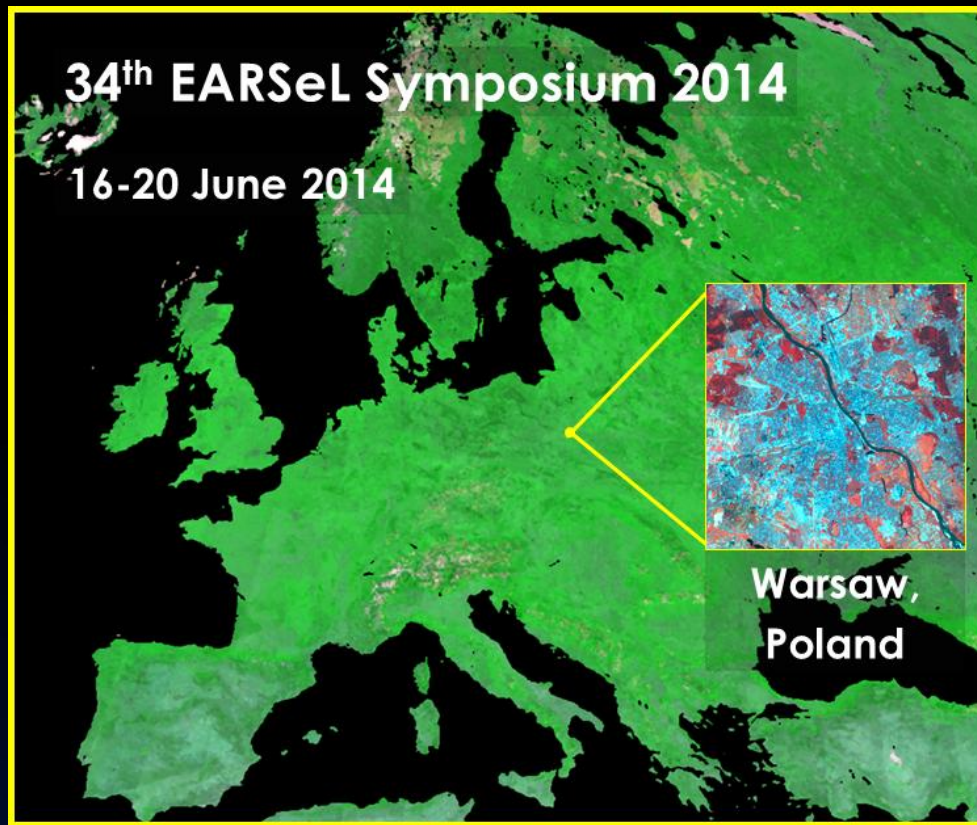


# EARSeL



March 2014  
No. 97

# NEWSLETTER



The Newsletter is a forum for the exchange of news and views amongst the members of the Association. The opinions expressed in the Newsletter do not necessarily reflect the views of the editors, the EARSeL Bureau or other members of the Association.

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**Front Cover** – 34th EARSeL Symposium 2014, Warsaw, Poland.

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## EARSeL Newsletter

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## Editorial

Dear members,

This March Issue starts with a call for candidates for the EARSeL Bureau and the EARSeL Book Series Editor. Reports and impressions on recent EARSeL Workshops such as the 7th EARSeL Workshop on Remote Sensing of Land Ice and Snow: Remote Sensing of the Earth's Cryosphere, Bern, and the 1st joint Workshop of the EARSeL Special Interest Group on Land Use & Land Cover and the NASA LCLUC Program, "Frontiers in Earth Observation for Land System Science" have been included at the "News from EARSeL" section. The research activities of Croatia and Finland of the past year are also presented.

The "News from Other Organisations" section includes the call for papers of the 5th ISDE Digital Earth Summit, whereas the "Science Article" rubric hosts an article on recent developments in satellites and sensors observing the Earth and beyond.

Four new research publications from the EARSeL eProceedings are presented, and amongst the new publications is the book "Land Use and Land Cover Mapping in Europe: Practices & Trends", in the framework of the EARSeL Book Series, as an activity of the EARSeL's SIG LU/LC, published by Springer.

EARSeL forthcoming events include the Annual 34th EARSeL Symposium 2014 & Workshops in Warsaw as well as, later in September, the "White Sea Student Workshop on Optics of Coastal Waters" in Russia organised by the EARSeL's SIG Education and Training.

Last but not least, a list of conferences, training courses and summer schools to attend in the near future can be found in the last part of the Newsletter.

We will be pleased to receive your feedback. Moreover, you are more than welcome to contribute a science article or report for the forthcoming issues of the EARSeL Newsletter.

Enjoy reading the March issue!

The Editors

## News from EARSeL

### Call for Candidates – EARSeL Bureau

EARSeL is seeking candidates to the four offices in the Bureau, who are willing to serve with their capacities the common interest of the Association, to bring new ideas within the team, to demonstrate management abilities, and to represent our Association.

According to the present EARSeL Statutes every two years the Bureau members need to receive approval to continue or the posts shall be filled with new persons originating from Member laboratories. In June 2014 the EARSeL Council of elected National Representatives shall vote during the Warsaw Annual Symposium on the offices of “Chairperson”, “Vice Chairperson”, “Secretary General”, and “Treasurer”.

The **Chairperson**, in coordination with the other Bureau members, needs to have visions as to the future of the Association, and to see how it may adapt to changing circumstances. He/She is responsible for the coordination of SIGs. The chairperson should be willing (and able) to make time for attending meetings organized under the EARSeL banner, or should designate another Bureau member to do so. The chairperson should also be able to attend other important international meetings to “fly the flag” whenever time and finances permit. He/She shall maintain external contacts, especially to the sponsoring agencies in cooperation with the Bureau member for International Affairs. The chairperson is also responsible for seeing that duties are done, and should be prepared to write a “Letter from the Chairperson” in the Newsletter at least once or twice a year, if not in each issue.

The **Vice Chairperson**, in coordination with the other Bureau members, should be able to deputize for the Chairperson at various meetings, when the latter is unable to attend. He/She is responsible for the scientific level of meetings. Either the Chairperson or Vice-Chairperson should be on the Scientific Committee of meetings EARSeL is involved in to ensure as high a scientific level as possible. The Vice-Chairperson should co-ordinate EARSeL’s various publications, in particular the EARSeL Newsletter, and the EARSeL Symposium proceedings. Reviewed Workshop proceedings should be left to the local workshop organizers.

The **Secretary General**, in coordination with the other Bureau members, is in charge of the administration of the Association and is its “mouth-piece” or spokesman. He/She should be willing to represent the Association at various meetings. He/She is responsible for drafting various information documents/reports/letters that the Association sends to its members and external contacts. Together with the Chairperson and Treasurer, he/she is responsible for the drafting of the annual report. The Secretary General also looks out for any Invitation to Tender (ITT) or Announcement of Opportunities (AO) in which EARSeL might participate.

The **Treasurer**, in coordination with the other Bureau members, is responsible for keeping the finances of the Association healthy and preparing the report for the annual General Assembly. The day-to-day book-keeping is looked after by the EARSeL Secretary, but the Treasurer should oversee this from time to time. The Treasurer shall negotiate the budgets of Symposia and Workshops with their organizers in coordination with the other Bureau members.

We invite anyone interested to face the challenge and serve our Association to declare her/his **candidacy** per e-mail to the Secretariat ([secretariat@earsel.org](mailto:secretariat@earsel.org)) at the latest on **15.04.2014**.

Candidates are asked to submit the following information, for each office (“Chairperson”, “Vice Chairperson”, “Secretary General”, and “Treasurer”): (a) Full name with a portrait, (b) Current position and possible active services to the Association (max 1 page A4), (c) Personal data and academia, (d) the reason for joining the Bureau.

Rosa Lasaponara,  
Secretary General of EARSeL, [rosa.lasaponara@imaa.cnr.it](mailto:rosa.lasaponara@imaa.cnr.it)



## Call for Candidates – EARSeL Book Series Editor

EARSeL is seeking a candidate to become the **EARSeL Book Series Editor**. The present editor has been working several years in this position and has asked to be released from the function. The EARSeL Book Series Editor's role is to identify and promote new topics and authors (volume editors) for books, preferably closely related to EARSeL activities, and then to follow the book proposals.

The Editor is in charge to:

- Analyse, review and evaluate editorial book project proposals.
- Support the proposals of potential authors that combine the book goals, content and outline.
- Cooperate with book authors during the book preparation, if necessary.
- Review and evaluate the final version of the book before printing.
- Prepare the final version for printing in cooperation with Springer.
- Report regularly on the publishing progress (especially before the 2 annual Bureau meetings).
- Join the Bureau/Council meetings after an official invitation.

The function is regarded as a function of honour and so will be without financial compensation, but the post-holder entitled to place the position on their CV and other relevant documents.

Candidates are asked to submit the following information:

- (a) Current position,
- (b) Personal data,
- (c) Main publications
- (d) Experience associated to the editor's activity

The submission should be sent to the EARSeL secretariat ([secretariat@earsel.org](mailto:secretariat@earsel.org)) at the latest on 30 April 2014.

Lena Halounová  
EARSeL Vice Chairperson  
[lana.halounova@fsv.cvut.cz](mailto:lana.halounova@fsv.cvut.cz)

## 7th EARSeL Workshop on Remote Sensing of Land Ice and Snow: Remote Sensing of the Earth's Cryosphere, Bern

Land Ice and Snow Special Interest Group organized the 7th EARSeL LISSIG Workshop in Bern (Fig. 1), Switzerland, February 3 – 6, 2014. Professor Stefan Wunderle (Fig 2), who is a chairman of this SIG and has already organized previous LISSIG workshops, opened the meeting on Monday morning. Lena Halounová, the EARSeL Vice Chairperson, presented a short welcome greeting in the name of EARSeL providing participants with a short history of EARSeL and LISSIG. She concluded with an invitation to the [34th EARSeL Symposium](#) in Warsaw accompanied by workshops and the [EARSeL & ISPRS Young Scientist Days 2014](#).

If you were interested in the workshop and opened its webpage, you would have found the following invitation:

*Remote sensing of the Earth's Cryosphere: Monitoring for climate studies and operational applications.*

The workshop invites presentations on all fields of environmental research focussing on snow and ice as proxy for changing cryosphere, methods for retrieving cryospheric parameters from various types of remote sensing data, theoretical basis of inversion methods and their application, state-of-the-art retrieval algorithms, data assimilation of remote sensing data and in situ observations in process models, current and planned sensors for snow and ice, etc. The workshop also offers the possibility for sessions covering preparations and successful realization of field campaigns in mountainous and polar regions. The last day is dedicated to the ESA-Globsnow User Consultation Meeting. All participants are invited to attend the meeting.

Homepage: <http://www.earsel.org/SIG/Snow-Ice/workshops.php>

The workshop fulfilled the entire plan and was a very good example of a scientific meeting with several tens of participants.

The workshop used oral and poster session presentation types, and the participants had an opportunity to hear and discuss about 38 oral presentations and 16 posters. The papers were – even though you are not a snow and land ice specialist – very interesting and informative. The theme is really one of important issues in the Earth's environment and the rapid results coming from such meetings can serve as a source for non-remote sensing people, decision makers, politicians, etc.

The workshop took place in a cosy space of the University of Bern under the very pleasant leadership of Professor Wunderle and his kind co-operators – Dr. Fabia Hüsler and Céline Dizerens. The participants were welcomed by a refreshment, already on Monday morning, and the care continued with coffee breaks offering also fresh fruits. The ice-breaker reception brought us to the main building of the University of Bern on Monday evening. As the building is situated above a large part of the city, we had an opportunity to have a nice city view. The space in the 5th floor, an interesting film and many tasteful small pieces of various kinds of cold and warm cuisine allowed us to meet new and old friends in a nice environment. The culture of Switzerland, focused on Bern and its history, was prepared for participants as a guided tour through this very beautiful and cosy city with many fountains offering drinkable water. The tour ended in front of Altes Tramdepot restaurant where the workshop diner was ready for all of us.

Thank you, Professor Wunderle, it was a pleasure to take part in.



Figure 1. University of Bern, Institute of Geography.



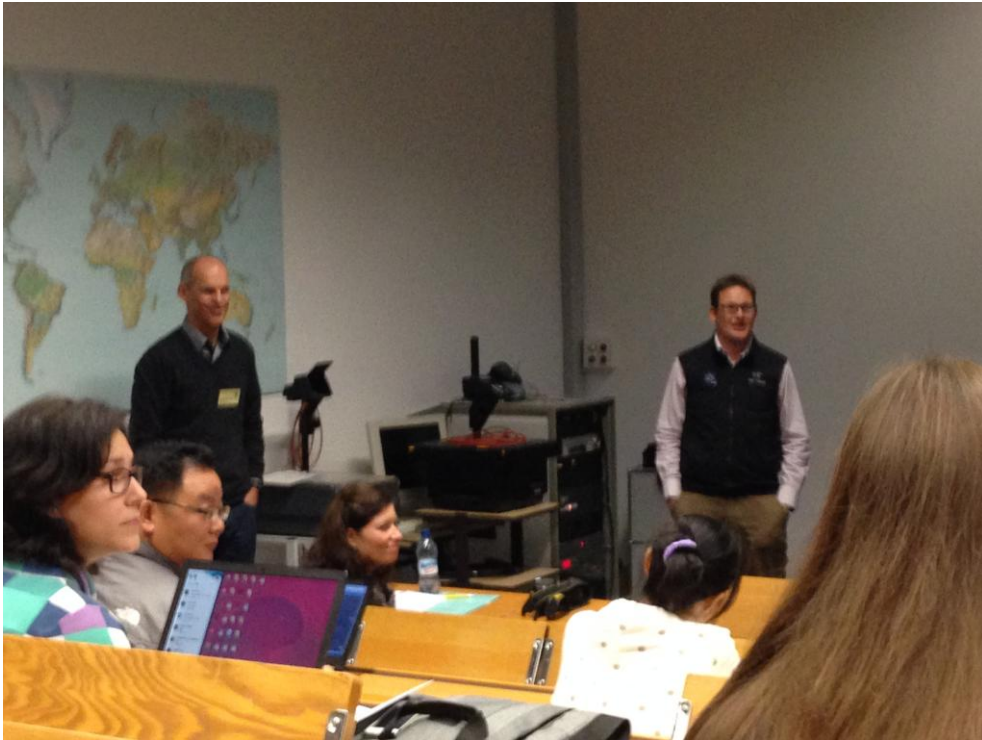


Figure 2. Professor Wunderle (left) during the workshop.



Figure 3. Science for entertainment. One of several items of an astonishment session where participants showed a remote aerial pilot system (RAPS before called UAV, UAS) that was used for cucumber cutting for a salad. The cucumber is held in the mouth of the scientist, a colleague of Professor Wunderle.

***Impressions of the 7<sup>th</sup> EARSeL Workshop on Land Ice and Snow***

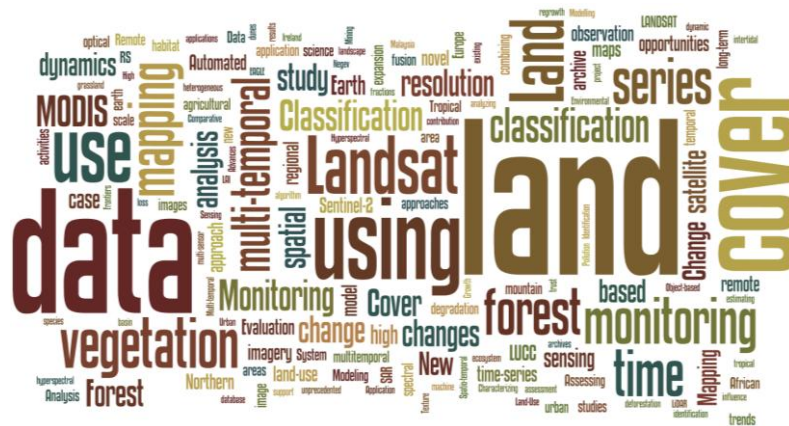
I attended the 7<sup>th</sup> EARSeL Workshop on Land Ice and Snow, at the University of Bern, as a user of remotely sensed snow data for weather forecasting applications. In my experience of this type of meeting, the user community is often under-represented, so I was delighted to find a really good mix of participants, including representatives of the National Met Services of France, UK, Poland, Finland, Canada, and Switzerland. This was an exceptionally well organised, varied, and highly relevant meeting for data producers and users alike. The presentations were all 20 or 30 minutes in length, which meant there were fewer than usual, but they were nearly all of very good quality, with no over-run. Coffee breaks were friendly and relaxed, so it was easy to follow up questions and make new acquaintances and scientific contacts. The venue was easy to reach from the rail station and the city centre, and we were treated to excellent hospitality, with the bonus of beautiful snowy mountain views on the final day when the mist and drizzle finally cleared.

Sessions covered glaciers and ice caps, the role and response of snow in a changing climate, snow hydrology and modelling, snow cover retrieval and product validation, from optical, microwave, and Synthetic Aperture Radar instruments, snow and ice satellite data programs and services, and new technologies. The final day was dedicated to the GlobSnow-2 User Consultation meeting, but there was good discussion of developments to and validation of the GlobSnow-2 products, especially snow water equivalent, throughout the workshop. Of particular note were keynote talks from Konrad Steffen (WSL), Eric Brun (Meteo-France) and Chris Derksen (Environment Canada).

With the emergence of so many datasets of remotely sensed snow properties in recent years, it is important to understand their respective capabilities and potential uses. Requirements for climate applications are very different from those for numerical weather prediction, even though the variables required are essentially the same. Workshops such as these are an important opportunity for data producers and users to communicate. Users gain a greater understanding of data under development, while helping inform requirements for the future. Personally, I learned about promising new wet snow products from SAR which could provide useful assimilation data alongside optical snow extent. I gained a thorough knowledge of the capabilities and limitations of a number of snow products, and made many useful contacts in the snow remote sensing community, some of which are already yielding collaborative activity. I came away feeling that a lot of excellent work has gone into the development of snow products for the GlobSnow and CRYOLAND projects, so it is essential that the product development and dissemination can be continued on an operational basis under future programs. As stressed at the workshop, there is an urgent need to ensure the continuity of snow monitoring from remote sensing, and to enable full exploitation of the upcoming Sentinel Mission.

Samantha Pullen,  
Met Office, UK

## Frontiers in Earth Observation for Land System Science



Land use and land cover monitoring is facing a new era with Landsat-8 and the upcoming Sentinels. At the same time, the recent opening of the Landsat archives marks a tide change in access to historic Earth Observation data. Thus, new opportunities for Earth Observation arise and the role of products from remote sensing data in the context of land system sciences becomes even greater.

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Eight keynotes and 100 posters were presented within four sessions, which were organized along the following themes:

- New sensors and emerging opportunities for land use and land cover monitoring,
- Advances in Land-Cover and Land-Use Science using Earth Observations,
- Mining the archives: better use of existing data for long-term LUCC studies,
- Frontiers in Remote Sensing of Land Cover and Land Use.

The workshop was organised back-to-back with the Global Land Project's Open Science Meeting 2014. Several participants visited both events and, this way, continued discussions on the advances in remote sensing for land use and land cover by interdisciplinary exchange with the larger land system science community during the three following days.

The welcome addresses were given by Sebastian van der Linden, Tobias Kuemmerle, Patrick Hostert (all at Humboldt-Universität zu Berlin), Ioannis Manakos (EARSel) and Garik Gutman (NASA LCLUC). Manakos and Gutman provided a short overview of the EARSel and NASA LCLUC programs, their goals, current activities and future plans.

Curtis Woodcock from Boston University and Bianca Hoersch from ESA-ESRIN started off with keynotes in session 1 on the new opportunities offered by available dense time series of Landsat data and on the mission planning for Sentinel-2, respectively. Here, a good collaboration between NASA and ESA was emphasized as an aim to optimize scientific outcomes of the new opportunities, e.g. through common standards in data preprocessing and policies. To achieve this, more exchange during scientific workshops but also between the relevant mission committees is needed.

Chris Justice, University of Maryland, and Ben Somers, KU Leuven, opened the second session with keynotes on the advances in land cover and land use monitoring. While Justice gave an overview on evolution of land products, Somers focused on the opportunities emerging from increased availability of multi-date imaging spectroscopy data. Posters in the session underlined and discussed the need for/role of case studies as a complement to global and regional mapping approaches.



Figure 3. Plenary session with keynote speech on day 1 of the workshop. © HU Berlin.

Day 2 of the workshop began with presentations by David Roy, University of South Dakota, and Thomas Udelhoven, Trier University. They approached the question of how to use the archives of

image data coming from two ends. Roy showed the immense amount of information contained in the Landsat archive and the opportunities offered by, e.g., the WELD product, for a more detailed mapping of land change processes. Udelhoven, on the other hand, illustrated how long lasting archives, e.g. the NOAA-AVHRR MEDOKADS, may be used to identify ongoing processes by means of data mining and this way increase process understanding in general. The poster session showed, how many land use related questions are nowadays addressed by analysis of archival data.

The last session focused on the new frontiers and the future challenges in Earth observations. Volker Radeloff, University of Wisconsin Madison, gave insight in several works addressing natural experiments and their value for understanding the consequences of human activities on land use. Martin Herold from Wageningen University emphasized the high value of remote sensing studies for forest and biomass assessments and identified improved calibration and validation activities, e.g., by means of terrestrial laser scanning, as objectives for the near future.

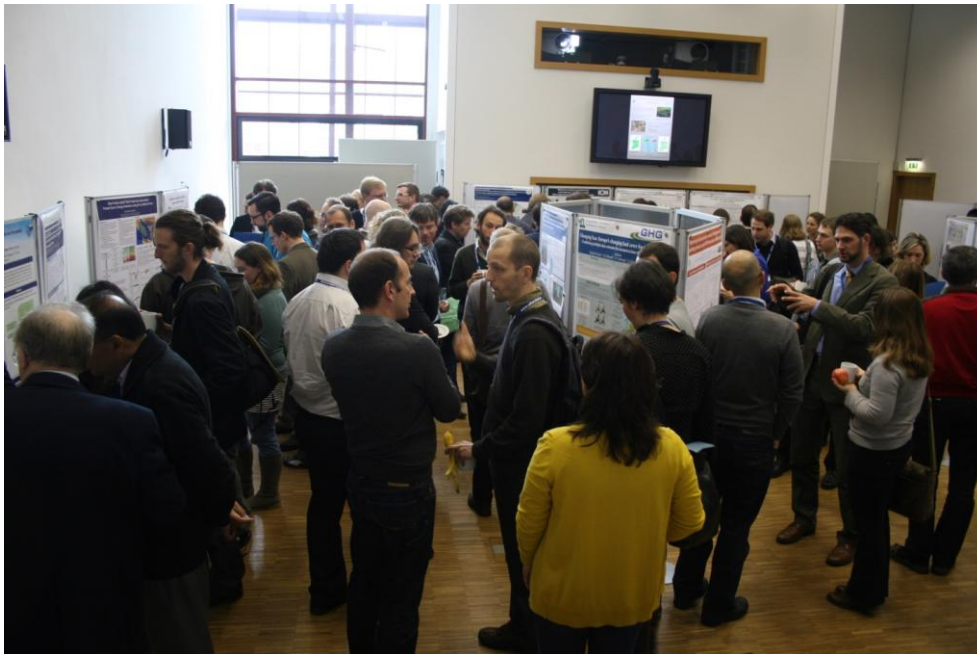


Figure 4. Discussion of posters during one of the four topic oriented sessions of the EARSeL SIG LUCC - NASA LCLUC workshop. © HU Berlin.

The format of keynotes and posters lead to very intense discussions of both individual presentations as well as entire sessions. It was commonly agreed that the moment was just right for this type of event and for a closer collaboration at all levels. Many studies and projects that use the new data are expected in the near future. The success of this workshop brought about an idea that it is desirable to organize a follow-up joint event in about three years.

At the closing, some ideas for a future workshop were suggested, such as a Young Scientist poster competition, etc. The organizers are open for more ideas and suggestions and would be happy to receive them by email.

Sebastian van der Linden<sup>1</sup>, Tobias Kuemmerle<sup>1</sup>, Ioannis Manakos<sup>2</sup> & Garik Gutman<sup>3</sup>

<sup>1</sup>*Humboldt-Universität zu Berlin*

<sup>2</sup>*EARSeL (SIG) Chairman, Centre for Research and Technology Hellas – Information Technologies Institute*

<sup>3</sup>*NASA Land-Cover/Land-Use Change Program*



## New EARSeL Members

We want to extend a warm welcome to the new member registered with EARSeL. We are looking forward to its active participation and contribution to the EARSeL, and in collaboration with other members, in this long-established network of scientific research laboratories.

### G-ECO Research

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## National Reports

### Remote Sensing Activities in Croatia, 2013

#### The Scientific Council for Remote Sensing of the Croatian Academy of Sciences and Arts

The new issue of the Bulletin of the Scientific Council for Remote Sensing of the Croatian Academy of Sciences and Arts, the first one to appear in the electronic form, has been published on the website [http://info.hazu.hr/bilten\\_zv\\_di](http://info.hazu.hr/bilten_zv_di). The executive council met twice and prepared proposals for the Assembly, among them setting up the *Fund for supporting international research activities of young scientists in the field of remote sensing*.

#### Section for Photography, General Interpretation and GIS

(Reports by: Dubravko Gajski and Andrija Krtalić)

During the past year, a number of courses were taught at the Faculty of Geodesy, University of Zagreb, and the FGAiG, University of Split. Scientific research resulted in the following dissertations: *Digital Elevation Model* (Šamanović); *Calibration of thermal, hyperspectral and multispectral sensors* (Miljković); *3D-modeling* (Gasparović). At the XII International Summer Workshop: *Fortification Architecture*, held in Brijuni 1–10 September 2013 and organized by the Ministry of Culture, D. Gajski delivered the lecture *New Trends in Close-Range Photogrammetry*.

The workshop on *Photogrammetry and laser scanning to produce documents in restoration works of immovable cultural heritage* was organized by the Department of Photogrammetry and Remote Sensing, Faculty of Geodesy, University of Zagreb. Keynote speaker D. Gajski presented his paper *Teaching GIS at the Faculty for Geodesy, University of Zagreb* at the ninth international conference on cartography and geoinformatics, held in Zadar 20–22 November 2013. The paper: Solter, A., Gajski, D.: *3D scanning of selected items from categories A collection of the Archaeological Museum in Zagreb* was presented at the scientific conference *Methodology and Archaeometry – present state and guidelines*, Department of Archaeology, Faculty of Philosophy University of Zagreb. Zagreb, 28–29 November 2013.

The methods of integration of inertial systems, GPS and hyperspectral scanners were developed within the framework of the FP7 funded TIRAMISU (*Toolbox Implementation for Removal of*

*Anti-Personnel Mines and UXO Submunitions*) project, which began on 1<sup>st</sup> January 2012 and is planned to be completed (if the research results show the validity of the follow-up) by 31<sup>st</sup> December 2015. Research on the project in the 2013 year encompassed the following: increasing the technical reliability of the multisensor surveying on different platforms (airship, helicopter Bell-206); computer-aided interpretation of digital images; hyperspectral imaging and analysis of these images; and analytical data preparation from mine information system (MIS) for defining the general and specific requirements for the collection additional data (contextual information and the use of multi-criteria analysis method).

The researchers also actively participated in the Center for Computer Vision.

### **The Geology and Geophysics Section**

*(Report by: Ivan Hećimović)*

The most important activity of this section in the application of remote sensing methods was focused on the implementation of the international bilateral Japanese-Croatian joint research project: *Project on Risk Identification and Land-Use Planning for Disaster Migration of Landslides and Floods in Croatia*. Two Croatian members participated in this project: the Croatian Geological Survey and the Faculty of Mining, Geology and Petroleum Engineering. Within the project two workshops were held in Japan for the period of two months (*Monitoring of landslides* and *Risk identification of landslides*). One of the goals of the workshop was to check the suitability of the stereoscopic analysis of aerial photographs in the study of landslides in Croatia. In this context, an inventory of landslides in the Podsljeme urban area was made based on the interpretation of two groups of aerial photographs recorded in 1964 and 1998 in the Zagreb area; the validity of the method was thereby confirmed.

In the same Podsljeme urban area, a new method of remote sensing using LIDAR technology was tested. With the launching of the LIDAR system recording, it is expected to obtain more accurate positioning and definitions of tectonically unstable zones and active landslides.

### **Section for Vegetation, Forestry and Agriculture**

*(Reports by: Renata Pernar and Ante Seletković)*

The research related to the assessment of the health of forest and individual trees using remote sensing methods was carried out for the City of Zagreb. Within the management unit *Forest Parks of the City of Zagreb*, 2 levels (categories) of damage were determined for individual trees and stands by the visual interpretation of satellite images of high spatial resolution – WorldView. Further, different vegetation indices were calculated by using the digital interpretation of satellite images, and the connection between their value and the degree of damage (health status) of individual trees and stands was checked. The possibility of using unmanned aircraft for forestry was examined. Preliminary studies were conducted in the area of the Park Maksimir. Furthermore, the health condition of trees was estimated in the area of the management unit *Josip Kozarac* on digital and analogue CIR aerial photographs.

The photointerpretation of images was conducted in the stereomodel (analogue images) and on the photogrammetric workstation (digital images). The interpretation of both types of aerial photographs was carried out on a systematic sample of different density network points (100 x 100 m, 200 x 200 m, 300 x 300 m, 500 x 500 m, 1000 x 1000 m), with a number of different combinations of interpreted trees per sample (1, 2, 4 trees). Based on the interpretation of the results, the indicators of damage (damage – D; mean damage – MD; damage index – DI; mean damage of significantly damaged trees – DO<sub>1</sub>) were estimated for certain types of trees, and the most suitable sample size was defined; the sufficient statistical reliability assessment of the health status of trees on CIR aerial photographs was thereby ensured.

## The Oceanography Section

(Report by: Mira Morović)

During the year 2013, we were working on several multi-year research projects supported by the Ministry of Science, Education and Sports, which were extended until the end of the year. Cruises for collecting oceanographic data were carried out as a part of a new monitoring project (the so-called *Adriatic Project*) and the monitoring project for the agency *Hrvatske vode*.

After having established contacts at the PORSEC Conference in Kochin (India) in 2012, M. Morović and Ž. Kovač were invited by the Nansen Environmental Research Centre in India to a workshop in the framework of the EU-sponsored project INDO – MARECLIM in March 2013, which opened the cooperation possibilities with India and the UK.

On 13 June, Dr. A. Ivanov from the Shirshov Institute of Oceanology, Russian Academy of Sciences, delivered the lecture entitled *SAR, GIS and Web technologies in oceanographic applications: Summary of recent results on local winds, oil seeps and oil discharges/spills*.

Ž. Kovač, thanks to POGO\_SCOR scholarship, worked from August to November 2013 at the Plymouth Marine Laboratory with S. Sathyendranath and T. Platt at the laboratories for satellite oceanography and marine optics.

In September, we participated in the MESAEP Conference in Istanbul, and in October, in the CIESM in Marseille.

Satellite images of chlorophyll for 2013 were collected (mainly from the MODIS sensor) and prepared for testing with the *in-situ* measured vertical profiles of chlorophyll recalculated to optically weighted values.

IOF continued its cooperation with the Croatian Meteorological and Hydrological Service under the inter-institutional virtual laboratory (ViLab), through which the results of the latest oceanographic and meteorological measurements are displayed on the web.

Publications:

Morović, M., Grbec, B., Kovač, Ž., Ninčević Gladan, Ž. 2013. Ocean colour and other optical satellite data versus in-situ data. Commission Internationale pour l'Exploration Scientifique de la mer Mediterranee. 40: (in press).

Grbec, B., Morović, M., Matić, F., Kušpilić, G., Ninčević, Ž., Vidjak, O., Bojanić, N., Čikeš Keč, V., Zorica, B. 2013. Regime shifts in the Adriatic Sea ecosystem. Book of Abstracts of the 17th Symposium on environmental pollution and its impact on life in the Mediterranean region with focus on impact of climate change in the Mediterranean region.

Lasić, A., Jasprica, N., Morović, M., Kapetanović, T., Carić, M., Drešković, N., Glavić, N., Mitić, B. 2014. Ecological characteristics of plant species and associations along two Dinaric karstic rivers (Bosnia and Herzegovina, the Balkans., *Biologia*, January 2014, Volume 69 (1): 40-52, DOI: 10.2478/s11756-013-0282-3.

Kovač, Ž., Morović, M., Matić, F. 2013. Uncovering spatial and temporal patterns of the Adriatic Sea color with self-organizing maps. *International Journal of Remote Sensing* (submitted).

## The Hydrometeorological Section

(Report by: Nataša Strelec Mahović and Bojan Lipovščak)

### Satellite meteorology

- Installation of the NWC SAF package used for producing satellite products for Nowcasting;
- Project EUMeTrain – DHMZ is a consortium member. All developed CAL modules, presentation recordings and case studies are available at the project homepage <http://eumetrain.org>;

- Satellite products for the analysis of atmospheric stability – results of the study are published at the ECSS 2013 conference (Helsinki, Finland) and the EUMETSAT/AMS conference (Vienna, Austria);
- Participation in the EUMETSAT delegate body meetings, participation at the workshop on the use of infra-red sounder data in Nowcasting.

#### *Radar meteorology*

- Participation in the EUMETNET OPERA project;
- Maintenance of the data-base of meteorological radar data from the OPERA member states;
- Participation in BALTRAD project;
- Radar measurements (Bilogora and Osijek doppler radars), composite radar image production, distribution of 15-min radar data to operational weather forecast, WMO, OPERA and NATO;
- Radar-based wind measurements (Bilogora and Osijek radars) in the framework of the EUMETNET project E-Profile;
- Radar measurements for hail suppression activities in the continental part of Croatia from May to September 2013. (Radar centers Bilogora, Osijek, Puntijarka, Varaždin, Trema, Stručec, Gorice, Gradište);
- Participation in ERAD (European Radar Conference);
- Project for the introduction of x-band radars in Croatian meteorological radar network.

#### *Lightning measurements*

- Operational use of lightning data from the LINET lightning detection network and the global ATD network;
- Study on the appearance of lightning in the convective clouds with overshooting tops and in hail-producing clouds. Results of the study published at ECSS 2013, EUMETSAT/AMS and EGU 2013 (Vienna, Austria) conferences;
- Lightning climatology for Croatia for 2008-2012 5-years period.

### **The Archaeology and Historic Heritage Section**

*(Report by: Bartul Šiljeg)*

As a part of the Open Days of the Institute of Archaeology, a series of lectures related to photogrammetry in archaeology, fusion of photogrammetry and laser scanning, and the application of GIS in archaeology was held. Colleagues from the Faculty of Geodesy of the University of Zagreb and from the Geofoto Ltd. held the lectures on 7 February.

For the project entitled *The Archaeological Topography of the Island of Rab*, both SGA shots and web browsers were used. The data about possible archaeologically interesting locations collected in this way were subsequently verified on site. These data, along with those gathered using other archaeological methods, were subsequently used in the development of the GIS database in collaboration with the Conservation Department in Rijeka. A corresponding team was put in place and relevant documentation were prepared, so that the project named *The Archive of Archaeological Aerial Photography of Croatia* might be duly registered with the National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia. In early June, oblique aerial photographs were taken in eastern Slavonia (in the area linking Čepin, Klisa and Semeljci). The observed sites were verified by reconnaissance. The surveying using aerial photography was also carried out in the areas of the Bjelovar-Bilogora and the Koprivnica-Križevci Counties.

**Council Chairperson**

Prof. Marijan Herak

**Croatian EARSel Representative**

Prof. Marinko Oluić

## Remote Sensing Activities in Finland, 2013

### Aalto University / Department of Radio Science and Engineering (RAD)

The RAD Remote Sensing Group has continued its support to ESA's Soil Moisture and Ocean Salinity Mission (SMOS). In 2013, the support was focused in thermal modeling of the reference radiometers (three of the 69 radiometers on-board) of the scientific payload. New front-end models for the reference radiometers were proposed in order to enhance their performance, and some of these corrections were adopted by ESA.

RAD has also pursued studies related to utilization of GNSS-based passive radar observations for the purpose of remote sensing. Especially, the applicability of the technology for remote sensing of Arctic areas, like snow and coniferous forests, has been considered. The group has also studied man-made radio frequency interferences that hinder the use of passive remote sensing satellites at microwave frequencies.

RAD is presently designing and building several nanosatellites. The projects are tightly integrated with space technology education and rely substantially on students' participation. The Aalto-1 satellite will carry an advanced spectral imager for Earth observation. The Aalto-2 satellite is part of the international QB50 nanosatellite mission and is dedicated to atmospheric studies in the lower thermosphere. The Aalto-1 satellite's launch is scheduled for 2014-2015 and that of Aalto-2 satellite for 2016. RAD is working also on many mission concepts and sensors for very small satellites for remote sensing.

A consortium led by the Finnish Meteorological Institute is developing an advanced high frequency (14-96 GHz) radar system for operation in various application areas. The remote sensing group of Aalto University is a consortium member along with the University of Helsinki, Harp Technologies Ltd., Vaisala, Eigenor Corporation, Aerial Oy, and Space Systems Finland. Current activities at Aalto include system design for the 14 GHz radar demonstrator and power supply design for the final radar system.

A tower-based UHF radiometer operating at 610 MHz has been constructed for detection of seasonal soil frost. The radiometer is of total power type, having a temperature stabilized receiver chain and internal calibration loads. Initial measurements have been performed in southern Finland and at the Sodankylä Arctic Research Centre.

The airborne 1.4 GHz synthetic aperture radiometer HUT-2D, designed and built by Helsinki University of Technology (now part of Aalto University), has been used for studies of measuring soil moisture in boreal areas. Soil moisture, being an important parameter in climate studies, is currently monitored from space by ESA's SMOS satellite, but both coverage and accuracy of soil moisture retrievals in boreal areas is poor. Research is focused to examine the effect of forests and bogs to soil moisture retrieval, as they are numerous in the boreal zone. Studies of forest areas have led to the development of a modified emission model, which provides retrieval of soil moisture with reasonable accuracy from airborne measurements. Bog areas show high variations in surface moisture and emissivity.

RAD is continuing research on boreal environment remote sensing with modern SAR based tools. In a study in Estonia, it was demonstrated that X-band spaceborne SAR is capable of mapping flooding under forest canopy. In another study the team proposed a new algorithm for soil and land cover type classification based on advanced polarimetric indices. Currently the team conducts studies on SAR interferometry and polarimetry applications for forests and grasslands.

RAD has continued its long-term project to collect microwave radiometer data on the brightness temperature behaviour of snow on lake ice. These data help improve accuracy of snow water equivalent retrieval from space-borne radiometer data in boreal lake-rich regions. Data are collected using the HUTRAD 6.9 to 36.5 GHz multifrequency radiometer and the HUT-2D interferometric 1.4



GHz radiometer; both instruments are accommodated onboard the RAD Skyvan research aircraft. Measurements are conducted under a variety of weather and snow conditions. The brightness temperature at 36.5 GHz is affected by snow grain size and that at 6.9 GHz by occasional water on top of the ice cover.

RAD organized the URSI Commission F Microwave Signatures 2013 Symposium (<http://frs2013.ursi.fi>) on October 28-31, 2013 in Espoo, Finland. The symposium is the main triennial remote sensing conference of URSI (International Union of Radio Science) Commission F (Wave Propagation and Remote Sensing) and is the 11<sup>th</sup> in the conference series dating back to 1974. A total of 79 presentations were given and the topics included GNSS reflectometry, sensors and calibration, RFI in remote sensing, soil moisture and land use, vegetation and forests, snow and ice, and atmosphere and precipitation. The snow and ice session was dedicated to the memory of late Professor Richard K. Moore, who was one of the pioneers of radar remote sensing.

RAD personnel were also responsible for local organization of the XXXIII Finnish URSI Convention on Radio Science and SMARAD Seminar of the Finnish National Committee of URSI and SMARAD (Center of Excellence in Smart Radios and Wireless Research) in Espoo, April 24–25, 2013. This convention was a historical event, because it took place exactly 60 years after the first Radio Days in Finland (April 24-25, 1953). The annual seminar of SMARAD formed part of the event. Conference topics included remote sensing and its applications.

### **VTT Technical Research Centre of Finland**

The focus of the remote sensing activities at VTT continued on forest and land cover and sea navigation support.

The ReCover project of the FP7 Program of the European Union that was coordinated by VTT was completed. A new concept for the monitoring of tropical forest to support REDD (Reduction of Emissions from Deforestation and Forest Degradation) in the tropical countries was developed. The concept is based on either two-phase or two-stage statistical sampling. Wall-to-wall mapping with image data of 10-30 m resolution is combined with a sample of very fine resolution imagery. Sample plots of the VHR data are assessed visually. About 100 products were delivered in 2013 to the users. The products comprised image mosaic maps, land cover maps from 1990 until present, and change maps including forest degradation. The satellite data were from optical and microwave instruments. The accuracy in forest cover mapping was around 90 % and similar with optical and L-band SAR. A user workshop was held in the conjunction of the 19<sup>th</sup> Conference of the Parties (COP) in Warsaw in November. Additionally bilateral user workshops were held with the users in Mexico, Colombia, Guyana, GEC and Fiji. The project had nine research partners from seven countries.

A method for forest degradation mapping was also developed in a project for ESA. This method applied multi-temporal L-band data. New road networks are first extracted as proxies of potential degradation and the actual degraded forest is found within a buffer zone around the road.

In FP7 project EUFODOS methods were developed for the estimation of forest damage and structural variables such as growing stock volumes by tree species. The user partner of VTT was forest industry. The data were from RapidEye and Spot.

Several algorithms were created to analyse forest with polarimetric SAR data. A PhD thesis was completed by Oleg Antropov. The peer reviewed published papers discussed among other things volume scattering modeling in ALOS PALSAR decompositions in boreal forest, and stand-level stem volume prediction of boreal forest.

Changes in forest plantation on a site in Uganda were mapped with multi-temporal very fine resolution data. The project included mapping of land cover changes, road network and housing and it combined numerical and visual interpretation. The project was part of ESA cooperation with the European Investment Bank.

Participation in the European GMES Initial Operations of GIO project continued. Forest cover maps from Iceland, Estonia, and Latvia was delivered to the European Environment Agency. The project was coordinated by Metria in Sweden.

An application RelasPhone was developed and uploaded to Google Play Store. The application uses a cellular phone with Android operating system to measure forest characteristics on the field. The phone can be used as a data logger and as a so-called relascope which is a common tool in operational forestry. The application is free of charge.

### **Finnish Geodetic Institute**

Finnish Geodetic Institute was awarded by the academy of Finland in 2013 the Centre of Excellence in Laser Scanning Research (CoE-LaSR), which covers the development of hardware electronics, system integration and positioning technologies and in-depth research into new innovations, information extraction methods, visualization techniques and applications based on these technologies. Laser scanning has important applications, for instance, in the estimation of standing tree stocks and in 3D modelling of the built environment. There are 30 doctors working in FGI, Oulu University, Aalto University and Helsinki University within the CoE, [www.fgi.fi/coelasr](http://www.fgi.fi/coelasr). The CoE-LaSR was evaluated within best four research group with respect to scientific merits and impact in Finland covering all sciences in 2013.

The output metrics of FGI Remote Sensing group included 37 refereed journals papers, and 12 refereed conference papers from 2013. Five new doctor of technology thesis was finished.

FGI started to coordinate European Union Space Technologies project Advanced\_SAR, which aims to develop 3D techniques for practical forestry. Different kinds of laser scanning, radar and optical airborne and satellite remote sensing data is first converted into 3D point clouds and then used for forest canopy height and biomass estimation. The group is working now in eight international, outside-funded projects.

The operational impact of the FGI RS group includes National Laser Scanning and Use of Airborne Laser Scanning for operative standwise forest inventory, the impact of which is more than 25M€ annual saving to the Finnish society.

### **Geological Survey of Finland**

A long term research on hyperspectral close-range and remote sensing for geo-environmental applications has been compiled into a dissertation. The work will be published in 2014. Results demonstrate hyperspectral remote sensing data to be readily applicable for soil moisture based site suitability assessment as part of forest management practices and also for peatland site type mapping. Glacial till soil element concentrations and moisture could be statistically significantly predicted from close-range visible and near-infrared spectra to improve cost efficiency of soil analyses.

### **University of Turku, Laboratory of Computer Cartography (UTU-LCC)**

UTU-LCC ([www.utu-lcc.utu.fi](http://www.utu-lcc.utu.fi)) has been developing new laser scanning (MLS and TLS) based approaches in fluvial morphology and change detection methodology for riverine environment including UAV-photogrammetry and pack-back MLS.

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## News from Other Organisations

### 5th ISDE Digital Earth Summit – Call for Papers

Nagoya, Japan, 9-11 November 2014

The International Society for Digital Earth will be hosting the 5th Digital Earth Summit, under the theme “Digital Earth for ESD”, from 9 - 11 November 2014 in Nagoya, Japan. This planned Digital Earth Summit will focus on how Digital Earth technologies and activities have contributed or will contribute to Education for Sustainable Development (ESD). Digital Earth technologies are one of the key technologies to support ESD by visualizing complicated earth system, social system and not only for the current situation but from the past to future.



The Digital Earth Summit Series have been convened at Auckland (2006), Potsdam (2008), Nessebar (2010) and Wellington (2012). This year's summit will provide inspiration for enriching the digital earth vision and promoting collaborations amongst participating institutions, and also offer a dynamic arena for individuals to share knowledge and experiences.

#### Call for Abstracts

The international program committee invites submissions of abstracts on any of the scientific topics selected this year:

##### 1. Digital Earth for ESD

- Digital Earth for sustainable society and future earth
- Systems thinking, critical thinking for global issues
- Integrated, holistic approach by geospatial information science
- Environment, and disaster education
- Carrier development

##### 2. Digital Earth for Citizen Science

- ICT, cloud services and sourcing
- Big data
- Institutional approach

##### 3. and more ...

#### Important Dates

- Mar. 9, 2014: Open for Online Registration and Abstract Submission
- May 9, 2014: Deadline of Abstract Submission
- Jul. 9, 2014: Notification of Acceptance
- Sep. 9, 2014: Deadline of Early Registration
- Oct. 9, 2014: Final Program Fix
- Nov. 9, 2014: Opening of Summit

Online registration is now available, please enjoy the early registration fee at:

<https://cos.congre.co.jp/gis2014/e/reg.php>

#### Website

5th Digital Earth Summit: <http://www.isde-j.com/summit2014>

International Society for Digital Earth: <http://www.digitalearth-isde.org>

**About ISDE**

The International Society for Digital Earth was founded in May, 2006 in China, on the principles of the 1999 Beijing Declaration on Digital Earth. The mission of the Society is to provide a framework for understanding evolving society-beneficial technologies, current and newly emerging, and to revise the Digital Earth Vision in light of new developments. The ISDE secretariat is hosted by the Institute of Remote Sensing and Digital Earth, Chinese Academy of Science.

**Contact***Local Organizer*

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## Science Article

### Satellites & Sensors

This article reports on recent developments in satellites and sensors observing the Earth and beyond.

#### Chang'e-3 and Yutu lunar rover

For the last issue I completely overlooked the, at that time, pending Chang'e-3 mission. Sorry about that. The mission was launched on 1 December 2013. Chang'e is a lunar exploration mission by China, incorporating a lander and China's first lunar rover called Yutu. Chang'e is the name of the goddess of the Moon in Chinese mythology. The rover is named Yutu, which is the Jade rabbit living on the Moon as a pet of the Moon goddess. Chang'e was inserted into a Moon orbit on 6 December 2013 and landed at the lunar surface on 14 December 2013.

The lander is equipped with a 150 mm telescope which will be used for astronomical observations in the ultraviolet band between 245 and 340 nm. As the Moon has virtually no atmosphere and has a very slow rotation, this allows for very long observations of a target. In addition to the telescope, the lander has an extreme-ultraviolet camera for observing the Earth's plasmasphere and three panoramic cameras for observing the lunar surface.

The 140 kg Yutu rover carries about 20 kg of payload instruments. It can transmit real-time video and do a simple soil-sample analysis. Just a few hours after the landing the rover was deployed, and a few days later it was reported that all scientific instruments were fully functional. The rover appears to have functioned for about one month. However, it then became clear there was a problem with the rover. Apparently the rover suffered thermal anomalies when the solar panels failed to fold back properly as a thermal protection measure for the cold lunar night. The exact reasons for the problem are unknown, but it might have to do with the harsh environment. Any instrument on the Moon has to be able to withstand lunar dust, high radiation levels, low gravity, and sharp temperature fluctuations between day and night. By mid-February China said farewell to its Yutu rover. On 3 March, the lander was still reported operational.

#### CBERS-3 Lost

The Chinese-Brazilian satellite CBERS-3 was launched December 9, but failed to reach orbit due to a malfunctioning rocket. According to reports the satellite fell back to Earth. The design of the satellite is based on the Chinese Ziyuan-1 platform and includes payloads designed in Brazil. The Imaging instruments have a resolution of up to 20 meter. Satellites in the same series were launched in 1999, 2003 and 2007. The launch of a successor satellite, CBERS-4, was originally planned in 2015 but may be advanced into this year to fill the gap. The satellites are a key tool in Brazil's efforts to control deforestation and to monitor its extended agricultural sector.

#### GPM-C

The joint JAXA/NASA Global Precipitation Measurement Core Observatory, GPM-C, was launched on 27 February 2014. The satellite will provide worldwide observations of rain and snow every three hours. GPM-C builds upon the legacy of the Tropical Rainfall Measuring Mission, the TRMM, which was launched in 1997. Compared to the TRMM, the GPM-C will extend observations to higher latitudes, covering the entire globe between the two polar circles. It combines two active precipitation radars (13.6 GHz and 35.5 GHz) with a passive microwave imager to map precipitation within cloud layers, to map the total amount of precipitation, and, for the first time, to give quantitative estimates of the physical properties of precipitation drops or particles.



### **Flock-1**

The largest fleet of small satellite, called Flock-1, was launched by deploying them from the International Space Station (ISS) between 11 February and 28 February. The “Doves” of Flock-1 are miniature CubeSat satellites built by a company called Planet Labs and are capable of capturing Earth images. Planet Labs is an American private company that aims to create an Earth imaging satellite network with open data access. The Flock-1 orbits at a height of around 500 km and can take images of the Earth roughly between 52 degrees north and 52 degrees south. The images have a resolution of 3 to 5 meter. The revisit rate, or frequency with which Dove CubeSats pass over a given area, is currently unprecedented among existing satellite systems in orbit.

### **Sentinel-1A to be launched**

The Sentinel-1A radar satellite is currently being prepared at Europe's Spaceport in French Guiana for launch on 3 April 2014. The satellite is the first in a family of satellites built for Europe's ambitious Copernicus environmental monitoring program. The payload of Sentinel-1 is a C-band SAR providing continuous imagery during the day, the night and all weather conditions. The twin satellite in the Sentinel-1 constellation, Sentinel-1B, will be launched in 2015. The goal of the Sentinel-1 mission is to provide C-Band SAR data continuity following the retirement of ERS-1 and ERS-2 and the end of the Envisat mission.

### **Upcoming launches**

Satellite	Launch date
SkySat-2	Mar 2014
BelarusSat-1	Mar 30, 2014
Meteor-M2	Mar 27, 2014
GeoEye-2	Mar 2014
Electro-L	Mar 2014
Hai Yang 2B	Mar 2014
SPOT-7	Mar/Apr 2014
EgyptSat-2 (MisrSat-2)	Apr 2014
Sentinel-1	Apr 2014

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## EARSeL eProceedings

### New Publications in Vol. 12(2), 2013



#### **Evaluation and assessment of arctangent-based post-glacial land uplift model**

Jari Pohjola, Tarmo Lipping, Jari Turunen, and Ari T. K. Ikonen

##### **Abstract**

Read full paper online: <http://www.eproceedings.org>

This paper describes a new method for improved estimation of the parameters of a semi-empirical land uplift model of Fennoscandia, introduced by Tore Pässe in 2001. The behaviour and the basis of the land uplift model parameters are also evaluated. The ongoing land uplift in the Baltic Sea region is due to the rebound of glacial stress caused by the most recent ice age 115,000-10,000 years before present (BP). The improved methodology for the land uplift model parameter estimation presented in this study is based on regional variations in bedrock properties and downland. The parameters are computed using ancient shore level positions and information about the prehistoric population in Finland. Because of the uncertainties and inaccuracies in the radiocarbon dating and the shore level estimations, Monte Carlo simulation was employed for the estimation of the parameter distributions. The resulting parameter estimates indicate the possibility of local variations in land uplift in Finland.

#### **EnGeoMAP - A geological mapping tool applied to the EnMAP mission**

Christian Rogaß, Karl Segl, Christian Mielke, Yvonne Fuchs, and Hermann Kaufmann

##### **Abstract**

Read full paper online: <http://www.eproceedings.org>

Hyperspectral imaging spectroscopy offers a broad range of spatial applications that are primarily based on the foregoing identification of surface cover materials. In this context, the future hyperspectral sensor EnMAP will provide a new standard of highly qualitative imaging spectroscopy data from space that enables spatiotemporal monitoring of surface materials. The high SNR of EnMAP offers the possibility to differentiate and to identify minerals that are showing characteristic absorption features as a 30 m × 30 m spatial mixture in the visible, the near infrared and the short wave infrared range (0.4 - 2.5 µm). For this purpose, spectral mixture analysis (SMA) approaches are traditionally used. However, these approaches lack in transferability, repeatability and inclusion of sensor characteristics. Additionally, they rely on image-based and randomly detected endmembers as well as on *in situ* or laboratory spectra that are not spatially stable in case of an image-based extraction and are assumed to be spectrally pure. In this work, a new framework is proposed that addresses these limitations considering the EnMAP sensor characteristics. It is named EnMAP Geological Mapper - EnGeoMAP. It consists of several new and adapted approaches to identify spectrally homogeneous regions. In parallel, minerals are identified and semi-quantified by a sensor-related and knowledge-based fitting approach. Supplementary outputs are abundance, classification, homogeneity and uncertainty maps. First results show that the proposed approach offers 100% repeatability and gains an identification error for minerals of about 2% on average for different studies. In this work, an approach is proposed that aims on spectroscopic mineral modelling by image synthesis that might be applied for geological mapping.

## New Publications in Vol. 13(1), 2014

### Satellite remote sensing applied to off-shore wind energy

Sara Venafra, Marco Morelli, and Andrea Masini

#### Abstract

Read full paper online: <http://www.eproceedings.org>

Wind as an energy resource has been increasingly in the focus of attention over the past decades, starting with the global oil crisis in the 1970s. The possibility of expanding wind power production to off-shore locations is attractive, especially in sites where wind levels tend to be higher and more constant.

Wind turbine energy production is usually evaluated by means of a wind turbine power curve, which is provided by the manufacturer and it is an important parameter to estimate wind plant per-formances. In this study we present a methodology aimed to support both planning of offshore wind farms using historical series of satellite data in order to detect the sites which could provide more wind energy production than others, and near real-time monitoring of offshore wind energy performances by means of SAR data. SAR wind data are retrieved from measured radar backscatter using empirical geophysical model functions, achieving good accuracy, global coverage and greater spatial resolution with respect to other wind measurement methods.

Moreover, we are able to calculate the AC power yield expected behaviour, using detailed models of each part of the wind plants.

In brief, we use SAR data from Cosmo-SkyMed in X-Band and from ERS and ENVISAT in C-Band to generate instant wind speeds and a composite product from NCDC NOAA to investigate wind climatology.

Such methodologies are currently being developed within the scope of SATENERG, a research project funded by ASI (Italian Space Agency). These methods have been applied in several test cases, and successful results in comparison with standard methodologies were obtained.

### An application of the Perpendicular Moisture Index for the prediction of fire hazard

Carmine Maffei, and Massimo Menenti

#### Abstract

Read full paper online: <http://www.eproceedings.org>

Various factors contribute to forest fire hazard, and among them vegetation moisture is the one that dictates susceptibility to fire ignition and propagation. The scientific community has developed a number of spectral indices based on remote sensing measurements in the optical domain for the assessment of vegetation equivalent water thickness (EWT), which is defined as the mass of liquid water per unit of leaf surface. However, fire models rely on the live fuel moisture content (LFMC) as a measure of vegetation moisture. LFMC is defined as the ratio of the mass of the liquid water in a fresh leaf over the mass of oven dry leaf, and spectral indices proposed so far fail in capturing LFMC variability. Recently, the perpendicular moisture index (PMI), based on MODIS, was proposed to overcome this limitation and provide a direct measure of LFMC. The aim of this research was to understand the potential and limitations of the PMI in predicting fire hazard, towards its application in a practical context.

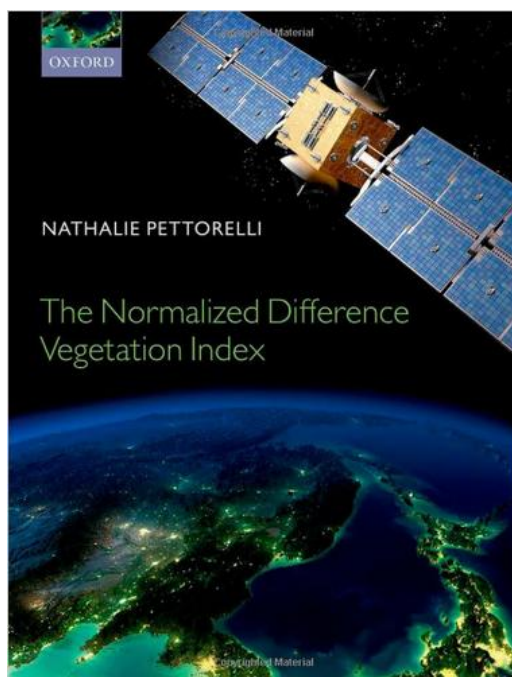
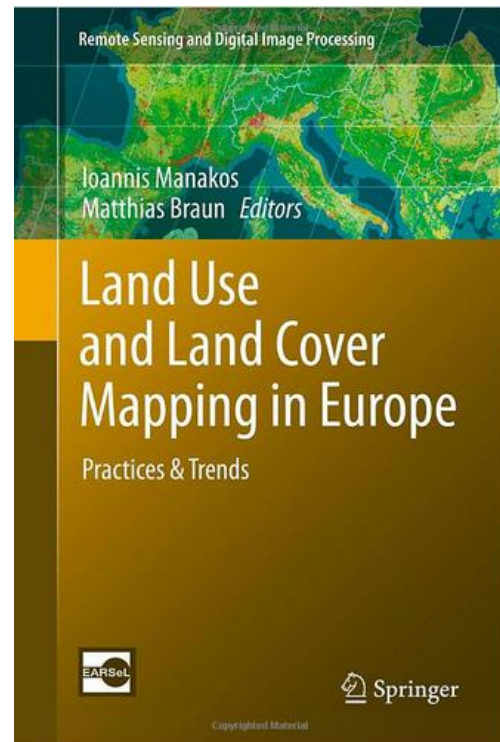
To this purpose, a data set of more than 7,700 fires recorded in Campania (13,595 km<sup>2</sup>), Italy, between 2000 and 2008 was compared with PMI derived from MODIS images. Results show that there is no relationship between PMI and fire size, whereas a linear correlation was found between the spectral index and fire rate of spread.

## Book Releases

**Land Use and Land Cover Mapping in Europe: Practices & Trends (Remote Sensing and Digital Image Processing)** edited by Ioannis Manakos and Matthias Braun, within the EARSeL Book Series, as an activity of the EARSeL SIG LU/LC, published by Springer.

Land use and land cover (LULC) and its changes (LUCC) are an interplay between bio-geophysical characteristics of the landscape and climate as well as the complex human interaction including its different patterns of utilization superimposed on the natural vegetation.

The book provides for the first time a comprehensive view of various LULC activities focusing on European initiatives, such as the LUCAS surveys, the CORINE land covers, the ESA/EU GMES program and its resulting Fast-Track- and Downstream Services, the EU JRC Global Land Cover, the ESA GlobCover project as well as the ESA initiative on Essential Climate Variables. All have and are producing highly appreciated land cover products. The book will cover the operational approaches, but also review current state-of-the-art scientific methodologies and recommendations for this field. It opens the view with best-practice examples that lead to a view that exceeds pure mapping, but to investigate into drivers and causes as well as future projections.



**The Normalized Difference Vegetation Index** written by Nathalie Pettorelli was published by Oxford University Press.

There has been a recent surge of interest in remote sensing and its use in ecology and conservation but this is the first book to focus explicitly on the Normalised Difference Vegetation Index.

This text provides an overview of the principles and possible applications of the NDVI in ecology, environmental and wildlife management, and conservation. Over the last few decades, numerous studies have highlighted the potential key role of satellite data and the NDVI in macroecology, plant ecology, animal population dynamics, environmental monitoring, habitat selection and habitat use studies, and paleoecology. The chapters are organised around two sections: the first detailing vegetation indices and the NDVI, the principles behind the NDVI, its correlation with climate, the available NDVI datasets, and the

possible complications and errors associated with the use of this satellite-based vegetation index. The second section discusses the possible applications of the NDVI in ecology, environmental and wildlife management, and conservation. This handbook is suitable for terrestrial ecologists and conservation biologists, students and specialists in the fields of conservation biology, biodiversity monitoring, and natural resource management.

## **Forthcoming EARSeL Conferences**

### **34th EARSeL Symposium 2014 & Workshops**

European remote sensing - new opportunities for science and practice

16 – 20 June 2014, Warsaw, Poland

[More info](#)



The 34th EARSeL Symposium entitled “European remote sensing - new opportunities for science and practice” will be held in Warsaw, Poland from 16th to 20th June 2014.

It will be accompanied by the following events:

- Joint Workshop of EARSeL Special Interest Groups 3D Remote Sensing and Urban Remote Sensing, Warsaw, 19-20 June 2014
- 5th Workshop of SIG Geological Applications, Warsaw, 19-20 June 2014
- 2nd Workshop of EARSeL Special Interest Group on Forestry Remote Sensing for Forestry Applications - New Challenges, Approaches and Achievements, Warsaw, 17-18 June 2014
- EARSeL & ISPRS Young Scientist Days

For more detailed information please refer to the Symposium website at:

<http://www.earsel.org/symposia/2014-symposium-Warsaw> which also provides links to the accompanying events.



## White Sea Student Workshop on Optics of Coastal Waters

30 August – 07 September 2014, Primorskiy, Republic Karelia, Russia

[More info](#)



### Call for papers

The White Sea Student Workshop on Optics of Coastal Waters jointly organised by the Lomonosov [Moscow State University](#) and the [European Association of Remote Sensing Laboratories \(EARSel\)](#) to be held at the [Nikolai Pertsov White Sea Biological Station](#), Primorskiy, Republic Karelia, Russia, will be a 5-day education and training event. It will address the principles, methods and results of optical analysis of environmental parameters using modern instruments in tutorials and field excursions. Findings will be evaluated in the context of hydrographic processes and ecosystem variables. The relevance of oceans and coastal zones for the daily weather and for the regional and global climate will be outlined.

The Workshop is intended for master and PhD students dealing with biological and physical oceanography and environmental sciences. It will offer students the opportunity to meet international researchers and to gain first-hand experience in marine optics and optical remote sensing in plenary sessions, individual study groups, and experiments in the laboratory and in the field. Students will have the opportunity to demonstrate their projects in oral or poster presentations.

**The number of students at the Workshop will be limited to 10. An interactive poster presentation will be offered to other interested students through an internet-based participation.**

For more detailed information please visit the Workshop website at:

<http://www.earsel.org/SIG/ET/1st-student-workshop/index.php>

## Other Conferences



5-7 March, 2014: [Image Information Mining Conference: The Sentinels Era](#).  
Bucharest, Romania.



19-21 March, 2014: [2014 Global Land Project Open Science Meeting](#).  
Berlin, Germany.



23-27 March, 2014: [The Sixth International Conference on Advanced Geographic Information Systems, Applications, and Services – GEOProcessing 2014](#).  
Barcelona, Spain.



23-28 March, 2014: [ASPRS 2014 Annual Conference and JACIE Workshop](#).  
Louisville, Kentucky, USA.



March 31 – April 2, 2014: [International workshop on Small Satellite and Sensor Technology for Disaster Management](#).  
Bangalore, India.



1-4 April, 2014: [3rd International Conference on the Use of Space Technology for Water Management](#).  
Rabat, Morocco.



10-11 April, 2014: [International Conference on Applied Science "Earth Remote Sensing Tools and Technologies in Science, Education and Business"](#).  
St. Petersburg, Russia.



14-16 April, 2014: [Wavelength Conference 2014](#).  
Malvern, Worcestershire, United Kingdom.



21-22 April, 2014: [7th IGRSM International Remote Sensing & GIS Conference and Exhibition \(IGRSM2014\): Geospatial Innovation for Nation Building](#).  
Kuala Lumpur, Malaysia.



22-24 April, 2014: [5th International Workshop on Remote Sensing of Vegetation Fluorescence](#).  
Paris, France.



27 April – 02 May, 2014: [European Geosciences Union General Assembly 2014, Remote sensing in Oil and Gas Exploration, Development and Production](#).  
Vienna, Austria.



5-7 May, 2014: [10th International Workshop on Greenhouse Gas Measurements from Space](#).  
Noordwijk, The Netherlands.



5-9 May, 2014: [SPIE DSS 2014](#).  
Baltimore, USA.



12-13 May, 2014: [Copernicus – Sentinels Serving Society and the Environment](#).  
Athens, Greece.



19-23 May, 2014: [2014 IEEE Radar Conference](#).  
Cincinnati, Ohio, USA.



20-22 May, 2014: [SENTINEL-2 for Science Workshop](#).  
Frascati, Italy.



21-24 May, 2014: [GEOBIA 2014: 5th International Conference on Geographic Object-Based Image Analysis](#).  
Thessaloniki, Greece.



22-23 May, 2014: [Symposium: Remote Sensing for Conservation – ZSL 2014](#).  
London, United Kingdom.



26-30 May, 2014: [Small Satellites System and Services Symposium \(The 4S Symposium\)](#).  
Porto Petro, Majorca, Spain.



2-4 June, 2014: [Global Space Applications Conference \(GLAC\)](#).  
Paris, France.



3-5 June, 2014: [EuSAR 2014: 10th European Conference on Synthetic Aperture Radar](#).  
Berlin, Germany.



3-6 June, 2014: [17th AGILE Conference on Geographic Information Science: Connecting a Digital Europe through Location and Place](#).  
Castellon, Spain.



10-13 June, 2014: [Open Source Geospatial Research and Education Symposium \(OGRS 2014\)](#).  
Espoo (Greater Helsinki area), Finland.



11-14 June, 2014: [Third International Workshop on Earth Observation and Remote Sensing Applications \(EORSA 2014\)](#).  
Changsha, China.



24-27 June, 2014: [6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing \(WHISPERS 2014\)](#).

Lausanne, Switzerland.



1-3 July, 2014: [AfricaGEO 2014 Conference & Exhibition](#).

Cape Town, South Africa.



11-13 July, 2014: [3rd International Conference on Signal and Image Processing \(CSIP 2014\)](#).

Beijing, China.



13-18 July, 2014: [IGARSS 2014 and 35th Canadian Symposium on Remote Sensing](#).

Québec, Canada.



13-16 July, 2014: [Second International Conference on Vulnerability and Risk Analysis and Management \(ICVRAM2014\) & Sixth International Symposium on Uncertainty Modelling and Analysis \(ISUMA2014\)](#).

Liverpool, United Kingdom.



2-10 August, 2014: [40th COSPAR Scientific Assembly](#).

Moscow, Russian Federation.



25-28 August, 2014: [PIERS 2014 Progress in Electromagnetics Research Symposium](#).

Guangzhou (Canton), China.



2-5 September, 2014: [Remote Sensing and Photogrammetry Society Conference 2014](#).

Aberystwyth, United Kingdom.



3-5 September, 2014: [CompIMAGE'14, Computational Modeling of Objects Presented in Images: Fundamentals, Methods, and Applications](#).

Pittsburgh, Pennsylvania, USA.



8-11 September, 2014: [1st International Geomatics Applications GEOMAPPLICA Conference](#).

Skiathos Island, Greece.



17-19 September, 2014: [EarthCARE Workshop 2014](#).

Tokyo, Japan.



22-25 September, 2014: [SPIE Remote Sensing 2014](#).

Amsterdam, Netherlands.



22-26 September, 2014: [RAQRS'IV: the 4th International Symposium on Recent Advances in Quantitative Remote Sensing](#).

Valencia, Spain.



23-26 September, 2014: [GIScience 2014. Eighth International Conference on Geographic Information Science.](#)

Vienna, Austria.



6-8 October, 2014: [Joint International Conference on Geospatial Theory, Processing, Modelling and Applications.](#)

Toronto, Canada.



13-17 October, 2014: [Climate Research and Earth Observations from Space: Climate Information for Decision Making.](#)

Darmstadt, Germany.



13-17 October, 2014: [International Radar Conference 2014, Catching the invisible \(RADAR 2014\).](#)

Lille, France.



13-17 October, 2014: [SPIE Asia-Pacific Remote Sensing 2014.](#)

Beijing, China.



27-30 October, 2014: [IEEE International Conference on Image Processing.](#)

Paris, France.



3-5 November, 2014: [Workshop of Photogrammetry, Remote Sensing and Laser Scanning.](#)

Telč, Czech Republic.



26-28 November, 2014: [Ocean Salinity Science & Salinity Remote Sensing Workshop.](#)

Exeter, United Kingdom.

## Summer Schools and Advanced Courses



### 2014 Geoinformatics Summer Camp and 11th ISPRS SC and WG VI/5 Summer School

19-28 May 2014, Wuhan University, Wuhan, China

Registration deadline: **15 March 2014**



### Split Remote Sensing Summer School 2014 (SplitRS 2014)

22-23 May 2014, G-ECO Research with support of EARSeL and Bowling Green State University, Split, Croatia

Deadline for registration: **1 April 2014**



### International Summer School GeKo 2014

26 May – 6 June 2014, University of Applied Sciences, Frankfurt, Germany

Registration will be possible until **31 March 2014**



### Summer School Radar/SAR 2014: International Summer School on Radar/SAR

4-11 July 2014, Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Bonn, Germany

Registration deadline: **18 March 2014**



### PhD Summer School Remote Sensing for Wind Energy

10-13 June 2014, Technical University of Denmark, Roskilde, Denmark

Deadline for registration: **21 May 2014**



### Earth Observation Summer School

4-14 August, 2014, ESA/ESRIN, Frascati, Italy

The deadline for application: **7 March 2014**



### White Sea Student Workshop on Optics of Coastal Waters

30 August - 7 September 2014, Lomonosov Moscow State University, European Association of Remote Sensing Laboratories (EARSeL), Nikolai Pertsov White Sea Biological Station, Northern Russia

Registration deadline: **31 May 2014**



### 5th ESA Advanced Training Course on Land Remote Sensing

8-12 September 2014, University of Valencia, Valencia, Spain

The deadline for application: **7 May 2014**



### Summer School on Remote Sensing of Clouds and Precipitation

8-17 September 2014, Hans Ertel Centre of Weather Research (HErZ), Bonn, Germany

Deadline for registration: **31 May 2014**



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**Credits:** Shalom Alechem, Christoff, Alicja Folbrier

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