



IRISH ASSOCIATION FOR QUATERNARY STUDIES

IQUA NEWSLETTER

April, 1989.

Edited by Ronnie Creighton.

Introduction

Since the last edition of the Newsletter there have been several successful events held by IQUA. These were the symposium in December, the first IQUA/IGA Joint Lecture in February and the 1989 AGM, Seminar and field trip held recently in Cork. These are all reported on in this issue, with the most space being given to the abstracts of the Cork seminar. Other newsworthy items are included, but again I appeal to the members to support the Newsletter with short abstracts, comments, etc. The next issue will be prepared in September so contributions should reach me at the Geological Survey of Ireland, Beggars Bush, Haddington Rd., Dublin 4, Tel. 01 609511, early in September.

Ronnie Creighton.

IQUA One-Day Symposium on the "Causes and Indicators of Quaternary Climatic Change".

held at the Geological Survey of Ireland, Dublin, Friday 2nd December 1988.

The 1988 symposium, organised by Bob Devoy, was again very successful. The theme of the meeting was very topical given present concerns about climate warming, rise in sea-levels, etc. Over seventy people attended the sessions. All contributors are to be congratulated on the quality of their papers. IQUA was pleased to welcome our keynote speaker Dr. Nick Shackleton from Cambridge, a leading expert in Quaternary climatic change as derived from deep-sea sediments. His talk outlined these research programmes and in a wide-ranging lecture gave a summary of the results to date. The complexity of such research was certainly revealed to an audience which was largely unfamiliar with the work.

Bill Watts and Pete Coxon spoke on the late-glacial and interglacial climates respectively, based on the floristic record, while Mike Baillee from Queens examined post-glacial climatic events, using tree-ring analysis. After lunch George Dardis, recently returned to Ireland, spoke on the evidence of the sediments. John Sweeney dealt with the complex subject of climate modelling. Finally Bob Devoy and Bill Carter considered the sea-level response to climatic change. Overall then another successful meeting for IQUA, with quality presentations, a good audience and interesting discussions. Bob Devoy will shortly publish a set of abstracts from the meeting.

Ronnie Creighton.

The following are the abstracts from the AGM held in Cork in March:

Holocene sea-level changes and coastal dynamics in the south and southeast of Ireland.

The south and southeast of Ireland is an area which is considered to have been isostatically stable during Late-glacial and Holocene times. Sea-level rose rapidly in the early Holocene, peaking or stabilising over the last 3,000-5,000 years (Carter et al. 1987). Drowning rather than up-lift should therefore dominate the characteristics of the coastline of the area. The rising sea-level mobilised offshore glacial sediments creating an abundance of material for redeposition both off- and onshore. This plentiful supply gradually ran out, except in areas of rapidly eroding cliffs of glacial material, e.g. at Blackwater, Co. Wexford. These redeposited sediments, in some cases, preserve beneath them evidence of environmental conditions which existed prior to their advent. The buried sediments may also provide information on the time and rate of development of the overlying structures. Five sites from the south and southeast of Ireland are discussed in relation to the above.

A. Sinnott (U.C.C.).

Problems of Coastal and Related Sea-level Changes in Southwest England.

Plentiful references to coastal and sea-level events are to be found in Cornish journals dating back to the eighteenth century. Observations and records of raised beaches, wave cut platforms and cliff notches can often be substantiated by present day site investigations. From various reports and documented explorations a case may be made for the possible existence of fossil shorelines at 30m, 20m and 8m O.D. in Cornwall, indicating a long history of variation in the land/sea-level relationship.

In looking specifically at Holocene sea-level change, fruitful investigations may be pursued in coastal depositional environments, particularly in protected embayments and estuarine areas. Here, complex sedimentary structures may provide valuable clues about changing energy regimes and sediment budgets, while associated biological and hydrobiological fossil forms can reveal much about marine influences, their nature and significance through time.

Information helpful in reconstructing sea-level history may be collected from many sources, especially sources such as borehole logs and geological probes where they are available. The validation, substantiation and elaboration of such material for Cornish sites helps develop a picture of land-level/sea-level relationships through time. Problems of evaluation and interpretation of data make the task of reconstruction of the coastal environment a complex one, however.

Michael Healy (U.C.C.)

Holocene sea-level history of Tongatapu, Tonga, from pollen analysis of mangrove peat.

Many Holocene sea-level studies are imprecise owing to use of fossil sea-level indicators that have a broad relationship with mean sea-level, and

lack of quantitative determination of this relationship from the present day environment. Such has hindered a regional picture of Holocene sea-level in the S.W. Pacific, with variable reports between islands from indicators such as inter-tidal notches, coral reefs, beach ridges and beach rock. Example is given from Tonga how a high resolution sea-level construction can be gained from pollen analysis of mangrove peat.

Joanna Ellison.

Vulnerability Mapping: An aid in protecting groundwater from pollution.

The "vulnerability" of groundwater to pollution is the sensitivity of its quality to potentially polluting human activities. "Vulnerability mapping" is the technique of assessing and ranking the vulnerability of groundwater and displaying it in a manner which is understandable and useful to decision-makers such as planners and engineers. The vulnerability of groundwater in Ireland varies greatly, depending on a number of inter-related geological and hydrogeological factors. The most important of these factors is, arguably, the unconsolidated materials - mainly Quaternary rocks - that overlie the aquifers and act as a protecting filtering layer.

The Geological Survey of Ireland is currently assessing the role of vulnerability mapping in Ireland. A number of areas around public water supply sources were chosen for examination. A desk study followed by a brief (1-5 day) reconnaissance survey was conducted around each source. The geological and hydrogeological features were mapped and assessed and used as the basis for the vulnerability map. It was concluded that although vulnerability mapping in Ireland will inevitably be qualitative and somewhat subjective, it nevertheless can serve as an effective and useful preliminary tool for the policy and operational levels of decision-making concerning the location of potentially polluting developments and groundwater protection.

Irene Quinn (Geological Consultant).

Donal Daly, (Geological Survey of Ireland).

Characteristics and significance of protalus ramparts and rock glaciers on Errigal Mountain, Co. Donegal.

Protalus ramparts and rock glaciers occur on Errigal Mountain, Co. Donegal. The ramparts are linear or gently-arcuate debris ridges with a single crest and shallow backing depression. They occupy zones of marked gradient reduction below talus slopes and rockwalls and possess distal slope gradients in excess of proximal slope gradients. One of the ramparts represents the largest such feature yet recognised in the uplands of Britain and Ireland. The rock glaciers extend a greater distance downslope from the talus-foot than the ramparts and have a strongly-arcuate or lobate plan-form. Interior ridges and depressions are interpreted as flow structures. Sedimentary characteristics lend support to the inferred modes of debris accumulation. A protalus rampart - rock glacier continuum has been identified and may be related to the underlying slope gradient and its influence on the shear stress threshold in an accumulating debris/ice mass. The landforms are probably of Nahanagan Stadial age (c. 11-10ka BP. and testify to extremely pronounced rockfall activity and

downslope debris movement at that time. A mean annual air temperature no higher than 1°C at sea-level during the Stadial is implied.

Peter Wilson (University of Ulster, Coleraine.)

Ice-proximal and deltaic sedimentary facies at Glasheen, Killarney.

Gravel pits three miles ESE of Killarney at 300ft O.D. reveal a south-to-north facies change from ice-marginal to more distal deltaic sediments, and show a number of special sedimentary and deformational phenomena. Ice-marginal deposits include massive, unsorted boulder gravels; crudely bedded gravels; lenses of foreset fine gravel and sand; and sheets of massive cobble diamictos 2-10ft thick, locally with reworked tops. Ice-melt lobes and rare possible ice-push folds are present.

One unit of laminated sand is cut by steep-sided pits, typically 2-5ft across, which were filled with asymmetrical lobes of graded gravel and sand, deposited in pulses. Pit walls are sharp, locally vertical or undercut, and adjacent sand shows no early collapse features. The pits may have formed as potholes, worn into frozen sand. Apparently frozen slabs were lifted from the top of the obliquely fissured sand body. The deltaic sequence consists of finely laminated bottom-set silts and clays, overlain by c.20ft of varied silts, sands and fine gravels, much of it deposited on sediment lobes 5-15ft high. At one locality rippled sand beds have been rolled up into a vertical fold limb c.5ft high, which is sharply truncated across the top. This "event" is completely lost along adjacent bedding planes. Topset gravels cover most of the deposit. Ice-wedge structures are developed, but several feet below the top.

M.E. Philcox (T.C.D.)

Glaciotectonic structures as a unidirectional indicator of ice movement in southwest Ireland.

Most of Iarthar Dhuibhneach (that part of Corca Dhuibhne, west of Dingle) remained unglaciated during the Fenitian Glaciation. Generally the Quaternary stratigraphy shows soliflucted sediments resting on littoral gravels. A section in a diamicton sequence at Tráigh Chloichir, 14km west of Dingle, is one of the exceptions. It was interpreted by previous authors as indicating a pre-Fenitian ice movement from the north. At the site 3-5m of locally derived diamicton rests on underlying steeply dipping Silurian sandstone. Careful examination reveals small scale glaciotectonic structures in the bedrock. These include thrust faults, drag folds, normal faults and probably some piggy-back (duplex type) structures. The diamicton is characteristically over-consolidated and largely matrix supported with well defined shear planes. In structural terms a large part of the diamicton sequence represents a fault breccia produced between the main hanging wall (ice) and the footwall (bedrock). Sedimentologically it is a till and, in places, is seen to incorporate a facies composed dominantly of extraneous debris. These tectonic features, together with a strong fabric trend in the diamicton, clearly indicate an ice movement from southeast to northwest (330°) over this area.

W.P. Warren, Geological Survey of Ireland.

Glacio-Mini-Tectonics, Ballycotton Bay.

The pattern of joints in till in Ballycotton Bay is consistent over c.8kms. There are three main joint sets present; one horizontal and two vertical. These sets are orthogonal and are related to larger tectonic features but are unaffected by them and are presumably a primary feature of the till. The vertical joints are parallel and perpendicular to the till fabric. The horizontal set is inherited from the thrust planes found in active glaciers. Other joint sets present are related to the shear planes predicted by soil mechanics. The joints are actually a cleavage not a true joint. The origin of the cleavage is discussed.

P. Vernon, (U.C.C.)

(End of Abstracts)

1st IQUA/IGA Joint Lecture.

22nd February, 1989 at U.C.D.

Quaternary Rocks - Important, complex, interesting but neglected - why?

Quaternary rocks cover more than 90% of the land surface of Ireland. They are crucial to almost all civil engineering projects, to agriculture, to the aggregate extraction industry, to groundwater, to environmental protection and to mineral prospecting. They are by far our most useful and valuable rocks. Sedimentologically they are probably our most complex deposits and are unsurpassed as a teaching medium for sedimentology. They contain spectacular tectonic structures, they are extraordinarily amenable to study and can frequently be cut with a knife or spade to reveal any face of a remarkable range of sedimentary and tectonic features. Why then are these the least studied of Irish rocks and why are they almost totally ignored by our university geology departments? It is sad to have to conclude that of geologists working in formerly glaciated areas ours are among the least informed. Is this situation likely to be rectified?

W.P. Warren, (Geological Survey of Ireland.)

1989 IQUA Autumn Symposium

The symposium topic is **'Conservation of Earth Science Sites of Scientific Interest'**? It is hoped to have speakers from the Nature Conservancy Council in Britain, Teggasc, Geological Survey of Ireland, Office of Public Works and the extractive industry. This is now an important topic for earth scientists as the National Heritage Council is currently reviewing the legislative and organisational aspects of nature conservation. Consequently an input from earth scientists could have beneficial results. Further details will be circulated in September.

Donal Daly, (Geological Survey of Ireland.)

International Geosphere-Biosphere Programme IGBP

The IGBP programme is a major research initiative being undertaken by the International Congress of Scientific Unions (ICSU). Ireland, through the Royal Irish Academy (RIA), has now registered its interest in the programme

and that part of it specifically relevant to IQUA members:- 'Techniques for Extracting Environmental Data of the Past? After a call for specific research proposals, a first submission was made by Professor Dooge in Beijing in September, 1988. The following IQUA members or associates have lodged proposals. J. Sweeney, J. Collins, M. O'Connell, R. Hammond, B. Carter, J. Oxford and B. Devoy. Copies of this submission are available. IQUA is well represented. An Irish IGBP Committee has now been established by the RIA. Membership is as follows: Chairman - Prof. Imbusch; and Prof. Orren, U.C.G.; Dr. Thorp, U.C.D.; Dr. Sidebottom, U.C.D.; Dr. O'Connor, U.C.G.; Dr. Jones, T.C.D. and Dr. Creighton G.S.I. This committee has yet to meet. It is important that Ireland is associated with IGBP, however it appears that funding will largely have to come from national sources.

Ronnie Creighton

Degree Awards

Marshall McCabe	D.Sc	Trinity College, Dublin. December, 1988.
Irene Quinn	Ph.D	CNA.A. Polytechnic of North London, July 1988.
Patrica Hanvey	Ph.D	University of Ulster. January, 1989.

Congratulations to all three!!

IQUA Committee 1989

The following Committee was elected at the recent AGM in Cork.

Chairperson:	W. Warren	ex. officio	D. Daly
Hon. Sec:	P. Wilson		I. Quinn
Hon. Treas.	M. Healy		T. Doherty
Newsletter Editor:	R. Creighton		M. O'Connell

1989 Subscriptions

Members are reminded that the 1989 subscriptions - ~~IR£3~~ - is now due. Please forward your subscriptions as soon as possible to:

Michael Healy,
Department of Geography
University College,
Cork.

IQUA Publications

A full list of IQUA publications was included in the last Newsletter. These are available from Michael Healy in Cork - check if you are missing anything !!

Forthcoming Events

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| IQUA | Annual Field Meeting | Waterford October 6-8, 1989. (see attached page). |
| IQUA | Annual Symposium | 'Conservation of Earth Science Sites. November/December, 1989. |
| IGA | Irish Geological Association | Members Night. Department of Geology, U.C.D. Wednesday, 10th May. |
| IGA | Weekend Excursion to North-West Clare. | 19-21st May, 1989. |
| IGA | Patrick Wyse-Jackson on | 'Evolution of the Fossil Record'. Trinity College Dublin, Wednesday 24th May at 8.00 pm. |
| IAEG | Irish Association for Economic Geology. | Weekend Course: 'Computing in Mineral Exploration etc.' Limerick Inn, Limerick 5-7 May 1989. |

If anyone has news of events in other societies which would be of interest to members. Please let me know for future editions.
