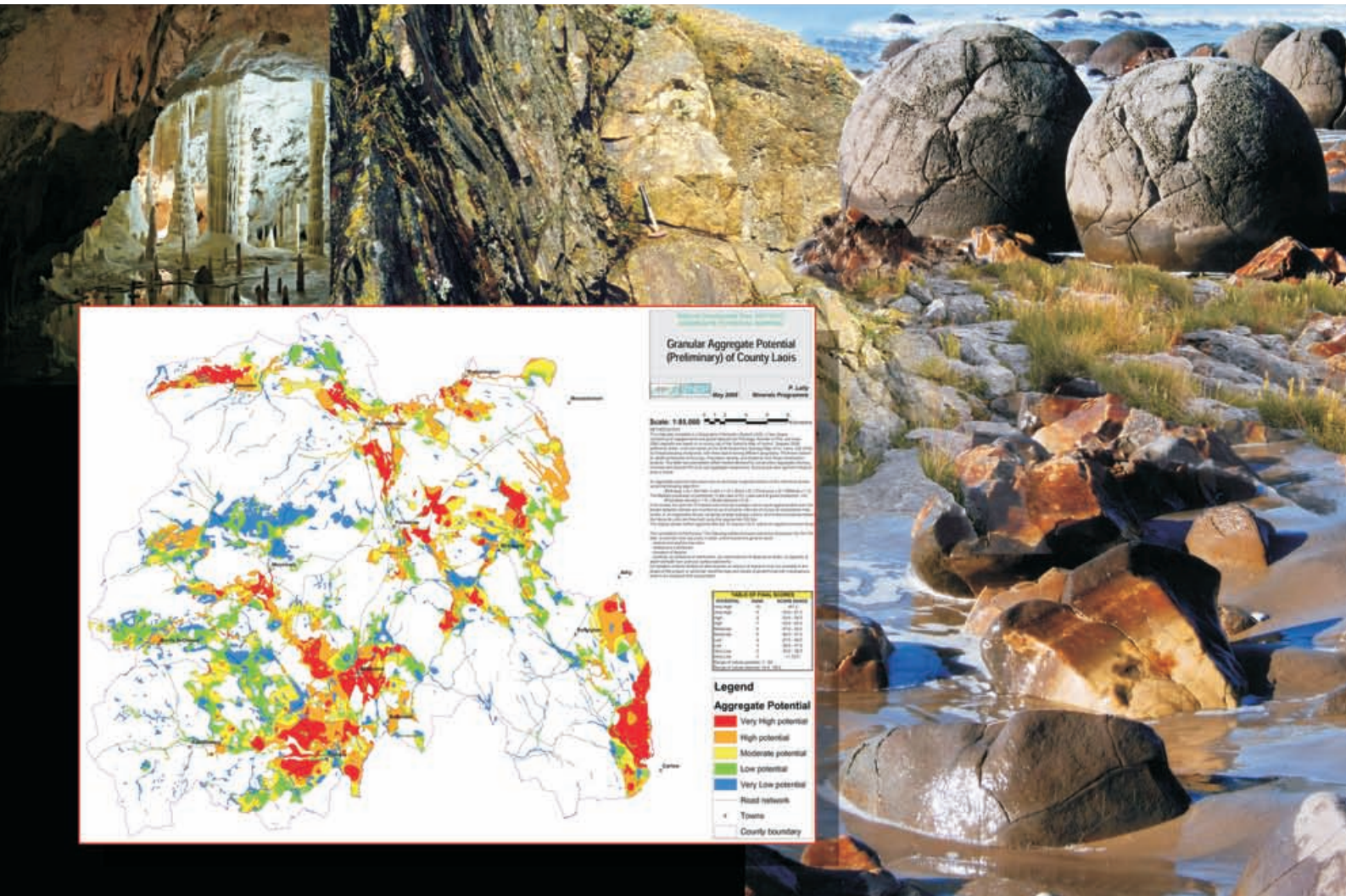


GEOLOGICAL SURVEY OF IRELAND



ANNUAL REPORT 2009

Appendices



GEOLOGICAL SURVEY OF IRELAND (GSI)

ANNUAL REPORT 2009 - APPENDICES

This information supplements that in the GSI Annual Report for 2009, available through www.gsi.ie. Hard copies of the highlights of this report can be obtained from the GSI Customer Centre. Additional information on the work of GSI is available through “Geology Matters”, the regular GSI Newsletter, copies of which can be accessed through www.gsi.ie

or by contacting the
GSI Customer Centre,
Geological Survey of Ireland,
Beggars Bush,
Haddington Road,
Dublin 4.
Phone (01) 6782000,
Lo-call 1890 44 9900,
Fax (01) 6681782,
Email gsisales@gsi.ie.

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1. GSI COMMITTEES

GSI Consultative Committee consists of representatives of our customer and stakeholder groups, as well as experts in fields of GSI operations. During 2009 the Committee held a joint meeting in April with the Consultative Committee of the Geological Survey of Northern Ireland and the agenda focused on scientific cooperation between the two surveys. The Committee also met in October when various aspects of GSI operations were reviewed. The membership at the end of 2009 was as follows:

Mr. Damien Allen, Dept. of the Environment, Heritage and Local Government
Dr. John Ashton, Boliden Tara Mines Ltd., County Meath
Dr. Sadhbh Baxter, NUI Galway
Mr. Stephen Bradley, Institute of Geologists of Ireland
Mr. Brian Byrne, Arup and Partners
Ms. Petra Coffey, Wicklow
Dr. Catherine Coxon, Trinity College Dublin
Mr. Pat Duggan, Department of the Environment, Heritage and Local Government
Mr. Garth Earls, Geological Survey of Northern Ireland
Mr. Thomas Furey, The Marine Institute, Oranmore, County Galway
Mr. Fergus Gallagher, Kilsaran Concrete Products Ltd., County Meath
Ms. Roisín Goodman, SLR Group Ltd
Mr. Stephen Harney, Athlone Institute of Technology, County Westmeath
Prof. Alan Jones, Dublin Institute for Advanced Studies
Mr. Peter Lydon, Association of Geography Teachers in Ireland
Mr. Micheál MacCarthaigh, Environmental Protection Agency
Ms. Mairead McCabe, Department of Communications, Energy and Natural Resources
Ms. Fionnuala Meagher, Sligo County Council
Mr. Ciarán ÓhÓbáin, Department of Communications, Energy and Natural Resources
Mr. Jim Ryan, Department of the Environment, Heritage and Local Government
Dr. Mike Sweeney, Copper Coast Geopark, County Waterford

The following GSI staff serve on the Committee:

Dr. Peadar McArdle Chairperson
Mr. Derek Collins Secretary
Dr. Pat O'Connor
Mr. Raphael Kelly
Dr. John Morris
Mr. Tom McIntyre
Mr. Koen Verbruggen

International Year of Planet Earth – Irish National Committee was established in 2006 to coordinate a programme of events to mark the International Year of Planet Earth (IYPE) 2008. Managed by GSI with the support of the Royal Irish Academy, this was an All-Island forum whose final meeting was held in March 2009 when the membership consisted of:-

Mr. David Ball	International Association of Hydrogeologists (Irish Branch)
Dr. Tony Bazley	ES2K
Prof Anne Buttimer	International Geographical Union, Royal Irish Academy (RIA), Senior Adviser to IYPE Corporation
Ms. Marie Cowan	ES2k, Geological Survey of Northern Ireland
Dr. Catherine Dalton	Irish Quaternary Association, National Committee for Geography
Mr. Garth Earls	Geological Survey of Northern Ireland
Mr. John Evans	Marine Institute
Dr. Vincent Gallagher	Irish Association for Economic Geology
Dr. Bettie Higgs	Department of Geology, NUI Cork
Prof. Alan Jones	Dublin Institute for Advanced Studies
Dr. Deirdre Lewis	Institute of Geologists of Ireland, Geosciences Committee (RIA)
Ms. Sonja Masterson	International Association of Hydrogeologists (Irish Branch)
Mr. Gerry Murphy	Irish Meteorological Society, Met Eireann
Dr. Aodhagán Ó'Rodaighe	National Committee for Climate Change
Mr. John O'Sullivan	Irish Offshore Operators Association, Geophysical Association of Ireland
Dr. Matthew Parkes	Institute of Geologists of Ireland, National Museum of Ireland, Geosciences Committee (RIA)
Ms. Susan Pyne	Irish Geological Association
Dr. Ian Sanders	Department of Geology, Trinity College Dublin

The following GSI staff served on the committee:

Dr. Peadar McArdle	Chairperson; Senior Adviser to IYPE Corporation
Ms. Mary Carter	Secretary; International Union of Geological Sciences
Dr. Sarah Gatley	
Mr. Enda Gallagher	
Ms. Sophie Preteseille	Copper Coast Geopark

Irish National Committee for IUGS and IGCP is managed by GSI with the support of the Royal Irish Academy. Its members at the end of 2009 were:

Dr. Peadar McArdle	Chairperson
Ms. Mary Carter	Secretary (Attended IUGS/IGCP meeting, Paris, February).
Ms. Marie Cowan	Geosciences Committee (RIA)

INFOMAR Project Board is the supervisory board for the INFOMAR Project, Ireland's national marine mapping programme, jointly managed by GSI and the Marine Institute.

Its members at the end of 2009 were:

Mr. Michael Manley	Chairperson, Department of Communications, Energy and Natural Resources (DCENR)
Mr. Peter Croker	Petroleum Affairs Division, DCENR
Mr. Thomas Furey	The Marine Institute
Dr. Peter Heffernan	The Marine Institute
Dr. Peadar McArdle	Geological Survey of Ireland
Mr. John Dillon	DCENR
Mr. Koen Verbruggen	Geological Survey of Ireland

Tsunami Warning System - Inter-Departmental Committee:

The purpose of this Committee is to develop a proposal to meet Ireland's needs for a tsunami warning system. It did not meet during 2009. Its members in 2009 were:

Mr. Michael Manley	Chairperson, Department of Communications, Energy and Natural Resources
Mr. John O'Donoghue	Secretary, Geological Survey of Ireland
Mr. Tony Boland	Department of the Environment, Heritage and Local Government
Mr. Jerome Kelly	Department of Education and Science
Dr. Peadar McArdle	Geological Survey of Ireland
Dr. Brian McConnell	Geological Survey of Ireland
Mr. Declan Murphy	Met Eireann
Mr. Michael Perkins	Department of Finance
Mr. Brian Spain	Department of Defence

Tsunami Warning System - Technical Group:

The purpose of this Group is to assist the Inter-Departmental Committee in the development of a proposal to meet Ireland's needs for a tsunami warning system. It met in December 2009. Its members in 2009 were:

Dr. Peadar McArdle	Chairperson, Geological Survey of Ireland
Mr. John O'Donoghue	Secretary, Geological Survey of Ireland
Ms. Celina Barrett	Department of the Environment, Heritage and Local Government
Mr. Kieran Cummins	Met Eireann
Prof. Alan Jones	Dublin Institute for Advanced Studies
Dr. Brian McConnell	Geological Survey of Ireland
Mr. Glenn Nolan	Marine Institute
Mr. Guy Westbrook	Marine Institute

Integrated Ocean Drilling Program (IODP) - National Committee:

The purpose of this Committee is to maximize participation by scientists at Irish institutes in IODP and to ensure that Ireland's scientific priorities are considered in developing the IODP science plan. Its members in 2009 were:

Mr. Koen Verbruggen	Chairperson
Mr. Peter Croker	Petroleum Affairs Division, DCENR
Dr. Robin Edwards	Trinity College Dublin
Prof. Pat Shannon	University College Dublin
Dr. Andy Wheeler	University College Cork

The following GSI staff serve on the Committee:

Dr. Brian McConnell
Mr. Xavier Monteys.

EPOS National Committee

European Plate Observing System (EPOS) is an initiative seeking affiliation to the European Strategy Forum on Research Infrastructure (ESFRI) and designed to coordinate technical infrastructure across Europe. The EPOS National Committee is coordinating preparations in Ireland and its members are:

Prof. Chris Bean	Chairperson, University College Dublin
Prof. Sergei Lebedev	National Delegate, Dublin Institute for Advanced Studies
Dr. Quentin Crowley	Trinity College Dublin
Mr. Thomas Furey	The Marine Institute
Prof. Alan Jones	Dublin Institute for Advanced Studies
Dr. Peadar McArdle	Geological Survey of Ireland
Dr. Brian McConnell	Geological Survey of Ireland
Prof. Frank Mc Dermott	University College Dublin.

INFOMAR Technical Advisory Committee

The INFOMAR Technical Advisory Committee provides advice on technical aspects of the INFOMAR programme. Its members are:

Eamonn Kelly	National Parks and Wildlife Service
Derek Reay	GSNI
Jim Casey	DAFF Engineering Division
Joe Breen	DoENI
Karl Brady	DOEHLG Underwater Archaeology Section
Michael Purcell	Dept. of Transport
Patrick Sheridan	Ordnance Survey Ireland
Patricia Comiskey	BIM
Peter Croker	DCENR Petroleum Affairs Division

Paddy Boylan
Rob McCabe
Rob Spillard
Thomas Tuohy
Alan Coghlan
Jim Whyte
David Parker
John Pepper

Loughs Agency
Commissioners of Irish Lights
MCA (UK)
Naval Service
SFPC
SFPC
UK Hydrographic Office
UK Hydrographic Office

INFOMAR Staff:

Koen Verbruggen GSI
Tommy Furey MI
Archie Donovan GSI
Sean Cullen GSI
Fergal McGrath MI
Linda Grealish INFOMAR

2. NATIONAL AND INTERNATIONAL REPRESENTATION

Commission for the Geological Map of the World

Mr. K. Verbruggen: North Atlantic Map

Committee of Heads of Irish Geoscience Institutes (CHIGI)

Dr. P. McArdle: Member

EU Directive on the management of waste from the extractive industries

Mr. G. Stanley: Co-chair of Technical Ad-hoc Group.

Eurogeosurveys

Dr. P. McArdle: Meeting of Directors: Grubenhagen, January; Zagreb, October.

Dr. P. O'Connor: Meeting of National Delegates: Brussels March;
Dublin, September

Dr. P. McArdle: Eurogeosurveys General Assembly: Brussels, March

Dr. P. O'Connor: Soils Expert Group

Mr. G. Stanley: Mineral Resources Expert Group

Dr. P. O'Connor: Geochemistry Expert Group: Trondheim, May; Belgrade,
September

Ms. M. Carter: INSPIRE Working Group

Mr. K. Verbruggen: Marine Geology Expert Group: Edinburgh, November

Dr. J. Morris: CCS Expert Group

European Geoparks Network

Dr. P. O'Connor, J. Morris, S. Gately, S. Preteseille.

Geoparks Ireland Forum

Chair: Dr. P. O'Connor, Ennistimon, October

Convenor: Ms. S. Preteseille, Ennistimon, October

Geoscience Information Consortium

Ms. M. Carter

GEO High Level Group

Dr. P. O'Connor: Brussels, April; Washington, December

International Year of Planet Earth

Dr. P. McArdle: Senior Adviser

Ms. M. Carter: Meeting of National Committees, Vienna

Integrated Ocean Drilling Program – ECORD Council

Management: Mr. X. Monteys and Mr. K. Verbruggen

Science: Mr. D. Hardy

Kopernikus, formerly Global Monitoring for Environment and Security (GMES)

Dr. P. O'Connor: Advisory Council member. Brussels, January, June and
November.

Mr. K. Verbruggen: National Contact Point, Terrafirma Project.

Northeast Atlantic Geoscience (NAG)

Dr. P. O'Connor, Edinburgh, March

**North East Atlantic and Mediterranean Tsunami Warning System (NEAMTWS)
Coordination Group (UNESCO)**

Dr. B. McConnell: Irish delegate, Istanbul, November

**ProGEO: The European Association for the Conservation of the Geological
Heritage**

Dr. J. Morris and Dr. S. Gatley: Irish Representatives.

Royal Irish Academy – National Committees:

Dr. P. McArdle: Geosciences.

Dr. W. Warren: Geography

3. PARTICIPATION IN WORKING GROUPS AND SOCIETIES

Applied Agricultural Meteorology Working Group (AGMET):

Ms. M. Lee: Member

Bréifne Mountains Co. Ltd.

Dr. P. O'Connor: Director.

Burren Connect Steering Group

Dr. P. O'Connor: Member

Coillte Advisory Panel, Woodland habitat on limestone pavement.

Dr. S. Gatley: Member.

Copper Coast European Geopark

Dr. J. Morris: Board of Directors

Earth Science Ireland

Dr. S. Gatley and Ms. S. Preteseille: Committee.

Mr. E. Gallagher: Editorial Board.

EPA STRIVE Steering Committee

Ms. N. Hunter Williams: Member

Europamines - Project Development Meetings and Site Visits:

Dr. J. Morris

European Federation of Geologists

Dr. J. Morris: Member of Geological Heritage Working Group

Dr. E. Doyle: Member of Resources and Reserves Working Group

EU Water Framework Directive (WFD)

Ms. N. Hunter Williams: Monitoring Working Group.

Ms. N. Hunter Williams, Dr. C. Hickey, Ms. M. Lee: Working Group on Groundwater (and sub-committees).

Ms. N. Hunter Williams: Urban Pressures Programme of Measures Study - Steering Committee.

Ms. N. Hunter Williams: Groundwater - Surface Water Interaction POMs Study - Steering Committee.

Ms. N. Hunter Williams, Dr. C. Hickey: WFD Visualisation (SNIFFER).

Steering Groups for River Basin District Management Projects: Ms. N. Hunter Williams (Shannon, South-Eastern, South-Western), Ms. M. Lee (Eastern, Western,); Dr. P. O'Connor (Shannon); Dr. E. Doyle (Neagh-Bann).

Exploration and Mining Division (EMD) – GSI Liaison Committee

Dr. P. McArdle and Dr. J. Morris

FP7 - Environment Programme Committee

Ms. M. Lee

Fingal Heritage Forum

Dr. S. Gatley: Member

FUNMIG Project (Fundamental migration behaviour of radionuclides in the environment).

Dr. P. O'Connor: Associate Partner

Geological Journal Editorial Board

Dr. B. McConnell: Member

Geological Society of America Bulletin

Dr. B. McConnell: Associate Editor

Geotechnical Society of Ireland (Engineers Ireland)

Dr. J. Creighton: Committee Member

Geothermal Working Group (DCENR)

Dr. J. Morris, Dr. E. Doyle, Dr. N. Hunter Williams

GIS in Government, Interdepartmental Group

Dr. R. Scanlon: Member

Hydrographic Society – Irish Branch

Mr. S. Cullen: Chairperson

ICT Board (DCENR)

Mr. R. Scanlon: Member

Institute of Geologists of Ireland

Mr. G. Stanley: Secretary

Ms. M. Carter: Board Member

Ms. E. Doyle: Disciplinary Committee

Inter-Departmental Committee on CCS

Dr. P. McArdle, Dr. J. Morris and Dr. B. McConnell: Members

Interdepartmental Irish Spatial Data Infrastructure/INSPIRE Working Group

Mr. K. Verbruggen, Dr. R. Scanlon: Members

International Association of Hydrogeologists – Irish Group

Dr. C. Hickey: Conference Sub-Committee

International Hydrological Programme (IHP)

Ms. M. Lee: Member, Irish National Committee.

Ms. M. Lee: International Commission on Irrigation and Drainage.

Irish Coastal Forum

Mr. A. Donovan and Mr. S. Cullen: Members.

Irish Geological Association

Ms. S. Preteseille: Council Member

Irish Journal of Earth Sciences

Dr. J. Morris: Editorial Board Member.

Irish Offshore Strategic Environmental Assessment 2 (IOSEA), Porcupine Basin, Petroleum Affairs Division, DCENR.

Mr. K. Verbruggen: Steering Group Member

Kerry Heritage Forum

Dr. S. Gatley: Member

Kerry Geopark Working Group

Dr. S. Gatley: Member

Marine Institute: Industry-led Research Awards

Mr. K. Verbruggen: Evaluator-information management

Maritime Institute of Ireland

Mr. S. Cullen: Treasurer

Mining Heritage Trust of Ireland Ltd.

Dr. J. Morris: Director

National Landscape Strategy Steering Group

Dr. P. O'Connor, Dr. S. Gatley: GSI representatives

EU NEED Project

Dr. P. O'Connor: Partner (Norway, October)

North Atlantic Minerals Symposium – Organising Committee

Mr. G. Stanley: Co-Chair

One Geology

Ms. M. Carter attended WP7, Belgium, March

Dr. R. Scanlon attended WP4

Sea Change, Marine Institute NDP Research

Mr. K. Verbruggen and Dr. R. Scanlon: Working Group Members

Silvermines Inter-Agency Advisory Committee

Dr. P. O'Connor: Member

StratAG (Strategic Research Cluster in Advanced Technologies)

Mr. K. Verbruggen: Scientific Board Member

Mr. X. Monteys: Member, Working Group on spatial visualisation and algorithms/Marine data.

Technical Advisory Group on Corrib Project (for the Minister for Communications, Energy and Natural Resources)

Mr. K. Verbruggen: Member

UK Groundwater Forum

Ms. M. Lee: Member

Waterford City Council Natural Heritage Forum

Dr. S. Gatley: Member.

4. RESEARCH USING GSI DATABASES

The following is a list of research topics based on GSI databases and the third level institutes where each was or is being undertaken. Some topics comprise more than one project.

WFD Groundwater-Surface Water Interaction POMs Study. Southwest RBD/RPS Lowland karst of Roscommon	Trinity College Dublin
Highly and moderately permeable subsoils	Trinity College Dublin
Holocene sediment transport, southeast Ireland	University College Dublin
Seabed substrate characterisation	NUI Galway
Neural networks and seabed backscatter	NUI Galway
Northeast Atlantic marine system modelling	NUI Galway
Slope processes in the Rockall Trough	University College Dublin
Accuracy of tidal prediction	Dublin Institute of Technology
Cenozoic basin margins, Porcupine and Rockall	University College Dublin
Quaternary of Clew Bay	Queen's University of Belfast
Use of digital laser scanning in Dublin Port area	University College Dublin
Site stability assessment using TerraFirma data	University College Dublin
Research into health risks associated with private well supplies in Ireland	Trinity College Dublin
Early Tertiary sediment transport systems across Ireland feeding the Porcupine and Rockall Basins	Trinity College Dublin
Processing and interpretation of seismic data from the Hatton Margin, west of Ireland	Trinity College Dublin
Character and impact of faults propagating through soft sediment to displace the deep seafloor	University College Dublin
Landscapes in stone: digital perspectives of the Connemara landscape	NUI Galway
Inorganic and organic characterisation of coastal and marine sediments: investigations into the fate of terrestrial organic carbon and implications for climate change	Dublin City University
Coral Atlas, an inventory of carbonate mounds in Irish waters	University College Cork
Marine biological investigation of the Irish Biologically Sensitive Area	Galway Mayo Institute of Technology
Geohazard identification and early reconnaissance for hydrocarbon potential using marine electromagnetic and high frequency acoustic methods	Dublin Institute for Advanced Studies / GSI
High resolution seafloor evidence for glacial and post-glacial environments in the Irish Sea	University College Cork
A high resolution record of contourite deposition and palaeoclimatic forcing on the eastern Porcupine Seabight	University College Cork
Griffith Geoscience Research Programme	see main part of Annual Report
Urban pressures POMs study for Water Framework Directive	Eastern RBD/CDM

On-site wastewater treatment systems study for Water Framework Directive	Western RBD/ESBI.
Ungauged catchments flow prediction study for Water Framework Directive	ESBI.
Evaluating Irish Marine Palaeoclimate Records (EIMeR)	NUI Maynooth
Holocene climate change on the western Irish seaboard employing foraminiferal analysis of sediment cores from Galway Bay	NUI Galway
Palaeoceanographic records of abrupt climate change: a preliminary investigation	Trinity College Dublin
Development of standard operating procedures for video analysis and classification. GIS integration, video visualisation and image data archiving	NUI Galway
Environmental, biological and geochemical studies in Dunmanus Bay and associated inner shelf areas	AQUAFAC, Dublin City University
Prototype toolset for evaluating automated image processing of sub-sea video data	NUI Maynooth
Application of improved single beam echosounder classification and characterization methods to multifrequency INFOMAR data	GSI, University of Victoria, Canada
Multibeam seabed mapping: correlating acoustic backscatter returns to ground-truthing using statistical tools. Developing a bio-geological classification scheme derived from existing INFOMAR-INSS databases	University College Cork
GIS integration of Irish onshore and offshore LIDAR datasets to create new value -added	NUI Maynooth
Carbonate mounds	University College Cork
LIDAR Backscatter	QTC
Marine Geochemistry	Dublin City University
Paleoenvironmental and glacial significance of iceberg keel marks on the Porcupine and Rockall Banks	GSI
Updating the glacial map of Ireland	University of Ulster
Investigation of gas pockmarks on the Malin Shelf	GSI
Geoprocessing large acoustic datasets	NUI Maynooth
Using acoustic soundings to map oceanographic conditions	Trinity College Dublin
Analysis of seabed and water-column particle transport patterns	NUI Galway
Archaeological applications of the Joint Irish Bathymetric Survey (JIBS) data	University of Ulster
Benthic mapping of the Biologically Sensitive Area (BSA) as a tool in ocean management	Galway-Mayo Institute of Technology

5. GSI PUBLICATIONS

- Anon. 2009. Geoscience: Towards a smarter economy. Geological Survey of Ireland, Geological Survey of Northern Ireland and Royal Irish Academy. 20 pages.
- Anon. 2009. Climate through Time: Our rocks reveal the story of change (Poster). British Geological Survey, Geological Survey of Northern Ireland and Geological Survey of Ireland.
- Anon. 2009. Landscapes, Rocks and Fossils: The Geological heritage of County Sligo. Sligo County Council, Sligo Borough Council, Geological Survey of Ireland and The Heritage Council. 43 pages.
- Anon. 2009. St. George's Channel Bedrock (with Tertiary Subcrop). Sheet 51°50'N-06°24'W. 1:250,000 Scale Geology Series. British Geological Survey with contributions by GSI and Petroleum Affairs Division.
- Anon. 2009. Building Stones Map (Poster). Geological Survey of Northern Ireland, Geological Survey of Ireland, Consarc Design Group, Northern Environment Agency, Queen's University Belfast and The Office of Public Works.
- Anon. 2009. INFOMAR Annual Seminar 2008. Book of Abstracts.
- Anon. 2009. Geology Matters: The Newsletter of the Geological Survey of Ireland. Issue No. 9, Autumn 2009. 16 pages.
- Baxter, S. 2009. A geological field guide to Cooley, Gullion, Mourne & Slieve Croob. Geological Survey of Ireland, The Heritage Council, Louth County Council and Louth Heritage Forum. 96 pages.
- Deakin, J. (Editor). 2009. Groundwater Newsletter, Issue 47, December 2009. Geological Survey of Ireland. 31 pages.
- Gallagher, E. 2009. A Brief Overview of Ireland's Marine Survey Story. Geological Survey of Ireland and The Marine Institute. 12 pages.
- Gallagher, E. (Editor) 2009. Planet Earth Newsletter, Issue No. 3 - End of Year Review. Geological Survey of Ireland. 24 pages.
- Pracht, M., Scanlon, R.P. and Sleeman, A.G. (Compilers) 2008. The Geology of 1:50,000 scale Bedrock Mapsheet 28a, Monaghan (GIS version). Including accompanying report. Geological Survey of Ireland
- Wyse Jackson, P.N. 2009. Great Irish Geoscientists. Geological Survey of Ireland. 32 pages (and Poster).

6. CONFERENCE PAPERS

- Ahmed, K.I., Demsar, U., and Monteys, X. 2009. Examining statistical segmentation of multibeam backscatter images with Geovisual Analytics (Abstract). In: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- Creighton, R., McKeon, C., Pellicer, X. and Verbruggen, K. 2009. Landslides in Ireland and the Irish Landslides Working Group (Abstract). In: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- Daly, D., Fletcher, S., Hunter Williams, N., Neale, S. and Simcox, H. 2009. Visualising groundwater - aiding understanding using 3-D images. In: Quevauviller, P.P., Fouillac, A.M., Grath, J. and Ward, R. (Editors) Groundwater Monitoring. John Wiley and Sons Ltd., UK., pages 67-79.
- Doyle, E., and Stanley, G. 2009. Status classification of groundwater bodies containing closed mine sites for the Water Framework Directive. In: Proceedings of the 29th Annual Groundwater Conference, IAH - Irish Group. Tullamore, April, pages 45-50.
- Furey, T., Sheehan, K., Hardy, D., Verbruggen, K. and Monteys, X. 2009. Acoustic and statistical methods for substrate and biota classification and modelling (Poster). GeoHab 2009, Norway, May.
- Hardy, D., O'Toole, R., McKeon, C. and Monteys, X. 2009. Large-scale acoustic classification of multibeam echosounder datasets within the INFOMAR Program. In: Near Surface 2009 - 15th European Meeting of Environmental and Engineering Geophysics, Dublin, September.
- Harris, P. and others (including X. Monteys and R. O'Toole). 2009. Large-scale geo-acoustic characterisation of multi-beam echo sounder backscatter and bathymetry data in Irish deepwaters: Phase 1- data pre-processing (Abstract). In: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- Hickey, C. 2009. The use of multiple techniques for investigating the low-lying karst of Western Ireland. In: Sustainability of the Karst Environment, Croatia, September.
- Hung, P., McLoone, S. and Monteys, X. 2009. Feature extraction for seabed classification from single beam echo sounder data (Abstract). In: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- Hunter Williams, N., Daly, D., Craig, M. and Lee, M. 2009. The EU Water Framework Directive in Ireland and the groundwater information renaissance. In: Proceedings of the 29th Annual Groundwater Conference, IAH - Irish Group, Tullamore, April, pages 26-36.

- McConnell, B., Crowley, Q. G. and Riggs, N. 2009. Laurentian origin for the Ordovician Grangegeeth volcanic arc terrane; a detrital zircon provenance study (Abstract). 52nd Irish Geological Research Meeting, Programme and Abstracts, Trinity College Dublin, February, page 42.
- McConnell, B., Riggs, N. and Crowley, Q.G. 2009. Detrital zircon provenance and Ordovician terrane amalgamation, western Ireland. (Poster). 52nd Irish Geological Research Meeting, Programme and Abstracts, Trinity College Dublin, February, page 75.
- McConnell, B., Riggs, N. and Crowley, Q.C. 2009. Detrital zircon provenance and Ordovician terrane amalgamation, western Ireland. *Journal of the Geological Society, London*, volume 166, pages 473-484.
- Monteys, X. 2009. Large-scale seabed classification: from image classification to seabed geology (Abstract). *In*: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- O'Toole, R., McKeon, C. and Hardy, D. 2009. Large-scale acoustic classification of multibeam echosounder datasets within the INFOMAR Program (Abstract). *In*: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- O'Toole, R., McKeon, C. and Hardy, D. 2009. Large-scale acoustic classification of multibeam echosounder datasets within the INFOMAR Program. (Poster). 52nd Irish Geological Research Meeting, Programme and Abstracts, Trinity College Dublin, February, page 83.
- Salem, A., Lei, K., Green, C., Fairhead, D. and Stanley, G. 2009. Removal of cultural noise from high-resolution aeromagnetic data using the equivalent source approach. *Proceedings of the 9th SEGJ International Symposium, Sapporo, Japan, October.*
- Sheehy, M., Gibson, P. and Foley, R. 2009. Aspects of ground motion susceptibility correlated to geological and geoenvironmental variables (Abstract). *In*: 3rd Annual Irish Earth Observation Symposium, Programme and Abstracts. Geological Survey of Ireland, Dublin.
- Stanley, G., Doyle, E., Gallagher, V., Ní Mháirtín, F. and Brogan, J. 2009. Ireland's historic mine sites inventory. *Proceedings of the 24th IAGS, Fredericton, Canada, pages 527-530.*
- Turner, J.N. and Monteys, X. 2009. Ireland's first ITRAX: a marine sediment prospective. (Poster). 52nd Irish Geological Research Meeting, Programme and Abstracts, Trinity College Dublin, February, page 93.

7. GENERAL ARTICLES

- Doyle, E. 2009. Irish National Seabed Survey. Shipwreck Inventory of Ireland: Louth, Meath, Dublin and Wicklow (compiled by K. Brady). The Stationery Office, Dublin, pages 535-536.
- Doyle, E. 2009. Setting up the IGI - Personal memories. IGI Newsletter Issue No. 21, January-November 2009, pages 2-3.
- Gallagher, E. 2009. "My Erratic Rock" Schools Geoscience Competition. Annual Review Extractive Industry Ireland 2009, pages 56-57.
- Gallagher, E. and Sheehy, M. 2009. Schools geoscience essay competition: "My Erratic Rock". IQUA Newsletter No. 43, August 2009, pages 6-7.
- Gatley, S. 2009. Geological heritage guidelines for the extractive industry. Annual Review Extractive Industry Ireland 2009, pages 42-45.
- McArdle, P. 2009. Carlow's Volcano. Carloviana, December 2009, No. 58, pages 45-47.
- Sleeman, A. 2009. Drilling in the Geological Survey of Ireland. Earth Science Ireland Magazine, Issue 5, Spring 2009, pages 31-33.

8. PRESENTATIONS

- Bloomer, S. Application of improved single beam echosounder classification and characterization methods to multifrequency INFOMAR data. Presentation at GSI on behalf of Project Team (including X. Monteys), November.
- Bone, R. and Morrocco, S. The GSI Landslide Susceptibility Mapping Project. Landslides Workshop, Geological Survey of Ireland, Dublin, April.
- Creighton, R. Introduction. Landslides Workshop, Geological Survey of Ireland, Dublin, April.
- Cullen, S. Introducing the RV Keary. Seabed 10, Dublin, October.
- Cullen, S. Ireland's seabed mapping. Presentation to the Royal Irish Yacht Club, Dun Laoghaire, January.
- Cullen, S. Marine surveying with RV Keary. Hydrography Seminar, UKHO, Reading, October.
- Deasy, J. Director's Chair: showcasing home-made movies! Seabed 10, Dublin, October.
- Donovan, A. Digital data from ship to web. Seabed 10, Dublin, October.
- Donovan, A. INFOMAR data. Seminar on Managing Massive Point Clouds, Utrecht, Netherlands, November.
- Doyle, E. Avoca Remediation Study, EU Contaminated Land Committee, hosted by D/EHLG, Dublin.
- Furey, T., Sheehan, K., Hardy, D., Verbruggen, K. and Monteys, X. INFOMAR: Towards 100% coverage, physical habitat mapping of Ireland's seabed. GEOHAB Seminar, Trondheim, Norway.
- Hardy, D. The RV Keary as a survey platform. Seabed 10, Dublin, October.
- Hickey, C. Conceptual model of karst of County Roscommon. Geoscience Research Group, NUI Maynooth, March.
- Hickey, C. A conceptual model of karst of County Roscommon. IAH (Irish Chapter) Technical Discussion Meeting, Dublin, March.
- Hunter Williams, N. Information for understanding and documenting the source catchment area. 8th Annual Rural Water Services Conference, September.
- Kabza, M., Murphy, O. and Spillane, M. Groundwater vulnerability mapping. IAH (Irish Chapter) Technical Discussion Meeting, Dublin, March.
- Lee, M. Groundwater Protection Schemes - uses of the spatial data layer. CPD Programme for Young Engineers, Engineers Ireland, Dublin, May.

- McArdle, P. Wicklow Gold - important discovery or harvest distraction? Irish Geological Association, Dublin, December.
- McArdle, P. Address on behalf of Mr. Conor Lenihan T.D., Minister of State at the Department of Communications, Energy and Natural Resources, Irish Mining & Quarrying Society, Dublin, November.
- McArdle, P. Setting the scene - Mapping Ireland's seabed. Seabed 10, Dublin, October.
- McArdle, P. Ireland's Seabed: Resources for the future. The Future of the Earth Sciences Symposium. TNO, Utrecht, The Netherlands, June.
- McConnell, B. GSI Bedrock mapping. Highlands Workshop, Belfast, April.
- Monteys, X., McKeon, C. and O'Toole, R. INFOMAR/INSS mapping and seabed classification. Workshop for StratAG, NUI Maynooth.
- Monteys, X. INFOMAR seabed classification. Seminar on Seabed Classification, IFREMER, Brest, France.
- Monteys, X. Seabed classification: From image classification to seabed geology: 10 years. Seabed 10, Dublin, October.
- Monteys, X. Shallow geophysical characterization and fluid flow processes in two large pock marks on the Malin Shelf, NW Ireland. Seabed 10, Dublin, October.
- Morris, J. Carbon capture and storage. BT Young Scientist and Technology Exhibition, RDS, Dublin, January.
- Mozo, B. Geotechnical 3D Geomodeller. Presentation at IRLOGI "Meet the Mapmakers" series, GSI, June.
- O'Shea, G. and O'Driscoll, D. Web-enabled data: INFOMAR web walk-through. Seabed 10, Dublin, October.
- Pellicer, X. The use of geophysical techniques for recognition of Quaternary sediments. EAGE Conference, Trinity College Dublin, September.
- Pozdnoukhov, A. and Pellicer, X. Models and methods for landslides susceptibility mapping: revisiting the Breifne area. Landslides Workshop, Geological Survey of Ireland, Dublin, April.
- Scanlon, R. Digging into geological databases - a guide to free websites. Evening lecture and webcast. Irish Mining & Quarrying Society and IAH-Irish Group, Dublin, May.
- Scanlon, R. The Dublin SURGE Project. Presentations to HSE, EPA, Teagasc, Dublin City Council, South Dublin, Fingal and Dun Laoghaire & Rathdown County Councils, November-December.

- Scanlon, R. Geovisionary workshop. 3rd Annual Irish Earth Observation Symposium, GSI, November.
- Scanlon, R. GIS developments in GSI. "GIS in Government" seminar, Wexford, December.
- Scanlon, R. and others. GSI's datasets. IRLOGI "Meet the Mapmakers", GSI site visit, Dublin, June.
- Sheehan, K. and McKeon, C. INFOMAR sampling and groundtruthing. Seabed 10, Dublin, October.
- Sheehy, M. Quaternary geology mapping. Presentation at IRLOGI "Meet the Mapmakers" series, GSI, June.
- Sheehy, M. Ground motion susceptibility analysis of Cork city. Presentation to Dept. of Geography, NUI Maynooth, April.
- Sleeman, A.G. Digital bedrock mapping. Presentation at IRLOGI "Meet the Mapmakers" series, GSI, June.
- Stanley, G. Historic Mine Sites - inventory and risk classification. EU Contaminated Land Committee, hosted by D/EHLG, Dublin.
- Verbruggen, K. 2006-2009 INFOMAR: Progress and developments to date. Seabed 10, Dublin, October.
- Verbruggen, K. Gold in Mayo. 2009 Weekend Short Course on Gold. Irish Association for Economic Geology, Armagh, May.
- Verbruggen, K. An update on the landslides work. CPD Programme for Young Engineers, Engineers Ireland, Dublin, May.
- Verbruggen, K. and Furey, T. INFOMAR. Presentation to StratAG Summit 2009, Maynooth, April.
- Verbruggen, K. and Sheils, Y. The INFOMAR programme, the Griffith Awards and other Irish marine research. Atlantic Ireland 2009, Dublin, October.

9. FIELD TRIPS LED BY STAFF

- Doyle, E. and Stanley, G. Avoca mining area. EU Contaminated Land Committee, hosted by D/EHLG.
- Long, B. An introduction to Connemara's bedrock geology. Irish Geological Association, June.
- McConnell, B. Field trip to Portrane. Association of Geography Teachers of Ireland, May.
- McConnell, B. Field trip to Portrane, North County Dublin. Irish Geological Association. October.
- Morris, J. The geology and mining heritage of the Isle of Man. Irish Geological Association. May.
- O'Connor, P. Walk in the Carlingford volcanic centre. Heritage Week, August.
- Preteseille, S. Field trip with Holy Cross National School, Tramore. Bealtaine Festival of Outdoor Science. Organised by Waterford Institute of Technology, May.
- Preteseille, S. Field trip to Comeragh Mountains for Kilmacthomas National School, June.
- Stanley, G. Geology, mining and the environment - Avoca, County Wicklow. Irish Geological Association, October.

10. EXHIBITIONS

INFOMAR exhibition. Volvo Ocean Race display, Galway, May-June.

Ireland Stand Prospectors and Developers Association of Canada (PDAC) Convention, Toronto, March. Joint stand with Exploration and Mining Division (DCENR) and Geological Survey of Northern Ireland.

IYPE Geological Exhibition. Geological Survey of Ireland, Beggars Bush.

Planet Earth Stand. BT Young Scientist and Technology Exhibition, RDS, Dublin, January. Joint stand with Dublin Institute for Advanced Studies, National Museum of Ireland and Petroleum Affairs Division (DCENR).

11. OVERSEAS MEETINGS ATTENDED

Geothermal Training course, Chesterfield, UK, November, N. Hunter Williams.

CO2 GeoNet Open forum, Venice, March, B. McConnell.

Workshop on 3D deep crustal model of Britain and Ireland, BGS, Keyworth, January, B. McConnell.

12. STAFF CHANGES

The following staff retired from GSI during 2009:

Chris McDonnell, Clive Murray, Seamus Nevin, John O'Donoghue, Andy Sleeman and Willie Warren.

The following staff left GSI during 2009 on Special Incentive Career Breaks:

Bernie Mockler, Xavier Pellicer.

Eibhlin Doyle transferred from GSI to EMD.

Raphael Kelly assumed responsibility as Head of Administration for GSI.

14. SOME STATISTICS

a) Distribution of queries from the public in 2008 and 2009

	2009	2008	% Change
Customer Centre	332	481	-31%
Groundwater	540	895	-40%
Minerals	92	90	+2%
Heritage	327	326	0%
Seabed (IWDDS)	272	704	-386%
Quaternary	210	99	+212%
Geotechnical	120	141	-15%
Info Mgt	254	78	+326%
Bedrock	35	60	-42%
Technical	24	16	+50%
Total	2206	2890	-24%

b) GSI website activity: Visitors/User Sessions

	2009	2008	% Change
gsi.ie	327,030	587,033	-44%
Web_Mapping	29,871	58,510	-49%
Seabed/IWDDS	19,528	¹ 17,577	+11%
Subtotals	376,429	663,120	-43%

Notes: ¹ Incomplete records.

² Spatial Pages and Planet Earth are discontinued.

c) GSI coverage in Print Media during 2009 (Column-cm)

Theme	National	Regional	Trade	Subtotals
Seabed	752	242	750	1744
Hazards	0	0	228	228
Energy/Climate	0	74	52	126
Heritage	200	94	519	813
Mining	146	0	13	159
Outreach	0	0	771	771
General	0	0	629	629
Subtotals	1098	410	2962	4470

d) Training in GSI

Individual training commitments are identified for all staff in their Role Profiles and reviewed in the mid-year Interim Review.

A total of 270 person-days were spent on training and at conferences during 2009. They were spread throughout the year but there was a significant fall off (163 person-days in the first half, 107 person-days in the second). This partly reflects the drop in staff numbers through 2009: the 2008 staff level of 55 had fallen to 41.3 by the end of 2009. Taking a median figure of 48 staff for 2009, there was a training input of 5.6 days per member of staff compared to 6.1 in 2008.

The enthusiastic support of SDU, which funds course fees and conference registrations, is acknowledged.