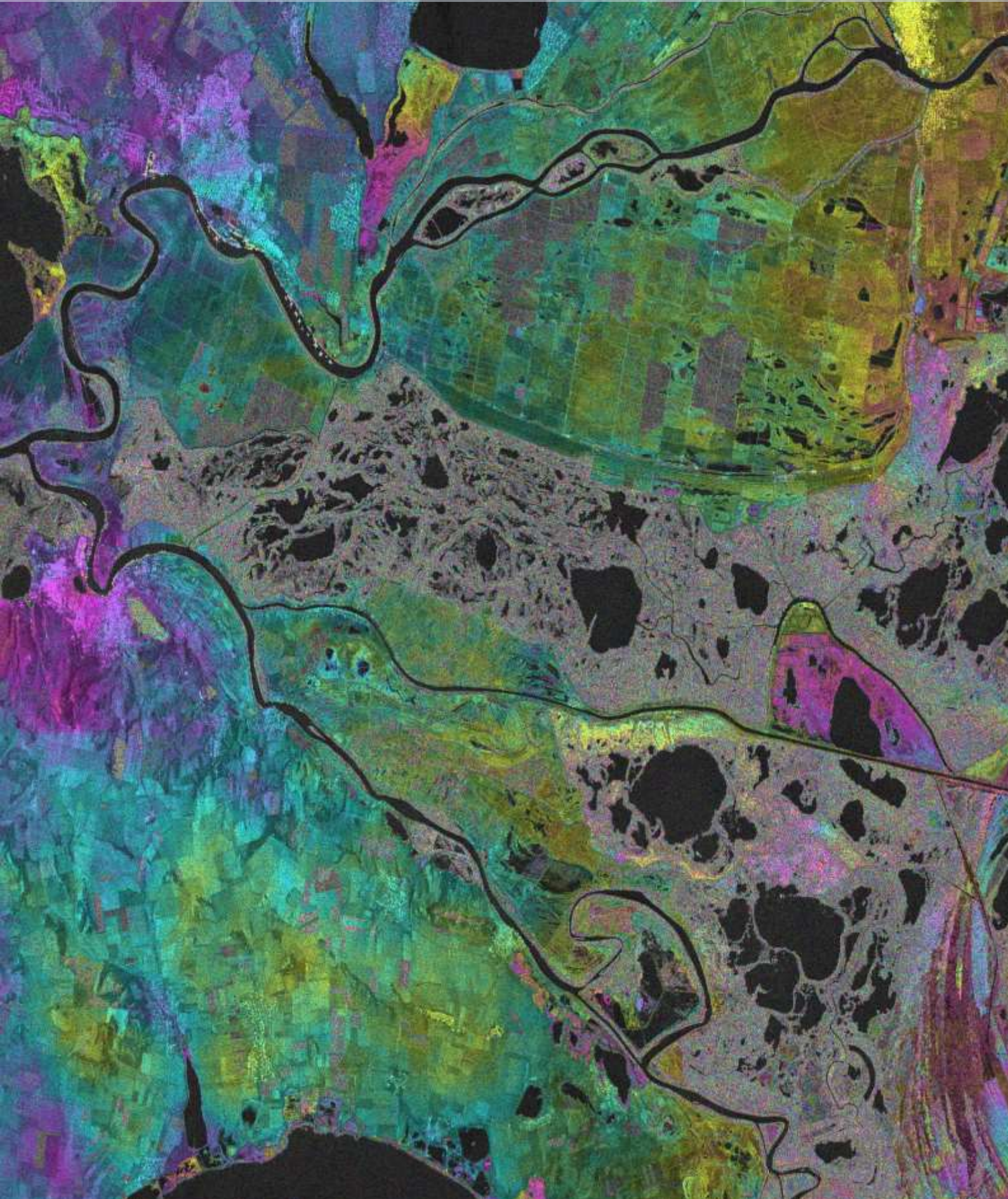




**GRSG Newsletter**  
**Issue 73**  
**June 2015**



# Contents Issue 73



GRSG Committee .....	3
Chairman's message.....	5
Editor's message.....	6
News and Developments .....	7
The 2015 AGM .....	11
Remote sensing of cross-border quakes.....	12
Nepal earthquake response 2015 .....	15
Student Award Winners! .....	17
Students .....	18
Introducing new(ish) GRSG committee members ...Andrew Iwanoczko and Matthew Webster .....	19
RSPSoc Wavelength conference .....	20
Meetings.....	21
Overseas Champions.....	24
GRSG Lifetime Members.....	25
GRSG Corporate Members.....	26
GRSG Membership 2015 .....	31
Disclaimer .....	33









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

An interferogram of Danube Delta, Romania. Copyright Copernicus data (2015)/Terrasigna. The image was created by combining two Sentinel-1A radar scenes from 2 and 14 March 2015 over the Danube Delta in Romania.







# GRSG Committee



<p><b>Luke Bateson</b>          British Geological Survey          Kingsley Durham Centre          Nottingham          NG12 5GG          Tel: +44 (0) 115 9363043          Email:  <a href="mailto:chairman@grsg.org.uk">chairman@grsg.org.uk</a></p>	<p><b>Chairman</b></p> 	<p><b>Charlotte Bishop</b>          NPA Satellite Mapping, CGG          Services (UK) Ltd          Crockham Park,          Edenbridge          Kent. TN8 6SR, UK.          Tel: +44 (0) 1732 865023          Email:  <a href="mailto:secretary@grsg.org.uk">secretary@grsg.org.uk</a></p>	<p><b>Secretary</b></p> 
<p><b>Eric Peters</b>          Consultant          10 Westfield Avenue,          Harpenden,          Hertfordshire          AL5 4HN          Tel: 44 (0) 1582 713347          Email: <a href="mailto:eric_peters@ntlworld.com">eric_peters@ntlworld.com</a>  <a href="mailto:treasurer@grsg.org.uk">treasurer@grsg.org.uk</a></p>	<p><b>Treasurer</b></p> 	<p><b>Huma Irfan</b>          Centre for Planetary Sciences,          UCL/Birkbeck, University of London,          Kathleen Lonsdale Building,          Gower Street,          London, WC1E 6BT          Email:  <a href="mailto:huma.irfan.09@ucl.ac.uk">huma.irfan.09@ucl.ac.uk</a></p>	<p><b>Webmaster/          Membership</b></p> 
<p><b>Elsbeth Robertson</b>          School of Earth Sciences          University of Bristol          Wills Memorial Building,          Queen's Road, Clifton          Bristol, BS8 1RJ          Email:  <a href="mailto:newsletter@grsg.org.uk">newsletter@grsg.org.uk</a></p>	<p><b>Newsletter</b></p> 	<p><b>Xue Wan</b>          Department of Earth Science and          Engineering,          Imperial College          South Kensington Campus          London SW7 2AZ.          Email:  <a href="mailto:x.wan12@imperial.ac.uk">x.wan12@imperial.ac.uk</a></p>	<p><b>Student Rep</b></p> 
<p><b>Dietmar Backes</b>          UCL - Department of          Civil, Environmental and Geomatic          Engineering          Gower Street, London          WC1E 6BT UK          Email:  <a href="mailto:dietmar@cege.ucl.ac.uk">dietmar@cege.ucl.ac.uk</a></p>	<p><b>Committee</b></p> 	<p><b>Andrew Iwanoczko</b>          Exelis Visual Information Solutions          Venture House, 2 Arlington Square          Bracknell, Berkshire, RG12 1WA          United Kingdom          Email:  <a href="mailto:Andrew.Iwanoczko@Exelisinc.com">Andrew.Iwanoczko@Exelisinc.com</a></p>	<p><b>Committee</b></p> 

# GRSG Committee



<p><b>Martin Black</b> British Antarctic Survey High Cross, Madingley Road, Cambridge, CB3 0ET Email: <a href="mailto:martin.black@bas.ac.uk">martin.black@bas.ac.uk</a></p>	<p><b>Committee</b></p> 	<p><b>Rita Matildes</b> Dep. Geographic Engineering, Geophysics and Energy/Centre of Geology Faculty of Sciences - University of Lisbon, Portugal Campo Grande, 1749-016 Lisbon Email: <a href="mailto:rmmatildes@fc.ul.pt">rmmatildes@fc.ul.pt</a></p>	<p><b>Committee</b></p> 
<p><b>Rebecca Phillips</b> Airbus Defence and Space Jupiter Court, 6 Dominus Way Meridian Business Park Leicester. LE19 1RP United Kingdom Tel: +44 (0)116 240 7200 Fax: +44 (0)116 240 7100 Email: <a href="mailto:rebecca.phillips@astrium.eads.net">rebecca.phillips@astrium.eads.net</a> Web: <a href="http://www.geo-airbusds.com">www.geo-airbusds.com</a></p>	<p><b>Committee</b></p> 	<p><b>Alex Gow</b> 4th Floor, The Building 578-586 Chiswick High Road Chiswick, London W4 5RP UK Tel: 07771330525 Email: <a href="mailto:alex.gow@digitalglobe.com">alex.gow@digitalglobe.com</a></p>	
<p><b>Matthew Webster</b> University College London Department of Geography Gower Street London WC1E 6BT United Kingdom Email: <a href="mailto:matthew.webster.13@ucl.ac.uk">matthew.webster.13@ucl.ac.uk</a></p>		<p><b>Andrew Hart</b> Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 5BW Email: <a href="mailto:abhart74@gmail.com">abhart74@gmail.com</a></p>	

# Chairman's message



Dear All,

Once again welcome to another informative GRSG Newsletter, sadly this will be the last one edited by Elspeth. Elspeth took over the newsletter editor role from Charlotte about 2 years ago and has continued to do an excellent job. I would like to express our thanks to Elspeth for all her hard work and wish her well in her new career.

Elspeth's departure has led to a bit of a reshuffle in the committee and a change in the way we deliver the newsletter. Huma is going to take over the overall editorship of the newsletter, including exploring how we can deliver a condensed summary to your inbox with the option to download the full pdf form the website. Huma will be supported by Matt and Rita who will help collate content.

We have also created a new committee position; Social Media representative, which will be undertaken by Martin with help from Rebecca. Martin and Rebecca will give us an organised approach to social media, such an approach has been lacking in the past and is becoming increasingly important since we have over 1200 members on Facebook and 2300 members on LinkedIn!

Hopefully you will have seen the call for papers for this year's conference; "Challenges in Geological Remote Sensing", which will take place from the 9th to 11th of December at the European Space Agency in Frascati, Rome, Italy. We have already received many high quality abstracts, but are always interested in hearing what people are up to so if you have work to share with the rest of the remote sensing community then please send in an abstract. The last time we went to Frascati we all enjoyed some excellent social events, this year we aim to match those with an Icebreaker at ESA, a tour of a vineyard, and a conference buffet dinner in a local Villa. The conference and social events are all free for GRSG members to attend, this means we need generous sponsorship!

I hope you enjoy the newsletter.

Best Wishes

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



# Editor's message



Dear all,

I hope everyone is well and looking forward to the summer (or winter!) months.

You may notice that this issue has an underlying theme – the use of remote sensing for natural disaster response and natural hazard research. Following the Nepal earthquake earlier this year, the remote sensing community was proactive in its response and aid to this disaster. In this issue, Richard Walters, from [Earthquakes without Borders](#) and the University of Leeds, details the collaboration, commitment and efforts of their team following the Nepal disaster in providing the first satellite images of ground movement following the quake. The article also highlights the broader mission of EwB, which is building and processing Sentinel data for monitoring tectonic regions in order to further understand tectonic regions and produce effective monitoring data. Please do get in touch with Richard if you have any questions.

In addition, in this issue we also have the usual [News and Developments](#), [Meetings](#) and [Committee Profiles](#). We are also pleased to announce the [2015 Student Award Winners](#) and we look forward to reading about their work in future issues.

On another note, it is with regret that I am both stepping down as the Newsletter Editor and from the Committee itself. I have enjoyed my two years on the Committee immensely and it's been an absolute pleasure trying to compile an interesting and informative newsletter for all the members. The timing seems apt, as I have recently completed my PhD and my career is taking a slightly different path away from remote sensing – at least for the moment! Being on the Committee, but more so being the newsletter editor, has given me a great opportunity to meet some great people from across a broad spectrum of the remote sensing community. Thank you to everyone who has read and contributed to past issues and I hope that everyone will continue to be as good in engaging with membership through the newsletter.

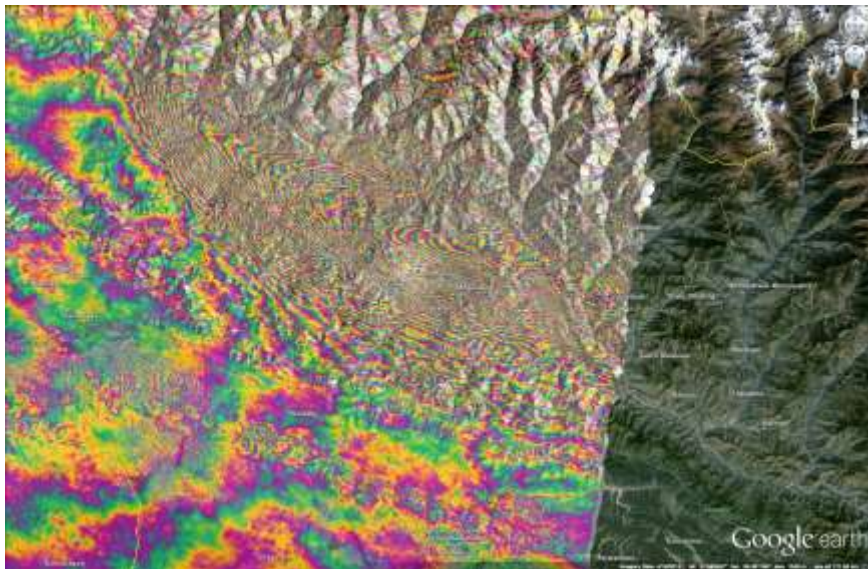
However, the Newsletter will not be left editor-less, and it is with great pleasure to announce that an enthusiastic editorial team will bring the next issue! Huma, alongside Rita and Matt, will lead the team. I wish you all the best of luck!

As usual if you have any comments then I am, as well as Huma, Rita and Matt, always happy to receive them, this newsletter is prepared for you, the membership, so please let us you're your thoughts. Likewise if you have any items you would like included e.g. images for the front cover, conferences, news items, articles etc then please send them through and they will go in the next newsletter.

Best wishes

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

## Mount Everest Shrank As Nepal Quake Lifted Kathmandu



On April 25 2015 a deadly earthquake hit Nepal. The first good view of the aftermath of Nepal's deadly earthquake from an interferogram reveals that a broad swath of ground near Kathmandu lifted vertically, by about 1 meter and also indicates that Mount Everest became slightly shorter. The interferogram has been produced as part of a European Space Agency study called INSARAP.

INSARAP will also derive a model to interpret the quake's "anatomy". This will help scientists understand Saturday's tremor in the context of historic events. The hope is that such

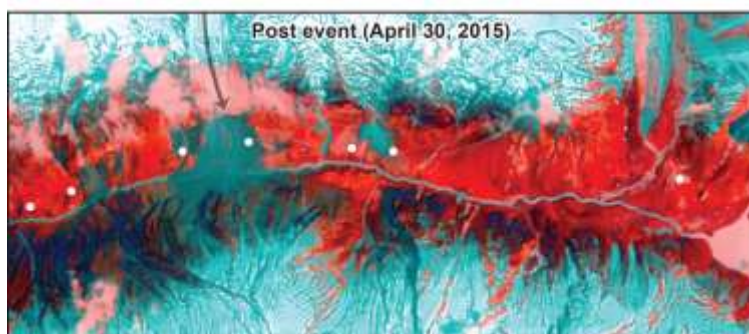
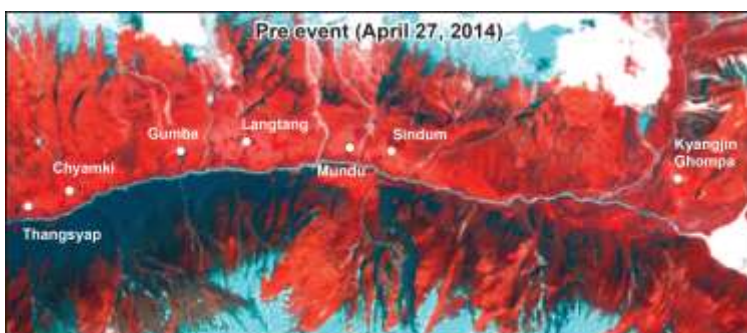
analysis can point to areas at greatest risk from future ruptures - information that can assist with disaster planning.

"We want to know which parts of the fault slipped," said Professor Wright, Leeds University.

"And that's important because it tells us those parts that did not, and which are still primed and ready to go in a future earthquake. "Many of us are involved in a project called [Earthquakes Without Frontiers](#), which has as its aim to use the latest scientific information to improve resilience."

Source: BBC. Image Credit: Credit: ESA SEOM InSARap Study – Norut/PPO.labs/Univ Leeds

## Landsat 8 Reveals Extent of Quake Disaster in Nepal's Langtang Valley



0 0.5 1 2 km

The magnitude 7.8 Gorkha earthquake that struck Nepal on April 25, 2015, caused extensive damage in Kathmandu Valley and severely affected Nepal's rural areas. The Langtang Valley in the Rasuwa district was particularly hard hit, as became apparent from pictures taken by a rescue helicopter mission on April 26. The valley's main village, Langtang, was completely destroyed by the earthquake and the large, wet, debris- and ice-rich avalanche and likely pressure wave from dust avalanche that it triggered, resulting in an unknown number of casualties.

Space agencies around the world are providing extensive resources in a huge international effort. They are tasking their satellites to observe the areas hit by the earthquake. This effort began immediately after the disaster. Imaging initially focused on Kathmandu.

Following the first social media reporting of the helicopter pilot's comments, an emergency NASA-USGS-interagency Earthquake Response Team alerted satellite mission operations teams about the likely serious plight of Langtang and other Himalayan valleys.

United States Geological Survey/NASA Landsat-8 satellite observations were first obtained over Nepal after the earthquake on April 30. Landsat 8 acquired the first largely cloud-free image of the Langtang Valley (post-event Landsat image ID: LS081410412015043000000000MS00\_GO006005004). Scientists analyzed the imagery and compared it with pre-earthquake imagery from a year earlier.

The analyses revealed the true extent of the disaster that took place in the Langtang Valley. Part of Langtang village was completely buried by a very large rock and ice avalanche that originated on the northwestern slopes above the village. The eastern part of Langtang village appears to have been destroyed by the pressure wave from the related dust avalanche. Large landslides or avalanches also affected the villages of Thyangshyup, Tsarding, Chyamki, Gumba, Mundu, Sindum and Kyangjing.

Source: [NASA](#)

## Sentinel-2A – “Colour Vision”

The ESA-developed Sentinel-2A satellite lifted off on a Vega rocket from Europe's Spaceport in Kourou, French Guiana at 01:52 GMT on 23 June (03:52 CEST; 22:52 local time, 22 June).

The 1.1 tonne satellite carries a high-resolution optical payload that will gather some of the best global imagery ever delivered from space of our land and vegetation for Europe's Copernicus environmental monitoring programme.

This information will mainly be used for agricultural and forestry practices, as well as help manage food security, monitor pollution in lakes and coastal waters and contribute to more rapid disaster mapping.

Just four days after being lofted into orbit, Europe's Sentinel-2A satellite delivered its first images of Earth, offering a glimpse of the 'colour vision' that it will provide for the Copernicus environmental monitoring programme.



With a swath width of 290 km, the satellite's first acquisition began in Sweden and made a strip-like observation through central Europe and the Mediterranean, ending in Algeria. The data were relayed in real time to Italy's Matera ground station, where teams eagerly awaited their arrival for processing.

While northern and central Europe was mostly cloudy, Italy's typical sunny weather allowed the teams to get their first glimpse of the multispectral instrument's capabilities over the northwestern part of the country and the French Riviera – and they were excited by what they saw. With a ground resolution of 10 m per pixel, the images show individual buildings in Milan, agricultural plots along the Po River, and ports along the southern French coast.

Source and image credit: [ESA](#)



## Philae probe still talking to Earth from surface of comet, say Rosetta scientists



Europe's robot lab Philae phoned home on Friday after several days' silence in its journey towards the sun on the back of a comet and is "doing very well", the German Aerospace Centre (DLR) said. The latest contact lasted 19 minutes and is the third time Philae has touched base with Earth since it landed on Comet 67P/Churyumov-Gerasimenko on 12 November after piggybacking on its mothership Rosetta.

The mission seeks to unlock the long-held secrets of comets –

primordial clusters of ice and dust scientists believe may reveal how the solar system was formed. After landing on the comet, Philae had used its stored battery power to send home reams of data before going into standby mode.

The hope was as the comet approaches the sun, solar energy would recharge Philae's batteries enough for it to reboot, make contact and ultimately resume scientific work.

It took seven months before Philae woke from hibernation on 13 June and made contact with Earth for two minutes. It reported back again two days later.

Source: [The Guardian](#). Image: Photograph: ESA/PA

## USGS Provides Higher Level Landsat Data

The U.S. Geological Survey (USGS) has begun production of higher level (more highly processed) Landsat data products to help advance land surface change studies. One such product is Landsat surface-reflectance data.

Surface reflectance and other high-level data products can be requested through the USGS Earth Resources Observation and Science (EROS) Center by accessing the [EROS Science Processing Architecture \(ESPA\)](#) interface. Surface reflectance data are also available using the USGS [EarthExplorer](#); select "Landsat CDR" under the tab for datasets. More information on Landsat surface reflectance data is available at the [USGS Landsat](#) website and in an updated USGS [Fact Sheet](#).

Source: [Geospatial Solutions](#)

## Airbus to build 900 satellites for OneWeb internet-from-space project



[Airbus](#) will design and build about 900 satellites for privately owned OneWeb, which plans to offer high-speed, space-based internet access to billions of people worldwide, company officials have announced.

About 700 of the satellites, each weighing less than 150 kg (330lb), would be launched into orbit beginning in 2018, with the rest staying on the ground until replacements were needed, said OneWeb, based in Britain's Channel Islands.

Airbus said it would be a new approach to satellite production, with up to four being

built per day.

Bankrolled in part by Richard Branson's London-based Virgin Group and chipmaker Qualcomm, the project would cost between \$1.5bn and \$2bn, said OneWeb founder and chief executive Greg Wyler.

Airbus Defence and [Space](#) said it would build the first 10 satellites at its facility in Toulouse, France, before shifting production to the United States.

Several other companies were vying for the spacecraft contract including Thales Alenia Space, Space Systems/Loral, Lockheed Martin Corp's Space Systems and OHB of Germany, the industry trade journal Aviation Week and Space Technology reported.

Source: [The Guardian](#)

## Hunga Tonga volcano eruption forms new S Pacific island

On March 12 A new island has been formed in the South Pacific after the eruption of an underwater volcano in Tonga. Images have emerged of the island's surface, 45km (28 miles) north-west of Tonga's capital, Nuku'alofa.

The island - which is 500m (1,640 feet) long - was formed after an eruption at the Hunga Tonga volcano that started in December.

Source: [BBC](#). Image credit: CNES/Airbus





## Challenges in Geological Remote Sensing

9<sup>th</sup> – 11<sup>th</sup> December 2015

ESA ESRIN, Frascati, Italy



### FIRST CALL FOR PAPERS

The Geological Remote Sensing Group (GRSG) is pleased to announce the first call for papers for its 26<sup>th</sup> Annual Conference which will focus on a wide range of remote sensing applications, tools, latest developments and sensors.

**Abstracts are welcome on a wide range of remote sensing themes, including:**

- **New sensors:** Sentinel applications, technological developments, analytical methods & algorithms
- **Latest developments in:**
- Oil & Gas
- Mineral Exploration
- 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**

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.

**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 & logistics to be announced soon on our website at: <http://www.grsg.org.uk/>

### Important dates:

Call for papers opens: **15<sup>th</sup> March 2015**

Registration opens: **15<sup>th</sup> May 2015**

Call for papers closes: **1<sup>st</sup> September 2015**



The  
Geological  
Society

*servicing science & profession*

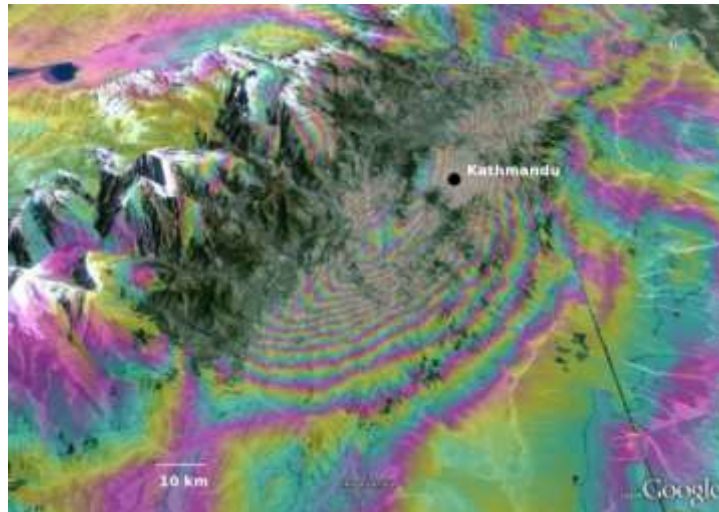


# Remote sensing of cross-border quakes



Active faults and the devastating earthquakes that they cause do not respect political borders. Whilst the recent series of large earthquakes in Nepal did the most damage to the mountain kingdom itself, the violent shaking from these events still killed and injured hundreds in neighbouring China, India and Bangladesh. The record of historical earthquakes in the region over the last 500 years tells a similar story- these countries' earthquake histories are intertwined by their shared proximity to the Himalayan mountain belt and its underlying megathrust fault. But similarly, the solution to improving resilience to these terrible events also needs to transcend political boundaries, bringing together scientists and policymakers from across affected countries to share knowledge, experience and ideas.

This is the central tenet that led a diverse group of natural and social scientists from around the UK to form the Earthquakes without Frontiers (EwF) partnership. Led by James Jackson at the University of Cambridge, EwF is a 5-year initiative funded by NERC and ESRC (the Natural Environment and Economic and Social Research Councils) under the Improving Resilience to Natural Hazards programme. The partnership includes researchers at Cambridge, Durham, Hull, Leeds, Northumbria and Oxford Universities, as well as at the British Geological Survey, the Overseas Development Institute, the Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics and Durham's Institute of Hazard, Risk and Resilience.



**Figure 1: Satellite radar interferogram of the 25<sup>th</sup> April 2015 Mw7.8 Nepal Earthquake. The coloured fringes represent contours of ground motion towards the satellite, at intervals of 8.5 cm. Image credit: Pablo Gonzalez, University of Leeds, EwF, LiCS; SAR data provided by the European Space Agency**

The project's geographical focus is on three broad regions: China, the Himalayan mountain front (Nepal and Northern India) and Central Asia (Kazakhstan and Kyrgyzstan), and the key natural science objective of EwF is to further knowledge of the distributions of earthquakes and triggered landslide hazard in the continental interiors. A large component of this work involves the use of remotely sensed data, naturally embodying the cross-border approach of the project. EwF scientists research landslide hazard and map active faults using digital topography and a variety of multispectral and optical imagery, and use satellite

radar to measure the warping of the Earth's crust both due to earthquakes and due to the steady interseismic motions that take place between earthquakes, as faults build up stress towards the next seismic event.

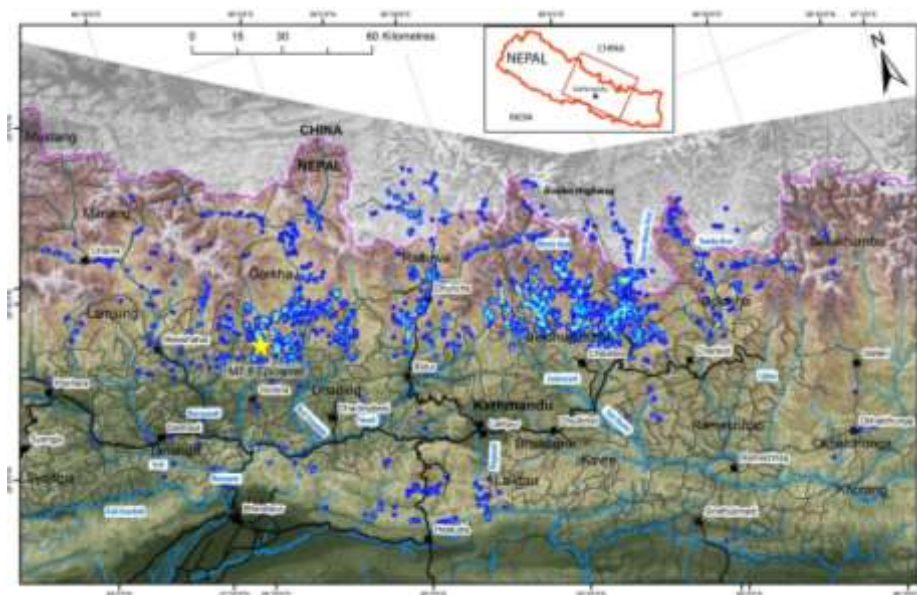
On these projects and across a wider breadth of social and natural scientific research, EwF researchers collaborate on joint projects with scientists in the partner countries, also running international workshops and training events for young scientists. And crucially this knowledge exchange is not just restricted to between geographical neighbours. The same types of fault that cause earthquakes in Italy also threaten vast regions in China, and lessons learnt about faults in Iran can inform on hazard in Kazakhstan. As such, although EwF research has a focus on China, the Himalayan mountain front and Central Asia, the partnership also brings together scientists from other countries including Iran, Italy and Turkey to share knowledge and experience across an even wider network. Perhaps most notably this exchange and discussion takes place at annual EwF partnership meetings, the most recent of which was held in Kathmandu in mid April this year.

So when a huge Mw7.8 earthquake struck Nepal on the 25<sup>th</sup> April, it came as a double blow to all within EwF. Nepal is not only one of our target areas, for which we aim to improve resilience to seismic hazard, but also many of the UK team had been in Kathmandu just one week before the earthquake, working and living alongside Nepali colleagues and friends. All EwF members felt strongly that we should put our combined experience to good use and so in the immediate aftermath of the Nepal earthquake, EwF team members and colleagues scrambled to rapidly obtain satellite imagery of the area, and in the weeks since have been working to analyse this imagery in order to aid with disaster relief efforts and hazard re-evaluation.

EwF researchers, along with colleagues at the University of Leeds, used data from the European Space Agency's new Sentinel-1A radar satellite to measure how the ground was permanently warped by the earthquake. Part of the EwF project focuses on exploitation of data from this new satellite and its twin, Sentinel-1B, which is due to be launched in 2016. This includes building an automated processing facility to cope with the vast amount of data the twin satellites are set to produce, imaging all active tectonic regions worldwide on an almost weekly basis. The EwF scientists and colleagues used their new facility to produce some of the first radar interferograms of the Nepal earthquake, mapping how the ground was warped along a 170 km stretch of the fault, moving by up to ~1.4 m near Kathmandu. They are now working on modelling these data to understand how the fault slipped at depth, the relationship with the large Mw 7.3 aftershock on the 12<sup>th</sup> May, and how these events may have stressed the surrounding regions of the fault, making these areas more likely to fail in future earthquakes.

And at the same time, EwF scientists at Durham University and the British Geological Survey have been using high-resolution optical and multispectral imagery to map the extent and intensity of triggered landslides in the region. The International Charter for Space and Major Disasters was invoked just 3 hours after the earthquake, and over the following few days, space agencies worldwide hurriedly tasked their respective satellites to acquire new imagery over Nepal. The EwF team has been using this wealth of

remotely-sensed data to identify around 3600 landslides that were either triggered by the earthquake or old landslides that were reactivated, using these maps to show where rivers are likely to be dammed and roads are likely to be blocked. The group has also highlighted the need to plan mitigation measures for the forthcoming monsoon season that starts this month as this may reactivate or trigger even more deadly landslides.



**Figure 2: Landslide map. Colour scale shows landslide intensity, with blue ~ 1 landslide/km<sup>2</sup> and red ~29 landslides/km<sup>2</sup>. (<http://ewf.nerc.ac.uk/2015/05/28/nepal-updated-28-may-landslide-inventory-following-25-april-nepal-earthquake/>) Image credit: University of Durham, EwF, BGS; Satellite data have been provided via the International Charter for Space and Major Disasters and freely available online viewers: WorldView @ Digital Globe; USGS LandSat8; Bhuvan RS2; Astrium Imagery; Google Crisis. Vector data: OSM. Digital Elevation Model: ASTER.**

Over the coming months, EwF researchers will continue to work on these projects and the many more social and natural science questions raised by the Nepal earthquake. We hope that the lessons learned and experience gained from this terrible event will bring us one step closer to improving resilience to future earthquakes, not just for Nepal and the countries across its borders, but also for all earthquake-prone countries worldwide.

Richard Walters is a Research Fellow at the University of Leeds, working as part of the Earthquakes without Frontiers project ([r.j.walters@leeds.ac.uk](mailto:r.j.walters@leeds.ac.uk)). For more details on EwF please visit (<http://ewf.nerc.ac.uk/>)



# Nepal earthquake response 2015

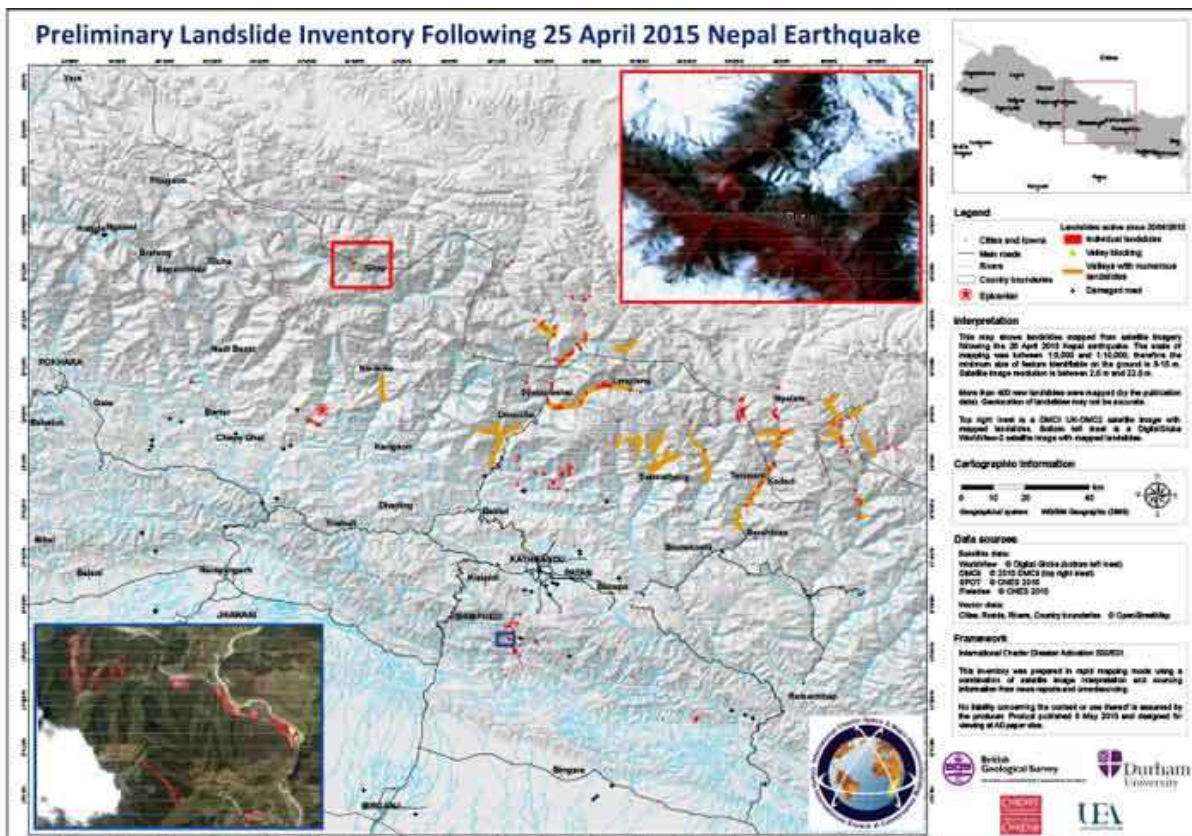


By Colm Jordan, BGS. Sourced from the [BGS website](#)

Following the M7.8 Gorkha earthquake in Nepal on 25th April 2015, the UK has played a leading role building an inventory of landslides and advising on the associated hazards. BGS and partners at Durham University have used satellite imagery to map and characterise over 3000 landslides triggered by the earthquake. We used various types of satellite data (obtained via the International Charter Space and Major Disasters and directly from data suppliers) including WorldView, UK-DMC2, SPOT, Pleiades and RADARSAT-2 to create maps of landslides active since the earthquake. These maps are helping the relief efforts by showing where roads or rivers are blocked and where villages have been affected by landslide debris.

The UK team has also worked alongside, and compiled the landslide maps from, other agencies such as NASA, [NGA](#), [MDA](#) and [ICIMOD](#) to produce a comprehensive map of the post-earthquake landslides. The maps have been posted in several locations including the [Charter website](#), [UNOSAT](#), [Nepal Earthquake Support](#) and [Earthquakes Without Frontiers](#), and are being used on the ground by several relief agencies.

Following on from this work the BGS and Durham University will be monitoring the landslide situation throughout the monsoon in collaboration with organisations such as MDA, UNOSAT, and ESA.



[Map of over 400 active landslides in Nepal, produced by BGS and Durham, Cardiff and UEA universities.](#)

[Published 5th May 2015.](#) 7.8 MB pdf

Source: WorldView / UK-DMC2 / SPOT / Pleiades

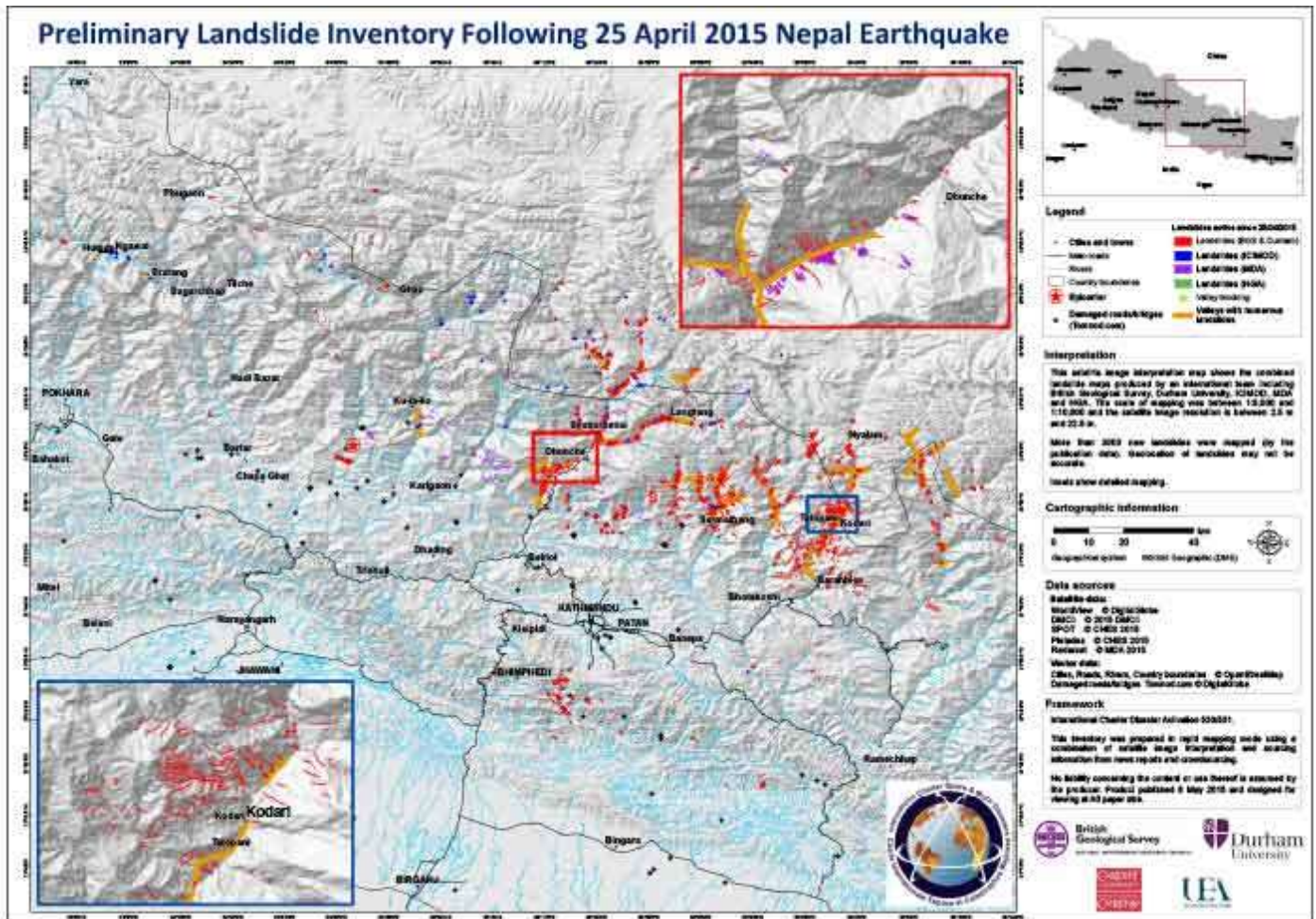
Copyright: WorldView © DigitalGlobe Inc.

UK-DMC2 © DMCii 2015

SPOT © CNES 2015

Pleiades © CNES 2015

Map produced by British Geological Survey



[Map of over 3000 active landslides in Nepal, produced by BGS and Durham University and other agencies.](#)

[Published 8th May 2015.](#) 5.6 MB pdf

Source: WorldView / UK-DMC2 / SPOT / Pleiades / RADARSAT-2

Copyright: WorldView © DigitalGlobe Inc.

UK-DMC2 © DMCii 2015

SPOT © CNES 2015

Pleiades © CNES 2015

RADARSAT-2 Data and Products © MacDonald, Dettwiler and Associates Ltd. (2015)

Map produced by British Geological Survey



# Student Award Winners!



It is our pleasure to announce the following Student Awards 2015 winners:

**Raquel Serrano** (University of Aberdeen)

**Jeanne Giniaux** (University of Leeds)

**Stephen Brough** (Aberystwyth University) – Awards share

**Huma Irfan** (Birkbeck, University of London) – Award share

Each year the Geological Remote Sensing Group (GRSG) offers up to three awards of £750 each. As you may notice, this year we awarded four awards. Owing to the high quality of submitted contributions this year, we had two rounds of voting with two draws for the third place in GRSG award. Thus, we decided to grant both Stephen and Huma £400 for the equal third places.

Our thanks go to all those who applied for our award this year. It is great to have a spread of applications from both UK as well as international institutions.

The application for GRSG student award 2016 will be announced at our GRSG next AGM in December 2015.

Congratulations to all of you!

## 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)

# Introducing new(ish) GRSG committee members ...Andrew Iwanoczko and Matthew Webster



Andrew is coastal geomorphologist and earth observation spatial specialist having worked and studied in the geographic information world (GIS and EO) since 2001.

With a passion for spatial products – information, SDIs and software - Andrew loves to bring new functionality and information sources to market and to watch business flourish.

Matthew is a recent graduate of the MSc Environmental Mapping programme at UCL. Prior to this, he studied Geography at the University of Southampton and will be returning there in September to study for a PhD in Remote Sensing.

To fulfil the MSc requirements, he completed his thesis: 'A Geomorphic Study of Kasei Valles, Mars: Based on Super Quality DEM Generation', with colleagues at Imperial College London. The research, presented at the GRSG AGM in December 2014, aimed to identify the mechanisms responsible for shaping the terrain we see on Mars today. Using a high resolution DEM derived from a stereo Context Camera (CTX) image pair, a comprehensive geomorphic and topographic analysis was conducted on a small region of theatre-headed channels, detected along the southern branch of Kasei Valles: the largest outflow channel on Mars. Results indicated the likely prevalence of a complex hydrological regime in that region, with episodes of fluvial and glacial activity being responsible for the surface morphology well into the geologically recent past.



# RSPSoc Wavelength conference



by Martin Black, GRSG Committee Member

This year's RSPSoc's student conference, Wavelength, was held at the end of March in Newcastle. The conference had a three day programme covering various remote sensing topics and, coinciding with an ISPRS (International Society for Photogrammetry and Remote Sensing) meeting, meant a strong keynote line up. Being a hardy Northerner myself, I was not put off by the chilly weather in Newcastle, though on the second day of the conference the weather might have been described by some as "unpredictable" – sun, torrential rain, hailstone, snow and back to sun again, all within one hour!

The technical programme of the conference included a number of talks on various topics, including dust/gas detection, vegetation, urban remote sensing, disaster management and data integration. I'm pleased to say that the best poster award of the conference went to a geological remote sensing poster – congratulations to Elena Field who presented her undergraduate (!) work on object versus pixel based classification techniques for geological mapping.



Being a student organised and primarily student based conference, the social event line up was as strong as ever this year. Following last year's introduction at Wavelength '14, laser quest returned and was as fun as ever! Other delegates enjoyed a walking tour of Newcastle and visits to the Great North Museum.

As ever, I would strongly encourage GRSG student members to consider attending Wavelength and helping to strengthen the line of up Geological Remote Sensing in the student community!



## JUNE

### 1-4: 77<sup>TH</sup> EAGE Conference & Exhibition 2015, Madrid, Spain

The topics have been set and the call for extended abstract for the 77th EAGE Conference & Exhibition 2015 in Madrid is now open! We invite you to submit your abstract and become part of the technical programme during the annual conference next year.

Registration opens	01 December 2014
Deadline conference call for extended abstracts	15 January 2015
Deadline early registration	15 March 2015
Deadline late registration	15 May 2015
Opening 77th EAGE Conference & Exhibition 2015	01 June 2015
Deadline workshops call for extended abstracts	15 February 20

### 2-5: WHISPERS Workshop in Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, Tokyo, Japan

After a record breaking edition in 2014 at EPFL in Lausanne (250 participants), which featured an outstanding **technical program**: <http://www.ieee-whispers.com/index.php/past-editions/2014-lausanne-switzerland>

as well as a number of **exhibiting companies**: <http://www.ieee-whispers.com/index.php/2014-sponsors>

The **2015 edition** of WHISPERS will be held in **Tokyo, Japan**.

Important dates: full paper submission: 31, January 2015

## JULY

### 27-29: Photogrammetric Processing of Planetary Stereo Imagery using ISIS and SOCET SET<sup>®</sup>

The Planetary Photogrammetry Guest Facility at the Astrogeology Science Center of the U.S. Geological Survey would like to announce its Call for Participation for a training opportunity on July 27-29, 2015. This training will cover photogrammetric processing of planetary stereo imagery using ISIS and SOCET SET<sup>®</sup> software developed by BAE Systems. The training is free to participants, and will cover end-to-end, hands-on photogrammetric procedures for surface extraction (i.e., digital elevation model generation) from Mars Reconnaissance Orbiter HiRISE image pairs. The topics include:

- An introduction to photogrammetric procedures and surface generation techniques;
- Overview of HiRISE imagery;
- Workflow and data exchange between ISIS and SOCET Set<sup>®</sup>

The hands-on training will include an overview of ISIS preprocessing, SOCET SET<sup>®</sup> import of image and reference data, orientation procedures, triangulation and bundle adjustment, automated surface extraction of digital terrain models (DTM), editing, and data export.

If you are interested in participating in this opportunity, then please send an email to Dr. Robin Ferguson ([PlanetaryPhotogrammetry@usgs.gov](mailto:PlanetaryPhotogrammetry@usgs.gov)) with the following specific information:

- You name and title
- Affiliation

- Address, phone number, and email address
- Brief statement describing your interest in the training

Please note that seating for this session is limited to 12 individuals, so please express your interest as soon as possible. Once the class is full, we will maintain a wait-list in case there are cancellations, and to notify interested individuals of future training opportunities.

- Training will be 3 days, Monday through Wednesday, July 27-29, 2015.
- Participants will use standardized sets of HiRISE images throughout the training.
- For information about GIS Training for Mappers being held July 29-31, 2015 - also hosted by the Astrogeology Science Center - please see: <http://astrogeology.usgs.gov/facilities/mrctr/planetary-gis-training-for-mappers>. Interested individuals can attend both the SO CET Set<sup>®</sup> and GIS workshops.
- If you are interested in ISIS training, please see: <http://isis.astrogeology.usgs.gov/IsisWorkshop/index.php/IsisWorkshop>
- For additional information and sign-up instructions, please see <http://astrogeology.usgs.gov/facilities/photogrammetry-guest-facility>.

"These workshops a great opportunity for Astrogeology to make available to the whole planetary community our unique and world-class expertise in planetary photogrammetry, which has been an integral part of our mandate since the inception of Apollo mission where our team was the first to generate geodetic-grade maps of the moon," said Astrogeology Director Dr. Laszlo Kestay

## SEPTEMBER

### 8-11: RSPSoc, NCEO and CEOI-ST joint annual conference 2015, Southampton, UK

The organising committee would like to invite you to the RSPSoc, NCEO and CEOI-ST joint annual conference 2015 at the University of Southampton from 8th to 11th September 2015. This year the RSPSoc, NCEO and CEOI-ST communities will be brought together in one conference focused around ESA's Copernicus programme. This year will be a remarkable year in Earth observation history as two of the Sentinel satellites (2 and 3), part of the ESA Copernicus programme, are planned for launch. To mark this occasion and the success of Sentinel-1, the theme for this year's conference is 'Earth Observation in the Sentinel Era'. A number of keynote speakers and a broad and exciting technical programme will provide a forum to introduce research opportunities around the Copernicus programme, and for the international community to demonstrate exciting applications and recent advances in the processing and analysis of remotely sensed data and in the next generation of remote sensing technologies.

Abstract submission and registration are open and available through the conference website at: <http://rspsoc2015.org/>

**Abstract submission deadline:** 1st May 2015.

Convenors: Pete M. Atkinson, Jadu Dash, Gareth Roberts, John Remedios and Mick Johnson

## OCTOBER

### 12-14: EO Open Science 2.0, ESA/Esrin, Italy

The European Space Agency (ESA) is preparing for innovative Earth Observation (EO) scientific exploitation activities – referred as *Earth Observation Open Science 2.0* - to maximize the scientific benefits of Earth Observation (EO) data by capitalizing on the digital revolution.

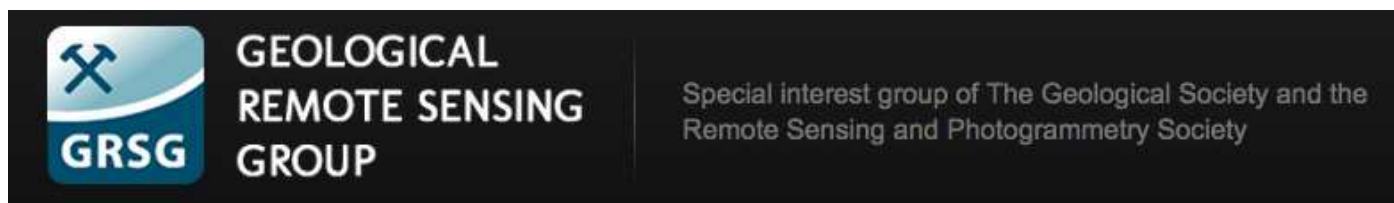
In this context, ESA is organizing a *community consultation meeting* (<http://www.eoscience20.org>) in Esrin (Frascati, Italy) on 12-14 Oct 2015 to explore the new challenges and opportunities for EO

research created by the rapid advances in Information and Communications Technologies. These include open tools and software, data-intensive science, virtual research environment, e-infrastructure, citizen science, crowdsourcing, advanced visualization, e-learning and education of the new generation of Data scientists.

The conference will present precursor activities in EO Open Science and Innovation and develop a Roadmap preparing for future ESA scientific exploitation activities. The conference will be followed by a Hackathon on 15-16 Oct in ESRIN for interested developers.

Deadline for submission of abstract and exhibitor request: 19.06.2015.

## DECEMBER



**We are pleased to announce that the 2015 GRSG conference will take place at the European Space Agency in Frascati, Italy on the 9<sup>th</sup> to 11<sup>th</sup> December 2015.**

The theme for the conference is 'Challenges in Geological Remote Sensing' and will cover the usual range of geological topic and applications with oil and gas sessions organised in conjunction with the EO Sub Committee of the International Association of Oil and Gas Producers. More information will be sent out in the near future.



# Overseas Champions



## Bob Agar

AGARSS Pty Ltd  
32 Wheelwright Road,  
Lesmurdie , WA 6076, Australia  
Tel: 619 291 7929  
Email: [bagar@agarss.com.au](mailto:bagar@agarss.com.au)

## Australia

## Okke Batelaan

Dept. of Hydrology & Hydraulic Eng.  
Vrije Universiteit Brussel  
Pleinlaan 2, 1050 Brussels, Belgium  
Tel: +32-2-6293039  
Email: [batelaan@vub.ac.be](mailto:batelaan@vub.ac.be)

## Belgium

## Vernon H Singhroy

Canada Centre of Remote Sensing  
588 Booth Street, Room 207Ottawa  
Canada K1A OY7  
Tel: 613 947 1215  
Email:  
[vern.singhroy@ccrs.nrcan.gc.ca](mailto:vern.singhroy@ccrs.nrcan.gc.ca)

## Canada

## Athanassios Ganas

Geodynamics Institute  
National Observatory of Athens, 118  
10 Lofos Nymfon,  
PO Box 20048,  
Athens, Greece  
Tel:+30-210-3490186  
Email: [aganas@gein.noa.gr](mailto:aganas@gein.noa.gr)

## Greece

## Tod Rubin

Chevron, Eurasia Business Planning  
240 G. Furmanov St.  
CDC Center One, 8<sup>th</sup> Floor  
Almanty 050059 Kazakhstan  
Email: [TRubin@Chevron.com](mailto:TRubin@Chevron.com)

## Kazakhstan

## Richard Bedell

Rengold  
940 Matley Lane, suite 17,  
Reno NV 89502, USA.  
Tel. +1 (775) 337-1545  
E-mail: [rbedell@rengold.com](mailto:rbedell@rengold.com)

## USA

## Alvaro Crosta

Geosciences Institute  
University of Campinas  
P.O. Box 6152, 13083-870  
Campinas SP Brazil  
Tel: +55-19-3521-5120  
E-mail: [alvaro@ige.unicamp.br](mailto:alvaro@ige.unicamp.br)

## Brazil

## Amer Smailbegovic

Photon  
Matice Hrvatske 15  
Split, Croatia  
Tel. +387 61555620  
Email. [amer@photonsplit.com](mailto:amer@photonsplit.com)

## Croatia

## Takashi Nishidai

NLC Associates  
3-33-1-111 Hatagaya,  
Shibuya-ku  
Tokyo, 151-0072 Japan  
Tel: +81 3 3375 7212  
E-mail:  
[takashi.nishidai@nlcrsa.com](mailto:takashi.nishidai@nlcrsa.com)

## Japan



# GRSG Lifetime Members



**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**, Nottingham University, 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

**Jason Manning**, ARUP, Services to the committee & Chairman



# GRSG Corporate Members



## Airbus Defence and Space

Rebecca Phillips  
Jupiter Court, 6 Dominus Way  
Meridian Business Park, Leicester  
LE3 1UT  
Tel: +44 (0)116 240 7200  
Email:  
rebecca.phillips@astrium.eads.net  
Website: [www.geo-airbusds.com](http://www.geo-airbusds.com)

# ARUP

## Arup

Jason Manning  
Senior Geologist  
13 Fitzroy Street, London W1T  
4BQ  
T : +44 (0)20 77 55 32 14  
F : +44 (0)20 77 55 21 21  
E-mail : [jason.manning@arup.com](mailto:jason.manning@arup.com)  
Website : [www.arup.com](http://www.arup.com)



## Analytical Spectral Devices, Inc.

Tom Ulrich  
Marketing Communications Manager  
2555 55<sup>th</sup> Street, Suite 100  
Boulder, Colorado 80301 USA  
(303) 444 6522 Ext. 129  
Email : [Amanda.griffin@panalytical.com](mailto:Amanda.griffin@panalytical.com)  
Website : [www.asdi.com](http://www.asdi.com)



## Barrick Gold Corporation

Xiaodong Zhou  
Senior Geologist, Exploration  
Suite 3700, 161 Bay Street  
Toronto, Canada M5J 2S1  
Tel: 416 3077366  
Fax: 416 8610008  
E-mail: [xzhou@barrick.com](mailto:xzhou@barrick.com)  
Website: [www.barrick.com](http://www.barrick.com)



## British Geological Survey

Luke Bateson  
Keyworth, Notts, NG12 5GG  
Tel: 0115 936 3452  
Fax: 0115 936 3474  
E-mail: [lbateson@bgs.ac.uk](mailto:lbateson@bgs.ac.uk)  
Website: <http://www.bgs.ac.uk>



**NPA Satellite Mapping, CGG Services (UK) Ltd**

Charlotte Bishop  
Crockham Park,  
Edenbridge,  
Kent, TN8 6SR, UK  
Tel: +441732 865023  
Email: [charlotte.bishop@cgg.com](mailto:charlotte.bishop@cgg.com)  
Website: [npa.cgg.com](http://npa.cgg.com)



**Chevron Energy Technology Company**

Christian Haselwimmer  
6001 Bollinger Canyon Road  
San Ramon CA 94583  
United States  
Email: [cehaselwimmer@chevron.com](mailto:cehaselwimmer@chevron.com)  
Website: [www.chevron.com](http://www.chevron.com)



**CoreScan Pty. Ltd.**

Neil Goodey  
Brigette A. Martini  
Unit 1, 127 Grandstand Rd.  
Ascot, WA 6104 Australia  
+61 8 9277 2355  
Email: [info@corescan.com.au](mailto:info@corescan.com.au)  
Website: [www.corescan.com.au](http://www.corescan.com.au)



**DigitalGlobe**

Azam Butt  
Regional Marketing Manager - EMEAR  
4<sup>th</sup> Floor, the Building  
578-586 Chiswick High Road  
London W4 5RP  
United Kingdom  
+44 (0)203 695 0931 office  
Email: [azambutt@digitalglobe.com](mailto:azambutt@digitalglobe.com)



**Exelis Visual Information Solutions**

Andrew Iwanoczko  
2 Arlington Square,  
Bracknell,  
Berkshire  
RG12 1WA  
Tel: +44(0)1344 747447  
Fax: +44(0)1344 742898  
Email:  
[andrew.iwanoczko@exelisinc.com](mailto:andrew.iwanoczko@exelisinc.com)  
Website: [www.exelisvis.eu](http://www.exelisvis.eu)



**Geoimage Pty**

Unit 13, 180 Moggill Road, Taringa,  
Qld, 4068 | PO Box 789  
Indooroopilly, QLD, 4068 |  
Tel: +61- 7-3871 0088  
Fax: +61- 7-3871 0042  
Email:  
[geoimage@geoimage.com.au](mailto:geoimage@geoimage.com.au)  
Website: [www.geoimage.com.au](http://www.geoimage.com.au)



**Marc Goossens**

Geosense/ Ursus Airborne  
Leertendijk 8, 7683 SE Den ham  
tel +31-(0)546-673734  
mob: +31-(0)6-308 908 56  
email: [goossens@geosense.nl](mailto:goossens@geosense.nl)  
[www.geosense.nl](http://www.geosense.nl)  
[www.ursus-airborne.com](http://www.ursus-airborne.com)



**HyVista Corporation Pty Ltd**

Peter Cocks  
Street: 11/10 Gladstone Rd, Castle Hill  
NSW 2154, Australia  
Postal: PO Box 437, Baulkham Hills  
NSW 1755, Australia  
phone: [+61 2 8850 0262](tel:+61288500262)  
fax: +61 2 9899 9366  
email: [pac@hyvista.com](mailto:pac@hyvista.com)  
web: [www.hyvista.com](http://www.hyvista.com)



**Integrgraph | ERDAS**

Andy Garratt  
EMEA Geospatial Regional Manager  
Delta Business Park,  
Great Western Way,  
Swindon, Wiltshire SN5 7XP  
Cell. +447740768897  
Email: [andy.garratt@intergraph.com](mailto:andy.garratt@intergraph.com)  
Website : [www.erdas.com](http://www.erdas.com)



**University of Twente,  
Faculty of Geo-Information Science  
and Earth Observation (ITC)**

Prof. Dr. F.D. (Freek) van der Meer  
Hengelosestraat 99  
PO Box 217  
Enschede, The Netherlands  
Email: [f.d.vandermeer@utwente.nl](mailto:f.d.vandermeer@utwente.nl)



**Itres Research Limited**

Joanne Devries  
Export Controls Manager/Marketing  
Coordinator  
Suite #110 3553 31st Street  
Nw Alberta T2L 2K7  
Canada  
Tel: 403-250-9944  
Email : [jdevries@itres.com](mailto:jdevries@itres.com)  
Website: [www.itres.com](http://www.itres.com)



**PhotoSat**

Gerry Mitchell  
President  
1050 West Pender Street, Suite 1710  
Vancouver, BC  
Canada V6E 3S7  
Tel: 604-681-9770  
Fax: 604-681-9790  
Email: [Gerry@photosat.ca](mailto:Gerry@photosat.ca)  
[www.photosat.ca](http://www.photosat.ca)



### **Rio Tinto Mining and Exploration**

Tim Gray  
2 Eastbourne Terrace,  
London, W2 6LG  
United Kingdom  
Tel: +44 (0)7920 810960  
Email: [timothy.gray@riotinto.com](mailto:timothy.gray@riotinto.com)  
Website: [www.riotinto.com](http://www.riotinto.com)

### **Southern Mapping**

Norman Banks  
39 Kingfisher drive  
Fourways  
2055  
South Africa  
Tel: +27 11-467-2609  
Fax: +27 11-467-3443  
Email: [norman@southernmapping.com](mailto:norman@southernmapping.com)  
Website: [www.southernmapping.com](http://www.southernmapping.com)

### **Shell International Exploration and Production**

Nick Kellerman  
Kessler Park 1,  
2288GS Rijswijk  
The Netherlands  
Email: [nick.kellerman@shell.com](mailto:nick.kellerman@shell.com)  
Website: <http://www.shell.com>

### **Spatial Energy**

Robin Leventhal  
1881 9<sup>th</sup> Street, Suite 303,  
Boulder, Colorado, USA  
Tel: +1 303 625-1048  
Email: [rleventhal@spatialenergy.com](mailto:rleventhal@spatialenergy.com)  
Website: <http://www.spatialenergy.com>

### **Specim**

Ana Aranda  
Teknologiantie 18 A  
Oulu  
90590  
Finland  
Tel: +358 (0)104244400  
Email: [info@specim.fi](mailto:info@specim.fi)  
Website: [www.specim.fi](http://www.specim.fi)

### **SpecTIR**

Linda Milks  
Remote Sensing Services  
9390 Gateway Drive, Suite 100  
Reno, Nevada 89521 U.S.A.  
775.329.6660 (office)  
775.771.7386 (mobile)  
775.329.6668 (fax)  
Website: [www.spectir.com](http://www.spectir.com)

### **TRE**

Stefano Cespa  
Via Ripa Di Porta Ticinese 79  
20143  
Italy  
Tel: +39 02 434 3121  
Email: [stefano.cespa@treuropa.com](mailto:stefano.cespa@treuropa.com)  
Website: [www.treuropa.com/](http://www.treuropa.com/)



Carlos Roberto de Souza  
Group Spectroscopy and Remote  
Sensing Labs Geosciences  
Institute University of Campinas PO  
Box 6152 Campinas, Sao Paulo,  
Brazil Ph: +(55) (19) 3521-  
4535 Email:  
[betto@ige.unicamp.br](mailto:betto@ige.unicamp.br) Website:  
<http://www.ige.unicamp.br/en>



Geological Remote Sensing Group

# GRSG Membership 2015

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

[treasurer@grsg.org.uk](mailto:treasurer@grsg.org.uk)

**Eric Peters**  
Consultant  
10 Westfield Avenue,  
Harpden,  
Hertfordshire  
AL5 4HN  
Tel: 44 (0) 1582 713347

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

**(Please print all details clearly):**

Full name		
Position		
Company/Organisation		
Street 1 Street 2 State/County	Billing address	Correspondence address (if different)
Postcode/Zip		
Country		
Telephone		
Email address		

**Please also complete the following section**

The Data Protection Act 1998

The information supplied on this form will be retained by the GRSG in a database of members. The information may also be used by the GRSG for marketing of future events organized or promoted by the GRSG which may be of interest to you.

If you do not wish to receive such information please tick this box

The GRSG may supply your information to the GRSG corporate sponsors, at any time. If you do not wish your information to be used in this way please tick this box

## A. 2013/2014 Membership

(please tick)

- Individual: UK £ 40
- Student UK £ 7
- Retired: UK £ 7
- Corporate: UK £ 200

Corporate members are entitled to distribute the GRSG newsletter in their organisation and to have their logo and contact details displayed in the GRSG newsletter and website.

Pay by credit/debit card  cheque (£)  invoice  (please tick)

Please make cheques payable to GEOLOGICAL REMOTE SENSING GROUP and send to the address above.

Invoicing and bank transfer details are available on request.

A receipt  can be provided on request.

Visa  Mastercard  No card handling fee. The GRSG accepts international credit cards, providing the card company can be billed in GBP.

Card account Number:

Print name of cardholder:

Authorised signature:

Valid from:

Expiry date:



# Disclaimer



No responsibility is assumed by the GRSG for any injury and/or damage to persons or property as a matter of product liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein. Advertising material in this publication does not constitute a guarantee or endorsement by the GRSG of the quality or value of such product or of the claims made by its manufacturer.

The GRSG does not purport to have a unified view and this newsletter is a forum for the views of all its members and their colleagues in industry, colleagues and government on a free and equitable basis.

*This newsletter has been created in Microsoft Word 2011 for Mac by Elspeth Robertson and distributed in pdf format to GRSG members*