

References

Afrika

CLIST 2013

Bernard-Olivier Clist, *Our iron smelting ¹⁴C dates from Central Africa, From a plain appointment to a full blown relationship*. In: JANE HUMPHRIS & T. REHREN (Hrsg.), *The World of Iron*. (London 2013), 22–28.

This paper reviews the ¹⁴C dates associated with early iron smelting in Central Africa before 1900 BP. All of the archaeological sites from which these early dates have been obtained are critically examined. For example, each dated sample is checked for its stratigraphic integrity, its degree of association with dated artefacts, and its associated ceramic sequence. The series of “good” ¹⁴C dates obtained from this re-appraisal is then presented at the regional level in order to provide a new paradigm of the expansion of iron metallurgy through Central Africa, from Cameroon to Congo. The work presented here follows several published papers and book chapters, and is based on research within the region by the author which began in 1982.

Keywords: Iron Age | Sub-Saharan Africa | Neolithic | radiocarbon dating | iron smelting | village expansion | Central Africa | iron smelting expansion

GIRESE 2020

Pierre Giresse, Jean Maley & Alex Chepstow-Lusty, *Understanding the 2500 yr BP rainforest crisis in West and Central Africa in the framework of the Late Holocene, Pluridisciplinary analysis and multiarchive reconstruction*. *Global and Planetary Change* **192** (2020), 103257, 1–19.

Numerous palaeoclimatic and prehistoric reconstructions have been reported at both the local scale and across the very large area of tropical Central Africa, clearly highlighting the Late Holocene Rainforest Crisis (LHRC) which mainly developed from ca. 2500 to 2000 yr BP. The broad synchronicity of this interval is striking and has been revealed in many different deep lakes from humid or montane forest, lakes or swamps marginal to tropical forest, and swamp forests where the oscillations of the surface water table produce temporary emersions. In parallel, a chronological review is presented of the Bantu arrival in these areas, including indicators for burning, metallurgy and land clearance. Nevertheless, evidence of human occupation, such as artefacts or deposits containing charcoal is exceptional and generally absent in most areas. Although the archaeological data exhibit a gradual southward densification of human occupation throughout Central Africa, the increase of settlements clearly began after 2350 yr BP, not before 2500 BP. However, some authors have interpreted the geochemical signal of increased erosion in the Congo Basin or the opening up of the forest around Lake Barombi Mbo in Cameroon as being attributed to agricultural clearance, or even the supply of charcoal required for metallurgy. In short, these early Bantu settlers (in such modest densities) may have been responsible for some local landscape degradation (clearance, fire, metallurgy), but these same settlers could not, under any circumstances and across all Central Africa, be held responsible directly or indirectly for the synchronous changes of lake levels, draining vast swamps and opening up of the tropical forest canopy, which was due to an increased dry season, while the

recovery with the recolonization of light demanding species, including oil palms (*Elaeis guineensis*) assisted by dispersers such as chimpanzees, was likewise due to natural processes. Therefore, it can be concluded that no data available validate the hypothesis that the major erosion or vegetation destruction ca. 2500 yr BP, was the result of large population movements. Indeed, the evolution of the environments of Central Africa are linked to the natural responses induced by general palaeoclimatic processes, observed synchronously not only in northern and eastern Africa, but globally. The natural recovery and resilience of these forests until the last centuries contrasts with the situation currently being faced.

Keywords: Late Holocene rainforest crisis | West and Central Africa | Palaeoenvironments | Natural dispersers | Lakes | Swamps | Pioneer species | Tropical forest dynamics

Aktuell

ALI 2020

Sheikh Taslim Ali, Lin Wang, Eric H. Y. Lau, Xiao-Ke Xu, Zhanwei Du, Ye Wu, Gabriel M. Leung & Benjamin J. Cowling, *Serial interval of SARS-CoV-2 was shortened over time by nonpharmaceutical interventions*. [science](#) **2020**, abc9004. DOI:10.1126/science.abc9004. s2020-abc9004-Supplement.pdf

Studies of novel coronavirus disease (COVID-19) have reported varying estimates of epidemiological parameters including serial interval distributions, i.e., the time between illness onset in successive cases in a transmission chain, and reproduction numbers. By compiling a line-list database of transmission pairs in mainland China, we show that mean serial intervals of COVID-19 have shortened substantially from 7.8 days to 2.6 days within a month (January 9 to February 13, 2020). This change is driven by enhanced nonpharmaceutical interventions, in particular case isolation. We also show that using real-time estimation of serial intervals allowing for variation over time, provides more accurate estimates of reproduction numbers than using conventionally fixed serial interval distributions. These findings could improve assessment of transmission dynamics, forecasting future incidence, and estimating the impact of control measures.

BERTOZZI 2020

Andrea L. Bertozzi, Elisa Franco, George Mohler, Martin B. Short & Daniel Sledge, *The challenges of modeling and forecasting the spread of COVID-19*. [PNAS](#) **117** (2020), 16732–16738. DOI:10.1073/pnas.2006520117.

The coronavirus disease 2019 (COVID-19) pandemic has placed epidemic modeling at the forefront of worldwide public policy making. Nonetheless, modeling and forecasting the spread of COVID-19 remains a challenge. Here, we detail three regionalscale models for forecasting and assessing the course of the pandemic. This work demonstrates the utility of parsimonious models for early-time data and provides an accessible framework for generating policy-relevant insights into its course. We show how these models can be connected to each other and to time series data for a particular region. Capable of measuring and forecasting the impacts of social distancing, these models highlight the dangers of relaxing non-pharmaceutical public health interventions in the absence of a vaccine or antiviral therapies.

Keywords: COVID-19 | pandemic | branching process | compartmental models

Significance: The coronavirus disease 2019 (COVID-19) pandemic has placed epidemic modeling at the forefront of worldwide public policy making. Nonetheless, modeling and forecasting the spread of COVID-19 remain a challenge. Here, we present and detail three regional-scale models for forecasting and assessing the course of the pandemic. This work is intended to demonstrate the utility of parsimonious models for understanding the pandemic and to provide an accessible framework for generating policy-relevant insights into its course. We show how these models can be connected to each other and to time series data for a particular region. Capable of measuring and forecasting the impacts of social distancing, these models highlight the dangers of relaxing nonpharmaceutical public health interventions in the absence of a vaccine or antiviral therapies.

CHIARENZA 2020

Alfio Alessandro Chiarenza, Alexander Farnsworth & Philip D. Mannion et al., *Asteroid impact, not volcanism, caused the end-Cretaceous dinosaur extinction*. [PNAS 117 \(2020\), 17084–17093](#).

[pnas117-17084-Supplement.pdf](#)

The Cretaceous/Paleogene mass extinction, 66 Ma, included the demise of non-avian dinosaurs. Intense debate has focused on the relative roles of Deccan volcanism and the Chicxulub asteroid impact as kill mechanisms for this event. Here, we combine fossil occurrence data with paleoclimate and habitat suitability models to evaluate dinosaur habitability in the wake of various asteroid impact and Deccan volcanism scenarios. Asteroid impact models generate a prolonged cold winter that suppresses potential global dinosaur habitats. Conversely, long-term forcing from Deccan volcanism (carbon dioxide [CO₂]-induced warming) leads to increased habitat suitability. Short-term (aerosol cooling) volcanism still allows equatorial habitability. These results support the asteroid impact as the main driver of the non-avian dinosaur extinction. By contrast, induced warming from volcanism mitigated the most extreme effects of asteroid impact, potentially reducing the extinction severity.

Keywords: Dinosauria | extinction | end-Cretaceous | Chicxulub | Deccan

Alfio Alessandro Chiarenza, Alexander Farnsworth, Philip D. Mannion, Daniel J. Lunt, Paul J. Valdes, Joanna V. Morgan & Peter A. Allison

Significance: We present a quantitative test of end-Cretaceous extinction scenarios and how these would have affected dinosaur habitats. Combining climate and ecological modeling tools, we demonstrate a substantial detrimental effect on dinosaur habitats caused by an impact winter scenario triggered by the Chicxulub asteroid. We were not able to obtain such an extinction state with several modeling scenarios of Deccan volcanism. We further show that the concomitant prolonged eruption of the Deccan traps might have acted as an ameliorating agent, buffering the negative effects on climate and global ecosystems that the asteroid impact produced at the Cretaceous–Paleogene boundary.

GIBSON 2020

Jacqueline MacDonald Gibson, Michael Fisher, Allison Clonch, John M. MacDonald & Philip J. Cook, *Children drinking private well water have higher blood lead than those with city water*. [PNAS 117 \(2020\), 16898–16907](#).

[pnas117-16898-Supplement.pdf](#)

Although the Flint, Michigan, water crisis renewed concerns about lead (Pb) in city drinking water, little attention has been paid to Pb in private wells, which provide drinking water for 13% of the US population. This study evaluates the

risk of Pb exposure in children in households relying on private wells. It is based on a curated dataset of blood Pb records from 59,483 North Carolina children matched with household water source information. We analyze the dataset for statistical associations between children’s blood Pb and household drinking water source. The analysis shows that children in homes relying on private wells have 25 % increased odds (95 % CI 6.2 to 48 %, $P < 0.01$) of elevated blood Pb, compared with children in houses served by a community water system that is regulated under the Safe Drinking Water Act. This increased Pb exposure is likely a result of corrosion of household plumbing and well components, because homes relying on private wells rarely treat their water to prevent corrosion. In contrast, corrosion control is required in regulated community water systems. These findings highlight the need for targeted outreach to prevent Pb exposure for the 42.5 million Americans depending on private wells for their drinking water.

Keywords: drinking water | private well | children’s health | lead exposure | blood lead

Significance: In the United States, 13 % of households depend on an unregulated private well for their water. Compared with children in houses served by a regulated water utility, children in these homes have a 25 % increased risk of elevated blood lead. Because lead is a neurotoxin, these children are at greater risk of experiencing irreversible cognitive damage, which can decrease their performance in school and increase their risks of behavioral problems. This study assesses associations between children’s blood lead and dependence on an unregulated private well for drinking water. It Highlights the need for interventions to control lead corrosion from plumbing and well components (such as drop pipes, pump parts, and valves and fittings) in households depending on private wells.

LEWIS 2020

Dyani Lewis, *Coronavirus in the Air*. [nature 583 \(2020\), 510–513](#).

Mounting evidence suggests that coronavirus can travel in airborne aerosols — but health advice has been slow to catch up.

LUBINSKI 2020

David Lubinski, *Understanding educational, occupational, and creative outcomes requires assessing intraindividual differences in abilities and interests*. [PNAS 117 \(2020\), 16720–16722](#).

Understanding the multidimensionality of human individuality is critical for developing human potential, scientifically based educational–occupational practices, and policy formation. It also has potential for insight into social climate change, which ensues as a function of an inordinate number of individuals with a particular point of view populating a specific niche, as the technology industry has done for Seattle. Perhaps, more idealistically, widespread knowledge of human psychological diversity will contribute to increased cross-cultural empathy.

MALLAPATY 2020

Smriti Mallapaty, *The Mathematical Strategy That Could Transform Coronavirus Testing*. [nature 583 \(2020\), 504–505](#).

To save time and money, several countries are using a technique called group testing, which pools samples from many people.

WALKER 2020

Patrick G. T. Walker et al., *The impact of COVID-19 and strategies for mitigation and suppression in low- and middle-income countries*. [science 369 \(2020\), 413–422](#). DOI:10.1126/science.abc0035.

s369-0413-Supplement.pdf

The ongoing coronavirus disease 2019 (COVID-19) pandemic poses a severe threat to public health worldwide. We combine data on demography, contact patterns, disease severity, and health care capacity and quality to understand its impact and inform strategies for its control. Younger populations in lower-income countries may reduce overall risk, but limited health system capacity coupled with closer intergenerational contact largely negates this benefit. Mitigation strategies that slow but do not interrupt transmission will still lead to COVID-19 epidemics rapidly overwhelming health systems, with substantial excess deaths in lower-income countries resulting from the poorer health care available. Of countries that have undertaken suppression to date, lower-income countries have acted earlier. However, this will need to be maintained or triggered more frequently in these settings to keep below available health capacity, with associated detrimental consequences for the wider health, well-being, and economies of these countries.

Patrick G. T. Walker, Charles Whittaker, Oliver J. Watson, Marc Baguelin, Peter Winskill, Arran Hamlet, Bimandra A. Djafaara, Zulma Cucunubá, Daniela Olivera Mesa, Will Green, Hayley Thompson, Shevanthi Nayagam, Kylie E. C. Ainslie, Sangeeta Bhatia, Samir Bhatt, Adhiratha Boonyasiri, Olivia Boyd, Nicholas F. Brazeau, Lorenzo Cattarino, Gina Cuomo-Dannenburg, Amy Dighe, Christl A. Donnelly, Ilaria Dorigatti, Sabine L. van Elsland, Rich FitzJohn, Han Fu, Katy A. M. Gaythorpe, Lily Geidelberg, Nicholas Grassly, David Haw, Sarah Hayes, Wes Hinsley, Natsuko Imai, David Jorgensen, Edward Knock, Daniel Laydon, Swapnil Mishra, Gemma Nedjati-Gilani, Lucy C. Okell, H. Juliette Unwin, Robert Verity, Michaela Vollmer, Caroline E. Walters, Haowei Wang, Yuanrong Wang, Xiaoyue Xi, David G. Lalloo, Neil M. Ferguson & Azra C. Ghani

Amerika

CURRY 2020

Andrew Curry, *Tools suggest people reached Americas early.* [science 369 \(2020\), 355–356.](#)

Skeptics question Mexican finds that suggest settlement during the last ice age.

As the group reports in *Nature* this week, the artifacts were deposited starting 26,000 years ago, and accumulated on the cave floor for the next 16,000 years. The authors argue that it adds up to a continuous human presence, with people regularly visiting the cave over millennia.

Critics point out that the tools are simple and don't resemble other toolkits from the Americas, raising the possibility they're the product of natural breakage. "They look like they could be artifacts, but why aren't they found anywhere else in the landscape?" wonders David Meltzer, an archaeologist at Southern Methodist University. The tools' consistency is also remarkable, he says. "If these tools are real, why are they only found—so far at least—in this one spot over a 10,000-year period? Humans adapt and adopt new technology."

NÄGELE 2020

Kathrin Nägele & Hannes Schroeder et al., *Genomic insights into the early peopling of the Caribbean.* [science 369 \(2020\), 456–460.](#)

s369-0456-Supplement.pdf

The Caribbean was one of the last regions of the Americas to be settled by humans, but where they came from and how and when they reached the islands remain unclear. We generated genome-wide data for 93 ancient Caribbean islanders dating between 3200 and 400 calibrated years before the present and found

evidence of at least three separate dispersals into the region, including two early dispersals into the Western Caribbean, one of which seems connected to radiation events in North America. This was followed by a later expansion from South America. We also detected genetic differences between the early settlers and the newcomers from South America, with almost no evidence of admixture. Our results add to our understanding of the initial peopling of the Caribbean and the movements of Archaic Age peoples in the Americas.

Kathrin Nägele, Cosimo Posth, Miren Iraeta Orbegozo, Yadira Chinique de Armas, Silvia Teresita Hernández Godoy, Ulises M. González Herrera, Maria A. Nieves-Colón, Marcela Sandoval-Velasco, Dorothea Mylopotamitaki, Rita Radzevičiute, Jason Laffoon, William J. Pestle, Jazmin Ramos-Madrigal, Thiseas C. Lamnidis, William C. Schaffer, Robert S. Carr, Jane S. Day, Carlos Arredondo Antúnez, Armando Rangel Rivero, Antonio J. Martínez-Fuentes, Edwin Crespo-Torres, Ivan Roksandic, Anne C. Stone, Carles Lalueza-Fox, Menno Hoogland, Mirjana Roksandic, Corinne L. Hofman, Johannes Krause & Hannes Schroeder

Bibel

FRANKLIN 2019

Norma Franklin, *Megiddo's Stables, Trading Egyptian Horses to the Assyrian Empire*. [TheTorah.com 2019, Sep. 3.](http://thetorah.com/article/megiddos-stables-trading-egyptian-horses-to-the-assyrian-empire) <<http://thetorah.com/article/megiddos-stables-trading-egyptian-horses-to-the-assyrian-empire>> (2020-07-25).

Combining the archaeological finds with the Assyrian texts and the contemporary political realities reveals that the stable-city of Stratum IV at Megiddo was an incredible military and commercial enterprise. It was constructed by Jeroboam II with the tacit agreement and logistical support of the Assyrians under Adad-nirari III, some two hundred years after what according to biblical chronology, was the reign of Solomon.

GARFINKEL 2015

Yosef Garfinkel, Igor Kreimerman & Peter Zilberg, *Debating Khirbet Qeiyafa, A Fortified City in Judah from the Time of King David*. ([Jerusalem 2015](#)).

This book started out as an article. As the article grew in size, it became apparent that in its current form it could not be accepted for publication in any regular journal. We faced two alternatives: to split it into several smaller publications or to add sections and turn it into a monograph. We chose the second option for two reasons. First, it enabled us to present our arguments in a more spacious format and with more illustrations. Second, we had just concluded the seventh and last excavation season at Khirbet Qeiyafa, so that no new data will be uncovered and few changes are expected. This is the time to summarize the main results, to supply answers to various issues concerning the site that have been raised over the last few years, and to present a comprehensive interim report. We are using this opportunity to discuss various methodological issues that relate to archaeology and the biblical tradition, and how to combine the two.

WHITE 2020

Ellen White, *Who Are the Nephilim? The mysterious beings of Genesis 6*. [Bible History Daily 2020, July 17](#).

It was once claimed that the mating of the sons of god and the daughters of Adam that resulted in the Nephilim caused the flood, and this caused the Nephilim to have a negative reputation. This was believed because the next verse (Genesis 6:5) is the introduction to the flood narrative and because their name means “fallen ones.” It is unlikely that this interpretation is correct because Genesis 6:4 presents nothing but praise for the Nephilim and no criticism is present. In addition, the name “fallen ones” is likely a reference to their divine paternity transforming—falling—into the human condition, albeit an almost superhuman condition.

Biologie

ALCAMI 2020

Antonio Alcamí, *Was smallpox a widespread mild disease?* [science](#) **369** (2020), 376–377.

Ancient DNA from the Viking Age suggests a rethink about the origin and evolution of smallpox.

Once VARV was established in humans, the findings of Mühlemann et al. suggest that the inactivation of genes occurred gradually over the centuries, leading to the generation of a highly virulent, human-specific modern VARV that caused smallpox. Notably, different virus clades (subtypes) coexisted, and the ancient VARV sequenced from Viking corpses corresponds to an extinct clade of VARV.

MÜHLEMANN 2020

Barbara Mühlemann & Lasse Vinner et al., *Diverse variola virus (smallpox) strains were widespread in northern Europe in the Viking Age.* [science](#) **369** (2020), 391.

s369-0391-Supplement.pdf

Smallpox, one of the most devastating human diseases, killed between 300 million and 500 million people in the 20th century alone. We recovered viral sequences from 13 northern European individuals, including 11 dated to ≈ 600 –1050 CE, overlapping the Viking Age, and reconstructed near-complete variola virus genomes for four of them. The samples predate the earliest confirmed smallpox cases by ≈ 1000 years, and the sequences reveal a now-extinct sister clade of the modern variola viruses that were in circulation before the eradication of smallpox. We date the most recent common ancestor of variola virus to ≈ 1700 years ago. Distinct patterns of gene inactivation in the four near-complete sequences show that different evolutionary paths of genotypic host adaptation resulted in variola viruses that circulated widely among humans.

Barbara Mühlemann, Lasse Vinner, Ashot Margaryan, Helene Wilhelmson, Constanza de la Fuente Castro, Morten E. Allentoft, Peter de Barros Damgaard, Anders Johannes Hansen, Sofie Holtsmark Nielsen, Lisa Mariann Strand, Jan Bill, Alexandra Buzhilova, Tamara Pushkina, Ceri Falys, Valeri Khartanovich, Vyacheslav Moiseyev, Marie Louise Schjellerup Jørkov, Palle Østergaard Sørensen, Yvonne Magnusson, Ingrid Gustin, Hannes Schroeder, Gerd Sutter, Geoffrey L. Smith, Christian Drosten, Ron A. M. Fouchier, Derek J. Smith, Eske Willerslev, Terry C. Jones & Martin Sikora

Judentum

HACHLILI 1989

Rachel Hachlili, *Ancient synagogues in Israel – third–seventh century C.E. Proceedings of Symposium, University of Haifa, May 1987*. BAR International Series 499 (Oxford 1989).

Klima

BLÖSCHL 2020

Günter Blöschl, Andrea Kiss & Alberto Viglione et al., *Current European flood-rich period exceptional compared with past 500 years. nature* **583** (2020), 560–566.

There are concerns that recent climate change is altering the frequency and magnitude of river floods in an unprecedented way¹. Historical studies have identified flood-rich periods in the past half millennium in various regions of Europe². However, because of the low temporal resolution of existing datasets and the relatively low number of series, it has remained unclear whether Europe is currently in a flood-rich period from a long-term perspective. Here we analyse how recent decades compare with the flood history of Europe, using a new database composed of more than 100 high-resolution (sub-annual) historical flood series based on documentary evidence covering all major regions of Europe. We show that the past three decades were among the most flood-rich periods in Europe in the past 500 years, and that this period differs from other flood-rich periods in terms of its extent, air temperatures and flood seasonality. We identified nine flood-rich periods and associated regions. Among the periods richest in floods are 1560–1580 (western and central Europe), 1760–1800 (most of Europe), 1840–1870 (western and southern Europe) and 1990–2016 (western and central Europe). In most parts of Europe, previous flood-rich periods occurred during cooler-than-usual phases, but the current flood-rich period has been much warmer. Flood seasonality is also more pronounced in the recent period. For example, during previous flood and inter-flood periods, 41 per cent and 42 per cent of central European floods occurred in summer, respectively, compared with 55 per cent of floods in the recent period. The exceptional nature of the present-day flood-rich period calls for process-based tools for flood-risk assessment that capture the physical mechanisms involved, and management strategies that can incorporate the recent changes in risk.

Gunter Blöschl, Andrea Kiss, Alberto Viglione, Mariano Barriendos, Oliver Böhm, Rudolf Brazdil, Denis Coeur, Gaston Demaree, Maria Carmen Llasat, Neil Macdonald, Dag Retso, Lars Roald, Petra Schmocker-Fackel, Ines Amorim, Monika Blinova, Gerardo Benito, Chiara Bertolin, Dario Camuffo, Daniel Cornet, Radosław Doktor, Libor Elleder, Silvia Enzi, Joao Carlos Garcia, Rudiger Glaser, Julia Hall, Klaus Haslinger, Michael Hofstatter, Jürgen Komma, Danuta Limanowka, David Lun, Andrei Panin, Juraĵ Parajka, Hrvoje Petri, Fernando S. Rodrigo, Christian Rohr, Johannes Schonbein, Lothar Schulte, Luis Pedro Silva, Willem H. J. Toonen, Peter Valent, Jürgen Waser & Oliver Wetter

LUDLOW 2020

Francis Ludlow & Rhonda McGovern, *A flood history of Europe. nature* **583** (2020), 522–524.

Europe's rich heritage of historical documents has been used to reconstruct the flooding history of the continent for the past five centuries. This could help policymakers to develop flood-management strategies for the future.

Mariano S. Morales et al., *Six hundred years of South American tree rings reveal an increase in severe hydroclimatic events since mid-20th century*. *PNAS* **117** (2020), 16816–16823.

pnas117-16816-Supplement.pdf

South American (SA) societies are highly vulnerable to droughts and pluvials, but lack of long-term climate observations severely limits our understanding of the global processes driving climatic variability in the region. The number and quality of SA climate-sensitive tree ring chronologies have significantly increased in recent decades, now providing a robust network of 286 records for characterizing hydroclimate variability since 1400 CE. We combine this network with a self-calibrated Palmer Drought Severity Index (scPDSI) dataset to derive the South American Drought Atlas (SADA) over the continent south of 12°S. The gridded annual reconstruction of austral summer scPDSI is the most spatially complete estimate of SA hydroclimate to date, and well matches past historical dry/wet events. Relating the SADA to the Australia–New Zealand Drought Atlas, sea surface temperatures and atmospheric pressure fields, we determine that the El Niño–Southern Oscillation (ENSO) and the Southern Annular Mode (SAM) are strongly associated with spatially extended droughts and pluvials over the SADA domain during the past several centuries. SADA also exhibits more extended severe droughts and extreme pluvials since the mid-20th century. Extensive droughts are consistent with the observed 20th-century trend toward positive SAM anomalies concomitant with the weakening of midlatitude Westerlies, while low-level moisture transport intensified by global warming has favored extreme rainfall across the subtropics. The SADA thus provides a long-term context for observed hydroclimatic changes and for 21st-century Intergovernmental Panel on Climate Change (IPCC) projections that suggest SA will experience more frequent/ severe droughts and rainfall events as a consequence of increasing greenhouse gas emissions.

Keywords: drought atlas | palaeoclimate reconstruction | extreme hydroclimate events | South America hydroclimate | Southern Hemisphere climate modes

Mariano S. Morales, Edward R. Cook, Jonathan Barichivich, Duncan A. Christie, Ricardo Villalba, Carlos LeQuesne, Ana M. Srur, M. Eugenia Ferrero, Ivaro Gonzalez-Reyes, Fleur Couvreur, Vladimir Matskovsky, Juan C. Aravena, Antonio Lara, Ignacio A. Mundo, Facundo Rojas, Mara R. Prieto, Jason E. Smerdon, Lucas O. Bianchi, Mariano H. Masiokas, Rocio Urrutia-Jalabert, Milagros Rodriguez-Catn, Ariel A. Muoz, Moises Rojas-Badilla, Claudio Alvarez, Lidio Lopez, Brian H. Luckman, David Lister, Ian Harris, Philip D. Jones, A. Park Williams, Gonzalo Velazquez, Diego Aliste, Isabella Aguilera-Betti, Eugenia Marcotti, Felipe Flores, Toms Muoz, Emilio Cuq & Jos A. Boninsegna

Significance: The SADA is an annually-resolved hydroclimate atlas in South America that spans the continent south of 12°S from 1400 to 2000 CE. Based on 286 tree ring records and instrumentally-based estimates of soil moisture, the SADA complements six drought atlases worldwide filling a geographical gap in the Southern Hemisphere. Independently validated with historical records, SADA shows that the frequency of widespread severe droughts and extreme pluvials since the 1960s is unprecedented. Major hydroclimate events expressed in the SADA are associated with strong El Niño Southern Oscillation (ENSO) and Southern Annular Mode (SAM) anomalies. Coupled ENSO-SAM anomalies together with subtropical low-level jet intensification due to increasing greenhouse gas emissions may cause more extreme droughts and pluvials in South America during the 21st century.

Ozeanien

IOANNIDIS 2020

Alexander G. Ioannidis et al., *Native American gene flow into Polynesia predating Easter Island settlement*. [nature 583 \(2020\), 572–577](#).
n583-0572-Supplement.pdf

The possibility of voyaging contact between prehistoric Polynesian and Native American populations has long intrigued researchers. Proponents have pointed to the existence of New World crops, such as the sweet potato and bottle gourd, in the Polynesian archaeological record, but nowhere else outside the pre-Columbian Americas^{1–6}, while critics have argued that these botanical dispersals need not have been human mediated⁷. The Norwegian explorer Thor Heyerdahl controversially suggested that prehistoric South American populations had an important role in the settlement of east Polynesia and particularly of Easter Island (Rapa Nui)². Several limited molecular genetic studies have reached opposing conclusions, and the possibility continues to be as hotly contested today as it was when first suggested^{8–12}. Here we analyse genome-wide variation in individuals from islands across Polynesia for signs of Native American admixture, analysing 807 individuals from 17 island populations and 15 Pacific coast Native American groups. We find conclusive evidence for prehistoric contact of Polynesian individuals with Native American individuals (around ad 1200) contemporaneous with the settlement of remote Oceania^{13–15}. Our analyses suggest strongly that a single contact event occurred in eastern Polynesia, before the settlement of Rapa Nui, between Polynesian individuals and a Native American group most closely related to the indigenous inhabitants of present-day Colombia.

Alexander G. Ioannidis, Javier Blanco-Portillo, Karla Sandoval, Erika Hagelberg, Juan Francisco Miquel-Poblete, J. Víctor Moreno-Mayar, Juan Esteban Rodríguez-Rodríguez, Consuelo D. Quinto-Cortés, Kathryn Auckland, Tom Parks, Kathryn Robson, Adrian V.S. Hill, María C. Avila-Arcos, Alexandra Sockell, Julian R. Homburger, Genevieve L. Wojcik, Kathleen C. Barnes, Luisa Herrera, Soledad Berríos, Mónica Acuña, Elena Llop, Celeste Eng, Scott Huntsman, Esteban G. Burchard, Christopher R. Gignoux, Lucía Cifuentes, Ricardo A. Verdugo, Mauricio Moraga, Alexander J. Mentzer, Carlos D. Bustamante & Andrés Moreno-Estrada

WALLIN 2020

Paul Wallin, *Native South Americans reached Polynesia early*. [nature 583 \(2020\), 524–525](#).

DNA analysis of Polynesians and Native South Americans has revealed an ancient genetic signature that resolves a long-running debate over Polynesian origins and early contacts between the two populations.

Physik

CASTELVECCHI 2020

Davide Castelvecchi, *Mystery of Universe’s Expansion Deepens with Fresh Data*. [nature 583 \(2020\), 500–501](#).

A long-awaited map of the Big Bang’s afterglow fails to settle debate over how fast the Universe is expanding.

Story or Book

LUCAS 2020

George Lucas, *Fiction meets the near future*. [science 369 \(2020\), 384](#).

An action-packed thriller explores the implications of emerging technologies.

Burn-In: A Novel of the Real Robotic Revolution. P. W. Singer and August Cole. Houghton Mif in Harcourt, 2020. 432 pp.

Far from the fanciful inventions that typically populate science fiction, the systems described herein are currently available or under development for imminent deployment.

The aim of this work of fiction is not merely to engage and entertain but also to educate and inform readers about the vast array of automated and increasingly intelligent autonomous systems that are proliferating in availability and use.