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Fotos tiradas do site da Nasa

***As pessoas interessadas em receber nossa newsletter via mail, podem escrever para revistadegeologia@yahoo.com.br pedindo sua adesão.

CONCURSOS

Poli-USP promove concurso para docente de Lavra de Minas

O Departamento de Engenharia de Minas e Petróleo da Escola Politécnica da Universidade de São Paulo abriu inscrições para o concurso de Professor Doutor, na especialidade de Lavra de Minas. Os interessados podem se inscrever entre 24 de outubro de 2013 a 21 de janeiro de 2014. O candidato deve comparecer ao Serviço de Órgãos Colegiados e Concursos da Escola Politécnica da USP, assinar um formulário de requerimento e entregar os documentos comprobatórios. Após a aprovação das inscrições, o concurso deverá ser realizado no período de trinta a cento e vinte dias. Mais informações no link:<http://www.usp.br/drh/novo/recsel/epconc1532013.htm>

ARTIGO DA SEMANA

NEWS METEORITICA DA SEMANA

Fireball Explodes Over Sarajevo, Bosnia at 30km Above the Ground
<http://www.astrowatch.net/2013/11/fireball-explodes-over-sarajevo-bosnia.html>



Multiple explosions were registered last night at 00:36:59 as bolide penetrated the atmosphere. Its fragments could have hit the ground. The cameras of Bosnia and Hercegovina Meteorite Network run by Orion Astronomic Society and Hydrometeorological Institute in Sarajevo, located in Sarajevo, Gradačac and Pelješac, registered bolide incursion with above -9 magnitude equal to the Moon glow in the first quarter. This is the brightest meteorite event every since the Meteorite Network commenced with its experimental activities in tracking the sky activity.

The fireball plummeted at 20 km/s speed and exploded/extinguished at about 30 km from the ground.

According to the preliminary calculations by Orion Astronomic Society meteorite, fragments would land in the triangle area Zenica -Bugojno - Travnik. Unless they completely disperse which depends on their composition, meteoroid bodies that make it to this altitude can be found on the ground as meteors.

Orion Astronomic Society issued the call for witnesses or those with photographic evidence to contact their email address: info@adorion.ba

Credit: sott.net

How Common Are Habitable Planets? One in Five Sun-Like Stars May Have Earth-Size, Potentially Habitable Planets

<http://www.sciencedaily.com/releases/2013/11/131104152720.htm>

Nov. 4, 2013 — NASA's Kepler space telescope, now crippled and its four-year mission at an end, nevertheless provided enough data to answer its main research question: How many of the 200 billion stars in our galaxy have potentially habitable planets?

Based on a [statistical analysis](#) of all the Kepler observations, [University of California](#), Berkeley, and University of Hawaii, Manoa, astronomers now estimate that one in five stars like the sun have planets about the size of Earth and a surface temperature conducive to life.

Given that about 20 percent of stars are sun-like, the researchers say, that amounts to several tens of billions of potentially habitable, Earth-size planets in the Milky Way Galaxy.

"When you look up at the thousands of stars in the night sky, the nearest sun-like star with an Earth-size planet in its habitable zone is probably only 12 light years away and can be seen with the naked eye. That is amazing," said UC Berkeley [graduate student](#) Erik Petigura, who led the analysis of the Kepler data.

"It's been nearly 20 years since the discovery of the first extrasolar planet around a normal star. Since then, we have learned that most stars have planets of some size orbiting them, and that Earth-size planets are relatively common in close-in orbits that are too hot for life," said Andrew Howard, a former UC Berkeley post-doctoral fellow who is now on the faculty of the Institute for Astronomy at the University of Hawaii. "With this result, we've come home, in a sense, by showing that planets like our Earth are relatively common throughout the Milky Way Galaxy."

Petigura, Howard and Geoffrey Marcy, UC Berkeley professor of astronomy, will publish their analysis and findings this week in the online early edition of the journal *Proceedings of the National Academy of Sciences*.

Earth-size may not mean habitable

"For NASA, this discovery is really important, because future missions will try to take an actual picture of a planet, and the size of the telescope they have to build depends on how close the nearest Earth-size planets are," Howard said. "An abundance of planets orbiting nearby stars simplifies such follow-up missions."

The team cautioned that Earth-size planets in orbits about the size of Earth's are not necessarily hospitable to life, even if they reside in the habitable zone around a star where the temperature is not too hot and not too cold.

"Some may have thick atmospheres, making it so hot at the surface that DNA-like molecules would not survive. Others may have rocky surfaces that could harbor [liquid water](#) suitable for living organisms," Marcy said. "We don't know what range of planet types and their environments are suitable for life."

Last week, however, Howard, Marcy and their colleagues provided hope that many such planets actually are rocky and could support liquid water. They reported that one Earth-size planet discovered by Kepler -- albeit, a planet with a likely temperature of 2,000 Kelvin, which is far too hot for life as we know it -- is the same density as Earth and most likely composed of rock and iron, like Earth.

"This gives us some confidence that when we look out into the habitable zone, the planets Erik is describing may be Earth-size, rocky planets," Howard said.

Transiting planets

NASA launched the Kepler space telescope in 2009 to look for planets outside the solar system that cross in front of, or transit, their stars, which causes a slight diminution -- about one hundredth of 1 percent -- in the star's brightness. From among the 150,000 stars photographed every 30 minutes for four years, NASA's Kepler team reported more than 3,000 planet candidates. Many of these are much larger than Earth -- ranging from large planets with thick atmospheres, like Neptune, to gas giants like Jupiter -- or in orbits so close to their stars that they are roasted.

To sort them out, Petigura and his colleagues are using the Keck telescopes in Hawaii to obtain spectra of as many stars as possible. This will help them determine each star's true brightness and calculate the diameter of each transiting planet, with an emphasis on Earth-diameter planets.

Independently, Petigura, Howard and Marcy focused on the 42,000 stars that are like the sun or slightly cooler and smaller, and found 603 candidate planets orbiting them. Only 10 of these were Earth-size, that is, one to two times the diameter of Earth and orbiting their star at a distance where they are heated to lukewarm temperatures suitable for life. The team's definition of habitable is that a planet receives between four times and one-quarter the amount of light that Earth receives from the sun.

A census of extrasolar planets

What distinguishes the team's analysis from previous analyses of Kepler data is that they subjected Petigura's planet-finding algorithms to a battery of tests in order to measure how many habitable zone, Earth-size planets they missed. Petigura actually introduced fake planets into the Kepler data in order to determine which ones his software could detect and which it couldn't.

"What we're doing is taking a census of extrasolar planets, but we can't knock on every door. Only after injecting these fake planets and measuring how many we actually found could we really pin down the number of real planets that we missed," Petigura said.

Accounting for missed planets, as well as the fact that only a small fraction of planets are oriented so that they cross in front of their host star as seen from Earth, allowed them to estimate that 22 percent of all sun-like stars in the galaxy have Earth-size planets in their habitable zones.

"The primary goal of the Kepler mission was to answer the question, 'When you look up in the night sky, what fraction of the stars that

you see have Earth-size planets at lukewarm temperatures so that water would not be frozen into ice or vaporized into steam, but remain a liquid, because liquid water is now understood to be the prerequisite for life?" Marcy said. "Until now, no one knew exactly how common potentially habitable planets were around sun-like stars in the galaxy."

All of the potentially habitable planets found in the team's survey are around K stars, which are cooler and slightly smaller than the sun, Petigura said. But the researchers' analysis shows that the result for K stars can be extrapolated to G stars like the sun. Had Kepler survived for an extended mission, it would have obtained enough data to directly detect a handful of Earth-size planets in the habitable zones of G-type stars.

"If the stars in the Kepler field are representative of stars in the solar neighborhood, ... then the nearest (Earth-size) planet is expected to orbit a star that is less than 12 light-years from Earth and can be seen by the unaided eye," the researchers wrote in their paper.

"Future instrumentation to image and take spectra of these Earths need only observe a few dozen nearby stars to detect a sample of Earth-size planets residing in the habitable zones of their host stars."

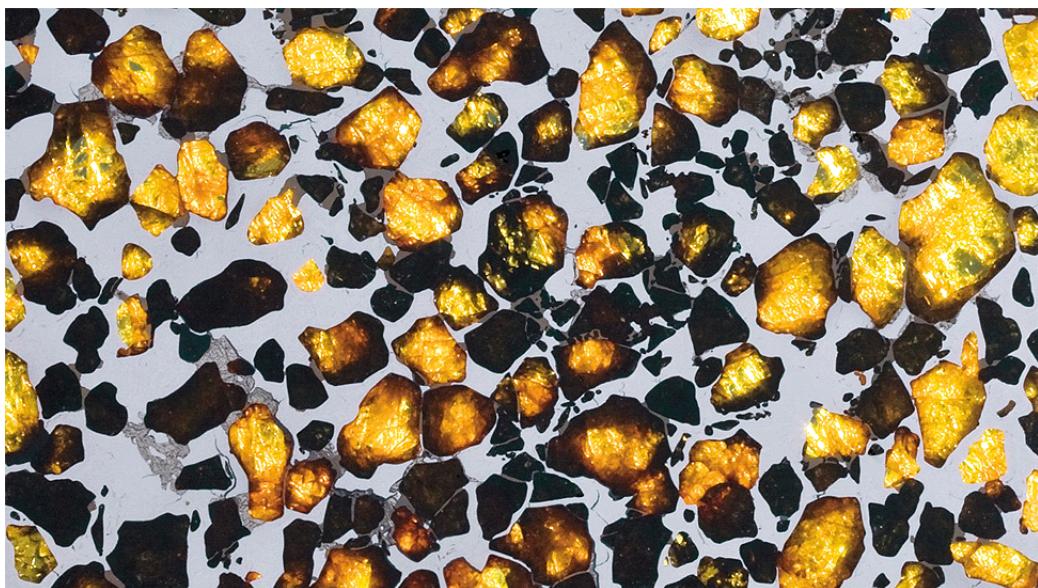
In January, the team reported a similar analysis of Kepler data for scorched planets that orbit close to their stars. The new, more complete analysis shows that "nature makes about as many planets in hospitable orbits as in close-in orbits," Howard said.

The research was funded by UC Berkeley and the National Science Foundation, with the assistance of the W. M. Keck Observatory and NASA.

Video: <http://www.youtube.com/watch?v=pffF4S-2BCw>

30 Starry Wonders Hiding Inside of Dull Meteorites

[http://gizmodo.com/30-starry-wonders-hiding-inside-of-dull-meteorites-1452025409?
utm_campaign=socialflow_gizmodo_facebook&utm_source=gizmodo_facebook&utm_medium=socialflow](http://gizmodo.com/30-starry-wonders-hiding-inside-of-dull-meteorites-1452025409?utm_campaign=socialflow_gizmodo_facebook&utm_source=gizmodo_facebook&utm_medium=socialflow)



A few weeks ago, [Russian](#) divers extracted a 1,250-pound chunk of the infamous Chelyabinsk meteorite from a lake where it [landed](#) on February 15. The massive space stone ended up[cracking into three pieces](#)—and though scientists may have cursed the clumsy divers, I was interested in something else: What was inside the rock?

Scientists have uncovered more than 12 fragments of the Chelyabinsk meteorite from the [lakeso](#) far. One sample has been classified an LL5 chondrite (a stony meteorite) with very low levels of iron, and is made up of silica, nickel and cobalt compounds—more on that in a second.

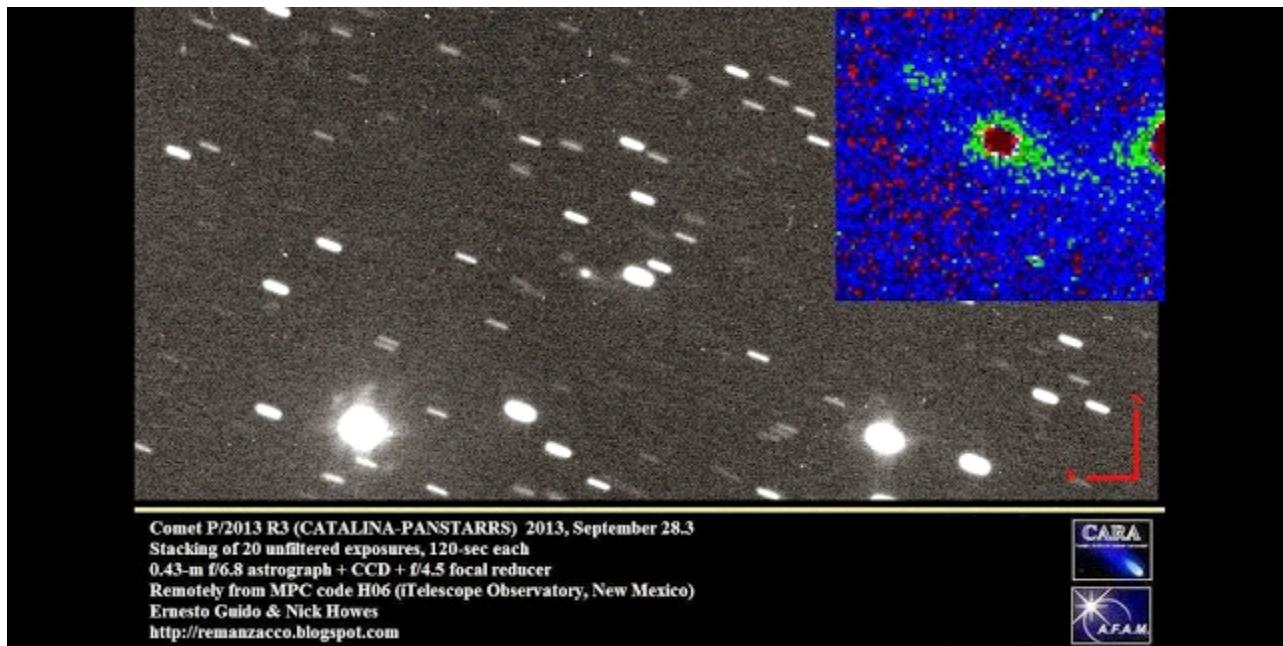
The Chelyabinsk meteorite made a [huge impact](#) on our collective consciousness, but it's far from the only [space rock](#) scientists have split open. I'd like to show you a few more meteorite innards, because they're far more amazing than you might imagine. 30 ethereal, extraterrestrial gems await you below.

This is a 112.2 gram fragment of the Chelyabinsk meteorite, which was found in a field. The broken fragment displays a thick primary fusion crust with flow lines and a matrix with melt veins and planar fractures. That's all caused when the meteorite enters the atmosphere—the sheer heat causes the rock to melt, creating a glassy layer over its surface.



Astronomers Puzzle Over Newfound Asteroid That Acts Like a Comet

<http://www.astrowatch.net/2013/11/astronomers-puzzle-over-newfound.html>



The distinction between comets and asteroids is in principle a clear one, encoded right in the words themselves. Both terms come from Greek roots—"comet" descends from a word meaning "long-haired" and "asteroid" means, roughly, "starlike." So there it is: comets are fuzzy, and asteroids are discrete pinpricks of light. The definitions hint at compositional differences as well: comets are icy, which leads them to come apart when they draw near the sun, whereas rocky asteroids are somewhat more robust. In recent years, though, astronomers have seen that asteroids can suddenly don the appearance of comets, complete with a fuzzy head and a long tail. Astronomers call them main-belt comets, because they exhibit cometlike traits but orbit within the Asteroid Belt between Mars and Jupiter. (Comets originate from more distant realms in the outer solar system.)

The explanations put forth for how an asteroid masquerades as a comet usually involve some sort of disruption, such as a smaller object colliding with the asteroid and ejecting a cloud of debris or the partial disintegration of the asteroid as sunlight vaporizes pockets of ice within. A newfound main-belt comet, however, looks quite a bit different than the rest. Astronomers have yet to explain its features, which include not just a tail but a cluster of fragments where a single head should be. "Even in the wild spectrum of main-belt comets,

this one is unusual," says astronomer David Jewitt of the University of California, Los Angeles. "There are certainly no great theories out there for what we're looking at."

The main-belt comet, designated P/2013 R3, was discovered in September at two observatories: the Catalina Sky Survey in Arizona and the Pan-STARRS 1 telescope in Hawaii. Only a dozen or so main-belt comets have been discovered, so astronomers quickly took to the world's largest telescopes to get a better look at the rare object. Jewitt examined P/2013 R3 with the 10-meter Keck 1 telescope in Hawaii, whereas astrophysicist Javier Licandro of the Institute of Astrophysics of the Canary Islands and his colleagues used the institution's 10.4-meter Gran Telescopio Canarias. Both saw that the object was different than all other main-belt comets discovered so far. "What we observed is that the object is not a single nucleus with a tail," Licandro says. He and his colleagues have identified four distinct pieces: two near the main, bright nucleus and another in the tail. "It is the first time that one of these main-belt comets is discovered that has split in parts," he says.

There may be more fragments waiting to be discovered, which is why Jewitt and his colleagues have secured time on the Hubble Space Telescope to get a clearer view. "We see three or four pieces from the ground, but who knows what we will see with the HST?" Jewitt says.

The Hubble observations may also help explain just what happened in the recent past to turn an undistinguished asteroid into a main-belt comet. Jewitt says that his preliminary data from Keck revealed that P/2013 R3 looked much like a split comet, or a comet that has broken into multiple pieces. The standard explanation for split comets is the sublimation of a comet's ice directly to vapor, which spews out gas and dust to form the fuzzy head and tail of a normal comet but can sometimes blow out a large chunk of a comet's nucleus as well. "The mystery is, though, that this object is not losing that much mass. It's fairly faint," Jewitt adds. "It's a little bit difficult to say why the sublimation would split the nucleus like that."

Another possibility is that the asteroid, spun up by the absorption and reemission of solar radiation, began to rotate so fast that it broke apart. "Very small asteroids can accelerate their rotation," Licandro explains. "If the structure is not very consolidated, like a rubble pile, it can happen that if we make it rotate too fast it starts to eject material." But the fast-rotator explanation has a strike against it as well, Jewitt notes. "We don't see any evidence for the rapid rotation that would be required," he says.

Another asteroid that sprouted a dust tail nearly four years ago might offer some insight into the newfound main-belt comet's origins, but that explanation, too, is a bit fraught. The metamorphosis of a previously undiscovered asteroid into main-belt comet P/2010 A2 in early 2010 may have been caused by the impact of a smaller body into the asteroid, ejecting a cloud of dusty debris into space. But such impact-driven eruptions "don't look like this at all," Jewitt says. "They blow out debris from the impact point, but they don't break out companions like this."

Astronomers' fascination with main-belt comets extends beyond the mere curiosity of seeing something out of the ordinary. The oddball objects blur the distinctions between comets and asteroids as well as challenge astronomers' assumptions about how they behave. "It's hugely shocking that this body that looks like an asteroid is behaving like a comet," Jewitt says. "It's a fact, but somehow it's wrong."

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Edição 4850

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Henrique Eduardo Alves confirma votação da proposta na próxima semana

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Artigo de Hernan Chaimovich*

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Reportagem do Valor Econômico informa sobre palestras que serão realizadas em São Paulo e Brasília

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Grand Challenges Explorations oferece 100 mil dólares a projetos inovadores em saúde, agricultura e desenvolvimento e já premiou seis brasileiros

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Pré-inscrições para as 80 vagas devem ser realizadas até 11 de novembro

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Interessados podem se inscrever pelos Correiros ou diretamente no campus da Universidade

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Evento será realizado no Museu de Arte Murilo Mendes, no dia 29 de novembro

[15. UFU realiza VII Semana Científica de Educação Física e Fisioterapia](#)

Evento é aberto à comunidade, as inscrições podem ser feitas até o dia 22/11

[16. Olimpíada Brasileira de Matemática publica mais um número da revista Eureka!](#)

A publicação é distribuída às instituições que participam da competição e também pode ser obtida sem custo pela internet

[17. V Congresso Brasileiro de Espectrometria de Massas em Campinas](#)

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[18. VerCiência na Travessa: Wallace, Darwin e a Evolução](#)

Evento conta com talkshow e exibição de documentário da BBC que fala sobre o naturalista inglês Alfred Wallace

[19. Pesquisas do Ipea contestam escassez de engenheiros](#)

Comparativo entre oferta e demanda por profissionais de Engenharia não comprova receios de um "apagão" generalizado na área

[20. Doutorado em Ciências Farmacêuticas na Univali está com inscrições abertas](#)

São oferecidas sete vagas com disponibilidade de seis bolsas da Capes/MEC

[21. Especialização gratuita em Inovação e Difusão Tecnológica no Amazonas está com inscrições abertas](#)

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[22. Ideias para melhorar o ambiente escolar serão premiadas em encontro do Festival Educação](#)

Cocriação presencial e roda de conversa com especialistas também farão parte da programação do evento

[23. Ciência Hoje On-line: Um futuro sombrio](#)

Monitoramento do pica-pau-do-parnaíba, ave em risco de extinção, revela que degradação do cerrado é uma das principais causas de ameaça a sua sobrevivência

[24. Revista Ciência Hoje: Magreza contagiosa](#)

Transmissão de flora intestinal de camundongos magros para obesos leva a perda de peso. O efeito só ocorre quando os animais têm uma alimentação saudável

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Os ministros devem avaliar a obtenção de royalties com a mineração

[2. Anticorpos científicos](#)

De acordo com editorial da Folha, pesquisa global se esforça para enfrentar efeitos colaterais do próprio sucesso e expurgar do acervo os erros e fraudes em expansão

[3. Comissão discute planos para a construção de satélite brasileiro](#)

A discussão faz parte do ciclo "Telecomunicações: Governança, Desafios Operacionais, Segurança e Visão de Futuro"

[4. Falso impasse na internet](#)

Editorial de domingo da Folha sobre o Marco Civil da Internet

5. Macacos nos mordam

Nossos cães são mansos, fiéis e sempre dispostos a bajular, em vez de morder, porque assim os criamos, segundo artigo de Marcelo Leite na Folha de domingo

6. Faculdades desistem de usar animais vivos em cursos de medicina do país

Segundo texto da Folha, muitas instituições usam métodos alternativos, como manequins

7. 52% dos institutos que usam bichos podem ser descredenciados

Ministério ameaça cassar autorização de laboratórios que não enviaram relatório

8. Em favor da liberdade acadêmica

Artigo de Joaquim Falcão* publicado na Folha. Eis aí, ao lado da defesa da liberdade acadêmica, uma boa campanha para nossos artistas: a exigência de uma Justiça responsabilizante

9. Incoerência na gestão do Programa Ciência Sem Fronteira: um depoimento

Artigo de Joaquim Albenisio G. Silveira* para o Jornal da Ciência

10. Unifesp promove fórum para integrar pesquisadores

O V Fórum Integrador de Pesquisadores da Unifesp acontecerá entre os dias 6 e 8 de novembro

11. Acre quer 'bolivianos' no Mais Médicos

Estado pressiona ministério para inclusão de brasileiros formados no país vizinho em programa do governo federal, reporta Folha de domingo

12. Medicina na Bolívia tem mais brasileiros que curso da USP

'Fábricas de médicos' atraem 16 vezes mais que a principal universidade do país, diz reportagem da Folha de domingo

13. Revalida tem pior índice de aprovação na primeira fase deste ano

O perfil dos inscritos nas três edições do Revalida é principalmente de médicos de nacionalidade brasileira

14. Padilha diz que se consultaria com estrangeiro reprovado no Revalida

Ministro da Saúde diz que exame é uma prova feita para médicos que querem operar ou trabalhar em UTI e que perfil do profissional é diferente do Mais Médicos. A matéria é do Estadão de sábado

15. Problemas na ciência

Artigo de Hélio Schwartzman publicado na Folha de sábado

16. Exageros da Anvisa

Editorial publicado no Estadão de domingo aborda a Lei de Acesso à Informação

17. Comissões de Educação e de Finanças debatem doações para universidades

O debate será realizado amanhã na Câmara dos Deputados

18. Ciência e Tecnologia rejeita taxa federal por direito de passagem

A rejeição foi pedida pelo relator, Bruno Araújo. Segundo ele, proposta cria dupla tributação sobre empresas de telefonia

19. Conferência vai debater benefícios da tecnologia nuclear para a inclusão social

No Brasil, a geração nuclear tem uma participação pequena na matriz energética, 2,9% do total

20. Novo ordenamento financeiro internacional deve favorecer estabelecimento de economias de baixo carbono

Uma das muitas ideias em circulação no mundo seria tornar a redução das emissões de carbono em lastro das moedas

21. Unifesp Leste terá cursos de engenharia e saúde

Nova unidade deve focar em trânsito e transporte, além de Engenharia Ambiental e Florestal, Arquitetura, Farmácia, Fonoaudiologia e Biomedicina

22. Poupança, inovação e crescimento

Artigo de Claudio Adilson Gonçalez* publicado no Estadão

23. Serviços de leitura online querem ser 'Netflix dos livros'

Biblioteca eletrônica. Scribd e Oyster assinam parcerias com grandes editoras e usam acervo compartilhado por usuários para criar opções de streaming; mediante pagamento mensal, pode-se acessar um catálogo de milhões de obras no celular, tablet ou PC

24. Clube do livro e bibliotecas são revisitados no formato digital

Claro Leitura, eReatah e Oi Bookstore usam conceitos tradicionais para popularizar hábito da leitura nas telas

25. Hawking dá breve versão de sua longa vida

Em autobiografia, físico de 71 anos opta por relato resumido de uma trajetória que superou expectativas dos médicos

26. Rio terá encontro internacional de reitores universitários em 2014

Mais de mil dirigentes da América Latina e de países ibéricos se reunirão na cidade duas semanas depois da Copa do Mundo

27. Estudante do Acre é o primeiro brasileiro a integrar o Wise Learnes

Grupo faz parte do World Innovation Summit for Education, um dos principais eventos internacionais na área da Educação

28. Voo limpo

Avião a energia solar impulsiona criação de tecnologias limpas e deve dar volta ao mundo em 2015; traje dos pilotos tem tecido brasileiro, publica Folha de domingo

29. Substância de coral destrói superbactéria hospitalar em testes

Causadora de infecção pulmonar, a bactéria KPC matou pelo menos 106 pessoas no Brasil no ano passado

30. Internet e tecnologia ajudam a melhorar nossa memória

Em livro, autor canadense diz que usar um sistema de buscas na web é a mesma coisa que consultar um amigo com uma pergunta

31. Atriz apadrinha macacos da espécie saúim-de-coleiraem evento no Inpa

Ato fez parte da ação ecológica promovida pelo Inpa e a Secretaria de Estado de Cultura

32. Ciência Hoje On-line: Física e química rondam Nobel de Medicina

Conceitos e ferramentas da física e química 'invadem', cada vez mais, pesquisas da área biológica

33. Revista Ciência Hoje: Complexidade urbana

Textos de Gilberto Velho selecionados por ex-alunos são reunidos em livro um ano após a morte do antropólogo

Edição 4847

1. Em evento da Fundação Bill e Melinda Gates, cientistas destacam avanço em tecnologia para o controle da dengue no Brasil

Conferência teve a participação do secretário geral da SBPC, Aldo Malavasi

2. Ciência sem Fronteiras quer atrair alunos do Acre, Amazonas e Amapá

O domínio da língua inglesa é uma das barreiras a serem vencidas para que estudantes participem do processo seletivo do programa para universidades britânicas

3. Manifesto da Sociedade Brasileira de Biociências Nucleares sobre experimentação animal

Documento assinado pela diretoria da SBBN repudia a invasão ao Instituto Royal

4. Comissão discute novo Código de Mineração com ministros

Os ministros devem avaliar a obtenção de royalties com a mineração

5. Audiência debate mudanças na Lei para incentivar desenvolvimento científico

As medidas são no âmbito das instituições federais de ensino superior e de instituições científicas e tecnológicas

6. Revistas científicas brasileiras são as menos internacionalizadas entre os emergentes

A avaliação foi feita por participantes de um painel sobre medição da qualidade das pesquisas e dos periódicos internacionais

7. MEC e Justiça assinam pacto para fiscalizar faculdades privadas

Objetivo é proteger estudantes de armadilhas, como cursos mal avaliados e cobranças abusivas

8. Acordo aumentará proteção de universitários em relações de consumo com instituições particulares

Acordo entre MEC e Senaçon prevê que órgãos desenvolvam ações conjuntas para o aperfeiçoamento da oferta de educação superior

9. FNDE adia prazo para renovação semestral de contratos do Fies

O novo prazo vale para os contratos formalizados a partir do dia 15 de janeiro de 2010 até o segundo semestre de 2013

10. USP propõe mudar 'estatuto da ditadura'

A ideia de um novo documento, elaborado com a participação de alunos, funcionários e docentes, foi apresentada nessa quinta-feira, 31, aos grevistas

11. Sancionada lei que retoma antigo fuso horário do Acre

Novo horário vale a partir de 10 de novembro. Lei foi publicada no Diário Oficial da União desta quinta-feira

12. Audiência discute andamento de ações para aplicação do Código Florestal

O deputado que pediu a audiência, Antônio Roberto (PV-MG), faz parte do Grupo de Trabalho que acompanha a implementação do Código Florestal

13. Meio Ambiente discutirá critérios para organismos de certificação florestal

As entidades certificadoras deverão ser cadastradas pelo Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Ibama)

14. BNDES incentiva cooperação entre empresas britânicas e brasileiras na área de inovação e sustentabilidade

Segundo presidente do BNDES, a tecnologia inovadora adotada pelas empresas britânicas poderá ser transferida para empresas brasileiras

15. Israel cria "superplanta" que pode ajudar a combater a fome mundial

Professor de biologia descobriu a característica de plantas geneticamente modificadas que exigem menos água para o crescimento

16. Emissões de CO₂ mostraram sinais de desaceleração da taxa de aumento

Relatório holandês mostra que emissões continuam a aumentar, mas a uma taxa menor do que em anos anteriores

[17. Oceanos absorvem mais calor do que se pensava, diz estudo](#)

Nova análise reconstruiu temperatura do Pacífico nos últimos 10 mil anos

[18. Tório é uma nova alternativa ao uso de urânio em reatores nucleares](#)

Ex-inspetor de armas da ONU destaca a segurança de elemento metálico

[19. Nova terapia contra a Aids em teste](#)

Experimento com anticorpos potentes foi bem sucedido em macacos e está agora sendo testado em humanos

[20. Em extinção, peixe-boi ganha novo centro de auxílio no Ceará](#)

O habitat desses animais tem sido frequentemente destruído pela atividade humana

[21. IBICT lança livro Fronteiras da Ciência da Informação](#)

Publicação é um panorama de temas considerados fronteiras da ciência da informação

[22. Escola Verde se destaca e vira referência em Rio Preto da Eva](#)

O município de Rio Preto da Eva possui hoje três projetos na única escola estadual do município, financiados pela Fapeam

[23. Inscrições abertas para mestrado e doutorado em Radioproteção e Dosimetria no IRD](#)

Instituto de Radioproteção e Dosimetria, no Rio de Janeiro, recebe inscrições até 29 de novembro

[24. Mestrado em ciência da tecnologia da computação em Itajubá, MG](#)

Inscrições abertas até 29 de novembro

[25. Seminário na Unesc aborda "As mudanças climáticas globais"](#)

Evento ocorre na próxima semana (4 a 6/11), no Auditório Ruy Hulse

[26. Professor do curso de Engenharia Civil do INESP apresenta artigos em conferência internacional de alvenaria](#)

Matheus de Faria vai participar da 9ª Conferência Internacional de Alvenaria, em Portugal

[27. Prorrogadas as inscrições para o Mestrado em Agricultura Conservacionista do Iapar](#)

Instituto Agronômico da Paraná oferece 21 vagas para três linhas de pesquisa

[28. Foi realizada a primeira cirurgia no Brasil com o uso do Google Glass](#)

Procedimento foi possível através da parceria entre a Onoffre Consulting - online & offline revolution - e o Instituto Lubeck

[29. V SIEPE promove atividades científicas e culturais em Bagé até sexta-feira](#)

Universidade Federal do Pampa recebe 1526 trabalhos em mostra científica

[30. Herpetofauna e condições ambientais](#)

Em obra clássica para o tema "Ofídios da Amazônia", o pesquisador Oswaldo Rodrigues da Cunha já evidenciava a necessidade de mais pesquisas para que, em novos estudos continuados em toda a região da Floresta Nacional de Caxiuanã, fossem registradas novas espécies

[31. Exame evita biópsia de próstata desnecessária](#)

O hospital em São Paulo é o primeiro do país a usar esse exame na prática clínica

[32. Cérebro de bebês reproduz movimentos de outras pessoas, afirma estudo](#)

Observando os movimentos do corpo de outros seres humanos, o córtex da criança ativa determinadas regiões do cérebro

[33. Tome Ciência: De perto ninguém é normal?](#)

Programa de TV promove debate sobre a psiquiatria moderna e aborda novas patologias integrantes do Manual Diagnóstico e Estatístico de Transtornos Mentais

[34. Ciência Hoje On-line: Tão perto, tão longe](#)

Levantamento da fauna e flora das ilhas Cagarras, no Rio de Janeiro, é feito pela primeira vez e torna-se disponível ao conhecimento público

AMBIENTE BRASIL

[Emissões nacionais caíram 36,7% entre 2005 e 2012, apontam ONGs](#)

Ambientalistas lançam sistema para medir emissões paralelo ao do governo. Entre 1990 e 2012, emissão de gases-estufa do Brasil aumentou 7%.

[Painel Brasileiro de Mudanças Climáticas cobra medidas imediatas de mitigação](#)

"O benefício da ação imediata para mitigar a mudança do clima supera o custo da inação", destaca trecho do primeiro relatório de avaliação nacional sobre mudanças climáticas do organismo científico.

Cientistas britânicos querem mapear genoma de 100 mil voluntários

Projeto vai disponibilizar dados em sistema de livre acesso. Análise trará avanços no conhecimento de males comuns, mas é criticada.

Esgotamento do potencial hidrelétrico mudará prioridades para geração de energia

O secretário de Planejamento Energético do Ministério de Minas e Energia, Altino Ventura, disse na quinta-feira (7) que a geração de energia hidrelétrica, eólica e a partir do bagaço de cana continuarão como prioridade nos próximos anos.

Centenas de tartarugas são achadas em malas em Bangcoc

Depois de fazer exames de raios-X nas malas, eles encontraram 423 tartarugas irradiadas, assim como 52 espécies desconhecidas de tartarugas marinhas e terrestres.

Polícia Montada da PM do Rio vai usar esterco para gerar energia

Biodigestor deve ter capacidade de transformar 450 quilos de esterco produzidos diariamente por 285 cavalos em gás metano, que será utilizado para abastecer a cozinha e aquecer os chuveiros do regimento.

Pesquisadores buscam raro meteorito na costa fluminense

A expedição é uma das atividades do 4º Encontro Internacional de Meteoritos e Vulcões 2013, que começou nesta quinta-feira e vai até domingo, no Instituto de Geologia da Universidade Federal do Rio de Janeiro.

Romanos usavam redes sociais há dois mil anos, diz livro

Para Tom Standage, Facebook e Twitter são reencarnações de ferramentas antigas de comunicação e interação.

Rio e prefeituras firmam acordo para reforçar proteção de reserva

De acordo com o documento, as prefeituras se comprometem a desenvolver ações e projetos voltados para a preservação da Reserva Biológica do Tinguá, que tem 26 mil hectares, e é um das mais importantes unidades de conservação federal.

Cientistas advertem sobre maior probabilidade de impactos de asteroïdes

A probabilidade de um asteroide bater na Terra é maior do que se pensava previamente, e poderia acontecer a cada três ou quatro décadas, de acordo com um estudo publicado na revista Science.

Autoridade dos EUA propõe banir gordura trans adicionada a alimentos

FDA ouvirá a indústria por 2 meses antes de efetivar decisão. Redução poderá evitar 20 mil ataques de coração, segundo especialista.

Agência da ONU vai analisar radiação existente no mar em Fukushima

Analistas da Agência de Energia Atômica vão coletar amostras para exame. Foco é tranquilizar países sobre vazamentos de água contaminada no mar.

Refinarias 'flex' podem ajudar na transição para economia de baixo carbono

Ofélia Araújo, da UFRJ, defende o uso do parque de refino brasileiro para coprocessar matérias-primas de origem fóssil e biomassa.

Agricultura autoriza importação de agrotóxicos para pragas

Ministério da Agricultura, Pecuária e Abastecimento autorizou a importação de agrotóxicos para contenção de praga que está atingindo lavouras no oeste da Bahia.

Asteróide com seis caudas assombra cientistas

Ao invés de se parecer com um pequeno ponto de luz, como a maioria dos asteroïdes, este tem meia dúzia caudas de poeira parecidas com as dos cometas, similares aos raios de uma roda.

Cientistas descobrem nos EUA 'tio-avô' do Tiranossauro Rex

Espécie tinha 7,3 m de comprimento e é 10 milhões de anos mais velho. Animal foi batizado de Lythronax argestes ou 'rei do sangue'.

Rússia pode imputar acusações adicionais a ativistas do Greenpeace

Agência atribui declaração a porta-voz de equipe subordinada a Putin. Ativistas seriam condenados por resistência à autoridade.

Brasil reciclagem 98% das latâncias de alumínio em 2012, diz entidade

No total, foram 267,1 mil toneladas recicladas de 19,8 bilhões de embalagens, o correspondente a 54,1 milhões por dia, ou 2,3 milhões por hora.

Brasil pedirá na COP-19 definição de responsabilidade climática de cada país

O diplomata José Antonio Marcondes de Carvalho, negociador do Brasil em assuntos ambientais, explicou em entrevista coletiva que a metodologia e a gestão dessa medição deveriam ser encarregadas ao Painel Intergovernamental da ONU sobre Mudança Climática.

Concentração de gases de efeito estufa bate recorde em 2012

Informação é de relatório da Organização Meteorológica Mundial, da ONU. CO₂, metano e óxido de nitrogênio alcançaram novos máximos.

Governo japonês estuda instalação de deslocados de Fukushima em outras áreas

O governo japonês quer instalar parte das pessoas deslocadas devido ao acidente na Central Nuclear de Fukushima em zonas afastadas do complexo, em vez de facilitar a volta dos moradores aos locais de origem.

Robô falante manda recado do espaço para astronauta japonês

Androide 'fará companhia' a astronauta que chegará até o fim do ano à ISS. Ele foi criado para estudar se um robô pode ajudar pessoas em isolamento.

Macacos usam mente para controlar dois braços virtuais ao mesmo tempo

Pesquisa do brasileiro Miguel Nicolelis avança para atividades bimanuais. Projeto 'Andar de novo' quer fazer paraplégico dar pontapé inicial da Copa.

Traje permite sentir efeitos de idade avançada sobre o corpo

Roupa foi criada na Alemanha para facilitar aprendizado de estudantes de geriatria sobre limitações típicas de um homem de 75 anos.

Argentina diz que está solucionando 50% de contaminação de rio

Segundo os ambientalistas, na bacia do rio Matanza-Riachuelo de 60 km, umas 15 mil indústrias despejam resíduos no rio e as indústrias químicas são responsáveis por mais de um terço da contaminação.

Carcaças de baleias na costa de Gana preocupa ambientalistas

Vinte baleias mortas foram encontradas na costa ganesa nos últimos quatro anos, oito delas desde setembro. A causa das mortes é desconhecida.

Bonito/MS é eleita melhor destino para turismo responsável no mundo

Sistema de controle de visitantes foi reconhecido em prêmio internacional. Projeto holandês contra exploração infantil no Brasil venceu outra categoria.

Após roubo dos beagles, Instituto Royal encerra atividades

O centro informou em comunicado que não pode prosseguir suas atividades devido à "a perda de quase todo o plantel de animais e de aproximadamente uma década de pesquisas".

Criminalidade ambiental movimenta cerca de US\$ 20 bilhões por ano

Segundo o diretor-executivo de Serviços Policiais de Interpol, Jean-Michel Louboutin, os benefícios da criminalidade ambiental, "bilhões roubados dos recursos naturais de cada país", são empregados para financiar o terrorismo e o crime organizado em escala global.

Ar poluído em ambientes fechados é quarto fator de risco de morte

A OMS avalia que anualmente dois milhões de pessoas morrem devido a sistemas deficientes de calefação.

Primeira dose de vacina anti-HIV é aplicada em macacos no Butantan

Quatro animais adultos e saudáveis iniciaram teste na terça-feira (5) em SP. Próxima fase incluirá 28 primatas; segurança em macacário foi reforçada.

Tribunal do Mar vai se pronunciar sobre detenção de ativistas no dia 22

Grupo ligado ao Greenpeace está detido desde setembro na Rússia. Governo russo não participou da audiência da Corte Internacional.

Depressão é segunda maior causa global de invalidez, diz estudo

Pesquisa aponta que apenas dores nas costas superam depressão como causa de invalidez, mas aponta grandes variações entre países e regiões.

Programa Água Doce chega ao Piauí e vai beneficiar 26 mil no semiárido

R\$ 13 milhões serão investidos na construção de 67 sistemas de dessalinização da água.

Impacto de meteorito na Rússia foi o dobro do que se calculava, diz estudo

Análise de queda foi feita com base em vídeos publicados na internet. Eventos deste tipo podem ser 10 vezes mais comuns do que se pensava.

Emissão de gases-estufa deve passar limite ideal até 2020, alerta ONU

Nível de emissões será até 12 bi toneladas de gases maior que o ideal. ONU pede que países lutem para desacelerar aquecimento.

ONU elogia novo passo do Brasil no tratamento da Aids

Para Unaids, Brasil reafirma 'liderança' ao oferecer terapia antirretroviral para todos os soropositivos, independentemente do estágio da doença.

Chineses transportaram pedras para Cidade Proibida por caminhos de gelo

Transporte de 120 toneladas de pedras foi feito por trenó. Trabalhadores cavavam buracos a cada 500 metros para lubrificar o gelo.

Acordo deve reduzir sódio de requeijão, hambúrguer e embutidos

Fabricantes se comprometeram a diminuir índice de sódio em quatro anos. Biscoito, macarrão instantâneo e maionese já estavam em acordos anteriores.

Tartarugas resgatadas no litoral de Sergipe passam por reabilitação

Animais foram encontrados debilitados, diz Projeto Tamar. Guarda-vidas fizeram o resgate de uma delas na Praia do Saco.

Meta de limitar aquecimento global a 2°C está cada vez mais distante, diz ONU

Os cientistas estimam que, se o aquecimento global ficar abaixo dos 2°C, as piores consequências poderão ser evitadas; COP-19 começa na segunda-feira.

Círculo Tela Verde recebe vídeos socioambientais até 30 de novembro

Objetivo da mostra é divulgar e estimular atividades de educação ambiental, participação e mobilização social.

Nave Soyuz é preparada antes de seguir para ISS com tocha olímpica

Foguete vai levar tocha dos jogos de Sochi para a Estação Espacial. Cosmonautas russos vão caminhar com objeto no espaço.

Primeiro arroz transgênico será lançado comercialmente até 2016

Autoridades do Instituto Internacional de Pesquisa do Arroz (IRRI) e do Departamento de Agricultura filipino anunciaram a conclusão dos testes de campo do recém-desenvolvido "arroz dourado", apesar dos ataques praticados contra um campo de testes.

Organizações listam dez lugares mais contaminados do mundo

Contaminação ambiental ameaça a saúde de 200 milhões de pessoas. Lista pretende ajudar autoridades a lutar contra diferentes tipos de poluição.

Cientistas identificam ornitorrinco extinto a partir de dente fossilizado

Molar foi encontrado na Austrália por pesquisadora. Animal viveu entre 5 e 15 milhões de anos atrás.

Guarda Costeira do Japão detém capitão de barco chinês por pesca ilegal

As relações entre a China e o Japão estão tensas há mais de um ano devido a uma disputa territorial no Mar da China Oriental.

Associações preparam proposta para energia solar no Brasil

Propostas para desenvolver o setor incluem leilões específicos para a fonte e outros para geração distribuída.

Senado discute políticas públicas para as comunidades tradicionais

Indígenas, quilombolas, pantaneiros e outros grupos expuseram as suas prioridades.

China está disposta a ajudar a criar novo acordo climático global

Tratado substituirá Protocolo de Kyoto, que engloba apenas países ricos. Negociação climática deve começar nos próximos dias, com a COP 19.

Peixe-lua de 150 quilos é encontrado em Praia Grande/SP

O animal foi capturado por acidente a cerca de um quilômetro da costa, onde se enrolou em uma rede de pesca, e possivelmente já estava morto.

Itália vai limitar tráfego de navios de cruzeiro em Veneza

Moradores reclamam de danos causados por embarcações. A partir de janeiro, tráfego diante da Praça de São Marcos será restrito.

COP-19 terá missão de definir bases para um novo Protocolo de Kyoto

A Conferência das Nações Unidas sobre Mudança no Clima acontece a partir da próxima segunda-feira em Varsóvia, na Polônia.

Para frear degelo, Banco Mundial pede redução de emissões

Relatório sugere metas de diminuição de metano e carbono negro. Medidas também salvariam milhares de vidas, segundo relatório.

Anvisa pretende rastrear alimentos para fiscalizar abuso de agrotóxicos

Grupo de trabalho deve propor estratégias de rotulagem e rastreabilidade. Medida vale para alimentos 'in natura' que chegam aos consumidores.

Fruta do cerrado se transforma em ravioli, farofa e pão em bistrô do Recife/PE

A macaúba é uma fruta que dá em uma palmeira. Nativa do cerrado, é produzida comercialmente em várias regiões do país, e agora começa a ter seu valor reconhecido na culinária.

Galáxia a 13 milhões de anos-luz tem buraco negro ativo em seu centro

NGC 4945 se parece muito com a Via Láctea em aspectos gerais.

Fóssil de nova espécie de ornitorrinco gigante é descoberto na Austrália

Maior ornitorrinco já descoberto tinha dentes - característica que a espécie moderna não possui - e até o dobro do tamanho atual.

Ministério da Agricultura decreta emergência na Bahia por causa de praga em lavouras

Lagarta que causa prejuízo principalmente às lavouras de milho, soja e algodão.

Japoneses fazem manifestação em Tóquio contra caça de baleias

Organização acusou governo de ser responsável por extirpar espécies. Prática é permitida em áreas costeiras do país, mediante regras de comitê.

Ambientalistas argentinos protestam contra fábrica de celulose no Uruguai

Governo uruguai autorizou ampliação da produção na semana passada. Cerca de 20 embarcações participaram do protesto no Rio Uruguai.

Cientistas debatem semelhanças entre doenças de humanos e animais

Conferência realizada nos Estados Unidos reuniu médicos e veterinários. Objetivo é trocar dados sobre tratamento de doença em diferentes espécies.

MMA faz capacitação em gestão territorial e ambiental indígena

É a primeira vez que se dá apoio direto a planos de gestão de modo mais sistemático.

Planetas habitáveis podem ser comuns, diz estudo

Um quinto das estrelas parecidas com o Sol tem planetas habitáveis. Estrela mais próxima com planeta habitável está a 12 anos luz.

Sequestro de carbono teria causado tremores de terra no Texas, diz estudo

Método injeta gases-estufa no subsolo em regiões petrolíferas. Pesquisa publicada na 'PNAS' analisou sequência de sismos.

Extrato de ipê pode ajudar a tratar lesões por veneno de cobra

Possível remédio feito a partir de substância não substituirá soro antifídico. Produto reduziu o número de células inflamadas e conteve a hemorragia.

Autoridades da China apreendem mil gatos e os soltam em floresta

Animais transportados por caminhão eram para consumo humano. Governo soltou os felinos pois não tinha recursos para cuidar deles.

Política de uso da água do planeta será discutida pela OCDE em Paris

Brasil apresentará experiência nacional na gestão de recursos hídricos.

Zoos nos EUA usam beagle para detectar gravidez de ursas polares

Cão Elvis, de 2 anos, tem demonstrado 97% de precisão em análises. Animal fareja amostras de proteínas contidas em fezes de fêmeas.

Projeto Tamar devolve ao mar mais uma tartaruga marinha na capital

Animal foi encontrado por pescadores em uma rede de pesca. Desde 2005, cerca de 200 animais foram reabilitados pelo projeto.

Oceanos absorvem mais calor do que se pensava, diz estudo

O aquecimento das águas mais fundas do Pacífico nas últimas décadas foi maior do que em qualquer momento desde o fim da última Era do Gelo, sendo 15 vezes maior agora do que há 10 mil anos.

Cargueiro espacial Albert Einstein se desintegra, diz agência europeia

Desintegração ocorreu como esperado na reentrada da atmosfera. Nave de abastecimento caiu em região desabitada do Pacífico Sul.

Novo ordenamento financeiro internacional deve favorecer estabelecimento de economias de baixo carbono

O tema integrou a pauta de debates da 2ª Rio Climate Challenge: Rio Clima, promovida pelo Instituto OndAzul nos dias 28 e 29 de outubro.

Embrapa oferece recomendações para o controle de lagarta na lavoura

Helicoverpa armigera ataca cultivos como tomate, milho, algodão e soja. Praga já causou prejuízo de cerca de R\$ 2 bilhões aos agricultores.

Templo ceremonial de 3 mil anos é descoberto no norte do Peru

Local sagrado era usado para prestar culto aos deuses da cultura Chavín. Civilização pré-incaica viveu de 900 a 200 a.C. na região de Lambayeque.

Falta de consenso adia implantação do PIB sustentável, avalia especialista

Há dúvidas sobre se convém trabalhar em cima do Produto Interno Bruto tradicional, agregando uma série de elementos qualitativos de natureza ambiental e social, ou se seria melhor construir outro indicador baseado no consumo que, nesse caso, seria a renda disponível das famílias, após o pagamento de suas necessidades básicas.

Extrato de ipê amarelo promete combater mordida de cobras

Experimentada em laboratório e em ratos, a substância se mostrou muito eficaz para reduzir a inflamação provocada pela mordida das cobras, conter a hemorragia, minimizar o edema e diminuir a atividade tóxica do veneno.

Vulcão provoca evacuação de mais de mil pessoas na Indonésia

O vulcão Sinabung lançou nuvens de fumaça no norte da ilha indonésia de Sumatra.

Apenas 30% dos municípios devem concluir os planos de saneamento básico em 2013

Pelo cenário atual, 70% dos municípios ficarão impedidos de receber recursos federais para aplicar no setor, já que o Decreto 7.217/2010 determinou que, a partir de janeiro de 2014, o acesso a verbas da União ou a financiamentos de instituições financeiras da administração pública federal destinados ao saneamento básico estará condicionado à existência do plano.

Parasita prejudica pesca de camarão na costa sudeste do Atlântico

Pesca tem piorado nos últimos meses graças à doença das guelras negras. Doença não mata camarões, mas os torna mais vulneráveis a predadores.

Avião movido a energia solar impulsiona criação de tecnologias limpas

O primeiro protótipo da aeronave Solar Impulse cruzou os Estados Unidos de costa a costa neste ano. O segundo protótipo deverá estar pronto no começo no ano que vem e disponível para dar uma volta ao mundo em 2015.

Disputa por terras pode levar índios e produtores a novos conflitos em MS

A região tem sido palco de conflitos entre índios e produtores rurais que disputam territórios considerados pela Funai como reserva indígena. Produtores garantem ter documentos que comprovam a posse da terra e se recusam a deixar fazendas que foram invadidas pelos índios.

Conferência vai debater benefícios da tecnologia nuclear para a inclusão social

Medicina nuclear, melhoria da produção agrícola e do processo industrial nos setores mecânico, elétrico e de petróleo, entre outros, além do controle e monitoramento da poluição do meio ambiente, de rios e lagos são algumas aplicações da tecnologia nuclear que serão discutidas.

Obama ordena ao governo que se prepare para mudanças climáticas

O presidente americano se comprometeu a agir por decreto na tentativa de reduzir as emissões de gases de efeito estufa no país.

Países não entram em acordo para criar santuário marinho na Antártica

China e Rússia colocaram obstáculos à proteção dos ecossistemas. Dois projetos de santuário queriam preservar área do tamanho da Índia.

Em extinção, peixe-boi ganha novo centro de auxílio no Ceará

O habitat desses animais tem sido frequentemente destruído pela atividade humana. Eles sofrem em particular com o assoreamento dos rios e a ocupação desordenada de manguezais e estuários, que são essenciais para sua reprodução e para a sobrevivência dos filhotes.

Parlamentar japonês entrega carta a imperador sobre crise em Fukushima

Taro Yamamoto quebrou tabu ao tentar envolver família real na política. Carta foi dada pessoalmente ao imperador Akihito durante festa.

Ativistas presos serão levados para São Petersburgo, diz Greenpeace

Informações foram obtidas pela organização com fontes diplomáticas. Grupo de 30 pessoas ainda está em Murmansk, segundo escritório no Brasil.

Abalos sísmicos preocupam população de Pedra Preta, no Rio Grande do Norte

O último abalo sísmico detectado na cidade de Pedra Preta, a 115 quilômetros de Natal, aconteceu pouco antes das 9h desta sexta-feira (1º).

Instituto Butantan abre votação para escolher nome de filhote de sucuri

Espécie é conhecida popularmente como anaconda. Nomes colocados para votação são Suri, Lineu, Abaré, Surucuriju e Boiúna.

Onça-pintada está mais ameaçada na Mata Atlântica e na Caatinga

Cientistas dizem que espécie está 'criticamente em perigo' nos dois biomas. População desses felinos caiu 10% na Amazônia nos últimos 27 anos.

Animais exóticos são resgatados após limpeza de lagos, em Belém/PA

Plantas aquáticas foram retiradas dos lagos Bolonha e Água Preta. 400 serpentes, répteis e anfíbios foram soltos no parque do Utinga.

Congresso ganhará iluminação azul em ação contra câncer de próstata

Novembro Azul' será lançado na próxima segunda-feira (4), em Brasília.Câncer de próstata é o segundo tipo de câncer que mais mata homens.

Proprietários rurais do Rio podem fazer cadastro ambiental a partir da semana que vem

O CAR é um registro eletrônico que será obrigatório para os proprietários rurais de todos os estados do país. O cadastro reunirá todas as informações ambientais das propriedades e posses no campo, com delimitação das áreas de reservas legais e das áreas de Proteção Permanente.

Astronautas passam por testes antes de viagem rumo à Estação Espacial

Japonês, russo e americano fizeram testes no Cazaquistão nesta sexta-feira. Eles partem no foguete Soyuz no próximo dia 7.

Cães reagem de acordo com direção do abanar de rabos, mostra estudo

Balançar de rabo de outros cachorros provocam ansiedade ou relaxamento. Como nos humanos, funcionamento do cérebro dos cães é assimétrico.

Grupo de trabalho da ONU diz que povos indígenas têm direitos violados por atividades econômicas

Os governos e as empresas precisam atuar mais intensamente para prevenir a violação dos direitos de povos nativos afetados pelo extrativismo e pelas atividades dos setores agroindustriais e de energia.

Ativistas lutam contra extinção de botos no Mar Báltico

A população do cetáceo que vive nas águas gélidas do norte europeu caiu 60% nos últimos anos. Ambientalistas exigem que autoridades proíbam pescadores de usar redes, que constituem armadilha fatal para os botos.

28 / 10 / 2013 Brasileiros propõem novo método para descobrir planetas

Espera-se que a técnica, que envolve o uso do observatório Alma (rede de radiotelescópios instalada a 5.000 metros de altitude no deserto do Atacama, no Chile), possa revelar pelo menos alguns planetas potencialmente habitáveis em torno de estrelas menores que o Sol.

28 / 10 / 2013 Lugar mais frio conhecido no Universo lembra forma de fantasma

Nebulosa do Bumerangue está a 5 mil anos luz da Terra. Sua temperatura é de -272°C, pouco acima do zero absoluto.

28 / 10 / 2013 Conferência aprova carta defendendo vinculação entre meio ambiente e inclusão social

A carta destaca algumas decisões adotadas pela Conferência Nacional do Meio Ambiente, a começar pela aprovação de ações voltadas para a produção de alimentos sustentáveis e segurança alimentar, bem como a coleta seletiva de lixo e a compostagem orgânica dos resíduos.

28 / 10 / 2013 Membros do Greenpeace denunciam condições da detenção na Rússia

Os membros do Greenpeace estão em prisão preventiva até seu julgamento, previsto para 24 de novembro.

28 / 10 / 2013 Agricultores nordestinos se reúnem na Paraíba para trocar experiência sobre agroecologia no Semiárido

Na região, segundo o IBGE vivem mais de 27 milhões de pessoas, representando aproximadamente 12% da população brasileira espalhados em 1.133 municípios do Nordeste e do norte de Minas Gerais.

28 / 10 / 2013 Índios da Amazônia começam a sofrer com doenças urbanas

De acordo com a pesquisa, apesar das doenças infecciosas e parasitárias ainda serem uma importante causa de mortalidade entre estes índios, as que mais cresceram nos últimos anos foram as crônicas não transmissíveis, como a hipertensão, a intolerância à glicose e a dislipidemia, que é um aumento anormal na taxa de lipídios no sangue.

28 / 10 / 2013 Estudo indica 11 genes que teriam ligação com mal de Alzheimer

Segundo os cientistas, a descoberta pode indicar medicamentos que podem ajudar a prevenir ou diminuir os efeitos da doença nos portadores ao focar no funcionamento desses genes.

28 / 10 / 2013 Pesquisadores chineses anunciam vacina contra gripe aviária

Eles tiveram sucesso no desenvolvimento da vacina, diz agência estatal. É a 1ª vez que vacina para combater a gripe é desenvolvida no país.

28 / 10 / 2013 Chuva continua e Inmet prevê queda de granizo em Mato Grosso do Sul

Frente fria provoca as mudanças no tempo, diz meteorologista. Em Campo Grande, temperaturas podem variar entre 21°C e 28°C.

28 / 10 / 2013 Jacaré-de-papo-amarelo é recolhido em portaria de prédio no ES

O réptil apareceu no bairro Feu Rosa, na Serra, e assustou moradores. Segundo a polícia, o animal de dois metros foi solto na lagoa Jacuném.

28 / 10 / 2013 Cidades do noroeste paulista têm 10 meses para adequar lixões

Lei que institui política de resíduos sólidos começa a valer em agosto. Em algumas cidades, lixo é descartado em locais inadequados.

28 / 10 / 2013 Funai apura ocupação indígena em fazendas de Japorã/MS

Coordenador diz que há informação de invasões neste fim de semana.

28 / 10 / 2013 Ativista se pendura na Torre Eiffel e pede libertação de presos na Rússia

Ele foi removido duas horas depois por um bombeiro, sem incidentes. 30 estão presos na Rússia por protesto contra exploração de petróleo.

28 / 10 / 2013 Mundo investe menos em 2012 do que no ano anterior para brecar aquecimento

O relatório Landscape 2013 afirma que até 2020 será necessário o investimento de US\$ 5 trilhões em tecnologia para geração de energia limpa. Isso permitiria controlar a escalada da temperatura no planeta, limitando seu aumento a 2 graus Celsius.

28 / 10 / 2013 Declaração defende avanço de áreas marinhas protegidas de 3% para 10%

Cerca de 15 países reafirmaram no sábado (26), em Ajaccio, a necessidade de transformar 10% dos oceanos em áreas marinhas protegidas até 2020, contra os menos de 3% atuais, e de se lançar negociações em 2014 sobre o status do alto-mar.

29 / 10 / 2013 Brasil vai produzir vacina de sarampo e rubéola para países pobres

Saúde faz parceria de R\$ 1,6 bilhão com Fiocruz e Bill & Melinda Gates. Atualmente, país exporta doses para 75 nações em todo o mundo.

29 / 10 / 2013 Acidente de Fukushima causa uma morte por dia, segundo pesquisador japonês

Segundo o ex-presidente do Comitê de Investigação do Acidente na Usina de Fukushima Yotaro Hatamura, 180 pessoas morreram nos últimos seis meses devido ao acidente de março de 2011.

29 / 10 / 2013 Conferência de bem-estar de cachorros e gatos discute legislação comum na UE

Os participantes consideraram "alarmante" o aumento do comércio ilegal de animais na União Europeia, um negócio que pode gerar lucro semanais de até 50 mil euros e cujas sanções são "mínimas".

29 / 10 / 2013 Minas de ouro de Johanesburgo viram 'Chernobyl' sul-africano

Águas estão contaminadas com metais pesados e elementos radioativos. Riscos para a saúde são preocupantes; abastecimento de água é limitado.

29 / 10 / 2013 Expedição descobre três novas espécies de vertebrados na Austrália

Achados incluem lagartixa com cauda em forma de folha e lagarto dourado. Região inexplorada do norte do país foi apelidada de 'mundo perdido'.

29 / 10 / 2013 Nasa capta erupção solar com filamento de 322 mil km de extensão

Emissões súbitas de radiação na superfície do astro têm sido comuns. Fenômeno não ultrapassa barreira da atmosfera terrestre, diz Nasa.

29 / 10 / 2013 Rússia reduz acusação contra membros do Greenpeace de pirataria a vandalismo

Por enquanto, o tribunal do porto russo de Murmansk acusou formalmente de vandalismo quatro dos 30 tripulantes da embarcação presa desde 19 de setembro no mar de Barents.

29 / 10 / 2013 Centro de criação recupera tartarugas gigantes de Galápagos

A morte do "George Solitário", ocorrida em 2012, não extinguiu a espécie das tartarugas gigantes das ilhas Galápagos. A Direção do Parque Nacional de Galápagos descobriu mais 17 tartarugas com o mesmo gene da tartaruga habitando o vulcão Wolf da ilha Isabela, que integra o arquipélago equatoriano Parque Nacional de Galápagos.

29 / 10 / 2013 Cetesb investiga se incêndio em depósito contaminou rio

Técnicos foram checar a possibilidade de contaminação das águas do Rio São Domingos, no interior paulista, devido incêndio ocorrido em depósito de açúcar.

29 / 10 / 2013 Justiça federal determina a suspensão das obras de Belo Monte

Decisão foi tomada na sexta pelo Tribunal Regional Federal da 1ª Região. Norte Energia afirmou que todas as obrigações estão sendo cumpridas.

29 / 10 / 2013 Etiópia instala "megatelescópios" e revela ambições no setor aeroespacial

A nação africana planeja lançar antes de 2017 três satélites ao espaço e unir-se, assim, à África do Sul e Nigéria como o terceiro Estado do continente com missão espacial.

29 / 10 / 2013 Após tsunami, empresas japonesas geram a própria eletricidade

Toyota tem sistema de eletricidade gerada pela própria fábrica, em Ohira. Mitsubishi e Nissan também buscam alternativas 'limpas' à energia nuclear.

29 / 10 / 2013 Borboleta mexicana que conviveu com dinossauros corre risco

Agricultura, desmatamento e poluição ameaçam espécie mais antiga. Governo estuda criar área de reserva ecológica para proteger espécie.

29 / 10 / 2013 Francês é 1ª pessoa com deficiência a saltar sobre Monte Everest

Homem de 55 anos convive há uma década com a esclerose múltipla. Ele pulou de helicóptero que sobrevoava a montanha a 10 mil metros.

29 / 10 / 2013 Litoral de Nova Jersey/EUA ainda não se recuperou de Sandy

Furacão causou mais de uma centena de mortos nos Estados Unidos e destruiu ou danificou cerca de 650 mil imóveis.

SCIENCE

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EARTH PAGES

Could volcanism have spread organisms?

Posted on November 7, 2013 by Steve Drury | [Leave a comment](#)

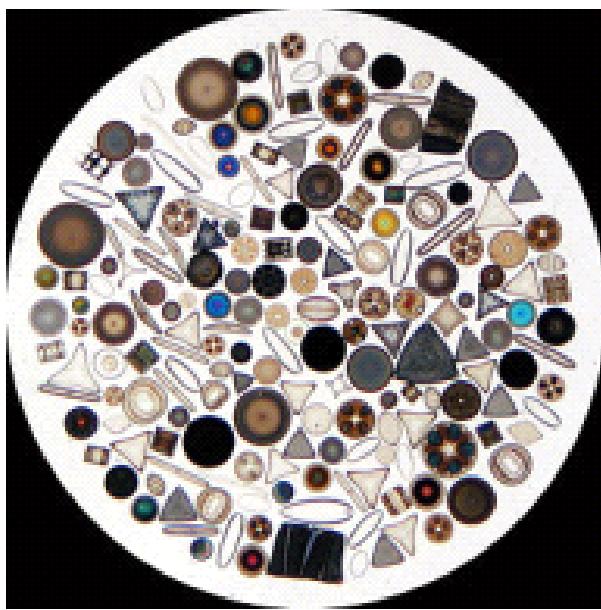
Recently there have been worrying accounts about pathogens, for instance the viruses that cause foot and mouth disease in livestock, flu in humans and other animals and the sheep disease bluetongue carried by tiny midges, being transported for thousands of kilometres in dust storms. They raise the question of whether or not in the past organisms small enough to be carried by winds in aerosol

suspension might have helped colonise regions distant from where they evolved.



The 600 square kilometre caldera lake of Taupo on New Zealand's North Island. (Photo credit: Wikipedia)

Studies of volcanic ash thought to have been transported at high latitudes in the Southern Hemisphere from a 25 thousand-year old major volcanic eruption on the North Island of New Zealand add volcanic activity to violent meteorological phenomena as a possible means of transport (Van Eaton, A.R. et al. 2013). High-flying diatoms: Widespread dispersal of microorganisms in an explosive volcanic eruption. *Geology*, v. 41, p. 1187-1190). Ash from as far as 850 km from the volcano turns out to incorporate abundant remains of diatoms – species of algae that secrete distinctively intricate skeletons made from silica. The volcano, Taupo, erupted from beneath a lake bed, explaining the diatoms' origin from lake muds and the water column itself. Even details of the organisms' soft parts and pigmentation are preserved in the ash, suggesting that at least some of them might have been transported alive. Astonishingly, the New Zealand authors' counts of organic material in the ash suggest that as much as 0.6 km³ of diatom remains were dispersed during the eruption.



Assorted species of diatoms on a microscope slide (credit: Wikipedia)

Violent sub-aqueous eruptions can entrain liquid water as spray as well as water vapour and glassy magma shards, carrying the mixture into the stratosphere, far above wind belts in the lower atmosphere. At such altitudes transport can spread fine aerosols through an entire hemisphere because they remain in suspension for long periods.

Different species of diatom live in subtly different environments, so that their relative proportions and presence or absence in ash

provide a ‘fingerprint’ for the volcano responsible. So the discovery by the team from the Victoria University of Wellington (a ‘first’) presents a new tool for identifying the source of ash layers in the volcanic record that came from other volcanoes associated with caldera lakes – common for those capable of launching huge volumes of material aloft, such as Toba that erupted in Sumatra at around 74 ka and may have influenced the first modern human migrants from Africa. But could minute organisms survive both the volcanic heat and blast and a traverse through the dry stratosphere to result in colonisation? If that were possible it would have significant implications for the spread of early life forms during the far more volcanically active Hadean and Archaean Eons of Earth’s history. Commenting on the article, Jennifer Pike of Cardiff University, UK (Pike, J. 2013. Of volcanoes and diatoms. *Geology*, v. **41**, p. 1199-2000) surmises that diatoms might survive drying out in the stratosphere, provided they were in the form of spores encased in silica. Such spores were not found in the Taupo ash, but who is to say that they will not be discovered in other ancient volcanic ash layers? Spores are extremely durable and other micro-organisms than diatoms produce them and have done in the past.

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An iconic early human skull

Posted on [October 23, 2013](#) by [Steve Drury](#) | [Leave a comment](#)

The earliest known human fossils outside of Africa were found at a site near Dmanisi in Georgia, between 1991 and 2005, following the discovery there in 1984 of primitive stone tools together with early Pleistocene animal bones. The Dmanisi finds occur with those of sabre-toothed cats and giant cheetahs, and so are probably not interments or in some kind of dwelling but were probably dragged into an underground carnivore den.



The five Dmanisi skulls of *Homo erectus georgicus* (credits; M.S. Ponce de Leon & P.E. Zollkofer, University of Zurich)

Initially the remains were assigned to a new species – *Homo georgicus* – but are now believed to be a subspecies of *H. erectus*. The finds are anatomically rich, with fossils of at least 5 individuals, both male and female, including 5 well-preserved skulls. Analysing them has been a long process. Details of the best preserved, indeed the most complete early *Homo* skull ever found, have taken 8 years since its discovery in 2005 to reach publication (Lordkipanidze, D. et al. 2013. A complete skull from Dmanisi, Georgia, and the evolutionary biology of early *Homo*. *Science*, v. **342**, p. 326-331, DOI: 10.1126/science.1238484).

To the surprise of palaeoanthropologists, this specimen of *Homo erectus georgicus* has some ape-like features, including a protruding upper jaw in a relatively large face that most resembles the oldest African *H. habilis*, from Ethiopia, dated at 2.3 Ma. With a braincase of 546 cm³, the skull is on the small side of *H. habilis* and in the range of late australopithecines. Yet, like the much younger *Homo floresiensis* – dubbed ‘the Hobbit’ – the association with tools, of the most basic Oldowan type, places it a cut above non-human hominins. The rest of the skeletal fossils show individuals with modern human proportions, albeit somewhat diminutive.

Surprises multiplied when comparative studies of all 5 skulls were complete. They are so different that, if found in widely separated specimens, would be placed in different species by most anatomists. Ruling out the chance association of several human species far from their Africa origins – few would suggest that up to 5 species left Africa at the same time and stuck together – a suggested explanation is that they represent a population of a human lineage in the process of evolving to a new species. The strength of this hypothesis contradicts the other recent view that several human species may have cohabited environments at different times. It also seems to throw into question the adoption of the name *H. erectus* for later human populations in both Africa and Eurasia: unless, as the authors tentatively suggest, there was genetic continuity and connectivity over large distances between both evolving populations

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An early oxygenated atmosphere

Posted on [October 9, 2013](#) by [Steve Drury](#) | [Leave a comment](#)

The Earth's earliest atmosphere undoubtedly had a chemistry dominated by carbon dioxide and nitrogen, together with transient water vapour, outgassed from volcanoes giving pervasive [reducing conditions](#) at the surface and in the oceans. Until the last couple of decades the only clear evidence of a switch to oxidising conditions and presumably significant atmospheric oxygen was direct, mineralogical evidence. The most obvious signs are ancient, reddened soils formed when soluble Fe²⁺ lost electrons to molecular oxygen to form the distinct red, orange and brown oxides and hydroxides of insoluble Fe³⁺ that impart a deep staining in even small quantities. Others include the disappearance from river-transported sediments of clearly transported grains of metal sulfides and uranium oxide that remain stable under reducing conditions but quickly break down in the presence of oxygen.

Widespread observations in Precambrian sediments, eventually linked with reliable radiometric ages, strongly suggested a fundamental environmental change at around 2.3 billion years ago: the [Great Oxidation Event](#). A few such signs emerge from somewhat older rocks back to 2.7 Ga, but only the 2.3 Ga event created a permanent feature of our home world; at first toxic to many of the prokaryote life forms of earlier times but eventually a prime condition for the rise of the Eukarya and eventually metazoan animals. Isotopic analysis of sulfur from Precambrian sediments also gave hints of a more complex but much debated transition because of the way S-isotopes fractionate under different environmental conditions. Now other indirect, isotopic approaches to redox conditions have become feasible, with a surprising result: powerful evidence that about 3 billion years ago there was appreciable atmospheric oxygen (Crowe, S.A. et al. 2013. Atmospheric oxygenation three billion years ago. *Nature*, v. **501**, p. 535-538).

The Danish-South African-German-Canadian group relied on a fractionation process among the isotopes of chromium, which can exist in several oxidation states. When minerals that contain Cr³⁺ are weathered under oxidising conditions to release soluble Cr⁶⁺ the loss in solution preferentially removes the ⁵³Cr isotope from residual soil. If the isotope enters groundwater with reducing conditions to precipitate some Cr³⁺-rich material yet more ⁵³Cr remains in solution. Eventually such enriched water may enter the oceans, where along with iron and other transition-group metal ions chromium can end up in banded iron formations (BIFs) to preserve isotopic evidence for oxidising conditions along its route from land to sea.



Banded iron formation (BIF) from the Precambrian of North America belonging to the National Museum of Mineralogy and Geology in Dresden, Germany. (credit: Wikipedia)

The team analysed both a palaeosol and a BIF unit from a stratigraphic sequence in the Achaean of NE South Africa that is between 2980 and 2924 Ma old. A substantial proportion of the palaeosol is depleted in ^{53}Cr whereas the lower part of the slightly younger BIF is significantly enriched. Changes in the concentration of redox sensitive elements, such as chromium itself, uranium and iron, in the two lithologies helps confirm the isotopic evidence for a major ~ 3 Ga oxidation event. It is possible to use the data to estimate what the atmospheric oxygen content might have been at that time: not enough to breathe, but significant at between 6×10^{-5} to 3×10^{-3} the atmospheric level at present. Oxygen can be produced abiogenically through irradiation of water vapour in the atmosphere as well as by organic photosynthesis. However, the first route seems incapable of yielding more than a billionth of present atmospheric concentrations, so the spotlight inevitably falls on a ‘much deep history’ of the action of blue-green bacteria (cyanobacteria) than hitherto suspected.

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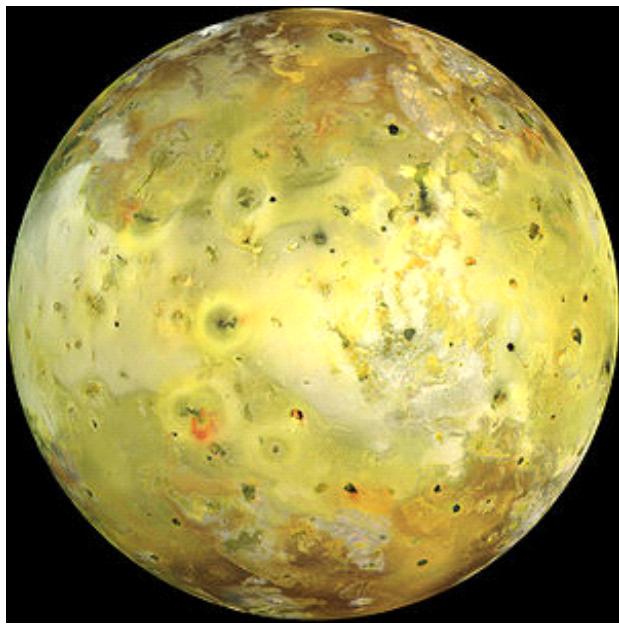
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Tectonics of the early Earth

Posted on [October 8, 2013](#) by [Steve Drury](#) | [1 Comment](#)

Tectonics on any rocky planet is an expression of the way heat is transferred from its deep interior to the surface to be lost by radiation to outer space. Radiative heat loss is vastly more efficient than either conduction or convection since the power emitted by a body is proportional to the fourth power of its absolute temperature. Unless it is superheated from outside by its star, a planet cannot stay molten at its surface for long because cooling by radiation releases all of the heat that makes its way to the surface. Any football supporter who has rushed to get a microwaved pie at half time will have learned this quickly: a cool crust can hide a damagingly hot centre.

Thermal power is delivered to a planet’s surface by convection deep down and conduction nearer the surface because rocks, both solid and molten, are almost opaque to radiation. The vigour of the outward flow of heat might seem to be related mainly to the amount of internal heat but it is also governed by limits imposed by temperature on the form of convection. Of the Inner Planets only Earth shows surface signs of deep convection in the form of plate tectonics driven mainly by the pull exerted by steep subduction of cool, dense slabs of old oceanic lithosphere. Only Jupiter’s moon [Io](#) shows comparable surface signs of inner dynamics, but in the form of immense volcanoes rather than lateral movements of slabs. Io has about 40 times the surface heat flow of Earth, thanks largely to huge tidal forces imposed by Jupiter. So it seems that a different mode of convection is needed to shift the tidal heat production; similar in many ways to Earth’s relatively puny and isolated hot spots and mantle plumes.



An analogy for the early Earth, Jupiter's moon Io is speckled with large active volcanoes; signs of vigorous internal heat transport but not of plate tectonics. Its colour is dominated by various forms of sulfur rather than mafic igneous rocks. (credit: Wikipedia)

Shortly after Earth's accretion it would have contained far more heat than now: gravitational energy of accretion itself; greater tidal heating from a close Moon and up to five times more from internal radioactive decay. The time at which plate tectonics can be deduced from evidence in ancient rocks has been disputed since the 1970s, but now an approach inspired by Io's behaviour approaches the issue from the opposite direction: what might have been the mode of Earth's heat transport shortly after accretion (Moore, W.B. & Webb, A.A.G. 2013. Heat-pipe Earth. *Nature*, v. **501**, p. 501-505). The two American geophysicists modelled Rayleigh-Bénard convection – multicelled convection akin to that of the 'heat pipes' inside Io – for a range of possible thermal conditions in the Hadean. The modelled planet, dominated by volcanic centres turned out to have some surprising properties.

The sheer efficiency of heat-pipe dominated heat transfer and radiative heat loss results in development of a thick cold lithosphere between the pipes, that advects surface material downwards. Decreasing the heat sources results in a 'flip' to convection very like plate tectonics. In itself, this notion of sudden shift from Rayleigh-Bénard convection to plate tectonics is not new – several Archaean specialists, including me, debated this in the late 1970s – but the convincing modelling is. The authors also assemble a plausible list of evidence for it from the Archaean geological record: the presence in pre- 3.2 Ga greenstone belts of abundant ultramafic lavas marking high fractions of mantle melting; the dome-trough structure of granite-greenstone terrains; granitic magmas formed by melting of wet mafic rocks at around 45 km depth, extending back to second-hand evidence from Hadean zircons preserved in much younger rocks. They dwell on the oldest sizeable terranes in West Greenland (the Itsaq gneiss complex), South Africa and Western Australia (Barberton and the Pilbara) as a plausible and tangible products of 'heat-pipe' tectonics. They suggest that the transition to plate-tectonic dominance was around 3.2 Ga, yet 'heat pipes' remain to the present in the form of plumes so nicely defined in the preceding item *Mantle structures beneath the central Pacific*.

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[Mantle structures beneath the central Pacific](#)

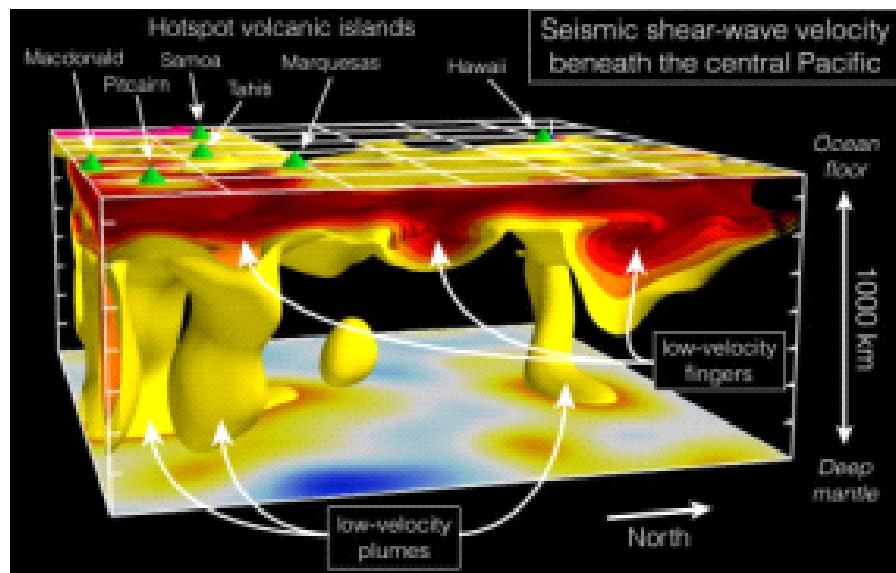
Posted on [September 26, 2013](#) by [Steve Drury](#) | [Leave a comment](#)

Since it first figured in Earth Pages 13 years ago [seismic tomography](#) has advanced steadily as regards the detail that can be shown and

the level of confidence in its accuracy: in the early days some geoscientists considered the results to be verging on the imaginary. There were indeed deficiencies, one being that a mantle plume which everyone believed to be present beneath Hawaii didn't show up on the first tomographic section through the central Pacific. Plumes are one of the forms likely to be taken by mantle heat convection, and many now believe that some of them emerge from great depths in the mantle, perhaps at its interface with the outer core.

The improvements in imaging deep structure stem mainly from increasingly sophisticated software and faster computers, the data being fed in being historic seismograph records from around the globe. The approach seeks out deviations in the speed of seismic waves from the mean at different depths beneath the Earth's surface. Decreases suggest lower strength and therefore hotter rocks while abnormally high speeds signify strong, cool parts of the mantle. The hotter mantle rock is the lower its density and the more likely it is to be rising, and vice versa.

Using state-of-the-art tomography to probe beneath the central Pacific is a natural strategy as the region contains a greater concentration of hot-spot related volcanic island chains than anywhere else and that is the focus of a US-French group of collaborators (French, S. et al. 2013. Waveform tomography reveals channelled flow at the base of the oceanic lithosphere. *Science*, v. **342**, 227-230; doi 10.1126/science.1241514). The authors first note the appearance on 2-D global maps for a depth of 250 km of elongate zones of low shear-strength mantle that approximately parallel the known directions of local absolute plate movement. The most clear of these occur beneath the Pacific hemisphere, strongly suggesting some kind of channelling of hot material by convection away from the East Pacific Rise.



Seismic tomographic model of the mantle beneath the central Pacific. Yellow to red colours represent increasingly low shear strength.
(credit: Global Seismology Group / Berkeley Seismological Laboratory)

Visually it is the three-dimensional models of the Pacific hot-spot 'swarm' that grab attention. These show the low velocity zone of the asthenosphere at depths of around 50 to 100 km, as predicted but with odd convolutions. Down to 1000 km is a zone of complexity with limb-like lobes of warm, low-strength mantle concentrated beneath the main island chains. That beneath the Hawaiian hot spot definitely has a plume-like shape but one curiously bent at depth, turning to the NW as it emerges from even deeper mantle then taking a knee-like bend to the east. Those beneath the hot spots of the west Pacific are more irregular but almost vertical. Just what kind of process the peculiarities represent in detail is not known, but it is almost certainly a reflection of complex forms taken by convection in a highly viscous medium.

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[Pushing back DNA sequencing: a Spanish cave bear](#)

Posted on September 25, 2013 by Steve Drury | [Leave a comment](#)

At the time, only 3 years ago, publication of the first full [Neanderthal genome](#) seemed miraculous. Yet the apparent magic proved repeatable, including for an obscure but distinct group of extinct humans – the [Denisovans](#) – known only from their DNA in a single pinkie bone. These advances astonished the world by showing that anatomically modern humans were capable of interbreeding with both groups; and did so that many people now living outside of Africa carry the genetic evidence. But the samples analysed for DNA were little more than 40 thousand years old. Older fossils of extinct animals have given up their genetic features, such as the wooly mammoth and a horse about 700 ka old, but only from samples frozen into permafrost at high northern latitudes.

The degradation of DNA over time seemed destined to limit palaeo-genetics, even when slowed down by natural freezing. The degradation breaks down any surviving genetic material into shorter and shorter fragments of the DNA molecule, ultimately to its atoms being recombined in new molecules of totally unrelated compounds through the chemical processes of fossilisation. Reassembling the fragments correctly becomes increasingly difficult the smaller they are. Few outside of a highly skilled specialists were optimistic of breaking the 100 ka barrier, even using frozen fossils. Unsurprisingly, having had such dramatic successes, the specialists continue to ride their luck and their ingenuity.



Excavations at Gran Dolina, in Atapuerca, Spain. (Photo credit: Wikipedia)

The cave complex of the [Atapuerca Mountains](#) in northern Spain, whose sediments range in age from almost a million years ago to recent times, contain rich accumulations of human remains, including the pre-Neanderthal [Homo heidelbergensis](#) and [H.](#)

antecessor dating back to more than 800 ka. If ever there was a magnet for archaeo-geneticists Atapuerca is definitely one. Moreover, physical anthropologists seem never to stop disputing their interpretations. Jesse Dabney of the now famous [Max Planck Institute for Evolutionary Anthropology](#) in Leipzig, Germany, and co-workers from Britain, New Zealand, Spain and Australia are now beginning to report results. The first are from a cave bear (probably *Ursos deningeri*) known to be older than 300 ka (Dabney, J. and 10 others 2013). Complete mitochondrial genome sequence of a Middle Pleistocene cave bear reconstructed from ultrashort DNA fragments in one of its foreleg bones. *Proceedings of the National Academy of Sciences*, v.**110**, doi/10.1073/pnas.1314445110). The bear's mitochondrial DNA was pieced together from fragments as small as 50 base pairs, and shows its ancestry to bears (*U. spelaeus*) from the later Pleistocene that became extinct at about 28 ka.



Reconstruction of a European cave bear (*Ursus spelaeus*) (credit: Wikipedia)

It may be only a matter of time before human DNA emerges from the rich Atapuerca fossil hoard; indeed the authors strongly hint that they are working on that now.

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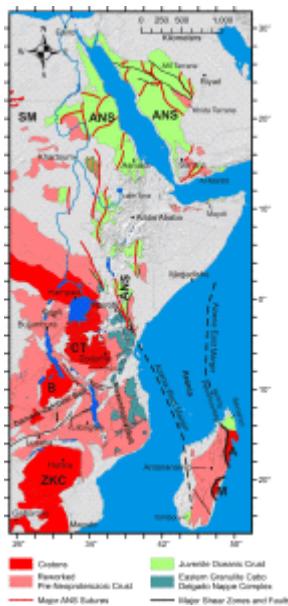
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[The East African Orogen: Neoproterozoic tectonics on display](#)

Posted on [September 19, 2013](#) by [Steve Drury](#) | [Leave a comment](#)

Over a period of about 300 Ma the fragmentation of a supercontinent, [Rodinia](#), drove a round of sea-floor spreading and continental drift that culminated in reassembly of the older continental pieces and entirely new crust in a new supercontinent, Gondwana. The largest source of evidence for this remarkable tectonic turnaround is a belt stretching N-S for over 3000 km from southern Israel through East Africa to Mozambique. At its widest the belt exposes [Neoproterozoic](#) rocks and structures for some 1700 km E-W from west of the Nile in northern Sudan almost to Riyadh in Saudi Arabia. This [Arabian-Nubian Shield](#) tapers southwards to thin out completely in northern Tanzania between far older cratons and in a state of high-grade metamorphism.

This East African Orogen has long been considered the best exposed bowels of former mountain building that there are: results of continent-continent collision and the bulldozing together of many oceanic arcs and remnants of oceanic lithosphere that once separated the cratons. This was much more complex than a case of head-on tectonics, the northward-swelling Arabian-Nubian Shield showing all the signs of being like a gigantic 'pip' squeezed out northwards from two cratonic jaws during the last stages of what is often called the [Pan African Orogeny](#). Interestingly, the line of the orogen is roughly followed by East Africa's other giant feature, the Rift Valley; actually two of them following Pan African terranes. A continental scale anisotropy has been reactivated and subject to extensional tectonics, and maybe in future a new round of sea-floor spreading as has begun in the Red Sea, some half a billion years after it formed.



Simplified geological map of the East African Orogen courtesy of the authors of Fritz et al 2013

Now there is an opportunity for anyone to download and read a digest of East African orogenic processes compiled by researchers from several countries along the belt and their colleagues from North America, Europe and Australia who have been privileged to work in this vast area (Fritz, H and 13 others 2013. [Orogen styles in the East African orogen: A review of the Neoproterozoic to Cambrian tectonic evolution. Journal of African Earth Sciences, v. 86, p. 65-106](#) Click on the link, scroll to the Open Access article to download the 12 Mb PDF version). The authors present superb simplified geological maps of each major part of the orogen, a vast array of references and well-written accounts of its sector-by-sector tectonic and metamorphic evolution, variations in style and broad tectonic setting.

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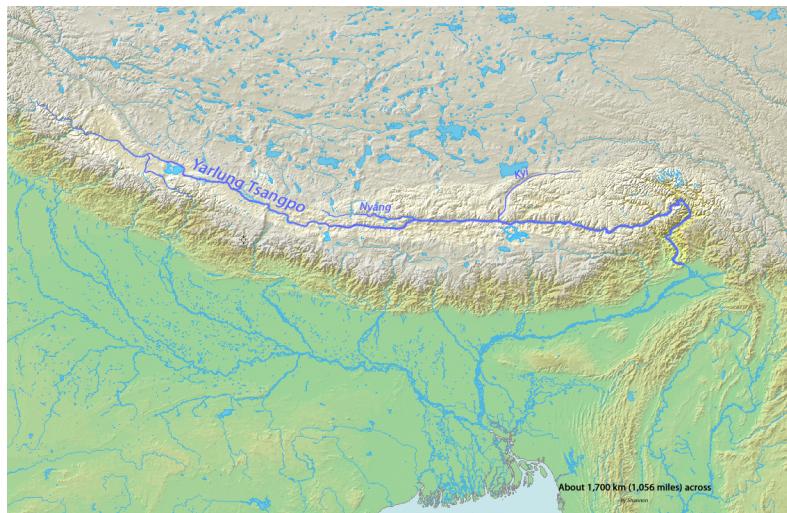
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[Explosive erosion in the Himalaya](#)

Posted on September 17, 2013 by Steve Drury | [Leave a comment](#)

As the Yalung-Tsangpo River on the northern flank of the Himalaya approaches a bend it rotates its flow by almost 180 degrees to become the Brahmaputra it enters one of the world's largest canyons. Over the 200 km length of the [Tsangpo Gorge](#) the river descends two kilometres between peaks that tower 7 km above sea level. Since the area is rising tectonically and as a result of the unloading that attends erosion, for the Tsangpo to have maintained its eastward flow it has been suggested that an average erosion rate of 3 to 5 km per million years was maintained continuously over the last 3 to 5 Ma. However, new information from the sediments downstream of the gorge suggests that much of the gorge's depth was cut during a series of sudden episodes (Lang, K.A. et al. 2013. Erosion of the Tsangpo Gorge by megafloods, Eastern Himalaya. *Geology*, v. 41, p. 1003-1006).



The Yarlung Tsangpo River watershed which drains the north slope of the Himalayas. (credit: Wikipedia)

It has become clear from a series of mountainside terraces that during the Pleistocene glaciers and debris from them often blocked the narrow valleys through which the river flowed along the northern flank of the Himalaya. Each blockage would have impounded enormous lakes upstream of the Tsangpo Gorge, containing up to 800 km^3 of water. Failure of the natural dams would have unleashed equally spectacular floods. The researchers from the University of Washington in Seattle examined the valley downstream of the gorge, to find unconsolidated sediments as much as 150 m above the present channel. They have similar grain size distributions to flood deposits laid down some 30 m above the channel by a flood unleashed in 2000 by the failure of a temporary dam caused by a landslide. The difference is that the higher level deposits are densely vegetated and have well-developed soils: they are almost certainly relics of far larger floods in the distant past from the lakes betrayed by the terraces above the Tsangpo Gorge.

By measuring the age of zircons found in the megaflood deposits using the U/Pb methods the team have been able to show that the sediments were derived mainly from 500 Ma crystalline basement in the Tsangpo Gorge itself rather than from the younger terranes in Tibet. There are four such deposits at separate elevations above the modern river below the gorge. Like the 2000 AD flood deposit, each terrace is capped by landslide debris suggesting that flooding and associated erosion destabilised the steep slopes so characteristic of the region. Because the valleys are so narrow (<200 m at the bottom), each flood would have been extremely deep, flows being of the order of a million cubic metres per second. The huge power would have been capable of moving blocks up to 18 m across with 1 m boulders being carried in suspension. It has been estimated that each of the floods would have been capable of removing material that would otherwise have taken up to 4000 years to erode at present rates of flow.

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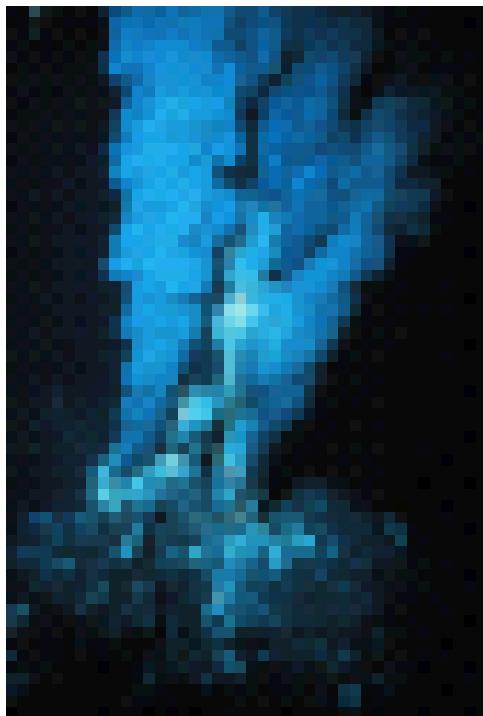
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Posted on [September 13, 2013](#) by [Steve Drury](#) | [1 Comment](#)



Hydrothermal vent at the mid-Atlantic Ridge (credit: Wikipedia)

Occasionally, journals not usually associated with mainstream geosciences publish something startling, but easily missed. *Nature* of 12 September 2013 alerted me to just such an oddity. It seems that the chemistry of sea-floor hydrothermal vents potentially can generate electrical power (Yamamoto, M. et al. 2013. Generation of electricity and illumination by an environmental fuel cell in deep-sea hydrothermal vents. *Angewandte Chemie*, online DOI: 10.1002/ange.201302704).

The team from the Japan Agency for Marine-Earth Science and Technology, the Riken Centre for Sustainable Resource Science and the University of Tokyo used a submersible ROV to suspend a fuel cell based on a platinum cathode and iridium anode in hydrothermal vents that emerge from the Okinawa Trough off southern Japan at a depth of over 1 km. It recorded a tiny, but significant power generation of a few milliwatts.

The fluids issuing from the vents are at over 300°C while seawater is around 4°C, creating a very high thermal gradient. More importantly, the fluid-seawater interface is also a boundary between geochemically very different conditions. The fluids are highly acidic (pH 4.8) compared with the slight alkalinity of seawater, and contain high concentrations of hydrogen and hydrogen sulfide but undetectable oxygen (sea water is slightly oxygenated).

The fuel cell was designed so that iridium in the anode speeds up the oxidation of H₂S at the geochemical interface which yields the electrons necessary in electrical currents. The experiment neatly signified its success by lighting up three light-emitting diodes. Does this herald entirely new means of renewable power generation? Perhaps, if the fuel cell is scaled-up enormously. Yet, the very basis of oxidation and reduction is expressed by the mnemonic OILRIG (Oxidation Is Loss Reduction Is Gain – of electrons) and any potential redox reaction in nature has potential, even plants can be electricity producers. In fact all fuel cells exploit oxidation reactions of one kind or another.

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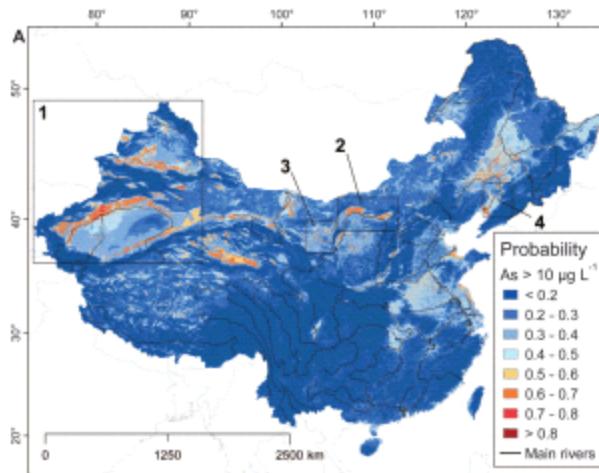
Estimating arsenic risks in China

Posted on September 4, 2013 by Steve Drury | 2 Comments

Two weeks after Earth pages featured [arsenic in groundwater below the Mekong Delta](#) another important paper has emerged about modelling risk of arsenic contamination throughout the People's Republic of China (Rodriguez-Lado, L. et al. 2013. Groundwater arsenic contamination throughout China. *Science*, v.341, p. 866-868). Scientists based in the Swiss Federal Institute of Aquatic Science and technology and the China Medical University follow up the results of geochemical testing of groundwater from almost 450 thousand wells in 12% of China's counties; part of a nationwide aim to test millions of wells. That is a programme likely to last for decades, and their work seeks to develop a predictive model that might better focus such an enormous effort and help in other large regions where well sampling is not so advanced.

As well as the well-known release of arsenic-containing ions through the dissolution of iron oxy-hydroxides in aquifers that exhibit reducing conditions, aridity that causes surface evaporation can create alkaline conditions in groundwater that also desorbs arsenic from similar minerals. The early results from China suggested 16 environmental factors available in digital map form, mainly geological, topographic and hydrogeochemical, that possibly encourage contamination; a clear indication of the sheer complexity of the problem.

Using GIS techniques these possible proxies were narrowed down to 8 that show significant correlation with arsenic levels above the WHO suggested maximum tolerable concentration of 10 micrograms per litre (10 parts per billion by volume). Geology (Holocene sediments are most likely sources), the texture of soils and their salinity, the potential wetness of soils predicted from topography and the density of surface streams carrying arsenic correlate positively with high well-water contamination, whereas slope, distance from streams and gravity (a measure of depth of sedimentary basins) show a negative correlation. These parameters form the basis for the predictive model and more than 2500 new arsenic measurements were used to validate the results of the analysis.



Estimated probability of arsenic in Chinese groundwater above the WHO acceptable maximum concentration (Credit: Rodriguez-Lado, et al. 2013)

The results graphically highlight possible high risk areas, mainly in the northern Chinese provinces that are partly confirmed by the validation. Using estimated variations in population density across the country the team discovered that as many as 19.6 million people may be affected by consumption of arsenic contaminated water. In fact if groundwater is used for irrigation, arsenic may also be ingested with locally grown food. It seems that the vast majority of Chinese people live outside the areas of risk, so that mitigating risk is likely to be more manageable than it is in Bangladesh and West Bengal.

As well as being an important input to environmental health management in the PRC the approach is appropriate for other large areas where direct water monitoring is less organised, such as Mongolia, Kazakhstan and Kyrgyzstan in central Asia, and in the arid regions of South America.

Related articles

- [New risk model sheds light on arsenic risk in China's groundwater\(phys.org\)](#)
- [New predictive method pinpoints arsenic hotspots \(terradaid.com\)](#)
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