CARTOGRAPHIC SOCIETY OF THE SLOVAK REPUBLIC

ACTIVITIES 2019 – 2023



National Report for the 19th General Assembly of the ICA

Bratislava 2023

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(13-18 August 2023, Cape Town, South Africa)

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Cartographic Society of the Slovak Republic

(http://www.slovakcarto.sk)

Activities in 2019 - 2023

Cartographic Society of the Slovak Republic (CS SR) is apolitical organization with scope in the Slovak Republic founded pursuing the Act on citizens' associations. The mission of the Cartographic Society is to associate people interested in cartography, cartographic works, and cartographic information, development of cartographic science and technologies, education of cartographers, history of cartography, compilation, production and use of different types of maps and atlases, and spatial information comprised in information systems. Members of the Society are university and superior school graduates of prevailingly technological and nature scientific specializations.

The CS SR is permanent member of the International Cartographic Association (ICA). The CS SR coordinates the collaboration of its members who are either members or corresponding members of individual commissions of the ICA. It regularly participates in the Barbara Petchenik Children's Map Competition, and successfully takes part in exhibitions of cartographic production organized at the occasion of international cartographic conferences.

The principal task of the CS SR is to organize specialized conferences and seminars involved with cartography and geo-information science and publishing activities. The CS SR in cooperation with the Institute of Geography SAS and Faculty of Natural Sciences, Comenius University in Bratislava publishes the journal *Kartografické listy* (Cartographic Letters, <u>http://gis.fns.uniba.sk/kartografickelisty/?p=0&l=en</u>, 2 issues per year). The journal was included into the ERIH PLUS database and in the SCOPUS database in 2020. This year we are commemorating the 30th anniversary of the creation of Cartographic Letters. The complete archive of all articles since 1993 is published on the journal's website.

At the plenary meeting, organized 24th of October 2019 at the occasion of the seminar on Activities in Cartography 2019 the members elected the following Executive Committee:

Ing. Róbert Fencík, PhD. – Chairman, Mgr. Miroslav Kožuch, PhD. – Vice-Chairman, Assoc. prof. RNDr. Ján Kaňuk, PhD. – Scientific Secretary, Assoc. prof. Ing. Renata Ďuračiová, PhD. – Administrator, Ing. Daniel Szatmári, PhD. – Member, Ing. Martin Zeman – Auditor. The CS SR has 106 members at present.

I. Specialized Cartographic Events in Slovakia in 2019 – 2023

1. The seminar "Activities in Cartography dedicated to Ján Pravda 2019" was carried out in cooperation with the CS SR, the Faculty of Civil Engineering in Bratislava and the Institute of Geography SAS. The seminar was held at the Faculty of Civil Engineering in Bratislava on 24th of October 2019. The event was attended by 60 participants from Slovakia and the Czech Republic. The themes of the seminar included processing of cartographic information with linkages to geo-information science. Seventeen papers were read and the proceedings of the abstracts were published. The presentations are published and available on the website www.svf.stuba.sk/sk/katedry/katedra-geodetickych-zakladov/aktivity-v-kartografii-2019.

2. The conference "GeoKARTO 2020" was organized by the CS SR in co-operation with the Faculty of Science of Pavol Jozef Šafárik University in Košice and the Institute of Geography SAS in Bratislava. The conference was held at the Faculty of Science in Košice on 10th and 11th of September 2020. The conference was oriented to the following themes: geovisualization, spatial analyses and modelling, remote sensing, creation and publishing of maps and atlases, web cartography and historical maps. Thirty-six papers and five posters were presented during two days of the conference. The event was attended by 78 experts. The proceedings of abstracts was published and one paper was published in the journal Cartographic Letters (Vol. 28, No. 2). Presentations are available at: <u>https://uge-share.science.upjs.sk/webshared/uge_web_files/udalosti/GeoKarto2020/prezentacie/</u>.

3. The conference "GeoKARTO 2022" was organized by the CS SR in co-operation with the Faculty of Natural Science of Comenius University in Bratislava and the Institute of Geography SAS in Bratislava. The conference was held at the Faculty of Natural Science in Bratislava on 8th and 9th of September 2022. The conference was oriented to the following themes: geovisualization, spatial analyses and modelling, remote sensing, creation and publishing of maps and atlases and web cartography. Thirty-seven papers and eight posters were presented during two days of the conference. The event was attended by 81 experts. The proceedings of abstracts was published. The proceedings and presentations are available at: https://gis.fns.uniba.sk/ppfgi/geokarto2022.

4. National competition "Barbara Petchenik Children's World Map 2021" organized CS SR and the Institute of Geography SAS in Bratislava. There were involved 88 children from all over Slovakia. Evaluation of children works was in April 2021. Winning drawings (Fig. 2, 3) were sent to the international round of Barbara Petchenik competition, which took place in Florence (Italy) during the 30th ICA International Cartographic Conference. Information available about winners of the national competition are the website on www.geography.sav.sk/detska-mapa-2021-vysledky/ and www.facebook.com/detskamapasveta/.



Fig.2: Winning drawings of the national competition Barbara Petchenik Children's World Map 2021



Fig. 3: Awarded drawing "*The Most Important Game of Chess*" – author: Pavol Rybár (8 years) – Primary Art School in Rajec

The national competition "Barbara Petchenik Children's World Map 2023" organized CS SR and the Institute of Geography SAS in Bratislava. There were delivered 588 competition works from all over Slovakia. Evaluation of children works was in April 2023. Six drawings were sent to the international round of competition, which took place in Cape Town, South Africa during the 31st ICA International Cartographic Conference. Information about winners of the national competition are available on the website www.geography.sav.sk/detska-mapa-sveta-2023-vysledky/.

II. Education of Cartographers

Education of specialists in cartography at a university level is carried out according to two models:

- The technical model with geodetic-topographic and technological objectives;
- Nature-scientific model with geographical objectives.

The graduate of the first model is granted the title of Ing. Geodesist – Cartographer from the technological university while the graduate of the second model obtains the title of Mgr. Geographer- Cartographer from the university focused on natural history.

Accreditation Commission of the Government of the SR approved the new curricula and programmes prepared by the technical and scientific faculties and since the academic year 2009/2010 the study of cartography is guided under the approved programmes. Cartography as the principal subject overlaps with the geo-information science, geo-information technologies, computer cartography and remote sensing.

The university studies comprise three levels:

- 1^{st} level 3-year Bachelor level and the graduate obtains the title of Bc.
- 2nd level 2-3-year Master level studies at universities specialised in nature history and humanities, and the graduate obtains the title of Mgr.
 - 2-3-year engineering study at a technological university and the graduate obtains the title of Ing.

 3^{rd} level – 4-year PhD studies destined to graduates possessing titles Mgr. or Ing. The study is organized in form of lectures, seminars and study stays. It ends by the defence of dissertation where the graduate should demonstrate the capacity of independent scientific work. The title granted to the graduate is PhD (*philosophiae doctor*).

Education of cartographers-engineers is carried out at the Faculty of Civil Engineering of the Slovak University of Technology in Bratislava, Faculty of Forestry and Faculty of Ecology and Environmental Science of the Technical University in Zvolen and at the Faculty of Mining, Ecology and Geotechnics of the Technical University in Košice. Education of cartographers-geographers is accomplished at the Faculty of Natural Sciences, Comenius University in Bratislava, Faculty of Science of Pavol Jozef Šafárik University in Košice, Faculty of Natural Sciences of the University of Matthias Bel in Banská Bystrica and at the Faculty of Humanities and Natural Sciences of the Prešovská University in Prešov.

III. Cartographic Research

Cartographic research in the Slovak Republic concentrates at universities of technology, humanities and nature history and at the Institute of Geography of SAS.

Faculty of Civil Engineering of the Slovak University of Technology

- VEGA 1/0468/20 Application of innovative mathematical methods in optimization of geomodeling processes based on data from laser scanning
- VEGA 1/0300/19 3D modelling of solar radiation on the tree vegetation represented by cloud of points from laser scanning
- GIANT Geoinformation Analytical IoT Platform for Decision Support, 2019 2021

STHORM - Software for the Creation of Tactile Orientation Maps, 2018 - 2019

ĎURAČIOVÁ, R. – PRUŽINEC, F.: Effects of terrain parameters and spatial resolution of a digital elevation model on the calculation of potential solar radiation in the mountain environment: a case study of the Tatra Mountains. in: ISPRS International Journal of Geo-Information (2022). Vol. 11, Iss. 7, online, 16 p., art. no. 389. ISSN: 2220-9964.

FENCÍK, R. – HAVRLANT, J. – TALICH, M. – ZEMAN, M.: Transformácia topografických sekcií tretieho vojenského mapovania územia Slovenska. In Kartografické listy. Roč. 28, č. 2 (2020), s. 35-52, ISSN 1336-5274.

IČ, T. – FAIXOVÁ CHALACHANOVÁ, J.: Rozšírenie metódy box counting na výpočet fraktálnej dimenzie pre rastrové digitálne povrchy. in Kartografické listy (2020). Vol. 28, no. 1, s. 3-14, ISSN: 1336-5274.

LIESKOVSKÝ, T. – FAIXOVÁ CHALACHANOVÁ, J.: The assessment of the chosen LiDAR data sources in Slovakia for the archaeological spatial analysis. In Proceedings of the 11th International Scientific and Professional Conference on Geodesy, Cartography and Geoinformatics, 2019, pp. 190-195. ISBN 978-0-367-34651-5.

Faculty of Natural Sciences, Comenius University

Research and development of non-contact methods for obtaining spatial data for the purpose of forest monitoring for more efficient forest management and increased forest protection (ITMS2014: 313011V465)

MIČIETOVÁ E., RÁŠOVÁ, A. (2023). Cartographic modeling of the carbon balance according to land cover changes in Slovakia in the years 2000 and 2018. Kartografické modelovanie bilancie uhlíka podľa zmien krajinnej pokrývky na Slovensku v rokoch 2000 a 2018. Kartografické listy, 31 (1), 3-32.

BELČÁKOVÁ L., BENOVÁ A, MORAVČÍK F. (2022). Land cover changes of selected part of city district Bratislava-Nové Mesto with focus on vineyards areas. Acta Geographica Universitatis Comenianae, Vol. 66, No. 2, pp. 233-257.

KARLÍK L., MATEČNÝ I., GÁBOR, M., TOLMÁČI L., FALŤAN V. (2023) Design of vineyard appellation reflecting natural terroir: A case study of Modra, Slovakia. Geographical Journal, Vol. 75, No. 1, 2023, pp. 47-68.

BOBÁĽOVÁ H., BRUŠKA A., FALŤAN V. (2023). Modeling the influence of selected physical-geographical characteristics on the land surface temperature in Bratislava. Acta Geographica Universitatis Comenianae, Vol. 67, No. 1, pp. 43-69.

Faculty of Science, UPJŠ in Košice

CBC ENI SKHUROUA – Extension of the operational "Space Emergency System" towards monitoring of dangerous natural and man-made geoprocesses in the HU-SK-RO-UA crossborder region, GeoSES.

APVV-18-0044 - Solar potential of urbanized areas and its use in the Smart City concept

VEGA 1/0798/20 – Synergistic use of multiple data sources from remote sensing of the Earth in research of landscape

PREGI, L., NOVOTNÝ, L., GÁBOR, Š. (2022). Vizualizácia priestorových procesov pomocou online mapovej aplikácie Flowmap.blue. Kartografické listy, 30 (1), 21-38.

HOFIERKA, J., GALLAY, M., ŠUPINSKÝ, J., GALLAYOVÁ, G. (2022). A tangible landscape modeling system for geography education. Education and Information Technologies, 27, 4, 5417-5435.

ŠUPINSKÝ, J., KAŇUK, J., NOVÁKOVÁ, M., HOCHMUTH, Z. (2022). LiDAR point clouds processing for large-scale cave mapping: a case study of the Majko dome in the Domica cave. Journal of Maps, 18 (2), 268-275.

POPOV, A., MINÁR, J., GALLAY, M. (2021). Multiresolution land surface segmentation and generalization of DEM: searching for optimal settings. Transactions in GIS, 25, 5, 2376-2393.

ŠAŠAK, J., GALLAY, M., KAŇUK, J., HOFIERKA, J., MINÁR, J. (2019). Combined use of terrestrial laser scanning and UAV photogrammetry in mapping alpine terrain. Remote Sensing, 11 (18), 2154.

The Institute of Geography of the Slovak Academy of Sciences

LAPIA (European Space Agency project; 2023 – 2024) Land cover change monitoring for identification of potential illegal activities in Slovakia

3DForEcoTech (COST)

Three-dimensional forest ecosystem monitoring and better understanding by terrestrial-based technologies

NOWCASTSAT (European Space Agency project; 2022 – 2023) Enhanced solar radiation nowcasting based on geostationary satellite data

V4 communication platform for use of Earth Observation methods in biotic forest disturbances (International Visegrad Fund - IVF)

SZATMÁRI, D. - FERANEC, J. - KOPECKÁ, M. - FENCÍK, R. - SOUKUP, T.: Land cover data provided by the Copernicus land monitoring service as important sources for thematic cartography. In EuroCarto 2022 [online]: abstracts of the International Cartographic Association. European Cartographic Conference. Göttingen: Copernicus Publications, 2022, p. 2, art. no. 132, DOI: 10.5194/ica-abs-5-132-2022.

SZATMÁRI, D. – KOPECKÁ, M. – FERANEC, J. (2022). Accuracy Assessment of the Building Height Copernicus Data Layer: A Case Study of Bratislava, Slovakia. In Land, 2022, vol. 11, art. no. 590, p. 3-14.

ŠVEDA, M., VÝBOŠŤOK, J., GURŇÁK, D. (2021). Atlas of Suburbanization of Bratislava, Institute of Geography SAS, 120 p.

SOBOCKÁ, J. – SAKSA, M. – FERANEC, J. – SZATMÁRI, D. – HOLEC, J. – BOBÁĽOVÁ, H. – RÁŠOVÁ, A. (2021). Mapping of urban environmentally sensitive areas in Bratislava city. In Journal of Soils and Sediments, 2021, vol. 21, no. 5, p. 2059-2070.

KOPECKÁ, M. – SZATMÁRI, D. – HOLEC, J. – FERANEC, J. (2021). Urban heat island modelling based on MUKLIMO: examples from Slovakia. In The AGILE: GIScience Series, vol. 2 : open-access proceedings of the Association of Geographic Information Laboratiories

in Europe. Eds. Partsinevelos, P., Kyriakidis, P., Kavouras, M. – Copernicus Publication, 2021, p. [1-11]. ISSN 2700-8150.

BUCHA, T. – PAPČO, J. – SAČKOV, I.– PAJTÍK, J. – SEDLIAK, M. – BARKA, I. – FERANEC, J. (2021). Woody Above – Ground Biomass Estimation on Abandoned Agriculture Land Using Sentinel-1 and Sentinel-2 Data. In Remote Sensing : Open Access Journal, 2021, vol. 13, art. no. 2488, p. 1-24.

FERANEC, J. – HOLEC, J. – ŠŤASTNÝ, P. – SZATMÁRI, D. – KOPECKÁ, M. (2019).
Visualising a comparison of simulated urban heat islands: a case study of two Slovakian cities. In Advances in Cartography and GIScience of the ICA. Vol. 1 [elektronický zdroj]. Ed. H. Fujita. – Tokyo : International Cartographic Association, p. [1-8]. ISSN 2570-2084.

HOLEC, J. – FERANEC, J. – ŠŤASTNÝ, P. – SZATMÁRI, D. – KOPECKÁ, M. – GARAJ, M. (2020). Evolution and assessment of urban heat island between the years 1998 and 2016: case study of the cities Bratislava and Trnava in western Slovakia. In Theoretical and Applied Climatology, vol. 141, iss. 3-4, p. 979–997.

GOGA, T. – FERANEC, J. – BUCHA, T. et al. (2019). A Review of the Application of Remote Sensing Data for Abandoned Agricultural Land Identification with Focus on Central and Eastern Europe. In Remote Sensing : Open Access Journal, vol. 11, no. 23, art. no. 2759.

IV. Publishing Activities

The Cartographic Society of the SR annually publishes the journal *Kartografické listy* (<u>http://gis.fns.uniba.sk/kartografickelisty</u>). So far 31 volumes have been published. The journal normally contains scientific articles of cartographers from Slovakia, Czechia and other countries. Apart from that, it also brings selected studies of students (theses of various levels and reports from the students' scientific activities) studying at technical and nature-scientific universities in Slovakia. The journal is sent to university libraries and institutions involved with cartography and geography.

Moreover, miscellanies and proceedings from specialized events, conferences and seminars are published. Publications can be found at the webpage <u>http://www.slovakcarto.sk</u>.

The publishing activity of the State concerning cartographic works concentrates in the Institute of Geodesy and Cartography in Bratislava.

The Institute of Geodesy and Cartography in Bratislava sponsors publishing of the State Map Series – Basic Maps of the SR at scales 1:5 000, 1:10 000, 1:25 000 and 1:50 000. Besides, it publishes the thematic maps that are compiled from the Basic Maps. During the period in question, technology of map compilation and manufacturing has changed as the digital processing prevails. It requires digitising of the basic materials. The Basic Database for the Geographical Information Systems ($ZBGIS^{(0)}$) was processed. New digital products (digital terrain model, digital surface model, orthophotomosaic and old maps) have been publishing through Geoportal of the Geodesy, Cartography and Cadastre Authority of the SR with using web application "the Map Client of ZBGIS" (Fig. 4). Basic maps of the SR, digital elevation models and orthophotomosaic cover the entire territory of Slovakia and constitute the background material for derivation of all maps.



Fig. 4: Web application for publishing digital products (https://zbgis.skgeodesy.sk/mkzbgis?bm=zbgis&z=8&c=19.530000,48.800000#)

CBS spol, s.r.o. (www.cbs.sk) is the cartographic company oriented to publishing of maps for public at large. Great part of its activity involves publishing of tourist maps (Fig. 5), thematic maps, painted maps and on-line maps. They launched a new mobile application called CBS MapExplorer (Fig. 5), which brings a new dimension of interactivity to the world of paper maps. It allows you to transform paper maps into digital interactive form. The company established the Slovak Museum of Maps (www.muzeummap.sk), which celebrates fifth anniversary (Fig. 6).



Fig. 5: Tourist maps and the mobile application CBS MapExplorer



Fig. 6: The Slovak Museum of Maps – 5th anniversary

Apart from these dominant publishing companies in Slovakia, the creation in the field of cartography is also pursued by the following organizations and private companies: State Institute of Geology of Dionýz Štúr in Bratislava, Soil Science and Conservation Research Institute in Bratislava, Topographic Institute Banská Bystrica, Slovak Environmental Agency in Banská Bystrica, The National Forestry Centre in Zvolen, Mapa Slovakia Bratislava, EUROSENSE Bratislava, Esprit Banská Štiavnica.

Several institutions and their cartographic products and GIS solutions received the Special Achievement in GIS (SAG) award for exceptional results in the use of the Geographical Information System (GIS) in last few years. The Statistical Office of the Slovak Republic (SO SR) received this award for the innovative use of mapping and analytical techniques in the implementation of "Territorial Planning" for the purposes of the 2021 Population and Housing Census. Capital City of Slovakia Bratislava was awarded for the map portal geoportal.bratislava.sk (Fig. 7) in 2022. The Institute of Geodesy and Cartography in Bratislava received an award for new version of web application "Map Client of ZBGIS" in 2023.



Fig. 7: The map portal of Capital City of Slovakia Bratislava

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Executive Committee Radlinského 11 813 68 Bratislava SLOVAK REPUBLIC www.slovakcarto.sk, phone +421 2 32888325, e-mail: robert.fencik@stuba.sk