IQUA

Cumann Ré Cheathartha na h-Éireann

Irish Quaternary Association

http://www.iqua.ie

February 2015 NS 54 ISSN 0790-4096

Editor: Ellen OCarroll

1. Introduction

Dear IQUA member,

Welcome to IQUA newsletter No. 54.

This year is proving to be a very exciting time for IQUA. The bid for INQUA 2019 is gathering pace and a new Facebook page (INQUA 2019 Dublin Ireland – Bid) has been created to help spread news of the bid plans and of interesting Quaternary-related research and projects for Ireland and beyond (See section 8 below).

We had a very stimulating IQUA symposium at the GSI last November entitled Lakes: Reflections of our past. A diverse range of speakers from across Ireland and Britain discussed a wide range of topics including the growing importance of Quaternary Science, archaeological Crannógs (lake dwellings), lake sediments as archives for palaeocological research, human and climatic influences on Irish lakes, glaciolacustrine varves and eutrophication trends (see Item 5 for Abstracts of talks). IQUA would like to thank the GSI for the use of their facilities once again. A special thanks goes to Karen Taylor for organising the Symposium, and to all Committee members who helped out in making it a great success.

IQUA's fieldtrip to the Limerick and Shannon Estuary Region $(19^{th} - 21^{st}$ Sept) was very well attended and the sun was shining for a very enjoyable boat trip around the Shannon and out to Scattery Island. More detailed discussions and summaries of the fieldtrip can be found in the accompanying IQUA Field Guide (no. 32) and in Item 4 of this newsletter.

Also included in this newsletter are details of our upcoming meetings and excursions as well as details of other lectures and events taking place which might be of interest to you, our members. New research programmes including the Gateways 2 adventure and Fragsus Research (see item 8) are detailed below. If you have any news that you wish to have included in the newsletter please contact me at <u>eocarro@tcd.ie</u>.

We hope you will join us for events during the year. There is currently a call for papers for the upcoming Spring Meeting and AGM (Saturday 25th April) – see Item 3 for details. The Spring Meeting is free of charge and is being hosted by Maynooth University – many thanks to Benjamin Thébaudeau for coordinating this event.

In September, IQUA are organising a joint IQUA/QRA fieldtrip to the South West of Ireland. This trip will take place from the 25th to the 29th of September. For more details see section 6 below.

Finally, thanks to all who contributed to this edition of the newsletter.

Kind regards, Ellen OCarroll, February 2015

2. IQUA Committee (2014/2015)

The IQUA Committee is as follows:

President: Dr Catherine Dalton, MIC, University of Limerick (continuing)
Secretary: Dr Bettina Stefanini, Maynooth University (continuing)
Treasurer: Dr Gayle McGlynn, TCD (continuing)
Postgraduate rep: Karen Taylor, NUI Galway (continuing)
Website manager: Dr Francis Ludlow, Yale University (continuing)
Publications Secretary: Dr Kieran Craven, TCD (continuing)
Newsletter editor: Dr Ellen OCarroll (continuing)

Ordinary members: Dr Steve Davis, UCD (continuing), Dr Benjamin Thebaudeau, TCD (continuing), Dr Rory Flood, QUB (continuing), Dr Gill Scott, Maynooth University (continuing).

3. IQUA Spring Meeting and AGM 2015

We are pleased to announce that the 2015 IQUA Spring Meeting will be hosted by the Department of Geography, Maynooth University.

Date: Sat 25th April 2015. Registration will begin at 9.30am. The Meeting will be followed by the AGM. Organisers: Benjamin Thébaudeau

The meeting is open to all and is free to attend. It will consist of short (20 mins) presentations on any area of new or ongoing Quaternary research. Postgraduate and post-doctoral researchers are especially welcome and are encouraged to take advantage of the opportunity to present in an informal and friendly setting. Both oral and poster presentations are invited.

The committee would also like to remind the current and former recipients of a Bill Watts or an IQUA research award of the opportunity to present the recent results of their research. In particular, the IQUA committee is eager to showcase to our members the way the dates awarded were used in all your research projects.

Please send abstracts of c. 200 words to: Benjamin Thebaudeau (<u>benjamin.thebaudeau@nuim.ie</u> by the weekend of the 14th March.

Further details including the venue and list of speakers will be circulated in due course. In the meantime please do not hesitate to get in touch with Benjamin Thébaudeau for offers of papers and any questions.

The Secretary (email: <u>bettina.stefanini@nuim.ie</u>) welcomes suggestions for Agenda Items up to Friday 24th April 2015 for the IQUA AGM. The Agenda will be circulated before the meeting, and will include nominations for the Committee.

More details on the venue location and submitting an abstract are available on the IQUA Meetings webpage.

We look forward to seeing you in Maynooth!

4. IQUA 2014 Annual Fieldtrip

IQUA Fieldtrip to Limerick and Shannon Estuary Region, 19th–21st September 2014.

Carlos Chique, School of Archaeology and Geography, National University of Ireland Galway

&

Alwynne Mc Keever, Department of Botany, School of Natural Sciences, Trinity College Dublin

IQUA fieldtrip: Saturday

For the first part of the fieldtrip we visited Mungret Quarry and the adjoining processing plant operated by Irish Cement. For most of us, it was our first time visiting a cement manufacturing plant. This is quite an extensive and complex facility. We learned how the processing plant has played a crucial role as an industrial component of Limerick city since the 1930s and how the plant takes advantage of the local geology characterising the Limerick-Shannon Estuary Region with easy access to shale, clay, and limestone. We were able to appreciate different "facies" from where raw materials were extracted and the massive machinery used in this process. Additionally, it was particularly interesting to understand the amount of "sourcing" of materials needed in the production of cement. The processing plant sources some of its materials from far-flung places including Africa and South America. It really makes you wonder about the complex logistics, extensive trade networks, and amount of effort put in place to create a simple, but also indispensable product in the construction industry.



Mungret Quarry

We also got the opportunity to visit the wider quarry area where most of the extraction takes place. This was definitely an impressive sight: a substantial layer of the bedrock has been literally dug out forming what can be described as a very wide canyon. It can be surprising how human beings can modify the landscape to such an extent. We also gained an insight on the mechanism used to keep the area flood-free which I presume requires a lot of effort and resources.

For the next part of our fieldtrip we visited the remains of the Grange Stone Circle and its surrounding areas including Lough Gur. Evidently, this was a very contrasting sight in comparison to the visit to the cement factory. In my case, this was my first time visiting such a large archaeological site in Ireland. Even some of the archaeologists among the group were impressed by its considerable size. In my opinion this is guite an interesting place to visit even for those not actively involved in archaeology. The Stone Circle is actually located within an earthen embankment and it is thought to have been built in a single phase. Although it is uncertain, the construction of the Stone Circle may date back to the Late Bronze Age. I was surprised about our vague understanding on the monument, its purpose, and its original builders. The site was most likely used for religious purposes, and I was left wondering the role that it played as a social aathering place at the time and for different peoples throughout hundreds of years. Indeed, far from being a 'forgotten' site, there is evidence suggesting restoration work at the monument as recent as the 19th-20th century, indicating а continuous significance for the local inhabitants.

Lough Gur is located in a very attractive setting with a long history of human habitation stretching back 4500 years. The area consists of a mixture of private and public ownership with plenty of information available for visitors including a museum displaying some of the archaeological findings from the area. The area is considered to be one of the most important prehistoric settlements in north-western Europe. The lake itself has an interesting history with nutrient pollution (eutrophication) which I'm sure was appealing to some of the palaeolimnologists in the group including myself. This is a highly enriched system with poor oxygen concentrations through the water column and seasonal algal blooms. Here, eutrophication is attributed to the highly permeable underlying local geology and human pressure in the catchment area. What makes the lake interesting is that it has a small or "perched" catchment area resulting from the local topography, which is

unusual given that the lake has a considerable size and normally it would be expected to drain a relatively substantial surface catchment area. In this case, the groundwater catchment of the lake seems to exert a much stronger influence on its water quality.



Examining some of the stones associated with Grange Stone Circle

There are current plans to undertake new palaeolimnological analyses at Lough Gur. Given the lack of water quality monitoring data prior to 1999 the application of palaeolimnological tools at Lough Gur is highly suitable. Although palaeolimnological reconstructions including pollen analysis have been conducted in the lake, they have focused on long-term 'change' rather than patterns in the recent past (e.g. past 500 years) - a time when considerable catchment disturbance and subsequent lake deterioration are most likely to have occurred. By analysing palaeoenvironmental indicators known to respond to changes in water quality such as chironomids and/or diatoms, the timing and causes of the ongoing eutrophication problem at Lough Gur could be established, which in turn could aid ongoing efforts by local stakeholders in designing and implementing nutrient mitigation measures. I'm sure that the results of this

upcoming project will be of most interest to the palaeolimnological community in Ireland in addition to being an effective lake management tool.

Overall, I think it can be easy to conclude that the first day of the fieldtrip was characterised by its contrast and a substantial amount of information in a multidisciplinary context attractive to an audience with diverse backgrounds.

IQUA fieldtrip: Sunday

Early on the Sunday morning we set off for our first site; Mooghaun in south east Clare. Here we had a swift hour to tour of the Mooghaun hillfort, built in 950BC over 16 years with a workforce of over 3,500 people. At this location Karen Molloy gave us an excellent overview of the archaeology of the region, including descriptions of the Great Clare Find (which included over 200 gold pieces) and a pollen diagram detailing the local vegetation change of the region since late-glacial times.



Viewing tower on top of Mooghaun ringfort



Woodlands on Mooghaun hillfort

After this we made the one hour trip to Kilrush. Here we were hosted by Crotty's Pub for lunch before taking a 20 minute ferry across to Scattery Island. Here we had a varied collection of talks on the geology and archaeology of Scattery Island. From an archaeological perspective, we learned about the history of the Island from Viking times to the present day, and toured the remains of four of the six churches on the island, with a detailed account of the missionary of St. Senan. We also learned about the modern ecology of the island, and the ongoing community-driven efforts to conserve and protect its habitats.



Church on Scattery Island

Kieran Hickey provided an overview of ongoing and historic land reclamation around the Shannon estuary, of which he estimated to be in excess of 10,000ha. From a suitably high location, Kieran also detailed the multiple potential causes for a tsunami to hit Irish coasts, and summarised the historic evidence of such events happening in the past.



Views along the road on Scattery Island

From here we walked back down towards the coast, to the salt marshes on the south of the Island. Here Kieran Craven explained the use of salt marshes in reconstructing sea levels. He discussed the use of geochemical methods to reconstruct sea levels, using the C/N, δ^{13} C and δ^{15} N values of organic matter sources in sediment cores. Since the geochemical composition of the saltmarsh is influenced by the plant material overlying it, this information can be used as a proxy for its position within the tidal frame, based on the plants it was supporting at that time.



Salt Marshes on Scattery Island

Finally we walked further to the south of the island, to observe the sediment exposed along the coast. Here, guided by Michael Philcox, we investigated the orientation and deformation of the sediment at multiple locations along the beach.



Michael Philcox discussing sediment formations on Scattery Island

After this we staggered back up the stony beach and returned to the east of the Island to catch our ferry back to the mainland. Before returning to Kilrush, the ferry took us on a final loop around the island, allowing us to observe the unusual sedimentology from the sea.

References:

Dalton, C. and OCarroll, E. (Eds.) (2014) *Limerick and Shannon Estuary Region*, IQUA Field Guide No. 32, Irish Quaternary Association, Dublin.

5. IQUA 2014 Autumn Symposium

Lakes: Reflections of our past

Friday 28th November 2014

Abstracts:

KEYNOTE TALK: From esoteric fringe to Climategate and beyond – the growing importance of Quaternary science

Prof. Chris Caseldine College of Life and Environmental Sciences, University of Exeter Email: <u>C.J.Caseldine@exeter.ac.uk</u>

Over the last 40 years Quaternary science has moved from being a relatively esoteric and little studied fringe academic subject to one contributing significantly to major global issues, particularly related to climate change and conservation issues. This change is briefly outlined and two questions are formulated that relate to these issues and to which Quaternary scientists are contributing – for climate change the question is posed 'what climate(s) are we aiming for?', and for conservation issues 'how do we decide on what baseline conditions should be i.e. what exactly are we conserving?'

With regard to both these questions emphasis is given to the role of studies of lake sediments as one of a suite of palaeoenvironmental tools that provide evidence of relevance to policy makers. With the growing importance of Quaternary research as an input into national and international policy making, and the potential need for scientists to communicate much more widely and to different audiences, consideration is given to the responsibilities and pitfalls of being a contemporary Quaternary scientist, issues likely to become more important over the next 40 years.

Crannógs: Ireland's most rewarding and enigmatic archaeological sites?

Prof. Aidan O'Sullivan School of Archaeology, University College Dublin Email: <u>aidan.osullivan@ucd.ie</u>

Ireland's crannógs – artificially built islands – are probably this island's most important wetland archaeological sites. The paper will also offer some insights from archaeology, environmental archaeology and early Irish historical sources into the social and ideological role of these island lakedwellings, in early medieval Ireland in particular, revealing that they are far from simply being settlements on lakes, with questions of boundaries, liminality and conspicuous social display all being significant aspects of their origins and use. This paper will briefly review what is known about Ireland's crannógs and lake dwellings, specifically in terms of definition, distribution, chronology and range of functions. It will demonstrate that a legacy of past archaeological excavations, although sometimes problematical, need not be disregarded their interpretation. The paper will also in demonstrate through case studies, including that of Coolure Demesne crannóg on Lough Derravaragh, and the already emerging evidence from recent excavations by Dr Nora Bermingham and the NIEA at Drumclay crannóg, Co. Fermanagh, that while crannógs can be highly rewarding in terms of archaeological and palaeoenvironmental data, there are several features of these distinctive sites that provide caution before should simplistic interpretations of their site histories. The paper will also briefly outline recent and ongoing archaeological research on Ireland's and Scotland's crannógs at UCD School of Archaeology.

Some introductory reading

O'Sullivan, A. 1998 *The Archaeology of Lake Settlement in Ireland*. Royal Irish Academy, Dublin. O'Sullivan, A. 2004 *The social and ideological role of crannogs in early medieval Ireland*. Unpublished PhD thesis (2 vols), Dept of Modern History, NUI Maynooth (available to download for free on <u>academia.edu</u> or on Maynooth University's eTheses archive at<u>http://eprints.maynoothuniversity.ie/5079/</u>) O'Sullivan, A., Sands, R. and Kelly, E.P.

2007 Coolure Demesne Crannog, Lough Derravaragh: An introduction to its archaeology and landscapes. Wordwell, Bray.

Mixed signals: attempting to resolve human and climatic influences on Irish lakes

Dr Aaron Potito Palaeoenvironmental Research Unit, School of Geography and Archaeology National University of Ireland Galway Email: <u>aaron.potito@nuigalway.ie</u>

Resolving human and climatic influences on lake sedimentary records is an ongoing challenge in Quaternary studies, and becomes especially

important in an Irish context, where humans have had a substantial influence on the landscape for at least the last 6000 years. This talk will focus on the use of chironomid (non-biting midge fly) subfossils in lake sediment records in reconstructing both climate and direct human impacts through time. Due to their unique life history traits, chironomids are excellent indicators of past environmental change and are used widely in reconstructing lake histories. In recent years, chironomids have mainly been used as a proxy for reconstructing temperature. However, chironomid communities are affected directly and indirectly by a wide variety of environmental variables including lake water pH, dissolved oxygen content, benthic substrate and lake nutrient status. Disentangling the climate signal from direct human influences can be especially challenging, as climate warming and cultural eutrophication can exhibit similar effects on lake ecology. The climate and cultural eutrophication signals can often be rectified through direct comparisons with instrumental timeseries and land-use records, which often require a historical context, or through constrained ordination analysis and variance partitioning within a multiproxy framework. Strategies for identifying the climate and human impact signals in Irish lakes will be explored using examples from multiple sites throughout Ireland, including a review of a recently published chironomid-based training set for western Ireland. The talk will conclude with several recommendations for Irish chironomid research going forward.

Lake sediment: the superior archive for palaeoecological investigations?

Prof. Michael O'Connell Palaeoenvironmental Research Unit, School of Geography and Archaeology, National University of Ireland Galway E-mail: <u>michael.oconnell@nuigalway.ie</u>

Archives that can potentially yield information on major aspects of past environments, e.g. vegetation dynamics, climate change and human impact, are many and varied, particularly in the mid latitudes which is the area of greatest relevance to most people. Typically, these archives include lake sediments and peat, the latter from a variety of sources, including raised bogs and blanket bogs and also fen and reedswamp deposits. Mor humus and organic-rich soils, from forest floors, including small hollows, and archaeological excavations, are further examples of archives with many peat-type qualities. The choice of deposit to be investigated, often depends on availability and especially availability at/near the area of main interest which is particularly important when investigating human impact and farming history. In Ireland, we are in the fortunate position to be often spoiled for choice as regards deposits suitable for multiproxy and detailed palaeoecological investigations, in that both lakes and bogs are geographically widespread and occur in a wide range of basin size, altitude and, in the case of lakes, different trophic status.

In this presentation, the choices that have been made, up to now, by palaeoecologists with particular reference to Ireland will be considered, and the pros and cons of lake sediments as sources of palaeoecological information will be discussed.

KEYNOTE TALK: Glaciolacustrine Varves: Worth the Bother?

Dr Cathy Delaney Division of Geography & Environmental Management, Manchester Metropolitan University Email: <u>C.Delaney@mmu.ac.uk</u>

Glaciolacustrine (clastic) varves have been used both to create single site chronological tools to examine temporal environmental change, and to construct multiple-site chronologies to reconstruct rates and timing of ice retreat. However, there is considerable controversy over the identification and use of clastic varves, firstly because rhythmically laminated silt and clay sequences can also be formed by turbidity currents, and secondly because rhythmically laminated silt and clay sequences are difficult to date independently, an approach considered essential for verification of the annual nature of the rhythmites. Nevertheless, when they work, clastic varve can provide very high resolution (seasonal) records of climate and environmental change over long timescales.

This paper will examine the possibility of using clastic varve sequences to reconstruct deglacial events associated with the British and Irish Ice sheets, using sediments from Paleolake Riada in Ireland and Paleolake Rawtenstall in NE England. Various approaches to analysis of rhythmites and identification of clastic varves, including detailed logging, particle size, thin sections, SEM and XRF analyses, will be considered and the possibilities for establishing deglacial varve chronologies in Ireland will be discussed.

Lacustrine karst as indicators of long-term lake water chemistry

Dr Mike Simms Department of Natural Sciences, National Museums Northern Ireland Email: <u>Michael.Simms@nmni.com</u>

Ireland is unusual within western Europe in having numerous lakes that lie partly or wholly on limestone. Typically, analysis of the water in many of these lakes reveals that it is fully saturated yet limestone exposed on their shores supports a distinctive assemblage of dissolutional karst forms. Bizarrely, some karst features can form even under conditions of permanent carbonate saturation, but most indicate that periodically the lake water must become unsaturated to some extent at least locally. These lake-shore karren potentially can reveal much about long-term trends in water chemistry and lake level through the Holocene, but they have been largely neglected by karst geomorphologists. The talk will provide an overview of the range of karst features observed, the processes that might have formed them, and attempt to explain what the datasets accumulated so far might tell us about the history of some of these lakes.

The influence of climate on lakes – the long and the short story!

Dr Eleanor Jennings Centre for Freshwater and Environmental Studies, Dundalk Institute of Technology Email: <u>eleanor.jennings@dkit.ie</u>

Understanding the effects of local weather on lake ecosystems is now even more crucial given current and projected trends in the global climate. These trends include not only long-term increases in temperature, but also increases in the occurrence of extreme conditions such as floods, storms, and heat waves. Lakes are particularly sensitive to climate. Dav-to-dav changes in temperature, wind speed, and solar radiation influence the degree of water column stratification. and therefore have consequences for the seasonal cvcle of phytoplankton species composition and biomass, while flood events can deliver pulses of dissolved and particulate substances to a lake from the surrounding catchment. In the longer term, lakes have been shown to track regional climatic signals such as the North Atlantic Oscillation, and northsouth movements of the Gulf Stream. This sensitivity of lakes to changes in the weather means that they can act as sentinels of climate change,

integrating the long-term changes in their surrounding catchments over time. Here the effects of climate on Irish and other lakes is reviewed at both longer and shorter time scales, using high frequency data from *in situ* buoys, longer term monitoring data and future climate modelling.

Using palaeolimnology as a tool to detect lake eutrophication trends and recovery

Prof. Phil Jordan School of Environmental Sciences, Ulster University, Coleraine Email: <u>p.jordan@ulster.ac.uk</u>

The recovery of eutrophic freshwaters continues to be high on the environmental policy agenda with phosphorus (P) management central to mitigation efforts. The length of the contemporary monitoring record often limits detecting and understanding the onset and trends of lake eutrophication caused by influent P loads. However, the mass balance Vollenweider P model, developed to understand and manage lake eutrophication, can also be applied to palaeolimnological data. Here, in dated sediments, whole-basin P load is predicted using combinations of lake P sedimentation, historical lake P concentration and estimates of historical hydraulic loading. Applied to a small inter-drumlin lake and catchment, data show that the rate of increased P loading is analogous to the 5,000km² Lough Neagh basin, suggesting a uniform pressureresponse. The model is validated by the contemporary Lough Neagh riverine P load record and more precisely by monitoring on the small lake inflow. The onset to increased contemporary P loading pressures is estimated to c.1950s, but suggests a period of prior but stable P loading pressures. More recent palaeolimnological studies show how similar approaches can be used to monitor lake recovery following landuse pressure changes in small catchments; these might ordinarily be missed in routine monitoring. The small scale is proposed, however, to be the most suitable to gauge the immediate impacts of mitigation measures and can be supported with detailed landuse, limnological and stream chemistry data.

6. IQUA/QRA Annual Fieldtrip and Annual Symposium 2015

This September $(25^{th} - 29^{th})$ there will be a joint IQUA/QRA Fieldtrip to the South east of Ireland

Preliminary plans are as follows:

Friday 25th September. Meet at suitable Wexford venue at ca. 9am. Venues will include: Ely House Ferrycarrig Heritage Park Camaross pingos Kilmore Quay Overnight Waterford

Saturday 26th Waterford city and surrounding area including talks and site visits on Viking Waterford and archaeological remains with a talk in the evening Overnight Waterford

Sunday 27th. Travel to Cork and site visits to Cork and surrounding environment

Monday 28th: Venues will include: Howe's Strand Courtmacsherry overnight cork

Tuesday 29th TBC Optional overnight Cork

Suggestions for an Annual Symposium theme by potential convenors are also welcome (through the Secretary, Bettina Stefanini – details above), <u>bettina.stefanini@nuim.ie</u>) for discussion at the 2015 AGM in Maynooth.

7. Bill Watts 14CHRONO AWARDS & IQUA Research awards

We are pleased to announce the winners of the **IQUA Research Awards**. The awards are open to all paid-up IQUA members of at least one year's standing. They consist of four AMS radiocarbon dates sponsored by the <u>14CHRONO Centre</u> of Queen's University Belfast and an additional IQUA grant designed to fund a further two radiocarbon dates, but which can alternatively cover other dating methods or laboratory fees (e.g. for DNA or isotope analyses).

The **winners for 2014** were announced at the IQUA Symposium on November 28th, 2014, and were as follows: **Susann Stolze** of the National University of Ireland, Galway and **Ruth Carden** who were each awarded 2 dates. **Ellen OCarroll and Malcolm McClure** who were awarded 1 date. Congratulations to the winners!

IQUA also proudly organises the **Bill Watts 14CHRONO Awards**, named in memory of W. A. Watts, a founding member of IQUA who passed away in 2010. The Awards are generously supported by the <u>14CHRONO Centre</u> at Queen's University Belfast. The Awards pay for six AMS radiocarbon dates for current postgraduate members of IQUA. Winners of the Awards are asked to present their research and the use of their awarded AMS¹⁴C dates at the Spring Meeting and to include their abstract in the IQUA Newsletter.

Winners of the 2014 Bill Watts 14CHRONO Awards were Carlos-Leonardo Chique of the National University of Ireland, Galway and Sabrina Renken of Trinity College Dublin, each awarded three dates.

8. Quaternary News

Bid for the 2019 INQUA Congress







IQUA is pleased to announce the creation of a new Facebook page to help better communicate with members and spread news of interesting Quaternary-related research and projects for Ireland and beyond. Check out <u>IQUA's Facebook page</u>, and don't forget to hit "Like" whilst you're there! On top of that, feel free to check

out our new Facebook page in support of our bid to host the <u>INQUA 2019 Congress in Dublin</u>. The IQUA website will shortly also host a dedicated webpage outlining our bid.

GATEWAYS II

February - March 2014

To boldly go where few have gone before

Martha Coleman - marthacoleman@gmail.com



The GATEWAYS project dates back to 2007 and has previously spent time of the western shores of Ireland seeking evidence of glacial activity. However, this time the aim was to head south seeking the potential limits of the last British Irish Ice Sheet (BIIS). Led by Dr Steve McCarron, Mavnooth University and Dr Daniel Praeg, OGS (National Institute of Oceanography and Experimental Geophysics), the internationally collaborated GATEWAYS II project's destination was the Celtic Sea. Eager to find our sea legs, the crew and science party set sail from Galway Bay on February 23rd 2014 aboard the RV Celtic Explorer.



The RV Celtic Explorer is one of the state owned research vessels run by the Marine Institute. It is 65.5m in length with 35 berths that includes room for up to 22 scientists. The boat also contains wet and dry laboratories where most of our work was carried out. Core targets were determined using the shallow geophysical profiles compiled by data from the (2-5 kHz) pinger and multibeam equipment

onboard the RV Celtic Explorer. Sediment sampling was carried out using the Grab Sampler, Box Corer and the 6m Vibrocore.

Science party participants were from Maynooth University, OGS and the British Geological Survey (BGS). Research crew also included scientists from DCU who were there to examine carbon cycling and the microbial diversity of Ireland's offshore environments. Also aboard were students from Maynooth University, Durham University and QUB. Life onboard was busy. From breakfast before 8am to dinner at 6pm coring and laboratory work was performed during the day while geophysics continued throughout the night. Rotas were drawn up to ensure everyone got their sleep.

We embarked on our journey ever hopeful that the Irish weather, in February, would not distract us from our mission. Leaving Galway Harbour the poor conditions did not stop the team from the initial coring, carried out in Galway Bay, before we made our way south along the western coast. Eventually the weather took control and we had to take shelter behind Bere Island, Co Cork. Nonetheless the work still continued with further sediment processing and core splitting. Come February 28th, at last, a 48 hour window of opportunity presented itself and we made way for the outer Celtic Sea shelf. From early morning the 6m vibrocoring was carried out in calm*ish* seas and again despite the weather cores were retrieved and sampling was done.

Then, in the early evening of March 1st the Celtic Sea provided great excitement with the recovery of overconsolidated interbedded mud and pebbly fine sand. Could they be glacial in origin? Further analysis back on land had to be carried out to clarify. In all the excitement it was forgotten that we were at the mercy of Mother Nature and once again the waves picked up. As hard as it was to be out so far and be so close to the evidence it was decided to make haste for shore before the approaching storm caught up with us. Although the journey back was spent trying not to fall off your chair or out of your bed, we could all sleep a little better anticipating we had achieved the aim of project and had extended the limits of the BIIS by 150km.

As the waves chased us we arrived safely at Cork Harbour the morning of March 3rd and work continued with the removal of all samples and data to their respective new homes. Cores and sediment samples were taken back to the Irish Sediment Core Research Facility (ISCORF) in Maynooth University to be run through the Multi Sensor Core Logger (MSCL) and to be processed for

foraminifera identification. The geochemical scientists took their samples back to the laboratories in DCU. With all the coring, sediment processing, administration, sleeping and eating it was sometimes easy to forget you were out in the middle of sea. Therefore, just to remind yourself, you would take a visit on deck, at night, to see the clearest stars and think about your reasons for volunteering for such an adventure and appreciate the fact that you are one of the few who gets to do this kind of work.

For results from the GATEWAYS II cruise please read the up-coming Praeg *et al.*, (2015) article. The GATEWAYS II research survey was carried out under the Sea Change strategy with the support of the Marine Institute.

Praeg, D., McCarron, S., Dove, D. Ó'Cofaigh, C. Scott, G., Monteys, X., Facchin, L., Romeo, R., and Coxan, P. 2015. Ice sheet extension to the Celtic Sea shelf edge at the Last Glacial Maximum, *Quaternary Science Reviews* (in press) doi:10.1016/j.quascirev.2014.12.010

FRAGSUS: Fragility and sustainability in restricted island environments: adaptation, cultural change and collapse in prehistory

Chris Hunt School of Natural Sciences and Psychology Liverpool John Moores University

C.O.Hunt@ljmu.ac.u

Why did the Maltese Temple Culture, the earliest European civilisation, endure for more than a thousand years on islands with virtually no natural resources? Was this a product of enduring human capital and a remarkably resilient population or was it the result of a well-managed but fragile environment sustained by appropriate technology and controlled by religion? When that humanenvironment relationship failed, perhaps aided by climatic instability, the Temple Culture appears to have collapsed and disappeared. Why did this happen? These questions are being addressed by a new Framework 7 European Research Council (ERC) Advanced Researchers Project grant that builds on a long-standing collaboration between Maltese and UK-based researchers.

The FRAGSUS Project is led by Dr Caroline Malone and colleagues at Queen's University Belfast, with partners in the Universities of Malta, Cambridge, Liverpool, Plymouth, UCD and Maynooth University, the Superintendence of Cultural Heritage, Malta and the National Museum of Archaeology, Malta.

The project will explore the changing environmental background of Malta during prehistory from the first occupation of Neolithic farmers around 5500BC until the Iron Age. Research by Professor Patrick Schembri (University of Malta) and Dr Chris Hunt (Liverpool) has suggested that the climate and environment was unstable during the last few millennia BC and may have impacted on prehistoric societies. A series of cores from across the Maltese Islands will allow the building of a detailed understanding of the changing vegetation and climate of the islands and to evaluate the scale and impact of human activity on natural environments through multi-proxy work including sediment characterisation, pollen, snails, insects, and geochemistry, with dating by radiocarbon and tephra.

The perpetual question for archaeology is the enigmatic megalithic temples of Malta, for which there are no close parallels within the Mediterranean region, and the project will focus on how these sites may have operated as part of a system of resource allocation in prehistoric times. The project will address issues of identity, artefacts, early economies and settlement landscapes.

FRAGSUS is hosting a session at INQUA 2015 on biogeography and sustainability of islands and is planning a meeting on the palaeoecology of islands in Belfast during 2016. More details to follow.

9. Caoimhe Muldoon

In memory of Caoimhe Muldoon, friend, colleague and fellow IQUA member



Caoimhe Muldoon died last autumn unexpectedly but her personality remains vivid in the memory of her friends, colleagues and those she met at IQUA and other events. She continuously touched those around her with her passion for life, people and the environment. She wrote her PhD thesis in Trinity on the conservation and genetics of the endangered Marsh Saxifrage. Later she worked for the Botanic Gardens, An Taisce, BEC Consultants and BirdWatch Ireland.

Caoimhe was a woman who applied near scientific honesty and immense courage to her own life and shared the resulting rich experiences generously with those around her. This made conversations with her always stimulating and hugely enjoyable. She left an emotional vacuum with me as she must have done with countless others.

Today would have been Caoimhe's forty-second birthday. I feel especially connected to all those who loved her and now travel the hard road of coming to terms with the death of somebody so vibrant and influential. However, like all her other friends, I know that I will continue to draw on the legacy of her inspiration.

Bettina Stefanini, 27th March 2015

10. Forthcoming workshops, seminars & conferences

The Agricultural History Society of Ireland Summer Conference 2015

Theme: Farming and local economies today and yesteryear in north- eastern Ireland

Date: 5–7th June, 2015 Venue: Armagh City Hotel, 2 Friary Road Armagh, Co. Armagh BT60 4FR

For updates see: (this site has a link on the home page to AHSI on facebook)

Conference organisers:

Professor Jim McAdam and Frances Ward, Agri Food and Biosciences Institute, Loughgall, Co Armagh Email addresses: <u>jim.mcadam@afbini.gov.uk;</u> frances.ward@afbini.gov.uk

Excursion and lecture Programme (provisional)

Friday 14.00 h: Visit the Agri-Food and Biosciences Institute (AFBI), Manor House, Loughgall, Co. Armagh. This will include tour of Top Fruit, Biomass, Grass, Potato and Mushroom Research

Saturday Lecture programme and conference dinner in the evening

(registration: 9.30 h; lectures commence at 10.00 h)

Sunday Excursion. The programme includes an extended guided visit to Navan

Centre and Fort / Emain Macha, near Armagh City. The results of excavations at this site of major archaeological and mythological importance will be presented.

Details regarding registration, accommodation and further information on the programme will be posted shortly.

11. Recent PhDs:

QUATERNARY GEOLOGY OF THE GERMAN NORTH SEA ANDWESTERN IRISH SEA MUD BELT: REVISED STRATIGRAPHIES,GEOTECHNICAL PROPERTIES, SEDIMENTOLOGY AND ANTHROPOGENIC IMPACTS

Mark Coughlan, UCC School of BEES, Butler Building, Distillery Fields, North Mall, Cork.

Abstract

The climatic development of the Mid to Late Quaternary (last 400,000 years) is characterised by fluctuation between glacial and interglacial periods leading to the present interglacial, the Holocene. In comparison to preceding periods it was believed the Holocene represented a time of relative climatic stability. However, recent work has shown that the Holocene can be divided into cooler periods such as the Little Ice Age alternating with time intervals where climatic conditions ameliorated i.e. Medieval Warm Period, Holocene Thermal Optimum and the present Modern Optimum. In addition, the Holocene is recognised as a period with increasing anthropogenic influence on the environment.

Onshore records recording glacial/interglacial cycles as well as anthropogenic effects are limited. However, sites of sediment accumulation on the shallow continental shelf offer the potential to reconstruct these events. Such sites include tunnel valleys and low energy, depositional settings. In this study we interrogated the sediment stratigraphy at such sites in the North Sea and Irish Sea using traditional techniques, as well as novel applications geotechnical data, to reconstruct the of palaeoenvironmental record. Within the German North Sea sector a combination of core, seismic and in-situ Cone Penetration Testing (CPT) data was used to identify sedimentary units, place them within a morphological context, relate them to alacial or interglacial periods stratigraphically, and correlate them across the German North Sea. Subsequently, we were able to revise the Mid to Late Quaternary stratigraphy for the North Sea using this new and novel data.

Similarly, Holocene environmental changes were investigated within the Irish Sea at a depositional site with active anthropogenic influence. The methods used included analyses on grain-size distribution, foraminifera, gamma spectrometry, AMS 14C and physical core logging. The investigation revealed a strong fluctuating climatic signal early in the areas history before anthropogenic influence affects the record through trawling.

12. Recent Publications:

Adams. J.J.R., Antoniadou, A., Hunt, C., Bennett, P., Croudace, I.W., Taylor, R.N., Pearce, R.B., Earl, G.P., Flemming, N.C., Moggeridge, J., Whiteside, T., Oliver, K., & Parker, A.J., 2013. The Belgammel Ram: a Hellenistic-Roman bronze proembolion found off the coast of Libya, test analysis of function, date, and metallurgy, with a digital reference archive. International Journal of Nautical Archaeology 42, 1, 60-75.

Barker, G., Barton, H., Cole, F., Doherty, C., Gilbertson, D., Hunt, C., Lloyd-Smith, L., Piper, P.J., Rabett, R.J., Reynolds, T. & Szabo, K. 2013 The Niah Caves, the 'human revolution', and foraging/farming transitions. Chapter 9 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 341-366.

Barton, H., Barker, G., Gilbertson, D, Hunt, C., Kealhofer, L., Lewis, H., Paz, V., Piper, P.J., Rabett, R.J., Reynolds, T. & Szabo, K. 2013 Late Pleistocene foragers, 35,000-11,500 years ago. Chapter 5 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 173-216.

Boyle, K., Rabett, R.J. & Hunt, C.O. (eds.) 2014 Living in the Landscape: Papers in honour of Graeme Barker. Cambridge: McDonald Institute for Archaeological Research. ISBN 978-1-902937-73-1

Douka, K., Jacobs, Z., Lane, C., Grün, R., Farr, L., Hunt, C., Inglis, R.H., Reynolds, T., Albert, P., Aubert, M., Cullen, V., Hill, E., Kinsley, L., Roberts, R.G., Tomlinson, E.L., Wulf, S., Barker, G. 2014. The chronostratigraphy of the Haua Fteah cave (Cyrenaica, northeast Libya). Journal of Human Evolution 66, 39-63. <u>http://dx.doi.org/10.1016/j.jhevol.2013.10.001</u>

Edwards, K.J., Fyfe, R.M., Hunt, C.O. & Schofield, E. in press. Moving forwards? Palynology and the human dimension. Journal of Archaeological Science doi:10.1016/j.jas.2015.02.010

Gilbertson, D., McLaren, S., Stephens, M., Hunt, C., Rose, J., Dykes, A., Grattan, J., Bird, M., Lewis, H., Kealhofer, L., Mani Banda, R., Badang, D., Daly, P., Rushworth, G., Pyatt, B., & Thompson, G. 2013 The cave entrance sequences and environmental change. Chapter 3 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 71-134.

Grab, S.W. and Knight, J. (eds) 2015. Landscapes and Landforms of South Africa. Springer, Berlin, 220pp. ISBN 978-3-319-03559-8.

Hunt, C.O. 2013. Fire, rush-lights and pine at Navan. Emania 21, 41-47.

Hunt, C.O. & Garrard, A. N. 2013. The Late Palaeolithic – Geological Context. in Garrard, A. N. & Byrd, B. F. (eds.) Beyond the Fertile Crescent. Late Palaeolithic and Neolithic Communities of the Jordanian Steppe: The Azraq Basin Project, Vol. 1. Oxford, Oxbow: Levant Supplementary Series 13, 54-135.

Hunt, C.O., Gilbertson, D.D., Hill, E.A. & Simpson, D. in press. Sedimentation, re-sedimentation and chronologies in archaeologically important caves: problems and prospects Journal of Archaeological Science doi:10.1016/j.jas.2015.02.030

Hunt, C.O. & Gilbertson, G.D. 2014. Late Quaternary shorelines, mangroves and human environments in the coastal lowlands of northeastern Borneo In Boyle. K, Rabett, R.J. & Hunt, C.O. (eds.) Living in the Landscape: Papers in honour of Graeme Barker. Cambridge: McDonald Institute for Archaeological Research, 121-136.

Hunt, C.O. & Rabett, R.J. 2014. Holocene landscape intervention and plant food production strategies in island and mainland Southeast Asia. Journal of Archaeological Science 51, 22-33 <u>http://dx.doi.org/10.1016/j.jas.2013.12.011</u>

Hunt, C. O. & Barker, G. 2014. Missing Links, Cultural Modernity and the Dead: Anatomically Modern Humans in the Great Cave of Niah (Sarawak, Borneo). in Porr, M. & Dennell, R. (eds.) East Of Africa: Southern Asia, Australia, and Modern Human Origins, Cambridge, Cambridge University Press, 90-107.

Jones, S. E., Hunt, C. O. & Reimer, P. J. 2013. A 2300 year record of sago and rice use from the Southern Kelabit Highlands of Sarawak, Malaysian Borneo. The Holocene 23, 5, 708-720.

Jones, S., Hunt, C., Barton, H., Lentfer, C. & Reimer, P. 2013 Forest disturbance, arboriculture and the adoption of rice in the Kelabit Highlands of Sarawak, Malaysian Borneo. The Holocene 23, 1528-1546.

Korte, M., Stolze, S., 2014: Variations in midlatitude auroral activity during the Holocene. Archaeometry, early online view. DOI: <u>10.1111/arcm.12152</u>

Knight, J. 2015. Ductile and brittle styles of subglacial sediment deformation: an example from western Ireland. Sedimentary Geology, 318, 85-96.

Knight, J. and Harrison, S. 2014. Mountain glacial and paraglacial environments under global climate change: lessons from the past and future directions. Geografiska Annaler: Series A, Physical Geography, 96 (3), 245-264.

Knight, J. 2014. Subglacial hydrology and drumlin sediments in Connemara, western Ireland. Geografiska Annaler: Series A, Physical Geography, 96 (3), 403-415.

Knight, J. and Harrison, S. 2014. Limitations of uniformitarianism in the Anthropocene. Anthropocene, 5, 71-75.

Lloyd-Smith, L., Barker, G., Barton, H., Cameron, J., Cole, F., Doherty, C., Hunt, C., Krigbaum, J., Lewis, H., Manser, J., Paz, V., Piper, P.J., Rabett, R. J., Rushworth, G. & Szabo, K. 2013 'Neolithic' societies c.4000-2000 years ago: Austronesian farmers? Chapter 7 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 255-298.

Matthews, J.A., Winkler, S. & Wilson, P. 2014. Age and origin of ice-cored moraines in Jotunheimen and Breheimen, southern Norway: insights from Schmidt-hammer exposure-age dating. *Geografiska Annaler* 96, 531-548.

Molloy, K., Feeser, I. and O'Connell, M. 2014. A pollen profile from Ballinphuill bog: vegetation and

land-use history. In: McKeon, J. and O'Sullivan, J. (eds), *The quiet landscape. Archaeological investigations on the M6 Galway to Ballinasloe national road scheme.* NRA Scheme Monographs 15. National Roads Authority, Dublin, pp. 116–118.

McClatchie M & OCarroll E, 2015, NRA Palaeoenvironmental Sampling Guidelines, Retrieval, analysis and reporting of plant macro-remains, wood, charcoal, insects and pollen from archaeological excavations, National Roads Authority. https://www.academia.edu/8790133.

Potito, A.P., C.A. Woodward, M. McKeown, and D.W. Beilman (2014) Modern influences on chironomid distribution in western Ireland: potential for palaeoenvironmental reconstruction. *Journal of Paleolimnology* 52: 395-404.

Prendergast, A.L., Azzopardi. M., O'Connell, T.C., Hunt, C., Barker, G., Stevens, R.E. 2013 Oxygen isotopes from Phorcus (Osilinus) turbinatus shells as a proxy for sea surface temperature in the central Mediterranean: A case study from Malta. Chemical Geology 345, 77-86.

Reilly, E. & Mitchell, F.J.G. (2015). Establishing chronologies for woodland small hollow and mor humus deposits using tephrochronology and radiocarbon dating. *The Holocene*, 25, 241-252.

Rabbett, R., Farr, L., Hill, E., Hunt, C., Lane, R., Moseley, H., Stimpson, C. & Barker, G.2013 The Cyrenaican Prehistory Project 2012: the sixth season of excavations in the Haua Fteah cave. Libyan Studies 44, 113-125.

Szabo, K., Cole, F., Lloyd-Smith, L., Barker, G., Hunt, C., Piper, P.J. & Doherty, C. 2013 The 'Metal Age' at the Niah Caves, c. 2000-500 years ago. Chapter 5 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 299-340.

Rabett, R.J., Barker, G., Barton, H., Hunt, C., Lloyd-Smith, L., Paz, V., Piper, P.J., Premathilake, R., Rushworth, G., Stephens, M. & Szabo, K. 2013 Landscape transformations and human response, c. 11,500-4,500 years ago. Chapter 6 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 217-254. Reynolds, T., Barker, G., Barton, H., Cranbrook, G., Farr, L., Hunt, C., Kealhofer, L., Paz, V., Pike, A., Piper, P. J., Rabett, R.J., Rushworth, G., Stimpson, C., & Szabo, K. 2013 The first modern humans at Niah, c. 50,000-35,000 years ago. Chapter 4 in Barker, G. (ed.) Rainforest foraging and farming in Island Southeast Asia: The archaeology of Niah Caves, Sarawak. Cambridge, McDonald Institute for Archaeological Research, 135-172.

13. General Membership Items

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

Join/Renew IQUA membership online via PayPal

IQUA membership costs just €15 per year (€10 for students/unwaged).

IQUA now offers a fast, safe, online payment system already familiar to many (**PayPal**) for joining IQUA or renewing your membership, and for purchasing past field guides (where available).

PayPal allows you to pay securely with your credit/debit card via the IQUA website: http://www.iqua.ie/membership.html. Simply click on the relevant "Pay Now" button and follow the on-screen instructions. An option to pay for more than one year's subscription at a time is also available.

Upon completing the process, you will receive a confirmation receipt from PayPal, and shortly thereafter confirmation from the Treasurer of your membership status.

If you do not have access to our online PayPal system, which is our preferred method of dues collection, please send a cheque (made payable to the Irish Quaternary Association) and details of your name, address, and email address to the IQUA Treasurer at the address below. Alternatively, you can join/update your membership at any IQUA meeting or event. If you have any queries about the current status of your IQUA membership, please contact the Treasurer.

IQUA Treasurer:

Gayle McGlynn, Department of Geography, Museum Building, Trinity College, Dublin 2. Email: mcglyng@tcd.ie

IQUA e-mail listerver: https://listserv.heanet.ie/iqua-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.

B. Stefanini, IQUA-L Moderator

IQUA thanks its kind sponsors:

Ex Libris

Geological Survey of Ireland

14Chrono LAB, Queens University, Belfast

