

## Literatur

### Aktuell

BRUMFIEL 2011

Geoff Brumfiel, David Cyranoski, Richard Monastersky & Alison Abbott, *Quake sparks nuclear crisis*. *nature* **471** (2011), 273–275.

Explosions at a tsunami-hit plant will knock public confidence and the industry worldwide. For his part, Grimes says that he believes the event actually proves the safety of nuclear power plants. Despite being more than 30 years old, and having faced the largest earthquake ever recorded in Japan and a towering tsunami, the reactors at Fukushima Daiichi have, so far, largely contained their dangerous radioactive fuel. “Actually, it’s a success,” Grimes says, then adds: “Although do I think the general public will be able to see that? I think the answer is, sadly, no.”

CHO 2011

Adrian Cho, *Have Physicists Already Glimpsed Particles of Dark Matter?* *science* **331** (2011), 1132–1133.

The debate over that question suggests that the discovery of dark matter-whenver it comes-will be a murky affair

”In the past, they’ve been pretty tightlipped with the details,” says Livermore’s Sorensen. “It’s like they’re saying, ‘We saw something. Now give us the Nobel Prize and go away.’ “ Looking at just the heat signals to snare the lowest-energy events and analyzing the data conservatively, CDMS II rules out the particles’ existence, says Blas Cabrera, the team leader from Stanford. “We believe it robustly rules it out,” he says. “It’s not even close.” Hooper acknowledges that the CDMS II limit imposes a constraint but says “there’s still wiggle room” for light dark matter particles.

OHLSON 2011

Mikael Ohlson et al., *Invasion of Norway spruce diversifies the fire regime in boreal European forests*. *Journal of Ecology* **99** (2011), 395–403.

JEcol099-0395-Supplement.pdf

Mikael Ohlson, Kendrick J. Brown, H. John B. Birks, John-Arvid Grytnes, Greger Hörnberg, Mats Niklasson, Heikki Seppä and Richard H. W. Bradshaw

1. Global wildfire activity and biomass burning have varied substantially during the Holocene in both time and space. At the regional to continental scale, macroclimate is considered to be the predominant control regulating wildfire activity. By contrast, the role of forest tree composition is often considered as a subsidiary factor in studies addressing temporal variation in regional wildfire activity.

2. Here, we assemble a spatially comprehensive data set of 75 macroscopic charcoal records that reflect local burning and forest landscapes that are spread over a substantial part of the European boreal forest, spanning both oceanic and continental climates.

3. We show that the late-Holocene invasion of Norway spruce *Picea abies*, a newforest dominant in northern Europe, significantly reduced wildfire activity, thus altering forest disturbance dynamics at a subcontinental scale.

4. Synthesis. Our findings show that a biotic change in the local forest ecosystem altered the fire regime largely independent of regional climate change, illustrating that forest composition is an important parameter that must be considered when modelling future fire risk and carbon dynamics in boreal forests.

Key-words: charcoal, climate change, forest history, Holocene, palaeoecology and land-use history, *Picea abies*, species invasion, spruce forest, wildfire activity

#### PLOTNIK 2011

Joshua M. Plotnik, Richard Lair, Wirot Suphachoksahakun & Frans B.M. de Waal, *Elephants know when they need a helping trunk in a cooperative task*. [PNAS 108 \(2011\), 5116–5121](#).

[pnas108-05116-Supplement.pdf](#), [pnas108-05116-Supplement1.mov](#), [pnas108-05116-Supplement2.mov](#), [pnas108-05116-Supplement3.mov](#), [pnas108-05116-Supplement4.mov](#), [pnas108-05116-Supplement5.mov](#)

Elephants are widely assumed to be among the most cognitively advanced animals, even though systematic evidence is lacking. This void in knowledge is mainly due to the danger and difficulty of submitting the largest land animal to behavioral experiments. In an attempt to change this situation, a classical 1930s cooperation paradigm commonly tested on monkeys and apes was modified by using a procedure originally designed for chimpanzees (*Pan troglodytes*) to measure the reactions of Asian elephants (*Elephas maximus*). This paradigm explores the cognition underlying coordination toward a shared goal. What do animals know or learn about the benefits of cooperation? Can they learn critical elements of a partner's role in cooperation? Whereas observations in nature suggest such understanding in nonhuman primates, experimental results have been mixed, and little evidence exists with regards to nonprimates. Here, we show that elephants can learn to coordinate with a partner in a task requiring two individuals to simultaneously pull two ends of the same rope to obtain a reward. Not only did the elephants act together, they inhibited the pulling response for up to 45 s if the arrival of a partner was delayed. They also grasped that there was no point to pulling if the partner lacked access to the rope. Such results have been interpreted as demonstrating an understanding of cooperation. Through convergent evolution, elephants may have reached a cooperative skill level on a par with that of chimpanzees.

animal behavior | comparative cognition | problem solving

## Amerika

#### BALTER 2011

Michael Balter, *Do Island Sites Suggest a Coastal Route to the Americas?* [science 331 \(2011\), 1122](#).

Researchers now realize that a number of sites in North and South America predate 14,000 years, suggesting that the first Americans arrived before the Clovis people and before the icefree land corridor opened up. Hence the renewed interest in the coastal hypothesis.

Erlandson notes that the projectile points found on the Channel Islands look nothing like Clovis points, which were probably used to hunt large mammals. But they do resemble points found at pre-Clovis sites in the Pacific Northwest, South America, and even Japan, where similar artifacts dated to 15,000 years ago have been found.

#### ERLANDSON 2011

Jon M. Erlandson et al., *Paleoindian Seafaring, Maritime Technologies, and Coastal Foraging on California's Channel Islands*. [science 331 \(2011\), 1181–1185](#).

[s331-1181-Supplement.pdf](#)

Jon M. Erlandson, Torben C. Rick, Todd J. Braje, Molly Casperson, Brendan Culleton, Brian Fulfrost, Tracy Garcia, Daniel A. Guthrie, Nicholas Jew, Douglas J. Kennett, Madonna L. Moss, Leslie Reeder, Craig Skinner, Jack Watts & Lauren Willis

Three archaeological sites on California's Channel Islands show that Paleoindians relied heavily on marine resources. The Paleocoastal sites, dated between  $\approx 12,200$  and  $11,200$  years ago, contain numerous stemmed projectile points and crescents associated with a variety of marine and aquatic faunal remains. At site CA-SRI-512 on Santa Rosa Island, Paleocoastal peoples used such tools to capture geese, cormorants, and other birds, along with marine mammals and finfish. At Cardwell Bluffs on San Miguel Island, Paleocoastal peoples collected local chert cobbles, worked them into bifaces and projectile points, and discarded thousands of marine shells. With bifacial technologies similar to those seen in Western Pluvial Lakes Tradition assemblages of western North America, the sites provide evidence for seafaring and island colonization by Paleoindians with a diversified maritime economy.

## Datierung

HAIN 2011

Mathis P. Hain, Daniel M. Sigman & Gerald H. Haug, *Shortcomings of the isolated abyssal reservoir model for deglacial radiocarbon changes in the mid-depth Indo-Pacific Ocean*. *Geophysical Research Letters* **38** (2011), L04604. <<http://dx.doi.org/10.1029/2010GL046158>>.

[1] Severely negative D14C anomalies from the mid-depth Pacific and the Arabian Sea have been taken as support for the hypothesized deglacial release of a previously isolated, extremely 14C-deplete deep ocean carbon reservoir. We report box model simulations that cast doubt on both the existence of the hypothesized deep reservoir and its ability to explain the mid-depth D14C anomalies. First, the degree of ice age isolation needed to substantially reduce the deep D14C of the deep reservoir causes anoxia and the trapping of alkalinity from CaCO<sub>3</sub> dissolution, the latter increasing atmospheric CO<sub>2</sub>. Second, even with a completely 14C-free deep reservoir, achieving the mid-depth D14C anomalies of observed duration requires ad hoc stifling of aspects of deep circulation to prevent rapid dissipation of the anomalous 14C-free carbon to the rest of the ocean and the atmosphere. We suggest that the mid-depth anomalies do not record basin-scale D14C changes but are instead local phenomena.

## Klima

REYES 2011

Alberto V. Reyes & Colin A. Cooke, *Northern peatland initiation lagged abrupt increases in deglacial atmospheric CH<sub>4</sub>*. *PNAS* **108** (2011), 4748–4753. [pnas108-04748-Supplement.pdf](#), [pnas108-04748-Supplement1.xls](#), [pnas108-04748-Supplement2.xls](#)

Peatlands are a key component of the global carbon cycle. Chronologies of peatland initiation are typically based on compiled basal peat radiocarbon (<sup>14</sup>C) dates and frequency histograms of binned calibrated age ranges. However, such compilations are problematic because poor quality <sup>14</sup>C dates are commonly included and because frequency histograms of binned age ranges introduce chronological artefacts that bias the record of peatland initiation. Using a published compilation of 274 basal <sup>14</sup>C dates from Alaska as a case study, we show that nearly half the <sup>14</sup>C dates are inappropriate for reconstructing peatland initiation, and that the temporal structure of peatland initiation is sensitive to sampling biases and treatment of calibrated <sup>14</sup>C dates. We present revised chronologies of peatland initiation for Alaska and the circumpolar Arctic based on summed probability distributions of calibrated <sup>14</sup>C dates. These revised chronologies reveal that northern peatland initiation lagged abrupt increases in atmospheric CH<sub>4</sub> concentration at the start of the

Bølling-Allerød interstadial (Termination 1A) and the end of the Younger Dryas chronozone (Termination 1B), suggesting that northern peatlands were not the primary drivers of the rapid increases in atmospheric CH<sub>4</sub>. Our results demonstrate that subtle methodological changes in the synthesis of basal <sup>14</sup>C ages lead to substantially different interpretations of temporal trends in peatland initiation, with direct implications for the role of peatlands in the global carbon cycle.  
radiocarbon dating; peatland carbon; ice core methane; paleoclimate

## SEXTON 2011

Philip F. Sexton et al., *Eocene global warming events driven by ventilation of oceanic dissolved organic carbon*. *nature* **471** (2011), 349–352.

n471-0349-Supplement.pdf

Philip F. Sexton, Richard D. Norris, Paul A. Wilson, Heiko Pälike, Thomas Westerhold, Ursula Röhl, Clara T. Bolton & Samantha Gibbs

'Hyperthermals' are intervals of rapid, pronounced global warming known from six episodes within the Palaeocene and Eocene epochs ( $\approx 65$ -34 million years (Myr) ago)<sup>1-13</sup>. The most extreme hyperthermal was the 170 thousand year (kyr) interval<sup>2</sup> of 5-7 °C global warming<sup>3</sup> during the Palaeocene-Eocene Thermal Maximum (PETM, 56 Myr ago). The PETM is widely attributed to massive release of greenhouse gases from buried sedimentary carbon reservoirs<sup>1,3,6,11,14-17</sup>, and other, comparatively modest, hyperthermals have also been linked to the release of sedimentary carbon<sup>3,6,11,16,17</sup>. Here we show, using new 2.4-Myr-long Eocene deep ocean records, that the comparatively modest hyperthermals are much more numerous than previously documented, paced by the eccentricity of Earth's orbit and have shorter durations ( $\approx 40$  kyr) and more rapid recovery phases than the PETM. These findings point to the operation of fundamentally different forcing and feedback mechanisms than for the PETM, involving redistribution of carbon among Earth's readily exchangeable surface reservoirs rather than carbon exhumation from, and subsequent burial back into, the sedimentary reservoir. Specifically, we interpret our records to indicate repeated, large-scale releases of dissolved organic carbon (at least 1,600 gigatonnes) from the ocean by ventilation (strengthened oxidation) of the ocean interior. The rapid recovery of the carbon cycle following each Eocene hyperthermal strongly suggests that carbon was resequenced by the ocean, rather than the much slower process of silicate rock weathering proposed for the PETM<sup>1,3</sup>. Our findings suggest that these pronounced climate warming events were driven not by repeated releases of carbon from buried sedimentary sources<sup>3,6,11,16,17</sup>, but, rather, by patterns of surficial carbon redistribution familiar from younger intervals of Earth history.

## Neolithikum

## BOWLES 2011

Samuel Bowles, *Cultivation of cereals by the first farmers was not more productive than foraging*. *PNAS* **108** (2011), 4760–4765.

pnas108-04760-Supplement.pdf

Did foragers become farmers because cultivation of crops was simply a better way to make a living? If so, what is arguably the greatest ever revolution in human livelihoods is readily explained. To answer the question, I estimate the caloric returns per hour of labor devoted to foraging wild species and cultivating the cereals exploited by the first farmers, using data on foragers and landabundant hand-tool farmers in the ethnographic and historical record, as well as archaeological evidence. A convincing answer must account not only for the work of foraging and cultivation but also for storage, processing, and other indirect labor, and for the costs associated with the delayed nature of agricultural production and the greater exposure to risk of those whose livelihoods depended on a few cultivars rather than

a larger number of wild species. Notwithstanding the considerable uncertainty to which these estimates inevitably are subject, the evidence is inconsistent with the hypothesis that the productivity of the first farmers exceeded that of early Holocene foragers. Social and demographic aspects of farming, rather than its productivity, may have been essential to its emergence and spread. Prominent among these aspects may have been the contribution of farming to population growth and to military prowess, both promoting the spread of farming as a livelihood.

labor productivity | technological change | time discount | certainty equivalent

## Religion

### BERING 2006

Jesse M. Bering, *The Cognitive Psychology of Belief in the Supernatural*. [American Scientist 94 \(2006\), 142–149](#).

Belief in a deity or an afterlife could be an evolutionarily advantageous byproduct of people’s ability to reason about the minds of others. The same way that I couldn’t help thinking of God under dire circumstances, I’ve also found that I can’t fathom what it would be like not to have an afterlife. I’m a materialist—I think consciousness ends with death. But nonetheless, try as I might, I run into a brick wall whenever I attempt to imagine what it would be “like” to be dead and not exist. I doubt I’m the only one. In the United States, as much as 95 percent of the population reportedly believes in life after death.

### BULBULIA 2008

JOSEPH BULBULIA ET AL. (Hrsg.), *The Evolution of Religion, Studies, theories, and critiques*. (Santa Margarita 2008).

Eds: Joseph Bulbulia, Richard Sosis, Erica Harris, Russell Genet, Cheryl Genet & Karen Wyman

### RICHERSON 1999

Peter J. Richerson & Robert Boyd, *Complex Societies, The Evolutionary Origins of a Crude Superorganism*. [Human Nature 10 \(1999\), 253–289](#).

The complexity of human societies of the past few thousand years rivals that of social insect societies. We hypothesize that two sets of social “instincts” underpin and constrain the evolution of complex societies. One set is ancient and shared with other social primate species, and one is derived and unique to our lineage. The latter evolved by the late Pleistocene, and led to the evolution of institutions of intermediate complexity in acephalous societies. The institutions of complex societies often conflict with our social instincts. The complex societies of the past few thousand years can function only because cultural evolution has created effective “work-arounds” to manage such instincts. We describe a series of work-arounds and use the data on the relative effectiveness of WWII armies to test the work-around hypothesis.

Keywords: Complex societies; Conflict; Cooperation; Gene-culture coevolution.