end with the place and country.
- **Main text:** limit the text of the paper to 20,000 characters including spaces and without the reference list, and tables. Do not use footnotes or endnotes. Divide the paper into sections with short, clear titles marked with numbers without final dots: **1 Section title**. Use only one level of subsections: **1.1 Subsection title**.

Research papers should have the following structure:
- **Introduction:** present the background of the research problem (trends and new perspectives), state of the art (current international discussion in the field), research gap, motivation, aim, and research questions.
- **Methods:** describe the study area, equipment, tools, models, programs, data collection, and analysis, define the variables, and justify the methods.
- **Results:** follow the research questions as presented in the introduction and briefly present the results.
- **Discussion:** interpret the results, generalize from them, and present related broader principles and relationships between the study and previous research. Critically assess the methods and their limitations, and discuss important implications of the results. Clarify unexpected results or lacking correlations.
- **Conclusion:** present the main implications of the findings, your interpretations, and unresolved questions, offering a short take-home message.

Review papers (narratives, best-practice examples, systematic approaches, etc.) should have the following structure:
- **Introduction:** include 1) the background; 2) the problem: trends, new perspectives, gaps, and conflicts; and 3) the motivation/justification.
- **Material and methods:** provide information such as data sources (e.g., bibliographic databases), search terms and search strategies, selection criteria (inclusion/exclusion of studies), the number of studies screened and included, and statistical methods of meta-analysis.

  - **Literature review:** use subheadings to indicate the content of the various subsections. Possible structure: methodological approaches, models or theories, extent of support for a given thesis, studies that agree with one another versus studies that disagree, chronological order, and geographical location.
  - **Conclusions:** provide implications of the findings and your interpretations (separate from facts), identify unresolved questions, summarize, and draw conclusions.
- **Acknowledgement:** use when relevant.
- **Reference list:** see the guidelines below.

2 Article submission

2.1 Open journal system

Author(s) must submit their contributions through the *Acta geographica Slovenica* Open Journal System (OJS) using the Word document template.

Enter all necessary information into the OJS. Any addition, deletion, or rearrangement of names of the author(s) in the authorship list should be made and confirmed by all coauthors before the manuscript has been accepted, and is only possible if approved by the journal editor.

To make anonymous peer review possible, the paper text and figures should not include names of author(s).

Do not use contractions or excessive abbreviations. Use plain text, with sparing use of **bold** and *italics*. Do not use auto-formatting, such as section or list numbering and bullets.

If a text is unsatisfactory, the editorial board may return it to the author(s) for professional copyediting or reject the paper. See the section on the peer-review process for details. Author(s) may suggest reviewers when submitting a paper.

2.2 Language

Papers are published in English.

Papers are submitted in English or Slovenian and copyedited/translated after acceptance by a professional chosen by the editorial board.

The translation or copyediting costs are borne by the author(s) (translation €500, copyediting €200) and must be paid before layout editing.

All papers should have English and Slovenian abstracts.

2.3 Supplementary file submission

Supplementary files (figures) can be submitted to the OJS packed in one zip file not exceeding 50 MB.

2.4 Submission date

The journal publishes the submission date of papers. Please contact the editor, Blaž Komac, with any questions.

3 Citations

Examples for citing publications are given below. Using "gray literature" is highly discouraged.

3.1 Citing articles

- Fridl, J., Urbanc, M., Pipan, P. 2009: The importance of teachers' perception of space in education. Acta geographica Slovenica 49-2. DOI: https://doi.org/10.3986/AGS49205
- Perko, D. 1998: The regionalization of Slovenia. Geografski zbornik 38.
- Gams, I. 1994a: Types of contact karst. Geografia fisica e dinamica quaternaria 17.

- Gams, I. 1994b: Changes of the Triglav glacier in the 1955-94 period in the light of climatic indicators. Geografski zbornik 34.
- de Kerk, G. V., Manuel, A. R. 2008: A comprehensive index for a sustainable society: The SSI – the Sustainable Society Index. Ecological Economics 66-2,3. DOI: https://doi.org/10.1016/j.ecolecon.2008.01.029
- van Hall, R. L., Cammeraat, L. H., Keesstra, S. D., Zorn, M. 2016: Impact of secondary vegetation succession on soil quality in a humid Mediterranean landscape. Catena, In press. DOI: https://doi.org/10.1016/j.catena.2016.05.021 (25. 11. 2016).

3.2 Citing books

- Cohen, J. 1988: Statistical power analysis for the behavioral sciences. New York.
- Nared, J., Razpotnik Visković, N. (eds.) 2014: Managing cultural heritage sites in Southeastern Europe. Ljubljana.
- Fridl, J., Kladnik, D., Perko, D., Orožen Adamič, M. (eds.) 1998: Geografski atlas Slovenije. Ljubljana.
- Luc, M., Somorowska, U., Szmańda, J. B. (eds.) 2015: Landscape analysis and planning. Heidelberg. DOI: https://doi.org/10.1007/978-3-319-13527-4

3.3 Citing parts of books or proceedings

- Zorn, M., Komac, B. 2013: Land degradation. Encyclopedia of Natural Hazards. Dordrecht. DOI: https://doi.org/10.1007/978-1-4020-4399-4_207
- Hrvatin, M., Perko, D., Komac, B., Zorn, M. 2006: Slovenia. Soil Erosion in Europe. Chichester. DOI: https://doi.org/10.1002/0470859202.ch25
- Gams, I. 1987: A contribution to the knowledge of the pattern of walls in the Mediterranean karst: a case study on the N. island Hvar, Yugoslavia. Karst and man, Proceedings of the International Symposium on Human Influence in Karst. Ljubljana.
- Komac, B., Zorn, M. 2010: Statistično modeliranje plazovitosti v državnem merilu. Od razumevanja do upravljanja, Naravne nesreče 1. Ljubljana.

3.4 Citing expert reports, theses, and dissertations

- Breg Valjavec, M. 2012: Geoinformatic methods for the detection of former waste disposal sites in karstic and nonkarstic regions (case study of dolines and gravel pits). Ph.D. thesis, University of Nova Gorica. Nova Gorica.
- Hrvatin, M. 2016: Morfometrične značilnosti površja na različnih kamninah v Sloveniji. Ph.D. thesis, Univerza na Primorskem. Koper.
- Holmes, R. L., Adams, R. K., Fritts, H. C. 1986: Tree-ring chronologies of North America: California, Eastern Oregon and Northern Great Basin with procedures used in the chronology development work including user manual for computer program COFECHA and ARSTAN. Chronology Series 6. University of Arizona, Laboratory of tree-ring research. Tucson.
- Šifrer, M. 1997: Površje v Sloveniji. Elaborat, Geografski inštitut Antona Melika ZRC SAZU. Ljubljana.

3.5 Citing online material with authors and titles

- Bender, O., Borsdorf, A., Heinrich, K. 2010: The interactive alpine information system GALPIS. Challenges for mountain regions, Tackling complexity. Internet: http://www.mountainresearch.at/images/Publikationen/Sonderband/bender-borsdorf-heinrich.pdf (4. 8. 2014).

3.6 Citing online material without authors

- Internet: http://giam.zrc-sazu.si (18. 11. 2016).
- Internet 1: http://giam.zrc-sazu.si/ (22. 7. 2012).
- Internet 2: http://ags.zrc-sazu.si (23. 7. 2012).

3.7 Citing sources without authors

- WCED – World commission on environmental and development: Our common future – Brundtland report. Oxford, 1987.
- Popis prebivalstva, gospodinjstev, stanovanj in kmečkih gospodarstev v Republiki Sloveniji, 1991 – končni podatki. Zavod Republike Slovenije za statistiko. Ljubljana, 1993.

3.8 Citing cartographic sources

- Državna topografska karta Republike Slovenije 1 : 25.000, list Brežice. Geodetska uprava Republike Slovenije. Ljubljana, 1998.
- Franciscejski kataster za Kranjsko, k. o. Sv. Agata, list A02. Arhiv Republike Slovenije. Ljubljana, 1823–1869.
- Buser, S. 1986: Osnovna geološka karta SFRJ 1 : 100.000, list Tolmin in Videm (Udine). Savezni geološki zavod. Beograd.
- The vegetation map of forest communities of Slovenia 1 : 400,000. Biološki inštitut Jovana Hadžija ZRC SAZU. Ljubljana, 2002.
- Digitalni model višin 12,5. Geodetska uprava Republike Slovenije. Ljubljana, 2005.

3.9 Citing official gazettes

- Zakon o kmetijskih zemljiščih. Uradni list Republike Slovenije 59/1996. Ljubljana.
- Zakon o varstvu pred naravnimi in drugimi nesrečami. Uradni list Republike Slovenije 64/1994, 33/2000, 87/2001, 41/2004, 28/2006 in 51/2006. Ljubljana.
- 1999/847/EC: Council Decision of 9 December 1999 establishing a Community action programme in the field of civil protection. Official Journal 327, 21. 12. 1999.

3.10 In-text citations

Please ensure that every reference cited in the text is also in the reference list (and vice versa). In-text citations should state the last name of the author(s) and the year, separate individual citations with semicolons, order the quotes according to year, and separate the page information from the name of the author(s) and year information with a comma; for example: (Melik 1955), (Melik, Ilešič and Vrišer 1963; Kokole 1974, 7–8; Gams 1982a; Gams 1982b).

For sources with more than three authors, list only the first followed by *et al.*: (Melik et al. 1956). Cite page numbers only for direct citations: Perko (2016, 25) states: »Hotspots are …« To cite online material with authors, cite the name: (Zorn 2010). To cite online material without authors, cite only Internet followed by a number: (Internet 2).

3.11 Works cited list

Arrange references alphabetically and then chronologically if necessary. Identify more than one reference by the same author(s) in the same year with the letters *a*, *b*, *c*, etc., after the year of publication: (1999a, 1999b). Use this format for indirect citations: (Gunn 2002, cited in Matei et al. 2014).

Include the Digital Object Identifier (DOI) in the reference if available. Format the DOI as follows: https://doi.org/… (for example: https://doi.org/10.3986/AGS.1812).

4 Tables and figures

Number all tables in the paper uniformly with their own titles. The number and the text are separated by a colon, and the caption ends with a period. Example:

Table 1: Number of inhabitants of Ljubljana.
Table 2: Changes in average air temperature in Ljubljana (Velkavrh 2009).

Tables should contain no formatting and should not be too large; it is recommended that tables not exceed one page.

Upload figures to the OJS as separate supplementary files in digital form. If the graphic supplements prepared cannot be uploaded using these programs, consult the editorial board in advance.

Number all figures (maps, graphs, photographs) in the paper uniformly with their own titles. Example:

Figure 1: Location of measurement points along the glacier.

All graphic materials must be adapted to the journal's format. Illustrations should be exactly 134 mm wide (one page) or 64 mm wide (half page, one column), and the height limit is 200 mm.

To make anonymous peer review possible, include the name of the author(s) with the title of the illustration in the supplementary file metadata, but not in the paper text.

Maps should be made in digital vector form with Corel Draw, Adobe Illustrator, or a similar program, especially if they contain text. They can exceptionally be produced in digital raster form with at least 300 dpi resolution, preferably in TIFF or JPG format. For maps made with *CorelDraw* or *Adobe Illustrator*, two separate files should be prepared; the original file (.cdr or .ai format) and an image file (.jpg format).

For maps made with ArcGIS with raster layers used next to vector layers (e.g., .tif of relief, airborne or satellite image), three files should be submitted: the first with a vector image without transparency together with a legend and colophon (export in .ai format), the second with a raster background (export in .tif format), and the third with all of the content (vector and raster elements) together showing the final version of the map (export in .jpg format).

Do not print titles on maps; they should appear in a caption.

Save colors in CMYK, not in RGB or other formats.

Use Times New Roman for the legend (size 8) and colophon (size 6). List the author(s), scale, source, and copyright in the colophon. Write the colophon in English (and Slovenian, if applicable). Example:

Scale / merilo: 1 : 1,000,000
Content by / avtor vsebine: Drago Perko
Map by / avtorica zemljevida: Jerneja Fridl
Source / vir: Statistical Office of the Republic of Slovenia, 2002
© 2005, ZRC SAZU Anton Melik Geographical Institute

Graphs should be made in digital form using *Excel* on separate sheets and accompanied by data.

Photos must be in raster format with a resolution of 240 dots per cm or 600 dpi, preferably in .tif or .jpg formats; that is, about 3,200 dots per page width of the journal.

Figures containing a screenshot should be prepared at the highest possible screen resolution (Control Panel\All Control Panel Items\Display\Screen Resolution). The figure is made using Print Screen, and the captured screen is pasted to the selected graphic program (e.g., *Paint*) and saved as .tif. The size of the image or its resolution must not be changed.

Examples of appropriate graphic data forms: see the templates of maps in cdr and mxd files for a whole-page map in landscape view and an example of correct file structure for submitting a map made with *ESRI ArcGIS*.

SUBMISSION PREPARATION CHECKLIST

As part of the submission process, check your submission's compliance with the following items. Submissions may be returned to author(s) that do not follow these guidelines.

1. The journal policies have been reviewed.
2. The submission has not been previously published and is not being considered for publication elsewhere (or an explanation has been provided in comments to the editor).
3. The metadata (title, abstract, key words, full address, etc.) are provided in English and Slovenian, when applicable.
4. The submission is in Microsoft Word format and the document template was used (single-spaced text, 12-point font, no formatting except italics and bold).

5. The manuscript has been checked for spelling and grammar.
6. All figure locations in the text are marked. Figures are not in the text and are provided as supplementary files: cdr, .ai for maps and illustrations; .tif for photographs; xlsx for graphs.
7. Tables are placed in the text at the appropriate place.
8. The reference list was prepared following the guidelines.
9. All references in the reference list are cited in the text, and vice versa.
10. Where available, URLs and DOI numbers for references are provided.
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12. I agree for this article to be translated or copyedited at my expense AFTER the article is accepted for publication (see guidelines for details).
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14. The instructions for ensuring a double-blind review have been followed.

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Acta geographica Slovenica editorial review form

1 The paper is an original scientific one – the paper follows the standard IMRAD scheme and is original and the first presentation of research results with the focus on methods, theoretical aspects or case study.)
Yes
No

2 The paper's content is suitable for publishing in the AGS journal – the paper is from the field of geography or related fields of interest, the presented topic is interesting and well presented. In case of negative answer add comments below.)
Yes
No

3 Editorial notes regarding the paper's content.

4 Length of the paper is acceptable for further processing (20.000 characters including space). If longer, the paper has to be shortened by the author and resubmitted.
- The paper has less than 20.000 characters.
- The paper has more than 20.000 characters, but less than 25.000.
- The paper has more than 25.000 characters.

5 The style and formatting of the paper is according to the AGS guidelines – the paper is prepared in plain text, no other text formatting is used than bold and italic. See the Guidelines of AGS journal for details.)
Yes
No

6 Notes regarding style and formatting.

7 Citing in the paper is according to the AGS guidelines and style, including DOI identificators.
Yes
No

8 The reference list is suitable (the author cites previously published papers with similar topic from other relevant scientific journal).
Yes, the author cited previously published papers on similar topic.
No, the author did not cite previously published papers on similar topic.

9 Scientific language of the paper is appropriate and understandable.
Yes
No

10 Supplementary files (ai, cdr, pdf, tif, jpg, xlsx etc.) that were added to the paper are in proper format and resolution (including the introductory photo), maps are prepared according to the AGS Guidelines. (In this step contact the technical editor [rok.ciglic@zrc-sazu.si] for assistance if needed).
- Supplementary files are correct.
- Supplementary files are not appropriate and need a major correction.
- Some supplementary files need corrections.

11 Describe the possible deficiencies of the supplementary files:

12 DECISION OF THE RESPONSIBLE EDITOR
The paper is accepted for further processing and may be sent to the reviewer.
The paper is accepted for further processing but needs technical improvements (see notes).
The paper is accepted for further processing but its content needs additional improvements (see notes).
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- It is more suitable for a specialized journal.
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- Other (see comments below).
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ACTA GEOGRAPHICA SLOVENICA REVIEW FORM

1 RELEVANCE

1a) Are the findings original and the paper is therefore a significant one?
yes
no
partly

1b) Is the paper suitable for the subject focus of the AGS journal?
yes
no

2 SIGNIFICANCE

2a Does the paper discuss an important problem in geography or related fields?
yes
no
partly

2b Does it bring relevant results for contemporary geography?
yes
no
partly

2c What is the level of the novelty of research presented in the paper?
high
middle
low

3 ORIGINALITY

3a Has the paper been already published or is too similar to work already published?
yes
no

3b Does the paper discuss a new issue?
yes
no

3c Are the methods presented sound and adequate?
yes
no
partly

3d Do the presented data support the conclusions?
yes
no
partly

4 CLARITY

4a Is the paper clear, logical and understandable?
yes
no

4b If necessary, add comments and recommendations to improve the clarity of the title, abstract, keywords, introduction, methods or conclusion:

5 QUALITY

5a Is the paper technically sound? (If no, the author should discuss technical editor [rok.ciglic@zrc-sazu.si] for assistance.)
yes
no

5b Does the paper take into account relevant current and past research on the topic?
yes
no
Propose amendments, if no is selected:

5d Is the references list the end of the paper adequate?
yes
no
Propose amendments, if no is selected:

5e Is the quoting in the text appropriate?
yes
no
partly
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5f Which tables are not necessary?

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6 COMMENTS OF THE REVIEWER

Comments of the reviewer on the contents of the paper:
Comments of the reviewer on the methods used in the paper:

7 RECOMMENDATION OF THE REVIEWER TO THE EDITOR-IN-CHIEF

My recommendation is:
Please rate the paper from 1 [low] to 100 [high]:
Personal notes of the reviewer to editor-in-chief.

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PUBLISHER

Anton Melik Geographical Institute
Research Center of the Slovenian Academy of Sciences and Arts
PO Box 306
SI–1001 Ljubljana
Slovenia

SOURCES OF SUPPORT

Slovenian Academy of Sciences and Arts
Slovenian Research Agency

JOURNAL HISTORY

Acta geographica Slovenica (print version: ISSN: 1581-6613, digital version: ISSN: 1581-8314) was founded in 1952. It was originally named *Geografski zbornik / Acta geographica* (ISSN 0373-4498). Altogether 42 volumes were published. In 2002 *Geographica Slovenica* (ISSN 0351-1731, founded in 1971, 35 volumes) was merged with the journal.

Since 2003 (from volume 43 onward) the name of the joint journal has been *Acta geographica Slovenica*. The journal continues the numbering system of the journal *Geografski zbornik / Acta geographica*.

Those interested in the history of the journal are invited to read the paper "The History of *Acta geographica Slovenica*."

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ISSN: 1581-6613
UDC – UDK: 91
ACTA GEOGRAPHICA SLOVENICA
GEOGRAFSKI ZBORNIK

57-1
2017

Print/tisk: Collegium Graphicum d. o. o.

Ljubljana 2017

ACTA GEOGRAPHICA SLOVENICA
GEOGRAFSKI ZBORNIK
57-1 • 2017

Contents – Vsebina

Special issue – Geographical Names

ISSN 1581-6613
9 771581 661010