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References

Afrika

Stewart 2020

Brian A. Stewart, Yuchao Zhao, Peter J. Mitchell, Genevieve Dewar, James D. Gleason & Joel D. Blum, *Ostrich eggshell bead strontium isotopes reveal persistent macroscale social networking across late Quaternary southern Africa.* PNAS **117** (2020), 6453–6462.

pnas117-06453-Supplement.pdf

Hunter-gatherer exchange networks dampen subsistence and reproductive risks by building relationships of mutual support outside local groups that are underwritten by symbolic gift exchange. Hxaro, the system of delayed reciprocity between Ju/'hoãn individuals in southern Africa's Kalahari Desert, is the best-known such example and the basis formost analogies andmodels of hunter-gatherer exchange in prehistory. However, its antiquity, drivers, and development remain unclear, as they do for long-distance exchanges among African foragers more broadly. Here we show through strontium isotope analyses of ostrich eggshell beads from highland Lesotho, and associated strontium isoscape development, that such practices stretch back into the late Middle Stone Age. We argue that these exchange items originated beyond the macroband from groups occupying the more water-stressed subcontinental interior. Tracking the emergence and persistence ofmacroscale, transbiome social networks helps illuminate the evolution of social strategies needed to thrive in stochastic environments, strategies that in our case study show persistence over more than 33,000 y.

Keywords: ostrich eggshell beads | strontium isotope analysis | social networks | late Quaternary | southern Africa

Significance: Hunter-gatherers like the Ju/'hoansi (!Kung) San use exchange networks to dampen subsistence and reproductive risks, but almost nothing is known of how, when, and why such practices emerged. Strontium isotope analysis of one preferred San exchange item, ostrich eggshell beads, from highland Lesotho shows that since the late Middle Stone Age ≈33 ka, such networks connected ecologically complementary regions over minimal distances of several hundred kilometers. Rapidly changing environmental conditions during Marine Isotope Stage 3 (≈59 to 25 ka) likely placed a premium on developing effective means of mitigating subsistence and demographic risks, with ostrich eggshell beads providing a uniform medium of personal decoration and exchange highly suitable for binding together extended open social networks.

Aktuell

Cohen 2020

Jon Cohen & Kai Kupferschmidt, *Countries test tactics in 'war' against COVID-19, Lockdowns and closings proliferate, but virus testing and contact tracing are lagging.* science **367** (2020), 1287–1288.

It's now clear that humanity won't get rid of COVID-19 as it did with SARS (severe acute respiratory syndrome) in 2003, says Mark Woolhouse, an epidemiologist at the University of Edinburgh: "We will be living with this virus indefinitely."

Keeping it at bay might require locking down society for many months, at staggering costs to the economy, social life, and mental health, at least until a vaccine is available. That is inconceivable to Woolhouse and many others.

DGEpi 2020

Stellungnahme der Deutschen Gesellschaft für Epidemiologie (DGEpi) zur Verbreitung des neuen Coronavirus (SARS-CoV-2). Deutsche Gesellschaft für Epidemiologie (2020), preprint, 1–4.

Aktuell liegt ein kurzes Zeitfenster vor, in dem die Entscheidung zwischen Eindämmung und Verlangsamung der Infektionsausbreitung noch ohne Überlastung des Gesundheitssystems erfolgen kann. In beiden Fällen ist eine konsequente Umsetzung für einen längeren Zeitraum notwendig.

Feng 2020

Shuo Feng, Chen Shen, Nan Xia, Wei Song, Mengzhen Fan & Benjamin | Cowling, *Rational use of face masks in the COVID-19 pandemic*. Lancet Respir Med (2020), preprint, 1–2. DOI:10.1016/S2213-2600(20)30134-X.

As evidence suggests COVID-19 could be transmitted before symptom onset, community transmission might be reduced if everyone, including people who have been infected but are asymptomatic and contagious, wear face masks. Universal use of face masks could be considered if supplies permit.

Ferguson 2020

Neil M. Ferguson et al., *Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand*. Imperial College London (2020), preprint, 1–20. DOI:10.25561/77482.

Two fundamental strategies are possible: (a) mitigation, which focuses on slowing but not necessarily stopping epidemic spread – reducing peak healthcare demand while protecting those most at risk of severe disease from infection, and (b) suppression, which aims to reverse epidemic growth, reducing case numbers to low levels and maintaining that situation indefinitely. Each policy has major challenges. We find that that optimal mitigation policies (combining home isolation of suspect cases, home quarantine of those living in the same household as suspect cases, and social distancing of the elderly and others at most risk of severe disease) might reduce peak healthcare demand by 2/3 and deaths by half. However, the resulting mitigated epidemic would still likely result in hundreds of thousands of deaths and health systems (most notably intensive care units) being overwhelmed many times over. For countries able to achieve it, this leaves suppression as the preferred policy option.

Neil M Ferguson, Daniel Laydon, Gemma Nedjati-Gilani, Natsuko Imai, Kylie Ainslie, Marc Baguelin, Sangeeta Bhatia, Adhiratha Boonyasiri, Zulma Cucunubá, Gina Cuomo-Dannenburg, Amy Dighe, Ilaria Dorigatti, Han Fu, Katy Gaythorpe, Will Green, Arran Hamlet, Wes Hinsley, Lucy C Okell, Sabine van Elsland, Hayley Thompson, Robert Verity, Erik Volz, Haowei Wang, Yuanrong Wang, Patrick GT Walker, Caroline Walters, Peter Winskill, Charles Whittaker, Christl A Donnelly, Steven Riley, Azra C Ghani.

an der Heiden 2020

Matthias an der Heiden & Udo Buchholz, *Modellierung von Beispielszenarien der SARS-CoV-2-Epidemie 2020 in Deutschland*. Robert-Koch-Institut (2020), preprint, 1–11. DOI:10.25646/6571.2.

Von jetzt an und in den nächsten Wochen sind maximale Anstrengungen erforderlich um die COVID-19-Epidemie in Deutschland zu verlangsamen, abzulachen und letztlich die Zahl der Hospitalisierungen, intensivplichtigen Patienten und Todesfälle zu minimieren.

Ioannidis 2020

John P. A. Ioannidis, *In the coronavirus pandemic, we're making decisions without reliable data*. statnews.com (2020), preprint, 1–7. <http://www.statnews.com/2020/03/17/a-fiasco-in-the-making-as-the-coronavirus-pandemic-takes-hold-we-are-making-decisions-witho>.

The most valuable piece of information for answering those questions would be to know the current prevalence of the infection in a random sample of a population and to repeat this exercise at regular time intervals to estimate the incidence of new infections. Sadly, that's information we don't have.

Nacoti 2020

Mirco Nacoti et al., *At the Epicenter of the Covid-19 Pandemic and Humanitarian Crises in Italy*, *Changing Perspectives on Preparation and Mitigation*. New England Journal of Medicine (2020), preprint, 1–5. DOI:10.1056/CAT.20.0080.

In a pandemic, patient-centered care is inadequate and must be replaced by communitycentered care. Solutions for Covid-19 are required for the entire population, not only for hospitals. The catastrophe unfolding in wealthy Lombardy could happen anywhere. Clinicians at a hospital at the epicenter call for a long-term plan for the next pandemic.

Mirco Nacoti, Andrea Ciocca, MEng, Angelo Giupponi, Pietro Brambillasca, Federico Lussana, Michele Pisano, Giuseppe Goisis, Daniele Bonacina, Francesco Fazzi, Richard Naspro, Luca Longhi, Maurizio Cereda, Carlo Montaguti

Shen 2020

Chen Shen, Nassim Nicholas Taleb & Yaneer Bar-Yam, *"Impact of non-pharmaceutical interventions..."*, *Review of Ferguson et al.* unknown (2020), preprint, 1.

Since lockdowns result in exponentially decreasing numbers of cases, a comparatively short amount of time can be sufficient to achieve pathogen extinction, after which relaxing restrictions can be done without resurgence. Since the exponential decay is highly sensitive to the interventions made by both government and social action, simulating their effects is less helpful than the advice to "go all out" and refine the effort over time with improved tracing, testing, and other protocols.

Sönnichsen 2020

Andreas Sönnichsen, *Stellungnahme, COVID-19: Wo ist die Evidenz?* Deutsches Netzwerk Evidenz-basierte Medizin e.V. (2020), preprint, 1–2. <http://www.ebm-netzwerk.de/de/veroeffentlichungen/covid-19>.

Strand 2020

Julia Strand, *"I was shocked. I felt physically ill", And still, she corrected the record*. Retraction Watch **2020**, Mar. 26. <http://retractionwatch.com/2020/03/26/>.

That something turned out to be a coding error that, once corrected, nullified the results.

Wang 2020

Chaolong Wang et al., *Evolving Epidemiology and Impact of Non-pharmaceutical Interventions on the Outbreak of Coronavirus Disease 2019 in Wuhan, China.* medRxiv **2020**, 20030593. DOI:10.1101/2020.03.03.20030593.

medRxiv2020-20030593-Supplement1.pdf, medRxiv2020-20030593-Supplement2.pdf

Background: We described the epidemiological features of the coronavirus disease 2019 (Covid-19) outbreak, and evaluated the impact of non-pharmaceutical interventions on the epidemic in Wuhan, China.

Methods: Individual-level data on 25,961 laboratory-confirmed Covid-19 cases reported through February 18, 2020 were extracted from the municipal Notifiable Disease Report System. Based on key events and interventions, we divided the epidemic into four periods: before January 11, January 11-22, January 23 – February 1, and February 2-18. We compared epidemiological characteristics across periods and different demographic groups. We developed a susceptible-exposed-infectious-recovered model to study the epidemic and evaluate the impact of interventions.

Results: The median age of the cases was 57 years and 50.3 % were women. The attack rate peaked in the third period and substantially declined afterwards across geographic regions, sex and age groups, except for children (age <20) whose attack rate continued to increase. Healthcare workers and elderly people had higher attack rates and severity risk increased with age. The effective reproductive number dropped from 3.86 (95 % credible interval 3.74 to 3.97) before interventions to 0.32 (0.28 to 0.37) post interventions. The interventions were estimated to prevent 94.5 % (93.7 to 95.2 %) infections till February 18. We found that at least 59 % of infected cases were unascertained in Wuhan, potentially including asymptomatic and mild-symptomatic cases.

Conclusions: Considerable countermeasures have effectively controlled the Covid-19 outbreak in Wuhan. Special efforts are needed to protect vulnerable populations, including healthcare workers, elderly and children. Estimation of unascertained cases has important implications on continuing surveillance and interventions.

Chaolong Wang, Li Liu, Xingjie Hao, Huan Guo*, Qi Wang, Jiao Huang, Na He, Hongjie Yu, Xihong Lin, An Pan, Sheng Wei, Tangchun Wu

Zhou 2020

Fei Zhou et al., *Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China, A retrospective cohort study.* The Lancet (2020), preprint, 1–9. DOI:10.1016/S0140-6736(20)30566-3.

Background Since December, 2019, Wuhan, China, has experienced an outbreak of coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Epidemiological and clinical characteristics of patients with COVID-19 have been reported but risk factors for mortality and a detailed clinical course of illness, including viral shedding, have not been well described.

Methods In this retrospective, multicentre cohort study, we included all adult inpatients (≥ 18 years old) with laboratoryconfirmed COVID-19 from Jinyintan Hospital and Wuhan Pulmonary Hospital (Wuhan, China) who had been discharged or

had died by Jan 31, 2020. Demographic, clinical, treatment, and laboratory data, including serial samples for viral RNA detection, were extracted from electronic medical records and compared between survivors and non-survivors. We used univariable and multivariable logistic regression methods to explore the risk factors associated with in-hospital death.

Findings 191 patients (135 from Jinyintan Hospital and 56 from Wuhan Pulmonary Hospital) were included in this study, of whom 137 were discharged and 54 died in hospital. 91 (48 %) patients had a comorbidity, with hypertension being the most common (58 [30 %] patients), followed by diabetes (36 [19 %] patients) and coronary heart disease (15 [8 %] patients). Multivariable regression showed increasing odds of in-hospital death associated with older age (odds ratio 1¡ñ10, 95 % CI 1¡ñ03–1¡ñ17, per year increase; p=0¡ñ0043), higher Sequential Organ Failure Assessment (SOFA) score (5¡ñ65, 2¡ñ61–12¡ñ23; p<0¡ñ0001), and d-dimer greater than 1 µg/L (18¡ñ42, 2¡ñ64–128¡ñ55; p=0¡ñ0033) on admission. Median duration of viral shedding was 20¡ñ0 days (IQR 17¡ñ0–24¡ñ0) in survivors, but SARS-CoV-2 was detectable until death in non-survivors. The longest observed duration of viral shedding in survivors was 37 days.

Interpretation The potential risk factors of older age, high SOFA score, and d-dimer greater than 1 µg/L could help clinicians to identify patients with poor prognosis at an early stage. Prolonged viral shedding provides the rationale for a strategy of isolation of infected patients and optimal antiviral interventions in the future.

Fei Zhou, Ting Yu, Ronghui Du, Guohui Fan, Ying Liu, Zhibo Liu, Jie Xiang, Yeming Wang, Bin Song, Xiaoying Gu, Lulu Guan, Yuan Wei, Hui Li, Xudong Wu, Jiuyang Xu, Shengjin Tu, Yi Zhang, Hua Chen, Bin Cao

Anthropologie

Bergström 2020

Anders Bergström, Shane A. McCarthy, Ruoyun Hui, Mohamed A. Almarri, Qasim Ayub, Petr Danecek, Yuan Chen, Sabine Felkel, Pil, *Insights into human genetic variation and population history from 929 diverse genomes*. science **367** (2020), 1339.

abs: s367-1339-Supplement.pdf

Genome sequences from diverse human groups are needed to understand the structure of genetic variation in our species and the history of, and relationships between, different populations. We present 929 high-coverage genome sequences from 54 diverse human populations, 26 of which are physically phased using linked-read sequencing. Analyses of these genomes reveal an excess of previously undocumented common genetic variation private to southern Africa, central Africa, Oceania, and the Americas, but an absence of such variants fixed between major geographical regions. We also find deep and gradual population separations within Africa, contrasting population size histories between hunter-gatherer and agriculturalist groups in the past 10,000 years, and a contrast between single Neanderthal but multiple Denisovan source populations contributing to present-day human populations.

Anders Bergström, Shane A. McCarthy, Ruoyun Hui, Mohamed A. Almarri, Qasim Ayub, Petr Danecek, Yuan Chen, Sabine Felkel, Pille Hallast, Jack Kamm, Hélène Blanché, Jean-François Deleuze, Howard Cann, Swapan Mallick, David Reich, Manjinder S. Sandhu, Pontus Skoglund, Aylwyn Scally, Yali Xue, Richard Durbin & Chris Tyler-Smith

Energie

Bos 2020

M. J. Bos., S. R. A. Kersten & D. W. F. Brilman, *Wind power to methanol, Renewable methanol production using electricity, electrolysis of water and CO2 air capture.* Applied Energy **264** (2020), 114672, 1–11.

The (planned) locations of these wind parks have an installed power around 1.5 GW per location. As design basis for this study it is assumed that 100 MW (6.7 %) of this 1.5 GW is available to produce methanol for 8000 h per year.

Highlights:

- Conversion of 100 MW wind power to methanol at 50 % efficiency.
- Feedstock H2O and CO2 are captured from air.
- Design of air capture installation and methanol reactor based on experimental work.
- 10 MW wind turbines can accommodate the air capture installation in the base tower.
- Estimated methanol price: 800 euro per ton.

A 100 MW stand-alone wind power to methanol process has been evaluated to determine the capital requirement and power to methanol effciency. Power available for electrolysis determines the amount of hydrogen produced. The stoichiometric amount of CO2 – required for the methanol synthesis – is produced using direct air capture. Integration of utilities for CO2 air capture, hydrogen production from co-harvested water and methanol synthesis is incorporated and capital costs for all process steps are estimated. Power to methanol effciency is determined to be around 50 %. The cost of methanol is around 300E ton-1 excluding and 800E ton-1 including wind turbine capital cost. Excluding 300 ME investment cost for 100 MW of wind turbines, total plant capital cost is around 200 ME. About 45 % of the capital cost is reserved for the electrolysers, 50 % for the CO2 air capture installation, and 5 % for the methanol synthesis system. The conceptual design and evaluation shows that renewable methanol produced from air captured CO2, water and renewable electricity is becoming a realistic option at reasonable costs of 750–800 E ton-1.

Keywords: Wind power | Electrolysis | CO2 air capture | Solid amine sorbent | CO2 hydrogenation | Methanol

Nolting 2020

Lars Nolting & Aaron Praktiknjo, *Can we phase-out all of them? Probabilistic assessments of security of electricity supply for the German case.* Applied Energy **263** (2020), 114704, 1–14.

Highlights:

- Probabilistic simulation of security of electricity supply in central Europe.
- Quasi-absolute levels of security of supply are unlikely to be maintained in future scenarios.
- Sensitivity of security of supply towards meteorological influences is increasing.
- Dependency on contributions from neighboring countries is growing.
- Relevance to coordinate capacity planning on an international level is demonstrated.

Against the backdrop of expansions of intermittent renewable energy capacity, planned nuclear phase-outs, and current debates on the additional mothballing of coal-fired power plants in central Europe, there is a substantial increase in uncertainty regarding security of electricity supply. In this context, we present a probabilistic and scenario-based analysis of impacts on security of supply for Germany as a case-study in the medium-term perspective (years 2020, 2022, and

2023). For our analysis, we introduce the energy security assessment module of the JERICHO energy system model from RWTH Aachen University. Our model allows for an hourly probabilistic simulation of security of supply and accounts for stochastic characteristics of (non-)availability of conventional generators, renewable feed-in, electricity demand, and import potentials from central-European countries. To increase the robustness of results, we use a comprehensive dataset of temperature, wind speeds, solar radiation and water levels from weather years 1986 to 2015 as input for our simulations. Our results indicate that Germany is unlikely to maintain its quasi-absolute levels of security of supply in the near future with a mean Loss of Load Expectation (LoLE) of up to 2.6 h in scenario year 2023. However, this does not necessarily imply that future levels of security of supply are insufficient. There is need for further assessments on identifying threshold levels for security of supply, which are economically efficient and acceptable for society. Our results also indicate that the sensitivity of security of supply for meteorological changes increases with reductions of conventional power plants. Finally, we demonstrate that the dependency of security of supply on imports from neighboring countries increases substantially calling for increased international coordination of national energy policies.

Keywords: Security of supply | Energy system modeling | Simulation | Probabilistic modeling | International capacity planning | Energy transition

Metallzeiten

Horn 2018

Christian Horn & Kristian Kristiansen (Hrsg.), *Warfare in Bronze Age Society*. (Cambridge 2018).

Warfare in Bronze Age Society takes a fresh look at warfare and its role in reshaping Bronze Age society. The Bronze Age represents the global emergence of a militarized society with a martial culture, materialized in a package of new, efficient weapons that remained in use formillennia to come. Warfare became institutionalized and professionalized during the Bronze Age, and a new class of warriors made their appearance. Evidence for this development is reflected in the ostentatious display of weapons in burials and hoards and in iconography from rock art to palace frescoes. These new manifestations of martial culture constructed the warrior as a 'Hero' and warfare as 'Heroic'. The case studies,written by an international team of scholars, discuss these and other new aspects of Bronze Age warfare. Moreover, the essays show that warriors also facilitated mobility and innovation as new weapons quickly spread from the Mediterranean to northern Europe.

Kristiansen 2018

Kristian Kristiansen, *Warfare and the Political Economy, Europe 1500–1100 BC*. In: Christian Horn & Kristian Kristiansen (Hrsg.), *Warfare in Bronze Age Society*. (Cambridge 2018), 23–46.

Warfare became institutionalized and professionalized in the Middle Bronze Age, and travelling warriors/mercenaries helped to speed innovations in weapon technology. The flange-hilted sword was the preferred weapon and was a concrete example of this internationalism in weapon technology and warfare. Warriors were organized in local retinues of fifteen to twenty men under the local sword-bearing leader. Many such war-bands could join forces and make up real armies under special circumstances. Organized trade made warriors indispensable, and warfare could take on huge proportions when it came to the control of trade routes, or

rather their most important hubs/ bottlenecks, such as Bernstor.. In addition, knowledge about far-away places and riches made migrations an attractive option in periods of crisis and population surplus.

In all this – trade alternating with raids and sometimes leading to large-scale migrations – Bronze Age warfare looks more like Celtic and Viking warfare and migration. It implies that, by the Bronze Age, European political economies had reached a level of organization that changed little until historical times. Some would term this a military democracy and others would term it a chiefdom-level of social organization. My point is that, by the Bronze Age, we can already observe significant variations between east and west Central Europe, linked to decentralized versus centralized political economies. Our objective must therefore be to uncover the historical forces leading to the dominance of one or the other form because they are historically interlinked.

Physik

Lombriser 2020

Lucas Lombriser, *Consistency of the local Hubble constant with the cosmic microwave background*. Physics Letters B **803** (2020), 135303, 1–6.

A significant tension has become manifest between the current expansion rate of our Universe measured from the cosmic microwave background by the Planck satellite and from local distance probes, which has prompted for interpretations of that as evidence of new physics. Within conventional cosmology a likely source of this discrepancy is identified here as a matter density fluctuation around the cosmic average of the 40 Mpc environment in which the calibration of Supernovae Type Ia separations with Cepheids and nearby absolute distance anchors is performed. Inhomogeneities on this scale easily reach 40 % and more. In that context, the discrepant expansion rates serve as evidence of residing in an underdense region of denv $\approx$ -0.5 $\pm$ 0.1. The probability for finding this local expansion rate given the Planck data lies at the 95 % confidence level. Likewise, a hypothetical equivalent local data set with mean expansion rate equal to that of Planck, while statistically favoured, would not gain strong preference over the actual data in the respective Bayes factor. These results therefore suggest borderline consistency between the local and Planck measurements of the Hubble constant. Generally accounting for the environmental uncertainty, the local measurement may be reinterpreted as a constraint on the cosmological Hubble constant of H0 = 74.7+5.8-4.2 km/s/Mpc. The current simplified analysis may be augmented with the employment of the full available data sets, an impact study for the immediate <= 10 Mpc environment of the distance anchors, more prone to inhomogeneities, as well as expansion rates measured by quasar lensing, gravitational waves, currently limited to the same 40 Mpc region, and local galaxy distributions.

Religion

Rauer 2019

Constantin Rauer, *Die Höhle Cougnac, Gewalt und Religion in der Höhlenmalerei*. Prähistorische Zeitschrift **94** (2019), 307–350.

The cave of Cougnac is not only one of the oldest and longest utilised cultic sites in human history (25,000– 14,000 BP), but also a sanctuary that shows clearly the animistic beliefs of the Upper Paleolithic. By precise iconographic image analyses

the article distinguishes mythical representations of the contents of belief, cultic representations of the magicians, ciphers of sexual simulation and magical rites to work out thereupon their interdependencies. This can be seen on a ca. 30 metre-long frieze telling a sequential illustrated story, namely one of two murdered and subsequently reincarnated individuals: one into a mammoth, the other into a megaceros. Throughout their journey of reincarnation they are accompanied by two magicians who, with the help of two auxiliary spirits, a deer and a bird, fly through the kingdom of the dead. In the pictorial sequence that follows, birdlike symbols swarm the naturally-occuring rock formations in the cave that strongly resemble vulvas, whereby the sexualisation of the rock face in the cave presents a contrast to these early murder scenes. The individual scenes as well as an entire hall were ultimately marked with ritual finger impressions, immortalising the artists in the rock face who, in turn, received the Mana of the rock face itself. A similar illustrated story of the murder scenes from Pech-Merle will also be analysed here. This article concludes with observations on the consciousness of death in the Upper Palaeolithic as well as its meaning for the conditio humana.

Keywords: Cougnac cave | origine of religion | religion and violence | iconography of cave painting

Die Cougnac-Höhle ist nicht nur eine der ältesten und am längsten genutzten Kultstätten der Menschheit (25.000–14.000 BP), sondern auch jenes Heiligtum, dessen Gemälde die animistischen Glaubens vorstellungen des Jungpaläolithikums deutlich vor Augen führen. Durch präzise ikonografische Bild ana lysen unterscheidet der Beitrag zwischen den mythischen Darstellungen der Glaubensinhalte, den kultischen Repräsentationen der Magier, den Chiffren der Sexualsimulation sowie den magischen Riten, um alsdann deren wechselseitige Bezüge herauszuarbeiten. Dies geschieht anhand des etwa 30 m langen Frieses von Cougnac, der eine sequenzielle Bildgeschichte erzählt. Die Geschichte handelt von zwei Ermordeten, die sich reinkarnieren; der eine in ein Mammut, der andere in einen Riesenhirsch. Begleitet werden ihre Seelenwanderungen von zwei Magiern, die mit zwei Hilfsgeistern, einem Hirsch und einem Vogel, durchs Totenreich fliegen. In der nachfolgenden Bildsequenz werden Felswandvulven von aviformen Zeichen umschwärmt, wobei die Sexualisierung der Felswand ein restituierendes Gegenstück zu den anfänglichen Mordszenen darstellt. Schließlich wurden die einzelnen Szenen sowie abschließend noch eine ganze Halle mit rituellen Fingerabdrücken markiert, womit die Adepten sich auf den Felswänden verewigten und dafür im Gegenzug das Mana der Felswand empfingen. Analysiert wird auch die sehr ähnliche Bildgeschichte der Mordszene von Pech-Merle. Der Beitrag schließt mit Betrachtungen zum Todesbewusstsein im Jungpaläolithikum sowie dessen Bedeutung für die conditio humana.

Keywords: Cougnac Höhle | Ursprung der Religion | Religion und Gewalt | Ikonografie der Höhlenmalerei

Zündung

Miganakallu 2020

Niranjan Miganakallu, Zhuyong Yang, Rafał Rogóż, Łukasz Jan Kapusta, Cord Christensen, Sam Barros & Jeffrey Naber, *Effect of water–methanol blends on engine performance at borderline knock conditions in gasoline direct injection engines.* Applied Energy **264** (2020), 114750, 1–13.

This indicates that at the operating conditions chosen for this study, pure water injection allows the engine to be operated within the controlled knock limit, resulting in lowest specific fuel consumption.

Highlights:

- New insight into the impact of water methanol blends on effective knock mitigation.
- Improved combustion stability with addition of water methanol blends.
- Combustion phasing plays a major role on the combustion stability.
- Reduced exhaust gas temperatures due to charge cooling and better combustion phasing.

One of the limiting factors improving the effciency of gasoline engines is engine knock. Various techniques including using fuels that result in charge cooling are employed to mitigate knock and improve effciency. Water and methanol have higher heat of vaporization than gasoline. When water or methanol is injected into the intake manifold, it evaporates by exchanging energy with the charge mixture resulting in charge cooling. This allows the engine to be run with advanced spark timing without engine knock. With this motive, the impact of water methanol injection on the engine performance of a gasoline direct injection engine was investigated. Experimental studies were conducted on a single-cylinder 0.55L engine with a compression ratio of 10.9:1 at 800 kPa net indicated mean effective pressure and 1500 revolutions per minute. Baseline tests without water injection were conducted by direct injection of gasoline fuel blended with 10 % ethanol (E10). Four mixtures: 100 % water, 75 % water + 25 % methanol, 50 % water + 50 % methanol and 100 % methanol were used with port injection. Spark ignition timing, flow rate of the fuel and the four mixtures were varied to be within the controlled knock limit while maintaining an excess air ratio of 1.0. Comparisons on the effectiveness of these mixtures indicate that higher methanol content in the mixture helped in reaching the maximum brake torque condition at lower mixture fuel ratios. Combustion stability of the engine was improved with the addition of water and water-methanol blends due to the sensitivity of combustion phasing at advanced spark timings reducing the variation in indicated mean effective pressure. Exhaust gas temperatures decrease with the addition of water and water-methanol blends due to the combined effect of increased charge cooling and improved combustion phasing.