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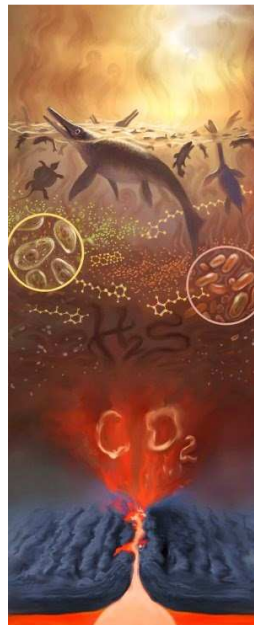


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## EM FOCUS

<http://www.geologypage.com/2015/04/oxygen-depleted-toxic-oceans-had-key.html#ixzz3dcC3oOh3>  
Oxygen-depleted toxic oceans had key role in mass extinction over 200 million years ago



*Life of the Triassic met a choking end in a runaway greenhouse climate, heating the seas into warm stagnation.  
Credit: Victor Leshyk*

Changes in the biochemical balance of the ocean were a crucial factor in the end-Triassic mass extinction, during which half of all plant, animal and marine life on Earth perished, according to new research involving the University of Southampton.

The study, published in the upcoming edition of *Geology*, reveals that a condition called 'marine photic zone euxinia' took place in the Panthalassic Ocean- the larger of the two oceans surrounding the supercontinent of Pangaea.

Photic zone euxinia occurs when the sun-lit surface waters of the ocean become devoid of oxygen and are poisoned by hydrogen sulphide -- a by-product of microorganisms that live without oxygen that is extremely toxic to most other lifeforms.

The international team of researchers studied fossilised organic molecules extracted from sedimentary rocks that originally accumulated on the bottom of the north-eastern Panthalassic Ocean, but are now exposed on the Queen Charlotte Islands, off the coast of British Columbia, Canada.

The team found molecules derived from photosynthesising brown-pigmented green sulphur bacteria -- microorganisms that only exist under severely anoxic conditions -- proving severe oxygen depletion and hydrogen sulphide poisoning of the upper ocean at the end of Triassic, 201 million years ago.

The researchers also documented marked changes in the nitrogen composition of organic matter, indicating that disruptions in marine nutrient cycles coincided with the development of low oxygen conditions.

Previous studies have reported evidence of photic zone euxinia from terrestrial and shallow, near-shore environments during the latest Triassic, but the new research is the first to provide such evidence from an open ocean setting, indicating these changes may have occurred on a global scale.

The University of Southampton's Professor Jessica Whiteside, who co-authored the study, explains: "As tectonic plates shifted to break up Pangaea, huge volcanic rifts would have spewed carbon dioxide into the atmosphere, leading to rising temperatures from the greenhouse effect. The rapid rises in CO<sub>2</sub> would have triggered changes in ocean circulation, acidification and deoxygenation."

"These changes have the potential to disrupt nutrient cycles and alter food chains essential for the survival of marine ecosystems. Our data now provides direct evidence that anoxic, and ultimately euxinic, conditions severely affected food chains."

"The same CO<sub>2</sub> rise that led to the oxygen depleted oceans also led to a mass extinction on land, and ultimately to the ecological take-over by dinosaurs, although the mechanisms are still under study."

Although the Earth was very different during the Triassic Period compared to today, the rate of carbon dioxide release from volcanic rifts are similar to those that we are experiencing now through the burning of fossil fuels.

Professor Whiteside comments: "The release of CO<sub>2</sub> was probably at least as rapid as that caused by the burning of fossil fuels today, although the initial concentrations were much higher in the Triassic. The consequences of rapidly rising CO<sub>2</sub> in ancient times inform us of the possible consequences of our own carbon dioxide crisis."

Reference:

A. H. Kasprak, J. Sepulveda, R. Price-Waldman, K. H. Williford, S. D. Schoepfer, J. W. Haggart, P. D. Ward, R. E. Summons, J. H. Whiteside. Episodic photic zone euxinia in the northeastern Panthalassic Ocean during the end-Triassic extinction. *Geology*, 2015; 43 (4): 307 DOI: [10.1130/G36371.1](https://doi.org/10.1130/G36371.1)

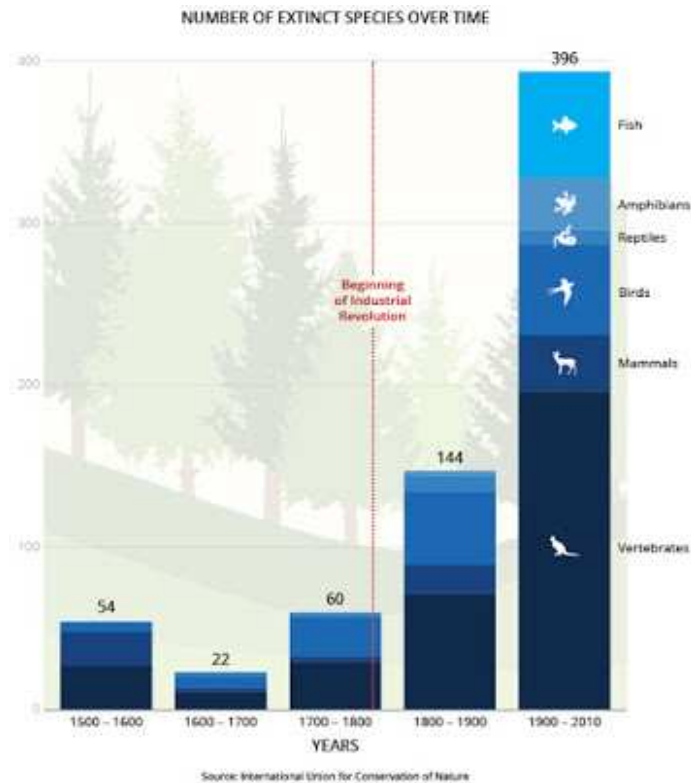
Note: The above story is based on materials provided by University of Southampton.

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<http://www.geologypage.com/2015/06/sixth-mass-extinction-is-here-species.html>

Sixth mass extinction is here: species are disappearing faster since the dinosaurs' demise



*Chart shows the enormous uptick in species loss over the last century.  
Credit: Image courtesy of Stanford University*

There is no longer any doubt: We are entering a mass extinction that threatens humanity's existence.

That is the bad news at the center of a new study by a group of scientists including Paul Ehrlich, the Bing Professor of Population Studies in biology and a senior fellow at the Stanford Woods Institute for the Environment. Ehrlich and his co-authors call for fast action to conserve threatened species, populations and habitat, but warn that the window of opportunity is rapidly closing.

"[The study] shows without any significant doubt that we are now entering the sixth great mass extinction event," Ehrlich said.

Although most well known for his positions on human population, Ehrlich has done extensive work on extinctions going back to his 1981 book, *Extinction: The Causes and Consequences of the Disappearance of Species*. He has long tied his work on coevolution, on racial, gender and economic justice, and on nuclear winter with the issue of wildlife populations and species loss.

There is general agreement among scientists that extinction rates have reached levels unparalleled since the dinosaurs died out 66 million years ago. However, some have challenged the theory, believing earlier estimates rested on assumptions that overestimated the crisis.

The new study, published in the journal *Science Advances*, shows that even with extremely conservative estimates, species are disappearing up to about 100 times faster than the normal rate between mass extinctions, known as the background rate.

"If it is allowed to continue, life would take many millions of years to recover, and our species itself would likely disappear early on," said lead author Gerardo Ceballos of the Universidad Autónoma de México.

### **Conservative approach**

Using fossil records and extinction counts from a range of records, the researchers compared a highly conservative estimate of current extinctions with a background rate estimate twice as high as those widely used in previous analyses. This way, they brought the two estimates -- current extinction rate and average background or going-on-all-the-time extinction rate -- as close to each other as possible.

Focusing on vertebrates, the group for which the most reliable modern and fossil data exist, the researchers asked whether even the lowest estimates of the difference between background and contemporary extinction rates still justify the conclusion that people are precipitating "a global spasm of biodiversity loss." The answer: a definitive yes.

"We emphasize that our calculations very likely underestimate the severity of the extinction crisis, because our aim was to place a realistic lower bound on humanity's impact on biodiversity," the researchers write.

To history's steady drumbeat, a human population growing in numbers, per capita consumption and economic inequity has altered or destroyed natural habitats. The long list of impacts includes:

- Land clearing for farming, logging and settlement
- Introduction of invasive species
- Carbon emissions that drive climate change and ocean acidification
- Toxins that alter and poison ecosystems

Now, the specter of extinction hangs over about 41 percent of all amphibian species and 26 percent of all mammals, according to the International Union for Conservation of Nature, which maintains an authoritative list of threatened and extinct species.

"There are examples of species all over the world that are essentially the walking dead," Ehrlich said.

As species disappear, so do crucial ecosystem services such as honeybees' crop pollination and wetlands' water purification. At the current rate of species loss, people will lose many biodiversity benefits within three generations, the study's authors write. "We are sawing off the limb that we are sitting on," Ehrlich said.

### **Hope for the future**

Despite the gloomy outlook, there is a meaningful way forward, according to Ehrlich and his colleagues. "Avoiding a true sixth mass extinction will require rapid, greatly intensified efforts to conserve already threatened species, and to alleviate pressures on their populations -- notably habitat loss, over-exploitation for economic gain and climate change," the study's authors write.

In the meantime, the researchers hope their work will inform conservation efforts, the maintenance of ecosystem services and public policy.

Co-authors on the paper include Anthony D. Barnosky of the University of California at Berkeley, Andrés García of Universidad Autónoma de México, Robert M. Pringle of Princeton University and Todd M. Palmer of the University of Florida.

### Reference:

Gerardo Ceballos, Paul R. Ehrlich, Anthony D. Barnosky, Andrés García, Robert M. Pringle and Todd M. Palmer. Accelerated modern human-induced species losses: Entering the sixth mass extinction. *Science Advances*, 2015 DOI: [10.1126/sciadv.1400253](https://doi.org/10.1126/sciadv.1400253)

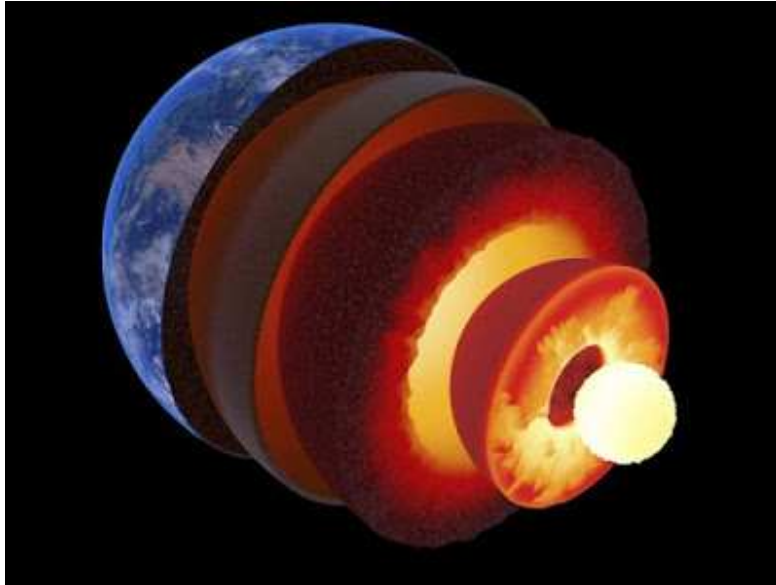
*Note: The above post is reprinted from materials provided by Stanford University. The original item was written by Rob Jordan.*

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<http://www.geologypage.com/2015/06/new-research-shows-earths-core-contains.html#ixzz3eqZDD7qz>

[New research shows Earth's core contains 90 percent of Earth's sulfur](#)



So perhaps there is some truth in the old legends of the underworld reeking of brimstone (or sulphur, as it is now called)? New research confirms that the Earth's core does in fact contain vast amounts of sulphur, estimated to be up to  $8.5 \times 10^{18}$  tonnes. This is about 10 times the amount of sulphur in the rest of the Earth, based on the most recent estimates (and for comparison, around 10% of the total mass of the Moon). This is the first time that scientists have conclusive geochemical evidence for sulphur in the Earth's core, lending weight to the theory that the Moon was formed by a planet-sized body colliding with the Earth. This work is reported in the peer-reviewed journal, *Geochemical Perspectives Letters*.

The Earth's core begins 2900km beneath our feet, so it is impossible to investigate directly. However, an international group of researchers have been able to develop indirect geochemical methods to show core composition.

As lead researcher Dr Paul Savage (Department of Earth Sciences, Durham University, UK) said:

"Scientists have suspected that there is sulphur in the core for some time, but this is the first time we have solid geochemical evidence to support the idea."

For a long time it has been known that the Earth's core is too light to be made only of iron and nickel, and it had been assumed that the core contained other lighter elements, such as sulphur, silicon, oxygen and carbon. However, given the depth of the core, this has been impossible to confirm directly. Fortunately, a cataclysmic event in the distant past - when the Earth collided with a large, planet-sized body, tearing off the part which became our Moon - left a fingerprint, which has been used to confirm the core content.

The researchers believe that the impact of the collision melted the Earth's mantle, allowing a sulphur-rich liquid to form in Earth's mantle, the vast middle layer between the core and the crust; some was probably lost into space, but some remained and sunk into the core. The key to confirming this lay in measuring the isotope ratios of elements (isotopes are atoms of the same element with slightly different masses) in the mantle, and comparing these to certain meteorites, which are believed to be the best match to the Earth's original composition.

Because of variability in mantle composition, it is difficult to draw firm conclusions from measuring sulphur directly, so the researchers chose to analyse copper from the Earth's mantle and crust - copper is often bound to sulphur. "We chose copper, because it is a chalcophile element, which means it prefers to be in sulphide-rich material - so is a good element to trace the fate of sulphur on Earth," said senior author Professor Frédéric Moynier (Institut de Physique du Globe, Paris). "Generally, where there is copper, there is sulphur; copper gives us a proxy measurement for sulphur."

The work comprised 3 distinct stages:

- Firstly, the researchers had to estimate the isotopic composition of copper in the Earth's mantle and crust.
- Secondly, they had to estimate the isotopic composition of copper in the Earth before it formed a core, and was bombarded by giant impactors. Direct measurement is of course impossible, so they used meteorites, which are regarded as the best analogue.
- Finally, they had to simulate which copper isotopic signature would be generated by the removal of sulphur-rich liquid after the 'giant impact'.

Using the state-of-the-art mass spectrometers at the Washington University in St. Louis and the Institut de Physique du Globe, Paris, they were able to confirm that there was a difference of 0.025% in the copper isotopic ratios between the Earth mantle samples, and the meteorite samples. Because the isotopes of copper divide unevenly between a sulphur-rich liquid and the rest of Earth's mantle, this shows that a large amount of sulphur must have been removed from the mantle.

Paul Savage said:

"This study is the first to show clear geochemical evidence that a sulphide liquid must have separated from the mantle early on in Earth's history - which most likely entered the core. We estimate that the quantity of sulphur in the core is vast, around  $8.5 \times 10^{18}$  tonnes, which to give an idea of scale, is around 10% of the mass of the Moon. In addition, the work adds weight to the theory that the Moon was formed via a collision between the Earth and another body.

"In a way, we can also say that we have life imitating art. For millennia, tales have been told of the underworld being awash with fire and brimstone. Now at least, we can be sure of the brimstone."

Commenting, Executive Co-Editor of Geochemical Perspectives Letters, Professor Graham Pearson (University of Alberta) said:

"The presence and identity of other elements in the Earth's core has been one of the most enduring problems in geochemistry. Savage and colleagues provide very elegant evidence, using isotopes of copper as a tracer, of the stripping of vast amounts of sulphur from the Earth's early mantle into the core. So the core turns out to be a good place to hide quite substantial amounts of elements other than iron and nickel. This study will surely encourage others to persist in the search for evidence of other elements in the core - data that is critically needed to complete our understanding of how the Earth formed and what the geochemical mass balance is in the Earth."

Reference:

Copper isotope evidence for large-scale sulphide fractionation during Earth's differentiation, Geochemical Perspectives Letters, v1, n1, DOI: [10.7185/geochemlet.1506](https://doi.org/10.7185/geochemlet.1506)

*The above post is reprinted from materials provided by European Association of Geochemistry.*

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## **NEWS METEORITICA DA SEMANA**

## **ÍNDICE DE NOTÍCIAS JORNAL DA CIÊNCIA**

## **AMBIENTE BRASIL**

### **08 / 07 / 2015 Observatório do Clima defende investimentos em fontes renováveis de energia**

Para o secretário-executivo do Observatório do Clima, Carlos Rittl, as políticas brasileiras de expansão da geração de energia deveriam considerar as mudanças climáticas e os riscos dos investimentos na hora de alocar os recursos.

### **08 / 07 / 2015 Cientistas afirmam que vivemos mudanças climáticas sem precedentes desde 1850**

Cientistas de todo o mundo se reuniram nesta terça-feira (7) na França e alertaram que tanto a temperatura da superfície terrestre e dos oceanos como o nível do mar, a concentração de gases do efeito estufa e as emissões de CO2 aumentaram a níveis históricos desde meados do século XIX.

### **08 / 07 / 2015 Lagosta rara de duas cores é encontrada nos Estados Unidos**

Exemplar estava entre lagostas vendidas para cooperativa. Chance de encontrar lagosta de duas cores é 1 em 50 milhões.

### **08 / 07 / 2015 Cometa estudado por missão Rosetta teria microrganismos na superfície**

Teoria foi apresentada por astrônomos do Reino Unido nesta semana. Tese reforçaria que cometas têm importância na aparição da vida na Terra.

### **08 / 07 / 2015 MMA fortalece parcerias na Amazônia Legal**

Encontros com os nove Estados da região buscam estabelecer estratégias de fortalecimento do Zoneamento Ecológico-Econômico.

### **08 / 07 / 2015 OMS tem que mudar para enfrentar epidemias, concluem especialistas**

Painel de especialistas independentes foi designado pela ONU. Falta de recursos pode ter limitado resposta da OMS a epidemia de ebola.

### **08 / 07 / 2015 No Equador, Papa Francisco pede exploração responsável da Amazônia**

Pontífice destacou a importância da Amazônia para 'o ecossistema mundial'. 'Não podemos seguir dando as costas à nossa mãe Terra', disse.

### **08 / 07 / 2015 Soldado se torna 8ª vítima de ataque de tubarão no litoral sudeste dos EUA**

Os especialistas em tubarões afirmam que os recentes ataques no litoral da Carolina do Norte são o resultado do fato de que há "muitas pessoas na água". Além disso, as incomuns altas temperaturas que se mantiveram nos meses do verão obrigou os tubarões a emigrar ao norte mais cedo que o normal.

### **08 / 07 / 2015 Contrabando de marfim muda rota para driblar fiscalização, diz Tailândia**

País lançou, este ano, iniciativa para combater comércio ilegal. Só este ano, Tailândia confiscou o equivalente a US\$ 12 milhões em marfim.

### **08 / 07 / 2015 Câmeras subaquáticas ajudarão a contar tubarões do mundo**

Projeto Global FinPrint quer levar câmeras a 400 recifes em todo o mundo. Objetivo é ter visão clara de qual a situação dos animais.

### **08 / 07 / 2015 Estados trocam experiências sobre o CAR**

Ferramenta eletrônica permitirá aos Estados fazer o cruzamento das informações declaradas com outros bancos de dados, gerando alertas sobre sobreposições de imóveis.

### **08 / 07 / 2015 Cientistas criam baratas ciborgues guiadas por controle remoto**

Equipe de engenheiros e entomólogos tenta desenvolver insetos que possam acessar áreas de desastres naturais.

### **08 / 07 / 2015 OMS diz que levará 'muitos meses' para colocar fim à epidemia de ebola**

Comitê decidiu manter status de emergência de saúde para a doença. Desde dezembro de 2013, vírus matou mais de 11.200 pessoas no mundo.

### **08 / 07 / 2015 Doenças ligadas ao tabaco matam 1 pessoa a cada 6 segundos, diz OMS**

Agência cobra governos a aumentar impostos para combater o fumo. Por ano, 6 milhões de pessoas morrem devido a doenças ligadas ao tabaco.

### **08 / 07 / 2015 Mapa aponta mudanças climáticas no litoral**

Levantamento será realizado em parceria com instituições internacionais e começará pela costa de Santa Catarina.

### **07 / 07 / 2015 Dois mil cientistas em Paris discutem soluções para mudança climática**

A cinco meses da conferência de Paris onde se reunirão representantes dos 195 estados envolvidos na busca de um acordo global da ONU para limitar o aquecimento global, mais de 2.000 especialistas se reunirão esta semana para uma atualização sobre a situação da pesquisa climática.



### **07 / 07 / 2015 Albatroz é tratado no litoral norte de São Paulo para voltar à natureza**

Ave, maior da espécie, foi encontrada anêmica em São Sebastião, SP. Animal de 9 quilos e 3,25 de envergadura é idosa, aponta oceanógrafo.

### **07 / 07 / 2015 Pintura descoberta na África revela uso de leite em tinta há 49 mil anos**

Até então, só se tinha evidências de uso de leite em tinta 2,2 mil anos atrás. Leite não era de uma vaca domesticada, mas de animal abatido.

### **07 / 07 / 2015 Nasa perde brevemente contato com nave que se dirige a Plutão**

Suspensão das comunicações durou uma hora e meia no sábado (4). Cientistas tentam averiguar o que falhou na New Horizons.

### **07 / 07 / 2015 FNMA faz consulta para melhorar projetos**

Pesquisa informará os gestores do fundo sobre as principais dificuldades enfrentadas pelas instituições públicas e privadas.

### **07 / 07 / 2015 Morador descobre fóssil de dinossauro na Patagônia argentina**

Após a descoberta, os paleontólogos e técnicos começaram a árdua tarefa de resgatar os fósseis e nos últimos 20 dias foram identificados um fêmur, costelas e uma fíbula (união de ossos) que estavam dispersos no local.

### **07 / 07 / 2015 Detectado sinal de galáxia emitido há 5 bilhões de anos**

A emissão de rádio estava 'gravada' em gás de hidrogênio e viajava em direção à Terra, que é pelo menos 500 anos mais jovem que essa galáxia.

### **07 / 07 / 2015 Novos indícios apontam vida microbiana em cometa 67P**

Astrônomos acreditam que solo negro do 67P indica a presença de micro-organismos semelhantes aos que vivem em locais inóspitos na Terra.

### **07 / 07 / 2015 Astrônomos britânicos descobrem cinco buracos negros supermassivos**

Segundo os pesquisadores, a descoberta reforça a possibilidade de existência de milhões de buracos negros desse tipo no universo.

### **07 / 07 / 2015 Grupo da UnB lança foguete de PVC e peças em 3D a 500 metros de altura**

Protótipo custou cerca de R\$ 2 mil e foi desenvolvido em um mês. Apesar de paraquedas ter falhado, teste foi considerado sucesso.

### **07 / 07 / 2015 Novas regras para reduzir cesáreas nos planos de saúde entram em vigor**

84,6% dos partos realizados no Brasil com planos de saúde são cesáreos. Planos devem informar às pacientes o número de cesáreas dos médicos.

### **07 / 07 / 2015 Combate ao Aedes aegypti envolverá mais de mil agentes de saúde no Ceará**

Agentes de endemias da Secretaria Municipal de Saúde de Fortaleza inspecionarão imóveis da capital em busca de focos do mosquito Aedes aegypti, transmissor da dengue, febre chikungunya e do zika vírus.

### **07 / 07 / 2015 Águas do rio Tietê voltam a escurecer e preocupam moradores em Salto/SP**

Moradores registraram a sujeira e água acinzentada no fim de semana. Mudança de cor é devido a aumento de chuvas, diz secretário.

### **07 / 07 / 2015 Estudo deve tornar mais precisa a previsão de tempestades**

Equipe de pesquisadores franco-brasileira identificou e corrigiu falha existente em modelos matemáticos usados para simular os processos de formação de nuvens e de chuva.

### **06 / 07 / 2015 Mudança climática reúne Brasil e 8 países**

Nações analisam próprios planos de adaptação, em diferentes estágios de elaboração e implantação nos ambientes domésticos.

### **06 / 07 / 2015 Jacaré azul e pássaros em extinção são apreendidos em Campos, no RJ**

Ação ocorreu na manhã deste domingo (5), no Parque Julião Nogueira. Além disso, um jovem de 25 anos foi detido.

### **06 / 07 / 2015 Ambientalista aposta em mudança na lei para combater espuma nos rios**

Fenômeno é causado pela presença de detergentes e fertilizantes na água. Em Pirapora do Bom Jesus (SP), casas foram invadidas pela espuma tóxica.



#### **06 / 07 / 2015 Nave Progress consegue acoplar-se com sucesso à ISS**

Foguete leva 3 toneladas de suprimentos aos astronautas em órbita. Explosão de nave da Nasa na semana passada afetou abastecimento.

#### **06 / 07 / 2015 Leões mantidos como pets em Gaza fazem jornada rumo a santuário**

Zoológico onde viviam foi destruído por bombardeio no ano passado. Palestino comprou filhotes quando eles tinham apenas um mês.

#### **06 / 07 / 2015 Empresa cria sistema computacional para seleção de plantas**

Instalado em um dispositivo eletromecânico, software permite classificar mudas de acordo com potencial de crescimento.

#### **06 / 07 / 2015 Parque Nacional da Tijuca, no Rio, completa 54 anos com exposição, passeios e oficina**

O parque tem mais de 4 mil hectares e inclui o Morro do Corcovado, uma das áreas mais visitadas do país, onde fica a estátua do Cristo Redentor. A estimativa é que mais de 3 milhões de pessoas visitem o parque anualmente.

#### **06 / 07 / 2015 Preso em rede de pesca, filhote de baleia é resgatado em Ilhabela, SP**

Animal ficou preso na sexta-feira (3) na altura da praia da Feiticeira. Resgate foi feito pelo Corpo de Bombeiros e durou cerca de três horas.

#### **06 / 07 / 2015 Casos de dengue chegam a 51 mil e Campinas registra epidemia recorde**

Nº de infectados é 21,3% superior ao total de 2014, quando foram 42.122. Número de mortes confirmadas é de 7 pessoas; três casos são investigados.

#### **06 / 07 / 2015 América Latina faz oficina sobre políticas agroambientais**

Brasil, Chile, Colômbia, México, Nicarágua, Costa Rica, Cuba, Panamá, Paraguai e Uruguai participam de reunião em Bogotá.

#### **06 / 07 / 2015 Testes de ebola em supostas vítimas da África dão negativo**

Ministro da Saúde da República Democrática do Congo nega epidemia. Sintomas incluíam diarreia, vômito e sangue na urina.

#### **06 / 07 / 2015 Gatos usam 'arma química' para ajudar a subjugar ratos**

Estudo russo alega que substância contida na urina de felinos tem o efeito de confundir os sentidos dos roedores, deixando-os com 'menos medo' de predadores.

#### **06 / 07 / 2015 Porto Alegre/RS tem três vezes mais casos de dengue do que em 2014**

Mesmo no inverno, autoridades recomendam cuidados para prevenir. RS tem mais de 1,1 mil casos, sendo que mais de 80% são autóctones.

#### **06 / 07 / 2015 Fascínio com 'rei dos animais' acabou com uma espécie**

Espécie do leão-do-atlas só poder "ser encontrada" atualmente na Trafalgar Square, em Londres, onde ficam quatro estátuas de bronze.

#### **04 / 07 / 2015 Mudança climática estimula ondas de calor na Europa, segundo cientistas**

Em Bruxelas, jovens se reuniram para 'batalha de água'. Ondas de calor estão se tornando mais frequentes, mostram análises.

#### **04 / 07 / 2015 Ação vai monitorar 10 municípios em situação crítica de queimadas no AC**

Operação Floresta Viva deve começar na próxima segunda-feira (6). Objetivo é combater o desmatamento ilegal no estado.

#### **04 / 07 / 2015 Um terço da população mundial não tem acesso a água tratada, diz ONU**

Saneamento alcançou mais pessoas no Brasil em 25 anos, mostra estudo. 94% dos brasileiros consomem água potável, contra 78% em 1990.

#### **04 / 07 / 2015 Documento de 36 Prêmios Nobel pede que líderes atuem contra mudança climática**

A assinatura da declaração conjunta, uma iniciativa do astrofísico americano Brian Schmidt, fechou o tradicional encontro dos cientistas agraciados com o Nobel e tem caráter de convocação por causa da proximidade da Cúpula do Clima de Paris, em dezembro.

#### **04 / 07 / 2015 Nave Progress decola para reabastecer a ISS**

Após uma viagem de dois dias, a Progress M-28M deve acoplar-se na madrugada de domingo à ISS com três toneladas de alimentos e de material científico.

#### **04 / 07 / 2015 [Em meio a onda de calor, zoológicos europeus dão picolé a animais](#)**

Continente tem registrado altas temperaturas. Zoológicos da Bélgica, Espanha e Itália tentam aliviar calor dos bichos.

#### **04 / 07 / 2015 [Avião Solar Impulse pousa nos EUA após voo de 5 dias com energia do sol](#)**

Aeronave decolou na última segunda-feira do Japão, rumo ao Havaí. Foram quebrados dois recordes mundiais com esse voo.

#### **04 / 07 / 2015 [Parque Nacional do Iguacu tem visitação recorde no 1º semestre](#)**

De janeiro a junho de 2015, foram 755 mil visitantes, 2% mais que em 2014. Segundo atrativo, foi o maior movimento do período na história do parque.

#### **04 / 07 / 2015 [Estudo diz que peixes terão que migrar se temperatura global subir](#)**

Pesquisa destaca necessidade de limitar as emissões de gases prejudiciais. 'Quanto mais esperarmos, haverá menos chances', alerta pesquisador.

#### **04 / 07 / 2015 [Inca reconhece comunidade Quilombola na Barra dos Coqueiros](#)**

145 famílias que vivem no local vão poder usar o terreno para exploração. Portaria que reconhece foi publicada no Diário Oficial desta sexta-feira (3).

#### **04 / 07 / 2015 [Presidente da Funai promete demarcar terras e ouvir povos indígenas nas decisões](#)**

Pouco mais de duas semanas após assumir o cargo de presidente da Fundação Nacional do Índio (Funai), João Pedro Gonçalves da Costa disse na sexta-feira (3) que sua gestão será marcada por demarcação de terras indígenas e abertura ampla de diálogos.

#### **04 / 07 / 2015 [Fóssil de tartaruga de 12 milhões de anos é descoberto na Venezuela](#)**

Os vestígios correspondem ao crânio de uma espécie do gênero extinto Bairdemys e têm semelhanças com as tartarugas de água doce arrau, que habitam o sudoeste da Venezuela e estão em risco de extinção.

#### **04 / 07 / 2015 [Museu Emílio Goeldi realiza colônia de férias, em Belém/PA](#)**

Programação irá começar na próxima segunda-feira (6). Evento promoverá gincanas e brincadeiras educativas.

#### **04 / 07 / 2015 [Madeira extraída por indígenas em MS foi para comercialização, diz PF](#)**

Polícia e Ibama foram impedidos de continuar trabalho na fazenda Buriti. Áreas desmatadas foram detectadas por imagens de satélite.

## **EARTH GAUGE**

### **Earth Gauge: Have Fun in the Sun**

**Link:** [www.earthgauge.net/2015/fun-sun](http://www.earthgauge.net/2015/fun-sun)

**Tweet this tip:** July is #UVSafety Month. Brush up on strategies for staying safe while having fun in the sun. [www.earthgauge.net/?p=15428](http://www.earthgauge.net/?p=15428)

### **Graphic: Fun in the Sun: Protect Yourself at the Beach**

What's your favorite outdoor activity? Whether it's swimming, hiking, boating or fishing, don't forget to protect your skin and eyes from the sun when you head outside to enjoy long summer days. The sun emits radiation in the form of ultraviolet (UV) rays. UV radiation is highest when and where the sun's rays are the strongest. This means that UV levels are highest around noon on a clear sunny day, as well as during the summer months. UV levels are also highest near surfaces that reflect sunlight, including water, snow and sand.

Exposure to UV can cause sunburn (ouch!), skin aging, eye damage and skin cancer – the most common form of cancer in the United States – and an estimated 73,870 U.S. residents will be diagnosed with melanoma in 2015 ([See state data](#)). But there's good news: skin cancer and other effects of UV exposure are largely preventable.

**Tip:** July is UV Safety Month, a great time to brush-up on strategies for staying safe – and having fun! – in the sun.

- **Know before you go:** Check the [UV Index](#), which provides a forecast of the expected risk of overexposure to UV radiation from the sun.
- **Wear sunscreen:** Sunscreens with Sun Protection Factor (SPF) 15 and higher provide protection by preventing UV radiation from reaching your skin. Reapply every two hours and after swimming, working or exercising outside.
- **Wear sunglasses:** Protect your eyes with sunglasses that have 100 percent UV protection. Check the label for the protection level.
- **Work and play in the shade:** When you are outside, seek shade. Wear tightly woven clothing and a wide brimmed hat to reduce the amount of UV radiation coming into contact with your skin.

Learn more about UV safety from the [SunWise program](#) and the [U.S. Department of Health & Human Services](#).

(Sources: EPA SunWise Program. "Action Steps for Sun Safety." [epa.gov/sunwise/actionsteps.html](http://epa.gov/sunwise/actionsteps.html); "Skin Cancer Facts for Your State," [epa.gov/sunwise/statefacts.html](http://epa.gov/sunwise/statefacts.html); U.S. Department of Health & Human Services, Federal Occupational Health. "What's Your UV:IQ?" [foh.hhs.gov/calendar/july.html](http://foh.hhs.gov/calendar/july.html); American Cancer Society. "Cancer Facts and Figures: 2015." [cancer.org/research/cancerfactsstatistics/cancerfactsfigures2015/](http://cancer.org/research/cancerfactsstatistics/cancerfactsfigures2015/))

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## CLIMATE FACT

### Climate Fact: Droughts, Floods and Water Vapor – Oh My!

**Link:** [www.earthgauge.net/2015/droughts-floods-and-water-vapor](http://www.earthgauge.net/2015/droughts-floods-and-water-vapor)

**Tweet this fact:** Understanding the water cycle can help us understand how a warming #climate will intensify #droughts, #floods. [www.earthgauge.net/?p=38796](http://www.earthgauge.net/?p=38796)

Understanding the earth's water cycle can help us understand how a warming climate will intensify droughts and floods.

A main contributor to the intensity of a drought or flooding event is how much water vapor can be held in the atmosphere. In a warming climate, additional heat increases the rate of evaporation of water from open bodies of water, plants and soil. This rapid evaporation gathers more moisture in the atmosphere for precipitation, while at the same time drying the land areas below. This accelerated, imbalanced water cycle can lead to more frequent and heavier bouts of extreme precipitation for some regions while leaving others dry.

Along with creating more intense droughts and floods, the ability of the earth's atmosphere to hold more water vapor can also amplify the warming effect of climate change. This is because water vapor, the gaseous form of water, is considered a greenhouse gas. As such, it traps heat that is trying to escape from the earth's surface and increases the warming potential of earth's atmosphere.

**Graphics** from the U.S. EPA's new report, *Climate Change in the United States: Benefits of Global Action* show the projected percentage change in annual mean precipitation and projected change in the intensity of extreme precipitation events under scenarios in which greenhouse gas emissions are reduced (mitigation) or not reduced (reference) over time.

### Learn more:

- To learn more about extreme weather in a changing climate, take this [free course](#) created by NEEF.
- For an in-depth look at the science behind linking more frequent future intense droughts with climate change, check out this [video from NASA](#) on Megadroughts.
- For an in-depth look at the science behind linking more frequent future flooding events with climate change, check out this [video from NASA](#) on temperature and Precipitation.
- For an in-depth look at how warmer temperatures, water vapor, droughts and flooding are related, check out this [video from NASA](#) on the Earth's Water Cycle.

(Sources: EPA. "Climate Impacts on Water Resources". [epa.gov/climatechange/impacts-adaptation/water.html#watercycles](http://epa.gov/climatechange/impacts-adaptation/water.html#watercycles); NOAA. "Heavy downpours more intense, frequent in a warmer world". [climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world](http://climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world); EPA. "Climate Action Benefits: Methods of Analysis: Precipitation in the U.S." [epa.gov/cira/climate-action-benefits-methods-analysis#precipitation-projections](http://epa.gov/cira/climate-action-benefits-methods-analysis#precipitation-projections); EPA. "Climate Action Benefits: Global Temperature Change." [epa.gov/cira/climate-action-benefits-methods-analysis#temperature-projections](http://epa.gov/cira/climate-action-benefits-methods-analysis#temperature-projections))

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## CALIBRANDO LA TIERRA

### Calibrando La Tierra: Diviértase Bajo el Sol

**Dirección:** [www.earthgauge.net/2015/diviertase-bajo-el-sol](http://www.earthgauge.net/2015/diviertase-bajo-el-sol)

**Comparte este hecho en Twitter:** Julio es el Mes de Protección contra #rayosUV. Proteja su piel y ojos mientras disfruta del verano. [www.earthgauge.net/?p=36611](http://www.earthgauge.net/?p=36611)

### Gráfico: [Diversión en el Sol: Protéjase en la Playa](#)

¿Cuál es su actividad favorita al aire libre? Si es la natación, senderismo, paseos en bote o pesca, no olvide proteger su piel y ojos ante el sol, en especial cuando se dirija afuera para disfrutar de los largos días de verano. El sol emite radiación en la forma de rayos ultravioleta (UV). La radiación ultravioleta es más intensa donde y cuando los rayos del sol son más fuertes. Esto quiere decir que el nivel de rayos ultravioletas es más elevado durante el mediodía en días soleados, al igual que durante los meses de verano. Los rayos ultravioletas también son más intensos cerca de superficies que reflejan la luz solar, como la nieve o la arena.

El estar expuesto a rayos ultravioletas puede causar quemaduras (¡ouch!), envejecimiento de la piel, daño en los ojos y cáncer de piel— el cual es tipo de cáncer más común en los Estados Unidos. Se estima que 73,870 habitantes de los Estados Unidos serán diagnosticados con melanoma en el 2015 ([el número estimado de nuevos casos de melanoma por estado](#)). Pero hay buenas noticias: el cáncer de piel y los demás efectos de los rayos UV son prevenibles.

**Consejos:** Julio es el Mes de Protección contra los Rayos Ultravioletas. ¡Es un buen momento para aprender cómo mantenerse seguro y divertirse en el sol!

- **Infórmese antes de salir:** Revise el [índice de rayos UV](#) para saber el pronóstico del riesgo de exposición ante los rayos UV del sol.
- **Use protector solar:** Los protectores solares con SPF (Factor de Protección Solar) de 15 o más protegen su piel al prevenir que la radiación ultravioleta llegue a su piel. Aplíquelo cada dos horas y luego de nadar, trabajar o ejercitar al aire libre.

- **Use gafas de sol:** Proteja sus ojos con gafas de sol que eviten la radiación ultravioleta en un 100 por ciento. Revise la etiqueta para el nivel de protección.
- **Trabaje y juegue en la sombra:** Cuando esté al aire libre use ropa protectora y un sombrero de ala grande para reducir la cantidad de radiación ultravioleta que llega a su piel. Recuerde que las mascotas también necesitan sombra.

Aprenda más sobre cómo estar seguro ante los rayos UV en el [Programa SunWise](#) (español) y en el [Departamento de Salud y Servicios Humanos de los Estados Unidos](#) (en inglés).

(Sources: EPA SunWise Program. "Action Steps for Sun Safety." <http://epa.gov/sunwise/actionsteps.html>; "Skin Cancer Facts for Your State," <http://www.epa.gov/sunwise/statefacts.html>; U.S. Department of Health & Human Services, Federal Occupational Health. "What's Your UV:IQ?" <http://www.foh.hhs.gov/calendar/july.html>; American Cancer Society. "Cancer Facts and Figures: 2015." <http://www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2015/>)

### El cambio climático impacta la agricultura y ganadería

**Dirección:** [www.earthgauge.net/2015/el-cambio-climatico-impacta-la-agricultura-y-ganaderia](http://www.earthgauge.net/2015/el-cambio-climatico-impacta-la-agricultura-y-ganaderia)

**Comparte este hecho en Twitter:** El cambio climático puede tener efectos positivos o negativos en la productividad de los cultivos: [www.earthgauge.net/?p=38792](http://www.earthgauge.net/?p=38792)

El tiempo y el clima juegan un papel importante en la agricultura debido a que los cultivos y los animales requieren condiciones específicas para el crecimiento. Por ejemplo, si las verduras están expuestas a 1,8-7,2 grados Fahrenheit por encima de su temperatura óptima, se reduce el rendimiento. Si la temperatura corporal de los animales sube más allá de cuatro o cinco grados Fahrenheit por encima de lo normal, los animales pueden llegar a ser estresados y la producción de carne, leche o huevos puede disminuir.

Los Estados Unidos producen aproximadamente 330 mil millones de dólares en productos agrícolas por año, con el ganado representando alrededor de la mitad de ese valor. De acuerdo con la Evaluación Nacional del Clima, alteraciones climáticas a la agricultura han aumentado en los últimos 40 años en los Estados Unidos. El cambio climático puede tener efectos positivos o negativos en la localización, el tiempo y la productividad de los cultivos, la ganadería y la pesca. He aquí algunas maneras en que el cambio climático ha afectado la agricultura y la ganadería:

- Las plantas expuestas a las altas temperaturas nocturnas mientras que las frutas, granos o fibras están creciendo están mostrando una menor productividad y reducción en la calidad. Los rendimientos del maíz en el 2010 y 2012 en el cinturón del maíz de EE.UU. experimentaron reducciones en el rendimiento de hasta 30 por ciento debido a las altas temperaturas nocturnas.
- Las temperaturas más cálidas están afectando los cultivos permanentes, reduciendo la cantidad de "horas de frío" (horas cuando las temperaturas están entre 32 a 50 grados Fahrenheit) necesarias para la nacimiento de las flores y la viabilidad. Los inviernos templados también contribuyen al nacimiento temprano o floración que puede ser dañado por las bajas temperaturas en la primavera. Michigan tuvo una pérdida de 220 millones de dólares en el 2012 debido a los daños por las heladas a las cerezas debido a inviernos templados.
- El calentamiento de las temperaturas e inviernos templados están influyendo en la distribución geográfica y el número de generaciones por temporada/año de hierbas malas, plagas e insectos que afectan a los cultivos. Ejemplo: las orugas del taladro del maíz produce una generación en el la parte norte del cinturón del maíz de EE.UU. y dos generaciones en la parte sur del cinturón del maíz. Los cambios en el número de generaciones y la distribución geográfica de este insecto están presionando a ciertas áreas de producción.
- La exposición de animales a varias noches calurosas puede causar estrés fisiológico, reduciendo las tasas de leche, huevos y la producción de carne. La exposición a calor o frío extremo también causa estrés fisiológico. En el 2011, la producción de carne tuvo pérdidas relacionadas con el calor de más de mil millones de dólares en los Estados Unidos.

Cambios en [las tendencias del tiempo severo](#) también pueden impactar la agricultura. Puedes aprender más leyendo los puntos destacados sobre la agricultura en [la Evaluación Nacional del Clima](#).

(Fuentes: Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.)

### GSW JOURNAL

Simulation of the borehole quasistatic electric field excited by the acoustic wave during logging while drilling due to electrokinetic effect

Xiaobo Zheng, Hengshan Hu, Wei Guan, and Jun Wang

Geophysics. 2015; 80(5): p. D417-D427

<http://geophysics.geoscienceworld.org/cgi/content/abstract/80/5/D417?source=gsw>

Standard-state thermodynamic properties of annite,  $\text{KFe}_3[(\text{OH})_2\text{AlSi}_3\text{O}_{10}]$ , based on new calorimetric measurements

Edgar Dachs and Artur Benisek

European Journal of Mineralogy published 7 July 2015,

10.1127/ejm/2015/0027-2462

<http://eurjmin.geoscienceworld.org/cgi/content/abstract/0027-2462v1?source=gsw>

Introduction to the North Falkland Basin revisited: exploration and appraisal of the Sea Lion Field

L. S. Williams and R. Newbould

Petroleum Geoscience. 2015; 21(2-3): p. 83-84

<http://pg.lyellcollection.org/cgi/content/full/21/2-3/83?source=gsw>

Sea Lion Field discovery and appraisal: a turning point for the North Falkland Basin

F. MacAulay

Petroleum Geoscience. 2015; 21(2-3): p. 111-124

<http://pg.lyellcollection.org/cgi/content/abstract/21/2-3/111?source=gsw>

Petroleum geochemistry of the Sea Lion Field, North Falkland Basin

P. Farrimond, A. Green, and L. Williams

Petroleum Geoscience. 2015; 21(2-3): p. 125-135

<http://pg.lyellcollection.org/cgi/content/abstract/21/2-3/125?source=gsw>

Three new alluaudite-like protonated arsenates:  $\text{NaMg}_3(\text{AsO}_4)(\text{AsO}_3\text{OH})_2$ ,  $\text{NaZn}_3(\text{AsO}_4)(\text{AsO}_3\text{OH})_2$  and  $\text{Na}(\text{Na}_{0.6}\text{Zn}_{0.4})\text{Zn}_2(\text{H}_{0.6}\text{AsO}_4)(\text{AsO}_3\text{OH})_2$   
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Fractal and multifractal analyses of sphalerite banding at the Zhaishang gold deposit, western Qinling, China

Chao Yu and Jiajun Liu

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Sea Lion Field, North Falkland Basin: seismic inversion and quantitative interpretation

A. Francis, M. Lewis, and C. Booth

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The reservoir characterization of the Sea Lion Field

Alun Griffiths

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<http://pg.lyellcollection.org/cgi/content/abstract/21/2-3/199?source=gsw>

Kononovite,  $\text{NaMg}(\text{SO}_4)\text{F}$ , a new mineral from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia

Igor V. Pekov, Maria G. Krzhizhanovskaya, Vasiliy O. Yapaskurt, Dmitry I. Belakovskiy, Nikita V. Chukanov, Inna S. Lykova, and Evgeny G. Sidorov

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Influence of high strain rate deformation on  $^{40}\text{Ar}/^{39}\text{Ar}$  mica ages from marble mylonites (Syros, Greece)

Anna Rogowitz, Benjamin Huet, David Schneider, and Bernhard Grasemann

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<http://lithosphere.gsapubs.org/cgi/content/abstract/L455.1v1?source=gsw>

Quaternary deformation in SE Sicily: Insights into the life and cycles of forebulge fault systems

D. Di Martire, A. Ascione, D. Calcaterra, G. Pappalardo, and S. Mazzoli

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Rapid Adjustment of Submarine Channel Architecture To Changes In Sediment Supply

Zane R. Jobe, Zoltan Sylvester, Andrew O. Parker, Nick Howes, Niall Slowey, and Carlos Pirmez

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<http://jsedres.sepmonline.org/cgi/content/abstract/85/6/729?source=gsw>

Diagenetic barite and sphalerite in middle Mesozoic sandstones, Scotian Basin, as tracers for basin hydrology

Georgia Pe-Piper, David J. W. Piper, Yuanyuan Zhang, and Isabel Chavez

AAPG Bulletin. 2015; 99(7): p. 1281-1313

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Multiple attenuation for shallow-water surveys: Notes on old challenges and new opportunities

Clement Kostov, Frederico Xavier de Melo, Abhishek Raj, Alexander Zarkhidze, Alex Cooke, Glenn Miers, and John Bacon  
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<http://tle.geoscienceworld.org/cgi/content/abstract/34/7/760?source=gsw>

An illustration of adaptive Marchenko imaging  
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Hyperspectral imaging for the determination of bitumen content in Athabasca oil sands core samples  
Michelle Speta, Benoit Rivard, Jilu Feng, Michael Lipsett, and Murray Gingras  
AAPG Bulletin. 2015; 99(7): p. 1245-1259  
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Primaries -- The only events that can be migrated and for which migration has meaning  
Arthur B. Weglein  
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Introduction to this special section: Multiples from attenuation to imaging  
Alejandro Valenciano and Nizar Chemingui  
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D. J. Verschuur and A. J. Berkhouit  
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Shelf-edge trajectories and stratal stacking patterns: Their sequence-stratigraphic significance and relation to styles of deep-water sedimentation and amount of deep-water sandstone  
Chenglin Gong, Yingmin Wang, David R. Pyles, Ronald J. Steel, Shang Xu, Qiang Xu, and Dong Li  
AAPG Bulletin, July 2015, v. 99, p. 1211-1243, doi:10.1306/01311513229  
<http://aapgbull.geoscienceworld.org/content/99/7/1211.abstract?etoc>

Hyperspectral imaging for the determination of bitumen content in Athabasca oil sands core samples  
Michelle Speta, Benoit Rivard, Jilu Feng, Michael Lipsett, and Murray Gingras  
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<http://aapgbull.geoscienceworld.org/content/99/7/1245.abstract?etoc>

Integrated rock classification in carbonate formations based on elastic and petrophysical properties estimated from conventional well logs  
Mehrnoosh Saneifar, Roy Conte, Clotilde Chen Valdes, Zoya Heidari, and Michael C. Pope  
AAPG Bulletin, July 2015, v. 99, p. 1261-1280, doi:10.1306/02091514167  
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Diagenetic barite and sphalerite in middle Mesozoic sandstones, Scotian Basin, as tracers for basin hydrology  
Georgia Pe-Piper, David J. W. Piper, Yuanyuan Zhang, and Isabel Chavez  
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<http://aapgbull.geoscienceworld.org/content/99/7/1281.abstract?etoc>

Advances in grain-size, mineral, and pore-scale characterization of lithic and clay-rich reservoirs  
K. E. Higgs, M. J. Arnot, and S. Brindle  
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Origin and accumulation of CO<sub>2</sub> and its natural displacement of oils in the continental margin basins, northern South China Sea  
Baojia Huang, Hui Tian, Hao Huang, Jihai Yang, Xianming Xiao, and Li Li  
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Mineral-chemistry quantification and petrophysical calibration for multimineral evaluations: A nonlinear approach  
Douglas K. McCarty, Paul N. Theologou, Timothy B. Fischer, Arkadiusz Derkowski, M. Rebecca Stokes, and Ann Ollila  
AAPG Bulletin, July 2015, v. 99, p. 1371-1397, doi:10.1306/01221514195

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An introduction to Lithosphere dynamics of sedimentary basins – The Circum-Mediterranean basins and analogues  
Michel Seranne, Juliette Lamarche, and Fabrizio Agosta  
Bulletin de la Société Géologique de France, July 2015, v. 186, p. 207-208, doi:10.2113/gssgfbull.186.4-5.207

<http://bsqf.geoscienceworld.org/content/186/4-5/207.extract?etoc>

Structural style and evolution of the Pyrenean-Provence thrust belt, SE France  
Lucie Bestani, Nicolas Espurt, Juliette Lamarche, Marc Floquet, Jean Philip, Olivier Bellier, and Fabrice Hollender  
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Post-depositional history of the Miocene Gorgoglione Formation (southern Apennines, Italy): inferences from mineralogical and structural analyses  
Francesco Cavalcante, Giacomo Prosser, Fabrizio Agosta, Claudia Belviso, and Giuseppe Corrado  
Bulletin de la Société Géologique de France, July 2015, v. 186, p. 243-256, doi:10.2113/gssgfbull.186.4-5.243

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Layered lower crust and mantle reflectivity as imaged by a re-processed crustal seismic profile from Sicily in the central Mediterranean  
Vera Valenti, Raimondo Catalano, Pingsheng Wei, and Shujiang Wang  
Bulletin de la Société Géologique de France, July 2015, v. 186, p. 257-272, doi:10.2113/gssgfbull.186.4-5.257

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Deep controls on foreland basin system evolution along the Sicilian fold and thrust belt  
Maurizio Gasparo Morticelli, Vera Valenti, Raimondo Catalano, Attilio Sulli, Mauro Agate, Giuseppe Avellone, Cinzia Albanese, Luca Basilone, and Calogero Gugliotta  
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Post-rift evolution of the Gulf of Lion margin tested by stratigraphic modelling

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Deep crustal structure across a young passive margin from wide-angle and reflection seismic data (The SARDINIA Experiment) – I. Gulf of Lion's margin

Maryline Moulin, Frauke Klingelhoefer, Alexandra Afilhado, Daniel Aslanian, Philippe Schnurle, Hervé Nouzé, Marina Rabineau, Marie-Odile Beslier, and Aurélie Feld

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Deep crustal structure across a young passive margin from wide-angle and reflection seismic data (The SARDINIA Experiment) – II. Sardinia's margin

Alexandra Afilhado, Maryline Moulin, Daniel Aslanian, Philippe Schnürle, Frauke Klingelhoefer, Hervé Nouzé, Marina Rabineau, Estelle Leroux, and Marie-Odile Beslier

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The Alboran domain in the western Mediterranean evolution: the birth of a concept

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The Piolit, Pelat and Baiardo Upper Cretaceous flysch formations (western Alps): geodynamic implications at the time of the Pyrenean tectonic phases

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Evidence for transform motion along the South Balearic margin and implications for the kinematics of opening of the Algerian basin

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An investigation of local Fe<sup>2+</sup> order-disorder in a mantle grosspyrite garnet using paramagnetically shifted <sup>27</sup>Al and <sup>29</sup>Si MAS NMR resonances

Aaron C. Palke, Charles A. Geiger, and Jonathan F. Stebbins

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Petrophysical properties of a granite-protomylonite-ultramylonite sequence: insight from the Monte Grighini shear zone, central Sardinia, Italy

Stefano Columbu, Gabriele Cruciani, Dario Fancello, Marcello Franceschelli, and Giovanni Musumeci

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Phase relations in the  $K_2CO_3$ - $FeCO_3$  and  $MgCO_3$ - $FeCO_3$  systems at 6 GPa and 900–1700°C

Anton Shatskiy, Konstantin D. Litasov, Eiji Ohtani, Yuri M. Borzdov, Aleksandr I. Khmel'nikov, and Yuri N. Palyanov

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Victor V. Sharygin

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Crystal chemistry of cation-exchanged forms of epistolite-group minerals, Part I. Ag- and Cu-exchanged lomonosovite and Ag-exchanged murmanite

Inna S. Lykova, Igor V. Pekov, Natalia V. Zubkova, Nikita V. Chukanov, Vasilii O. Yapaskurt, Nadezhda A. Chervonnaya, and Andrey A. Zolotarev

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Characterization of citric acid induced transformation of short-range-order minerals in Alfisol, Inceptisol and Vertisol of India

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Three new alluaudite-like protonated arsenates:  $NaMg_3(AsO_4)(AsO_3OH)_2$ ,  $NaZn_3(AsO_4)(AsO_3OH)_2$  and  $Na(Na_{0.6}Zn_{0.4})Zn_2(H_{0.6}AsO_4)(AsO_3OH)_2$

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Kononovite,  $NaMg(SO_4)F$ , a new mineral from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia

Igor V. Pekov, Maria G. Krzhizhanovskaya, Vasilii O. Yapaskurt, Dmitry I.

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