

# GEO Q

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## European Geosciences Union General Assembly 2014



## Information & Schedules

Vienna | 27 April – 02 May 2014



Information  
Vienna

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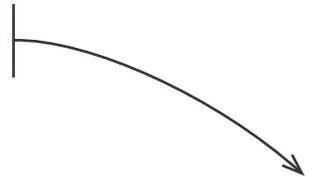
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# EDITORIAL

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Premiering a theme, the EGU General Assembly – which took place at the end of April in Vienna – was particularly special this year. It not only had a series of new features associated with The Face of the Earth topic, but it was also the biggest EGU conference to date, with close to 12,500 participants and over 15,000 presentations. In this edition of GeoQ, we reflect on a busy and exciting time in Vienna, highlighting research presented at the conference as well as other special features of the meeting.

In the Articles section, we feature particularly interesting research we had the chance to hear about and discuss at the EGU General Assembly. Julia Rosen writes about the exciting Azolla, a freshwater fern that promises to be a sustainable source of biofuel and protein. Tim Middleton reports on the talks and press conferences given by Corrado Cimarelli and Jörn Sesterhenn on volcanic lightning and the acoustics of eruptions, respectively. Finally, Jane Robb writes about Andrew Cunliffe's PhD research on soil organic carbon.

Importantly, the EGU Voice section features an excellent letter from the EGU President. Günter Blöschl looks back at this year's Assembly, highlighting the most successful events and features of

the meeting. He also makes an important announcement regarding next year's conference, which is taking place in Vienna from 12 to 17 April 2015.

Another EGU 2014 newsletter highlight is a report on young scientist activities at the meeting. The conference had a few new features and events targeted specifically at early-career researchers that were very well-received. EGU Communications Officer Sara Mynott, who is also the young scientists contact person at the EGU Executive Office, reports on this.

On the topic of young scientists, three early-career hydrologists organised a very interesting session on the future of scientific meetings at the EGU conference. They report on the outcome of the session in the External News section.

I couldn't end this editorial without welcoming Hans Thybo, who was inaugurated as EGU Vice-President at the General Assembly, and Nicholas Arndt, Gerrit de Rooij and Hubert Savenije, who became the new chairs of the Outreach, Programme and Publications Committees, respectively. The EGU anticipates they will continue the excellent and hard work of their predecessors, Don Dingwell, Niels Hovius, Gert-Jan Reichert and Ulrich Pöschl. Find out more about the new faces of the Union in the EGU News section.

To finalise, a quick note to remind all EGU members to nominate outstanding researchers to the EGU awards and medals. Check our [website](#) for more information. The deadline is 15 June!

*Bárbara Ferreira*  
*GeoQ Chief Editor & EGU Media and Communications Manager*  
*EGU Executive Office, Munich, Germany*

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The current and previous editions of the EGU newsletter (GeoQ and The Eggs) are available online at [www.egu.eu/newsletter](http://www.egu.eu/newsletter).

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COVER PHOTO: Programme books at the EGU 2014 General Assembly (Credit: Tim Middleton)

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## Fern of the future?

Held in the palm of a human hand, a single specimen of *Azolla filiculoides* looks downright inconsequential. Even with the scaly leaves of this miniature aquatic fern spread flat, it barely spans the distance between the creases that cleave the flesh. Its fibrous root tendrils dangle like a lock of matted hair, adding to its overall impression of impotence and making it even harder to believe that *Azolla* might help address humanity's greatest challenges. That it could is the hope of a team of scientists investigating *Azolla*'s potential as a sustainable source of biofuel and protein. They presented their preliminary results last month at the EGU General Assembly.

More reminiscent of a moss than a fern, *Azolla* has a long history with humans. Rice farmers in ancient China used it for thousands of years as green manure to replenish their paddies, unknowingly harnessing the power of its symbiotic nitrogen-fixing cyanobacteria. *Azolla* then enjoyed a moment of global celebrity in the 1970's and 80's as Western agricultural researchers began to recognise its potential before it fell abruptly into disrepute. Invasive *Azolla* grows like a weed: in 1993, it made headlines in Europe when blooms choked the Guadiana River in Portugal following an influx of phosphate runoff from upstream farms and factories.

But this ignominious debut did not alert the scientific community to *Azolla*'s biofuel potential. In fact, the diminutive fern did not come to the attention of Henk Brinkhuis, a geologist at Utrecht University in the Netherlands, until eleven years later, when copious quantities of *Azolla* spores turned up in ancient sediments from the Arctic Ocean. Scientists collecting cores in the newly ice-free Arctic Ocean in 2004 discovered evidence that, during the balmy Eocene epoch about 50 million years ago, *Azolla* blanketed the pole. They hypothesised that, in collusion with other changing environmental factors, these humble plants might have altered the climate – kick-starting the global cooling that drove Earth into its present ice-house state – by consuming CO<sub>2</sub> and storing it in their biomass, where it has remained at the bottom of the Arctic Ocean.

Now, *Azolla* may be poised to help bring down CO<sub>2</sub> yet again, but in an entirely different way: awed by its irrepressible capacity for reproduction (it can double in mass every two days), Brinkhuis assembled an interdisciplinary group of scientists from Utrecht and Wageningen Universities in the Netherlands and Imperial College in the UK to investigate the suitability of several species of *Azolla* for commercial biofuel production. Peter Bijl, also a geologist at Utrecht, coordinates the project from the helm of the [Laboratory of Palynology and Paleobotany \(LPP\) Foundation](#), a non-profit that specialises in bridging the gap between academia and industry.

"The *Azolla* lipids are very special in terms of composition and carbon chain length, diversity and functional groups," Bijl says, discussing the new results he presented at the EGU meeting. The long-chained lipids store energy, making them suitable for biofuel, while



*Azolla filiculoides* close up. (Credit: Robert Vidéki, Doronicum Kft., Bugwood.org)

other types of *Azolla* compounds can be manipulated into specialised high-value chemicals like lubricants. From what remains of the fuzzy green-red ferns after extracting these molecules, Bijl and his colleagues demonstrated that they can concentrate protein of the desirably nondescript variety (think soy) used in processed foods and animal feed. This has tremendous benefits from an economic point of view, Bijl says: "Basically, you can sell the same product twice."

*Azolla* also stands out as a radical alternative to other biofuel crops like corn, oil palms, and sugar cane that have become the source of global controversy. The problems that plague these other biofuels – once a seemingly promising way forward – include their competition with food crops for arable land, their suitability to tropical regions that often face a trade-off between rainforest and crop land, and the fact that these crops require so much synthetic fertiliser that, in the long run, they are far from carbon neutral.

*Azolla*, however, might sidestep these issues. First, the fern can be grown on marginal land that lacks agricultural utility. For example, Bijl says: "In India, there are large coastal areas where the groundwater has become brackish, but there are certain species of *Azolla* that can tolerate this." Second, the fern, like its full-sized relatives, thrives in relatively low light conditions like the natural sunlight available at mid-latitudes, alleviating the burden on low-latitude countries to grow most of the world's biofuel or the need for expensive indoor growing facilities. Third, with an endless supply of nitrogen, it requires few inputs, especially if grown in a closed system.

The holy grail of a closed system – nothing added, nothing wasted, endless product – has proved elusive for traditional biofuels. However, *Azolla* cultivation might come close because free sunlight, nitrogen and CO<sub>2</sub> constitute the primary inputs, and the whole process



*Azolla* growth in Broken Creek near Cobram in Victoria, Australia. (Credit: Arthur Mostead)

takes place in isolated tanks where nutrients can be reclaimed from wastewater streams and fed back into the next batch. Heat speeds up the process, but that could come from unexpected sources. On an industrial scale, Bijl envisions coupling *Azolla* production facilities to industrial operations like concrete factories or steel plants where heat and CO<sub>2</sub> abound.

Other biofuel experts agree that *Azolla* truly does differ from previous crops in important ways. Keith Smith, a geologist at the University of Edinburgh who has studied the greenhouse gas emissions of growing traditional biofuels, says that *Azolla*'s natural nitrogen source would greatly reduce such emissions. Its ability to grow on marginal land helps too, he says, because what really matters is avoiding "land use change whereby forest land becomes converted to agricultural land. The CO<sub>2</sub> emissions associated with this process are huge compared with any environmental benefits from using biofuels instead of fossil fuels."

However, Tad Patzek, Professor of Petroleum and Geosystems Engineering at the University of Texas at Austin and a prominent biofuel critic, thinks *Azolla* is just another doomed biofuel darling.

"It makes no difference what less or more exotic source of biofuels we find," he wrote in an email. "They all – without an exception – are unsustainable and/or harmful at the scales we want to deploy them." A truly closed system can't exist, he argues, because removing biomass and the micronutrients it contains violates "the thermodynamic definition of sustainability". In addition, there are other conceivable concerns regarding the threat posed by invasive *Azolla* if spores escape into the wild and cautionary tales of other non-food biofuel crops like switchgrass and jatropha that failed to fulfill perhaps overly-inflated hopes.

Bijl and the LPP Foundation harbor no delusions that *Azolla* will save the world. However, their research reveals that the fern could produce commercially viable quantities of chemicals and proteins without the human and environmental costs of other biofuels. With the results of the preliminary investigations now in hand, the LPP Foundation hopes to attract business partners like energy giants, specialty chemical companies, and food and animal feed manufacturers.

So far, Bijl says there have been hints of interest from potential collaborators, but nothing concrete. Will anyone bite? It's too soon to tell, but in the meantime, Bijl's vats of *Azolla* will just keep growing and growing, synthesising lipids and proteins without any regard for mankind, just as they have done for 50 million years.

*Julia Rosen*

*Freelance science writer*

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## Flash, bang, jet: new observations of volcanic plumes

It erupts every day. Thousands of explosions occur every year. And, if you look closely, you might just catch sight of the lightning.

The Japanese volcano Sakurajima nestles in Kagoshima bay, spewing its jets of volcanic debris onto the 680,000 residents of the nearby city. Corrado Cimarelli, a volcanologist at the Ludwig Maximilian University in Munich, comes here to observe the lightning. He uses high-speed cameras to capture the moment and then recreates the spectacle in his lab.

"My colleague Miguel Alatorre-Ibargüengoitia was doing experiments looking at [volcanic] jets and we discovered the lightning in one of these experiments, completely by chance," says Cimarelli. "Miguel and I were looking at the videos and we thought: what was that white thing in the video? So we went back and we saw that there were actually many of these flashes."

To recreate volcanic lightning in his lab, Cimarelli uses about 100 grams of ash per experiment, but each one lasts for only a few milliseconds. "Without the high-speed camera you don't see anything, you just hear a big boom and everything is finished," he explains. The lightning is caused by the separation of charged particles within the plume: the ash carries electrical charges, the ash expands, and the electrical charges become separated. The flash of lightning occurs when the charge difference is so great that it can overcome the resistive air in between. Over time the lightning flashes get bigger but less frequent. "This is something we can actually observe in volcanic plumes," says Cimarelli, "you start with an acceleration of particles and you see a lot of crackling of lightning around the vent. Then, with time, you build up longer and more powerful lightning." Cimarelli and his team also found a relationship between the size of the particles and the number of flashes produced: more flashes are seen when there is a greater proportion of smaller particles.

Volcanic lightning has been proposed as the ‘spark of life’, electrical discharges that aided the first formation of organic molecules. Cimarelli is excited by the possibility: “Volcanoes not only produce the spark but they actually contributed to the formation of the early atmosphere on the Earth. All the gases are actually escaping from the volcanoes. I’m not saying life was produced by volcanoes, but it’s a sexy idea. We don’t need to look for strange explanations if everything is there.” Cimarelli hopes to pursue this idea in future experiments.

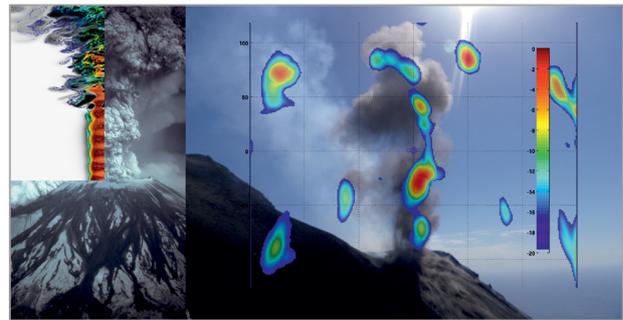
There’s also a very practical application in the form of hazard management. “We cannot predict the eruption, but we can tell something about the structure of the plume and the fate of the ash from the plume. But we need to couple this technique with other monitoring,” says Cimarelli. This is where the sounds come in. “During monitoring at night our camera can’t see the very beginning of the eruption, but we can spot it because of the sound. So we can synchronise our camera with the microphone and then use the microphone signal to look in the video to find the beginning of the eruption.” These techniques are being used in collaboration with researchers at the Universities of Kyoto and Kyushu in Japan.



Jörn Sesterhenn, from the Technical University of Berlin, is also very interested in the sounds produced by volcanic jets. When a volcano erupts the key parameters to determine are the diameter of the vent, the speed of the jet and the volume of ash in the flow. These variables can be very hard to measure directly, but, explains Sesterhenn, we can listen instead.

“We go to the volcano and take pictures and also place microphones. At home we compute the whole thing using a supercomputer. From this computation we find out how the acoustic waves radiate. From these characteristics we do what we call beam forming and identify the sources of the sound [in space].” In other words, Sesterhenn and his colleagues can make a map of where in the jet the noises are coming from.

Many volcanic jets are supersonic. “Every jet which has a pressure inside the volcano that is twice the ambient pressure will be supersonic,” explains Sesterhenn. These supersonic jets have certain characteristics, which Sesterhenn has reproduced in his numerical models. When the jet first starts it produces a vortex ring. “It’s a bit like a smoke ring,” says Sesterhenn, “if you have a fluid coming out of a tube you have friction between the fluid and the wall and this causes the fluid to start turning.” Then there are shock cells, patches in the jet that correspond to supersonic booms. Some jets are like



Left: The eruption column at Mount St. Helens and a numerical model of a volcanic jet. Shock cells are visible as dark red patches within the jet. Right: The location of acoustic sources within a volcanic jet. Images courtesy of the US Geological Survey and Jörn Sesterhenn.

single puffs of smoke – just one vortex ring is produced; others are more continuous and include lines of shock cells.

Sesterhenn is also able to learn about the ash content of the jet purely from acoustic observations. “If you have ash, the ash changes the structure of the jet. For example, with no ash you have a certain mode of behaviour for a certain Mach number (the ratio of the speed of the jet to the speed of sound) – for example a spiral motion. If you keep everything the same but alter the ash content then this motion changes. If we knew everything else about the jet we could infer the ash content from the type of motion – whether it’s spiraling or flapping, for example. If we know other things, like the vent diameter, we can calculate the volume fraction of ash in the air.”

“Ultimately this will be helpful for hazard management,” he explains. “Microphones are very cheap devices – they cost a couple of hundred Euros – but it’s not a short term goal.”

Flashes and bangs in volcanic jets make for exciting research topics, but they also reveal vital information about volcanic eruptions as they progress. Hopefully, real-time observations of these sights and sounds will soon feed into disaster management initiatives.

*Tim Middleton*

*Freelance science writer and PhD student at the University of Oxford*

## Notes

A video of Cimarelli’s volcanic lightning in the lab is available [online](#).

Sesterhenn’s work has been accepted for publication in *Geophysical Research Letters*.

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# Scrublands and carbon fluxes: an unexpected result?

“For starters, checking for rattlesnakes before collecting samples is a must!” laughs Andrew Cunliffe from the University of Exeter in the UK, a young scientist member of the EGU who has just presented in the session on [dynamic soil landscapes](#) at the 2014 General Assembly. His [talk](#) was on redistribution of soil organic carbon (SOC) in semi-arid rangelands (grazing land with shrubby vegetation). He used the Chihuahuan desert in New Mexico, USA as a case study for understanding SOC dynamics in this relatively understudied area of soil science.

Semi-arid rangelands tend not to get the bulk of attention from soil scientists studying SOC because there is little growth of plants in scrublands, and there is little SOC available to begin with. Coupled with this is the fact that human activities have less impact on how soil carbon is distributed in semi-arid lands compared to intensively managed agricultural landscapes, so dryland SOC dynamics tends to be rather static and uninteresting to soil scientists. And yet, this type of land makes up around 40% of the world’s land surfaces, representing an important part of the global terrestrial carbon sink. Further, it helps sustain a sixth of the global population, often in marginal environments. Recognising this, Cunliffe and his colleagues set out to investigate particulate SOC distribution and redistribution over the constantly changing interface between grasslands and semi-arid scrublands.

The study of SOC is important because of its key link to climate change: how is carbon transported and stored within Earth’s biogeochemical systems? Not only that, but understanding SOC dynamics helps us understand the impact that changes in land cover have on different soils and wider ecosystems. It is especially important when considering the long term soil quality and fertility for supporting crops and livestock. Understanding what land management practices can keep SOC in the soils for the longest can help us work with farmers to ensure they have the best land for growing crops. Combining an understanding of SOC dynamics with climate and land use change can also help us prepare farmers for climate change and the subsequent changes in soils and land management they will need to endure and practice.

In Cunliffe’s study, he collected 50 samples from four plots with different types of vegetation and examined the concentrations of particulate SOC in various particle-size fractions obtained from these samples, leading to some interesting results.

Soil components can roughly be separated into three parts: coarse, medium and fine. Generally, it’s thought that there’s no organic carbon to be found in big soil particles (those greater than 2 mm), and little in medium-sized ones (0.25–2 mm). However, Cunliffe’s findings have shed new light on the distribution of organic carbon across soil aggregates. While fine soil particles (those under 0.25 mm) have relatively high concentrations of organic carbon, a finding in line with soil other science research, the medium-sized particles were surprisingly rich. The biggest particles were the biggest surprise, containing a similar concentration of organic carbon as the smaller (sub 2 mm) aggregates. The amount of carbon stored in scrubland soils could be severely underestimated if these size fractions are ignored.



View across the Sevilleta National Wildlife Reserve, in the Chihuahuan desert in New Mexico, USA. Inset: rattlesnake beneath a creosote bush where Cunliffe had wanted to collect a soil sample. (Credit: Andrew Cunliffe)

Surface runoff is a major erosive process in semi-arid rangelands. Here, rainstorm intensities exceed the soil’s infiltration capacity and excess water flows over the land surface, carrying with it some of the soil. This process leads to wide redistribution of soil particulates and, in addition, SOC.

Eroded sediments are commonly enriched in SOC relative to the eroding topsoil. This is widely attributed to the fact that water erosion tends to favour the smaller particle sizes, which usually have relatively high SOC concentrations. However, Cunliffe’s work has shown that this size selectivity explains less than 15% of the SOC enrichment they’ve monitored and he is working to find out why. Furthermore, they’ve found large changes in SOC enrichment when vegetation changes from grasslands to shrublands, which are currently very poorly understood.

Cunliffe’s study helps to show that common practices of understanding of SOC distribution (and redistribution) are not always directly applicable for semi-arid rangelands. As these landscapes hold one of the largest carbon sinks in the world, it may even be that we are underestimating the amount of SOC these environments contain by excluding coarse soil fractions in SOC studies. For Cunliffe, this was an exciting and unexpected result.

So where will Cunliffe go next with these exciting results? He’s now deploying remote sensing technologies to survey these landscapes and examine fine-scale controls on the distribution of SOC. He hopes this will help understand catchment-scale SOC dynamics in semi-arid rangelands and help scientists better understand how carbon is collected, redistributed and locked up in Earth processes.

*Jane Robb*

*Project Assistant, University College London*

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## Letter from the EGU President

### Reflections on the 2014 General Assembly

The [2014 General Assembly](#) was an amazing event: it was not only the biggest ever geoscience meeting in Europe with well above 12,000 participants but also, dare I say, it was one of the most exciting too. For instance, it had a very vibrant programme thanks to the commitment of all the session convenors and authors, who were instrumental in making this year's event a true scientific feast. Among the new features this year was a theme: The Face of the Earth – Process and Form. The idea behind introducing a theme was to better connect the individual disciplines within the geosciences, a much needed development given that most of the exciting research questions and societal challenges are at the interfaces between the various areas. As we are no longer only residents but have become co-designers of this planet, the links between all the spheres of the Earth system and the role humans play in them are becoming centre stage. The keynote talks relating to the theme, held every day of the Assembly, were particularly well received as they were addressed to a general geoscientific audience. Following this year's success, next year's General Assembly will once again be themed: A Voyage Through Scales is an invitation to contemplate the Earth's extraordinary variability extending from milliseconds to its age and from microns to the size of the planet.

There have also been important developments in terms of presentation format and logistics. To improve interaction, the number of PICO (Presenting Interactive COntent) sessions, first implemented in 2013, has increased. PICO is a novel presentation method that combines the strengths of oral and poster presentations, giving authors a platform to introduce their research to an audience on large, interactive display panels, followed by group viewing and stimulating discussions. There will be even more PICOs in 2015 with some slight improvements in the position of the display panels. In other developments, the organisers made a major effort in improving the catering – including better coffee! I hope you noticed the difference. Further, the WLAN was recently upgraded in the conference centre and worked smoothly, even with more than 7000 simultaneous users during peak times.

Personally, I was particularly impressed by the impact and number of young scientists. By talking to colleagues on the corridors, I learned that the initiatives specifically addressed to young colleagues were very well received. These included the dedicated Young Scientists' Lounge where early-career researchers gathered their thoughts away from the buzz of the conference, young scientist forums and discussion sessions, an improved job market, and upgraded travel support for young researchers, particularly from economically disadvantaged countries in Europe. Indeed, our biggest resources are the talent and enthusiasm of young scientists. A key philosophy of the EGU is to support an environment that fosters

a free and open exchange of ideas, especially among young people, according to the bottom-up nature of the Union. Indeed, we cannot talk about the future of geosciences without highlighting the role of young researchers!

The annual General Assembly is Europe's leading forum for the Earth, space and planetary sciences but the EGU has much more to offer. Check out the many [topical meetings and conferences](#) on the EGU web page! You could also consider making EGU journals your premier publication outlet: we publish 16 high-quality [open access journals](#) that can be read by anybody on the globe, free of charge. And you can use the EGU as a platform to inform decision makers about the Earth sciences with the help of our [communication](#) and outreach products.

While you are engaging in the diverse EGU activities please make sure to put 12–17 April 2015 into your calendar as the date of the next General Assembly. See you next year in Vienna!

*Günter Blöschl*  
EGU President



# Division reports

## News brought to you from four EGU divisions

In each edition of GeoQ division presidents contribute reports that update EGU members with news from their divisions. Issue 10 gives voice to Michael Schmidt (Geodesy), Irina Artemieva (Geodynamics), Andreas Lang (Geomorphology) and Nicholas Arndt (Geochemistry, Mineralogy, Petrology & Volcanology).

### Geodesy

#### 2014 General Assembly

In 2014, the Geodesy Division ([G](#)) ran a total of 14 sessions scheduled over the whole week. The sessions were well attended and the lecture rooms for the most of the sessions were sufficiently large. The Geodesy Division had 390 submitted abstracts, around 3% more than in 2013. As in previous years, the most popular sessions (by number of abstracts and by number of participants) were related to gravity field research and gravity satellite missions. The open session on regional [GNSS \(Global Navigation Satellite System\) analysis](#) was scheduled as a PICO session, and like last year, the response was predominantly positive.

This year the Outstanding Young Scientists Award was given to [Roelof Rietbroek](#) for providing methodological solutions to the problem of integrating GRACE data, together with GPS, altimetry, and model data into estimates of mass redistribution. During the Division Meeting he gave a short and scintillating presentation entitled 'CSI geodesy: pointing out culprits behind sea level change'. Furthermore, [Verena Lieb](#) was decorated with the Outstanding Student Poster (OSP) Award for her poster on regional gravity field modelling, in addition to [Bas de Boer](#) for his contribution on simulating regional sea-level changes over the past glacial cycles, both of which were presented last year.

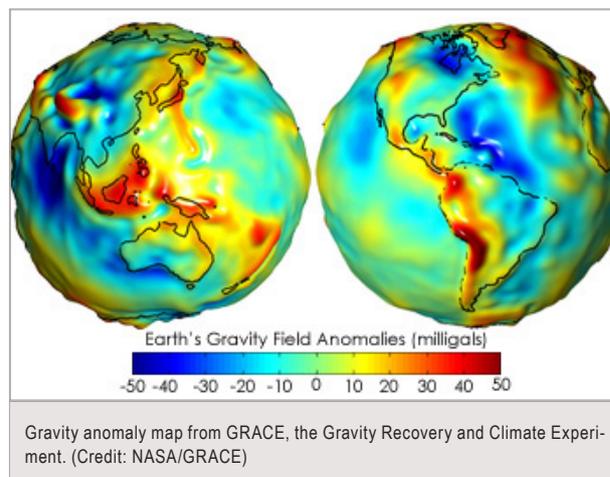
#### 2014 Vening Meinesz Medal

This year's Vening Meinesz Medal was awarded to [Reinhard Dietrich](#) for his outstanding accomplishments in the application of terrestrial and satellite geodesy to study cryospheric change and the glacial isostatic adjustment process, and his pioneering quantitative studies of the current state of polar ice sheets. He gave a great medal lecture entitled '[Geodesy and ice: is there still something to discover?](#)' during the conference.

#### Geodesy Division officers and committees

Johannes Böhm (Vienna University of Technology) and Johannes Bouman (German Geodetic Research Institute) have been appointed as the two deputy presidents according to the new EGU by-laws. The division president is a member of the Programme Committee, which organises the General Assembly, with Johannes Böhm designated as the alternate. Furthermore, Roelof Rietbroek (University of Bonn, Germany) was appointed as the new Young Scientist Representative of the Geodesy Division for a term of two years.

The Vening Meinesz Medal Committee consists of the four past medalists as well as the Geodesy Division president and the EGU



Awards Committee chair (both non-voting). The last year's medalist is chairing the committee. The 2015 committee consists of: Reinhard Dietrich (1), Zuheir Altamimi (2, chair), Che-Kwan Shum (3) and Harald Schuh (4), in addition to myself and Alberto Montanari (Awards Committee Chair).

The Outstanding Young Scientists Award Committee consists of the division president, the two deputy presidents and the latest medalist (Roelof Rietbroek). The Outstanding Student Poster Award Committee consists of the division president and the two deputy presidents. All committees were approved unanimously during the Division Meeting. The Programme Group for the 2015 Assembly consists of the division president, the two deputy presidents, the young scientist representative and one or two others to cover the whole field of geodesy.

#### Upcoming issues

The preparation of the next EGU Assembly will start soon: the skeleton programme for the Geodesy Division could be based on this year's successful sessions, but we also welcome new sessions! In this context the following items are important:

- Co-organised sessions strengthen the interdisciplinary character of the EGU;
- The total number of sessions within the Geodesy Division should be around 12 to ensure large and strong sessions run at the conference;
- PICO sessions are independent of oral slots and should be considered as an appropriate alternative;
- When choosing conveners and chairs, the gender diversity, the diversity in countries/institutes, and the inclusion of younger scientists should be given strong consideration;
- A minimum of three conveners for each session is generally desirable.

I look forward to hearing your session suggestions!

*Michael Schmidt*  
G Division President

## Geodynamics

The ongoing activities of the EGU Geodynamics Division ([GD](#)) are guided by the multitude of scientific methods, which aim to understand deep and shallow processes acting at different time scales across a variety of tectonic settings. Geodynamics as a discipline embraces depth scales from near-surface processes to core dynamics, length scales from grain size to lithospheric plates, and timescales from seismic deformation to mantle convection. It plays a critical role in integrating knowledge from a multitude of research disciplines, bridging geology, tectonics, deep and shallow geophysics, rheology, geochemistry, mathematical physics, laboratory experiments, and numerical simulations.

Many research topics in the GD Division overlap with those of other EGU divisions (e.g. SM, G, TS, NH and GMPV). To reduce overlap between sessions on similar topics, and to achieve maximum exposure of scientific results to a multi-division community, the scientific programme of the GD Division at EGU 2014 was developed together with other divisions (SM, GMPV, G, and in particular with TS).

The GD Division programme at the EGU 2014 General Assembly continued the success of past years and showed a 46% increase in the number of presentations compared to EGU 2013 (507 abstracts presented in 13 oral/poster and 2 PICO sessions). By keeping the number of GD sessions at the same level as in 2013, GD significantly increased the size of the sessions and their visibility. This was achieved through the organisation of large multidisciplinary topical sessions with targeted sub-sessions. In spite of the competition, the GD Division organised many successful sessions that were well attended, sometimes exceeding the capacity of the rooms. Highlights at the 2014 General Assembly included the [Augustus Love Medal Lecture](#) of the GD Division given by [Shun-Ichiro Karato](#) (Yale University). Our cooperation with non-European organisations continued, aided by a number of invitations of solicited talks from American and Australian experts and by the AGU's Studies of the Earth's Deep Interior co-sponsorship of the GD session '[Mantle dynamics in the Earth and other planetary bodies](#)'.

Together with other EGU divisions, GD continues to promote competition between young EGU participants. In 2014 the GD Division awards to early-career researchers were presented to [Rhodri Davies](#) (GD Outstanding Young Scientists Award) and [Chase Shyu](#) (GD Outstanding Student Poster Award 2013). There was a significant increase in a number of posters registered at the EGU 2014 for the student competition. Coordinators of the Division Outstanding Student Poster contest are Maxim Ballmer (present) and Ana-Catalina Plesa (incoming). The participants of the GD Division scientific programme have received a large number of travel awards, with the highest success rate (57%) among the EGU divisions.

Broad presentation of research results from the Geodynamics community continues through international journals, including EGU's journal *Solid Earth*. During the last few years, this open access journal has gradually gained a solid reputation in the scientific community.

The positive experience of the EGU 2014 General Assembly will form the basis for the preparation of the GD Division programme for EGU 2015. The bottom-up initiative that is at the core of the EGU and its Assembly is both welcome and eagerly anticipated in proposing sessions for and organising the GD Division scientific programme for 2015. Contributions from early-career researchers are particularly welcome.

*Irina Artemieva*  
GD Division President

## Geomorphology

The Geomorphology Division ([GM](#)) programme at the EGU 2014 General Assembly has seen abstract numbers increase by 13% compared to 2013, continuing the success of past years and establishing the meeting as the leading annual scientific event for geomorphology. Over 1200 contributions (including in co-organised sessions) were presented filling room G2 all week, and three full days in rooms across the G-level.

This year's General Assembly theme The Face of the Earth placed geomorphology at centre stage. This was beautifully highlighted by Jean Braun's Rocks of the Earth keynote lecture and Heather Viles' Union symposium lecture 'Linking life and landscape: (bio)geomorphological contributions to shaping the face of the Earth'.

The 2014 Ralph Alger Bagnold Medal was awarded to [Pieter van der Beek](#). He delivered a stimulating Bagnold Lecture entitled 'Late-Cainozoic climate change, erosion, and relief of mountain belts: 20 years of chickens and eggs'. As in recent years the Medal Lecture was preceded by a reception sponsored by the British Society for Geomorphology (BSG) and their journal, *Earth Surface Processes and Landforms*.

The division's 2014 Outstanding Young Scientist Award went to [Robert G. Hilton](#). He delivered the Penck lecture on 'Orogenesis as a carbon dioxide source or sink? New insights from the organic carbon cycle of Taiwan'. Ping Fu received the 2013 Outstanding Student Poster Award for her poster on 'Paleoglacioclation of Shaluli Shan, Southeastern Tibetan Plateau'.

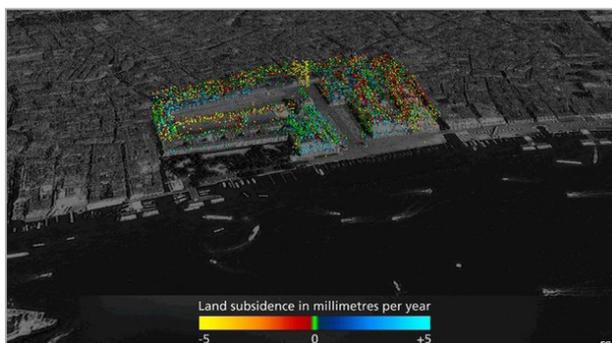
The workshops for young researchers continue to be highlights of the GM programme. This year they included 'Pitfalls, statistical and otherwise, in analysis of environmental data' with James Kirchner and 'Meet the Master' with Paul Carling. For years GM has been trailblazing workshops for young researchers. Their great success and the excellent feedback received for them stimulated the roll out of similar events at Union level in 2014. Again, in coming years, workshops for young researchers will be forming an important part of the EGU programme, both at division and Union level. New this year was the 'Meet and greet' drinks reception for young scientists for which Lucy Clarke, the GM Young Scientists Representative, managed to secure BSG sponsoring. Another new activity was the very well received 'International Young Geomorphologists Social Event' organised by young German geomorphologists (*Junge Geomorphologen*), who hired an authentic Austrian restaurant for a whole night!

And of course, the science presented in GM was not just of high scientific value but also of great societal relevance: the session on land subsidence, highlighted through a press conference, was picked up by AGU, BBC and more than 60 newspapers and magazines (including Der Spiegel). Gilles Erkens, the main convenor, was interviewed over 20 times during the Assembly and in the week thereafter.

The 2014 General Assembly also saw the GM community celebrating the first year of its new EGU journal *Earth Surface Dynamics* (ESurf) at a reception on Tuesday evening. EGU-style open access publishing after public peer-review and an interactive public discussion process has proven attractive for the GM community. The division is looking forward to receiving more high quality articles on [Earth Surface Dynamics](#). Page charges have been waived until at least April 2015.

The full division structure, the scientific officers and their contact details can be found at: <http://www.egu.eu/gm/structure>. For further details please consult the presentation from the division business meeting at: <http://www.egu.eu/gm/reports>.

*Andreas Lang*  
GM Division President



Radar data are increasingly important to measure land subsidence. The problem of land subsidence was highlighted in a GM scientific session, as well as at a press conference at the EGU 2014 General Assembly. (Credit: ESA/DLR)

## Geochemistry, Mineralogy, Petrology & Volcanology

Activities of the Geochemistry, Mineralogy, Petrology & Volcanology Division (GMPV) encompass a broad range of geoscience disciplines. A major focus is the solid Earth, and a series of processes that starts with mantle geodynamics, extends through the formation of magma and its evolution in the crust, and terminates with volcanic eruptions. In addition, the mineralogy group deal with metamorphism and the geochemists study processes ranging from mantle evolution to the chemical record of climate change.



This span of activities is reflected in the career of [Chris Hawkesworth](#) who received GMPV's Bunsen Medal. Hawkesworth is a geochemist whose research has included the origin of granitic magmas, material transfer in subduction zones and the generation of the continental crust from the Hadean to the present. The career of [Sebastien Watt](#), who received an Arne Richter Award for Outstanding Young Scientists, reflects the interests of the volcanology group. Watt works on reconstructing regional volcanic histories with an emphasis on volcanic landslides.

Our collaboration with the Volcanology, Geochemistry, and Petrology (VGP) section of the American Geophysical Union continues to be strong. This year the two groups co-sponsored four sessions at the EGU General Assembly. On Thursday afternoon, Frederic Moynier delivered the lecture of VGP's Kuno Medal and this was followed by a VGP-GMPV reception. Next year we will extend the collaboration to include the Geological Society of America. Bruno Dhuime will coordinate these activities.

We have also recruited two young scientists to the division. Ioannis Baziotis has been actively promoting our activities on social networks for several months and he will be joined by another young scientist before the summer.

The GMPV Division is closely associated with the Great Debates in the geosciences at the EGU meeting. This year we co-organised the debate on the minerals industry: '[Metals in our backyard: to mine or not to mine](#)'.

Participation in GMPV activities at the General Assembly is strongly influenced by the 'Goldschmidt effect'. When this major geochemistry meeting is held outside of Europe, as is the case this year, the number of abstracts and the size of the audience in our sessions are up – by about 45% this year compared with 2013. Next year the Goldschmidt meeting will be in Prague but we are counting on the enthusiasm generated by this year's numerous successful sessions to provide the momentum needed to overcome the effect in 2015.

*Nicholas Arndt*  
GMPV Division President



## Some highlights from EGU 2014

From 27 April to 2 May, Earth, planetary and space scientists from all over the world got together in Vienna for the EGU 2014 General Assembly. The meeting was rich in scientific achievements and international discussions and, for the first time, it had a theme: [The Face of the Earth](#). With over 15,000 presentations and close to 12,500 participants from 106 countries, it was also the largest to date.

The theme brought interesting new features to the Austria Center Vienna, where the conference took place. There were exhibition areas focusing on the five sub-themes of the meeting: Rocks of the Earth, Waters of the Earth, Life of the Earth, Atmosphere of the Earth and Space and the Earth. In addition, the conference featured daily keynote lectures dedicated to each of these topics, which proved to be extremely popular among participants.

Union-wide sessions, in particular the [IPCC Union Symposium](#) and the [Geoengineering Great Debate](#), also had a full house. The many scientific sessions, medal lectures and side events, which were of high scientific quality and interest, also helped make the Assembly a great success.

There were other well-received novelties at the conference, such as [PICO](#) presentations with a new format, intended to enhance interactivity among presenters and participants. The many specials we had for early-career researchers were also welcomed, including a lounge for young scientists and a student canteen.

### Media and communications

Following last year's example, there was a strong online presence at EGU 2014, including active use of Facebook and Twitter. Thousands of tweets featured the conference Twitter hashtag (#EGU2014) and many used this, other session-specific hashtags, and the updates on the official EGU Twitter account ([@EuroGeosciences](#)), to follow the goings on at the Assembly. [@EuroGeosciences](#) gained some 140 new followers during the Assembly week and close to 80 new people 'liked' the [EGU's page on Facebook](#) in that period.

The EGU official blog, [GeoLog](#), and the EGU [network blogs](#) also saw a flurry of activity with some 30 posts published at the Assembly, thousands of views and many new subscribers.

In addition to its scientific achievements and active online presence, the conference also saw keen media participation and reporting. The Press Centre welcomed over 40 media participants, including



EGU 2014 highlights video: [click to play](#) or [watch it online](#). (Credit: EGU/Stephanie McClellan)

journalists, press officers, science writers and EGU bloggers. The EGU conference [has featured](#) in over 200 online, print and radio articles published by the BBC, Nature, Der Spiegel among many others, thanks to the hard work of media participants.

One of the EGU 2014 press assistants has produced an excellent highlights video of the meeting, which you can [watch online](#).

### Thank you and see you next year!

The Union is especially grateful to those who worked behind the scenes at the Assembly. We thank the ACV staff, all the conference assistants and our conference organiser Copernicus, particularly Katja Gänger, Mario Ebel, Katrin Krüger and Martin Rasmussen, for all their hard work before and at the meeting. A special thanks goes out to the members of the Programme Committee, chaired for the last time by Gert-Jan Reichart, who worked tirelessly in coordinating the full scientific programme for the General Assembly.

The EGU is also grateful to all scientists, in particular abstract authors and session conveners, who participated in the meeting and were instrumental to its success, as well as to the hard-working journalists and exhibitors we had the pleasure to host. Please let us know how we can make the meeting even more enjoyable for you by providing feedback at <http://www.egu2014.eu/feedback>.

We hope to see you all next year in Vienna, Austria, at the **EGU 2015 General Assembly, 12–17 April 2015**.

*An earlier version of this article was [published on the EGU website](#).*

## Welcome to the new EGU Vice-President and three new committee chairs!

The EGU 2014 General Assembly, themed The Face of The Earth, saw a number of changing faces in the Union. During the meeting, Hans Thybo was inaugurated as EGU Vice-President, while Nicholas Arndt, Gerrit de Rooij and Hubert Savenije became the new chairs of the Outreach, Programme and Publications Committees, respectively.

[Hans Thybo](#) was elected as EGU President/Vice-President for the term 2014–2018 in the EGU Autumn 2013 elections. He will serve as Vice-President (President-Elect) for the first year, then as the Union President for the next two years and finally as Vice-President (Past-President) for the fourth year. At the same election, [Mioara Manda](#) was re-elected as EGU General Secretary, a position she will hold for two years counting from the 2014 Plenary.

Nicholas Arndt, who is also the President of the Division on Geochemistry, Mineralogy, Petrology & Volcanology, will serve as Outreach Committee Chair for a period of two years, renewable once. The Outreach Committee is in charge of coordinating EGU's substantial [outreach programme](#), aimed at promoting the Earth, planetary and space sciences beyond the scientific community.

Gerrit de Rooij, the President of the Hydrological Sciences Division, will be the Programme Committee Chair for the 2015 and 2016 General Assemblies. He has significant experience working behind the scenes at the EGU annual conference, with hydrology being one of the largest and most active programme groups, engaging substantially with young scientists.

Finally, Hubert Savenije, who is one of the executive editors for the Hydrology and Earth System Sciences journal, will be chairing the



Hans Thybo, Nick Arndt, Gerrit de Rooij and Hubert Savenije are the new faces of the Union.

Publications Committee for three to six years. The EGU currently has a portfolio of 16 diverse scientific journals, which use an innovative peer-review format and are fully open access.

Another important change approved in Plenary, was the modification of the Union by-laws. The new version is now [online on the EGU website](#).

The EGU is grateful to Don Dingwell for his work during his term as EGU President/Vice-President, and to Niels Hovius, Gert-Jan Reichart and Ulrich Pöschl, former chairs of the Outreach, Programme and Publications Committees, respectively, for their enthusiasm and dedication to the Union and its activities.

*An earlier version of this article was [published on the EGU website](#).*

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## Obituary: Peter Fabian (1937–2014)

Peter Fabian, the first EGU President, passed away on 11 March at the age of 76.

Fabian, one of EGU's founding fathers, served the geosciences through a great variety of positions. As the president of the European Geophysical Society, he succeeded in merging this organisation with the European Union of Geosciences to create the European Geosciences Union in Munich in 2002. He served as the president of the EGU until 2005, and then as vice-president from 2005 to 2006. Most recently, he was involved in the organisation of EGU Alexander von Humboldt International Conferences.

Fabian was an expert in atmospheric sciences who earned international recognition for his pioneering measurements of the vertical distribution of halocarbons in the middle atmosphere. He also

contributed to investigations on the impact of aviation on the atmosphere and established research on phenology, a powerful tool for probing the effect of global warming on vegetation. At the time of his passing, he was a Professor Emeritus for Bioclimatology and Emissions Research at the Technical University of Munich.

His presence in the Union, atmospheric science circles, and the wider scientific community will be profoundly felt.

*Comment from Roland Schlich, EGU Treasurer:*

*"A mon ami Peter Fabian*

*I came to know Peter Fabian at the time a few of us decided to promote the merging of two well established European scientific*

organisations: the European Geophysical Society (EGS) and the European Union of Geosciences (EUG). Peter Fabian belongs to the group of visionary scientists who really were convinced that such a merging would result in Europe's premier geosciences union. As a member of the former EUG Executive and of the EGU

board, I am extremely indebted to Peter for his contribution to this unique and successful adventure."

An earlier version of this article was [published on the EGU website](#).

## Winners of the 2014 EGU Photo Contest and Communicate Your Science Video Competition

The selection committee received over 200 photos for this year's [EGU Photo Contest](#), covering fields across the geosciences. Participants voted for their favourites throughout the General Assembly week and there were three clear winners. Congratulations to [Trent Marwick](#), [Velio Coviello](#) and [John Clemmens](#) – 2014's fantastic photographers!

Congratulations also to Louise Crochemore, the winner of the first ever Communicate Your Science Video Competition. Louise is a PhD student at the National Research Institute of Science and Technology for Environment and Agriculture France, and has been investigating how to manage water resources effectively.

You can watch the winning video, '[Hydrological drought predictions for reservoir management: what's the use?](#)', on the EGU YouTube channel. The winning photographs are available on [Imaggeo](#).

*These results were originally announced on the EGU blog, GeoLog ([photo](#), [video](#))*



Details from the three winning Imaggeo photos – top and bottom left – and screenshot from the winning video – bottom right. (Credit: Trent Marwick, Velio Coviello, John Clemens and Louise Crochemore; photos distributed via [imaggeo.egu.eu](#))

## New EGU partnerships

The EGU has signed Memoranda of Cooperation with the Geological Society of America ([GSA](#)) and the International Union of Forest Research Organizations ([IUFRO](#)) on April 28, 2014.

The GSA is a non-profit organisation whose [mission](#) is "to advance geoscience research and discovery, service to society, stewardship of Earth, and the geosciences profession". The memorandum now signed aims to foster the cooperation between 13 of EGU's divisions and the GSA.

As described on [their website](#), "IUFRO is a non-profit, non-governmental international network of forest scientists, which promotes global cooperation in forest-related research and enhances the understanding of the ecological, economic and social aspects of

forests and trees". The agreement aims to improve collaboration between 7 of EGU's divisions and 3 of IUFRO's.

This brings the total number of EGU partner organisations to five. The EGU has also signed Union-wide Memoranda of Understanding with the American Geophysical Union (AGU), the Asia Oceania Geosciences Society (AOGS) and the Japan Geoscience Union (JpGU).

Further details about the new Memoranda of Cooperation, and the Memoranda of Understanding with AGU, AOGS and JpGU, are available from the [Collaborations](#) section on the EGU website.

An earlier version of this article was [published on the EGU website](#)



## Famous paintings help study the Earth's past atmosphere

EGU press release on research published in *Atmospheric Chemistry and Physics*

*A team of Greek and German researchers has shown that the colours of sunsets painted by famous artists can be used to estimate pollution levels in the Earth's past atmosphere. In particular, the paintings reveal that ash and gas released during major volcanic eruptions scatter the different colours of sunlight, making sunsets appear more red. The results are [now published](#) in *Atmospheric Chemistry and Physics*, an EGU open access journal.*

When the Tambora volcano in Indonesia erupted in 1815, painters in Europe could see the colours of the sky changing. The volcanic ash and gas spewed into the atmosphere travelled the world and, as these aerosol particles scattered sunlight, they produced bright red and orange sunsets in Europe for up to three years after the eruption. J. M. W. Turner was one of the artists who painted the stunning sunsets during that time. Now, scientists are using his, and other great masters', paintings to retrieve information on the composition of the past atmosphere.

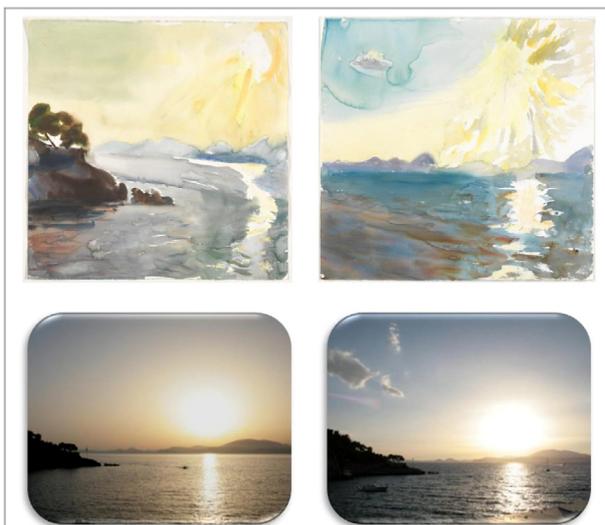
"Nature speaks to the hearts and souls of great artists," says lead-author Christos Zerefos, a professor of atmospheric physics at the Academy of Athens in Greece. "But we have found that, when colouring sunsets, it is the way their brains perceive greens and reds that contains important environmental information."

Zerefos and his team analysed hundreds of high-quality digital photographs of sunset paintings done between 1500 and 2000, a period including over 50 large volcanic eruptions around the globe. They were looking to find out whether the relative amounts of red and green along the horizon of each painting could provide information on the amount of aerosols in the atmosphere.

"We found that red-to-green ratios measured in the sunsets of paintings by great masters correlate well with the amount of volcanic aerosols in the atmosphere, regardless of the painters and of the school of painting," says Zerefos.

Skies more polluted by volcanic ash scatter sunlight more, so they appear more red. Similar effects are seen with mineral (desert dust) or man-made aerosols. Air with a higher amount of aerosols has a higher 'aerosol optical depth', a parameter the team calculated using the red-to-green ratios in the paintings. They then compared these values with those given by independent proxies such as ice-core and volcanic-explosivity data, and found good agreement. The results obtained validate those of the team's previous study, [published in \*Atmospheric Chemistry and Physics\* in 2007](#).

To further support their model, the researchers asked a famous colourist to paint sunsets during and after the passage of a Saharan dust cloud over the island of Hydra in June 2010. The painter was



Top: Digitally compressed paintings produced by colourist P. Tetsis at the island of Hydra in June 2010 during and after the passage of a Saharan dust cloud. The painting on the left features a more aerosol-rich scene (more dust in the atmosphere) than the one on the right. Bottom: Digital camera photos of the landscape. The pictures shown were taken half-way through the painting process. (Credit: paintings by P. Tetsis, photos by C. Zerefos)

not aware of the dust event. The scientists then compared measurements of the aerosol optical depth made by modern instruments with those estimated from the red-to-green ratios of the paintings and of digital photographs, and found that they all matched well.

Since aerosols scatter sunlight, less of it reaches the surface, leading to cooling. The Tambora eruption, the largest in recorded history, killed some 10,000 people directly and over 60,000 more due to the starvation and disease during the 'volcanic winter' that followed. Aerosol optical depth can be directly used in climate models, so having estimates for this parameter helps researchers understand how aerosols have affected the Earth's climate in the past. This, in turn, can help improve predictions of future climate change.

"We wanted to provide alternative ways of exploiting the environmental information in the past atmosphere in places where, and in centuries when, instrumental measurements were not available," concludes Zerefos.

*This press release was originally [published on the EGU website](#)*

### References

Zerefos, C. S. et al.: [Further evidence of important environmental information content in red-to-green ratios as depicted in paintings by great masters](#), *Atmos. Chem. Phys.*, 14, 2987–3015, 2014



## Atmospheric Chemistry and Physics (ACP)

### A tropical West Pacific OH minimum and implications for stratospheric composition

Most of the short-lived biogenic and anthropogenic chemical species that are emitted into the atmosphere break down efficiently by reaction with OH (hydroxyl radicals) and do not reach the stratosphere. In this paper, the authors show the existence of a pronounced minimum in the tropospheric column of ozone over the West Pacific, the main source region for stratospheric air, and suggest a corresponding minimum of the tropospheric column of OH.

#### Reference

Rex, M. et al.: [A tropical West Pacific OH minimum and implications for stratospheric composition](#), *Atmos. Chem. Phys.*, 14, 4827–4841, 2014

### Effects of stratospheric ozone recovery on photochemistry and ozone air quality in the troposphere

In this study, the authors examine the implications of stratospheric ozone recovery for the chemistry and ozone air quality of the troposphere with a global chemical transport model (GEOS-Chem).

#### Reference

Zhang, H. et al.: [Effects of stratospheric ozone recovery on photochemistry and ozone air quality in the troposphere](#), *Atmos. Chem. Phys.*, 14, 4079–4086, 2014

### Characterization of submicron aerosols during a month of serious pollution in Beijing, 2013

In January 2013, Beijing experienced several serious haze events. To achieve a better understanding of the characteristics, sources and processes of aerosols during this month, a high-resolution time-of-flight aerosol mass spectrometer was deployed at an urban site between 1 January and 1 February 2013 to obtain the size-resolved chemical composition of non-refractory submicron particles in the air. The results are reported in this paper.

#### Reference

Zhang, J. K. et al.: [Characterization of submicron aerosols during a month of serious pollution in Beijing, 2013](#), *Atmos. Chem. Phys.*, 14, 2887–2903, 2014

### Uncertainty analysis of projections of ozone-depleting substances: mixing ratios, EESC, ODPs, and GWPs

Here the authors present a comprehensive uncertainty analysis of the future mixing ratios of ozone-depleting substances (ODPs), levels of equivalent effective stratospheric chlorine (EESC), ozone depletion potentials, and global warming potentials (GWPs).

#### Reference

Velders, G. J. M. and Daniel, J. S.: [Uncertainty analysis of projections of ozone-depleting substances: mixing ratios, EESC, ODPs, and GWPs](#), *Atmos. Chem. Phys.*, 14, 2757–2776, 2014

## Biogeosciences (BG)

### Subsurface pH and carbonate saturation state of aragonite on the Chinese side of the North Yellow Sea: seasonal variations and controls

Based on eight field surveys conducted between May 2011 and May 2012, a team investigated seasonal variations in pH, carbonate saturation state of aragonite, and ancillary data on the Chinese side of the North Yellow Sea. They report the results in this paper.

#### Reference

Zhai, W.-D. et al.: [Subsurface pH and carbonate saturation state of aragonite on the Chinese side of the North Yellow Sea: seasonal variations and controls](#), *Biogeosciences*, 11, 1103–1123, 2014.

### Exploring local adaptation and the ocean acidification seascape – studies in the California Current Large Marine Ecosystem

This study explores local adaptation to ocean acidification. It focuses on the recent efforts by the Ocean Margin Ecosystems Group for Acidification Studies research consortium to characterise a portion of the California Current Large Marine Ecosystem.

#### Reference

Hofmann, G. E. et al.: [Exploring local adaptation and the ocean acidification seascape – studies in the California Current Large Marine Ecosystem](#), *Biogeosciences*, 11, 1053–1064, 2014

# Climate of the Past (CP)

## Modelling global-scale climate impacts of the late Miocene Messinian Salinity Crisis

By running extreme, sensitivity-type experiments with a fully coupled ocean–atmosphere general circulation model, this paper investigates the potential of various Messinian Salinity Crisis Mediterranean Outflow Water scenarios to impact global-scale climate.

### Reference

Ivanovic, R. F. et al.: [Modelling global-scale climate impacts of the late Miocene Messinian Salinity Crisis](#), *Clim. Past*, 10, 607–622, 2014

## The challenge of simulating the warmth of the mid-Miocene climatic optimum in CESM1

In this paper, the authors use the recently released Community Earth System Model (CESM1.0) with a slab ocean to simulate the mid-Miocene climatic optimum, incorporating recent Miocene CO<sub>2</sub> reconstructions of 400 ppm (parts per million).

### Reference

Goldner, A., Herold, N., and Huber, M.: [The challenge of simulating the warmth of the mid-Miocene climatic optimum in CESM1](#), *Clim. Past*, 10, 523–536, 2014.

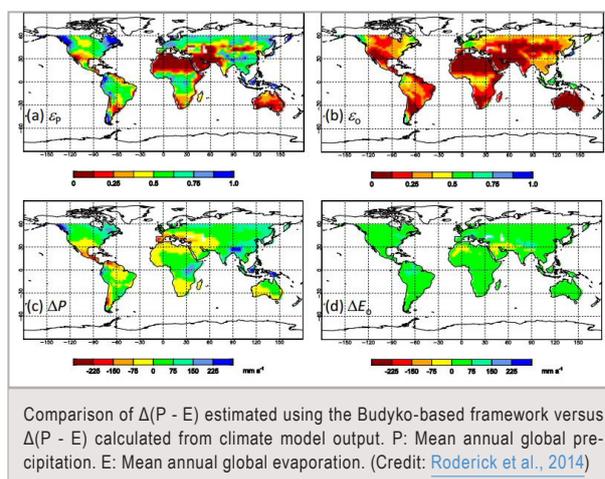
# Hydrology and Earth System Sciences (HESS)

## A general framework for understanding the response of the water cycle to global warming over land and ocean

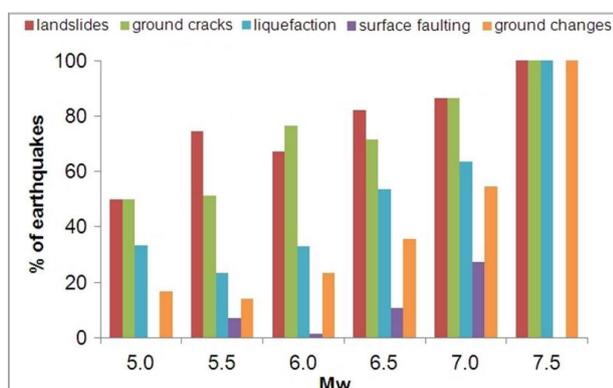
In developing a simple framework for how the water cycle responds to warming on a local scale, the authors of this study found that the climate model output shows a remarkably close relation to the long-standing Budyko framework of catchment hydrology.

### Reference

Roderick, M. L. et al.: [A general framework for understanding the response of the water cycle to global warming over land and ocean](#), *Hydrol. Earth Syst. Sci.*, 18, 1575–1589, 2014



# Natural Hazards and Earth System Sciences (NHESS)



Percentage of earthquakes in each magnitude class for which a specific type of ground failure was reported. (Credit: [Martino et al., 2014](#))

## Earthquake-induced ground failures in Italy from a reviewed database

This paper presents and analyses a database of earthquake-induced ground failures in Italy. The catalogue collects data regarding landslides, liquefaction, ground cracks, surface faulting and ground changes triggered by earthquakes of Mercalli epicentral intensity 8 or greater that occurred in the last millennium in Italy.

### Reference

Martino, S., Prestininzi, A., and Romeo, R. W.: [Earthquake-induced ground failures in Italy from a reviewed database](#), *Nat. Hazards Earth Syst. Sci.*, 14, 799–814, 2014

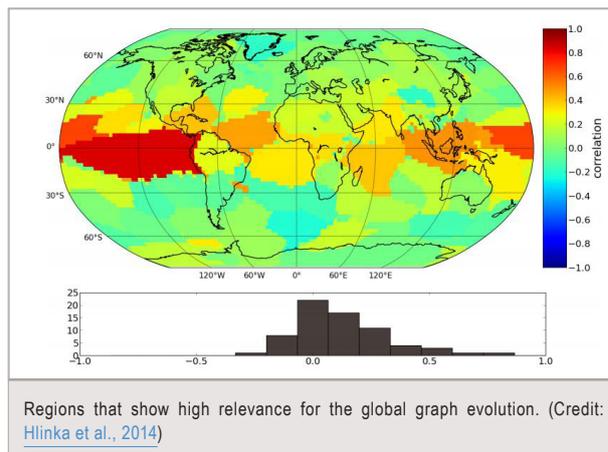
# Nonlinear Processes in Geophysics (NPG)

## Regional and inter-regional effects in evolving climate networks

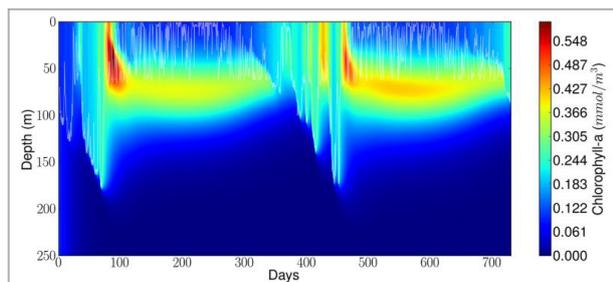
In this study, the authors identify the sources of the evolving network characteristics by considering a reduced-dimensionality description of the climate system using network nodes given by rotated principal component analysis. The time evolution of structures in local intra-component networks is studied and compared to evolving inter-component connectivity.

### Reference

Hlinka, J. et al.: [Regional and inter-regional effects in evolving climate networks](#), *Nonlin. Processes Geophys.*, 21, 451–462, 2014



## Ocean Science (OS)



Time–depth plot of chlorophyll at Bermuda, showing the clear subsurface chlorophyll maxima. (Credit: [Hill et al., 2014](#))

## Adapting to life: ocean biogeochemical modelling and adaptive remeshing

Here, a team of researchers presents a novel method of simulating ocean biogeochemical behaviour on a vertically adaptive computational mesh, where the mesh changes in response to the biogeochemical and physical state of the system throughout the simulation.

### Reference

Hill, J. et al.: [Adapting to life: ocean biogeochemical modelling and adaptive remeshing](#), *Ocean Sci.*, 10, 323–343, 2014

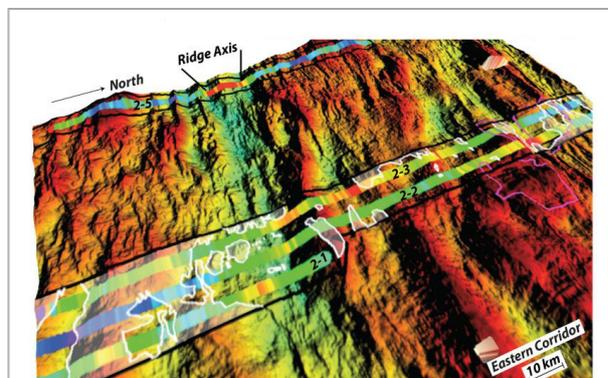
## Solid Earth (SE)

## Magnetic signature of large exhumed mantle domains of the Southwest Indian Ridge – results from a deep-tow geophysical survey over 0 to 11 Ma old seafloor

This study investigates the magnetic signature of ultramafic seafloor in the eastern part of the Southwest Indian Ridge. Over a 11 Myr period, detachment faulting has exhumed large areas of mantle-derived rocks in this region.

### Reference

Bronner, A. et al.: [Magnetic signature of large exhumed mantle domains of the Southwest Indian Ridge – results from a deep-tow geophysical survey over 0 to 11 Ma old seafloor](#), *Solid Earth*, 5, 339–354, 2014



Three-dimensional bathymetric view of one of the survey areas. Full image and colour code available in the paper. (Credit: [Bronner et al. 2014](#))

# The Cryosphere (TC)



Mer de Glace (Sea of Ice), located on the northern slopes of the Mont Blanc, is one of the best known Alpine glaciers. (Credit: [Stergios Misios](#), distributed via [imagegeo.egu.eu](#))

## Modelling environmental influences on calving at Helheim Glacier in eastern Greenland

Calving is an important mass-loss process for many glaciers worldwide, and has been assumed to respond to a variety of environmental influences. This paper applies a grounded, flowline tidewater glacier model, using a physically based calving mechanism to Helheim Glacier, eastern Greenland.

### Reference

Cook, S. et al.: [Modelling environmental influences on calving at Helheim Glacier in eastern Greenland](#), *The Cryosphere*, 8, 827–841, 2014

## Little Ice Age climate reconstruction from ensemble reanalysis of Alpine glacier fluctuations

Here the author analyses terminus position histories from an ensemble of seven glaciers in the Alps with a macroscopic model of glacier dynamics to derive a history of glacier equilibrium line altitude for the time span 400–2010 C.E..

### Reference

Lüthi, M. P.: [Little Ice Age climate reconstruction from ensemble reanalysis of Alpine glacier fluctuations](#), *The Cryosphere*, 8, 639–650, 2014

## Fracture-induced softening for large-scale ice dynamics

To account for the macroscopic effect of fracture processes on large-scale viscous ice dynamics (i.e., ice-shelf scale), the authors apply a continuum representation of fractures and related fracture growth into the prognostic Parallel Ice Sheet Model and compare the results to observations.

### Reference

Albrecht, T. and Levermann, A.: [Fracture-induced softening for large-scale ice dynamics](#), *The Cryosphere*, 8, 587–605, 2014



**Blog  
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[blogs.egu.eu](http://blogs.egu.eu)

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the official EGU blog

[geolog.egu.eu](http://geolog.egu.eu)



# Software and research

## Collaborate, share and learn how to develop sustainable scientific software

Nowadays, software and research go hand-in-hand. To advance their research, scientists not only use but also develop their own software packages. This, supporting scientific software development is essential and needs to focus on helping scientists produce robust, reliable and maintainable software. As data policies are increasingly considering software produced for research purposes as 'data', (e.g. the [AGU's data policy](#)), this is a topic relevant to Earth and space sciences community. The EGU journal Geoscientific Model Development in particular has taken a lead by [requiring that authors make code available and accessible](#) to potential users.

Researchers are not left alone with the problems they may face with software in their research. There are organisations specialising in supporting them, such as the UK-based [Software Sustainability Institute](#). The Institute is based at the universities of Edinburgh, Manchester, Oxford and Southampton, and draws on a team of experts with a breadth of experience in software development, project and programme management, research facilitation, publicity and community engagement.

The Institute is a national facility for cultivating world-class research through software. For example, it provides [software engineering consultancy](#) for research projects that develop research code. Community outreach activities include the annual [Collaborations Workshop](#) and the [Fellowship Programme](#). The Workshop brings together researchers, software developers, managers, funders and more to explore important ideas in software and research and to plant the seeds of interdisciplinary collaboration. The Fellowship Programme funds researchers to organise or attend events or meetings in exchange for their expertise and advice. The Software Sustainability Institute also delivers [training in software skills for researchers](#) and runs a variety of campaigns to support software in research, such as the [Research Software Engineer campaign](#).

At the 2013 AGU Fall Meeting, four Institute fellows (Allen Pope, Melody Sandells, Kayla Iacovino, and Robin Wilson) proposed and convened a townhall meeting to discuss topics related to software in research. The session had about 50 attendees ranging from scientists developing their own code to software engineers working alongside researchers. Marco Tedesco, Program Director at the US National Science Foundation's Polar Cyberinfrastructure Program, kicked off the meeting by highlighting the three main topics for the session: collaboration strategies and technologies, software training for researchers, and code reuse, sharing and publishing.

The diverse audience allowed for exploration of the topic of software in research from different perspectives. The outcomes of the discussion further echoed many of the experiences that the Institute has had so far. Undoubtedly, these topics and issues are familiar to a number of researchers in the geophysical sciences.

### Collaboration strategies and technologies

A wide variety of tools are used for collaboration: Google Drive, Dropbox, Skype and the old-school email. In general, collaboration

on the same resources works well, but many kinks are still in the works. Some institutions don't allow using certain popular tools among scientists (e.g. Skype), some tools don't scale up well (e.g. large Google Hangouts), and some researchers don't have the budget in place for video teleconferencing. A common problem shared was transferring terabytes of input data to collaborators: as someone commented: "We mail the hard drives."

### Software training for researchers

All agreed that software training is essential for anyone doing research and should begin as early as possible in a researcher's career. Software engineering skills must be taught, otherwise researchers are set up to write code that is unstable, difficult to maintain and has security gaps. Training should not be limited only to a programming language. Students should be taught good practices on structuring, commenting and testing code. There are many training materials available online, but without basic training in software development, students will not be able to make good use of them. It was suggested this was a ripe area for a workshop at future conferences.

### Code reuse, sharing and publishing

Version control for managing code turned out to be a familiar solution with the session's attendees. Many used [GitHub](#), but some noted that version control can be a bit of a headache. The time you spend figuring it out is usually precious time taken off research. The attendees also discussed the benefits of code review and different ways it could be done: from pair programming, to group meetings where the code is analysed line by line. Everyone was in favour of source code being published alongside the papers it was used for, following the example of journals such as [Computer Physics Communications](#).

The session showed that exchanging ideas and sharing experiences helps to learn how to address the issues related to software and research. A lot has been done but there is still a lot to do. There are a number of initiatives helping scientists in getting trained up to develop sustainable software (such as [Software Carpentry](#)).

To continue and broaden this discussion, the Software Sustainability Institute is conducting a follow-on survey. We encourage all EGU members to please take five minutes to participate at <http://tinyurl.com/AGU13software>.

*Aleksandra Pawlik<sup>1</sup>, Allen Pope<sup>2</sup>, Mel Sandells<sup>3</sup>,  
Kayla Iacovino<sup>4</sup>, Robin Wilson<sup>5</sup>*

<sup>1</sup>Software Sustainability Institute, UK

<sup>2</sup>Earth Sciences Department, Dartmouth College, USA and National Snow and Ice Data Center, University of Colorado, Boulder, USA

<sup>3</sup>Department of Meteorology, University of Reading, UK

<sup>4</sup>Geography Department, University of Cambridge, UK

<sup>5</sup>Geography & Environment, University of Southampton, UK



## An African GIFT Experience

This year the EGU embarked on a new journey into Africa to deliver its renowned [Geosciences Information for Teachers \(GIFT\)](#) programme to teachers in South Africa and neighbouring countries in collaboration with UNESCO and the European Space Agency (ESA). The topic: [Climate Change and Human Adaptation](#). Representatives of the organising team report on the activities...

Set in 'the windy city' of Port Elizabeth (or PE if you're local), in stunning 28°C sun, complimentary blue skies and a dash of wind, we made our way to the Nelson Mandela Metropolitan University's (NMMU) Missionvale Campus to begin the proceedings. The Missionvale Campus is situated just outside Port Elizabeth, in the heart of surrounding communities. The campus is intricately connected to these communities, with a commitment to supporting the development of those local to Port Elizabeth through school education and lifelong learning – making it the ideal location for the workshop.

We were welcomed by Thoko Mayekiso, the Deputy Vice-Chancellor for Research and Engagement at NMMU, followed by a short introduction given by the co-organisers Sarah Gaines from UNESCO and Carlo Laj from the EGU, and from our host Mactar Doucouré (from NMMU's Africa Earth Observation Network – Earth Stewardship Science Research Institute, better known as AEON-ESSRI).

To open the workshop, we had Maarten de Wit (from AEON-ESSRI) discuss the importance of geology in understanding climate change. De Wit put geology and climate change into a South African, and broader African, political and social context. He focused on the African concept of 'observing the present and considering the past to ponder the future' – a notion that is summed up in the isiXhosa word *lphakade*. De Wit introduced *lphakade* in the context of Earth stewardship: scientifically informed, ethical and democratic management of both the physical and living systems of our planet. The Earth is a system, but so is our society. Because our society is reliant on the Earth, it has a responsibility to manage it. Therefore, we need to apply our appreciation of our culture and how it will change in the next 50 years to our understanding of how to manage the Earth system.

Echoing the need for systems thinking in managing climate change, Rob O'Donoghue spoke about the South African school curriculum on climate change. O'Donoghue highlighted the need for systems thinking to be integrated as a learning enhancement tool. He also echoed the usefulness of the past in learning about the present, not only in a geological context, but in a social one. Africans have lived through climate variability in the past and have met these challenges with innovative solutions in agriculture, animal husbandry, cooking, sanitation and more. Both applied their perspectives on the importance of understanding the socio-cultural aspects of climate change to teaching. They emphasised the need to help relate climate change to children, and stop it seeming scary and



Participants and organisers outside NMMU's Missionvale Campus. (Credit: Jane Robb)



Sally Dengg, an EGU Committee on Education member, explains an experiment about thermohaline circulation to the teachers. For some of the practicals, the organisers had to improvise with materials commonly available to teachers – instead of test tubes, they used plastic bottles. (Credit: Jane Robb)

impossible to manage. By using stories, art, music and other culturally informed methods we can make understanding and responding to climate change more manageable for future generations.

During lunch (with amazing live local music providing the background to our delicious South African cuisine) we discussed what the teachers thought of the workshop so far. What concerned the teachers most was the need to make climate change accessible to their children without forcing an impossible change on them. In many African countries, including South Africa, people are aware that their daily practices are harming the environment. However, unlike developed countries, these practices are essential to survival on a daily basis. The teachers simplified the issue: environment is directly linked to survival in this part of the world. These people do not have the luxury to change their daily practices. If anything,



The World Challenge Game in action. 'Families' had to colour in sheets to make money for their countries within a time limit. (Credit: Jane Robb)

this highlighted the need for workshops like this, which help teachers find different ways to engage the next generation with climate change in a way that means they can continue to develop.

Carl Palmer from the South African based Applied Centre for Climate and Earth System Science reiterated this point in his talk on how climate change affects us. He highlighted the fact that poor communities cannot deal with climate change in the way developed countries can. And yet, Africa is a large continent, rich in unique landscapes and biodiversity, with an incredible diversity of people too. As Guy Midgely from the South African Biodiversity Institute also discussed, Africa contains a wealth of natural resources as well as a wealth of variable climates and people. Palmer emphasised the need to excite and inspire our children about what Africa has to offer, encouraging them to choose science. Not just geoscience however: we need them to address the issues of sanitation, malnutrition, health and politics in tandem with climate to make a real difference. In other words, rather than a threat, climate change is an opportunity to engage kids with science.

To compliment these insightful approaches to climate change education, the workshop integrated several presentations on the science behind climate change and areas where climate change impacts are being felt, including agriculture (Bernard Seguin), water (Roland Schulze), ocean changes (Jean-Pierre Gattuso), as well as remote sensing of the atmosphere (Michael Verstraete). These presentations opened up the discussion for how to teach children specifically about the scientific aspects of climate change: what happens to these different Earth systems in a changing climate, and how can we transfer this knowledge to children in the classroom? For the teachers, although there was a lot of information packed into a tight curriculum, this was incredibly valuable as it catered directly to the GIFT workshop mantra: reducing the time from research to textbook. These presentations gave teachers the opportunity to hear about the science directly from the scientists.

In addition to these presentations (now [available online](#)), we were also treated to demonstrations and practical exercises by Ian McKay, from the University of the Witwatersrand and the International Geoscience Education Organisation, Sally Dengg from GEO-MAR Helmholtz Centre for Ocean Research and Carl Palmer. We experienced interactive discussions, marshmallows and chemical structures, solar cookers, production of carbon dioxide, acidifying oceans and exploding hydrogen balloons. To finish up the workshop, we watched the film *Thin Ice* and ended with a critical discussion on how the teachers will disseminate what they have learnt to their colleagues, students, communities and councils.

What we were able to take away from the workshop was the need for a paradigm shift in the way we think and educate about climate change in an African context, where the participants helped us understand how to make the global local. Climate change isn't just a scientific issue: it is implicitly related to people, politics and survival. To engage children with climate change science, we need to develop a systems thinking approach, balancing global responsibilities while maintaining healthy lifestyles and valuing the cultures and perspectives of the very people we are trying to engage.

Jane Robb<sup>1</sup>, Carlo La<sup>2</sup> and Sarah Gaines<sup>3</sup>

<sup>1</sup>Project Assistant at University College London  
(Former EGU Educational Fellow)

<sup>2</sup>Chair of the EGU Committee on Education

<sup>3</sup>Assistant Program Specialist at UNESCO

An earlier version of this article was [published on the EGU blog](#)

**imaggero**

Check out the new website of the EGU  
open access geosciences image repository

**imaggero.egu.eu**

## New educational activities at the EGU

In the past few months, the EGU worked particularly hard on its educational activities. The Committee on Education organised no less than three GIFT workshops and, with the help of Jane Robb, who took part in EGU's Educational Fellowship, the Union has expanded its education portfolio. Here Robb shares these new and exciting EGU educational initiatives.

### Planet Press

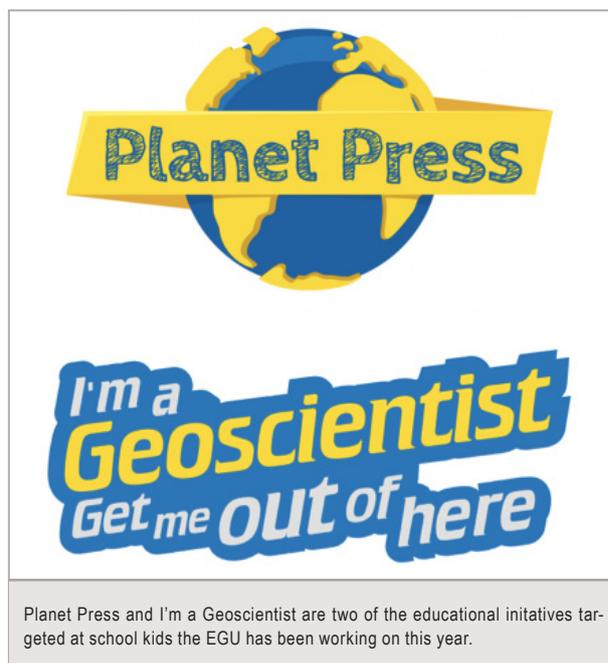
If you like engaging children with science through up-to-date news then this is the place for you! Inspired by [UNAWA's Space Scoop](#) stories for kids, the EGU have developed [Planet Press](#) – engaging geoscience news stories for kids. Aimed primarily at 7–11 year olds, these are EGU press releases 'translated' into kids' language, but they can also be useful if you want more digestible geoscience news. Each Planet Press is written in-house and reviewed by one of the Union's scientist members, as well as an educator to ensure their science content is accurate and the writing is appropriate for the target age group. In addition, fun printable versions have been made for classroom use. So far, all Planet Presses are in English but, in the future, we hope to make them available in other European languages.

### Teacher's Corner

There are many resources out there for teaching geoscience, but, with so many to choose from, sometimes it is difficult to find exactly what you need. [Teacher's Corner](#) is a database of teaching resources spanning all geoscience subjects, specifically aimed at teachers. The database is searchable by age range, type of activity and subject area, making it easier for you to find teaching inspiration. Teacher's Corner will also showcase some of the work that GIFT teachers have produced from Geosciences Information For Teachers (GIFT) workshops and while engaging with real scientists. In addition, if you're a GIFT teacher or have a great resource of your own, [you can upload your teaching ideas and resources](#) to Teacher's Corner for other teachers to use and share.

### I'm a Geoscientist – Get me out of here!

Some of you will have heard of I'm a Scientist – Get Me Out of Here!, which runs in the UK and engages school children with scientists. The EGU has now developed their own version of this event in collaboration with the UK company Gallomanor, called [I'm a Geoscientist – Get Me Out of Here!](#). I'm a Geoscientist focuses on the geosciences, with scientists from across the EGU's broad subject areas chatting online to 500 school students from across Europe and South Africa. Although registration to take part in our first June (17th to 26th) 2014 event has closed, you can still join in by visiting the I'm a Geoscientist website ([imageoscientist.eu](http://imageoscientist.eu)) and watching the event take place – live! There you will be able to see the questions students are asking the scientists and the scientists' responses. [If you're a teacher](#), you can use this event to engage



your own classes with science or just have a look at what goes on to see if you'd like to take part in a future event. [If you're a scientist](#), you can take this opportunity to practice engaging with the public about your research, see your research in new light, gain wider recognition for your work and fulfil the public engagement requirements of your funding proposal.

### Geolocations Database

If you like taking your family or class on field trips to explain geological phenomena, or just like to get out in the wild, our [Geolocations Database](#) could be a great place to find out about some of the best locations near you. The database is designed for teachers or parents wanting to find exciting geological locations nearby, and is searchable by country, type of location and whether it is suitable (and safe) for children. In addition, you can also [upload](#) your own favourite geological locations to the database!

That's all for now, but we'd like to keep these initiatives going strong in the future. We need help in writing Planet Press releases, ideas for Teacher's Corner resources and sites for the Geolocations Database. We also hope to continue to run I'm a Geoscientist in the future, to help more school children chat directly to scientists about their research and provide scientists with the opportunity to practice communicating their work. If you would like to help with any of these initiatives then please get in touch with EGU Media and Communications Manager Bárbara Ferreira at [media@egu.eu](mailto:media@egu.eu).

Jane Robb  
Project Assistant at University College London  
(Former EGU Educational Fellow)

An earlier version of this article was [published on the EGU blog](#)

## EGU 2014: A great event for early-career researchers

This year, there was more on for young scientists (YS) at the EGU General Assembly than ever before, with Union-wide and division specific sessions for YS throughout the week, a selection of YS social activities on in the evenings and many opportunities to network during the meeting. These kicked off with the Young Scientists' Corner at the Opening Reception. Big, bold and blue, this 'corner' was hard to miss and was a great spot for first-timers to break the ice and get to know fellow conference participants.

EGU 2014 also saw a fantastic new feature for the YS community – the Young Scientists' Lounge. Set up with squishy sofas, desks, all-important internet points and coffee on tap, the Lounge was a bustling hub from Monday on. Filled with young researchers meeting, musing over the conference programme and preparing for their next presentation, there was never a quiet moment. Lucy Clarke, YS representative for the Geomorphology Division, described it as “a fantastic resource, giving YS a place to go to and be able to work and meet other people without feeling intimidated” – a feeling echoed by many at the conference. The Lounge was one of the better received initiatives this year and you can be sure to see it again in 2015!

The EGU is committed to fostering the next generation of geoscientists and this is where the 2014 YS programme really came to the fore. Back by popular demand, Hydrological Sciences and Geomorphology once again ran their meet the masters workshops, which offer YS the opportunity to talk to senior scientists in their field and address their academic concerns with experts in their area. The Young Hydrologic Society met to stimulate YS participation in the hydrological sciences, young geomorphologists were given tips and tricks to analyse environmental data and a host of YS were given hints on how to publish the perfect paper – and that is only a snapshot!

These sessions were supported by a suite of Union-wide short courses, with a strong focus on careers and communication. The short course on finding funding was filled far beyond capacity and sessions on how to make a science video and successfully share your science with school kids both had an excellent turn out. Keep your eyes on [GeoLog](#), the EGU blog, for resources from these short courses and others that took place at the Assembly. Sarah Blackford and Helen Goulding, masters in making job applicants stand out from the crowd, also hosted two cracking careers sessions to help YS add value to their research experience and make an outstanding impression on paper and in person (check out some of their top tips [here](#) and [here](#)).

Some YS, however, are already at the top of their game, and you'd have a tough job finding better examples than the winners of the EGU 2014 Outstanding Young Scientists Awards. This year, 14 fantastic YS were awarded for their excellence in the Earth, planetary and space sciences at [Union](#) and [division](#) level, each giving a fascinating lecture on their findings during the conference. Nominations for next year are open now, so if you know an inspiring scientist who



Top: entrance to the YS Lounge at the EGU 2014 General Assembly. Bottom: YS mingling over coffee at the meeting. Credit: Stephanie McClellan

should be rewarded for their work, make sure you [put their name forward](#) by 15 June.

We also gained a near-full complement of Young Scientist Representatives, with many new and eager faces taking on the role of representing young scientists in each of the EGU's scientific divisions. For the first time, the EGU YS reps met under one roof to share their ideas, discuss exciting actions for the future, and take on feedback from YS to make next year's Assembly even better. “I think this was the start of a new direction for EGU for the years to come,” said Matthew Agius, YS rep for Seismology, following the meeting. Wouter Berghuijs, YS rep for Hydrological Sciences, added: “Now that all the young scientist representatives of different divisions know each other, there is a great opportunity for collaboration.”

Scientists during the conference were overwhelmingly positive about this year's YS events and knowing that they had representatives they could talk to (we're still looking for a few more to [join the team](#) though!). All in all, EGU 2014 has been an amazing occasion for YS, with an array of excellent activities, successful short courses and a brilliant boost to YS representation in the Union. With a committed team of YS set to get ready for EGU 2015, we can't wait for the next Assembly.

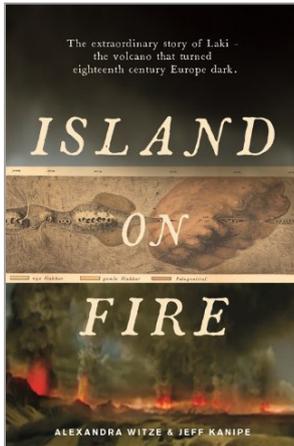
Sara Mynott

EGU Communications Officer and young scientists  
contact person at the EGU office



## Island on Fire

The extraordinary story of Laki, the volcano that turned eighteenth-century Europe dark



By Alexandra Witze and Jeff Kanipe

PROFILE BOOKS

224 pages | Hardback  
1<sup>st</sup> edition | March 2014  
ISBN 978-1781250044

Price: £10.99 (~€14)

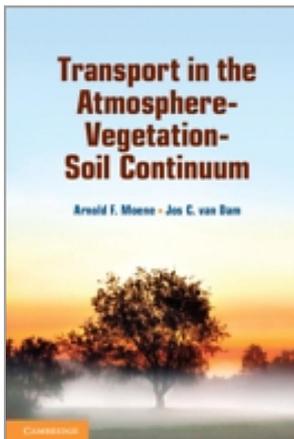
### [Publisher's summary](#)

The eruption of Iceland's Laki volcano is one of history's great untold natural disasters. The eruption, spewing out a poisonous fog, lasted for eight months, but its effects lingered across Europe for years, causing the death of people as far away as the Nile, and creating famine that may have triggered the French revolution. [Island on Fire](#) is the story not only of a volcano but also of the people whose lives it changed, such as the pastor Jon Steingrímsson, who witnessed and recorded the events in Iceland. It is the story, too, of modern volcanology, and looks at how events might work out should Laki erupt again in our time.

### [Note](#)

Witze was one of the winners of the 2011/2012 EGU Science Journalism Fellowship. She used the support to research this book.

## Transport in the Atmosphere-Vegetation-Soil Continuum



By Arnold F. Moene and Jos C. van Dam

CAMBRIDGE UNIVERSITY PRESS

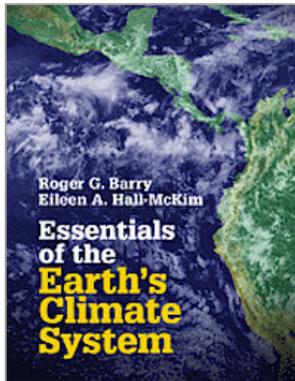
446 pages | Hardback  
1<sup>st</sup> edition | May 2014  
ISBN 9780521195683

Price: £45 (~€56)

### [Publisher's summary](#)

Traditionally, soil science, atmospheric science, hydrology, plant science and agriculture have been studied largely as separate subjects. These systems are clearly interlinked, however, and in recent years a great deal of interdisciplinary research has been undertaken to better understand their interactions. This [textbook](#) was developed from a course that the authors have been teaching for many years on atmosphere-vegetation-soil interactions at one of the leading international research institutes in environmental science and agriculture. The book describes the atmosphere-vegetation-soil continuum from the perspective of several interrelated disciplines, integrated into one textbook. The text is interspersed with many student exercises and problems, with solutions provided. It will be ideal for intermediate to advanced students in meteorology, hydrology, soil science, environmental sciences and biology who are studying the atmosphere-vegetation-soil continuum, as well as researchers and professionals interested in the observation and modelling of atmosphere-vegetation-soil interactions.

# Essentials of the Earth's Climate System



By Roger G. Barry and  
Eileen A. Hall-McKim

CAMBRIDGE UNIVERSITY  
PRESS

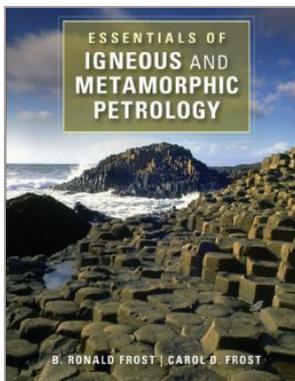
271 pages | Paperback  
1<sup>st</sup> edition | March 2014  
ISBN 9781107620490

Price: £35 (~€43)

## Publisher's summary (abridged)

This [concise introduction](#) to modern climatology covers the key topics for intermediate undergraduate students on one-semester courses. The treatment of topics is non-mathematical wherever possible, instead focusing on physical processes to allow students to grasp concepts more easily. Full-colour illustrations support the text and supplementary topics are covered in boxes, enabling students to further increase their knowledge and awareness. A historical perspective of climatology is woven throughout, providing students with an insight into key scientists and technological developments. Each chapter concludes with a summary of the main points and a mixture of review and discussion questions, encouraging students to check their understanding and think critically. A list of key web links to data and other resources, and solutions and hints to answers to the student questions (password-protected for instructors) are provided online to complete the teaching package.

# Essentials of Igneous and Metamorphic Petrology



By B. Ronald Frost and Carol  
D. Frost

CAMBRIDGE UNIVERSITY  
PRESS

314 pages | Paperback  
1<sup>st</sup> edition | January 2014  
ISBN 9781107011502

Price: £35 (~€43)

## Publisher's summary (abridged)

All geoscience students need to understand the origins, environments and basic processes that produce igneous and metamorphic rocks. This concise [textbook](#), written specifically for one-semester undergraduate courses, provides students with the key information they need to understand these processes. Topics are organised around the types of rocks to expect in a given tectonic environment, rather than around rock classifications: this is much more interesting and engaging for students, as it applies petrology to real geologic environments. This textbook includes over 250 illustrations and photos, and is supplemented by additional colour photomicrographs made freely available online. Application boxes throughout the text encourage students to consider how petrology connects to wider aspects of geology, including economic geology, geologic hazards and geophysics. End-of-chapter exercises allow students to apply the concepts they have learnt and practice interpreting petrologic data.

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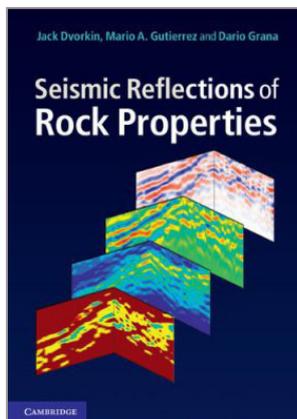
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# Seismic Reflections of Rock Properties



By Jack Dvorkin, Mario A. Gutierrez and Dario Grana

CAMBRIDGE UNIVERSITY PRESS

338 pages | Hardback  
1<sup>st</sup> edition | March 2014  
ISBN 9780521899192

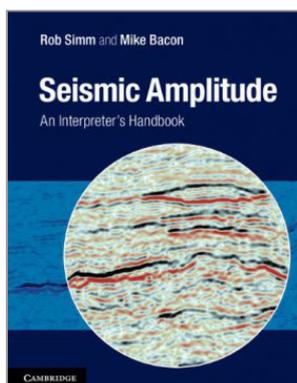
Price: £45 (~€56)

## Publisher's summary

This [book](#) provides an accessible guide to using the rock physics-based forward modelling approach for mapping the subsurface, systematically linking rock properties to seismic amplitude. Providing practical workflows, the book shows how to methodically vary lithology, porosity, rock type, and pore fluids and reservoir geometry, calculate the corresponding elastic properties, and then generate synthetic seismic traces. These synthetic traces can then be compared to actual seismic traces from the field: a similar actual seismic response implies similar rock properties in the subsurface. The book catalogs various cases, including clastic sediments, carbonates, time-lapse seismic monitoring, and discusses the effect of attenuation on seismic reflections. It shows how to build earth models (pseudo-wells) using deterministic and statistical approaches, and includes case studies based on real well data. A vital guide for researchers and petroleum geologists, in industry and academia, providing sample catalogs of synthetic seismic reflections from a variety of realistic reservoir models.

# Seismic Amplitude

## An Interpreter's Handbook



By Rob Simm and Mike Bacon

CAMBRIDGE UNIVERSITY PRESS

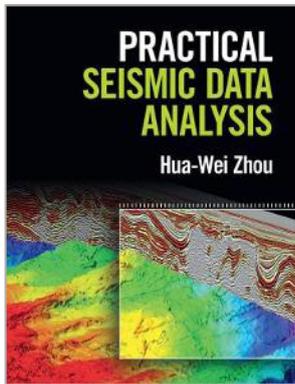
279 pages | Hardback  
1<sup>st</sup> edition | April 2014  
ISBN 9781107011502

Price: £45 (~€56)

## Publisher's summary

Seismic amplitudes yield key information on lithology and fluid fill, enabling interpretation of reservoir quality and likelihood of hydrocarbon presence. The modern seismic interpreter must be able to deploy a range of sophisticated geophysical techniques, such as seismic inversion, AVO (amplitude variation with offset), and rock physics modelling, as well as integrating information from other geophysical techniques and well data. This accessible, authoritative [book](#) provides a complete framework for seismic amplitude interpretation and analysis in a practical manner that allows easy application – independent of any commercial software products. Deriving from the authors' extensive industry expertise and experience of delivering practical courses on the subject, it guides the interpreter through each step, introducing techniques with practical observations and helping to evaluate interpretation confidence. Seismic Amplitude is an invaluable day-to-day tool for graduate students and industry professionals in geology, geophysics, petrophysics, reservoir engineering, and all subsurface disciplines making regular use of seismic data.

# Practical Seismic Data Analysis



By Hua-Wei Zhou

CAMBRIDGE UNIVERSITY PRESS

496 pages | Hardback  
1<sup>st</sup> edition | January 2014  
ISBN 9780521199100

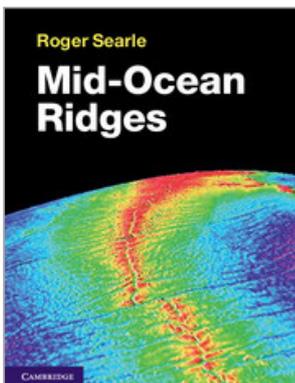
Price: £45 (~€56)

Publisher's summary (abridged)

This [modern introduction](#) to seismic data processing in both exploration and global geophysics demonstrates practical applications through real data and tutorial examples. The underlying physics and mathematics of the various seismic analysis methods are presented, giving students an appreciation of their limitations and potential for creating models of the sub-surface. Designed for a one-semester course, this textbook discusses key techniques within the context of the world's ever increasing need for petroleum and mineral resources – equipping upper undergraduate and graduate students with the tools they need for a career in industry. Examples presented throughout the text allow students to compare different methods and can be used in demonstrations with the instructor's software of choice.

## Mid-Ocean Ridges

A book review



By Roger Searle

CAMBRIDGE UNIVERSITY PRESS

330 pages | Hardback  
1<sup>st</sup> edition | September 2013  
ISBN 9781107017528

Price: £45 (~€56)

Within each chapter, Searle builds up from the foundations of the topic to the latest research in the area, rapidly equipping the reader with the necessary background and building on this basic knowledge to give them a deeper understanding of the subject. This makes the book accessible to, and appropriate for, researchers at any level, from undergraduate students to senior scientists. Furthermore, each chapter is broken down into bite-sized segments with summary of key points to complete the package, making it an excellent reference text. The book concludes with a thorough synthesis of MOR dynamics, which ties together the topics covered in each chapter.

Mid-Ocean Ridges is richly illustrated with maps, charts, diagrams and data that support the text and detail the current understanding of MOR systems. Such figures are invaluable when comprehending a system so far from sight. In addition, you can find a directory of MORs and related features around the world, as well as an extensive glossary to support students and scientists who may be unfamiliar with MOR terminology in the final pages. The book also includes a carefully selected reference list that serves as a superb starting point for research in this field.

If I could ask for one thing more from this book, it would be an overview of the fauna associated with ridge systems, but this topic alone could be another volume in itself. In covering the dynamic processes associated with MORs, this book is an excellent resource. It is not only suitable for the geoscientists engaged in this area of research, but also the volcanologists and oceanographers whose work is coupled to these dynamic systems.

Mid-ocean ridges (MORs) span some 65,000 km across the sea floor and are the critical point at which new crust is formed on the planet. As such, they are a crucial area of study for any geoscientist. In his recently published [book](#), Roger Searle provides a fantastic overview of these continent-forming ranges that split the Earth's underwater crust. After opening with a brief history of MOR study and the techniques used to investigate these features, Searle launches into the fundamentals of MOR dynamics. The volume covers the oceanic lithosphere, the structure and composition of the crust, the volcanic, hydrothermal and tectonic processes associated with MORs and their role in plate boundary formation.

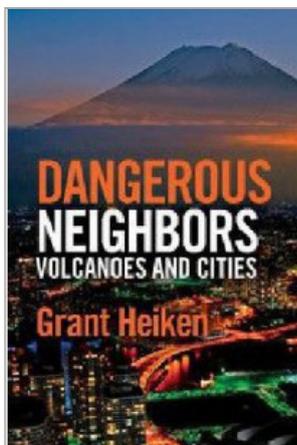
Each chapter is a self-contained package of information, so the reader can tackle a particular topic, say, hydrothermal processes associated with MOR systems, without prior knowledge of mid-ocean ridges, or without reading the book cover to cover. That said, anyone who were to read it cover to cover, would not be disappointed. Searle details the dynamic aspects of the world's mid-ocean ridges with incredible clarity, delving into their history, composition, structure and processes, and incorporating some of the latest research in the field.

Sara Mynott

EGU Communications Officer

# Dangerous Neighbours: Volcanoes and Cities

## A book review



By Grant Heiken

CAMBRIDGE UNIVERSITY PRESS

196 pages | Hardback  
1<sup>st</sup> edition | October 2013  
ISBN 9781107039230

Price: £19.99 (~€25)

[Dangerous Neighbours: Volcanoes and Cities](#) is an accessible and informative book covering risk and mitigation of volcanic hazards in major global cities. It has been written by volcanologist and urban-studies expert Grant Heiken, whose credentials include being a geology instructor for NASA's Apollo programme, researching geothermal development and urban planning at Los Alamos National Laboratory, and presiding over the International Association of Volcanology and Chemistry of the Earth's Interior between 1995 and 1999. Much of the case studies in the book stem from his personal experience, which is apparent in the way he discusses the locations, and this provides a very topical, relevant and personal reading experience.

Heiken has written the book in language that can be easily understood by the non-scientist. It is written in a conversational tone, and every scientific term is explained. The target audience spans from interested members of the public to professionals who are involved in urban planning and civil protection. For the volcanologist, the book provides excellent examples of how various cities around the world can and do respond to volcanic hazards.

The introduction covers some basic questions – such as 'Why do people live near high-risk volcanoes?' – and also gives a brief overview of some past eruptions in various parts of the world, to provide context for the gravity of such situations.

The subsequent eight chapters each deal with volcanic hazards near big cities in different parts of the world. Naples, in Italy, is discussed in the first chapter. The second chapter tackles a range of volcanic hazards in Mexico City. The third chapter looks at two volcanoes near Quito, Ecuador. The fourth looks at Manila in the Philippines, and the many volcanoes that surround it. The fifth has a number of big-city case studies from Japan, and the sixth examines Auckland in New Zealand, which is host to a massive fifty volcanoes! The seventh chapter takes us to the northwest sector of the United States, specifically Seattle and Portland. In the eighth

chapter, a comparison is made between the islands of Santorini, Greece, and Montserrat, in the Caribbean.

As can be seen from the above, there is a lot of data to chew over, but what is good about the examples given in this book is that, due to the way they are written, they are easy to bring up in conversation with non-scientists when trying to communicate risk.

The final chapter asks the question 'How should a city respond?' This provides a closing overview of the state of science and hazard mitigation today, and discusses potential ramifications of not taking volcanic risk in such locations seriously.

In all, the book tackles some major questions in the fields of volcanology and urban studies, and encourages the reader to think across the boundaries of these fields, all the while putting human communities at the centre of discussion.

One problem that crops up time and time again is the retrofitting of evacuation routes and plans as big cities grow. Naples stands out as a particularly high risk area, due to its narrow and constrictive road design, increasing population and the infrequent recurrence time of eruptions from Mount Vesuvius. Kagoshima in Japan, on the other hand, approaches urban planning slightly differently due to the frequent eruptions of Sakurajima.

The book shows how both eruption frequency and level of activity from nearby volcanoes influences residents' ideas of risk. Generally, awareness is higher in more volcanically active areas. But in some cases, risk perception can, counterproductively, decrease near some constantly active volcanoes as they are considered a 'fact of life'. This brief discourse into the human psychology of such situations adds an extra layer of complexity to the issue of risk management.

The other point Heiken is keen to make is that volcanoes are volatile and large eruptions could disrupt life on a grand scale irrespective of current effective plans. This uncertainty is shown to be present in every case study discussed in the book, and in the last chapter the author makes a compelling case for pushing awareness of such issues, in very human terms.

This book is thoroughly recommended for anyone with an interest in volcanic hazards, and does not require any preexisting knowledge on the subject. It is easily digestible and will prove useful for the enthusiast and professional alike.

*Holly Ferrie*

*Geosciences Student, Department of Environment,  
Earth and Ecosystems, Open University, UK*



This section advertises conferences, summer schools and workshops submitted to the EGU online [meetings calendar](#). The EGU logo marks meetings co-sponsored by the Union.

Please note that events submitted to the calendar without description or website are not highlighted here.

## 7<sup>th</sup> International Scientific Conference on the Global Water and Energy Cycle (GEWEX)

14–17 July 2014, The Hague, The Netherlands

Under the theme Trending Now: Water, this conference will celebrate 25 years of GEWEX research and set the stage for the next phase of research addressing the World Climate Research Programme Grand Challenges. The focus will be on water resources, extremes, and climate sensitivity through observations and data sets, their analyses, process studies, model development and exploitation, applications, technology transfer to operational results, and research capacity development and training for the next generation of scientists.

Website: <http://gewex.org/2014conf/home.html>

## MEME'2014 – Mathematics and Engineering in Marine and Earth Problems

21–25 July 2014, Aveiro, Portugal

The main goal of MEME'2014 is to provide a multidisciplinary forum on the development of innovative scientific and technological tools for the study and exploration of the Earth and the Ocean. The conference is expected to foster a tighter cooperation between theoretical and experimental practitioners.

Website: <http://www.meme.glocos.org>

## AOGS 11<sup>th</sup> Annual Meeting

28 July – 01 August 2014, Sapporo, Japan

The Asia Oceania Geosciences Society (AOGS) was established in 2003 to serve the geosciences community in Asia and Oceania. Since its inception, the focus of the society has been to promote geosciences and its application for the benefit of humanity not only to the Asia Oceania region, but also all over the world. In this light, the society's major activity is the organisation of an annual conference and exhibition that is held for five days each summer.

Website: <http://www.asiaoceania.org/aogs2014>

## COSPAR General Assembly 2014 – COSMOS

02–10 August 2014, Moscow, Russia

Every second year the Committee on Space Research (COSPAR) organises a General Assembly (also called Scientific Assembly). These are conferences currently gathering more than a thousand participating space researchers.

Website: <https://www.cospar-assembly.org>

## Tephra 2014 – Maximizing the Potential of Tephra for Multidisciplinary Science

03–07 August 2014, Portland, Oregon, USA

This workshop will discuss major developments, best practices, and future directions/needs in tephra studies from both volcanological and tephrochronological perspectives. By bringing together a broad array of scientists who study tephra for different purposes, the meeting intends to enhance interdisciplinary collaboration and data sharing.

Website: <http://www.geohazards.buffalo.edu/documents/Tephra2014.shtml>

## 3<sup>rd</sup> Young Earth Scientists Congress

11–14 August 2014, Dar es Salaam, Tanzania

The 3<sup>rd</sup> Young Earth Scientist (YES) Congress, with the theme Bridging Geo-Generation into Global Earth Science Integrations, will be conducted at the Mwalimu Julius Nyerere International Convention Centre in Dar es Salaam. The event is jointly organised by the Tanzania YES National Chapter and the Tanzania Geological Society in cooperation with governmental and non-governmental organisations.

Website: <http://www.yescongress.org/2014>

## 25<sup>th</sup> Colloquium of African Geology (CAG25)

14–16 August 2014, Dar es Salaam, Tanzania

The 25<sup>th</sup> Colloquium of African Geology-CAG25, with the theme Earth Sciences for Improving Livelihood in Africa, will be conducted at the Mwalimu Julius Nyerere International Convention Centre in Dar es Salaam. The event will be jointly organised by the Tanzania YES National Chapter and the Tanzania Geological Society in cooperation with governmental and non-governmental organisations.

Website: <http://www.cag25.or.tz>

## GRS Deformation of Geological Materials in Multi-Scale and Multi-Phase Systems

16–17 August 2014, Andover, USA

The Gordon Research Seminar on Rock Deformation is a unique forum for graduate students, post-docs, and other scientists with comparable levels of experience and education to present and exchange new data and cutting edge ideas. This meeting focuses on the mechanisms and implications of rock deformation.

Website: [http://bit.ly/GRS\\_rock](http://bit.ly/GRS_rock)  
Abstract deadline: 19 July 2014

## The first World Weather Open Science Conference (WWOSC 2014)

16–21 August 2014, Montréal, Canada

The theme of WWOSC 2014 is 'Seamless prediction of the Earth system: from minutes to months'. The conference is structured around a science programme, covering basic weather research, as well as a user, application and social science programme.

Website: <http://www.wwosc2014.org>

## GRC Evolving Rock Structure: From Grain-Scale to Planet-Scale

17–22 August 2014, Andover, USA

At this Gordon Research Conference, experts in experimental rock deformation, structural geology, earthquake seismology, geodesy, geodynamics, mineral physics, material science, petroleum engineering and planetary geology will discuss recent progress and outstanding questions in characterising structural evolution across multiple length scales.

Website: [http://bit.ly/grc\\_def](http://bit.ly/grc_def)  
Abstract deadline: 20 July 2014

## 4<sup>th</sup> Atlantic Conjugate Margins Conference

20–22 August 2014, St. John's, NL Canada

This conference brings industry and academia together to discuss the similarities of basin evolution along conjugate margins. In 2014, the focus of the event includes all the margins of the North Atlantic. Session themes include: Atlantic margins, geodynamics, deepwater systems, structural and tectonic settings and petroleum exploration.

Website: <http://www.conjugatemarginsnl.ca/2014-conference>

## 22<sup>nd</sup> EM Induction Workshop

24–30 August 2014, Weimar, Germany

The international Electromagnetic (EM) Induction Workshops are the premier events for researchers around the world to exchange latest developments in the field of geophysical electromagnetism.

Website: <http://www.emiw2014.de>

## Short Course in Climate Extremes Analysis

27–29 August 2014, Hannover, Germany

This meeting will feature extensive hands-on computer tutorials on real-world climate data. Participants will also learn about the theoretical background of statistical extremes analysis.

Website: <http://bit.ly/climaterisk>  
Abstract deadline: 15 June 2014

## GeoMod 2014

01–05 September 2014, Berlin, Germany

Biennial conference on recent advances in analogue and numerical modelling in tectonics and surface processes, structural geology and geodynamics. There will be a post conference field trip to Erzgebirge (Ore Mountains).

Website: <http://www.geo-x.net/geomod2014>

## Wegener 2014: Measuring and Modelling our Dynamic Planet

01–04 September 2014, Leeds, UK

The 17<sup>th</sup> Wegener General Assembly will focus on Earth deformation and the study of earthquakes using geodesy and geodynamics.

Website: <http://see.leeds.ac.uk/wegener>  
Abstract deadline: 30 June 2014

## 24<sup>th</sup> European Cosmic Ray Symposium (ECRS2014)

01–05 September 2014, Kiel, Germany

ECRS2014 is the 24<sup>th</sup> in a series of European Cosmic Ray Symposia. The main goal of the symposia is that of spreading throughout the European Physics community the information concerning the status of the research in cosmic rays and related fields, recent results, newly emerging ideas and forthcoming experiments.

Website: <http://ulysses.physik.uni-kiel.de/ECRS-2014>

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## 14<sup>th</sup> European Solar Physics Meeting (ESPM)

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08–12 September 2014, Dublin, Ireland

ESPMs are triennial events that welcome contributions from all aspects of modern solar physics with invited and contributed oral and poster presentations. The conference is organised by the European Solar Physics Division, a joint Division of the European Physical Society and the European Astronomical Society, and by the Astrophysics Research Group of Trinity College Dublin.

Website: <http://www.espm14.ie>

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## Geoscienze 2014 Congresso SGI–SIMP 2014

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10–12 September 2014, Milan, Italy

This is the joint meeting of the Italian Geological Society (SGI) and Italian Society of Mineralogy and Petrology (SIMP). The language of the conference is Italian.

Website: <http://www.geoscienze2014.it>

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## International Workshop on Soil Degradation Risks in Planted Forests

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10 September 2014, Bilbao, Spain

The aim of the workshop is to raise awareness of the impact of forestry practices on soil degradation and on the importance of forest soils for forest productivity. The causes of degradation will be examined and the impact on long-term productivity discussed. The workshop will review national and regional practices and policies for soil protection and propose a common framework to regional policy makers to reduce the risk of soil degradation in planted forest.

Website: <http://bit.ly/bilbaoworkshop>

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## Geospace revisited: a Cluster–MAARBLE–Van Allen Probes Conference

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15–20 September 2014, Island of Rhodes, Greece

This conference aims at revisiting long-standing issues of geospace dynamic phenomena. New data from space missions like Cluster, THEMIS and the more recent Van Allen Probes, along with measurements from ground-based magnetometer arrays around the globe, processed with new methods and combined with theory and simulations are expected to shed light on the complex interplay of particles, fields and waves in geospace, and in particular the inner magnetosphere (radiation belts and ring current).

Website: <http://geospacerev.space.noa.gr/index.php>

Abstract deadline: 15 June 2014

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## Deep Earth Processes: Windows on the Working of a Planet

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15–16 September 2014, London, UK

The physical and chemical nature of Earth's deep interior is key in controlling many of the processes that shape our planet: from mantle convection to melting, from volcanism to plate tectonics. This international meeting seeks to draw together the latest ideas and results from geophysicists, geochemists, mineral physicists, geodynamicists and petrologists to identify the processes shaping the inaccessible depths of our planet.

Website: <http://www.geolsoc.org.uk/deepearth14>

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## Multiproxy Approach to the Reconstruction of the Pliocene Climate Workshop

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17–19 September 2014, Barcelona, Spain

The aim of the workshop is to facilitate a community effort to reconstruct key climatic parameters (temperature, CO<sub>2</sub>, ice, sea level, vegetation) in selected time intervals within the Pliocene epoch to provide a global representation of Pliocene climate and facilitate data modeling comparisons.

Website: <http://jornades.uab.cat/plioclim>

Abstract deadline: 15 July 2014

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## Topo–Europe 2014: Interplay Between Surface, Lithospheric and Mantle Processes

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17–19 September 2014, Barcelona, Spain

The Topo–Europe 2014 conference will focus on the links between topography, landscape evolution, crustal and lithospheric mantle structures, and geodynamic processes occurring at various depth- and time-scales. The conference will be multidisciplinary including participants from geodynamics, tectonics, seismology, sedimentology, geomorphology and oceanography.

Website: <http://bit.ly/TOPO-Europe>

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## Autumn School: Data Assimilation in Biogeochemical Cycles

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20–27 September 2014, Trieste, Italy

The International Space Science Institute's (ISSI) Working Group on Carbon Cycle Data Assimilation: How to Consistently Assimilate Multiple Data Streams is organising an Autumn School on Data Assimilation in Biogeochemical Cycles. The school will support the training of young scientists building the next generation of

researchers in the growing field of data assimilation in biogeochemical cycle science.

Website: <http://bit.ly/BGC-Systems>

## ELS 2014 – The Earth Living Skin: Soil, Life and Climate Changes

21–25 September 2014, Nova Yardinia, Castellaneta Marina, Italy

This conference series sets up the ambitious goal of studying soils as the main environmental interface where atmosphere, hydrosphere, biosphere and geosphere design and model incredible living systems with time. ELS 2014 aims to gather the thoughts and findings of scientists coming from all the different disciplines related to the soil systems: soil science, geomorphology, biogeochemistry, hydrological sciences, climatology and natural hazards only to mention the main ones.

Website: <http://www.els2014.eu>

## GeoFrankfurt 2014

21–24 September 2014, Frankfurt, Germany

GeoFrankfurt2014 is the joint meeting of the Deutsche Geophysikalische Gesellschaft, the Deutsche Gesellschaft für Geowissenschaften, the Geologische Vereinigung, the Paläontologische Gesellschaft, the Central European Section of the Society for Sedimentary Geology and the Senckenberg Nature Research Society. The different fields covered by these societies result in a wide spectrum of geoscientific disciplines being covered at GeoFrankfurt2014, ranging from the Earth's core to the surface.

Website: <http://www.geofrankfurt2014.com/index.html>



## Thunderstorms and Elementary Particle Acceleration (TEPA 2014)

22–26 September 2014, Byurakan, Armenia

The study of high-energy phenomena in the atmosphere provides unique information about particle acceleration and multiplication in the lower and upper atmosphere during thunderstorms. The generation and propagation of large fluxes of particles in the atmosphere and in near space are related to the development of thunderstorms and may be used for monitoring dangerous consequences of extreme weather.

Website: <http://crd.yerphi.am/Conferences/tepa2014/home>

Abstract deadline: 1 July 2014

## XII Congress of the Croatian Society of Soil Science

22–26 September 2014, Dubrovnik, Croatia

The aim of this congress is to bring together leading researchers and specialists in soil science to share their experiences, research results and discuss all aspects of sustainable soil management for food and environmental safety.

Website: <http://www.congress-csss.org>

## The GeoShale 2014 Conference

24–26 September 2014, Warsaw, Poland

GeoShale 2014 focuses on 'Recent advances in geology of fine grained sediments'. It is proposing the following panels: shale basins stratigraphy, paleoenvironment and paleoclimate, shale geochemistry, diagenesis and reservoir properties, shale basins geophysics and tectonics, and shale gas exploration and production.

Website: <http://konferencje.pgi.gov.pl/geoshale.html>

## 30<sup>th</sup> International Conference on Ore Potential of Alkaline, Kimberlite and Carbonatite Magmatism

29 September – 02 October 2014, Antalya, Turkey

This annual conference has been organised under the auspices of the Russian Academy of Sciences' Vernadsky Institute of Geochemistry and Analytical Chemistry since 1983. Topics include: genesis of alkaline magmatism, genesis of kimberlites and other ultrapotassic rocks, experimental data for petrogenesis of alkaline rocks, geochemistry, petrology and ore potential of alkaline-carbonatitic, mafic and ultramafic rocks and granitoids, and the mineralogy and crystalchemistry of alkaline rocks and carbonatites.

Website: <http://alkaline2014.com>

## GRACE Science Team Meeting 2014

29 September – 02 October 2014, Potsdam, Germany

The GRACE Science Team Meeting 2014 will be held at the German Research Centre for Geosciences in Potsdam. Further information on registration, abstract submission and housing can be found in summer 2014 on the conference website.

Website: <http://bit.ly/GRACE-meeting>