
IQUA

Cumann Ré Cheathartha na h-Éireann

Irish Quaternary Association

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Editor: Janice Fuller



Introduction

Thanks to no foot-and-mouth this year, we were all able to get out and about and this edition of the Newsletter contains reports of three field meetings that took place in Ireland this summer. Details of the forthcoming IQUA symposium are also provided, as well as, recent publications, and an update on IQUA's relationship with INQUA.

I would like to thank all the contributors to the Newsletter, especially Michael Philcox who kindly responded to my pleas for help. Items for the next Newsletter should be sent to me by mid-March 2003 (contact details below).

Upcoming Events

1. IQUA Annual Symposium

Friday November 1st 2002

Geological Survey of Ireland,

Beggar's Bush, Dublin

Coffee at 9.45am;

First talk at 10.15am

'Multiple Proxies for Environmental Reconstruction'

Pollen analysis is, and will continue to be, a major technique for reconstruction of terrestrial environments. In recent years however, it has become increasingly apparent that a higher degree of precision and accuracy can be obtained by adopting a multiproxy approach, in conjunction with pollen analysis, e.g. macrofossils, beetles etc.

This year's IQUA Symposium aims to evaluate the extent to which multiple strands of palaeo-environmental evidence answer questions including: to what extent do multiple palaeo-environmental indicators provide complementary data? What happens when proxy data do not provide analogous evidence? Is the major limitation to any palaeo-environmental study dating accuracy and reliability?

Symposium Programme

1. Keynote speaker: David H Keen
Molluscs, insects, plants? The multiproxy story so far. Who is telling the truth?
2. Michael O Connell, NUI, Galway
TIMECHS: new multi-proxy evidence for Holocene environmental change at the Atlantic fringe of Europe
3. Andy Richards, University of Limerick
Interpreting organic sequences from Cold Stages and the problems inherent with such work
4. Nicki Whitehouse, Queens University Belfast
Comparing fossil beetle faunas with other biological proxies: the value of an integrated, multiproxy approach
5. Chris Caseldine, University of Exeter
Prehistoric environmental change on Achill island, Co. Mayo - multi-proxy evidence for an environmental 'event' ca. 4,500 14C yr BP
6. Ingelise Stuijts, Discovery Programme
Multi-proxy adventures in Derryville bog, Co. Tipperary
7. David Taylor, Trinity College Dublin
TBA
8. Gill Plunkett, Queens University Belfast
Tephrochronology: an invaluable tool for intra- and inter-site correlations in multi-proxy studies

2. New undergraduate degree program in Marine Science (first intake Oct. 2002).

For more details see:

<http://www.science.ulst.ac.uk/marine/>

IQUA Annual Field Meeting

Kilkenny, 12-13th October 2002

This year the fieldtrip was based in Kilkenny during the weekend of October 12-13th. The trip was organised and led by Susan Hegarty, and was mainly a field demonstration of her Ph.D. thesis work, based on her mapping of Quaternary sediments and landforms throughout Co. Kilkenny for the Geological Survey. Seven people, mainly with a taste for glacial sediments, took part. The weather was fine and sunny most of the time, Sunday's front proving feeble in that area.

The trip began with a discussion of Susan's new Quaternary map and a comparison with DEM images. The latter look like air photos taken from a satellite, but can be computer-manipulated, to emphasise topography. Various subdued landforms, some not easily detected even on air photos, show up clearly, and can reveal changes in ice-flow direction or superimposed directions. Artefacts such as bog-cutting patterns also show up. Linear features, notably crag-and-tail ridges, indicate an ice flow from NNW in the north-western part of the county.

The party then descended into Dunmore cave, which has a new visitor centre and incipient museum. We were given the official tour of rather good speleotherms and told some gruesome local history.

Of particular interest to the party was a deposit of cross-laminated sand and fine gravel over 1 m thick, derived from the Namurian, and partly covered with flowstone (with potential for U-Th dating). The timing and transport route of the sediments are problematical, but sub-glacial drainage is possible, especially as some of the larger clasts are sub-angular.

The party next drove around part of the southern margin of the Castlecomer Plateau, to look at a series of north-south dry channels up to at least 30 m deep and 2.5 km long, cut into Namurian shale and sandstone. The heads of these channels are abrupt, sometimes forked. The lower ends open out at the contact with the underlying limestone, suggesting a genetic link with karstic drainage (the Dunmore cave sand deposit may be related). The channelled formation has low permeability but is relatively easily eroded. The form and distribution of the channels and the nature of the bedrock together suggest a sub-glacial origin as Nye channels.

The next stop was the Ormonde Brick quarry c.4 km east of Castlecomer, where the thin, Namurian-dominant till was the primary objective. The till includes some limestone clasts, presumably derived from the lowlands to the north of the plateau. Several sharp anticlines deform the top few feet of the shales and the overlying till and suggest glacial compression. The quarry lies above a former coal mine. A horizontal coal seam 7m below surface has been

mined out (below ground) and back-filled.

Some old shafts and tunnels are visible in the present faces. The Ormonde operation targets a particular shale bed just above the coal, which is suitable for brick-making. The till type here was contrasted with a limestone-rich till seen at the next stop in a stream section at Croghteenclough.

The last stop on Saturday was the large, recently abandoned Readymix gravel pit at Dunmore, which illustrates the character of the narrow belt of thick limestone-rich gravels along the River Nore, which cuts right across the Namurian and Westphalian outcrop from the north. Fine-grained lacustrine deposits (not seen) are overlain by a succession of coarse sands and boulder gravels, locally including fault-bounded let-down structures formed by the slow melting of buried ice blocks. The succession suggests prograding outwash, including major flood deposits with occasional rounded limestone boulders over a metre across. The buried ice blocks are more likely to have been transported south by such floods than to be remnants of a retreating ice front. The distribution of the Nore gravels is interpreted to reflect the confluence of two ice sheets, one flowing from the NNW (see above), the other from the north, identified in the east of the county from its limestone-poor pebble content. During retreat these ice sheets are thought to have separated in the vicinity of the Nore valley, which became a major channel-way for south-flowing outwash.

On Sunday morning we drove to Waterford, to see an exposure in a small cliff on the bank of the River Suir (approx. S.640120). Here a reddish till section, dominated by Old Red Sandstone and Lower Palaeozoic clasts, consists of two parts. The bottom 1 m is a compact silty diamict with strong sub-horizontal clast fabric, which is interpreted as lodgement till. This grades up into a paler, sandier diamict with randomly orientated clasts, and pockets of stratified grit and sand over 1.5 m across and 50 cm deep; this upper unit is interpreted as a melt-out till belonging to the same glaciation. Its age and stratigraphic relationships are not known; it is not of Irish Sea type. The exposure illustrated well the contrast between the two till types.

The second stop was c.7 km NE of Carrick-on-Suir, to look at a cluster of pingos. These are sub-circular hollows tens of metres across with surrounding upstanding rims (ramparts) c.2 m high. Simplifying, they formed above locally disrupted permafrost, where springs emerged to build up a dome of ice. Sediment above the dome slid off, forming the peripheral rampart. The hollow eventually left by the melted ice was then partially filled with soliflucted debris from the rampart. A palaeosol within the hollow-fill gave a radiocarbon date indicating growth of the pingos within the Younger Dryas. All known pingo sites in Ireland are at the foot of south-facing slopes, where the sun can disrupt the permafrost above a potential spring line.

More details of all these sites, and two others, are given in the guidebook, together with references. The guidebook, written by Susan Hegarty, is a worthy addition to IQUA's collection. She deserves our thanks for organizing a very interesting trip and producing the guidebook; and we wish her success in the imminent submission of her thesis.

Michael Philcox

Guidebook details:

Hegarty, Susan. 2002. *The Quaternary of Kilkenny with Particular Emphasis on the Castlecomer Plateau*. Irish Quaternary Association Fieldguide No. 24. pp. 52

Contact the author for copies at (01) 7168487;
Susan.Hegarty@ucd.ie

QRA Fieldtrip to South-West Ireland 20th- 23rd September 2002

This trip, which was postponed last year because of Foot-and-Mouth, was centred on Killarney and covered a range of Quaternary and archaeological topics at localities as far apart as The Mizen and Loop Head. It was organised principally by Stephan Harrison (ex Coventry University, now Oxford) and Tim Mighall (Coventry), who jointly edited the 156-page field guide in the usual QRA format. They and their grad students, and colleagues from Newcastle and elsewhere, provided most of the site descriptions, with additional contributions

from other British and Irish "local experts". There were about 17 participants, mainly from Britain. Travel was by private and hired cars, as few as possible, minimising parking problems. The weather was rare: not a drop of rain, and the Reeks cloud-free most of the time.

On Day 1 we penetrated the heart of the Reeks up the Gaddagh River to the moraine overlooking Lough Cummeenmore, to examine till, river terraces and various paraglacial, periglacial and Holocene features, including rock glaciers and alluvial fans. A lot of detailed work has been carried out in this area by the Coventry group in recent years, which is beginning to come through as publications. Some of the later "events" in the valley have been dated from intercalated peats. Pollen diagrams illustrate initial tree colonisation and the subsequent effect of human activity. The (field) day ended with a drive through The Gap of Dunloe, which must have a much more complex origin than just a throughway for ice from the Kenmare centre. Little modern work has been done there as yet.

On Day 2 we drove through that magnificent scenery between Killarney and Bantry, with fleeting (and dangerous!) glimpses of a host of Quaternary morphological features, as yet practically unstudied. We joined Billy O'Brien in Schull, and visited the Bronze Age copper mines on Mount Gabriel. These are aligned along one distinctive bed, and some are over 10

m long. The effect of mining (no smelting is known) on the mineral uptake in adjacent bogs (also visited) is small at most. The use of wood for fuel and tools had limited effect on pollen curves.

Day 3 began with a visit to the Ross Island copper mines, Bronze Age to 19th-century, under the guidance again of Billy O'Brien. A still, sunny morning beside Lough Leane, the mountains and woods reflected in the water, provided an idyllic background, against which to contemplate the sweat, grime and dangers of these mining operations. This was followed by a fleeting visit to the high-level gravel terrace NE of Killarney, part of the Kilcummin Moraine, and an up-date on the site visited by IQUA in 1996. This proved to be of interest to the "Reeks Brigade", with the prospect of trying to match retreat chronologies. In the absence of peat, new methods of dating will be required.

The party then headed north, crossed the Shannon on the ferry and visited the thick (>20 m) till-dominant section at the Bridges of Ross on Loop Head. Here Andy Richards (Kingston University) has been applying geochemical techniques to distinguish similar-looking stratigraphic units, partly through degrees of weathering. An interbedded unit of laminated silt has yielded an apparently stadial pollen assemblage, including halophytes, but is at present undated.

On Day 4 we visited another thick, composite, till-dominant cliff at Feohanagh, on the NE side of Smerwick Harbour on the Dingle peninsula. This is also under investigation by Andy Richards, following the 1970s work of Colin Lewis, who was with the party and was able to give us a wider perspective. A meagre pollen assemblage from one of the lower units suggests a possible (uncorrelated) interstadial environment. A gravel in mid-section is interpreted as the Courtmacsherry Raised Beach. However, its origin as a beach deposit at this site was questioned. The discontinuous till sections in this area are difficult to correlate. The tills originated (partly as composite debris flows) from local mountain glaciers. As their geochemistry is partly dependent upon the source rocks, its use in identifying repetitive events calls for special caution.

The party next visited "Peddlers Lake" (L. Doon) near Connor Pass, a corrie with rock bar and remarkably well preserved and extensive ice striations, chatter marks and crescentic gouges. The site was described as early as 1849 and is thus also of historic interest. The last stop was Mhónáin Corrie on the east side of Mount Brandon, to look at a Holocene debris fan and related alluvial fan, the outer fringe of which is interbedded with peat. The pollen record shows an evolving woodland assemblage, replaced by grassland and peat with some indication of human activity. Sediment influxes (radio-carbon dated to Late Neolithic to

Early Christian) appear to be related to wetter conditions rather than human activity alone, though the latter may have already destabilised the source areas.

In summary, this QRA trip was very enjoyable and informative. It was well organised, well led, and blessed with perfect weather and good company. The well illustrated guidebook* will be of value to Quaternary geomorphologists, palynologists and archaeologists, and includes 18 pages of references. My only regret is that more IQUA members were not there to benefit from the trip.

* Harrison, S. & Mighall, T.M. (eds) 2002. *The Quaternary of South West Ireland. Field Guide*; Quaternary Research Association, London, pp. 156.

Michael Philcox

Irish Glacial Field Studies Group

Field Trip to Co. Roscommon

10-11th August 2002

Led by Cathy Delaney and Robbie Meehan
Well, who says it always rains on field trips? We started the field trip in glorious sunshine with an overview of the area around Turlagh, Co. Roscommon by taking in the wonderful views from the top of a high ridge on an old ceremonial burial mound (marked 'Barrow' on OS Sheet 40, Grid ref M 933 543).

From here, we could see up as far as Leitrim and down to South Tipperary. Glacial features abounded: hills to the north and east looked clearly sculpted by ice movement, with classic crag and tail profile. Closer to our location, some of the drumlins seem to be formed of sculpted rock – we could see outcrop across the valley and further down the hill on which we stood. Directly south east of our location was Lough Funshinagh, otherwise known as the ‘Disappearing Lake’ – an intermittent turlough that becomes nearly dry every three or four years.

The real gem of the area, however, was a sinuous meltwater channel that wound its way down from just below the ridge summit towards the Rooskagh Esker. These now-dry channels formed beneath the ice after the drumlins were formed. As it wound down the hill slope the channel was at times deep enough to completely hide us from view of the surrounding land.

While driving, Cathy filled us in with a few background details about the Rooskagh Esker, and eskers in general. However, as often happens when you have a car full of enthusiastic field trippers we didn’t immediately get as far as the we’d intended along the Rooskagh Esker, as an interesting exposure was spotted just off the road! We had been driving in a south-south-east direction from Lough Funshinagh along the line of the esker towards ‘Site 2’. After examining the exposure and getting an overview of the

surrounding area from the top of the esker, the conclusion was that this was a spur or short transverse ridge feeding into the main esker ridge. Cathy discussed such transverse ridges in her paper (Delaney, C. 2001) - *While it is possible that these are terminal moraines, continuity with the esker indicates that they are more likely to be crevasse fills, along with water and sediment were diverted toward the main channel.*

After lunch, Cathy opened up some clay cores that she had sampled on a raised bog site near Brideswell. These cores were sampled using a Russian Corer that returns an intact core of about 0.5m in length. They were samples of lacustrine clay (often called blue clay) from beneath a raised bog. The cores had been allowed to partially dry, revealing clearly the layers within the core, and allowing the identification of successive seasons of deposition. Cathy has counted these layers and is correlating them between core samples. She hopes by taking more samples like these across a wider area she will be able to learn more about the deposition patterns, and the extent of the lake in which they were deposited.

After spending the first day of the trip mucking around within and at the edges of the esker fields, we went deeper into drumlin country, led by our intrepid guide for the second day, Robbie. With the aid of print-outs of an azimuth-shaded Digital Elevation Model of this

part of the Irish Midlands, coupled with field evidence, he managed to convince us that there were at least two, superimposed, directions of ice flow – especially in the region between Tulsk and Frenchpark.

Evidence that the ridges around Strokestown that are parallel to the Old Red Sandstone Slieve Bawn Mountains are transverse ridges, rather than features parallel to ice flow, comes from sandstone-derived till overlying the limestone bedrock in the lowlands to the west of Slieve Bawn. We observed deep red sandy till overlying limestones at several locations, including Queen Maeve's Fort (Rathcroghan), and also in a pit excavated for a slatted-floor cowshed at Caran in north Roscommon.

Fittingly, we finished the day at a presumed series of ice marginal moraines at Killeglan. The fields around had mostly been cleared of boulders, demonstrating how difficult it can be to find pristine Quaternary geology features in a heavily-farmed environment such as Ireland. Many theories on exact depositional conditions were discussed, but it seemed as though the angular and blocky boulders were very local, derived, possibly, from the ripped-up topmost layers of the limestone bedrock.

Over the two days, we had been speculating about the relationship between the bedrock type and the form of the glacial deposits. For example, in the area of the Killeglan moraines,

we observed many karst features – does the enhanced drainage of a karstic system inhibit slippage of sub-glacial sediments and increase the likelihood of a sediment pile-up? This issue and others provided food for much lively discussion during what was a most enjoyable field trip

Una Leader and Taly Hunter Williams

IQUA and INQUA

The relationship between IQUA and INQUA has recently been somewhat remote, because the Royal Irish Academy is the official INQUA representative and the individual concerned has not been “a Quaternary person”. The Academy has now asked that IQUA's representative on the National Committee for Geology (currently myself) should be more directly involved with INQUA affairs. This should give IQUA members a closer link with INQUA, which, among other things, may be a potential source of research funds. The Academy would like some feedback from IQUA as to what kind of links Ireland should try to establish with INQUA.

I therefore ask members to contact me, if they have ideas that they would like to pursue in this context.

*Michael Philcox, Red Bog, Blessington, Co.
Wicklow. E-mail: mphilcox@tcd.ie*

Abstract of Recently Completed Thesis

Murdy, J.M. 2001. *The Origins and Development of the Coastal Dunes of SE. County Down, Northern Ireland.* PhD thesis, Queens' University Belfast. 334pp.

This investigation used a multidisciplinary approach to elucidate antecedent conditions and development of the Murlough and Ballykinler coastal dunefields, southeast County Down, Northern Ireland. Geophysical (GPR) and lithostratigraphic evidence were used to identify facies and trace their relative stratigraphical relationships and extent. Relative age determinations via luminescence methodologies (IRSL and OSL) and ^{14}C dates have been used for the chronostratigraphy of the identified facies. A hypothesis relating to the late-Pleistocene and Holocene coastal evolution of Murlough and Ballykinler recognised the importance of antecedent glacial/deglacial environments of the late-Pleistocene and operation of allogenic forcing mechanisms, including Holocene relative sea level and atmospheric conditions, such as the magnitude and duration of storms which have had a profound influence upon coastal sediment budgets. The bulk of aeolian deposits present at Murlough and Ballykinler probably developed under circumstances proposed by a forced regression model. This model involves a general regressive shoreline in which aeolian reworking

of exposed beach and nearshore sediment, due to a lower sea-level position, allows dune accretion at positions immediately landward of the source area as well as down drift of it. An investigation of beach-ridge morphogenesis has revealed that ideal opportunistic dune forming condition prevailed during the Holocene; particularly the occurrence of SE storms and associated strong winds. Dated evidence tends to support the model proposed by *Posamentier et al.*, (1992), which implies that even in a macro-transgressive shoreline context, one can find normal regressive sites dependent on excess sediment supply. The Little Ice Age dune building phase associated with parabolic dune forcing and a lowered RSL. However the relationship between falling RSL and dune building is equivocal. This is displayed by the influence of anthropogenic and biotic activity during the later stages of coastal evolution at Murlough and Ballykinler.

Posamentier, H.W., Allem, G.P., & James, D.P. 1992: High resolution sequence stratigraphy, the East Coulee delta, Alberta. *J. of Sed. Petr.*, v.62, p310-317

Recent Publications on Quaternary

Research in Ireland

Anderson, E., Harrison, S., Passmore, D.G. and Mighall, T.M. 1998. Geomorphic evidence of Younger Dryas glaciation in the Macgillicuddy's Reeks, South West Ireland. In L.A. Owen (ed.) *Mountain Glaciations, Quaternary*. Proceedings. 6, 75-90. Quaternary Research Association, Cambridge.

Anderson, E., Harrison, S., Passmore, D.G. and Mighall, T.M. 2000. Holocene alluvial fan development in the Macgillicuddy's Reeks, southwest Ireland. *Geol. Soc. America, Bull.*, 112, 1834-1849.

Anderson, E., Harrison, S. and Passmore, D.G. 2001. A late-glacial protalus rampart in Macgillicuddy's Reeks, south-west Ireland. *Irish J. Earth Sci.*, 19, 43-50.

Coxon, P. 2001. Understanding Irish landscape evolution: pollen assemblages from Neogene and Pleistocene palaeosurfaces in western Ireland. *Proc. Royal Irish Acad.* 101B, 85-98.

Coxon, P. 2001. The Quaternary history of Clare Island. In: Graham, J.R. (Ed.) *New Survey of Clare Island. Volume 2: Geology*. Dublin. Royal Irish Academy. Pages 87-112.

Delaney, C. 2001. Morphology and sedimentology of the Rooskagh Esker, Co. Roscommon. *Irish Journal of Earth Sciences* 19, 5-22

Fuller, J.L. 2002. Past vegetation and land-use dynamics in Mayo Abbey, Central Mayo. *Archaeology Ireland* 16, 20- 23.

Hall, V.A. and Pilcher, J.R. 2002. Late-Quaternary Icelandic tephra in Ireland and Great Britain: detection. Characterisation and usefulness. *The Holocene* 12, 223-230.

Knight, J. 2002. Glacial geological evidence for stick-slip basal ice flow. *Quaternary Science Reviews*, 21 (8-9), 975-983

Knight, J. (ed) 2002. *Field Guide to the Coastal Environments of Northern Ireland*. University of Ulster, Coleraine. 216pp.

Knight, J. 2002. Wind abrasion (ventifaction) on Donegal and Oregon coasts and implications for the sediment dynamics of coastal systems. *Journal of Coastal Research, Special Issue*, 28, 451-459.

Moles, N. R. and Moles, R. T. 2002. Influence of geology, glacial processes and land-use on soil composition and Quaternary landscape evolution in The Burren National Park, Ireland. *Catena*, 47, 291-321.

Ó Cofaigh, C. & Evans, D.J.A. 2001. Sedimentary evidence for deforming bed conditions associated with a grounded Irish Sea glacier, southern Ireland. *J. Quat. Sci.*, 16, 435-454.

O'Connell, M. and K. Molloy. 2001. Farming and woodland dynamics in Ireland during the Neolithic. *Proc. Royal Irish Acad.* 101B, 99- 128.

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Contributions for the next IQUA Newsletter should be sent to:

Dr Janice Fuller, Department of Botany, NUI, Galway; E-mail Janice.Fuller@nuigalway.ie
