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CONCURSOS

Inscrições para concurso do Observatório Nacional terminam dia 10 de agosto

Vagas para pesquisador, tecnologista e técnico.
As inscrições para o concurso público do Observatório Nacional podem ser feitas até o próximo dia 10 de agosto. Ao todo, são sete vagas para pesquisador, sete para tecnologista, e nove vagas para técnico.
Para pesquisador, os candidatos devem ter doutorado e as vagas são para a área de astronomia e geofísica. Para tecnologista, há vagas para a área de metrologia em tempo e frequência, geofísica e tecnologia da informação. Já para técnico, os candidatos devem ter formação em informática, mecânica, eletrônica ou mecatrônica.
Os editais foram publicados no Diário Oficial da União (DOU) no dia 4 de junho e estão disponíveis na página do ON na internet (http://www.on.br/concurso_2012/).
(Ascom do ON)

Concurso para tecnologista no LNCC

Termina no dia 24 de agosto o prazo para inscrições no concurso público para o cargo de tecnologista no Laboratório Nacional de Computação Cientifica (LNCC).
São duas vagas disponíveis. A primeira é para a área de Bioinformática para atividades como montagem, análise funcional e comparativa de genomas, metagenomas e transcriptomas.
A outra vaga é para a área de Biofísica Molecular Computacional para atividades de desenvolvimento de métodos e programas para previsão de estruturas de proteínas.
Mais informações estão disponíveis na página do LNCC www.lncc.br.
(Informações do Laboratório de Bioinformática do LNCC/MCTI)

Cetem abre inscrições para concurso

O Centro de Tecnologia Mineral (Cetem) oferece 16 vagas para pesquisadores, tecnologistas e técnicos. Interessados podem se inscrever até o dia 20 de agosto.
Estão abertas as inscrições para o concurso público do Centro de Tecnologia Mineral (Cetem). A unidade de pesquisa do Ministério da Ciência, Tecnologia e Inovação (MCTI) oferece 16 vagas de nível médio e superior.
O edital estabelece duas vagas de pesquisador e três de tecnologista e 11 de nível médio. Geólogos, engenheiros, químicos e físicos, além de profissionais de ciências biológicas e engenharia de bioprocessos podem se habilitar.

Os salários variam R$5.520,12 a R$ 10.350,93 para pesquisadores e tecnologistas de nível superior e de R$ 2.711,73 a R$ 4.473,73 para nível médio, nos dois casos considerando a titulação. A taxa de inscrição custa R$ 50 para função técnica e de R$ 120 para os demais cargos.
As inscrições podem ser realizadas via internet pelo site www.cetem.gov.br ou presencialmente no Cetem, das 9h às 16h, no Serviço de Recursos Humanos, localizado à Av. Pedro Calmon, 900 - Cidade Universitária - Rio de Janeiro. O edital está disponível no site do Cetem: www.cetem.gov.br.
(Ascom do Cetem)

CONGRESSOS E SIMPÓSIOS

2011 | 2012 | 2013 | 2014

2012

	JAN	FEV	MAR	ABR	MAI	JUN	JUL	AGO	SET	OUT	NOV	DEZ
Evento Regional												
19th International Symposium ICSOBA – International Committee for Study of Bauxite, Alumina & Aluminium										✓		
Evento Nacional												
46o Congresso Brasileiro de Geologia									✓			
XX CONGRESO GEOLÓGICO BOLIVIANO 2012										✓		
XIX SIMPÓSIO BRASILEIRO SOBRE PESQUISA ANTÁRTICA									✓			
Evento Internacional												
34th International Geological Congress - Austrália								✓				
XI CONGRESSO DE GEOQUÍMICA DOS PAÍSES DE LÍNGUA PORTUGUESA								✓				
III Jornadas del Cenozoico						✓						
"Geoanalysis"									✓			
South American Symposium on Isotope Geology							✓					
I Congresso Internacional "GeoCiências na CPLP"					✓							
19th International Symposium ICSOBA										✓		

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JORNAL DA CIENCIA

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2. Votação da MP do Código Florestal deve ficar para outubro, diz líder do governo no Senado
3. O futuro está na educação, artigo de Mozart Neves Ramos
4. Pesquisas acadêmicas têm continuidade durante greve das universidades federais
5. Especialistas discutem amanhã violência sexual contra a mulher em SP
6. A universidade brasileira e o caminho para crescer, artigo de Nagib Nassar
7. Andifes elege nova diretoria
8. Encerram amanhã inscrições para o Prêmio de Fotografia Ciência & Arte
9. Magnata cria prêmio e distribui US$ 27 milhões para nove pessoas
10. Coordenador do MCTI diz que tecnologia nacional precisa de infraestrutura
11. Setor de software e serviços cresceu 12% no País em 2011
12. Brasil repassa tecnologia agropecuária para países da África e América do Sul
13. Brasileira acusa chinesa de roubar códigos de software
14. Mais de 90% das cidades estão sem plano para o lixo
15. Fungos e aquecimento global, artigo de Fernando Reinach
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17. Livro do Cetem em inglês sobre biohidrometalurgia reúne cientistas de 10 países
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1. Atuação do Parlamento será fundamental para atingir objetivos da Rio+20
2. Entrevista sobre ciência na Amazônia
3. Monitoramento da Amazônia mostra nova redução no desmatamento
4. Reunião entre quilombolas de Rio dos Macacos e governo sobre posse de terra termina sem consenso
5. Carvão na encruzilhada: um insumo mineral sujo e poluente
6. Após dois anos, Prefeitura de São Paulo lança plano de resíduos sólidos sem metas

7. Inovações que mudaram a vida dos brasileiros
8. Brasil é 72º em ranking de inclusão digital
9. A revolução e o voto no Brasil, artigo de Octaciano Nogueira
10. Começam inscrições para Premio México de Ciência y Tecnologia 2012
11. CGEE assina novo acordo de cooperação com a Cepal para a realização de estudos focados em integração latino-americana em CT&I
12. Secretário-Geral da ONU nomeia brasileira para Painel de Alto Nível sobre a Agenda de Desenvolvimento Pós-2015
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14. Ciência sem Fronteiras abre novas chamadas graduação sanduíche em sete países
15. Estudantes brasileiros conquistam medalhas de ouro, prata e bronze na Bulgária
16. Brasileiro ganha ouro em Olimpíada Internacional de Física
17. Antigo cemitério clandestino ou arqueológico? Artigo de Audemário Prazeres
18. Inscrições para concurso do Observatório Nacional terminam dia 10 de agosto
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Edição 4551 - Notícias de C&T - Serviço da SBPC

1. Ministério da Educação lança manual sobre redação do Enem
2. Comissão especial vai propor um novo modelo para o ensino médio no País
3. Projeto proíbe uso de animais em pesquisas se houver sofrimento
4. Escolha de reitores nas Universidades Públicas, artigo de José Antônio Aleixo da Silva
5. CNPq e INPI discutem a Open Innovation e os desafios para o País
6. Mais de cem pessoas realizam treinamento do Portal de Periódicos durante a 64ª Reunião Anual da SBPC
7. Internautas navegam pela Amazônia
8. Ministério da Saúde lançará nova chamada do Pós-Doc SUS
9. Após ampliar aporte para a energia eólica, BNDES foca a solar
10. Micro e pequenas empresas discutem assistência tecnológica
11. Incubadoras selecionam novos projetos
12. O anteprojeto do novo Código Penal, artigo de Marcelo Leonardo
13. Com expansão, formação de professores é prioridade para universidades
14. Primeiro transplante de ovário do País é realizado no Paraná
15. A Literatura de Cordel e os Horizontes Inovadores para a Escolarização do Leitor, artigo de Silvio Profirio da Silva
16. Inscrições para Prêmio Finep Jovem Inovador 2012 estão abertas
17. "Poética das ruas" é tema da próxima edição do 'Ciência às Seis e Meia'
18. Inscrições para concurso do Inpa vão até 10 de agosto
19. 3ª Escola Latino Americana de Educação, Ciências Neurais e Cognitivas

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1. 25 mil pessoas participaram da Reunião Anual da SBPC no Maranhão
2. 'Toda iniciativa para a educação é válida'
3. SBPC reitera críticas aos cortes no orçamento para ciência, tecnologia e inovação
4. Otávio Velho defende questionamento do eurocentrismo que marca o pensamento brasileiro
5. A história social das ciências, populações locais e saberes ganha destaque no último dia da 64ª Reunião Anual da SBPC
6. Ciência: mais perguntas que respostas, artigo de Eloi S. Garcia
7. Projeto no Senado dobra cotas em federais
8. Um desvio preocupante, artigo de Hermer Ferreira Figueiredo
9. Dilma sanciona lei que troca dívida das universidades por bolsas do ProUni
10. Brasil ainda tem 1 milhão sem escola
11. Salário nivelado pode engessar qualidade universitária no País
12. Professor é quem mais influencia leitores
13. Parceiros europeus do Ciência sem Fronteiras realizam mesa redonda na 64ª Reunião Anual da SBPC
14. Técnicos do ICMBio protestam contra usinas no Tapajós
15. Nobel defende taxa para enfrentar a Aids
16. Nosso verão de verdade climática, artigo de Jeffrey Sachs
17. Inpe doa mapa de São Luís à Base de Alcântara
18. Brasil é ouro e prata na Olimpíada de Matemática da Comunidade dos Países de Língua Portuguesa
19. Cetem abre inscrições para concurso

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1. Diretoria da SBPC avalia 64ª Reunião Anual como um sucesso
2. TCU não só fiscaliza, mas também atua de forma preventiva para melhorar a eficiência da gestão pública
3. Os biomas do Maranhão e a Mata Atlântica: ameaças e perspectivas
4. Uma leitura de antropólogos e sociólogos sobre o futuro da Amazônia
5. Resistência à Belo Monte impede Xingu de participar da 64ª Reunião Anual da SBPC
6. Melatonina, o hormônio do escuro
7. Ciência e cultura, o que elas têm em comum?
8. Coordenadores dos INCTs, Pibic e Pibiti discutem seus programas durante a Reunião Anual da SBPC
9. 'Sou um missionário da ciência'
10. Inep vai investir R$ 2 milhões em estudos sobre a correção da redação do Enem
11. Finep anuncia pacote de R$ 1,2 bi com recursos da Subvenção Econômica
12. Morre um dos maiores pesquisadores da área de Economia Política da Comunicação
13. Ciência, tecnologia e ainda a vaca, artigo de Paulo Cesar Soares
14. Vacina contra dengue tem êxito em teste

15. O que pode levar a uma cidade sustentável? Artigo Washington Novaes
16. Lançamento de minifoguetes aguça curiosidade do público
17. Brasil sedia Olimpíada Internacional de Astronomia pela primeira vez
18. Tome Ciência: Esporte tem ciência
19. Departamento de Química da Unicamp abre concurso para professor

AMBIENTE BRASIL

Com 5 meses de atraso, conselho do 'Fundo verde' da ONU vai se reunir

Reunião vai ocorrer entre os dias 23 e 25 de agosto, afirma entidade. Fundo deveria canalizar até US$ 100 bilhões, mas ficou sem recursos.

Desmatamento na Amazônia cai 23% em 12 meses

Com isso, quase 700 quilômetros quadrados foram poupados na comparação entre os períodos avaliados.

Gelo da Groenlândia é menos vulnerável ao aquecimento global do que se temia

Pesquisador da Universidade de Copenhague questiona previsões sobre degelo no Polo Norte e afirma que ainda é muito cedo para proclamar "apocalipse pela mudança climática".

Justiça de SP determina multa para supermercado que não fornecer sacolinha

Os supermercados paulistas que não fornecerem sacolinhas ou embalagens de papel ou de material biodegradável gratuitas aos clientes e em quantidade suficiente poderão ser multados em até R$ 20 mil por dia e por ponto de venda.

Estudo revela que poluição da Ásia contamina EUA e Canadá

Aproximadamente a metade das partículas de aerossol na América do Norte provém de fontes de fora da região e a maioria é poeira de origem natural, ao invés da produzida pela queima de carvão ou outros combustíveis fósseis, destacou a pesquisa publicada na revista Science.

Governo busca consenso na disputa entre Marinha e quilombolas na Bahia

Desde 2010, a Marinha pretende ampliar as instalações da base, onde residem 450 famílias de militares. No entanto, de acordo com o governo, a Marinha recuou na reivindicação e aceita ceder aos quilombolas parte do terreno onde está instalada a vila militar.

Facebook prioriza energia sem emissões para cumprir meta em 2015

Em 2014 empresa terá central de processamento de dados na Suécia. Fontes renováveis devem representar 25% da energia consumida até 2015.

Rio Grande do Sul registra mais quatro mortes pelo vírus Influenza H1N1, mas vê tendência de queda

Na Região Sul, cujo clima frio facilita a circulação do vírus, as 157 vítimas da doença neste ano equivalem a 19,9% das 789 mortes ocorridas em 2009.

Estudo americano prevê demanda maior por voos espaciais comerciais

Viagens privadas devem movimentar até R$ 3,2 bi numa década, diz texto. Preços variam de R$ 195 mil a R$ 410 mi, por segundos de contemplação.

Antártica já teve palmeiras e temperaturas subtropicais, dizem cientistas

Especialistas dizem que período que registrou forte aquecimento pode ajudar a entender momento atual da Terra.

Fóssil completo de inseto com 365 milhões de anos é descoberto

Animal viveu no período geológico Devoniano, da era Paleozoica. Resultados de estudo francês estão publicados na revista 'Nature'.

Biólogo encontra novo anfíbio em área de Mata Atlântica, no Paraná

Espécie foi descoberta em reserva da região de Guaraqueçaba. Batizado de 'Brachycephalus tridactylus', anuro tem apenas três dedos.

Governo quer votar e colocar Código Florestal em prática, diz ministra

Izabella Teixeira, do Meio Ambiente, pede apoio da sociedade ao projeto. MP deve passar pelo Congresso até 8 de outubro ou perde a eficácia.

Nova espécie de dinossauro é encontrada no Maranhão

Animal possuía cerca de 3 metros e idade estimada em 95 milhões de anos. Fósseis de réptil foram encontrados por cientistas da UFRJ e da UFMA.

Norte e Nordeste sofreram menos com pandemia de gripe A, diz estudo

Cientistas brasileiros e do exterior analisaram mortes de 1996 a 2010. Pesquisa desafia a ideia de que vírus 'influenza' é mais mortal nos trópicos.

Norte-coreanos precisam de água potável de maneira urgente, diz ONU

Inundações contaminaram reservas de água, causando risco de epidemias. 119 pessoas morreram e foram registrados danos graves à agricultura.

ONU escolhe latino-americanas para planos de desenvolvimento

A missão do grupo é assessorar a identificação de um novo plano internacional que supra os Objetivos de Desenvolvimento do Milênio, estipulados em 2000 e que deveriam ser cumpridos até 2015.

Vegetais e oceanos absorvem mais CO2, segundo estudo

Segundo os cientistas, esta absorção dobrou em cinquenta anos, passando de 2,4 bilhões de toneladas anuais de carbono em 1960 a 5 bilhões em 2010.

Quase 70% dos casos de H1N1 que evoluiram para óbito em SP ocorreram em pacientes com fator de risco

Para os outros tipos de vírus da gripe, foram registrados no estado, em 2012, 102 casos graves do Influenza A H3N2 sazonal e três casos para Influenza B sazonal. Ao todo, 11 óbitos foram registrados em 2012 causados pelos dois vírus.

Internautas navegam pela Amazônia

Atlas inclui principais atividades produtivas da região, empreendimentos de infraestrutura, áreas protegidas, clima e tipos de solo, entre outras informações.

Baleia de 30 toneladas é encontrada morta em praia australiana

Ainda não se sabe o motivo da morte do animal que deve ter sido levado até a praia pelas fortes ondas.

Reintrodução de leões criados em cativeiro fracassa na África, diz estudo

Para cientistas, felinos de cativeiro não sobrevivem em áreas selvagens. Ações de libertação são chamadas de 'comerciais' e 'mito' pela pesquisa.

MP-ES vai investigar a qualidade de sacolas biodegradáveis

Teste mostra que sacolas não se decompõem em 180 dias. Plástico comum, oxibiodegradável e biodegradável foram enterrados.

Justiça concede 30 dias para que não-índios deixem reserva xavante em Mato Grosso

A Justiça Federal em Mato Grosso aprovou o plano da Funai para retirar da Terra Indígena Xavante-Marãiwatsédé, no nordeste do Mato Grosso, um número ainda incerto de não-índios que vivem na área há décadas.

Nove homens são presos suspeitos de participar de rinha de galo em GO

Suspeitos foram detidos e podem responder por maus tratos a animais. Polícia Militar de Luziânia chegou ao local por meio de denúncia anônima.

Reunião entre quilombolas de Rio dos Macacos e governo sobre posse de terra termina sem consenso
Ulianópolis/PA deixa a lista de desmatadores da Amazônia

Segundo o MMA, a adesão de cerca de 80% dos imóveis rurais do município no Cadastro Ambiental Rural foi uma das principais razões para a cidade paraense conseguir sair da lista de desmatadores da Amazônia.

Baleia ameaçada de extinção possui 60 tipos de cantos diferentes

'Músicas' destes animais os aproximam dos pássaros, afirma pesquisa. Cientistas gravaram cinco meses de cantos das baleias-da-groenlândia.

Secretaria de Saúde de MG confirma 21 mortes por H1N1 em 2012

Segundo boletim, 52 casos foram confirmados. Maior número de mortes foi registrado na faixa etária de 40 a 49 anos.

Múmias egípcias de museu do Reino Unido são escaneadas por cientistas

Sete múmias de 900 a.C. passaram por exames de ressonância magnética. Objetivo é saber como viveram essas pessoas na antiguidade.

Golfinhos encantam turistas e moradores na Praia de Iracema, no CE

Turista baiana flagrou passeio de golfinhos no mar de Fortaleza. Segundo especialistas, espécie habita a costa da capital cearense.

Estudo identifica tomate tolerante à contaminação por cádmio

Pesquisa feita na Esalq-USP avaliou grande número de cultivares e induziu mutações nas plantas para selecionar tomateiro resistente ao metal pesado.

Uso de energia solar e eólica pode ter incentivo fiscal

O projeto, apresentado na Câmara dos Deputados, beneficia pessoas jurídicas e físicas, e abrange instalações com capacidade instalada de até mil quilowatts.

Pará já tem mais de 9 mil casos confirmados de dengue em 2012

Apesar de alto, a secretaria de Saúde negou que haja indicação de surto de dengue no Pará.

Estudos indicam importância de tipo de células-tronco no câncer

Frequentemente, um tumor que desapareceu do corpo volta meses depois. Alguns pesquisadores acreditam que isso seja causado por um tipo raro de células que consegue sobreviver à radio e à quimioterapia e acaba por formar esses novos tumores meses ou até anos depois.

Ministra diz que monitoramento da Amazônia mostra nova redução no desmatamento

Dois dias antes da divulgação oficial dos dados mensais de monitoramento da maior floresta tropical do planeta, a ministra disse que, apesar de o balanço geral do desmatamento registrado entre 2011 e 2012 ser favorável, os dados também apontam a necessidade de melhoria das ações de controle.

Robô nadador criado por cientistas japoneses pode ajudar a salvar vidas

'Swumanoid' poderia ser usado para patrulhar costa e socorrer banhistas. Nadadores e roupas de banho também seriam beneficiados, dizem autores.

Indústria de Cubatão/SP planta árvores para homenagear os funcionários

Projeto foi proposto por um funcionário que levou a ideia para a direção. Mais de 1000 árvores já foram plantadas pelo nascimento de crianças.

Pesquisa da USP usa radiação para deixar mosquito da dengue estéril

Os pesquisadores jogam radiação na pupa, como é chamada a fase jovem do inseto, tornando o macho estéril. Com uma baixa dosagem de radiação gama, que tem como fonte o Cobalto 60, o inseto macho fica incapaz de fecundar a fêmea.

Polícia Federal investiga caso dos reféns de índios em Belo Monte

Funcionários da Norte Energia foram mantidos reféns durante cinco dias por índios das etnias Juruna e Arara na Aldeia Maratu, no Pará.

Novo vírus de gripe mata focas bebês e pode ameaçar humanos

A nova cepa recebeu o nome de avian H3N8 e é apontada como responsável pelas mortes de 162 focas ao longo da costa americana em 2011.

Paul McCartney se une a luta para salvar elefante maltratado na Índia

Ex-beatle pediu para ministro do país libertar animal de cativeiro. Cantor já defendeu fim do uso de bichos em testes de cosméticos.

Anfíbio com formato de cobra é descoberto no Rio Madeira, em RO

Animal raro foi encontrado por biológos em canteiro de obras de usina. Exemplares estão no Museu Emilio Goeldi, no Pará.

Universidades de Brasil e Espanha assinam convênio para pesquisa

11 universidades fundaram a Rede Salamanca de Universidades Brasileiras para aumentar a mobilidade de estudantes, docentes e pesquisadores e impulsionar a criação de duplas ou múltiplas titulações.

Filhote de lobo guará é resgatado em Goiás

Animal foi encontrado em uma propriedade rural em Inhumas.

Fazendeiros recorrem à Justiça contra demarcação de terra xavante em Mato Grosso

A reserva indígena abrange 165.241 hectares (1 hectare equivale a aproximadamente um campo de futebol oficial) dos municípios de Alto Boa Vista, Bom Jesus do Araguaia e São Félix do Araguaia.

Dinossauros foram extintos de uma só vez, aponta estudo espanhol

Fóssil encontrado nos Pirineus mostrou indícios sobre extinção de animais. Teoria contesta estudo que tratava fim dos dinossauros como

gradual.

Alto nível de cafeína é identificado em mar da costa dos EUA, diz pesquisa

Estudo encontrou concentração de substância no litoral do estado do Oregon. Cafeína é normalmente achada em trechos de água doce, dizem cientistas.

Cientistas ingleses convocam bebês para estudar evolução do autismo

Universidade de Durham procura crianças de até dois meses e meio. Testes serão indolores e não invasivos, acompanhados pelos pais.

Indonésia liberta 85 pangolins que seriam contrabandeados

Controladores de pragas, animais são encontrados na Ásia e África. Entre os exemplares resgatados havia filhotes.

Peixes-boi órfãos serão devolvidos à natureza no Amazonas

Animais estavam sob os cuidados do Instituto Mamirauá. Esta é a primeira vez em 12 anos que evento do tipo acontece no AM.

Cinco bandeiras dos EUA continuam inteiras na Lua após 40 anos

Missões Apollo fincaram seis bandeiras na superfície lunar. Uma delas, a primeira, caiu durante a decolagem da Apollo 11.

Cientista cético admite que homem causou mudanças climáticas

Richard Muller mudou posição e reconheceu que ação humana afeta clima. Pesquisa vai levar em conta temperatura oceânica, dizem pesquisadores.

UFRJ transforma o bagaço de cana em fibra de carbono

Hoje, o bagaço da cana-de-açúcar é o principal resíduo do agronegócio brasileiro. Uma tonelada da planta usada para fazer etanol produz, em média, 140 kg de bagaço.

Cultura humana de caça e coleta começou há 44 mil anos, diz estudo

Pesquisa analisou artefatos dos povos primitivos San, da África do Sul. Aplicador com veneno e mistura de cera de abelha estão entre os achados.

Plano em Alagoas prevê medidas para salvar ave com risco de extinção

Ministério Público e ONG querem preservar o mutum-de-alagoas. Exemplares do animal foram levados para área de preservação em MG.

Seca nos EUA entre 2000 e 2004 foi a pior em 800 anos, afirma estudo

Cientistas dizem que estiagens graves ocorrerão mais vezes neste século. Investigação foi publicada nesta fim de semana na revista 'Nature'.

MPF/PA recomenda ao Ibama e Funai providências para garantir navegação no Xingu

Falta de respostas para o problema motivou protesto indígena em que funcionários da Norte Energia, a construtora de Belo Monte, foram impedidos de deixar aldeia.

Dilma e ministros passaram três semanas 'trancados' com Código

Izabella Teixeira contou a Jô Soares como foi análise do Código Florestal. Ministra do Meio Ambiente adiantou que desmatamento da Amazônia caiu.

Coreia do Norte pede ajuda à ONU por causa de enchentes

Chuva destruiu lavouras e agravou a situação de escassez de alimentos. Quase 90 pessoas já morreram desde a semana passada.

Região Sul registra 153 mortes de pacientes com o vírus H1N1

O Paraná contabiliza 986 casos da doença confirmados em laboratório desde janeiro; Santa Catarina, 741 e o Rio Grande do Sul, 383.

China quer pousar sonda na lua em 2013

Programa espacial chinês quer priorizar pesquisas sobre a superfície lunar já no ano que vem.

Cientistas descobrem 'cupins-bomba camicases' na Guiana Francesa

À medida que envelhecem e se tornam menos capazes de cumprir as tarefas do dia a dia, os insetos desse grupo começam a armazenar cristais sólidos que produzem uma reação química quando misturados com outras secreções do animal.

Exposição 'Vida Marinha' revela belezas dos oceanos

Durante o mês de agosto, mais de 30 imagens do fotógrafo e mergulhador Ary Amarante estarão expostas na mostra Vida Marinha, no Aquário de São Paulo.

Projeto Orla capacita instrutores

Há 400 municípios litorâneos no país, dos quais 80 participam do programa, que é de caráter nacional. MMA pretende ampliar o número de adesões.

Más condições ambientais atingem 77% das famílias chinesas, diz estudo

Pessoas expostas à poluição têm mais atitudes ecológicas, afirma pesquisa. Mais de 70% dos entrevistados dizem reutilizar sacolas de supermercado.

Ação conjunta na Amazônia

MMA reúne governos para desenvolver trabalho coordenado em toda a região. Objetivo é reduzir, ainda mais, os índices de desmatamento.

Zoológicos dos EUA investem na reprodução de animais ameaçados

Iniciativas chegam a receber investimentos de até US$ 350 mil ao ano. Apesar do gasto, 83% das espécies não atingem metas de reprodução.

Caverna revela registros antigos de animais domésticos

Sítio arqueológico na Namíbia contém ossos de cabra e carneiro de cerca de 2000 anos, os mais antigos encontrados até agora na África subsaariana.

Há 30 anos, estação Salyut 6 queimava na reentrada na Terra

Lançada em 1976, a estação especial soviética Salyut 6 foi um marco.

Amazônia Sem Fogo no Equador

Brasil ajudará na capacitação de líderes comunitários, produtores rurais e técnicos envolvidos com a questão ambiental, com o intuito de reduzir o fenômeno dos incêndios florestais.

Cientistas brasileiros retornam ao País, mas pedem infraestrutura

Segundo um levantamento realizado com mais de 17 mil cientistas de 16 países pelo Bureau Nacional de Pesquisa Econômica dos Estados Unidos em áreas como biologia e ciências da terra, o número de pesquisadores brasileiros que deixam o País definitivamente é de cerca de 5%.

Gafanhotos estressados pioram a qualidade do solo, diz pesquisa

Os pesquisadores afirmam que um dos fatores que mais contribuem para o desenvolvimento de estresse nos gafanhotos é a grande presença exagerada no seu habitat de aranhas, inimigas naturais do inseto.

Expansão do biogás só depende de estímulos do governo

As pesquisas já apontam que o combustível tem potencial para dividir espaço, em grau de importância estratégica para o setor, com o etanol e o biodiesel.

Cientistas estudam semelhanças geológicas entre África e América do Sul

Segundo o professor da USP Miguel Basei, coordenador do estudo no Brasil, foi possível definir numerosos locais do Oeste da África que, ao redor de 500 milhões de anos atrás, estavam unidos a seus congêneres sul-americanos.

Simpósio em São Pedro/SP discute como melhorar a gestão hídrica

Evento vai reunir especialistas e políticos dos municípios das Bacias dos Rios Piracicaba, Capivari e Jundiaí.

Cenários de mudanças não ajudam o equilíbrio da matriz energética

Além de garantir a manutenção de sistemas, como o de produção de energia eólica e solar, os pesquisadores buscam novas fontes que poderiam complementar essa oferta para atender a crescente demanda do setor.

Russos tentam descobrir se cangurus são canhotos ou destros

Pesquisador diz que sabe-se muito poucos sobre esses animais e vai à Tasmânia colher informações. Um professor acredita que a pesquisa vai ajudar a entender como seres humanos usam as mãos.

Ativistas japoneses protestam contra política nuclear em Tóquio

Eles exigem que país abandone a forma de energia. Governo anunciou em junho reativação de dois reatores nucleares.

Cargueiro russo consegue se acoplar à Estação Espacial Internacional

Uma falha impediu o procedimento na última terça-feira. O Progress M-15M ficará enganchado à ISS até segunda-feira.

Número recorde de baleias-francas é visto no litoral de Santa Catarina

103 animais foram monitorados pelo sobrevoos do Projeto Baleia Franca. Entre as baleias, foi visto um filhote albino, ocorrência rara na espécie.

Vacina contra dengue tem êxito em teste

Em um teste clínico com mais de 4.000 pacientes na Tailândia, uma vacina experimental produzida pela farmacêutica francesa Sanofi Pasteur conseguiu se mostrar eficiente contra três dos quatro sorotipos da dengue.

Governo propõe conceder parte de terreno da Marinha para quilombolas

Desde 2010, membros da comunidade e da Marinha disputam na Justiça a área conhecida como Barragem dos Macacos.

ANP e Chevron se reunirão para discutir retomada da produção

Reunião deverá ocorrer na próxima semana, anunciou a ANP. Chevron tem que entregar cronograma e ANP terá 30 dias para decidir.

Astronauta vai comandar programa de rádio direto da Estação Espacial

Joe Acaba vai falar sobre as experiências a bordo do laboratório no programa que estreia no dia 3 de agosto.

Universidade de Berkeley cria laser de 1 quadrilhão de watts

Segundo os cientistas, o equipamento consome pouca energia, já que os pulsos são muito curtos.

ONG de Piracicaba cria book de fotos de cachorros para adoção à distância

Animais podem ser adotados pela internet, pelo Facebook ou por e-mail. 'Padrinho' pode alimentar, escovar, dar banho e passear com o 'afilhado'.

Curiosos atrapalham resgate de baleia em praia da Indonésia

Mamífero está encalhado na região de Java desde a última quarta-feira. Barcos de moradores circulam pela área e dificultam esforços.

Polêmica da sacolinha plástica vai parar nas Olimpíadas

Apoiada por personalidades como o magnata Richard Branson, o ator Jeff Bridges e a estilista Vivienne Westwood, campanha pede para a visitantes de Londres rejeitarem embalagens plásticas.

Abaixo-assinado feito na SBPC pede mais dinheiro para pesquisa científica

Reunião anual termina nesta sexta-feira, em São Luis, no Maranhão. Presidente da entidade quer mais verbas para a educação no Brasil.

Chuva de meteoros poderá ser vista neste fim de semana

Fenômeno terá seu ápice às quatro horas da manhã do domingo, quando estima-se que caiam 20 meteoros por hora.

Reunião sobre comércio de espécies selvagens aprova sanções a 7 países

Para evitá-las, eles terão de aprovar leis e apresentar relatórios. Encontro mundial sobre esse tipo de negócio acontece na Suíça.

Cientistas descobrem falha subglacial que contribui para degelo antártico

Os cientistas acreditam que uma retração do manto de gelo da Antártica Ocidental seja responsável por cerca de 10% da elevação do nível do mar provocada pelas mudanças climáticas, que se não for controlada ameaça inundar muitas cidades litorâneas em algumas gerações.

IPT terá planta piloto para gaseificação de biomassa

Projeto conceitual de planta industrial de gaseificação com capacidade de processar 400 mil toneladas anuais de bagaço e palha de cana-de-açúcar será instalada em Piracicaba (SP).

Lobo-marinho aparece na praia de Boiçucanga, em São Sebastião/SP

Animal apareceu por volta das 7h desta sexta e aparentava muito cansaço. Local onde o mamífero estava foi isolado pela Defesa Civil da cidade.

24 / 07 / 2012 **Trepadeiras nas fachadas podem diminuir poluição nas cidades em até 30%**

Estudo mostra que uso de plantas em paredes externas cria corredores verdes nas cidades que podem ser mais eficientes que iniciativas tradicionais.

23 / 07 / 2012 **Maior parte dos estados e municípios não tem Plano de Gestão de Resíduos Sólidos**

A partir de 2 de agosto, a cidade que não tiver o planejamento fica impedida de solicitar recursos federais para limpeza urbana.

23 / 07 / 2012 **Coleta de lixo tóxico ainda é desafio para o Brasil**

Os cidadãos ainda dispõem de poucos locais adequados para jogar fora pilhas e baterias; pneus; lâmpadas fluorescentes e embalagens de óleo lubrificante e de agrotóxicos.

23 / 07 / 2012 **Brasil contrata Exército dos EUA para planejar hidrovia no São Francisco**

Codevasf pagará R$ 7,8 milhões por projetos para navegabilidade do rio. Exército brasileiro diz não ver risco para a segurança nacional.

27 / 07 / 2012 **Especialistas alertam para ameaças de mudanças climáticas extremas**

De autoestradas no Texas a centrais nucleares em Illinois, o concreto, o aço e a engenharia sofisticada que sustentam a infraestrutura dos Estados Unidos estão em risco por causa da seca, do calor e das tempestades que atingem o País.

28 / 07 / 2012 **Chuva de meteoros poderá ser vista neste fim de semana**

Fenômeno terá seu ápice às quatro horas da manhã do domingo, quando estima-se que caiam 20 meteoros por hora.

26 / 07 / 2012 **Biodiversidade cai em metade das florestas tropicais, aponta estudo**

Análise publicada na revista 'Nature' avaliou 60 reservas em 20 a 30 anos. Perturbação do habitat, caça e exploração são maiores fatores para declínio.

26 / 07 / 2012 **Ibama reavalia uso de quatro tipos de agrotóxico e sua relação com o desaparecimento de abelhas no país**

Além de reduzir as formas de aplicação desses produtos, que não podem ser mais disseminados via aérea, o órgão ambiental iniciou o processo de reavaliação das substâncias imidacloprido, tiametoxam, clotianidina e fipronil.

24 / 07 / 2012 **Poli aponta solução para descarte de esgoto no mar de Santos**

Sistema diminui concentração de fósforo no oceano, responsável por prejuízos à fauna e à população local.

26 / 07 / 2012 **Fruta amazônica possui mais Vitamina C que a laranja**

Há 2 mil hectares de plantações de camu-camu em SP, diz pesquisador. Brasil ainda não possui patente do fruto rico em vitamina C.

25 / 07 / 2012 **EUA defendem plano ambiental global para reduzir poluição do ar**

Americanos querem diminuir fuligem e evitar impacto da mudança climática. Ação ambiental liderada pelo país conta com outros 19 governos.

25 / 07 / 2012 **Satélites registram degelo recorde na superfície da Groenlândia**

Nasa estima que 97% da camada superior de gelo chegou a derreter. Índice é tão alto que especialista da agência questionou se era real.

25 / 07 / 2012 **Migração do 'homo sapiens' causou extinção dos neandertais, diz estudo**

Homem moderno teria sido ameaça maior que mudança climática. Análise foi feita a partir de restos de cinzas vulcânicas coletadas.

23 / 07 / 2012 **Emissões de dióxido de carbono em 2011 aumentaram 3%, aponta estudo**

Atividades humanas liberam gás na atmosfera e causam mudança climática. China teve alta de 9% e chegou a patamar similar ao da União Europeia.

23 / 07 / 2012 **Geocientistas acham reservatório natural de água limpa na Namíbia**

Batizado de Ohangwena 2, o aquífero de 2.800 km² poderá suprir essa região do país africano por 400 anos mesmo com as taxas de consumo atuais.

25 / 07 / 2012 **Contribuição dos agentes polinizadores para a biodiversidade**

Resultado de Projeto Temático, livro que será lançado no dia 26 destaca preocupação com os polinizadores, cujo declínio tem consequências desastrosas tanto para a biodiversidade como para o agronegócio.

24 / 07 / 2012 **Cientistas criam medusa artificial com células de rato e silicone**

Quando recebe estímulos elétricos, ser é capaz de nadar em água salgada. Criação se baseia em semelhança entre o animal marinho e o coração.

24 / 07 / 2012 **Reduzir o consumo de sal diminui risco de câncer de estômago, diz ONG**

Em campanha para prevenir doença, entidade propõe corte no consumo de certos alimentos e rótulos mais precisos em produtos.

26 / 07 / 2012 **Arqueólogos encontram barca funerária de 5 mil anos no Egito**

Objeto provavelmente data da primeira dinastia de faraós. Embarcação era posta em túmulo para que morto a usasse em outro mundo.

25 / 07 / 2012 **Carrinhos de sorvete que usam energia solar circulam em Amsterdã**

O carrinho é baseado em um sistema que armazena energia solar, captada por painéis fotovoltaicos no teto, em baterias. Estas baterias fornecem energia suficiente para o congelador durante o dia e até em dias nublados, quando o sol não está brilhando.

23 / 07 / 2012 **Aquecimento oceânico provocou surgimento de bactéria na Europa**

O Vibrio é um grupo de bactérias que costuma crescer em ambientes marinhos tropicais e quentes. A bactéria pode provocar várias infecções em seres humanos, com sintomas parecidos ao cólera e a gastroenterite de comer frutos do mar crus ou mal cozidos ou da exposição à água do mar.

26 / 07 / 2012 **A água na Chapada dos Veadeiros**

Processo formativo na porção brasileira da Bacia do Prata é tema de seminário nesta quinta-feira (26).

27 / 07 / 2012 **Estudo mostra que tubarões têm pasta de dente 'embutida' na boca**

Cientistas alemães dizem que arcadas dentárias dos animais contém alto índice de flúor, o que os torna provavelmente livres de cáries.

25 / 07 / 2012 **Funai diz que portaria sobre terras indígenas será suspensa; AGU informa que está "analisando" a decisão**

A norma regulamenta a atuação dos advogados públicos e procuradores em processos judiciais envolvendo a demarcação de terras indígenas de todo o país.

27 / 07 / 2012 **Servidores da Funai protestam contra portaria sobre terras indígenas**

Ato foi no prédio da AGU; outros servidores em greve apoiaram protesto. Grupo de 50 pessoas queimou cartazes e máscaras da presidente Dilma.

25 / 07 / 2012 **Baleias diminuem sensibilidade da audição para proteger ouvidos de ruídos produzidos pelo homem**

A Marinha estima que os fortes barulhos provocados apenas pelos seus dispositivos de escuta subaquáticos, principalmente os sonares, resultam em perda auditiva temporária ou permanente em mais de 250 mil criaturas marinhas todos os anos, um número que está aumentando.

26 / 07 / 2012 **Desmatamento reduz em junho, mas MT ainda lidera degradação florestal**

De acordo com Imazon, estado concentra 80% da degradação florestal. Em 11 meses foram 1.587 km2 no estado frente aos 1.974 km2 da região.

25 / 07 / 2012 **Região da África do Sul tem babuínos 'fora de controle', diz cientista**

Pode ser tarde para medidas de controle, avalia antropóloga americana. Macacos vivem em áreas urbanas nas imediações da Cidade do Cabo.

27 / 07 / 2012 **Garimpo submarino ameaça biodiversidade**

Empresas reivindicaram propriedade sobre sítios em zonas vulcânicas do Pacífico.

25 / 07 / 2012 **Rio inicia nova etapa de mapeamento das áreas com risco iminente de deslizamento**

A meta é chegar ao final do ano com essas 36 cidades mapeadas quanto ao risco iminente, de modo a atingir um total acumulado de 67 municípios no estado.

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Geochemistry International

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Posted on July 27, 2012 by Steve Drury

Artist's concept of NASA's Mars Science Laboratory (Curiosity) near a canyon on Mars. (Credit: NASA-JPL via Wikipedia)

Why is 'Curiosity' the latest Mars rover aimed to land at Gale Crater? It seems to have been filled with stratified sediments deposited in the crater over perhaps as long as two billion years after it formed by a meteorite impact. The sediments now occur as a relic of later aeolian erosion at the centre of the crater in the form of a large mound that Curiosity is designed to climb and sample. The big attraction is the detection of clays and sulfate minerals in the sediments using multispectral remote sensing. They clearly suggest the influence of water in the formation of the sediments, hence the suggestion that they are lake sediments. On that assumption, Gale Crater is hoped to be a fruitful site for seeking signs of former biological processes: given the technical circumstances of the mission it is deemed the best site there is on Mars for NASA's Mars Science Laboratory.

Sulfates on Mars have excited geologists enormously, along with their companion clays, because they signify the influence of abundant acid water in the breakdown of Martian primary igneous rocks from which the sediments have undoubtedly been derived. Their formation is undoubtedly the geoscientific 'sexy beast' of the last four or five years. Given multi-channel remotely sensed data – and Mars labs are awash with them from several previous missions – sulfates are easy to detect from their distinctive reflectance spectra so there has been abundant pay-back for geologists involved with the Red Planet. But there is water and there is…water. It is hoped to be proved that the depositional medium was standing water or at least abundant subsurface aqueous fluids, which may have lingered for long enough for living organisms to have formed. But there is a possibility that sulfates can form, and so too clays, by superficial weathering processes beneath a humid atmosphere.

An oblique view of Gale crater showing the landing site and the mound of layered rocks that NASA's Curiosity rover will investigate. The landing site is outlined in yellow. (Credit: NASA-JPL via Wikipedia)

Erwin Dehouck and team of French geochemists set out experimentally to recreate conceivable atmospheric and climatic conditions from Mars's early history to mimic weathering processes (Dehouck, E. *et al*. 2012. Evaluating the role of sulfide-weathering in the formation of sulfates or carbonates on Mars. *Geochimica et Cosmochimica Acta*, v. **90**, p. 47-63). The experiment involved liquid water and hydrogen peroxide (detected in Mars's present atmosphere and probably produced photochemically from water vapour) in contact with a CO_2 atmosphere. Martian surface conditions were simulated by evaporation of H_2O and H_2O_2 to mix with dominant CO_2, which allowed 'dew' to form on the experimental samples. The samples consisted of ground up olivine and pyroxene, important mineral constituents of basalt – feldspar was not used. – mixed with the iron sulfide pyrrhotite, commonly found in terrestrial basalts and meteorites judged to have come from Mars. Samples of each pure mineral and mixtures with the sulfide were left in the apparatus for four years and then analysed in detail.

Even in such a short exposure the silicate-sulfide mixtures reacted to produce sulfate minerals –hexahydrite ($MgSO_4\_6H_2O$), gypsum ($CaSO_4\_2H_2O$) and jarosite($KFe_3(OH)_6(SO_4)_2$), together with goethite (FeOOH) and hematite (Fe_2O_3). Without the presence of sulfides, the silicate minerals barely broke down under the simulated Martian conditions but did produce traces of magnesium carbonate. The sulfate bearing assemblages look very like those reported from many locations on Mars. The acid conditions produced by weathering of sulfides to yield sulfate ions are incompatible with preservation of carbonates, as the experiment indicates. However, there are reports of Martian sediments that do contain abundant carbonate minerals.

The researchers' conclusions are interesting: "These results raise doubts on the need for a global acidic event to produce the sulfate-bearing assemblages, suggest that regional sequestration of sulfate deposits is due to regional differences in sulfide content of the bedrock, and pave the way for reevaluating the likelihood that early sediments preserved biosignatures from the earliest times". Weathering by dew formation seems quite adequate to match existing observations.

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- http://www.planetary.org/get-involved/events/planetfest-2012/

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The oldest impact structure

Posted on July 26, 2012 by Steve Drury

Ilulisat Grenland (credit: Wikipedia)

Various lines of evidence, such as sedimentary deposits of glass spherules and shocked minerals or signs of unusual isotopic chemistry (see *Ejecta from the Sudbury impact* and *Evidence builds for major impacts in Early Archaean* in *EPN* April 2005 and August 2002) point to the predicted intensity of meteorite or comet bombardment of the early Earth, and evidence is growing for some events that had global effects. Yet no actual impact sites from the Archaean Eon have been found, until recently. That is not entirely unexpected because erosion during the last few billion years will have removed all trace of the characteristic surface craters. But perhaps there is cryptic evidence in Archaean terrains for the deeper influence of impacts: after all, the depth of penetration of large meteoritic 'missiles' would have been of a similar order to their diameter where shock structures in minerals would slowly anneal and impact-generated melts would crystallise slowly enough to masquerade as plutonic igneous rocks.

Close to the Arctic Circle in SW Greenland Archaean gneisses are associated with a roughly 200 km wide geomagnetic anomaly and regionally curvilinear features that suggest a series of concentric closed structures over a 100 km diameter area (Garde, A.A. *et al*. 2012. Searching for giant, ancient impact structures on Earth: The Mesoarchaean Maniitsoq structure, West Greenland. *Earth and Planetary Science Letters,* v. 337, p. 197-210). Adam Garde and colleagues from the Greenland Geological Survey, Cardiff University UK and Lund University Sweden focused on the central part of these anomalies where gneisses are extensively brecciated with signs of annealed shock-induced lamellae in quartz, feldspar melting and fluidization of highly comminuted mylonites. They ascribe this assemblage of features on a variety of scales to the effects of a major meteorite impact on 25 km deep continental crust. The metamorphic complex contains the famous Amitsoq Gneisses that once had the status of the world's oldest rocks at around 3.8 Ga, but is dominated by migmatites formed around 3.1 Ga that are akin to the Nuuk Gneisses from further south.

The possible signs of a deeply penetrating impact are cut through by small ultramafic intrusions, zircons from which yield $^{207}Pb/^{206}Pb$ ages between 3.01 and 2.98 Ma, confirming the structures' Mesoarchaean age. An interesting and unanswered question concerns the origin of these magmas together with marginally younger, voluminous granites. Were the ultramafic magmas generated by high degrees of partial melting of mantle as a result of the immense energy of impact? Having temperatures well above those of basaltic melts, could the ultramafic intrusions in turn have induced crustal melting within the depths of a large impact basin?

Related articles

- The remains of a gigantic, three-billion-year-old meteorite impact discovered in Greenland (refreshingnews99.blogspot.com)
- The remains of a gigantic, three-billion-year-old meteorite impact discovered in Greenland (GEUS) (livasperiklis.com)

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Burrowers: knowing front from back

Posted on July 10, 2012 by Steve Drury

In sedimentary rocks below the base of the Cambrian there is not only a dearth of body fossils, but signs of creatures burrowing and stirring up the sediment are most uncommon. A burrower needs several criteria to be fulfilled: a supply of oxygen; sufficient food; a body able to penetrate and an ability to move back and forth, but forth would probably do fine, provided the animal could turn corners. The amount of oxygen in bottom waters would have influenced its availability beneath the seabed. Whatever the conditions, dead organic matter falls and is buried by sediment before it is oxidised away, even nowadays. There is little sign that there was any marked change between the oxygenation of the planet just before and after the start of the Cambrian Period, so the main control over burrowing is that of animal morphology.

Many modern burrowing animals are pretty flaccid but moving sediment aside and upwards demands some muscle power. Most important, the creature needs a means of navigation, albeit of a rudimentary kind, and since what goes in beneath the surface – food – must go out – excreta – there must be a front- and a back end. That 'fore-and-aft' symmetry is the essential feature of bilaterian animals. Only a limited range of animal taxa don't have that built-in. Sponges are the most obvious example, having no discernible symmetry of any kind. Radially symmetrical animals such as jellyfish and coral polyps only have a top and a bottom. An absence of inbuilt horizontal directionality stops non-bilaterians from burrowing in any shape or form. But, so what?

The vast majority of animals have some kind of bilateral symmetry; even echinoderms have it from their 5-fold symmetry that is also the simplest kind of radiality. By the start of the Cambrian, not only had bilaterians split off from the less symmetrical but almost all the phyla living today, and several that became extinct in the last 542 Ma, have representatives in the Cambrian fossil record. The only logical conclusion is that emergence of bilaterians and their fundamental diversification took place in the Precambrian: they are absent from earlier strata only because they had no hard parts. Comparing the DNA of living representatives of the main bilaterian phyla and with that of non-bilaterians can help date the times of genetic and morphological separation, but only crudely. This 'molecular clock' approach points to some time between 900 and 650 Ma ago for the last common ancestor of bilaterians.

Uruguayan fossil burrows from late Neoproterozoic (Credit: Pecoits, E. et al. 2012)

Getting a handle on the minimum time for the split depends either on finding fossils or unequivocal signs of bilaterian activity. The oldest unequivocally bilaterian fossils occur in rocks about 550 Ma old, which doesn't take us much further back than the base of the Cambrian. But there are trace fossils that are significantly more ancient (Pecoits, E. *et al*. 2012. Bilaterian burrows and grazing behaviour at >585 million years ago. *Science*, v. **336**, p. 1693-1696). They are tiny burrows in fine-grained sediments from Uruguay, so tiny that there is a chance that they may be traces of grazing bacterial films on the seabed rather than beneath it. The decider is the mechanics of trace fossil formation. Surface tracks only a millimetre or so across would only penetrate the biofilm, so on lithification they would simply disappear. Burrows on the other hand penetrate the sediment itself to get at food items. Even if this was a biofilm, the track would be in sediment above the film, so compaction would preserve it. The Uruguayan exam-[les are exquisite horizontal burrows, and they push back the minimum age for the origin of the bilaterians to at least 40 Ma older than the start of the Cambrian. In fact 585 Ma is a minimum age for the sediments as it is the U-Pb age of zircons in a granite that intrudes and metamorphoses them.

An equally significant observation is that the burrows only appear towards the end of a glacial episode – probably the last of the Neoproterozoic 'Snowball Earth' events – as marked by tillites below the burrowed shales and occasional 'dropstones' in them. Could it be that the climatic and other stresses of a global glaciation triggered the fundamental division among the Animalia?

Related articles

- Observatory: Slugs' Tunnels Shed Light on Early Bilateral Animals (nytimes.com)

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Eats barks leaves nuts and fruits

Posted on July 10, 2012 by Steve Drury

The Malapa valley South Africa, where *Australopithecus sediba* was found. (Credit: Lee R. Berger via Wikipedia)

The first stone tools and bones that had been cut by them, found in rocks dated at 2.5-2.6 Ma in the Bouri area of Ethiopia's Afar Depression, have generally been taken as a sign that their invention was connected with more easily accessing meat for food. A corollary of this idea is that it was the introduction of meat into the hominin diet that helped 'fuel' the growth of their brains: meat-tools-brain interrelated in an evolutionary sense. There is a spatial link between such tools and fossils of *Australopithecus*, but direct attribution of the tools to these australopithecines has not been widely accepted. It is more generally accepted that a link to tools can be made with *Homo habilis*, but they lived, at the earliest, 200 to 300 ka later. The wear patterns on their teeth and association with animal bones bearing cut marks has been taken to indicate that at least part of their diet was meat.

Another approach to diet is to analyse the proportions of stable carbon isotopes (^{13}C and ^{12}C) in tooth enamel, which can discriminate between the ultimate plant source in their diet, i.e. between grasses that use the C_4 photosynthetic pathway and the C_3 version used by woody and herbaceous plants. The isotopic 'signature' of plants is also passed on to animals, depending on what vegetation they eat, and so up the food chain to predators and the scavengers that depend on their leavings. South African *Au. africanus* of around 2.5 Ma ago show a definite C_4 preference as do local paranthropoids ('robust' australopithecine-like creatures) from around 1.8 Ma. The early humans *H. habilis* and *H. ergaster* also show the C_4 isotopic proportions, which in both cases may be from a meaty diet or from a vegetarian component. The main point from these similar results, whatever the plant-meat proportions being consumed, is that these hominins were very different from chimpanzees in their eating habits, and probably as regards their habitats: savannah rather than woodlands respectively.

There are no reports of C-isotope research on *Au. garhi* teeth, but results from 2 Ma old *Au. sediba* found in South Africa have just been published (Henry, A.G and 8 others 2012. The diet of *Australopithecus sediba*, *Nature*, v. **487**, p. 90-93) along with plant materials from dental plaque and tooth wear patterns. *Au. sediba* is notable for its very modern-looking hands and other 'advanced' features(http://earth-pages.co.uk/2011/10/12/another-candidate-for-earliest-direct-human-ancestor/). Some believe it to have been closer to the direct line of human descent than a number of other hominin species, including the poor quality remains of *H. habilis*. So, did *sediba* eat meat? The forensic evidence suggests something unexpected. The C-isotope data points towards food dominated by C_3 plants – less grasses and sedges, and more shrubbery. Tooth wear suggests bark was eaten, while plant remains from plaque indicate fruit leaves and wood. This is a feeding pattern more like that of chimpanzees than *Homo* species, *Au. africanus* and the paranthropoids that are roughly contemporary with *Au. sediba*. Ecological analysis of the sediments which buried the hominin specimens suggest a seasonal climate and savannah biome with abundant C_4 plants that supported grazing herds, mixed with possibly some denser woodland along drainages. This is a pattern familiar from living savannah chimpanzee bands.

The hand and forearm of *Australopithecus sediba* (Credit: Peter Schmid, courtesy Lee R. Berger via Wikipedia)

So, despite being an 'advanced' hominin, by carrying clear signs of foods that were not consumed by meaty potential prey animals *Au. sediba* probably was not a meat eater. Yet species with strong C_4 'signatures' cannot be assigned to carnivory on C-isotope evidence alone. One has to decide from other data, such as tooth-wear and plaque, whether this or that hominin ate grasses, those that clearly did not becoming candidates for dominantly meat-eating. How to detect a tool-using species with a mixed diet, akin to more modern humans, is a tough nut to crack.

Related articles

- Ancient Tartar, Other Dental Clues Reveal Unexpected Diet of Early Human Relative (blogs.scientificamerican.com)
- Early Human Ate Like a Giraffe (news.sciencemag.org)
- A (near) human tragedy, and a visit to the dentist; a new hominin find, and what it signifies (paulbraterman.wordpress.com)

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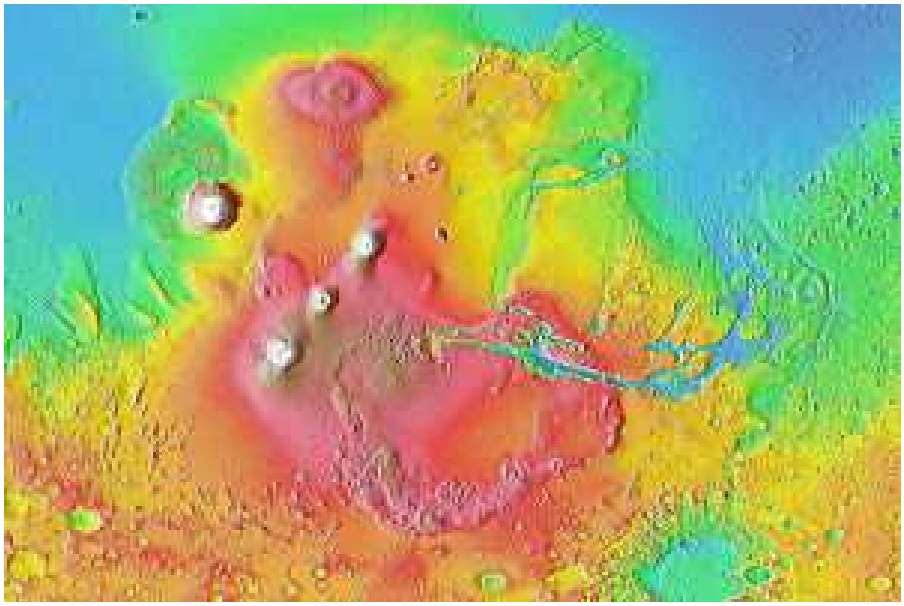
A mighty sag or a big wrench for Mars

Posted on July 10, 2012 by Steve Drury



Colour-coded relief map of the Thatsis bulge on Mars, with Valles Marineris at left centre (Credit: Goddard Space Flight Center, NASA, via Wikipedia)

In the Solar System topographic features don't come larger than Valles Marineris on Mars. At between 5 to 10 kilometres deep and extending along a fifth of the planet's circumference, it makes the Grand Canyon and The Gorge of the Nile look puny.

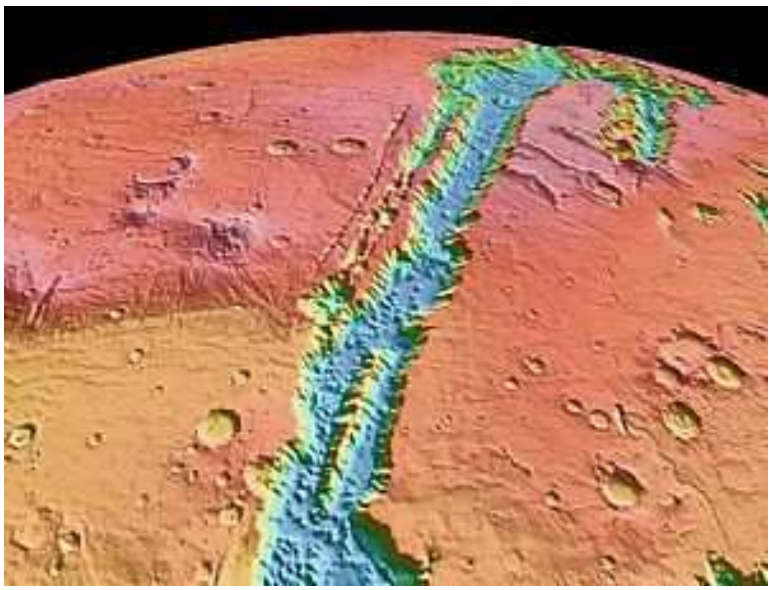
The base and margins of this stupendous valley contains all manner of evidence for erosion, huge landslips and signs of collapse into voids in Mars's crust. Much of the erosion on Mars seems to have stemmed from catastrophic floods several billion years ago, though whether they were all of water or if some were volcanic in origin is being debated (Leverington, D.W. 2011. A volcanic origin for the outflow channels of Mars: Key evidence and major implications. *Geomorphology*, v. **132**, p. 51-75 http://www.webpages.ttu.edu/dleverin/leverington_mars_outflow_channels_geomorphology_2011.pdf , but see http://www.universetoday.com/94367/did-water-or-lava-carve-the-outflow-channels-on-mars/)

It is difficult to imagine anything other than some kind of fault control over the almost straight, roughly east-west trend of Vales Marineris, but the scale suggests, again, an unmatched scale of tectonics. It has long been thought that the massive canyon resulted from extensional rifting that created a major weakness etched out by later erosion and/or collapse into huge subsurface voids in the crust. Yet there is little sign of commensurately large faults, through there are some. But the structure is an integral part of yet another superlative. It is on the eastern flank of the mighty Tharsis bulge on which several humongous volcanoes, including Mons Olympus, developed: perhaps there is a causal link between the two dominating features.

Jeffrey Andrews-Hanna of the Colorado School of Mines in the US has tried to model the bulge-chasm pair, coming to the conclusion that there is little sign of major extension. The finale of his study zeroes-in on the possibility of dominant subsidence producing the structure (Andrews-Hanna, J.C. 2012. The formation of Valles Marineris: 3. Trough formation through super-isostasy, stress, sedimentation, and subsidence. *Journal of Geophysical Research*, v. **117**, E06002, doi:10.1029/2012JE004059).

In this model, the Tharsis bulge and its associated volcanic province rose so high that on the scale of the planet it must have created a large positive gravitational anomaly. This remains for the most part, but in the Valles Marineris region the crust is now either in isostatic balance or has large negative gravity anomalies, complicated by the fact that the very carving of the canyon system must have resulted in some uplift through unloading. For a while the whole bulge was supported in this gravitationally unstable state by the strength of the Martian lithosphere, and most of it is still in a state of disequilibrium.

Andrews-Hanna's novel view is that a small amount of extension allowed residual magma to rise in linear zone along the eventual length of Valles Marineris as dykes. The magmas and their heating effect reduced the strength of the lithosphere, locally removing support for the huge load, which subsided. By creating greater slope on the surface of Tharsis the subsidence would have become a focus for both erosion and sedimentation, the increased sedimentary load adding to the subsidence to give the present stupendous depth of the canyons and chasms.



Simulated oblique view of the topography of Valles Marineris looking westwards (Credit: Goddard Space Flight Center, NASA, via Wikipedia)

But this isn't the only model for the canyon system (Yin, A. Structural analysis of the Valles Marineris fault zone: Possible evidence for large-scale strike-slip faulting on Mars. *Lithosphere*, v. **4** doi:10.1130/L192.1). An Yin of the University of California used a combination of remote sensing data from Mars Reconnaissance Orbiter and Mars Odyssey to perform detailed lithological and structural mapping along Valles Marineris. What emerged were several fault zones up to 2000 km long. Instead of an expected extensional sense of movement they are strike-slip faults, with displacements of the order of 100 km in a left-lateral sense. Yin's model is that the canyon system bean as a zone of transtensional deformation: very different from that of Andrews-Hanna. It also begs the question of the underlying tectonic processes, because strike-slip zone on Earth are usually associated with distributed stress from plate tectonics.

Related articles

- For an entertaining, if sometimes bizarrely speculative tour of the Martian landscape, check out http://www.youtube.com/watch?feature=player_embedded&v=2wOogk2LSSw#!

Posted in Planetary, extraterrestrial geology, and meteoritics | Tagged Mars, Martian tectonics, Mons Olympus, Valles Marineris | Leave a comment

The Great Blurting

Posted on June 22, 2012 by Steve Drury

It is hard to resist curiosity when a phrase includes a superlative. Dickens knew this when he opened *A Tale of Two Cities* with the words, '*It was the best of times,* it was the worst of times…'. So impacted into post-Victorian English language are they that the *Daily Mirror* of 13 May 2012 used them to celebrate 'The most scintillating finish in Premier League history': referring of course to the footballing tales of the city of Manchester (UK, that is). So it was with some gaiety that I turned to a paper in the May 2012 issue of *Geology* (Løseth. H. *et al*. 2012. World's largest extrusive body of sand? *Geology*, v. **40**, p. 467-470). Now, that is a title to conjure with, and I would advise any academic author to add a superlative adjective of some kind to their next manuscript title, to ensure more than 5 readers and at least one citation to add to her/his CV. Conversely, I caution against seemingly ultra-high impact, exclamatory single-word titles such as '*Coelocanth!*', *Porphyroblast!*', '*Ignimbrite!*' or '*Sphenochasm!*': they summon untoward visions of geoscientists much given to snorting and pawing the air in salivating lust and groveling need, to plagiarise – yet again – Joseph Heller's *Catch 22* (thus Heller described Hungry Joe's reaction to a pornographic cameo brooch).

The sand body in question lies in the Pleistocene subsurface of the Norwegian sector of the North Sea above the Snorre oilfield, and came to light through a 3-D seismic survey with extraordinarily good resolution that allowed the reconstruction of its base and top structure contours (two-way time) and thus its overall volume and shape. At 10 km^3, were it to have formed yesterday to cover Manhattan the paper's abstract suggests that it would have reached the 37th floor of the Empire State Building. More parochially, had it engulfed the 'Square Mile' of the City of London (Post Codes EC1, 2, 3 and 4) 30 St Mary Axe ('The Gherkin') and 'The Shard' would be buried in their entirety leaving one of capitalism's iconic heartlands a curiously gnarled sandy plain.

Small mud volcano, Romania (Photo credit: Wikipedia)

That the sand is extrusive rather than being simply a sedimentary stratum is revealed by its extraordinary shape. Its thickest part is in a depression surrounded by mounds of the underlying unit – the former seabed – above which the body is absent. These mounds show marginal signs on the seismic sections of dykes that could have acted as feeders from stratiform sands deeper in the sequence, the dykes coinciding with the base of 'ditches' in the body's upper surface. In turn, the ditches have flanking ridges as if the ditches and the dykes below were feeders for the sand extrusion. Such an extrusive sand body is currently forming at the accidentally triggered Lusi sand volcano in Indonesia where a single vent exudes about 50 thousand m^3 each day; a rate that would take 550 years to produce the Snorre field body. Pleistocene stratigraphy surrounding the vast North Sea 'boil' suggests that it formed during a period of rapid sedimentation from the huge North Sea ice shelf supplied by the Scandinavian ice sheet.

Helge Løseth and colleagues from Statoil and the University of Rennes ran a series of dry sandbox experiments to mimic the process of sand injection. By pumping air through interbedded sand, glass ballotini and silica powder, to represent two types of non cohesive sands and cohesive mudrocks, they found that increasing the overall air pressure in the box eventually fluidized the 'sands' which blurted through the 'clays' to form 'volcanoes' with plumes of sand that enlarged the area of deposition at the surface. Cutting into the sediments after the experiments revealed a remarkably real-looking system of intrusive sand bodies (dykes, sills and laccoliths) as well as the extrusive mass of sand. Chances are that such bodies may form more commonly in marine sequences, given encouraging over-pressuring through sudden increases in normal sedimentation. If so, the very open grain structure of the vented sands might provide superb petroleum reservoir characteristics.

Related articles

- It's enough sand to bury Manhattan… (msnbc.msn.com)

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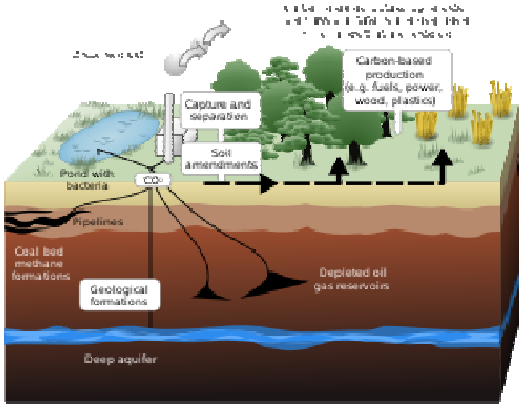
Carbon dioxide burial: an analogy of some pitfalls

Posted on June 21, 2012 by Steve Drury



geological sequestration of carbon dioxide emissions from a coal-fired power plant. (Photo credit: LeJean Hardin and Jamie Payne Wikipedia)

Of all the 'geoengineering' approaches that may offer some relief from global warming pumping CO_2 into deep sedimentary rocks, through carbon capture and storage (CCS) is one that most directly intervenes in the natural carbon cycle. In fact it adds an almost wholly anthropogenic route to the movement of carbon. It is difficult if not impossible for natural processes to 'pump' gases downwards except when they are dissolved in water and most often through the conversion of CO_2 to solid carbonates or carbohydrates that are simply buried on the ocean floor. Artificially producing carbonate or organic matter on a sufficient scale to send meaningful amounts of anthropogenic carbon dioxide to long-term rock storage is pretty much beyond current technology, but gas sequestration seems feasible, if costly. The main issues concern making sure geological traps are 'tight' enough to prevent sufficient leakage to render the exercise of little use and to understand the geochemical effects of large amounts of buried gas that would inevitably move around to some extent.

The geochemistry is interesting as reactions of CO2 with rock and subsurface water are inevitable. The most obvious is that solution in water releases hydrogen ions to create weakly acidic fluids: on the one hand that might be a route for precipitation of carbonate and more secure carbon storage, through reaction with minerals (see http://earth-pages.co.uk/2012/04/10/possible-snags-and-boons-for-co2-disposal/), but another possibility is increasing solution of minerals that might eventually cause a trap to leak. A counterpart of pH change is the release of electrons, whose acceptance in chemical reactions creates reducing conditions. The most common minerals to be affected by reducing reactions are the iron oxides, hydroxides and sulfates that often coat sand-sized grains in sedimentary rocks, or occur as accessory minerals in igneous and metamorphic rocks. Iron in such minerals is in the Fe-3 valence state (*ferric* iron from which an electron has been lost through oxidation) which makes them among the least soluble common materials, provided conditions remain oxidising. Flooding sedimentary rocks with CO_2 inevitably produces a commensurate flow of electrons that readily interact with Fe-3. The oxidised product Fe-2 (*ferrous*iron) is soluble in water, and so reduction breaks down iron-rich grain coatings. Much the same happens with less abundant manganese oxides and hydroxides. One important concern is that iron hydroxide (FeO.OH or goethite) has a molecular structure so open that it becomes a kind of geochemical sponge. Goethite may lock up a large range of otherwise soluble ions, including those of arsenic and some toxic metals. Should goethite be dissolved by reduction that toxic load moves into solution and can migrate.

Bleached zone with carbonate-oxide core in Jurassic Entrada Sandstone, Green River, Utah. (Image: Max Wigley, University of Cambridge)

Except where deep, carbonated groundwater leaks to the surface in springs – the famous Perrier brand of mineral water is an example – it is difficult to judge what is happing to gases and fluids at depth. But their long-past activity can leave signatures in sedimentary rocks exhumed to the surface. Most continental sandstones, formed either through river or wind action, are strongly coloured by iron minerals simply because of strongly oxidising conditions at the Earth's surface for the past two billion years or more. Should reducing fluids move through the, the iron is dissolved and leached away to leave streaks and patches of bleached sandstone in otherwise red rocks. In a few cases an altogether more pervasive bleaching of hundreds of metres of rock marks the site of massive fluid-leakage zones. Terrestrial Mesozoic sedimentary sequences in the Green River area of Utah, USA exhibit spectacular examples, easily amenable to field and lab study (Wigley, M. *et al*. 2012. Fluid-mineral reactions and trace metal mobilization in an exhumed natural CO_2 reservoir, Green River, Utah. *Geology*, v. **40**, p. 555-558). There the bleaching rises up through the otherwise brown and yellow sandstones, cutting across the bedding. In the bleached zone, secondary calcite fills pore spaces. At the contact with unbleached sandstone there are layers of carbonate and metal oxides, enriched in cobalt, copper, zinc, nickel, lead, tin, molybdenum and chromium: not ores but clear signs confirming the general model of reductive dissolution of iron minerals and movement of metal-rich fluid. Carbon isotopes from the junction are richer in ^{13}C than could be explained by the gas phase having been methane, and confirm naturally CO_2 - rich fluids.

So, Green River provides a natural analogue for a carbon capture and storage system, albeit one that leaked so profusely it would be a latter day disaster zone. In that sense the site will help in deciding where not to construct CCS facilities.

Related articles

- Earthquake risk for carbon capture and storage schemes (newscientist.com)
- Fessenden, J. 2012. Carbon sequestration and natural analogs. *Geology*, v. **40**, p. 575-576

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Disputes in the cavern

Posted on June 14, 2012 by Steve Drury

If Ignatius Loyola been a child of the late 20th century, it is quite likely that he would have chosen palaeoanthropology as a career rather than theology, seeing as he was so predisposed to casuistry. When I innocently asked a vertebrate palaeontologist who specialized in the Pliocene and Pleistocene Epochs why it was that students of hominins were so prone to controversy, his answer was revealing: 'They

don't have many fossils'. One place where there are lots of hominin fossils, in fact the largest known sample of them, is the Atapuerca cavern in northern Spain. At the deepest level of the cave system there is a veritable charnel house containing the remains of at least 28 individuals. Because there are bones from all parts of the human anatomy, some have suggested that the cache is one of deliberate burial, but there is a disturbing dearth of the smaller bones of feet and hands. Consequently, other voices claim that the bodies were washed in by floods, losing extremities en route – though that view would be easily tested using other signs of trauma on large bones. Yet that is a minor quibble compared with one that is developing around the context of the age of the boneyard and the taxonomy of the cadavers in it (http://www.guardian.co.uk/science/2012/jun/10/fossil-dating-row-sima-huesos-spain).

Head of Homo heidelbergensis , Senckenberg Museum, Frankfurt am Main, Germany (Photo credit: Wikipedia)

The Spanish team responsible for the evolutionary wealth of the entire Atapuerca cave complex, which ranges from almost a million years ago to recent times, assigned the Sima de los Huesos (Pit of Bones) fossils to *Homo heidelbergensis*. In fact about 90% of all *H. heidelbergensis* remains are from Atapuerca, so any anatomical dispute over these specimens is a threat to the status of the species itself. One leading authority who does dispute this assignment is Chris Stringer of the UK Natural History Museum, who claims that many of the heads have teeth and jaws with shapes that fall within the range of Neanderthals – supposedly descended from *H. heidelbergensis.* The age of the deposit is the focus of debate. Were it to be around 400 ka or younger, as early attempts at dating suggested, then the fossils might well be those of Neanderthals for that is early in the range of that species as determined by 'molecular-clock' studies of Neanderthal DNA. However, the material most likely to yield a good radiometric age is carbonate speleothem, the stuff of stalactites and stalagmites though more commonly a matrix that binds old cave detritus. The fossils are undoubtedly far older than the maximum age that can be achieved using the well known radiocarbon method (<60 ka), but speleothem lends itself to a precise dating technique based on the decay series of uranium isotopes. In the case of Sima de los Huesos, the fossils lie in a clay breccia overlain by a layer of speleothem, which has yielded a U-series age of around 600 Ma (Bischoff, J.L. *et al.* 2007. High-resolution U-series dates from the Sima de los Huesos hominids yields 600 kyrs: implications for the evolution of the early Neanderthal lineage. *Journal of Archaeological Science*, v. **34**, p. 763-770).

The 'bone breccia' in Sima de los Huesos, Atapuerca caverns Spain (from Bischoff, J.L. *et al.* 2007)

Neanderthal head from Israel (Wikipedia)

Stringer argues that the hominins' anatomy is so like that of Neanderthals that, somehow, the radiometric age must be wrong – i.e. too old – perhaps because the speleothem is in fact from a 600 ka block that fell onto the fossils after they had accumulated. His view is that they are Neanderthals descended from *H. heidelbergensis* living in the earlier Pleistocene and which was the common ancestor of both Neanderthals and anatomically modern humans. Bischoff, J.L. *et al.* consider the Sima de los Huesos hominids to be 'at the very beginnings of the Neanderthal evolutionary lineage', which seems to me to be a reasonable deduction from both stratigraphic and anatomical data. To demand that they must be at least 200 ka younger, apparently on the basis of an estimate of Neanderthal origination from DNA data seems less reasonable. The appearance of Stringer's detailed arguments in *Evolutionary Anthropology* (v. **21**(3)) is eagerly awaited, following the *Observer's* take on his position.

Another area in which controversy is brewing – and has been for decades – is that of the origin of human artistic culture. One of the gem-boxes of early art is the Geissenclösterle (monastery of the goats) cavern in southern Germany, in which have been found various figurines made of bird bone and ivory, including a celebrated lion-man theriomorph, highly exaggerated female figures, flutes and beads. They belong to the Aurignacian culture brought by the earliest anatomically modern Europeans who diffused westwards along the Danube from the near-East as early as 45 ka ago. The layer containing the artifacts was originally dated at about 35 ka, but new radiocarbon techniques have been tried on bi=one with cut marks, among other materials (Higham, T. *et al*. 2012. Testing models for the beginnings of the Aurignacian and the advent of art and music: the radiocarbon chronology of Geissenclösterle. *Journal of Human Evolution*, v. **62**, p. 664-676 doi:10.1016/j.jhevol.2012.03.003) and found to yield a much older age of 42.5 ka, close to the oldest European date for modern human occupation 43-45 ka for the stratigraphically older Uluzzian tool industry.

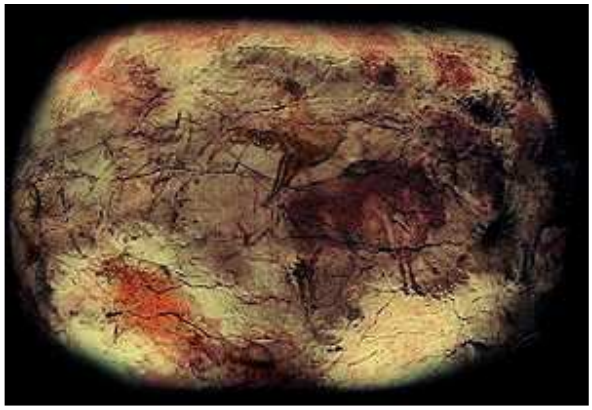
Lion-man sculpture from Geissenclösterle (J. Duckek Wikipedia)

The date is also considerably earlier than the demise of the Neanderthals and raises the issue of modern-Neanderthal contacts. Indeed the layer below that assigned to Aurignacian contains tools made by Neanderthals, whose age is statistically indistinguishable from the later occupation level. The Chatelperronian tool industry, which closely resembles the Aurignacian but is ascribed to Neanderthals, is supposed to be around 40 ka old, but the advanced radiocarbon technique that yielded much older ages for Geissenclösterle apparently has not yet been deployed on this culture. On the basis of limited age data, it does seem likely that Neanderthals adopted the new technology after they encountered it. The Aurignacian artistic products are vastly more advanced than any found at older sites in Africa.

Aurignacian female figurine from near Geissenclösterle..(Silosarg: Wikipedia)

In the context of the debate about modern human and Neanderthal cognitive abilities, which suggests the former were altogether smarter and more creative, there is an unvoiced or at least unheeded argument. Whether or not Neanderthals originated artifacts that were 'modern' for their time or copied them is not as important as the fact that this group, previously isolated for up to 400 millennia, were able to appreciate and learn these novelties. That is much the same as people living today, in Australia for instance, a couple of generations from hunter-gatherer origins, working on production lines, piloting aircraft, social networking and creating world-class abstract art. What did they, and the Aurignacians, produce from other materials that have not survived decay; ditto for any pre-45 ka humans? Another point rarely raised, but surely valid, is that previous people may not have felt any need to produce art in forms that survive for tens or hundreds of millennia. Forty-odd thousand years ago, climate was undergoing rapid ups and downs of temperature and humidity in the run-up to the last glacial maximum. Conditions at mid-latitudes would have been much more changeable than those of the tropics. Both anatomically modern humans and Neanderthals faced the same attendant ecological changes, and they faced each other as occupants of southern Europe and as rivals for available resources. Finally, Aurignacians hailed from the east, also cohabited by Neanderthals and severely affected by rapid climate change from around 80 ka, so did they bring with them a culture formed elsewhere? Europe concentrates palaeoanthropologists and their endeavours, while much of the planet to which humans diffused from Africa – and Africa itself – are grossly under-investigated by comparison: ideas will undoubtedly change drastically as these areas get the attention they deserve.

Controversy is not a problem. Indeed, with imperfect, inadequate or ambiguous data it is unavoidable, and heated disputes spur the search for more information that can help resolve ideas or change them. What cannot be sidestepped is the potential for havoc that may arise with new and improved methods. In both cases outlined here radiometric dates have thrown the proverbial spaniel into the works. That used in the Geissenclösterle cavern was designed to remove younger contaminating material from samples for radiocarbon dating and inevitably tends to push ^{14}C dates further back in time. By removing a source of inaccuracy it highlights the inadequacies of dates obtained by earlier approaches on which a great deal of current archaeology thinking relies. How much younger contamination is present in a sample only emerges after the improved dating: it may be absent or substantial. So, until dates produced by earlier radiocarbon methods are redated neither their absolute values nor their relative sequence in time can be considered reliable.



Art on the walls of Altamira Cave, northern Spoain, including both older abstract works and younger figurative depictions of prey animals (Photo credit: Wikipedia)

Results from just such an advance in radiometric dating of cave deposits in northern Spain will really cause a stir, when they sink in (Pike, A.W.G. and 10 others 2012. U-series dating of Paleolithic art in 11 caves in Spain. *Science*, v. **336**, p. 1409-1413). The U-series method used at the University of Bristol by the joint British-Spanish collaborators dates calcite deposits on painted cave walls, including those at the famous Altamira site. This speleothem or 'flowstone' may underlie artwork or may have grown over it after completion, giving maximum and minimum ages for the painting, respectively. If a work has flowstone underneath and as a coating, dating

potentially 'brackets' a possible age range. The superb figurative depictions of various prey animals, such as bison in Altamira cave, turn out to have been painted around at around 18 ka, during the last glacial maximum. However a lot of the art is abstract, such as hands surrounded by red pigment presumably sprayed onto the wall from the artist's mouth, various stippled discs and dots. Many of the latter are beneath flowstone that is around twice as old as the more familiar objects and range in age from 34 to 41 ka, thereby being close in time with the Geissenclösterle materials. Like them, their ages may coincide with the arrival of the earliest anatomically modern Europeans, but they are also towards the end of the period when Neanderthals were still present in much of Europe, including northern Spain. It cannot be ruled out therefore that the earliest paintings were Neanderthal symbolic art.

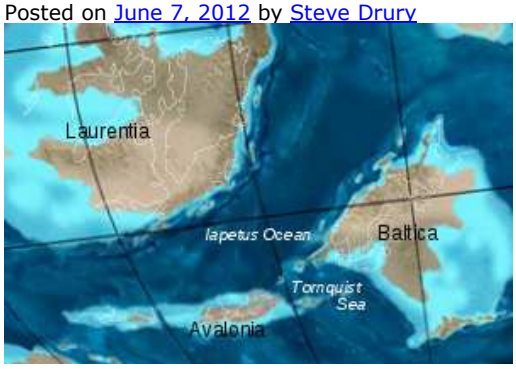
Related articles

- The 3 May 2012 issue of *Nature* contained a broad review of human migration (Peopling the Planet p. 23-35) including a summary of unpublished precision dating (Callaway, E. Date with history. p. 27-29)
- Balter, M. 2012. New light on revolutions that weren't. *Science*, v. 336. p. 530-531
- Scientists are accused of distorting theory of human evolution by misdating bones (guardian.co.uk)
- Earliest musical instruments in Europe 40,000 years ago (sciencedaily.com)
- Cave art appreciation opens ancient human minds to us (newscientist.com)
- Homo heidelbergensis was only slightly taller than the Neanderthal (eurekalert.org)

Posted in Anthropology and Geoarchaeology | Tagged Altamira Cave, Anatomically modern humans, Aurignacian, Chris Stringer, human evolution, Neanderthal, origin of art | Leave a comment

When Iapetus opened

Posted on June 7, 2012 by Steve Drury



The Iapetus Ocean separating the paleocontinents of Baltica, Laurentia and Avalonia about 460 million years ago. (Rob Blakey http://jan.ucc.nau.edu/~rcb7/, Wikipedia)

The first sign that there was something odd about the Lower Palaeozoic in NW Europe and North America stemmed from gross mismatches between fossil assemblages only a few tens of kilometers apart across the regional strike of sedimentary rocks older than the Upper Silurian. It didn't show up in the Devonian and Carboniferous, and nothing like it reappeared until well into the Jurassic. Until the 1960s the separation of these faunal provinces was ascribed to something akin to the Wallace Line that currently separates the flora and fauna of Oceania, Australia and the eastern islands of Indonesia from those of western Indonesia and Asia: a barrier to migration presented by the deep-water but narrow channel between Bali and Lombok in the Indonesian archipelago. The ancient biological boundary roughly coincides with the long-described Caledonian and Acadian Orogens of NW Europe and eastern North America respectively. With the discovery of plate tectonics another explanation arose: that formerly the opposite sides of the once contiguous orogens had been separated by thousands of kilometers across a former ocean. This was named in 1966 by John Tuzo Wilson after Iapetus , one of the mythical Greek titans who fathered Atlas – the eponym of the Atlantic Ocean. So, in the tectonic canon, the Caledonian-Acadian mountain belt marks the closure through subduction of its former oceanic lithosphere which brought the distinct faunal provinces together across a line known as the Iapetus Suture. Many lines of evidence time-stamp this continental collision to the end of the Silurian Period.

The Iapetus Suture, marked by the Niarbyl Fault on the Isle of Man. One of few places one can believably straddle two ancient continents. (G.J Kingsley at Wikipedia)

When the Iapetus Ocean began to open is not so easy to pin-point, save that it predated the Cambrian Period. The most likely possibility is that it marked the line of separation between fragments of the 1 billion-year old Rodinia supercontinent, which started to break up in the early Neoproterozoic. That was a protracted event, palaeomagnetic, radiometric and stratigraphic data loosely constraining extension between the former two sides of Iapetus to between 620 and 570 Ma. Around Quebec City, Canada are a number of large faults in the St Lawrence rift system that bound a zone of deep water sediments and volcanic rocks that yielded this broad age range. Yet the faults are associated with glassy rocks formed by frictional melting during brittle fracturing. These pseudotachylites can be dated, and have now helped resolve the 'fuzziness' of Iapetus's formation (O'Brien, T.M. & van der Pluijm, B.A. 2012. Timing of Iapetus Ocean rifting from Ar geochronology of pseudotachylites in the St Lawrence rift system of southern Quebec. *Geology*, v. **40**, p. 443-446). The two co-workers from the University of Michigan show that the rifting occurred between 613 and 614 Ma, coinciding with a brief period of mafic dyke emplacement in Newfoundland and Labrador. Since the Iapetus Suture occurs not far away from the St Lawrence rift system in eastern Canada the area has now become the best constrained example of what soon became known in the early days of plate tectonics as a Wilson Cycle, representing rift, drift and collision. John Tuzo Wilson (1908-1993), a Canadian descended from French and Scottish settlers, and a pioneer of the modern phase of geology, would be pleased it had finally homed in on terrain he knew well.

Posted in Tectonics | Tagged Iapetus Ocean, Iapetus Suture, Wilson cycle | Leave a comment

Early origins of meat and two veg

Posted on June 1, 2012 by Steve Drury

(Photo credit: Wikipedia)

When and how humans acquired fire on demand and began to cook has long engaged story tellers and historians. Entertaining tales are those of the titan Prometheus, who stole fire from Zeus and then had his liver eaten by an eagle (http://en.wikipedia.org/wiki/Prometheus), and of Bo-bo, who accidentally discovered the barbecue approach to the meat of pigs (http://www.amazingribs.com/BBQ_articles/dissertation_on_roast_pork.html). Despite the secretive pleasures of some French and Ethiopian gourmets, raw flesh is not widely appreciated, although a rare steak comes pretty close. There is nothing wrong with it apart from its usually being tough and prone to deliver spectacular evacuations. Cooking unfolds the proteins in meat making them easier to digest and therefore portions of cooked meat deliver higher nutrition than they would direct from the carcase. Likewise, cooking some vegetables, especially various tubers, breaks down their chemistry to more easily digested and more palatable materials: think 'potato' in this context. In fact many potentially nutritious tubers are positively toxic if not processed and cooked, classic examples being cassava and wild yams.

While some anthropologists consider a change in hominin habits to eating meat *per se*, probably originally as carrion, as the necessary step to a leap in nutrition from which an enlarged brain developed, others favour the harnessing of fire and the invention of cooking that released greater proportions of proteins and carbohydrates from available foodstuffs. Since hominins evolved in distinctly seasonal savannas and open woodland, the shortage of game and directly edible above-ground plant parts in the dry season suggests indirectly that our early ancestors had two possible survival paths open to them: powerful jaws and complex digestive tracts to survive on woody stems or digging up tubers. Respectively, the anatomy and tooth-wear patterns of paranthropoids and early *Homo* to some extent support such a dichotomy that arose from the australopithecines after about 2 Ma ago. Both succeeded and cohabited roughly the same ranges in eastern Africa for as long as a million years.

So pinning down the origin of controlled use of fire is a major goal of Pleistocene archaeology to settle the issue of nutrition and brain growth. Also, it would help explain how hominins were able to diffuse far beyond their home ranges to northern latitudes sufficiently high to place fire as an essential source of warmth at night and in winters. Yet, evidence for habitual use of fire is younger than 400 thousand years among *H. heidelbergensis, H. neanderthalensis* and *H. sapiens*, literally leaving the wide roaming *H. erectus* to shiver as far as scientific proof of hearth and home is concerned. There have been claims of early charring, burnt bones and ashes but until recently such evidence has been ambiguous, largely because fire can start easily and naturally in tinder-rich conditions. There are now, however, advanced microscopic, chemical and physical techniques for estimating temperatures to which bones have been subjected and detecting changes in materials caused by fire, which can be applied to minute samples from sites once occupied by earlier people. One test site for the methods has been the Wonderwerk Cave in South Africa that is known from Acheulean tools and cut bone to have been occupied as long ago as 1.1 Ma. They gave a positive result for the use of fire by the earliest cave occupants (Berna, F, *et al*. 2012. Microstratigraphic evidence of in situ fire in the Acheulean strata of Wonderwerk Cave, Northern Cape province, South Africa. *Proceedings of the National Academy of Science USA*, www.pnas.org/cgi/doi/10.1073/pnas.1117620109 – open access). The same methods had previously been used to establish controlled human use of fire around 400 ka in once occupied caves in Israel, but at Wonderwerk almost triple the age of earliest known use. But they have refuted similar claims from the famous Zhoukoudian site of 'Peking Man' (Asian *H. erectus)* (http://www.unesco.org/ext/field/beijing/whc/pkm-site.htm).

A useful adage is that 'the absence of evidence is not evidence of absence', and it is early days for the routine archaeological use of micromorphology, Fourier transform infrared (FTIR) spectroscopy in the search for human embers. In drylands naturally started fires, either as a result of lightning or spontaneous combustion, are so common that hominins would have been well aware of them, their dangers and perhaps their advantages as regards a free barbecue. Possibly Bo-bo's salivating at the aroma of roast pig from the wreckage of his father house that he had razed to the ground though sheer stupidity would have struck some early hominins as a useful connection between a lucky feast and the still glowing embers of a bush fire. With care, embers can survive for long enough to be carried and used to start controlled fire; a fact not lost on many surviving fully human foragers, and also kids on a South Yorkshire council estate eager for the delights of roasting some 'borrowed' potatoes.

Related articles

- First flames: earliest man-made fire found? (evoanth.wordpress.com)
- Scientists find clue to human evolution's burning question (rawstory.com)
- Roberts R.G. & Bird, M.I. 2012. *Homo* 'incendius'. *Nature*, v. **485**, p. 586-587.