

## References

### Aktuell

SHINDELL 2019

Drew Shindell & Christopher J. Smith, *Climate and air-quality benefits of a realistic phase-out of fossil fuels*. [nature 573 \(2019\), 408–411](#).

The combustion of fossil fuels produces emissions of the long-lived greenhouse gas carbon dioxide and of short-lived pollutants, including sulfur dioxide, that contribute to the formation of atmospheric aerosols. Atmospheric aerosols can cool the climate, masking some of the warming effect that results from the emission of greenhouse gases. However, aerosol particulates are highly toxic when inhaled, leading to millions of premature deaths per year. The phasing out of unabated fossil-fuel combustion will therefore provide health benefits, but will also reduce the extent to which the warming induced by greenhouse gases is masked by aerosols. Because aerosol levels respond much more rapidly to changes in emissions relative to carbon dioxide, large near-term increases in the magnitude and rate of climate warming are predicted in many idealized studies that typically assume an instantaneous removal of all anthropogenic or fossil-fuel-related emissions. Here we show that more realistic modelling scenarios do not produce a substantial near-term increase in either the magnitude or the rate of warming, and in fact can lead to a decrease in warming rates within two decades of the start of the fossil-fuel phase-out. Accounting for the time required to transform power generation, industry and transportation leads to gradually increasing and largely offsetting climate impacts of carbon dioxide and sulfur dioxide, with the rate of warming further slowed by reductions in fossil-methane emissions. Our results indicate that even the most aggressive plausible transition to a clean-energy society provides benefits for climate change mitigation and air quality at essentially all decadal to centennial timescales.

TAHERIPOUR 2019

Farzad Taheripour, Thomas W. Hertel & Navin Ramankutty, *Market-mediated responses confound policies to limit deforestation from oil palm expansion in Malaysia and Indonesia*. [PNAS 116 \(2019\), 19193–19199](#).

[pnas116-19193-Supplement.pdf](#)

The global demand for palm oil has grown rapidly over the past several decades. Much of the output expansion has occurred in carbon- and biodiversity-rich forest lands of Malaysia and Indonesia (M&I), contributing to record levels of terrestrial carbon emissions and biodiversity loss. This has led to a variety of voluntary and mandatory regulatory actions, as well as calls for limits on palm oil imports from M&I. This paper offers a comprehensive, global assessment of the economic and environmental consequences of alternative policies aimed at limiting deforestation from oil palm expansion in M&I. It Highlights the challenges of limiting forest and biodiversity loss in the presence of market-mediated spillovers into related oilseed and agricultural commodity and factor markets, both in M&I and overseas. Indeed, limiting palm oil production or consumption is unlikely to halt deforestation in M&I in the absence of active forest conservation incentives. Policies aimed at restricting palm oil production in M&I also have broader consequences for the

economy, including significant impacts on consumer prices, real wages, and welfare, that vary among different global regions. A crucial distinction is whether the initiative is undertaken domestically, in which case the M&I region could benefit, or by major palm oil importers, in which case M&I loses income. Nonetheless, all policies considered here pass the social welfare test of global carbon dioxide mitigation benefits exceeding their costs.

**Keywords:** Malaysia and Indonesia | palm oil restriction | deforestation | economic impacts | market-mediated responses

**Significance:** The rapid expansion of oil palm in Malaysia and Indonesia (M&I) has contributed to record levels of deforestation, carbon emissions, and biodiversity loss. Sustainability certification schemes seeking to address this problem have fallen short of their stated goals, leading to calls for more aggressive measures. Here we explore 3 alternative conservation policies within a global economic framework and find that market-mediated responses confound the efficacy and distributional impacts of these policies. We suggest that simply limiting palm oil production or consumption is unlikely to halt deforestation in M&I in the absence of active forest conservation incentives. We also find that M&I would benefit economically by taking domestic action rather than waiting for others to act.

## Archäologie

FOGELIN 2019

Lars Fogelin, *An Unauthorized Companion to American Archaeological Theory*. (Arizona 2019). <<http://arizona.academia.edu/LarsFogelin>>.

This book was born of frustration. It was born of myriad different flavors of frustration with innumerable varieties of people and subjects. More than anything, it was born of my frustration with the current state of archaeological theory in America—how it’s viewed, how it’s taught, and how it’s presented. Archaeological theory is useful, interesting, fun, and even funny, not that you could tell by the way most archaeologists talk about it. Archaeologists typically present theory as dry, esoteric, abstract, and, more than anything, just so fucking serious. But archaeological theory isn’t really like that.

I cannot stress the following enough—the primary readings are better than anything written here. If you only read this book, you don’t know archaeological theory; you only know one archaeologist’s warped view of theory.

This brings me to my final goal for this book. From the start, I chose to make this book available for free to see if an alternative form of academic publishing could work. I admit that my sophomoric tone might have played a small part in my noble decision to forego academic publishing, but let’s ignore that for the moment. I have written academic books with real publishers, and I will let you in on the truth of it. Unless it’s an introductory textbook, it doesn’t make much money. All told, my previous three academic books netted me a couple thousand dollars in royalties—which is real money. I’m not complaining. If you divide the royalties by the hours I worked on those books, though, I was making pennies an hour. The only people who make money in academic publishing are the major academic publishers. So screw ‘em. The only thing I ask is that you please consider downloading this book from my Academia.edu page so I can track how many people are reading it. I am hoping that those numbers will help me make the case that academics freely posting their books online is a viable alternative to traditional academic publishing. Finally, if you have found this book useful, please share it with others or, better yet, share the link to it with others.

<http://arizona.academia.edu/LarsFogelin>

## Datierung

TALLER 2019

Andreas Taller & Nicholas J. Conard, *Transition or Replacement? Radiocarbon Dates from Hohle Fels Cave (Alb-Donau-Kreis/D) and the Passage from Aurignacian to Gravettian*. [Archäologisches Korrespondenzblatt 49 \(2019\), 165–181](#).

The Upper Palaeolithic record of Hohle Fels Cave (Swabian Jura, near Schelklingen) provides an excellent record of the transition from the Aurignacian to the Gravettian. The Gravettian of Hohle Fels dates among the oldest Middle Upper Palaeolithic sites known with earliest ages between 35 and 34 ka cal BP. The radiocarbon dates from Geißenklösterle confirm the early age for the Swabian Gravettian. The lithic assemblages from Hohle Fels and those from other Swabian sites in the vicinity (Geißenklösterle, Brillenhöhle) indicate an early Gravettian with artefacts such as Gravette points, Microgravette points, Font-Robert points and flechettes. In Hohle Fels we see no significant hiatus in the settlement, and the dates from the Upper Aurignacian and oldest Gravettian are in deed chronologically very close and do in part overlap. Here, we discuss existing as well as new AMS14C radiocarbon dates from the Gravettian and their significance for the evolution of this Upper Palaeolithic entity. We then contextualise the results both with existing data on the regional and European palaeo-environment as well as the early Gravettian landscape of sites in Central Europe with occupations such as the Weinberghöhlen in Bavaria or Willendorf II/5 in Lower Austria. The dates also shed light on the relationship of the different Gravettian layers of Hohle Fels and thus contribute to understanding the stratigraphic context of these four horizons.

Die jungpaläolithischen Schichten des Hohle Fels (nahe Schelklingen) bieten exzellente Voraussetzungen für eine Untersuchung des Überganges vom Aurignacien zum Gravettien. Mit einem Alter von 35000-34000 Jahren kalibriert vor heute gehört das Gravettien der Fundstelle zu den ältesten Inventaren des Mittleren Jungpaläolithikums in Mitteleuropa. Die ebenfalls sehr alten Radiokarbondatierungen aus der benachbarten Geißenklösterle-Höhle bestätigen das hohe Alter des Gravettien auf der Schwäbischen Alb. Die Steinartefaktinventare aus dem Hohle Fels und den anderen Fundstellen der Alb in der unmittelbaren Umgebung (Geißenklösterle, Brillenhöhle) zeigen auch typologisch ein frühes Gravettien an, mit Geräten wie Gravettespitzen, Mikrogravettespitzen, Font-Robert-Spitzen und fléchettes. In der Stratigraphie des Hohle Fels gibt es keine erkennbare Besiedlungslücke zwischen Aurignacien und Gravettien, und die Datierungen beider Technokomplexe überlappen teilweise. In diesem Aufsatz werden neue wie bereits existente AMS 14C-Datierungen der gravettienzeitlichen Schichten des Hohle Fels und ihre Implikationen für die Entwicklung des Gravettien diskutiert. Die Ergebnisse werden sowohl mit Daten zur regionalen wie europaweiten Paläoumwelt als auch mit der Fundstellenlandschaft des frühen Gravettien in Mitteleuropa mit Stationen wie den Weinberghöhlen in Bayern oder Willendorf H/5 in Niederösterreich kontextualisiert. Die Datierungen verbessern darüber hinaus auch das Verständnis der stratigraphischen Zusammenhänge der vier relevanten Fundschichten des Hohle Fels.

## Islam

GROSS 2014

MARKUS GROSS & KARL-HEINZ OHLIG (Hrsg.), *Die Entstehung einer Weltreligion III, Die heilige Stadt Mekka – eine liter-*

*arische Fiktion*. INĀRAH: Schriften zur frühen Islamgeschichte und zum Koran 7 (Berlin 2014).

GROSS 2017

MARKUS GROSS & KARL-HEINZ OHLIG (Hrsg.), *Die Entstehung einer Weltreligion IV, Mohammed – Geschichte oder Mythos?* INĀRAH: Schriften zur frühen Islamgeschichte und zum Koran 8 (Berlin 2017).

OHLIG 2005

KARL-HEINZ OHLIG & GERD-R. PUIN (Hrsg.), *Die dunklen Anfänge, Neue Forschungen zur Entstehung und frühen Geschichte des Islam*. INĀRAH: Schriften zur frühen Islamgeschichte und zum Koran 1 (Berlin 2006).

YEOMANS 2010

SARAH YEOMANS (Hrsg.), *Islam in the Ancient World*. ([Washington 2010](#)).

## Mathematik

BRANCH 2019

Oliver Branch & Volker Wulfmeyer, *Deliberate enhancement of rainfall using desert plantations*. [PNAS 116 \(2019\), 18841–18847](#).

[pnas116-18841-Supplement1.pdf](#), [pnas116-18841-Supplement2.mp4](#)

Large-scale afforestation is increasingly being considered as a negative emissions method for sequestering large quantities of atmospheric CO<sub>2</sub>. At the same time, regional weather modification Methods, like cloud seeding, are being used to counteract increasing water scarcity in arid regions. Large-scale sustainable desert agroforestry plantations can contribute to climate change mitigation and can also be used to modify regional climate, particularly rainfall. Climate impacts from plantations need to be well understood before considering implementation. Typically, impact studies are attempted at continental or global scales and use coarser-resolution models, which suffer from severe systematic errors. This is highly problematic because decision makers should only countenance geoengineering schemes like global afforestation if impacts are understood on the regional scale. We posit the necessity of using high-resolution regional models with sophisticated representations of land–atmosphere feedback and vegetation. This approach allows for studying desert plantations and the process chain leading to climate modification. We demonstrate that large-scale plantations enhance regional clouds and rainfall and derive an index for predicting plantation impacts. Thus, desert plantations represent a unique environmental solution via predictable regional weather modification and carbon storage.

**Keywords:** desert plantations | weather modification | rainfall enhancement

**Significance:** Our desert plantation concept aligns closely with research into biological carbon sequestration solutions but uniquely extends into the purview of deliberate rainfall enhancement. With this synergy of carbon sequestration and regional weather modification, we can counteract water scarcity and desertification while minimizing conflicts with food croplands. We have demonstrated that large plantations do enhance rainfall in arid regions and identified the underlying

process chain. By using this knowledge we have developed a global index to assess which deserts are most favorable for weather modification and discuss how rainfall impacts can be intensified using agricultural Methods. This potential for rainfall enhancement and carbon sequestration makes the research extremely interesting for the scientific community and for society.

ZHOU 2019

Sha Zhou et al., *Land–atmosphere feedbacks exacerbate concurrent soil drought and atmospheric aridity*. *PNAS* **116** (2019), 18848–18853.

[pnas116-18848-Supplement.pdf](#)

Compound extremes such as cooccurring soil drought (low soil moisture) and atmospheric aridity (high vapor pressure deficit) can be disastrous for natural and societal systems. Soil drought and atmospheric aridity are 2 main physiological stressors driving widespread vegetation mortality and reduced terrestrial carbon uptake. Here, we empirically demonstrate that strong negative coupling between soil moisture and vapor pressure deficit occurs globally, indicating high probability of cooccurring soil drought and atmospheric aridity. Using the Global Land Atmosphere Coupling Experiment (GLACE)-CMIP5 experiment, we further show that concurrent soil drought and atmospheric aridity are greatly exacerbated by land–atmosphere feedbacks. The feedback of soil drought on the atmosphere is largely responsible for enabling atmospheric aridity extremes. In addition, the soil moisture–precipitation feedback acts to amplify precipitation and soil moisture deficits in most regions. CMIP5 models further show that the frequency of concurrent soil drought and atmospheric aridity enhanced by land–atmosphere feedbacks is projected to increase in the 21st century. Importantly, land–atmosphere feedbacks will greatly increase the intensity of both soil drought and atmospheric aridity beyond that expected from changes in mean climate alone.

**Keywords:** soil moisture | vapor pressure deficit | compound extreme events | GLACE-CMIP5

Sha Zhou, A. Park Williams, Alexis M. Berg, Benjamin I. Cook, Yao Zhang, Stefan Hagemann, Ruth Lorenz, Sonia I. Seneviratne & Pierre Gentine

**Significance:** Soil drought and atmospheric aridity can be disastrous for ecosystems and society. This study demonstrates the critical role of land–atmosphere feedbacks in driving cooccurring soil drought and atmospheric aridity. The frequency and intensity of atmospheric aridity are greatly reduced without the feedback of soil moisture to atmospheric temperature and humidity. Soil moisture can also impact precipitation to amplify soil moisture deficits under dry conditions. These land–atmosphere processes lead to high probability of concurrent soil drought and atmospheric aridity. Compared to the historical period, models project future frequency and intensity of concurrent soil drought and atmospheric aridity to be further enhanced by land–atmosphere feedbacks, which may pose large risks to ecosystem services and human well-being in the future.