

## Literatur

### Afrika

BAYON 2012

Germain Bayon, Bernard Dennielou, Joël Etoubleau, Emmanuel Ponzevera, Samuel Toucanne & Sylvain Bermell, *Intensifying Weathering and Land Use in Iron Age Central Africa*. [science 335 \(2012\), 1219–1222](#).

s335-1219-Supplement.pdf

About 3000 years ago, a major vegetation change occurred in Central Africa, when rainforest trees were abruptly replaced by savannas. Up to this point, the consensus of the scientific community has been that the forest disturbance was caused by climate change. We show here that chemical weathering in Central Africa, reconstructed from geochemical analyses of a marine sediment core, intensified abruptly at the same period, departing substantially from the long-term weathering fluctuations related to the Late Quaternary climate. Evidence that this weathering event was also contemporaneous with the migration of Bantu-speaking farmers across Central Africa suggests that human land-use intensification at that time had already made a major impact on the rainforest.

DUPONT 2012

Lydie Dupont, *The Human Factor*. [science 335 \(2012\), 1180–1181](#).

Marine sediments suggest that climate was not the sole driver of the African rainforest crisis 3000 years ago.

The results from both weathering proxies can be explained by changing climate, except for the period between 3000 and 2000 years ago. During the African rainforest crisis of the first millennium B.C.E., both proxies show that weathering increased despite reduced precipitation and constant temperatures.

### Aktuell

BALTER 2012

Michael Balter, *Reviewer's Déjà Vu, French Science Sleuthing Uncover Plagiarized Papers*. [science 335 \(2012\), 1157–1158](#).

After a few insistent e-mails to the journal, Forget and Jansen were given the name of the submitted paper's corresponding author: Serge Valentin Pangou, director of the Study and Research Group on Biological Diversity (GERDIB) in Brazzaville, the Congo's capital. While GERDIB is not well known internationally, it is an important institution in the Congo that often carries out ecological and environmental studies for the government, researchers familiar with it say. And according to foreign scientists who have worked in the Congo, as its director, Pangou serves as a powerful gatekeeper who can grant research permits to them, as well as to Congolese graduate students and junior researchers.

BARHAM 2012

Peter J Barham, *An analysis of the changes in ability and knowledge of students taking A-level physics and mathematics over a 35 year period*.

[Physics Education 47 \(2012\), ii, 162–168](#).

New undergraduate students arriving to study physics at the University of Bristol from 1975 onwards have all taken the same test of their knowledge and understanding of physics and mathematics. Many of the questions test knowledge of material that has been in the A-level syllabus for maths or physics throughout this period. The ability of incoming students to answer these questions declined significantly in the 1990s with average scores falling from around 75 % up to 1990 to below 50 % after 2000 against a background of increasing A-level grades of the entrants to the programme. It is suggested that changes in teaching and examination methods have caused students to be less able to carry out multi-stage calculations and that the introduction of modular examinations may have encouraged a culture where students tend to forget material learnt in previous modules.

#### CARPENTER 2012

Siri Carpenter, *Psychology's Bold Initiative*. [science 335 \(2012\), 1558–1561](#). In an unusual attempt at scientific self-examination, psychology researchers are scrutinizing their field's reproducibility. Nosek first became interested in the problem of replication in psychology several years ago, after he started having persistent problems confirming others' results—something his lab routinely does before extending research to address new questions. Believing himself to be a careful methodologist, he wondered whether something was wrong with the studies he was attempting to reproduce.

#### EDITORIAL 2012

*Must try harder*. [nature 483 \(2012\), 509–509](#).

Too many sloppy mistakes are creeping into scientific papers. Lab heads must look more rigorously at the data – and at themselves.

#### EIWANGER 2012

Josef Eiwanger, *Am Ursprung der Gegenwart – Urgeschichte im marokkanischen Rif*. [Archäologie in Deutschland 2012, ii, 12–17](#).

Seit eineinhalb Jahrzehnten forscht die Kommission für Archäologie Außereuropäischer Kulturen (KAAK) des DAI im Nordosten des Königreichs Marokko. Grund dafür war die ganz besondere geografische Situation an der Nahtstelle des afrikanischen zum europäischen Kontinent. Hier bot sich die Chance, nahezu in Sichtweite zwei ganz unterschiedliche Kulturkreise miteinander zu vergleichen.

An der Unterkante stieß man in 3 m Tiefe völlig unerwartet auf reiche Schichten des Mittelpaläolithikums. Sie wurden aufgrund mittels Beschleuniger-Massenspektrometrie erstellter Radiokarbonaten auf ein Alter von 50 000 bis 40 000 Jahren datiert. Zu diesem Zeitpunkt unterschieden wir dabei ein >Atérien< und, darunter, ein >Moustérien<, eine akkurat dem Lehrbuch entsprechende stratigrafische Situation. Im weiteren Verlauf der Grabungen, die wir inzwischen auf nahezu die Hälfte des 100 m<sup>2</sup> messenden Abris ausgeweitet hatten, wurde der Schichtverlauf immer komplizierter und überraschender. Unter dem >Moustérien< folgte eine kompakte und geschlossene Calciumcarbonatschicht. Darunter befand sich erneut >Atérien<, unter dem schließlich wieder ein >Moustérien< lag. Diese eigenartige Interstratifikation, jüngst im Zentrum ergänzt um ein oberstes >Moustérien<, eliminiert logischerweise die verbreitete Vorstellung einer Abfolge Atérien – Moustérien und reduziert die beiden Komplexe auf ein übergeordnetes Mittelpaläolithikum. Daraufhin angefertigte umfangreiche TL-Datierungsserien an verbranntem Silex ergaben eine Abfolge von ca. 180 000 bis 30 000 Jahren. Somit liegt in Ifri n'Ammar das älteste gesicherte Mittelpaläolithikum Nordafrikas vor und zugleich mit ca. 135 000 v. Chr. das älteste >Atérien<. Alle anderen bekannten Fundstellen im westlichen Maghreb setzen später ein.

MURRAY 2012

Arthur Murray & Ian Hart, *The ‘radioactive dice’ experiment: why is the ‘half-life’ slightly wrong?* [Physics Education 47 \(2012\), ii, 197–197.](#)

The ‘radioactive dice’ experiment is a commonly used classroom analogue to model the decay of radioactive nuclei. However, the value of the half-life obtained from this experiment differs significantly from that calculated for real nuclei decaying exponentially with the same decay constant. This article attempts to explain the discrepancy and suggests modifications to the experiment to minimize this effect.

## Anthropologie

HAILE-SELASSIE 2012

Yohannes Haile-Selassie, Beverly Z. Saylor, Alan Deino, Naomi E. Levin, Mulugeta Alene & Bruce M. Latimer, *A new hominin foot from Ethiopia shows.* [nature 483 \(2012\), 565–569.](#)

[n483-0565-Supplement.pdf](#)

A newly discovered partial hominin foot skeleton from eastern Africa indicates the presence of more than one hominin locomotor adaptation at the beginning of the Late Pliocene epoch. Here we show that new pedal elements, dated to about 3.4 million years ago, belong to a species that does not match the contemporaneous *Australopithecus afarensis* in its morphology and inferred locomotor adaptations, but instead are more similar to the earlier *Ardipithecus ramidus* in possessing an opposable great toe. This not only indicates the presence of more than one hominin species at the beginning of the Late Pliocene of eastern Africa, but also indicates the persistence of a species with *Ar. ramidus*-like locomotor adaptation into the Late Pliocene.

LIEBERMAN 2012

Daniel E. Lieberman, *Those feet in ancient times.* [nature 483 \(2012\), 550–551.](#)

A fossil foot found in Ethiopia suggests that human ancestors that walked on two feet and also ably climbed trees existed until 3.4 million years ago, adding evidence for locomotor diversity during early human evolution.

MCGLONE 2012

Matt McGlone, *The Hunters Did It.* [science 335 \(2012\), 1452–1452.](#)

Human hunting was responsible for the extinction of large mammal species in tropical Australia.

STEWART 2012

J. R. Stewart & C. B. Stringer, *Human Evolution Out of Africa: The Role of Refugia and Climate Change.* [science 335 \(2012\), 1317–1321.](#)

[s335-1317-Supplement.pdf](#)

Although an African origin of the modern human species is generally accepted, the evolutionary processes involved in the speciation, geographical spread, and eventual extinction of archaic humans outside of Africa are much debated. An additional complexity has been the recent evidence of limited interbreeding between modern humans and the Neandertals and Denisovans. Modern human migrations and interactions began during the buildup to the Last Glacial Maximum, starting about 100,000 years ago. By examining the history of other organisms through glacial cycles, valuable models for evolutionary biogeography can be formulated. According to one such model, the adoption of a new refugium by a subgroup of a species may lead to important evolutionary changes.

## Anthropologie Klima

### RULE 2012

Susan Rule, Barry W. Brook, Simon G. Haberle, Chris S. M. Turney, A. Peter Kershaw & Christopher N. Johnson, *The Aftermath of Megafaunal Extinction: Ecosystem Transformation in Pleistocene Australia*. [science 335 \(2012\), 1483–1486](#).

s335-1483-Supplement.pdf

Giant vertebrates dominated many Pleistocene ecosystems. Many were herbivores, and their sudden extinction in prehistory could have had large ecological impacts. We used a high-resolution 130,000-year environmental record to help resolve the cause and reconstruct the ecological consequences of extinction of Australia's megafauna. Our results suggest that human arrival rather than climate caused megafaunal extinction, which then triggered replacement of mixed rainforest by sclerophyll vegetation through a combination of direct effects on vegetation of relaxed herbivore pressure and increased fire in the landscape. This ecosystem shift was as large as any effect of climate change over the last glacial cycle, and indicates the magnitude of changes that may have followed megafaunal extinction elsewhere in the world.

## Datierung

### HIESS 2012

Joe Hiess, Daniel J. Condon, Noah McLean & Stephen R. Noble,  $^{238}\text{U}/^{235}\text{U}$  *Systematics in Terrestrial Uranium-Bearing Minerals*. [science 335 \(2012\), 1610–1614](#).

s335-1610-Supplement.pdf, s335-1610-Supplement1.xlsx, s335-1610-Supplement2.xlsx, s335-1610-Supplement3.xlsx, s335-1610-Supplement4.xlsx, s335-1610-Supplement5.xlsx

The present-day  $^{238}\text{U}/^{235}\text{U}$  ratio has fundamental implications for uranium-lead geochronology and cosmochronology. A value of 137.88 has previously been considered invariant and has been used without uncertainty to calculate terrestrial mineral ages. We report high-precision  $^{238}\text{U}/^{235}\text{U}$  measurements for a suite of uranium-bearing minerals from 58 samples representing a diverse range of lithologies. This data set exhibits a range in  $^{238}\text{U}/^{235}\text{U}$  values of  $>5$  per mil, with no clear relation to any petrogenetic, secular, or regional trends. Variation between comagmatic minerals suggests that  $^{238}\text{U}/^{235}\text{U}$  fractionation processes operate at magmatic temperatures. A mean  $^{238}\text{U}/^{235}\text{U}$  value of  $137.818 \pm 0.045$  (2s) in zircon samples reflects the average uranium isotopic composition and variability of terrestrial zircon. This distribution is broadly representative of the average crustal and "bulk Earth"  $^{238}\text{U}/^{235}\text{U}$  composition.

### KINOSHITA 2012

N. Kinoshita et al., *A Shorter  $^{146}\text{Sm}$  Half-Life Measured and Implications for  $^{146}\text{Sm}$ - $^{142}\text{Nd}$  Chronology in the Solar System*. [science 335 \(2012\), 1614–1617](#).

s335-1614-Supplement.pdf

N. Kinoshita, M. Paul, Y. Kashiv, P. Collon, C. M. Deibel, B. DiGiovine, J. P. Greene, D. J. Henderson, C. L. Jiang, S. T. Marley, T. Nakanishi, R. C. Pardo, K. E. Rehm, D. Robertson, R. Scott, C. Schmitt, X. D. Tang, R. Vondrasek, A. Yokoyama

The extinct p-process nuclide  $^{146}\text{Sm}$  serves as an astrophysical and geochemical chronometer through measurements of isotopic anomalies of its  $\alpha$ -decay daughter  $^{142}\text{Nd}$ . Based on analyses of  $^{146}\text{Sm}/^{147}\text{Sm}$   $\alpha$ -activity and atom ratios, we determined the half-life of  $^{146}\text{Sm}$  to be  $68 \pm 7$  (1s) million years, which is shorter than the currently used value of

$103 \pm 5$  million years. This half-life value implies a higher initial  $^{146}\text{Sm}$  abundance in the early solar system,  $(^{146}\text{Sm}/^{144}\text{Sm})_0 = 0.0094 \pm 0.0005$  (2s), than previously estimated. Terrestrial, lunar, and martian planetary silicate mantle differentiation events dated with  $^{146}\text{Sm}$ - $^{142}\text{Nd}$  converge to a shorter time span and in general to earlier times, due to the combined effect of the new  $^{146}\text{Sm}$  half-life and  $(^{146}\text{Sm}/^{144}\text{Sm})_0$  values.

## STIRLING 2012

Claudine H. Stirling, *Keeping Time with Earth's Heaviest Element*. [science](#) **335** (2012), 1585–1585.

New  $^{238}\text{U}/^{235}\text{U}$  ratios for uranium-bearing minerals provide a better chronometer for dating geological processes.

## Energie

### BURNS 2012

Peter C. Burns, Rodney C. Ewing & Alexandra Navrotsky, *Nuclear Fuel in a Reactor Accident*. [science](#) **335** (2012), 1184–1188.

Nuclear accidents that lead to melting of a reactor core create heterogeneous materials containing hundreds of radionuclides, many with short half-lives. The long-lived fission products and transuranium elements within damaged fuel remain a concern for millennia. Currently, accurate fundamental models for the prediction of release rates of radionuclides from fuel, especially in contact with water, after an accident remain limited. Relatively little is known about fuel corrosion and radionuclide release under the extreme chemical, radiation, and thermal conditions during and subsequent to a nuclear accident. We review the current understanding of nuclear fuel interactions with the environment, including studies over the relatively narrow range of geochemical, hydrological, and radiation environments relevant to geological repository performance, and discuss priorities for research needed to develop future predictive models.

## Klima

### DESCHAMPS 2012

Pierre Deschamps et al., *Ice-sheet collapse and sea-level rise at the Bølling warming 14,600 years ago*. [nature](#) **483** (2012), 559–564.

[n483-0559-Supplement.pdf](#)

Pierre Deschamps, Nicolas Durand, Edouard Bard, Bruno Hamelin, Gilbert Camoin, Alexander L. Thomas, Gideon M. Henderson, Jun'ichi Okuno & Yusuke Yokoyama

Past sea-level records provide invaluable information about the response of ice sheets to climate forcing. Some such records suggest that the last deglaciation was punctuated by a dramatic period of sea-level rise, of about 20 metres, in less than 500 years. Controversy about the amplitude and timing of this meltwater pulse (MWP-1A) has, however, led to uncertainty about the source of the melt water and its temporal and causal relationships with the abrupt climate changes of the deglaciation. Here we show that MWP-1A started no earlier than 14,650 years ago and ended before 14,310 years ago, making it coeval with the Bølling warming. Our results, based on corals drilled offshore from Tahiti during Integrated Ocean Drilling Project Expedition 310, reveal that the increase in sea level at Tahiti was between 12 and 22 metres, with a most probable value between 14 and 18 metres, establishing a significant meltwater contribution from the Southern Hemisphere. This implies that the rate of eustatic sea-level rise exceeded 40 millimetres per year during MWP-1A.

## KOPP 2012

Robert E. Kopp, *Tahitian record suggests Antarctic collapse*. [nature 483 \(2012\), 549–550](#).

The exact origin, timing and amplitude of a rapid period of sea-level rise known as melt-water pulse 1A, about 14,500 years ago, have remained unclear. An analysis of coral samples from Tahiti delivers some answers.

## RAYMO 2012

Maureen E. Raymo & Jerry X. Mitrovica, *Collapse of polar ice sheets during the stage 11 interglacial*. [nature 483 \(2012\), 453–456](#).

[n483-0453-Supplement.pdf](#)

Contentious observations of Pleistocene shoreline features on the tectonically stable islands of Bermuda and the Bahamas have suggested that sea level about 400,000 years ago was more than 20 metres higher than it is today<sup>1-4</sup>. Geochronologic and geomorphic evidence indicates that these features formed during interglacial marine isotope stage (MIS) 11, an unusually long interval of warmth during the ice age<sup>1-4</sup>. Previous work has advanced two divergent hypotheses for these shoreline features: first, significant melting of the East Antarctic Ice Sheet, in addition to the collapse of the West Antarctic Ice Sheet and the Greenland Ice Sheet<sup>1-3</sup>; or second, emplacement by a mega-tsunami during MIS 11 (ref. 4, 5). Here we show that the elevations of these features are corrected downwards by 10 metres when we account for post-glacial crustal subsidence of these sites over the course of the anomalously long interglacial. On the basis of this correction, we estimate that eustatic sea level rose to  $\approx 6$ -13 m above the present-day value in the second half of MIS 11. This suggests that both the Greenland Ice Sheet and the West Antarctic Ice Sheet collapsed during the protracted warm period while changes in the volume of the East Antarctic Ice Sheet were relatively minor, thereby resolving the long-standing controversy over the stability of the East Antarctic Ice Sheet during MIS 11.

## Story or Book

### BALTER 2012

Michael Balter, *Critics Assail Notion That Europeans Settled Americas*. [science 335 \(2012\), 1289–1290](#).

Across Atlantic Ice: The Origin of America's Clovis. Dennis J. Stanford & Bruce A. Bradley. Preis: EUR 26,00, Gebundene Ausgabe: 304 Seiten, Verlag: University of California (21. Februar 2012), Sprache: Englisch, ISBN-10: 0520227832

When originally proposed in the late 1990s, Stanford and Bradley's hypothesis linked Solutrean artifacts to those of the 13,000-year-old Clovis culture, the first clearly identified stone-tool-making tradition in the Americas. Since then, additional strong evidence for pre-Clovis tools has come to light (Science, 25 March 2011, p. 1512); most experts still think the first Americans hailed from Asia, although earlier than once thought.

Ancient DNA expert Eske Willerslev of the University of Copenhagen sides with the critics that no current evidence supports the Solutrean hypothesis. But he also agrees with Stanford and Bradley that researchers need additional older North American DNA, in particular from the much larger and more informative nuclear genome, before the controversy can be resolved. Thus down but not out, the Solutrean hypothesis lives for another day.

### BOOK 2012

*Free Will*. [nature 483 \(2012\), 273](#).

Free Will. Sam Harris. Free Press 96 pp. \$9.99 (2012)

Neuroscientist Sam Harris, the author of the bestselling *The Moral Landscape* (2010), here skewers the concept of free will – that mainstay of law, policy and politics – in fewer than 100 pages. Using evidence drawn from psychology and neuroscience, Harris asserts that the course of human life is all down to luck, and that willpower is a “biological phenomenon”. We are not in charge of our own minds, he says: thought and intention simply arise. This is a tract that is sure to boldly go straight to the heart of the determinism debate.

#### BOOK 2012

*Born Believers*. [nature 483 \(2012\), 273](#).

*Born Believers: The Science of Children’s Religious Belief*. Justin L. Barrett. Free Press 320 pp. \$26.00 (2012)

Psychologist Justin Barrett says that belief is rooted not in indoctrination, but in a default setting of the infant brain. A range of findings in developmental psychology, he argues, support the theory: very young children, for instance, are aware that nature is not designed by humans; and people tend to look for unseen agents behind natural phenomena. Barrett says that the evidence points to a universal “natural religion” – but he also argues that parents must not impose belief systems on their children, and should leave the question of whether to die a believer up to their offspring.

#### ERLANSON 2012

Dan Erlanson, *The Pi that wasn’t round, How to square a circle*. [nature 483 \(2012\), 368](#).

#### GILBEY 2012

John Gilbey, *Visiting Bob, Life insurance*. [nature 483 \(2012\), 504](#).

#### JOHNSTON 2012

Elizabeth Johnston, *Pictures of Remembering*. [science 335 \(2012\), 1172](#).

The history of the memory sciences resembles in some respects the claims about memory made by one particular psychologist-Bartlett, whose mantra was that the fate, significance, and meaning of all psychic material was in the hands of future users.

*Memory. Fragments of a Modern History*. by Alison Winter. University of Chicago Press, Chicago, 2011. 329 pp. \$30, £19.95. ISBN 9780226902586.

The notion that “secreted within us are perfect records of past experiences” was the very theory that Bartlett vigorously opposed-the “trace theory” of memory. Winter does a masterful job of explicating Bartlett’s perspective, despite its odd placement late in the book between recovered memories and the FMSF. Regardless of this quibble, her rich account of the development of Bartlett’s work, from his early fellowship dissertation studies of conventionalization to his dynamic model of memory schema, shows that it is more than an argument for the falsity of memory.

#### RAMALHO-SANTOS 2012

João Ramalho-Santos, *Invisible, The path to immortality*. [nature 483 \(2012\), 642](#).