

IGI NEWSLETTER

December 2015 – No. 33

IGI NEWS

IGI AGM

The IGI AGM was held on 26th May 2015 at the IGI Office on Merrion Square. A review of the activities of the IGI over the year 2014-2015 was presented and documented in the *Annual Report* with a discussion on a number of issues. A new Board was elected at the AGM:

President EurGeol. Marie Fleming, P.Geo.

Vice-President EurGeol. Dr James Hodgson, P. Geo.

Treasurer EurGeol. Catherine Buckley, P.Geo.

Secretary EurGeol. Dr. Peter Glanville, P.Geo.

Non-Executive Board members

EurGeol Mairead Glennon, P.Geo.

Dr. Billy O'Keefe, P.Geo.

EurGeol. Claire Clifford, P.Geo.

EurGeol. Dave Blaney, P.Geo.

Dr. Henning Moe, P.Geo.

EurGeol Vaughan Williams, P.Geo.

The IGI membership currently stands at 181 Professional Members details of which are in the current *Professional Members Listings* on the IGI website.

EUROPEAN FEDERATION OF GEOLOGISTS MEETING 2015



Workshop: Mining in a crowded country 11 & 12 June 2015

Venue

The venue for the lecture element of the workshop was the magnificent home of the North of England Institute of Mining and Mechanical Engineers (NEIMME), Newcastle (UK).



The Library of the NEIMME

The field trip element (over one and a half days took in the Northumberland Coalfield, the North Pennine Orefield and a visit to the manufacturing plant of SMD. The talks set the scene for the subsequent field excursion.

Theme

The theme of the Workshop 'Mining in a Crowded Country' was chosen by the organisers (The Geological Society of London or GeolSoc) as mining is at the heart of the North of England's history and development. It was here that the steam engine (developed by Stephenson) was first widely used on railways, and the Davy safety lamp was first

demonstrated. Coal production dominates the long history of mining in the north-east of England, with lead and more recently fluorspar being mined from the North Pennine Orefield to the west of Newcastle, and now potash production is being planned from a new mine in North Yorkshire. Yet this is a heavily populated region, with differing views about land use and the acceptability of mining in the 21st Century. The workshop explores legacy of metal mining in the North Pennines, current good practice in coal mining and raised a number of interesting questions on the future of mining, not only in the north of England but also worldwide.

Programme

Four excellent presentations on the theme were preceded by an introductory talk by the President of The GeolSoc (David Manning) on 'The geology of a busy region'. The presentations on the main theme were:

- The future for coal – **Paul Younger** (University of Glasgow)
- Potash in a National Park – **Graham Clarke** (Sirius Minerals)
- Metals: new life in the North Pennines? – **Rick Smith** (FWS Consultants Ltd)
- Remote mining – **Stef Kapusniak** (Business Development Manager – Mining, SMD Ltd)

The first part of the field excursion took us around the Northumberland Coalfield (which has a long history of mining bituminous coals, dating back over 200 years), where we visited England's largest coal operation – the Shotton Colliery (worked by the Banks Group), coastal outcrops of the coal sequence to view the geological characteristics of the Westphalian coal-bearing strata and an environmental park built over an old coalfield. During the field visit it was clearly demonstrated that current mining provides an opportunity to correct earlier environmental damage caused by both underground and surface mining with the development amenity parkland as well as improved landscapes. We were expertly shown around the Coalfield by Prof. Manning.

Following this we visited the manufacturing plant of SMD (Soil Machine Dynamics Limited) who are manufacturing some of the plant to be used by Nautilus Minerals in their Solwara 1 seafloor massive sulphides project in Papua New Guinea (see the following website for a good video of the equipment under construction in Newcastle <https://smd.co.uk/products/submerged-mining/special-projects.htm>).

On day two of the field excursion we travelled west to the historically important North Pennine Orefield where we were shown around by Brian Young (BGS, retired). The Northern Pennine Orefield, centred around the hills and valleys of Alston Moor and Weardale, comprises numerous vein and related deposits hosted in a cyclothem succession of Carboniferous limestones, sandstones and mudstones. The deposits exhibit many characteristics of the 'Mississippi Valley Type' of style of mineralization. Since at least the 12th century the area has been a major source of lead and iron ores, with the peak production being recorded during the 18th and 19th centuries. More recently, zinc ores became an important product together with the development of large scale mining for

fluorspar (CaF_2), barytes (BaSO_4) and witherite (BaCO_3). The local abundance of the latter mineral and other barium carbonates was a unique feature of the field.

During its long mining history the area became an important centre for ideas and concepts in the understanding of the nature and origins of deposits of this type. Although commercial mining ended in 1999, the Orefield remains an important focus of research and has recently seen renewed exploration for hitherto undiscovered base metal deposits (the Irish based company Minco Plc leading the exploration) using ideas learned from the Irish type deposits. For additional information on this see the Minco website: <http://www.mincoplc.com/projects/england-north-pennines/>).

In addition to its substantial output of metal ores and industrial minerals, the Orefield is known internationally as a source of some of the finest specimens of several of its constituent minerals, most notably fluorite, examples of which are to be seen in many of the world's major collections.

On the trip we visited some of the Orefield's classic locations including Rookhope (the location of the famous borehole of the same name which intersected the Weardale Granite), the Slitt Pb vein and limonitic flat (with both iron and lead being produced at the site), Groverake fluorspar mine (with its headframe), Nenthead lead and zinc mines which now has an extensive tourist mine facility demonstrating geological features as well as mining history and including the Vieille Montagne operation.

Overall, the workshop was an excellent event demonstrating how mining can co-exist with other industries (there is a dust sensitive pharmaceutical plant beside the Shotton Colliery) and land uses – farming and National Parks.

At the time of the workshop Sirius Minerals were awaiting a decision on their application to develop their deep potash mine within the North York Moors National Park near Whitby. Since the workshop, planning permission has been granted to Sirius Minerals to develop the deposit.

EurGeol Gerry Stanley PGeo

KINDRA



www.kindraproject.eu

As the national member association of the European Federation of Geologists (EFG), the IGI was requested to participate in the KINDRA (Knowledge Inventory for Hydrogeology Research) project which is funded by the

European Commission's HORIZON2020 Framework Programme.

Led by the EFG and coordinated by the Earth Sciences Department at Sapienza University of Rome, KINDRA is a three-year project which aims to develop and disseminate a European Inventory of Groundwater Research (EIGR). The objectives of the project are to track Europe's contemporary hydrogeological research and innovation, and to be able to identify critical challenges and research gaps. The inventory will be developed according to a new Harmonised Research Classification System (HRC-SYS) which requires an effective assessment of the state-of-the-art of hydrogeological research across different geographical and geo-environmental settings, allowing for direct comparison and identifying synergies in groundwater research. The project will contribute to improving management and policy development for groundwater resources at the EU level, consistent with the EU Water Framework Directive (WFD) and EC Groundwater Directive (GWD). Accordingly, the EIGR will provide a public-access service for European hydrogeological research in progress.

The project began in January 2015 and the IGI recently submitted a preliminary overview of organisations and institutions in Ireland that are involved in hydrogeological research. Most of the project work will be carried out in 2016, and the IGI will participate in an orientation workshop for member associations in Brussels in November 2015. The IGI will coordinate activities in Ireland and will be reaching out to the Irish Group of the IAH and research bodies in the coming months, both to collate relevant information and share results.

For further information see: www.kindraproject.eu

Dr. Henning Moe, P.Geol.

UCD GEOPHYSICS GROUP RESEARCH IN ICELAND



Dublin might not seem the obvious location for a group specialising in volcano seismology, but the recent contributions made by the UCD Geophysics Group to this topic has proven that when it comes to scientific research, it is not all about location, location, location. In response to the two Icelandic eruptions in 2010 and 2011, the European Commission funded a large scale, four year collaborative project, FUTUREVOLC.

Since 2008, the Group has carried out a number of field experiments on volcanoes and has collected data from Costa Rica, Sicily, Indonesia, Tenerife and most recently, Iceland.

As we saw in 2010, ice-covered volcanoes can cause some of the most destructive and violent events in nature. The interaction of magma and ice/water can lead to an overheated, over-pressurised system that pulverises the rock into fine ash – much like the ash that blanketed northern Europe in 2010. In 2011 a similar, though larger, eruption occurred at Grímsvötn volcano beneath Vatnajökull glacier. Again, the interaction of ice and magma caused an ash cloud and local flooding, however due to the prevailing winds at the time the ash was blown north-northeast. In the case of Grímsvötn, it is estimated that the magma took approximately two hours to melt through the glacier and for the first visual evidence of the eruption. In terms of improving the early warning systems, either for local communities or the airline industry, knowing an eruption is occurring beneath the ice could offer extra hours to civil protection, and communicating with the public and decision makers.



In response to the two Icelandic eruptions in 2010 and 2011, the European Commission funded a large scale, four-year collaborative project, FUTUREVOLC. The project is funded by the European Commission under FP7 and is led by the University of Iceland and the Icelandic Meteorological Office (IMO) and includes scientists, civil protection authorities, observatories and SMEs (technical and software developers) and aims to understand and monitor not only what is

happening subsurface in the volcano system, but also forecast what will happen once the eruption has started and eruptive products are in the atmosphere.

UCD's role FUTUREVOLC is primarily collecting and analysing seismic data to determine what is happening beneath the surface – either within the volcanic edifice itself, or between the volcano and the glacier. In 2013 Prof. Chris Bean and his team installed 14 seismometers West-Southwest of Vatnajökull glacier; similar seismometers are regularly used in volcanic settings to 'listen' to the subsurface activity.

The UCD Group however, are using seismometers in a more novel way. The seismometers have been deployed in two clusters of seven stations each with a specific geometry designed to listen to volcanic tremor. This tremor is different from typical volcano-tectonic events in that it is generally less energetic, of longer duration and there are no clear arrival times of the seismic waves, therefore making it difficult to determine where the tremor is coming from. The clusters of seismometers (also known as arrays) can be used to find the source direction of these tremor signals by calculating the back azimuth. The goal is to determine whether the source is likely to be the volcano itself coming to life, the glacier moving and grinding across the bedrock, or the movement of flood waters between the bedrock/edifice and the glacier. The floods are known locally as jökulhaups and are extremely fast flowing, dangerous floods caused by melting of the base of the glacier by volcanic activity beneath. Our ability to distinguish between these apparently similar signals

will improve not only our understanding of how the system works, but also improve our early warning systems in the event of an eruption beneath the ice by providing more information about the processes.



In August 2014, Bárðarbunga volcano, also beneath Vatnajökull glacier, began to rumble. The Icelandic Meteorological Office (responsible for hazard monitoring in Iceland) recorded an increase in seismicity near Bárðarbunga crater. By carefully monitoring this seismic activity, and locating the individual events, the scientists in IMO could track a dyke propagating beyond the crater to the North East at 5-10km depth. In the following days, the dyke turned towards the North and within a month had propagated almost 50km from Bárðarbunga. The magma eventually reached the surface at the end of August – luckily this occurred at Holuhraun, approximately 10km beyond the edge of Vatnajökull and so did not lead to any magma-ice interactions. The resulting effusive eruption has produced a 74km² lava field to date and continues at the time of writing this article. In the past three months, the crater itself has been subsiding with large (Magnitude 4-5) earthquakes recorded daily.

As part of FUTUREVOLC, several teams within the project have deployed additional equipment in the area including UCD - in August the UCD team, with additional support from the Geological Survey of Ireland, deployed a third array to the North of the glacier. By combining the data collected from the three UCD arrays, we can analyse the seismic activity recorded at the eruption site and near Bárðarbunga crater. Seismic data, combined with infrasound, gas and water chemistry sampling and plume analysis is being used to monitor conditions in the area in real time. In addition to the real time monitoring, the unparalleled

dataset collected from the area is being used by multinational teams of scientists to help understand the processes beneath the volcano.

For further information about the project see www.futurevolc.hi.is If you want to know more about the Bárðarbunga/Holuhraun eruption see www.vedur.is

Dr Aoife Braiden and Dr Chris Bean. formerly of the School of Geological Sciences, University College Dublin

TELLUS TAKES OFF NATIONWIDE



A new phase of Tellus has taken off in Eastern Ireland. The fourth phase is the next step in a nationwide roll-out of the programme and will result in 50% of Ireland being surveyed by the end of 2017, with the potential for widespread economic and environmental benefits. Led by the Geological Survey of Ireland, Tellus collects geochemical and geophysical data that support the management of Ireland's environment and natural resources, extending the successful geological mapping project that began in Northern Ireland (2004–2007), continued into the border regions (2011-13) and then moved across the north midlands (2014-15). Approximately 25% of the country has now been surveyed, with data freely available online.

As a result of the surveys already completed, the economy of the border region has benefited from inward investment in mineral exploration and the potential for the rest of the country is considered to be highly significant. Other benefits from earlier phases include data that can be used to improve agricultural productivity, environmental management and radon risk mapping. An independent evaluation of the Tellus Border project carried out in 2014 by PA Consulting Group recommended that the survey be rolled out nationally in order to maximise the benefits that accrue from collection of this type of data.

The 2015 phase of Tellus will cover 5,810 km², focusing on an airborne survey of counties Meath, Kildare, Offaly, rural Dublin, and northern parts of counties Laois and Wicklow. The airborne geophysical survey involves a fixed-wing aircraft, operated by Sander Geophysics Ltd, flying at a low level of 60m over rural areas. The aircraft carries three geophysical systems providing data on the magnetic field, conductivity and radiometric properties of earth materials below.

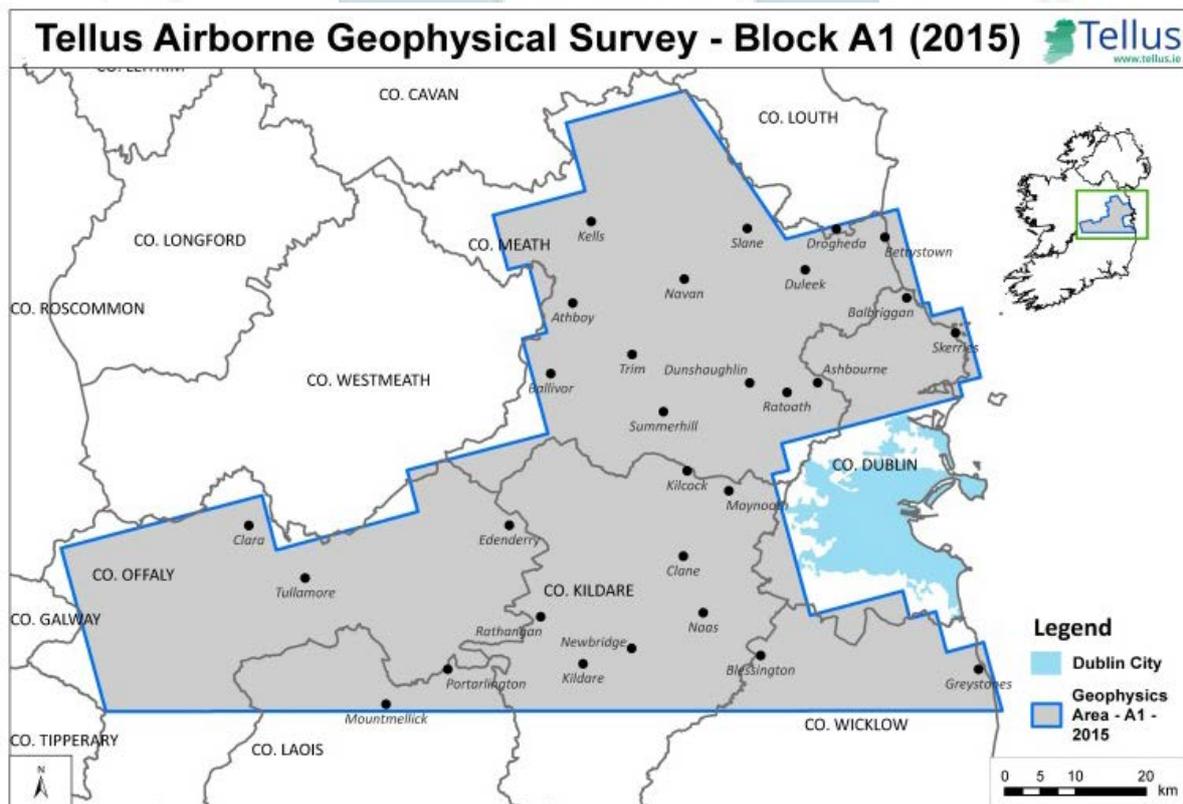


Surveying started on 30th June and the aircraft flew some 32,500 line km before finishing in autumn 2015.



To ensure the public is aware of the survey and in particular to alert horse owners, farmers and livestock owners about the low flying plane, a major communications programme is underway. This includes working in close co-operation with organisations such as the Irish Aviation Authority, the Irish Farmers Association and the Irish Thoroughbred Breeders Association.

Image courtesy of Sander Geophysics Ltd.



The latest geophysical data release has just been made, it includes data collected in the north midlands region during 2014-2015 and includes airborne magnetics, radiometrics and electromagnetic data collected from two aircraft operated by CGG Ltd which completed surveying in the region between September 2014 and April 2015. To register your interest in receiving data release notifications, please email tellus@gsi.ie.

Geochemistry programme activities this year focus on the preparation, laboratory analysis and interpretation of data from soil samples collected in the north midlands area during 2014, to be made available to the public during 2016. The next geochemistry data release, set for November 2015, will be precious metals data for GSI archive stream sediment samples from southeast Leinster.

For up-to-date news on the project, including details of flight plans, visit www.tellus.ie.

EurGeol Mairéad Glennon, P.Geo. Geological Survey of Ireland

IGI COURSE - DRILLING TECHNIQUES & OPERATIONS

The IGI organised a one day seminar on drilling techniques and drilling rig site operations which was held on Friday the 3rd October 2014 in the Newpark Hotel, Kilkenny. There were 36 participants on the seminar that was split into a half day of presentations by experts on the principles of groundwater, mineral exploration, geotechnical and environmental drilling operations and half a day field visit for the practical demonstration of drilling rig operations, site set up and challenges, to provide an understanding of the role of geologists overseeing drilling operations. The course was specifically aimed at graduate geologists and IGI members who wish to gain greater experience.

The first presentation 'Water Well Drilling' was by David Ball who is an expert hydrogeologist particularly in groundwater supply well drilling with extensive experience in Ireland and internationally. David introduced the objectives and practical considerations of drilling for the inexperienced geologist. The presentation included video demonstrations of a water well drilling operation. His presentation covered a brief part of site selection and well design and well completion, drilling and casing and grouting the overburden and bedrock sections - what to look out for and how to manage encountered ground conditions when drilling groundwater boreholes. A short section on air lift pumping and initial yield estimation was also covered.

The second presentation 'Site Investigations' was presented by Stephen Letch from Site Investigation Ltd and provided an introduction to geotechnical drilling techniques for site investigation projects. The methods presented by Stephen included cable percussive drilling and associated testing, rotary core drilling and Geobor S drilling. The presentation outlined the different methods of geotechnical drilling, the associated testing that can be undertaken and an example of the logs that can then be used in the design process for geotechnical investigation and reporting.

The presentation 'Site Investigation at Brownfield Sites' was presented by Claire Clifford of Malone O'Regan and was an introduction to drilling for site investigations at brownfield sites.

The topics covered included the role of the geologist in selection and appropriate use of different drilling methods, sampling during drilling operations and constructing monitoring wells appropriate to the site conditions encountered and the objective of the site investigation. Also the use of borehole logs for an environmental investigation and how these can be used to inform the Conceptual Site Model was covered with the use of a number of case studies. The importance of the role of the geologist in site investigation was highlighted.

The final presentation 'Mineral Exploration Drilling' by Michael McCarthy of Priority Drilling provided an insight on the company's expertise in surface and underground wireline diamond drilling and directional drilling (Navi-drilling for clients in Ireland, UK, and Western Europe. Michael presented a very interesting case study from Priority's drilling work at the Pallas Green exploration project on how the Navi drilling technique can be used to recover cores from an extensive area utilising a single parent borehole and drill rig set up. This presentation provided useful insight from the perspective of the drilling contractor for geologists involved in drilling projects.

For the afternoon session, attendees travelled to Thomastown, Kilkenny to a practical demonstration by Jim Stephenson of JS Drilling, with demonstrations of borehole drilling using the drilling methods discussed in the morning presentations including window sampling and air rotary coring. Despite the rain, there was enthusiastic participation during the practical session which was very informative and provided many of the attendees with their first experience of an operational drilling rig.

EurGeol Claire Clifford, PGeo

IGI PROFESSIONAL INDEMNITY INSURANCE

The IGI and Thompson Insurances are pleased to provide a Professional Indemnity (PI) Insurance application service for IGI members in good standing.

What is professional indemnity insurance?

Typically, PI does not concern itself with bodily injury or damage to property. This cover protects the professional person. It protects against legal liability to pay damages to persons who have suffered financial loss arising from professional negligence.

PI has come to the fore in the past decade principally due to the willingness of more people to seek compensation when they feel the professional advice/service they have received has not met their expectations. The requirement of professional bodies that members have a minimum level of PI cover in place has also increased the tendency to take out this form of cover.

How do claims arise?

The list of claims examples for geologists is not exhaustive but I would like to use an architect as an example here. In **Sutcliffe v. Thackrah (1974)** Thackrah were appointed architects and issued interim completion certs despite the work not having been done or incorrectly completed. A new builder had to be appointed at higher cost to complete the job. Sutcliffe successfully sued Thackrah for negligence and breach of duty. Consider the potential for damages if a geologist signed off on work without having done a thorough job or despite best intentions making a mistake. Consider further the legal costs involved in successfully defending a claim where no negligence took place.

Professional people purport to have expert knowledge and qualifications and so owe a duty to their clients to exercise the degree of skill expected of such a person. If they fail to exercise that care and skill and a client suffers a financial loss as a result, the client may well sue them for negligence.

What are the benefits of an institute or association negotiating a scheme facility with one insurer?

A PI scheme for the Institute of Geologists of Ireland has a number of advantages. A block of premiums is placed with one insurer which means the institute enjoys greater bargaining power when negotiating premiums, cover enhancements and claims settlements. A single scheme could never claim to be the most competitive offering available in all cases but, on balance, schemes remain highly competitive and tend to be able to negotiate market leading coverage. Examples of cover enhancements not readily available on the open market for geologists include a non-aggregated limit of indemnity (€1m being the standard limit), a negligence and civil liability wording, loss of documents extension, pollution extension, dishonesty of employees extension, libel and slander, compensation for court attendance and defence of intellectual property rights.

Further, where an insurance broker with experience of professional indemnity manages the scheme a number of pitfalls can be avoided particularly around continuing coverage due to the nature of the "claims made" wording of PI insurance. It is essential a retroactive cover date is applied on all new policies right back to the date when you first began insuring for PI. With cover on a "claims made" basis, provided the claim is made during the period of insurance, it does not matter when the act of negligence giving rise to the claim took place. However, retroactive cover can only be applied as far back as the retroactive cover date on your policy.

In order that PI insurers can get a comprehensive understanding of the nature of each risk they usually require completion of a proposal form which your broker can help with, details of partners/directors, total number of other staff, details of major contracts and previous claims.

Insurers usually calculate the premium for PI by applying a rate to the gross fees or gross revenue of a company after considering all other risk information. A good broker will then negotiate the best deal for their client taking an insurance market canvass into consideration.



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Please download the dedicated [IGI insurance form](#) to be completed and returned to shane.hennelly@nti.ie for a quotation. Please note this dedicated service is available to IGI members only.

Shane Hennelly, Thompson Insurances

KEEPING IN TOUCH

Thank you to all those who have contributed to this IGI *Newsletter*.

We hope to keep you informed of the activities of the IGI and members and welcome any feedback in addition to any articles, news items or information on upcoming events that you would like included in the next *Newsletter*, please contact Claire Clifford at cclifford@morce.ie.



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