

References

Afrika

MCDONALD 2020

Mary M. A. McDonald, *The Mid-Holocene bifacial projectile points from Dakhleh Oasis, Egypt: Implications concerning origins of the knapping tradition, changing hunting patterns, the local neolithic, and African cultural independence*. [Journal of Anthropological Archaeology](#) **59** (2020), 101199, 1–19.

The bifacial lithic technology used to produce the numerous arrowheads found in North Africa in the MidHolocene is generally thought to have arrived from the Levant, imported with the Neolithic farming tradition after 6200 BCE. However, evidence from Dakhleh Oasis, Egypt, suggests that few Neolithic traits were adopted, while the local bifacial knapping tradition developed independently of the Levant. A group of points from the Dakhleh Bashendi A unit, thought derived from the small points of the Levantine Pottery Neolithic, actually appear much earlier in Dakhleh and evolved locally. Likewise, large points in Dakhleh, usually equated with the large arrowheads of the Levantine PPNB, again developed locally. They were produced by a different chaîne opératoire, while their dimensions and morphology suggest they tipped spears rather than arrows, for use against large MidHolocene game animals. A similar range of large points is found in the Fayum Oasis and at Merimde in the Nile Delta, and smaller versions occur westward in the Central Sahara, but in both cases long after they first appeared in Dakhleh. In the Fayum and Merimde, the Dakhleh hollow-based large point was modified to deal with dangerous animals such as crocodiles.

Keywords: Dakhleh Oasis | Egypt | Mid-Holocene | Origins bifacial projectile points | Hunting patterns | Neolithisation | African cultural independence

Aktuell

CALLAWAY 2021

Ewen Callaway, *Fast-Spreading Covid Variant Can Elude Immune Responses*. [nature](#) **589** (2021), 500–501.

Early studies find that a variant of the virus identified in South Africa could compromise immunity.

CHENG 2021

Hai Cheng et al., *The Younger Dryas onset at 12.87 ky B.P. is still justified if the Laacher See eruption is considered, Reply to Stuchlík et al.* [PNAS](#) **118** (2021), e2024692118.

In summary, the main criticism from Stuchlik et al. rests on the potential influence of the LSVE on abrupt cooling at $\approx 12,870$ B.P.—an issue not discussed in our paper, but which has been disputed elsewhere—and identification of the YD onset later within the negative d18O trend. Nevertheless, our data indeed provide a precise chronological framework for subsequent research in the field, including the LSVE.

Hai Cheng, Haiwei Zhang, Jonathan Baker, Ashish Sinha, Hanying Li, Jingyao Zhao, Xiyu Dong, Youwei Li, Xue Jia, Baoyun Zong & Yanjun Cai

HOWARD 2021

Jeremy Howard et al., *An evidence review of face masks against COVID-19*. [PNAS 118 \(2021\), e2014564118](#).
[DOI:10.1073/pnas.2014564118](#).

The science around the use of masks by the public to impede COVID-19 transmission is advancing rapidly. In this narrative review, we develop an analytical framework to examine mask usage, synthesizing the relevant literature to inform multiple areas: population impact, transmission characteristics, source control, wearer protection, sociological considerations, and implementation considerations. A primary route of transmission of COVID-19 is via respiratory particles, and it is known to be transmissible from presymptomatic, paucisymptomatic, and asymptomatic individuals. Reducing disease spread requires two things: limiting contacts of infected individuals via physical distancing and other measures and reducing the transmission probability per contact. The preponderance of evidence indicates that mask wearing reduces transmissibility per contact by reducing transmission of infected respiratory particles in both laboratory and clinical contexts. Public mask wearing is most effective at reducing spread of the virus when compliance is high. Given the current shortages of medical masks, we recommend the adoption of public cloth mask wearing, as an effective form of source control, in conjunction with existing hygiene, distancing, and contact tracing strategies. Because many respiratory particles become smaller due to evaporation, we recommend increasing focus on a previously overlooked aspect of mask usage: mask wearing by infectious people (“source control”) with benefits at the population level, rather than only mask wearing by susceptible people, such as health care workers, with focus on individual outcomes. We recommend that public officials and governments strongly encourage the use of widespread face masks in public, including the use of appropriate regulation.

Keywords: COVID-19 | SARS-CoV-2 | masks | pandemic

Jeremy Howard, Austin Huang, Zhiyuan Li, Zeynep Tufekci, Vladimir Zdimal, Helene-Mari van der Westhuizen, Arne von Delft, Amy Price, Lex Fridman, Lei-Han Tang, Viola Tang, Gregory L. Watson, Christina E. Bax, Reshama Shaikh, Frederik Questier, Danny Hernandez, Larry F. Chu, Christina M. Ramirez & Anne W. Rimoin

MARZIANO 2021

Valentina Marziano et al., *Retrospective analysis of the Italian exit strategy from COVID-19 lockdown*. [PNAS 118 \(2021\), e2019617118](#).
[DOI:10.1073/pnas.2019617118](#).

[pnas118-e2019617118-Supplement.pdf](#)

After the national lockdown imposed on March 11, 2020, the Italian government has gradually resumed the suspended economic and social activities since May 4, while maintaining the closure of schools until September 14. We use a model of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission to estimate the health impact of different exit strategies. The strategy adopted in Italy kept the reproduction number R_t at values close to one until the end of September, with marginal regional differences. Based on the estimated postlockdown transmissibility, reopening of workplaces in selected industrial activities might have had a minor impact on the transmissibility. Reopening educational levels in May up to secondary schools might have influenced SARS-CoV-2 transmissibility only marginally; however, including high schools might have resulted in a marked increase

of the disease burden. Earlier reopening would have resulted in disproportionately higher hospitalization incidence. Given community contacts in September, we project a large second wave associated with school reopening in the fall.

The transmission model is an age-structured SIR model with a gammadistributed generation time with mean 6.6 d and operates at the country level (however, a regional implementation of the model was also simulated to evaluate interregional epidemiological heterogeneities).

Keywords: SARS-CoV-2 | reopening scenarios | mathematical modeling

Valentina Marziano, Giorgio Guzzetta, Bruna Maria Rondinone, Fabio Boccuni, Flavia Riccardo, Antonino Bella, Piero Poletti, Filippo Trentini, Patrizio Pezzotti, Silvio Brusaferrò, Giovanni Rezza, Sergio Iavicoli, Marco Ajelli & Stefano Merler

Significance: We use a mathematical model to evaluate the Italian exit strategy after the lockdown imposed against the COVID-19 epidemics, comparing it to a number of alternative scenarios. We highlight that a successful reopening requires two critical conditions: a low value of the reproduction number and a low incidence of infection. The first is needed to allow some margin for expansion after the lifting of restrictions; the second is needed because the level of incidence will be maintained approximately constant after the reproduction number has grown to values close to one. Furthermore, we suggest that, even with significant reductions of transmission rates, resuming social contacts at prepandemic levels escalates quickly the COVID-19 burden.

STUČHLÍK 2021

Evžen Stuchlík, Daniel Vondrák, Zuzana Hořická, Jolana Hrubá, Ana Mijovilovich & Günther Kletetschka, *Identification of the Younger Dryas onset was confused by the Laacher See volcanic eruption*. [PNAS 118 \(2021\), e2022485118](#).

Then, the subsequent major continuous decrease of $\delta^{18}\text{O}$ indicates the actual YD onset, as a reaction to an extraterrestrial impact event (ETIE) revealed by the Pt anomaly along with the occurrence of microspherules and nanodiamonds.

Amerika

Roos 2021

Christopher I. Roos et al., *Native American fire management at an ancient wildland-urban interface in the Southwest United States*. [PNAS 118 \(2021\), e2018733118](#).

[pnas118-e2018733118-Supplement.pdf](#)

Charcoal deposition alone suggests that this fire-free period in the 20th century is unusual for at least 1500 y and perhaps much longer.

The intersection of expanding human development and wildland landscapes—the “wildland–urban interface” or WUI—is one of the most vexing contexts for fire management because it involves complex interacting systems of people and nature. Here, we document the dynamism and stability of an ancient WUI that was apparently sustainable for more than 500 y. We combine ethnography, archaeology, paleoecology, and ecological modeling to infer intensive wood and fire use by Native American ancestors of Jemez Pueblo and the consequences on fire size, fire–climate relationships, and fire intensity. Initial settlement of northern New Mexico by Jemez farmers increased fire activity within an already dynamic landscape that experienced frequent fires. Wood harvesting for domestic fuel and architectural uses and abundant, small, patchy fires created a landscape that burned often but only rarely burned extensively. Depopulation of the forested landscape due to

Spanish colonial impacts resulted in a rebound of fuels accompanied by the return of widely spreading, frequent surface fires. The sequence of more than 500 y of perennial small fires and wood collecting followed by frequent “free-range” wildland surface fires made the landscape resistant to extreme fire behavior, even when climate was conducive and surface fires were large. The ancient Jemez WUI offers an alternative model for fire management in modern WUI in the western United States, and possibly other settings where local management of woody fuels through use (domestic wood collecting) coupled with small prescribed fires may make these communities both self-reliant and more resilient to wildfire hazards.

Keywords: cultural burning | Ancestral Pueblo | ponderosa pine | New Mexico | fire history

Christopher I. Roos, Thomas W. Swetnam, T. J. Ferguson, Matthew J. Liebmann, Rachel A. Loehman, John R. Welch, Ellis Q. Margolis, Christopher H. Guiterman, William C. Hockaday, Michael J. Aiuvalasit, Jenna Battillo, Joshua Farella & Christopher A. Kiahtipes

Significance: As residential development continues into flammable landscapes, wildfires increasingly threaten homes, lives, and livelihoods in the so-called “wildland–urban interface,” or WUI. Although this problem seems distinctly modern, Native American communities have lived in WUI contexts for centuries. When carefully considered, the past offers valuable lessons for coexisting with wildfire, climate change, and related challenges. Here we show that ancestors of Native Americans from Jemez Pueblo used ecologically savvy intensive burning and wood collection to make their ancient WUI resistant to climate variability and extreme fire behavior. Learning from the past offers modern WUI communities more options for addressing contemporary fire challenges. Public/private–tribal partnerships for wood and fire management can offer paths forward to restore fire-resilient WUI communities.

Energie

LEFEBVRE 2021

Pierre Lefebvre et al., *Diagenetic formation of uranium-silica polymers in lake sediments over 3,300 years*. [PNAS 118 \(2021\), e2021844118](#).

[pnas118-e2021844118-Supplement.pdf](#)

The long-term fate of uranium-contaminated sediments, especially downstream former mining areas, is a widespread environmental challenge. Essential for their management is the proper understanding of uranium (U) immobilization mechanisms in reducing environments. In particular, the long-term behavior of noncrystalline U(IV) species and their possible evolution to more stable phases in subsurface conditions is poorly documented, which limits our ability to predict U long-term geochemical reactivity. Here, we report direct evidence for the evolution of U speciation over 3,300 y in naturally highly U-enriched sediments (350–760 ug/g U) from Lake Negre (Mercantour Massif, Mediterranean Alps, France) by combining U isotopic data ($\delta^{238}\text{U}$ and $(^{234}\text{U}/^{238}\text{U})$) with U L3-edge X-ray absorption fine structure spectroscopy. Constant isotopic ratios over the entire sediment core indicate stable U sources and accumulation modes, allowing for determination of the impact of aging on U speciation. We demonstrate that, after sediment deposition, mononuclear U(IV) species associated with organic matter transformed into authigenic polymeric U(IV)–silica species that might have partially converted to a nanocrystalline coffinite ($\text{U}_2\text{Si}_2\text{O}_7 \cdot n\text{H}_2\text{O}$)-like phase. This diagenetic transformation occurred in less than 700 y and is consistent with the high silica availability of sediments in which diatoms are abundant. It also yields consistency with laboratory studies that proposed the formation of colloidal polynuclear

U(IV)–silica species, as precursors for coffinite formation. However, the incomplete transformation observed here only slightly reduces the potential lability of U, which could have important implications to evaluate the longterm management of U-contaminated sediments and, by extension, of U-bearing wastes in silica-rich subsurface environments.

Keywords: uranium | noncrystalline species | diagenetic aging | lake sediments | uranium isotopes

Pierre Lefebvre, Alkiviadis Gourgiotis, Arnaud Mangeret, Pierre Sabatier, Pierre Le Pape, Olivier Diez, Pascale Louvat, Nicolas Menguy, Pauline Merrot, Camille Baya, Mathilde Zebracki, Pascale Blanchart, Emmanuel Malet, Didier Jzquel, Jean-Louis Reyss, John R. Bargar, Jrme Gaillardet, Charlotte Cazala & Guillaume Morin

Significance: Understanding the long-term fate of widespread noncrystalline uranium (U) species is critical to improving our knowledge of U biogeochemistry and U-contaminated environments. We use naturally U-enriched lake sediments that have been deposited for thousands of years as an analogue for the progressive evolution of contaminated environments, in order to uncover if noncrystalline species may evolve into more resistant crystalline phases. We combine multidisciplinary tools including U isotope ratio and speciation techniques to describe a mineralogical transformation where organic-bound U evolves into polymeric and nanocrystalline uranium-silica phases that are still easily remobilized even 3,300 y after their deposition. These findings bring an interpretation that illuminates an active debate on uranium mobility in the environment.

Isotope

VARALLI 2021

Alessandra Varalli, Jocelyne Desideri, Mireille David-Elbiali, Gwen-aëlle Goude, Matthieu Honegger & Marie Besse, *Bronze Age innovations and impact on human diet, A multi-isotopic and multi-proxy study of western Switzerland*. *PLoS ONE* **16** (2021), e245726. [DOI:10.1371/journal.pone.0245726](https://doi.org/10.1371/journal.pone.0245726).

This research Highlights the importance studying the entire trophic chain, including archaeobotanical samples that are still rare in European isotopic research, because this provides crucial details for the reconstruction of the paleoenvironment, agricultural strategies and human dietary choices. Furthermore, multi-sampling analysis of human remains enabling cross-sectional evaluation facilitates tracking dietary changes throughout an individual's lifespan.

The archaeological Bronze Age record in Europe reveals unprecedented changes in subsistence strategies due to innovative farming techniques and new crop cultivation. Increasing cultural exchanges affected the economic system. The inhabitants of Switzerland played a pivotal role in this European context through relationships with the Mediterranean, the High and Middle Danube regions and the Alps thanks to the area's central position. This research aims to reconstruct, for the first time in Switzerland, human socio-economic systems through the study of human diet, herding and farming practices and their changes throughout the Bronze Age (2200–800 BCE) by means of biochemical markers. The study includes 41 human, 22 terrestrial and aquatic animal specimens and 30 charred seeds and chaff samples from sites in western Switzerland. Stable isotope analyses were performed on cereal and legume seeds (d13C, d15N), animal bone collagen (d13Ccoll, d15N, d34S), human bone and tooth dentine collagen (d13Ccoll, d15N,) and human tooth

enamel ($\delta^{13}\text{C}_{\text{enamel}}$). The isotopic data suggest a) an intensification of soil fertilization and no hydric stress throughout the Bronze Age, b) a human diet mainly composed of terrestrial resources despite the proximity of Lake Geneva and the Rhone river, c) a diet based on C3 plants during the Early and Middle Bronze Age as opposed to the significant consumption of ^{13}C -enriched resources (probably millet) by individuals from the Final Bronze Age, d) no important changes in dietary patterns throughout an individual's lifespan but a more varied diet in childhood compared to adulthood, e) no differences in diet according to biological criteria (age, sex) or funerary behavior (burial architecture, grave goods).

Jungpaläolithikum

GRIMM 2021

David Grimm, *Siberia may be long-sought site of dog domestication.* *science* **371** (2021), 451–452.

Klima

BOVA 2021

Samantha Bova, Yair Rosenthal, Zhengyu Liu, Shital P. Godad & Mi Yan, *Seasonal origin of the thermal maxima at the Holocene and the last interglacial.* *nature* **589** (2021), 548–553.

n589-0548-Supplement.pdf

Proxy reconstructions from marine sediment cores indicate peak temperatures in the first half of the last and current interglacial periods (the thermal maxima of the Holocene epoch, 10,000 to 6,000 years ago, and the last interglacial period, 128,000 to 123,000 years ago) that arguably exceed modern warmth. By contrast, climate models simulate monotonic warming throughout both periods. This substantial model–data discrepancy undermines confidence in both proxy reconstructions and climate models, and inhibits a mechanistic understanding of recent climate change. Here we show that previous global reconstructions of temperature in the Holocene^{1–3} and the last interglacial period reflect the evolution of seasonal, rather than annual, temperatures and we develop a method of transforming them to mean annual temperatures. We further demonstrate that global mean annual sea surface temperatures have been steadily increasing since the start of the Holocene (about 12,000 years ago), first in response to retreating ice sheets (12 to 6.5 thousand years ago), and then as a result of rising greenhouse gas concentrations (0.25 ± 0.21 degrees Celsius over the past 6,500 years or so). However, mean annual temperatures during the last interglacial period were stable and warmer than estimates of temperatures during the Holocene, and we attribute this to the near-constant greenhouse gas levels and the reduced extent of ice sheets. We therefore argue that the climate of the Holocene differed from that of the last interglacial period in two ways: first, larger remnant glacial ice sheets acted to cool the early Holocene, and second, rising greenhouse gas levels in the late Holocene warmed the planet. Furthermore, our reconstructions demonstrate that the modern global temperature has exceeded annual levels over the past 12,000 years and probably approaches the warmth of the last interglacial period (128,000 to 115,000 years ago).

HERTZBERG 2021

Jennifer Hertzberg, *A seasonal solution to a palaeoclimate puzzle.* *nature* **589** (2021), 521–522.

Scientists have long been baffled by the mismatch of climate simulations of the past 12,000 years with temperature reconstructions from geological records. It now emerges that seasonal biases in the records explain the disparity.

Metallzeiten

MELLER 2019

Harald Meller, *Fürsten, Krieger, Heiligtümer – Aunjetitzer Kultur, Ahnen, Armeen und geheimes Wissen – eine neue Herrschaftsform in Mitteldeutschland*. [Archäologie in Deutschland 2019](#), iv, 20–25.

Die Aunjetitzer Kultur brachte Stabilität, Reichtum und vor allem eine noch nie zuvor gesehene Herrschaftsform nach Mitteldeutschland. Doch wer waren diese Menschen? Wo kamen sie her? Und was zeichnet sie aus?

Story or Book

HASSETT 2021

B. R. Hassett, *Exploring the origins of urban living*. [science 371 \(2021\)](#), 472.

Ancient human settlements are brought vividly to life in an engaging new analysis.

Four Lost Cities: A Secret History of the Urban Age. Annalee Newitz. Norton, 2021. 320 pp.

Newitz has achieved something remarkable, taking a very personal drive to understand the way we live and using it to enliven the past, at each turn letting expert voices guide a clear-sighted discussion of the lives of marginalized populations, the potential held by new scientific methods of analysis, and—perhaps most importantly—the self-awareness that what we see of the past is very much a product of how we understand the present.