



## NewsLetter January/February 2005 Issue no. 5

### Geothermal Energy in Ireland

Geothermal Energy Exploitation In Ireland –  
Review of Current Status and Proposals  
for Optimising Future Utilisation

Final Report to Sustainable Energy Ireland



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July 2004

Prepared for:  
Sustainable Energy Ireland

#### Geothermal Resource Map of Ireland

A study for Sustainable Energy Ireland carried out by the CSA Group in cooperation with Conodate Geology, Cork Institute of Technology and the Geological Survey of Ireland to identify potential resources of geothermal energy in Ireland was launched by SEI in Glasnevin in October 2004. From

thermal, geological, structural and hydrodynamic data a GIS-linked geothermal database was produced and a series of geothermal maps of Ireland modelled. The current status and utilisation of geothermal energy resources in Ireland was reviewed, and recommendations made on the future potential exploitation of the geothermal resource in Ireland.

The study surveyed warm springs and surface water temperature trends. The review indicates that Ireland is particularly well suited for the utilization of ground source heat pumps, due to its temperate climate and rainfall levels that ensure good conductivity and year round rainfall recharge. There are abundant marine and surface water geothermal resources that could be exploited in Ireland, but need encouragement for their development. The two main areas of warm spring development are in north Leinster and Mallow regions.

In order to map the subsurface temperatures, temperature data from 19 mineral and oil exploration holes ranging in depth 400m – 3,300m was retrieved. CSA also surveyed 32 open boreholes, ranging in depth from 40m – 810m, to obtain their temperature profiles. Geothermal maps were produced for surface, 100m, 500m, 1000m, 2,500m and 5,000m depths and can be viewed using MapInfo software. Temperature plots may be viewed with the accompanying geological data overlaid and individual borehole data points with references interrogated.

Taking the Republic of Ireland and Northern Ireland together, this review has indicated a regional increase in temperature ranging from 17°C – 19°C in the south to 25°C – 27°C in the north at 500m depth. At 2,500m temperatures range from 28°C – 45°C in the south to 64°C – 97°C in the north. This indicates a significant economic resource with potential for commercial development.

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The Final Report can be downloaded from:

[www.sei.ie/erdd/geothermal](http://www.sei.ie/erdd/geothermal)

*EurGeol Gareth Jones PGeo*

## Industry News

Tara Mines Exploration Department, in partnership with Priority Drilling is currently testing the *Wassara* downhole water hammer system, developed in Sweden. The objective is to drill a 600m deep open hole that can be extended with diamond core drilling to explore for ore at greater depths.



The trial hole reached a depth of 557 metres in approximately seven drilling shifts, over five times faster than conventional diamond drilling. Some problems were encountered with hole deviation and a further trial is planned to reduce deviation and potentially reach greater depths.



Although geological information is lost with this new system, time is gained, a vital element in the search for more ore in the deeper area surrounding the Navan orebody.

*EurGeol Mark Holdstock PGeo*

## CPD returns

### **Continuing Professional Development (CPD)**

In order to keep up to date with the ever increasing technical and regulatory changes in our profession, and in line with the IGI's stated objective of improving professional standards, all IGI members must devise and carry out a CPD programme, and complete the CPD form annually. This approach is in line with best practice in professional geology organizations in other countries, and is similar to that operated by other professional bodies such as the IEI and RIAI.

During 2004 the views of a large section of the membership were sought on the CPD process and forms. Following this consultation, a sub-committee was appointed by the IGI Board to review the CPD system and the reporting forms. The sub-committee has attempted to make the system of CPD returns easier for the membership, without losing the important elements of CPD. The new forms should take no more than an hour to complete. Our hope is that most of that time will be spent setting challenging goals for the coming year(s) and reflecting on how you progressed towards the goals you set yourself last year.

The number of forms has been reduced to three pages, and is again provided in *Excel* workbook format, along with a glossary and information on how to complete the forms. Details of the changes that have been introduced this year can be found in the 'How to complete' page included in the workbook that has been sent out to members by e-mail. This year also sees the introduction of part-time, part-time senior, retired and unemployed categories. Definitions of each category can be found in the 'Glossary' page in the workbook. Hopefully answers to most of your questions can be readily found within this information. Help is also readily available from the IGI CPD sub-committee if you have queries or problems with completing the forms.

The completed forms for 2004 must be returned, along with your membership fee for 2005, by 30<sup>th</sup> April 2005. Forms should be returned by email ([info@igi.ie](mailto:info@igi.ie)), or printed and posted, to the IGI Office.

*IGI CPD sub-committee (Anita Furey, Julian Menue, Mark Holdstock)*

## Academy Committee for Geosciences



### Bulletin 2 – March 2005

At the February meeting of the Academy Committee for Geosciences, the planned abolition by UNESCO of the position of Director of Earth Sciences was noted. The UNESCO Earth Science Division's activities will be split into two sections: one, comprising IGCP (International Geological Correlation Programme), Geoparks, international co-operation, earth observation and capacity building will be merged with the Division of Ecological Sciences. The other, comprising disaster reduction, will go to the Division of Basic and Engineering Sciences. A 50% funding cut is planned by UNESCO for the IGCP from 2006, with no funding assurances beyond that. The Committee will ask UNESCO to reconsider these decisions, pointing out the value of the IGCP to geoscientists both in Ireland and in developing countries.

Interim reports were presented by the following working groups:

#### Priority areas and funding for geoscience research.

Chair: Prof. Pat Shannon.

Progress is being made on two fronts:

1. data are being collated on the range of academic research areas in Ireland, the sources of funding and the amount of funding obtained by third level geoscience institutions during the past five years;
2. an initial industry survey has identified hydrocarbon exploration, environmental geoscience and aggregate resource assessment as three areas of research of major industrial importance. Further work will aim to quantify the major needs of the geoscience industry throughout Ireland.

The group will also identify priorities, and possible sources of funding, for academic research. It will liaise in its work with the Geoscience Initiative,

being led by the GSI. It expects to submit a final report on its work by September 2005.

#### Promotion of geoscience education in schools.

Chair: Dr Ian Sanders.

The working group is focusing on:

1. establishing what teaching resources, including textbooks, maps and samples, are already available to schools, what special training has already been given, and is still required;
2. identifying problems teachers have experienced with these resources (e.g. appropriate level of difficulty, sufficient supply of materials, guidance and ideas on how to present concepts) and improving their usefulness in the classroom;
3. production of rock sets for schools and design of tasks built around them, for delivery to schools by September 2005.

#### Geoscience outreach to the general public.

Chair: Dr Matthew Parkes.

The working group is keen that the Geosciences Committee facilitate, encourage and endorse the many existing outreach activities in Ireland. In addition, five key actions are suggested for the period 2005-2008:

1. work towards ensuring that output from third level geoscience research is routinely communicated to the public;
2. set up a new externally funded prize scheme for the best guide / project / interpretation / community effort involving geodiversity;
3. co-ordinate or contribute to a range of geoscience events around the British Association for Advancement of Science visit to Trinity College Dublin in September 2005;
4. organise one or more one day/half day workshops/seminars on geoscience topics of high public relevance for targeted groups such as planners, politicians, media;
5. run an RIA lecture series on topical geoscience.

Any correspondence for the attention of the Geosciences Committee can be sent to [geosciences@ria.ie](mailto:geosciences@ria.ie). The committee next meets on Tuesday 7<sup>th</sup> June, 2005.

Bulletins and other documents relating to the committee will be archived on its web site: <http://www.ria.ie/committees/geosciences/index.html>.

**Committee membership:** Dr Chris Bean (Chair), Prof. Pat Shannon (Vice-Chair), Dr Julian Menuge (Secretary), Mr David Ball, Mr Mick Cory; Dr Catherine Coxon; Dr Catherine Dalton (Representative of the Academy Committee for Geography); Dr Eve Daly; Mr Garth Earls; Ms Rebecca Gageby (Programme Manager); Prof. John Gamble; Dr Deirdre Lewis; Dr Peadar McArdle; Mr Eoin Moran; Dr Aodhagán Ó Rodaighe (Representative of Irish Committee on Climate Change); Dr Matthew Parkes; Dr Ian Sanders.

***EurGeol Julian Menuge PGeo***

Secretary, Academy Committee for Geosciences  
1<sup>st</sup> March 2005.

## New Environmental Geological Map

### ***AN ENVIRONMENTAL GEOLOGICAL MAP OF THE SOUTH MUNSTER BASIN, IRELAND***

The Department of Geology at UCC in collaboration with the Geological Survey of Ireland has carried out extensive research work on the geology of southern Ireland in recent years with the aim of defining and understanding the distribution of the various rock formations in this important sedimentary province. The results of some of this work have already been published by the Geological Survey of Ireland in 2002.



***Pictured at the map launch on the 5th October 2004. From left: Dr. Ivor MacCarthy, Professor G.Wrixon President of UCC, Professor J. Gamble Head Geology Dept UCC.***

Stemming from this work, the Department of Geology has compiled an interesting, new and very

detailed map of the country west of a line from Galley Head to Macroom in County Cork, an area of some 3,500 square kilometres. This area comprises the western part of the Devonian-Carboniferous South Munster Basin.

### **THE MAP**

The map is the product of about 30 years of research work carried out at the Department of Geology UCC by Dr. Ivor MacCarthy and UCC research students. This work involved extensive field observation of outcropping bedrock. Much of this work was carried out on a scale of 1:50 or 1:100 with data being plotted initially on to 1:10,000 topographical base maps. Extensive use was also made of Ordnance Survey aerial photographs, which permitted the recognition of major fracture and fold patterns in the bedrock. Geological data from the 1:10,000 base maps was transferred to Ordnance Survey 1:50,000 topographical maps before inputting into a computer drawing package and final production on a scale of 1:75,000.

The map is a full-colour, thematic production, depicting environmental aspects of the geology of southwest Ireland in more detail than any previous publication has achieved. This is a large map, measuring 0.9m high by 2m in width.

Additionally, the map shows the distribution of environmentally significant fractures and faults in the region. It also shows the orientation of the sedimentary layers and the style of folding and deformation of the rock formations in cross-section.

This is probably the first thematic map of its type in Ireland and it is likely that this approach will be adopted more in future map publications here. A summary environmental map is also included as an inset within the larger map. The map is accompanied by an explanatory booklet, which contains an extensive reference list for this part of the South Munster Basin.

### **APPLICATIONS OF THE MAP**

This map has extensive practical applications, which include the following:

1. Data source for academic researchers.
2. Information for planners, engineers and assessors of environmental hazard risk.

This map provides essential information to aid in the prediction of unstable ground conditions. It shows the distribution of a vast

array of fractures in the bedrock some of which may be up to 10m in width. Many of these are filled with various types of soil deposits.

Such situations are potential areas of ground instability due to groundwater movement along the fracture infills both below the ground and on the surface.

This has particular importance now because of the increased risk of flooding and ground collapse due to the apparent increase in the frequency of flash floods in recent times (presumably linked to climate change). The map allows the prediction of areas at risk due to this type of situation.



***The map's author in the field! Photograph by Tomas Tyner (UCC photographer).***

It is an essential tool used by hydrogeologists in identifying potential aquifers, sources of groundwater and groundwater migration patterns. The identification of the complex fracture network aids such studies.

3. Use for the production of Environmental Impact Studies
4. Teaching in Environmental Studies (Science), Geology and Earth Science programmes in universities here and abroad
5. Third level Adult Education programmes
6. Geotourism: Southern Ireland is an important location for geological field parties from various parts of the world.
7. Interest to the general public. There is considerable public interest in environmental aspects of geology.

## **AVAILABILITY**

Copies of the map are available by contacting:  
The Department of Geology, University College Cork,  
Cork, Ireland.  
(Phone: +353 21 490 2533, Email: [i.maccarthy@ucc.ie](mailto:i.maccarthy@ucc.ie)).  
Price: €25 plus €5 post and package

*Ivor MacCarthy PGeo*

## **2004 John Jackson Memorial Lecture**

### **John Jackson Lecture 2004 - Report**

The 11<sup>th</sup> annual John Jackson lecture was delivered by the Donal Daly of the IGI on 11<sup>th</sup> November 2004 to the Royal Irish Academy. This annual lecture series commemorates the life and work of Dr. John S. Jackson – an Irish geologist and naturalist.

Donal's paper was entitled "Groundwater at Risk in Ireland; Putting Geo-Scientific Information and Maps at the Core of Land Use and Environmental Decision Making" and was delivered to a well attended gathering drawn from the wider environmental community.

Donal explained how in the last decade, the Geological Survey of Ireland have made great strides forward in compiling a national database of geological information. The production of county-based Groundwater Protection Schemes was a major driver behind this work. A huge resource, including aquifer classifications, vulnerability ratings and source protection areas, is now available to be used as a tool in effective land use planning. Access to this information and the associated groundwater protection responses is enhanced by the digital GIS database now available on the GSI website ([www.gsi.ie](http://www.gsi.ie)). Key land zoning information can now be accessed free of charge, on a county or individual location scale.

The EU's Water Framework Directive (WFD) has highlighted the importance of having readily accessible geoscientific information. A broader risk assessment based approach is now required that considers receptors (groundwater, drinking water, groundwater dependent rivers, lakes and ecosystems) and geological pathways (both vertical and horizontal). The availability of this information through the GSI data base now makes it possible to map the pathway susceptibility for

pollutants in given hydrogeological environments. The WFD Groundwater Working Group and the WFD Technical Coordination Group are currently devising a structured approach to derive the risk category for all groundwater bodies.

Donal ended his most thought provoking lecture by stressing that the maintenance of this national geoscience resource is of fundamental importance. While advances in digital technology have certainly made the job of land managers easier, key decisions must only be made with full regard given to accurate and up to date geoscience information.

*Karen-Lee Ibbotson, White Young Green*

Full copies of Donal's paper (32 pages) can be obtained from the GSI Customer Centre at a cost of €6 (includes postage) or €5 over the counter.

## IGRM 2005

The 48<sup>th</sup> annual Irish Geology Research Meeting was held over the weekend of Friday 18th to Sunday 20th February 2005 at Trinity College Dublin. The IGRM is an important showcase for geological research in Ireland. Forty five talks and thirty three posters were presented on subjects ranging from the taphonomy of Miocene amphibians and reptiles, to the geology of the Great Eucrite intrusion on Ardnamurchan. The meeting coordinator, Dr Ian Sanders is thanked for his superb organisation of the meeting. Congratulation to Maria McNamara (Geology, UCD) and Brian O'Driscoll (Geology, TCD) on their awards for the best student talk and best student poster presentation respectively.

*EurGeol Frank McDermott PGeo*

## Articles Welcome

IGI Newsletters will be published every two months. Please send comments, letters and articles for inclusion in the next issue (due 1<sup>st</sup> May 2005) to *EurGeol Frank McDermott PGeo*, Department of Geology, UCD, e-mail: [frank.mcdermott@ucd.ie](mailto:frank.mcdermott@ucd.ie) before Friday April 29<sup>th</sup> 2005. Articles with accompanying photographs (jpegs < 500 kb) are particularly welcome.

*All views expressed within articles published in IGI Newsletters are those of the contributors, and do not necessarily reflect those of the IGI Board.*

## Event Guide

### March 12<sup>th</sup> 2005

The Irish Quaternary Association (IQUA) Spring Meeting and AGM will be held in the Museum Building, Trinity College Dublin on Saturday, March 12<sup>th</sup>, starting at 10 am. Enquiries to Michael Philcox: [mphilcox@ted.ie](mailto:mphilcox@ted.ie) or (045) 865535. Details of the Meeting Programme can be found on the IQUA website

[http://www.tcd.ie/Geography/IQUA/Meet/Met\\_Hme.htm](http://www.tcd.ie/Geography/IQUA/Meet/Met_Hme.htm)

### May 25<sup>th</sup>-26<sup>th</sup> 2005

The Geophysical Association of Ireland will hold a seminar on the topic of 'Geophysical applications in engineering investigations'. Venue: Hodson Bay Hotel, Athlone, Co. Westmeath. More details to follow.

## Advertisement

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