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References

Aktuell

Ben-Yosef 2017

Erez Ben-Yosef, Michael Millman, Ron Shaar, Lisa Tauxe & Oded Lipschits, *Six centuries of geomagnetic intensity variations recorded by royal Judean stamped jar handles*. PNAS **114** (2017), 2160–2165.

Earth's magnetic field, one of the most enigmatic physical phenomena of the planet, is constantly changing on various time scales, from decades to millennia and longer. The reconstruction of geomagnetic field behavior in periods predating direct observations with modern instrumentation is based on geological and archaeological materials and has the twin challenges of (i) the accuracy of ancient paleomagnetic estimates and (ii) the dating of the archaeological material. Here we address the latter by using a set of storage jar handles (fired clay) stamped by royal seals as part of the ancient administrative system in Judah (Jerusalem and its vicinity). The typology of the stamp impressions, which corresponds to changes in the political entities ruling this area, provides excellent age constraints for the firing event of these artifacts. Together with rigorous paleomagnetic experimental procedures, this study yielded an unparalleled record of the geomagnetic field intensity during the eighth to second centuries BCE. The new record constitutes a substantial advance in our knowledge of past geomagnetic field variations in the southern Levant. Although it demonstrates a relatively stable and gradually declining field during the sixth to second centuries BCE, the new record provides further support for a short interval of extreme high values during the late eighth century BCE. The rate of change during this "geomagnetic spike" [defined as virtual axial dipole moment > 160 ZAm2 (10E21 Am2)] is further constrained by the new data, which indicate an extremely rapid weakening of the field (losing ≈27 % of its strength over ca. 30 y).

Keywords: archaeomagnetism | archaeointensity | levantine archaeomagnetic curve | paleosecular variation | archaeomagnetic spikes

Significance: Understanding the geomagnetic field behavior in the past, and, in particular, its intensity component, has implications for various (and disparate) fields of research, including the physics of Earth's interior, atmospheric and cosmologic sciences, biology, and archaeology. This study provides substantial data on variations in geomagnetic field intensity during the eighth to second centuries BCE Levant, thus significantly improving the existing record for this region. In addition, the study provides further evidence of extremely strong field in the late eighth century BCE ("geomagnetic spike"), and of rapid rates of change (>20 % over three decades). The improved Levantine record is an important basis for geophysical models (core-mantle interactions, cosmogenic processes, and more) as well as a reference for archaeomagnetic dating.

Borden 2017

John H. Borden, *A retirement 'hobby'*. science **355** (2017), 542.

After flunking out of undergraduate premed in 1957, spending 4 years growing up in the Marine Corps, returning to academic life, and falling in love with insects, I spent 37 happy years as a faculty member at a research-intensive university. When I turned 65 in 2003, I was shocked to face the looming doom of mandatory

retirement. I still had my health and energy, and I wasn't ready for lawn bowling. I wanted to work. Hanging around the university was not an option; the department chair had already claimed my office. So, with some trepidation, I moved to industry. I'm now in my 14th year on the "dark side"—and it has been a great adventure.

Butler 2017

Declan Butler, *Refugees in Focus*, *The biggest concentrations of displaced people lie far from the spotlight.* nature **543** (2017), 22–23.

Dijstelbloem 2017

Huub Dijstelbloem, *Migration tracking is a mess.* nature **543** (2017), 32–34.

Monitoring technologies only add to the political noise over managing mobility, warns Huub Dijstelbloem.

Editorial 2017

Counting people. nature **543** (2017), 5–6.

All involved should acknowledge that global migration statistics are a mess.

Misinterpretation and misrepresentation of data on population movements is rife. Official numbers are often mistakenly taken at face value, when further examination shows the underlying data are a mess. The UNHCR, the United Nations' refugee agency, states for example that the world is "witnessing the highest levels of displacement on record". However, as we outline in a News Feature this week (page 22), that claim doesn't stand up to scrutiny — particularly when global population growth is taken into account. That article is part of a special issue of Nature this week that examines migration.

Gillon 2017

Michaël Gillon et al., *Seven temperate terrestrial planets around the nearby ultracool dwarf star TRAPPIST-1.* nature **542** (2017), 456–460.

Michaël Gillon, Amaury H. M. J. Triaud, brice-Olivier Demory, Emmanuël Jehin, Eric Agol, Katherine M. Deck, Susan M. Lederer, Julien de Wit, Artem burdanov, James G. Ingalls, Emeline bolmont, Jeremy Leconte, Sean N. Raymond, franck Selsis, Martin Turbet, Khalid barkaoui, Adam burgasser, Matthew R. burleigh, Sean J. Carey, Aleksander Chaushev, Chris M. Copperwheat, Laetitia Delrez, Catarina S. fernandes, Daniel L. Holdsworth, Enrico J. Kotze, Valérie Van Grootel, yaseen Almleaky, Zouhair benkhaldoun, Pierre Magain & Didier Queloz

One aim of modern astronomy is to detect temperate, Earth-like exoplanets that are well suited for atmospheric characterization. Recently, three Earth-sized planets were detected that transit (that is, pass in front of) a star with a mass just eight per cent that of the Sun, located 12 parsecs away1. The transiting configuration of these planets, combined with the Jupiter-like size of their host star— %

named TRAPPIST-1—makes possible in-depth studies of their atmospheric properties with present-day and future astronomical facilities1–3. Here we report the results of a photometric monitoring campaign of that star from the ground and space. Our observations reveal that at least seven planets with sizes and masses similar to those of Earth revolve around TRAPPIST-1. The six inner planets form a near-resonant chain, such that their orbital periods (1.51, 2.42, 4.04, 6.06, 9.1 and 12.35 days) are near-ratios of small integers. This architecture suggests that the planets formed farther from the star and migrated inwards4,5. Moreover, the seven planets have equilibrium temperatures low enough to make possible the presence of liquid water on their surfaces6–8.

Holder 2017

Curtis D. Holder, *Coping with class in science*. science **355** (2017), 658.

I grew up in rural North Carolina, in a single-parent, poor, working-class family living in a singlewide mobile home. Writing that sentence takes courage after 30 years of denial, guilt, and feeling like an outsider in academia. As a first-generation college student, I struggled with financial challenges. But just as problematic were the social and cultural barriers that made me doubt whether I was smart enough to be in college or to pursue a career in science. Now a full professor and chair of my department, I know that, with the help of supportive colleagues and mentors, students like me can succeed.

Sinha 2017

Gunjan Sinha, *Stateless Scientists, Displaced researchers face huge challenges making lives abroad, even if they find work*. nature **543** (2017), 24–27.

Snellen 2017

Ignas A. G. Snellen, *Earth's seven sisters*. nature **542** (2017), 421–423.

Seven small planets whose surfaces could harbour liquid water have been spotted around a nearby dwarf star. If such a configuration is common in planetary systems, our Galaxy could be teeming with Earth-like planets.

In the past few years, evidence has been mounting that Earth-sized planets are abundant in the Galaxy, but Gillon and collaborators' findings indicate that these planets are even more common than previously thought. From geometric arguments, we expect that for every transiting planet found, there should be a multitude of similar planets (20–100 times more) that, seen from Earth, never pass in front of their host star. Of course, the authors could have been lucky, but finding seven transiting Earth-sized planets in such a small sample suggests that the Solar System with its four (sub-)Earth-sized planets might be nothing out of the ordinary.

Amerika

Amorim 2017

Carlos Eduardo G. Amorim et al., *Genetic signature of natural selection in first Americans*. PNAS **114** (2017), 2195–2199.

Carlos Eduardo G. Amorim, Kelly Nunes, Diogo Meyer, David Comas, Maria Cátira Bortolini, Francisco Mauro Salzano & Tábita Hünemeier

When humans moved from Asia toward the Americas over 18,000 y ago and eventually peopled the New World they encountered a new environment with extreme climate conditions and distinct dietary resources. These environmental and dietary pressures may have led to instances of genetic adaptation with the potential to influence the phenotypic variation in extant Native American populations. An example of such an event is the evolution of the fatty acid desaturases (FADS) genes, which have been claimed to harbor signals of positive selection in Inuit populations due to adaptation to the cold Greenland Arctic climate and to a proteinrich diet. Because there was evidence of intercontinental variation in this genetic region, with indications of positive selection for its variants, we decided to compare the Inuit findings with other Native American data. Here, we use several lines of evidence to show that the signal of FADS-positive selection is not restricted to the Arctic but instead is broadly observed throughout the Americas. The shared signature of selection among populations living in such a diverse range of

environments is likely due to a single and strong instance of local adaptation that took place in the common ancestral population before their entrance into the New World. These first Americans peopled the whole continent and spread this adaptive variant across a diverse set of environments.

Keywords: peopling of America | natural selection | genetics | first Americans

Significance: There is much interest in understanding the role of natural selection in shaping physiological adaptations to climate, diet, and diseases in humans. We investigated this issue by analyzing genomic data from Native American populations inhabiting different ecological regions and ancient Native Americans. We found signals of natural selection at the fatty acid desaturases (FADS) genes not only in an Arctic population, as was previously found, but throughout the Americas, suggesting a single and strong adaptive event that occurred in Beringia, before the range expansion of the first Americans within the American continent and Greenland.

Bibel

Galil 2012

Gershon Galil, Ayelet Gilboa, Aren M. Maeir & Dan'el Kahn (Hrsg.), *The Ancient Near East in the 12th–10th Centuries BCE – Culture and History*, *Proceedings of the International Conference held at the University of Haifa, 2–5 May, 2010*. Alter Orient und Altes Testament 392 (Münster 2012).

The history of the ancient Near East in the 12th–10th centuries BCE is still an unsolved riddle. At times the veil is lifted and tiny components of this elaborate puzzle glow in a new light. But many questions are as yet unanswered, and most details are still vague. Nevertheless, the broad outlines of this age are fairly well agreed by most scholars: the three superpowers Egypt, Hatti and Assyria gradually lost their hold and their influence in the area: first the Hittites, just after 1200 BCE, and a few dozens of years later, Egypt and Assyria. Historians generally concur that after the reign of Tukulti-Ninurta I (1243–1208 BCE), Assyria plunged into a prolonged decline, gradually losing its western territories to the Aramaean invaders. This process is clearly demonstrated by the 'Chronicle of Tiglath-pileser I' and by the 'Broken Obelisk' (see Zadok's and Fales's articles). The rare complete silence of the Assyrian annals between 1055 and 934 BCE is the best indication that the Assyrians, under immense pressure from the Aramaeans, retreated to their homeland and fought a protracted and bitter war of survival. Concurrently, there are good indications that the Egyptians forfeited their influence in Canaan (the Wenamun report; see Kahn's and Stern's articles). Most Canaanite city states gradually disappeared, and by the end of the 10th century BCE only few survived as independent city states, mainly on the Phoenician coast. The 'newcomers' (the Aramaeans, the Sea Peoples, the Israelites and the Transjordanian peoples) became the masters of the land from the Sinai Peninsula to the sources of the Tigris, and from the Amuq Plain to Assyria.

The studies presented in this book touch on diverse aspects of human activities (political, social, economic, and cultural), and refer to different parts of the ancient Near East: from Melid and Hanigalbat in the north to Egypt and Kush in the south and from Assyria and Babylonia in the East to the Kingdom of Taita and (southern) Philistia in the west. They do though center mainly on the Bible and the history of ancient Israel and its western and eastern neighbors, as compared with other ancient Near Eastern cultures. The papers present an extensive vista of

views—from biblical and archaeological perspectives and indeed most of them were written from an interdisciplinary standpoint.

Galil 2012

Gershon Galil, *Solomon's Temple, Fiction or Reality?* In: Gershon Galil, Ayelet Gilboa, Aren M. Maeir & Dan'el Kahn (Hrsg.), *The Ancient Near East in the 12th–10th Centuries BCE – Culture and History, Proceedings of the International Conference held at the University of Haifa, 2–5 May, 2010.* Alter Orient und Altes Testament 392 (Münster 2012), 137–.

In sum, the original text incorporated by Dtr in 1 Kgs 5:15–9:9 was composed in the second half of Solomon's reign and reflects the circumstances of this period. A few glosses were added to this text in the pre-exilic period, and it was enlarged and augmented by Dtr in the mid-6th century BCE. In the Persian period, a few priestly elements were added to the text. The architectural plan of the temple is very close to the plan of temples in Syria in the early-1st millennium BCE. The similarities between 1 Kgs 5:15–9:9 and Neo-Assyrian and Neo-Babylonian building inscriptions and stories may indicate that the genre of the text in the book of Kings is 'a building story'. But the similarities are only partial, and may not be used as an argument for dating this biblical text. By contrast, only the Deuteronomistic edition of the text is very close to the Neo-Assyrian pattern, and there is no evidence that the pre-Deuteronomistic version of the text included similar elements which were switched by Dtr, as suggested by Hurowitz. It is reasonable to suggest that the Temple was built in the days of Solomon, and the building story was composed by Solomon's scribes: no king in the Ancient Near East caused his scribes to compose a building story or inscription in honor of another king. Nothing of the sort ever occurred, and it is even less possible that a king would build a temple or a palace and say that it was the work of one of his predecessors.

Noonan 2010

Benjamin J. Noonan, *Abraham, Blessing, and the Nations, A Reexamination of the Niphal and Hitpael of* ברך *in the Patriarchal Narratives.* Hebrew Studies **51** (2010), 73–93.

A long-recognized crux interpretum in Genesis is the diathesis of the Niphal (Gen 12:3; 18:18; 28:14) and Hitpael (Gen 22:18; 26:4) stems of brk in the different renditions of the patriarchal promise of blessing. Many scholars assume that both stems should be translated the same way, arguing for either a medio-passive ("be blessed" or "become blessed") or a reflexive ("bless themselves") translation. After investigating the functions of the Niphal, Piel, and Hitpael verbal stems in biblical Hebrew, this paper reexamines the Niphal and Hitpael of brk in the Hebrew Bible and argues that these two stems of this lexeme have different meanings contextually. Despite their different nuances, however, both stems indicate that the nations are blessed by means of Abraham, not that they utter blessings using Abraham's name because they recognize his status as one greatly blessed by God.

Klima

Flohr 2017

Pascal Flohr et al., *Late Holocene droughts in the Fertile Crescent recorded in a speleothem from northern Iraq.* Geophysical Research

Letters (2017), preprint, 1–9. .

GeoResLet2017.02-Flohr-Supplement1.pdf, GeoResLet2017.02-Flohr-Supplement2.xlsx, GeoResLet2017.02-Flohr-Supplement3.xlsx, GeoResLet2017.02-Flohr-Supplement4.xlsx, GeoResLet2017.02-Flohr-Supplement5.xlsx, GeoResLet2017.02-Flohr-Supplement6.xlsx

Pascal Flohr, Dominik Fleitmann, Eduardo Zorita, Aleksey Sadekov, Hai Cheng, Matt Bosomworth, Lawrence Edwards, Wendy Matthews & Roger Matthews

Key Points:

- A long-term drying trend was present in the Fertile Crescent from at least 950 C.E.
- The recent droughts were extreme compared to the mean climate and superimposed on the long-term aridification
- The long-term trend is not captured by tree ring records or climate models

Droughts have had large impacts on past and present societies. High-resolution paleoclimate data are essential to place recent droughts in a meaningful historical context and to predict regional future changes with greater accuracy. Such records, however, are very scarce in the Middle East in general, and the Fertile Crescent in particular. Here we present a 2400 year long speleothem-based multiproxy record from Gejkar Cave in northern Iraq. Oxygen and carbon isotopes and magnesium are faithful recorders of effective moisture. The new Gejkar record not only shows that droughts in 1998–2000 and 2007–2010, which have been argued to be a contributing factor to Syrian civil war, were extreme compared to the current mean climate, but they were also superimposed on a long-term aridification trend that already started around or before 950 C.E. (Common Era). This long-term trend is not captured by tree ring records and climate models, emphasizing the importance of using various paleoclimate proxy data to evaluate and improve climate models and to correctly inform policy makers about future hydroclimatic changes in this drought-prone region.

Kupfer

Helwing 2009

Barbara Helwing, *Rethinking the Tin Mountains, Patterns of usage and circulation of tin in Greater Iran from the 4th to the 1st millennium bc.* Türkiye Bilimler Akademisi Arkeoloji Dergisi **12** (2009), 209–221.

Considering the development of early copper processing in Western Asia in general, a period of experimentation in various materials available from locally confined sources of tin-copper, lead and possibly other materials can be stated to have occurred during the early 3rd millennium BC. This early start, however, does not lead to the formation of a stable industry. In the later Early Dynastic city states of Mesopotamia, elites seem to have taken over control of the traffic in such items through the newly developing maritime trade on the Persian Gulf, thereby possibly discouraging local industries from further developments. Susa begins only during the later part of the 3rd millennium to participate in the tin trade network, and in the 2nd millennium BC becomes one of its controlling nods, as was Anshan further east.

Keywords: Iran | tin | Bronze Age | tin alloy | metal trade

Methoden

Loken 2017

Eric Loken & Andrew Gelman, *Measurement error and the replication*

crisis, *The assumption that measurement error always reduces effect sizes is false*. science **355** (2017), 584–585.

A common view is that any study finding an effect under noisy conditions provides evidence that the underlying effect is particularly strong and robust. Yet, statistical significance conveys very little information when measurements are noisy. In noisy research settings, poor measurement can contribute to exaggerated estimates of effect size.

A key point for practitioners is that surprising results from small studies should not be defended by saying that they would have been even better with improved measurement. Furthermore, the signal-to-noise ratio cannot in general be estimated merely from internal evidence. It is a common mistake to take a t-ratio as a measure of strength of evidence and conclude that just because an estimate is statistically significant, the signal-to-noise level is high. It is also a mistake to assume that the observed effect size would have been even larger if not for the burden of measurement error. Intuitions that are appropriate when measurements are precise are sometimes misapplied in noisy and more probabilistic settings.

Mittelpaläolithikum

Benito 2017

Blas M. Benito et al., *The ecological niche and distribution of Neanderthals during the Last Interglacial*. Journal of Biogeography **44** (2017), 51–61.

Blas M. Benito, Jens-Christian Svenning, Trine Kellberg-Nielsen, Felix Riede, Graciela Gil-Romera, Thomas Mailund, Peter C. Kjaergaard & Brody S. Sandel

Aim In this paper, we investigate the role of climate and topography in shaping the distribution of Neanderthals (Homo neanderthalensis) at different spatial scales. To this end, we compiled the most comprehensive data set on the distribution of this species during the Last Interglacial optimum (MIS 5e) available to date. This was used to calibrate a palaeo-species distribution model, and analyse variable importance at continental and local scales.

Location Europe and Irano-Turanian region (20° N to 70° N, 10° W to 70° E).

Methods We used archaeological records and palaeoclimatic and topographic predictors to calibrate a model based on an ensemble of generalized linear models fitted with different combinations of predictors and weighted background data. Area under the curve scores computed by leave-one-out were used to assess variable importance at the continental scale, while local regression combined with recursive partition trees was used to assess variable importance at the local scale.

Results Annual rainfall and winter temperatures were the most important predictors at the continental scale, while topography and summer rainfall defined habitat suitability at the local scale. The highest habitat suitability scores were observed along the Mediterranean coastlines. Mountain ranges and continental plains showed low habitat suitability values.

Main conclusions The model results confirmed that abiotic drivers played an important role in shaping Neanderthals distribution during the Last Interglacial. The high suitability of the Mediterranean coastlines and the low suitability values of most sites at the northern and eastern distribution limits (Germany, Hungary, Ukraine) challenge the notion of Neanderthals as a species with preference for colder environments.

Keywords: archaeology | ecological niche | habitat suitability | Homo neanderthalensis | Last Interglacial | MIS 5e | palaeo-species distribution modelling | potential distribution

Neolithikum

Szécsényi-Nagy 2014

Anna Szécsényi-Nagy, Victoria Keerl, János Jakucs, Guido Brandt, Eszter Bánffy & Kurt W. Alt, *Ancient DNA Evidence for a Homogeneous Maternal Gene Pool in Sixth Millennium cal BC Hungary and the Central European LBK*. Proceedings of the British Academy **198** (2014), 71–93.

Our results support a maternal genetic affiliation between the Szakálhát culture and the LBK in Transdanubia, and a genetic continuity between the LBK in the Carpathian Basin and in central Europe. We have shown that demonstrable huntergatherer impacts on the Neolithic datasets studied are negligible to date. Based on the haplogroup similarities and lineage matches between Starc¡evo, LBKT, and LBK in central Europe, we argue for an initial migration wave of the LBK from Transdanubia (Szécsényi-Nagy et al. in prep.). This new early Neolithic genetic input in central Europe remained as a predominantly unchanged substrate for the following two millennia (Brandt et al. 2013).