

Tellus Border Project **gold mapping**

Minerals **Aggregate Potential Mapping**

ALSO INSIDE

- BT Young Scientist and Technology Exhibition 2014
- INFOMAR Update
- Geological Photography Challenge
- All the news

Introduction

Welcome to Issue No. 15 of Geology Matters, The Newsletter of the Geological Survey of Ireland.

In this issue we provide the latest findings of The Tellus border Project and the launch of the new gold Map. The Tellus team also featured at the National Ploughing championships and we have a report. We also have the latest news on the INFOMAR Project and a special report on aggregate potential in our minerals section plus all the regular features.

We hope you enjoy reading this edition of Geology Matters and as always we welcome your comments and feedback. We would like to take this opportunity to remind you that you can stay up to date with all matters geological by accessing our website www.gsi.ie

You might also like to visit our Customer Centre and Library. Contact details and opening times are provided below.

Geological Survey of Ireland
Beggars Bush, Haddington Road
Dublin 4

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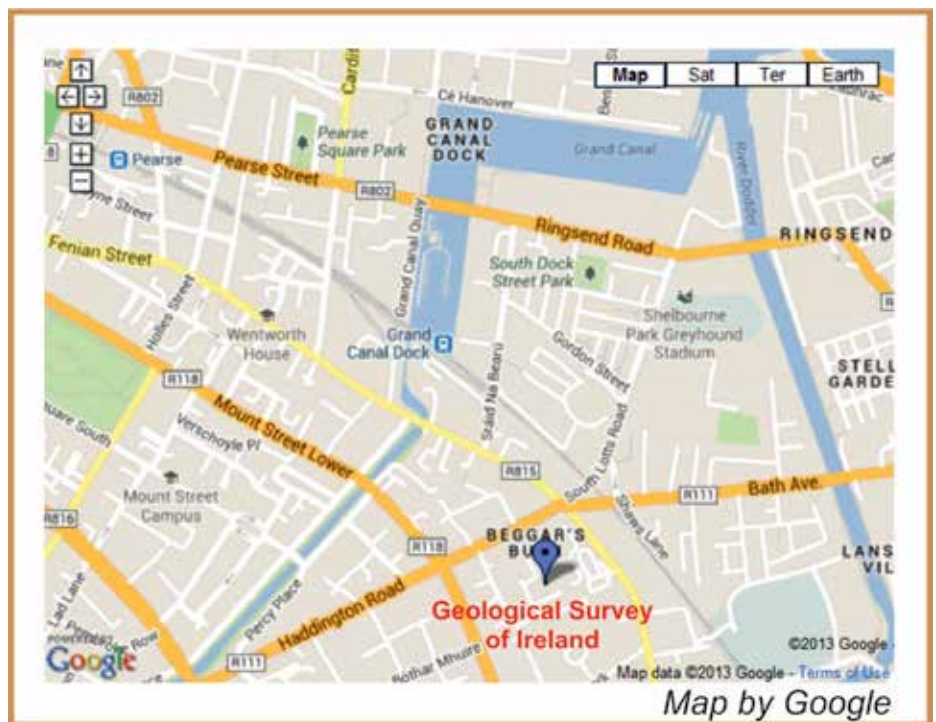
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If you would like to provide feedback on any aspect of Geology Matters, either for publication or simply to comment on any aspect of the newsletter please send your comments to gsisales@gsi.ie

Cover Image: Amazing Krakatoa eruption by Dian Adijaja Susanto

Director's Discourse: New plans!

Koen Verbruggen

2014 sees somewhat of a watershed for GSI, and many Government Programmes, with the ending of projects developed under the former National Development Plan and transition to more flexible multiannual projects, now under the Programme for Government. Last year GSI saw the completion of major work under the Geoscience Initiatives I, which was the focus of our Geoscience 2013 Meeting in the autumn, including our National Groundwater Vulnerability Mapping, Aggregate Potential Mapping (reported in this issue) and further development of our Landslide Vulnerability Mapping.

In late 2013 we also reached another milestone for INFOMAR, the national marine mapping programme, when we received government approval for the continuation of the programme through the next phase to 2018. Critically this approval results from the strongly expressed support for the programme, across almost every government department and sector, reflecting both the broad impact of the programme and the hard work and success of the GSI-MI joint venture.

Now in 2014 we are taking a strategic look at our activities, and future projects, under Geoscience Initiatives II, which are divisible into quality mapping Initiatives (through field mapping, Infomar and Tellus), development of the Irish National Geoscience Data Centre (as online datasets and web mapping) and Applied Products, which will be developed with stakeholders and underpinned by robust science and research.



Koen Verbruggen *Director Geological Survey of Ireland*

We have already commenced a range of pilot projects to test out new initiatives, which have been developed in response to societal needs, new datasets we have produced or gained access to, and key customer feedback. Projects include an integrated approach to updating our geological mapping in response to the Tellus Border data, by our Land Mapping Unit, which will update both Quaternary and Bedrock geology and also use digital field data capture to improve turnaround times. We have also commenced a Karst Mapping Programme, which will include the sink holes which have recently developed such a high media profile, and is utilising high resolution LIDAR data previously acquired. Landslide vulnerability mapping, developed already in key pilot areas, will now be rolled out nationally.

Under data initiatives new emphasis will be placed on ensuring our key holdings are up to date and accessible

in the format required by customers, both internal and external. Our data underpins all our activities and focus will initially be on our Groundwater wells, Geotechnical Site Investigations and Quarry Database and Directory.

2014 will also see the conclusion of the first phase of our major Griffiths Research Programme, which will form the focus of our Geoscience 2014 meeting this autumn. Through provision of data, project partnering and funding opportunities such as INFOMAR and Tellus short calls, GSI will continue to work to advance Irish geoscience research.

As always on these new initiatives and our existing programmes, we welcome the feedback and opinion of all our readers!

Tellus Border Update

Mairéad Glennon Assistant Project Manager Tellus Border Project



A project supported by the INTERREG IVA Programme managed by the Special EU Programmes Body

The Tellus Border project is an EU INTERREG IVA-funded geoenvironmental mapping project. It has mapped the border counties of Ireland (Donegal, Sligo, Leitrim, Cavan, Monaghan and Louth) and is integrating these with existing data collected in Northern Ireland as part of the Tellus project in 2007. The Geological Survey of Ireland is a partner in this cross-border initiative, which is led by the Geological Survey of Northern Ireland in Belfast. The outputs of this three-year project were presented to 134 delegates at the Tellus Border Results and Research Conference held at the Hillgrove Hotel, Co. Monaghan on 24th October 2013.

Through coupled airborne geophysical and ground-based geochemical surveys, a region covering over 12,000km² in the Rep. of Ireland border region has been physically and chemically mapped to support environmental management and natural resources assessment. Along with the results from the surveys, findings from 13 applied research projects based on Tellus and Tellus Border data were revealed. These findings indicated new and innovative uses for the data in environmental management, mineral exploration and agricultural productivity. Presentations and research posters are available at www.tellusborder.eu.

One of the most eagerly awaited outputs of the project was the border region's most comprehensive map of gold in stream sediments to date, generated from over 3,500 samples taken in 2011 and 2012. Results are extremely promising, indicating localised anomalies throughout the region and more notably high



Minister for Natural Resources Fergus O' Dowd joins geologist Kate Knights to launch the new gold map resulting from the Tellus Border survey at the National Museum of Ireland Archaeology Exhibition.

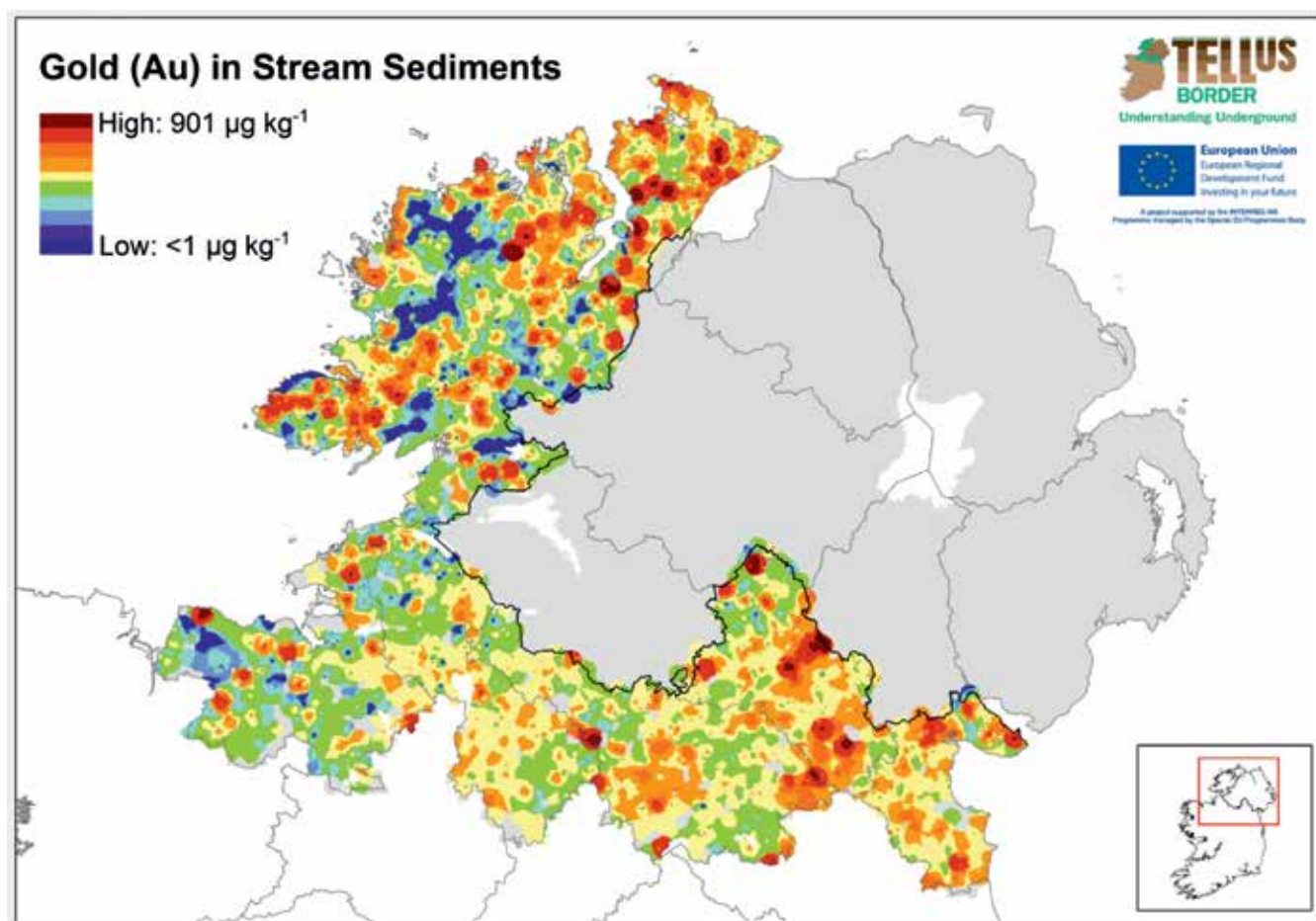
concentrations in several areas. As well as highlighting known existing gold occurrences, such as Clontibret in Co. Monaghan and Glentogher and Glencolumbkille in Co Donegal, a number of new areas with anomalous gold concentrations have been identified associated with the Donegal Granites and Dalradian lithologies (Inishowen, Termon) and with Silurian/Ordovician shales and sandstones in Cos. Monaghan (Carrickmacross) and Cavan (Kingscourt, Killashandra). Results are expected to stimulate considerable mineral exploration industry interest and investment in the area. As a consequence of the original Tellus project in Northern Ireland, it is estimated that £32m has been stimulated in inward investment

to the Northern Irish economy through mineral prospecting activity. In addition to the gold data, maps for over 50 elements in soil, stream water and stream sediment geochemical data were published in October. The trace-level results reveal important natural and man-made influences on the soil and water chemistry of the area, significant for managing the environment and optimising agricultural productivity on a cross-border basis. Geochemical and geophysical maps are now available, free of charge, at www.tellusborder.eu.

Over the past three years duration of Tellus Border considerable demand and momentum has been built up to continue the work throughout the island of Ireland. The Director of Geological Survey of Ireland,

Koen Verbruggen, was pleased to announce at the conference that Tellus will continue as a programme area in the GSI during 2014 following the completion of the EU-funded border region project in December

this year. The team will focus next year on continuing research on the border region data and planning future phases of surveying.



Aggregate Potential Mapping

Crushed Rock Aggregate Potential

Gerry Stanley
Minerals Section,

Gaining access to aggregates can be problematical as there may be competing land uses within an area where aggregates exist. The Geological Survey of Ireland (GSI) commenced a programme of aggregate potential mapping (APM) for both sand and gravel, and crushed rock resources in Ireland in 2007.

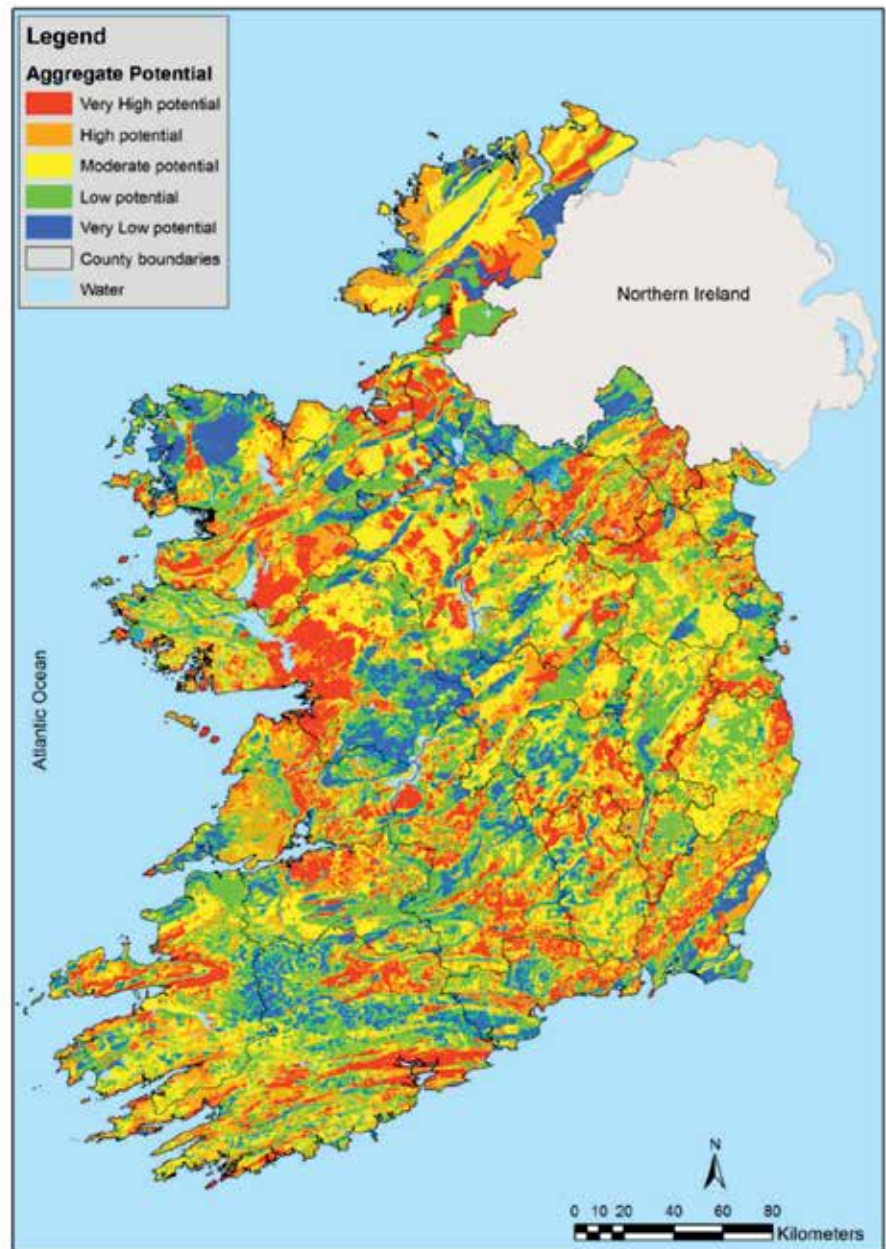
The system for crushed rock aggregates was developed following consultation with industry and experts in the quarry sector. The mapping system is based on a system of scores applied to geological, geographic, market and social factors. Scores were applied from 1 to 10 for seven factors:

- Rock Type Suitability (2.8)
- Deleterious Substances (0.7)
- Number of quarries (1.2)
- Area (0.5)
- Overburden thickness (2.0)
- Elevation (0.8)
- Markets (1.2)

The seven factors were weighted by a multiplication factor (in parentheses after the listed factors above). The final score is obtained by summing the weighted scores to give a final score ranging from 5 to 100.

The information is integrated within a Geographic Information System where geoprocessing tools were used to spatially discriminate between areas of differing aggregate potential, (see map).

It must be stressed that even though an area may be designated as 'low' or 'very low' this does not mean that the area has 'no' potential. It may be that in a given area in the absence of better quality material a particular rock type may be the only option. Also some rocks may possess particular qualities which make them suitable for specific uses – for example a mud rock may be suitable as a source of clay for brick manufacture.



Crushed Rock Aggregate Potential Map of Irish Republic

The main outputs from the project are available within a public viewer on the GSI website with attendant data interrogation tools. Please see: <http://spatial.dcenr.gov.ie/APM/index.html>

The work was carried out on a county-by-county basis and then joined to produce a seamless map for the entire country.

The APM project results should be of interest to the building and road construction sectors, and planning authorities at local and regional level.

Aggregate Potential Mapping

Granular Aggregate Potential

Gaining access to aggregates can be problematical as there may be competing land uses within an area where aggregates exist. The Geological Survey of Ireland (GSI) commenced a programme of aggregate potential mapping (APM) for both sand and gravel, and crushed rock resources in Ireland in 2007.

The system for granular (sand and gravel) aggregates was developed following consultation with industry and experts in the quarry sector. The mapping system is based on a system of scores applied to geological, geographic, market and social factors. Scores were applied from 1 to 10 for seven factors:

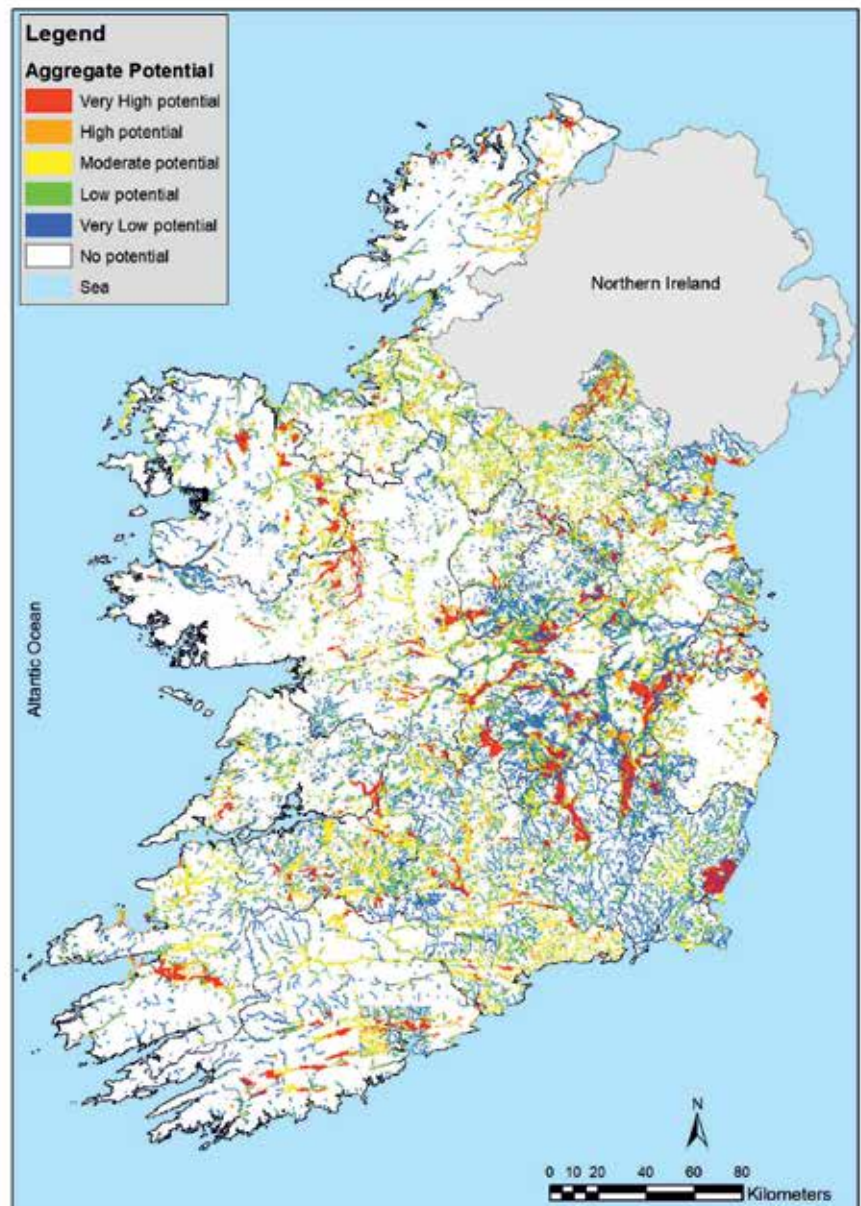
- Genesis-Petrology (2)
- Number of pits (1.2)
- Area (2)*
- Thickness (2)*
- Elevation (0.5)
- Markets (1.2)

*In the case of 'alluvium' the factor is 1.0.

The six factors were weighted by a multiplication factor (in parentheses after the listed factors above). The final score is obtained by summing the weighted scores to give a final score ranging from 3.5 to 100.

The information is integrated within a Geographic Information System where geoprocessing tools were used to spatially discriminate between areas of differing aggregate potential, (see map).

It must be stressed that even though an area may be designated as 'low' or 'very low' this does not mean that the area has 'no' potential. It may be that in a given area in the absence of better quality material a particular deposit may be the only option.



Granular Aggregate Potential Map of Irish Republic

Unlike the crushed rock potential map there are large tracts of ground uncoloured which indicates that no sand or gravel has been mapped in these areas.

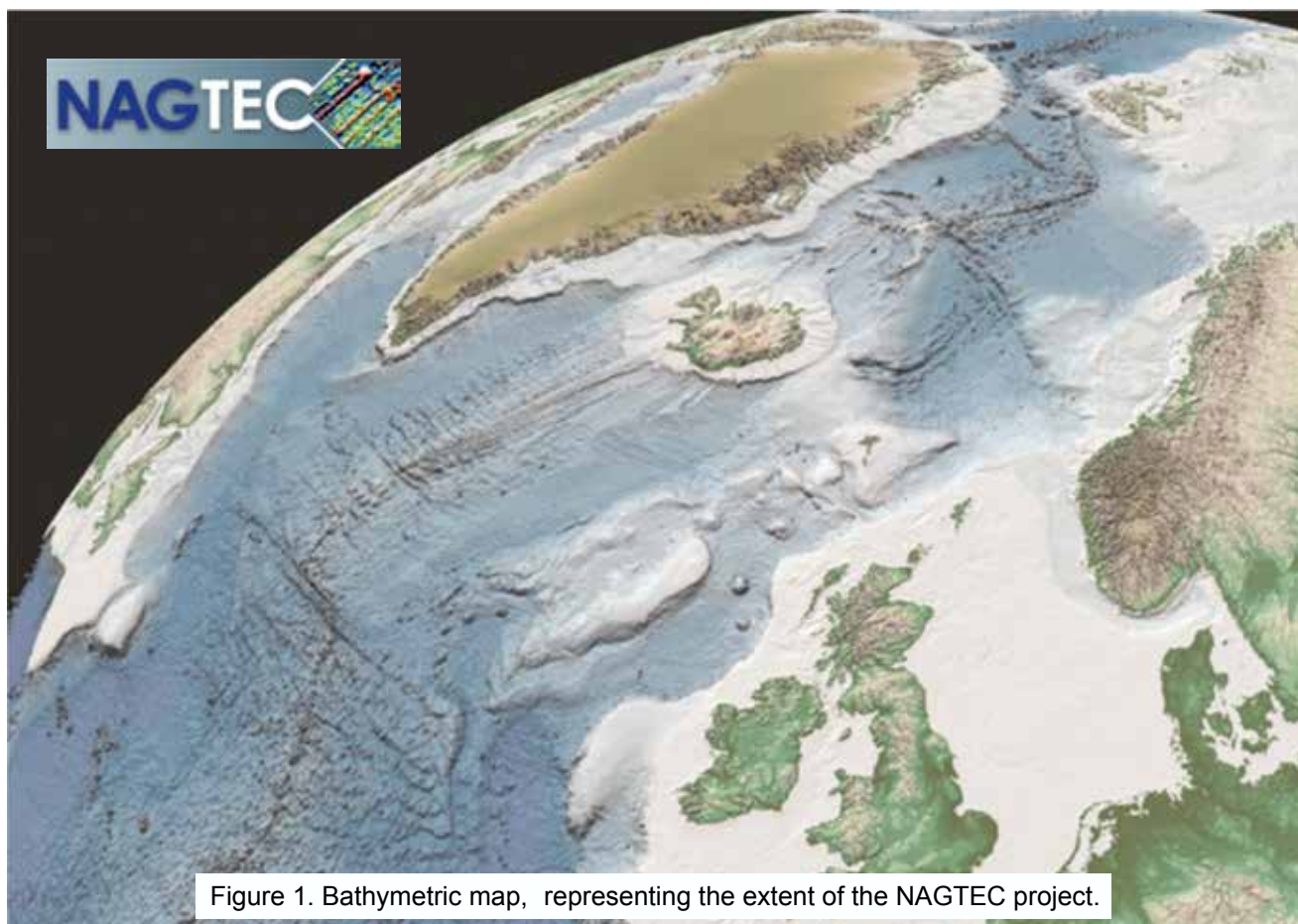
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GSI hosts sixth international NAGTEC workshop

Maria Judge, Geological Survey of Ireland.



This November the Geological Survey of Ireland (GSI) had the privilege of hosting the sixth Northeast Atlantic Geoscience Tectonostratigraphic Atlas (NAGTEC) project workshop. The GSI's involvement with the NAGTEC project began as a result of our partnership with the Northeast Atlantic Geoscience (NAG) consortium. NAG is a cooperative framework agreement between the following north European Geological Surveys: Ireland, Northern Ireland, Great Britain, the Netherlands, Norway, Germany, Iceland and Denmark (including Greenland and the Faroe Islands).

The NAG initiative works on sharing best practice and identifying theme areas of overlap between geological interests and challenges, encountered by all of its surveys. NAGTEC is the first project initiated by NAG; it began in June 2011 and is set to run for three years. So far the project has

been keeping to a strict schedule and is due to complete in June 2014. NAGTEC aims to tackle the geological theme of common interest: Tectonic development of the North Atlantic; in order to: make a systematic compilation of all tectonostratigraphic information across the region, standardise nomenclature and data across the region and identify important data gaps that hamper further understanding of regional exploration priorities. The project is co-funded by the NAG Surveys and a consortium of oil and gas companies interested in the region. Over the course of the project, the NAG surveys have been compiling the latest information and research inputs, then merging these data into standardised formats, so as to have a unified approach when analysing the regional geology and delivering it to the sponsoring companies; a tall order but a welcome challenge.

NAGTEC has proven to be a great example of how we can use our shared scientific interests and cumulative data, to develop value added projects that aspire to address technical challenges and socio-geological interests on a large scale. This ambitious project is in its final phase and as such, all contributing parties are busy completing data products that will combine to result in: (i) an atlas, detailing the evolution of the northeast Atlantic and (ii) data presented in both a physical and online web Geographical Information System (GIS).

These final products will be available to the contributing surveys and sponsoring oil companies for a moratorium of 2 years for the atlas and 5 years for the GIS. Expiry of the moratorium on the hard copy atlas is scheduled for June 2016, followed by the release of the web GIS in June 2019. On completion

of data products, the surveys' expert research personnel will publish details of the project's exciting scientific research and new understanding of the NAGTEC region, in peer reviewed scientific publications. The project will also highlight key data gaps, which may be pursued by further projects and research.

Over the course of the project, each of the participating surveys has an opportunity to host one of the bi-annual NAGTEC workshops. These workshops showcase progress to sponsors and provide a platform for further developing data products, interpretations and project planning with the international team. During the course of the project, survey personnel and company sponsors have travelled to workshops in Copenhagen Denmark, Edinburgh UK, Reykjavik Iceland, Utrecht The Netherlands, Tórshavn The Faroe Islands and most recently, Dublin Ireland. Four days of events were scheduled for the Dublin workshop from Sunday November 10th to Wednesday November 13th. Events began bright and early the Sunday morning, with participants taking part in a field trip to Lough Shinny and Portrane, in North County Dublin with Prof. John Walsh, University College Dublin (UCD) and Dr. Brian McConnell, GSI. The sun shone high in a blue sky, displaying Dublin's coastal geology in spectacular light, which very much impressed our international colleagues. The following three days involved a variety of meetings, beginning the annual

Irish petroleum conference: Atlantic Ireland 2013 and followed by the two day NAGTEC Workshop.

The first day of the NAGTEC workshop provided essential opportunity for preliminary deliberation of the project's innovative data products, with the sponsoring company representatives. It began with presentations by expert research personnel - including Prof. Pat Shannon, UCD - summarising the project's applied research into the evolution of the northeastern Atlantic. A poster session followed these presentations; designed to showcase the interpreted data products that will be presented in the atlas. Presentation and interaction with the group during the presentation of each poster proved progressive, with constructive comments and corrections from the group. The second day was reserved for interaction between specific working groups. Scientific discussion on regional data interpretation, documentation and text production took topical precedence.

By creating this tectonostratigraphic atlas of the Northeast Atlantic, NAGTEC will achieve the first systemic, standardised correlation of tectonostratigraphic information comprising the entire north eastern Atlantic region. It is hoped that the result of the project will promote an understanding of the geology and regional exploration priorities. The GSI were delighted with the opportunity to present expertise and share our facilities with international colleagues, many of whom visited

Ireland for the first time. GSI staff were commended, by the NAGTEC project coordinator and many workshop attendees, for organising an informative and enjoyable field trip and very successful workshop.

The long term benefits to Ireland, as a result of participation in NAGTEC are predicted to be significant. It is hoped NAGTEC will help support petroleum exploration and further stimulate research offshore Ireland. An additional benefit is the project's promotion of our territorial waters as a potential exploration area to sponsoring companies, not yet working in the Irish region. This project will also highlight data and knowledge gaps for further exploration and research.

The Irish contribution to the NAGTEC project is co-ordinated by Maria Judge, an INFOMAR consultant at the Geological Survey of Ireland, and employs full time (NAGTEC funded) technical support from a post-doctoral researcher, Dr Kenneth McDermott who is based at the School of Geological Sciences, UCD under the supervision of Prof. Pat Shannon. The GSI wish to extend gratitude to colleagues at the Department of Communications, Energy and Natural Resources' Petroleum Affairs Division of Ireland, for permitting access to the released offshore petroleum exploration data, from which much of our data products were generated.

Further information is available at <http://nagtec.org/home>



Figure 2. Outcrop at Lough Shinny, displaying z folds in inverted Carboniferous basin strata.

DU NOYER PHOTO COMPETITION 2013

In December, GSI announced the results of the 2013 Du Noyer Photographic competition, run in association with the Irish Geological Association (IGA). Prizes were presented to the winners at an awards ceremony which took place in GSI offices. We send our warmest congratulations to the winners and we thank all entrants for their interest in the competition.

The Competition is named after George Victor Du Noyer (1817-1869), a skilled artist who worked for many years with a youthful GSI and had a tendency to add illustrations to the geological maps on which he worked.

The overall winner of the Irish category was Mr. Brian McCready from Co. Down for his image of sunlight falling on the granite peaks of the Mourne Mountains. The winner of the foreign category was Dr Sharron Schwartz for her entry depicting a 'rock tree' taken between Bolivia and Chile.



Brian McCready being presented with first prize by Dr Bettie Higgs, representing IGA.

CATEGORY: IRISH

WINNER: Brian McCready



Binnian Sunset - Sunlight falls on the distinctive granite peaks of the Mountains of Mourne in County Down.

CATEGORY: IRISH

RUNNER UP: Martin Frank



Limestone Pavement mountains and permanent lake. Lough Gealáin with view of Mullagh More. The Burren National Park, Co. Clare.

CATEGORY: IRISH

THIRD PLACE: Malcolm McPherson



This image was taken in the evening at Belderrig Harbour on the North coast of Co Mayo and shows a large vein of quartz in the foreground with Horse Island in the distance.

CATEGORY: FOREIGN

WINNER: Dr Sharron Schwartz



The high 4000m+ plateau between Bolivia and Chile is one of the driest places on Earth. Here wind is the dominant form of erosion resulting in weird rock outcrops such as this which is known locally as the “rock tree”.

Tellus at the National Ploughing Championships

Mairead Glennon and Shane Carey



The National Ploughing Championships were held at Ratheniska, Co. Laois on 24th -26th September 2013 and the Tellus Border team had the exciting prospect of exhibiting at the event for the first time. The three day event, which attracted over 220,000 visitors this year, was a mammoth operation which saw a small city spring up in rural Co. Laois near the village of Ratheniska. As you can imagine, this doesn't happen overnight and the Tellus team embarked to Laois the day before the event to set up the exhibit. Trundling along the 22km of trackway laid through the 700 acre site in the yellow GSI van, the scale of the site hit home, with electricity, broadband and water service providers working round the clock with exhibitors to get ready on time. If the event is famous for one thing, it's the traffic, so the next morning at the crack of dawn we headed off in the autumn mist and got there on time to welcome the deluge of crowds to our stand. Whole boxes of pens, notepads and maps disappeared as fast as we could put them out as the people kept coming. A fair proportion of the 60,000 cups of tea and coffee consumed at the event kept us going until 6pm each day. In keeping with the cross-border nature of the project our colleagues from GSNI, Claire McGinn and Mohammednur Dessisa, arrived from Belfast to help out the GSI team of ourselves, Kate Knights, Jim Hodgson and Koen Verbruggen.

Over the three days we had a bamboozling variety of conversations with farmers, agricultural advisors, feed/supplement merchants, vets and members of the public about the project which was a thoroughly enjoyable and educational departure from our more usual geological conference circles. Trace elements in soil, soil types and groundwater wells proved hot topics for discussion at the stand which showcased the geoscientific data in an interactive 3D geographic information system. We also got a chance to check out the wider event ourselves, with the robotic milking, sheep shearing and fashion shows providing something

for everyone, especially the city slickers amongst us!

After the three days on the stand, back we were again on the 4th day to pack up. Thankfully the rain held off for most of the event and the dreaded mudbath conditions of previous years didn't materialise. Leaving the site, it had already been announced that the event would be held again in Ratheniska in 2014. We knew that we would be coming back. Watch out for a bigger and better GSI stand at the Ploughing this year, to be held 23rd-25th September 2014.



Shane Carey (right), at the Tellus Border Project Stand at the National Ploughing Championships with the Tellus Border viewer, available at www.tellusborder.eu

GeoGathering

Gerry Stanley

Throughout 2013 a tourism initiative known as The Gathering 2013 was run to invite the Irish international community to return home to meet their friends and family. To celebrate the contribution of Irish geoscientists to the advancement of geosciences internationally in exploration, palaeontology, geo-policy, mining, hydrogeology, engineering, geo-tourism and finance across academia, society and business, four of Ireland's leading geoscience organisations (GSI, IAEG, IMQS and the IGI) organised the Geo-Gathering over the weekend of 19-20th October 2013 at the Menlo Park Hotel in Galway.

There were nine extremely interesting and informative talks covering most areas of the geosciences but in particular resources (minerals and hydrocarbons). The meeting was opened by GSI Director, Koen Verbruggen who thought that many of us "looked like extras from 'The Quiet Man' before we left Ireland some 30 years ago". He went on to provide a summary of the exciting geology that is taking place right across the wide spectrum of the geosciences in Ireland.

Dale Hendricks presented a lifetime of experiences in the minerals sector (over 60 years) ending with some very interesting insights into salting (a practice of enhancing exploration results).

Eibhlín Doyle summarised the recently delivered report on the "Assessment of Economic Contribution of Mineral Exploration and Mining in Ireland" carried out by Indecon. The sector contributes a handsome €809m economy-wide expenditure impact employing over 3,000 people with a broad geographic spread.

Derek Briggs explored the weird and wonderful world of fossils and fossil communities with examples

from the famous Burgess Shale site in Canada. His talk was illustrated throughout with 3D reconstructions of some of the most intriguing life forms ever recorded on our planet.

Maeve Boland presented a most interesting talk on how we interact with decision makers, communities and politicians. The basic tenet of her presentation was that we needed to be more proactive with these groups as they ultimately make policy, pay our bills or lead our lives.

Murray Hitzman reported on the recently published National Academy of Sciences (of America) report into carbon dioxide capture and storage and hydraulic fracturing (fracking). The basic message was that once properly carried out and policed fracking can be safe and contributes significantly to energy supply and security. With respect to carbon dioxide storage the Academy recommends that extensive and careful studies on the rocks into which the carbon is to be placed need to take carried out before carbon dioxide is injected into the reservoir.

Kevin Quinn spoke about the success story of Tullow Oil. One of the factors contributing to that success is the philosophy the once you discover an oil or gas accumulation production will follow or put more succinctly "discover – and production will take care of itself". Tullow operates in several African countries and prides itself with excellent community relationships with many programmes aimed at providing assistance to their neighbours.

Adrian Black, working in Australia, presented a case history of discovery. In his case he was discovering nickel in Western Australia in an area which had been explored previously. His take home message was "keep drilling and work as a team". These are his essential ingredients for success and his company Newexco won

the coveted "Discovery of the Year Award" in Australia in 2008 and the Association of Mining and Exploration Companies "Prospector of the Year Award" in 2009.

Christian Schaffalitzky rounded up the talks session with a wide ranging discourse touching on many of the topics covered in the earlier talks and spoke about the Future of Irish Geology. He showed an intriguing image from the air of a windfarm and a fracking installations from Germany – it was really hard to see the fracking installation. Christian mulled over the recent move away from the use of the words geology and geologists and made a heartfelt plea not to call ourselves Earth Scientists!

There was an evening dinner followed by music and 'dancing'. However, as Margaret Browne put it best, we demonstrated that we definitely cannot do the 'Siege of Ennis'.

On the following day some 30 survivors went on a field excursion to the Burren lead by John Murray of NUIG where he demonstrated both geological and archaeological wonders of the region.

A special word of appreciation should go to Margaret Browne (IAEG) who coordinated the event with assistance from Noeleen Fox (IAEG), Roy Coates (IAEG), Mark Patton (IAEG), Siobhan Tinnelly (IMQS), Sean Finlay (IMQS), Deirdre Lewis (IGI), Marie Fleming (IGI), Laurena Leacy (IGI) and Gerry Stanley (GSI and IGI).

Reaction to the event was really positive and all agreed that as a formula for future meetings it was one worth repeating – perhaps at an interval of 5 years.



Speakers at the GeoGathering: back row (left to right) – Christian Schaffalitzky (Eurasia Mining), Kevin Quinn (Tullow Oil), Adrian Black (Newexco Services), Derek Briggs (Yale Peabody Museum); front row (left to right) – Koen Verbruggen (GSI), Murray Hitzman (Colorado School of Mines), Maeve Boland (American Geosciences Institute), Eibhlin Doyle (EMD), and Dale Hendrick (Hendrick Resources).

BT Young Scientist and Technology Exhibition

Mary Carter



Tess Casasin Sheridan and Aoife Doherty, from Mary Immaculate Secondary School, Lisdoonvarna, Co Clare, winners of the GSI Prize with Koen Verbruggen, Director, Geological Survey of Ireland. The title of their project was “Why are the beaches in Clare different colours?”. Their teacher is Mr. John Sims.

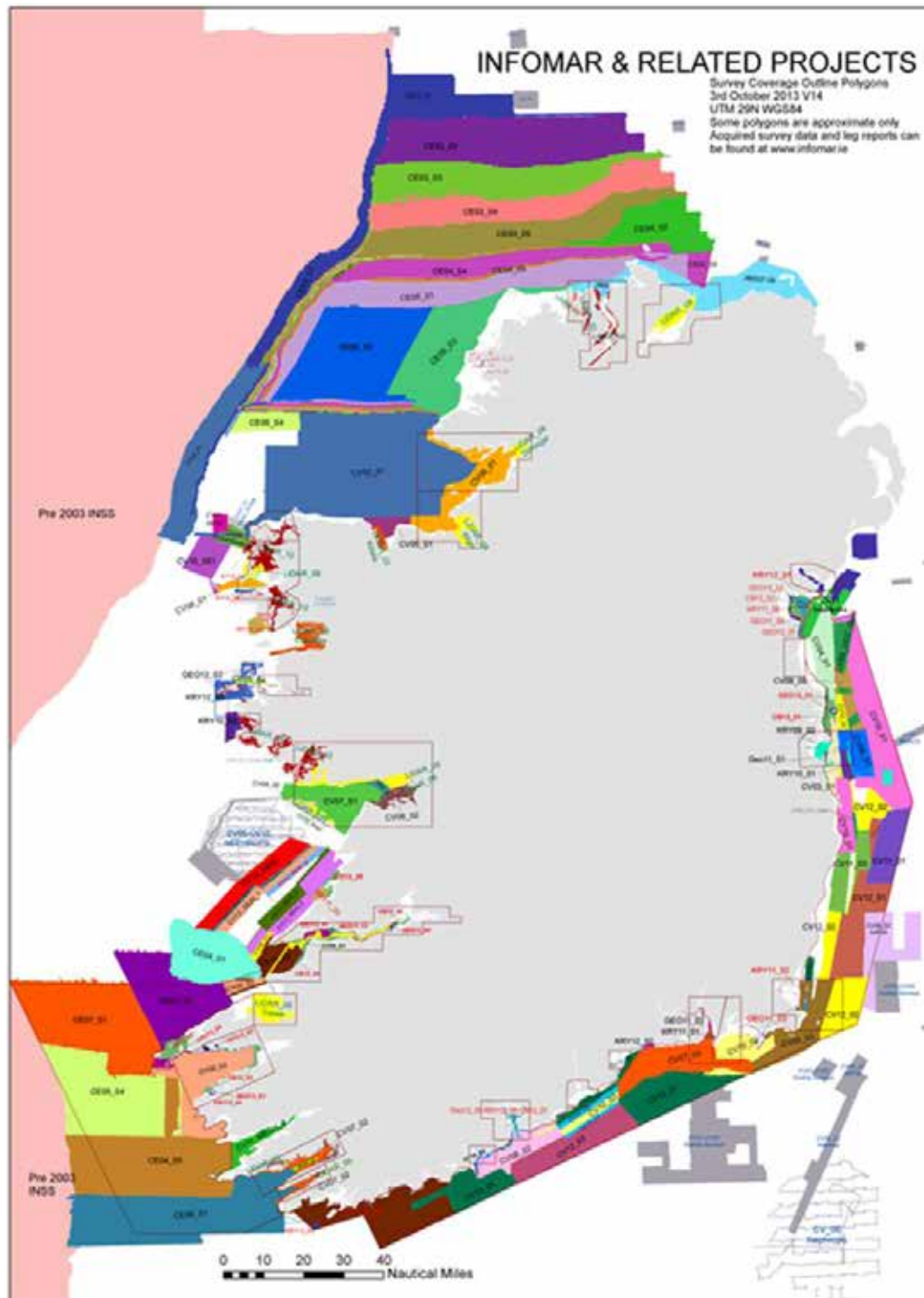
INFOMAR Update

Archie Donovan INFOMAR Project Manager

The INTEGRated Mapping FOR the Sustainable Development of Ireland's MARine Resource (INFOMAR) programme is a joint venture between the Geological Survey of Ireland (GSI) and the Marine Institute (MI).

The programme is a successor to the Irish National Seabed Survey (INSS) and concentrates on creating integrated mapping products of the physical, chemical and biological features of the seabed in the near-shore area.

The programme is funded by the Irish Government through the Department of Communications, Energy and Natural Resources. This article is a guide to the upcoming INFOMAR survey operations during the 2014 season.



Coastal and inshore area mapped as of end of 2013. Each colour represents a separate survey leg, labelled by survey platform (2 digits), year of survey (2 digits) and survey number (2 digits). Details on <http://www.infomar.ie>.

INFOMAR Programme 2014: Proposed Survey Areas

The 2014 INFOMAR preliminary survey operations will primarily focus on coastal and inshore survey. The MI R.V. Celtic Voyager will focus on the following areas...

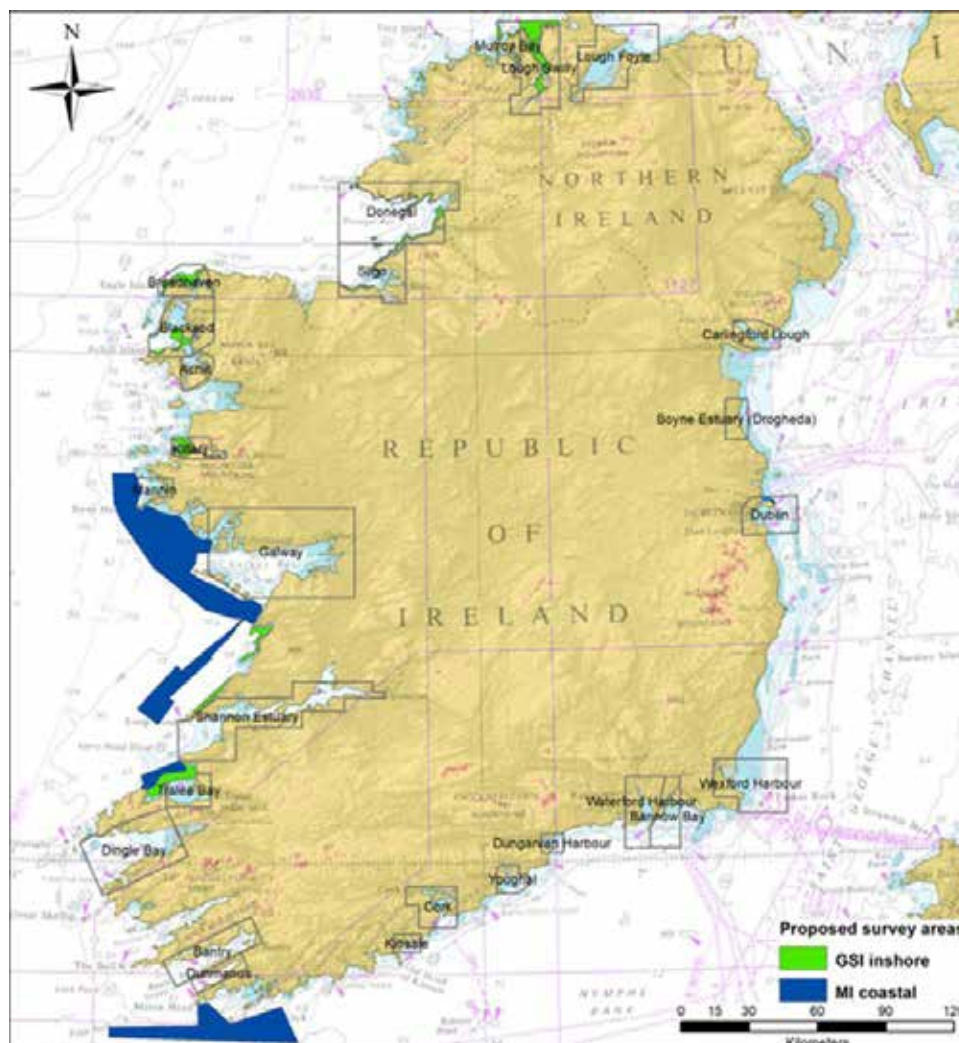
- West Clare on behalf of Sustainable Energy Authority for Ireland
- South West coast, merging coverage achieved in 2013 in Roaring water Bay with historical coverage obtained by the R.V. Celtic Explorer in 2006
- Offshore Tralee Bay merging with historical data collected by R.V. Celtic Explorer
- West Coast offshore Co. Galway extending coverage within the Biologically Sensitive Area

The three GSI R.V.'s Keary, Cosantóir Bradán and Geo will conduct survey activity on the following areas

- Lough Swilly and outer Mulroy Bay, extending previous Lidar coverage
- Sheep Haven and Gola Island (work carried out on behalf of BIM)
- Donegal Bay extending further inshore coverage achieved by the R.V. Celtic Voyager
- Blacksod Bay/ Broadhaven Bay
- West Clare surveying inner coastline on behalf of Sustainable Energy Authority for Ireland
- Tralee bay.

All survey activities are preliminary and might change depending on weather and other unforeseen factors.

Proposed survey areas for 2014.



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Value Added Exploitation

A specific objective of INFOMAR is the delivery of a programme of national and international value added research to leverage the skills, expertise and data from the INSS and INFOMAR.

The programme office coordinates Research Calls and associated grant aid award schemes, and encourages industry & research partnership and collaborative applications, particularly in areas related to INFOMAR activities where there is future scope for commercial opportunities, growth and/or jobs.

23 research projects were funded in 2011/2012 across a broad array of disciplines and areas including (see Table. 1)

- Data management, visualisation, analysis, and integration
- Geoscience, Oceanography, Acoustics
- Ocean Energy
- Technology Development
- Education and outreach

Data Products and Access

All INFOMAR datasets can be freely accessed via the data and products page of the INFOMAR website (<http://www.infomar.ie/data>).

A. Data Viewer Sites:

1. <http://geos2.marine.ie/infomar>:
This is a Web Map Viewer link above.
2. <http://spatial.dcenr.gov.ie/imf/imf.jsp?site=INFOMAR>:
This is the INFOMAR public viewer link above.
3. <http://geos2.marine.ie/infomar/Help/LinktoWMS.html>

B. Data Download Site

The webmapping viewers provide the user with enhanced data visualisation and query tools in comparison to the data download site. However, data can be downloaded directly without first reviewing it in the above viewers from the data download site: <https://jetstream.gsi.ie/iwdds/index.html>.

C. Products Download

INFOMAR and INSS products can be viewed and downloaded here: <http://www.infomar.ie/data/ProductAccess.php>

<http://www.infomar.ie/data/ChartsMap.php>

https://jetstream.gsi.ie/delivery/INFOMAR_Google/INFOMAR_INSS_Shipwreck_Locations_2013.kmz

Table 1 Research projects funded by INFOMAR in 2011/2013

Title	Organisation
Geochemical constraints on the age, affinity and history of the Porcupine High	University College Dublin
The Bedrock Geology of Dublin Bay	Trinity College Dublin
Organic characteristics of aerobic microbial communities in deep sea sediment from the South Pacific Gyre	Dublin City University
Sea surface alkalinity across the Irish shelf from underway temperature and salinity data collected during the INFOMAR project	NUI, Galway
Integrated Coastal Mapping of Dublin Bay: Geomorphology based on geophysical data, Satellite inferred bathymetry and 3D integration with INFOMAR datasets	NUI, Maynooth
Carbon Cycling in Dunmanus Bay pockmarks: Data generation and interpretation from the INFOMAR ground truthing program on the Porcupine Bank and Dunmanus Bay, Ireland (CE11 017)	Dublin City University
Celtic Sea Sedimentary Processes, Quaternary Stratigraphy and Offshore Renewable Energy Development (CeSQuORE)	University College Cork
Appraisal of Irish Sea Seabed Imaging for Tidal Energy Generation (ISSITEG)	University College Cork
Integration of multiple offshore and onshore datasets from NE Ireland and the Irish Sea: an integrated 3-D model of geological structure	University College Dublin
Modelling the beta diversity of the continental margin	NUI, Galway
Web based geospatial encoded marine video and image demonstrator project	Geotech Technologies
Coastal Seabed Observatory Platform (COSOP)	Techworks
Development of an integrated environmental on-line mapping system for the marine environment, to support the Marine Strategy Framework Directive and to highlight the Value of INFOMAR Data	National Biodiversity Data Centre, Ireland
Integration of INFOMAR data products and auxiliary data with handheld GPS devices and shipborne navigation systems	Monterrey Software Solutions
A Study of the Effect on Seabed Sediments at Ocean Energy Sites of Storm Waves and Currents using a Coupled Wave and Hydrodynamic Numerical Model	Numerics Warehouse
Scaling Hydrographic Education & Training through Interactive E-learning and Scenario-Based Operational Simulation Integrated with INSS/INFOMAR Datasets and Operational Procedures	SonarSim
COLDSTORE: Enhanced facilities for the extension of sediment core shelf life	NUI, Maynooth
Foundation Risk & Geotechnical Uncertainty Mapping for future Offshore Wind Farm Developments	Gavin & Doherty Geosolutions
Delivery of a Real-time Survey Planner for Online Multibeam Quality Control	SonarSim
Development of online webGIS educational portal about Ireland's Coastal and Marine Geology	University College Cork
Geological and geophysical description of the Arc Mounds, southwest Porcupine Bank	NUI, Galway
A popular online marine resource management game'	RealSim Games
Smart Event Triggered Ocean Monitoring Platform, (lander/mooring/databuoy)	University of Limerick
Delivery of a Real-time Survey Planner for Online Multibeam Quality Control	SonarSim
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Staff News

Appointments

While every recent newsletter has seemed to feature one or more retirements from GSI, we are delighted to report on a new appointment. Gerard (Gerry) below, Cott joined us as a Senior Driller in January 2014, to enable us to maintain our valued drilling service, which underpin so much of our fieldwork. Gerry, who hails from Castlemartyr in Cork, has extensive experience in drilling and site investigation, most recently with Causeway Geotech. Gerry will be working together with Oisín O'Brien in our Central Technical Services section, managed by Tom McIntyre.

Promotions

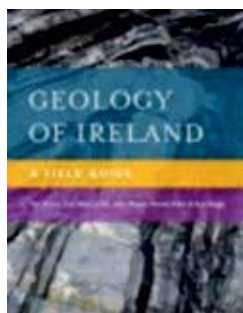
After a Department wide competition, two promotions have been made to GSI Management team at Principal Geologist level. Archie Donovan and Ray Scanlon have been appointed with responsibility for the marine and terrestrial programmes respectively. Archie joined the Irish National Seabed Survey team from its inception in 1999 and took the Data Manager role into the successor programme INFOMAR in 2006, most recently he took over the project management. Ray Scanlon was GSI's Information Manager and manages the Tellus Border Project, in 2012 he was appointed Acting Principal Geologist. We wish them well in their challenging new roles.



New Publications in GSI's walk-in-shop and on our e-store www.gsishop.ie

For further information about our publications and for additional publications please visit our online shop at www.gsishop.ie

Prices listed do not include Post and Packing



Geology of Ireland - A Field Guide

Authors: Pat Meere, Ivor MacCarthy, John Reavy, Alaister Allen & Ken Higgs

Format: Paperback.

Extent: Size: 240mm X 170mm Pages; 256

Illustrations: Colour Throughout.

Publisher: The Collins Press 2013

Price €19.99



The Burren and the Aran Islands - Exploring the Archaeology

Author: Carleton Jones

Format: Paperback Size: 244mm X 244mm Pages: 270pp

Illustrations: Colour Photos/B&W Photos/Line Drawings Published: 2004

Publisher: The Collins Press

Price €19.99



Irish Rocks

Author: Patrick Gaffikin

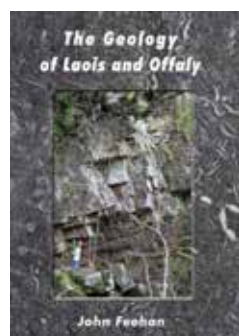
Format: Paperback

Extent: 44 pp Size: 210mm X 145mm

Illustrations: Colour Throughout

Publisher: Albertine Kennedy Publishing Published: 2013

Price €9.00

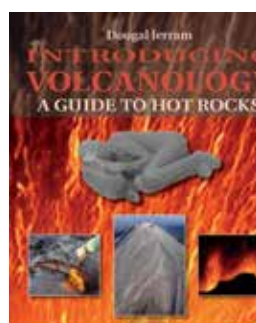


The Geology of Laois and Offaly

Price €40.00

ISBN 978-0-95745433-1-9

Author: John Feehan Format: Hardback Extent: 403pp Size: 215 x 300 mm Illustration: Colour Throughout Published: 2013 Publisher: Offaly County Council in association with Laois County Council and the Geological Survey of Ireland.



Introducing Volcanology – A Guide to Hot Rocks

Author: Dougal Jerram

Format: Paperback

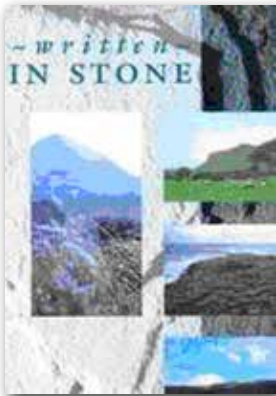
Extent: 128pp Size: 165mm X 195mm

Illustrations: Colour Throughout

Publisher: Dunedin Academic Press Ltd Published: 2011

Price €13.99

Bestsellers in GSI's walk-in-shop and on our e-store www.gsishop.ie



Written in Stone DVD

Price €25.00

P. Kennan (1995). The Written in Stone television series was commissioned by GSI and aired on RTE in 1995 and again in 2006. A DVD and book were also produced as part of GSI's celebration of its 150 years history. The DVD describes the geology of Ireland, beautifully illustrated and explained by one of Ireland's most renowned experts and greatest communicators in earth science, Dr Pádhraig Kennan.

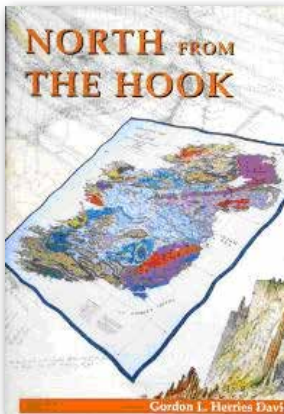


Understanding Earth Processes, Rocks and the Geological History of Ireland

Price €15.00

This publication which is a recommended text for Leaving Certificate Geography, comprises a geological map which depicts the distribution of rocks of different ages and types at the present and the accompanying book, which gives a historical geography (paleogeography) of each Earth period, as shown in the map legend.

A. Sleeman, B. McConnell & S. Gatley (2004)



North from the Hook

Price €25.00

G.L. Herries Davies (1995). The Geological Survey of Ireland (GSI) is one of the world's oldest Geological Surveys. It was founded in 1845 but its roots extend back a further twenty years to 1825. In this volume a distinguished Irish earth scientist and historian of science tells, for the first time, the story of the Survey over its life of 150 years.

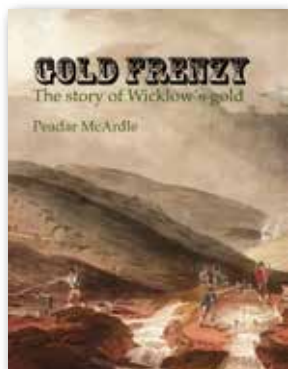


Bedrock Geological Map of Ireland (Scale 1:500,000)

Price €10.00

Bedrock Geology of Ireland, compiled by B. McConnell and S. Gatley (2006)

Derived from the Geological Survey of Ireland 1:100,000 scale Bedrock Map Series and the Geological Survey of Northern Ireland 1:250,000 scale Geological Map of Northern Ireland.



Gold Frenzy: The story of Wicklow Gold

Price €20.00

Gold has always been mankind's enduring passion and long after the initial gold rush of the early 18th century, a belief persisted that enormous riches lay hidden in the Wicklow hills. In this entertaining and highly informative book, Peadar McArdle, former Director of the Geological Survey of Ireland, describes how the frenzy has never really died down, and to this day, panners hope to be rewarded by the glimmer of gold. Peadar McArdle (2012).



Rock around Ireland - A guide to Irish geology

Price €20.00

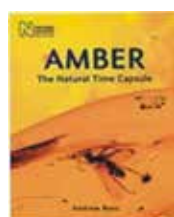
P. McArdle, 2008. Number 2 in the Science Spin Discovery Series. This highly illustrated hardback book is an accessible introduction to the geology of Ireland. 112 pages, hardback.



Earthquakes - Our Trembling Planet

Price €8.00

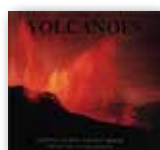
BGS publication. S. Van Rose & R. Musson (1997). Part of the BGS Earthwise series this book looks at the geological background to earthquakes and the how, where and why they strike and why some parts of the world suffer more than others.



Amber (The Natural Time Capsule)

Price €12.00

British Natural History Museum Publication. Andrew Ross (1998). The book explains how amber is formed, where it is found and how to distinguish genuine amber from fakes. It describes its many uses, both in art and science, and recounts the elusive search for DNA from insect inclusions.



Volcanoes

Price €10.00

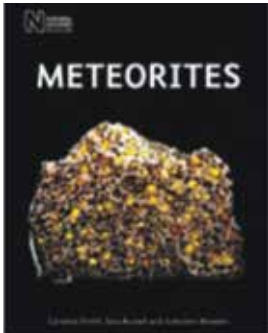
British Natural History Museum Publication. S. Van Rose & I.F. Mercer (1999). This issue deals with volcanoes and how they erupt, famous eruptions and how volcanoes can bring prosperity and hazards to the millions of people who live nearby.



Earthquakes

Price €3.50

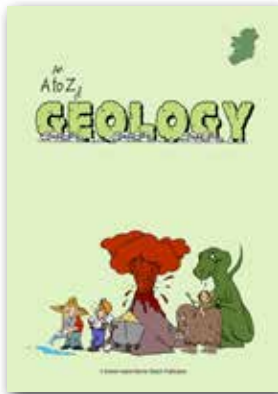
BGS publication. S. Van Rose (1983). This booklet investigates the nature, distribution, causes and effects of these transient but terrifying natural events and looks at the possibilities of averting their most disastrous consequences.



Meteorites

Price €12.00

British Natural History Museum Publication: Caroline Smith, Sara Russell and Gretchen Benedix. (2009) Meteorites are rocks from space that have fallen to the Earth's surface. Once considered bad omens, they are now recognised as giving us a unique insight into the nature of material that was present at the formation of the solar system. In Meteorites, leading experts from the British Natural History Museum provide an introduction to these mysterious objects. It is written in an easy-to-follow, jargon-free style, making it accessible to all and is illustrated throughout with a mix of photographs, diagrams and maps.

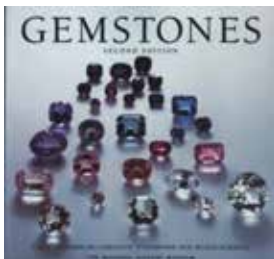


An A to Z of Geology

Price €5.99

A simple well-illustrated A to Z of geology.

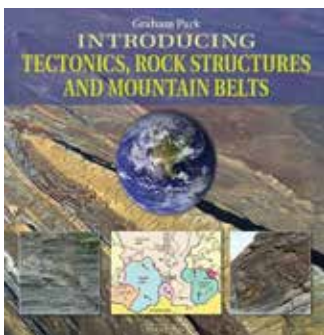
GSI has cooperated with the Sherkin Island Marine Station on the production of an A-Z Guide to Geology. This simple, well-illustrated guide will be of interest to primary school teachers, secondary school geography teachers and the wider general public. Indeed anybody who has ever wondered a little about Planet Earth and its resources should find this book interesting.



Gemstones

Price €10.00

British Natural History Museum Publication: Cally Oldershaw, Christine Woodward and Roger Harding (2001). Gemstones have been a source of fascination for many thousands of years. This book looks at each gemstone in turn, exploring their unique beauty, rarity and durability. It reveals how each of the gem minerals forms, where they are found and mined and how they are identified. The book also explains how to distinguish the real from the fake, cutting and polishing techniques and their use in adornment, from over 4500 years ago, right up to the present day.



Introducing Tectonics, Rock Structures and Mountain Belts

Author: Graham Park

Format: Paperback

Extent: 144pp Size: 220mm X 220mm

Illustrations: Colour Throughout

Publisher: Dunedin Academic Press Ltd Published: 2012

Price €22.00