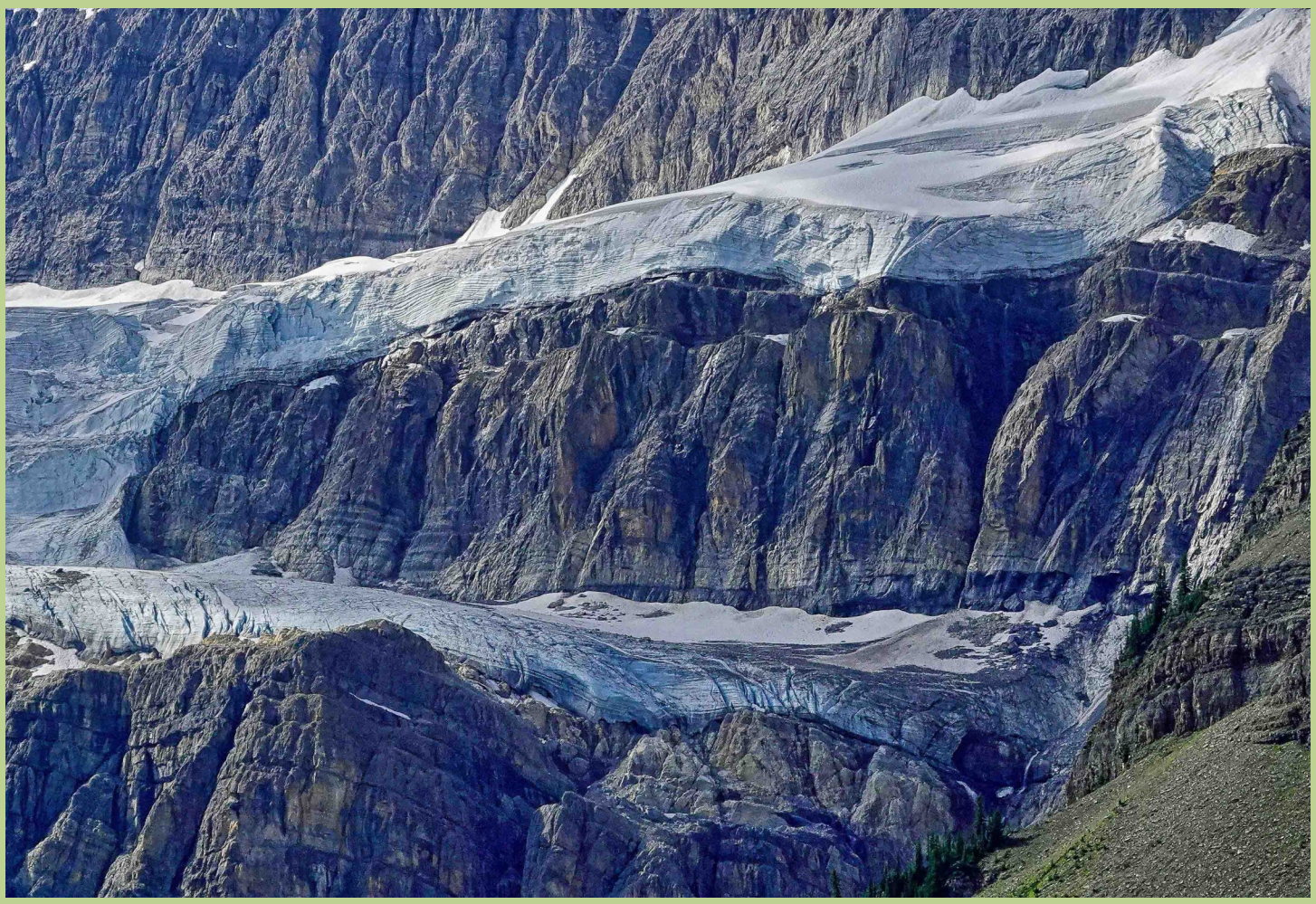
Quaternary Times



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AMQUA

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CONTENTS

Newsletter Editor
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Cover: Crowfoot Glacier in Banff National Park, AB. Photo by Gerald David Osborn.

The View from the Moraine: the President's Message

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Greetings and happy spring to all AmQua members, or at least its Northern Hemisphere cohort. It has been a long winter and a long year indeed. I hope that everyone reading this note is well, and that your family, friends, and colleagues are well.

This is a time to remember those we have lost, and Quaternary Sciences has lost several leaders over the last year. John Kutzbach, winner of the AGU Roger Revelle Medal and Fellow of the American Association for the Advancement of Science, passed away in January. John transformed the practice of paleoclimatology through his innovative experiments with global circulation models and collaborative data-model comparisons and established the orbital drivers of monsoonal variations in the subtropics. John Matthews, of the Geological Survey of Canada, and one of the great paleoecologists working in Beringia, also passed away in January. John was an early formulators of the Beringian Mammoth-Steppe hypothesis; for a fuller set of vignettes about John, see the fond remembrances posted by Duane Froese: https://twitter.com/tephrafan/status/1354082077344493569. Richard West, another pioneering paleobotanist, Fellow of the Royal Society, and founder of the Quaternary Research Association, passed away in December. Richard worked up many classic records, including the early paleobotanical indicators of the Valdes advance here in Wisconsin. By framing early questions about e.g. whether plant communities were in equilibrium with past climates, Richard helped moved palynology away from stratigraphic zonation and towards more ecologically oriented questions.

Eric Grimm's unexpected passing in November 2020 was a particular loss. Many in AmQua were close to Eric, myself included, and his passing has hit us hard. Eric was a long-time supporter of AmQua, a past president, and the 2015 recipient of AmQua's Distinguished Award. Several of Eric's colleagues have published remembrances in Eric's honor, including one by George Jacobson in Palynology (https://www.tandfonline.com/doi/full/10.1080/01916122.2020.1870281) and in-press pieces by Richard Bradshaw and colleagues in Vegetation History and Archaeobotany and for GSA by Russ Graham and colleagues.

AmQua is helping organize several events in Eric's honor. Thanks to gifts from many of Eric's friends and family members, an AmQua memorial fund is being established in Eric's honor (https://www.amqua.org/in-memory-of-eric-grimm.html), with the opportunity to donate still open. The precise wording of the award is still being finalized, but likely will support an award to an early career scientist for their leadership in Open Data and Open Science. An international 24-hour virtual symposium is being held in Eric's honor on April 28 (https://sites.google.com/view/ericgrimm/home), organized by continent and timezone, with the America's session scheduled for 1–6 pm ET. All

are welcome for any or all of this event. We also welcome field photos of Eric to share with his family

My apologies if this View from the Moraine has been more somber than usual, but it has been a somber year. But it is now spring, and life renews. Here in southern Wisconsin, the sandhill cranes are passing through and heading north again. Vaccines are being delivered at a rate unimaginable a few short months ago. Many of us are now at least starting to think about relaunching visits to friends and family, vacations, fieldwork, or other travel.

At AmQua, we are also at the stages of change, renewal, and planning ahead. Dr. Susann Stolze is stepping down as Newsletter Editor, after five years of tireless service to AmQua. Susann, on behalf of all of us, we are deeply grateful for your time and service. This leaves open the question for how best AmQua should communicate with its members (Newsletter? Website posts? Social media?). I welcome both suggestions and volunteers to help.

The ad-hoc DEI committee has been making progress, with new language and a clearer process for the AmQua awards. We have several promising candidate locations for AmQua 2022, which we will announce later this year. Following on the great success of VAmQua 2020, we will continue to work on ways of combining the best of traditional meetings with the new access opportunities that virtual conferences enable.

So, here's a hearty good riddance to 2020, best wishes to all for personal and professional renewal in 2021, and here's to us all raising a glass together again at AmQua 2022.

Editor's Note

Dear reader,

After five years of bringing the AMQUA newsletter to you twice a year, I will step down as editor of the *Quaternary Times*. It was a privilege and great pleasure to serve the society and its members in this position and to get to know many of you who contributed to the newsletter over the years. I am sure we will meet at one of the next meetings again.

Signing off,

Susann Stolze, PhD

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Photo: Jack Williams (2018)

AMQUA Biennial Meeting

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Representatives from the AmQua Community, Council, and Executive Committee, along with the 2020 host Quaternary Research Center at the University of Washington have decided to cancel the postponed 2020 Biennial meeting which was tentatively planned for Summer 2021 at the University of Washington in Seattle.

However, there has been interest in holding some AmQua sponsored virtual workshops in the Summer of 2021. Potential topics for the workshop and plans are in the developmental stage so if there is any interest in participating please contact Colin Long at longco@uwosh.edu.

Call to host the 2022 Biennial Meeting

The AmQua Council is prepared to examine bids to host and organize the 2022 AmQua Biennial meeting. If you or your group are interested or wish to get information regarding the process, please feel free to contact AmQua secretary Colin Long at longco@uwosh.edu. The goal is to have all hosting bids submitted to the Council by July 1, 2021.

Research Reports

Functional paleoecology and the pollen-plant functional trait linkage

Thomas Brussel[1,2] and Simon C. Brewer[2]
[1]University of Oregon, [2]University of Utah

The field of functional paleoecology is growing yet no one has tested whether linking plant functional traits to pollen records reconstructs ecological function at present. While presenting reconstructions of the latitudinal functional diversity gradient over the past 11,000 years at professional conferences like AMQUA 2018 in Dublin, Ireland, I was critically asked "How do you know that transforming pollen data to ecological function actually works?". That question led my colleague Dr. Simon Brewer and I to make the pollen-plant functional trait linkage at modern. We linked North American surface pollen samples from the Neotoma Paleoecology Database (Williams et al., 2018) with functional trait data for plant height, seed mass, and leaf area from the Botanical Information and Ecology Network (Enquist et al., 2016), and transformed them into ecological function, i.e., estimates of site-level trait estimates (Brussel and Brewer, 2021).

To see how transforming pollen into ecological function performed we examined the linkage at multiple scales. Our first test included a comparison of pollen-derived trait estimates to the functional trait measurements that were used to inform them, and boxplot results showed good overlap. With this first test showing promise, we examined the spatial dynamics of pollen-derived functional traits throughout the continent (Fig. 1).

Some of our findings were expected, and others, interesting. Leaf area was largest in deciduous forests and became smaller with movement towards northern latitudes, and plant heights were similar throughout the continent, suggesting low competition for light. There was a coherent latitudinal gradient in seed mass that we suggested may have occurred due to functional, as opposed to species, selection from the late-glacial period to present via directional selection, or a macroscale driver like temperature or insolation gradients. To conclude on the driver, though, would require more phylogenetic research like that of Griffin and Barrett (2004).

To look at a macroecological example of how the pollen-plant functional trait linkage can be utilized, we quantified the range of functional traits (i.e., functional diversity) at each site to reconstruct the latitudinal functional diversity gradient at present (Lamanna et al., 2014). Functional diversity is the driver of ecosystem function (Diaz et al., 2007) and when quantified using plant height, seed mass and leaf area, we examine the ecosystem fitness function (Díaz et al., 2016). We also made comparisons to gradients in the number of taxa expected from standardized counting (richness) and the taxon dominance (richness) (Fig. 2). Correlations between the pollen-based estimates were weak and were contrary to what might be presumed regarding species richness and dominance of individual pollen taxa within ecosystems as they relate to the range of function within ecosystems along latitudinal gradients.

With these results we can say that the pollen-plant functional trait linkage accurately translates into ecological function. We can now use the transformation for extending into paleo-timescales to explore priority questions that were previously difficult to answer, like variations in biogeochemical cycling and services like climate regulation (Seddon et al., 2014).

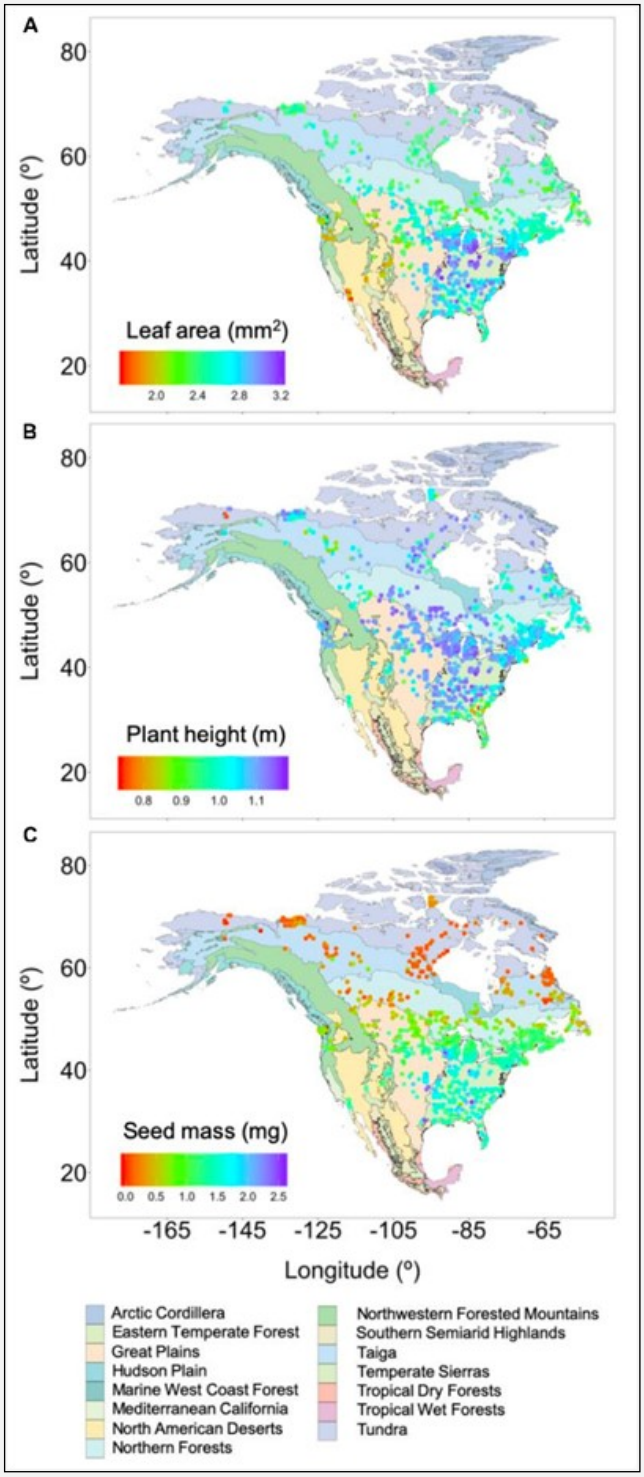

Figure 1. *Pollen-derived leaf (A), plant height (B), and seed mass (C) estimates obtained by linking plant functional traits to surface pollen samples (Williams et al., 2018). Colors on the continent correspond to ecoregions (Omernik, 1987).*

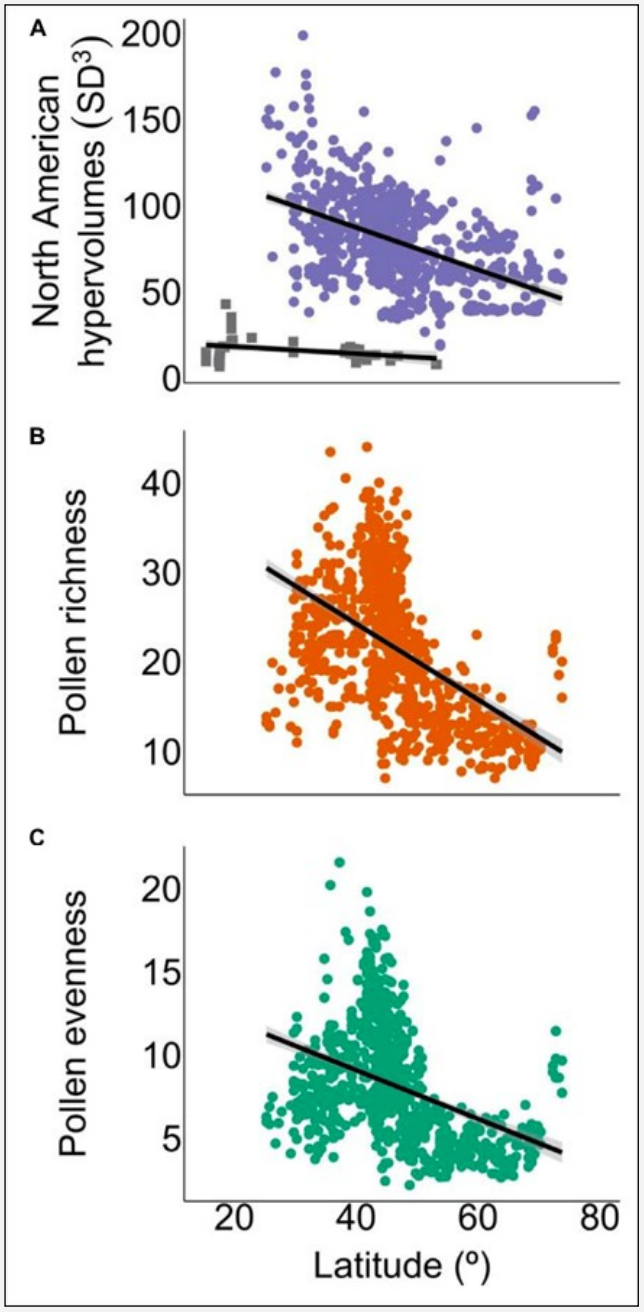

Figure 2. *The latitudinal functional diversity gradient of North America from surface pollen samples (light purple points) compared to the gradient estimated from tree assemblages (gray boxes, Lamanna et al., 2014) (A). Gradients in pollen richness (B) and evenness (C) are also shown. Slopes were identified using linear modeling (black lines); functional diversity (A) and pollen richness (B) gradients were significantly related to latitude.*

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Last appearance dates of Pleistocene vertebrates in Oklahoma, with implications for their extinction

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Hypotheses for the cause of the Pleistocene extinction (~12.8 ka) range from overkill to climate change to other fringe hypotheses (comet impact, disease, solar radiation, etc.). Besides the megafauna, other smaller mammals, birds, reptiles, amphibians, and fish also went extinct in North America. This study focuses on Pleistocene vertebrates in the state of Oklahoma (Fig. 1) and their last appearance dates in the local fossil record. This is a review of previously published data of others and data from secondary sources (Smith and Cifelli, 2000; Caire et al., 2019; Alroy, 2021; PBDB, 2021).

More than just megafauna went extinct during the Pleistocene Epoch (2.6–0.011 Ma). Extinct megafauna (mammoths, bison, camels, horses, ground sloths, saber-toothed cats, etc.) are present at archaeological and paleontological fossil sites across Oklahoma. Only a few taxa (such as mammoths or bison) coexisted or were associated with humans. Other smaller mammals (rabbits, rodents, shrews, etc.) and various birds, reptiles, amphibians, and fish are also present in the local Pleistocene fossil record.

Based on last appearance dates, most mammals and other vertebrates disappeared from Oklahoma during the Irvingtonian (1.8–0.26 Ma) and Rancholabrean (260–11 ka) Land Mammal Ages before humans were present (Fig. 2).

Mammoths, camels, and three smaller mammals were present during Clovis times (starting at 13.4 ka), with mammoths present at the Clovis archaeological site of Domebo. Ancient bison were present after the extinction of the rest of the megafauna. A leopard frog, a ribbon snake, and an extinct tortoise were also present during Clovis times (with the frog present at the Clovis site of Domebo; Smith and Cifelli, 2000). Last appearance dates of other mammals, birds, reptiles, and fish are earlier in the Pleis-

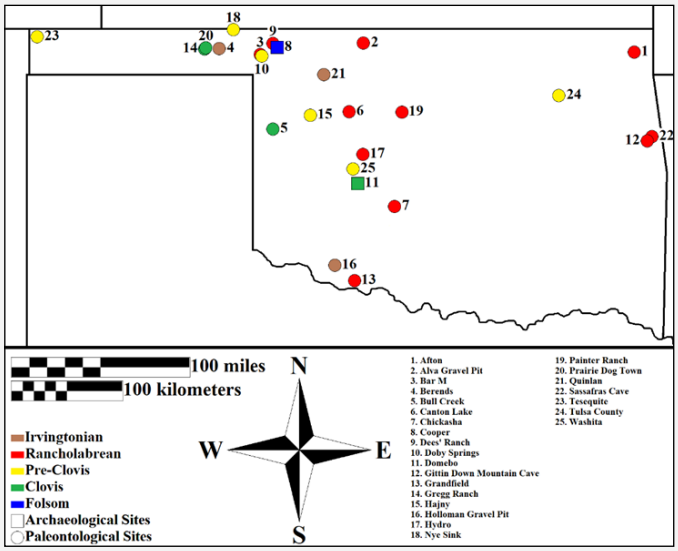

Figure 1. *Locations of Pleistocene fossil sites in Oklahoma.*

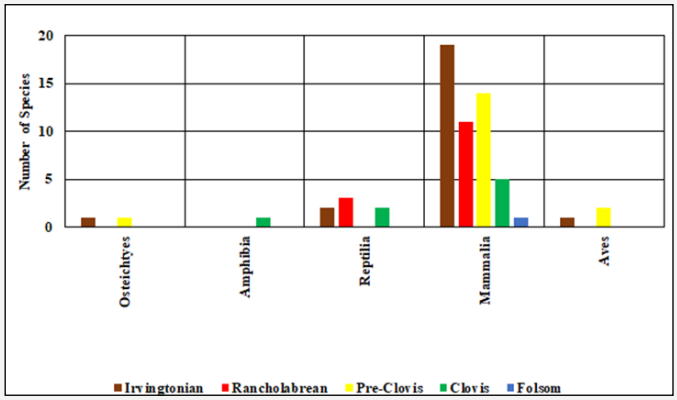

Figure 2. *Number of vertebrate species reported extinct or extirpated in Oklahoma.*

tocene, regardless of size. Most sites were in the western half of Oklahoma, where it is drier with lighter vegetation cover. This could suggest that conditions in these areas were more favorable to fossil preservation (i.e., fewer plants and less rainfall to destroy hard tissues).

Overall, the Pleistocene extinction (at least in Oklahoma) appears more temporally dispersed than would be expected for a sudden event. Many taxa went extinct early in the Pleistocene before humans arrived. A few larger mammals survived later, but few of them were associated with humans. These patterns could be the result of biases in preservation and/or recovery, as mentioned earlier. More detailed research on extinct taxa (as well as living taxa no longer present in Oklahoma) is recommended.

Acknowledgements

I thank my wife (Elizabeth Hartley), parents (Barbara Hartley and James Hartley), and professional colleagues for their encouragement and assistance through the course of my career development. I also thank the American Quaternary Association for allowing me to share my research.

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Anatomy of abrupt climate change: reconstructing precipitation and seasonality of the Younger Dryas in Greenland using insect and moss oxygen isotope measurements from lake sediments (NSF GRFP awarded research)

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The Younger Dryas (YD; ~13.0–11.7 ka) is a relatively recent example of abrupt climate change, characterized by a rapid transition to and from extremely cold and dry conditions across much of the world (Alley, 2000). The initial cooling was likely caused by weakened Atlantic Meridional Overturning Circulation as a result of excessive meltwater inputs inhibiting deepwater formation (Alley, 2000; Denton et al., 2005). The modern rate of warming in the Arctic is leading to major meltwater inputs to the North Atlantic (Rahmstorf et al., 2015), making investigating the YD essential for better understanding potential future ocean circulation related climate impacts. Current research on the YD comes from Greenland ice cores, Arctic moraine positions, North Atlantic marine sediment records, and European lake sediment records (Denton et al., 2005). However, annual temperature reconstructions from the Greenland ice cores show YD changes on the order of ~10°C while summer temperature reconstructions based on glacial

geomorphology in Greenland are around half that (Denton et al., 2005). This has led to the "seasonality hypothesis" which asserts that the YD involved extreme cooling in the winter but relatively small changes in the summer (Denton et al., 2005). This hypothesis remains outstanding, as there are no seasonally resolved YD climate records from Greenland. Members of the Quaternary Sediment Lab (PI: Yarrow Axford) collected sediment from Lake N14 of south Greenland (Björck et al., 2002), the only known location in Greenland with sediment spanning the YD, in 2019 (Fig. 1). Previous work at Lake N14 showed qualitative evidence for mild YD summers (Björck et al., 2002), but modern proxies have not been applied there.

Thus far, we have confirmed the presence of intact sediment from Lake N14 during the YD using radiocarbon dating (Fig. 2) and estimated annual precipitation stable oxygen isotopes ($\delta^{18}O$) through the YD using $\delta^{18}O$ measurements of aquatic insect parts (chironomid head capsules).

Considering that chironomid larvae live in lakes across the world, consistently record the $\delta^{18}O$ value of lake water, grow throughout the year, and have well-preserved chitinous head capsules, they make an excellent proxy for lake water and have been applied across the Arctic (Wooller et al., 2004; Lasher et al., 2017). The lakes in this study are through-flowing, precipitation fed, and likely have minimal influence from evaporation, which allows for a robust relationship between chironomid inferred lake water $\delta^{18}O$ and precipitation $\delta^{18}O$ (Wooller et al., 2004; Lasher et al., 2017). Year-round larval growth and the estimated residence times of the study lakes (~1 year) both indicate that the $\delta^{18}O$ values of precipitation inferred from chironomids are an annually averaged signal like ice core $\delta^{18}O$. Condensation temperature is a major control on the $\delta^{18}O$ value of precipitation across Greenland and temperature changes likely explain much of any past $\delta^{18}O$ shifts. However, major changes in moisture sources/pathways during the YD may have also influenced $\delta^{18}O$ values of precipitation. I have compared the $\delta^{18}O$ values of precipitation inferred from chironomids with those registered in central Greenland ice core (GISP2) $\delta^{18}O$ before, during, and after the YD. These records are very similar, suggesting that we are probably correct in interpreting our proxy as annual, that influences of groundwater and evaporation were minimal on Lake N14, and that both south and central Greenland experienced similar shifts in temperature, precipitation seasonality, and/or source into and out of the Younger Dryas.

Figure 1. *Coring of Lake N14 in the Summer of 2019. Left to right: Everett Lasher, Aaron Hartz, and Laura Larocca.*

Figure 2. *Radiocarbon sampling of sediment cores from Lake N14 done by Pete Puleo.*

Additionally, we are in the process of validating and deploying a new (and potentially widely applicable) proxy for reconstructing warm vs. cool season Arctic precipitation isotopes. A ubiquitous, straightforward proxy that captures seasonal precipitation in a single archive does not yet exist for Arctic environments. This is unfortunate, given that changes in seasonal temperatures and precipitation, like those potentially in the YD, are vital to understand. One process related to sea level rise is glacial mass balance, which is controlled by summer temperatures and winter precipitation. Additionally, the timing and intensity of seasonal changes control many biological processes, such as plant pollination and species migration. Understanding how and why seasonality has changed in the past would provide critical insight for the future.

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Recent Graduates

Harrison, Brynn Marie (2021) A regional synthesis of post-glacial fire history in the eastern Cascades, Washington, using macroscopic charcoal analysis. MS thesis, Central Washington University, Ellensburg. Advisor: Dr. Megan Walsh.

The recent rise in severe wildfires in the Pacific Northwest (PNW) has created a heightened sense of urgency and reignited public interest in wildfire risk. In order to put this rise into a broader spatial and temporal context, a more in-depth look at fire histories from frequently burned areas in the eastern Cascades is needed. The first major objective of this study was to determine if CharAnalysis, a statistical program developed to reconstruct fire history from macroscopic charcoal-based records, is appropriate for use with charcoal records from the eastern Cascades of Washington. The second major objective was to develop a regional synthesis of post-glacial fire activity for the eastern Cascades using the seven existing charcoal-based records by developing a regional biomass burning curve, which was then compared to the existing PNW synthesis. Broadscale trends in biomass burning in the eastern Cascades during the Holocene were then contextualized using existing records of past climatic variability, vegetation shifts, and human activity.

Results from the first objective determined that CharAnalysis is either an inappropriate, moderately appropriate, or appropriate tool for use with charcoal records from the eastern Cascades depending on the site's vegetation and fire regime. Results from completing the second objective indicate that biomass burning in the eastern Cascades rose throughout the post-glacial period, likely due to climate shifts, the establishment of modern forests (particularly after ca. 7,000 cal yr BP), and increased human use of fire in the late Holocene. This increase continued until ca. 500 cal yr BP, when fire activity drastically declined, first from cooler climatic conditions, and then due to indigenous population decline and land-use changes that occurred as a result of Euro-American settlement (ca. 100 cal yr BP). Similar trends in Holocene fire activity were observed between the eastern Cascades and the PNW biomass burning curves, but with greater levels of burning in the eastern Cascades in the middle to late Holocene. By completing this analysis, much needed data points from multiple sites on the eastern side of the Cascades now contribute to our understanding of past and future drivers of fire activity in the PNW.

New Publications

Rushton, Z.A., Walsh, M.K. (2021) Holocene fire history reconstruction of a mid-elevation mixed-conifer forest in the Eastern Cascades, Washington (USA). The Holocene. https://doi.org/1177/0959683620988034.

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Obituaries

Eric C. Grimm (1951–2020)

On Sunday, November 15th, 2020, Dr. Eric C. Grimm, loving husband, father, and world-renowned scientist, passed away suddenly at the age of 69. Eric was born on August 20th, 1951 in Cincinnati, Ohio. He grew up in Rapid City, SD, exploring the geology and plant life of the Black Hills. He was fascinated with science, and was an insatiable reader. Eric received his Ph.D. in Ecology from the University of Minnesota in 1981.

Eric accepting his Distinguished AMQUA Career Award in Santa Fe, New Mexico, 2016.

In 1988, he moved to Springfield, IL and began his career at the Illinois State Museum as the Curator of Botany, rising to become the Director of Sciences in 2013. He helped lead the Landscape History Program, which contributed to the understanding of long-term changes in climate, landforms, ecosystems, and human-environment interactions and was the basis for the Museum's natural history hall.

Eric was committed to sharing scientific research with the public. He was a brilliant lecturer and excelled at explaining complex topics in a friendly and understandable way; his lectures on climate change always drew a crowd. He was internationally known and respected for his studies of fossil pollen (palynology) and research documenting long-term changes in vegetation and climate. He developed the North American Pollen Database, which was used to refine climate models to predict future climate change and to understand how species adapt to changing climates.

After his retirement from the Museum, he continued his robust research agenda and development of the Neotoma Paleoecology Database. He was deeply respected by his colleagues and beloved for his generosity in mentoring young scientists. Among his many honours, he was elected a Fellow of the American Association for the Advancement of Science in 2002, received the Outstanding Service Award from the International Paleolimnology Association in 2012, and was awarded the 2015 Distinguished Career Award by the American Quaternary Association.

He spent the past five years working from his home office in Jefferson, SD where he enjoyed tending to his vegetable garden, taking walks with Jane at the Adams Homestead and State Na-

ture Preserve, and assisting with the care of his mother-in-law Pauline Allard. Eric loved spending time outdoors hiking, fishing, and skiing. His friends and family will fondly recall casual walks becoming guided nature tours, with Eric stopping to inspect leaf shapes and cheerily relating the scientific name of every tree and shrub.

This text is an excerpt of the obituary by Eric Grimm's wife Jane Anne Allard published online at https://www.legacy.com/obituaries/keloland/obituary.aspx?n=eric-grimm&pid=197110651&fhid=28599. Jane Anne Allard kindly gave permission to reproduce the text in the newsletter.

John E. Kutzbach

Obituary retrieved, with permission by Michael Morgan from the University of Wisconsin, from https://www.aos.wisc.edu/news/John_Kutzbach_1937-2021/

Photo courtesy: https://www.aos.wisc.edu/news/John_Kutzbach_1937-2021/

John Kutzbach died on January 29, 2021 of cancer at the age of 83. Professor Kutzbach was a professor in the Department of Atmospheric and Oceanic Sciences from 1966 until his retirement in 2002. He was also former director and Senior Scientist of the UW-Madison Nelson Institute Center for Climatic Research. A native of Wisconsin, Professor Kutzbach earned all of his degrees at UW-Madison: an undergraduate engineering degree in (1960), a M.S. degree (1961) and a Ph.D. (1966) in atmospheric sciences from the then Department of Meteorology.

John Kutzbach's career contributions to climate science are expansive and foundational. Early in his career, his work introduced the use of empirical orthogonal functions (EOFs) to the atmospheric sciences to identify large-scale and long-period modes of atmospheric circulation. He then shifted into paleoclimate studies during the 1970s. That ground-breaking research used general circulation models to explore several problems including the role of earth's orbital changes in producing the glacial/interglacial cycles and global monsoon cycles of the last few hundred thousand years; linkages between vegetation changes and climate changes; the role of uplift of mountains and plateaus in producing major climatic changes over the past ten million years; and the role of geographic changes associated with plate movements in producing climate changes over the past 250 million years.

As noted in the 2006 AGU citation for his Roger Revelle Medal award, "[t]hese and other studies are characterized by an impressive economy of design, clarity of interpretation, and depth of insight into the operation of the climate system. Together, this body of work forms a large part of the framework of our current understanding of past climates." Prof. Kutzbach's pioneering use of general circulation models for climate research broke ground for future generations of climate scientists to study past, present, and future aspects of our earth system. Further his interdisciplinary work with geologists, geochemists, paleoecologists, glaciologists, archeologists, and hydrologists, helped identify and ultimately improve the quality of the output of the climate models that

current earth system scientists use to develop climate projections. Reflecting the breadth of his research experiences, and his prescience in seeing the evolution of our science, he was a leading proponent of the renaming of the Department of Meteorology in the early 1990's to the Department's present name, Atmospheric and Oceanic Sciences. Indeed, this change has helped ultimately in laying the foundations for a vigorous ocean sciences component to our department's disciplinary reach – an important lasting legacy of Prof. Kutzbach's service to our program. In recent years his work has focused on the impacts of climate and climate change on natural resources and society, past climates and past environments, how humans have contributed to climate change, and present-day climate variability and simulations of future climate changes.

His numerous, deep, and careful studies of the Earth's climate system have earned him some of the highest honors in the geosciences: He was a recipient of the Roger Revelle Medal of the American Geophysical Union in 2006 (for outstanding contributions to Earth-system science), the Milankovitch Medal of the European Geophysical Society in 2001 (for pioneering and outstanding contributions to climate science), the Humboldt Research Award of the Alexander von Humboldt Foundation of Germany in 1976, the Distinguished Career Achievement Award of the American Quaternary Association in 2003, and the International Science and Technology Award of China in 2017. In 2020, Professor Kutzbach was the recipient of our Department's Alumni Achievement Award. He was a Fellow of the American Association for the Advancement of Science, the American Geophysical Union, and the American Meteorological Society. Professor Kutzbach was named a UW-Madison Planeart-Bascom Professor of Liberal Arts in 1990 and was elected a member of the National Academy of Sciences in 2006.

Richard West

Obituary by Simon Lewis, QRA President as published in QRA Email Newsletter on January 5. 2021

It is with much sadness that we inform you that Professor Richard West died on 30th December 2020, at the age of ninety-four, following a short illness. Richard West went up to Cambridge in 1948, obtaining a First Class Honours degree in Botany. His PhD, awarded in 1954 and supervised by Harry Godwin, then Director of the Subdepartment of Quaternary Research, was the now classic study of the stratigraphy and palynology of the Middle Pleistocene interglacial lake deposits at Hoxne, Suffolk. Richard became a lecturer in the Department of Botany in 1960, Director of the Subdepartment in 1966, and Head of the Department of Botany in 1977. He was elected a Fellow of the Royal Society in 1968. Richard retired in 1991. As Quaternary scientists we all owe Richard a great debt of gratitude for his work to develop the subject through his early contributions in the 1950s, his many influential publications over the next six decades and, not least, his vision in 1964 to establish the Quaternary Field Studies Group, which became the Quaternary Research Association in 1969, and Richardits first President (1969–71). Richard remained active throughout a long retirement, indeed he was a co-author of a short note in the latest edition of QN. Richard's passing is the end of an era.

Roger Yates Anderson

Kirsten Menking, Vassar College, NY
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I am sorry to inform the AMQUA community of the death of Roger Yates Anderson on January 9, 2021 due to COVID-19. Roger was an emeritus professor in the department of Earth and Planetary Sciences at the University of New Mexico, Albuquerque, where he taught for ~40 years. He was an incredibly creative scientist, devoted to understanding the origin of varves and the role of the sun in climate change. He held several patents on sediment traps and devices he called "intervalometers," which were mounted in the traps to dispense teflon powder at user-specified intervals. These devices allowed him to place time stamps on the continuous rain of sediments in a lake and to follow the changing clastic and ecological inputs over a season or succession of years. Through a side business operated out of his home called the Aquatic Monitoring Institute, Roger manufactured these traps for colleagues and helped deploy them in waterbodies all over the world, including the Dry Valleys of Antarctica, the Pacific Ocean off the coast of California, and Spirit Lake, on the flanks of Mt. St. Helens, prior to its eruption. The latter trap was never found but provided a great story that Roger enjoyed relaying to colleagues, family, and friends.

In addition to his pioneering work on seasonal sedimentation, Roger was one of the first people to adopt a multi-proxy approach to studying lake sediments. With graduate students such as Douglas Kirkland, J. Platt Bradbury, and Walter Dean, he examined not only the mineralogy and grain size of sediments, but also the stable isotope content of carbonates and the pollen, diatoms, ostracodes, fish fossils, and plant remains that revealed the changing climate over time. Many of his projects represented truly herculean efforts that spanned several decades. His work on the Permian Castile Formation in the Delaware Basin of southeastern New Mexico and western Texas is one such example and involved the hand counting and thickness measurement of 260,000 layers of annually deposited gypsum. In doing this work, Roger also became an early adopter of the use of spectral analysis on paleoclimatic time series, finding cycles consistent with orbital precession and obliquity, and much later in his life, uncovering higher frequency signals with periods identical to solar Hale and Gleissberg cycles.

He was, in fact, working on a manuscript using the same data at the time of his death at age 93. In addition to his research on the Castile and Elk Lake in Minnesota, Roger is perhaps best known for his work on Pleistocene pluvial Lake Estancia in central New Mexico, another multi-decade effort that continued well beyond his retirement. With graduate student Bruce Allen and others, he found evidence of millennial scale oscillations that appear to match those recorded in Greenland ice cores and embarked on numerical modeling experiments to explore what climatic conditions were responsible for raising the lake to its various highstands.

While Roger had a very productive scientific career, he was also devoted to the causes of peace and social justice and to his family. He is survived by myself (his life partner of the past 24 years) and our adopted son as well as by 7 other children, 12 grandchildren, and 12 great-grandchildren. Those who would like to learn more about his life are invited to read his biography at https://tinyurl.com/rogermem.

Announcements

TALK SERIES

ADVANCES IN STRATIGRAPHY AND GEOCHRONOLOGY

The Stratigraphy and Chronology Commission (SACCOM) of INQUA is organizing a series of virtual talks on a diverse range of geochronology and stratigraphy topics during the coming Spring. These will be held live on Thursdays at 9 am USA EST, 2 pm London, 3 pm Paris, and 10 pm Beijing time. For more details, please go to the SACCOM webpage at: https://www.inqua.org/commissions/saccom. Please see the Zoom link below. Most of the talks will be recorded. Please see the full program attached below:

22 April 2021

Konstantinos Panagiotopoulos (University of Cologne Provisional, France)
Vegetation and climate dynamics in southeastern Europe since the Early Pleistocene: a chronostratigraphical approach

29 April 2021

Sarah Finkelstein (University of Toronto, Canada)
Biostratigraphy and chronology of sub-till organic-bearing deposits in the Hudson Bay Lowlands, Canada

6 May 2021

Pinkey Bisht (Wadia Institute of Himalayan Geology, India)
Chronology and climatic implications of Late Quaternary glaciations in Central Himalaya with special focus in the upper Kali Ganga valley, Uttarakhand

13 May 2021

Leah Morgan (U.S. Geological Survey, USA)
Tephrochronology by Ar/Ar: methods and applications in paleoanthropology

20 May 2021

Matthew Kirby (California State University Fullerton, USA)
Re-visiting Lake Mojave Using a Basin Analysis Approach: Trying to Resolve a Complex History of Lake Level Change

27 May 2021

Tom Higham (University of Oxford, England)
TBA

3 June 2021

Quentin Simon (CEREGE, France)
Atmospheric beryllium-10, a versatile cosmogenic nuclide for relative and radiometric dating

10 June 2021

Bob Booth (Lehigh University, USA)
Wetland and forest responses to Holocene moisture variability: insights from the peatland paleoenvironmental archive

17 June 2021

Kenneth Mertens (IFREMER, Concarneau, France)
Never mind the dinosaurs, here's the dinoflagellates

24 June 2021

Kathleen Wendt (Oregon State University, USA)
The Devils Hole U-series chronology: new insights from a peculiar cave in Nevada

(Overseen by Lewis Owen on behalf of SACCOM)

ZOOM LINK:
Advances in Stratigraphy and Geochronology
Thursday, April 22, 2021 @ 9:00–10:00am
Weekly on Thursday
Location:
https://ncsu.zoom.us/j/91983687150?pwd=cE1MMk02cE9iODdzaG01V2tTZzVsdz09
Description:
Lewis Owen is inviting you to a scheduled Zoom meeting.
Join Zoom Meeting
https://ncsu.zoom.us/j/91983687150?pwd=cE1MMk02cE9iODdzaG01V2tTZzVsdz09
Meeting ID: 919 8368 7150
Passcode: 035620
One tap mobile
+16513728299,,91983687150#,,,,*035620# US (Minnesota)
+17866351003,,91983687150#,,,,*035620# US (Miami)

F I E L D T R I P

2021 NORTHWESTERN CELL FRIENDS OF THE PLEISTOCENE GLACIAL LAKE MISSOULA 9–12 SEPTEMBER 2021

This trip was canceled in 2020 due to the pandemic, but I am optimistic that carpooling can take place in September 2021. Check out http://www.fop.cascadiageo.org/ for information.

As of now, the Northwestern Cell of the Friends of the Pleistocene is planning on returning to the glacial Lake Missoula basin after 28 years since the last meeting. The trip is being coordinated by Larry Smith (lsmith@mtech.edu) with help from Rich Chambers and others that have worked in the lake basin.

We will examine glacial lake deposits along with evidence for multiple lake stands and drainage events at both classic sites and recently discovered and described locations.

Where:

Paradise Center, Montana (http://www.paradisecentermt.org/)

Logistics:

Like most Friends trips, we will be relying on carpooling to stops in western Montana. Unfortunately, most of the roads we'll travel are two-lane highways with tight accommodations and parking spaces, therefore the trip size will be limited to approximately the first 75 participants. We would appreciate people with larger vehicles, such as minivans, vans, or suburbans, bringing them along and filling them to capacity. Two-person pickup trucks or other vehicles are discouraged. None of the driving will be on roads requiring high-clearance vehicles.

Cost:

~$25 for attendance on any part of the trip and to reserve a space. This will cover handouts, some snacks, and any remainder will be donated to the Paradise Community Center for hosting us. Camping or lodging costs are separate (see below).

Registrations will need to be sent via your PayPal account to Larry at uptownlarry.smith@gmail.com or mailed with a check made out to: Larry Smith, Geological Engineering, Montana Tech, 1300 W. Park St, Butte, MT 59701

Lodging:

Camping – Sanders County Fairgrounds (please make your own reservations – we are working with the County Fairgrounds – so they are aware of this schedule)

⇒ Scenic, on Clark Fork River, grass and trees; options available
⇒ https://www.sanderscountyfair.com/templates/index.php?fairID=12345#
⇒ Dry Camp (no power or water at sites, but access to bathrooms with one shower per gender) $15/night
⇒ Full service: power and water at site, same bathroom and shower access (110 volt - $25/night, >100 sites; 30 amp RV hookup with water - $30/night, 6 sites; 50 amp RV hookup with water - $35/night, 40 sites)
⇒ No sewer hookup at any sites

Camping at Paradise Community Center (contingent on the center's staff) – no power or showers, walk-in tent camping, water and bathrooms available – prices to be determined.

Motels

⇒ Plains, MT - Dew Duck Inn (6 miles), https://www.dewduckinn.com/
⇒ Plains, MT - Glacier Crossroads Lodging (6 miles); https://glaciermt.com/listing/glacier-cross-roads
⇒ Quinns Hot Springs Resort (5 miles); https://www.quinnshotsprings.com/
⇒ More in St. Regis, MT (25 miles)

Ninemile Pit E Strip

Preliminary Itinerary:


StripRehbein gravel pit sampling 21.45 in hole dug

Day 0: Thursday, 9 September 2021

Set up, hand out maps and guides.

Day 1: Friday, 10 September 2021

Driving about 180 miles roundtrip to Clark Fork, Idaho (https://goo.gl/maps/pNP6aL7dZudkGKyV6)

Examine glacial deposits and history, glaciolacustrine deposits within "ice dam region."

Discuss evidence for several terminal Purcell Lobe ice dam positions for the lake impoundment; gravelly alluvium likely deposited during lake draining events; Eddy Narrows site of Pardee's discharge calculations; glaciolacustrine deposits at Heron, MT (near a late ice-dam position).

Day 2: Saturday, 11 September 2021

Driving about 110 miles round trip (https://goo.gl/maps/zGjwP3ipJbe2ycNx7)

Lake drainage features – Markle Pass, Camas Prairie, Clark Fork River Paradise to St Regis

Plan is to catch Markle Pass dunes at early morning light; discuss flow velocities into Camas Prairie and Dog (Rainbow) Lake during lake-level lowering from near maximum levels, visit glaciolacustrine deposits in Plains area, visit large imbricated boulders in canyon reach, discuss deposits in the St Regis area.

Day 3: Sunday, 12 September 2021

Clark Fork River valley, Ninemile area, and Missoula Valley – Driving about 150 miles one way to near Drummond, MT (https://goo.gl/maps/cFpj16F5f9sC3cFP7)

Lake drainage features, glaciolacustrine deposits, and geochronology. Plan is to view giant bars along the Clark Fork River, including Cyr eddy bar, Tarkio bar with overlying glaciolacustrine deposits, view of Ninemile section, gravel deposits on top of Cayuse Hill, visit to Rail Line section in Missoula Valley, and view of shorelines. Plan is to have the trip end at the Garden Gulch section where details of subaerial exposure of glaciolacustrine deposits can be viewed in a narrow, steep outcrop along the Clark Fork River.