Liste erstellt am 2011-12-21

Literatur

Aktuell

Alvarez-Solas 2011

Jorge Alvarez-Solas & Gilles Ramstein, *On the triggering mechanism of Heinrich events*. PNAS **108** (2011), E1359–E1360.

Godfray 2011

H. Charles J. Godfray, *Food for thought*. PNAS **108** (2011), 19845–19846.
The calories of food produced today in the poorest countries are approximately 2,000 to 3,000 kcal • d-1 per person, which, after waste and food fed to livestock are taken into account, is considerably below the minimum thought to constitute a healthy diet. In the richest countries, 8,000 to 9,000 kcal • d-1 per person are produced, much more than anyone could consume. Some of this excess is exported (including to the very poorest countries as food aid), but a very large proportion is fed to livestock and so is consumed indirectly by humans. The relationship between GDP and calorie production is remarkably tight, allowing likely pressures on the food system to be estimated based on assumptions about population and economic growth.

Hamlin 2011

J. Kiley Hamlin, Karen Wynn, Paul Bloom & Neha Mahajan, *How infants and toddlers react to antisocial others*. PNAS **108** (2011), 19931–19936.
pnas108-19931-Supplement1.mov, pnas108-19931-Supplement2.mov, pnas108-19931-Supplement3.mov, pnas108-19931-Supplement4.mov, pnas108-19931-Supplement5.mov, pnas108-19931-Supplement6.mov, pnas108-19931-Supplement7.mov, pnas108-19931-Supplement8.mov
Although adults generally prefer helpful behaviors and those who perform them, there are situations (in particular, when the target of an action is disliked) in which overt antisocial acts are seen as appropriate, and thosewho performthemare viewed positively. The current studies explore the developmental origins of this capacity for selective social evaluation. We find that although 5-mo-old infants uniformly prefer individuals who act positively toward others regardless of the status of the target, 8-mo-old infants selectively prefer characterswho act positively toward prosocial individuals and characters who act negatively toward antisocial individuals. Additionally, young toddlers direct positive behaviors toward prosocial others and negative behaviors toward antisocial others. These findings constitute evidence that the nuanced social judgments and actions readily observable in human adults have their foundations in early developing cognitive mechanisms.
cooperation | infancy

Kee 2011

Eric Kee & Hany Farid, *A perceptual metric for photo retouching*. PNAS **108** (2011), 19907–19912.
pnas108-19907-Supplement.csv
In recent years, advertisers and magazine editors have been widely criticized for taking digital photo retouching to an extreme. Impossibly thin, tall, and wrinkle- and blemish-free models are routinely splashed onto billboards, advertisements, and magazine covers. The ubiquity of these unrealistic and highly idealized images has been linked to eating

disorders and body image dissatisfaction in men, women, and children. In response, several countries have considered legislating the labeling of retouched photos. We describe a quantitative and perceptually meaningful metric of photo retouching. Photographs are rated on the degree to which they have been digitally altered by explicitly modeling and estimating geometric and photometric changes. This metric correlates well with perceptual judgments of photo retouching and can be used to objectively judge by how much a retouched photo has strayed from reality.
photo manipulation | photo analysis

Lansing 2011

J. Stephen Lansing & James N. Kremer, *Rice, fish, and the planet*. PNAS **108** (2011), 19841–19842.

Results indicate that the presence of the fish benefits the rice by reducing insects, diseases, and weeds. The researchers notice that, when the fish bump into the rice stems, insects like planthoppers often fall into the water and are eaten. Video recordings quantify this effect, indicating a removal rate of planthoppers by fish of about 26 %. The hitting activity of the fish also shakes dew drops from the plants in the early morning, reducing the risk of spore generation and mycelium penetration of rice blast disease in the leaves. The carp also eat or uproot many weeds, resulting in an almost weed-free paddy. If the fish are beneficial to the rice, the converse is also true. The presence of the rice plants attracts insects, which become a food source for the fish, and the leaves of the plants provide shade that reduces water temperature in the hot season. Rice also moderates the aquatic environment. It acts as a nitrogen sink and helps reduce the concentration of ammonia in the water and total N in the soil. Overall, paddies with fish require 68 % less pesticide and 24 % less fertilizer than rice monoculture.

Nordahl 2011

Christine Wu Nordahl et al., *Brain enlargement is associated with regression in preschool-age boys with autism spectrum disorders*. PNAS **108** (2011), 20195–20200.

Christine Wu Nordahl, Nicholas Lange, Deana D. Li, Lou Ann Barnett, Aaron Lee, Michael H. Buonocore, Tony J. Simon, Sally Rogers, Sally Ozonoff and David G. Amaral
Autism is a heterogeneous disorder with multiple behavioral and biological phenotypes. Accelerated brain growth during early childhood is a well-established biological feature of autism. Onset pattern, i.e., early onset or regressive, is an intensely studied behavioral phenotype of autism. There is currently little known, however, about whether, or how, onset status maps onto the abnormal brain growth. We examined the relationship between total brain volume and onset status in a large sample of 2- to 4-yold boys and girls with autism spectrum disorder (ASD) [n = 53, no regression (nREG); n = 61, regression (REG)] and a comparison group of age-matched typically developing controls (n = 66). We also examined retrospective head circumference measurements from birth through 18 mo of age. We found that abnormal brain enlargement was most commonly found in boys with regressive autism. Brain size in boys without regression did not differ from controls. Retrospective head circumference measurements indicate that head circumference in boys with regressive autism is normal at birth but diverges from the other groups around 4-6 mo of age. There were no differences in brain size in girls with autism (n = 22, ASD; n = 24, controls). These results suggest that there may be distinct neural phenotypes associated with different onsets of autism. For boys with regressive autism, divergence in brain size occurs well before loss of skills is commonly reported. Thus, rapid head growth may be a risk factor for regressive autism.
MRI | neurodevelopment | trajectory | macrocephaly

Priyadarshi 2011

Antra Priyadarshi, Gerardo Dominguez & Mark H. Thiemens, *Reply to Strub et al.: Chlorine activation by neutrons as an obvious source of ^{35}S at Fukushima*. PNAS **108** (2011), E1389.

The comments are mostly irrelevant, and we quantitatively address them. The 35S accrued and contained within the primary coolant and fuel rods would have been lost within 1-2 d after the earthquake as the tsunami breached and flooded the reactor site. Furthermore, 35SO4 2- emitted into the atmosphere at that time would have been transported and scavenged by wet deposition processes during March 15-17, when a transient cyclone passed over Japan (3). In addition, the northeasterly winds associated with a transient cyclone increased the sulfate deposition rate over the areas around Fukushima (3). Most importantly, the lifetime of sulfate is 2-5 d (4), and emissions at this time could not possibly account for the peak observed on March 28 in La Jolla.

Ros 2011

Ivo G. Ros, Lori C. Bassman, Marc A. Badger, Alyssa N. Pierson & Andrew A. Biewener, *Pigeons steer like helicopters and generate downand upstroke lift during low speed turns*. PNAS **108** (2011), 19990–19995.

Turning is crucial for animals, particularly during predator–prey interactions and to avoid obstacles. For flying animals, turning consists of changes in (i) flight trajectory, or path of travel, and (ii) body orientation, or 3D angular position. Changes in flight trajectory can only be achieved by modulating aerodynamic forces relative to gravity. How birds coordinate aerodynamic force production relative to changes in body orientation during turns is key to understanding the control strategies used in avian maneuvering flight. We hypothesized that pigeons produce aerodynamic forces in a uniform direction relative to their bodies, requiring changes in body orientation to redirect those forces to turn. Using detailed 3D kinematics and body mass distributions, we examined net aerodynamic forces and body orientations in slowly flying pigeons (Columba livia) executing level 90° turns. The net aerodynamic force averaged over the downstroke was maintained in a fixed direction relative to the body throughout the turn, even though the body orientation of the birds varied substantially. Early in the turn, changes in body orientation primarily redirected the downstroke aerodynamic force, affecting the bird's flight trajectory. Subsequently, the pigeon mainly reacquired the body orientation used in forward flight without affecting its flight trajectory. Surprisingly, the pigeon's upstroke generated aerodynamic forces that were approximately 50 % of those generated during the downstroke, nearly matching the relative upstroke forces produced by hummingbirds. Thus, pigeons achieve low speed turns much like helicopters, by using whole-body rotations to alter the direction of aerodynamic force production to change their flight trajectory.

biomechanics | tip reversal | aerodynamics | flapping flight | locomotion

Strub 2011

Erik Strub, Bernhard Gmal, Volker Hannstein, Gunter Pretzsch & Eugen Schrödl, *Creation path of ^{35}S from Fukushima not so obvious*. PNAS **108** (2011), E1388.

Although we acknowledge it as probable that the detected 35S originated from Fukushima, we have doubts about the proposed creation and release path. First, there are several possible alternative sources of 35S.

To conclude, the attempt to gain insights into the accident at Fukushima from airborne radioactivity measurements is very interesting. However, given the uncertainties stated above, we doubt that meaningful quantitative statements are possible from such an analysis. The Fukushima accident is anything but a "well-defined 35S source." The evidence

appears to be too weak to gain "previously undescribed insight" into environmental transformational rates, simultaneously estimating the depositional time scale, oxidation time scale, and a neutron fluence, with everything based on a single significantly increased 35S value.

Tilman 2011

David Tilman, Christian Balzer, Jason Hill & Belinda L. Befort, *Global food demand and the sustainable intensification of agriculture*. PNAS **108** (2011), 20260–20264.

Global food demand is increasing rapidly, as are the environmental impacts of agricultural expansion. Here, we project global demand for crop production in 2050 and evaluate the environmental impacts of alternative ways that this demand might be met. We find that per capita demand for crops, when measured as caloric or protein content of all crops combined, has been a similarly increasing function of per capita real income since 1960. This relationship forecasts a 100-110 % increase in global crop demand from 2005 to 2050. Quantitative assessments show that the environmental impacts of meeting this demand depend on how global agriculture expands. If current trends of greater agricultural intensification in richer nations and greater land clearing (extensification) in poorer nations were to continue, ≈1 billion ha of land would be cleared globally by 2050, with CO2-C equivalent greenhouse gas emissions reaching ≈3 Gt y-1 and N use ≈250 Mt y-1 by then. In contrast, if 2050 crop demand was met by moderate intensification focused on existing croplands of underyielding nations, adaptation and transfer of high-yielding technologies to these croplands, and global technological improvements, our analyses forecast land clearing of only ≈0.2 billion ha, greenhouse gas emissions of ≈1 Gt y-1, and global N use of ≈225 Mt y-1. Efficient management practices could substantially lower nitrogen use. Attainment of high yields on existing croplands of underyielding nations is of great importance if global crop demand is to be met with minimal environmental impacts.
food security | land-use change | biodiversity | climate change | soil fertility

Xie 2011

Jian Xie, Liangliang Hu, Jianjun Tang, Xue Wu, Nana Li, Yongge Yuan, Haishui Yang, Jiaen Zhang, Shiming Luo & Xin Chen, *Ecological mechanisms underlying the sustainability of the agricultural heritage rice-fish coculture system*. PNAS **108** (2011), 19851–19852.

pnas108-19851-Fulltext.pdf

For centuries, traditional agricultural systems have contributed to food and livelihood security throughout the world. Recognizing the ecological legacy in the traditional agricultural systems may help us develop novel sustainable agriculture. We examine how rice-fish coculture (RF), which has been designated a "globally important agricultural heritage system," has been maintained for over 1,200 y in south China. A field survey demonstrated that although rice yield and rice-yield stability are similar in RF and rice monoculture (RM), RF requires 68 %less pesticide and 24 %less chemical fertilizer than RM. A field experiment confirmed this result.We documented that a mutually beneficial relationship between rice and fish develops in RF: Fish reduce rice pests and rice favors fish by moderating the water environment. This positive relationship between rice and fish reduces the need for pesticides in RF. Our results also indicate a complementary use of nitrogen (N) between rice and fish in RF, resulting in low N fertilizer application and low N release into the environment. These findings provide unique insights into how positive interactions and complementary use of resource between species generate emergent ecosystem properties and how modern agricultural systems might be improved by exploiting synergies between species.

Energie

House 2011

Kurt Zenz House, Antonio C. Baclig, Manya Ranjan, Ernst A. van Nierop, Jennifer Wilcox & Howard J. Herzog, *Economic and energetic analysis of capturing CO_2 from ambient air*. PNAS **108** (2011), 20428–20433.

Capturing carbon dioxide from the atmosphere ("air capture") in an industrial process has been proposed as an option for stabilizing global CO2 concentrations. Published analyses suggest these air capture systems may cost a few hundred dollars per tonne of CO2, making it cost competitive with mainstream CO2 mitigation options like renewable energy, nuclear power, and carbon dioxide capture and storage from large CO2 emitting point sources. We investigate the thermodynamic efficiencies of commercial separation systems as well as trace gas removal systems to better understand and constrain the energy requirements and costs of these air capture systems. Our empirical analyses of operating commercial processes suggest that the energetic and financial costs of capturing CO2 from the air are likely to have been underestimated. Specifically, our analysis of existing gas separation systems suggests that, unless air capture significantly outperforms these systems, it is likely to require more than 400 kJ of work per mole of CO2, requiring it to be powered by CO2-neutral power sources in order to be CO2 negative. We estimate that total system costs of an air capture system will be on the order of $ 1 000 per tonne of CO2, based on experience with as-built large-scale trace gas removal systems.

direct air capture | gas separation economics | separation thermodynamics | concentration factor | Sherwood plot

Schellnhuber 2011

Hans Joachim Schellnhuber, *Geoengineering: The good, the MAD, and the sensible*. PNAS **108** (2011), 20277–20278.

So it seems rather odd to first burn fossil fuels (where the ambient carbon was captured, reduced, and concentrated by biogeochemical processes over hundred millions of years), then let the oxidized carbon mix and migrate across the entire atmosphere, and finally distill the CO2 again molecule by molecule using sophisticated technology. There is no free energy lunch.

Grabung

Russell 2010

Anna Russell, *Retracing the Steppes – A Zooarchaeological Analysis of Changing Subsistence Patterns in the Late Neolithic at Tell Sabi Abyad, Northern Syria, c. 6900 to 5900 BC*. Dissertation, Universität Leiden (Leiden 2010).

Grundlagen

Hansen 2011

Svend Hansen, *Technische und soziale Innovationen in der zweiten Hälfte des 4. Jahrtausends v. Chr.* In: Svend Hansen und Johannes Müller (Hrsg.), *Sozialarchäologische Perspektiven: Gesellschaftlicher Wandel 5000–1500 v. Chr. zwischen Atlantik und Kaukasus, Internationale Tagung 15.–18. Oktober 2007 in Kiel*. (Darmstadt 2011), 153–191.

In Europe during the second half of the 4th millennium BC many technical and social innovations appeared, which became part of a new social structure. To understand this new social dispositive, it is necessary to detach oneself from the apparent universalities of the neoevolu-tionistic development scheme of political power. On the basis of scientific datings it is far more the field of archaeology, which – basing upon source material – should write a history of power.
Among the technical elements of the bundle of innovations are wheel and wagon, the domestication of horse and donkey and the breeding of the woolly sheep. Further to mention is the appearance of new metals (silver and lead) and new alloys as well as the expanded possibilities in the production of goods (metal vessels, daggers, swords).
New weapons, foremost daggers and shaft-hole axes, quickly became widespread. They were used by a new social type of warrior, whose representational medium also treads upon new paths: the mound over the single tomb and the life-sized stone stele. Some of these tombs contained not only lavish grave goods, but also individuals (often children and adolescents), who had to follow the dead potentate into the grave. Hence, his power was still exerted upon the living. – In the closing chapter the question is discussed as to whether developments in new techniques represent the results or the prerequisites of centralised power.

Klima

Donges 2011

Jonathan F. Donges, Reik V. Donner, Martin H. Trauth, Norbert Marwan, Hans-Joachim Schellnhuber & Jürgen Kurths, *Nonlinear detection of paleoclimate-variability transitions possibly related to human evolution*. PNAS **108** (2011), 20422–20427.
Potential paleoclimatic driving mechanisms acting on human evolution present an open problem of cross-disciplinary scientific interest. The analysis of paleoclimate archives encoding the environmental variability in East Africa during the past 5 Ma has triggered an ongoing debate about possible candidate processes and evolutionary mechanisms. In this work, we apply a nonlinear statistical technique, recurrence network analysis, to three distinct marine records of terrigenous dust flux. Our method enables us to identify three epochs with transitions between qualitatively different types of environmental variability in North and East Africa during the (i) Middle Pliocene (3.35–3.15 Ma B.P.), (ii) Early Pleistocene (2.25–1.6 Ma B.P.), and (iii) Middle Pleistocene (1.1–0.7 Ma B.P.). A deeper examination of these transition periods reveals potential climatic drivers, including (i) large-scale changes in ocean currents due to a spatial shift of the Indonesian throughflow in combination with an intensification of Northern Hemisphere glaciation, (ii) a global reorganization of the atmospheric Walker circulation induced in the tropical Pacific and Indian Ocean, and (iii) shifts in the dominating temporal variability pattern of glacial activity during the Middle Pleistocene, respectively. A reexamination of the available fossil record demonstrates statistically significant coincidences between the detected transition periods and major steps in hominin evolution. This result suggests that the observed shifts between more regular and more erratic environmental variability may have acted as a trigger for rapid change in the development of humankind in Africa.
African climate | Plio-Pleistocene | climate-driven evolution | dynamical transitions | nonlinear time series analysis

Huybers 2011

Peter Huybers, *Combined obliquity and precession pacing of late Pleistocene deglaciations*. nature **480** (2011), 229–231.
n480-0229-Supplement.zip

Milankovitch1 proposed that Earth resides in an interglacial state when its spin axis both tilts to a high obliquity and precesses to align the Northern Hemisphere summer with Earth's nearest approach to the Sun. This general concept has been elaborated into hypotheses that precession2, obliquity3,4 or combinations of both5-8 could pace deglaciations during the late Pleistocene9,10. Earlier tests have shown that obliquity paces the late Pleistocene glacial cycles4,11 but have been inconclusive with regard to precession, whose shorter period of about 20,000 years makes phasing more sensitive to timing errors4,11,12. No quantitative test has provided firm evidence for a dual effect. Here I show that both obliquity and precession pace late Pleistocene glacial cycles. Deficiencies in time control that have long stymied efforts to establish orbital effects on deglaciation are overcome using a new statistical test that focuses on maxima in orbital forcing. The results are fully consistent with Milankovitch's proposal but also admit the possibility that long Southern Hemisphere summers contribute to deglaciation.

Neolithikum

McCormick 1992

Finbar McCormick, *Early faunal evidence for dairying*. Oxford Journal of Archaeology **11** (1992), 201–209.

The high incidence of young calves and mature females in faunal assemblages is often interpreted as being indicative of the practice of specialised dairying. An alternative model is suggested here on the basis of faunal and documentary evidence from the early historical period in Ireland.

Story or Book

Berreby 2011

David Berreby, *Eating with integrity*, *A question of taste*. nature **480** (2011), 284.

I thought I had. I checked everyone for allergies. Religious covenants. Lipid and corticosterone metabolism. Medications, immunizations . Well, you can't be too careful. And I social-vetted the menu: everyone checked off everything. And there was nothing to offend anyone. Tempeh-salmon, made by our own 'bot, right here. All ingredients grown sterile, no contact with organic matter or pollutants .