Irish Quaternary Association Autumn Symposium 2024

29th November 2024

09:00 – 17:00

DECC Carrauntoohil Auditorium

Tom Johnson House, Haddington Road, Dublin, DO4 K7X4

Peatlands: Past, Present and Future

Book of Abstracts

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Programme:

Schedule				
Start time	End Time			
09:00	-		Registration	
09:30	09:45		Welcome Address: Koen Verbruggen (GSI)	
Session 1			**Speaker**	**Title**
09:45	10:15	S1 Keynote	Dave Beilman	Lessons learned from past peat worldwide
10:15	10:25	S1-T1	Helen Essell	Deciphering the origin and spread of blanket peat in the Mourne Mountains, County Down
10:25	10:35	S1-T2	Pete D. Akers	Project DRYPEAT: Developing a new isotopic proxy for bog evapotranspiration
10:35	10:45	S1-T3	Gosse Bootsma	Botanical and chemical factors impacting recent carbon storage dynamics in temperate peatlands
10:45	10:55	S1-T4	James Dill-Russell	Testing the replicability of palaeoenvironmental records from a raised bog
10:55	11:05	S1-T5	Raymond Flynn	Ground Penetrating Radar to understand peatlands in the past, present and future
11:05	11:15	S1 Discussion		Q & A for Session 1
11:15	11:45		Tea/Coffee	
Session 2			**Speaker**	**Title**
11:45	12:15	S2 Keynote	John Connolly	Ireland's Hidden Peatlands – a geographical perspective
12:15	12:25	S2-T1	Mahdi Khoshlahjeh Azar	Potential of SAR remote sensing for monitoring Irish raised bogs
12:25	12:35	S2-T2	Corrado Grappiolo	AI2PEAT: Toward the automated mapping of raised peatland ecology at national scale
12:35	12:45	S2-T3	Farimah Fattahi Masrour	Viability of surcharging as a means of limiting long-term settlement in peat
12:45	12:55	S2-T4	Hilary Pierce	Examining the relationship between rainfall and water table position in grassland peat soils
12:55	13:05	S2-T5	Callum R. C. Evans	Testate amoebae are informative bioindicators of critically high ammonia deposition on peatlands.
13:05	13:15	S2 Discussion		Q & A for Session 2
13:15	14:30		Lunch	
Session 2			**Speaker**	**Title**
14:30	15:00	S3 Keynote	Kate Flood	Changing landscapes, changing values: reimagining social and cultural values for Irish peatlands
15:00	15:10	S3-T1	Jamie Rohu	Twelve bogs: history, politics, ecology
15:10	15:20	S3-T2	Catherine Keena	Engaging with Irish farmers managing upland blanket peatlands through agri-environment shemes to effect biodiversity practice change.
15:20	15:50		Tea/Coffee	
15:50	16:00	S3-T3	Ellen O Carroll and Cathy Moore	Irish peatlands past? The anatomy of a national archaeological resource
16:00	16:10	S3-T4	Claire Nolan	Irish peatlands present and future? Communication, collaboration and peatland archaeological heritages
16:10	16:20	S3-T5	Richard Fewster	New peat initiation under 20th-century climate change in New Zealand's Southern Alps
16:20	16:35	S3 Discussion		Q & A for Session 3
16:35	16:45		IQUA Prize giving	
16:45	17:00		Concluding remarks	

ORAL ABSTRACTS
(in order of presentation)

Session 1

Keynote Speaker:

Dave Beilman

Bio:

Dave Beilman received his PhD from the University of California at Los Angeles after a BSc and MSc from the University of Alberta. He was a Marie Curie International Fellow at Queen's University Belfast before taking a faculty position at the University of Hawaii. His research and teaching interests are in biogeography, terrestrial ecosystems and climate change, and wetlands. He lives with his wife and daughter in Honolulu, Hawaii in the Manoa Valley on the Island of Oahu.

Session: S1 Keynote

Lessons learned from past peat worldwide

Dave Beilman

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Abstract:

Peatlands are well-known hotspots of carbon storage and biodiversity, making them recognized providers of ecosystem services globally. But their value as information hotspots, the archive of environmental change as peat accumulates, is equally important. Two aspects of peatlands worldwide are highlightable. First, peatlands are distributed widely, yielding unique information in regions where other data can be lacking. Fifty thousand years of atmospheric inputs and influence in the Pacific is evident in tropical peat from Hawaii. Second, peatlands are sensitive Earth system components, and subject to losses and even disappearance from global change pressures in many regions, yet expanding in others. Studying centennial scale peat dynamics in the Antarctic Peninsula are helping to constrain anticipated future changes in plant growth as amplified polar warming progresses. Many opportunities for new understanding of our past and future world are available to peatland science, making the conservation and study of peatlands an important goal among the grand challenges of coming decades.

Session: S1-T1

Deciphering the origin and spread of blanket peat in the Mourne Mountains, County Down

Helen Essell

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Abstract:

Today, blanket peat dominates Ireland's uplands. Its origin is typically ascribed to the Bronze Age (~4450–2650 BP) and it is viewed as a consequence of farming activity. Considerable spatial and temporal divergence in the timing of peat formation and pollen evidence, however, show that the history of blanket peat differs between Ireland's uplands, warranting long-term, regionally specific studies of landscape history. The environmental and human history of the Mourne Mountains, County Down, is poorly understood due to sparse palaeoenvironmental study and archaeological enquiry. Here, we adopt a palaeoecological lens to report on the Holocene landscape history of the Mournes in order to understand the status of blanket peat in the landscape. We determine the timing of local peat initiation, and using five cryptotephra dated pollen records, we answer extant questions regarding the status of mid-Holocene woodland, the degree of landscape openness through the past and the roles of natural and anthropogenic drivers of landscape change. We find that blanket peat has been a feature of the Mourne uplands since mid-7th millennium BP, and thus its origin in this area much predates other upland areas. We discuss the implications for this for past land-use in the area and future conservation activities.

Session: S1-T2

Project DRYPEAT: Developing a new isotopic proxy for bog evapotranspiration

Pete D. Akers

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Abstract:

Blanket bog carbon storage and biodiversity are critical components of a sustainable Ireland, but a warming and drying climate may push blanket bogs beyond a tipping point into ecological collapse. Although the exact conditions that lead to this threshold are unknown, we can better understand bog resilience by identifying and quantifying past droughts that the bogs survived. In our new project DRYPEAT (Deuterium-excess Reconstruction to Yield Peatland Evaporation, Aridity, and Transpiration), we aim to develop a new peatland evapotranspiration (ET) proxy using the deuterium-excess (dxs), a second-order stable isotopic parameter, of bog plant cellulose. Uniquely, DRYPEAT will use the differences in cellulose dxs between non-vascular Sphagnum and vascular bog plants (e.g., Calluna, Eriophorum) to capture the previously unquantified transpiration component of ET. Our proxy development will be achieved through sustained monitoring of bog precipitation, surface waters, and vegetation in the Wicklow Mountains and then applied to local peat cores to compare past periods of high ET that the bogs survived with predicted future ET extremes. The technical and methodological advancements achieved in DRYPEAT will thus aid Irish climate mitigation planning around the future survival of blanket bogs while also expanding knowledge of Irish geoscience and its paleoenvironment.

Session: S1-T3

Botanical and chemical factors impacting recent carbon storage dynamics in temperate peatlands

Gosse Bootsma

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Abstract:

Peatlands are a key terrestrial ecosystem, especially in the British Isles, which support unique biodiversity and form a major carbon store. This ecosystem is highly dependent on climatic factors and can be significantly influenced by human activity. Going into the future, improving understanding of how carbon is sequestered and released is key, as carbon dioxide and methane are major greenhouse gases. Therefore, carbon storage dynamics of peatlands could have a significant impact on future climate change.

This project aims to improve understanding of peatland carbon storage dynamics over the last few centuries, by combining information on species diversity and composition, pollution, and the chemical composition of peat, using methods including a range of radiocarbon dating techniques, ramped pyrolysis, bulk density, loss-on-ignition, and X-Ray Fluorescence. The work primarily focuses on peatlands in Northern Ireland in and Scotland. In this way, the project hopes to improve understanding of how recent challenges have impacted temperate peatlands.

In this talk I will focus on some unusual methods of radiocarbon dating, especially applying ramped pyrolysis and combustion to peat.

Session: S1-T4

Testing the replicability of palaeoenvironmental records from a raised bog

James Dill-Russell

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Jo Smith, School of Biological Sciences, University of Aberdeen

Abstract:

Ombrotrophic peatlands are sensitive to climatic changes due to their reliance on precipitation for nutrients and water. For this reason, peat archives are commonly used for palaeoclimate investigations, providing a range of proxies that shed light on past bog surface conditions. Most typically, palaeoenvironmental studies entail the investigation of a single core from a bog, which is then compared with individual cores from other bogs. Here we consider the extent to which cores from different locations on a bog yield common palaeoenvironmental signals. We focus on the period between 6000-5000 BP, during which several climate oscillations are thought to have occurred, and examine three cores from Sluggan Moss, Northern Ireland. Using tephrostratigraphies to align the sequences, we examine pollen, plant macrofossil and testate amoebae records from the cores. Initial results show that the general trends of signals between two cores follow similar directions, with increased ericaceous material coincident with environmental shifts towards drier conditions. Results from the third core diverge, however. We consider possible reasons for the discrepancies and the implications for reconstructing past environments from single-core records.

Session: S1-T5

Ground Penetrating Radar to understand peatlands in the past, present and future

Raymond Flynn

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Abstract:

Ground penetrating radar (GPR) has received widespread attention as a non-invasive geophysical tool for investigating the subsurface. Across Ireland, GPR has permitted high resolution mapping of bog substrates, while allowing quantification of the volume of peat underlying an area, when considered with topographic data. Despite these benefits, considerable potential remains for using GPR to better understand peatland development. Profiles showing internal variations in signal have allowed tree stumps and irregular shell marl surfaces to be identified, and suggest diachronous deposition of marl as peat accumulated and forced water tables in glacial deposits to rise. This is further corroborated by profiles, and associated coring, across mounds protruding through early Holocene lake beds, which reveal development of ombotrophic peat directly on glacial till. Within the peatland sequences, variations in the elevation of the fen peat/bog peat interface can be related to impacts of more recent artificial drainage, which has lowered bog water tables. This has also affected bog surfaces and their ecohydrology, with GPR revealing greater sensitivity in bog peat than underlying fen peat, in line with compressibility measurements. Results highlight GPR's potential as a tool for better understanding peatland development and for better characterising current and future responses to anthropogenic activity.

ORAL ABSTRACTS
(in order of presentation)

Session 2

Keynote Speaker:

John Connolly

Bio:

Dr. John Connolly is an Assistant Professor in Physical Geography at Trinity College Dublin. He leads the Trinity Geospatial & Environmental Modelling Group. John's research uses GIS, Remote Sensing and Machine Learning to study the terrestrial environment including land use change; landscape carbon dynamics and habitat assessment. He has published more than 50 journal articles, reports and policy statements including articles in leading international peer-review journals such as: *Geoderma*, *Earth Science Reviews*; *International Journal of Remote Sensing* and *Nature Scientific Reports*. John is currently involved in ten research projects as Principal Investigator, Co-PI and funded Investigator, funded by the EPA, SFI/TE and DAFM. He collaborates widely, both in Ireland and globally and supervises several PhD students and Post Doctoral Researchers.

Session: S2 Keynote

Ireland's Hidden Peatlands – a geographical perspective

John Connolly

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Abstract:

Although peatlands cover only 3% of the land area, they contain 33% of all terrestrial soil organic carbon stocks. In addition, they support a broad range of environmental services such as water quality and biodiversity. Anthropogenic activity, particularly drainage and land use change has degraded many peatlands with consequences for environmental services. This has long been the case in Ireland and across Europe and more recently in tropical regions.

They play a crucial role in the global carbon cycle as well as providing many of nature's contributions to people. However, degradation impacts the many ecosystem services that peatlands provide including carbon (C) storage and greenhouse gas exchange, water quality and biodiversity. The degradation of peatlands can lead to fire, GHG emissions, dissolved and particulate matter emissions and, heavy metal mobilisation with consequences for human health and the environment.

The extent and condition of peatlands nationally, regionally and globally is not clear. In Ireland, peatlands have undergone extensive degradation through land use change and conversion. Recent studies estimate that peat soil extent, including shallow peat soil, is 1.66 million hectares with about 2 billion tonnes of Carbon stored in the soil. Much of this soil is located under a variety of different land cover types and in different drainage states. This leads to some uncertainty regarding green house gas fluxes.

This presentation focuses on the geospatial techniques that we have used to refine and quantify the spatial extent and condition of peat soils in Ireland from 1809 to the present.

Session: S2-T1

Potential of SAR remote sensing for monitoring Irish raised bogs

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Abstract:

Synthetic Aperture Radar (SAR) remote sensing is potentially useful for spatio-temporal monitoring of temperate peatlands, especially given that radar penetrates clouds and so offers a higher temporal resolution than optical satellites. However, accurately tracking bog condition and restoration progress by using SAR requires a comprehensive understanding of how bog characteristics relate to SAR parameters in both space and time. To facilitate this understanding, six ecologically well characterised and hydro-geologically well-instrumented raised bogs — Mongan, Clara, Killyconny, Ardagullion, All Saints, and Castlegar — have been selected. These represent a spectrum of peatland condition from relatively intact to industrially degraded. Our observations show the potential of SAR remote sensing, particularly VV and VH time series backscattering for monitoring peatland restoration. The amplitude of backscatter oscillations is a key indicator of degradation, with more noticeable fluctuations in degraded areas compared to near-intact bogs. SAR backscatter signals can detect the impact of rewetting works, but the subtle differences in post-rewetting backscatter require detailed temporal analysis to track progress effectively. The correlation between SAR backscatter and GWL weakens with inundation (flooding), making it essential to filter out inundated periods for accurate monitoring. SAR intensity standard deviation and polarization differences can provide insights into peatland ecological conditions, aiding in restoration assessment and the identification of key ecological changes.

Session: S1-T2

AI2Peat: Toward the automated mapping of raised peatland ecology at national scale

Corrado Grappiolo

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Abstract:

Peatland ecology is a critical indicator of peatland condition and can be used as a proxy for greenhouse gas emissions. In Ireland, a major challenge is to map peatland ecology across the 15-20% of the country's land area that is characterised by peat soils.

We present a machine learning approach - a hierarchy of neural networks - to classifying the ecology of temperate raised peatlands. The approach leverages Sentinel-2 multispectral satellite imagery - which has 10 metre resolution ground sampling distance and revisit time of 5-10 days - and detailed field-surveys of raised peatland ecology in the form of ecotope maps (8 ecotopes). Our preliminary experimental setup aimed at training the neural hierarchy with 15 ecotope maps and imagery, and subsequently testing its performance on 3 previously unseen imagery, recorded an averaged weighted F1 score of 0.71 (0.07 std. dev.).

We show how such an neural network approach can automatically infer the ecology of over 11,000 raised peatlands in Ireland. This work shows the promise of artificial intelligence and satellite data to support monitoring of Irish peatlands at national scale, e.g. by producing island-wide peatland ecology maps on yearly basis.

Session: S2-T3

Viability of surcharging as a means of limiting long-term settlement in peat

Farimah Fattahi Masrour

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Abstract:

Peat soils exhibit low shear strength and high compressibility (especially post-construction settlements) which render them challenging from a geotechnical engineering standpoint. The traditional practice of excavating and replacing peat with more component material gives rise to CO_2 release from the peat and is therefore unsustainable. The focus of this research is on the potential of surcharging, a ground improvement technique commonly deployed in mineral soils, to reduce long term settlement (creep) in peat while enabling it to remain in situ. The research project involves three strands. The first strand, which is almost complete, involved interpretation of field data from instrumented embankments along the N56 at Glenties, Co. Donegal. These embankments were subjected to various levels of surcharge, with supporting data from an unsurcharged 'control' embankment. The second phase involves long-term large diameter oedometer tests on block samples of peat, with a focus on the impact of surcharge on the magnitude and duration of creep settlement reduction. Particular challenges include repeatability of testing and limiting peat decomposition during testing. Finally, the field and oedometer tests will be modelled using PLAXIS 2D finite element software in conjunction with the Soft Soil Creep model to help broaden the parameter space.

Session: S2-T4

Examining the relationship between rainfall and water table position in grassland peat soils

Hilary Pierce

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Abstract:

Using artificial drainage on peat soils is a common practice to increase agronomic production on waterlogged lands, but leads to the release of carbon dioxide to the atmosphere. There are an estimated 300-350,000 ha of permanent grassland on peat soils in Ireland, with varying degrees of drainage, and 80,000 ha of such soils are targeted for 'reduced management intensity' in the National Climate Action Plan. This may involve removal or blocking of existing artificial drainage features to raise the water table and reduce net carbon emissions. The Department of Agriculture, Food and The Marine-funded project, REWET, aims to provide a deeper understanding of the hydrologic impacts of active water table management on grassland peat soils. To achieve this goal, six field sites on grassland farms were selected and classified into peatland type. The sites are instrumented with rainfall gauges and dipwells with sensors to monitor the water table position. One aim of the project is to determine the relationship between rainfall and water table position at the different sites. Such results will ultimately inform water table management strategies to reduce the impact of greenhouse gas emissions on the environment and support sustainable land management practices on grassland peat soils.

Session: S2-T5

Testate amoebae are informative bioindicators of critically high ammonia deposition on peatlands.

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Graeme T. Swindles, Geography Department, School of Natural and Built Environment, Queen's University Belfast.

Abstract:

The global nitrogen cycle has been majorly disrupted by anthropogenic activity. While nitrogen emissions in the UK and Ireland are declining, ammonia remains a significant exception. Ammonia emissions are mostly agriculturally sourced and deposited on nearby habitats at high rates in both countries. Peatlands are vulnerable to ammonia deposition, and essential peatland restoration risks being diminished by excessive ammonia deposition, leading to the loss of valuable ecosystem services. We investigated testate amoebae (indicators of contemporary and historic peatland conditions) as bioindicators of seasonal ammonia deposition on six peatlands across Northern Ireland. Sphagnum, an ammonia-sensitive bryophyte, was sampled adjacent to ammonia monitoring sites once per season for a year. When ammonia deposition was critically high, multivariate analysis demonstrated a link between ammonia and testate amoebae assemblage change. Similarly, at high ammonia deposition sites, testate amoebae taxa diversity was observed to be significantly reduced in springtime, when it is expected to be highest. Although, in response to high ammonia deposition large algivorous taxa did not proliferate as was anticipated, and mixotrophic taxa abundance decreases could not be linked primarily to ammonia. Our research demonstrated the continued potential of testate amoebae as highly informative peatland bioindicators.

ORAL ABSTRACTS
(in order of presentation)

Session 3

Keynote Speaker:

Kate Flood

Bio:

Kate Flood is a researcher with the EPA Peat Hub Ireland project based in UCD. This project integrates knowledge from a range of disciplines to encourage the sustainable management of peatlands including biodiversity, management, climate, soil, water, archaeology, policy, and socio-cultural perspectives. Her research interests include the cultural and social dimensions of peatland conservation and the role of communities in contributing to the restoration and resilience of peatlands.

Session: S3 Keynote

Changing landscapes, changing values: reimagining social and cultural values for Irish peatlands

Kate Flood

University College Dublin

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Abstract:

Peatlands are important archives of historical information, providing insights into past human activity and environmental change. In Ireland, peatland landscapes have been highly modified and degraded by human activities, often driven by economic, political, and socio-cultural factors which are, in turn, underpinned by societal values and behaviours. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) emphasises that modifying values and behaviours is critical for the transformative change required to address current environmental challenges. Researchers have long advocated for integrating social insights with ecological data, and various frameworks, such as social-ecological systems and ecosystem services, have been developed to support this integration. Yet critical knowledge gaps persist concerning the social and political dimensions of peatland conservation, restoration and management. This presentation will explore the role of values in shaping the past, present and future of peatland management in Ireland, as priorities shift from economic exploitation to more sustainable and equitable models. In the past, socio-cultural traditions have often constrained transformational change. Current societal and cultural values also underlie resistance to change, with a variety of actors opposing peatland restoration, rewetting and other sustainable management strategies. However culture in all its forms can also be a force for positive change, fostering adaptation, social-ecological resilience and guiding a shift from values of individualism and consumption towards more collaborative values. Envisioning different land uses for Ireland's peatlands requires attention to values and how we transmit knowledge to future generations in ways that open possibilities for new forms of valuing and appreciation. Interdisciplinary and transdisciplinary research will be essential, with contributions from the arts, humanities and social sciences (AHSS) needed to develop more integrated and holistic understanding of peatland landscapes alongside traditional scientific research. Such contributions can also help expand our concepts of time and temporality, shifting from short-term thinking to long-term management and planning. This presentation will also draw on insights from the Peat Hub Ireland project, and its use of scenario planning to better understand how future social, economic and environmental worlds will be served by the choices that are made for peatlands today.

Session: S3-T1

Twelve bogs: history, politics, ecology

Jamie Rohu

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Abstract:

Intact peatlands are now widely recognised as carbon stores and habitat for wild plants and animals. Humans have extracted turf from these spaces for millennia in order to meet their domestic heating and cooking needs. However, these use values are largely incompatible given the slow natural rate of peat accumulation.

In response to increased environmental awareness and directives from the European Union, successive Irish governments have enacted legislation to protect and rehabilitate the country's best remaining raised bogs. The transition of landscapes from one use to another presents both economic and technical challenges. Restorative activities by the state have brought it into direct conflict with people in possession of turbary rights to cut turf. Therefore, I argue that the greatest barrier to ecological remediation is a political one.

Contemporary peatland research focuses on physical aspects, notably greenhouse gas emissions from agricultural, post-industrial, rehabilitated and restored bogs. I aim to fill the gap in the literature concerning the socioeconomic consequences of peatland transformation through the publication of a scholarly monograph entitled *Twelve Bogs: History, Politics, Ecology*. This fellowship, based in the Department of History at Trinity College Dublin, is co-funded by Research Ireland and the National Parks and Wildlife Service.

Session: S3-T2

Engaging with Irish farmers managing upland blanket peatlands through agri-environment schemes to effect biodiversity practice change.

Catherine Keena

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Abstract:

There are approximately one million hectares of uplands in Ireland, 45% of which is blanket peatland. Some 340,000 hectares are farmed as commonages by up to 15,000 farmers, other areas are privately owned and farmed. Farming in these vast upland areas is experiencing socio-economic decline, presenting unique challenges including low farm incomes and an aging farming population. Issues of overgrazing, undergrazing and abandonment have resulted in some of these peatland areas failing to attain Favourable Conservation Status with reduced biodiversity including declines in iconic upland bird species such as red grouse and hen harrier, encroachment of Invasive Alien Species, and a reduction in high status water quality.

EU policies and in particular the Common Agriculture Policy (CAP), impact significantly on Irish uplands.. In order to effect biodiversity practice change on farms, engagement with farmers is key. A study on biodiversity knowledge exchange with Irish farmers using face-to-face questionnaire-based interviews on-farm on concluded that while farmers were positive towards biodiversity, it was not a priority. There was a lack of understanding of biodiversity, requiring effective training. Farm advisors were identified as the key source of environmental information, and along with other farmers and family members were key influencers of farming decisions.

Session: S3-T3

Irish peatlands past? The anatomy of a national archaeological resource

Ellen O Carroll[1] and Cathy Moore[2]

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Abstract:

''There is some argument for saying that the Irish bogs hold more information about the past, than any other wetland in Europe.” (Coles and Coles, 1989, 159)

In the three and a half decades since the ‘bogland’ archaeological record of Ireland was described as such, drainage and peat extraction continued to expose, and destroy, archaeological sites and deposits, ironically proving the above argument to be correct. With the ‘official’ end of industrial cutting, compiling and assessment of the archaeological datasets has been carried out by the Irish Peatland Archaeology Across Time Project (IPeAAT; funded by the IRC COALESCE INSTAR+ scheme). This paper outlines the approaches and initial ouputs of this project, which has included the construction of a relational database incorporating a comprehensive range of information drawn from a detailed investigation of archaeological excavations, and associated data including palaeoenvironmental assessments and analyses, and chronological ‘hygiene’ of radiocarbon dates. Ongoing spatial and chronological modelling is analysing patterns of past human activity in peatlands across Ireland. These data also have implications for future ‘afteruses’ of peatlands; not least the preservation of surviving archaeological sites in situ during programmes of peatland rehabilitation and the wider communication of the value and fragility of the resource.

Session: S3-T4

Irish peatlands present and future? Communication, collaboration and peatland archaeological heritages

Claire Nolan

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Ellen O'Carroll, University College Cork
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Abstract:

While organic archaeological remains from peatlands provide often vivid and immediate evidence of past human activities, communication and promotion of the broader heritage value of this resource in Ireland has been, at best, rather uneven. The number of sites and artefacts that have been destroyed or damaged as a direct result of peat extraction, means that much tangible heritage now only survives as record, or sometimes behind museum glass. Moreover, the sociocultural context of the exploitation of peat is tied to complex expressions of intangible cultural heritage, leading to extended and ongoing debates around the 'green future' of these environments, which tend to overshadow the archaeological context. This paper provides an overview of work by the Irish Peatland Archaeology Across Time Project (funded by the IRC COALESCE INSTAR+ scheme), and previous UCC projects, that has attempted to encourage communities of practice outside the Academy to consider the place of the past, in the present and future of peatlands. What might trans-disciplinarity offer in such tightly contested spaces, specifically the interface between archaeology, and modes of representation/communication via the arts? Can we seek to create nuanced, hopeful narratives around peatland rehabilitation and the past loss of tangible archaeological sites?

Session: S3-T5

New peat initiation under 20th-century climate change in New Zealand's Southern Alps

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Abstract:

Emerging peatlands represent a growing, though presently unquantified, carbon sink in the global climate system, with important implications for radiative forcing. Rising temperatures and shifting precipitation patterns have made regions towards the latitudinal and altitudinal limits of the peatland bioclimatic envelope increasingly conducive for peat formation, due to increases in plant productivity and moisture availability. While renewed peat growth has been well-documented in warming high-latitude regions, direct observations of new peat initiating in response to 20th-century climate change remain scarce. In our ongoing study, we explore evidence for recent peat initiation in a deglaciating valley in New Zealand's Southern Alps. Our results reveal that montane peats have developed across the upper valley within the past 75 years, during a period of steady regional warming and glacial retreat. Additionally, we observe consistent patterns of ecological succession in these nascent peatlands, including shifts from herbaceous- to moss-dominated vegetation. Our results indicate the potential for broader peat expansion in montane regions undergoing rapid deglaciation in warmer and wetter climates. Further bioclimatic modelling is now needed to identify plausible locations for future peatland initiation and expansion at regional scales.