Mapping Mountain Dynamics: From Glaciers to Volcanoes

Proceedings of the
8th ICA Mountain Cartography Workshop
1st – 5th September 2012, Taurewa, New Zealand

Workshop Organisation
New Zealand Cartographic Society
www.cartography.org.nz

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This publication is the outcome of the work of contributors who participated in the 8th ICA Mountain Cartography Workshop from 1-5 September 2012, in Taurewa, New Zealand. This meeting brought together cartographers, artists, practitioners and geoscientists who focused their attention on enhancing special issues of mountain cartography in order to evaluate current trends as well as to provide innovative ways of sharing geospatial information. The main intention of the workshop was to investigate how on the one side mountain cartography is being currently addressed and on the other side how to enhance the possibilities of developing new theories and techniques for design and transfer of geospatial information that is embedded in a mountainous environment.

The relevance and significance of the workshop, and this subsequent publication is to be seen as a further initiative for research and development in cartography and neighbouring disciplines. It also provides the stimulus for organizing further events that will explore topics in and around mountain cartography.

As chair of the ICA Commission on Mountain Cartography I would like to thank all authors for their contributions as well as their willing and enthusiastic co-operation. Furthermore I would also like to acknowledge the professional work of the organization committee in New Zealand, who undertook the task of organizing the workshop as well as designing and coordinating this publication and its chapters. I hope that this contribution provides a valuable addition to cartographic theory and praxis and I am confident that readers will be inspired by the contributing author’s efforts.

Karel Kriz
Chair, ICA Commission on Mountain Cartography
August 2013, Vienna
Since 1999, the International Cartographic Association (ICA) Commission on Mountain Cartography has been holding Workshops every other year, alternating with the International Cartographic Conferences (ICC). The New Zealand Cartographic Society (NZCS) was pleased to host the 8th Mountain Cartography Workshop at the Sir Edmund Hillary Outdoor Pursuits Centre at Taurewa, near Tongariro National Park, 1st – 5th September 2012. The meeting gathered 24 mountain cartographers and enthusiasts from nine countries: Argentina, Austria, Canada, Germany, Norway, Slovenia, Switzerland, USA and New Zealand.

The Workshop theme, Mapping Mountain Dynamics: From glaciers to volcanoes, set the mountain scene and the central focus for presentations and discussions. Over three days (3rd – 5th September), 21 scheduled presentations were run, grouped into six themes: Mountain Mapping, Glacier Mapping, User-Related Studies, Mobile Media, Professional Cartography and “From the Ocean Floor to the Mountain Tops”. In addition several unscheduled presentations and projections enriched the Workshop’s programme. The Workshop proper opened on Saturday evening, 1st September, with an excellent presentation from Dr Harry Keys of the New Zealand Department of Conservation, not only informing us of the natural and cultural context of the Tongariro National Park setting, but updating us on the devastation caused by the volcanic explosions on nearby Mt Tongariro, which had happened less than a month before.

This publication is the record of the workshop, consisting of 14 papers and 8 abstracts mainly describing mountain cartography related projects but with a mix of representations, technologies and techniques that are directly
relevant to mountain cartographers. Seven of the paper chapters have either been developed from what were abstracts at the time of the workshop or are submissions from scratch.

The Mountain and Glacier Mapping section of these proceedings has research chapters that are for the most part derived from the Mountain Mapping and Glacier Mapping sessions. We start with the challenges of contemporary photorealistic representations of mountainous terrain in Slovenia (Dušan Petrovič, University of Ljubljana), followed by two glacier-themed chapters: the application of digital photogrammetry techniques to create a new DEM of Tasman Glacier in the NZ Southern Alps (Sebastián Vivero, University of Otago) and a review of cartographic depictions of glacier dynamics (Roger Wheate, University of Northern British Columbia, Canada).

From the mountains to the ocean floor, we then consider the mapping of the unseen mountains at the bottom of the Pacific Ocean near Hawaii (Tom Patterson, US National Park Service). Finally a novel technique combining grayscale and coloured raster without losing colour intensity or hillshade detail is reported on (Aileen Buckley, Esri), something that will be of value in the production of future mountain maps.

The User-Related Studies and Mobile Media sessions at the workshop have been combined here in the section on Usability and Cognition research. A chapter on usability evaluation of panoramic maps of Switzerland (Stefan Räber, ETH Zurich) kicks off the section. Next, non-visual terrain representation is considered in a speculative chapter on multi-modal exploration of rugged digital terrain via smartphones (Antoni Moore, University of Otago). Georg Gartner (Vienna University of Technology) reports on some wayfinding challenges in the context of “emo-maps” (i.e. maps describing people's emotions), generated from volunteered data collected via mobile devices. The city setting of this chapter (Vienna, Austria) could be substituted by a mountainous setting, perhaps mapping elicited emotions of a different kind. Finally in this section, an assessment of small scale mountain maps for a museum exhibition is reported on (Karel Kriz, University of Vienna).

The Professional and Personal Mapping section is the last paper section, grouping chapters derived from several of the original workshop sessions. First off is Peter Howorth's personal account of the mapping of the hidden and forgotten pilgrimage trails of the Athos Peninsula, including Mount Athos itself. The next chapter takes us on a journey to the mid 1930s, when one of the first New Zealand hiking maps was produced, of the Tararu Mountains (Geoff Aitken, NewTopo). In the first of three professionally-oriented chapters, an innovative geographical atlas of Argentina, from the Andes to the Atlantic, incorporating 1:500,000 overview maps with corresponding satellite imagery is reported on (Carlos Nelson, Instituto Geográfico Nacional). Then there is an account of constructing texture maps using Photoshop to produce the renowned Geographx terrain maps (Roger Smith, Geographx). Finally Geoff Aitken is back to explain his new and crisp approach to topographic mapping, as evidenced through the products of his company, NewTopo.

The Abstracts section represents presentations at the workshop touching on most of the above topics, and more. In the first of four extended abstracts, Roger Smith (Geographx) demonstrates how to interpret geomorphology from suitably designed maps. Next is an overview of current projects at TU Dresden, concerning glacier dynamics in the Himalayas (Benjamin Schroeter, Dresden University of Technology). The third abstract covers a semi-automated approach to reconstructing glacier DEMs based on historical maps (Lorenz Hurni, presented by Stephan Wondrak, ETH Zurich). Then there is an account of the use of LiDAR technology for flood mapping (Andrew Steffert, Horizons Regional Council, NZ), a technology that also generates mountainous terrain data of unprecedented quantity and quality.

The remaining abstracts include ones on the development of mountain-related applications for mobile phones, and a user interface for the Tyrolean Avalanche Warning Center Portal (both Karel Kriz, University of Vienna). Martin Gamache of National Geographic Magazine gave various presentations throughout the time of the workshop, on the use of new relief tools in the production of NGM maps and illustrations, on the cartography of the NGM Mount Everest map, another on the climbing routes of the famous El Capitan vertical world and a new ocean floor map – these are summarized in the abstract that follows. The final abstract is on the creation of terrain maps in a digital environment (Nathaniel Vaughn Kelso, Stamen Design).

No introduction would be complete without mentioning the extra-curricular activities. It takes commitment beyond a love for mountain cartography to come so far to the middle of a New Zealand winter! However, as it happened, the weather was relatively kind, at least on the day programmed for excursions and nobody stayed in
the warmth of the lodge on that day. All participants split into several groups, each targeting a different type of activity, from hiking, through snowboarding and ski touring to mountaineering. Many local bush walks saw a number of international hikers enjoying lush vegetation, bird songs and the smell of bush flowers. Mount Ruapehu’s snow fields accommodated a lonely snowboarder who couldn’t resist pushing his limits on the challenging piste in Happy Valley. The fearsome peaks of Mt Ngauruhoe (2287m) and Mt Tongariro (1967m) fell to a group of experienced mountaineers, who conquered their summits in gale force winds. Finally, the famous Mount Ruapehu Crater Lake welcomed a small group of mountaineers and one ski touring enthusiast to its shores, enjoying panoramic views of Summit Plateau from nearby Dome (2672m). The day finished with plenty of talks, photo presentations and a movie taken during one of the trips. The afternoon of Tuesday 4th was also spent on recreation, mixing some walking in the rain with a visit to the Tongariro National Park Visitor Centre, and finishing off with a nice coffee at The Grand Chateau in Whakapapa Village. Despite the weather that day, everybody enjoyed the outing but was equally pleased to be back in the safety and warmth of the lodge for an evening meal.

The Commission business meeting was also held on the Tuesday and the minutes are available from the Commission website (www.mountaincartography.org), together with the Powerpoint presentations from the workshop (thanks to N.V.Kelso). The closing session for the workshop on the following day was jointly chaired by Georg Gartner, President of ICA, Karel Kriz, Chair of the ICA Commission on Mountain Cartography, and Igor Drecki, Vice President of the New Zealand Cartographic Society, who thanked Geoff Aitken, Chair of the Local Organising Committee, and his team for a superbly organised event. The NZCS in turn thank all participants who made this such a special occasion, the Commission chairs, Karel Kriz and Lorenz Hurni, the ICA as represented by president Georg Gartner as well as Stefan Räber and Dušan Petrović for their help and facilitation. Tim Nolan, Marney Brosnan and Markus Jobst must also be thanked for their role in the design, publication and printing process for these proceedings.

We look forward to the 9th Mountain Cartography Workshop, which is planned to take place in Banff, Alberta, Canada, between 22nd and 26th April 2014. Roger Wheate leads the local organising committee. All welcome!

Igor Drecki, Geoff Aitken, Roger Smith, Christian Fremd and Antoni Moore
Local Organising Committee
New Zealand Cartographic Society

Mt Ruapehu’s Pinnacle Ridge with Mt Ngauruhoe and Mt Tongariro in the background; Photography Igor Drecki.
Introduction

Group Photograph

Participants of the 8th Mountain Cartography Workshop held in Taurewa near Tongariro National Park, New Zealand; Photography Karel Kriz.

Left to right: Andrew Steffert, Christian Fremd, Martin Gamache, Roger Wheate, Belinda Smith Lyttle, Karel Kriz, Bjørn Sandvik, Stefan Räber, Georg Gartner, Stephan Wondrak, Igor Drecki (at back), Tom Patterson, Rosemary Jorgensen, Peter Howorth, Benjamin Schröter, Sebastián Vivero, Antoni Moore, Carlos Nelson, Aileen Buckley, Nathaniel Kelso, Roger Smith, Dušan Petrovič, Rebecca Hayter, Geoff Aitken
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