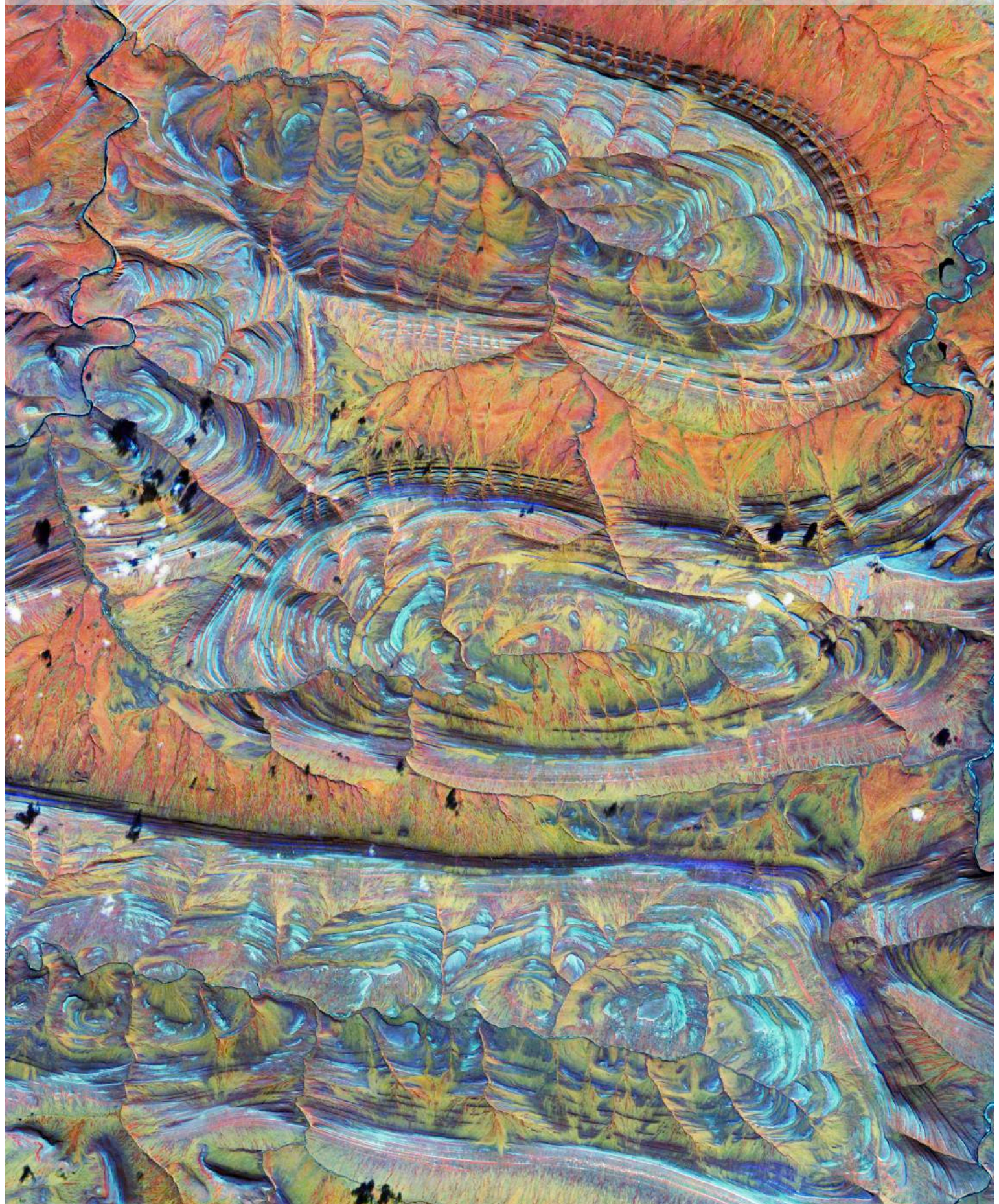




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**Issue 69**  
**March 2014**



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The Geological Remote Sensing Group (GRSG) is a Special Interest Group affiliated jointly with The Geological Society of London and the Remote Sensing and Photogrammetry Society. It was founded in 1989 to raise awareness and encourage the use of remote sensing technologies in the geoscientific and related communities. The GRSG seeks to represent the views of industry, government and academic individuals and organisations - resulting in a balanced scientific, technological and commercial viewpoint.

## Front Cover

Rapideye imagery, ©Blackbridge

Western Alaska displayed in False Colour IR bands 5,3,2 (NIR, R and G). This image has been stretched to accent the geology, vegetation and hydrology of the local region. Imagery provided to GRSG with thanks.

# GRSG Committee



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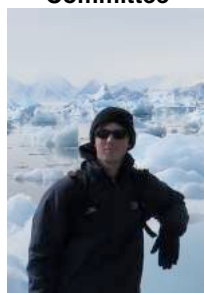
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## Committee



# Chairman's message



Dear Members

Welcome to my first chairman's message and as the chair I have a tough act to follow! Hopefully most of you will know me as I have been on the GRSG committee and Treasurer for several years now, for those that don't I work within the Earth Observation team at the British Geological Survey where I have been involved with numerous remote sensing projects for the past 12 years. It is a great honour to be the GRSG chairman, especially in our 25th year and I will endeavour to steer the group in the best way possible. If you have suggestions or would like to send comments then please get in touch at [chairman@grsg.org.uk](mailto:chairman@grsg.org.uk).

The outgoing chairman, Jason Manning, has done a great job over the last few years cumulating in a very successful conference in Berlin last December. This, in my opinion, had the strongest technical content of any GRSG conference. I would therefore like to thank all involved, especially our German colleagues, Friedrich Kuehn, Cornelia Glassier and Christian Fischer and of course the GRSG committee who all made things run very smoothly. Hopefully those of you who attended the conference feel the same; we would like to capture your views and feedback via the survey: <https://www.surveymonkey.com/s/TT8SFTS>.

I also need to thank our newsletter editor, Elspeth Robertson, and all the contributors for putting together another jam-packed and informative newsletter. This year seems busier than ever and we have some exciting new developments within the GRSG. Firstly we welcome new committee members; Martin Black from the British Antarctic Survey, Rita Matildes from the University of Lisbon, Portugal and Gavin Hunt from Spectra-Map. We also say goodbye to our former Chairman, Jason, although I'm sure he will continue to join us for a drink after our committee meetings!

The GRSG is committed to helping our student members, this year we will once again offer three £750 student awards (see page 15). A further new development for the GRSG is our first joint GRSG-BARSC remote sensing careers evening, this free to attend event will bring students together with remote sensing companies in Burlington House, London on the 13<sup>th</sup> of June (see page 16).

Lastly I would like to draw your attention to two conferences. The GRSG are helping to organise and chair a geological session at this year RSPSoc conference, held in Aberystwyth, Wales in September, if you are interested in presenting then please see page 41 for more information. Of course we also have our own AGM, this year is our Silver Anniversary therefore the conference is titled '25 years of Geological Remote Sensing' and will be held in Burlington house from the 15<sup>th</sup> – 17<sup>th</sup> December, the call for papers has opened so please consider submitting an abstract and put the date in your diary.

Best Wishes

Luke Bateson (GRSG Chairman)  
[chairman@grsg.org](mailto:chairman@grsg.org)



# Editor's message



Dear all,

This newsletter is, as usual, full to the brim. First of all I would like to say a big thank you to everyone who attended the AGM last December in Berlin. Following the success of the 2011 AGM in Frascati, last year we relocated to Berlin for an excellent jam-packed meeting covering a broad range of topics. Have a look at the [AGM photos](#) and the presentations will be available shortly online.

In this issue, we have the usual [News and Developments](#) section, longer-length articles, [book announcements](#), and the first call for papers for our 25<sup>th</sup> Anniversary AGM in 2014. Martin Black, a new Committee Member, has written a summary of his enviable [fieldtrip to Antarctica](#). His work not only involves analysing the first ever hyperspectral dataset of Antarctica, but also involves meeting seals and penguins. We also include an article from ITC that describes a new project in [geothermal capacity building in the Philippines](#). We've had the pleasure of adding some new committee members this year. Over the coming issues you can read about them in our committee profiles, and first up is Rita Matilides.

There's lots of news for students this quarter. We have the announcement of this year's [student awards](#) (deadline 22<sup>nd</sup> April) and a 'save the date' for our very first [Remote Sensing careers evening](#) at the Geological Society, London. This event will be held in association with the British Association of British Remote Sensing Companies and will be free for all students to attend. It will be a fantastic opportunity for students to get an insight into remote sensing careers and to meet industry representatives. Last year, the North American GRSG committee held a [careers webinar](#) and the details of how you can catch up on it are also included in this edition.

As always, I hope you enjoy reading this issue and please feel free to send contributions. Any feedback is also always welcome.

All the best

Elspeth Robertson  
GRSG Newsletter Editor - [newsletter@grsg.org.uk](mailto:newsletter@grsg.org.uk)

As some of you may know GRSG now has its own group pages on both LinkedIn (over 1,700 members!) and Facebook but now we are also on Twitter under @grsg\_geolsoc. Search for us under GRSG – Geological Remote Sensing Group (LinkedIn and Facebook) and join in the discussions and meet other like-minded people. For more information on these groups please contact Huma Irfan.

All past GRSG newsletters (numbers 1 to 68) are available on the website  
<https://www.grsg.org.uk/newsletters/>

## Sochi, Winter Olympic sites



The Black Sea resort of Sochi, Russia, is the warmest city ever to host the Winter Olympic Games. The left image, acquired on Jan. 7, 2014, by the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on NASA's Terra spacecraft, shows the Sochi Olympic Park Coastal Cluster -- the circular area on the shoreline in the bottom center of the image -- which was built for Olympic indoor sports. The ASTER image on the right, acquired on Jan. 4, 2014, shows the Mountain Cluster where the alpine events took place, although the slopes are not quite as steep as they appear in this image as height has been exaggerated 1.5 times to bring out topographic details.

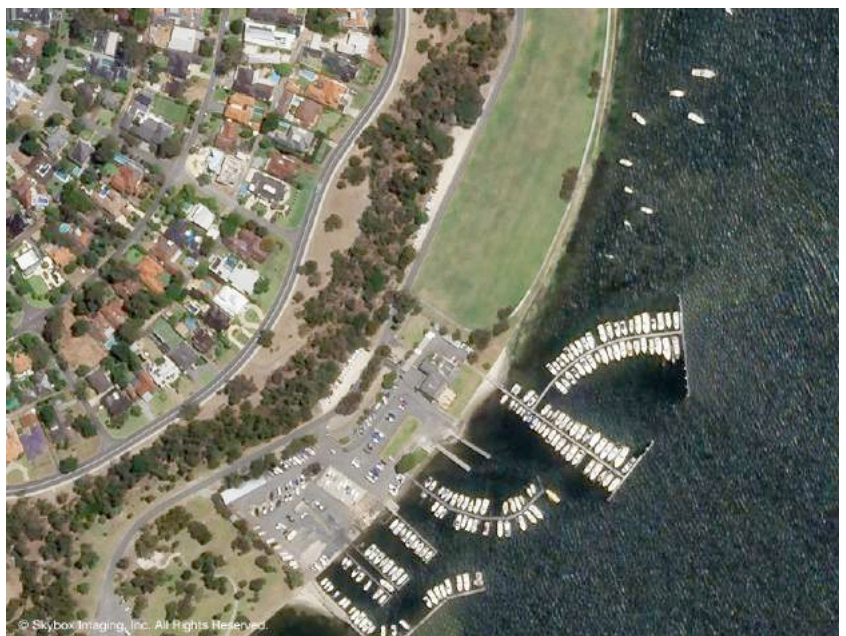
Source: <http://photojournal.jpl.nasa.gov/catalog/pia17970> & <http://photojournal.jpl.nasa.gov/catalog/pia17971>  
Image credit: NASA/GSFC/METI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team

## First Skybox images released

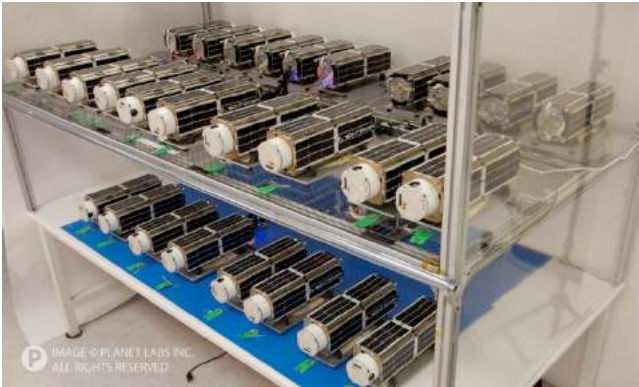
In December 2013 the first images and HD video from SkySat-1 were released.

SkySat-1 is a high-performance satellite producing sub-meter resolution imagery and high-definition video that was designed and built at the Skybox Imaging Headquarters in Mountain View, California. To Skybox's knowledge, SkySat-1 is the smallest satellite ever flown that is capable of capturing imagery at better than 1 meter resolution.

Photo: Beaton Parks in Perth, Australia  
Credit: SkyBox Imaging, Inc. All Rights Reserved



## Flock 1 of Planet Labs' CubeSats deployed



A constellation of 28 CubeSats, known as Flock 1, was successfully deployed from the ISS during February. These satellites are expected to return imagery with a resolution between 3 and 5 meters. Each satellite is around the size of a slice of bread and will monitor natural disasters, deforestation and environmental changes.

Image credit: Planet Labs

Source: <http://www.planet.com/flock1/> and <http://www.space.com/24972-cubesats-space-station-launch.html>

## Kompsat 5 images released

South Korea's Ministry of Science, ICT and Future Planning has released Kompsat 5 images acquired for the purpose of calibration.

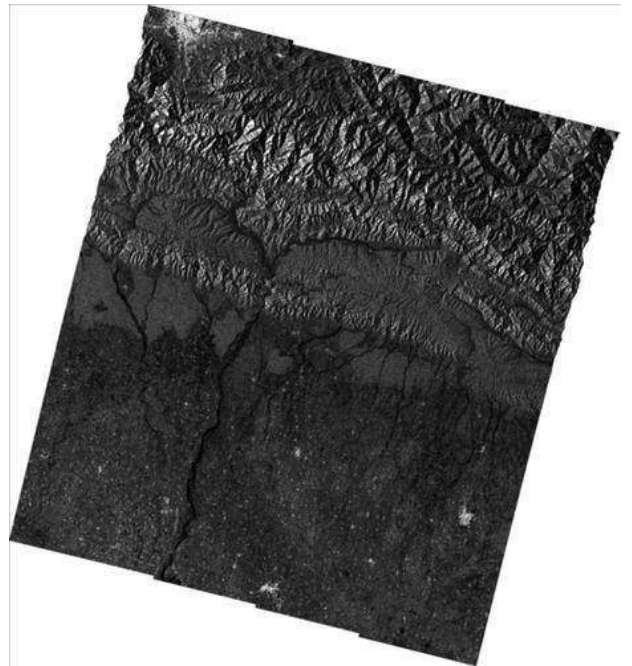
KOMPSAT-5 carries X-band synthetic aperture radar (SAR) for earth observation, and is capable of day-and-night imaging under all weather condition.

It provides three operation modes: High Resolution Mode (spotlight mode) to provide 1 m resolution with 5 km by 5 km swath, Standard Mode (strip mode) to provide 3 m resolution with 30 km swath and Wide Swath Mode (ScanSAR mode) to provide 20 m resolution with 100 km swath at 550 km altitude.

Figure: The Himalayas

Source:

<http://www.hellodd.com/news/article.html?no=46657> and [http://www.spacedaily.com/reports/SAR\\_images\\_acquired\\_by\\_KOMPSAT\\_5\\_999.html](http://www.spacedaily.com/reports/SAR_images_acquired_by_KOMPSAT_5_999.html)



## Mount Vesuvius wins DigitalGlobe's image competition

Mount Vesuvius took the crown in DigitalGlobe's annual Top Image of the Year competition.

Check out the top 5 images [here](#).

Source: [http://www.gim-international.com/news/remote\\_sensing/satellite\\_imagery/id7825-mount\\_vesuvius\\_wins\\_image\\_contest.html](http://www.gim-international.com/news/remote_sensing/satellite_imagery/id7825-mount_vesuvius_wins_image_contest.html)

Copyright: DigitalGlobe

## The floodwaters of Mars, 10 years imaging Mars

Ten years ago, on 14 January 2004, Mars Express took its very first images of Mars in colour and in 3D.

To mark the occasion, The Planetary Science and Remote Sensing Group at Freie Universität Berlin produced a fly-through movie of the ancient flood plain Kasei Valles. The movie is based on the [67-image mosaic](#) released as part of the ten-years-since-launch celebrations in June 2013.



The scene spans 987 km in the north–south direction, 19–36°N, and 1550 km in the east–west direction (280–310°E). It covers 1.55 million square kilometres, an area equivalent to the size of Mongolia. Kasei Valles is one of the largest outflow channel systems on Mars, created during dramatic flood events. From source to sink, it extends some 3000 km and descends 3 km.

The processing of the High Resolution Stereo Camera image data was carried out at the DLR German Aerospace Center.

Copyright: ESA/DLR/FU Berlin (G. Neukum)

Source: [http://www.esa.int/spaceinvideos/Videos/2014/01/The\\_floodwaters\\_of\\_Mars](http://www.esa.int/spaceinvideos/Videos/2014/01/The_floodwaters_of_Mars) and [https://www.youtube.com/watch?v=0LI4pU\\_KL9Y](https://www.youtube.com/watch?v=0LI4pU_KL9Y)

## Antarctica's ice loss on the rise

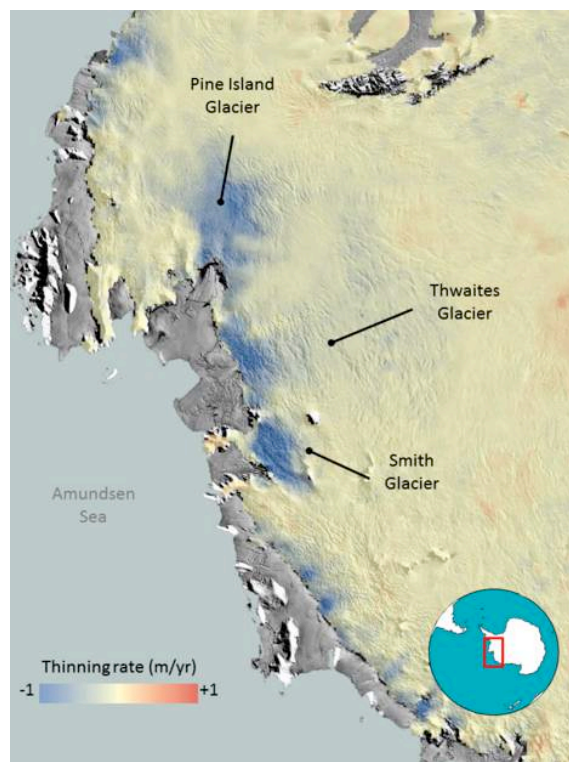
Three years of observations by ESA's CryoSat satellite show that the West Antarctic Ice Sheet is losing over 150 cubic kilometres of ice each year – considerably more than when last surveyed.

The imbalance in West Antarctica continues to be dominated by ice losses from glaciers flowing into the Amundsen Sea.

An international team of polar scientists had recently concluded that West Antarctica caused global sea levels to rise by 0.28 mm each year between 2005 and 2010, based on observations from 10 different satellite missions. But the latest research from CryoSat suggests that the sea level contribution from this area is now 15% higher.

Source:

[http://www.esa.int/Our\\_Activities/Observing\\_the\\_Earth/CryoSat/Antarctica\\_s\\_ice\\_loss\\_on\\_the\\_rise](http://www.esa.int/Our_Activities/Observing_the_Earth/CryoSat/Antarctica_s_ice_loss_on_the_rise)





## Free SPOT data for Researchers



The French government has agreed to open its Spot optical Earth observation data archive and distribute, free of charge to noncommercial users, Spot satellite data that are at least five years old. In addition to requiring a five-year time lag between when an image is taken and when it is freely available for distribution, the policy excludes Spot 5 data with resolutions sharper than 10 meters.

CNES said its decision was made in concert with Airbus Defence and Space, formerly named Astrium Services, which since 2008 has been the majority shareholder in the company that commercializes Spot data.

CNES has already begun processing, at its own charge, a first tranche of 100,000 images that will be available later this year.

Source: <http://www.spacenews.com/article/civil-space/39234france-to-make-older-spot-images-available-to-researchers-for-free>

Image: Oleron, France

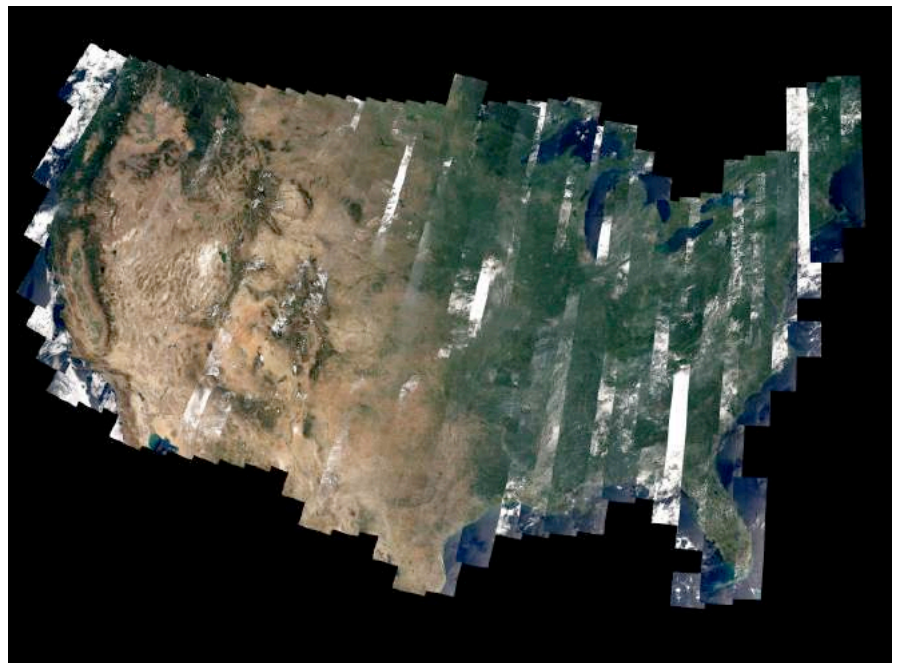
Copyright: CNES 2003, Distribution Astrium Services / Spot Image

## Landsat 8's first year

On Feb. 11, 2013, the Landsat 8 satellite rocketed into a sunny California morning onboard a powerful Atlas V and began its life in orbit. In the year since launch, scientists have been working to understand the information the satellite has been sending back. Some have been calibrating the data—checking it against ground observations and matching it to the rest of the 42-year-long Landsat record. At the same time, the broader science community has been learning to use the new data.

The strips in the image above are a result of the way Landsat 8 operates. Like its predecessors, Landsat 8 collects data in 185-kilometer (115-mile) wide strips called swaths or paths. Each orbit follows a predetermined ground track so

that the same path is imaged each time an orbit is repeated. It takes 233 paths and 16 days to cover all of the land on Earth. This means that every land surface has the potential to be imaged once every 16 days, giving Roy two or three opportunities to get a cloud-free view of each pixel in the United States in a month.



Source: <http://www.nasa.gov/content/landsat-8s-first-year/#.UyLfh58-h>

Image credit: NASA/David Roy

## Nasa Mars orbiters see clues to possible water flows



This image combines a photograph of seasonal dark flows on a Martian slope with a grid of colors based on data collected by a mineral-mapping spectrometer observing the same area.

The features are dark, finger-like markings that advance down some Martian slopes when temperatures rise. Researchers didn't find any spectral signature tied to water or salts but they did find distinct and consistent spectral signatures of ferric and ferrous minerals at most of the sites. . These support a suggestion that brines with an iron-mineral antifreeze, such as ferric sulfate, may flow seasonally, though there are still other possible explanations.

The photograph is from the High Resolution Imaging Science Experiment (HiRISE) camera. The composition information, as an image with pixels appearing as a grid of squares, is from the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM). Both of these instruments are on NASA's Mars Reconnaissance Orbiter.

Source: <http://www.jpl.nasa.gov/spaceimages/details.php?id=PIA17934> and [http://www.jpl.nasa.gov/news/news.php?release=2014-042&1&utm\\_source=iContact&utm\\_medium=email&utm\\_campaign=NASAJPL&utm\\_content=releases20140210](http://www.jpl.nasa.gov/news/news.php?release=2014-042&1&utm_source=iContact&utm_medium=email&utm_campaign=NASAJPL&utm_content=releases20140210)

Image credit: NASA/JPL-Caltech/UA/JHU-APL

Figure: Palikir Crater in the southern hemisphere of Mars.

For more news and information about GRSG check out the news feed on our new website!

<http://www.grsg.org.uk/>



# AGM Summary



Following the success of the 2011 AGM in Rome, last year's AGM was held in an "away" location - this time in Berlin. The conference was held between the 9-11<sup>th</sup> December in the representative office of Saxony-Anhalt Lander, in the political, historic and cultural centre of Berlin. The conference once again drew in an international audience, attracting representatives from geological surveys, research institutes, academia, mining, oil and gas companies and from specialist remote sensing companies and suppliers, amongst others.

The theme "Status and developments in geological remote sensing" drew in a diverse range of presentations and over the course of three days topics included hyperspectral applications, mapping, mineral exploration, InSAR, geohazards and many more. We had a great range of conference sponsors that included: Geosense, Astrium, CGG, DigitalGlobe, Southern Mapping Company, Exelis, Riegel, Specim, Hexagon, Intergraph, TerraCore, Arup, SphereOptics, iTres, SpecTIRE, Spectral Evolution, Spatial Energy, HyVista, BlackBridge, Earth Server, TRIGIS and GAFAG. Of course, this meeting would not have been possible without our colleagues in Germany from DLR and Martin Luther University Halle-Wittenberg.



Day 1 saw presentations on the theme of Geological Mapping, Oil and Gas, and Geohazards and the Environment. These sessions were followed by the annual AGM where the Committee updated the members on their work during the 2013 as well as committee changes. Day 2 and 3 saw presentations on Hyperspectral, New Developments, DEM and Geomorphology, InSAR and some more Geological Mapping and Mineral Exploration. Nearly all presentations have been released can be accessed from our website, ready for you to indulge whenever you feel like it.

As per GRSG tradition, not all time was spent in the lecture theatre but also at organised social events that allowed the perfect opportunity to relax and have further discussions. The Icebreaker was at the fantastic Daimlers, a Mercedes showroom and restaurant where I am pretty certain you could take home a car as a souvenir. The conference dinner was perhaps was on the most atmospheric we've ever had, as we were in the Museum of Natural History. Here we ate under the gaze of dinosaurs and wondered around the exhibits rocks and Stone Age tools.



The Committee would like to say a huge thank you to everyone who presented and attended. A big thank you goes to the organising Committee, both in London and Berlin. We also thank the sponsors for their support and making the 2013 AGM possible and memorable. We look forward to seeing you in December 2014 for our 25<sup>th</sup> Anniversary AGM, which we promise won't be one to be missed!

# 2013 AGM photos



# 2014 AGM: first call for papers



Geological  
Remote Sensing  
Group

**25** Years of Geological Remote Sensing  
15<sup>th</sup> – 17<sup>th</sup> December 2014  
The Geological Society, London

## FIRST CALL FOR PAPERS

The Geological Remote Sensing Group (GRSG) announces the first call for papers for the 25<sup>th</sup> Anniversary meeting. This meeting will celebrate 25 years of geological remote sensing focusing on the pinnacle moments during this period as well as looking at the wide range of remote sensing tools, latest developments, sensors and applications that are now available.

As usual, abstracts are welcome on a wide range of remote sensing themes, including:

- **Retrospective viewpoints** on how remote sensing has changed in 25 yrs (e.g. Landsat, ASTER, Hyperspectral etc)
- **New sensors:** technological developments, analytical methods & algorithms
- **Latest developments in:**
  - Mineral exploration
  - Oil & Gas
  - Geological applications (geological mapping, lithological classification, tectonics, seismology)
  - Geomorphology
  - Geohazards (e.g. landslides, flooding)
  - Terrain, Bathymetry and Elevation models
  - Classification, multi-temporal analysis and modelling
- **Planetary science** & comparative geomorphology
- **Hyperspectral & Multispectral; Radar / InSAR; Optical & high resolution**

**Abstracts (Oral Presentations and Posters):** Title, Author(s) and 300 word abstract should be sent to [agm@grsg.org.uk](mailto:agm@grsg.org.uk)

**Further information, sponsorship opportunities and logistics:** <http://www.grsg.org.uk/>

The Geological Remote Sensing Group (GRSG) is a special interest group of The Geological Society (GeoSoc) and the Remote Sensing and Photogrammetry Society (RSPSoc) formed in 1989. For further information visit [www.grsg.org.uk](http://www.grsg.org.uk)

### Important dates:

Registration opens: **1<sup>st</sup> May 2014**

Call for papers closes: **1<sup>st</sup> September 2014**



The  
Geological  
Society

*servicing science & profession*



## Attention all students!!



**GRSG Membership for students is only £7!** As a GRSG student member you are able to apply for the annual Student Award (see the next page for further details), you can get exclusive access to the current and old Newsletter issues, as well as receive invitations to careers webinars and events.

If you would like to join you can do so online at <https://www.grsg.org.uk> or if you would like to know more information please contact the GRSG Student Representative Xue Wan ([x.wan12@imperial.ac.uk](mailto:x.wan12@imperial.ac.uk)) or the GRSG Membership Secretary, Huma Irfan ([membership@grsg.org.uk](mailto:membership@grsg.org.uk)).

# Fieldwork Bursary

Nigel Press was very honoured by the GRSG's gesture in making him Life-time Member of the GRSG following the support of Nigel Press Associates Ltd (now CGG Services (UK) Ltd) in GRSG activities for a number of years. Recognising that there is still much needed scientific progress to be made in our discipline, he wanted to offer some continuing contribution for the future in return. Nigel is therefore pleased to announce that a fieldwork bursary fund run by his family is being opened to Members of GRSG. The Fund provides a few bursaries each year, mainly to MSc students, to undertake fieldwork which has a humanitarian, sociological or environmental benefit, and ideally is carried out in conjunction with an NGO. Selection of projects is made purely on merit; last year The Fund partly supported a GRSG member, Naomi Morris, on a very ambitious trip to work on geo-hazards in Papua New Guinea, other recipients included undergraduates from Oxford who worked on the Colima volcano in Mexico and L'Aquila earthquake site in Italy.

More details on this opportunity and how to apply can be found at [www.lydiapress.org](http://www.lydiapress.org)





## The Geological Remote Sensing Group

### Annual Student Award

- ❖ Three awards of £750 for geoscience remote sensing research
- ❖ The student awards are available for GRSG student members in full or part-time university program

**The deadline for application is 22<sup>nd</sup> April**

More information : <https://www.grsg.org.uk/>

Follow us:



# Student Careers Event



Geological Remote Sensing Group



## SAVE THE DATE

### Joint GRSG/BARSC Student Careers Event

Friday June 13<sup>th</sup> 2014  
3pm onwards  
The Geological Society, London



The Geological Remote Sensing Group (GRSG) together with the British Association of Remote Sensing Companies (BARSC) are hosting a student careers event at the Geological Society in Piccadilly on Friday June 13<sup>th</sup>.

This **free** event provides university students and recent graduates with the chance to meet a variety of remote sensing companies who operate within the UK and internationally. This event is of interest to those with an interest in any area of remote sensing and not limited to those with a geological background.

The event involves a series of short presentations by individuals working in the remote sensing industry, with the aim of providing attendees with an insight into the diverse range of roles and the varied career paths that exist within the sector (both geological and non-geological). The talks will be followed by a drinks reception where students are encouraged to network with members of industry and find out more about potential employers.

If you are interesting in presenting at this event please email [agm@grsg.org.uk](mailto:agm@grsg.org.uk)

Further information on registration, exhibition and logistics will be circulated nearer the time and will be available online ([www.grsg.org.uk](http://www.grsg.org.uk) and [www.barsc.org.uk](http://www.barsc.org.uk))

#### **About GRSG**

*The Geological Remote Sensing Group (GRSG) is a special interest group of The Geological Society (GeoSoc) and the Remote Sensing and Photogrammetry Society (RSPSoc) formed in 1989. For further information visit [www.grsg.org.uk](http://www.grsg.org.uk)*

#### **About BARSC**

*The British Association of Remote Sensing Companies actively promotes the interests of all organisations and individuals who work with remote sensing technology and data. Remote Sensing (or Earth Observation) includes companies and organisations involved in satellite building and launching, processing, distributing and selling the collected data as well as offering expert services to make best use of this incredible resource. For further information visit [www.barsc.org.uk](http://www.barsc.org.uk)*



# GRSG Careers Webinar



Last November, the GRSG North America Committee hosted a “Careers in Remote Sensing and GIS” Webinar. The webinar is now available to watch at <ftp://ftp03.spatialenergy.com> (user and p/w GRSG)

The flyer below describes the webinar format and the speakers.



## GRSG North America

### Student Webinar: Careers in Remote Sensing and GIS

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- **Date: Wednesday, November 20, 2013**
  - **Time: 11:00 am – 12 pm Mountain Time (12 – 1 pm EST, etc.)**
  - **Format:** Short Presentations, followed by Q & A session
  - **Presenters:**
    - Ben Clarke, Nexen Global Exploration (10 min)**
    - Lorraine Tighe, Intermap (10 min)**
    - Bob Brovey, Brovey and Associates (10 min)**
  - **Series of Topics Covered:**
    - Introductory Slide(s) – Position, Education, Experience, Contact Info.
    - Description of Role/Position/Job – Skills Required / ‘tools for success’, Rewards
    - Career Opportunities – Rewards, Sectors– Industry (e.g. Majors), Government/Public, Academia > What can you do to aid your own success...
  - **Hosted by Spatial Energy**
- **Registration Web Link:** <https://www1.gotomeeting.com/register/588744336>



### GRSG North American Committee

# Field spectroscopy in the Antarctic



GRSG committee member Martin Black shares tales from recent fieldwork in the Antarctic.

“It’s not actually *that* cold”... or at least that’s the main thing I’ve been telling people since settling back into the real world after a month long visit to Antarctica.

Before I regale you with tales of my Antarctic exploration, I’ll go over a little of the back-story and why I actually ended up in Antarctica. I started my NERC funded PhD back in October 2013 on joint project with the British Antarctic Survey (BAS) and the University of Hull. My PhD was exciting before the possibility of any fieldwork was even mentioned – my primary dataset is from an airborne hyperspectral campaign, collecting visible, shortwave and thermal infrared data simultaneously. Now to most of you, that probably doesn’t sound very exciting, but this dataset is special. It’s the first ever



*Top left to bottom right: Boarding the Dash 7 in Punta Arenas; the pilots during the flight (yes they fly with the cockpit door open); spectacular views of the Antarctic Peninsula; a Dash 7 landing at Rothera.*

airborne hyperspectral data from Antarctica (yes, we even beat the Americans who practically invented hyperspectral imaging!)... and I have three years, or thereabouts, to use this dataset for geological mapping.

One of my supervisors here at BAS, Dr. Teal Riley, is what you would call a “proper” field geologist. He’s been at BAS for almost 20 years and spent dozens of field seasons doing traditional geological mapping the Antarctic. I on the other hand, consider myself firmly in the field of remote sensing, meaning I spend many hours sat at a computer looking at imagery of faraway places; though I seldom get to actually visit the places where the data was collected. Early on in my PhD, I discovered there was little ground spectral data available from the Antarctic, perhaps not a big surprise. However, Teal said not to worry; we’ll be able to fill in the gaps when we head to Antarctica. Now this was a shock; my PhD was advertised with no mention of fieldwork and generally when you do remote sensing, that’s usually the case. Lo and behold, a few successful grant applications later and we had plane tickets to Chile and peli-case of spectrometers ready to go.



*Top left to bottom right: a Weddell Seal; a nesting Skua (looking calm for once); some curious Adélie penguins; an elephant seal.*

We left for the Antarctic in early January this year, heading through South America. Several flights and several hours days later saw us arrive at Punta Arenas, at the very southern tip of Chile. From there, thanks to bad weather in Antarctica, we had a few days to relax before our connection to BAS' main research station, Rothera (67°S, 68°W). BAS operate a fleet of aircraft, with a DeHavilland Dash 7 being used for people and cargo transfers between the bases and South America, and several Twin Otters for field operations. There was myself and Teal on the flight, along with some of our Canadian collaborators, Stephen Achal from ITRES Research Ltd., and Eldon Puckrin from the Canadian Department for Research and Defense who were bringing along some special military grade spectrometers. The flight was also shared with a cohort of other BAS employees and even a documentary crew.



*Left: Me using the field spectrometer. Top Right: The team on arrival at Anchorage Island (L to R: Martin, Alex, Teal, Eldon, Stephen). Bottom Right: Teal in foreground, while collecting spectra on Lagoon Island.*

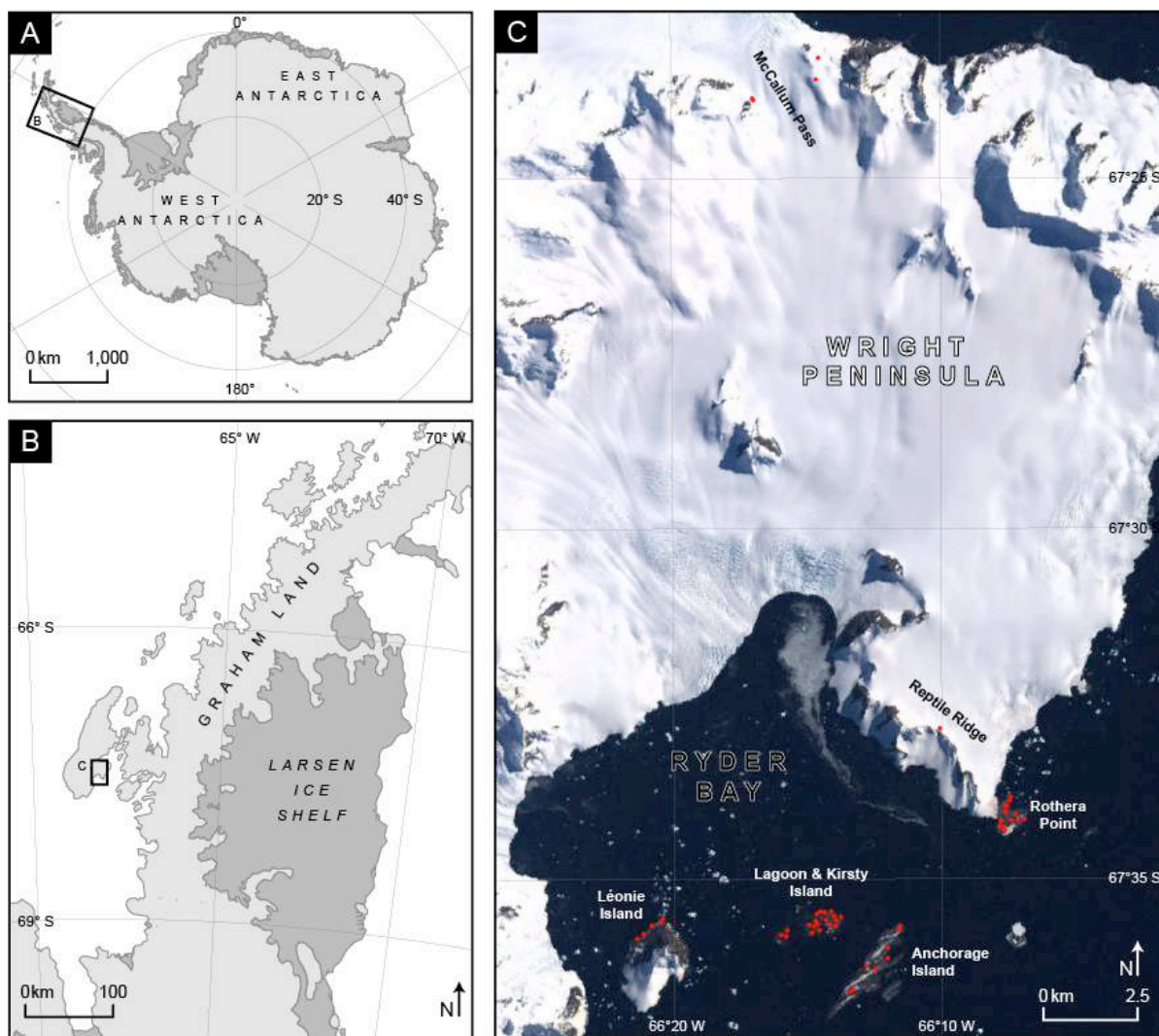
The flight itself was largely uneventful as it's mostly spent over the ocean and after the 20+ hours of flying it took to get to South America, I was pretty much fed up of being on a plane. Those feelings went away after about 3 hours of flying, as we started to get some glimpses of the Antarctic Peninsula. The views from my cabin window moved from lonely icebergs through to sea ice, and eventually the spectacular mountainous and glaciated terrain that makes up the majority of the Antarctic Peninsula.

With little time to take holiday snaps and comprehend the spectacular scenery we were on the approach to Rothera. After landing, we were welcomed by the Base Commander and whisked away into various base induction type activities.

The first few days on base were a bit of blur – we had a few days of field training and spent time testing our spectrometers. I also ate copious amounts of food; on base you can eat a hot meal almost every 2 hours during the day (you have to eat more when it's cold, right?). I spent a little while walking around the research station getting to know the local wildlife too; from curious Adelaide penguins to the somewhat aggressive Skua's (if you go near their nests) and plenty of lazy (and very smelly) elephant seals that hang around on Rothera Point.

By the time we'd finished our training and testing we set out to do some actual science. We had two spectrometers with us, an optical based spectrometer for measuring the visible and shortwave infrared which was field portable, and a Fourier Transform Infrared (FTIR) spectrometer for the shortwave and thermal infrared, which was slightly less portable. We had grand ambitions to get to all the areas of airborne data acquisition that were possible to reach from Rothera. This meant a lot of boat travel to nearby islands. If I learnt one thing from the boat travel it's that thermally insulated boat suits are claustrophobic... and it's definitely a two man job to get in and out of them (you wear them over normal clothes, so it's a bit of a squeeze).

Once we had arrived on the islands it was time for the actual field spectroscopy. Spectroscopy isn't a terribly exciting thing to write about... in short, you just zap rock surfaces with the spectrometer and the data is saved to a field laptop; rinse and repeat, for several hours a day (with some walking between field sites). However, all of this is incredibly exciting when you're in the Antarctic. The scenery and wildlife certainly make up for repetitive nature of field spectroscopy. For maximum efficiency we split into two field teams; Team UK (Teal and I) and Team Canada (Stephen and Eldon). Teal and I took one of the spectrometers into the field and Team Canada stayed at the base camp operating the other spectrometer. We also had a Field General Assistant (Alex Shipp) who was really helpful in his primary role of bringing us lunch (!) and secondary role of transporting the geological samples back to Team Canada. This set up meant we had a really productive time acquiring over 700 spectra and collecting around 250 geological samples (which I'm told will miraculously appear in Cambridge in a few months).



Maps showing the context of the Antarctic Peninsula (A), the Study areas within on Southern Adelaide Island (B) and the field stations overlain on a Landsat image (C).

Our samples were mostly collected from the Granodiorites which make up the Adelaide Island Intrusive suite, but there were also samples collected from the various bits of moss and lichen which have started to take hold on the low-lying, ice free islands along with the copious amounts of seal and bird pøø guano which forms a thin veneer over the geology. All of these samples will hopefully help me piece together a spectral library which will help with the interpretation and analysis of the airborne hyperspectral data.

After having an intense schedule over the first three weeks, we had a few days of relaxing at the end of the trip, completing some of the spectroscopy back in the lab at base and packaging the samples and kit for shipping back to the UK. I also managed to get my very first taste of downhill skiing, on my own private ski slope, which was an amazing experience.

In early February, we left Rothera for the long journey home though this time via the Falkland Islands which is a slightly more direct route than the South American route. Once in the Falklands I had a chance to reflect on the whole experience. We had a very successful field season and I am very grateful to everybody involved with the trip and to the BAS staff in both Cambridge and the Antarctic. In particular I would like to thank Teal Riley my supervisor for realising and organising the trip. The work would have not been possible without his passion and work ethic (and the occasions where I needed some motivation, when I was cold, tired and getting attacked by Skuas carrying a heavy spectrometer on my back). I'd also like to thank Alex Shipp, Stephen Achal and Eldon Puckrin for their support in the field and both Eldon and the NERC Field Spectroscopy Facility for the loans of their spectrometers.

# GEOCAP: Geothermal Capacity Building Program (Indonesia-Netherlands)



*Freek van der Meer, Chris Hecker*  
University of Twente, Faculty ITC, The Netherlands

## **Background**

At the University of Twente, faculty ITC, we recently started a program directed at capacity building in geothermal exploration in Indonesia. The ITC group is coordinating and managing this program while also contributing its geologic remote sensing expertise to the team. In this article we summarize the potential role of remote sensing in geothermal exploration, we provide some background on the economic developments and related energy issues in Indonesia and we reflect on the GEOCAP Geothermal Capacity Building Program (Indonesia-Netherlands).

## **Geothermal energy exploration**

Temperature gradients in the Earth's crust are typically 25 to 30°C per kilometer depth, however in active volcanic areas situated in subduction or rift zones, gradients of up to 150°C per kilometer depth can be reached. In such volcanic areas, meteoric water in permeable and porous rocks is heated and hot water is trapped to form a geothermal reservoir. At the Earth's surface hot springs and fumaroles are evidence of hot geothermal water. In low enthalpy systems the heat can be used for heating/cooling and drying while in high enthalpy systems energy is generated using hot water or steam.

Geothermal exploration methods find suitable target locations for steam or fluid production. During per-feasibility studies of prospective areas, scientists explore both the likelihood of the presence of a commercial geothermal reservoir, but also investigate the regional power demand, the regulatory framework, infrastructure, access to the power grid as well as environmental conditions and legislation. Remote sensing plays a role in some of these aspects, particularly in environmental base line mapping, mapping infrastructure etc., but this newsletter article addresses the use of remote sensing in the geologic exploration and reconnaissance stage detection of prospective areas.



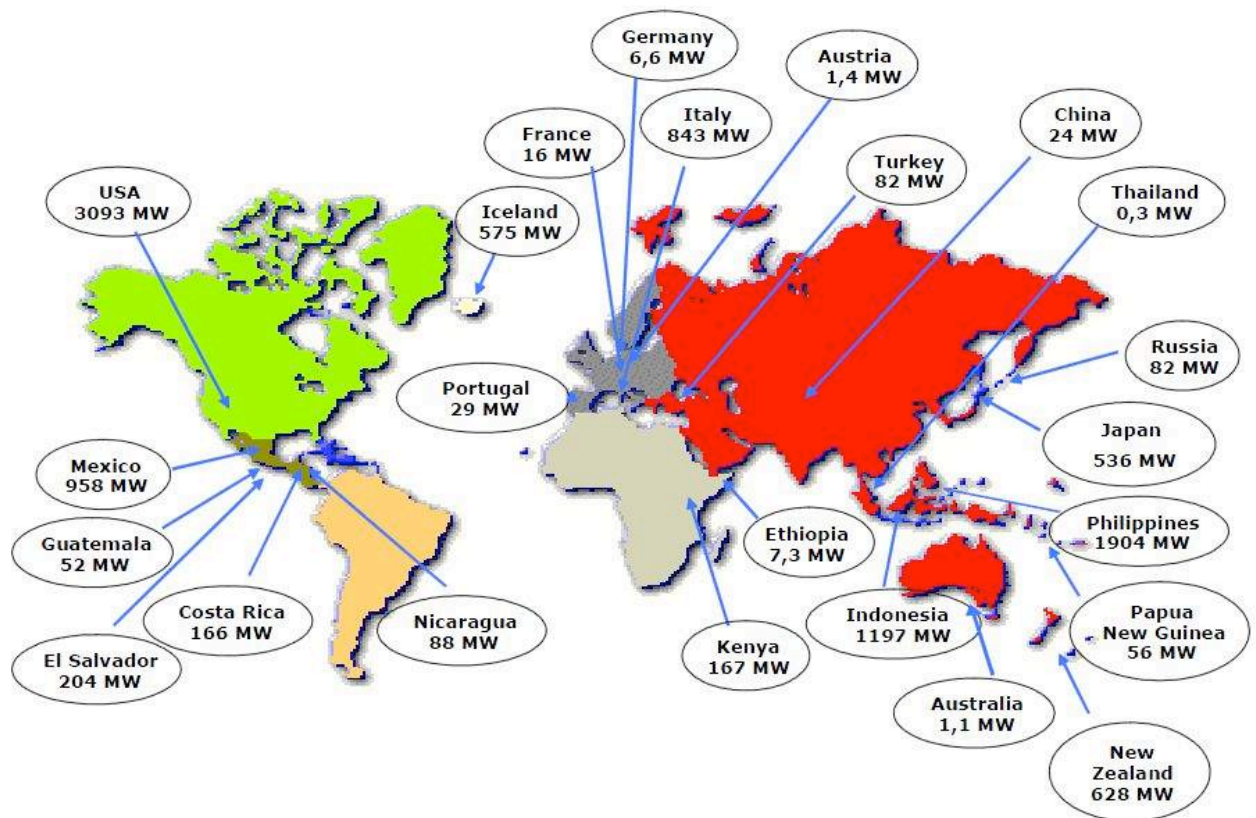


Fig. 1. Worldwide distribution of the 10.9 GW installed geothermal capacity in 2010 (after: Bertani, 2012, *Geothermics* 41, p 1– 29).

Traditional exploration methods for geothermal resources include: hydrology, geochemistry, and geophysics. A hydrogeological survey aims to reconstruct the water circulation system trying to relate surface manifestations of geothermal activity (e.g., hot springs, steam vents, fumaroles, etc) to fault/fracture systems, variation in lithology etc. Geochemical surveys typically sample water from hot springs, gas from hot pools and steam from fumaroles where the fluid chemistry can be used to develop geothermometers that provide an estimate of the temperature of deep reservoirs. A multitude of geophysical techniques are deployed in exploration surveys for geothermal characterization. Gravity and magnetic surveys provide information about subsurface lithology and active seismic surveys as well as (passive) seismic tomography provide information about subsurface structure and identification of warmer and cooler regions. Reservoir modeling integrates elements from geological, geochemical and geophysical surveying to refine the geologic model through numerical simulation in order to understand the behavior of a geothermal reservoir, to find the most suitable and productive reservoir, to estimate reservoir volume and recoverable heat, to identify zones of high permeability, to locate drilling locations, and to forecast future well and reservoir behavior.

Although geothermal energy forms a few percent of the total energy mix worldwide (Figure 1), in countries with high volcanic activity there is great potential to use this natural heat source to

generate energy. There are a number of pros and cons for geothermal energy as opposed to alternative renewable energies (hydro, solar, wind etc) as well as fossil fuel based energy production. There is the obvious advantage of less carbon dioxide emissions and thus a 'cleaner energy source'. Geothermal electric plants typically produce 13 g/kWh of Carbon dioxide while the CO<sub>2</sub> emissions are 453 g/kWh for natural gas, 906g g/kWh for oil and 1042 g/kWh for coal. Geothermal plants can be online 100%-90% of the time while coal plants can only be online 75% of the time and nuclear plants can only be online 65% of the time. The disadvantages are the high building costs of around \$1175-1750 per kW installed capacity as well as high financial risks during the exploration phase; thus geothermal energy is generally perceived as more expensive than traditional energy sources. Geothermal areas aren't always near electricity grids and exploitation may result in minor earthquakes, subsidence, etc. and heat depletion, and natural cooling of Earth's crust cannot be avoided.

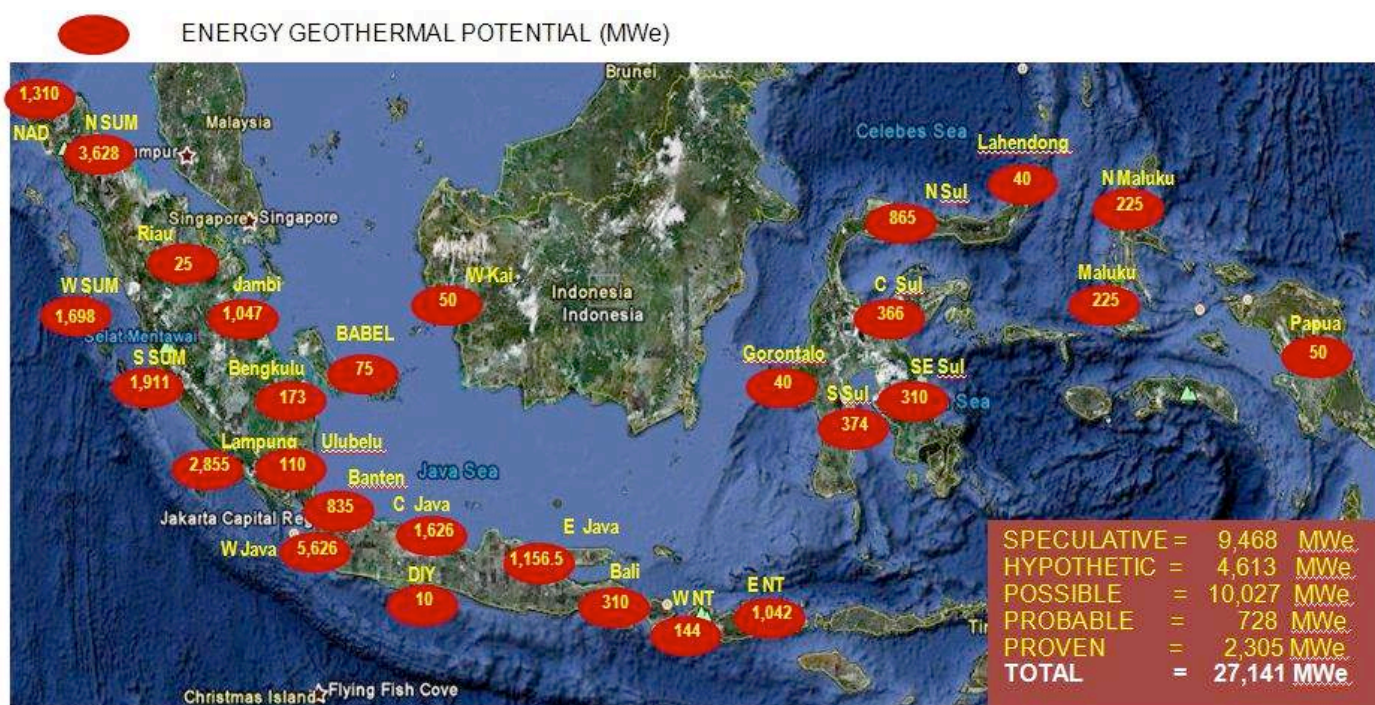


Fig 2. Regional distribution of geothermal potential in Indonesia showing the largest potential in Java and Sumatera islands (courtesy: Antonaria, BAPPENAS)

### The role of remote sensing

Geologic remote sensing can be integrated into the process of geothermal exploration, however at present it is not yet an integral part of it. Besides for environmental studies, remote sensing can be used in the exploration stage of geothermal prospecting. Typically geothermal sites are monitored with interferometric SAR aimed at studying land subsidence and surface deformation. Most of these measurements are done with ERS and ASAR data and with the advent of the ESA sentinel-1 mission it can be perceived that such measurements will be done routinely in future geothermal projects. Reconstructing the relation between the stratigraphy and structural geology of a

geothermal area in relation to the hydrogeology is important for unravelling the functioning of cap rock, reservoir and circulation of geothermal fluids. Combined use of multispectral enhanced image products and products derived from digital terrain models have been demonstrated for structural mapping. In addition, both multispectral and hyperspectral remote sensing is used for surface alteration mineralogy mapping where the altered rock mineralogy is indicative of the temperature and thus tells us something about the location of a reservoir. Thermal remote sensing is used to map surface temperature and to estimate the geothermal heat flux. These are parameters relevant to characterize a reservoir. Spatial variation of soil temperature gradients has been shown to influence vegetation communities. Optical multi- and hyperspectral remote sensing offers potentially a tool to map vegetation parameters that can be related to vegetation species diversity and vegetation stress. These vegetation parameters may guide in finding reservoir areas.

### **Indonesia's economic development and energy needs**

Indonesia among other countries in the 'ring of fire' has a number of operational geothermal power plants and a huge resource for thermal energy (Figure 2). Indonesia is with 220 million people and a GDP estimated around US\$800 billion in 2010 one of the largest economies in Southeast Asia with a steady growth rate of 5 to 6 percent per year. The population growth rate along with the economic growth impacts on the countries need for infrastructure (e.g., schools, hospitals, housing, roads), resources (e.g., food, water, electricity), and jobs. In 2006, the Government of Indonesia the adopted the Fast-Track Program designed to rapidly develop 10,000 MW of generation capacity utilizing the relatively inexpensive coal resources that is abundant in the country. This resource is cheap but the downside is that it is results in massive CO<sub>2</sub> and dust emissions which are hazardous to

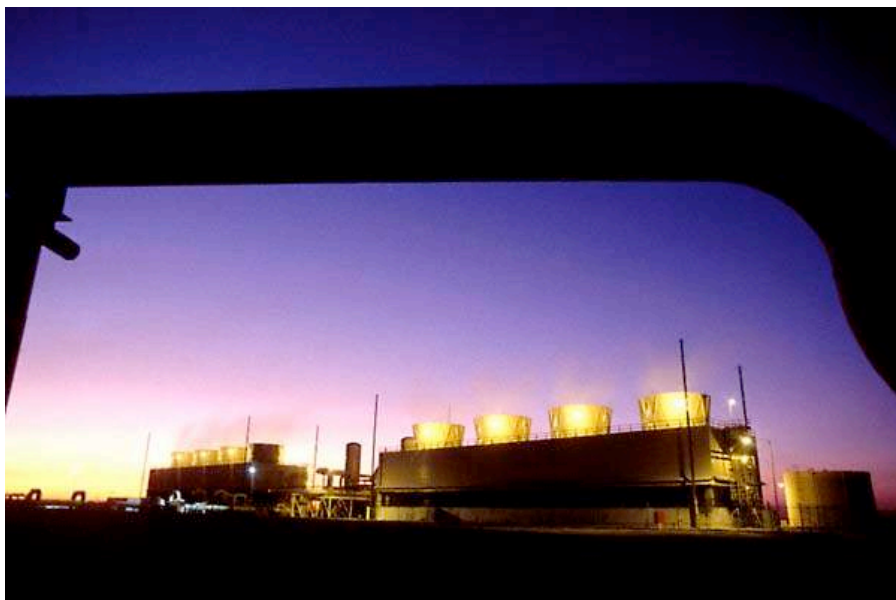


*Fig 3. Fumarole Gedong Songo (Courtesy: Suryantini, ITB)*

the people and environment and negative contribute to climate change. Indonesia however is also committed to international agreements on greenhouse gas emission. The government launched the INISIATIF ENERGI BERSIH (More Energy, less Carbon), the Indonesian effort to limit the impact of climate change caused by greenhouse gas emissions. This initiative proposes a 9,500 MW of Geothermal electricity generation to be commissioned by 2025 that will reduce 69.5 million

ton CO<sub>2</sub> annually and over 2,085 million calculated over a 30 year. There are presently two main hurdles to overcome that limit the development of geothermal energy: lack of skilled and trained personnel to explore, produce and exploit the resource and the competition between exploration and protection of forest areas as most of the suitable locations for geothermal energy are located in protected forest areas. To achieve the ambition of the Government of Indonesia to increase energy production from geothermal resources to 3556 MW in 2014 and 12.332 MW and to support the 20 new geothermal working areas, geothermal companies will need earth scientists (geophysicist, geologists, geochemist) but also engineers, economists, land conservation experts and legal experts.

## About GEOCAP



*Fig 4. The Salak geothermal powerplant operated by Chevron (Courtesy: Abadi Poernomo, INAGA)*

The dynamic growth and ambitious plans of the geothermal sector in Indonesia require a lot more skilled personnel and well-trained scientific specialists than currently exist hence a nationwide capacity building program has been drafted by BAPPENAS; the Ministry of National Development Planning. It is difficult to assess the capacity needed both in volume as well as in level of education. The Netherlands Embassy started to assist BAPPENAS in 2009, to

accelerate investments in geothermal areas. In 2014 the Netherlands-Indonesian geothermal capacity building program GEOCAP led by the University of Twente was launched. The Netherlands contribution to the program is 5.85million euro. The objective of the program is to increase the capacity of Indonesia's Ministries, Local Government Agencies, public and private companies and knowledge institutions in developing, exploring and utilization of geothermal energy sources, and to assess and monitor its impact on the economy and environment. A broad Indonesian-Netherlands consortium consisting of 11 universities, knowledge institutes and geothermal companies formed a Public-Private Partnership to draft GEOCAP. Indonesian partners include: Technical University Bandung (ITB), University of Indonesia (UI), Gadjah Mada University (UGM), INAGA, geothermal companies, WWF Indonesia. Dutch partners include: IF Technology,

Well Engineering Partners (WEP), TNO, DNV-KEMA, Delft University of Technology, Utrecht University, and University of Twente (consortium leader).



*Fig 5. Wayang Windu panorama in west Java operated by STAR-ENERGY with 227 MW (Courtesy: Abadi Poernomo, INAGA).*

The GEOCAP program has a number of intimately linked components:

- An Education and training program; focusing on developing capacity at university and technician level in support of the development of the geothermal sector
- A Research program; addressing the real needs of the sector and solving real life problems related to exploration, exploitation of geothermal resources as well as environmental and legislation issues.
- A Data base program; to collect, standardize, digitize and store surface and subsurface information relevant to geothermal development.
- explore the use of-low & medium enthalpy resources in Indonesia

- A geothermal 2050 program; out of the box thinking is necessary to explore potential unconventional geothermal resources that at present are undiscovered or technically not yet feasible.

The program aims to engage with local governments and local population. This is unique and highly needed as all the permits are dealt with (contrary to oil and gas concessions that are dealt with by the state government) by local authorities who are only in part known with geothermal energy exploration. In this presentation we will report on the status of GEOCAP, discuss the challenges of geothermal exploration in the Indonesian context both from a geosciences perspective as from a policy perspective and we will discuss the advantages of collaborating in a public-private setting.

For more information:  
f.d.vandermeer@utwente.nl



*Fig. 6. Active geyser with surface mineral alteration (Courtesy: Raats, Agentschap.nl)*

# Committee Profile – Rita Matildes



I graduated in Applied Geology in 2005 but even before that I realized that my great interest resided in remote sensing (and not so remote!) as a key tool to study external geodynamic processes. From 2006 to 2011 I worked as a junior research fellow at the Faculty of Sciences, University of Lisbon (FCUL), integrated in projects involving the application of aerial photogrammetry to study coastal cliff retreat phenomenon (which was also my MSc. final project) and the development of GIS databases and 3D geological/geotechnical models.

Since 2011 I have been working on my PhD in Geographic Engineering, a work that focuses on the application of terrestrial photogrammetry and terrestrial laserscanner to study the susceptibility to the occurrence of mass movements at a local scale, also on coastal cliffs. This work integrates a larger national project that aims to develop and establish a coastal monitoring system in Portugal, a project in which I am responsible for terrestrial surveys and monitoring of cliff failures in 11 high risk prone beaches. At the present time, one year to the end of my PhD fellowship, I am redirecting my energies to GIS again, a discipline that I have already assist in teaching for 2 years in the Geographical Engineering, Geophysics and Energy department of FCUL, particularly in 3D applications, and also in BIM, a theme in which I have a parallel project.

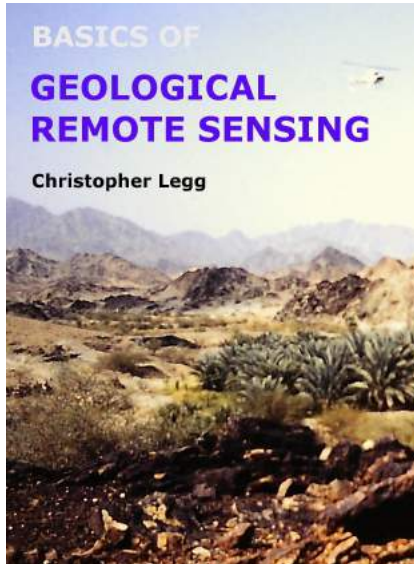
I believe GRSG stands out in both academic as industry communities as a very important core of knowledge and expertise sharing, which I follow not only as a student but also as a professional that needs to be up-to-date on the latest in the field of remote sensing developments and applications.

# NEW Book: Basics of Geological Remote Sensing



Christopher Legg

## **PUBLISHED! A NEW LOW-COST E-BOOK ON GEOLOGICAL REMOTE SENSING**

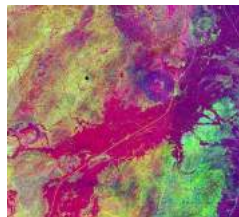


Aimed at all geologists who are not already remote sensing specialists, but particularly at students and geologists in the developing world.

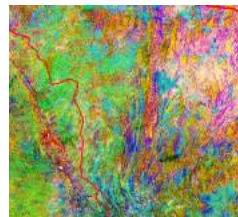
The emphasis is on free and low-cost data, and on free or open-source software

Based on the author's long experience of geological remote sensing in Africa, the Middle East, Europe and Australia, the book includes -

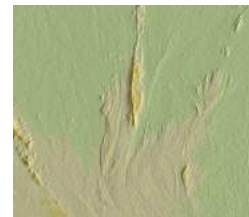
- principles of remote sensing
- main archive and operational sensor systems
- basics of image processing applied to geology
- integration of remote sensing into geological mapping and mineral exploration
- uses of remote sensing in environmental monitoring and reporting
- remote sensing for production and exploration intelligence
- sources of imagery and other data
- numerous links to other publications and free sources of information



Landsat 8 thermal composite



ASTER SWIR decorrelation stretch



Hillshaded ASTER DEM

The book uses examples from Africa, the Middle East and Australia, and will be linked to online courses in geological remote sensing with sample data-sets

The book is now published through Amazon (Kindle), Barnes and Noble (Nook) and Kobo, and will shortly appear in Google Books. The price is US\$5 or UK£3, and the book can be read on most e-readers and on tablets using free apps

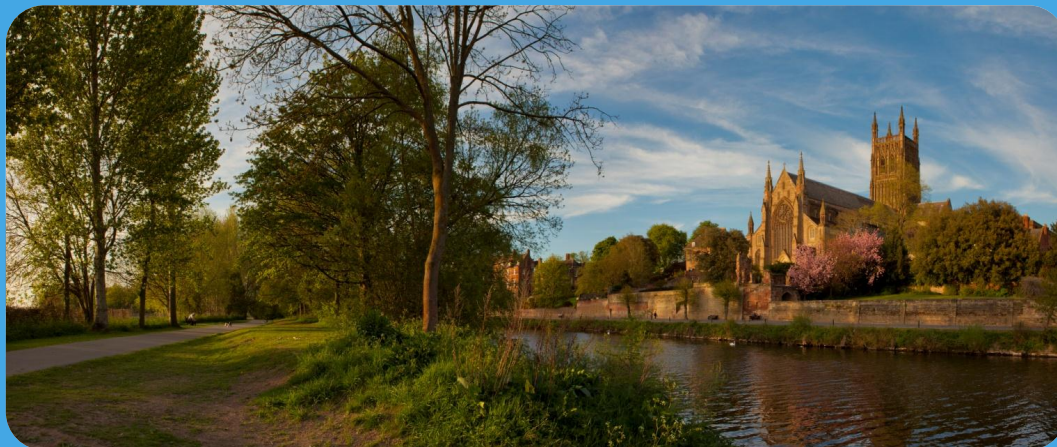


# Other Meetings



**APRIL**

14<sup>th</sup> – 16<sup>th</sup>: **RSPSoc Wavelength Conference**, Worcester, UK



## Wavelength 2014

*The conference for students and new professionals  
in remote sensing and photogrammetry*

**14<sup>th</sup> - 16<sup>th</sup> April 2014**

RSPSoc's 2014 Wavelength Conference promises a variety of oral and poster presentation sessions, three career-oriented keynotes and a number of fun and friendly social events.

### VENUE

Malvern St. James School, Great Malvern, Worcester, WR14 3BA, UK.

### REGISTRATION

Open until Friday 14<sup>th</sup> February 2014.

Book your place now using the online registration facility (website below).

### ABSTRACTS

Please send 250-word abstracts & your preference for oral or poster presentation to [amy@rspsoc-wavelength.org.uk](mailto:amy@rspsoc-wavelength.org.uk) by Friday 17<sup>th</sup> January 2014.



For more information...

Web: [www.rspsoc-wavelength.org.uk](http://www.rspsoc-wavelength.org.uk)

Twitter: @rspsoc\_wlength

Facebook: RSPSoc Wavelength



## APRIL/MAY

27<sup>th</sup> – 2<sup>nd</sup> May: **EGU General Assembly**, Vienna, Austria

The EGU General Assembly 2014 will bring together geoscientists from all over the world to one meeting covering all disciplines of the Earth, planetary and space sciences. The EGU aims to provide a forum where scientists, especially early career researchers, can present their work and discuss their ideas with experts in all fields of geosciences. For the first time, in 2014, the EGU General Assembly will have a theme!

29<sup>th</sup> 1<sup>st</sup> May: **Photogrammetric Processing of Planetary Stereo Imagery using SOCET SET<sup>®</sup>**

The Planetary Photogrammetry Guest Facility at the Astrogeology Science Center of the U.S. Geological Survey would like to announce a Call for Participation for a training opportunity on April 29 - May 1, 2014, on Photogrammetric Processing of Planetary Stereo Imagery using SOCET SET<sup>®</sup>. **The training is free to participants**, and will cover end-to-end, hands-on photogrammetric procedures for surface extraction from Mars Reconnaissance Orbiter HiRISE image pairs. The topics include:

- **An introduction to photogrammetric procedures and surface generation techniques;**
- **Overview of HiRISE imagery; and**
- **Workflow and data exchange between ISIS and SOCET SET.**

The hands-on training will include ISIS preprocessing, SOCET SET import of image and reference data, control point selection, orientation procedures, triangulation and bundle adjustment, manual and automated surface extraction of digital terrain models (DTM), editing, and data export.

If you are interested in participating in this opportunity, please send an email to [Dr. Raad Saleh \(PlanetaryPhotogrammetry@usgs.gov\)](mailto:Dr.RaadSaleh@usgs.gov) with the following specific information: your name, title, affiliation, address, full contact information, and a short statement describing your interest in the training. Please note that seating for this session is very limited, so please express your interest as soon as possible. Please note the following:

1. Training will be 3 days, from Tuesday through Thursday, April 29 - May 1, 2014.
2. The training will be based exclusively on a standard set of HiRISE stereo images.
3. ISIS, SOCET SET and the Guest Facility support the use of images from several planetary cameras in addition to HiRISE. While this hands-on training will be based on HiRISE images, it would be our pleasure to advise participants on the suitability of other planetary cameras for their research projects. Furthermore, we can provide one-on-one support to producing DTMs at later days.
4. The Guest Facility has a single workstation available year-round for users who need to generate their own products. If you would like to stay longer (after this training) or come at a later date to generate your own products using the Guest Facility, please let us know the kind of images you would be using and how many DTMs you hope to produce so that we can schedule your visit accordingly.
5. For more information about the Guest Facility, and for Frequently Asked Questions, please visit: <http://astrogeology.usgs.gov/geology/photogrammetry-guest-facility>. Go to Downloads at the bottom of the page and follow the link "Planetary Photogrammetry Guest Facility FAQ".
6. If you are interested in ISIS training, please see: <http://isis.astrogeology.usgs.gov/IsisWorkshop/index.php/IsisWorkshop>

With your participation, we look forward to realizing another successful and productive training session. In the meantime, please do not hesitate to contact me directly if you have any questions or require further information.

Thank you.

Contact: Dr. Raad Saleh

Training Coordinator, The Planetary Photogrammetry Guest Facility  
United States Geological Survey

Email: [PlanetaryPhotogrammetry@usgs.gov](mailto:PlanetaryPhotogrammetry@usgs.gov)

19<sup>th</sup> - 20<sup>th</sup> May: **Fermor Meeting, Comparative Planetology**, London

A great deal of new data on the terrestrial planets and moons has been produced recently from numerous planetary orbiters, together with rovers. This meeting is planned to bring together scientists who are studying aspects of planetary science on terrestrial planets in the inner solar system. Presentations will fall under three broad themes:

- Planetary crusts and interiors,
- Planetary surfaces
- Surface processes (including volcanism, tectonic activity, sedimentation, and impact cratering), and planetary climates and atmospheres.

Links between the three themes will be investigated, to develop ideas of exchange between the interior, exterior and atmosphere of planetary-scale bodies.

### **Invited Speakers**

Dr David Catling (University of Washington, Seattle USA) – Atmospheric evolution on Rocky Planets; Dr Mary Bourke (Trinity College Dublin, Ireland) – Blows and flows on Martian dunes; Professor Sanjeev Gupta (Imperial, London, UK) – Recent explorations of the Curiosity rover; Dr Nick Tosca (St Andrews, UK) – Alien surfaces: interpreting the mineralogical record of early Earth and Mars  
David W Mittlefehldt (JSC Houston) – Dawn at Vesta

### **Convenors**

Professor Hilary Downes FGS Professor Ian Crawford FRAS Dr Peter Grindrod FGS, FRAS

### **Registration**

There is a registration fee for this meeting and RAS Fellows are eligible for the same rate as GSL Fellows. You can register either online or by downloading the PDF registration form from the 'Downloads box', and sending a completed copy to [Naomi Newbold](mailto:Naomi.Newbold@geolsoc.org.uk). To apply online or download form please visit: <https://www.geolsoc.org.uk/fermor14>

To receive the GSL Fellow rate online please ensure that you are logged in as a Fellow. RAS Fellows need to select the 'Other Societies' option. Please note that the registration fees **do not** include accommodation. Further information about how to book accommodation will be sent with your registration confirmation details.

A draft programme will be available shortly.

### **REGISTRATION RATES**

Fellow - £100.00  
Non-fellow - £150.00  
Other Societies Member - £100.00  
Corporate Affiliates - £100.00  
Student - £50.00  
Retired - £55.0

More information can be found at: <https://www.geolsoc.org.uk/fermor14>

### **Topics for discussion**

- Volcanism • Tectonics • Sedimentation • Cratering • Analogues • Samples, • Rovers • Remote sensing

# Fermor Meeting 2014: *Comparative Planetology*

19-20 May 2014

## The Geological Society, Burlington House

A great deal of new data on the terrestrial planets and moons has been produced recently from numerous planetary orbiters, together with rovers. This meeting is planned to bring together scientists who are studying aspects of planetary science on terrestrial planets in the inner solar system. Presentations will fall under three broad themes: Planetary crusts and interiors, planetary surfaces and surface processes (including volcanism, tectonic activity, sedimentation, and impact cratering), and planetary climates and atmospheres. Links between the three themes will be investigated, to develop ideas of exchange between the interior, exterior and atmosphere of planetary-scale bodies.

### Topics for discussion:

- Internal structures
- Sedimentation
- Samples
- Volcanism
- Cratering
- Rovers
- Tectonics
- Analogues
- Remote sensing

### Conveners:

Professor Hilary Downes FGS  
Professor Ian Crawford FRAS  
Dr Peter Grindrod FGS, FRAS

### Registration fees:

GSL and RAS Fellows £100  
Non-Fellows £150  
Retired £55  
Students £50

### Speakers include:

Dr Ellen Stofan (NASA Chief Scientist) *Venus-Earth-Mars-Titan: Comparing Surfaces, Comparing Climates*

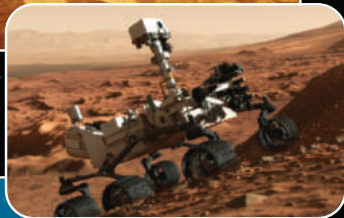
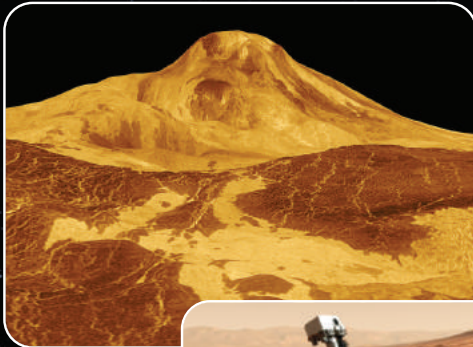
Dr David Catling (University of Washington, Seattle USA) *Atmospheric evolution on Rocky Planets*

Dr Mary Bourke (Trinity College Dublin, Ireland) *Blows and flows on Martian dunes*

Professor Sanjeev Gupta (Imperial, London, UK) *Recent explorations of the Curiosity rover*

Dr Nick Tosca (St Andrews, UK) *Alien surfaces: interpreting the mineralogical record of early Earth and Mars*

Dr David W Mittlefehldt (JSC Houston) *Dawn at Vesta*



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Follow this event on Twitter #fermor14

14<sup>th</sup> – 16<sup>th</sup> May: **TC IV Symposium 2014**, Suzhou, China

The Symposium, as one of the most important events of ISPRS Technical Commission IV, is to provide an inter-disciplinary forum for scientists, researchers and practitioners in the field of “Geo-spatial databases and location based services”. The participants of the Symposium will present the latest developments and applications, discuss cutting-edge technologies, exchange research ideas, and promote international collaboration.

21<sup>st</sup>-23<sup>rd</sup> May: **SPLIT REMOTE SENSING SUMMER SCHOOL 2014 (SplitRS 2014)**, Croatia

This intensive and advanced, 3-day learning event, presents best insights into most recent techniques learned from top international professors and researchers. Participants will learn about different remote sensing applications using both passive and active sensors. Learning about information extraction techniques will be an integral part of the school program in 2014. Registration will be available from Feb 01 – May 01 2014.

**Summer school fee is €380 for professionals and €200 for students. The fee includes the Social Event: Split at Night and dinner.**

<http://splitremotesensing.com/>

22<sup>nd</sup>- 23<sup>rd</sup> May: **Symposium - Remote sensing for conservation**, London UK

The conservation of biological diversity is a major public concern. An increasingly strong link is being built between human wellbeing and biodiversity, with the weight of scientific evidence suggesting humans depend on many aspects of biodiversity, particularly the structure and functioning of ecosystems and the services that they provide.

The usefulness of remote sensing science to inform conservation biology and environmental management has been highlighted by many; however these two research communities have only recently started to coordinate their agendas. Such synchronization is key to improving the potential for remote sensing data to effectively support environmental management decisions.

This symposium will illustrate how integrative approaches allow a better ecological understanding of the mechanisms shaping current changes in biodiversity patterns, while triggering innovative approaches, new research directions in remote sensing science and the development of new remote sensing products.

Call for posters and online registration can be found at <http://www.zsl.org/science/whats-on/symposium-remote-sensing-for-conservation>

## **JUNE**

6<sup>th</sup> – 8<sup>th</sup>: **1<sup>st</sup> International Geo-Cultural Symposium “Kaldera 2014”**, Santorini

**Organizer** MESONISOS, Center of Island & Mediterranean Culture & Members of the Scientific Community of Faculty of Geology and Geo-Environment

The purpose of the symposium is to highlight and interpret the geological phenomena of the island, while also explaining their influence in its cultural evolution.

The Symposium will take place in the Conference Center of Luka & Evangelo Bellonia Foundation, which is located in Fira, the island's capital in Santorini.

16<sup>th</sup> – 20<sup>th</sup>: **34<sup>th</sup> EARSeL Symposium 2014** (European Association of Remote Sensing Laboratories),  
Warsaw, Poland

University of Warsaw, Main Campus, Krakowskie Przedmieście 26/28, Warsaw, Poland  
Accompaniend by:

Joint Workshop of EARSeL Special Interest Groups 3D Remote Sensing and Urban Remote Sensing  
Workshop of EARSeL Special Interest Group Geological Applications Workshop of EARSeL Special  
Interest Group Forestry. EARSeL & ISPRS Young Scientist Days (Chairpersons: Anna Jarocińska, Bogdan  
Zagajewski, Krzysztof Stereńczak)

**For more information about the workshop please take a look to the attached first circular or visit the  
SIG Website**

**<http://www.earsel.org/symposia/2014-symposium-Warsaw/index.php>**

**<http://www.earsel.org/symposia/2014-symposium-Warsaw/fees.php>**

16<sup>th</sup> – 19<sup>th</sup>: **76<sup>th</sup> EAGE Conference & Exhibition 2014**, Amsterdam

The 76<sup>th</sup> EAGE Conference & Exhibition 2014 is the largest and most comprehensive geoscience event in  
the world. The six-day programme consists of a large conference and a technical exhibition presenting the  
latest developments in geophysics, geology and reservoir/petroleum engineering.

25<sup>th</sup> – 27<sup>th</sup>: **6<sup>th</sup> Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote  
Sensing**, Lausanne, Switzerland

The aim of this workshop is to bring together all the people involved in **hyperspectral data processing**,

# 6<sup>th</sup>

## Workshop on Hyperspectral Image and Signal Processing : Evolution in Remote Sensing



whispers

### 2014 : CALL FOR PAPERS

Dear colleagues,

The **WHISPERS** conference is a meeting gathering scientists and industrial partners dealing with acquisition and processing of hyperspectral data. By hyperspectral data, we mean signals acquired by spectrometers as well as images acquired from microscopes, airborne and satellite sensors.

The workshop will be held in Lausanne, Switzerland, at the TSTCC, the new on-campus convention centre of the EPFL, **June 25-27th, 2014**.

We encourage contributions in the fields of :

- Spectrometers and hyperspectral sensors : design and calibration
- Physical modeling, physical analysis
- Noise estimation and reduction
- Dimension reduction
- Unmixing, source separation, endmember extraction
- Segmentation, classification
- High performance computing and compression

Moreover, applications papers are welcome, including the emerging fields of

- Airborne and satellite remote sensing,
- Monitoring of the environment, pollution, precision agriculture
- Chemistry
- Biomedical imagery
- Defense application
- Industrial inspection
- Astrophysics

#### PAPER SUBMISSION

Prospective authors are invited to contribute by submitting a full paper in English of no more than 4 pages, including illustrations, results and references. Submissions should be formatted in accordance with IEEE guidelines. All the papers will undergo a review process and will be reviewed by at least two reviewers. Accepted papers will be published in IEEE Xplore. For more details about submission and style templates, please visit the Website (<http://www.ieee-whispers.com/>).

#### SPECIAL SESSIONS

If you want to organize a special session, you should send your proposal to the Program Chairs by February 1st, 2014. The proposal should include:

- session title
- name, address and affiliations of the session's organizers (one or two people)
- list of papers (5 or 10 for an oral session, possibly more for a poster session)
- list of authors and affiliations
- a short rationale describing the potential impact of the proposed session.

Special session's organizers are expected to attend the conference and chair the session.

Please note that authors contributing to a special session should submit their paper using the standard procedure.

#### ORGANIZING COMMITTEE

- Dr. Devis Tuia, EPFL Lausanne, Switzerland
- Prof. Michael Schaepmann, University of Zurich, Switzerland
- Prof. Jocelyn Chanussot, Institut National Polytechnique Grenoble, France.
- Prof. Sebastian Lopez, Universidad de las Palmas de Gran Canaria, Spain.

PDF version of this call for papers can be found here :

- [http://www.ieee-whispers.com/2014\\_A.pdf](http://www.ieee-whispers.com/2014_A.pdf)
- [http://www.ieee-whispers.com/2014\\_B.pdf](http://www.ieee-whispers.com/2014_B.pdf)

#### IMPORTANT DATES

- 1st March : Submission of full 4 pages paper
- 2nd April : Notification of acceptance
- 7th May : Submission of camera ready papers
- 15th May : Early registration deadline

### Lausanne, Switzerland 25-27 june



[www.ieee-whispers.com](http://www.ieee-whispers.com)  
[info@ieee-whispers.com](mailto:info@ieee-whispers.com)

## JULY

13<sup>th</sup> – 18<sup>th</sup>: **IGARSS 2014**, Quebec City, Canada

The development of new and renewable sources of energy in the context of a changing planet is a critical and important issue throughout the world. IGARSS 2014 and the 35th Canadian Symposium on Remote Sensing (CSRS) will include keynote speakers and include special sessions dedicated to the “Energy” theme.

In addition to a host of well established session themes, IGARSS 2014/35th CSRS topics will also include Earth observation for Arctic research, Earth observation for renewable energy, energy budgets and modeling, future satellite programs, global environmental change, international co-operation ( including the Committee on Earth Observation Satellites – CEOS ; Global Earth Observation System of Systems – GEOSS ), new remote sensing technologies, security and defence, sustainable development, and more. A Summer School will be held the week before the symposium.

## SEPTEMBER

2<sup>nd</sup> -5<sup>th</sup>: **RSPSoc 2014 Conference**, Aberystwyth, Wales

*"New Sensors for a Changing World"*

*The GRSG will chair a session on geological aspects, please consider submitting an abstract if interested.*

With platforms such as UAV's and multi-spectral LiDAR's coming online and new spaceborne sensors such as Landsat-8, Sentinel-2, ALOS-2 and WorldView-3 being launched in the run up to the conference the theme will be focused on the methods and applications applicable to these sensors or first results from these new sensors. Particular applications areas of interest are but not exclusive to the Global Earth Observation System of Systems Societal Benefit Areas areas: *Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture and Biodiversity.*

See poster on next page.



# RSPSoc 2014

## Annual Conference

Aberystwyth September 2nd - 5th

*"New Sensors for a Changing World"*

### Key Dates

**Call for Abstracts:**  
January 2014

**Abstract Deadline:**  
April 2014

**Conference:**  
September 2nd - 5th 2014

### Venue

**Aberystwyth University**

Hosted by



### Themes

The Remote Sensing Community is entering a new era where, with the development of new ground, airborne and space borne sensors, we have new opportunities to observe, map and monitor the Earth at multiple spatial and temporal scales.

RSPSoc 2014 aims to highlight past and current **research, education** and **commercial** opportunities relevant to this new capability across a wide range of applications including **climate change, ecosystem dynamics, agriculture, forestry, energy, health, water** and **weather**.

[www.rspsoc2014.co.uk](http://www.rspsoc2014.co.uk)

[info@rspsoc2014.co.uk](mailto:info@rspsoc2014.co.uk)



## 14<sup>th</sup> – 18<sup>th</sup>: **Near Surface Geoscience 2014**

EAGE is pleased to invite you to the International Conference and Exhibition on Near Surface Geoscience, to be held from **14-18 September 2014 in Athens, Greece**. Near Surface Geoscience 2014 will consist of two sub-conferences: The '20<sup>th</sup> European Meeting of Environmental and Engineering Geophysics' and the 'First Applied Shallow Marine Geophysics Conference'. The exhibition will be held parallel to both conferences and will be central place for companies from all disciplines to display their products and services.

The call for paper deadline for both conferences is **15 April 2014**, so do not forget to submit your paper!

The 20<sup>th</sup> European Meeting of Environmental and Engineering Geophysics is set up to highlight new achievements of geoscientific methods applied for the investigation of the shallow parts of the earth and its surface.

## 24<sup>TH</sup> – 26<sup>TH</sup>: **XX Congress of Carpathian Balkan Geological Association – CBGA2014**

The Organizing Committee of **CBGA 2014** would like to invite all interested scientists to attend the **XX Congress of Carpathian Balkan Geological Association**, a jubilee Congress, which will be held from 24 to 26 September 2014 in Tirana, Albania.

Albania, a country in the western Balkans, is noted among other Alpine terrains for its very spectacular outcrop of Jurassic ophiolites which present a complete geological section and host a lot of mineral deposits of Cr, Cu, Fe, etc. Albania has also attracted the interest of several foreign companies for its oil and gas reserves. Thanks to both small surface and good new roads, it can be visited in a few days and you can enjoy the very interesting geology and part of Albania history through the visit of the archaeological centres.

## **DECEMBER**

## 15<sup>th</sup> – 17<sup>th</sup>: **25 years of Geological Remote Sensing – GRSG AGM 2014**

# GRSG International Reps



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**John Berry**, Berry Associates services to GRSG, USA Rep

**Claire Fleming**, BGS, Service to the committee & Treasurer

**Alistair Lamb**, Infoterra, Services to the committee & Chairman

**Geoff Lawrence**, TREICol, Founding Chairman

**Stuart Marsh**, BGS, Services to the committee & Chairman

**Philippa Mason**, HME Partnership/Imperial College, Services to the committee & Secretary

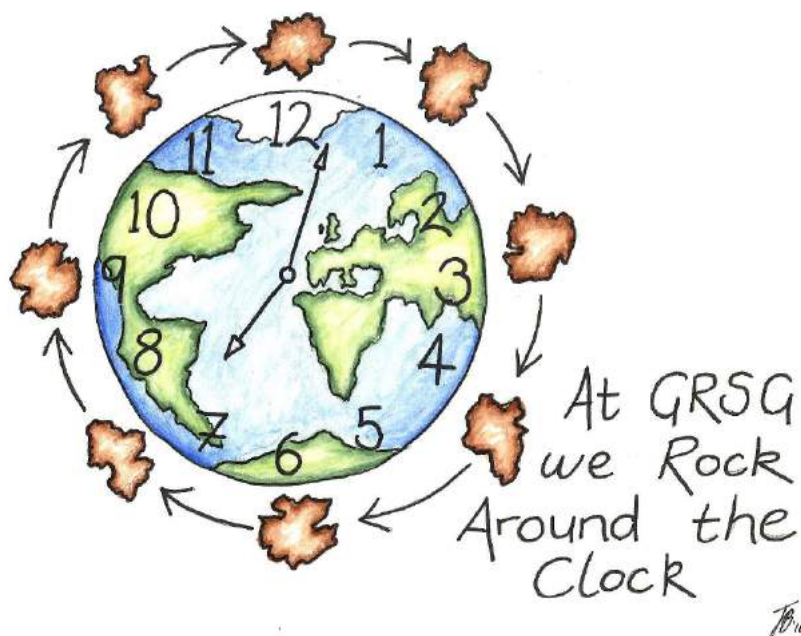
**John McMahon Moore**, Imperial College, Services to the committee & Vice Chairman

**Nigel Press**, Fugro NPA Limited, Recognition of long-term Corporate membership & NPA Student Award

**Dan Taranik**, Exploration Mapping Group Inc, Services to the committee & Chairman

**Richard Teeuw**, University of Portsmouth, Services to the committee & Chairman

**Richard Evers**, Shell Petroleum Development Company of Nigeria Ltd, Services to the committee & Chairman



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*Sensing the Planet*

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**UNICAMP**



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Geological Remote Sensing Group

# GRSG Membership 2014/2015

Please print out and sign the completed form (we need your signature) and scan and email or return by fax or post

**Note membership can also be applied for on our website:** <https://www.grsq.org.uk>

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(please tick)

- Individual: UK £ 40
- Student UK £ 7
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*This newsletter has been created in Microsoft Word 2011 for Mac by Elspeth Robertson and distributed in pdf format to GRSG members*