

Climate Archaeology: New Paradigms for Changing Times

Kathryn Lafrenz Samuels

Department of Anthropology, University of Maryland

The archaeological anxieties surrounding the ‘Anthropocene’ are telling. While archaeologists are seeking to contribute to interdisciplinary work on defining a new geological epoch (see Braje et al. 2014; Edgeworth et al. 2014; Erlandson and Braje 2013), archaeology itself has insufficiently examined the tectonic shifts underfoot and warranted for our own discipline. What new epoch does climate change bring to archaeology? Global climate change challenges archaeology in unprecedented ways, and if we want to be honest with ourselves, if we wish to respond to its unfolding realities, climate change marks a new era for archaeological research. The papers gathered here represent this new era and the changing realities we find ourselves in. As a collection the papers are not simply timely, but necessary, and they point towards the paradigm shift that climate change will bring for archaeological research and practice. This shift goes well beyond the already collapsing dichotomies of nature/culture, human/non-human and past/present. It will entrain a radical reorientation around moral and ethical axes—for example, negotiating quandaries of risk and responsibility, inheritance and intergenerational distribution—in all domains of archaeology’s work in the world. Together this collection addresses the impacts of climate change on these various domains, from conservation and preservation, to management and policy, and research and public engagement.

It is fair to say that the impacts of climate change on archaeological and other heritage resources represents the most thoroughly studied and discussed area of research and management interest (for example, Brimblecombe 2014; Cassar 2005; English Heritage 2008; Harvey and Perry 2015; Markham et al. 2016; Rockman et al. 2016; Sabbioni et al. 2012). Changes in temperature, precipitation, extreme weather events, humidity, soil moisture levels, sea level rise, water table chemistry (for example, salinization) and solar radiation are already affecting archaeological material and heritage resources as a result of climate change (Cassar 2005). The impacts of pests, mold and diseases are also increasing due to these environmental changes, as are fluctuations in the microclimate of building materials that contribute to their degradation. Concerns about loss have long driven an archaeological impetus for documentation and preservation. Flinders Petrie (1904: 177–178; quoted by Lipe 1984: 9) saw archaeologists as “saving lives” in material form, as he remarked in the context of his excavations in Egypt: “A work that has cost days, weeks, or years of toil has a right to existence... Every tablet, every little scarab, is a portion of life solidified;—so much will, so much labour, so much living reality... the work of the archaeologist is to save lives”. However, the scale of potential loss is bringing an almost existential panic, not simply for archaeology’s role as facilitator of the record of humankind, but almost as a requiem for a species too blinkered to save itself. But of course the impacts of climate change will be differentially distributed. Those regions and societies that will be most impacted by global climate change are also typically the least culpable for contributing to it (Althor et al. 2016).

Of more immediate concern, some regions are witnessing more accelerated changes relative to others, such as, for example, the low-lying Pacific islands and the Arctic region. Vibeke Martens discusses several projects in northern Norway seeking to develop management tools for making decisions about preservation, especially whether to preserve *in situ* or *ex situ*. While some plant and animal species have the ability to migrate poleward with rising temperatures, and humans can flee the violence, hunger and dwindling resources brought on by climate change so far as their passports and bureaucratic red tape allow, decisions must be made for archaeological materials. Further, sea level rise presents one of the

most pervasive and troubling impacts to archaeological resources. James Hansen, a leading climate scientist turned climate activist in the United States, noted in his popular book *Storms of My Grandchildren* (2009) that so many heritage resources would be lost with sea level rise given the proximity of so many historical cities and civilizations to the coast. Ben Marzeion and Anders Levermann (2014) showed that 20 per cent of cultural UNESCO World Heritage Sites would be impacted by rising sea levels due to global climate change. Understandably, assessing and monitoring the impact of sea level rise on archaeological resources is a key area of much needed work in archaeology. Samuel Knott, Katherine Szabó, Mal Ridges and Richard Fullagar address the value of GIS for regional scale modelling to assess site vulnerability and sensitivity, while the promise of community participation in monitoring and the unique challenges for intertidal zones are highlighted by Ellie Graham, Joanna Hambly and Tom Dawson. Between these two papers we see a range of promising directions for further development, from desk-based modelling integrating archaeological interests into climate modelling more broadly, to mobilizing communities as witnesses to the impacts of climate change through participatory approaches to site monitoring and management.

A suite of challenges face archaeological heritage management from climate change, including flooding, erosion, subsidence, changes in rainfall patterns and temperatures, water shortages and increased incidence of extreme weather events. These require planning responses over multiple timeframes, from the short to long term. They also call for increased and coordinated monitoring, and further research on areas such as disaster preparedness, identifying indicators of impacts, and the development of technology for monitoring, assessment and prediction (Cassar 2005). Management and policy responses have been primarily targeted at the site or local level, but broader coordination and institutional responses are taking root. Victoria Herrmann describes the work of the Climate Heritage Coalition in her paper, and Hannah Fluck and Meredith Wiggins provide a thorough institutional account covering issues of loss, maladaptation and resilience for English Heritage resources. Also, the United States National Park Service is developing a program for adaptive management in response to climate change, which is then further developed and implemented by individual

parks, as for example the paper by Caitlin Rankin, Christy Mog and Shawn Jones detail for the Klondike Gold Rush National Historical Park in Alaska.

Beyond bringing new issues of conservation and management, climate change also prompts new topics of archaeological research and encourages broader commitment to public engagement, participatory frameworks and heritage perspectives. As examples of areas of research that will be increasingly relevant in the face of climate change and global environmental change, several papers in this collection trace particularly productive avenues of archaeological inquiry: ice patches (Rachel Reckin), pollution (Haeden Stewart), carbon-based fossil fuels (Christina Vestergaard and Felix Riede) and traditional ecological knowledge (Claudia Comberti). Ice patches present a veritable treasure trove of new archaeological knowledge. However, little is known about the dynamics and structure of ice patches, which Reckin investigates for the Greater Yellowstone Ecosystem (GYE). Meanwhile, Stewart pursues an archaeology of toxicity for the site of Mill Creek Ravine in Edmonton, Canada, through the use of relational analytical frames keyed to temporal cycles and scales, 'communities of harm' and the precarity of uncertainty. More broadly, Vestergaard and Riede call for approaches that join archaeologies of the recent past with environmental archaeology. Indeed, new areas of research made increasingly important by climate change will require reworking the methods we bring to understanding emerging phenomena, in particular joining archaeological methods with present-oriented methods such as ethnography. For example, Comberti uses ethnographic approaches to examine traditional ecological knowledge surrounding ancient earthworks in the Llanos de Moxos area of the Beni region of the Bolivian Amazon, deftly juxtaposing the top-down versus bottom-up strategies for climate adaptation. Further, Rowan Jackson, Andrew Dugmore and Felix Riede argue for a new social contract for archaeology in the face of climate change adaptation that positions archaeology closer to advocacy, and includes bringing archaeological research to interdisciplinary publishing venues, fostering better climate communication with the public through the medium of museum exhibits and programming, and pursuing transdisciplinary knowledge production. I would push this new social contract even further by suggesting we need to explore

a diverse range of outlets (beyond museums) for public engagement in climate communication and advocacy work. This includes embracing the strengths of cultural heritage frameworks to act as a kind of climate proxy and thinking about the persuasive capacities of archaeological knowledge and resources in the public sphere (Lafrenz Samuels 2015, 2016, 2017).

Archaeologists have been keenly aware of and concerned with the impacts of climate change on archaeological resources, but what about the impacts on archaeology as a discipline? Climate change presents a new turn for archaeology because, as addressed in this collection, it implicates archaeological practice across the board, whether informing research programmes, conservation strategies, management priorities, community engagement or policymaking. Global climate change places archaeology in a unique position within the contemporary landscape of academic knowledge production, as a discipline well-equipped to communicate the long-term coupling of human impacts and environmental change, and the carbon-paved pathway we can now call ‘anthropogenic.’ Further, it is a new era when we can legitimately question whether, over the past several hundreds or thousands of years—depending on where one pegs the beginning of humanity’s influence on climate—there is such a thing as an ecofact, or is everything an artefact now? And does that broaden the archaeologist’s remit? The contemporary challenges of climate change orients archaeology less as the study of the past and more as the study of past-present relationships, placing the past and present on equal analytical footing. The present-day social and political work of archaeology become less a context in which archaeology operates and more a mission statement requiring concerted strategy and tools of public persuasion. Inter-generational relations confront archaeology with yet another thicket of thorny ethical issues and moral quandaries, weighing the equitable distribution of responsibilities and risks across generations, between forebears, ourselves and future descendants. What will our archaeologies of today communicate and bestow to the generations of tomorrow?

References

- Althor, G., Watson, J.E.M. and Fuller, R.A. 2016. Global Mismatch between Greenhouse Gas Emissions and the Burden of Climate Change. *Scientific Reports* 6: sre20281.

- Braje, T.J., Erlandson, J.M., Aikens, C.M., Beach, T., Fitzpatrick, S., Gonzalez, S., Kennet, D.J., Kirch, P.V., Lee, G.-A., Lightfoot, K.G., McClure, S.B., Panich, L.M., Rick, T.C., Roosevelt, A.C., Schneider, T.D., Smith, B. and Zeder, M.A. 2014. An Anthropocene without Archaeology—Should We Care? *SAA Archaeological Record* 14(1): 26–29.
- Brimblecombe, P. 2014. Refining Climate Change Threats to Heritage. *Journal of the Institute of Conservation* 37(2): 85–93.
- Cassar, M. 2005. *Climate Change and the Historic Environment*. London: University College London Centre for Sustainable Heritage.
- Edgeworth, M., Benjamin, J., Clarke, B., Crossland, Z., Domanska, E., Gorman, A.C., Graves-Brown, P., Harris, E.C., Hudson, M.J., Kelly, J.M., Paz, V.J., Salerno, M.A., Witmore, C. and Zarankin, A. 2014. Archaeology of the Anthropocene [Forum]. *Journal of Contemporary Archaeology* 1(1): 73–132.
- English Heritage. 2008. *Climate Change and the Historic Environment*. Swindon: English Heritage.
- Erlandson, J.M. and Braje, T.J. 2013. Archaeology and the Anthropocene. *Anthropocene* 4: 1–7.
- Hansen, J. 2009. *Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity*. New York: Bloomsbury.
- Harvey, D.C. and Perry, J. (eds). 2015. *The Future of Heritage as Climates Change: Loss, Adaptation and Creativity*. Abingdon: Routledge.
- Lafrenz Samuels, K. 2015. Introduction: Heritage as Persuasion. In K. Lafrenz Samuels and T. Rico (eds) *Heritage Keywords: Rhetoric and Redescription in Cultural Heritage*. Boulder: University Press of Colorado, 3–28.
- Lafrenz Samuels, K. 2016. The Cadence of Climate: Heritage Proxies and Social Change. *Journal of Social Archaeology* 16(2): 142–163.
- Lafrenz Samuels, K. 2017. Biodiversity in World Heritage Cultural Landscapes: Possibilities and Problems for Communicating Climate Change and Mobilizing Mitigation. *Culture, Agriculture, Food and Environment* 39(2): 116–126.
- Lipe, W.D. 1984. Value and Meaning in Cultural Resources. In Cleere, H. (ed.) *Approaches to the Archaeological Heritage*. Cambridge: Cambridge University Press, 1–11.
- Markham, A., Osipova, E., Lafrenz Samuels, K. and Caldas, A. 2016. *World Heritage and Tourism in a Changing Climate*. Nairobi and Paris: United Nations Environment Programme & United Nations Educational, Scientific and Cultural Organization.
- Marzeion, B. and Levermann, A. 2014. Loss of Cultural World Heritage and Currently Inhabited Places to Sea-level Rise. *Environmental Research Letters* 9(3): 1–7.
- Petrie, W.M.F. 1972 [1904]. *Methods and Aims in Archaeology*. New York: Benjamin Blom.

- Rockman, M., Morgan, M., Ziaja, S., Hambrecht, G. and Meadow, A. 2016. *Cultural Resources Climate Change Strategy*. Washington, DC: National Park Service.
- Sabbioni, C., Brimblecombe, P. and Cassar, M. 2012. *The Atlas of Climate Change Impact on European Cultural Heritage: Scientific Analysis and Management Strategies*. London: Anthem Press.