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NEWSLETTER



European Association of Remote Sensing Laboratories

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Editorial

Dear members,

Another EARSeL event, the 33rd EARSeL Symposium that took place in Matera last June, came to its end. A brief report outlines and comments on the main outcomes of this EARSeL event. A more detailed report, not only for the Symposium but also for all the accompanying events, will be included in a forthcoming issue.

The "News from Other Organisations" section includes a very interesting report by Professor Gottfried Konecny, entitled "The International Society for Photogrammetry and Remote Sensing (ISPRS) study on the status of mapping in the world" presented at the Second High Level Forum on Global Geospatial Information Management in Qatar.

The "Science Article" rubric hosts once more an article by Wim Baker, who reports on the recent developments in Earth Observation satellites and sensors, with four new publications showing significant advances in the field of remote sensing appearing in the EARSeL eProceedings.

Dr Claudia Kuenzer, one of the chairman of EARSeL's Thermal Remote Sensing SIG, has edited with Stefan Dech the book entitled: "Thermal Infrared Remote Sensing: Sensors, Methods, Applications (Remote Sensing and Digital Image Processing)", available from Springer publications.

The forthcoming EARSeL events are underway, starting with the 9th EARSeL Forest Fire Special Interest Group Workshop on 'Quantifying the environmental impact of forest fires' in October 2013 and then in 2014 the 7th Workshop on Remote Sensing of Land Ice and Snow 'Cryosphere: Monitoring for climate studies and operational applications' in February and the 5th Land Use & Land Cover Workshop one month later in March. The Annual 34th EARSeL Symposium 2014 will take place next June in Warsaw.

Last but not least, the last part of this issue includes a list of conferences, training courses and summer schools to attend in the near future.

Your feedback on the EARSeL Newsletter is critical to us. We will be pleased to hear your comments and suggestions. Moreover, you are more than welcome to contribute a science article or report for the forthcoming issues.

Enjoy reading this September issue!

The Editors



News from EARSeL

Report on the 33rd EARSeL Symposium, Matera

The 33rd European Association of Remote Sensing Laboratories (EARSeL) Symposium was held in Matera Italy, on 3 - 6 June 2013, at the University of Basilicata and "Mediateca". This year's Symposium was jointly organised by EARSeL and the Italian National Council Research (Institute of Environmental Analysis-IMAA and Institute of Architectural and Archaeological Heritage- IBAM) and University of Basilicata.

The 33rd EARSeL Symposium entitled "Towards Horizon 2020: Earth Observation and Social Perspectives" was accompanied by the following events:

4th Workshop on Education and Training	4 June 2013
Research Forum dedicated to Remote Sensing for Developing Countries	5 June 2013
6th Workshop on Remote Sensing of the Coastal Zone	5-7 June 2013
4th Workshop on Cultural and Natural Heritage	6-7 June 2013
II ESA RS Course: Remote Sensing for Archaeology	3-5 June 2013
MEET-EO: MEet Emerging Technologies in Earth Observation & RS	7 June 2013
Archeosat: Photographic exhibition on space technology for archaeology	2-8 June 2013





Figure 1: The panel of the 33rd EARSeL Symposium in Matera, 2013.

Both the Symposium and the Workshops, along with the educational activities supported by the European Space Agency, were aimed at keeping participants up to date with the latest advances in Remote Sensing technologies; applicable to various disciplines. Moreover, the main goal was to present not only outstanding research activities within a unique forum but also support: (i) business opportunities in Earth Observation & remote sensing technologies, in the context of MEET-EO: MEet Emerging Technologies in Earth Observation & RS, organised by Basilicata Innovazione in cooperation with EARSeL; (ii) popularization of the Remote sensing technologies in the social context through the



Archeosat exhibition, organised by Rosa Lasaponara and Nicola Masini with the Italian Space Agency and the patronage of UNESCO. The exhibition was focused on the use of space technology for archaeology and mainly based on satellite data captured by the platform Cosmo SkyMed and provided by ASI. Thanks to the satellite data and pictures, visitors traveled from Atacama (South Peru) to the Sahara Desert, from the tropical forests of Southeast Asia to the Mediterranean habitats and continental Europe landscape, from the Neolithic in Stonehenge and Foggia to the magno-greek remains Metaponto, from the ancient network of water channels of the Khmer imperial city of Angkor in Cambodia to the Nazca lines in Peru, from the buried remains of Sabratha in Libya to Pelusium in the Nile Delta and Samarra in Irag.

Moreover, the second ESA course on "Remote Sensing applications for the study and observation of archaeological sites" was organised by Rosa Lasaponara, Nicola Masini and Mario Hernandez chairmen of the EARSeL ReSeArCH SIG (http://www.ibam.cnr.it/earsel).



Figure 2: A social event in the framework of the 33rd EARSeL Symposium.



Figure 3: During the field trip in the framework of the II ESA RS Course: Remote Sensing for Archaeology.

The course provided an introduction to active and passive Remote Sensing techniques as well as some examples of applications of SAR, optical data, geophysical prospection for archaeological studies and cultural landscape investigations. For this course, spaceborne data from Optical and



Polarimetric SAR sensors (like COSMO-SKYMED, ALOS PALSAR and RADARSAT-2) were used. In situ geoprospection was carried out in the archaeological area of Timmari with the support of the Sopraintendenza dei beni archeologici della Basilicata. The course, with theoretical lectures and practical applications, aimed at supporting and popularizing the use of space technologies in archaeology as well as in natural and cultural heritage.

The rich proposal and organisation of these new events, such as the II ESA RS Course: Remote Sensing for Archaeology, the meeting on business opportunities in Earth Observation & Remote Sensing technologies, and the Exhibitions, along with the specific workshops organised in the framework of the annual EARSEL symposium enabled the local organisers to bring together outstanding researchers, small and medium enterprises, and young students to support and facilitate the use of remote sensing not only from a scientific point of view but also as educational and business opportunities.



Figure 4: EARSeL Chairman, Dr Ioannis Manakos during his closing speech.

As a whole, there were more than 320 participants coming from four continents of the world with more than 30 scientific sessions within both the Symposium and Workshops.

The agenda of the Symposium included both oral and poster sessions with strong interaction and lively scientific debates for the following sessions: EO for improving Smart City management, Monitoring and protecting biodiversity, Support of regenerative energy production and transport, Improving climate observations, agriculture, water and fisheries management, supporting disaster management, remote sensing for archaeology, land use and land cover, degradation and desertification, 3D remote sensing, Radar, Lidar, Thermal Remote Sensing, new instruments and methods, including ground truthing. A special session was also dedicated to Pleiades, jointly organised with CNES.

As keynote presentations, outstanding representatives of national and international space agencies and institution such as ESA, NASA, ASI, CNES, BELSPO, IEA, provided a focus on the past, present and future activities and opportunities. The programme of the 33 EARSeL Symposium will remain available at http://www.earsel.org/symposia/2013-symposium-Matera/index.php, and the abstract book will be available on the 33rd EARSeL Symposium website.

The next EARSeL Newsletter will offer a complete overview of the conference, workshops and educational activities in Matera.

Hope to see you at the forthcoming EARSeL events.



Rosa Lasaponara CNR- IMAA Nicola Masini CNR-IBAM

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News from Other Organisations

Second High Level Forum on Global Geospatial Information Management

Doha, Qatar, 4 – 6 February 2013 Session 5 of the Provisional agenda

The International Society for Photogrammetry and Remote Sensing (ISPRS) study on the status of mapping in the world

Gottfried Konecny,

Emeritus Professor, Leibniz University, Hannover, Germany

I. Introduction

1. In 1968, 1974, 1980 and 1987 the UN Secretariat has completed studies on the status of world topographic mapping. Topographic maps at that time constituted the basis for reliable geospatial information, as they do up until today.

Topographic maps were and are principally compiled by activities of the governmental national mapping agencies (NMA's). Representatives of these agencies of the UN member countries have regularly exchanged views on the status of mapping at the UN Regional Cartographic Conferences for Asia and the Pacific and for the Americas.

The issues of mapping have gained importance for the national and global management of resources and for sustainable development with increasing emphasis on environmental issues.

The last summary on the status of mapping has been published by the United Nations in their publication "World Cartography" in volume XX, published in 1990 (ST/TCD/14). It reflected the status of topographic mapping surveys up until the year 1986. As of 1980 the scope of mapping also began to include cadastral mapping, as a basis for land management issues.

The results of the published study for topographic mapping coverage of the land area of the world resulted in the following summary:

scale/range	1:25 000	1:50 000	1:100 000	1:200 000
Africa	2,9 %	41,4 %	21,7 %	89,1 %
Asia	15,2 %	84 %	56,4 %	100 %
Australia and Oceania	18,3 %	24,3 %	54,4 %	100 %
Europe	86,9 %	96,2 %	87,5 %	90,9 %
Former USSR	100 %	100 %	100 %	100 %
North America	54,1 %	77,7 %	37,3 %	99,2 %
South America	7 %	33 %	57,9 %	84,4 %
World	33,5 %	65,6 %	55,7 %	95,1 %



scale/range	1:25 000	1:50 000	1:100 000	1:200 000
Africa	1,7 %	2,2 %	3,6 %	1,4 %
Asia	4,0 %	2,7 %	0 %	1,9 %
Australia and Oceania	0 %	0,8 %	0 %	0,3 %
Europe	6,6 %	5,7 %	7,0 %	7,5 %
Former USSR	0 %	0 %	0 %	0 %
North America	4,0 %	2,7 %	0 %	6,5 %
South America	0 %	0,1 %	0 %	0,3 %
World	5,0 %	2,3 %	0,7 %	3,7 %

The survey also revealed, that not only the coverage of maps was an important factor, but also the update rates of the topographic map. These were in summary:

Since the last publication of the data on the status of mapping there have been highly effective technology improvements in IT in sensor technology and in the availability of satellite platforms.

Foreseeing these the UN Cartographic Conferences have passed a number of resolutions to update the effort on the status of mapping within existing resources.

2. The Ninth UNRCC for the Americas in New York 2009 in its resolution 3/IX has tasked the UN to prepare a study on the status of mapping in the world by study to be directed to the national geospatial information authorities in the world.

In this context the International Society for Photogrammetry and Remote Sensing ISPRS has offered technical support to the GGIM Secretariat.

3. In preparation for this survey by the UNGGIM Secretariat a questionnaire was jointly designed, which was sent out to the geospatial information authorities on April 27, 2012.

II. Design of the Questionnaire

4. The questionnaire was designed to give answers, not only on the progress in area coverage of mapping during the last 26 years, and the status of up-to-dateness of the maps, but also on the status of introducing new technology and expanded tests in the different countries, characterizing the existing national infrastructure for mapping.

Altogether, 27 questions were formulated as multiple choice questions:

A) National Topographic Mapping Coverage: 7 questions

- the scales of mapping in use in 8 categories (1:1000, 1:5000, 1:25 000, 1:50 000, 1:100 000, 1:250 000, 1:500 000, 1:1 000 000 or similar) and coverage of the data in km² or in % of the national area
- 2) the age of map data
- 3) restrictions imposed on the availability of maps
- 4) maps for sale or for free
- 5) procedure of map updates by map sheet or by features
- 6) methodology for updating (field surveys, photogrammetry, satellite imagery, third party data, crowd sourcing)
- 7) inhouse or outsourcing operations

B) National Imagery Acquisition (7 questions):

8) is there a national aerial photography program flown at regular intervals; are domestic services used; is the imagery analog or digital



9) is there a national satellite imagery acquisition program providing images at regular intervals; are these domestic sources

- 10) use of radar or lidar sensors
- 11) is Lidar used for DEM's and at which resolution
- 12) are orthophotos produced and at which scale
- 13) is there a national DEM
- 14) is there the intention or use of 3D information for urban and rural landscape models

<u>C)</u> <u>National surveying and Cadastral Coverage</u> (8 questions)

- 15) are there licensed surveyors
- 16) is there a national cadastral map coverage and is the NMA responsible for cadastral mapping
- 17) what is the use of cadastral maps (titles, tax)
- 18) are cadastral maps based on geodetic control
- 19) are property boundaries monumented in the field
- 20) updating methodology of property maps
- 21) number of employees or private surveyors engaged in cadastral operations
- D) Organisation (6 questions)
- 22) is topographic mapping nationally funded
- 23) annual budget
- 24) number of staff (total and technical) in NMA
- 25) legal or regulatory mandate of NMA
- 26) products in % supplied as
 - hard copy maps
 - digital data
 - online downloads
 - web services
- 27) archival practices
- 5. The questionnaire is intended to provide an overview of the current status of mapping the world with characteristic questions relating to the use of new technology for mapping and the cadastre including institutional arrangements on a national level.

III. Status of the Responses

6. After the mailing of the questionnaire on April 27, 2012 altogether 91 responses have been received to date. This is a favourable response. A follow-up process is continuing from the GGIM Secretariat with the help of regional committees.

ISPRS has also addressed their national member organisations to solicit further official responses by personal contacts.

- 7. ISPRS has initiated the analysis of the responses. A MS-Access database has been developed by Mr. Uwe Breitkopf of the Institute for Photogrammetry and Geoinformation of Leibniz University, Hannover to systematically analyse the replies to the 27 questions in a simplified manner. The database is now usable for the analysis of the responses and is easily expandable and is available to GGIM.
- 8. The database principally needs to include information on all 193 UN member countries and on all non-UN member regions, bringing the total of areas to be included to over 200.



- 9. Some information on these over 200 regions can be obtained from international map vendors. The Institute of Photogrammetry and Geoinformation of Leibniz University Hannover has used the web published database of Eastview Geospatial to arrive at an estimate of the map coverages and the update status of the entire globe.
- 10. The results obtained so far need verification by additional correspondence.
- To make the effort sustainable, ISPRS has established an international Working Group (WG IV-2 "Status of Geospatial Data Bases") within its Commission IV (Geospatial Data Bases) for the 2012 – 2016 Congress Period.
- 12. The first meeting of the Working Group will take place during Interexpo GeoSiberia in Novosibirsk, Russian Federation from April 22 to 24, 2013, organized by the Siberian State Academy for Geodesy.
- 13. With respect to the UNGGIM effort the results of the 2012 survey a publication is intended by July 2013.
- 14. The verified results are also to be presented to the GGIM Meeting of Experts on Global Geospatial Information Management in Cambridge, July 24 26, 2013.

IV. Replies

- 15. 91 replies were received from 90 U.N. member countries plus 1 from Northern Ireland.
- 16. European replies (36) were nearly complete, except for Russia, Bjelarus and Montenegro (3). Small countries, such as San Marino, Liechtenstein or Monaco, which do not have own mapping administrations, were not included in the survey.
- 17. From the Americas the survey also returned good results (15), except for Argentina, Paraguay, Bolivia, Venezuela, Guyana, Suriname, Cuba, the Dominican Republic, the Caribbean Islands and the Bahamas.
- 18. Africa is partly covered (20). Missing are Angola, both Congos, Gabun, Nigeria, both Sudans, Libya, Kenya, Djibouti, Tanzania, Somalia, Eritrea, Malawi, Mozambique, Zimbabwe, Swaziland, Lesotho, Benin, Liberia, Sierra Leone, Gambia, Western Sahara, Mali, Chad, Equatorial Africa
- 19. In the Pacific (3) most of the Island States are missing, as well as Antarctica.
- 20. The biggest gap of responses is from Asia (15) : The Arab States, Central Asia, Afghanistan, Pakistan, India, Bangladesh, Myanmar, Thailand, Indonesia, Timor Leste, North Korea.
- 21. the replies cover only about 50% of the land areas of the globe.
- 22. also not covered are bathymetry and hydrography of the ocean areas, which cover about 2/3 of the globe.

V. Results of the Analysis to date

23. for the 91 countries and regions, which have replied, the analysis of the results by the Questions asked is as follows:

A) National Topographic Mapping Coverage

Question 1) Extent of existing Geodata or Map Coverage at various scale ranges

Most NMA's have only listed their coverages for the scales, for which they are responsible. No mention was made in some responses of the large scale coverage of urban areas under responsibility of the municipalities. This still needs to be locally verified.

Some NMA's have provided graphical indexes of their map coverage, and some have even indicated the last update of the maps, but the supplied data were inconclusive with respect to the data coverage in km² or in % of the national area.

Some NMA's have listed links to their web-sites. Most of these are in their national languages. Again it is very difficult to extract the desired information.

Nevertheless a map was derived to show the available largest scale coverages of the counties, which have replied. See Fig.1 to Fig.6 for the scale ranges 1:1000, 1:5000,

1:25 000, 1:50 000, 1:100 000 and 1:250 000 with the percentage of coverage for each country.

Since some countries did not submit the information with sufficient clarity or did not respond at all, another approach had to be taken for those areas. The Eastview Geospatial database for ordering international maps has been analyzed to derive an estimate of the map coverage at different scale ranges for the land areas of the globe. A distinction has been made in 3 categories: Fig.7 shows the coverages of maps at the largest available scale for maps produced by the country itself.

It is no secret, that countries, which have or had global security concerns did their own mapping of the globe. These were done by the US Defense Agencies and the Defense Agencies of the former Soviet Union. Their maps are now for sale by Eastview. Fig.8 shows the coverages at the largest available scale produced by the USA and Fig. 9 produced by the Russian Agencies.

Question 2) Current Age of Existing Geodata

Fig. 10 shows the average age of the largest map coverage for a country having given a report. Moreover, the Eastview database contains the dates of issues of the listed geodata and maps listed for a country or region not having submitted a report. This permits to assess the actuality of the available global map content at the largest available scale shown in Fig. 11.

Question 3) Restrictions on Map Data Distribution

In most countries the maps are freely accessible without restrictions (68 countries). Only 22 countries (out of the 90) have restrictions on maps for the public. (See Fig. 12)

Question 4) Sale of Maps

In most countries map data are for sale in analog and digital form. 39 countries have web distribution facilities and 51 have not. (See Fig. 13). Generally only small scale overview maps are available through the web.

In 77 countries maps in various forms are offered for sale. Only in 5 countries they are offered at no cost. (See Fig. 14)

Question 5) Updating Strategy

72 countries out of 90 update their maps. 15 countries do not have updating programs. 46 countries carry out updating by map sheets and 29 by features.

Question 6) Updating Methodology

The methodology of updating in 35 countries is by photogrammetry supported by field surveys in large and medium scales and from satellite images supported by field surveys and aerial imagery at small scales. 23 countries list a combination of photogrammetry and field surveys. 2 countries list field surveys only, 7 aerial images only and 3 satellite images only. 9 countries utilize crowd sourcing combined with other methods.

Question 7) Inhouse Capabilities of NMA's

50 NMA's have inhouse mapping operations, 13 practice outsourcing and 27 have both. (See Fig.15)

B) National Imagery Acquisition

Question 8) National Aerial Imagery Program

55 countries have a national aerial photography program, 33 do not. 50 countries use digital imagery only, 10 use traditional analog imagery only and 23 utilize both types.

7 countries have no own facilities



Question 9) Satellite Imagery Uses by NMA

74 NMA's use satellite imagery for mapping. 17 countries do not.

Question 10) Use of Radar or Lidar

Radar imagery is used in cloud prevalent countries, and Lidar in most developed countries. Developing countries have not introduced this technology. Altogether 46 countries use radar or lidar sensors, 44 do not. (See Fig.17)

Question 11) Lidar DEM

Lidar is used for DEMS mainly in the developed world. 46 countries use it for DEM Generation.

Question 12) Orthophoto Program

Orthophoto technology is generally used in 82 countries to bridge the time gap for map updates. Only 8 countries do not use it. (See Fig.18)

Question 13) Interest in 3D technology by NMA

45 country NMA's are interested in 3D modelling information for viewing urban landscapes, 45 are not. (See Fig,19)

Question 14) National DEM

National DEM's are established in 64 countries, in 26 countries not..

C) National surveying and cadastral coverage

Question 15) Licensed Surveyors

75 countries have licensed surveyors for property surveys, 15 have not. (See Fig.20)

Question 16) Responsibility for Cadastral Mapping and Cadastral Map Coverage

A national cadastral map coverage is available in 17 countries, but not in 29 countries. (See Fig.21)

Only 41 NMA's have the responsibility for the real estate cadastre. 49 have not. (See Fig.22)

Question 17) Use of Cadastral Maps

The use of cadastral maps is generally for securing titles (45), for taxation (39), for land registration (50), for conveyancing (36) and for other reasons (17).

Question 18) Cadastral Maps and Geodetic Control

In 77 countries cadastral maps are based on geodetic control, in 13 not.

Question 19) Monumentation of Property Boundaries

In the majority of countries (65) property boundaries are monumented in the field, in 24 countries they are not. (See Fig.23)

Question 20) Updating of Cadastral Maps

Updating of property maps in 68 countries is done by transaction procedures, in 22 countries this is not linked to transactions.

Question 21) Number of Cadastral Employees

The number of employees or private surveyors engaged in cadastral operations is usually much larger than the personnel engaged in topographic surveys.

D) Organisation

Question 22) National Funding for Mapping

Topographic mapping is nationally funded in 80 countries, in 10 not.

Question 23) Mapping Budget

Some countries list their budget and this is proof that mapping is a very substantial highly regarded operation.



Question 24) NMA staff

The number of staff engaged in mapping in the developed countries exceeds the number of staff in the developing countries.

Question 25) Legal Status of Mapping

In most countries (77) NMA's have legal or regulatory status, in 11 countries they have not.

Question 26) Form of Map Products Supplied

Even in developing countries the supply of digital map data exceeds that of analog products. Online and web delivery of map data is generally only available in developed countries. 56 countries list hard copy maps as possible output, 55 digital media, 31 downloads and 29 the web.

Question 27) Archival of Geodata

All countries care about archiving their map data in analog or digital form. 37 list servers, 53 do not. They use more conservative media. (See Fig.24)

VI. Discussion

24. Another Access database has been created by ISPRS to compare the results of the current 2012 GGIM study data with the data of 1986 published in World Cartography XX, 1990.

To compare the country data between 1986 and 2012 it is necessary to relate the areas of the countries of the world to the current status, as some countries have merged (e.g. Yemen) and some have split (Sudan – South Sudan, Serbia – Kosovo). This is no problem, if the data for mapping coverage are available for each scale at a $\rm km^2$ basis.

- 25. The UNRCC Resolution 3/IX of E/Conf 99/3 New York 2009 recommended that the study should take into consideration official national mapping agencies, other institutions, and the private sector, including both the status of technological and legal issues pertaining to geospatial data.
- 26. In this regard ISPRS has established contacts to the following private sector institutions, in the hope that they will communicate for the purpose of the study their acquired imagery and mapping coverages:
 - Google Earth and Google Maps (imagery and maps)
 - Microsoft Bingmaps (imagery and maps)
 - TomTom (road features)
 - Navteq (road features)
- 27. ISPRS has also established contacts to the commercial map providers
 - Eastview Geospatial, Minneapolis, Mn., USA
 - ILH Stuttgart, Germany

These companies provide internationally available maps for sale including map indexes which can help to verify the information obtained in the surveys and permit to supplement missing data.

- 28. The questionnaire survey conducted by the GGIM Secretariat has not only provided the requested data, but the questionnaires have also identified discussion partners, with whom it will be possible to clarify the desired information, so far missing.
- 29. According to the schedule drafted in December 2011 of the project is on schedule.
- 30. In continuation the following schedule is proposed in the table

no.	task	responsibility	time	status
1	Design of questionnaire	G. Konecny & E. Jaeger, Hannover	till Jan 20, 2012	completed
2	Verification of questionnaire - with EuroSDR	C. Heipke & K. Mooney, EuroSDR	till Feb 20, 2012	completed



		- with ISPRS Secretariat	 Chen Jun, ISPRS & Ms shang Yaoling & Dr. Zhao Renliang 	till Feb 20, 2012	completed
	3	Submission to UN Secretariat and GGIM Committee Bureau	- G. Konecny, Hannover to A. Laaribi, UN	till March 1, 2012	completed
	4	Contact to private enterprises with request for cooperation: - Google - Microsoft - Navtecq - TomTom - Eastview Geospatial - ILH Stuttgart	G. Konecny	till April 1, 2012	completed
	5	Compilation of addresses and mailing	A. Laaribi, UN-GGIM	Mail by April 27, 2012	completed
(6	Receipt of answers by UN-GGIM	A. Laaribi	Responses between June 1 and July 27, 2012	completed
	7	Transmission of received data	A. Laaribi to G. Konecny	June 5 to July 24, 2012	completed
	8	Review by ISPRS Secretariat	 Chen Jun, ISPRS & Ms Shang Yaoling & Dr. Zhao Renliang 	by July 24, 2012	completed
9	9	Preparation of interim report to UN-GGIM	G. Konecny	by July 27, 2012	completed
1	0	Interim presentation UN-GGIM in New York	G. Konecny	August 13-15, 2012	completed
1	1	Interim presentation at ISPRS Congress, Melbourne & solicita- tion for missing answers	G. Konecny	August 25-31, 2012	completed
1	2	Inputs by GGIM Committee and advice regarding finalization of project	A. Laaribi for collection of suggestions	August 15-31, 2012	completed
1	.3	Communication with regional and national members for supply of missing data	A. Laaribi and G. Konecny	October 1, 2012	completed
1	4	draft analysis of survey	G. Konecny	January 15, 2013	completed
1	.5	Preparation of joint report by GGIM and ISPRS for presentation of results at 2 nd GGIM forum	A. Laaribi & G. Konecny	January 20, 2013	in progress
1	6	Presentation of report at 2 nd GGIM Forum in Qatar	G. Konecny	February 4-6, 2013	Planned
1	.7	Participation in ISPRS	G. Konecny	April 22-26, 2013	Planned
		WG IV-2 meeting in Novosibirsk for validation of results	A. Laaribi		
1	8	Preparation of joint report	A. Laaribi & G. Konecny	June 15, 2013	Planned
		by GGIM and ISPRS for			
		presentation of verified results at 2 nd Meeting of Experts of GGIM in Cambridge			
1	9	Presentation of report at	G. Konecny	July 24-26, 2013	Planned
1		2 nd GGIM Expert Meeting in Cam-			

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EARSeL Newsletter

	bridge,			
	Delivery of publishable materials to printers			
20	Publication of results in print	UNGGIM or ISPRS	December 31, 2013	Planned



Figure 1: Coverage 1:1000 with percentage





Figure 2: Coverage 1:5000 maps with percentage



Figure 3: Coverage 1:25 000 maps with percentages





Figure 4: Coverage 1:50 000 maps with percentages



Figure 5: Coverage 1:100 000 with percentages



Figure 6: Coverage 1: 250 000 with percentages



Figure 7: Availability of Locally Produced Maps from Eastview Geospatial at scales 1:10 000 to 1:250 000



Figure 8: Availability of US Produced Maps from Eastview at scales 1:10 000 to 1:250 000



Figure 9: Availability of Russian Maps at Eastview at 1:10 000 to 1:250 000





Figure 10: Map Age from Questionnaires for largest scale cover



Figure 11: Age of largest scale cover maps from Questionnaire and Eastview data combined





Figure 13: Map distribution by web



Figure 14: Map Availability for sale or free of charge



Figure 15: NMA In-house Operation or Outsourcing





Figure 16: Digital or Analog Photogrammetry Use



Figure 17: Radar and Lidar Uses



Figure 19: NMA Interest in 3D



Figure 22: NMA responsibility for cadastre





Figure 23: Monumentation of Property Boundaries



Figure 24: Use of Servers for Map Archival



Science Article

Satellites & Sensors

This article reports on recent developments in Earth Observation satellites and sensors.

Radarsat-1 malfunction

On March 29, 2013, Canada's first Earth Observation satellite, RADARSAT-1, experienced a "technical anomaly". Following numerous attempts to resolve the technical issue the satellite was declared dead after 17 years of outstanding service. Radarsat-2, launched in 2007, is still going strong.

PhoneSat 1.0 and 2.0

Hey, did you ever wish you could launch your mobile phone? That's exactly what NASA did. On April 21 three cubesats, designed to demonstrate use of a commercial mobile phone as an extremely low-cost spacecraft avionics and computer system, were launched into orbit. The PhoneSat 1.0 V1A and PhoneSat 1.0 V1B, also known as Graham and Bell, are built around a Nexus One Android-based smartphone. PhoneSat 2.0, also known as Alexander, is based on a Nexus S mobile phone augmented with an S-band radio, solar panels, GPS receiver, magnetorquers and reaction wheels. Orbital analysis indicates that the PhoneSats have deorbited on April 27 and have burned up in Earth's atmosphere. No one has been able to hear from the satellites since, which confirms the predictions. Next, NASA will teach us how to launch your wife's tablet, your kid's game box and your car's onboard computer...

Gaofen-1 and NEE-1/Pegaso

On April 26, China's first launch of the year carried the Gaofen-1 (Gao fen means "high resolution", 1 to 2 meter) imaging satellite into a sun-synchronous orbit. Gaofen-1 is the first of up to six satellites China is to launch for the high-definition earth observation system (HDEOS) before 2016.

Following Gaofen-1, the second satellite of the constellation will be satellite featuring a sensor with a panchromatic resolution of 1 meter and a multispectral 4-meter resolution. Gaofen-3 will be a SAR Payload, while Gaofen 4 will be the first Geostationary Satellite of the constellation featuring a 50-meter resolution imager. Gaofen-6 will be a copy of Gaofen-1 and is planned to be launched in 2016 at the end of Gaofen-1's projected life time.

Three small cubesat satellites were also carried by the launcher: Turksat-3USAT, from the Istanbul Technical University, CubeBug-1 (also called Capitan Beto) from Argentina, and NEE-01 Pegaso from the Ecuadorian space agency EXA. NEE-1 Pegaso is Ecuador's first satellite. The main payload of the satellite is a visible and infrared camera. On 22 May 2013, Pegaso passed very close to the spent upper stage of a Tsyklon-3 rocket, launched into space nearly three decades ago, over the Indian Ocean. While there did not appear to be a direct collision between the satellite and upper stage, it was unclear if the satellite had sustained damage from debris in the vicinity of the rocket. Currently the satellite seems to be rotating and EXA is trying to stabilize the satellite.

VNREDSat-1A, ESTCube-1, Proba-V

On May 7 three satellites were launched by a Vega rocket of Arianespace.

VNREDSat-1A is Vietnam's third satellite. Its first two satellites were communication satellites, while the third satellite is Vietnam's first remote sensing satellite. The satellite acquires images at 2.5-meter resolution in panchromatic mode and 10-meter resolution in multi-spectral mode (four bands) with a 17.5 km swath.



Proba-V is the fourth satellite in the ESA Proba series. The V stands for vegetation, not the Roman number five. It carries an instrument similar to the Vegetation instruments of the Spot-4 and Spot-5 satellites. The satellite will fill the gap between the Spot Vegetation instruments and the delayed Sentinel-3A and -3B satellites. Resolution of the instrument is 350 meter VNIR (3 bands) and 700 meter SWIR (1 band).

ESTCube-1 is the first Estonian satellite. While emphasis was placed on educating students during creation of ESTCube-1, it does have a scientific purpose. Onboard the satellite is an electric solar wind sail, consisting of 10 meters of conductive wire, sometimes referred to as Heytether, which will be deployed from the satellite.

Landsat 8

Operational control of Landsat 8 has been transferred to the USGS. This marks the continuation of the 41-year old Landsat program. The USGS aims at collecting 400 Landsat 8 scenes every day.

Resurs-P1

Russia's Resurs-P No. 1 civilian imaging satellite was launched on June 25 aboard a Soyuz-2-1B from Baykonur. The Resurs-P satellites are the latest in a series of Russian Earth imaging satellites. Built by TsSKB-Progress of Samara, and based on the Yantar' spy satellites, the Resurs-P1 satellite carries a Geoton-L1 telescope with a 1-meter resolution multispectral imager and a 25-meter resolution hyperspectral imager with 96 bands.

Busy India

ISRO has a string of satellites lined up for launch in the coming months. First, INSAT-3D, was launched on 25 July 2013 by an Ariane rocket. The satellite carries a meteorological payload. SPOT-7 will be launched somewhere in September 2013. SPOT-7 has a resolution of 1.5-meter panchromatic and 8-meter multispectral. The satellite will join the constellation of SPOT-6 and Pleiades-1A and Pleiades-1B. Mars orbiter (Mangalyaan) will be launched on October 25. This will be the first Indian mission to Mars. Finally, Cartosat-2C will be launched somewhere in October 2013. The Cartosat-2 series of satellites carry a panchromatic high-resolution camera of about 1-meter resolution.

Jason-1 decommissioned

After its last transmitter failed on June 21, the ocean altimetry satellite Jason-1 was decommissioned by NASA. The satellite was a joint project between NASA and CNES. Its mission of more than 11 years helped scientists better understand ocean circulation, climate change and weather forecasting. Its successor, OSTM/Jason-2, has already been in orbit since 2008.

GOES-12 retired

After 10 years of monitoring hurricanes, blizzards and less severe weather, the GOES-12 geostationary satellite has been retired. NOAA continues to operate GOES-13 as the eastern satellite for the United States and GOES-15 as the western satellite. Backup satellite is GOES-14, which can be activated if any of the operational satellites experience any problems.

Kompsat-5 (Arirang-5)

On August 22, South Korea's KARI agency launched its first X-band SAR satellite Kompsat-5.



The satellite, also known as Arirang-5, was launched from the Russian missile base at Yasniy/Dombarovskiy aboard a Dnepr rocket, which is a recycled R-36M missile. The SAR has various modes ranging from a 1-meter high-resolution mode (spot mode), to a standard 3-meter resolution mode (stripmap mode), to a wide swath 20-meter resolution mode (ScanSAR mode). Polarization can be selected from HH, HV, VH and VV. The instrument is capable of recording 2 minutes of data per orbit. The agile Kompsat-5 spacecraft has a cross-track body pointing capability which effectively doubles the FOR (Field of Regard).

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European Association of Remote Sensing Laboratories EARSeL eProceedings

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New Publications in Vol. 12(1), 2013

A global evaluation of harmonic analysis of time series under distinct gap conditions

Jie Zhou, Li Jia, Guangcheng Hu, and Massimo Menenti

Abstract

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

Reconstruction of time series of satellite image data to obtain continuous, consistent and accurate data for downstream applications is playing a crucial role in remote sensing applications such as vegetation dynamics, land cover changes, land-atmosphere interactions and climate changes. Among the numerous methods and models developed to reconstruct time series of satellite observations in recent decades, Harmonic ANalysis of Time Series (HANTS) is one of the most widely used. Many studies based on time series reconstructed with HANTS documented the excellent performance of this method.

In the view of this study, the HANTS algorithm can be divided into two sub-processes, i.e., contaminated data identification and series reconstruction based on valid data. This study was dedicated to the evaluation of the performance of the latter sub-process. A simulated reference series dataset was constructed first, and then random gaps were introduced to these reference series. We built a look up table for distinct gap conditions by doing statistics on the deviation between the reference series and series reconstructed from gapped reference series. The look up table was used to evaluate the performance of a global NDVI time series dataset processed by HANTS.

The results show that the size of maximum gap (MGS), the number of loss (NL) and the number of gaps (NG) were significant factors in the reconstruction. When NDVI time series were rebuilt by HANTS, most of the region north than 40°N and mountainous areas of earth show bad reconstruction performance, that is, the root mean square deviation (RMSD) could exceed 0.25. This can be attributed to the periodical snow cover in these regions.

Integration of the pixel and object domain for the mapping of new urban landscapes in the Mediterranean with a focus on outdoor water consumption

Nils Wolf, and Angela Hof

Abstract

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

Land use demands of tourism and residential development drive the spread of leisure infrastructure and new urban landscapes in the Mediterranean. In particular along the coasts, golf courses, irrigated landscaping and swimming pools are becoming characteristic features of already densely populated locations that are among the areas with the greatest water deficits. Against this background, the present paper assesses the potential of different high-resolution imagery in combination with innovative image analysis techniques for an automated, targeted mapping of water-related urban features. The mapping task is conducted with WorldView-2, IKONOS and airborne imagery in three different urban study areas in Spain and Greece. Object-based feature extraction and the Random Forests algorithm are applied to the classification problem of separating turf grass, swimming pools, other vegetation and non-vegetated areas. The classifier performance is evaluated against susceptibility to reduced training set size and high-dimensional features spaces, variations in the training set (stability of results), varying feature subspaces, and the inclusion of uncertain - hence potentially mislabelled - pixels in the model calibration stage. The results indicate



that best discrimination can be obtained if complementing the standard spectral feature space by object features from multi-scale segmentation. Furthermore, it is confirmed that Random Forests can handle high-dimensional feature spaces with large amounts of potentially redundant or irrelevant features. Comparing the results across image sources and study areas reveals different quality levels, but indicates that water-related urban landscape elements can be mapped, if the remote sensing imagery meets several requirements such as very high spatial resolution.

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 Påsse 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 download. 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 \times 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.



Book Releases

Thermal Infrared Remote Sensing: Sensors, Methods, Applications (Remote Sensing and Digital Image Processing) is available from Springer, edited by Claudia Kuenzer and Stefan Dech.

Temperature is one of the most important physical environmental variables monitored by earth observing remote sensing systems. Temperature ranges define the boundaries of habitats on our planet. Thermal hazards endanger our resources and well-being.

This book provides an overview of the state of the art in the field of thermal infrared remote sensing. In this book renowned international experts have contributed chapters on currently available thermal sensors as well as innovative plans for future missions. Further chapters discuss the underlying physics and image processing techniques for analyzing thermal data. Ground-breaking chapters on applications present a wide variety of case studies leading to a deepened understanding of land and sea surface temperature dynamics, urban



heat island effects, forest fires, volcanic eruption precursors, underground coal fires, geothermal systems, soil moisture variability, and temperature-based mineral discrimination.



Manual of Airborne Topographic Lidar edited by Michael Renslow was published by The American Society for Photogrammetry and Remote Sensing.

Lidar is the most significant mapping technology to emerge in the last several years. The ASPRS Manual of Airborne Topographic Lidar covers all the relevant topics relating to the science behind lidar systems, mission planning, data collection and management, quality control/quality assurance, and product development.

Topics covered include an overview of ALS technology, enabling technologies, ALS systems, guidelines for lidar data collection, data processing, lidar industry support systems, lidar data and complementary technologies, accuracy standards and guidelines, digital elevation models, forestry applications, corridor mapping, flood-prone area mapping, building extracting and reconstruction from lidar point clouds, airport surveying, coastal applications, hydrological applications, and natural hazards.



Forthcoming EARSeL Conferences

7th Workshop on Remote Sensing of Land Ice and Snow: Cryosphere: Monitoring for climate studies and operational applications

At University of Bern, Institute of Geography 3 – 6 February 2014, Bern, Switzerland

More info



General

The EARSeL Special Interest Group on Land Ice and Snow (SIG LIS) aims to bundle methodological and application-oriented research activities in this thematic field. The workshops shall provide a platform for scientific exchange and discussion on a variety of related topics.

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 for the ESA-Globsnow User Consultation Meeting. All participants are invited to attend the meeting.

The deadline for submission of abstracts is the **15th November 2013**.

All scientists, professionals and researchers involved or interested in the field of the workshop are encouraged to present papers according to the following topics:

- Glaciers and Ice Caps
- Snow cover (continental to global scale)
- Snow albedo and climate
- Snow hydrology
- New technologies (sensors/methods)
- Snow modelling and data assimilation
- ESA Globsnow contribution (special session included in the workshop)

Important Dates

Abstract submission deadline

15 November 2013 16 December 2013

Notification of acceptance



- > Deadline for presenting authors registration 15 January 2014
- Deadline for registration 3 February 2014

For more detailed information please visit the Workshop website at: http://www.earsel.org/SIG/Snow-Ice/workshops.php.

5th Land Use & Land Cover Workshop

At Humboldt-Universität zu Berlin

17 – 18 March 2014, Berlin, Germany

More info



General

Landsat-8 and the upcoming Sentinels, together with an increasing number of free-access EO data archives open up new possibilities for space-based analysis of land use and land cover chance. This first joint workshop of the EARSeL SIG LULC and NASA's LCLUC Science Team focuses on the new frontiers in remote sensing analyses that result from these new possibilities.

The workshop is organized in half-day sessions around 4 themes. Each session contains 2 keynotes by international experts, intensive poster presentations and discussions, and wrap-up discussions.

- New sensors and emerging opportunities for land use and land cover monitoring. This session will offer space for presentations on recent and future missions including their associated data policies, formats, standard products, and will highlight emerging opportunities for LUCC mapping.
- Advances in Land-Cover and Land-Use Science using Earth Observations. This session provides examples of recent land use studies that incorporate remotely sensed data.
- Mining the archives: better use of existing data for long-term LUCC studies. This session will highlight the opportunities and challenges for making better use of existing image archives, including topics such as mass-processing, automated image analyses, compositing, time series analysis and sensor inter-calibration for LUCC applications.
- Frontiers in Remote Sensing of Land Cover and Land Use. This session will be focused on new frontiers in remote sensing of land cover and land use change.

The deadline for submission of abstracts is the **15th October 2013**.

Important Dates

Abstract submission deadline
 Notification of acceptance
 Deadline for Early Bird registration
 Deadline for registration
 March 2014

For more detailed information please visit the Workshop website at: https://www.geographie.hu-berlin.de/labs/geomatics/events/earsel-en/workshop.



34th EARSeL Symposium 2014

European remote sensing - new opportunities for science and practice 16 – 20 June 2014, Warsaw, Poland

More info



Call for papers

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. All scientists are encouraged to submit their research papers. The deadline for abstract submission is the **28th February 2014**.

For more detailed information please refer to the Symposium website at: http://www.earsel.org/symposia/2014-symposium-Warsaw.



Other Conferences

*	4-6 September, 2013: Remote Sensing and Photogrammetry Society Annual Conference. Glasgow, United Kingdom.
	9-10 September, 2013: Workshop on UAV-based Remote Sensing. Cologne, Germany.
	9-13 September, 2013: ESA Living Planet Symposium 2013. Edinburgh, United Kingdom.
=	12-14 September, 2013: 14 th N-AERUS Conference. Enschede, The Netherlands.
=	16-20 September, 2013: 2013 EUMETSAT & 19th AMS Satellite Conferences. Vienna, Austria.
-	20-24 September, 2013: ACRS 2013: Asian Conference on Remote Sensing. Bali, Indonesia.
-	23-26 September, 2013: 2013 SPIE Remote Sensing Symposium. Dresden, Germany.
	23-25 September, 2013: Interdisciplinary Conference of Young Earth System Scientists 2013. Hamburg, Germany.
-	1-3 October, 2013: Earth from Space – the Most Effective Solutions, 6th International Conference. Moscow, Russia.
-	5-8 October, 2013: SMPR 2013 International Conference of Sensors and Models in Photogrammetry and Remote Sensing. Tehran, Iran.
	7-8 October, 2013: 7th Coastal Altimetry Workshop. Boulder, Colorado, USA.
=	9-10 October, 2013: 1st International Earth Observation Convoy and Constellation Concepts Workshop. Noordwijk, The Netherlands.
-	20-24 October, 2013: 34rd Asian Conference on Remote Sensing. South Kuta, Bali, Indonesia.



22-24 October, 2013: XV Congreso de la Asociación Espapola de Teledetección. Madrid, Spain. 11-15 November, 2013: First COSPAR Symposium. Bangkok, Thailand. 12-13 November, 2013: ISPRS Workshop. Antalya, Turkey. 14-16 November, 2013: GEOMAT 2013. lasi, Romania. 2-3 December, 2013: ICRS 2013 – International Conference on Remote Sensing. Dubai, UAE. 2-4 December, 2013: 7th International Workshop on Sand/Duststorms and Associated Dustfall. Frascati (Rome), Italy. 00 09-13 December, 2013: AGU 2013 FALL Meeting: Gravity and Magnetic methods. Engineering and Environmental applications in Geophysics. San Francisco, United States. 24 16-17 December, 2013: A Kaleidoscope of colour: From the turbid to the oligotrophic. Plymouth, United Kingdom. 12-14 February, 2014: EuroCOW 2014: the Calibration and Orientation Workshop. Barcelona, Spain. 5-7 March, 2014: SA-EUSC-JRC 2014 - Image Information Mining Conference. Bucharest, Romania 19-21 March, 2014: 2014 Global Land Project Open Science Meeting. Berlin, Germany. 22-23 May, 2014: Symposium: Remote Sensing for Conservation - ZSL 2014. London, United Kingdom. ±Ξ 21-23 May, 2014: GEOBIA 2014: 5th International Conference on Geographic Object-Based Image Analysis. Thessaloniki, Greece.



2-6 June, 2014: EuSAR 2014: 10th European Conference on Synthetic Aperture Radar. Berlin, Germany.

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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 Scientific Assembly of the Committee on Space Research (COSPAR). Moscow, Russian Federation.

22-26 September, 2014: RAQRS'IV: the 4th International Symposium on Recent Advances in Quantitative Remote Sensing. Valencia, Spain.

Summer Schools and Advanced Courses

2014 GeoInformatics Summer Camp and 11th ISPRS SC and WG VI/5 Summer School 22-28 May 2014, Wuhan University, Wuhan, China Deadline for application: 15 March 2014

International Summer School in Glaciology 6-16 August 2014, University of Alaska (UAF), McCarthy, Alaska Deadline for application: 15 February 2014



Back Cover: 7th Workshop on Remote Sensing of Land Ice and Snow: Cryosphere: Monitoring for climate studies and operational applications. Bern, Switzerland. 5th Land Use & Land Cover Workshop. Berlin, Germany.

Credits: emc, vtibi, Ayla87, aida_n Sources: http://www.sxc.hu/photo/20773, http://www.sxc.hu/photo/1776, http://www.sxc.hu/photo/1425279, http://www.sxc.hu/photo/1339599





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