



Editor: Martha Coleman

1. Introduction

Dear IQUA member,

Welcome to Newsletter no. 61.

This year the IQUA Spring Meeting and AGM were held on the 21st April in the Hunt Museum, Limerick. The theme was '*Standing on the Shoulders of Giants: A Quaternary Science Retrospective*' where key Quaternary scientists were discussed as recognition of past research. The day of talks coincided with a two day family friendly mammal exhibition in the Limerick's Granary Library.

Our thanks to Dr Catherine Dalton and Darren Barry for organising the event and to Jim Martin from Museum on the Move for producing a fabulous and interesting display of Irish mammals from the ice age's woolly mammoth to modern day pine martins. A post press piece was published in Issue 23 of *Earth Science Ireland* magazine now available at <http://www.earthscienceireland.org/>

Another successful two days of the exhibition was held in the dlr Lexlcon in Dun Laoghaire, Dublin on the 24th and 25th August as part of Heritage Week 2018. Also, in conjunction with Heritage Week 2018 and through funding provided from the Heritage Council, IQUA produced an outreach/educational leaflet directed at the public and potential future members. This is a great flyer to hand to people giving them an overview of what IQUA does and why (see image below).



At the IQUA AGM it was decided the 2018 field meeting would take place in the central midlands on the 14th to 16th September. This intriguing field meeting will be based around Mullingar and will cover a range of Quaternary related topics.

The AGM included the election of a new Postgraduate Rep, Niamh Millward of UCD and Newsletter Editor, Martha Coleman of MU. A new Ordinary Member voted in was Dr Ellen O'Carroll and Website Manager is now Randal McGuckin

The theme of the upcoming 2018 IQUA Symposium is '*Ireland's Offshore Quaternary Records*'. We look forward to this event that is being held in the Geological Survey Ireland, Beggar's Bush, Dublin 4 on Friday 23rd November 2018.

As always please keep in touch with IQUA news on Twitter using @Quaternary_Irl and using the hashtag #IQUA or take a look on Facebook <https://www.facebook.com/IrishQuatAssociation> for all your IQUA related updates. Moreover, be sure to keep an eye on Twitter for INQUA updates using <https://twitter.com/INQUADUB19> and on Facebook <https://www.facebook.com/INQUADUB2019/>

Finally, IQUA would like to extend their sincere sympathies to the family and friends of Dr Eileen Reilly on her recent passing. Eileen gave many talks to IQUA members and most recently was involved in the South East Ireland IQUA/QRA 2015 trip. She will be missed by those who knew her and our thoughts are with her family during this time.

Thanks to all of those who contributed to this edition of the IQUA newsletter.

Kind Regards
Martha Coleman

2. IQUA Committee (2018/2019)

President: Dr Catherine Dalton, MIC, University of Limerick (continuing)

Secretary: Dr Benjamin Thébaudeau, (continuing)

Treasurer: Dr Kieran Craven, Geological Survey of Ireland, Beggar's Bush, Haddington Rd, Dublin 4, (continuing)

Postgraduate Rep: Niamh Millward, UCD, Archaeology, (elected)

Website Manager: Randall McGuckin (elected)

Publications Secretary: Alwynne McGeever, Department of Geography, TCD (elected)

Newsletter Editor: Martha Coleman, Maynooth University, (elected)

Ordinary Members: Dr Ellen O'Carroll, (elected), Dr Steve Davis, UCD (continuing), Dr Rory Flood, QUB (continuing), Darren Barry, MIC, University of Limerick (continuing), Dr Sara Benetti, University of Coleraine (continuing), Dr Frank Ludlow, TCD (continuing), Dr Gayle McGlynn, Department of Geography, TCD, (continuing).

3. IQUA Spring Meeting 2018

IQUA Spring Meeting, Hunt Museum, Limerick

PRESENTATION ABSTRACTS

Dr Bettie Higgs (University College Cork)

Title: The challenges faced by Women Quaternary Scientists

We're standing on the shoulders of giants - but are these all male shoulders? Historically, where are the women in Quaternary Science? If they exist, were their challenges any different to those of their male contemporaries? Examples will be used, from the 1600s onwards, to illustrate common themes in the day-to-day experiences of women geoscientists. The characteristics of the women who succeeded will be discussed, and their achievements highlighted. The objective of this presentation is to celebrate the contributions of women over the centuries and to gain some insights into what it was like for them and whether there is a legacy to this day. The presentation will set a broad context for the remainder of the talks at the Symposium.

Writer: Antoinette Madden (Natural History Museum)

Speaker: Dr Catherine Dalton (Mary Immaculate College)

Title: Sydney Mary Thompson (1847-1923)

Sydney Mary Thompson was born in Co Antrim into an upper middle-class family. She became a prominent member of the Belfast Naturalists' Field Club (BNFC) and pursued interests in botany, natural history and geology. She was the only female committee member of the BNFC in the 1890s and the first secretary of the Geological Section which was set up to help trace the path and direction of the ice across Britain and Ireland. She wrote many significant papers that were presented at Club meetings and published in the Club's Proceedings. Her work contributed to revising geological maps of Co Antrim and the conception of a vast ice sheet from various confluent sources moving over the landscape, transforming the surface of the country by erosion and deposition. Her most important contribution to Irish Quaternary geology was the finding of Ailsa Craig microgranite at Moys, Co Derry, which pushed the limit of penetration of the Scottish glacier some 20 miles further west than previously designated.

Speaker: Timothy Collins (NUI, Galway)

Title: Robert Lloyd Praeger (1865-1953)

From the 1880s to the 1950s, Robert Lloyd Praeger dominated the world of Irish natural science, with a unique combination of an unparalleled breadth of knowledge, organising skill, considerable literary gifts, a prolific output and an unwavering intellectual purpose. An engineer by graduation, a librarian by profession and a botanist by inclination, it was as a Quaternary geologist and later as a naturalist and writer that he made his mark in Ireland. A gifted organiser, Praeger was at the forefront of the amateur naturalist field club movement which reached its peak in the years running up to the advent of the Great War. Today he is best remembered for his many books and articles extolling the virtues of exploring the countryside of Ireland for the benefit of body and soul alike.

Speaker: Prof Fraser Mitchell (Trinity College Dublin)

Title: Frank Mitchell (1912-1997)

Frank Mitchell entered Trinity College Dublin in 1930 to read modern languages but soon realised that his true interests lay in the natural sciences. He went on to study Botany, Geology and Zoology and excelled academically. In his final year he took on a position of field assistant to Professor Knud Jessen from Copenhagen who was researching the vegetation history of Ireland with the support of the Royal Irish Academy. This set Frank up for his career in deciphering landscape evolution. He published widely through scientific journals and books. His most significant publication was his book, *Reading the Irish Landscape* which ran to three editions. He is recognised nationally and internationally as the giant of Irish Quaternary research and this is reflected in many honours including President of the International Quaternary Association (1969-73), Fellow of the Royal Society (1973) and President of the Royal Irish Academy (1976-79). This paper will briefly review his career and then go on to explore how his legacy still has a major influence on Quaternary research today. This will be explored through the relevance of vegetation history to concerns about future climate change and the conservation of biodiversity.

Speaker: Prof Keith Bennett (St Andrews University)

Title: Bill Watts (1930-2010)

Bill Watts was a Quaternary palaeoecologist, based at Trinity College Dublin for nearly all his career. He became TCD's Provost and, concurrently, President of the Royal Irish Academy, so one of Ireland's leading academics of his day. His scientific work included early and pioneering studies of plant macrofossils, a substantial series of papers on the long record of lake sediments at Monticchio (Italy), as well as some of the first late Quaternary records from Iberia, Mexico and Florida (USA), and Irish interglacial deposits. He was also influential in promoting the interpretation of pollen data as records of plant populations and their dynamics, being among the first to point out that pollen sequences are the outcome of ecological processes.

Speaker: Dr Gill Plunkett (Queens University Belfast)

Title: Valerie Hall (1946-2016)

Valerie Hall was a botanist, palynologist and tephrochronologist, with a love of the natural world, culture and people. Introduced in the 1960s to palynology by Alan G. Smith during her botany

degree at Queen's University Belfast, Valerie returned as a mature student to undertake a PhD in the late 1980s, having raised a family and overcome cancer. Her research brought together her interest in plants and folk life, as she as she combined palynology with historical records to reconstruct landscape development in Ulster during the historic period. From there, Valerie teamed up Jonathan Pilcher to pioneer the application of distal tephrochronology, and together they revealed yet another gem in Irish bogs in the form of many invisible layers of volcanic ash. Publishing prolifically and hosting many esteemed colleagues and up-and-coming PhD students through the 1990s and 2000s, Valerie rapidly developed an international reputation as much for her research as for her warm hospitality and keen sense of humour. Sadly, early in her retirement, Valerie succumbed to a complicated return of cancer. She continued to work on her latest research project, an environmental history of her native Belfast, when she could, demonstrating unflinching stalwartness. Her defining legacy remains as much in the work she pioneered and produced as in the lasting personal impression she made on all who knew her.

OTHER TALKS

Title: Exploring the submerged landscapes of Ireland

Eoin Mac Craith (Geological Survey of Ireland)

The European Marine Observation and Data Network (EMODnet) was established by the European Commission to collate valuable existing marine environmental information across all European seas. Through collaboration, over 200 partner agencies deliver marine data, metadata and data products on 7 key themes of environmental importance, including geology. These data are merged and published online in standardised, interoperable formats free of restriction on use. For each of the environmental themes, a project is established that facilitates data sharing.

The project EMODnet Geology is now in its third phase. Through this project, 38 partner agencies across Europe work on standardising marine geological maps and information, including information on submerged landscapes. As a partner in the EMODnet Geology project, the Geological Survey of Ireland will contribute existing information on submerged landscape features from the inner continental shelf of Ireland.

It is envisaged that by collating these data for the Irish shelf and investigating new seabed data acquired by the INFOMAR, the national marine mapping programme, a submerged landscape on the scale of "Doggerland" in the North Sea will be established offshore Ireland. A revised overview of submerged landscapes offshore Ireland will inform Marine Spatial Planning activities and help to protect potential submerged archaeological sites dating back to the Last Glacial Maximum (LGM).

Title: Mediterranean sea surface temperatures & planktonic foraminifera palaeoecology during short-term climate oscillations of the Late Pleistocene

Margaret A. Browne & Dr Angela Cloke-Hayes (Mary Immaculate College)

The Mediterranean Sea is a semi-enclosed marginal sea of the North Atlantic, and marine deep-sea sediments from the region are an excellent archive of the intensity and evolution of Late Pleistocene climatic fluctuations. In general, the Mediterranean is a warm oligotrophic sea, with steep thermal and salinity gradients from west to east. However, the NW Mediterranean is unique in that it is both one of the coldest regions of the Mediterranean Sea and an area of deep water formation.

This research is based on an analysis of the planktonic foraminiferal assemblage of a high-resolution sediment core (M40/4 82-2SL) from the Gulf of Lion. The core extends back to the end of Heinrich Stadial 1 (HS1) (~15.5kyr), providing a detailed record of the Bølling-Allerød (BA), Younger Dryas (YD) and Holocene in this region. Using Artificial Neural Networks, the average annual sea surface temperatures (SST) during the BA ($15.08 \pm 0.55^\circ\text{C}$) were $\sim 3^\circ\text{C}$ lower than modern SST in the W. Mediterranean. During the YD, SST decreased to an average of $8.2 \pm 0.49^\circ\text{C}$, approximately 10°C lower than today and 3.5°C lower than the LGM average in the W. Mediterranean (Hayes et al., Quaternary Science Reviews, 24, 999-1016 (2005)).

An analysis of the core indicates that nutrient availability and water structure are the main ecological variables governing species distribution, rather than sea surface temperatures. In addition, the high resolution of the core allows for examination of shorter centennial-scale events, such as the 8.2 event and Inter-Allerød Cold Period. Three 14C AMS dates obtained for the study were kindly supported by the Bill Watts 14CHRONO IQUA Awards (Nov 2015).

4. Annual Fieldtrip 2018 to the Midlands 14th-16th September 2018

After 21 years we are going back to the Midlands on the weekend 14th to 16th September 2018.

Peat has given us a rich source of new palaeoecological and archaeological data. Add to this spectacular glacial geology and the outstanding medieval architectural heritage of north Co Offaly and you get about half of what's happening on this trip. The other half is about a very special site called Derragh, located where the river Inny flows out of Lough Kinale. We're in for a treat here with a plethora of environmental proxies from this one area.

The Lough Kinale/Derragh area was studied by the lake Settlement Project of the Discovery Programme between 2002 and 2005. One module of this project was a multi-proxy environmental research project (2002 and 2003) in collaboration with the Palaeoenvironments Research Group at the University of Exeter. The research focused on the history of three crannogs and the general landscape through extensive coring of Lough Kinale and Derragh Lough, and a raised bog separating Derragh peninsular from the mainland. During fieldwork in 2002, Mesolithic and Neolithic lithics were found close to the outlet of the River Inny on the Derragh peninsular. This led to excavations between 2003 and 2005, which exposed a platform area that was used for multiple purposes. Various organic materials including bones and wood, and lithics were subsequently analysed. The IQUA fieldtrip will visit the general area and in particular the Derraghpeninsular and the site of the excavation where some of the environmental results will be presented

We are basing ourselves for both Friday and Saturday nights in the Greville Arms hotel in Mullingar phone 044 934 8563. The rate is: €139 per person sharing for 2 nights B&B and 1 dinner (i.e. €278 total for two people in a double room, with dinner for both on Saturday). There is a single supplement supplement of €15 on this.

There are prices without dinner (i.e. B & B only) but you should still ask for the special IQUA rate. The Friday evening seminar talks will be in the hotel but of course you are not obliged to stay there. There are quite a number of other options in town.

5. IQUA Dating Award Results

Intertidal peat deposits between Toe Head and Red Strand, West Cork (IQUA 2017 research award)

Anthony Beese

Intertidal peat deposits are widespread along the southwest coast of Ireland but have not been described systematically. Local studies have, however, been completed at Cork Harbour (Carter *et al.* 1989) and around the Iveragh peninsula in County Kerry (Devoy, 2009). For the stretch of coast between Cape Clear and Cork Harbour, the only comprehensive investigation is by Waitz (2015). Her study describes the results of extensive coring of a substantial thickness of organic sediment preserved at Tralong, at the head of a long inlet between Glandore and Rosscarbery. There, abundant tree roots and other wood detritus occupy a considerable part of the foreshore, while there is a low peat cliff adjacent. AMS radiocarbon dating of the samples taken from the cores demonstrates a gradual increase in relative sea level (RSL) from the mid-to-late Holocene for a total thickness of between 4 and 5m of peat.

Since the adjacent coast is not well documented, it was decided, as part of the current exercise, to complete a preliminary inventory of local sites with peat along a short section of coast. In the event, a total of six sites were identified along the much-indented shoreline between Toe Head and Red Strand, which lie about 22 km apart. From west to east, the sites are: Traligagh (51.4961, -9.2352), on the west side of Toe Head; Tralong (51.5570, -9.0697), already mentioned; Warren Strand, Rosscarbery; Owenahincha and Long Strand, also in Rosscarbery Bay; and Red Strand, east of Galley Head (51.5474, -8.9284). Coordinates are given for the *in situ* exposures that have been observed. Such a high frequency of 'submerged forest' locations is typical of other coasts, including that of south Cornwall, which has a similar aspect (French 1999). The character of the sites is discussed below, beginning with Red Strand, where a sample from a tree was dated using an IQUA research award.

On 6 January 2014, after 'Superstorm Christine', a fallen trunk was exposed at the western end of Red Strand, when erosion caused temporary removal of

the covering sand. The photographic record by Patrick Lombard demonstrates that the tree's roots were embedded in a thin layer of eroded dark brown peat (approximately 0.3 m thick), as well as in the underlying glacial diamict. Thus, the tree must be *in situ* and the associated peat is interpreted as a palaeosol. Tim Feen, a local historian, cut a transverse slice from the trunk, estimated to be 0.35 in diameter, which he preserved by freezing. The high strength and structure of the 'hardwood' sample is consistent with oak, while the progressively diminishing thickness of its outer growth rings suggests that the tree may have been under stress, perhaps from increasingly saline conditions prior to collapse. A subsample from the external surface or rim of the tree trunk was selected as suitable for AMS radiocarbon dating because it avoided an inbuilt age for the tree, the main objective being to obtain a possible date of submergence for the terrestrial environment. The survival of the tree trunk suggests that it was buried in sand after a sudden erosive event, such as a storm.

The sample from Red Strand provided an AMS radiocarbon measurement of $4,121 \pm 43$ BP (UBA-36641) or 2,872 – 2,577 cal BC (95.4% probability), which is equivalent to the late Neolithic. Based on its position within the tide cycle, the elevation of the palaeosol relative to the Malin Head datum is estimated to be -1.8m OD. This RSL value and date fit with the mid-to-late-Holocene portion of the glacial isostatic adjustment (GIA) curve for West Cork, as presented in Plets *et al.* (2015). Interestingly, a similar radiocarbon date of c. 4,800 cal BP was determined at a lower level of -2.5m OD (Waitz, 2015) at Tralong. The difference between the elevations is interpreted as owing to greater compaction of the thick peat sequence at Tralong.

Interestingly, inspection of aerial images by the OSi (2005) reveals diffuse black sinuous lines contrasting with pale colour of the sand at Red Strand, with a more definite dark patch (51.5471, -8.9283) at the same location as the tree. On the same images, the submerged rock outcrop is more widespread than on surveys of different date, indicating that the shoreline profile must have been significantly reduced by erosion when the survey was flown on 11 July 2005 (personal communication Niall McCall, OSi). Aerial reconnaissance has been demonstrated to be of value in a study of submerged landscapes in Scotland (Cowley *et al.* 2012).

At the strand called Traligagh, a layer of peat, up to 0.6m thick, was exposed along the course of a

stream, and seemed to be of limited extent given its proximity to ribbed outcrops of bedrock. Several closely spaced tree stumps and abundant wood detritus, found within the peat, indicate a similar *in situ* woodland environment as that identified at Tralong and Red Strand. Significantly, this palaeosol is estimated to be close to half-tide (0m OD), and may, therefore, have been submerged later than at Red Strand. Wood samples were collected for further study.

At Rosscarbery, there is documentary evidence of 'turf' with tree roots again extending into the underlying sediment (Ó Maidín, 1958, p.79). The vague location, given in a mid-eighteenth century letter by Richard Pococke, is most likely to be a reference to Warren Strand, at the mouth of the estuary:

In the bay they soon came to turf, which is about five feet deep; it does not burn to ashes, but burns hard & red: Under this is the white clay, with roots of trees in it as there are in the turf.

In recent years, compact lumps of peat have been observed occasionally at the Warren, the most recent find being a stray boulder in January 2018. The flat, sub-rounded shape of the boulder together with its weak fissility, indicates that it is a rip-up clast derived from a thin layer of woody peat, of at least 0.1m thickness. The peat itself is well humified and includes macrofossils such as small branches, twigs and other indeterminate material. Presumably, the parent layer lies buried in sand within or just below the intertidal zone. According to local reports, broken clods of peat have also been found at neighbouring Owenahincha.

At the head of the estuary at Rosscarbery, peat was excavated at a second location. A note by George Victor du Noyer in the *Memoir* (Jukes and Kinahan 1861) states that the people dug 'peat-bog for fuel' from under the slob. This inner part of the estuary is now submerged under a lagoon owing to the construction of a causeway. Preliminary evidence, however, indicates that a freshwater lake dating back to the late glacial period may have preceded the estuary at Rosscarbery (Beese 2017). This site, therefore, is an example of intertidal peat that is not a valid marker of RSL.

At the eastern end of Long Strand and near to the outlet of Kilkeran Lake, broken fragments from sub-rounded boulders are sometimes thrown up onto the shore after storms. Pale brownish-grey, faintly laminated silt is dominant while black peat occurs as impersistent and deformed masses within the

silt. Preliminary identifications of the abundant plant material include stems of *Hippuris vulgaris* (mare's-tail), in growth position, and indeterminate root systems. This facies indicates a shallow freshwater lake or swamp rather than the more widespread woodland environment. Importantly, the antecedent wetland was terrestrial while the existing Kilkeran Lake is classified as a coastal lagoon (Hatch and Healy 1998), adding to the evidence for RSL rise. Aerial ortho-photography (OSi 2005) again reveals that submerged peat is probably present in the vicinity, occurring as diffuse patches just below lowest tide level (51.5514, -8.9599).

The geomorphological context of the sites is also of interest. At Traligagh and Tralong, *in situ* peat with fossil wood takes up a fragile existence within the sheltered portions of inlets, while at the Warren, Owenahincha, Long Strand and Red Strand, the exposed and 'soft' shoreline is associated with active storm-wave erosion, so that submerged peat and occasional rip-up clasts are more typical. The exposures at Tralagig and Tralong are both located along the line of coastal streams, suggesting that any overlying deposits have been eroded away by floodwater.

Beese, A.P. 2017. Rosscarbery: landscape and people. *Rosscarbery Past and Present*, 19, 113-120.

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Cowley, D., Benjamin, J., Martin, C. 2012. Aerial reconnaissance of maritime landscapes in Scotland – some preliminary observations on context, methodology and results. *AARG News*, 45, 64-73.

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French, C.N. 1999. The 'submerged forest' palaeosols of Cornwall. *Proceedings of the Ussher Society*, 9, 365-369.

Hatch, P. and Healy, B. 1998. Aquatic vegetation of Irish coastal lagoons. *Bulletin of the Irish Biogeographical Society*. 21: 2-21.

Jukes, J.B. and Kinahan, G.H. 1861. Explanations to accompany Sheets 200, 203, 204, 205, and part of 199 of the map of the Geological Survey of

Ireland illustrating part of the County of Cork. *Memoirs of the Geological Survey of Ireland*, 28

Ó Maidín, P. (ed.). 1958. Pococke's tour of south and south-west Ireland in 1758. *Journal of the Cork Archaeological and Historical Society*, 63, 73-94.

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Plets, M.K., Callard, S.L., Cooper, J.A.G., Long, A.J., Quinn, R.J., Belknap, D.F., Edwards, R.J., Jackson, D.W.T., Kelley, J.T., Long, D., Milne, G.A., Monteys, X. 2015. Late Quaternary evolution and sea-level history of a glaciated embayment, Bantry Bay, SW Ireland. *Marine Geology*, 369, 251-272.

Waitz, Andrea. 2015. Coastal peat deposits. Environmental history and human impact. A case study from Tralong Bay, Co. Cork. MSc thesis, University of Dublin, Trinity College.

6. IQUA Autumn Symposium 2018

Venue: Geological Survey of Ireland Lecture Theatre, Ballsbridge, Dublin 4.

Date: Friday 23rd November 2018

Convenor: Dr Stephen McCarron, Maynooth University (stephen.mccarron@mu.ie)

Topic: Ireland's Offshore Quaternary Records

This Symposium will review the progress being made in mapping and understanding the Quaternary record in Irish offshore waters. Advances in our understanding of the Quaternary history of Irish shelves will be compared to ongoing research in neighbouring regions, including discussion of the schemas emerging to classify and age constrain known sequences. The Symposium will introduce research utilising a wide variety of data types including bathymetry, shallow and deep seismic profiles and geological sampling being applied in programmes such as INFOMAR.

The call for papers is out. Contact Dr Stephen McCarron at the above email.

7. Recent PhDs

Karen Taylor PhD

Thesis title: Chironomid response to prehistoric farming in northwest Ireland

Supervisor: Dr Aaron Potito

Abstract: This article-based PhD thesis explored the utility and performance of chironomid (Diptera: Chironomidae) autecology in the investigation of prehistoric farming impacts on freshwater lake systems. Chironomid subfossils, lake sediment geochemistry ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$ and C:N) and fossil pollen analyses were used in a comparative limnological assessment of three archaeologically rich study sites in County Sligo, Ireland. At all three study sites, pastoral farming and its associated nutrient inputs, as represented by non-arboreal pollen indicative of grassland/pasture (NAPp) and lake sediment geochemistry, were concomitant with increases in eutrophic chironomid taxa. Redundancy analysis (RDA) and partial RDAs established that $\delta^{15}\text{N}$ and NAPp were controlling factors of chironomid community compositional change during the Neolithic (4000 - 2500 BC) and Bronze Age (2500 - 800/750 BC).

Bronze Age farming had a considerably greater impact on the lake systems than Neolithic farming, as indicated by a higher proportion of eutrophic taxa and increases in $\delta^{15}\text{N}$, C:N and $\delta^{13}\text{C}$ values, consistent with increased erosion and agricultural inputs. The timing and magnitude of change show that Neolithic and Bronze Age farming exhibited a strong control over chironomid communities at all three sites. Cultural eutrophication also led to the extirpation of several oligotrophic chironomid taxa present in the natural pre-impacted lake systems. In order to verify the importance of prehistoric agricultural influences on the human impacted lakes, an isolated high-elevation catchment was used as a control site to reconstruct chironomid and geochemical response to broad-scale environmental change, where the pollen record showed negligible human activity. Given the lack of prehistoric human influence on the control lake, the record was used to construct the first mid to late Holocene chironomid-inferred temperature (C-IT) record for Ireland, creating a climatic context for the development of Irish society during the Neolithic and Bronze Age. Findings from this PhD thesis provide valuable information about the timing, intensity and environmental impact of prehistoric farming in northwest Ireland.

8. Notices & News

* INQUA Dublin 25th – 31st July 2019 organisation update *

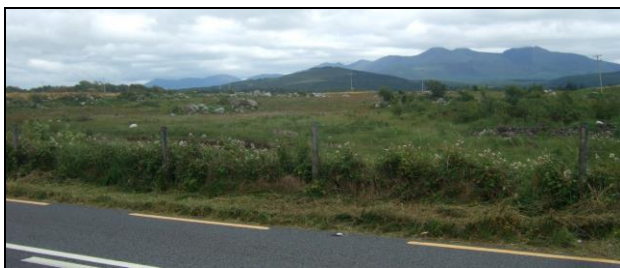
Work continues on the upcoming INQUA Congress by the Local Organisation Committee and the Scientific Committee. A hugely successful call for scientific sessions has resulted in a dynamic and very interesting list of proposed themes for the congress.

The call for abstracts is now out and with a submission deadline of 9th January 2019. For full details check out the website <http://www.inqua2019.org/> and keep up to date on Twitter for INQUA updates using <https://twitter.com/INQUADUB19> and on Facebook <https://www.facebook.com/INQUADUB2019/>

* Dating and analysis awards 2018 *

The official call for the postgraduate and general awards will go out before the end of September. The deadline for applications is 31st October. The final winners will be announced at the IQUA symposium on the 23rd November 2018.

The Fate of the Tooreenasliggaun Drumlins



Those whose eyes drift left off the road on the Killorglin to Glenbeigh section of the Ring of Kerry route may have observed the scenes above, about 6km west of Killorglin and about 1.5km before the Red Fox inn. Here in the bog covering much of townland of Tooreenasliggaun, with the Reeks in the background, are a series of low drumlins, part of the outwash deposit through which the River Caragh cuts from Lough Caragh. These low drumlins have limited topographical expression, being less than 10 metres in height, and they do not show up on OS maps or, as far as I can see looking at the OSi public viewer, on recent air photographs.

Left undisturbed until recently, the potential of these features as a source of gravel convenient to the roadside now appears to be appreciated. It looks as these landforms may soon either disappear or be irrevocably altered. No doubt casual landscape alterations like this are being replicated all the time in many parts of Ireland. Perhaps not much can or should be done, yet it is hard not to think that stronger, more explicit, policies of landscape conservation need serious formulation and implementation. The prospect of an ever more extensive debased landscape is surely unappealing to visitors and residents alike.



Arnold Horner

9. Recent Publications

Delaney, C.A., McCarron, S., Davis, S., 2018. Irish Ice Sheet dynamics during deglaciation of the central Irish Midlands: Evidence of ice streaming and surging from airborne LiDAR. *Geomorphology* 306, 235-253.

Eze, P.N. and Knight, J., 2018. A geomorphological characterisation of river systems in South Africa: a case study of the Sabie River. *Physics and Chemistry of the Earth*, 105, 196-205.

Knight, J. and Grab, S.W., 2018. Drainage network morphometry and evolution in highland eastern Lesotho, southern Africa. *Quaternary International*, 470, 4-17.

Knight, J. and Zerboni, A., 2018. Formation of desert pavements and the interpretation of lithic-strewn landscapes of the central Sahara. *Journal of Arid Environments*, 153, 39-51.

Knight, J., Grab, S.W. and Carbutt, C. 2018. Influence of mountain geomorphology on alpine ecosystems in the Drakensberg Alpine Centre, southern Africa. *Geografiska Annaler: Series A, Physical Geography*, 100 (2), 140-162.

Knight, J. and Harrison, S. 2018. Transience in cascading paraglacial systems. *Land Degradation and Development*, 29, 1991-2001.

Knight, J. and Rogerson, C.M. (eds) 2018. *The Geography of South Africa: Contemporary Changes and New Directions*. Springer, Switzerland.

Grab, S.W. and Knight, J. 2018. Southern African montane environments. In: Holmes, P. and Boardman, J. (eds) *Southern African Landscapes and Environmental Change*. Routledge, 153-180.

Knight, J. and Grab, S.W. 2018. The geomorphic evolution of southern Africa during the Cenozoic. In: Holmes, P. and Boardman, J. (eds) *Southern African Landscapes and Environmental Change*. Routledge, 6-28.

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