

# GEO Q

THE QUARTERLY NEWSLETTER OF  
THE EUROPEAN GEOSCIENCES UNION

SPECIAL EDITION

ISSUE 4, DECEMBER 2012



# 10 YEARS OF EGU

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# EDITORIAL

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Welcome to a very special edition of *GeoQ* dedicated to the 10<sup>th</sup> anniversary of the European Geosciences Union!

Ten years ago, in September 2002, the European Geophysical Society (EGS) and the European Union of Geosciences (EUG) merged to form the EGU, a “dynamic, innovative, and interdisciplinary learned association” to advance Earth, planetary, and space sciences, and promote cooperation between scientists. Since then, we have grown to unite over 12,500 members, publish 14 Open Access journals, and organise meetings and education and outreach activities. Now a decade old, and with a well-staffed Executive Office in Munich, the EGU is more dynamic than ever.

This special edition of *GeoQ* celebrates this major milestone in the Union’s history by telling its story and showing a glimpse into its future. This issue further sheds light on the EGU’s unique relationship with conference-organiser and publisher Copernicus, and on the workings of our Munich office. In the EGU Voice section, our Outreach Committee Chair writes about the past and future of the Union’s outreach activities, while the Education section features a report about EGU’s most successful education activity to date: the Geosciences Information for Teachers (GIFT) Workshops.

In line with the Union’s “dynamic” and “innovative” standards, we have recently strengthened our online presence by means of a blog

network. The On the Web section introduces this network and its geoscience bloggers. Also slightly different this quarter is the External News section, which features newspaper and magazine stories on research published in the Union’s journals in the past few months and presented at the 2012 General Assembly.

Next year’s General Assembly marks the 10<sup>th</sup> anniversary of another landmark event: the first joint EGS-EUG Assembly, a precursor to EGU’s annual conference, which at the time also featured the AGU. With the abstract submission deadline for the 2013 meeting (January 9) fast approaching, make sure to submit your paper soon!

This issue of *GeoQ* also marks one year since the newsletter, previously known as *The Eggs*, was redesigned. We believe it is, therefore, the ideal opportunity to ask our readers for feedback. With this in mind, I hope you will take a couple of minutes to complete the short questionnaire at <http://bit.ly/GeoQfeedback>, as your input would be invaluable towards improving future editions.

Happy reading!

*Bárbara Ferreira*  
Chief Editor & EGU Media and Communications Officer

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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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## Ten years of EGU

### The Union's history in the voice of its Treasurer, Roland Schlich

*Nobody is better placed to look back on the EGU's first decade than Treasurer Roland Schlich, one of its founding fathers. Retired from his academic duties, Schlich continues to be heavily involved in the Union's day-to-day activities. To flesh out the story of this deceptively young organisation and hear what its 10<sup>th</sup> anniversary means to someone who has given so much to its development, Science Communications Fellow Edvard Glücksman sat down with Roland on 14 September 2012 on a break at the recent Outreach Committee retreat in Pisa, Italy.*

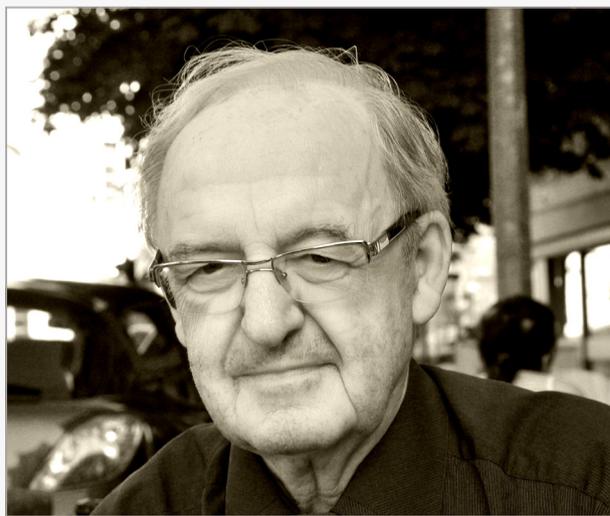
On 7 September 2002 at Hotel Platzl in Munich, [Council members from the European Geophysical Society \(EGS\) and European Union of Geosciences \(EUG\)](#) came together to sign the EGU into existence. Today, just a decade later, the Union boasts over 11,000 members across 22 Scientific Divisions, publishes 14 Open Access journals, hosts Europe's largest annual geosciences conference and, through a growing number of outreach and communication projects, is taking on an increasingly prominent ambassadorial role for the Earth and planetary sciences.

Nevertheless, Schlich was not always confident the merger would work, particularly in light of the challenges inherent in assigning a small number of individuals to speak for a large and scientifically diverse group of European researchers. He recalls, "When the EGS and the EUG ceased and the EGU was built up by a handful of scientists from Germany, France, and the UK, I was not necessarily convinced that the adventure would be so successful. For its subsequent success I am very proud."

#### Competitive coexistence

By all means, merging two highly established organisations and, above all, reconciling their differences, was not an easy task. The EGS and EUG were founded in 1971 and 1981 respectively, coexisting and competing for Europe's Earth and planetary scientists for over two decades. Schlich, one of the EUG's founding members and Treasurer (1981-1996), followed by Chief Executive (1996-2004), explains, "Both organisations were running for the same reasons, the development of science, and we were competing, of course. However we were also slightly different: EGS was built on the model of the American Geophysical Union (AGU), with division sections and so on, whereas EUG had a more interdisciplinary, thematic structure."

The two original organisations also differed slightly in their scientific focus, although not enough to make it easy for young scientists to know which one to join. Schlich recalls some of the conversations he had with his students as they mulled over which side to pledge their allegiance to, "We [the EUG] were more on the geology, geochemistry, and mineralogy side, whereas they [the EGS] focused



Treasurer Roland Schlich in a photograph taken in 2010.

on geophysics. Nevertheless, it became increasingly clear that we could not continue like this: even the students in my lab were hesitating about which side to join and then every two years they would attend separate meetings at almost the same time!"

The sheer practical incompatibility of having two competing organisations soon began to weigh heavily on Schlich's mind, "I was sure that the only way forward was to open negotiations towards a merger, but even that was going to be difficult given the meeting schedules at the time [both organisations had parallel meetings every two years]. My first objective, therefore, was to convince EGS to have their big meeting on the odd years when we did not have ours, but this did not work since the leaders of both organisations were convinced they were the better one and nobody wanted to compromise!"

However, like other members of the EUG, Schlich was also increasingly aware of his organisation's potential fate within such a competitive atmosphere. He recalls, "Since the EGS had a publications model, with six journals, they were not keen to merge but, rather, wanted to absorb us. For me, this would have been a bad idea because one side always feels worse when they are absorbed. We therefore needed a merger through a common effort."

#### Moving towards a merger

Given the untenable state of affairs and the potential threat of ramped up hostilities, Schlich decided to kick-start the unification process by putting pressure on the EUG Executive and finally, in 2000, managing to convince then-president David Gee to hold an extraordinary meeting at Frankfurt airport. Schlich knew his

argument had to be compelling, “I invited all available past presidents and told them we should merge the two organisations before it was too late, before one of us would be absorbed by the other. I also told them that this was the only solution for making us competitive with the AGU, which I knew a lot about at the time after having even sent my secretary to the United States to learn how they work.”

His persistence in the lead-up to Frankfurt paid off, “At the end of that meeting, I obtained the authorisation to proceed with merger discussions, so I contacted Arne Richter, then-Executive Secretary of the EGS, and invited him to our 2001 meeting in Strasbourg. In turn, he invited me to the following EGS meeting, where we scheduled a working session together.”

Perhaps only in hindsight, it is with great fondness that Schlich recalls the delicate, mercurial relationship between his colleagues at the EUG and Arne Richter, “The EGS was invigorated by Richter’s arrival when, in 1988, he was recruited from the Max Planck Institute. In many ways, his appointment changed everything for them. Remember, we [EUG] were founded partly because they were quickly losing visibility. They simply did not have the right people in the right places. Arne had a lot of imagination and he worked hard but, when it came to compromise, he acted like a king!”

### Dialogue and leadership

Richter’s arrival was a key turning point in the fate of the EGS and, according to Schlich, much of it could be attributed to his unique personality. He describes their first meeting in Lindau, where Richter was based, “I very much enjoyed that session because that is where I discovered him as a person, and I liked him. I like people who express themselves properly instead of turning around the pot! However, it was not all roses and, at the end of the first day, we were quite frustrated with each other.”

Discussions took their toll but, in the end, the two men were able to make headway on what would become a key moment in the EGU’s foundation. “Only on the second day did we converge on the idea that we could win only by merging and, of course, we both understood the problems with this marriage but we were both also conscious,

thankfully, that this was our best option. We wrote a memorandum of understanding which we managed to get signed by both parties.”

Having reached a preliminary agreement, Schlich and Richter now faced the delicate task of assigning the EGU’s first leadership positions. It was a pivotal moment which required two large organisations, both full of strong personalities, to reach a workable compromise. With this in mind, Schlich recalls to what extent the discussions hinged upon tactful diplomacy, “After the rather quiet steps of getting a memorandum signed – because sometimes this kind of thing has to be done quietly – we faced the pivotal allocation of positions. Arne was confident about his future [prominent] role in the new organisation. Meanwhile, I was fortunately happy with what I had accomplished during my career and I was not too stressed. I could therefore leave him with the impression that it was his baby.”

And so, finally, the two councils came together in September 2002 in order to merge the respective EUG and EGS constitutions and officially establish the EGU. Schlich describes the importance of satisfying both sides right from the start, “We came to the practical necessity of allocating a fair balance of leadership positions for the first two terms. Everyone agreed that Peter Fabian of the EGS would be the first EGU President, followed by the EUG’s John Ludden. The most animated discussion related to the Executive Secretary position. Despite strong pressure from Arne, who several people felt should be given the job on his own, a group of EUG people converged and stood up to propose we take on two general secretaries. I was subsequently chosen to serve alongside Arne who, with his team in Lindau, was in a better position to do this job, but this compromise meant there was more balance and less frustration on our side.”

### The first EGU meeting

Leaving Richter with the main decision-making responsibilities, Schlich focused on the EGU’s first major event, a 2003 meeting in Nice, bringing together EUG and EGS scientists alongside their transatlantic counterparts from the AGU. For Schlich, the practical realisation of years of his work was, it turns out, a victim of its own success, “That first meeting was truly a zoo! We brought on the AGU as a sort of alibi, a witness to our successful merger. Everyone was excited and we attracted far more participants than expected, a total



Celebration of the 10 years of EGU at the October 2012 Council meeting in Munich.



of 12,000, including up to 4,000 from the US. The science was good, of course, but the logistics were a real problem.”

Compromise remained the main driving force behind those earliest moments though, even after the official merger, the two parent organisations continued to run their finances separately. “Those early days were not easy and – very much against my character – I had to bite my tongue on several occasions, especially regarding how the finances were run,” Schlich recalls.

The logistical difficulties encountered at the Nice meeting backfired the following year, with profound financial implications for the organisation. This, according to Schlich, was a real turning point, ultimately leading him to take on the position he still occupies today, “The 2004 meeting was truly a catastrophe! We imagined we would have over 10,000 people yet again but, because people were so put off by the poor logistics in Nice, we struggled to get 6,000 and ran into a deficit of almost half a million Euros. Since I had to pay for this with the EUG’s reserve funds, the only sensible next step was to merge the finances of the two organisations. Based on this experience, I was elected Treasurer in 2005. The rest, as they say, is history!”

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## A decade on

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Ten years on, Schlich is constantly reminded of why he worked so hard towards getting the EGU up and running. In particular, he remains ever-inspired by the Union’s young scientists, “Two years

ago, a guy came up to me at a conference and shook my hand. He said to me, ‘Roland, I have to thank you because the first paper I ever presented, many years ago, was in Strasbourg at one of your meetings, with a travel grant signed by you.’ You can imagine that, up on hearing this, I was over the moon! He wasn’t obliged to remember the details and, even less so, to tell me about it years later. I still use this story to demonstrate why our travel grants are such an important part of what we do.”

“Young people often remember the first time they present in public. To me, this is the best publicity we can make for our organisation and one of the most important contributions we can make to the scientific process.”

Year upon year, Schlich is proud to see the EGU developing into a dynamic organisation with a growing international influence. However, he insists that its greatest strength remains unchanged, “I have been delighted to witness the growth of this organisation from the very beginning: a true adventure! However, without a doubt, one of my greatest pleasures is to observe the quality of the science presented by our members.”

Here’s to another ten years of dialogue, compromise, and world-class science!

*Edvard Glücksman*  
EGU Science Communications Fellow

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# The Union of the future

*Recently elected to the EGU presidency, Günter Blöschl writes about his vision for the future of the Union.*

On describing his ancient world, Heraclitus said: “No man ever steps in the same river twice, for it’s not the same river and he’s not the same man.”; this ever-present change is equally valid in today’s world. Where is the EGU going at a time when almost every aspect of life is changing more rapidly than ever before? Clearly, it will not suffice for us to respond to any changes. The Union needs to play an active role in shaping a community of geoscientists, fostering a climate where the Earth, planetary, and space sciences can thrive, and in shaping a society where our research findings have a real-world impact. To realise this pro-active role, the Union will continue to focus on the cooperation between disciplines and across borders, raising the profile of young scientists, investing in outreach and science policy, and on perpetual innovation.

The annual EGU General Assembly has been steadily increasing in size and scope in the ten years of the Union’s existence. The [2012 meeting](#), with a vibrant programme and varied opportunities for networking across borders and disciplines, was one of the most successful to date. As the most thrilling research questions are getting more interdisciplinary, more and more sessions are

being co-organised by scientists from different fields. The General Assembly is a superb forum for the exchange of ideas across the Union disciplines and I think it is important for the EGU to actively encourage this cross-fertilisation, both within the Union and through strategic partnerships with other learned societies.

But the EGU has much more to offer than the General Assembly. Our many [co-sponsored topical meetings and conferences](#), summer schools and other training programmes are booming. This is one of the main growth areas of our Union, one where the EGU can play an important catalytic role in enabling researchers to increasingly cooperate across borders to enhance the competitiveness of geoscientists in Europe. A network of topical events revolving around a multitude of themes and a wider use of social media will be instrumental for this integration. As I strongly believe in one global science community, encouragement and increased travel support for economically disadvantaged scientists will be a key element of this integration.

Our biggest resources are the talent and enthusiasm of young scientists. To make the EGU an even more attractive forum for young researchers, we need to cultivate an environment that fosters a free and open exchange of ideas, in accordance with the bottom-up



Günter Blöschl was elected to the presidency of the Union last year. He will serve as EGU Vice-President for one year, becoming EGU President at the 2013 General Assembly.

philosophy of the Union where contributions of each individual are valued and encouraged. Raising the level of excitement and relevance of the geosciences amongst young scientists, identifying and encouraging young, talented members to take up leadership positions as convenors at the General Assembly or as editors of our journals will be important. The EGU already has an award programme for young scientists but there are more opportunities. Some divisions are now forming youth committees to organise activities, such as summer schools, for master and PhD students. And there are plans for think tanks to be formed by young scientists to work out ideas for the Earth sciences of the 21<sup>st</sup> century.

In a rapidly changing world, the geosciences should play a key role in a Europe-wide open space for knowledge. The EGU is a society which should claim leadership in the European research agenda. The Union already has a very active [outreach programme](#) and plans to contribute to the European science policy agenda through strategic partnerships and other activities. Encouraging the involvement

of officers of the European Commission, the European Research Council and other agencies in EGU forums, and increasing the visibility of the Union by enhancing its communication with the media and the public will be important. Conversely, EGU members and the Union itself have an important role in supporting policy-makers and society at large, providing advice and forward-looking recommendations on societal issues related to the geosciences. The LAquila earthquake and subsequent trial, for example, highlighted the delicate balance of responsibilities of Earth scientists for society. I hope the EGU can become an important discussion and information platform relevant to decision making.

Pro-active innovation, I believe, is a key to success in a changing world. The EGU has a strong track record in innovation and even as a trend setter in the Earth sciences and beyond. Take the EGU Interactive [Open Access Publishing Policy](#) as an example. Only ten years ago, Open Access publication was considered exotic by many. Today, the EGU is publishing 14 extremely successful Open Access journals that can be read, free of charge, by anybody across the globe! More importantly, the idea has spread like wildfire across the science community. The publication marketplace is still evolving towards improved web-design and integrated, adaptive communication systems, including social media. The EGU will continue to play a leading role in this exciting process.

Finally, it is worth highlighting that EGU's fortes are the ideas and dedication of its members. I would encourage all of you to come up with new ideas on how to make the EGU and our community an even stronger and more thriving forum. As Heraclitus said, "there is nothing permanent except change." Innovation needs to be permanent. We are in for an exciting future.

Günter Blöschl  
EGU Vice-President

## Copernicus and EGU

### 25 years of success stories

*The relationship between EGU and its meetings organiser and publisher in the voice of the Managing Director of Copernicus.*

It was in February 1988 that Sir Ian Axford, then president of the European Geophysical Society (EGS) and director of the Max Planck Institute for Solar System Research, had the idea to provide a permanent office to the EGS. During that time, the society was registered in Switzerland, without staff members. The idea for a permanent office arose from the need to handle membership business, as well as to organise the EGS General Assembly, a medium-sized conference with up to 1,000 participants, continuously. Before then, meeting businesses were dealt by each local organising committee, who were doing a great job but unnecessarily 're-inventing the wheel' each year.

Axford reached out to his colleagues in the direction of the Max Planck as well as to some scientists, and gathered seven people to found the [Copernicus Gesellschaft e.V.](#) (incorporated society, non-profit status). One of the founders was Arne Richter, later EGS Executive Secretary. Although being two independent corporations, the relation between Copernicus and EGS was a very strong one.

The EGS was growing and so did Copernicus. In 1994, the EGS decided not to continue their publishing activities with major commercial publishing houses. A logical consequence for Copernicus was to offer publishing services to EGS and the publishing segment of Copernicus was launched.

When the community of EGS started to think about Open Access and liberal handling of copyrights and distribution licenses,



Martin Rasmussen is Managing Director of Copernicus since 2004. The publisher and conference organiser is based in Göttingen, Germany.

Copernicus was fulfilling this job and became an Open Access publishing house. Together with a very active group of scientists led by Ulrich Pöschl, now chair of the EGU Publications Committee, the flagship journal *Atmospheric Chemistry and Physics* and an innovative approach to [Public Peer Review – the interactive Open Access publishing](#) – were launched.

The partnership between Copernicus and EGS was pioneering, even in those days. Today, more and more publishers and conference organisers realise that scientists know how to communicate science better than business people could ever do. The role of publishers is changing from a content-locking copyright keeper to a service provider, helping scientists realising their visions. The role allocation between Copernicus and EGS was always like this: EGS as the voice of the (geo)sciences and Copernicus as the partner to implement all the society's great ideas. Borrowing a term from our colleagues in ecology, Copernicus and EGS were a great symbiosis.

When EGS and the European Union of Geosciences (EUG) decided to merge to create the EGU, the symbiosis celebrated the next success: the first conference above 10,000 participants (Nice 2003).

The year 2004 was then a very exciting one for the new-born EGU and its partner Copernicus. The first EGU General Assembly took place, [new interactive journals were launched](#), and most of the existing 'traditional' journals were transformed into Open Access (the last closed-access journal followed in 2009).

Since late 2004, Copernicus has been headed by me, also a geoscientist by education. We started to re-arrange the partnership in a way that the non-profit society activities of the EGU and the business part were strengthened by splitting the duties amongst the two parties. Arne Richter continued to serve as EGU Executive Secretary and the growing EGU committees have focused on various activities regarding membership, outreach, education, and scientific policy. Copernicus has focused on two segments: conference organising and Open Access publishing. All EGU journals are owned by the Union and the editorial policy and content is clearly ruled by the chief editorial boards and, on the Union level, by the Publications Committee. Similar to this is the organisation of duties between Copernicus and the Programme Committee regarding EGU's General Assembly. This arrangement was fully established when Philippe Courtial started to serve as EGU Executive Secretary and founded the Executive Office in Munich.

The collaboration of Copernicus and EGU is, even after 25 years, one of the best-functioning marriages I have ever seen. We trust and know each other like an old couple, but we are vibrant and innovative like teenagers.

Copernicus serves other scientific associations and research initiatives. Our very [active involvement in the Open Access movement](#) brings in a variety of new ideas for scientific communications. I am convinced that this is a clear advantage of our open relationship and I think that even the EGU can sometimes benefit from our other affairs.

For me personally, but also for all our staff members at Copernicus, the collaboration with the EGU and its wonderful Council and Committee members, authors, reviewers, meeting organisers and participants, as well as its more than 11,000 members, is a very pleasant one. We feel happy and very honoured that we have been allowed to serve the EGU all these years and we look very much forward to the continuation of this partnership.

All the best, EGU, for your next 10 years!

*Martin Rasmussen*  
Copernicus Managing Director

## A year to remember

### EGU Science Communications Fellow Edvard Glücksman says goodbye to the Office

*With his stint at the EGU Executive Office coming to an end, Science Communications Fellow [Edvard Glücksman](#) looks back on an action-packed year of geosciences, social media, and life in the Bavarian capital.*

Only a year ago, I was putting the finishing touches on my doctoral thesis and agonising over the prospect of life beyond the expiry date of my student card. Today, as I prepare to leave the Executive Office,

those nervous moments seem so far away, replaced by a whirlwind of new experiences and acquired skills, friendships forged, and a sense of belonging to a city I had never previously visited.

I arrived to the Office with large boots to fill, taking over from the prolific [Jennifer Holden](#) as the second ever Postdoctoral Fellow. Already a veteran General Assembly participant at the time, Jennifer played a vital role in the early development of the EGU's social

media channels and its outreach strategy, in particular through her dedication to galvanising the Union's young and [female](#) scientists. Tasked with on the one hand helping Media and Communications Officer Bárbara Ferreira launch the new-look [GeoQ](#) newsletter and, on the other, continuing Jennifer's social media legacy, I was immediately thrown into the deep end in the run-up to the [2012 General Assembly](#). Preparing for a conference of over 11,000 participants in such a wide range of subject areas was an eye-opening experience for me, having just completed my doctorate in the field of protistology, the study of protists (Protozoa), where the largest international conference barely exceeds 300 scientists.

Those opening months flew by as I learned to juggle regular office tasks with Assembly preparations. Little by little, I also grew to know the EGU as an organisation, including by attending the General Assembly Programme Committee meeting in Utrecht in late February. There, I witnessed first-hand the [Council members](#) in action and put faces to those names I had heard so much about.

At the same time, I made an effort to explore Munich and find my place within its distinctively international social scene. With my colleagues and newfound friends I experienced, with fascination, Bavaria's many traditional events, including Fasching (carnival) and the Starkbierzeit (the season of the 'strong' beers). In hindsight, those were just intimate little gatherings compared with the mother of all parties, Oktoberfest, where Munich gets turned upside down by two relentless weeks of beer, meat, and tourists.

After months of tweeting, blogging, writing, editing, and designing General Assembly content, we were suddenly Vienna-bound for the EGU's annual flagship event. Charged with the Assembly's social media duties, I gained a true insider's perspective from the comfort of a sofa in the EGU Booth. It was at the Assembly, in that complex maze of poster halls, corporate stalls, and lecture theatres, that I learned the true global significance of the EGU. The sheer number of scientists from all over the world was staggering; so too were the number of oversubscribed sessions, each covering a fragment of the Union's seemingly infinite range of subjects. Though it is sometimes hard to gauge the success of online outreach activities, I knew our social media efforts were paying off when, on the final day, a 'tweet-up', or meetup of our Twitter followers, brought together fifteen scientists for coffee. A well-deserved opportunity for everyone to experience human contact!

With the General Assembly done and dusted, I was finally able to settle into a steady office routine. Over the summer, we prepared the next edition of this newsletter, launched our [blog network](#), and continued to develop our social media channels. At the same time, I made the most of the barbecues, brunches, and Biergartens that characterise warmer months in Munich, a city that lives for the outdoors.

In August, I travelled to Colorado and California for a study tour of the US energy sector, covering my meetings and site visits on the EGU blog (see [entries](#) for 17–31 August). The trip, hosted by the Emerging Leaders in Environmental and Energy Programme ([ELEEP](#)), provided a hands-on introduction to some of the most



Edvard Glücksman during a visit to the 2012 Oktoberfest.

pressing transatlantic energy challenges and I returned with fresh perspectives and a heightened enthusiasm for many of the most important issues covered by our burgeoning [Energy, Resources and the Environment](#) Division.

I have always been keen to travel and, to that end, was also fortunate enough to participate in some of the EGU's public outreach activities, witnessing first-hand the Union's potential to inspire younger generations by introducing its structure in lectures to students at schools and universities. September's Outreach Committee meeting in Pisa confirmed that the EGU will remain one of the largest and most dynamic Earth and planetary sciences institutions around, exemplified by our steadily increasing number of online followers and their heightened levels of engagement and visible enthusiasm. Bárbara and I understood just how far we have progressed when we recently attended [SpotOn London 2012](#), a prestigious science communication conference, finding ourselves pleasantly surprised. The regularity and quality of our content closely matches the output of many of the biggest and most active organisations in Europe.

We live in an age where the value of work experience is judged by the acquisition of 'transferable skills'. To that end, I am most grateful for having been offered the opportunity to spend a year immersed in the many facets of science communication within such an international and scientifically diverse scientific organisation. A year ago, freshly severed from my student life, I had the privilege of arriving to an EGU on the cusp of its social media revolution and, importantly, at the very moment of [GeoQ's](#) birth. This special issue, then, not only commemorates a fantastic first decade of the Union's existence but also the first successful year of this new-look newsletter, not least thanks to Bárbara's tremendous efforts. Her presence, alongside Philippe Courtial, Robert Barsch, and Karen Resenberger at the Executive Office, have made this a truly unforgettable year of learning, personal growth, and quirky Bavarian traditions. Servus!

*Edvard Glücksman*  
EGU Science Communications Fellow



## Reaching out

*Chairman of EGU Outreach Committee Niels Hovius explains why the EGU's diverse portfolio of outreach programs is one of the triumphs of the Union's first decade of existence.*

The application form for grants from my national research council asks me to explain how I will engage the public with my funded science. The candidate I most want for the open PhD studentship is looking for a topic with direct societal relevance. My head of department has requested a list of my media features for consideration in the upcoming review. My daughter's teacher would like me to give a science talk at school again this year. And, "How does that trial in the news affect my work?" the neighbours want to know. If science has ever been pursued in splendid isolation, then those days are over. "Geoscience for Society" is rightly in the EGU banner.

To help the geoscience community reach out, the EGU has developed a range of initiatives. Since 2011, media contacts are handled year-round by professional staff in the [EGU Office](#), with [press releases](#) on the most notable publications in [EGU journals](#) and press conferences and interviews during our principal meetings. Science highlights are also featured on the new-look [EGU website](#) and in [social media](#), where the boundaries between science and society are perhaps most easily crossed. Making use of the flexibility and immediacy of those social media, the EGU is further hosting and moderating open [Twitter](#) discussions on [scientific publications](#) and [issues](#) with broader relevance, as well as a [series of blogs](#). Elsewhere, our Geoscience Information For Teachers ([GIFT](#)) programme each year empowers many dozens of school teachers from across the world to bring geoscience into classrooms with the enthusiasm and excitement that are needed to open the eyes of the next generation to our subject.

But EGU Outreach is about more, because there is also a need for bridges within our own community. [Financial support](#) for young scientists to attend our meetings, assistance for key experts to speak at external events, [mentoring](#) schemes, a network for young geoscientists, training schools where students can work directly with leading scientists to acquire knowledge and skills they can't get in their own institute, a platform for women in science, a market for jobs, an effective and comprehensive website with up-to-date information about all aspects of the Union, and the [newsletter](#) you are reading now: these are all initiatives that aim to strengthen the geoscience community, to bring in those that should be a part of it, and to help build fulfilling careers.

The EGU is a not-for-profit organisation. The revenue from our strong General Assembly and scientific journals portfolio is used substantially to support Outreach initiatives that add real value to being a part of the Union. This is driven overwhelmingly by volunteers who bring their own ideas and passions, and invest some time to enhance the quality of our scientific experience and of the links between our science and our society. But then, we all need to reach out from time to time.

You can find more information about the EGU Outreach programme on the [EGU website](#). If you are interested in contributing your ideas and/or time to EGU Outreach, please contact Media and Communications Officer [Bárbara Ferreira](#).

*Niels Hovius  
EGU Outreach Committee Chair*



Niels Hovius with his son during an expedition in Northeast Greenland. Credit: Thomas Ulrich

# Division reports

## News brought to you from four of EGU's divisions

In each edition of GeoQ, we select several Division Presidents to contribute reports updating members with news from their divisions. Issue 4 gives voice to Charlotte Krawczyk (SM President), Artemi Cerdà (SSS President), Norma Crosby (ST President), and Fabrizio Storti (TS President).

### Seismology

The current work of the EGU Seismology Division (SM) is guided by the following basic thought: the EGU offers a well recognised forum where a large variety of scientific questions and results are discussed. Since the impact of geosciences in society has probably never been as high as it is today, we can foster this development by broadening our research topics and opening our fields to wider, interdisciplinary collaborations within the EGU. Here, seismology as a discipline is significant, since it contributes to a large variety of both basic and applied thematic fields and urgent questions. SM, therefore, wants to strengthen its value by enhancing the development from static to dynamic models, from acquisition parameters to petrophysical properties, and from geomodels to geotechnical applications. As a result, our ability to make relevant predictions for the future is also growing.

This concern shaped the SM programme at the 2102 General Assembly and also finds its way into the call for abstracts for 2013. Highlights this year were the Beno Gutenberg Medal Lecture by Michel Campillo and the Great Debate on The Role and Responsibilities of Geoscientists for Warning and Mitigation of Natural Disasters, which was jointly organised with the Natural Hazards Division. The debate was a great success, with the panel members (Massimo Cocco, Bruno Merz, Peter Billing, Gero Michel) stimulating

the discussion with statements about issues that are important to a wide range of communities (earthquake hazards, uncertainty in flood risk assessment, European Commission on civil protection, risk and insurance). Thereby, the challenging connection between scientific, operational, economic, and political responsibilities [was elaborated](#). It was concluded that both basic and applied research are necessary prerequisites within any step to reduce vulnerability, and improve awareness, preparation, and mitigation.

Many of the points raised during the debate, held in Vienna, were picked up more recently in the aftermath of the guilty verdict handed down to Italian seismologists working with the L'Aquila earthquake. Media requests on this topic were answered promptly and information was provided on short notice using our [Division webpage](#). In addition, a [Twitter discussion forum](#) and an [web-based blog](#) offered everybody a chance to express themselves in public.

The community itself drives the Division forward. Therefore, please don't forget to leave a time slot free in your 2013 General Assembly schedule for the Division Meeting, which will be held during the lunch break preceding the Beno Gutenberg Medal Lecture.

Charlotte Krawczyk  
SM Division President

### Soil System Sciences

The Soil System Sciences (SSS) is a growing Division of the European Geosciences Union that was enabled by the work done by the previous Presidents, Jerzy Weber and Teodoro Miano, and a group of enthusiastic scientists keen to demonstrate the key role



Olive plantation on red clay soil in Andalucía. Ploughing, pesticides, herbicides, and mineralisation are some of the threats that make the future of soils, and the fate of societies, unknown. Credit: Artemi Cerdà

that soils play in the Earth system. I have served as SSS Division President since April 2011 and I have just been elected for a new two-year period.

To get a better and more efficient organisation, the SSS Division is now divided into subdivisions. The Division is structured into [ten subdivisions](#) and has [eight officers](#), as stated on the SSS website. This new structure responds to the needs of a diverse and rich group of scientists and to the visible increase in the number of abstract submissions from soil scientists at the EGU General Assembly. The number of abstracts rose from 278 in 2005 to 1,099 in 2012. Year after year, the topics of the scientific sessions grow richer and more diverse, and we encourage collaboration with other EGU divisions, mainly Geomorphology, Hydrological Sciences, and Biogeosciences.

In the past year, the SSS Division was an active part of the Outreach Committee, attending the meeting in Pisa, supporting the dissemination programme coordinated by Niels Hovius, and contributing to the Medal Committee coordinated by Alberto Montanari with nominations for four medals.

Following the agreement within the Division Meeting last April, we are also developing a [blog](#) and a [newsletter](#). Both of them serve as a contribution of an active group of scientists and are coordinated by Antonio Jordán, SSS Officer for News and Information.



Soils feed humankind, it is time to protect them. Horta de Xàtiva in Eastern Spain. Credit: Artemi Cerdà

The medallists from the SSS Division were [José Torrent](#) (Duchau-four medal), for his contribution to understanding the mineralogy of iron oxides and the iron and phosphorus biogeochemical cycle in the soil-plant system, as well as [Claudio Zaccone](#) (Outstanding Young Scientist), for his contribution to understanding the role of humification processes in ombrotrophic bog profiles and the interactions between humic substances and organic/inorganic pollutants. The Best Poster Awards from the 2012 GA went to Sarah McCormack, Alicia Marugan, Gianbattista Bussi and Miriam Muñoz Rojas.

The members of the SSS Division are attempting to disseminate the mission of the EGU within the soil science community and we expect an increase in attendees to the next couple of General Assemblies. To that end, we hope that the applied soil sciences will be more visible with each passing year and that as many as possible new scientific findings will be disseminated in our General Assembly every year. However, we also hope that our knowledge will reach

the general public and for this we hope to harness the power of the EGU's Outreach Committee.

The SSS Division faces a promising period, particularly as a result of high quality contributions from young scientists, and we hope they continue to find a natural home within the EGU.

*Artemi Cerdà*  
SSS Division President

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## Solar–Terrestrial Sciences

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The Solar–Terrestrial Sciences (ST) Division considers all aspects of solar and heliospheric physics, specifically the solar-terrestrial connection. It covers the physical processes occurring on the Sun, in the solar wind, as well as in Earth's magnetosphere and ionosphere. To better our understanding of our local star, the Sun, researchers define the neighbourhood that we live in by studying these various domains individually as well as from a coupled approach. Solar activity (e.g. coronal mass ejections, solar flares, solar energetic particle events) and the response of the near-Earth space environment to these solar phenomena are considered on a wide-range of temporal and spatial scales.

In 2012, the General Assembly in Vienna included a diverse selection of ST sessions covering data analysis and interpretation of space-borne and ground-based data, as well as theoretical studies and different modelling techniques. Presentations covered a wide range of topics ranging from the dynamics of the Sun to how solar activity manifests itself throughout the heliosphere.

The Julius Bartels Medal for the year 2012 was awarded to [Michael Lockwood](#) for his outstanding contributions to the understanding of the dynamics of the terrestrial magnetosphere and the coupling between solar variability, magnetospheric and ionospheric processes, and the terrestrial climate. Most recently Michael Lockwood has expanded his activities into the consideration of the variability of the Sun on a broad range of time scales, and its influence not only on geomagnetism and the upper atmosphere, but also on possible influences on the Earth's climate.

One of aims of the ST Division is to promote, support and inspire scientists in the beginning of their career. The ST Division Outstanding Young Scientist Award 2012 was awarded to [Alejandro Luque](#) for his outstanding contribution to the understanding of the electrodynamics of plasma streamers found in transient luminous events occurring in the mesosphere of the Earth. Furthermore, the Union Outstanding Student Poster (OSP) Awards 2011 for ST were awarded during the ST Division 2012 business meeting to Heli Hietala for the poster entitled Particle Acceleration in Shock-Shock Interaction – Multi-spacecraft In Situ Observations and to Alexandra Alexandrova for the poster entitled Three-dimensional Non-steady Magnetic Reconnection Signatures: Model and Observations.

*Norma Crosby*  
ST Division President



## Tectonics and Structural Geology

The Tectonics and Structural Geology Division ([TS](#)) covers the description, study, and modelling of geological processes causing rock deformation at very different scales, from the microscopic to the tectonic plate level, and at the different structural levels in the lithosphere. Tectonic processes are dynamically inserted in their deformation environments, from the deep Earth to the interaction and feedback with surface processes. TS activities at the General Assembly are conducted in tight collaboration with the Geodynamics Division (GD) in order to minimise overlaps and optimise scientific programmes. During the 2012 General Assembly, 821 papers were presented within 38 sessions for which TS was leading, helping to touch all of the most interesting current science themes in our Division.

The TS Division medal, the 2012 Stephan Mueller Medal, was awarded to [Jacques Malavieille](#) in recognition of his “fundamental contributions to the integration of field-based studies with analog modelling to study lithospheric deformation.” Jacques gave a very well attended review lecture on this subject. The TS Division Outstanding Young Scientist Award 2012 was awarded to [André R. Niemeijer](#) for his “exceptional work on the effects of fluid-rock interactions and fabric development on rock and fault mechanical properties.” Further, the Outstanding Student Poster Award was awarded to Marcel Thielmann for his poster paper entitled Shear Heating and Subduction Initiation. Nominations for the 2013 awards will be possible from next January up to June.

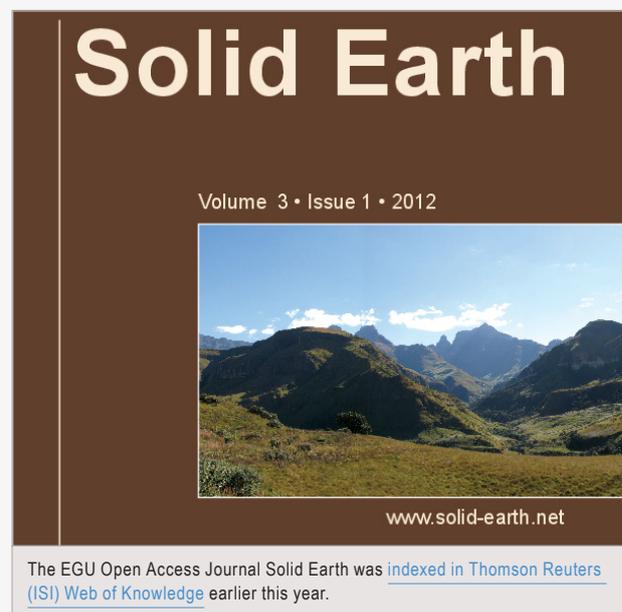
On Division news, in August, Giorgio Pennacchioni and Neil Mancktelow organised at Neves Lake in South Tyrol, the second edition of the biennial TS Summer School on Deformation Structures Within the Tauerns Metagranitoids, including lessons in the class and in the field. As the first edition, the second summer school was a great success and we are already looking forward to the third edition in 2014.

The Open Access EGU journal *Solid Earth* is now indexed in Thomson Reuters (ISI) Web of Knowledge and will receive the first impact factor next June. The journal is performing very well and the TS Division community is encouraged to send in their best work to this publication to make it the leading journal in the field.

Finally, with the end of the Autumn 2012 election for EGU Division Presidents, the TS Division community has elected a new President, Susanne Buiter, whose mandate will begin at the 2013 General Assembly.

I want to take this opportunity to thank you very much for the support and collaboration that you gave to the Division over the past four years. See all you in Vienna next year!

*Fabrizio Storti*  
TS Division President





## EGU announces 2013 Awards and Medals

The EGU has named the 41 recipients of next year's Union Medals and Awards, Division Medals, and Division Outstanding Young Scientist Awards. These individuals, honoured for their important contributions to the Earth, planetary, and space sciences, will receive their prizes at the 2013 EGU General Assembly taking place in Vienna on 07–12 April.

The following individuals will receive 2013 Union Medals and Awards:

- **Edouard Bard** – Alfred Wegener Medal
- **Sierd A. P. L. Cloetingh** – Arthur Holmes Medal
- **Roger-Maurice Bonnet** – Jean Dominique Cassini Medal
- **Hang Su, Xavier Fettweis, Simon M. Mudd, and Alexis P. Rouillard** – Arne Richter Award for Outstanding Young Scientists
- **Teodoro Miano** – Union Service Award

The following individuals will receive 2013 Division Medals:

- **Michael C. Gurnis** – Augustus Love Medal
- **Jeroen Tromp** – Beno Gutenberg Medal
- **Harry L. Bryden** – Fridtjof Nansen Medal
- **Göran T. Marklund** – Hannes Alfvén Medal
- **Miryam Bar-Matthews** – Hans Oeschger Medal
- **Georgja Destouni** – Henry Darcy Medal
- **Helmut J. Weissert** – Jean Baptiste Lamarck Medal
- **Michael L. Roderick** – John Dalton Medal
- **Nikolai A. Tsyganenko** – Julius Bartels Medal
- **Jürgen Kurths** – Lewis Fry Richardson Medal
- **Florent Domine** – Louis Agassiz Medal
- **Mark Zoback** – Louis Néel Medal

- **Didier Paillard** – Milutin Milankovic Medal
- **Dominique Jault** – Petrus Peregrinus Medal
- **William Shotyk** – Philippe DuChaufour Medal
- **Justin Sheffield** – Plinius Medal
- **James W. Kirchner** – Ralph Alger Bagnold Medal
- **Catherine A. McCammon** – Robert Wilhelm Bunsen Medal
- **Tilman Spohn** – Runcorn-Florensky Medal
- **Emile A. Okal** – Sergey Soloviev Medal
- **Leigh H. Royden** – Stephan Mueller Medal
- **Zuheir Altamimi** – Vening Meinesz Medal
- **John P. Burrows** – Vilhelm Bjerknes Medal
- **Albertus J. Dolman** – Vernadsky Medal
- **Alessandro Annoni** – Ian McHarg Medal

The following individuals will receive 2013 Division Outstanding Young Scientist Awards:

- **Nicolas Brantut** – Earth Magnetism & Rock Physics (EMRP)
- **Juan C. Afonso** – Geodynamics (GD)
- **Gabriele Villarini** – Hydrological Sciences (HS)
- **Yongxiang Huang** – Nonlinear Processes in Geosciences (NP)
- **Roham Bakhtyar** – Ocean Sciences (OS)
- **Yong Wei** – Planetary and Solar System Sciences (PS)
- **Raúl Zornoza Belmonte** – Soil System Sciences (SSS)
- **Steven A. F. Smith** – Tectonics and Structural Geology (TS)

For more information on EGU's honours, please check the [Awards & Medals](#) page on the EGU website.

*An earlier version of this article was published on the EGU website*



Some of EGU's 2012 medalists and awardees, their nominators, and the EGU President and Vice-President at the 2012 General Assembly. Credit: Sue Voice

# Autumn 2012 Union election results

The EGU election for the next Treasurer and Division Presidents closed on 01 December. The EGU is thankful to all those who used their voting right. Active participation in elections ensures continuation of the well-established bottom-up structure of our Union!

In total, we received 1266 ballot papers. **Roland Schlich** was elected Union Treasurer with 1238 votes, or 97.8%. The results of the Division Presidents election were as follows (note that each EGU voting member is allowed to vote in up to three Division elections):

- Atmospheric Sciences – **Oksana Tarasova** (96.2%, 302 votes)
- Biogeosciences – **Alina Stadnitskaia** (96.3%, 158 votes)
- Climate: Past, Present & Future – **Thomas Blunier** (96.8%, 215 votes)
- Cryospheric Sciences – **Jürg Schweizer** (97.5%, 77 votes)
- Earth Magnetism & Rock Physics – **Georg Dresen** (96.1%, 74 votes)
- Earth and Space Science Informatics – **Joan Maso** (97.9%, 47 votes)
- Energy, Resources and the Environment – **Christopher Juhlin** (100.0%, 70 votes)
- Geochemistry, Mineralogy, Petrology & Volcanology – **Nicholas Arndt** (100.0%, 131 votes)
- Geodesy – **Michael Schmidt** (69.7%, 108 votes); **Feliz Perosanz** (28.4%, 44 votes)
- Geodynamics – **Irina M. Artemieva** (57.8%, 159 votes); **Paul Tackley** (42.2%, 116 votes)

- Geomorphology – **Andreas Lang** (98.7%, 77 votes)
- Geosciences Instrumentation and Data Systems – **Walter Schmidt** (55.0%, 72 votes); **Francesco Soldovieri** (45.0%, 59 votes)
- Hydrological Sciences – **Gerrit de Rooij** (95.1%, 176 votes)
- Natural Hazards – **Stefano Tinti** (98.4%, 189 votes)
- Nonlinear Processes in Geosciences – **Shaun Lovejoy** (58.1%, 93 votes); **Jose Manuel Redondo** (41.9%, 67 votes)
- Ocean Sciences – **Peter Brandt** (99.1%, 108 votes)
- Planetary and Solar System Sciences – **Ozgur Karatekin** (54.4%, 87 votes); **Jesus Martinez-Frias** (43.8%, 70 votes)
- Seismology – **Charlotte Krawczyk** (97.8%, 131 votes)
- Soil System Sciences – **Artemi Cerdà** (98.9%, 90 votes)
- Solar–Terrestrial Sciences – **Norma B. Crosby** (97.8%, 88 votes)
- Stratigraphy, Sedimentology and Palaeontology – **Patric Jacobs** (93.9%, 31 votes)
- Tectonics and Structural Geology – **Susanne Buiter** (98.0%, 148 votes)

The EGU Treasurer and all Division Presidents will be inaugurated during the EGU plenary meeting on 08 April 2013 in Vienna, Austria, with their terms lasting for two years from inauguration.

Photographs of the candidates are available on the [EGU website](#).

*An earlier version of this article was published on the EGU website*

## Scientists alarmed by verdict of Italian court

*On 22 October an Italian judge sentenced seven members of Italy's National Commission for the Forecast and Prevention of Major Risks, six scientists and a former government official, to six years in jail for manslaughter for providing "inexact, incomplete and contradictory" information to the public before an earthquake hit the town of L'Aquila, Italy, in 2009. The EGU Seismology Division (SM) reacted to the verdict on their Division page with a statement that provides some insight on the possible consequences this case may have for the dialogue between science and society, and for scientific research itself. Following the publication of this SM document, copied below, the EGU has hosted a [Twitter discussion](#) and a [web-based forum](#) on the matter.*

The seismological community is deeply concerned about the L'Aquila verdict by an Italian court on 22 October 2012. The manslaughter conviction of six earthquake experts in Italy for failing to give adequate warning of the 2009 earthquake in the city of L'Aquila that killed over 300 people, has occupied the thoughts of large parts of our community.

The consequences of this verdict for science in general, and for the exchange of information between scientists and policy-makers in particular, could be drastic. If scientists stop actively engaging with the public to demonstrate the importance of their work, if they refuse to work in hazard-evaluation panels, or if they are afraid of offering

scientific advice to the best of their ability, the prime foundations of science – sharing and openly discussing research and increasing knowledge – are no longer met.

As there are many subtleties to the L'Aquila case, it cannot be judged by most of us. Thus, to instead provide a constructive input on the discussion, the [current status of earthquake prediction](#) is summarised by scientists of the SM Division of EGU.

*Charlotte Krawczyk  
SM Division President*

*An earlier version of this article was published on the SM Division page*



Destruction in L'Aquila on 6 April 2009. Credit: AP/Guardia Forestale, HO



## Scientists pinpoint great-earthquake hot spots

EGU press release highlights research published in *Solid Earth*

*The world's largest earthquakes occur at subduction zones – locations where a tectonic plate slips under another. But where along these extended subduction areas are great earthquakes most likely to happen? Scientists have now found that regions where 'scars' on the seafloor, called fracture zones, meet subduction areas are at higher risk of generating powerful earthquakes. The results are published today in Solid Earth, an Open Access journal of the European Geosciences Union (EGU).*

"We find that 87% of the 15 largest (8.6 magnitude or higher) and half of the 50 largest (8.4 magnitude or higher) earthquakes of the past century are associated with intersection regions between oceanic fracture zones and subduction zones," says Dietmar Müller, researcher at the University of Sydney in Australia and lead author of the *Solid Earth* paper. The connection is less striking for smaller earthquakes.

Powerful earthquakes related to these intersection regions include the destructive 2011 Tohoku-Oki and 2004 Sumatra events.

"If the association we found were due to a random data distribution, only about 25% of great subduction earthquakes should coincide with these special tectonic environments. Therefore, we can rule out that the link we found is just due to chance," he adds.

The researchers considered about 1,500 earthquakes in their study. They used a database of significant post-1900 events, as well as geophysical data mapping fracture zones and subduction zones, among others. They analysed information from these databases by using a specific data mining method.

"The method was originally developed for analysing online user data," says Thomas Landgrebe, also involved in the study. "The technique we apply is commonly used to find a few specific items which are expected to be most appealing to an Internet user. Instead, we use it to find which tectonic environment is most suitable for generating great earthquakes."

Since earthquake generation is a very complex process, the scientists don't yet have a complete understanding of why great earthquakes prefer the intersection areas. They suggest that it is due to the physical properties of fracture zones, which result in "strong, persistent coupling in the subduction boundaries," Landgrebe explains. This means that the subduction fault area is locked and thus capable of accumulating stress over long periods of time.

"The connection we have uncovered provides critical information for seismologists to, in the long run, pinpoint particular tectonic environments that are statistically more prone to strong seismic coupling and great earthquake supercycles," Müller says. An area

with earthquake supercycles experiences recurring powerful earthquakes every few centuries or millennia.

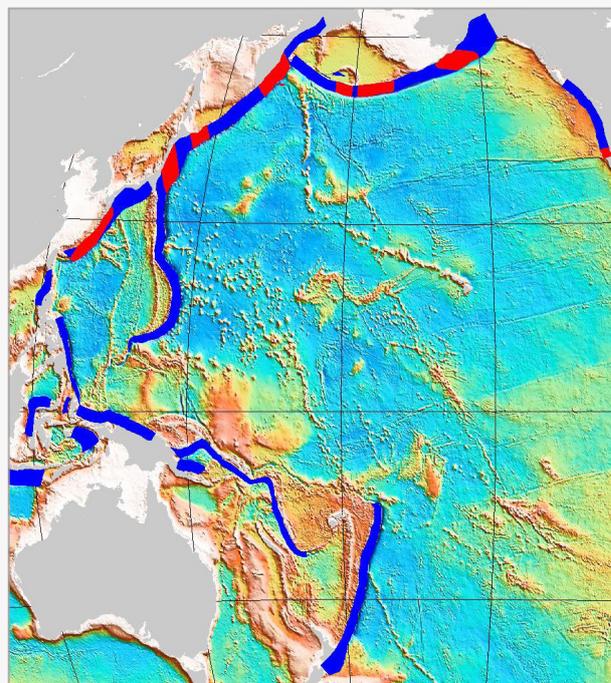
Regions that have long earthquake supercycles are usually not picked up as risk areas by seismic hazard maps as these are constructed mainly using data collected after 1900. An example is the area of the 2011 Tohoku-Oki earthquake, which had no record of large earthquakes over the past century and was not predicted to be of significant risk by previous hazard maps.

"The power of our new method is that it does pick up many of these regions and, hence, could contribute to much-needed improvements of long-term seismic hazard maps," Müller explains.

"Even though we don't fully understand the physics of long earthquake cycles, any improvements that can be made using statistical data analysis should be considered as they can help reduce earthquake damage and loss of life."

### Reference

Müller, R. D. and Landgrebe, T. C. W.: [The link between great earthquakes and the subduction of oceanic fracture zones](#), *Solid Earth*, 3, 447-465, 2012



Map (detail) showing subduction zones and oceanic fracture zones. The blue bands are subduction interfaces – the parts of the subduction zone where the subducting plates are physically 'grinding' against the overriding plates. Coloured in red are the areas where oceanic fracture zones intersect these interfaces, which have higher probability of generating great earthquakes. Full version available [online](#). Credit: Müller and Landgrebe (2012)



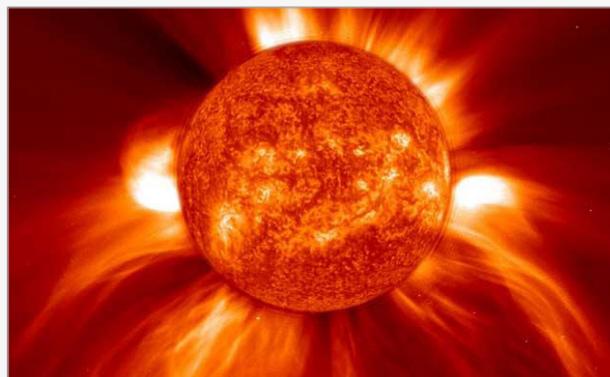
## Annales Geophysicae

### The 'step feature' of suprathermal ion distributions: a discriminator between acceleration processes?

With this study, we draw attention to the so-called 'step feature' of the velocity distributions of suprathermal particles in the solar wind. We also offer a criterion that allows one to distinguish between those scenarios that employ velocity diffusion, i.e. second-order Fermi processes, which are prime candidates in the present debate.

#### Reference

Fahr, H. J. and Fichtner, H.: [The 'step feature' of suprathermal ion distributions: a discriminator between acceleration processes?](#), *Ann. Geophys.*, 30, 1315-1319, 2012



A coronal mass ejection from the sun. These violent solar plasma eruptions disrupt the solar wind. Credit: ESA/NASA

## Atmospheric Chemistry and Physics

### No statistically significant effect of a short-term decrease in the nucleation rate on atmospheric aerosols

We use a global aerosol microphysics model to determine whether a ten-day reduction of 15% in the nucleation rate could generate a statistically significant response in aerosol concentrations and optical properties.

#### Reference

Dunne, E. M. et al.: [No statistically significant effect of a short-term decrease in the nucleation rate on atmospheric aerosols](#), *Atmos. Chem. Phys.*, 12, 11573-11587, 2012

### Sea-spray geoengineering in the HadGEM2-ES earth-system model: radiative impact and climate response

The radiative impact and climate effects of geoengineering using sea-spray aerosols have been investigated in the HadGEM2-ES Earth system model using a fully prognostic treatment of the sea-spray aerosols and also including their direct radiative effect.

#### Reference

Jones, A. and Haywood, J. M.: [Sea-spray geoengineering in the HadGEM2-ES earth-system model: radiative impact and climate response](#), *Atmos. Chem. Phys.*, 12, 10887-10898, 2012

### Future air quality in Europe: a multi-model assessment of projected exposure to ozone

In order to explore future air quality in Europe at the 2030 horizon, two emission scenarios developed in the framework of the Global Energy Assessment including varying assumptions on climate and energy access policies are investigated with an ensemble of six regional and global atmospheric chemistry transport models.

#### Reference

Colette, A. et al.: [Future air quality in Europe: a multi-model assessment of projected exposure to ozone](#), *Atmos. Chem. Phys.*, 12, 10613-10630, 2012

### Multi-generation gas-phase oxidation, equilibrium partitioning, and the formation and evolution of secondary organic aerosol

A new model of secondary organic aerosol formation is developed that explicitly takes into account multi-generational oxidation as well as fragmentation of gas-phase compounds, and assumes equilibrium gas-particle partitioning.

#### Reference

Cappa, C. D. and Wilson, K. R.: [Multi-generation gas-phase oxidation, equilibrium partitioning, and the formation and evolution of secondary organic aerosol](#), *Atmos. Chem. Phys.*, 12, 9505-9528, 2012

### Particle backscatter and relative humidity measured across cirrus clouds and comparison with microphysical cirrus modelling

Advanced measurement and modelling techniques are employed to estimate the partitioning of atmospheric water between the gas phase and the condensed phase in and around cirrus clouds, and thus to identify in-cloud and out-of-cloud supersaturations with respect to ice.

#### Reference

Brabec, M. et al.: [Particle backscatter and relative humidity measured across cirrus clouds and comparison with microphysical cirrus modelling](#), *Atmos. Chem. Phys.*, 12, 9135-9148, 2012

### Diurnal variations of organic molecular tracers and stable carbon isotopic composition in atmospheric aerosols over Mt. Tai in the North China Plain: an influence of biomass burning

This study demonstrates that crop-residue burning activities can significantly enhance the organic aerosol loading and alter the organic composition and stable carbon isotopic composition of aerosol particles in the troposphere over the North China Plain.

#### Reference

Fu, P. Q. et al.: [Diurnal variations of organic molecular tracers and stable carbon isotopic composition in atmospheric aerosols over Mt. Tai in the North China Plain: an influence of biomass burning](#), *Atmos. Chem. Phys.*, 12, 8359-8375, 2012

### Contrasting trends of mass and optical properties of aerosols over the Northern Hemisphere from 1992 to 2011

This study compares the long-term variation of mass and optical properties of atmospheric aerosols over the Northern Hemisphere, including China, the US, Canada and Europe. Contrasting trends of mass and optical properties were found from 1992 to 2011.

#### Reference

Wang, K. C. et al.: [Contrasting trends of mass and optical properties of aerosols over the Northern Hemisphere from 1992 to 2011](#), *Atmos. Chem. Phys.*, 12, 9387-9398, 2012

### Occurrence of lower cloud albedo in ship tracks

The concept of geoengineering by marine cloud brightening is based on seeding marine stratocumulus clouds with sub-micrometer sea-salt particles to enhance the cloud droplet number concentration and cloud albedo, thereby producing a climate cooling effect. The efficacy of this as a strategy for global cooling rests on the extent to which aerosol-perturbed marine clouds will respond with increased albedo. It is found that the sign (increase or decrease) and magnitude of the albedo response in ship tracks depends on the mesoscale cloud structure, the free tropospheric humidity, and cloud top height.

#### Reference

Chen, Y.-C. et al.: [Occurrence of lower cloud albedo in ship tracks](#), *Atmos. Chem. Phys.*, 12, 8223-8235, 2012

## Atmospheric Measurement Techniques

### The scientific basis for a satellite mission to retrieve CCN concentrations and their impacts on convective clouds

The cloud-mediated aerosol radiative forcing is widely recognised as the main source of uncertainty in our knowledge of the anthropogenic forcing on climate. Here, we present a new conceptual framework to help us overcome the challenges for improving our understanding, using relatively simple passive satellite measurements in the visible and infrared.

#### Reference

Rosenfeld, D. et al.: [The scientific basis for a satellite mission to retrieve CCN concentrations and their impacts on convective clouds](#), *Atmos. Meas. Tech.*, 5, 2039-2055, 2012

### First middle-atmospheric zonal wind profile measurements with a new ground-based microwave Doppler-spectro-radiometer

We report on the wind radiometer WIRA, a new ground-based microwave Doppler-spectro-radiometer specifically designed for the measurement of middle-atmospheric horizontal wind by observing ozone emission spectra at 142.17504GHz.

#### Reference

Rüfenacht, R., Kämpfer, N., and Murk, A.: [First middle-atmospheric zonal wind profile measurements with a new ground-based microwave Doppler-spectro-radiometer](#), *Atmos. Meas. Tech.*, 5, 2647-2659, 2012

## Combined wind measurements by two different lidar instruments in the Arctic middle atmosphere

The comparison of winds derived by RMR and sodium lidar is excellent for long integration times of 10h as well as shorter ones of 1h. Combination of data from both lidars allows identifying wavy structures between 30 and 110km altitude, whose amplitudes increase with height.

### Reference

Hildebrand, J. et al.: [Combined wind measurements by two different lidar instruments in the Arctic middle atmosphere](#), *Atmos. Meas. Tech.*, 5, 2433-2445, 2012

## Development of a new data-processing method for SKYNET sky radiometer observations

In this study, we propose a new data processing method to improve single scattering albedo retrievals for the SKYNET sky radiometer network, which is one of the growing number of networks of sun-sky photometers, such as NASA AERONET and others.

### Reference

Hashimoto, M. et al.: [Development of a new data-processing method for SKYNET sky radiometer observations](#), *Atmos. Meas. Tech.*, 5, 2723-2737, 2012

# Biogeosciences

## Ocean acidification limits temperature-induced poleward expansion of coral habitats around Japan

Using results from four coupled global carbon cycle-climate models combined with in situ observations, we estimate the effects of future global warming and ocean acidification on potential habitats for tropical/subtropical and temperate coral communities in the seas around Japan.

### Reference

Yara, Y. et al.: [Ocean acidification limits temperature-induced poleward expansion of coral habitats around Japan](#), *Biogeosciences*, 9, 4955-4968, 2012



Coral community on Australia's Great Barrier Reef. Many of the world's corals are affected by ocean acidification. Credit: Ove Hoegh-Guldberg/NRDC

## Activity and abundance of denitrifying bacteria in the subsurface biosphere of diffuse hydrothermal vents of the Juan de Fuca Ridge

Based on our rate measurements, and on published data on hydrothermal fluid fluxes and residence times, we estimated that up to  $\sim 10\text{Tg N yr}^{-1}$  could globally be removed in the subsurface biosphere

of hydrothermal vents systems, thus, representing a small fraction of the total marine N loss ( $\sim 275$  to  $> 400\text{Tg N yr}^{-1}$ ).

### Reference

Bourbonnais, A. et al.: [Activity and abundance of denitrifying bacteria in the subsurface biosphere of diffuse hydrothermal vents of the Juan de Fuca Ridge](#), *Biogeosciences*, 9, 4661-4678, 2012

## Bioerosion by microbial euendoliths in benthic foraminifera from heavy metal-polluted coastal environments of Portovesme (south-western Sardinia, Italy)

We found that carbonate dissolution induced by euendoliths is selective, depending on the Mg content and morpho-structural types of foraminiferal taxa. This study provides evidences for a connection between heavy metal dispersion, decrease in pH of the sea-water and bioerosional processes on foraminifera.

### Reference

Cherchi, A. et al.: [Bioerosion by microbial euendoliths in benthic foraminifera from heavy metal-polluted coastal environments of Portovesme \(south-western Sardinia, Italy\)](#), *Biogeosciences*, 9, 4607-4620, 2012

## High-resolution inter-polar difference of atmospheric methane around the Last Glacial Maximum

We present new high-resolution methane records from the North Greenland Ice Core Project and the European Project for Ice Coring in Antarctica Dronning Maud Land ice cores covering Termination



1, the Last Glacial Maximum, and parts of the last glacial back to 32000 years before present.

#### Reference

Baumgartner, M. et al.: [High-resolution interpolator difference of atmospheric methane around the Last Glacial Maximum](#), *Biogeosciences*, 9, 3961-3977, 2012

### Marine bacteria in deep Arctic and Antarctic ice cores: a proxy for evolution in oceans over 300 million generations

Ice cores offer the opportunity to study evolution of marine microbes over ~ 300 million generations by analysing their genomes vs. depth in glacial ice over the last 700,000yr as frozen proxies for changes in their genomes in oceans.

#### Reference

Price, P. B. and Bay, R. C.: [Marine bacteria in deep Arctic and Antarctic ice cores: a proxy for evolution in oceans over 300 million generations](#), *Biogeosciences*, 9, 3799-3815, 2012

### The carbon budget of terrestrial ecosystems in East Asia over the last two decades

We estimate the current terrestrial carbon balance of East Asia and its driving mechanisms during 1990–2009 using three different approaches: inventories combined with satellite greenness measurements, terrestrial ecosystem carbon cycle models and atmospheric inversion models.

#### Reference

Piao, S. L. et al.: [The carbon budget of terrestrial ecosystems in East Asia over the last two decades](#), *Biogeosciences*, 9, 3571-3586, 2012

### Tree height integrated into pantropical forest biomass estimates

Aboveground tropical tree biomass and carbon storage estimates commonly ignore tree height (H). We estimate the effect of incorporating H on tropics-wide forest biomass estimates in 327 plots across four continents using 42,656H and diameter measurements and harvested trees from 20 sites to answer various questions.

#### Reference

Feldpausch, T. R. et al.: [Tree height integrated into pantropical forest biomass estimates](#), *Biogeosciences*, 9, 3381-3403, 2012

### A synthesis of carbon in international trade

In a globalised world, the transfer of carbon between regions, either physically or embodied in production, represents a substantial fraction of global carbon emissions. The resulting emission transfers are important for balancing regional carbon budgets and for understanding the drivers of emissions.

#### Reference

Peters, G. P., Davis, S. J., and Andrew, R.: [A synthesis of carbon in international trade](#), *Biogeosciences*, 9, 3247-3276, 2012

## Earth System Dynamics

### Urbanisation suitability maps: a dynamic spatial decision support system for sustainable land use

Recent developments in land consumption assessment identify the need to implement integrated evaluation approaches, with particular attention to the development of multidimensional tools for guiding and managing sustainable land use. Land use policy decisions are implemented mostly through spatial planning and its related zoning. We propose a novel methodological approach to identify a decision-making process for land use allocation.

#### Reference

Cerreta, M. and De Toro, P.: [Urbanisation suitability maps: a dynamic spatial decision support system for sustainable land use](#), *Earth Syst. Dynam.*, 3, 157-171, 2012



Urbanisation of the Valencia garden (Horta de València). The loss of soils by urbanisation is a worldwide threat. Credit: Artemi Cerdà




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### Effects of land cover change on temperature and rainfall extremes in multi-model ensemble simulations

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The impact of historical land use induced land cover change on regional-scale climate extremes is examined using four climate models within the Land Use and Climate, Identification of robust impacts project.

#### Reference

Pitman, A. J. et al.: [Effects of land cover change on temperature and rainfall extremes in multi-model ensemble simulations](#), *Earth Syst. Dynam.*, 3, 213-231, 2012

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### Technology and human purpose: the problem of solids transport on the Earth's surface

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Invoking purpose as a mechanism in solids advection is an example of the need to import anthropic principles and concepts into the language and methodology of modern Earth system dynamics.

#### Reference

Haff, P. K.: [Technology and human purpose: the problem of solids transport on the Earth's surface](#), *Earth Syst. Dynam.*, 3, 149-156, 2012

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## Hydrology and Earth System Sciences

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### Should we apply bias correction to global and regional climate model data?

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With this article, we advocate communicating the entire uncertainty range associated with climate change predictions openly and hope to stimulate a lively discussion on bias correction among the atmospheric and hydrological community and end users of climate change impact studies.

#### Reference

Ehret, U. et al.: [HESS Opinions: should we apply bias correction to global and regional climate model data?](#), *Hydrol. Earth Syst. Sci.*, 16, 3391-3404, 2012

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### Incorporating student-centred approaches into catchment hydrology teaching: a review and synthesis

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As hydrologists confront the future of water resources on a globalised, resource-scarce and human-impacted planet, the educational preparation of future generations of water scientists becomes increasingly important.

#### Reference

Thompson, S. E. et al.: [Incorporating student-centred approaches into catchment hydrology teaching: a review and synthesis](#), *Hydrol. Earth Syst. Sci.*, 16, 3263-3278, 2012

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### It takes a community to raise a hydrologist: the Modular Curriculum for Hydrologic Advancement (MOCHA)

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In this paper we combine literature review, community survey, discussion and assessment to provide a holistic baseline for the future of hydrology education. The ultimate objective of our educational initiative is to enable educators to train a new generation of 'renaissance hydrologists,' who can master the holistic nature of our field and of the problems we encounter.

#### Reference

Wagener, T. et al.: [It takes a community to raise a hydrologist: the Modular Curriculum for Hydrologic Advancement \(MOCHA\)](#), *Hydrol. Earth Syst. Sci.*, 16, 3405-3418, 2012

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### Water resources trends in Middle East and North Africa towards 2050

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Changes in water resources availability can be expected as consequences of climate change, population growth, economic development and environmental considerations. A two-stage modelling approach is used to explore the impact of these changes in the Middle East and North Africa region.

#### Reference

Droogers, P. et al.: [Water resources trends in Middle East and North Africa towards 2050](#), *Hydrol. Earth Syst. Sci.*, 16, 3101-3114, 2012

# Natural Hazards and Earth System Sciences

## Potential of semi-structural and non-structural adaptation strategies to reduce future flood risk: case study for the Meuse

Our research suggests that annual flood risk may increase by up to 185% by 2030 compared with 2000, as a result of combined land-use and climate changes. The independent contributions of climate change and land-use change to the simulated increase are 108% and 37%, respectively.

### Reference

Poussin, J. K. et al.: [Potential of semi-structural and non-structural adaptation strategies to reduce future flood risk: case study for the Meuse](#), *Nat. Hazards Earth Syst. Sci.*, 12, 3455-3471, 2012

## Assessment of remotely sensed drought features in vulnerable agriculture

In this paper, the remotely sensed Reconnaissance Drought Index (RDI) is employed for the quantification of drought. RDI enables the assessment of hydro-meteorological drought, since it uses hydro-meteorological parameters, such as precipitation and potential evapotranspiration.

### Reference

Dalezios, N. R., Blanta, A., and Spyropoulos, N. V.: [Assessment of remotely sensed drought features in vulnerable agriculture](#), *Nat. Hazards Earth Syst. Sci.*, 12, 3139-3150, 2012

## Rainfall intensity–duration thresholds for bedload transport initiation in small Alpine watersheds

In this study, the characteristics of rainfall events leading to bedload transport were investigated in five small Alpine catchments located in different geographical and morphological regions of Switzerland, Italy and France.

### Reference

Badoux, A. et al.: [Rainfall intensity–duration thresholds for bedload transport initiation in small Alpine watersheds](#), *Nat. Hazards Earth Syst. Sci.*, 12, 3091-3108, 2012

## Improving the active involvement of stakeholders and the public in flood risk management – tools of an involvement strategy and case study results from Austria, Germany and Italy

This paper presents basic elements and the application of two innovative approaches as a part of an ‘involvement strategy’ that aims at the active involvement of all interested parties (stakeholders) for assessing, reviewing and updating flood risk management plans, as formulated in the EU Flood Risk Management Directive 2007/60/EC.

### Reference

Fleischhauer, M. et al.: [Improving the active involvement of stakeholders and the public in flood risk management – tools of an involvement strategy and case study results from Austria, Germany and Italy](#), *Nat. Hazards Earth Syst. Sci.*, 12, 2785-2798, 2012

## The Cryosphere



Complex geometry of well developed Arctic melt ponds. Aerial photo taken on 14 August 2005 on the Healy–Oden Trans Arctic Expedition (HOTRAX). Credit: Hohenegger et al. (2012)

## Transition in the fractal geometry of Arctic melt ponds

By analysing data from hundreds of thousands of melt ponds, we find an unexpected separation of scales, where pond fractal dimension  $D$  transitions from 1 to 2 around a critical length scale of  $100\text{m}^2$  in area. The results impact sea ice albedo, the transmitted radiation fields under melting sea ice, the heat balance of sea ice and the upper ocean, and biological productivity such as under ice phytoplankton blooms.

### Reference

Hohenegger, C. et al.: [Transition in the fractal geometry of Arctic melt ponds](#), *The Cryosphere*, 6, 1157-1162, 2012



## Biomolecules allow chemists to read 'history book of the sea'

01 October 2012 – A chemist at the Alfred Wegener Institute for Polar and Marine Research is studying how [dissolved organic matter](#) acts as a 'history book of the sea.'

Professor Boris Koch and colleagues are using a combination of techniques to identify and retrace the biomolecular tracks left by sea phenomena such as algae blooms, schools of dolphins and the warming impact of the Sun.

It is this dissolved organic matter (DOM) that can help reveal the history of the ocean. Using a mass spectrometer at the [Helmholtz Zentrum München](#), a team of researchers have identified thousands of individual components contained within the dissolved organic matter. By looking at the chemical formula of each molecule (and the amount of carbon, oxygen, hydrogen and nitrogen contained within it) the team can assess where an individual molecule might have come from.

Dissolved organic matter in the ocean is one of the largest active, organic carbon reservoirs on earth. There is an estimated 662 billion tonnes of carbon stored in the sea in this way. Some of the DOM is quickly broken down by bacteria into its most basic components, releasing the stored carbon dioxide in the process, allowing it to escape back into the atmosphere. However some of it is not broken down, rather it becomes chemically modified and withstands the decomposition process for up to 5,000 years. The interruption of the degradation process means that marine DOM acts as a buffer in the organic carbon cycle.

By analysing the DOM, the chemists can gain a 'chemical fingerprint' which, when statistically analysed, can allow the team to draw

conclusions about the water in which the dissolved organic matter once swam in. They can work out how old the dissolved matter is, whether it was exposed to strong sunlight along its path through the ocean or which bacteria and types of plankton once swam in the same body of water.

"We are just beginning our studies. However, it would appear that, using this method, we have discovered a new way of exploiting the water's chemical memory," says Boris Koch.

The team can even trace which share of the dissolved organic matter leaves its tracks in the atmosphere. "Foam and waves can transport DOM into the air where it has a considerable influence on climate," adds Dr Philippe Schmitt-Kopplin from the Institute of Ecological Chemistry at Helmholtz Zentrum München.

The team now hopes to find out more about the role of this dissolved organic matter in the global carbon cycle. They believe that oceanographers could supplement temperature and salt content data with DOM data to enrich their studies. The team is planning to study the DOM along migration routes of southern elephant seals to see if the waters demonstrate any chemical commonalities. "Perhaps we will find evidence that these marine mammals find their way using 'water odour'," Koch says.

The team's work has been published in a special volume of [Biogeosciences](#). [Wired.co.uk](#) sincerely hopes that this evidence of a chemical memory in the sea is not exploited by homeopaths.

*This news item, featuring research published in EGU's Open Access Journal Biogeosciences, was [originally published by Wired.co.uk](#)*

## Britain could suffer smog worse than Beijing

03 August 2012 – *Britain could be blanketed with thick fog worse than Beijing if carbon emissions are not slashed, scientists have warned.*

The thick smog that has come to symbolise Asia's rampant air pollution could come to the UK if carbon emissions are not slashed, scientists have warned.

A rapid rise in air pollution caused by burning fossil fuels, oil, gas and coal poses a major health risk and claims up to 1.3 million lives a year globally, according to the World Health Organisation.

But scientists have warned that with government negotiations to limit our carbon output stalling, emissions could continue to grow at their current pace.

A team of researchers in Italy and Germany say that if this "business as usual" approach continues, by 2050 the UK will have the same levels of thick air pollution as Asia has today.

Scientists hope the startling findings, which appear in [Atmospheric Chemistry and Physics](#) journal, will spur governments to get around



Building clouded in heavy smog in Beijing, China. Credit: Diego Azubel/EPA

the negotiating table and come up with new strategies to limit our carbon footprint.

But they warn that with much of Europe and the United States struggling through the largest economic downturn since the depression, political will to strike a fresh deal may be lacking.

The report's lead author, physicist Andrea Pozzer, from the Max Planck Institute of Chemistry in Germany, said: "Strong actions and further effective legislation are essential to avoid the drastic deterioration of air quality, which can have severe effects on human health. "We show that further legislation to control and reduce man-made emissions is needed, in particular for eastern China and northern India, to avoid hot-spots of elevated air pollution."

The picture is even grimmer in East and South Asia, where pollution is set to triple over the next four decades unless drastic action is taken.

Researchers working on the study estimated air quality in 2005, 2010, 2025 and 2050 using an atmospheric chemistry model.

The results show that in 2025 and 2050, under the business-as-usual scenario, East Asia will be exposed to high levels of pollutants.

These include nitrogen dioxide and sulphur dioxide, which cause breathing problems, and fine particulate matter which causes lung and heart disease.

Northern India and the Arabian Gulf region, on the other hand, will suffer a marked increase in ozone levels, which are linked to asthma, bronchitis and heart attacks.

Co-author Greet Janssens-Maenhout, of the European Commission Joint Research Centre in Italy, said: "At present the post-Kyoto climate negotiations are progressing slowly, and it is unclear how air quality policies will develop globally.

"In regions with economic growth, it might be less effective to implement emission-reduction measures due to strong growth in activities in particular sectors; in countries suffering from the economic downturn, implementing expensive air-quality measures could prove difficult in coming years."

*This news item, featuring research published in EGU's Open Access Journal Atmospheric Chemistry and Physics, was [originally published by The Telegraph](#)*

## Europe Considers \$1.1 Billion 'Juice' Rocket to Habitable Worlds

26 April 2012 – The European Space Agency will decide next week whether to launch an 830 million-euro (\$1.1 billion) mission to explore habitable worlds around Jupiter.

A successful mission would enable scientists to learn more about Jupiter's habitable moons, according to Imperial College of London space physicist Michele Dougherty, who spoke today at a European Geosciences Union press briefing in Vienna. The Paris-based agency is scheduled to decide on May 2.

The Jupiter Icy Moon Explorer, or 'Juice' mission, would be "the first to send an orbiter to an icy world," said Dougherty, who also leads the ESA's mission-study team. "Juice will address the question whether there are habitats elsewhere in the solar system with the conditions to sustain life."

The European satellite would orbit Jupiter's Ganymede, the gaseous planet's largest moon, for about three years beginning in 2030. Ganymede is the only moon in the solar system with its own magnetic field, along with an atmosphere and subsurface ocean. The Juice rocket would lift off in 2022 for the eight-year journey to Jupiter.

Europe's space agency is in talks with the US National Aeronautics and Space Administration about sharing instruments on the Juice mission. A single instrument can cost 30 million euros and the array of measurement and tracking devices that would be loaded onto the orbiter aren't included in the headline cost, Dougherty said.

*This news item, featuring research presented at the 2012 EGU General Assembly, was [originally published by Bloomberg](#)*

# World's glaciers 'out of balance'

26 April 2012 – Earth's glaciers are seriously out of balance with the global climate and are already on their way to losing almost 40% of their volume.



The retreat of McCall Glacier in North Alaska. The left panel is 1958; the right panel is 2003. Credit: M. Nolan/UAF

That is the assessment of scientists after studying a representative group of 144 small and large glaciers around the world.

Their figure assumes no further warming of the climate.

However, if temperatures continue to rise as models predict, the wastage will be even higher, the team says.

"When we look at the data, we can see that the glaciers are out of balance, meaning the climate has actually changed faster than the changes we've seen in ice area and volume," explained Sebastian Mernild from Los Alamos National Laboratory, New Mexico, US.

"Our data suggests the glaciers will commit about 30% of their area and about 38% of their volume to global sea level rise."

Dr Mernild's group calculates this figure to be on the order of 22cm.

"This will happen in the next decades to centuries," he told BBC News.

Dr Mernild, from the [Climate, Ocean, and Sea Ice modelling \(COSIM\) Group](#) at Los Alamos, was describing his team's work here at the European Geosciences Union (EGU) meeting in Vienna, Austria.

A glacier is in balance when the snow at higher, colder elevations equals the volume of snow and ice lost through melting at lower, warmer elevations.

If precipitation is greater, the glacier will increase its mass; if melting dominates, the glacier will thin and retreat until it reaches a state of equilibrium again.

Dr Mernild's team says its assessment of the glacier sample indicates climate conditions have changed so fast that many ice bodies have not yet had time to fully adjust to their new equilibrium position.

This means a certain amount of mass loss is already locked into the system even if there is no further warming.

"Glaciers will move up in the terrain, they will become smaller and thinner and they will adjust to the climate conditions.

"On the other hand, we expect the climate will warm continuously in the future, meaning that the glaciers will become even more out of balance, and that means the glaciers will commit even more volume to sea level rise."

If the models are correct and further warming is seen during the next several decades and longer, the study projects that the Earth's glaciers could ultimately lose more than half their mass.

The picture is described as regional, with some areas said to be more out of balance than others.

Dr Mernild cites the Alps as one glacier group that is farther from balance than the global average.

He says alpine glaciers are likely to lose most of their mass by 2100.

"But if you take into account the volume of ice in the glaciers here in the Alps, it won't have the same impact on the global sea level rise compared to if we see the same out of balance conditions in other places on the globe where we know there is more ice located.

"So, the contribution to sea level rise will not be that big from the Alps region."

The COSIM assumption is that there is a sea level equivalent of 60cm locked away in all the world's glaciers (the number excludes the ice sheets of Antarctica and Greenland).

That figure has been debated here at EGU. Dr Matthias Huss, from the University of Fribourg, Switzerland, presented new data suggesting there was only 48cm of sea level tied up in all the world's glaciers (and the larger glaciers referred to as ice caps).

"Our number is 192,000 cu km. This is about 25% less than some previous estimates. It is a total potential sea-level rise of 0.48m," Dr Huss told BBC News.

"We're using a physically based approach. Until now, people have relied on simple statistical methods."

The Fribourg researcher said his team's work captured much better the range of thicknesses in the world's glaciers, of which there are estimated to be about 160,000.

*This news item, featuring research presented at the 2012 EGU General Assembly, was [originally published by the BBC](#)*



## 10 years of Geosciences Information for Teachers (GIFT) workshops

### Best practice for the science–teaching interface

*The EGU Committee on Education tells of the past and future of the EGU's most successful education activity: the GIFT workshops.*

In 2002 in Nice, France, then-EGU Executive Secretary Arne Richter announced a collaboration between scientists and schools all over Europe. The aim was to bring state-of-the-art science via high school teachers into tomorrow's classrooms. Carlo Laj was appointed chair of the EGU Committee on Education (CoE) and, in 2003, the first GIFT workshop took place at the General Assembly, featuring 42 teachers from seven European countries.



The theme of the 2013 GIFT workshop at the EGU General Assembly (07–12 April, Vienna, Austria) is [Natural Hazards](#).

### Growing success and a Nobel Prize laureate: the early years of GIFT

The workshop quickly became known amongst teachers all over the European continent and, in the following years, the number of participants doubled. Due to the importance of the valuable hands-on activities, which require an intimate setting, and the limited space at the conference venue, the maximum number of participants had to be limited to 85. In 2005, the EGU Assembly moved to Vienna, Austria and 70 teachers from 17 countries attended the presentation by Nobel Prize laureate Paul Crutzen at the GIFT workshop. Since then, the workshop has become a two-and-a-half day fixture within the General Assembly calendar. With so many teachers wanting more access to research experience, the CoE added the Teachers at Sea programme, where high school teachers can apply to become members of staff on scientific research vessels during research expeditions.

### GIFT: more than 'just' a workshop

Meanwhile, the number of applicants significantly exceeded a manageable number of participants. In addition, GIFT teachers from more distant countries like China, Malaysia and the USA were

included in the workshop. Teachers began to apply for a second participation at the workshop and started to form teachers' networks beyond their national borders. A regular exchange of teachers between the AGU GIFT workshop in San Francisco and the EGU GIFT in Vienna was established. A few years later, the European GIFT concept also became international, with the CoE helping to organise workshops abroad.

### 2009/2010: GIFT on video and in the footsteps of Alexander von Humboldt

The year 2009 brought further additions to the GIFT concept. For the first time, some lectures were filmed during the workshop. Along with all the other workshop material (programmes, brochures, abstracts of presentations) these recordings were made available as web streams and are openly accessible free of charge [via the EGU website](#). In 2010, the first GIFT workshop at an [Alexander von Humboldt Conference](#) took place, in Merida, Mexico. In addition, the CoE launched the GIFT Distinguished Lecture Series, which brings GIFT speakers directly into classrooms and to teacher conferences.

### 2013: GIFT goes to Africa!

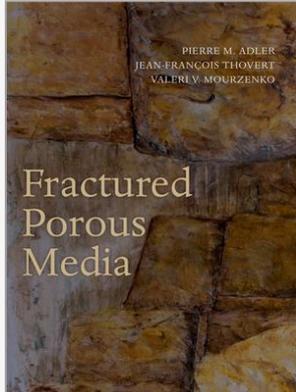
The upcoming year will bring new and fascinating prospects for GIFT. The EGU has teamed up with UNESCO to take the GIFT workshop idea to Africa. The scope is to disseminate the latest findings in science to the teachers there, to support the development of the next generation of Earth scientists in Africa. The opportunities and challenges in the Earth sciences there are great, starting with traditional mineral extraction and extending into environmental management such as climate change adaptation, prevention of natural hazards, and ensuring access to drinking water. The first UNESCO–GIFT workshop on African soil will deal with climate change and human adaptation. It will take place at the African Earth Observatory Network at the Nelson Mandela Metropolitan University in Port Elisabeth, South Africa in partnership with the African Center from Climate and Earth System Science and organised by UNESCO's Windhoek office.

After more than ten years of existence, the GIFT idea has not only grown significantly and reached more than 1,000 science teachers; it has also broadened its views and targets to share scientific findings beyond the borders of Europe.

*EGU Committee on Education*



## Fractured Porous Media



By Pierre M. Adler, Jean-François Thovert, and Valeri V. Mourzenko

OXFORD UNIVERSITY PRESS

184 pages | Hardback  
1<sup>st</sup> edition | October 2012  
ISBN 978-0-19-966651-5

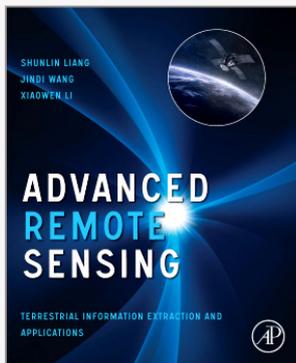
Price: £45 (~€56) -or- £36 (~€45) with EGU discount

### Publisher's summary

This book provides a systematic treatment of the geometrical and transport properties of fractures, fracture networks, and fractured porous media. A concise introduction to a topical field, it provides a unique theoretical view point on fractured porous media based on percolation theory for students and professionals in Geophysics, Materials Science, and Earth Sciences.

EGU members can claim the special discount by visiting the OUP website at [www.oup.co.uk](http://www.oup.co.uk), adding the book to the shopping basket, and entering the code **AAFY12** in the promotional code box. For further information on this offer, please contact [jennifer.winders@oup.com](mailto:jennifer.winders@oup.com).

## Advanced Remote Sensing: Terrestrial Information Extraction and Applications



By Shunlin Liang, Xiaowen Li, and Jindi Wang

ACADEMIC PRESS (ELSEVIER)

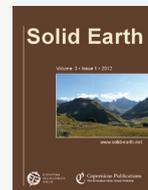
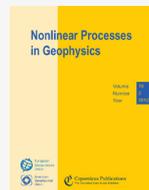
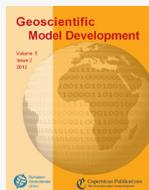
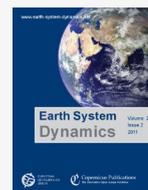
800 pages | Hardback  
1<sup>st</sup> edition | August 2012  
ISBN 978-0-12-385954-9

Price: €108

### Publisher's summary

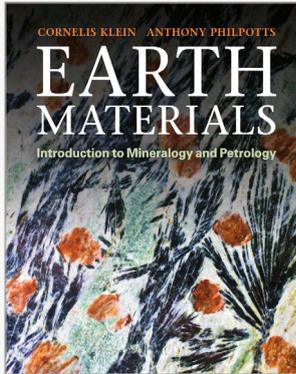
*Advanced Remote Sensing* is an application-based reference that provides a single source of mathematical concepts necessary for remote sensing data gathering and assimilation. It presents state-of-the-art techniques for estimating land surface variables from a variety of data types, including optical sensors such as radar and lidar. Scientists in a number of different fields including geography, geology, atmospheric science, environmental science, planetary science and ecology will have access to critically-important data extraction techniques and their virtually unlimited applications. While rigorous enough for the most experienced of scientists, the techniques are well designed and integrated, making the book's content intuitive, clearly presented, and practical in its implementation.

## The Open Access Journals of the European Geosciences Union





# Earth Materials: Introduction to Mineralogy and Petrology



By Cornelis Klein and Tony Philpotts

CAMBRIDGE UNIVERSITY PRESS

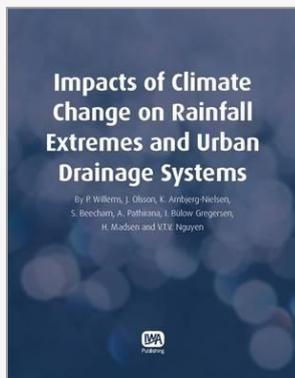
552 pages | Paperback  
1<sup>st</sup> edition | September 2012  
ISBN 978-0-52-114521-3

Price: £40 (~€50)

## Publisher's summary

The fundamental concepts of mineralogy and petrology are explained in this highly illustrated, full-color [textbook](#) to create a concise overview for students studying Earth materials. The relationship between minerals and rocks and how they relate to the broader Earth, materials and environmental sciences is interwoven throughout. Beautiful photos of specimens and Crystal-Maker's 3-D illustrations allow students to easily visualise minerals, rocks and crystal structures. Review questions at the end of chapters allow students to check their understanding. The importance of Earth materials to human cultural development and the hazards they pose to humans are discussed in later chapters. This ambitious, wide-ranging book is written by two world-renowned textbook authors each with over 40 years of teaching experience, who bring that experience to clearly convey the important topics.

# Impacts of Climate Change on Rainfall Extremes and Urban Drainage Systems



By Patrick Willems et al. (Eds.)

IWA PUBLISHING

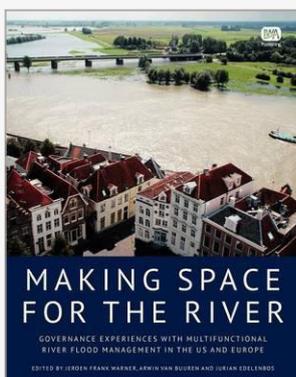
238 pages | Paperback  
1<sup>st</sup> edition | September 2012  
ISBN 978-1-78-040125-6

Price: €120.15 -or- €90.11 for IWA members

## Publisher's summary

[Impacts of Climate Change on Rainfall Extremes and Urban Drainage Systems](#) provides a state-of-the-art overview of existing methodologies and relevant results related to the assessment of the climate change impacts on urban rainfall extremes as well as on urban hydrology and hydraulics. This overview focuses mainly on several difficulties and limitations regarding the current methods and discusses various issues and challenges facing the research community in dealing with the climate change impact assessment and adaptation for urban drainage infrastructure design and management.

# Making Space for the River



By Jeroen Frank Warner, Arwin van Buuren and Jurian Edelenbos (Eds.)

IWA PUBLISHING

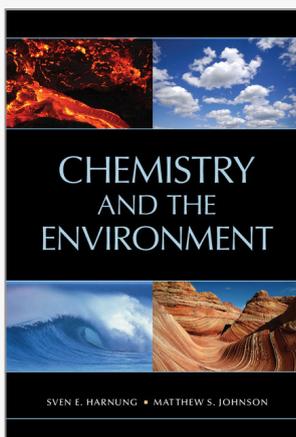
218 pages | Paperback  
1<sup>st</sup> edition | November 2012  
ISBN 978-1-78-040112-6

Price: €120.15 -or- €90.11 for IWA members

## Publisher's summary

This book examines recent developments in river (flood) management from the viewpoint of [Making Space for the River](#) and the resulting challenges for water governance. Different examples from Europe and the United States of America are discussed that aim to 'green' rivers, including increasing river discharge for flood management, enhancing natural and landscape values, promoting local or regional economic development, and urban regeneration.

# Chemistry and the Environment



By Sven E. Harnung and  
Matthew S. Johnson

CAMBRIDGE UNIVERSITY  
PRESS

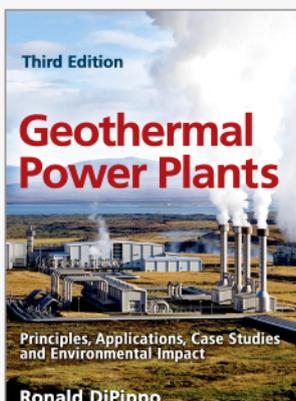
440 pages | Hardback  
1<sup>st</sup> edition | October 2012  
ISBN 978-1-10-702155-6

Price: £80 (~€99)

## Publisher's summary

This [textbook](#) presents the chemistry of the environment using the full strength of physical, inorganic and organic chemistry, in addition to the necessary mathematics and physics. It provides a broad yet thorough description of the environment and the environmental impact of human activity using scientific principles. It gives an accessible account while paying attention to the fundamental basis of the science, showing derivations of formulas and giving primary references and historical insight. The authors make consistent use of professionally accepted nomenclature (IUPAC and SI), allowing transparent access to the material by students and scientists from other fields. This textbook has been developed through many years of feedback from students and colleagues. It includes more than 400 online student exercises that have been class tested and refined. The book will be invaluable in environmental chemistry courses for advanced undergraduate and graduate students and professionals in chemistry and allied fields.

## Geothermal Power Plants: Principles, Applications, Case Studies and Environmental Impact



By Ronald DiPippo

BUTTERWORTH-  
HEINEMANN (ELSEVIER)

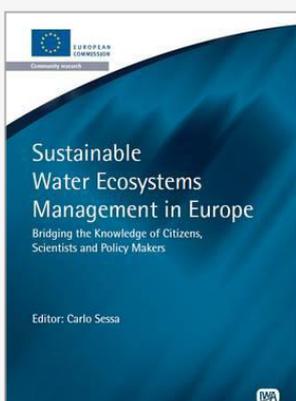
624 pages | Hardback  
3<sup>rd</sup> edition | May 2012  
ISBN 978-0-08-098206-9

Price: €92.95

## Publisher's summary

Now in its third edition, [this single resource](#) covers all aspects of the utilisation of geothermal energy for power generation using fundamental scientific and engineering principles. Its practical emphasis is enhanced by the use of case studies from real plants that increase the reader's understanding of geothermal energy conversion and provide a unique compilation of hard-to-obtain data and experience. Important new chapters cover Hot Dry Rock, Enhanced Geothermal Systems, and Deep Hydrothermal Systems. New, international case studies provide practical, hands-on knowledge.

## Sustainable Water Ecosystems Management in Europe



By Carlo Sessa (Ed.)

IWA PUBLISHING

148 pages | Paperback  
1<sup>st</sup> edition | August 2012  
ISBN 978-1-78-040114-0

Price: €114.75 -or- €86.06 for  
IWA members

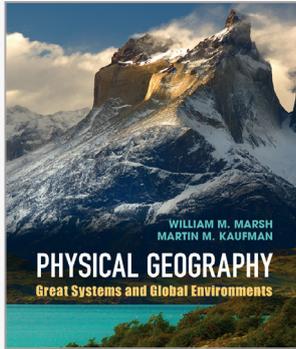
## Publisher's summary

[Sustainable Water Ecosystems Management in Europe](#) examines the anthropogenic deterioration of water ecosystems, in particular in coastal areas. It proposes a new approach to enhance connectivity between research and policy-making. The book exploits the concept of integrated adaptive ecosystem management, by engaging scientists, policy makers and the public (the latter including both stakeholders and lay citizens/water users) in comparable case studies. Emphasis is given to the role of the public to enlarge the concept of organisational learning to the wider concept of social learning.



# Physical Geography

## A book review



By William M. Marsh and  
Martin M. Kaufman

CAMBRIDGE UNIVERSITY  
PRESS

720 pages | Hardback  
1<sup>st</sup> edition | August 2012  
ISBN 978-0-52-176428-5

Price: £45.00 (~€55.00)

In this special issue of *GeoQ* it was only appropriate to review a volume that covers the majority of the Union's divisions and reflects the multidisciplinary nature of the EGU. *Physical Geography*, by two Earth scientists with a wealth of experience in teaching and textbook writing, fits the bill and much more.

The authors, William M. Marsch and Martin M. Kaufman, are renowned academics who have been teaching geosciences for over 20 years. Marsch is a professor at the University of British Columbia in Vancouver, Canada, and an experienced textbook author with half a dozen books in physical geography and land-use applications. Kaufman is the Chair of the Earth and Resource Sciences Department at the University of Michigan, Flint, US, where he teaches physical geography courses.

Marsch and Kaufman devised an all-encompassing textbook filled with stunning pictures and dozens of single-concept diagrams (many designed by Marsch himself) that, combined with clear text, eloquently describe Earth's physical geography. It uses an 'arm-in-arm' page design, where images appear alongside the text passages they relate to, to tell the story of the planet's great systems and global environments. The book leads the reader to discover the nature of geographic change on our planet and is a great tool to teach about natural and anthropogenic factors of change, such as volcanic eruptions or human-made pollution, to science and non-science undergraduates alike.

Much as the classic volume by [Chorley & Kennedy \(1971\)](#), this interdisciplinary book uses the systems approach to describe Earth's physical geography. Rather than analysing the planet's global environments (atmosphere, hydrosphere, geosphere, and so forth) as isolated spheres, the book argues that the Earth's physical geography is best explained by means of the interconnected systems that shape the world's atmosphere, waters, and land. All of these 'great systems' are dealt with in the book's five parts: Earth's Energy, Climate, and Ocean Systems; Earth's Life Support Systems; Earth's Water Systems; Earth's Rock and Mountain Systems; and Earth's Erosional and Landform Systems.

The chapters of Part I introduce the reader to the systems approach and to the planet as a whole and ends with interesting chapters on

global climate ("a system of systems") and climate change ("one of the most pressing issues of our time"). Part II is dedicated to the biosphere, including soil system sciences, and the agents that support and change it. Part III gives a glimpse into the 'big picture' of water on our planet, where Earth's immense oceans and the atmosphere ("the planet's central water-distribution machine") play lead roles. Freshwater systems are the focus of the last two chapters of Part III, which have sections on floods and on the human impact on water resources. Part IV focuses on the solid Earth and the forces that shape it, with chapters dedicated to plate tectonics, and to mountains, volcanoes, and earthquakes. The fifth and final part of the book explains erosional and landform systems: geomorphic, stream, coastal, glacial, and wind systems.

This division in parts is useful to separate the different groups of chapters regarding each of the Earth's great systems and to direct a reader interested in, e.g., Earth's water systems, to the relevant part of the book. However, while present in the Contents pages, the parts division is absent (perhaps due to an editorial mistake) in the remainder of the book: there are no division pages marking the end of a part and the beginning of another, making a reader who missed the Table of Contents unaware of the parts division. This is a minor point of criticism on an otherwise excellent volume.

The book is overall very well presented and organised: the structure of individual chapters and their presentation are excellent. Each starts with an overview and an introduction (often including the authors' personal stories), which draw the reader in and pave the ground for the material presented in the following pages. To keep the reader abreast of the topics taught in each section, chapters also feature short yet useful in-chapter summaries. The last few pages of each chapter contain a more extensive summary and overview, often including enlightening diagrams, as well as review questions to help students reflect on and retain the material learned.

The usefulness of *Physical Geography* as a teaching resource is further displayed in the companion volume and online materials. The Instructor's Guidebook highlights the key topics of each chapter and suggests teaching strategies. The extensive online resources include flashcards, to help students understand the meaning of the textbook's most important concepts, and Powerpoints, with figures from the book for instructors to use in presentations.

The planet, shaped by nature and humankind, is now changing faster than ever. Any textbook that encourages students to be the environmentally conscious citizens of tomorrow is welcome – and *Physical Geography* is an ideal volume.

*Bárbara Ferreira*

*Chief Editor & EGU Media and Communications Officer*

*Would you like to become a book reviewer for GeoQ?  
Please contact [Bárbara Ferreira](#) for more information.*



## Global Development, Geochemistry, and Velociraptors

Launching the EGU blog network!

We recently launched the EGU's official [blog network](#), a project we hope will unite a diverse community of insightful bloggers in the Earth, planetary, and space sciences. The aim of the network is to offer blogging researchers an online platform to share their insights with other scientists and, importantly, to distill complex and often misunderstood concepts so they are easier to understand for the general public. Furthermore, these blogs, chosen as examples of quality science writing by competent scientists, will hopefully inspire more researchers to share their work with the EGU's legion of online followers and regular visitors of [GeoLog](#), our official blog.

Although we are particularly keen to read about European research, we are happy to host bloggers based all over the world and working within any related discipline. If you'd like to know more about the network, including how to join, please email [Bárbara Ferreira](#).



Banner of the EGU Blog Network page, [blogs.egu.eu](https://blogs.egu.eu).

Our first three featured blogs are vastly different but equally absorbing, authored by scientists based in the UK and Canada. They are:

### Geology for Global Development, by Joel Gill

[Geology for Global Development's blog](#) is a series of articles, discussions, photos and links – all relating to the application of

geoscience to international development. Geology for Global Development (GfGD) recognises the significant contribution good geoscience can make fighting poverty and improving lives across the world. The blog aims to discuss, promote and broaden understanding of this contribution, whilst working to support young geoscientists in the growth of appropriate skills and knowledge in order that they make a positive, effective, and greater contribution to development throughout their careers. Find out more at [www.gfgd.org](http://www.gfgd.org). Tweets as [@geo\\_dev](#).

### Green Tea and Velociraptors, by Jon Tennant

Palaeontologists have a unique position among scientists in unravelling the mystery of lost ancient worlds. Communicating this science, which Jon Tennant does in his [Green Tea and Velociraptors](#) blog, is essential to maintain the fascination that captivates people of all ages. Jon is currently undertaking a PhD in vertebrate macroevolution in London, and co-hosts a podcast series called [Palaeocast](#). Tweets as [@protohedgehog](#).

### GeoSphere, by Matt Herod

Matt Herod is a PhD Candidate in the Department of Earth Sciences at the University of Ottawa in Ontario, Canada. His research focuses on the environmental geochemistry of iodine and the radioactive isotope iodine-129. His work involves characterising a 129I baseline in the Canadian Arctic and applying this to the transport and sources of 129I to remote regions as well as to long term radioactive waste disposal. His project includes both field work in the Yukon Territory and lab work back home. Matt [blogs](#) about any topic in geology that interests him, which is nearly everything, and attempts to make these topics understandable to everyone. Tweets as [@GeoHerod](#).



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## EGU General Assembly 2013

07–12 April 2013, Vienna, Austria

The 2013 General Assembly of the European Geosciences Union (EGU) will bring together geoscientists from all over the world into one meeting covering all disciplines of the Earth, planetary, and space sciences. Especially for young scientists, it is the aim of the EGU to provide a forum where they can present their work and discuss their ideas with experts in all fields of geosciences. The deadline for submission of abstracts is 09 January 2013.

Website: <http://egu2013.eu>

## Caribbean Waves 2013

22–25 January 2013, Gosier, Guadeloupe, France

The 2<sup>nd</sup> edition of the International Conference Caribbean Waves is a great opportunity for geophysicists, geologists, geographers, oceanographers, coastal engineers and disaster managers to discuss marine natural hazards (tsunamis, swells, surges, flooding) and their generation modes (earthquakes, eruptions, landslides, cyclones, etc.) within the Caribbean. All aspects from the description of historical events, results of field surveys and numerical simulations of past and potential events, prediction and mitigation of possible events, risk assessment, and early warning systems will be in the framework of the conference. Further discussions about general tectonic, geology, coral reef protection, mangroves rehabilitation processes, and related topics will be held. Special sessions about the 2010 Haiti catastrophe and sustainable production of electricity using waves' energy are also planned.

Website: <http://www.caribbeanwaves2.fr>

## EGU and IVS Training School for the Next Generation Geodetic and Astrometric VLBI

02–05 March 2013, Helsinki, Finland

The VLBI training school is part of the activities in Working Group 6 of the International Very Long Baseline Interferometry (VLBI) Service for Geodesy and Astrometry (IVS). The aim of this training school is to convey knowledge to the next generation researchers who will work with the next generation of VLBI systems for Geodesy and Astrometry. The goal is to cover all major aspects of today's VLBI systems and the next generation. The school will cover technical aspects, observations, correlation, data analysis, and the

interpretation of results. The deadline for the receipt of abstracts is 17 December 2012.

Website: [http://www.evga.org/vlbi\\_school.html](http://www.evga.org/vlbi_school.html)

## International Space University (ISU) 17<sup>th</sup> Annual International Symposium

05–07 March 2013, Strasbourg, France

ISU's next annual symposium will address 'Tele-reach' where we use this term to refer to technologies and applications which allow remote presence, participation, interaction or control. The emphasis here will be placed on exploring the role that space can play in broadening and sustaining the 'reach' of Information and Communication Technology systems to benefit humankind in areas such as education, healthcare, and environmental management. Looking beyond the socio-economic benefits here on Earth, we will widen the scope to include fields such as tele-presence and tele-operation of remote equipment both on Earth and in space. The programme will include invited contributions from leading experts in the field plus presentations and posters.

Website: <http://www.isunet.edu/symposium>

## Basalt 2013 – Cenozoic Magmatism in Central Europe

24–28 April 2013, Görlitz, Germany

This conference will focus on Cenozoic magmatism in Central Europe dealing with multifarious aspects of igneous systems. A main intention will be the communication between scientists with different scientific approach to Cenozoic magmatism. The meeting should highlight the process-oriented and material aspects of magmatism from the geophysical to the geochemical and volcanological point of view. Therefore all disciplines of geosciences ranging from geology and physical volcanology, through petrology, mineralogy and geochemistry up to geophysics will be employed. Furthermore, we invite contributions to active magmatic processes, landscape evolution and impact of volcanoes on society (resources, hazards) as well as to the outreach of volcanological sciences to the public (geotourism). In honour of Prof K.H. Scheumann (1881-1964) a special attention will be devoted to the 100<sup>th</sup> anniversary of his polzenite definition.

Website: <http://ow.ly/fOLBm>

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# FUN FACTS ABOUT THE EGU

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1. The [EGU Executive Office](#) is located in Munich, Germany. Its staff had a small lunch-time [celebration when the EGU turned 10](#).
2. The [EGU's General Assembly](#) is the largest geosciences conference in Europe: it annually convenes over 11,000 scientists, most of them from Germany.
3. [Imaggeo](#) is EGU's online Open Access geosciences image repository. It has over 1,000 free-to-use photos!
4. The EGU has regular [news services](#) for its members, journalists, and other interested parties.



5. Did you know the EGU publishes [14 scientific journals](#)? More: they are all Open Access!
6. From the atmosphere to tectonics, the EGU's broad remit is reflected in its [22 Scientific Divisions](#).
7. The Union regularly [supports scientific meetings](#), including conference series, topical meetings, workshops, and training schools.
8. The EGU annually bestows [awards and medals](#) to both eminent researchers and promising young geoscientists.



9. Education is a major part of EGU's mandate. [GIFT](#) is our annual geosciences for teachers workshop.
10. There are many ways to stay connected with the EGU: aside from this newsletter and the website, the Union is on [Twitter](#), [Facebook](#), [LinkedIn](#), [Google+](#), [YouTube](#), and the [blogosphere](#).

*Fun facts by Bárbara Ferreira and Edvard Glücksman*  
EGU Executive Office

*Drawings by Cian O'Lunaigh*

Web Editor at CERN and freelance cartoonist. For cartoon commissions, contact [cianolunaigh@gmail.com](mailto:cianolunaigh@gmail.com)

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