

## Literatur

### Aktuell

#### CHAMBERS 2014

John Chambers, *A chronometer for Earth's age*. [nature 508 \(2014\), 51–52](#).

Simulations of Earth's growth show a correlation between the timing of the Moon's formation and the amount of mass that Earth accreted afterwards. This relationship provides a way of measuring the age of our planet.

#### JACOBSON 2014

Seth A. Jacobson, Alessandro Morbidelli, Sean N. Raymond, David P. O'Brien, Kevin J. Walsh & David C. Rubie, *Highly siderophile elements in Earth's mantle as a clock for the Moon-forming impact*. [nature 508 \(2014\), 84–87](#).

According to the generally accepted scenario, the last giant impact on Earth formed the Moon and initiated the final phase of core formation by melting Earth's mantle. A key goal of geochemistry is to date this event, but different ages have been proposed. Some<sup>1–3</sup> argue for an early Moon-forming event, approximately 30 million years (Myr) after the condensation of the first solids in the Solar System, whereas others<sup>4–6</sup> claim a date later than 50 Myr (and possibly as late as around 100 Myr) after condensation. Here we show that a Moon-forming event at 40 Myr after condensation, or earlier, is ruled out at a 99.9 per cent confidence level. We use a large number of N-body simulations to demonstrate a relationship between the time of the last giant impact on an Earth-like planet and the amount of mass subsequently added during the era known as Late Accretion. As the last giant impact is delayed, the late-accreted mass decreases in a predictable fashion. This relationship exists within both the classical scenario<sup>7,8</sup> and the Grand Tack scenario<sup>9,10</sup> of terrestrial planet formation, and holds across a wide range of disk conditions. The concentration of highly siderophile elements (HSEs) in Earth's mantle constrains the mass of chondritic material added to Earth during Late Accretion<sup>11,12</sup>. Using HSE abundance measurements<sup>13,14</sup>, we determine a Moon-formation age of  $95 \pm 32$  Myr after condensation. The possibility exists that some late projectiles were differentiated and left an incomplete HSE record in Earth's mantle. Even in this case, various isotopic constraints strongly suggest that the late-accreted mass did not exceed 1 per cent of Earth's mass, and so the HSE clock still robustly limits the timing of the Moon-forming event to significantly later than 40 Myr after condensation.

#### WOOD 2014

Bernard Wood, *Fifty years after Homo habilis*. [nature 508 \(2014\), 31–33](#).

Bernard Wood explains why the announcement of 'handy man' in April 1964 threw the field of hominin evolution into a turmoil that continues to this day.

## Biologie

GASSMANN 2014

Aaron J. Gassmann et al., *Field-evolved resistance by western corn rootworm to multiple *Bacillus thuringiensis* toxins in transgenic maize*. *PNAS* **111** (2014), 5141–5146.

Aaron J. Gassmann, Jennifer L. Petzold-Maxwell, Eric H. Clifton, Mike W. Dunbar, Amanda M. Hoffmann, David A. Ingber & Ryan S. Keweshan

The widespread planting of crops genetically engineered to produce insecticidal toxins derived from the bacterium *Bacillus thuringiensis* (Bt) places intense selective pressure on pest populations to evolve resistance. Western corn rootworm is a key pest of maize, and in continuous maize fields it is often managed through planting of Bt maize. During 2009 and 2010, fields were identified in Iowa in which western corn rootworm imposed severe injury to maize producing Bt toxin Cry3Bb1. Subsequent bioassays revealed Cry3Bb1 resistance in these populations. Here, we report that, during 2011, injury to Bt maize in the field expanded to include mCry3A maize in addition to Cry3Bb1 maize and that laboratory analysis of western corn rootworm from these fields found resistance to Cry3Bb1 and mCry3A and cross-resistance between these toxins. Resistance to Bt maize has persisted in Iowa, with both the number of Bt fields identified with severe root injury and the ability western corn rootworm populations to survive on Cry3Bb1 maize increasing between 2009 and 2011. Additionally, Bt maize targeting western corn rootworm does not produce a high dose of Bt toxin, and the magnitude of resistance associated with feeding injury was less than that seen in a high-dose Bt crop. These first cases of resistance by western corn rootworm highlight the vulnerability of Bt maize to further evolution of resistance from this pest and, more broadly, point to the potential of insects to develop resistance rapidly when Bt crops do not achieve a high dose of Bt toxin.

evolution | resistance management | transgenic crops

## Datierung

NIGRO 2014

Lorenzo Nigro, *An absolute Iron Age chronology of the Levant and the Mediterranean*. In: LORENZO NIGRO (Hrsg.), *Reading Catastrophes: Earthquakes, Floods, Famines, Epidemics between Egypt and Palestine – 3rd–1st millennium BC, Proceedings of the International Conference “Reading Catastrophes”, held in Rome, 3rd–4th December 2012*. Rome “La Sapienza” Studies on the Archaeology of Palestine & Transjordan 11 (Rome 2014), 261–269.

The range of error of this system – i.e. a timetable trying to minimize difference between different chronologies proposed so far and fixed chronological datum points – is around 1.5%, that is, on a period of ten centuries, 15 years. The latter is the maximum oscillation accepted for most reliable dates (for example Pharaoh Shoshenq’s raid into Palestine: 925 BC) to validate the table, also considering astronomic periodical observations in ancient Egypt.

The Levantine New Chronology is offered to scholars as a simple tool summarizing the efforts of many, to whom is addressed the author admiration for the continuous commitment towards a more convincing and firmly based historical reconstruction.

## Klima

FALL 2011

Souleymane Fall, Anthony Watts, John Nielsen-Gammon, Evan Jones, Dev Niyogi, John R. Christy & Roger A. Pielke Sr., *Analysis of the impacts of station exposure on the U.S. Historical Climatology Network temperatures and temperature trends*. [Journal of Geophysical Research](#) **116** (2011), D14120. DOI:10.1029/2010JD015146.

JGeophysRes116-D14120-Supplement1.txt, JGeophysRes116-D14120-Supplement2.zip

The recently concluded Surface Stations Project surveyed 82.5% of the U.S. Historical Climatology Network (USHCN) stations and provided a classification based on exposure conditions of each surveyed station, using a rating system employed by the National Oceanic and Atmospheric Administration to develop the U.S. Climate Reference Network. The unique opportunity offered by this completed survey permits an examination of the relationship between USHCN station siting characteristics and temperature trends at national and regional scales and on differences between USHCN temperatures and North American Regional Reanalysis (NARR) temperatures. This initial study examines temperature differences among different levels of siting quality without controlling for other factors such as instrument type. Temperature trend estimates vary according to site classification, with poor siting leading to an overestimate of minimum temperature trends and an underestimate of maximum temperature trends, resulting in particular in a substantial difference in estimates of the diurnal temperature range trends. The opposite-signed differences of maximum and minimum temperature trends are similar in magnitude, so that the overall mean temperature trends are nearly identical across site classifications. Homogeneity adjustments tend to reduce trend differences, but statistically significant differences remain for all but average temperature trends. Comparison of observed temperatures with NARR shows that the most poorly sited stations are warmer compared to NARR than are other stations, and a major portion of this bias is associated with the siting classification rather than the geographical distribution of stations. According to the best-sited stations, the diurnal temperature range in the lower 48 states has no century-scale trend.

MARTÍNEZ-GARCÍA 2014

Alfredo Martínez-García et al., *Iron Fertilization of the Subantarctic Ocean During the Last Ice Age*. [science](#) **343** (2014), 1347–1350.

s343-1347-Supplement.pdf

Alfredo Martínez-García, Daniel M. Sigman, Haojia Ren, Robert F. Anderson, Marietta Straub, David A. Hodell, Samuel L. Jaccard, Timothy I. Eglinton & Gerald H. Haug

John H. Martin, who discovered widespread iron limitation of ocean productivity, proposed that dust-borne iron fertilization of Southern Ocean phytoplankton caused the ice age reduction in atmospheric carbon dioxide (CO<sub>2</sub>). In a sediment core from the Subantarctic Atlantic, we measured foraminifera-bound nitrogen isotopes to reconstruct ice age nitrate consumption, burial fluxes of iron, and proxies for productivity. Peak glacial times and millennial cold events are characterized by increases in dust flux, productivity, and the degree of nitrate consumption; this combination is uniquely consistent with Subantarctic iron fertilization. The associated strengthening of the Southern Ocean's biological pump can explain the lowering of CO<sub>2</sub> at the transition from mid-climate states to full ice age conditions as well as the millennial-scale CO<sub>2</sub> oscillations.

## RUSSELL 2014

James M. Russell et al., *Glacial forcing of central Indonesian hydroclimate since 60,000 y B.P.* [PNAS 111 \(2014\), 5100–5105.](#)

James M. Russell, Hendrik Vogel, Bronwen L. Konecky, Satria Bijaksana, Yongsong Huang, Martin Melles, Nigel Wattrus, Cassandra Costa & John W. King

The Indo-Pacific warm pool houses the largest zone of deep atmospheric convection on Earth and plays a critical role in global climate variations. Despite the region's importance, changes in Indo-Pacific hydroclimate on orbital timescales remain poorly constrained. Here we present high-resolution geochemical records of surface runoff and vegetation from sediment cores from Lake Towuti, on the island of Sulawesi in central Indonesia, that continuously span the past 60,000 y. We show that wet conditions and rainforest ecosystems on Sulawesi present during marine isotope stage 3 (MIS3) and the Holocene were interrupted by severe drying between  $\approx 33,000$  and 16,000 y B.P. when Northern Hemisphere ice sheets expanded and global temperatures cooled. Our record reveals little direct influence of precessional orbital forcing on regional climate, and the similarity between MIS3 and Holocene climates observed in Lake Towuti suggests that exposure of the Sunda Shelf has a weaker influence on regional hydroclimate and terrestrial ecosystems than suggested previously. We infer that hydrological variability in this part of Indonesia varies strongly in response to high-latitude climate forcing, likely through reorganizations of the monsoons and the position of the intertropical convergence zone. These findings suggest an important role for the tropical western Pacific in amplifying glacial–interglacial climate variability.

tropical Pacific | paleoclimate | geochemistry | paleoecology

## Mittelpaläolithikum

### BELFER-COHEN 1992

Anna Belfer-Cohen & Erella Hovers, *In the Eye of the Beholder, Mousterian and Natufian Burials in the Levant.* [Current Anthropology 33 \(1992\), 463–471.](#)

It seems that many scholars still possess “mental templates” as to what a burial should look like. These templates, based on ethnographic models of recent complex societies (in the sense of Price and Brown 1985), are projected onto the past and influence attitudes with regard to intentional burial in the Mousterian. Incorporated in these attitudes is a bias against Middle Palaeolithic hominids other than *H. sapiens sapiens* as “poor relations who did not make it” evolutionarily and must therefore have been inferior to their *H. sapiens sapiens* contemporaries. Obviously, when their cultural remains are examined by “objective” criteria (stemming from behavioural models based on complex societies), they do not stand up to them, ergo these hominids were really inferior. As is the case with other objectives of scientific inquiry, the status of Middle Palaeolithic mortuary behaviour seems to be affected by “values . . . read into the record and then read right back out again, as though they existed objectively” (Ruse 1988:66).

### GARGETT 1989

Robert H. Gargett, *Grave Shortcomings, The Evidence for Neandertal Burial.* [Current Anthropology 30 \(1989\), 157–190.](#)

Robert H. Gargett, Harvey M. Bricker, Geoffrey Clark, John Lindly, Catherine Farizy, Claude Masset, David W. Frayer, Anta Montet-White, Clive Gamble,

Antonio Gilman, Arlette Leroi-Gourhan, M. I. Martínez Navarrete, Paul Ossa, Erik Trinkaus and Andrzej W. Weber

Evidence for purposeful disposal of the dead and other inferences of ritual behavior in the Middle Paleolithic are examined geoarchaeologically. Cave geomorphology, sedimentology, and taphonomy form the basis for a reexamination of the Neandertal discoveries most often cited in this connection: La Chapelle-aux-Saints, Le Moustier, La Ferrassie, Teshik-Tash, Regourdou, and Shanidar. Logical incongruencies are identified between the published observations and the conclusion that Neandertals were being buried by their conspecifics.

#### STRAUS 1989

Lawrence Guy Straus, *Grave Reservations, More on Paleolithic Burial Evidence*. *Current Anthropology* **30** (1989), 633–634.

It seems clear to me that Neanderthal burial was a rare event. Indeed, burial, even in southwestern France, remained rare in the Upper Paleolithic, especially in its early millennia (Aurignacian and Gravettian). As with many other aspects of the so-called Middle/Upper Paleolithic (or archaic/modern-*Homo sapiens*) transition, burial did not instantly become the universal vogue at 100,000, 40,000, 35,000, or 30,000 B.P. (or whatever arbitrary date one chooses for “the transition”).

Just as it is simplistic to accept all early human remains as having been deliberately buried, so is it simplistic to reject all burials prior to the Upper Paleolithic. And so too is it simplistic to assume that deliberate burial was a common characteristic of all Upper Paleolithic groups in all times and places. The subject needs further detailed examination and—above all—new discoveries made under properly controlled conditions of excavation.

## Neolithikum

#### MELLER 2013

Harald Meller, *Der Anfang vom Ende, Überlegungen zur Entstehung des Krieges im Neolithikum*. In: HARALD MELLER (Hrsg.), *3300 BC: Mysteriöse Steinzeittote und ihre Welt, Sonderausstellung vom 14. November bis 18. Mai 2014 im Landesmuseum für Vorgeschichte Halle*. (Halle 2013), 239–245.

#### ZICH 2013

Bernd Zich, *Traktion und ihr Einfluß auf die Entwicklung von Rad, Wagen und Pflug*. In: HARALD MELLER (Hrsg.), *3300 BC: Mysteriöse Steinzeittote und ihre Welt, Sonderausstellung vom 14. November bis 18. Mai 2014 im Landesmuseum für Vorgeschichte Halle*. (Halle 2013), 78–82.