



1. Introduction

Dear All,
Welcome to this edition of the IQUA Newsletter. I hope you find much of interest to you within. As always, I remain eager to hear from anyone with material to contribute for the next newsletter due in July. Our next big event is the IQUA Spring Meeting, 28th March, back in TCD's Museum building. Our thanks to Gayle McGlynn for organising this year's Meeting. As usual, I encourage as many as possible of us to attend, keep in touch and support the organising team. As per the last two years, a small prize will be available for the best Postgraduate talk at the meeting.

Stephen McCarron, NUIM, March. 2009

2. IQUA AGM, 2009

The IQUA Committee, following a change in the Treasurer mid-2008 is currently as follows:

President: Pete Coxon, TCD

Secretary: Stephen McCarron, NUIM

Treasurer: Frank Ludlow, TCD

Postgrad rep: Gayle McGlynn, TCD

Website manager: Robin Edwards, TCD.

Publications Secretary: Stephen McCarron, NUIM

Ordinary members: Donal Mullane, Graeme Swindles (U. of Bradford)

Nominations for the post of Ordinary Member can be made through the Secretary. Extraordinary items for the Agenda can also be forwarded to the Secretary.

As usual, we will be attempting to decide on the Autumn Symposium theme and Fieldtrip location and leaders at the AGM. All offers and suggestions on either are welcome through any member of the Committee (see IQUA webpages for contact details).

3. IQUA Symposium, Nov. 21st 2008

A large audience and high calibre talks ensured the success of our annual symposium last November. The theme of 'Climates Past – Climates Future?' allowed and brought together a diverse and stimulating range of talks that highlighted the applicability of Quaternary study to improving our understanding of the climate system and its operation. The climatic 'leap' into the Holocene so beautifully recorded in Greenland formed the focus of our invited Keynote address by Prof. Mike Walker, Lampeter, Wales. Using a multiple chemical proxies from the core, but most clearly its deuterium excess decline at 11,700 b2k +/- 99yrs, Mike expertly discussed the novel 'geological' Global Stratigraphic Section and Point marker or 'golden spike' proposed as the base of the Holocene. Following Mike's insight into the high tech world of ice core drilling and the workings of INQUA Working Groups, we were treated to equally exciting discussions of: Greenland ice velocities and the ice sheet's record of calving acceleration feedback climate change response (A. Long, U. of Durham); the sediment and landform record of probably similar rapid ice drawdown into the Irish Sea Basin evidenced by closely juxtaposed streamlined landforms and ice berg keel marks in the central eastern Irish Sea Basin (K. van der Wateren, U. of Wales, Bangor); multi-proxy evidence of Holocene palaeoclimatic change in Ireland (Prof. M. O'Connell, NUIG); the use of loess as a proxy of arid conditions at the onset of the Holocene in the British Isles (P. Wilson, U. of Ulster); and bringing the Symposium up to present day and the shorter term trending in climatic variability, we finished (bar the pints) on a modelling note by R. Fealy, NUIM and his summary of recent north Atlantic driven climatic change.

All in all, the day proved to be the traditional mix of fun, tea and biccies, meeting friends and excellent science. The Committee would like to pass on their

thanks again to our kind hosts the GSI, and to all members and friends who attended. An abstracts volume was produced and can be purchased using the online PayPal system on our website or at future IQUA meetings.

S. McCarron, March, 2009.

4. For the Record

In advance of the Drumlin symposium to be held in the west of Ireland this month, its convener Jasper Knight has kindly contributed a short piece on the history of drumlin research and the Drumlin Symposia.

Drumlins at the edge: VII International Drumlin Symposium, 23-26 March 2009, Westport, Ireland



Historically, drumlins have been a specific focus of Quaternary research in Ireland, for a number of reasons. Linguistically, the Irish word droimnín (meaning, broadly, a hill) was adopted by the Rev Maxwell H. Close in his key paper of 1867 to refer to an upstanding glacial hill or ridge comprised of boulder-clay (glacial till).

Drumlin distributions in Ireland were extensively described by key workers including J.K. Charlesworth and W.B. Wright. The drowned drumlins of Strangford Lough frequently appear as the iconic 'basket of eggs' topography in textbooks. Much of the data on drumlin sediments have also come from studies undertaken in Ireland, in particular by Marshall McCabe and George Dardis in the 1980s.

Following initial work in Ireland in particular, interest in drumlin shape, distribution, and formation mechanisms was revived in the decades 1950-1970, where new numerical analysis, modelling and remotely-sensed mapping data were used. Interest in drumlin sedimentology came to the fore from the 1980s onwards, when more detailed sediment descriptors and methods of sediment analysis (not 'boulder-clay!') were used. Finally, the advent of

more advanced remote-sensing techniques, including high-resolution satellite imagery, GPS, LiDAR and subsurface geophysical methods has now placed studies of drumlins within a wider context and as part of a continuum of subglacial bedforms indicative of changes in basal thermal and hydrological regimes. Ironically, this more sophisticated view of drumlins takes place at a time when it is now apparent that Irish drumlins are, for the most part, modified and remoulded Rogen (ribbed) moraines.

A number of Drumlin Symposia have taken place, focusing on subglacial processes and environments and the formation, characteristics and significance of drumlins. The first symposium was held in Manchester, England, in 1984, and organised by John Menzies (Brock) and Jim Rose (Royal Holloway). Further symposia were held in Ottawa, Canada (1987); Oulu, Finland (1990); Northern Ireland (1992); Berlin, Germany (1995) and Torun, Poland (2001). The 1992 meeting, organized by Marshall McCabe and George Dardis, included field excursions to drumlins in Donegal Bay, Clew Bay and Galway Bay.

The VII International Drumlin Symposium revisits some of these sites in the light of new models for ice sheet development and extent in Ireland, based on new bedform mapping and cosmogenic dating evidence. This meeting will help re-focus attention on the dynamics of the subglacial environment in Ireland.

Jasper Knight, Exeter, Feb. 2009.

5. Research Update

New Research on the Irish Continental Shelf into the History of the Former British Irish Ice Sheet

[Dr Sara Benetti](#), [Dr Paul Dunlop](#) (Quaternary Environmental Change Research Group, University of Ulster – Coleraine) and [Prof. Colm Ó Cofaigh](#) (Durham University)

The Irish landscape is littered with glacial landforms such as drumlins, eskers and moraines that provide a signature of the last Irish ice sheet. Although these landforms have been investigated around Ireland and Britain for over a century, there is still great uncertainty concerning the dimensions, dynamics and history of the former British-Irish Ice Sheet (BIIS). This is mainly because it extended offshore onto the continental shelf around Ireland and Britain so important parts of the glacial record remain hidden below sea level (Fig. 1; Ó Cofaigh and Evans, 2007; Bradwell et al., 2007).

The recent massive development of marine scientific exploration in Ireland through the Irish National Seabed Survey (INSS) and the INFOMAR project provides an opportunity to solve these longstanding scientific problems. Initial interpretations of the INSS and INFOMAR bathymetric and sub-bottom data by the research team has resulted in the identification of a series of submerged glacial features, related to the presence of the BIIS on the Irish continental shelf at least during the last glaciation. Additionally, evidence of submarine failures and large sediment depocentres possibly due to an increased sediment and meltwater supply from the ice margin have been identified off the northern Irish shelf, onto the continental slope and rise, by sidescan sonar data (O'Reilly et al., 2007) and by the INSS deep-water multibeam data. These interpretations of marine remote sensing data lead to the speculation that glaciomarine processes had a very strong influence of the development of the northwest Irish continental margin, yet they do not provide any information on the type of processes involved nor on their timing and magnitude.

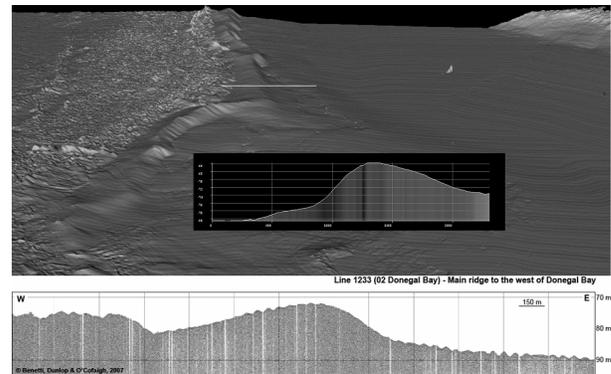


Figure 1 – Example of glacial feature on the NW Irish continental shelf: the main moraine system in Donegal Bay, about 18 km long, 1 to 2 km wide and 12 m high, at a water depth around 60-70 m.

In order to fill this gap in our understanding of the dynamics of the BIIS, the research team acquired a series of sediment cores by piston and vibro-coring on the northern Irish continental margin during the cruise CE08_16 on board the *R.V. Celtic Explorer* in August 2008 (Figures 2 and 3). The cruise was funded by the SSTI ship time programme 2008 with INFOMAR providing technical support and equipment.

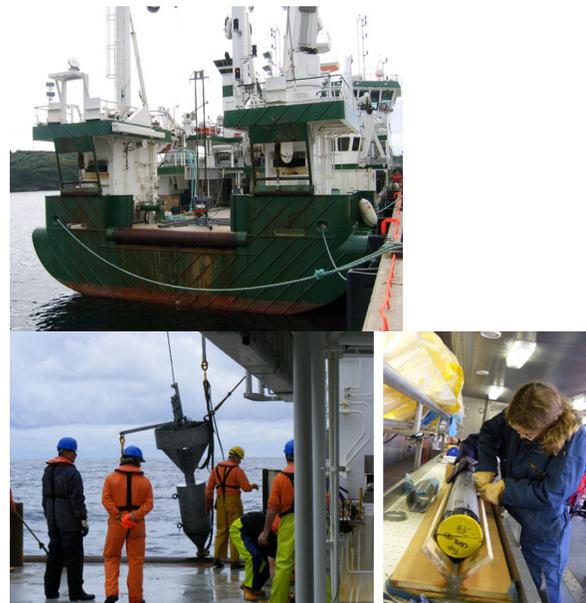


Figure 2 – Top: The Geological Survey of Ireland's vibrocorer (Geo-Corer 3000+6000) on the back deck of the *R.V. Celtic Explorer*. Left lower: The deployment of the piston corer Geo-Piston from the back deck. Right lower: Splitting one of the cores on board.

Figure 3 shows the location of the target areas covered during the cruise, which included:

(1) All the major glacial/deglacial landforms identified by the team on the continental shelf in order to obtain a record of past ice sheet advance and retreat across the shelf and in particular to determine the timing and rate of ice retreat during deglaciation.

(2) Two submarine canyons on the continental slope to determine the nature of slope sedimentation during both glacial- and non-glacial periods.

(3) Two sediment depocentres at the foot of the slope in order to elucidate the nature of 'distal' glaciomarine and non-glacial sedimentary processes.

Additionally, this project will integrate the terrestrial and marine records of the former ice sheet through the combination of Digital Elevation Models (DEMs) of the Irish landscape and the seabed into a single Geographic Information System (GIS) and then map the glacial record using remote sensing techniques. Remote sensing allows systematic and consistent mapping to be done at the ice-sheet scale, ensuring the investigation closely matches the spatial scale of the system. This will create a strong framework of ice flow and retreat patterns from the ice-sheet interior to the margin and will produce the first spatially consistent reconstruction of the BIIS.

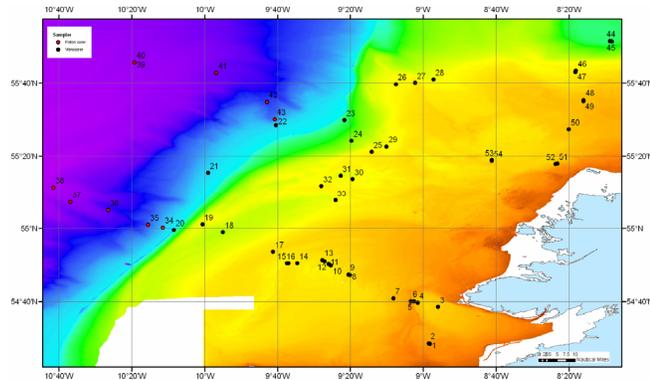


Figure 3 – Core locations on the NW Irish continental shelf. Black dots represent vibrocorer locations, red dots are piston corer locations.

The main output of this project will be a palaeogeographic reconstruction of the glacial history of the Irish sector of the BIIS. This will include information on the dynamic behaviour of the former ice sheet, the timing and rate of deglaciation, the nature of glacially-influenced and non-glacial marine sedimentation, and temporal and spatial changes in oceanographic circulation. Our data will provide important constraints for predictive modelling studies of ice-ocean-climate change in the North Atlantic through the identification and documentation of sedimentation styles associated

with glacial retreat. Results from our research will help resolve long-standing scientific problems related to our ability to interpret how contemporary ice sheets might change in future and how palaeo ice sheets behaved in the past.

Past and current students' research projects

- Robert Boyle (PhD – Univ. of Ulster):
Reconstructing the history of the Irish Ice Sheet from the interior to the margin on the continental shelf
(http://www.science.ulster.ac.uk/qec/boyle_r.html).
- Cathal Clarke (Final year – NUIG):
Understanding late Midlandian and Holocene depositional history of Donegal bay: high-resolution seismic reflection interpretation.
- Leona Donaghy (MRes – Univ. of Ulster): The Glacial Geology of the British Irish Ice Sheet on the North West Irish Continental Shelf (completed).
- Rachel Shannon (MRes – Univ. of Ulster):
Reconstructing the configuration and dynamics of the last Irish Ice Sheet on the Irish Continental Shelf (completed).

6. Forthcoming Meetings

Drumlins at the edge: VII International Drumlin Symposium, 23-26 March 2009, Westport, Ireland.

IQUA Spring Meeting, Museum Building, TCD, Sat 28th March, 9.30 – 3pm.
Organised by: Gayle McGlynn, TCD.
(e-mail: mcglyng@tcd.ie)

IQUA AGM follows meeting close. Details and Agenda: IQUA Website Meetings page. (secretary e-mail: stephen.mccarron@nuim.ie).

QRA Field Meeting, The Solent Basin and West Sussex: 4/04/09 – 08/04/09. University of Southampton. A joint meeting with the Prehistoric Society Leaders: Becky Briant, Martin Bates, Rob Hosfield, Francis Wenban-Smith. Details: Becky Briant(b.briant@bbk.ac.uk) 07952 766881 <http://qra.org.uk/meetings/7>

Invited and Professorial Inaugural Talks: Tuesday, 31st March, 2009 QUB School of Geography, Archaeology & Palaeoecology: Prof. John Birks (1-2pm) and Prof. Keith Bennett (4-5 pm). Details: Ms Karen Rice, on +44 28 9097 5140 (k.rice@qub.ac.uk).

7. Recent member publications

Chiverrell, R.C., Foster, G.C., Thomas, G.S.P., Marshall, P., Hamilton, D. 2009. Robust chronologies for landform development. *Earth Surface Processes and Landforms* Volume 34, Issue 2, Pages: 319-328

Chiverrell, R.C., Thomas, G.S.P., Foster, G.C. 2008. Sediment-landform assemblages and digital elevation data: Testing an improved methodology for the assessment of sand and gravel aggregate resources in north-western Britain. *Engineering Geology* 99 (1-2), pp. 40-50

Clark, J., McCabe, A.M., Schnabel, C., Clark, P.U., McCarron, S.G., Freeman, S.P.H.T., Maden, C. and Xu, S. 2009 Cosmogenic ¹⁰Be chronology of the last deglaciation of western Ireland, and implications for sensitivity of the Irish Ice Sheet to climate change. *Geological Society of America Bulletin*, v. 121, p. 3-16.

Foster, G.C., Chiverrell, R.C., Harvey, A.M., Dearing, J.A., Dunsford, H. 2008. Catchment

hydro-geomorphological responses to environmental change in the Southern Uplands of Scotland. *Holocene* 18 (6), pp. 935-950

Paul M. V. Coombes P.M.V., Chiverrell R.C., Barber K.E., 2009. A high-resolution pollen and geochemical analysis of late Holocene human impact and vegetation history in southern Cumbria, England. *Journal of Quaternary Science*, 24, 3, Pages: 224-236

Roe, H.M., Doherty, C.T., Patterson, R.T., and Swindles, G.T. 2008. Contemporary distributions of saltmarsh diatoms in the Seymour–Belize Inlet Complex, British Columbia, Canada: Implications for studies of sea-level change. *Marine Micropaleontology* 70, 134-150.

Smith, M.J., Knight, J. and Field, K.S. 2008. Glacial striae observations for Ireland compiled from historic records. *Journal of Maps*, 378-398.

8. General Membership Items

Renewal of Membership

Please let your students/ colleagues know about IQUA and encourage them to join.

Membership can now be paid online, through our PayPal facility, via the IQUA website: <http://www.tcd.ie/Geography/IQUA/Index.htm>

Alternatively, please cut out and complete the form below and send it with the relevant annual subscription to the Honorary Treasurer of IQUA:

Irish Quaternary Association

Renewal of Membership

Full members €15.00 (£10); students and unwaged €10.00 (£7)

Name:

Address: _____

Telephone:.....

E-Mail:.....

Amount paid.....

Please also check the date on your address label (e.g. on Newsletter envelope) and contact the Treasurer if you think it is incorrect.

Treasurer:
Mr Frank Ludlow, c/o Dept. of Geography, TCD

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IQUA will accept Sterling cheques, although a small handling charge will be incurred.

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<https://listserv.heanet.ie/iqa-l.html>

If you are not receiving IQUA listserv emails, please sign up to the list at the location above. A request for subscription to the IQUA-L list goes initially to the list moderator first for cross-referencing with the current membership list.

S. McCarron, IQUA-L Moderator

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