VMSG

Volcanic and Magmatic Studies Group

June 2018 Newsletter (No. 39)

Welcome to the June VMSG newsletter!

Dear VMSG members, welcome to the quarterly newsletter of our special interest group. In this issue we have another great collection of content including student bursary reports, an article from MinSoc (one of our main sponsors), a progress report highlighting the building success of the new journal Volcanica, along with the second edition of the 'Impact in Focus' section in which Sally Gibson (VMSG chair) gives insights into a paper that has helped to shape her understanding of magmatic processes.

Thermo Fisher Scientific VMSG Award

Its time to nominate!!

Nominations should be sent to the VMSG Secretary (richard.brown3@durham.ac.uk) by the 1st of July and should consist of:

- Letter of nomination, articulating how the award criteria are met, and for which contribution(s) the nominee is considered
- Curriculum Vitae
- Up to three additional letters of support

Nominations will be considered by the VMSG committee in the summer committee meeting.

The award will be bestowed at the annual VMSG meeting in January for more info visit: https://www.vmsg.org.uk/award/

Willy Aspinal Prize Prize an Outstanding Paper in Applied Volcanology

Recently come across an outstanding paper in applied volcanology!?

The Willy Aspinall Prize may be made annually to the lead author of an outstanding paper on applied volcanology published (in English) within three years of the lead author being awarded a PhD at a university in the UK.

Nominations should consist of a letter of nomination together with at least one letter of support along with a copy of the paper being nominated and a copy of the nominee's CV (2 pages maximum and including a list of publications). Each nomination package should be submitted in electronic form (a single pdf file) and sent to the VMSG Secretary (richard.brown3@durham.ac.uk). For more info, check here: link.

Volcanica

Sent in by Jamie Farquharson (University of Strasbourg)

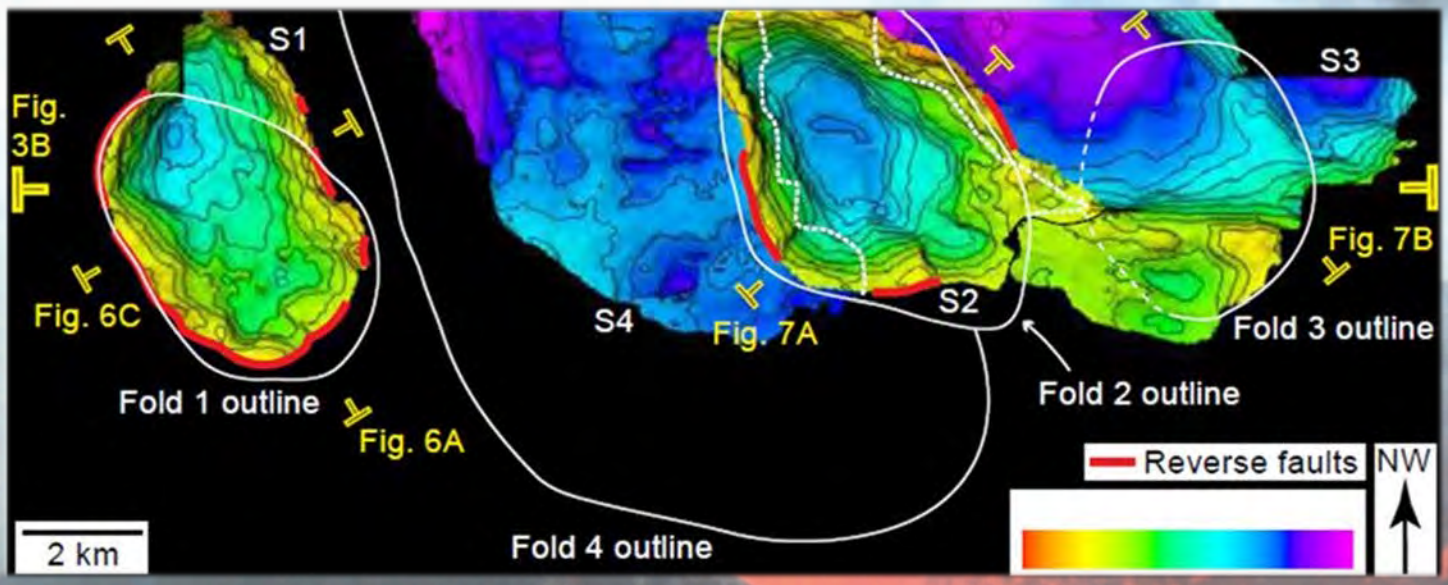
Since the first call for papers last November, Volcanica—the world's first diamond-open-access journal for volcanology—is well on its way to producing its first complete issue, with three articles published so far. However, there's no need to wait! Volcanica articles are published on a rolling basis and are available to download for free at: http://www.jvolcanica.org/ojs/index.php/volcanica/issue/view/1.

Here is a brief précis of what readers can expect.

In our first article, Jennifer Reeves and co-authors from Imperial College London investigate sill emplacement off the coast of New Zealand using 3D seismic reflection data. Do these ground deformation patterns—deceptively simple at first glance—in fact represent intricate geometries and complex intrusion processes? Reeves et al. posit just that: discrepancies between observed and expected fold geometries could reflect multiple cycles of subsidence and uplift resulting from iterative sill inflation and deflation.

Reeves, J., Magee, C. and Jackson, C. (2018) "Unravelling intrusion-induced forced fold kinematics and ground deformation using 3D seismic reflection data", Volcanica, 1(1), pp. 1-17. doi: https://doi.org/10.30909/vol.01.01.0117.

In our second article, Yves Moussallam (Université Clermont Auvergne, University of Cambridge) and



Depth structure map of the Canterbury Basin highlighting the location of reverse faults around sill edges.

co-authors give us an explosive insight into the ongoing Trail by Fire mission. Specifically, this article addresses with the present volcanic unrest at the Nevados de Chillán complex in Chile: could this be the precursor to a magmatic eruption?

An eruption at the Nevados de Chillán volcanic complex, captured on the 2 February 2016.

Moussallam, Y., Bani, P., Schipper, C., Cardona, C., Franco, L., Barnie, T., Amigo, Álvaro, Curtis, A., Peters, N., Aiuppa, A., Giudice, G. and Oppenheimer, C. (2018) "Unrest at the Nevados de Chillán volcanic complex: a failed or yet to unfold magmatic eruption?", Volcanica, 1(1), pp. 19-32. doi: https://doi.org/10.30909/vol.01.01.1932.

The third article is by Michael Heap and co-authors from the Université de Strasbourg, Sapienza University of Rome, Durham University and Technische Universität München. By performing a series of experiments, they seek to answer the age-old question: just how tough is tuff? The Mt. Epomeo Green Tuff is one of the most commonly-employed building materials on Ischia Island, but can it take the heat?

Statue carved from a single block of Mt. Epomeo Green Tuff on Ischia Island, Italy.

Heap, M., Kushnir, A., Griffiths, L., Wadsworth, F., Marmoni, G. M., Fiorucci, M., Martino, S., Baud, P., Gilg, H. A. and Reuschlé, T. (2018) "Fire resistance of the Mt. Epomeo Green Tuff, a widely-used building stone on Ischia Island (Italy)", Volcanica, 1(1), pp. 33-48. doi: https://doi.org/10.30909/vol.01.01.3348.

Volcanica is a broad-scope open-access international journal promoting research into all aspects of volcanology, including physical phenomena and their impact on society, health, and the environment.

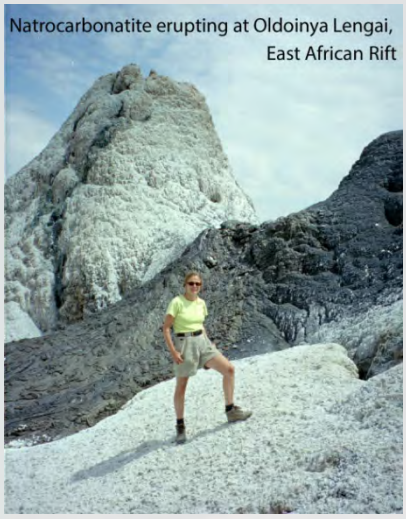
If you are interested in submitting your research to Volcanica, visit www.jvolcanica.org or search for "Volcanica journal" online. To contact our outreach team, email outreach@jvolcanica.org. If you would like to find out about getting involved, please email search@jvolcanica.org for information. For technical queries or if you are unsure whether your article is appropriate for Volcanica contact farquharson@jvolcanica.org or wadsworth@jvolcanica.org.

Impact in Focus

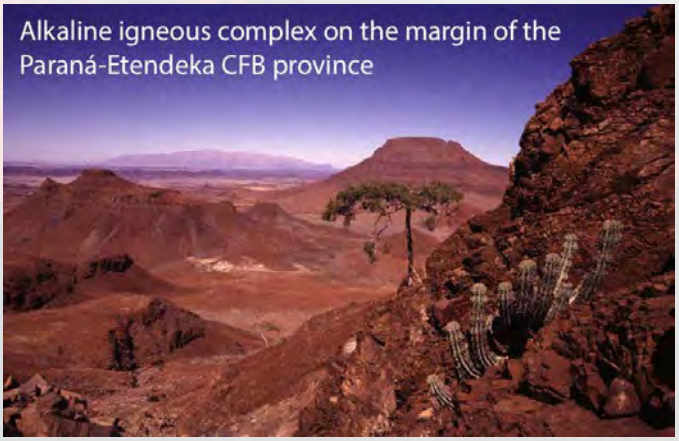
In this issue **Dr. Sally Gibson** (Cambridge University) has kindly agreed to share some insights on a key paper that helped shape her understanding of magmatic processes. This feature is run every issue so be sure to look out for the next instalment!

Citation: McKenzie, D. (1989). Some remarks on the movement of small melt fractions in the mantle. Earth & Planetary Science Letters, 95, 53-72. Link.

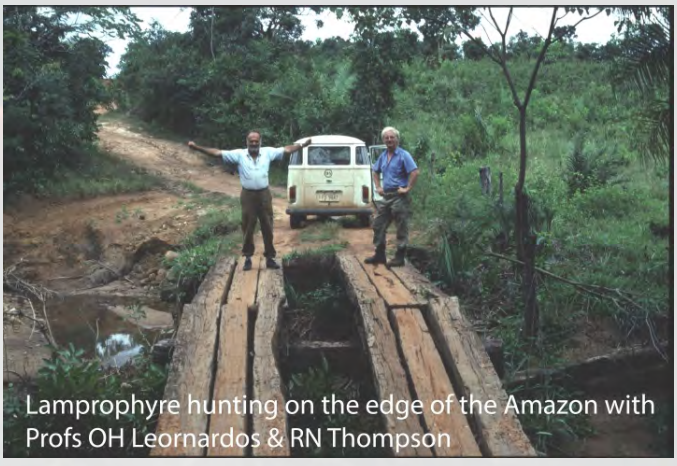
Recommendation: This paper has significantly influenced my research activities.


Natrocarbonatite erupting at Oldoinya Lengai, East African Rift

I was first introduced to kimberlites and carbonatites by the late Prof Barry Dawson, while studying for a Geology degree at the University of Sheffield in the 1980's. Barry was one of the world's leading authorities on these 'exotic' mantle melts and conveyed his great enthusiasm for them in his lectures by including tales of his favourite volcano, Oldoinya Lengai (Tanzania) and presenting each student with a small piece of a South African kimberlite.Little was known about the physical processes that allowed kimberlites and carbonatites to reach Earth's surface until Dan McKenzie's 1989 paper on the movement of small fraction, volatile-rich melts in the mantle. His paper completely revolutionized our understanding of how these melts are able to separate from their mantle source regions and migrate upwards. Dan showed that while the low viscosity of these melts allows them to easily infiltrate along grain boundaries their small volumes and low temperatures might inhibit their ascent through the overlying cold lithospheric mantle, such that they readily 'freeze', and might only be remobilised during major extension and heating events.


Alkaline igneous complex on the margin of the Paraná-Etendeka CFB province

The 1990's was a hugely exciting time for petrology when ideas were rapidly changing, mainly due to significant advances in analytical techniques and also because of the acknowledgement that the most robust studies required an understanding of the physical processes involved in melt generation and magma crystallisation. It was also when there were major debates about mantle plumes and rifting; we now take much of this for granted but these controversies laid the foundations for current research on the largest volcanic eruptions on Earth (i.e. continental flood basalt provinces).


Lamprophyre hunting on the edge of the Amazon with Profs OH Leornardos & RN Thompson

Dan McKenzie's paper on small-fraction melts was published at the start of my Post-Doctoral research with Prof Bob Thompson (at the University of Durham) and had a big impact on our work. One of the major goals was to understand how Earth's continental lithosphere responded to major rifting

and heating events. Bob and I embarked on major field campaigns across numerous continents to collect the world's largest and smallest volume melts.

A key focus was to collect volcanic rocks crystallised from volatile-rich small-fraction mantle melts and establish their temporal and spatial relationships with the associated continental rift zones and flood basalt provinces. One of these campaigns involved >30,000 km of travelling in South America and Southern Africa in order to collect samples that more often than not outcropped as just tiny dykes. We found ourselves in some incredible landscapes (jungles, desserts) and met the most wonderful people. We also witnessed at first hand the devastation of the Amazon and the impact on local Indian tribes – this was a truly humbling time.

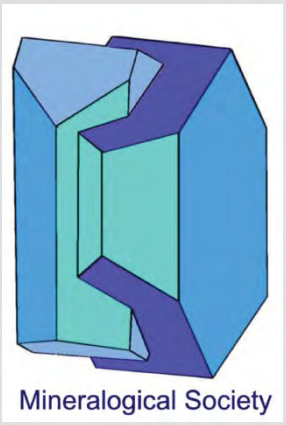

Volcanic neck on the Colorado Plateau: small-fraction volatile-rich melt generation on the margin of the Rio Grande Rift, Western USA

At the end of these field campaigns we amassed a huge collection of samples of kimberlites, lamprophyres etc, and by analysing and dating these were able to show that widespread remobilisation of volatile-rich lithospheric mantle occurs during both rifting and heating events (associated with the impact of mantle plumes). This work was important because it highlighted for the first time the vast areas of our planet's surface that are affected by these major events in Earth's history, and also the timescales over which they occur.

The important role that small-fraction mantle melts play in the solid Earth is becoming increasingly recognised; this is primarily because they transport massive amounts of CO2, H2O and also sulfur. Nevertheless, the capacity of the lithospheric mantle to accumulate and store volatiles released from the convecting mantle remains poorly understood. My current research activities and those of my students are focused on ancient fragments of continental mantle together with ocean island basalts and continental flood basalts; the common theme is the role of volatile-rich mantle melts. Dan McKenzie's 1989 paper remains the 'go to' reference for the movement of these small-fraction melts in the mantle and his ideas are fundamental to furthering our understanding of global volatile cycles.

VMSG Parent Societies

Sent in by Kevin Murphy (Executive Director of the Mineralogical Society)



The MinSoc is one of two parent bodies for the Volcanic and Magmatic Studies Group, one of eight Special Interest Groups (SIGs) in the Society. Funding for the group comes from the MinSoc (63%) and the GeolSoc (37%) and the GeolSoc offers the use of meeting rooms at Burlington House on three days per year.

MinSoc has supported several recent VMSG meetings through hosting of online payment systems and management of the accounts. The Society's Finance Manager, Russell Rajendra, ensures that all of the SIGs finances are kept on the straight and narrow and that the accounts are audited each year. MinSoc also takes responsibility for items such as field-trip insurance, data protection, etc.

Members who choose to join the VMSG via the MinSoc also benefit from receiving copies of Elements, the multi-Society magazine, and from access to our two journals, Clay Minerals and Mineralogical Magazine. Discounts on all Society-published books are available to MinSoc members also, including Introduction to the Rock-Forming Minerals (by Deer, Howie and Zussman, third edition published in 2013).

Members of the VMSG community are asked to support their parent Societies, and in particular MinSoc. Societies raise money largely through sale of books and especially journals. To support MinSoc, consider publishing in Mineralogical Magazine or Clay Minerals. Ensure that your university library does not cancel its subscription to a Society journal. Offer to serve on a Society committee or Council. Promote the Society to your students/colleagues.

Read more at www.minersoc.org.

Student bursary reports

Within this section, short reports are included that have been sent in by PhD students who received VMSG bursary funding to attend conferences. Well done to all presenters!

EGU General Assembly 2018, Vienna, Austria (8-13 April 2018)

Attendee: Suraya Hilmi Hazim

Affiliation: University of Liverpool

Crustal deformation asscociated with the intrusion of igneous bodies: Insights from analogue modelling techniques

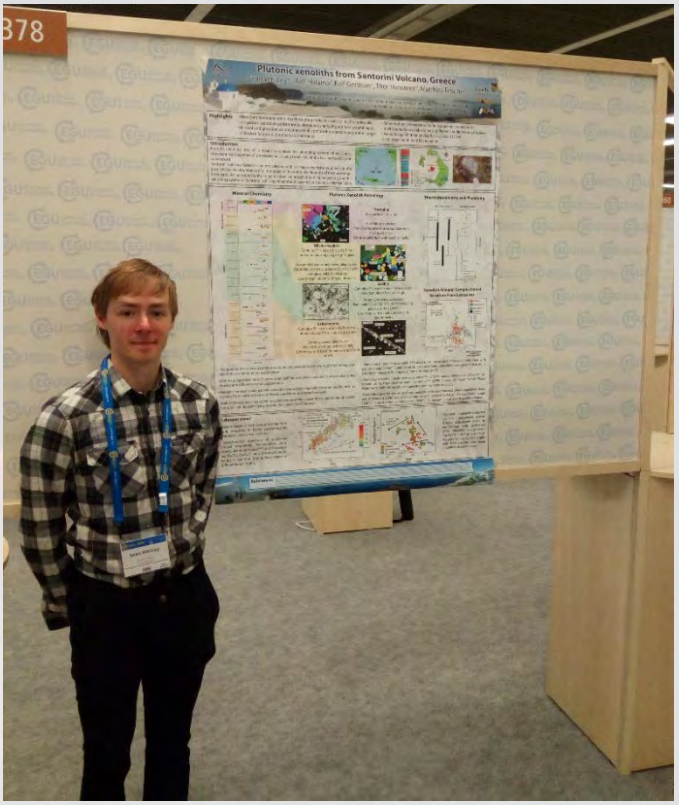
I would like to thank the Volcanic and Magmatic Studies Group for the student bursary which allowed me to travel to Vienna, Austria to attend the prestigious EGU General Assembly 2018. This was my first time attending the conference and I was given the opportunity to present a talk about my research titled "Crustal deformation asscociated with the intrusion of igneous bodies: Insights from analogue modelling techniques" in the session Volcanic Processes: Tectonics, Deformation and Geodesy.

The talk served as an excellent platform to showcase my work, as well as to spark fruitful discussions with peers and experts in the field after the session had ended. My presentation focused on the interpretation of surface and subsurface deformation patterns associated with magmatic intrusions using scaled laboratory experiments. As a final year PhD student in my writing up stage, I gained a lot of useful insight from the discussions I've had throughout the conference. I've received feedback not only from researchers within my discipline, but from other disciplines as well, which allowed me to look at my work from a fresh perspective.

With 15075 participants from 112 countries, this conference was an excellent opportunity to get to know researchers from across the globe. As a young researcher, I was glad to make new acquantainces here at the conference and it was a chance to catch up with old friends as well. Many thanks again to the VMSG for supporting my trip to Vienna!

Attendee: Sean Whitley

Affiliation: Keele University



Plutonic xenoliths from Santorini Volcano, Greece

I would like to thank the VMSG for providing assistance for me to attend and present at the EGU General Assembly 2018 in Vienna, Austria. This enabled me to present my current work on plutonic xenoliths found in the eruptive deposits of Santorini

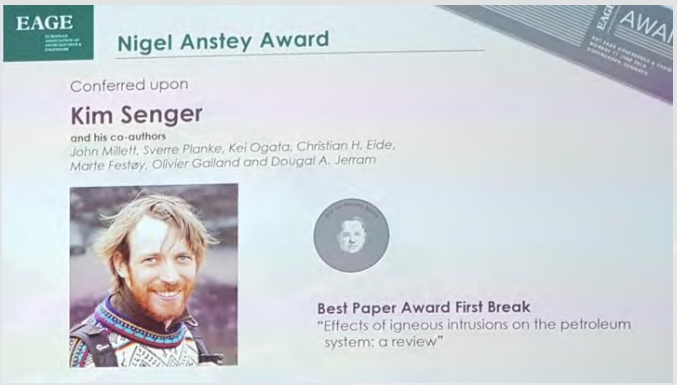
volcano, Greece. The amount of material to take in at a conference of this scale is almost overwhelming and was a great experience. There was never a moment with nothing to see, and the ability to learn from the entire range of Geoscience disciplines is a huge benefit to a conference of this scale. With 15,075 attendees across the week, my poster session had a constant flow of multidisciplinary academics to discuss my work with, in addition to discussions with other researchers about their work in both related and unrelated sessions. The numerous short courses were also great, both to satisfy my curiosity about the methodologies used in many geoscience disciplines, and also to enhance the way I approach my work. In addition to discussing my Santorini work, I was fortunate to meet with two international researchers who have published influential papers on the other case volcano in my project, Merapi. I have just acquired a unique dataset for this section of my project, and it was great to be able to discuss this and potential collaboration with them in person.

Thanks again to the VMSG for this opportunity!

EAGE Nigel Anstey Award

Best paper in First Break 2018

The 2018 award was presented to Kim Senger of UNIS and co-authors for their publication looking at the implications of sill intrusions on petroleum systems. Kim couldn't make the ceremony so I popped along instead:) link.



Citation: Senger, K., Millett, J., Planke, S., Ogata, K., Eide, C., Festøy, M., Galland, O. and Jerram, D. (2017): Effects of igneous intrusions on the petroleum system: a review. First Break Vol 35, No 6, June 2017 pp. 47 – 56. DOI: DOI: 10.3997/1365-2397.2017011link

Understanding the volcanic breakup of the NE Atlantic and its influence on climate change

Magellan Workshop IODP

Location: GEOMAR, Kiel, Germany

Dates: 29-30th May, 2018

In the last week of May, more than 40 scientists from nine countries met at the GEOMAR Helmholtz Centre for Ocean Research Kiel for a MagellanPlus workshop to discuss new research projects around the North Atlantic Igneous Province. The aim of the workshop was to prepare drilling proposals for the International Ocean Discovery Program (IODP).

The meeting proved to be a great success with an exciting and wide ranging group of presentations and discussions covering everything from global scale tomography, rifting models and igneous petrology through to high resolution ashfall, isotope and biostratigraphy records through the Paleocene and Eocene of the North Atlantic and further afield. The key themes of the workshop covered 1. The tectono-magmatic evolution of the NAIP and 2. Potential links between magmatism and the Paleocene-Eocene Thermal Maximum (PETM). For those not familiar with the PETM, it comprises the most recent example of a rapid global warming event on a scale similar to some of the predictions for anthropogenic warming. Therefore, understanding the triggers and climatic feedbacks in the global system at this time is seen as critical for gaining insights on the longer term consequences of rapid heating. Many hypotheses exist for the warming event ranging from gas hydrate destabilization to permafrost melting etc. but one hypotheses, initially proposed by Henrik Svensen et al., in Nature (2004), was that sill intrusions emplaced into organic rich

sediments during the NAIP caused huge volumes of methane to be produced and subsequently outgassed to the atmosphere through a series of 1000's of hydrothermal vent complexes mapped from seismic data along the Norwegian margin but also known from East Greenland, the Faroe Shetland Basin etc. could have been the cause. The temporal linkage for this being the trigger is very compelling, but key uncertainties remain to be tested.

The goal of the meeting was to discuss and identify clear key scientific objectives that may be solved by new scientific drilling in the NE Atlantic. The consensus was clearly that new drilling is indeed required in order to address both of these linked themes and the working group will now move forward with the process of building a comprehensive drilling Proposal to address these themes. The JOIDES Resolution drilling ship is scheduled to be in the North Atlantic in 2022, and so we very much hope that some of the outstanding questions regarding the evolution of the NAIP will be addressed at this time.

For more information on the Magellan workshop, please visit Link.

Call for Papers | Geothermal Systems: Interdisciplinary Approaches for an Effective Exploration

Special volume extended till July 27, 2018.

Geofluids is a peer-reviewed, Open Access journal that provides a forum for original research and reviews relating to the role of fluids in mineralogical, chemical, and structural evolution of the Earth's crust. The most recent Impact Factor for Geofluids is 2.687 according to the 2016 Journal Citation Reports.

You can download the Call-for-Papers of the special issue at the following URL: http://www.hindawi.com/journals/GEOFLUIDS/si/986915/cfp/

John Tarney (1937-2018)

Andy Saunders and Graham Park

Professor John Tarney, petrologist and geochemist, died on 31st March 2018, shortly after his 81st birthday. He read geology at Durham University, subsequently gaining a PhD there in 1961, before moving to Birmingham where he held a fellowship and then lectureship. John was appointed to the F.W. Bennett Chair in the Department of Geology in Leicester in 1980, a post he held until his retirement in 1999. In addition to his numerous university roles (he was Head of Department twice), he sat on several external committees and working groups, including NERC and the Royal Society, and played an important role in establishing the UK involvement in ocean drilling (DSDP and IPOD). He was a member of the Geochemistry Group of the Mineralogical Society from 1975 to 1979, and sat on the Council of the Min. Soc. from 1980 to 1983.

John's PhD research concerned the geochemistry of the Lewisian rocks of NW Scotland, an interest that persisted throughout much of his career. He was particularly keen in applying the then new technique of X-ray fluorescence (XRF) spectrometry to rock analysis, which led to the geology departments in Birmingham and subsequently Leicester becoming centres of excellence in this methodology. Through the application of XRF to a wide range of rock types and by liaising with isotope geochemists in the UK and overseas, John revolutionized the science of analytical 'hard-rock' geochemistry. His research interests spanned the formation of high-grade gneiss terrains, the formation of arc and back-arc systems, the development of mantle heterogeneities, and the petrogenesis of Proterozoic dyke swarms. This was facilitated by widespread travel, and led to the publication of well over 100 journal articles and books, the training of almost 30 research students and post-docs, and the organization of many meetings and conferences. He was the recipient of the Murchison Fund of the Geological Society in 1979.

John was enthusiastic and meticulous about his work, and put a tremendous amount of time and energy into any project with which he was involved. He was very kind and thoughtful both to his research

students and to the many colleagues who shared his research.

The years after his retirement were marred by ill-health, but John bore his troubles with stoicism and good humour. He loved nothing better than spending time with his family, and going for walks and cycle rides with them. He will be sorely missed by his wife, Mary, their three children (Clare, Michael and Paul), six grandchildren, and one great-grandchild, as well as by his many friends.

Notices

GDPR

The Volcanic and Magmatic Studies Group (VMSG) is a joint special interest group of the Geological Society of London and the Mineralogical Society, and gathers personal information about members in order to provide you with services relating to our activities (conferences, bursaries, fieldtrips etc). These data will be stored electronically by VMSG for a period of not more than three years. They will be used to contact you in relation to that event/product in which you expressed interest only. After the 3-year period has expired, the data will be archived on paper to a secure location at the Mineralogical Society's premises. Individuals can ask at any time to see stored records and to have them amended or to have them deleted permanently.

Fieldtrip Co-ordinator:

The role of fieldtrip co-ordinator for the VMSG committee is currently being reallocated after Janine Kavanagh rotated off committee, so if you are interested in running a VMSG fieldtrip, please contact any member of the current committee and we will coordinate from there. These are great opportunities to get the community together so if you are interested in getting one off the ground please do get in touch!

Upcoming awards of relevance to the VMSG community:

Do you know an outstanding member of the VMSG community? Please consider nominating them for awards and medals bestowed by other societies. Remember, these recognise both early career scientists as well as those well established.

PhD studentships:

We are collating all VMSG-related PhD studentships for dissemination. Please circulate to interested undergraduate students and others. If you want your PhD to be on the list, please let our student representative know. http://www.vmsg.org.uk/students/phd.php

VMSG Distribution List

The VMSG mailing list is managed by jisc-mail. As a list member, you can subscribe to the list or change all your details yourself by subscribing to jisc-mail.

VMSG can also be found on Twitter, Facebook and LinkedIn.

Sami Mikhail (sm342@st-andrews.ac.uk) runs the VMSG twitter account with a great range of links to papers, positions, articles/news of interest being updated on a regular basis so do follow!!

How to join or leave the group?

Go to the group homepage at www.jiscmail.ac.uk/vmsg and choose the 'Subscribe or Unsubscribe' link from that page. You will receive a confirmation email which you need to respond to.

Editorial

Many thanks to those who have contributed to this issue. Please forward any articles, comments or notices of events, workshops and conferences before 31st Aug 2018, for inclusion in the next newsletter.

All previous newsletters are available for download from the website.

John Millett (john.millett@abdn.ac.uk or john.millett@vbpr.no)