NewsLetter
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Earthquakes and Groundwater Levels in Ireland

As reported in GSI News, Issue No. 2 (Winter 2005, available on the GSI website at www.gsi.ie), three GSI groundwater level monitoring wells (operated by OPW) in Co. Kilkenny showed significant fluctuations of water levels due to the 26 December 2004 earthquake off Sumatra.

The three wells have been monitored since the early 1980s and penetrate different aquifers:

- KNY 18/92: 20m deep in Quaternary gravel
- KNY 27/58: 62 m deep in Dolomitic Limestone
- KNY 31/72: 40m deep in Kiltorcan Sandstone

The fluctuations in water level are recorded by a pen writing on a chart on a clockwork-driven rotating drum. The recording ratio (i.e. movement of pen:change in water level) is normally 1:10 or 1:20.

The three wells simultaneously registered abrupt water level changes in the early hours of 26 December. The maximum fluctuations ranged from about 50 mm in 18/92, to 240 mm in 25/78, to 280 mm in 31/72. The differences probably relate to the differing storage coefficients in the three aquifers. Similar effects were seen in wells monitored by GSNI/EHS in Northern Ireland.

Recent study of water level recorder charts from the Kilkenny wells, and from another borehole in Carboniferous limestone in Co. Roscommon (Ros 14/91), has found traces of at least 80 seismic events since 1980. Comparison of the event dates with earthquake records on the USGS website indicates that the event magnitudes range from 6.2 upwards, with most of them being above 7. The 26th December record stands out as generating the largest water level fluctuation so far.

Apart from the intrinsic interest in recording such events at such a distance, there should be practical benefits from analysing the data - helping us to understand the nature of our aquifers, and to derive realistic storage coefficients in the affected aquifers. Work is continuing!

EurGeol Geoff Wright PGeO and Jane Coll

Groundwater Section, GSI

New geophysical and geochemical surveys of Northern Ireland

A new mapping project is now underway in Northern Ireland – the Tellus Project. The project comprises regional geochemical and geophysical surveys that will advance the development of the natural resource industry and provide a baseline of information against which to measure environmental change. The project is managed by the Geological Survey of Northern Ireland and funded by the Department of Enterprise, Trade and Investment.

Soil sampling for the Tellus Project in Northern Ireland. Picture is Crown copyright

Soils, stream sediments and stream waters are being sampled. Soils are sampled in rural areas at an interval of one site per two km^2 and at four sites per km^2 in urban districts. Two samples are taken at each site, at depths of 20 and 50cm. Most of Counties Fermanagh, Londonderry and Tyrone were sampled in 2004 and the remaining counties will be completed in 2005.

Stream-sediments and stream-waters will be sampled at a nominal interval of one site per two km^2 over Counties Antrim, Armagh and Down in 2005. This work will extend the stream-sediment and water-sampling survey of the west completed by the British Geological Survey (BGS) between 1994 and 1996.

Soil and stream sediment samples will be analysed for more than 50 elements by XRF and ICP-MS/ AES, and for platinum group elements by lead fire-assay. Soils will also be analysed by aqua regia digest ICP-MS. Waters will be analysed by ICP-MS and ion chromatography.

The Tellus airborne survey will take place in 2005 and 2006. The survey will be flown by the Joint Airborne-geoscience Capability (JAC), a newly formed partnership of BGS and the Geological Survey of Finland (GTK). The survey will be flown with a Twin Otter aircraft purchased in 2004 by the Natural Environment Research Council and equipped by GTK with magnetic gradiometer, 256-channel gamma-ray spectrometer and four-frequency electromagnetic system. The survey will be flown on NNW-orientated flight lines, spaced 200 m apart, at a survey altitude of 55-90m over rural areas and 250m over urban areas. A margin will be flown over the Republic of Ireland to facilitate merging of any surveys that may be flown in the Republic in the future.

The surveys will provide definitive geophysical and geochemical datasets of the land area of Northern Ireland. After processing and analysis, the data will be made available to Northern Ireland government (DETI, DARD, DOE, DRD) and under licence to the natural resource industry, environmental consultancies, and the wider earth-science community.

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Engineering Geophysics in Ireland - Seminar

ENGINEERING **G**EOPHYSICS IN **I**RELAND; **S**EMINAR –
(*Geophysical applications in engineering investigations*)

Venue: Hodson Bay Hotel, Athlone, County Westmeath
Date: 25th May 2005 (9 a.m. – 5:30 p.m.)

SPEAKERS WILL INCLUDE EXPERIENCED GEOPHYSICISTS AND ENGINEERS FROM IRELAND AND ABROAD.

Proposed topics

- Downhole Geophysics
- Use of Geophysics in assessing Nature of Overburden
- Appraisal of Geophysical Findings with Direct Investigation
- Use of Geophysics in the Location of Utilities
- Importance of Correct Survey Design/Geophysical Specifications for Engineering Tenders
- Case Studies
- When Geophysical Results Conflict with Direct Findings
- Use of Geophysics to Investigate Karst

Employment Opportunities

White Young Green are seeking Graduates for the following areas: Contaminated Land (Cork and Dublin), Groundwater, Waste, Hydrogeologist / Hydrologist. Please send a Covering Letter and CV to jobs.ireland@wyg.ie. For further details please check our website www.wyg.com (6th May 2005).

Articles Welcome

IGI Newsletters will be published every two months. Please send comments, letters and articles for inclusion in the next issue (due 1st July 2005) to EurGeol Frank McDermott PGeo, Department of Geology, UCD, e-mail: frank.mcdermott@ucd.ie before June 28th 2005.