

References

Amerika Klima

DUNCAN 2021

Neil A. Duncan, Nicholas J. D. Loughlin, John H. Walker, Emma P. Hocking & Bronwen S. Whitney, *Pre-Columbian fire management and control of climate-driven floodwaters over 3,500 years in southwestern Amazonia*. [PNAS 118 \(2021\), e2022206118](#).

[pnas118-e2022206118-Supplement.pdf](#)

In landscapes that support economic and cultural activities, human communities actively manage environments and environmental change at a variety of spatial scales that complicate the effects of continental-scale climate. Here, we demonstrate how hydrological conditions were modified by humans against the backdrop of Holocene climate change in southwestern Amazonia. Paleoecological investigations (phytoliths, charcoal, pollen, diatoms) of two sediment cores extracted from within the same permanent wetland, ≈ 22 km apart, show a 1,500-y difference in when the intensification of land use and management occurred, including raised field agriculture, fire regime, and agroforestry. Although rising precipitation is well known during the mid to late Holocene, human actions manipulated climate-driven hydrological changes on the landscape, revealing differing histories of human landscape domestication. Environmental factors are unable to account for local differences without the mediation of human communities that transformed the region to its current savanna/forest/wetland mosaic beginning at least 3,500 y ago. Regional environmental variables did not drive the choices made by farmers and fishers, who shaped these local contexts to better manage resource extraction. The savannas we observe today were created in the post-European period, where their fire regime and structural diversity were shaped by cattle ranching.

Keywords: pre-Colombian Amazon | paleoenvironment | hydrological change | agriculture | landscape domestication

Significance: The Chavín, Moche, Tiwanaku, and Inka are well-known pre-Columbian cultures, but during the same time, in the southwestern Amazon, people were transforming a 100,000-km² landscape over thousands of years. The extent of earthworks in the Llanos de Mojos has become clear since the 1960s, but dating these features has been difficult. We show that preColumbian people used hydrological engineering and fire to maximize aquatic and terrestrial resources beginning at least 3,500 years ago. In the 17th century CE, cattle and new technologies brought by Jesuit missions altered the form and function of these landscapes. The scale and antiquity of these Amazonian earthworks demand comparison with domesticated landscapes and civilizations from around the world.

PIPERNO 2021

Dolores R. Piperno, Crystal H. McMichael, Nigel C. A. Pitman & Juan Ernesto Guevara Andino et al., *A 5,000-year vegetation and fire history for tierra firme forests in the Medio Putumayo-Algodón watersheds, northeastern Peru*. [PNAS 118 \(2021\), e2022213118](#).

[pnas118-e2022213118-Supplement.pdf](#)

This paper addresses an important debate in Amazonian studies; namely, the scale, intensity, and nature of human modification of the forests in prehistory.

Phytolith and charcoal analysis of terrestrial soils underneath mature tierra firme (nonflooded, nonriverine) forests in the remote Medio Putumayo-Algodón watersheds, northeastern Peru, provide a vegetation and fire history spanning at least the past 5,000 y. A tree inventory carried out in the region enables calibration of ancient phytolith records with standing vegetation and estimates of palm species densities on the landscape through time. Phytolith records show no evidence for forest clearing or agriculture with major annual seed and root crops. Frequencies of important economic palms such as *Oenocarpus*, *Euterpe*, *Bactris*, and *Astrocaryum* spp., some of which contain hyperdominant species in the modern flora, do not increase through prehistoric time. This indicates pre-Columbian occupations, if documented in the region with future research, did not significantly increase the abundance of those species through management or cultivation. Phytoliths from other arboreal and woody species similarly reflect a stable forest structure and diversity throughout the records. Charcoal ^{14}C dates evidence local forest burning between ca. 2,800 and 1,400 y ago. Our data support previous research indicating that considerable areas of some Amazonian tierra firme forests were not significantly impacted by human activities during the prehistoric era. Rather, it appears that over the last 5,000 y, indigenous populations in this region coexisted with, and helped maintain, large expanses of relatively unmodified forest, as they continue to do today.

Keywords: Amazonia | vegetation history | phytoliths | charcoal

Dolores R. Piperno, Crystal H. McMichael, Nigel C. A. Pitman, Juan Ernesto Guevara Andino, Marcos Ríos Paredes, Britte M. Heijink & Luis A. Torres-Montenegro

Significance: The extent to which pre-Columbian societies in Amazonia occupied and significantly altered the tierra firme (nonflooded, nonriverine) forest environment is an enduring question and the subject of a current debate. Our research addresses these issues in tierra firme forests of northeastern Peru. We present phytolith and charcoal data indicating the forests were not cleared, farmed, or otherwise significantly altered in prehistory. Frequencies of hyperdominant palm species did not increase through time, indicating prehistoric human exploitation contributed little to the species' disproportionate abundance in the modern flora. Our data indicate that forest resurgence and fire decrease upon the tragic consequences of European contact were not so widespread as to have been principal contributors to the onset of the "Little Ice Age."

Anthropologie

O COBOCK 2021

Cara Ocobock, Sarah Lacy & Alexandra Niclou, *Between a rock and a cold place, Neanderthal biocultural cold adaptations*. [Evolutionary Anthropology](#) **30** (2021), 262–279.

A large body of work focuses on the unique aspects of Neanderthal anatomy, inferred physiology, and behavior to test the assumption that Neanderthals were hyper-adapted to living in cold environments. This research has expanded over the years to include previously unexplored and potentially adaptive features such as brown adipose tissue and fire-usage. Here we review the current state of knowledge of Neanderthal cold adaptations along morphological, physiological, and behavioral lines. While highlighting foundational as well as recent work, we also emphasize key areas for future research. Despite thriving in a variety of climates, it is well-accepted that Neanderthals appear to be the most cold-adapted of known fossil hominin groups; however, there are still many unknowns. There is a great deal yet

to be uncovered about the nature and manifestation of Neanderthal adaptation and how the synergy of biology and culture helped buffer them against extreme and variable environments.

Keywords: anatomy | cold adaptation | culture | energetics | Neanderthal

POWERS 2021

Simon T. Powers, Carel P. van Schaik & Laurent Lehmann, *Cooperation in large-scale human societies, What, if anything, makes it unique, and how did it evolve?* [Evolutionary Anthropology 30 \(2021\), 280–293.](#)

To resolve the major controversy about why prosocial behaviors persist in large-scale human societies, we propose that two questions need to be answered. First, how do social interactions in small-scale and large-scale societies differ? By reviewing the exchange and collective-action dilemmas in both small-scale and large-scale societies, we show they are not different. Second, are individual decision-making mechanisms driven by self-interest? We extract from the literature three types of individual decision-making mechanism, which differ in their social influence and sensitivity to self-interest, to conclude that humans interacting with non-relatives are largely driven by self-interest. We then ask: what was the key mechanism that allowed prosocial behaviors to continue as societies grew? We show the key role played by new social interaction mechanisms—change in the rules of exchange and collective-action dilemmas—devised by the interacting individuals, which allow for self-interested individuals to remain prosocial as societies grow.

Keywords: cooperation | cultural group selection | evolutionary psychology | human social evolution | institutions | large-scale societies

RAICHLLEN 2021

David A. Raichlen & Herman Pontzer, *Energetic and endurance constraints on great ape quadrupedalism and the benefits of hominin bipedalism.* [Evolutionary Anthropology 30 \(2021\), 253–261.](#)

Bipedal walking was one of the first key behavioral traits that defined the evolution of early hominins. While it is not possible to identify specific selection pressures underlying bipedal evolution, we can better understand how the adoption of bipedalism may have benefited our hominin ancestors. Here, we focus on how bipedalism relaxes constraints on nonhuman primate quadrupedal limb mechanics, providing key advantages during hominin evolution. Nonhuman primate quadrupedal kinematics, especially in our closest living relatives, the great apes, are dominated by highly flexed limb joints, often associated with high energy costs, and are constrained by the need to reduce loads on mobile, but less stable forelimb joints. Bipedal walking would have allowed greater hind limb joint extension, which is associated with reduced energy costs and increased endurance. We suggest that relaxing these constraints provided bipedal hominins important benefits associated with long distance foraging and mobility.

Keywords: bent-hip bent-knee | chimpanzee | evolution | fatigue | locomotion

Bibel

FAUST 2020

Avraham Faust, *Between the Highland Polity and Philistia: The United Monarchy and the Resettlement of the Shephelah in the Iron Age IIA, with a Special Focus on Tel ‘Eton and Khirbet Qeiyafa.* [Bulletin of the American Schools of Oriental Research 383 \(2020\), 115–136.](#)

The Shephelah, one of Judah's 8th century B.C.E. settlement hubs, was sparsely settled during the Iron Age I, when only a small Canaanite enclave survived in its eastern part. The resettlement of the Shephelah, beginning during the Iron Age I–II transition and lasting over 200 years, was a complex process that had two different facets. The first, better-known facet is the gradual establishment of dozens of new sites, the vast majority of which had clear connections to the highlands polity (e.g., Lachish, Tel Zayit, Tel Burna). The second, less-discussed facet is the transformations experienced by the few settlements that existed in the region in the Iron Age I, most notably Tell Beit Mirsim, Beth-Shemesh, Tel .Eton, and Tel Halif. After presenting background data, the article will offer a detailed reconstruction of the processes through which the Shephelah became part of the highland polity, with a special focus on Tel .Eton and on the enigmatic, earlier, and short-lived site of Khirbet Qeiyafa. The paper will conclude with a detailed refutation of the recent suggestion that the small Iron Age I Canaanite enclave that existed in the eastern Shephelah developed into a large Iron Age IIA Canaanite polity.

Keywords: Shephelah | United Monarchy | 10th century | Tel .Eton | Khirbet Qeiyafa | Israel | Judah | Philistia

Biologie

BAKER 1988

Brenda J. Baker & George J. Armelagos et al., *The Origin and Antiquity of Syphilis: Paleopathological Diagnosis and Interpretation*. [Current Anthropology](#) **29** (1988), 703–737.

A review of the literature regarding the origin of syphilis in the light of paleopathological diagnosis and interpretation strongly suggests a New World origin. Whereas the evidence for pre-Columbian treponematosi s in the Old World is documentary and equivocal, abundant skeletal evidence indicates the presence of Columbus.

Brenda J. Baker, George J. Armelagos, Marshall Joseph Becker, Don Brothwell, Andrea Drusini, Marie Clabeaux Geise, Marc A. Kelley, Iwataro Moritoto, Alan G. Morris, George T. Nurse, Mary Lucas Powell, Bruce M. Rothschild and Shelley R. Saunders

KOCHER 2021

Arthur Kocher et al., *Ten millennia of hepatitis B virus evolution*. [science](#) **374** (2021), 182–188.

[s374-0182-Supplement.pdf](#)

Hepatitis B virus (HBV) has been infecting humans for millennia and remains a global health problem, but its past diversity and dispersal routes are largely unknown. We generated HBV genomic data from 137 Eurasians and Native Americans dated between $\approx 10,500$ and ≈ 400 years ago. We date the most recent common ancestor of all HBV lineages to between $\approx 20,000$ and 12,000 years ago, with the virus present in European and South American hunter-gatherers during the early Holocene. After the European Neolithic transition, Mesolithic HBV strains were replaced by a lineage likely disseminated by early farmers that prevailed throughout western Eurasia for ≈ 4000 years, declining around the end of the 2nd millennium BCE. The only remnant of this prehistoric HBV diversity is the rare genotype G, which appears to have reemerged during the HIV pandemic.

Arthur Kocher, Luka Papac, Rodrigo Barquera, Felix M. Key, Maria A. Spyrou, Ron Hubler, Adam B. Rohrlach, Franziska Aron, Raphaela Stahl, Antje Wissgott,

Florian van Bommel, Maria Pfefferkorn, Alissa Mittnik, Vanessa Villalba-Mouco, Gunnar U. Neumann, Maite Rivollat, Marieke S. van de Loosdrecht, Kerttu Majander, Rezeda I. Tukhbatova, Lyazzat Musralina, Ayshin Ghalichi, Sandra Penske, Susanna Sabin, Megan Michel, Joscha Gretzinger, Elizabeth A. Nelson, Tiago Ferraz, Kathrin Nagele, Cody Parker, Marcel Keller, Evelyn K. Guevara, Michal Feldman, Stefanie Eisenmann, Eirini Skourtanioti, Karen Giffin, Guido Alberto Gnecci-Ruscone, Susanne Friederich, Vittoria Schimmenti, Valery Khartanovich, Marina K. Karapetian, Mikhail S. Chaplygin, Vladimir V. Kufterin, Aleksandr A. Khokhlov, Andrey A. Chizhevsky, Dmitry A. Stashenkov, Anna F. Kochkina, Cristina Tejedor-Rodriguez, Inigo Garcia-Martinez de Lagran, Hector Arcusa-Magallon, Rafael Garrido-Pena, Jose Ignacio Royo-Guillen, Jan Novacek, Stephane Rottier, Sacha Kacki, Sylvie Saintot, Elena Kaverzneva, Andrej B. Belinskiy, Petr Veleminsky, Petr Limbursky, Michal Kostka, Louise Loe, Elizabeth Popescu, Rachel Clarke, Alice Lyons, Richard Mortimer, Antti Sajantila, Yadira Chinique de Armas, Silvia Teresita Hernandez Godoy, Diana I. Hernandez-Zaragoza, Jessica Pearson, Didier Binder, Philippe Lefranc, Anatoly R. Kantorovich, Vladimir E. Maslov, Luca Lai, Magdalena Zoledziewska, Jessica F. Beckett, Michaela Langova, Alzbeta Danielisova, Tara Ingman, Gabriel Garcia Atienzar, Maria Paz de Miguel Ibanez, Alejandro Romero, Alessandra Sperduti, Sophie Beckett, Susannah J. Salter, Emma D. Zilivinskaya, Dmitry V. Vasil'v, Kristin von Heyking, Richard L. Burger, Lucy C. Salazar, Luc Amkreutz, Masnav Navruzbekov, Eva Rosenstock, Carmen Alonso-Fernandez, Vladimir Slavchev, Alexey A. Kalmykov, Biaslan Ch. Atabiev, Elena Batieva, Micaela Alvarez Calmet, Bastien Llamas, Michael Schultz, Raiko Krauß, Javier Jimenez-Echevarria, Michael Francken, Svetlana Shnaider, Peter de Knijff, Eveline Altena, Katrien Van de Vijver, Lars Fehren-Schmitz, Tiffany A. Tung, Sandra Losch, Maria Dobrovolskaya, Nikolaj Makarov, Chris Read, Melanie Van Twest, Claudia Sagona, Peter C. Ramsel, Murat Akar, K. Aslihan Yener, Eduardo Carmona Ballester, Francesco Cucca, Vittorio Mazzaello, Pilar Utrilla, Kurt Rademaker, Eva Fernandez-Dominguez, Douglas Baird, Patrick Semal, Lourdes Marquez-Morfin, Mirjana Rokсандic, Hubert Steiner, Domingo Carlos Salazar-Garcia, Natalia Shishlina, Yilmaz Selim Erdal, Fredrik Hallgren, Yavor Boyadzhiev, Kamen Boyadzhiev, Mario Küßner, Duncan Sayer, Paivi Onkamo, Robin Skeates, Manuel Rojo-Guerra, Alexandra Buzhilova, Elmira Khussainova, Leyla B. Djansugurova, Arman Z. Beisenov, Zainolla Samashev, Ken Massy, Marcello Mannino, Vyacheslav Moiseyev, Kristiina Mannermaa, Oleg Balanovsky, Marie-France Deguilloux, Sabine Reinhold, Svend Hansen, Egor P. Kitov, Miroslav Dobe, Michal Ernee, Harald Meller, Kurt W. Alt, Kay Prufer, Christina Warinner, Stephan Schiffels, Philipp W. Stockhammer, Kirsten Bos, Cosimo Posth, Alexander Herbig, Wolfgang Haak, Johannes Krause & Denise Kuhnert

Energie

HUA 2021

Jianxiong Hua, Yuntong Song, Lei Zhou, Fengnian Liu & Haiqiao Wei, *Operation strategy optimization of lean combustion using turbulent jet ignition at different engine loads*. [Applied Energy](#) **302** (2021), 117586, 1–15.

Highlights:

- Extreme lean burn and low NO_x emission were achieved by turbulent jet ignition.
- Intake boost was adopted to recovery power output and improve thermal efficiency.

- Various intake strategies were studied to reduce fuel consumption under low loads.
- A combined control strategy was proposed for TJI lean burn over wide engine loads.

Turbulent jet ignition is an important method to achieve lean combustion in spark ignition engines by using a pre-chamber to ensure reliable ignition and a high burning rate. In this work, a TJI device is designed with additional fuel supply in the pre-chamber, the combustion characteristics of TJI are analyzed, and its operation strategy optimization over wide engine loads is performed on a single-cylinder engine. The results show that a stable combustion process with an excess air coefficient in the range of 1.0–2.2 is achieved, reducing the fuel consumption rate by up to 9.6% under a part load compared with that of the baseline engine. However, under high loads, lean combustion cannot effectively maintain the required power output, and under low loads, excessive lean combustion results in a significant reduction in the combustion efficiency. Therefore, a technical solution involving different intake strategies for different loads, including intake boost, Miller cycle, throttle adjustment, and negative valve overlap, is proposed to flexibly regulate the air/fuel ratio and maintain the incylinder excess air coefficient in the optimal range (1.5–2.0). The results show that the fuel consumption rate of boosted lean combustion strategy is reduced by 10–12.5% under high loads compared with that of the baseline engine. Under medium-to-low loads, a reasonable intake strategy reduces the intake air mass and helps avoid excessive lean combustion, and the fuel consumption can be reduced by more than 9.6%. The present work demonstrates the potential of TJI application to enhance the thermal efficiency through lean combustion.

Keywords: Turbulent jet ignition | Lean combustion | Intake boost | Intake strategy | Thermal efficiency

Judentum

AUERBACH 1930

Elias Auerbach, *Klausner's "Jesus von Nazareth"*. [Jüdische Rundschau 35 \(1930\), 677.](#)

Wenn Klausner fragt: Warum hat das Judentum die Lehre Jesu verworfen? so liegt der Fehler in der Frage selbst. Das Judentum hat die Lehre Jesu garnicht verworfen. Jesus hat vielmehr in der kurzen Zeit seiner Wirksamkeit soviel Anerkennung und Gefolgschaft gefunden , wie kein Prophet vor ihm in Israel. Auch alle anderen Propheten sind mindestens ebenso sehr vom Volke "verworfen" worden. Und doch haben sie eine Epoche geschaffen und sind in den biblischen Kanon aufgenommen worden. Jesus ist zu spät geboren worden! Dreihundert Jahre früher, und seine Lehren und Parabeln ständen heute sicher neben Amos und Jeremia, neben den Sprüchen und Psalmen in unserer Bibel.

Die Ablösung des Judentums von Jesus erfolgte, weil später seine Junger, und zwar vor allem Paulus, der ihn nicht gekannt hat, an der Heidenmission festhielten, die Jesus ablehnte, zu einer Zeit , wo das Judentum um seiner nationalen Selbsterhaltung willen sie ablehnte, nachdem es sie bis dahin eifrig betrieben hatte; und weil diese Junger zu einer Vergöttlichung Jesu übergingen, die ihm selbst völlig fremd war. Das "Christentum" wurde vom Judentum abgelehnt; Jesus aber hat mit dem Christentum sehr wenig zu schaffen. Er steht nicht nur dem Judentum näher, sondern er steht ganz in ihm.

GUTTMANN 1931

Michael Guttman, *Die wissenschaftliche Talmudpflege der neueren Zeit II, Dr. Joseph Klausner, Jesus von Nazareth*. [Monatsschrift für Geschichte und Wissenschaft des Judentums 75 \(1931\), 241–268](#).

Was unserem Empfinden nach nottut, ist unbestechliche Erforschung der Wahrheit nach den möglichst besten und unparteiischen Forschungen und Ergebnissen der Gegenwart. Und im Vordergrund aller Fragen steht die Klärung des Problems: Was haben die Juden der Antike innergeschichtlich, aus eigener Anschauung, vom Evangelien-Jesus gewußt, und was ist ihnen von Außen her angedichtet oder suggestiv eingegeben worden. Eine dem vorigen Geschlecht angehörige und dogmatisch orientierte Variante der Leben-Jesu Darstellungen scheint uns diesem Zweck am allerwenigsten zu entsprechen.

GUTTMANN 1933

Michael Guttman, *Nochmals Klausners Jesus-Werk, 2. Schlußwort*. [Monatsschrift für Geschichte und Wissenschaft des Judentums 77 \(1933\), 18–44](#).

Ist es nun der heidenchristliche Jesustyp, von dem aus Klausner an seine Gesetzeskritik herantritt? Dann hat er die Antithese unrichtig gewählt- Der Paulinismus hat das Entweder-Oder nicht zwischen “Gesetz” und Ethik gestellt, sondern zwischen “Gesetz” und “Mysterium”. Diese Antithese war schon vor Paulus lebendig, insbesondere in den mystischen und orientalisches beeinflussten Seitenströmungen im Hellenismus. Diese waren in ihrem Antagonismus zum jüdischen Gesetz keineswegs durch ethische Renaissance-bestrebungen bestimmt, sondern durch eine grundsätzliche Andersartigkeit im Wesen der Beziehung zu Gott.

KLAUSNER 1933

Joseph Klausner, *Nochmals Klausners Jesus-Werk, 1. Erwiderung auf Guttmanns Besprechung*. [Monatsschrift für Geschichte und Wissenschaft des Judentums 77 \(1933\), 16–18](#).

Klima

BECKER 2020

Mélanie Becker et al., *Water level changes, subsidence, and sea level rise in the Ganges-Brahmaputra-Meghna delta*. [PNAS 117 \(2020\), 1867–1876](#).

[pnas117-01867-Supplement.pdf](#)

Being one of the most vulnerable regions in the world, the Ganges-Brahmaputra-Meghna delta presents a major challenge for climate change adaptation of nearly 200 million inhabitants. It is often considered as a delta mostly exposed to sea-level rise and exacerbated by land subsidence, even if the local vertical land movement rates remain uncertain. Here, we reconstruct the water-level (WL) changes over 1968 to 2012, using an unprecedented set of 101 water-level gauges across the delta. Over the last 45 y, WL in the delta increased slightly faster (≈ 3 mm/y), than global mean sea level (≈ 2 mm/y). However, from 2005 onward, we observe an acceleration in the WL rise in the west of the delta. The interannual WL fluctuations are strongly modulated by El Niño Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) variability, with WL lower than average by 30 to 60 cm during cooccurrent El Niño and positive IOD events and higher-than-average

WL, by 16 to 35 cm, during La Nina years. Using satellite altimetry and WL reconstructions, we estimate that the maximum expected rates of delta subsidence during 1993 to 2012 range from 1 to 7 mm/y. By 2100, even under a greenhouse gas emission mitigation scenario (Representative Concentration Pathway [RCP] 4.5), the subsidence could double the projected sea-level rise, making it reach 85 to 140 cm across the delta. This study provides a robust regional estimate of contemporary relative WL changes in the delta induced by continental freshwater dynamics, vertical land motion, and sea-level rise, giving a basis for developing climate mitigation strategies.

Keywords: delta | water level | sea level | subsidence | Bangladesh

Mélanie Becker, Fabrice Papa, Mikhail Karpytchev, Caroline Delebecque, Yann Krien, Jamal Uddin Khan, Valérie Ballu, Fabien Durand, Gonéri Le Cozannet, A. K. M. Saiful Islam, Stéphane Calmant & C. K. Shum

Significance: This work provides a robust estimate of water-level (WL) changes in the Ganges–Brahmaputra–Meghna delta, driven by continental freshwater dynamics, vertical land motion, and sea-level rise. Through an unprecedented set of 101 gauges, we reconstruct WL variations since the 1970s and show that the WL across the delta increased slightly faster, ≈ 3 mm/y, than the global mean sea-level rise (≈ 2 mm/y). By combining satellite altimetry and WL reconstructions, we estimate that maximum expected rates of delta subsidence since the 1990s range from 1 to 7 mm/y. By 2100, even under a greenhouse gas emission mitigation scenario (RCP4.5), the subsidence could double the projected sea-level rise, making it reach 85 to 140 cm across the delta.

BUNCH 2021

Ted E. Bunch et al., *A Tunguska sized airburst destroyed Tall el-Hammam a Middle Bronze Age city in the Jordan Valley near the Dead Sea*. *Scientific Reports* **11** (2021), 18632. DOI:10.1038/s41598-021-97778-3.

SciRep11-18632-Supplement.pdf

We present evidence that in ≈ 1650 BCE (≈ 3600 years ago), a cosmic airburst destroyed Tall el-Hammam, a Middle-Bronze-Age city in the southern Jordan Valley northeast of the Dead Sea. The proposed airburst was larger than the 1908 explosion over Tunguska, Russia, where a ≈ 50 -m-wide bolide detonated with $\approx 1000\times$ more energy than the Hiroshima atomic bomb. A city-wide ≈ 1.5 -m-thick carbon-and-ash-rich destruction layer contains peak concentrations of shocked quartz (≈ 5 – 10 GPa); melted pottery and mudbricks; diamond-like carbon; soot; Fe- and Si-rich spherules; CaCO_3 spherules from melted plaster; and melted platinum, iridium, nickel, gold, silver, zircon, chromite, and quartz. Heating experiments indicate temperatures exceeded 2000°C . Amid city-side devastation, the airburst demolished 12+ m of the 4-to-5-story palace complex and the massive 4-m-thick mudbrick rampart, while causing extreme disarticulation and skeletal fragmentation in nearby humans. An airburst-related influx of salt (≈ 4 wt. %) produced hypersalinity, inhibited agriculture, and caused a ≈ 300 – 600 -year-long abandonment of ≈ 120 regional settlements within a > 25 -km radius. Tall el-Hammam may be the second oldest city/town destroyed by a cosmic airburst/impact, after Abu Hureyra, Syria, and possibly the earliest site with an oral tradition that was written down (Genesis). Tunguska-scale airbursts can devastate entire cities/regions and thus, pose a severe modern-day hazard.

Ted E. Bunch, Malcolm A. LeCompte, A. Victor Adedeji, James H. Wittke, T. David Burleigh, Robert E. Hermes, Charles Mooney, Dale Batchelor, Wendy S. Wolbach, Joel Kathan, Gunther Kletetschka, Mark C. L. Patterson, Edward C.

Swindel, Timothy Witwer, George A. Howard, Siddhartha Mitra, Christopher R. Moore, Kurt Langworthy, James P. Kennett, Allen West & Phillip J. Silvia

Mittelpaläolithikum

BELLO 2021

Silvia M. Bello, *Boning up on Neanderthal art*. [Nature Ecology & Evolution](#) **5** (2021), 1201–1202.

A decorated bone object adds to the mounting evidence that Neanderthals were capable of advanced behavioural complexity and could produce artistic representations.

LEDER 2021

Dirk Leder et al., *A 51,000-year-old engraved bone reveals Neanderthals' capacity for symbolic behaviour*. [Nature Ecology & Evolution](#) **5** (2021), 1273–1282.

[NatEcoEvo05-1273-Supplement.pdf](#)

While there is substantial evidence for art and symbolic behaviour in early Homo sapiens across Africa and Eurasia, similar evidence connected to Neanderthals is sparse and often contested in scientific debates. Each new discovery is thus crucial for our understanding of Neanderthals' cognitive capacity. Here we report on the discovery of an at least 51,000-year-old engraved giant deer phalanx found at the former cave entrance of Einhornhöhle, northern Germany. The find comes from an apparent Middle Palaeolithic context that is linked to Neanderthals. The engraved bone demonstrates that conceptual imagination, as a prerequisite to compose individual lines into a coherent design, was present in Neanderthals. Therefore, Neanderthal's awareness of symbolic meaning is very likely. Our findings show that Neanderthals were capable of creating symbolic expressions before H. sapiens arrived in Central Europe.

Dirk Leder, Raphael Hermann, Matthias Hüls, Gabriele Russo, Philipp Hoelzmann, Ralf Nielbock, Utz Böhner, Jens Lehmann, Michael Meier, Antje Schwalb, Andrea Tröllner-Reimer, Tim Koddenberg & Thomas Terberger

Ozeanien

MCCONNELL 2021

Joseph R. McConnell et al., *Hemispheric black carbon increase after the 13th-century Maori arrival in New Zealand*. [nature](#) **598** (2021), 82–85.

New Zealand was among the last habitable places on earth to be colonized by humans¹. Charcoal records indicate that wildfires were rare prior to colonization and widespread following the 13th- to 14th-century Maori settlement², but the precise timing and magnitude of associated biomass-burning emissions are unknown^{1,3}, as are effects on light-absorbing black carbon aerosol concentrations over the pristine Southern Ocean and Antarctica⁴. Here we used an array of well-dated Antarctic ice-core records to show that while black carbon deposition rates were stable over continental Antarctica during the past two millennia, they were approximately threefold higher over the northern Antarctic Peninsula during the past 700 years. Aerosol modelling⁵ demonstrates that the observed deposition could result only from increased emissions poleward of 40° S—implicating fires in

Tasmania, New Zealand and Patagonia—but only New Zealand palaeofire records indicate coincident increases. Rapid deposition increases started in 1297 (± 30 s.d.) in the northern Antarctic Peninsula, consistent with the late 13th-century Maori settlement and New Zealand black carbon emissions of 36 (± 21.2 s.d.) Gg y^{-1} during peak deposition in the 16th century. While charcoal and pollen records suggest earlier, climate-modulated burning in Tasmania and southern Patagonia^{6,7}, deposition in Antarctica shows that black carbon emissions from burning in New Zealand dwarfed other preindustrial emissions in these regions during the past 2,000 years, providing clear evidence of large-scale environmental effects associated with early human activities across the remote Southern Hemisphere.

Joseph R. McConnell, Nathan J. Chellman, Robert Mulvaney, Sabine Eckhardt, Andreas Stohl, Gill Plunkett, Sepp Kipfstuhl, Johannes Freitag, Elisabeth Isaksson, Kelly E. Gleason, Sandra O. Brugger, David B. McWethy, Nerilie J. Abram, Pengfei Liu & Alberto J. Arístarain

Physik

TABERLET 2021

Nicolas Taberlet & Nicolas Plihon, *Sublimation-driven morphogenesis of Zen stones on ice surfaces*. [PNAS 118 \(2021\), e2109107118](#).

[pnas118-e2109107118-Supplement1.pdf](#), [pnas118-e2109107118-Supplement2.mp4](#)

In this article, the formation of Zen stones on frozen lakes and the shape of the resulting pedestal are elucidated. Zen stones are natural structures in which a stone, initially resting on an ice surface, ends up balanced atop a narrow ice pedestal. We provide a physical explanation for their formation, sometimes believed to be caused by the melting of the ice. Instead, we show that slow surface sublimation is indeed the physical mechanism responsible for the differential ablation. Far from the stone, the sublimation rate is governed by the diffuse sunlight, while in its vicinity, the shade it creates inhibits the sublimation process. We reproduced the phenomenon in laboratory-scale experiments conducted in a lyophilizer and studied the dynamics of the morphogenesis. In this apparatus, which imposes controlled constant sublimation rate, a variety of model stones consisting of metal disks was used, which allows us to rule out the possible influence of the thermal conduction in the morphogenesis process. Instead, we show that the stone only acts as an umbrella whose shade hinders the sublimation, hence protecting the ice underneath, which leads to the formation of the pedestal. Numerical simulations, in which the local ablation rate of the surface depends solely on the visible portion of the sky, allow us to study the influence of the shape of the stone on the formation of the ice foot. Finally, we show that the far-infrared black-body irradiance of the stone itself leads to the formation of a depression surrounding the pedestal.

Keywords: morphogenesis | differential ablation | sublimation

Significance: Zen stones are fascinating natural structures consisting of a stone standing on a slender ice pedestal, whose origin had long been misunderstood. We demonstrate that they are caused by a variation in the sublimation rate of the surrounding ice, which leads to the slow formation of a pedestal, adding to the very few reports of sublimation-driven pattern formation. Understanding this process sheds light on other differential ablation processes encountered on ice surfaces, such as debris-covered glaciers, whose existence is threatened by global warming, and icy bodies in space. Indeed, NASA's Europa Lander project aims to seek biosignatures on Jupiter's ice-covered moon, on the surface of which differential sublimation may threaten the lander stability, and this needs to be fully understood.

Politik

WEISSMANN 2021

Karlheinz Weissmann, *Sinnstiftung mit pazifistischer Motivation*. [Junge Freiheit 2021, Oct. 8](#).

Vor vierzig Jahren mobilisierte die Friedensbewegung Hunderttausende, die im Bonner Hofgarten gegen den Nato-Doppelbeschuß demonstrierten.

Aber selbst das konnte nicht darüber hinwegtäuschen, daß pazifistische Strömungen regelmäßig der Tarnung kommunistischer Einflußnahme dienten. Stalin hatte diese Möglichkeit früh erkannt, und, nachdem sich keine KP fähig zeigte, mittels freier Wahlen an die Macht zu kommen, eine Friedensbewegung organisieren lassen, in der Kommunisten möglichst gar nicht in Erscheinung treten sollten. Man bediente sich im Regelfall einer Volksfrontpolitik neuer Art, bezog vor allem “progressive” Christen und “bürgerliche” Intellektuelle ein, um den Eindruck der Überparteilichkeit zu vermitteln.

Sprachlehre

VENTRIS 1940

M. G. F. Ventris, *Introducing the Minoan Language*. [American Journal of Archaeology 44 \(1940\), 494–520](#).

The fantasy with most followers appears to be that which makes Minoan out as Greek. The theory that Minoan could be Greek is based of course on a deliberate disregard for historical plausibility, and the wonder is that the Greek readings have been got into publishable form at all.