



Report 2007–2011 of the ICA Commission on Mountain Cartography to the ICA General Assembly

0. Introduction, history

During the German-speaking Cartographic Congress in Interlaken/Switzerland in 1996, the Commission on High Mountain Cartography of the German Society of Cartography with representatives of the three German-speaking alpine countries was founded. In February 1998, the Commission organized a first workshop in the Silvretta area in Austria with 35 participants from 7 countries which demonstrated the breadth and necessity of this research area. Based on these precursor activities, the General Assembly of ICA at the ICC 1999 in Ottawa approved the ICA Commission on Mountain Cartography. Today, the activities of the two commissions are overlapping to a large extent.

1. Chair / Co-chair

Assistant Prof. Dr. **Karel Kriz** (Chair), University of Vienna, Austria

Prof. Dr. **Lorenz Hurni** (Co-chair), Swiss Federal Institute of Technology (ETH) Zurich, Switzerland

2. Members

Regular members

Manfred Buchroithner, Germany

Tom Patterson, USA

Dušan Petrovič, Slovenia

Maria Pla Toldrà, Catalonia, Spain

Corresponding members

Igor Drecki, New Zealand

Kristoffer J. Kristiansen, Norway

Jacek Drachal, Poland

Martin Gamache, USA

Jürg Gilgen, Switzerland

Gabriela Ilies, Romania

Viktor Kaufmann, Austria

Roger Wheate, Canada

Carlos Nelson, Argentina

Stefan Räber, Switzerland

Christian Haeberling, Switzerland

3. Terms of Reference 2007–2011

1. Further define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields.
2. Provide an updated, attractive web-site with information about Commission activities, links to other events and theme-specific knowledge.
3. Provide an updated web-portal with links to related web-sites and bibliographic information.
4. Emphasise cartographic design issues and map related representations in large scale topographic mapping.

5. Continue the well-established workshop series.
6. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities.

4. Business Meetings

- August 8, 2007, Moscow, Russia
- February 13, 2008, Lenk, Switzerland
- November 19, 2009, Santiago de Chile, Chile
- Thursday, September 2, 2010, Borsa, Romania
- Minutes are published at:
<http://www.mountaincartography.org/activities/meetings/index.php>

5. Workshops

5.1 6th ICA Mountain Cartography Workshop in Lenk, Switzerland, 11-15.2.2008

by Christian Häberling and Lorenz Hurni, ETH Zurich

In February 11 to 15, 2008, for the first time Switzerland was a host nation of the 6th gathering of the ICA Mountain Cartography Workshop. The Workshop focused on mountain-related topographic and thematic aspects and their depiction on maps and map related representations. Since 1998, every two years cartographers and representatives of other fields related to cartography and GIS (e.g. geology, natural hazards, tourism, biology) meet in an inspiring mountain region to discuss their current projects and work.

Under the lead of Prof Lorenz Hurni, the Institute of Cartography at ETH Zurich was in charge of the Workshop organisation, which took place at Lenk im Simmental. Lenk is a small village in the Bernese Alps situated in a wide valley north of the Wildstrubel massif. The sports and recreational complex KUSPO (www.kuspo.ch) provided convenient infrastructure and comfortable accommodation, making it an ideal venue for a successful meeting.

Almost 60 participants from 15 countries took part in the Workshop. Besides core members of the Commission, many new experts and researchers were in attendance. The Workshop participants were honoured to have the welcoming addresses delivered by William Cartwright, President of the ICA, and Stefan Arn, President of the Swiss Society of Cartography (SGK).

The Workshop programme featured three different kinds of presentations, i.e. “classic” presentations reporting on the latest research and developments, short presentations according to the Pecha-Kucha system (see [en. wikipedia.org/wiki/Pecha_Kucha](http://en.wikipedia.org/wiki/Pecha_Kucha)) covering production processes and new products, and a small map and relief exhibition showcasing the newest map products. The 34 presentations were grouped into the following five main themes:

- Physical Geography
- DEM and Terrain Modeling
- Relief Depiction
- History of Mountain Mapping
- Multimedia Applications and Mobile Devices

In the Physical Geography sessions, a number of scientific mapping and cartographic projects as well as case studies from all over the world were presented (Michaela Kinberger, University of Vienna; Manfred Buchroithner, TU Dresden; Giorgio Vassena, University of Brescia; Richard Ladstätter, TU Graz; Sabine Stäuble, University of Lausanne). Other presentations covered issues relating to terrain evaluation or monitoring techniques (Igor Drecki, University of Auckland; Melanie Kunz, ETH Zurich;

David Theler, University of Lausanne). Finally, developments of new interactive map and 3D-visualisation applications were discussed (Alexander Thimm, Swiss National Park; Karel Kriz, University of Vienna; Christophe Lienert, ETH Zurich).

The DEM and Terrain Modelling session covered projects that involved the use of latest laser technologies or high resolution satellite image data (Julien Vallet, Helimap.ch; Kirsten Wolff, ETH Zurich), new approaches for the visualisation of hidden geological structures (Peter Jordan, Böhlinger AG) and derivation of contour lines for small scale maps (Anna Leonowicz, ETH Zurich). A presentation by Maria Pla and Blanca Baella (ICC, Barcelona) focused on requirements for database-driven relief representations for topographic maps. The sessions on Relief Depiction covered the broadest variety of presentations. First, the needs of mountain map users concerning the accuracy and symbolisation of topographic maps, especially members of Alpine Clubs, were evaluated (Martin Gurtner, swisstopo). Two other presentations dealt with the evolution of classic relief maps and perspective views for different cartographic purposes (Alex Tait, International Mapping; Martin Gamache, National Geographic). Similar, but more technical projects on the development of new tourist maps with an integrated shaded relief were demonstrated (Roger Smith, Geographx NZ; William McNulty, National Geographic; Tom Patterson, US National Park Service). David Schobesberger (University of Vienna) presented an evaluation of the application and effectiveness of 2-D vs. 3-D representations in National Park Service maps. Loïc Gondol (IGN Paris) discussed tests for new cliff drawings and scree representation on topographic maps. Tibor Tóth (Tóth Graphix) demonstrated his relief shading methods using Photoshop and a tablet device. Finally, Stefan Räber (ETH Zurich) presented various physical relief depiction techniques, including the production of physical relief models with modern computer-controlled routers for an Earth Science exhibition at ETH Zurich.

The session on the History of Mountain Mapping started with a biographical presentation of the Swiss topographer and cartographer Jacot-Guillarmod (1868–1925) and his influential cartographic cliff representations (Hans-Uli Feldmann, swisstopo), followed by a presentation on the cartographic tradition and the latest technological developments at the Institute of Cartography of ETH Zurich (Lorenz Hurni). Alistair Pearson (University of Portsmouth) reported on laser measurements and geometric analysis performed on a historic relief model to check its accuracy.

A session on Multimedia Application and Mobile Devices for mountain mapping included presentations on web applications for data acquisition (Dušan Petrovič, University of Ljubljana), spatial communication using Google tools (Karel Kriz, University of Vienna) and accessibility visualisation (Adrian Weber, ETH Zurich). Furthermore, an implementation of GPS technology for mountain mapping and tour planning was demonstrated by Juan Galera (University of Leon).

The topics of the eight short presentations grouped in two sessions included the following: representational principles of rock depiction (Jürg Gilgen, swisstopo), tourist mapping activities in Romania (Gabriela and Marin Ilies, University of Cluj-Napoca), the historic development of panoramic maps (Arne Rohweder, Gecko Maps), mobile trekking guide devices for the Rwenzori National Park, Uganda (Constante Bonacina, University of Brescia), smart interactive maps (Nathaniel Kelso, The Washington Post), Multi-date habitat mapping approaches in Quebec (Guillaume Fortin, University of Moncton), a topographic map of the Tatra Mountains (Rafal Jonca, RJ Carto), and traditional hill-shading for digital maps (Gizella Bassa, Gizimap).

A new kind of discussion forum was tried out for the first time at the Workshop, which attracted considerable interest due to the topic: New graphic design for the Swiss National Topographic Maps. The forum was led by Lorenz Hurni (ETH Zurich), and Hans-Uli Feldmann and Martin Gurtner (both swisstopo). Participants discussed the new structure of the map content with new object classes, and shared their views about the displayed design samples with different symbolization and labeling options.

The Workshop featured various social events and activities which fostered networking opportunities among the participants. At the Tuesday evening welcoming, the participants enjoyed drinks at the Cinema Lenk followed by the screening of two recent Swiss films. Due to the excellent weather, Wednesday was an excellent day to enjoy various outdoor activities, including skiing, snow walking or simply relaxing in the sun. At the curling event that evening, many newly formed international teams were established to master this surprisingly challenging sport. Finally, the “Raclette dinner”, a traditional Swiss cheese dish, was very much enjoyed by everyone on Thursday evening.

All papers are published in the publication series of ICC. They can also be accessed at:
http://www.mountaincartography.org/activities/workshops/lenk_switzerland/index.php



Participants at 6th Mountain Cartography Workshop, Lenk, Switzerland

5.2 7th ICA Mountain Cartography Workshop in Borsa, Romania, 1-5.9.2010

by Gabriela Ilies, Babes-Bolyai University

The International Cartographic Association (ICA) Commission on Mountain Cartography held its seventh biennial workshop in Borsa, Romania, on 1–5 September 2010. The Sighetu Marmatiei Extension of Babes-Bolyai University organized the workshop at the Hotel Paltinis, located at the base of the Rodnei Mountains—at 2303 m, the highest spot in the Oriental Carpathians. Borsa, situated in Maramures in the extreme north of Romania, is home to 29,000 inhabitants. Mineral springs, mountaineering, and skiing are popular tourist activities in the region.

Staying at a small hotel booked exclusively for the workshop facilitated the professional interaction in our group. The workshop hosted 39 participants from 11 countries: Austria, Switzerland, Germany, Greece, Poland, Russia, Slovenia, Spain, Argentina, the United States, and Romania. The attendees represented an array of professions— academics, practising cartographers, map designers, and glaciologists—all bound by a common interest in mapping mountains.

The workshop themes were broadly organized around mountain mapping and geospatial information retrieval. The program featured three kinds of presentations: long presentations (10 minutes), short presentations and demos (6 minutes), and posters. The 26 presentations were organized into the following themes:

- Mapping and GIS applications for mountain regions
- Relief mapping and visualization
- Tourist mapping projects—good practice guide
- 3D mapping
- Topographic mapping
- Visualization, animation, new techniques

The workshop began on Wednesday 1 September with a kick-off meeting at the Hotel Paltinis. Following a welcome message by the local organizing committee, Karel Kriz gave a short overview of the program, and then participants introduced themselves.

On Thursday morning, the workshop featured six presentations. Martin Gamache gave a talk titled “Relief Mapping at National Geographic Magazine: 1970 to Present.” His talk was accompanied by lavish examples of mountain maps. Alexandru Petrisor then talked about micro-scale geostatistical analysis and visualization of a mountainous area in the Ialomita basin, with a focus on development aspects. Jeremias Uffmann presented the new centennial edition of the 1908 Alpenverein Map of the Brenta Massif; Manfred Buchroithner and Thomas Himpel led this mapping effort, which was on display as a poster.

After a short break, the presentations turned to new visualization techniques. Karel Kriz discussed the Cultural History Information System of the Western Himalaya and gave demos of this project. Christian Haerberling presented the new Web-based interactive Swiss World Atlas, featuring mountain maps for education purposes, and later gave a live online demonstration of the atlas. Fernando Berenguer closed the session with a presentation on mapping Jou Negro, a micro-glacier on Picos de Europa, Spain.

A short walk on Thursday afternoon to nearby Horses Waterfall gave the participants the opportunity to explore the Rodnei Mountains up close for the first time. Back at the Hotel Paltinis, the local organizers conducted a discussion forum on Romanian mountain mapping, with input from the workshop participants from Romania.

Friday was completely devoted to presentations: nine long and seven short contributions. Patrick J. Kennelly opened the floor with a talk about sky models and illumination issues, followed by Dorina Ilies from University of Oradea with problems related to mapping morphological structures in the Plopiș Mountain area. Tom Patterson introduced ShadedReliefArchive.com, a Web site containing manual shaded relief, and discussed a study of hypsometric tints. Ionuț Iosifescu presented on a new approach for environmental monitoring using a GIS platform. Mapping rock glaciers was the subject of Viktor Kaufmann’s presentation, and Tomaz Podobnikar talked about identifying mountain peaks through a shape-analysis technique.

In the topographic mapping session, David Schobesberger introduced a topographic overview map of Himachal Pradesh, followed by Dušan Petrovič with the results of airborne laser scanning data in mountain areas and Jacek Drachal presenting on the use of SRTM and MODIS data in small-scale mapping of mountains. Lorenz Hurni highlighted new features in the Atlas of Switzerland 3.0, emphasizing mountain-related topics, and gave a short demo. Carlos Nelson then told the group about mountain cartography in Argentina, discussing different types of maps and scales. Rafał Jonca finished the session by announcing the completion of a worldwide 90-m digital elevation model (DEM).

Short “Pecha-Kucha-style” presentations, first introduced at the Lenk workshop in 2008, proved a popular format at Borsa, in two sessions. The presentations included issues of visualization and modelling for Soča River (Dušan Petrovič, Aleš Golja); software application for automated small-scale relief shading (Anna M. Leonowicz, Bernhard Jenny); Natural Earth features and demonstrations (Nathaniel Vaughn Kelso, Tom Patterson); and digital rock drawing (Jürg Gilgen). In the second session, Nikos Tzelepis started with topographic relief characterization of Greek municipalities (for the team of Athanassia Darra, Marinos Kavouras, and Nikos Tzelepis), and Marianna Serebryakova discussed Swiss mountain relief shading techniques as practised in Russia. Her talk included striking examples of mountain maps.

The workshop hosted social events and outdoor activities to foster informal interaction among the participants. On Friday evening, the group was treated to a traditional Romanian dinner with folk music and dance demonstrations. Because of the cold and rainy weather, the Saturday excursion offered a choice of two different destinations: while 14 hardy participants braved the first snow of the year to climb Pietrosu Rodnei Peak, other participants hiked above the tree line to Lake Izvorul Bistritei.

All papers are published in *Geographica Technica*, a Cluj University Press review, indexed in Scopus; publication. They can also be accessed at:

http://www.mountaincartography.org/activities/workshops/borsa_romania/index.php



Participants at 7th ICA Mountain Cartography Workshop, Borsa – Maramures, Romania

5.3 Supported events, conference sessions

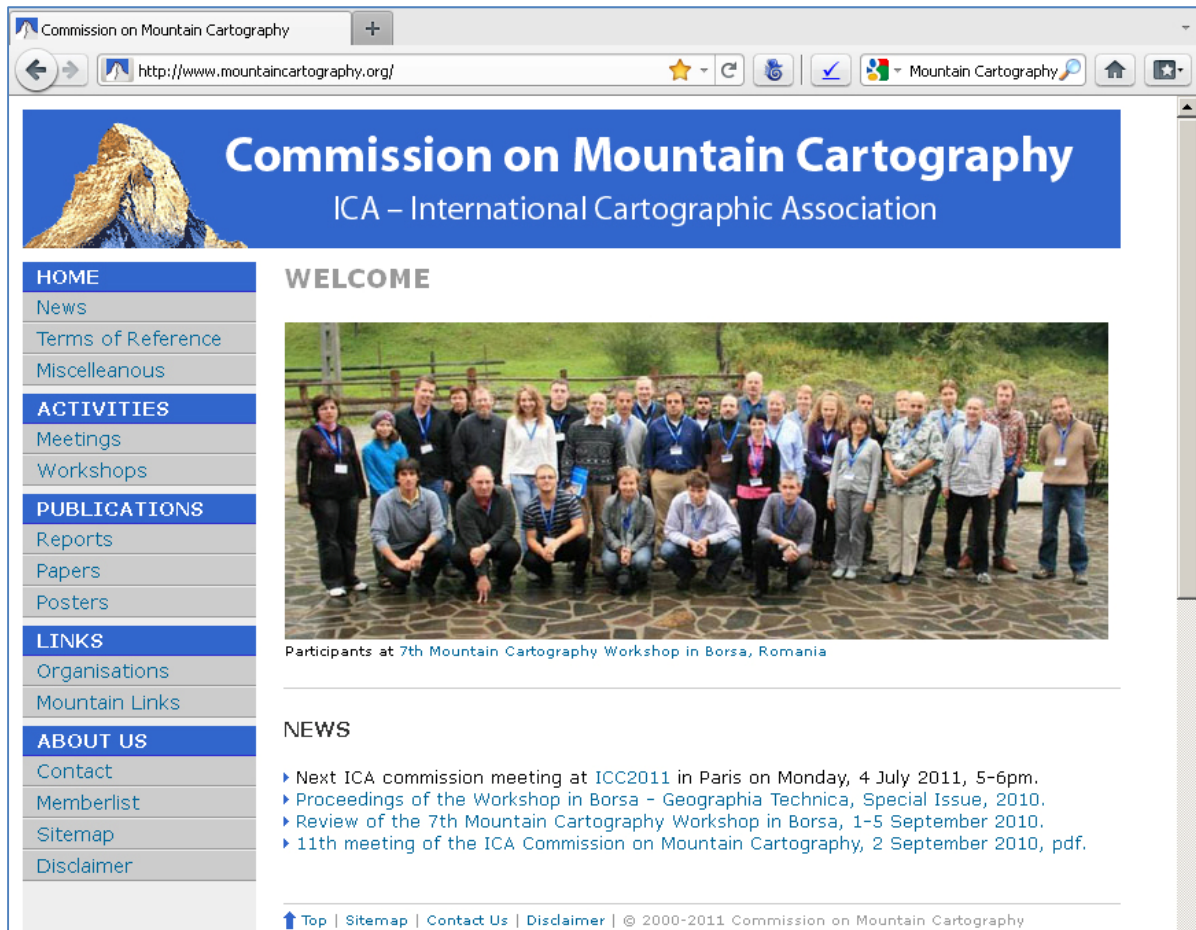
- 10th International Symposium on High Mountain Remote Sensing Cartography 11-Sep-2008, ICIMOD, Kathmandu
- ICC 2009, Santiago de Chile: two sessions on Mountain Cartography
- ICC 2011, Paris: three sessions on Mountain Cartography

6. Commission publications (proceedings, book chapters, special journal issues, web-sites)

- Hurni, Lorenz (Ed.) 2009: Mountain Mapping and Visualisation. Proceedings of the 6th ICA Mountain Cartography Workshop, 11th-15th February 2008, Lenk, 186 p. ISBN 978-3-033-01884-6 All papers are also published at: http://www.mountaincartography.org/publications/papers/papers_lenk_08/index.php
- Heidun Ionel (Ed.) 2010: Mountain Mapping and geospatial information retrieval. Proceedings of the 7th ICA Mountain Cartography Workshop, Borsa-Maramures, Romania September 2010 published in *Geographica Technica*. , All papers are also published at http://www.mountaincartography.org/activities/workshops/borsa_romania/index.php
- The Special Mountain Cartography issue of *Cartographic Perspectives* (No. 67, Winter 2010). Bernhard Jenny and Tom Patterson guest editors.
- Sutter, Felix; Räber, Stefan and Bernhard Jenny, 2006: <http://www.terrainmodels.com/>

7. Website

The commission web-site <http://www.mountaincartography.org> has been entirely redesigned and extended by all commission publications by Stefan Räber, cartographer and webmaster of the Institute of Cartography at ETH Zurich.



8. Financial planning

The commission has used the financial contribution provided by ICA within the reporting period, mainly for reservation fees at the workshop locations, printing costs and website design. We propose to spend the contribution for the next period for the same items.

9. Comments, lessons learned

Within the last years the Commission with its activities attracted cartographers, GIS specialists, geographers, remote sensing specialists and other professionals and therefore formed a rather mixed group. Two interest groups can be observed: Specialist in the fields of topographic mapping and relief representation, and thematic specialists with GIS applications in mountainous areas. This interesting combination makes the workshops unique and always creates a real mountain cartography spirit. Since the main topic of the first group, topographic mapping is not focused only on mountain regions; we support the creation of an ICA Working Group on Topographic Cartography, which can work in cooperation with the Commission on Mountain Cartography in period 2011-2015.

10. Review of terms of reference 2007–2011

1. Further define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields. **to continue**
2. Provide an updated, attractive web-site with information about Commission activities, links to other events and theme-specific knowledge. **achieved, to be continued**
3. Provide an updated web-portal with links to related web-sites and bibliographic information. **to be continued**
4. Emphasise cartographic design issues and map related representations in large scale topographic mapping. **to be continued**
5. Continue the well-established workshop series **to continue**
6. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities. **to continue**

11. Proposed terms of reference 2011–2015

Based on the experiences during the reporting period and the review comments, the commission proposes to focus on the following terms of reference for the period 2011–2015:

1. Define the topics of Mountain Cartography and promote the methods and knowledge of mountain cartography among scientists and professionals in cartography and related fields.
2. Provide an updated, attractive web-portal with information about Commission activities, links to other events, theme-specific knowledge, related web-sites and bibliographic information
3. Discuss different issues about mountain cartography and map related representations in large scale topographic mapping, as similarity and differences in symbolization and map design, technological issues, maps use, connections to Location-based Services (LBS).
4. Continue the well-established workshop series.
5. Promote publication activities (proceedings, web-proceedings, journal articles and special issues) and common research activities.

12. Future activities

The commission will continue its highly successful series of workshops with the next workshop in New Zealand from September 2-5, 2012 (see <http://www.mountaincartography.org>). Further workshops in British Columbia (CAN), US North-East, Poland (Tatra) are envisaged. Proposed Working Group on Topographic Cartography may closely cooperate with the commission, organizing joint workshops, publications and other activities.

Vienna, Zurich, Washington, Ljubljana, May 2011

Karel Kriz, Chair of the ICA Commission on Mountain Cartography

Lorenz Hurni, Co-Chair of the ICA Commission on Mountain Cartography

Tom Patterson, Corresponding Member of the ICA Commission on Mountain Cartography

Dušan Petrovič, Corresponding Member of the ICA Commission on Mountain Cartography