

## Literatur

### Aktuell

#### AMIOT 2011

Romain Amiot et al., *Oxygen isotopes of East Asian dinosaurs reveal exceptionally cold Early Cretaceous climates*. [PNAS 108 \(2011\), 5179–5183](#).

[pnas108-05179-Supplement.pdf](#)

Romain Amiot, Xu Wang, Zhonghe Zhou, Xiaolin Wang, Eric Buffetaut, Christophe Lécuyer, Zhongli Ding, Frédéric Fluteau, Tsuyoshi Hibino, Nao Kushuhashi, Jinyou Mo, Varavudh Suteethorn, Yuanqing Wang, Xing Xu and Fusong Zhang

Early Cretaceous vertebrate assemblages from East Asia and particularly the Jehol Biota of northeastern China flourished during a period of highly debated climatic history. While the unique characters of these continental faunas have been the subject of various speculations about their biogeographic history, little attention has been paid to their possible climatic causes. Here we address this question using the oxygen isotope composition of apatite phosphate ( $d_{18}O_p$ ) from various reptile remains recovered from China, Thailand, and Japan.  $d_{18}O_p$  values indicate that cold terrestrial climates prevailed at least in this part of Asia during the Barremian–early Albian interval. Estimated mean air temperatures of about  $10 \pm 4$  °C at midlatitudes ( $\approx 42$  °N) correspond to present day cool temperate climatic conditions. Such low temperatures are in agreement with previous reports of cold marine temperatures during this part of the Early Cretaceous, as well as with the widespread occurrence of the temperate fossil wood genus *Xenoxylon* and the absence of thermophilic reptiles such as crocodylians in northeastern China. The unique character of the Jehol Biota is thus not only the result of its evolutionary and biogeographical history but is also due to rather cold local climatic conditions linked to the paleolatitudinal position of northeastern China and global icehouse climates that prevailed during this part of the Early Cretaceous.

vertebrate phosphate | oxygen isotopes | paleoclimate

#### BOHANNON 2011

John Bohannon, *Counting the Dead in Afghanistan*. [science 331 \(2011\), 1256–1260](#).

[s331-1256-Supplement.htm](#)

A military data set of civilian casualties, provided exclusively to Science, indicates that the war has become more lethal to the Afghan population, largely because of indiscriminate insurgent attacks

#### BOULARD 2011

Eglantine Boulard et al., *New host for carbon in the deep Earth*. [PNAS 108 \(2011\), 5184–5187](#).

[pnas108-05184-Supplement.pdf](#)

Eglantine Boulard, Alexandre Gloter, Alexandre Corgne, Daniele Antonangeli, Anne-Line Auzende, Jean-Philippe Perrillat, François Guyot and Guillaume Fiquet

The global geochemical carbon cycle involves exchanges between the Earth's interior and the surface. Carbon is recycled into the mantle via subduction mainly as carbonates and is released to the atmosphere via volcanism mostly as CO<sub>2</sub>. The stability of carbonates versus decarbonation and melting is therefore of great interest for understanding the global carbon cycle. For all these reasons, the thermodynamic properties and phase diagrams of

these minerals are needed up to core mantle boundary conditions. However, the nature of C-bearing minerals at these conditions remains unclear. Here we show the existence of a new Mg-Fe carbon-bearing compound at depths greater than 1,800 km. Its structure, based on three-membered rings of corner-sharing (CO<sub>4</sub>)<sub>4</sub>- tetrahedra, is in close agreement with predictions by first principles quantum calculations [Oganov AR, et al. (2008) Novel high-pressure structures of MgCO<sub>3</sub>, CaCO<sub>3</sub> and CO<sub>2</sub> and their role in Earth's lower mantle. *Earth Planet Sci Lett* 273:38–47]. This high-pressure polymorph of carbonates concentrates a large amount of Fe(III) as a result of intracrystalline reaction between Fe(II) and (CO<sub>3</sub>)<sup>2-</sup> groups schematically written as  $4\text{FeO} + \text{CO}_2 \rightarrow 2\text{Fe}_2\text{O}_3 + \text{C}$ . This results in an assemblage of the new high-pressure phase, magnetite and nanodiamonds.

diamond | Earth mantle | phase transition | experimental petrology | redox interaction

#### BRUMFIEL 2011

Geoff Brumfiel, *The meltdown that wasn't*. [nature 471 \(2011\), 417–418](#).

How a handful of operators at a crippled reactor averted a greater catastrophe at the Fukushima plant.

Still, at unit 1 the immediate crisis has passed. With the pressure down, fire engines began to flood the reactor with sea water at 8:20 p.m. on 12 March, allowing the fuel to slowly cool to a safe temperature. The response at unit 1 also provided a model for stabilizing the other two reactors. And day by day, the radioactive decay in the reactor cores is ebbing. It could be days or weeks before the reactors are truly safe, but for now things remain stable. As for the operators at unit 1, says Harding, “I think they really did respond pretty well.”

#### COMMENT 2011

Frances S. Chen, Robert Kumsta & Markus Heinrichs, *Oxytocin and intergroup relations: Goodwill is not a fixed pie*. [PNAS 108 \(2011\), E45](#).

#### FERGUSON 2011

Charles D. Ferguson, *Do not phase out nuclear power – yet*. [nature 471 \(2011\), 411](#).

Fission power must remain a crucial part of the energy mix until renewable energy technologies can be scaled up, argues Charles D. Ferguson.

Contemporary plant designs - ‘generation III’ - have better safety features than the 1970s-era generation II designs for the Fukushima reactors, making them more expensive. Some, such as the AP1000 designed by the Westinghouse Electric Company, headquartered in Cranberry Township, Pennsylvania, have passive safety features that do not require technicians to activate emergency systems or electrical power to ensure safety after a mishap. Others, such as Paris-based Areva’s EPR, have advanced active safety systems designed to prevent the release of radioactive material to the environment. Further designs, such as the pebble-bed modular reactor, may prevent nuclear fuel from ever experiencing a meltdown. Concerns were raised about the Fukushima designs as early as 1972, the year after reactor unit 1 began operations. But the nuclear industry opposed shutting down such reactors because 32 were in operation worldwide - about 7% of the world’s total. Almost one-quarter of the reactors in the United States are of this type. The remaining plants of this design should undergo a thorough safety review and, as a result, some may need to close.

#### HUGHES 1911

T. McKenny Hughes, *The Fox and the Fleas*. [nature 86 \(1911\), 110–111](#).

#### REPLY 2011

Carsten K. W. De Dreu, Lindred L. Greer, Gerben A. Van Kleef, Shaul Shalvi & Michel J. J. Handgraaf, *Perhaps goodwill is unlimited but oxytocin-induced goodwill is not, Reply to Chen et al.* [PNAS 108 \(2011\), E46](#).

## Anthropologie

HENN 2011

Brenna M. Henn et al., *Hunter-gatherer genomic diversity suggests a southern African origin for modern humans*. [PNAS 108 \(2011\), 5154–5162](#).  
pnas108-05154-Supplement.pdf

Brenna M. Henn, Christopher R. Gignoux, Matthew Jobin, Julie M. Granka, J. M. Macpherson, Jeffrey M. Kidd, Laura Rodríguez-Botigué, Sohini Ramachandran, Lawrence Hon, Abra Brisbin, Alice A. Lin, Peter A. Underhill, David Comas, Kenneth K. Kidd, Paul J. Norman, Peter Parham, Carlos D. Bustamante, Joanna L. Mountain and Marcus W. Feldman

Africa is inferred to be the continent of origin for all modern human populations, but the details of human prehistory and evolution in Africa remain largely obscure owing to the complex histories of hundreds of distinct populations. We present data for more than 580,000 SNPs for several hunter-gatherer populations: the Hadza and Sandawe of Tanzania, and the Khomani Bushmen of South Africa, including speakers of the nearly extinct N|u language. We find that African hunter-gatherer populations today remain highly differentiated, encompassing major components of variation that are not found in other African populations. Hunter-gatherer populations also tend to have the lowest levels of genome-wide linkage disequilibrium among 27 African populations. We analyzed geographic patterns of linkage disequilibrium and population differentiation, as measured by  $F_{ST}$ , in Africa. The observed patterns are consistent with an origin of modern humans in southern Africa rather than eastern Africa, as is generally assumed. Additionally, genetic variation in African hunter-gatherer populations has been significantly affected by interaction with farmers and herders over the past 5,000 y, through both severe population bottlenecks and sex-biased migration. However, African hunter-gatherer populations continue to maintain the highest levels of genetic diversity in the world.

human evolution | population genetics | Khoisan

ROEBROEKS 2011

Wil Roebroeks & Paola Villa, *On the earliest evidence for habitual use of fire in Europe*. [PNAS 108 \(2011\), 5209–5214](#).

pnas108-05209-Supplement1.pdf, pnas108-05209-Supplement2.doc

The timing of the human control of fire is a hotly debated issue, with claims for regular fire use by early hominins in Africa at  $\approx 1.6$  million y ago. These claims are not uncontested, but most archaeologists would agree that the colonization of areas outside Africa, especially of regions such as Europe where temperatures at time dropped below freezing, was indeed tied to the use of fire. Our review of the European evidence suggests that early hominins moved into northern latitudes without the habitual use of fire. It was only much later, from  $\approx 300,000$  to 400,000 y ago onward, that fire became a significant part of the hominin technological repertoire. It is also from the second half of the Middle Pleistocene onward that we can observe spectacular cases of Neandertal pyrotechnological knowledge in the production of hafting materials. The increase in the number of sites with good evidence of fire throughout the Late Pleistocene shows that European Neandertals had fire management not unlike that documented for Upper Paleolithic groups.

human evolution | Paleolithic archeology | fireplaces | hafting adhesives

TENENBAUM 2011

Joshua B. Tenenbaum, Charles Kemp, Thomas L. Griffiths & Noah D. Goodman, *How to Grow a Mind: Statistics, Structure, and Abstraction*. [science 331 \(2011\), 1279–1285](#).

s331-1279-Supplement.pdf

In coming to understand the world—in learning concepts, acquiring language, and grasping causal relations—our minds make inferences that appear to go far beyond the data available. How do we do it? This review describes recent approaches to reverse-engineering human learning and cognitive development and, in parallel, engineering more humanlike machine learning systems. Computational models that perform probabilistic inference over hierarchies of flexibly structured representations can address some of the deepest questions about the nature and origins of human thought: How does abstract knowledge guide learning and reasoning from sparse data? What forms does our knowledge take, across different domains and tasks? And how is that abstract knowledge itself acquired?

## Klima

### STAGER 2011

J. Curt Stager, David B. Ryves, Brian M. Chase & Francesco S. R. Pausata, *Catastrophic Drought in the Afro-Asian Monsoon Region During Heinrich Event 1*. [science 331 \(2011\), 1299–1302](#).

[s331-1299-Supplement.pdf](#)

Between 15,000 and 18,000 years ago, large amounts of ice and meltwater entered the North Atlantic during Heinrich stadial 1. This caused substantial regional cooling, but major climatic impacts also occurred in the tropics. Here, we demonstrate that the height of this stadial, about 16,000 to 17,000 years ago (Heinrich event 1), coincided with one of the most extreme and widespread megadroughts of the past 50,000 years or more in the Afro-Asian monsoon region, with potentially serious consequences for Paleolithic cultures. Late Quaternary tropical drying commonly is attributed to southward drift of the intertropical convergence zone, but the broad geographic range of the Heinrich event 1 megadrought suggests that severe, systemic weakening of Afro-Asian rainfall systems also occurred, probably in response to sea surface cooling.

## Kultur

### CHAPAIS 2011

Bernard Chapais, *The Deep Social Structure of Humankind*. [science 331 \(2011\), 1276–1277](#).

Primatology and anthropology converge on the uniqueness of human society.

### HILL 2011

Kim R. Hill et al., *Co-Residence Patterns in Hunter-Gatherer Societies Show Unique Human Social Structure*. [science 331 \(2011\), 1286–1289](#).

[s331-1286-Supplement.pdf](#)

Kim R. Hill, Robert S. Walker, Miran Božičević, James Eder, Thomas Headland, Barry Hewlett, A. Magdalena Hurtado, Frank Marlowe, Polly Wiessner & Brian Wood

Contemporary humans exhibit spectacular biological success derived from cumulative culture and cooperation. The origins of these traits may be related to our ancestral group structure. Because humans lived as foragers for 95% of our species' history, we analyzed co-residence patterns among 32 present-day foraging societies (total  $n = 5067$  individuals, mean experienced band size = 28.2 adults). We found that hunter-gatherers display a unique social structure where (i) either sex may disperse or remain in their natal group, (ii) adult brothers and sisters often co-reside, and (iii) most individuals in residential groups are genetically unrelated. These patterns produce large interaction networks of unrelated adults and suggest that inclusive fitness cannot explain extensive cooperation in hunter-gatherer bands. However, large social networks may help to explain why humans evolved capacities for social learning that resulted in cumulative culture.

## Story or Book

LAGERGREN 2011

Marten Lagergren, *A long, diligent life, A 90-year cohort study hints that personality plays a unexpected part in lifespan.* [nature 471 \(2011\), 443–444.](#)

The Longevity Project: Surprising Discoveries for Health and Long Life from the Landmark Eight-Decade Study

Howard S. Friedman and Leslie R. Martin

Hudson Street Press/ Hay House: 2011

272 pp. \$25.95/£10.99

The difference in length of life between men and women has always intrigued epidemiologists and demographers. The Longevity Project adds a new twist by suggesting that behaviour also influences the longer lifespan of women. In the study, children of either sex who were drawn to masculine careers (those shown by tests to be mostly preferred by men, such as being a mechanical engineer or pilot) had a shorter lifespan than those who preferred more feminine occupations (such as being an interior decorator or working with children). Thus, cultural dimensions may explain why life expectancy for the sexes differs over time and between countries and cultures.

ROBERTS 2011

Peter Roberts, *Renewal, Flesh of my flesh.* [nature 471 \(2011\), 542.](#)