

Literatur

Afrika

MORALES 2013

Jacob Morales et al., *The origins of agriculture in North-West Africa: Macro-botanical remains from Epipalaeolithic and Early Neolithic levels of Ifri Oudadane (Morocco)*. [Journal of Archaeological Science](#) **40** (2013), 2659–2669.

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Jacob Morales, Guillem Pérez-Jordà, Leonor Peña-Chocarro, Lydia Zapata, Mónica Ruíz-Alonso, Jose Antonio López-Sáez & Jörg Linstädter

This research aims to shed light on the early stages of agricultural development in Northern Africa through the analysis of the rich macro-botanical assemblages obtained from Ifri Oudadane, an Epipalaeolithic/Early Neolithic site from North-East Morocco. Results indicate the presence of domesticated plants, cereals (*Hordeum vulgare*, *Triticum monococcum/dicoccum*, *Triticum durum* and *Triticum aestivum/durum*) and pulses (*Lens culinaris* and *Pisum sativum*) in the Early Neolithic. One lentil has been dated to 7611 ± 37 cal BP representing the oldest direct date of a domesticated plant seed in Morocco and, by extension, in North Africa. Similarities in both radiocarbon dates and crop assemblages from Early Neolithic sites in Northern Morocco and the Iberian Peninsula suggest a simultaneous East to West maritime spread of agriculture along the shores of the Western Mediterranean. Wild plants were abundantly collected in both the Epipalaeolithic and the Early Neolithic periods pointing to the important role of these resources during the two periods. In addition to fruits and seeds that could have been consumed by both humans and domesticated animals, fragments of esparto grass (*Stipa tenacissima*) rhizomes have been identified. This is a western Mediterranean native plant that may have been used as a source of fibres for basketry.

Keywords: Origin of agriculture | Wild plant gathering | Basketry | Archaeobotany | Morocco | Epipalaeolithic | Early Neolithic

Aktuell

HUBLIN 2013

Jean-Jacques Hublin, *Free digital scans of human fossils*. [nature](#) **497** (2013), 183.

Draconian access requirements are squandering the potential of imaging technology to advance human palaeontology, cautions Jean-Jacques Hublin.

Being refused the right to examine a sought-after specimen is a common experience in the professional life of a palaeoanthropologist. Too often I have heard in the back rooms of museums that “nobody can find the key to the Neanderthal’s cabinet”, “the fossil is away on exhibition” or “it is currently being reconstructed”. Human fossils that make international celebrities of their discoverers are difficult to find in geological strata, but they can become unreachable relics when they are in storage.

Like many others, I believed these advances meant that issues related to consent, scarcity and distance would soon be behind us. Sadly, fluid access to the fossil

record, real or virtual, remains a dream. It has become a major bone of contention in palaeoanthropology that digital data, once produced and exploited, are not made available to other researchers.

MACILWAIN 2013

Colin Macilwain, *Driving students into science is a fool's errand*. [nature 497 \(2013\), 289](#).

If programmes to bolster STEM education are effective, they distort the labour market; if they aren't, they're a waste of money, argues Colin Macilwain. Start by asking why no such government-backed programmes exist to pull children into being lawyers or accountants. The obvious answer is that there is no need: young people can see the prospects in these fields for themselves. As a result, places to study these subjects tend to be fiercely competitive. The dynamic at work here isn't complicated. By cajoling more children to enter science and engineering — as the United Kingdom also does by rigging university-funding rules to provide more support for STEM than other subjects — the state increases STEM student numbers, floods the market with STEM graduates, reduces competition for their services and cuts their wages. And that suits the keenest proponents of STEM education programmes — industrial employers and their legion of lobbyists — absolutely fine.

Amerika

LAHAYE 2013

Christelle Lahaye et al., *Human occupation in South America by 20,000 BC: the Toca da Tira Peia site, Piauí, Brazil*. [Journal of Archaeological Science 40 \(2013\), 2840–2847](#).

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Christelle Lahaye, Marion Hernandez, Eric Boëda, Gisele D. Felice, Niède Guidon, Sirlei Hoeltz, Antoine Lourdeau, Marina Pagli, Anne-Marie Pessis, Michel Rasse & Sibeli Viana

When and how did the first human beings settle in the American continent? Numerous data, from archaeological researches as well as from palaeogenetics, anthropological and environmental studies, have led to partially contradictory interpretations in recent years, often because of the lack of a reliable chronological framework. The present study contributes to the establishment of such a framework using luminescence techniques to date a Brazilian archaeological site, the Toca da Tira Peia. It constitutes an exemplary case study: all our observations and measurements tend to prove the good integrity of the site and the anthropological nature of the artifacts and we are confident in the accuracy of the luminescence dating results. All these points underline the importance of the Toca da Tira Peia. The results bring new pieces of evidence of a human presence in the north-east of Brazil as early as 20,000 BC. The Toca da Tira Peia thus contributes to the rewriting of the history of the peopling of the American continent.

Keywords: Optically stimulated luminescence dating | Toca da Tira Peia | Brazil | First peopling in America | Luminescence

Anthropologie

BARTON 2013

Robert A. Barton & Chris Venditti, *Human frontal lobes are not relatively large*. [PNAS 110 \(2013\), 9001–9006](#).

One of the most pervasive assumptions about human brain evolution is that it involved relative enlargement of the frontal lobes. We show that this assumption is without foundation. Analysis of five independent data sets using correctly scaled measures and phylogenetic methods reveals that the size of human frontal lobes, and of specific frontal regions, is as expected relative to the size of other brain structures. Recent claims for relative enlargement of human frontal white matter volume, and for relative enlargement shared by all great apes, seem to be mistaken. Furthermore, using a recently developed method for detecting shifts in evolutionary rates, we find that the rate of change in relative frontal cortex volume along the phylogenetic branch leading to humans was unremarkable and that other branches showed significantly faster rates of change. Although absolute and proportional frontal region size increased rapidly in humans, this change was tightly correlated with corresponding size increases in other areas and whole brain size, and with decreases in frontal neuron densities. The search for the neural basis of human cognitive uniqueness should therefore focus less on the frontal lobes in isolation and more on distributed neural networks.
prefrontal cortex | cognition | primates

COLEMAN 2010

Mark N. Coleman & Matthew W. Colbert, *Correlations Between Auditory Structures and Hearing Sensitivity in Non-Human Primates*. [Journal of Morphology](#) **271** (2010), 511–532.

Primates show distinctions in hearing sensitivity and auditory morphology that generally follow phylogenetic patterns. However, few previous studies have attempted to investigate how differences in primate hearing are directly related to differences in ear morphology. This research helps fill this void by exploring the form-to-function relationships of the auditory system in a phylogenetically broad sample of nonhuman primates. Numerous structures from the outer, middle, and inner ears were measured in taxa with known hearing capabilities. The structures investigated include the overall size and shape of the pinna, the areas of the tympanic membrane and stapedial footplate, the masses and lever arm lengths of the ossicles, the volumes of the middle ear cavities, and the length of the cochlea. The results demonstrate that a variety of auditory structures show significant correlations with certain aspects of hearing (particularly low-frequency sensitivity). Although the majority of these relationships agree with expectations from auditory theory, some traditional (and possibly outdated) ideas were not supported. For example, the common misconception that higher middle ear transformer ratios (e.g., impedance transformer ratio) result in increased hearing sensitivity was not supported. Although simple correlations between form and function do not necessarily imply causality, the relationships defined in this study not only increase our understanding of auditory patterns in extant taxa but also lay the foundation to begin investigating the hearing in fossil primates.

Keywords: primate hearing; auditory functional morphology; inner ear; middle ear; outer ear; phylogenetic comparative methods

POTTS 2013

Richard Potts, *Hominin evolution in settings of strong environmental variability*. [Quaternary Science Reviews](#) **73** (2013), 1–13.

Investigations into how climate change shaped human evolution have begun to focus on environmental dynamics, i.e., the nature and tempo of climate and landscape variability, an approach that de-emphasizes static reconstructions of early hominin habitats. The interaction among insolation cycles is especially apparent in the paleoenvironmental records of the East African Rift System, where the longest

records of human evolution are preserved. However, environmental indicators such as deep-sea oxygen isotopes, terrestrial dust flux, paleosol carbon isotopes, and lake sediments do not point consistently to any simple trend or climate driver of evolutionary change. Comparison of environmental indicators cautions against an exclusive focus on any given end-member of environmental fluctuation (driest or wettest, warmest or coolest), and argues for the impact of the entire range of variability in shaping evolutionary change. A model of alternating high and low climate variability for tropical Africa further implies that specific environmental indicators reflect different aspects of East African environmental dynamics. The model may thus help reconcile some of the conflicting interpretations about the environmental drivers of hominin evolution. First and last appearances of hominin lineages, benchmark biogeographic events, and the emergence of key adaptations and capacities to alter the surroundings are consistently concentrated in the predicted longest intervals of high climate variability. The view that emerges is that important changes in stone technology, sociality, and other aspects of hominin behavior can now be understood as adaptive responses to heightened habitat instability.

Keywords: Paleoclimate | Human evolution | Adaptability | Variability selection | Ologresailie | Africa | Environment

QUAM 2013

Rolf M. Quam, Darryl J. de Ruiter, Melchiorre Masali, Juan-Luis Arsuaga, Ignacio Martínez & Jacopo Moggi-Cecchi, *Early hominin auditory ossicles from South Africa*. [PNAS 110 \(2013\), 8847–8851](#).

The middle ear ossicles are only rarely preserved in fossil hominins. Here, we report the discovery of a complete ossicular chain (malleus, incus, and stapes) of *Paranthropus robustus* as well as additional ear ossicles from *Australopithecus africanus*. The malleus in both early hominin taxa is clearly human-like in the proportions of the manubrium and corpus, whereas the incus and stapes resemble African and Asian great apes more closely. A deep phylogenetic origin is proposed for the derived malleus morphology, and this may represent one of the earliest human-like features to appear in the fossil record. The anatomical differences found in the early hominin incus and stapes, along with other aspects of the outer, middle, and inner ear, are consistent with the suggestion of different auditory capacities in these early hominin taxa compared with modern humans.

Bibel

GAINES 2013

Janet Howe Gaines, *How Bad Was Jezebel?* [Bible History Daily 2013, May 6](#). <<http://www.biblicalarchaeology.org/daily/people-cultures-in-the-bible/people-in-the-bible/how-bad-was-jezebel/>> (2013-05-19).

How bad was Jezebel? The Deuteronomist uses every possible argument to make the case against her.

Every Biblical word condemns her: Jezebel is an outspoken woman in a time when females have little status and few rights; a foreigner in a xenophobic land; an idol worshiper in a place with a Yahweh-based, state-sponsored religion; a murderer and meddler in political affairs in a nation of strong patriarchs; a traitor in a country where no ruler is above the law; and a whore in the territory where the Ten Commandments originate.

Yet there is much to admire in this ancient queen. In a kinder analysis, Jezebel emerges as a fiery and determined person, with an intensity matched only by

Elijah's. She is true to her native religion and customs. She is even more loyal to her husband. Throughout her reign, she boldly exercises what power she has. And in the end, having lived her life on her own terms, Jezebel faces certain death with dignity.

NEUGEBAUER 1915

Paul V. Neugebauer & Ernst F. Weidner, *Ein astronomischer Beobachtungstext aus dem 37. Jahre Nebukadnezars II (-567/66)*. Ber. ü. d. Verh. d. Königl. Sächsischen Ges. d. Wissenschaften zu Leipzig – Philologisch-historische Klasse 67.2 (Leipzig 1915). <<http://www.archive.org/details/einastronomische00neuguoft>>.

Biologie

WROE 2013

Stephen Wroe et al., *Climate change frames debate over the extinction of megafauna in Sahul (Pleistocene Australia-New Guinea)*. *PNAS* **110** (2013), 8777–8781.

Stephen Wroe, Judith H. Field, Michael Archer, Donald K. Grayson, Gilbert J. Price, Julien Louys, J. Tyler Faith, Gregory E. Webb, Iain Davidson & Scott D. Mooney

Around 88 large vertebrate taxa disappeared from Sahul sometime during the Pleistocene, with the majority of losses (54 taxa) clearly taking place within the last 400,000 years. The largest was the 2.8-ton browsing *Diprotodon optatum*, whereas the \approx 100- to 130-kg marsupial lion, *Thylacoleo carnifex*, the world's most specialized mammalian carnivore, and *Varanus priscus*, the largest lizard known, were formidable predators. Explanations for these extinctions have centered on climatic change or human activities. Here, we review the evidence and arguments for both. Human involvement in the disappearance of some species remains possible but unproven. Mounting evidence points to the loss of most species before the peopling of Sahul (circa 50–45 ka) and a significant role for climate change in the disappearance of the continent's megafauna.

megafauna extinction | Pleistocene extinctions | archaeology | human colonization | faunal turnover

Energie

YANG 2013

Hongqiang Yang, Shijin Shuai, Zhi Wang, Jianxin Wang & Hongming Xu, *Multiple premixed compression ignition (MPCI) of low-octane gasoline with direct injection for high efficiency and clean combustion engines*. *Applied Energy* (2013), preprint, 1–49.

This paper investigates the performance of two-stage RON66 multiple premixed compression ignition (MPCI) mode at 70% split ratio and 100 MPa common rail pressure. The gasoline MPCI mode is realized by the multiple premixed combustion processes in a sequence of “spray-combustion-spray-combustion” around the compression top dead center (TDC). The spray and combustion events are preferred to be separated completely without overlap. This decouples the pressure rise with pollutants formation process. With optimization, it can lower the pressure rise rate and emissions simultaneously while achieving a high thermal efficiency

even at high engine load. The high volatility and feasible ignitability of low-octane gasoline have been used with the MPCCI concept to generate multiple premixed combustion processes. Sweeping of the injection timing under different engine loads in RON66 double injection mode is carried out, and a partially premixed compression ignition (PPCI) to MPCCI transition is observed while the injection timing sweeping. Diesel single injection is compared with the RON66 MPCCI mode at 15 % EGR rate. High fuel efficiency and low pollutants emission are achieved through the two-stage RON66 MPCCI mode.

Keywords: Multiple premixed compression Ignition (MPCCI); Low-octane gasoline; Gasoline direct injection compression ignition (GDICI); High efficiency; Low pollutants

Grundlagen

PAGEL 2013

Mark Pagel, Quentin D. Atkinson, Andreea S. Calude & Andrew Meade, *Ultraconserved words point to deep language ancestry across Eurasia*. [PNAS 110 \(2013\), 8471–8476](#).

[pnas110-08471-Supplement1.docx](#), [pnas110-08471-Supplement2.docx](#)

The search for ever deeper relationships among the World's languages is bedeviled by the fact that most words evolve too rapidly to preserve evidence of their ancestry beyond 5,000 to 9,000 y. On the other hand, quantitative modeling indicates that some "ultraconserved" words exist that might be used to find evidence for deep linguistic relationships beyond that time barrier. Here we use a statistical model, which takes into account the frequency with which words are used in common everyday speech, to predict the existence of a set of such highly conserved words among seven language families of Eurasia postulated to form a linguistic superfamily that evolved from a common ancestor around 15,000 y ago. We derive a dated phylogenetic tree of this proposed superfamily with a time-depth of $\approx 14,450$ y, implying that some frequently used words have been retained in related forms since the end of the last ice age. Words used more than once per 1,000 in everyday speech were 7- to 10-times more likely to show deep ancestry on this tree. Our results suggest a remarkable fidelity in the transmission of some words and give theoretical justification to the search for features of language that might be preserved across wide spans of time and geography.

cultural evolution | phylogeny | historical linguistics

PRINGLE 2013

Heather Pringle, *Die Geburt der Kreativität*. [Spektrum der Wissenschaft 2013, vi, 22–29](#).

Zu Erfindern und Künstlern wurden Menschen nicht erst vor 40 000 Jahren, als der Homo sapiens in Europa erschien. Afrikanische Kulturen liefern viel ältere Zeugnisse von Kreativität. Die ersten Anfänge finden sich sogar bei noch früheren Menschen.

Laut Thomas war überragende Schläueheit gar nicht so maßgeblich. Wichtiger für die rasante Kulturevolution wäre eine gute soziale Vernetzung gewesen. Thomas und seine Kollegen simulierten dies zunächst für Europa. Aus genetischen Daten der heutigen Bevölkerung erschlossen sie die Menschenzahl und Bevölkerungsdichte für Homo sapiens am Beginn des Jungpaläolithikums, also zu jener Zeit, als die moderne Kultur in Europa aufblühte. Ähnliche Berechnungen machten sie dann für afrikanische Populationen, wobei sie deren Wachstum und Bevölkerungsver-schiebungen einbezogen. Heraus kam, dass die Menschheit in Afrika vor gut 100

000 Jahren die gleiche Dichte erreichte, wie sie später im frühen Jungpaläolithikum in Europa herrschte. Die Simulationen zeigten auch, wie stark umfangreiche soziale Netze die Kreativität antreiben.

Schon 2011 schrieben die Archäologen Fiona Coward von der University of London und Matt Grove von der University of Liverpool: “So wie Viren nur unter bestimmten Bedingungen gedeihen, erfordert die Verbreitung kultureller Innovationen ein passendes, und zwar ein besonderes soziales Umfeld. Vor allem braucht es dazu große, vernetzte Populationen, die sich gegenseitig ‘anstecken’ können.” Das bringt uns in die heutige Welt zurück. Nie lebten gleichzeitig so viele Menschen. Wir drängen uns in Riesenstädten und haben eine Unmenge Wissen und Erfindungen angehäuft, die täglich anwachsen. Die elektronischen sozialen Netze befördern einen rascheren Informationsaustausch als je zuvor. Das Innovationstempo beschleunigt sich zunehmend.

Jungpaläolithikum

TARTAR 2013

Elise Tartar & Randall White, *The manufacture of Aurignacian split-based points: an experimental challenge*. [Journal of Archaeological Science](#) **40** (2013), 2723–2745.

Hunting is one of the areas of human activity that sees the most significant changes in the period from 40 000–35 000 BP in Europe. In this respect, the Aurignacian technocomplex shows technical innovations, notably with the fabrication of split-based points (SBP) in antler and the mass production of bladelets, arguably to serve as weapon armatures. Yet, little experiment work has been dedicated to this question. To begin to fill this gap, we have designed an experimental program devoted to testing and assessing the design, manufacture and use of Aurignacian weaponry.

In this paper, we present the very first stage of this project, focused on the fabrication of SBP’s and particularly the question of the creation of the basal splits, an issue much-debated since the 1920’s. From our replicative experiments and comparisons with the rich collections from Abri Castanet and Blanchard, we conclude that the incision, flexion and cleavage procedure (IFC) applied to SBP’s combines the techniques proposed by previous authors. The use of the IFC procedure has been identified in at least 23 sites in SW Europe. Importantly, because this procedure is rigidly conditioned by the physical and mechanical properties of antler, it is unlikely that another technical solution was possible to create the basal splits.

Keywords: Aurignacian | Hunting | Split based points | Tongued pieces | Antler technology | Abri Castanet | Abri Blanchard

Mathematik

BOWLES 2013

Samuel Bowles & Jung-Kyoo Choi, *Coevolution of farming and private property during the early Holocene*. [PNAS](#) **110** (2013), 8830–8835.

The advent of farming around 12 millennia ago was a cultural as well as technological revolution, requiring a new system of property rights. Among mobile hunter–gatherers during the late Pleistocene, food was almost certainly widely shared as it was acquired. If a harvested crop or the meat of a domesticated animal were to have been distributed to other group members, a late Pleistocene would-be farmer would have had little incentive to engage in the required investments in clearing,

cultivation, animal tending, and storage. However, the new property rights that farming required—secure individual claims to the products of one’s labor—were infeasible because most of the mobile and dispersed resources of a forager economy could not cost-effectively be delimited and defended. The resulting chicken-and-egg puzzle might be resolved if farming had been much more productive than foraging, but initially it was not. Our model and simulations explain how, despite being an unlikely event, farming and a new system of farming-friendly property rights nonetheless jointly emerged when they did. This Holocene revolution was not sparked by a superior technology. It occurred because possession of the wealth of farmers—crops, dwellings, and animals—could be unambiguously demarcated and defended. This facilitated the spread of new property rights that were advantageous to the groups adopting them. Our results thus challenge uncausal models of historical dynamics driven by advances in technology, population pressure, or other exogenous changes. Our approach may be applied to other technological and institutional revolutions such as the 18th- and 19th-century industrial revolution and the information revolution today.

agent-based simulation | evolutionary game theory | technical change | institutional change | big history

ISERN 2012

Neus Isern, Joaquim Fort & Marc Vander Linden, *Space Competition and Time Delays in Human Range Expansions, Application to the Neolithic Transition*. [PLoS ONE 7 \(2012\), e51106](https://doi.org/10.1371/journal.pone.0051106).

[DOI:10.1371/journal.pone.0051106](https://doi.org/10.1371/journal.pone.0051106).

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Space competition effects are well-known in many microbiological and ecological systems. Here we analyze such an effect in human populations. The Neolithic transition (change from foraging to farming) was mainly the outcome of a demographic process that spread gradually throughout Europe from the Near East. In Northern Europe, archaeological data show a slowdown on the Neolithic rate of spread that can be related to a high indigenous (Mesolithic) population density hindering the advance as a result of the space competition between the two populations. We measure this slowdown from a database of 902 Early Neolithic sites and develop a time-delayed reaction-diffusion model with space competition between Neolithic and Mesolithic populations, to predict the observed speeds. The comparison of the predicted speed with the observations and with a previous non-delayed model show that both effects, the time delay effect due to the generation lag and the space competition between populations, are crucial in order to understand the observations.

Metallzeiten

KRAUSSE 2013

Dirk Krause, *Druiden, Ritter, Fürstinnen*. [Spektrum der Wissenschaft 2013](#), vi, 64–71.

Archäologische Grabungen der letzten Jahre erhärten das Bild einer aristokratisch geprägten keltischen Gesellschaft, in der auch Frauen das Sagen hatten – zumindest in der Anfangszeit dieser Kultur.

Kurz nach 400 v. Chr. scheinen jedoch nahezu alle frühkeltischen Machtzentren ihre Bedeutung verloren zu haben. Es ist gewiss kein Zufall, dass die antiken Schriftquellen für diese Epoche den Beginn der keltischen Wanderungen bezeugen. Fest steht: Im frühkeltischen Kerngebiet wurde zwischen 350 und 200 v. Chr. weder in Prunkgräbern bestattet noch existierten große, befestigte Siedlungen. Offensichtlich fielen die Bevölkerungsdichte und die gesellschaftliche Komplexität nördlich der Alpen etwa auf das Anfangsniveau zurück. Neben klimatischen Faktoren spielte wohl die Erschöpfung der von den Kelten erstmals intensiv genutzten, aber eigentlich wenig fruchtbaren Mittelgebirgsböden eine Rolle. Um die anstehenden Probleme zu lösen, hätten neue Organisations- und Herrschaftsformen entwickelt werden müssen. Doch auch wenn Machtzentren wie die Heuneburg, der Mont Lassois oder der Glauberg im 6. und 5. Jahrhundert v. Chr. zum Teil bereits städtischen Charakter hatten, vollzogen die Kelten nicht den entscheidenden Schritt hin zur Hochkultur. Indikatoren wie Schriftlichkeit, Beamtenschaft, staatliche Gewalt und dergleichen fehlen in dieser frühen Phase komplett.

Methoden

IOANNIDIS 2005

John P. A. Ioannidis, *Why Most Published Research Findings Are False*. [PLoS Medicine 2 \(2005\), e124. DOI:10.1371/journal.pmed.0020124.](#)

There is increasing concern that most current published research findings are false. The probability that a research claim is true may depend on study power and bias, the number of other studies on the same question, and, importantly, the ratio of true to no relationships among the relationships probed in each scientific field. In this framework, a research finding is less likely to be true when the studies conducted in a field are smaller; when effect sizes are smaller; when there is a greater number and lesser preselection of tested relationships; where there is greater flexibility in designs, definitions, outcomes, and analytical modes; when there is greater financial and other interest and prejudice; and when more teams are involved in a scientific field in chase of statistical significance. Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true. Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias. In this essay, I discuss the implications of these problems for the conduct and interpretation of research.

TENNANT 2013

Richard K. Tennant, Richard T. Jones, Fiona Brock, Charlotte Cook, Chris S. M. Turney, John Love & Rob Lee, *A new flow cytometry method enabling rapid purification of fossil pollen from terrestrial sediments for AMS radiocarbon dating*. [Journal of Quaternary Science 28 \(2013\), 229–236.](#)

[jqs28-229-Supplement1.tif](#), [jqs28-229-Supplement2.tif](#), [jqs28-229-Supplement3.tif](#), [jqs28-229-Supplement4.tif](#)

Radiocarbon (^{14}C) accelerator mass spectrometry (AMS) dating has played a significant role towards improving our understanding of the timing of events and rates of change in archaeological and environmental records over the last 50 000 years. Although it is not always possible to find suitable macrofossils for ^{14}C dating, microfossils, notably plant pollen, are a viable alternative. Obtaining preserved pollen samples of known provenance and of sufficient quantity for dating by ^{14}C AMS is, however, challenging because of time-consuming methods of extraction and purification and possible contamination from other organic material. Here

we report a new, rapid and straightforward method using flow cytometry (FCM) to distinguish, sort and collect sufficient quantities of fossil pollen with minimal contamination from lake sediments for radiocarbon dating. Using this approach, we demonstrate ^{14}C AMS ages that date back to at least 40 ka BP. While future work may be required to refine purification methodologies for different sample types and to precisely quantify the dating limit of this approach, FCM dating of microfossils shows considerable promise in generating robust geochronological frameworks for sequences that have previously proved problematic.
Keywords: flow cytometry; accelerator mass spectrometry; lacustrine (lake) sediments; pollen dating; radiocarbon dating.

Neolithikum

BANKS 2013

William E. Banks, Nicolas Antunes, Solange Rigaud & Francesco d'Errico, *Ecological constraints on the first prehistoric farmers in Europe*. [Journal of Archaeological Science](#) **40** (2013), 2746–2753.
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The Neolithic Revolution, which witnessed the transformation of huntergatherer groups into farming communities, is traditionally viewed as the event that allowed human groups to create systems of production that, in the long run, led to present-day societies. Despite the large corpus of research focused on the mechanisms and outcomes of the Neolithic transition, relatively little effort has been devoted to evaluating whether particular production-oriented adaptations could be integrated into a broad range of ecological conditions, and if specific cultural traditions differed ecologically. In order to investigate whether the differences between the adaptations and geographic distributions of three major Early Neolithic archaeological cultures are related to the exploitation of different suites of environmental conditions, we apply genetic algorithm and maximum entropy ecological niche modeling techniques to reconstruct and compare the ecological niches within which three principal Neolithic cultures (Impressed Ware, Cardial Ware, and Linearbandkeramik) spread across Europe between ca. 8000 and 7000 cal yr BP. Results show that these cultures occupied mutually exclusive suites of environmental conditions and, thus, were adapted to distinct and essentially non-overlapping ecological niches. We argue that the historical processes behind the Neolithization of Europe were influenced by environmental factors predisposing occupation of regions most suited to specific cultural adaptations.

Keywords: Eco-cultural niche modeling | European Early Neolithic | Linearbandkeramik | Cardial Ware culture | Impressed Ware culture

HINZ 2012

Martin Hinz, Ingo Feeser, Karl-Göran Sjögren & Johannes Müller, *Demography and the intensity of cultural activities: an evaluation of Funnel Beaker Societies (4200–2800 cal BC)*. [Journal of Archaeological Science](#) **39** (2012), 3331–3340.

The Early and Middle Neolithic in Northern Central Europe and Southern Scandinavia is characterised by substantial changes in economic technology as well as in material culture in different periods. One of the main drivers for social development, but also for anthropogenic changes in the environment, is surely shifts in population density. To evaluate group sizes and population density we need archaeological proxies. Similar to other studies, we use ^{14}C dates to reconstruct the intensity of prehistoric activities. A comparison of the human impact from pollen

data with a quantification based on 14C dates proves a correlation which supports our appreciation of the value of sum-calibrated probabilities of radiometric measurements as a proxy for demographic developments. The large amount of usable dates in this study not only enables us to draw general conclusions on a supraregional level, but also makes it possible for us to compare the character of different areas on a regional scale. As a result, we reconstruct a significant rise in population between 4100 and 3500 cal BC and a degression around 3350–3100 cal BC, followed by a reiterated increase for the Funnel Beaker West and North Groups. On the Danish Isles, as well as in the Funnel Beaker North Eastern Group, different tendencies are observable.

Keywords: Neolithic | Human impact | Funnel Beaker | Quantification | Calibration | Pollen analysis | Demography | Proxy development

Ostasien

YANG 2013

Xiaoyan Yang, Huw J. Barton, Zhiwei Wan, Quan Li, Zhikun Ma, Mingqi Li, Dan Zhang & Jun Wei, *Sago-Type Palms Were an Important Plant Food Prior to Rice in Southern Subtropical China*. [PLoS ONE 8 \(2013\), e63148](#). DOI:10.1371/journal.pone.0063148.

Poor preservation of plant macroremains in the acid soils of southern subtropical China has hampered understanding of prehistoric diets in the region and of the spread of domesticated rice southwards from the Yangtze River region. According to records in ancient books and archaeological discoveries from historical sites, it is presumed that roots and tubers were the staple plant foods in this region before rice agriculture was widely practiced. But no direct evidences provided to test the hypothesis. Here we present evidence from starch and phytolith analyses of samples obtained during systematic excavations at the site of Xincun on the southern coast of China, demonstrating that during 3,350–2,470 aBC humans exploited sago palms, bananas, freshwater roots and tubers, fern roots, acorns, Job's-tears as well as wild rice. A dominance of starches and phytoliths from palms suggest that the sago-type palms were an important plant food prior to the rice in south subtropical China. We also believe that because of their reliance on a wide range of starch-rich plant foods, the transition towards labour intensive rice agriculture was a slow process.

Ozeanien

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Carl P. Lipo, Terry L. Hunt & Sergio Rapu Haa, *The 'walking' megalithic statues (moai) of Easter Island*. [Journal of Archaeological Science 40 \(2013\), 2859–2866](#).

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Explaining how the monumental statues (moai) of Easter Island were transported has remained open to debate and speculation, including their resource expenditures and role in deforestation. Archaeological evidence including analysis of moai variability, particularly those abandoned along ancient roads, indicates transport was achieved in a vertical position. To test this proposition we constructed a precise three-dimensional 4.35 metric ton replica of an actual statue and demonstrate

how positioning the center of mass allowed it to fall forward and rock from side to side causing it to ‘walk.’ Our experiments reveal how the statue form was engineered for efficient transport by a small number of individuals.

Keywords: Easter Island | Rapa Nui | Megaliths | Moai | Pacific prehistory | Eastern Polynesia