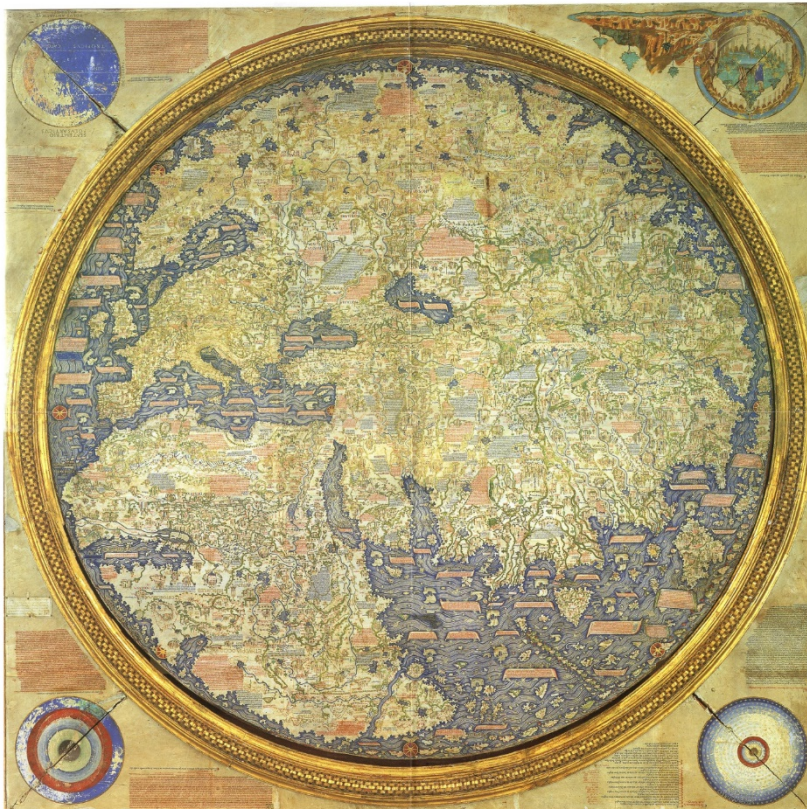


Program and Abstracts

16th International Conference Geoinformation and Cartography



**24 Sept. 2020 Zagreb, 25 Sept. 2020 Rovinj / Rovigno
26 Sept. 2020 Vodnjan / Dignano, 27 Sept. 2020 Plitvice Lakes**

Organized by the Croatian Cartographic Society and
the Faculty of Geodesy of the University of Zagreb

Endorsed by the International Cartographic Association

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Croatian Cartographic Society



University of Zagreb, Faculty of Geodesy

Program and Abstracts

16th International Conference
on Geoinformation and Cartography

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24–27 September 2020

Zagreb, Rovinj / Rovigno, Vodnjan / Dignano, Plitvice Lakes

Organizers

Croatian Cartographic Society

University of Zagreb, Faculty of Geodesy

Under the Auspices of

International Cartographic Association

Partners

State Geodetic Administration of the Republic of Croatia

Zajednica Talijana Vodnjan – Comunita' degli Italiani di Dignano

Centar za povijesna istraživanja Rovinj – Il Centro di ricerche storiche Rovigno

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Introduction

By organizing this conference the Croatian Cartographic Society and the Faculty of Geodesy of the University of Zagreb wish to contribute to the development of geoinformatics, cartography, geodesy, geography and associated fields with special emphasis on new achievements. A wide range of themes offered and renowned invited lecturers guarantee interesting lectures and a contemporary approach.

Suggested Themes

- AI, machine learning and robotics
- Big data visualization
- Climate changes
- Covid-19
- Geodiversity
- Geoheritage and cartoheritage
- Geoinformation and cartography in education
- Geospatial technologies for local and regional development
- GIS and ecology
- Internet of things
- Location-based services and web mapping
- Map projections
- Maps for autonomous vehicles
- Maritime, military and topographic cartography
- Remote sensing and cartography
- Satellite technologies in cartography
- Spatial data visualization and analysis
- UAV – unmanned aerial vehicles

The Organizing Committee is going to consider proposals of other themes from fields connecting cartography, geography, geodesy, geology, geoinformatics and associated professions.

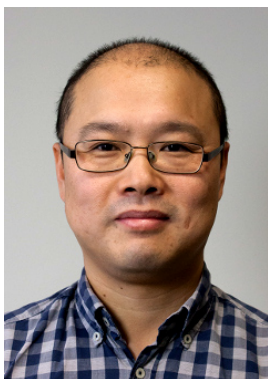
Conference program and lecture abstracts are going to be published online and presentations are going to be published at the Croatian Cartographic Society website. Papers received by the organizer prior to October 15, 2020 are going to be reviewed and published in Cartography and Geoinformation, issue 34.

Keynote Speakers



Professor in Cartography, UACEG, Sofia; Founder and President of Bulgarian Cartographic Association (BCA); Head of Laboratory on cartography; Treasurer and ExC member of International Society for Digital Earth; Project manager and author of 50 atlases and 200 wall maps in DataMap-Europe. Since 2006, I am organising International Conferences on Cartography and GIS every 2 years.

She have been working for ICA since 1998. Her main activities are rolled out in the Commission on Cartography and Children, where she served as co-chair (2014–2019) and jury member of several BP Competitions. She have also contributed to the commissions on Cartography and EWCM, Map Projections, among others. As a VP in the ICA, her priorities include promoting cartography and ICA at a national and international level, helping national mapping organisations, and underlining cartography's key role in the geo-society.



Haosheng Huang starts a tenure track professorship in GIScience and Cartography at the Research Group CartoGIS at Ghent University, Belgium since February 2020. Previously, he was a senior lecturer and research group leader at the GIScience Center of the Department of Geography at the University of Zurich, Switzerland; a researcher and lecturer (Univ.Ass. Dr.techn.) at Research Group Cartography, Vienna University of Technology (TU Wien), Austria.

Haosheng is currently the Chair of the ICA Commission on Location Based Services, and Associate Editor of the Journal of Location Based Services (Taylor & Francis). He is also members of editorial board of ISPRS International Journal of Geo-Information (IJGI, MDPI), Journal of Geovisualization and Spatial Analysis (Springer), and Urban Planning (Cogitatio). Haosheng received a Ph.D. degree (with Distinction/Honours) in Geoinformation from TU Wien in 2013. He holds MSc and BSc degrees in Computer Science from the South China Normal University.

16th International Conference on Geoinformation and Cartography

First day program, Thursday, 24 September 2020

Location:

University of Zagreb, Faculty of Geodesy, Kačićeva 26, Zagreb

The history of the University of Zagreb began on 23 September 1669, when the Holy Roman Emperor and the King of Hungary and Croatia Leopold I gave the Jesuit Academy in the free royal city of Zagreb a diploma, granting it the status and privileges of a university institution. The recognition was adopted by the Parliament of the Kingdom of Croatia on 3 November 1671.

The Faculty of Geodesy of the University of Zagreb was established in 1962 as an independent faculty. However, the education of surveyors and geodesists in Croatia has a long history. The basic activities of the Faculty of Geodesy are teaching, and scientific and research work in the field of geodesy and geoinformatics.



8:30–9:30 Registration

9:30–10:00 Opening Ceremony

10:00–11:00 Keynote Lectures

Temenoujka Bandrova	Creating Educational Disaster Centre “Save the Children Life”
Haosheng Huang	Data Modelling and Processing in Map-Based Mobile Services

11:00–11:30 Book Promotion

Ivka Kljajić, Nediljko Dominović, Ivo-Pavao Jazbec, Miljenko Lapaine	New Cartographic Dictionary
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11:30–12:00 Coffee Break

12:00–13:30 A Solemn Session of the Faculty of Geodesy Council

13:30–14:00 Lunch

14:00–15:00 Lectures and Poster Session

Vladimir Baričević, Robert Župan, Damir Šantek, Ivan Landek	Improvement of the Data Model – Thematic Units Land Cover and Land Use
Marko Budić, Duje Kukoč, Tomislav Kurečić, Ivan Mišur, Krešimir Petrinjak	GeoCro – Mobile App by Croatian Geological Survey
Marta Hamzić, Borna Fuerst-Bjeliš, Mladen Pahernik	Structural Characteristics of Patches in the Central Lika Landscape – Application of Spatial and Regression Analysis

Posters

Nikola Belić, Andrew Newell, Snježana Markušić, Tvrtko Korbar, Marko Špelić, Marko Budić, Vlatko Brčić, Krešimir Petrinjak, Dea Brunović, Ozren Hasan, Pavle Ferić	Geological Modelling at the Croatian Geological Survey
Pavle Ferić, Marko Budić, Jasna Severec, Nikola Belić	The Basic Geological Map of Požega Mt.

The end of the conference first day.

Second day program, Friday, 25 September 2020

Rovinj and Lim Bay and Valley All Day Guided Tour

10:30-11:30 Tour of the Franciscan monastery and the church of St. Euphemia

11:30-12:00 Coffee break

12:00-13:00 Visit to the Center for Historical Research Rovinj with its Map Collection

13:30-17:30 Panoramic excursion by boat to the Lim Bay



Rovinj / Rovigno is a city in Croatia situated on the north Adriatic Sea. Located on the western coast of the Istrian peninsula, it is a popular tourist resort and an active fishing port. The town is officially bilingual, Italian and Croatian, hence both town names are official and equal.



Franciscan monastery in Rovinj

The construction of the Franciscan monastery beautiful Baroque building in Rovinj started in 1702. The monastery belongs to a type of claustral city monasteries and, according to its integral parts, it is traditional and adjusted to the life of the monks and the wider community. It combines work, worship, habitation, feeding, entertainment and activities important for our environment. The church was finished in 1710 and consecrated to St. Francis of Assisi. The monastery library stores a collection of about twelve thousand books, mainly of theological content, some of which date from the 16th, 17th and 18th centuries and are true rarities. The library was annexed to the monastery in 1878. The monastery also has a monastery collection of over 250 exhibits representing various and diverse evidence of human creativity, knowledge and achievement. The objects were made applying traditional art and craft techniques and using various materials. Let us mention some: Herbarium from 1756; Reliquary of the Holy Cross and the Torture Pole from the 18th century; Icon of the Holy Mary and Child from the 16th century; and other.

The Church of St. Euphemia, often known as the Basilica of St. Euphemia, is a Baroque church located in the heart of the historic part of Rovinj. This three-nave church was built from 1725–36, over the remains of older, early Christian structures. The dedication was originally to Saint George, later to Saints George and Euphemia; the present building is dedicated to Euphemia only. Its façade dates from 1883. The relics of Saint Euphemia are preserved in a Roman sarcophagus from the sixth century (but adapted in the 15th century). The church contains several treasures and works of art: Gothic statues from the 15th century, paintings from the 16th and the 17th centuries: *Last Supper* and *Christ in the Gethsemane*. The bell tower resembles the tower of St Mark's Basilica in Venice. It was built during 1654–1680. On top of this 60 m-high tower stands the statue of Saint Euphemia, serving as a wind vane.



The Church of St. Euphemia

By Berthold Werner, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=38526238>

The Center for Historical Research in Rovinj is an institution of the Italian National Community that lives and operates in Istria, Rijeka and Dalmatia, on whose behalf it exercises the right to historical research. The proposal to create a center for historical studies of the Italian National Community in Yugoslavia was formulated in November 1968 by the Italian Union for Istria and Rijeka, today's Italian Union. It is an organization of Italians in the Republics of Croatia and Slovenia, whose purpose is to protect and develop the national, cultural and linguistic identity of Italians in the area.

The scientific library of the Center has more than 93,000 volumes. Since 1995, it has had the status of a depository library of the Council of Europe, with a special section on human and minority rights and environmental protection. The library also keeps a special collection of geographical, topographic and military maps, as well as paintings and views from the 16th century to the present day.



The Center for Historical Research in Rovinj

The Lim bay and valley is a peculiar geographic feature found near Rovinj and Vrsar on the western coast of Istria, south of Poreč, Croatia. The name comes from the Latin *limes* for "limit", referring to the landform's position at the border of two Roman provinces: Dalmatia and Italia.



Lim Bay and Valey

Fra Mauro, O.S.B. Cam., (c.1400–1464) was an Italian cartographer who lived in the Republic of Venice. He created the most detailed and accurate map of the world up until that time, the *Fra Mauro map*. Mauro was a monk of the Camaldolese Monastery of St. Michael, located on the island of Murano in the Venetian Lagoon. It was there that he maintained a cartography workshop.

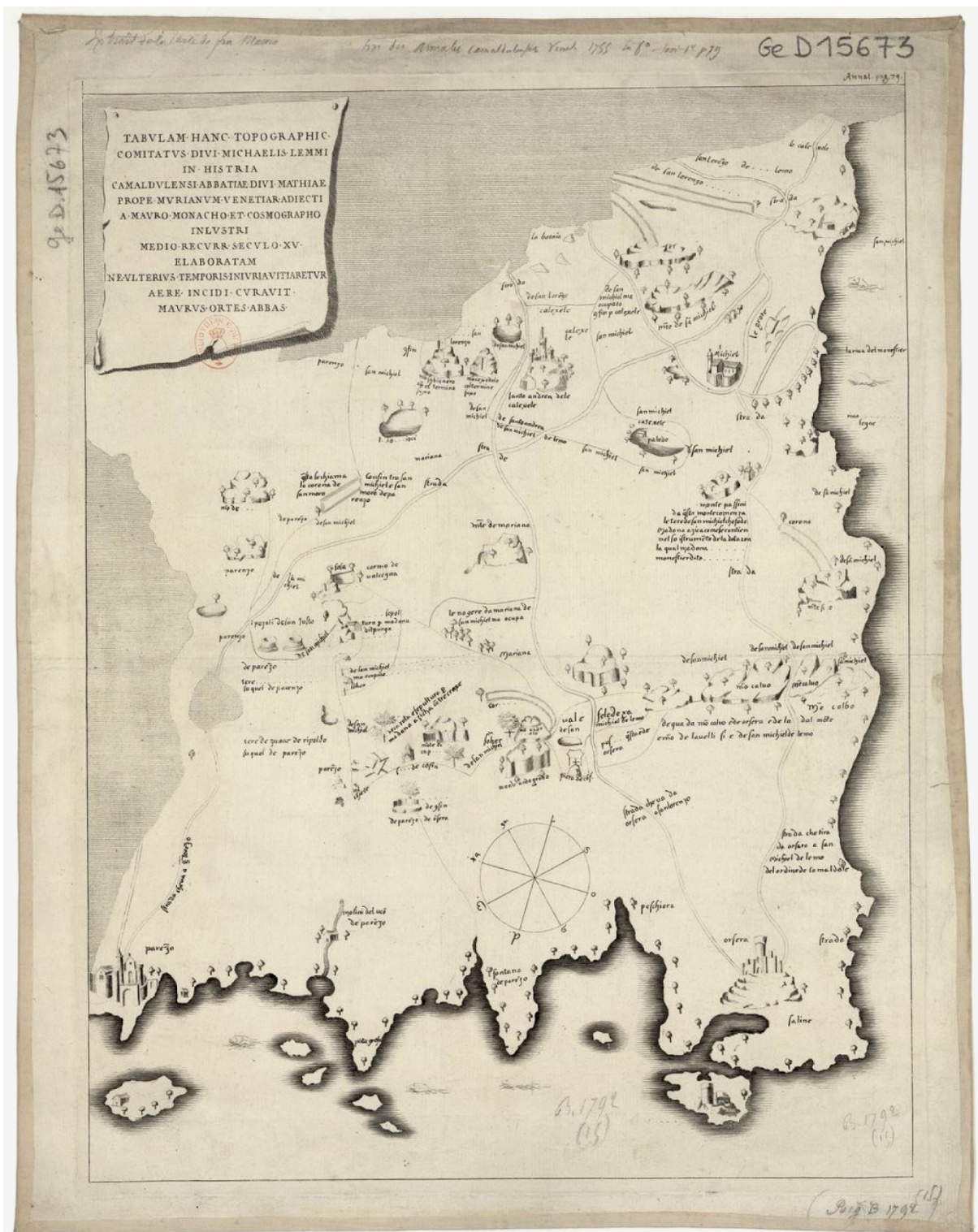


The Fra Mauro world map is a major cartographical work. It took several years to complete and was very expensive to produce. The map contains hundreds of detailed illustrations and more than 3000 descriptive texts. It was the most detailed and accurate representation of the world that had been produced up until that time. As such, the Fra Mauro map is considered one of the most important works in the history of cartography.



This image made by NASA compares the Fra Mauro map to a modern satellite image. NASA describes the comparison as "stunning" and notes how accurate parts of the map are considering the methods that were available at the time.

His other famous work is a topographic sketch of the part of western Istria from Poreč to the Lim Channel with its hinterland. It shows the places, roads and boundaries of the property of the Camaldolense monastery of St. Mihovil of Lim. This is the first large-scale topographic map of a part of Istria.



Source gallica.bnf.fr / Bibliothèque nationale de France

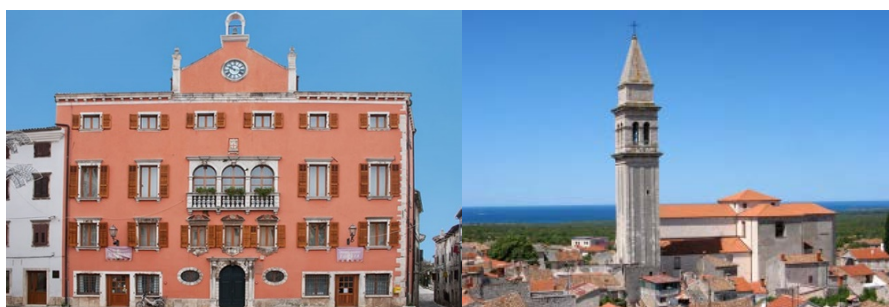
Tabulam hanc topographic(am) comitatus divi Michealis Lemmi in Histria camaldulensi abbatiae divi Mathiea prope Murianum Veneti(ar)um), Adiecti a Mauro monacho et cosmographo inlvstri medio recurr(ente) seculo XV, elaboratam ne ulterius temporis iniuria vitiaretur aere incidi curavit Maurus Ortes abbas. The map is kept in the Bibliothèque nationale de France, Cartes et plans department, GE D-15673 (public domain).

Third day program, Saturday, 26 September 2020

Location: The Bradamante Palace Vodnjan / Dignano

Vodnjan (Croatian) or *Dignano* (Italian) is a town and municipality in Istria County, Croatia, located about 10 kilometres north of largest city in Istria, Pula. Inside the historic nucleus, the town preserved its characteristic Medieval look with atria and narrow streets, irregularly winding among houses, with cobble roads and façades made of cobble stone, old streets still impressively recognizable by their Gothic, Venetian Renaissance and Baroque style and many churches rich with memories and art.

Over the centuries the Bradamante palace (XVII) was a Venetian loggia, a warehouse for barley storage, the seat of the Podestà (chief magistrate of a city state, mayor), an archive, a local health office, a guardhouse, the Cashier's office, the Municipal Commissioner's Residence, a prison and theater, a Recruitment center, the Imperial-Royal Commissariat, a District Court and a residential building. Today is the centre of the Italian Community of Vodnjan. The building itself is a part of a rich architectural heritage of the city. It is located in the National square of Vodnjan (Dignano) which is one of the centre of the public life. Baroque façade is characterized by dramatic masks, ornate windows with lunettes and shells carved in stone (in the foreground), decorative window parapets, an elegant trifora (tripartite gothic stone window) with a charming central balustrade (on the main floor), and the coat of arms that was previously embedded in the wall of the Venetian castle which was demolished in 1808. One of the specific features of the building that makes it unique is the clock in the attic – raised above the eaves in 1814. The old clock from the Venetian castle was used at first but after constant repairs it was replaced with a new one made in Vienna in 1877. The spacious lobby exhibits the permanent collection of the "Coats of arms of rectors and notable families of Vodnjan/Dignano" reconstructed from 2008 to 2010. The first floor keeps an extensive library (2.000 volumes), the computer room and the recreation center.



The Bradamante palace in Vodnjan

Parish church of St. Blaise in Vodnjan

10:00–12:00 Guided Sightseeing of Vodnjan

Olive oil tasting



Visit to the church of St. Blaise

In 1800, after 40 years of construction, 13 thousand golden ducats spent, as well as ten years of charity donations of its inhabitants, the church was consecrated on the feast day of St. Blaise. It was worth the effort because at the site of the one-time church, a magnificent and well-proportioned basilica was built. By the size of its ground plan (56.20 x 31.60 m), and the 25 meter high cupola, the parish church of St. Blaise is the largest parish church in Istria. Furthermore, it is the church with the tallest bell tower (62 m).

12:00–12:15 Formal Opening

12:15–13:00 Lecture

Miljenko Lapaine	Fra Mauro – Cosmographus Incomparabilis
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13:00–14:00 Lunch Break

14:00–15:00 Lectures

Mladen Černi	Orientation of Church Buildings – Another Dating Element
Damir Medak, Mario Miler, Ante Marendić	LABIRINT – Towards new Academic Qualifications in Geodesy and Geoinformation
Miljenko Lapaine, Dino Šubat	Spherical Photography and Equirectangular Projection
Marta Hamzić, Borna Fuerst-Bjeliš	Development Types and Subtypes of the Central Lika Landscape for the Period 1980-2012 – application of Spatial and Process-oriented GIS Model

15:00–16:00 Coffee Break and Concert

Program:

Domenico Scarlatti: Sonata in D maggiore

Franz Liszt: Etuda in D minore op. 1 no. 4

Jan Sibelius: The Spruce from The Trees, op. 75



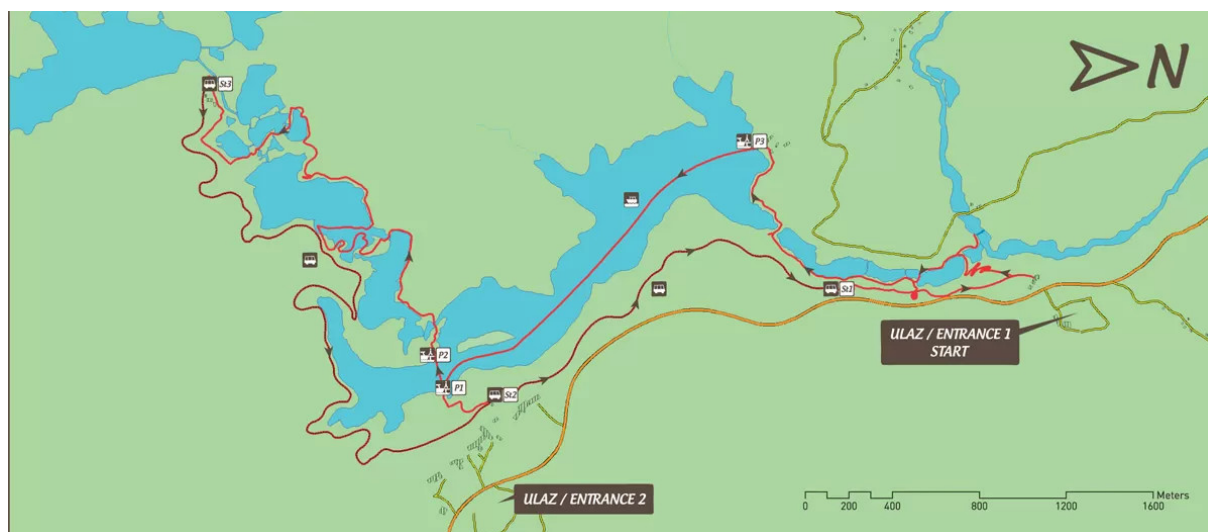
Giulia Timea Fioranti – piano
Mentor pianist prof. Tatiana Šverko

Fourth day program, Sunday, 27 September 2020

Plitvice Lakes Guided Tour

Plitvice Lakes National Park is one of the oldest and largest national parks in Croatia. In 1979, Plitvice Lakes National Park was added to the UNESCO World Heritage register. The national park was founded in 1949 and is in the mountainous karst area of central Croatia, at the border to Bosnia and Herzegovina. The important north-south road that passes through the national park area connects the Croatian inland with the Adriatic coastal region.

Departure from Zagreb by small bus in front of the West Raylway Station at 11 am. The tour of Plitvice Lakes begins at the northern entrance to the Park ("Entrance 1" = "Ulaz 1"). The tour is circular and includes the zones of "Lower" and "Upper Lakes". The end point of the program is reached by a combination of walking and electric boat ride, and the return to the starting point is mostly by panoramic train. We will enjoy the beauty of the largest and most attractive waterfalls ("Veliki slap", "Veliki" and "Mali prštavac") as well as countless smaller waterfalls, and the beauty of the lakes. Return to Zagreb in the evening.



Map of the Plitvice Lakes Guided Tour

16th International Conference
on Geoinformation and Cartography

Abstracts

Creating Educational Disaster Centre “Save the Children Life”

Temenoujka BANDROVA

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Abstract

Children are a part of the most vulnerable to disaster social groups; therefore, they need to be educated continuously in the field of Disaster Risk Reduction (DRR). Important challenge of the advanced researchers and experts is to ensure that knowledge and skills, gained by the children in the DRR training centres during primary and secondary school will be useful throughout their lives. To answer these needs, a conceptual framework for Educational Disaster Centre (EDC) “Save the children life” establishment at University of Architecture, Civil Engineering and Geodesy (UACEG), Bulgaria, is stated, considering that children are very capable to adopt innovations quickly, to develop their own innovative solutions to real challenges, and to take advantage of complex concepts to reduce risk in disaster situations.

The main objectives of this Centre are to provide guidance, educational materials and tools to children and their families to be prepared for adequate behaviour before, during and after a disaster using of spatial thinking. The EDC educators will be University teachers, scientists from Bulgarian academy of science, PhD students, and invited foreign professionals. UACEG students will be involved in the educational and training EDC activities. The first efforts of the proposed Centre will be towards education of schoolchildren. It is worth to be mentioned, that the undergraduate students need also of relevant education in disaster preparedness and DRR, which will be among the future EDC activities.

The Centre activities could contribute to the policy of the institutional responsiveness to the DRR educational needs and to fill critical gaps in children’s disaster preparedness. The success of the proposed Centre in increasing children resilience strongly depends on the coordinated efforts of the institutions responsible for Early Warning & Crisis Management (EW &CM) policies. In this respect, we still have a lot of work to do for successful collaboration of the EDC with governmental, private and non-profit organisations related to the DRR national programmes and policy. Bulgarian Cartographic Association will be engaged by advertisement, conference propagation and expert support in the process of establishing the EDC “Save the children life”.

Key words: natural disaster, educational centre, children’s disaster preparedness

Improvement of the Data Model – Thematic Unit Land Cover and Land Use

Vladimir BARIČEVIĆ¹, Robert ŽUPAN², Damir ŠANTEK¹, Ivan LANDEK¹

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² University of Zagreb, Faculty of Geodesy, Kačićeva 26, 10000 Zagreb

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Abstract

Based on the Law on State Survey and Real Estate Cadastre (NN112/18), article 15, the official state maps as well as topographic and cartographic databases are made on the basis of Basic Topographic Database. The basic topographic database is structured in accordance with the data model of the Croatian Topographic Information System (CROTIS). To date, CROTIS was published in several versions (No. 1.0, 1.1, 1.2 and 2.0), all of them with the goal of improvement and to increase a number of users. CROTIS 2.0 consists of 7 packages – buildings, lines, traffic, land cover and use, hydrography, relief and geographical names. This paper presents several proposals for improving the data model of the thematic unit named Land cover and Land use.

Keywords: CROTIS, land cover, land use, topographic base

Geological Modelling at the Croatian Geological Survey

Nikola BELIĆ^{1,*}, Andrew NEWELL², Snježana MARKUŠIĆ³, Tvrtko KORBAR¹, Marko ŠPELIĆ¹, Marko BUDIĆ¹, Vlatko BRČIĆ¹, Krešimir PETRINJAK¹, Dea BRUNOVIĆ¹, Ozren HASAN¹, and Pavle FERIĆ¹

¹ Hrvatski geološki institut – Croatian Geological Survey

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² UKRI BGS – Natural Environment Research Council, British Geological Survey

³ Department of Geophysics, Faculty of Science, University of Zagreb

Abstract

Geological modeling at the Croatian Geological Survey is a developing discipline. In the past few years, a number of geological models were made, mostly for internal use, or as a training result for the ongoing projects, primarily GeoTwinn and Geosekva, while others were built for the purposes of scientific publication. This review will give several examples of selected geological models developed during the past few years period. It will also list different types of geological models and needed typical input data, and give a basic workflow for model building. Geological modeling requires acquisition of different spatial surface and subsurface input data, including primarily digital elevation model – DEM (or similar), different base maps, and other spatial data containing various geological information. Besides the resulting geological model, in the model building process, a whole series of resulting maps and other cartographic outputs are developed.

Keywords: geological modelling, spatial data, maps, DEM, geological data

GeoCro – Mobile App by Croatian Geological Survey

Marko BUDIĆ, Duje KUKOČ, Tomislav KUREČIĆ, Ivan MIŠUR, Krešimir PETRINJAK

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Abstract

GeoCro is a mobile application developed by the Croatian Geological Survey (HGI-CGS) for the promotion of geology in the Republic of Croatia. The aim was to present geology to the general public in a simple and intuitive way. The application is designed for geological enthusiasts and interested amateurs, nature lovers, mountaineers, and tourists, as well as professional geologists and other scientists. While using location information, the application displays the geological map of Croatia with basic information about the various surface rock formations and structures, and a brief overview of the geological history of Croatia.

The base of the application is the Geological Map of the Republic of Croatia at a scale of 1:300,000 (HGI, 2009) and its associated Interpreter (HGI, 2009), where all geological units shown on the map are described. The base maps offered in the app are provided by the Mapbox platform and the user can choose between default, terrain, satellite, and simplified base map. The second part of the application is a database containing lines and polygons (geological borders and units), and geological points of interest. These are geologically attractive locations (phenomena) which are divided into three categories: fossils, rocks, and geosites. All locations in the database can be displayed on the map and explored in detail. The app is GPS enabled which allows the user to see his own location on the map, and save it on his individual locations list in the app.

GeoCro app was developed through the partnership of HGI-CGS, providing geological information, basic guidelines, and functionalities, and STEMI d.o.o., providing technical development. GeoCro is available for free download on Android and iOS platforms in the Croatian language.

Keywords: GeoCro, mobile app, geology, Croatia

Orientation of Church Buildings – Another Dating Element

Mladen ČERNI

Vodnjan

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Abstract

Dating a building means determining the time of its construction. This information provides various data on the historical research, culture and urban development of a particular area. Church buildings are usually dated by researching historical sources (documents, inscriptions, archaeological analyses) and comparing them with other related examples in architecture (analysis of architectural form – layout and spatial relations, construction system, construction method, etc.).

This paper explores dating the construction of church buildings based on their orientation towards four cardinal points. The geographic area researched was Vodnjan in Istria (Republic of Croatia), and the period researched was from the 5th to the 17th century. The territory of Istria was ruled during this period by several political superpowers (Byzantium, Venice, Franconia) and Christianity underwent major changes (the East-West Schism, the Pontifical State in Ravenna, the Patriarchate of Aquileia, the Crusades, the Reformation, etc.). Each authority that built a new church oriented it toward its religious centre. This means that churches can also be dated based on their orientation towards four cardinal points.

The orientation of the parietal lines of churches in relation to religious seats was analyzed on cartographic and cadastral basemaps using geodetic methods in CAD and GIS tools and the results obtained are presented in the paper. These seats are Constantinople, Ravenna, Aachen, Aquileia (Grado), Rome, and Upper Crimea. The research found that the churches had meaningful orientations towards the religious seats which governed the Vodnjan area at certain times. Of the 28 churches analyzed in the Vodnjan area, only three churches (11%) were not oriented towards the religious seats mentioned above.

Keywords: church buildings, orientation, history and culture

Basic Geological Map of Požega Mt.

Pavle FERİĆ, Marko BUDIĆ, Jasna SEVEREC, Nikola BELIĆ

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Abstract

The geological map of Požega Mt. was made according to the lithostratigraphic principle. Eighteen lithostratigraphic units and three members were defined and their spatial distribution was presented on the map. The defined lithostratigraphic units cover the time span from Lower Triassic until recent time. The map was compiled according to Guidelines for compilation of the Basic Geological Map of the Republic of Croatia, scale 1:50 000 (HGI, 2012) within the national project „Basic geological map of the Republic of Croatia“ (Halamić et al., 2019)

Standard workflow for the production of geological maps at the Department of Geology of the Croatian Geological Survey includes:

- Scanning and georeferencing of the preliminary geological maps and field maps at a scale of 1:25 000.
- Vectorization of geological boundaries and polygon construction of the observed lithostratigraphic units.
- Digitization and graphic processing of field observation points, measured structural elements (fractures, faults, etc.), and their spatial distribution on the appropriate topographic base map.
- Digitization and graphic processing of geological columns, geological cross sections, interpreters, and other parts of the standard basic geological map, scale 1:50 000.
- Finalization of the complete map sheet at a scale of 1:50 000 with all related parts according to the Guidelines for compilation of the Basic Geological Map of the Republic of Croatia.

Until 2017, the entire procedure was executed in Autodesk AutoCAD MAP. During 2018/2019 the transition was made to ESRI ArcGIS platform, and the map is finalized in the Adobe Illustrator using Avenza MAPublisher module. The basic geological map of Požeška gora Mt. is the first geological map of the Republic of Croatia scale 1:50 000 made entirely in GIS environment.

Keywords: Geological map, Požeška gora, GIS, Cartography

New Cartographic Dictionary

Miljenko LAPAINE, Nedjeljko FRANČULA, Ivo-Pavao JAZBEC

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Abstract

The Cartographic Dictionary was published this year by the Croatian Cartographic Society and Dominović Publishing House. In this paper we will describe the problems we encountered in the preparation of this dictionary. Cartography is a discipline which deals with devising, producing, promoting and studying maps. According to the official division of the sciences in Croatia, cartography is a branch of geodesy, and therefore is numbered among the technical sciences. However, it is generally acknowledged that maps are all around us, so cartography is to a great extent integral to geography, geology, seafaring, forestry, agronomy, history, architecture, pedagogy and many other areas which use maps and geoinformation.

The *Cartographic Dictionary* is an expert dictionary containing expressions from cartography and related areas. The *Dictionary* has 2,500 entries arranged in alphabetical order. If the entry consists of two or more words, the first is always a noun. For example, *thematic map* is listed in the dictionary under *map, thematic*. The comma indicates that the normal word order has been reversed.

Each entry begins with a definition, which is usually concise, consisting of one sentence. Often, if more explanation is needed, the reader is directed (*See...*) to similar entries. The brief, concise definition is usually followed by a *note*, sometimes extensive, giving the reader more information if required. All the definitions are in Croatian. However, cartography knows no borders, so most entries are accompanied by synonyms in English, French and German. At the end of the dictionary there is a glossary which will help readers find the right expressions in these languages with directions to the appropriate entry in Croatian.

More than 40 years have passed since the publication of the first and only *Multilingual Cartographic Dictionary* in Croatia. During the intervening period, many new things have happened in the world, and the authors of this new dictionary have tried to include those relevant to the field of cartography.

Keywords: cartography, dictionary

Development Types and Subtypes of the Central Lika Landscape for the Period 1980-2012 – Application of Spatial and Process-oriented GIS Model

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Abstract

This paper conducts the establishment and spatial analysis of development types and subtypes of the Central Lika landscape for the period 1980–2012, as well as observes the processes in the landscape that have occurred. For this purpose, a GIS model is applied and graphically displayed. When determining the landscape types and subtypes of Central Lika, a method based on land cover/land use was applied and data from the CORINE database for the years 1980 and 2012 were used. Based on the interrelationships of the determined landscape types for the two observed years, six development types and three development subtypes of the Central Lika landscape for the period 1980–2012 were established. In order to observe the spatial distribution of the three phases of the vegetation succession process, a spatial analysis of the Central Lika developmental subtypes of the Central Lika landscape was conducted. For this purpose, a spatial analysis method Standard Deviation Ellipse (Directional Distribution) was applied. The obtained results showed that in the examined period (1980–2012) stagnation was the dominant (89.46%) development type/process. The next significant development type/process was Vegetation Succession (5.55%), whereas other, less significant, were Agrarianisation (2.58%), Vegetation Degradation (1.31%) and Construction (0.63%). Within the development type Vegetation Succession, the most common development subtype was Vegetation Succession of the second phase, which occupies a total of 3.11% of the area of Central Lika.

Keywords: land cover/land use, development types, development subtypes, spatial analysis, process analysis, GIS model, Central Lika

Structural Characteristics of Patches in the Central Lika Landscape – Application of Spatial and Regression Analysis

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Abstract

This paper analyses the structural characteristics (shape, position and condition) of landscape patches in Central Lika according to landscape types and for the landscape of Central Lika as a whole. A set of indicators for the landscape structure was used along with GIS technology. Interrelation of the structural characteristics of landscape patches were determined using regression analysis. When determining the landscape types of Central Lika, a method based on land cover/land use was applied. For this purpose, data from the CORINE database for the year 2012 were used. At the level of the landscape type in Central Lika and the landscape of Central Lika as a whole, a set of indicators for the landscape structure were used, based on a variety of spatial analysis methods: Mean Shape Index – for the landscape patch shapes; Core Area Index – for the condition of the landscape patches, and Average Nearest Neighbour – for the position of the landscape patches. The most important result of this paper was to confirm the correlation between the shape and condition, and between the shape and position of the landscape patches of Central Lika, while no correlation between the condition and position of the landscape patches of Central Lika was found.

Keywords: Land cover/land use, structural characteristics, landscape patches, GIS, regression analysis, spatial analysis, Central Lika

Data Modelling and Processing in Map-Based Mobile Services

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Abstract

We are now living in a mobile information era, which is fundamentally changing science and society. Location Based Services (LBS), particularly map-based mobile services, which deliver information depending on the location of the (mobile) device and user, play a key role in this mobile information era. In this talk, I will first briefly review the ongoing evolution and recent research trends of this scientific field. To motivate further research and stimulate collective efforts, the talk will then focus on the open research challenges on data modelling and processing that are essential for map-based mobile services, setting a research agenda to ‘positively’ shape the future of our mobile information society.

Keywords: location based services, data modelling, data processing, mobile services

Fra Mauro – Cosmographus Incomparabilis

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Abstract

The Fra Mauro map is a map of the world made around 1450 by the Italian cartographer Fra Mauro, which is “considered the greatest memorial of medieval cartography.” It is a circular planisphere drawn on parchment and set in a wooden frame that measures over two by two meters. It includes Asia, the Indian Ocean, Africa, Europe, and the Atlantic. It is oriented with south at the top.

The Fra Mauro world map is a major cartographical work. It took several years to complete and was very expensive to produce. The map contains hundreds of detailed illustrations and more than 3000 descriptive texts. It was the most detailed and accurate representation of the world that had been produced up until that time. As such, the Fra Mauro map is considered one of the most important works in the history of cartography. It marks the end of Bible-based geography in Europe and the beginning of embracing a more scientific way of making maps, placing accuracy ahead of religious or traditional beliefs.

The map was made for the rulers of Venice and Portugal, two of the main seafaring nations of the time. The map is usually on display in the museum Museo Correr in Venice in Italy.

His other famous work is a topographic sketch of a part of western Istria from Poreč to the Lim Channel with its hinterland. It shows the places, roads and boundaries of the property of the monastery of Sv. Mihovil Limski. This is the first large-scale topographic map of a part of Istria.

Keywords: Fra Mauro, world map, Istria, St. Mihovil monastery

Spherical Photography and Equirectangular Projection

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Abstract

Panoramic images have increasingly interesting applications and they are extensively used for cultural heritage documentation and virtual 3D environments. Moreover, 3D model visualization in virtual reality has been recognized as an efficient, fast, and easy way of representing a variety of objects worldwide for present-day users, who have stringent requirements and high expectations.

The presentation focuses on equirectangular projection of panoramic images. It is shown that such images are produced in a special type of cylindrical projection known from the theory of map projections as simple cylindrical projection or Plate Carée projection. The reason of using that projection is in the simplest form of its equations. Furthermore, we remind that simple cylindrical projection is equidistant along meridians, but not equal-area nor conformal. It is shown that the form of the image of a great circle on the sphere will be a sinusoid in the plane of projection, as well as in the panoramic image.

The application of panoramic photography is illustrated by several examples. These are an overview of water supply facilities as part of the water supply network records, revision of utility fee calculation with the help of panoramic photos from the aircraft, dynamic display and marking of damage to facilities, determination of building height, 360Theo web application for viewing panoramic photos and measuring vertical and horizontal directions, obtaining point clouds based on panoramic photos from a quick walk around a room.

Keywords: spherical photography, panorama, equirectangular projection

LABIRINT – Towards New Academic Qualifications in Geodesy and Geoinformation

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Abstract

The project „Development and improvement of curricula based on occupational standards and qualification standards in fields of geodesy and geoinformation – LABIRINT“ has been funded by European Social Fund for the period between February 2019 to February 2022. During the project, Faculty of Geodesy of University of Zagreb (with Faculty of Civil Engineering, Architecture and Geodesy of University of Split and Institute for Development of Education as partners) shall develop new occupational standards (currently 10) and qualification standards for the fields of geodesy and geoinformation. The process has been defined by Croatian Qualification Framework and it involves academic institutions, employers and employees in private, state and public sector. Both academic partners shall benefit both from the improvement of educational facilities (new instruments and computer labs) and from the feedback of stakeholders about the competences needed for Bachelors and Masters of the future. The goal of this presentation is to show the project results obtained so far, related to occupational standards and to introduce the second stage of the project: qualification standards.

Keywords: occupational standards, qualifications framework, geodesy and geoinformation

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