



## Division reports

News brought to you from five EGU divisions

In each edition of GeoQ division presidents contribute reports updating EGU members with news from their divisions. Issue 7 gives voice to Andreas Lang (Geomorphology), Nicholas Arndt (Geochemistry, Mineralogy, Petrology & Volcanology), Gerrit de Rooij (Hydrological Sciences), Shaun Lovejoy (Nonlinear Processes in Geosciences) and Peter Brandt (Ocean Sciences).

### Geomorphology

The Geomorphology ([GM](#)) Division programme at the EGU 2013 General Assembly continued the success of past years and saw stable abstract numbers (compared to 2012), verifying the meeting as the leading annual event for geomorphology globally. A total of 1009 abstracts (including co-organised sessions) were presented filling room 21 all week, two full days in room 22 and several other locations across the conference centre.

The 2013 Bagnold Medal has been awarded to [James W. Kirchner](#) for his outstanding contributions to our understanding of geomorphological processes using innovation and rigor in data analysis, and slicing through the complexity of Earth's surface systems to uncover the underlying physics. The Medal Lecture entitled 'The physics and chemistry of Earth's dynamic surface' was preceded by a reception sponsored by the British Society for Geomorphology and their journal *Earth Surface Processes and Landforms*.

For the first time an outstanding young geomorphologist was successful at Union level: [Simon Mudd](#) received an EGU Arne Richter Award for Outstanding Young Scientists. He was rewarded for his exceptionally innovative modelling studies that combine chemical weathering and physical erosion processes to shed new light on how climate change and tectonic forcing determine hill-slope morphology and soil thickness.

The 2012 Outstanding Student Poster Award was awarded to [Wout van Dijk](#) from the University of Utrecht for his poster 'Experimental meandering: from braided towards meandering by the addition of cohesive floodplain material'.

The workshops for young researchers continue to be the highlight of the GM programme. In 2013 they focused on 'Dating techniques in geomorphology' with Kevin Norton & Geoff Duller, 'Open access publishing' with Tom Coulthard & Richard Gloaguen, 'Meet the Master' with Heather Viles and 'Supervising Master's and PhD students' with François Métivier & Markus Stoffel. Due to the great success and excellent feedback received, the workshops for young researchers will continue to be part of the GM programme in future. They also serve as models for other divisions that are planning to introduce similar workshops.

Another division highlight at the General Assembly was the launch of the new EGU journal *Earth Surface Dynamics* ([ESurf](#)), an international scientific journal dedicated to the publication and discussion of high quality research on the physical, chemical and biological processes shaping Earth's surface and their interactions on all scales. The main subject areas of *ESurf* comprise field measurements, remote sensing and experimental and numerical modelling of Earth surface processes and their interactions with the lithosphere, biosphere, atmosphere, hydrosphere and pedosphere. *ESurf* offers EGU-style open access publishing after a public peer-review and interactive public discussion process.

The GM Division team has also seen some changes: Paul Bishop (University of Glasgow) replaced Gerard Govers as Chair of the Medal Committee. Jantiene Baartman (Wageningen University) will help coordinate the scientific programme in the area of overlap with the Hydrological Sciences and Soil System Sciences Divisions. Further, Lucy E. Clarke from the University of Hull has agreed to act as young scientists representative for the division. The full division structure, the sciences officers and their contact details can be found on the [division website](#).

For further details, please consult the presentation from the division business meeting [online](#).

*Andreas Lang  
GM Division President*

### Geochemistry, Mineralogy, Petrology & Volcanology

The [Goldschmidt](#) conference was held in Europe in 2013 and as usual the Geochemistry, Mineralogy, Petrology & Volcanology ([GMPV](#)) Division suffered the consequences. A significant number of geochemists, petrologists and mineralogists chose to attend the meeting in Florence and many volcanologists preferred the meeting of the International Association of Volcanology and Chemistry of the Earth's Interior ([IAVCEI 2013](#)) in Japan. This meant that the number of GMPV abstracts at the EGU General Assembly was 40% down on the previous year. The upside is that we can look forward to a bumper year in 2014 when Goldschmidt is on the far side of the USA.

In spite of the competition, the GMPV division organised many very successful sessions at this year's General Assembly. For example, our ongoing series on the early Earth continued, we had two very interesting sessions on how magma chambers work, our collaboration with the Geodynamics and Tectonics Divisions was evident in several co-sponsored sessions on the mantle, and as usual we had a series of strong volcanology sessions. In addition, Catherine McCammon gave an excellent Bunsen Medal Lecture.



Our cooperation with the Volcanology, Geochemistry, and Petrology (VGP) section of the American Geophysical Union (AGU) continues, aided by close cooperation with Catherine McCammon, the present VGP president, and Catherine Chauvel, the future president. Raj Dasgupta delivered the VGP Kuno Medal Lecture in one of our sessions, and three other sessions were co-sponsored by GMPV and VGP. Over ten sessions proposed for this year's AGU Fall Meeting have been slated for co-sponsorship by GMPV.

Max Wilke, our Mineralogy Officer, finished his 5-year stint and to replace him we needed to appoint two others. Fabrizio Nestola of the University of Padova in Italy and an expert in high-temperature mantle mineralogy will assure continued collaboration with the Geo-dynamics Division, and Andrew Putnis of the University of Münster in Germany and an authority on metamorphism and low-temperature mineralogy, will strengthen EGU activities in these fields.

Nicholas Arndt  
GMPV Division President

## Hydrological Sciences

This year, the International Association of Hydrological Sciences decade that focused on Predictions in Ungauged Basins draws to a close. In an ironic twist, nature reminded us the prediction in lavishly gauged basins can still be elusive: Europe was quite unprepared for the [floods in the Danube and Elbe basins](#) in May and June.

The heavy rains in late spring [were related to](#) the north-eastern trajectory of low-pressure systems emanating from the Mediterranean that carried moist air to the central European mountain ranges, where the air lost much of its water. The effect of the abundant rainfall was compounded by the subsurface component of the terrestrial hydrological cycle. Snowfall late in winter thawed in the spring wetting the soil, and copious rainfall not long after snowmelt further elevated groundwater levels and diminished the air-filled pore space in the soil above it. With the potential for subsurface storage of additional water severely compromised, much of the heavy rain of May was carried off to the river systems by surface runoff. This caused their water levels to rise dramatically, breaking records in some places.

The trajectory taken by the low-pressure systems is not that unusual and large volumes of snowmelt or spring rains will also occur from time to time. We may therefore anticipate both conditions occurring in tandem sometime in the future. To avoid loss of life and massive material damage, the various affected countries are currently debating preventive measures. A few observations can offer guidance to this debate.

[Satellite imagery by NASA](#) showed that large sections of the Elbe and its tributaries occupied a much broader area than usual, but nevertheless were mostly contained within their floodplains. Only on a limited number of locations did the dams break and larger areas flooded.

Yet the property damage was huge. In some locations older buildings withstood being flooded much better than nearby newer ones. The older constructions were often designed with occasional flooding in mind, evidenced for instance by elevated foundations, tiles on



Passau, the Bavarian town where the Danube is joined by the rivers Inn and Ilz, was one of the worst affected by the June floods. (Credit: Stefan Penninger)

the ground floor and inner walls and wide staircases in brickwork. It seems building activities increasingly take place in what was considered the river floodplain a few decades ago, but without taking this into account in the design. Furthermore, the resulting constriction of the flow bed is often not compensated for (e.g., by deepening the river bed or removing obstacles to the flow elsewhere in the cross-section of the riverbed/floodplain). Consequently, the water level corresponding to a given discharge will have to increase. Instead of simply making dams and dikes higher and stronger, it is increasingly argued that it would be better to allow the river to use a wider bed or one with fewer obstacles. It should be noted that measures that ensure a more effective discharge through the river bed should first be executed downstream, lest upstream measures increase the risk of flooding downstream by delivering the water faster.

The severity of the 2013 European floods was for a considerable part linked to the lack of storage in the unsaturated zone. It stands to reason to find ways to increase storage within the catchment to reduce the contribution of overland flow to river discharge. By gradually releasing stored water, the signal pulse can be damped. Some have advocated building storage reservoirs in the mountainous parts of basins of flood-prone rivers, but the ecological and esthetic impact of a sizeable number of reservoirs that need to be empty most of the time makes them unappealing. The management of such reservoirs has little room for error: fill them too early and the storage they provide will not be available when needed; fill them too late and the high-water signal will not be damped. It appears more attractive and feasible to build rainfall capturing reservoirs in cities. There, they could effectively dampen the effect of rapid discharge of water falling on roofs and pavement through sewage systems. The ever increasing paved area (cities and roads) within catchments contributes noticeably to the reduction of subsurface storage of water, and makes rivers respond to rainfall with more spiked discharge peaks.

In rural regions, designating areas relatively close to rivers and streams, in which the groundwater table is kept low by a drainage system and the soil remains permeable, can increase storage. The latter can be achieved by tillage or by choosing vegetation with sturdy roots that create a macropore network, such as trees. When such areas are permitted to be flooded in case of exceptionally high water they can provide even more storage and a damped transmission of the discharge peak downstream. Between floods, such areas can remain productive.

As a final measure, some places could be selected for controlled flooding to protect other areas when the dams are threatened. In



such places, farms and other buildings could be placed on artificial mounds and cattle should be able to flee to higher grounds as well.

The lessons for the management of major rivers and their flood-plains are clear. It is now time to heed these lessons by implementing wise policies and by taking the right measures in a timely fashion. The scientific community can help to achieve this by communicating effectively with those responsible for policy making, land and water management and land-use planning.

*Gerrit H. de Rooij  
HS Division President*



PICO presentations at the 2013 General Assembly (Credit: Sue Voice)

## Ocean Sciences

After a few years acting as vice-president of the Ocean Sciences ([OS](#)) Division, the EGU 2013 General Assembly was my first conference as president. As in the many years before in which I attended the conference (since my first time as a young student in the 90s), the OS programme covered a large range of topics from general circulation and the oceans role in climate to shelf and coastal oceanography, marginal seas, ocean biogeochemistry, theory and dynamical processes as well as operational oceanography and instrumentation.

In the past few years, we could see the great development of the EGU, particularly its General Assembly. For example, the OS programme of the 2013 meeting included a great number of abstracts: nearly 300 oral and more than 500 poster presentations. A highlight of the 2013 OS programme was the lecture by the Fridtjof Nansen medalist Harry Bryden who presented exciting results regarding the variability of the Atlantic meridional overturning circulation. Another highlight was the introduction of [PICO](#) presentations, which combine short oral presentations with in-depth discussion between the presenter and the attending scientists in front of wide touch-screen displays. I think these presentations represent a stimulating means of scientific discussions and direct interaction among scientists, and we aim to develop them further.

At this point I want to thank the previous OS presidents, particularly my predecessor Bernard Barnier. I am also thankful to the whole OS team including the Nansen Medal Committee who contributed significantly to the development of the division and helped me start as the new president.

One of the main axes of OS activities is the Ocean Science journal. During the last few years, the number of submitted abstracts and accepted papers increased considerably, which shows the increased impact of this open-access journal in the scientific community. This success can be traced back to the great work of the team of editors and reviewers who make the journal more and more attractive for readers and authors.

With the General Assembly, the Ocean Science journal and the outreach and education activities, we aim to further develop into a productive environment for scientists from Europe and all over the world to achieve progress in the various ocean science disciplines and to have beneficial interactions with other fields of the geosciences. We also aim to provide a platform for researchers, particularly young scientists, to present their results, and network within the research

community, as well as to actively play a role in developing the future of the EGU and its OS Division.

*Peter Brandt  
OS Division President*

## Nonlinear Processes in Geosciences

As the new president of the Nonlinear Processes in Geosciences ([NP](#)) Division, I would like to warmly thank Henk Dijkstra, my predecessor, for the last four years. The following summary (referring to the past year) mostly concerns achievements under his mandate.

First, I'd like to introduce the new NP executive, which has some old faces as well as some new ones. Stefano Pierini is the new Science Officer for Dynamical Systems Approaches to Problems in the Geosciences (NP2), François Schmitt is the Officer for Scales, Scaling and Nonlinear Variability (NP3), Reik Donner is in charge of Time Series and Patterns (NP4), Olivier Talagrand is Officer for Predictability (NP5), Turbulence, Transport and Diffusion (NP6) is overseen by Jose Redondo, while Vincent Rey and Valerio Lucarini are the Officers for Nonlinear Waves (NP7) and Nonlinear Stochastics (NP8), respectively. Daniel Schertzer (Publications), Shaun Lovejoy (President and Programme Group Chair), Isabel de Lima (Scientific Affairs) and August Gires (Webmaster) are also part of the new executive. The new Richardson Medal Committee is composed of: C. Nicolis (Chair), H. Swinney, J. Kurths, S. Fauve and K. Fraedrich.

Thanks to the NP community, the 2013 General Assembly featured 377 NP abstracts in 18 NP sessions and 11 co-organised sessions. In addition, there were three NP short courses: 'Nonlinear time series analysis' by R. Donner and S. Barbosa, 'Tipping points in the geosciences' by M. Ghil, P. Ditlevsen and H.A. Dijkstra and 'Predictability in theory and predictability in practice' by L. Smith.

I should also mention the following NP honours: [Auguste Gires](#) received the 2012 Outstanding Student Poster Award, while the 2013 Outstanding Young Scientist Award and the 2013 Lewis Fry Richardson Medal were awarded to [Yongxiang Huang](#) and [Jürgen Kurths](#), respectively

Thank you for all your efforts. I'm looking forward to seeing you all in Vienna in 2014!

*Shaun Lovejoy  
NP Division President*