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JORNAL DA CIÊNCIA

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16. Ricardo Brentani: legado para o futuro
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18. Tome Ciência: O uso de animais para salvar vidas humanas
19. Aulas mais instigantes para disseminar a astronomia no Brasil

AMBIENTE BRASIL

Divergências entre ricos e pobres por ajuda marcam conferência climática
Cúpula termina nesta sexta-feira (7) com atritos relativos à ajuda financeira dos países ricos aos em desenvolvimento. Impasse está no cronograma.

Desmatamento cai no Brasil, mas sobe em países vizinhos, diz Imazon
Segundo instituto, Bolívia, Equador e Colômbia puxam a alta na Amazônia. Fatores que afetam a região vão de construção de estradas até mineração.

Promessas da UE não acabam com impasse durante a COP 18, no Qatar
Negociações estão 'à beira do fracasso', segundo grupos ambientalistas. Encontro de duas semanas tem término previsto para esta sexta-feira (7).

Noruega repassa US$ 180 milhões ao Brasil por queda no desmatamento
Verba é parte do Fundo Amazônia, que prevê receber US$ 1 bi até 2015. País europeu repassou quantia devido à redução na devastação florestal.

Brasil registra queda na produção madeireira extrativista, aponta IBGE
A maior queda foi do pinheiro-brasileiro nativo, cuja retração chegou a 15,8%. Em seguida, vem o carvão vegetal, com variação de -10,1%; nó de pinho, com retração de 3,7%; e lenha, com queda de 1,7%.

Às margens da Lagoa dos Patos, butiazal ocupa 800 hectares no RS
Maior floresta de butiás do Rio Grande do Sul fica em Tapes. No local vivem pelo menos 50 espécies ameaçadas de extinção no estado.

EUA podem combater dengue com mosquito geneticamente modificado
Gene defeituoso de inseto afetaria descendentes, reduzindo a população. Experimento ainda aguarda autorização de agência do governo americano.

Custos sociais de Belo Monte chegam a R$ 1 bilhão, diz estudo
Cálculo é conservador e estimativa pode ser maior, diz professor do ITA. Consórcio prevê R$ 3,2 bilhões para compensação dos impactos da usina.

Justiça Federal mantém decisão de retirada de não índios de área de 230 mil hectares em Mato Grosso
Segundo o Ministério Público Federal (MPF) em Mato Grosso, 455 pessoas em 242 imóveis (casas, comércios e fazendas) foram notificadas sobre o prazo entre os dias 7 e 17 de novembro.

Pesquisadores identificam as zonas com maior risco de grandes tremores
Estudo australiano analisou 1.500 terremotos e juntou dados de mapas. Quase 90% dos piores incidentes do século 20 foram em 2 tipos de região.

Meteorologia descarta El Niño no começo de 2013
Centro de Prevenção Climática dos EUA afirma que fenômeno meteorológico não acontecerá antes de meado do primeiro semestre do próximo ano.

Paleontólogos do Triângulo Mineiro acham fósseis de peixe que viveu há 85 milhões de anos
A espécie, segundo o coordenador da pesquisa, Agustín Martinelli, viveu na época dos dinossauros, há 85 milhões de anos.

Brasil detém segunda maior área florestal do planeta
O Brasil tem 516 milhões de hectares de florestas, o equivalente a 60,7% do território nacional, ficando atrás apenas da Rússia.

Mais de 30% das terras indígenas na Amazônia sofrerão impacto por causa de hidrelétricas, diz procurador
Na avaliação do procurador Felício Pontes, do Ministério Público Federal no Pará, o projeto do governo brasileiro, que prevê a instalação de 153 empreendimentos nos próximos 20 anos, também vai afetar a vida de quase todas as populações tradicionais amazonenses.

Fiscalização constata destruição da Mata Atlântica no Vale do Ribeira/SP
Cerca de 750 mil metros quadrados foram desmatados. Proprietário terá que pagar multa de R$ 2,5 milhões e poderá ser preso.

Colisão de cometas abriu buracos na superfície da Lua, afirmam cientistas
Informações foram reveladas a partir de medições de sondas da Nasa. Estudo sobre o tema foi publicado nesta quinta-feira na revista 'Science'.

Elefante tem presas e cauda cortadas por caçadores e morre na Índia
Ataque ocorreu nesta quinta-feira (6) em Goalpura, no nordeste do país. Em foto, animal aparece deitado em poça de lama após lutar pela vida.

Contaminação por mercúrio dobra nos mares em cem anos, diz estudo
Série de nove pesquisas mapeia presença do metal pesado nos oceanos. Um terço do mercúrio lançado no ar tem origem humana, dizem cientistas.

Ministra brasileira defende extensão do Protocolo de Kyoto na COP 18
Izabella Teixeira, do Meio Ambiente, discursou nesta quarta-feira em Doha. Ela apresentou ainda iniciativas do país para reduzir as emissões de gases.

Ninhos de Gavião-real em RO são monitorados por biólogos do Inpa
Em Cacoal há três ninhos da ave que está em extinção. Objetivo é acompanhar a vida e o desenvolvimento do animal.

Programa Cidades Sustentáveis será adotado por 191 prefeitos eleitos em outubro
O objetivo é colocar a sustentabilidade na agenda dos partidos políticos e candidatos para que os eleitos incorporem as metas propostas aos seus programas de governo. No total, 555 candidatos aderiram à iniciativa.

Coreia do Sul desiste de retomar caça das baleias
Ministério da Pesca afirmou que país vai continuar as pesquisas sem matar o animal.

Operação apreende 20 mil alevinos de aruanã em Tabatinga, no Amazonas
Três pessoas foram presas em flagrante e responderão por crime ambiental. Peixes seriam comercializados na Colômbia e foram devolvidos à natureza.

Sondas Grail revelam que asteroides danificaram crosta lunar
A intensidade de choques, muito maior que o previsto, criou fraturas e maior porosidade na crosta lunar. Cientistas afirmam que estudo sobre a Lua revela muito sobre passado da Terra.

Pontas de cigarro usadas em ninhos protegem aves de ácaros, diz estudo
Aves que vivem em áreas urbanas podem usar objeto para fazer o ninho. Autor considerou o resultado 'inesperado'.

"Feijão verde": astrônomos descobrem novo tipo de galáxia
Chamada de "feijão verde" devido à sua aparência incomum. Elas brilham sob intensa radiação emitida por buracos negros centrais supermassivos e estão entre os objetos mais raros do universo.

Termoelétricas desativadas vão gerar economia de mais de R$ 207 milhões
Economia será com gastos com a compra de óleo diesel, em Rondônia. Localidades farão parte do Sistema Interligado Nacional, diz Eletrobras.

Redução de savanas na África ameaça vida de leões, aponta estudo
Em pouco mais de 50 anos, população de leões caiu 68%. Avanço demográfico sobre reservas seria um dos principais problemas.

Dinossauro que pode ser o mais antigo é descoberto em museu
'Nyasasaurus parringtoni' viveu há cerca de 245 milhões de anos. Estudos anteriores sobre fóssil que estava na Inglaterra eram inconclusivos.

"Exportação" da poluição de países ricos movimenta conferência do clima
Resultados recentes sobre a distribuição mundial das emissões de carbono esquentaram as discussões sobre a chamada terceirização da poluição, que acontece quando países ricos deslocam suas fábricas e indústrias muito poluidoras para outras nações.

Cerca de 990kg de pescado ilegal são apreendidos em Amaturá, no AM
Pirapitingas e tambaquis estavam escondidos em porão de embarcação. As duas espécies de peixe estão protegidas pelo período de Defeso.

Missão de mais de um ano preparará astronautas para viagens longas
O astronauta Scott Kelly, da Nasa, e o cosmonauta Mikhail Kornienko, da Roscosmos, participarão da missão, que será a mais prolongada para um americano.

Fim do mundo: 12% dos americanos acreditam; Nasa desmente
12% dos americanos acredita ser verdadeiro o prognóstico dos maias que fixa o fim para o próximo dia 21 de dezembro, assim como 20% dos chineses, 13% dos mexicanos, 12% dos argentinos e 10% dos espanhóis.

Algas em ambientes pobres em nutrientes são mais suscetíveis às mudanças climáticas
Aumento da temperatura e diminuição da acidez das águas dos mares podem provocar mudanças nas comunidades de algas estruturadoras de habitats costeiros, apontam experimentos realizados por grupo internacional.

Clima extremo é o novo normal, diz secretário-geral da ONU
Ban Ki-moon afirmou em Conferência do Clima que sinais de mudança estão aparentes em todo lugar e "dos Estados Unidos à Índia, da Ucrânia ao Brasil, a seca dizimou lavouras".

Países em desenvolvimento também têm que cortar emissões, diz estudo
Nações mais pobres não podem dizer que culpa é só dos governos ricos. Avaliação divulgada nesta terça-feira foi feita por economistas britânicos.

Discussão sobre extensão de Kyoto acelerou, diz negociador brasileiro
Discussão sobre transferência de tecnologia e financiamento estaria travada. Embaixador Luiz Alberto Figueiredo falou a jornalistas na COP 18, em Doha.

Reino Unido anuncia financiamento voltado a ajuda climática
O Reino Unido anunciou que pretende pagar 1,8 bilhões de libras - pouco mais de 6 bilhões de reais - voltado a ajuda climática a países em desenvolvimento entre o ano que vem e 2015.

Palmeira Juçara: emprego e renda
A conservação do bioma Mata Atlântica e geração de emprego e renda a partir do uso sustentável da Palmeira Juçara são temas da Oficina de Elaboração do Plano de Melhoria da Cadeia de Valor da Polpa dos Frutos da Palmeira Juçara, que acontece até quarta-feira (5), em Porto Alegre (RS).

África apresenta propostas em agenda de quatro pontos para COP 18
Segundo os líderes africanos, o encontro pode terminar como um dos "menos produtivos desde 2009", quando foi realizada a reunião em Copenhague.

Nova lâmpada feita de plástico é aposta para o futuro da iluminação
Segundo inventor, dispositivo tem vida útil de até dez anos.

Pico do Jaraguá (SP) registra mais raios ascendentes do que a média mundial
Número de descargas atmosféricas que partem do solo e se propagam em direção a nuvens registrado em um mês é superior ao observado durante um ano no Empire State Building, em Nova York.

Indígenas cobram agilidade do STF em processos sobre demarcação de terra
Lideranças indígenas participaram na terça-feira (4) de audiência no Supremo Tribunal Federal para cobrar agilidade na solução de processos envolvendo demarcação de terras.

Voyager 1 finalmente está próxima de sair do Sistema Solar
Sistemas da sonda, lançada em 1977, indicam que no máximo em dois anos ela será o primeiro equipamento humano a percorrer o espaço interestelar.

Rinocerontes são levados da Grã-Bretanha para a África
A expectativa dos ambientalistas é a de que haja um aumento na população local e até mesmo a de que os rinocerontes vindos da Inglaterra possam ser soltos no futuro.

Em 9 países, floresta amazônica perdeu 240 mil km² de 2000 a 2010
Número é de rede de ONGs que levantou dados do Brasil e vizinhos. Ambientalista diz que Amazônia pode sofrer mais com 'novas ameaças'.

Pela 1ª vez, cientistas fotografam códigos genéticos de DNA
Enzo di Fabrizio, pesquisador da Universidade de Gênova, na Itália, desenvolveu a técnica que "puxa" fitas de DNA entre dois pilares minúsculos de silicone, para depois fotografá-las com um microscópio de elétrons. Até este ponto, a técnica registra sete tiras de DNA que estão envolvidas com o que se refere a uma "corda".

Piscicultores já podem criar tambaqui no Rio Tocantins
A preservação e cultivo do tambaqui na Bacia do Tocantins fazem parte do Plano Safra da Pesca e Aquicultura, que destina R$ 4,1 bilhões em crédito para investir no setor, com juros reduzidos e maior prazo de carência.

Tufão Bopha causa mais de 40 mortes nas Filipinas, diz TV local
Mais de 50 mil filipinos tiveram que deixar suas casas nesta terça-feira (4). Tufão tocou a terra na ilha de Mindanao, sul do país, durante o amanhecer.

Chineses querem plantar legumes em Marte e na Lua no futuro
Experiência científica preliminar feita em Pequim teve sucesso, diz agência. Sistema usa plantas e algas e permite a colheita de vegetais frescos.

ONGs pedem na COP 18 que países ricos reparem 'injustiça' com pobres
Carta pede que nações levem em conta danos por mudança climática. Cúpula climática da ONU realizada no Qatar entrou em semana decisiva.

Verba para prevenção a desastres está sujeita a série de exigências, diz governo
Para a liberação dos recursos para projetos de prevenção e combate a desastres no país, municípios e Estados beneficiários devem cumprir itens, de acordo com a União.

Polícia investiga desaparecimento de cacique Tembé no Pará
Polícia Federal faz buscas para localizar o líder indígena Valdeci Tembé. Ele teria sumido da reserva Alto Rio Guamá no último sábado.

Exposição Brazilian Nature abre na Baviera nesta terça
Resultado de uma parceria entre a Fapesp e o Museu Botânico de Berlim, a exposição mostra o trabalho de documentação feito por Carl Friedrich Philipp von Martius (1794-1868), reunido na obra Flora brasiliensis, que 171 anos depois da publicação de seu primeiro volume permanece como o mais completo levantamento da flora brasileira.

Cientista diz que mistério da 'ilha fantasma' do Pacífico foi solucionado
Pesquisador apontou erro em marcação feita por baleeiro em 1876. Polêmica começou quando grupo de navegadores não encontrou território.

Governo usou só 48% da verba para evitar desastres
Até novembro, apenas R$ 2,1 bi dos R$ 4,4 bi previstos foram utilizados.

Campanha de conservação aumenta população de gorilas na África
Uganda divulga que população de gorilas da montanha aumentou para 880, graças a programas de orientação para remoção de armadilhas de caçadores.

Agrotóxicos na água podem ser causa de alergias
Estudo americano relaciona aumento de casos alérgicos a componente químico presente em pesticidas.

Cinco novos peixes recebem nomes de presidentes e ex-vice dos EUA
Espécies foram batizadas de Clinton, Roosevelt, Obama, Carter e Al Gore. Pesquisadores querem chamar a atenção para preservação no país.

Primeira análise de solo de Marte do Curiosity não traz surpresas
Instrumentos químicos do jipe-robô encontraram vapor de água, cloro e enxofre no solo marciano, mas nada de composto orgânicos.

Grilos usam 'remos' nas patas para saltar de dentro da água, diz estudo
Animal do tipo 'pigmeu' possui estrutura similar a remos nas patas traseiras. Estudo foi publicado no periódico 'Current Biology', nesta segunda-feira (3).

Nasa apresenta dado inconclusivo sobre possível orgânico em Marte
Agência fez apresentação sobre resultados do Curiosity. Havia especulações de que ela confirmaria achado de material orgânico.

Brasil avalia políticas agroambientais para intercâmbio com países da América Latina e Caribe
Trabalhadores rurais, representantes de comunidades indígenas e do setor privado estão reunidos em Brasília e vão elaborar um documento apontando os resultados positivos e os gargalos das experiências brasileiras, criadas para garantir sustentabilidade às atividades agrícolas.

Indígenas Kaiowá-Guarani usam fogão ecológico como tecnologia social
Com baixo custo de implementação, o fogão traz melhorias para a saúde das famílias, além de beneficiar o meio ambiente.

China, Índia e Brasil emitiram mais CO2 em 2011, diz pesquisa
EUA e União Europeia produziram menos gás carbônico, segundo dados levantados por universidade britânica.

COP18: 90 países estão longe de ser sustentáveis em energia
Ao analisar 22 diferentes indicadores, o Índice de Sustentabilidade Energética do WEC considera que os 10 melhores destaques de 2012 são Suécia, Suíça, Canadá, Noruega, Finlândia, Nova Zelândia, Japão, França e Áustria, respectivamente.

Na Nasa há 24 anos, brasileira atuou em projetos de jipes de Marte
Das oito sondas que conseguiram realizar a difícil aterrissagem no planeta vermelho, quatro tiveram a participação da engenheira carioca Jacqueline Lyra: o pequeno Sojourner, em 1997, os robôs gêmeos Spirit e Opportunity, em 2004, e agora o Curiosity.

Copa 2014 vai gerar 11 milhões de toneladas de CO2; pegada é de duas toneladas por turista
Até o momento, nenhuma sede brasileira apresentou um plano de contenção ou compensação pela emissão de carbono na preparação, na realização e no pós Copa 2014.

Educação deve garantir a quilombolas acesso a conhecimentos tradicionais de seu povo, diz Fundação Palmares
Segundo a Fundação Cultural Palmares, existem 3.754 comunidades remanescentes de quilombos espalhadas pelo Brasil, a maioria concentrada nos estados do Maranhão, da Bahia e de Minas Gerais. Ao todo, as comunidades abrigam 130 mil famílias.

Encontrados indícios de tsunami em lago suíço no século 6
Pesquisadores encontraram depósitos de sedimentos no Lago Genebra que indicam a ocorrência de um tsunami de oito metros na cidade, em 563.

Cientistas querem exterminar ratos de ilha para preservar animais locais
Desratização vai acontecer na Geórgia do Sul, pertencente ao Reino Unido. Roedores atacam filhotes de aves como os pinguins e o albatroz.

Foguete Soyuz com satélite Pleiades B é lançado com sucesso
Trata-se de um sistema dual de observação da Terra que fornecerá imagens ópticas de alta resolução para missões civis e de defesa.

Petróleo cria dilema para esquimós no Alasca
Comunidade teme que exploração de recursos naturais vai ameaçar uma atividade tradicional e vital: a caça a baleias.

Aves adaptam canto de acordo com volume de ruído urbano, diz estudo
Pesquisa analisou 21 espécies que vivem no Brasil e no México. Pássaros escolheriam canto que menos se deteriora no ambiente.

Nova usina solar impulsiona energia limpa na Costa Rica
Parque Solar Miravalles produz eletricidade suficiente para 600 casas. Hidrelétricas e eólicas já representam mais de 90% da geração no país.

Cientistas estudam cidades para achar benefícios do aquecimento global
Pesquisadores da Universidade de Columbia avaliarem crescimento de plantas em Nova York e descobriram que aumento de CO2 melhora crescimento de árvores.

Lima abre "pequena Pompeia" com maior achado arqueológico
O achado arqueológico guarda vestígios de quatro séculos de história e cinco fases construtivas diferentes, que vão desde a época pré-hispânica até o primeiro século de independência do Peru.

Demora da Justiça retarda conclusão de processos demarcatórios, diz presidenta da Funai
"Demora uma geração e, por isso, há jovens que crescem em acampamentos, impedidos inclusive de acessar a reprodução da própria cultura, já que não têm acesso efetivo a suas terras."

Gel com extrato de planta amazônica pode prevenir câncer de pele, diz USP
Substância da almecegueira foi usada em pesquisa em Ribeirão Preto, SP. Eficácia contra raios UV foi evidenciada após testes em camundongos.

Empresas paulistas trocam controle químico de pragas pelo biológico
Propriedades em SP utilizam tecnologia alternativa para combater pragas. Produzir sem usar veneno é o desafio de muitos agricultores.

Mudanças do clima ameaçam ilhas do Pacífico, alerta órgão da ONU
Segundo o Pnuma, as ilhas estão enfrentando desafios jamais vistos às suas economias e ao seu meio ambiente. Entre os problemas estão o aumento do nível do mar, ciclones tropicais, cheias e secas, entre outros.

Secretária da ONU para o clima diz faltar ambição a países na COP 18
Economia tirou mudança climática do holofote, disse Christiana Figueres. Conferência realizada em Doha, no Qatar, entrou nesta sexta em seu 5º dia.

Cientistas de Cambridge criam células-tronco do sangue
A pesquisa mostra que essas células-tronco podem ser usadas no combate às doenças de circulação e do coração.

Prática agroflorestal fortalece assentamentos de Reforma Agrária
Projeto de proteção e recuperação ambiental aliado ao resgate da dignidade de vida de famílias agricultoras nos assentamentos está sendo viabilizado pela prática agroflorestal em diversas localidades do país.

Navio de apoio oceanográfico Ary Rongel participa da 31ª Operação Antártica
O navio terá como tarefa principal dar apoio logístico à Estação Antártica Comandante Ferraz e aos trabalhos de montagem dos módulos antárticos emergenciais, que servirão de base para a continuação dos trabalhos de pesquisa na base, completamente destruída por um incêndio na madrugada do dia 25 de fevereiro deste ano.

França prevê produzir 1ª vacina contra dengue em até 4 anos
Segundo a Organização Mundial da Saúde, entre 50 e 100 milhões de casos são registrados a cada ano em mais de 100 países.

Projetos de energia eólica são maioria entre aprovados para leilão da Empresa de Pesquisa Energética
O Leilão A-5 objetiva suprir a demanda projetada das empresas distribuidoras para o ano de 2017. Os 525 projetos com habilitação técnica para participar da licitação envolvem a geração de 14.181 megawatts (MW).

Pesquisa 'mais completa' em pólos mostra aceleração no degelo
Após diversas polêmicas sobre o fenômeno, pesquisadores de diferentes países usaram imagens feitas por 10 de satélites e amostras no decorrer dos últimos 20 anos para elaborar um relatório aparentemente conclusivo sobre o tema.

Cientistas criam novo meio para usar energia nuclear no espaço
Teste transformou calor de reator atômico em eletricidade usando motor. Sistema pode alimentar sondas espaciais no futuro, dizem cientistas.

Promessas para conter emissões de gases não são suficientes, diz estudo
ONG afirma que política atual de países não vai limitar aquecimento. Dados foram divulgados durante conferência climática da ONU, no Qatar.

'Estamos esperando há 20 anos', diz indígena sobre demarcação em MS
Equipe do governo federal participa de reunião em Campo Grande. Encontro conta com membros de etnias guarany-kaiowá e terena.

'Rio ancestral' formou Grand Canyon há 70 milhões de anos, sugere estudo
Pesquisa da 'Science' analisou grãos que mostraram idade de desfiladeiro. Grand Canyon chega a ter 1,5 km de profundidade em alguns pontos.

Trem cai em riacho e provoca risco de contaminação ambiental nos EUA
Trem de carga saiu dos trilhos ao passar por ponte que cedeu. Moradores de três cidades foram orientados a permanecer em casa.

Abrigo britânico resgata ouriços desnutridos após enchentes
Entidade recebe animais abaixo do peso e fragilizados por clima úmido e frio do verão britânico.

Rio vai ganhar primeiro centro de excelência de redução de riscos da América do Sul
O centro deve possibilitar uma maior integração entre os especialistas de várias áreas, além do alinhamento com as políticas internacionais de prevenção de desastres. "Isso vai facilitar muito esse link com as Nações Unidas.

2011 foi o ano mais quente registrado na Suíça, afirma órgão climatológico
Foi o ano mais quente desde que as medições começaram, em 1864. MeteoSwiss informou que temperatura foi acima da média em 11 meses.

Suprema Corte dos EUA vai decidir se gene humano pode ser patenteado
Tribunal vai avaliar pedido de empresa em patentear genes ligados a câncer de mama e de ovário. Decisão será divulgada em junho.

26 / 11 / 2012 Pesquisa aponta processo mais rápido para produzir vacina de gripe
Método dispensa culturas de células ou ovos, que hoje são essenciais. Medicamento foi testado com sucesso em camundongos, porcos e furões.

26 / 11 / 2012 Peixes de várias espécies aparecem mortos em lago de Mato Grosso
Lago fica em área de preservação permanente em Porto Alegre do Norte. Sema disse que há outros cinco lagos na região com o mesmo problema.

26 / 11 / 2012 Caramujos africanos aparecem nos quintais no período chuvoso em MT
Doutora em biociência explica como eliminar bichos dos quintais. Responsabilidade da limpeza dos terrenos baldios é da prefeitura.

26 / 11 / 2012 Grupo promove ação ambiental às margens de rio em Campinas/SP
'Reviva o Rio Atibaia' completou 15º aniversário neste domingo (25). Projeto ofereceu mudas de plantas nativas da Mata Atlântica ao público.

26 / 11 / 2012 Ministra do Meio Ambiente participa de evento em Arraial do Cabo/RJ
Encontro de Reserva Extrativistas Costeiro-Marinhas começa no dia 26. Evento reúne representantes de várias cidades do país.

26 / 11 / 2012 Descoberto dinossauro com chifres anterior ao Triceratops
Xenoceratops foremostensis viveu há 80 milhões de anos no Canadá, e é o mais antigo dinossauro deste tipo a ser encontrado no país.

26 / 11 / 2012 Chuvas amenizam situação de produtores baianos; alguns perderam todo o rebanho
A pecuária local foi a atividade mais afetada pela estiagem em todo o Semiárido nordestino.

26 / 11 / 2012 Brasileiros ajudam a desvendar segredos de 'irmão' de Plutão
Descoberto em 2005, esse planeta anão é aproximadamente esférico (suavemente oval) e tem cerca de 1.450 km de diâmetro. Mas a grande surpresa do novo estudo é que, diferentemente de Plutão, Makemake não tem uma tênue atmosfera global.

26 / 11 / 2012 Pássaro gigante pré-histórico era 'dócil herbívoro', diz estudo
Conhecido como Diatryma, ave não era um predador assustador como se acreditava, dizem cientistas.

26 / 11 / 2012 Novas estrelas ficam cada vez mais raras
Astrônomos afirmam que taxa de natalidade de estrelas está reduzindo drasticamente.

26 / 11 / 2012 Homem pesca tubarão-cabeça-chata de 200 kg em Porto de Galinhas/PE
Esse foi o quarto tubarão capturado na região metropolitana do Recife somente no mês de novembro.

26 / 11 / 2012 No Qatar, países voltam a negociar medidas contra mudanças climáticas
Continuidade do Protocolo de Kyoto terá destaque na COP 18, em Doha. Negociadores brasileiros explicam dificuldades do processo.

26 / 11 / 2012 Brasil quer garantir no Catar metas ambientais para o mundo a partir de janeiro
A nova fase do acordo é a maior expectativa do Brasil e, talvez, a única aposta de especialistas, como saldo da COP18, que prossegue até 7 de dezembro.

26 / 11 / 2012 Em conferência sobre clima, ambientalistas vão pressionar por respostas concretas dos países
Para as organizações ambientais que vão acompanhar os debates, do dia 26 de novembro a 7 de dezembro em Doha, o evento tem que servir, ao menos, para "pavimentar o caminho" para as futuras propostas e metas a serem assumidas pelos países.

26 / 11 / 2012 Empresários preocupados com implementação de metas definidas na COP18
Empresários de várias partes do mundo, que participarão como observadores da COP18, que começa nesta segunda-feira (26), em Doha (Catar), estarão preocupados e discutirão sobre as limitações do setor para acompanhar os compromissos acertados entre os países.

27 / 11 / 2012 Pessimismo marca abertura de reunião climática da ONU no Qatar
Quase 200 nações estão reunidas a partir desta segunda (26) em Doha. Meta é buscar novo acordo contra o aquecimento global a partir de 2020.

27 / 11 / 2012 Furacão Sandy custou mais de 42 bilhões de dólares a Nova York
A supertempestade de 29 de outubro inundou o metrô, arruinou milhares de casas na região de Nova York e interrompeu a eletricidade em vários pontos da cidade durante dias, além de causar escassez de combustível.

27 / 11 / 2012 Parede usa água da chuva para criar sons e atrai turistas na Alemanha
Criativo sistema de canos, funis e ralos foi montado em um pátio na cidade de Dresden.

27 / 11 / 2012 Governo fecha nesta semana acordo que dará acesso de Estados ao Cadastro Ambiental Rural
O banco de dados será alimentado pelos próprios produtores, pela internet - o modelo será parecido com o da Declaração do Imposto de Renda.

27 / 11 / 2012 Cientistas da USP desenvolvem superadesivo para bicos de aves
Técnica permite reconstituição de bicos com diferentes tipos de próteses. Procedimento com peça de metal foi realizado por veterinários em ganso.

27 / 11 / 2012 Parceria evita colisões entre barcaças e baleias na região de Abrolhos
Criar um bom sistema de "semáforos" marinhos é crucial para esse pedaço da costa brasileira porque ele combina elementos que aumentam o risco de colisões.

27 / 11 / 2012 Ativistas filipinos acendem velas em memória a golfinho morto
Ato nesta segunda relembrou golfinho Wen Wen, morto na última semana. Animal era um dos 25 que eram motivo de batalha judicial com empresários.

27 / 11 / 2012 1º clone de equino no país tem DNA de garanhão que teve 1.648 filhotes
Cavalo carrega material do Mangalarga Turbante, que viveu em Rio Pardo. Com técnica criada em Mogi Guaçu, Turbantinho nasceu há

10 semanas.

27 / 11 / 2012 Aumenta número de baleias jubarte encalhadas no Brasil
Segundo levantamento do Projeto Baleia Jubarte, 44 animais da espécie encalharam na costa do País este ano, contra 39 de 2011.

27 / 11 / 2012 Indonésia tem papel feito de fezes de elefante
Fibras presentes no estrume são lavadas e desinfetadas. A polpa resultante é prensada e transformada em folhas.

27 / 11 / 2012 Desastres naturais no Brasil causaram perdas de R$ 15 bilhões, revela Banco Mundial
Os estudos se referem às enchentes em Santa Catarina em 2008, às chuvas em Alagoas e Pernambuco em 2010 e às inundações e deslizamentos de terra na Região Serrana do Rio de Janeiro em 2011.

27 / 11 / 2012 Morre chimpanzé que se comunicava por linguagem de sinais
Dar, como era chamado, era o segundo membro mais novo de uma família de macacos e era um dos três chimpanzés que se comunicavam por sinais na Universidade Central de Washington.

27 / 11 / 2012 Governo federal e Unicef iniciam diagnóstico de proteção à infância nos desastres naturais
O objetivo é conhecer as condições de atendimento oferecido pelos órgãos públicos às crianças e aos adolescentes em episódios desse tipo.

27 / 11 / 2012 Nova espécie de lagartixa é descoberta no nordeste da Austrália
'Diporiphora ameliae' foi vista em local de criação de gado em Queensland. Regiões áridas do país têm a maior diversidade de répteis do mundo.

27 / 11 / 2012 Maior acidez do mar dissolve concha de criaturas marinhas, diz estudo
Pesquisa indica que mudanças climáticas estão afetando elo importante do ecossistema do mar.

SCIENCE

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Upper Ludfordian Black Shales as Indicators of Euxinic Conditions, Subpolar Urals
A. I. Antoshkina, O. V. Valyaeva, S. I. Isaenko, and O. S. Prots'ko p.1038 abstract

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Probing the Earth's mantle using noise
Posted on December 4, 2012 by Steve Drury | Leave a comment

Artistic impression of a global seismic tomogram – beneath Mercator projection – dividing the mantle into 'warm' and 'cool' regions (Credit: Cornell University Geology Department – http://www.geo.cornell.edu/geology/classes/Geo101/graphics/s12fsl.jpg)
It goes without saying that it is difficult to sample the mantle. The only direct samples are inclusions found in igneous rocks that formed by partial melting at depth so that the magma incorporated fragments of mantle rock as it rose, or where tectonics has shoved once very deep blocks to the surface. Even if such samples were not contaminated in some way, they are isolated from any context. For 20 years geophysicists have been analysing seismograms from many stations across the globe for every digitally recordable earthquake to

use in a form of depth sounding. This seismic tomography assesses variations in the speed of body (P and S) waves according to the path that they travelled through the Earth.

Unusually high speeds at a particular depth suggests more rigid rock and thus cooler temperatures whereas hotter materials slow down body waves. The result is images of deep structure in vertical 2-D slices, but the quality of such sections depends, ironically, on plate tectonics. Earthquakes, by definition mainly occur at plate boundaries, which are lines at the surface. Such a one-dimensional source for seismic tomograms inevitably leaves the bulk of the mantle as a blur. But there are more ways of killing a cat than drowning it in melted butter. All kinds of processes unconnected with tectonics, such as ocean waves hitting the shore and interfering with one another across the ocean basins, plus changes in atmospheric pressure especially associated with storms, also create waves similar in kind to seismic ones that pass through the solid Earth.

Such aseismic energy produces the background noise seen on any seismogram. Even though this noise is way below the energy and amplitude associated with earthquakes, it is continuous and all pervading: the cumulative energy. Given highly sensitive modern detectors and sophisticated processing much the same kind of depth sounding is possible using micro-seismic noise, but for the entire planet and at high resolution. Rather than imaging speed variations this approach can pick up reflections from physical boundaries in the solid Earth. Surface micro-seismic waves exactly the same as Rayleigh and Love waves from earthquakes have already been used to analyse the Mohorovičić discontinuity between crust and upper mantle as well as features in the continental crust; indeed the potential of noise was recognized in the 1960s. But the deep mantle and core are the principle targets, being far out of reach of experimental seismic surveys using artificial energy input. It seems they are now accessible using body-wave noise (Poli, P. et al. 2012. Body-wave imaging of Earth's mantle discontinuities from ambient seismic noise. Science, v. 338, p. 1063-1065).

Poli and colleagues from the University of Grenoble, France and Finland used a temporary network of 42 seismometers laid out in Arctic Finland to pick up noise, and sophisticated signal processing to separate surface waves from body waves. Their experiment resolved two major mantle discontinuities at ~410 and 660 km depth that define a transition zone between the upper and lower mantle, where the dominant mineral of the upper mantle – olivine – changes its molecular state to a more closely packed configuration akin to that of the mineral perovskite that is thought to characterize the lower mantle. Moreover, they were able to demonstrate that the 2-step shift to perovskite occupies depth changes of about 10-15 km.

Applying the method elsewhere doesn't need a flurry of new closely-spaced seismic networks. Data are already available from arrays that aimed at conventional seismic tomography, such as USArray that deploys 400 portable stations in area-by-area steps across the United States (http://earth-pages.co.uk/2009/11/01/the-march-of-the-seismometers/)

It is early days, but micro-seismic noise seems very like the dreams of planetary probing foreseen by several science fiction writers, such as Larry Niven who envisaged 'deep radar' being deployed for exploration by his piratical hero Louis Wu. Trouble is, radar of that kind would need a stupendous power source and would probably fry any living beings unwise enough to use it. Noise may be a free lunch to the well-equipped geophysicist of the future.

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Breakthrough in human tools: the scene shifts to Africa
Posted on November 22, 2012 by Steve Drury | 1 Comment
A means of assessing the cognitive abilities of hominins is through the objects that they created, whether tools or artefacts with apparent symbolic significance. The latter include pigments, coloured shells, beads, artwork or even deliberately parallel and crossing lines gouged on otherwise innocuous rock. Undoubtedly valuable to their creators, possibly treasured and passed on until lost or broken – most are fragile – symbolic artefacts are rare. So although they shout 'thoughtful', their age tells us little about when such a capacity first arose. Many archaeologists and palaeoanthropologists assert that creating and/or manipulating symbols may signify a link with being able to speak. Tools are a lot easier to find, probably as discards and lost items, and a well-described and understood sequence of forms and sometimes uses has been established, which extends as far back as perhaps 3 Ma – before the genus Homo appeared.

In terms of their meaning in terms of the consciousness of their makers and users, there are possibly four major recognisable steps. Chimpanzees and some birds can learn to pick up natural objects, such as stones and twigs, and use them: some bands of chimps even retain the knowledge. A step beyond that is preparing a natural object for use, as with breaking a pebble to create a cutting edge: something not exclusively human because it is possible that pre-human hominins created the earliest such Oldowan tools. Being able to visualise hidden potential inside something natural is altogether more advanced, and is represented by the iconic bi-face or Acheulean 'hand-axe'. Its earliest makers, H. ergaster and erectus, literally brought such objects to light by skilfully knapping away the outer parts of substantial lumps of suitable rock. The knowledge endured for more than a million years but was eventually added to and superseded by a range of more delicate and specific stone tools, but more sophisticated tools represented the same 'liberation' of a simple idea held in rock. The fourth general cognitive leap was to add several resources together as composite tools, and arguably we have not long emerged from that phase with the creation of composite tools that help us design and make other tools: a machine-tool culture.

Example of a microlith (credit: Wikipedia)
It is that penultimate step-up in consciousness that has been engaging archaeologists since they first realised that some small, sharp chips of stone were not waste but deliberately crafted for combination with wood or bone. Such 'microliths' have been found in intact arrows and sickles of the Meso- and Neolithic, but their range steadily goes back in time with more research. Unmistakeable microliths have now been discovered at the South African coastal site at Pinnacle Point, in an occupation layer that is 71 ka old (Brown, K.S. and 8 others 2012. An early and enduring advanced technology originating 71, 000 years ago in South Africa. Nature, v. 491, p. 590-593).

The Pinnacle Point technology was indeed sophisticated, microlith manufacture requiring fire treatment as well as choice of rock and careful shaping and sharpening. As well as extending the microlith culture back so far the team of South African, US, Australian and Greek archaeologists compared them with 28 later African tool kits. The designs have barely changed from 71 ka to those of the last few

hundred years. Kyle Brown and colleagues show that the industrial method endured, thereby laying to rest the somewhat reactionary notion that the methods were lost again and again in Africa after separate inventions and were only taken up decisively by the supposed 'advanced' anatomically modern humans who colonised Europe…

It is difficult to see how the Pinnacle Point microliths could have been useful, unless hafted in arrows or throwing sticks – maybe even saws and sickles? Crucially, they predate larger blade-tools that could have been hafted to form spears. The focus must now shift to the Zambian scene where possible microliths are reported at two 250 ka sites. If confirmed, they would link the decisive fourth cognitive step towards humanity with the very origin of fully modern humans, rather than a much later, non-African dawning of 'smarts' along with language, advanced art and much else in the chilly caves of southern Europe.

Of all human-colonised continents Africa lags far behind the rest as regards spread and density of archaeological digs. Only the 'famous' sites attract resources for investigation. Imagine what might emerge once there are more local people with research skills, equipment and transport; and, dare I say it, more independence of action and the attendant confidence in their ability.

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A glimpse of the Hadean
Posted on November 22, 2012 by Steve Drury | Leave a comment
There is something deeply unsatisfying, even untidy, about a geoscientific history from which the first half billion years is more or less a blank. Every likely stone has been turned and every isotope hurled as a curve-ball through a mass spectrometer in the quest for either direct evidence of Hadean events or an acrid whiff that lingers in later matter. All, that is, except for one…

Formed in a proposed supernova that likely helped trigger formation of the Sun and Solar System, 150Gd quickly decayed to produce 146Sm, which itself had a half-life of about 68 Ma. That is too short for any significant trace of that radioactive rare-earth element to remain in terrestrial rocks, but its daughter isotope 142Nd bears witness to its former existence. Checking the proportion of 142Nd against the heavier 144Nd is a means of assessing isotopic fractionation according to atomic mass between a solid source of a magma, and between residual magma and solids that crystallised from it.

A popular and well-supported view of the Hadean is that shortly after accretion of the Earth a stupendous impact left a deep 'ocean' of magma and flung off mass that produced the Moon. Solidification of that ocean, which would have involved denser minerals sinking and lighter ones rising to higher levels, has been suggested to have resulted in differentiation of the mantle into two portions, one enriched, the other depleted; an event on which the entire later geochemical history of our planet has depended. Should either part of the mantle melt again, the igneous rocks that would result should carry a neodymium isotope signature of one or the other. Little sign of either emerges from studies of igneous rocks younger than 2.5 Ga, but older rocks from Greenland that go back to 3.8 Ga demonstrate that almost all of them melted from the Hadean depleted mantle. Without rocks carrying 142Nd/144Nd ratios signifying the other side of the more ancient mantle division, an enriched source, the grand idea was flawed. But this one-sidedness appears now to have been balanced by other Archaean igneous rocks (Rizo, H. et al. 2012. The elusive Hadean enriched reservoir revealed by 142Nd deficits in Isua Archaean rocks. Nature, v. 491, p. 96-100).

3.8 billion year-old Amitsoq gneisses, West Greenland (Image credit: Stephen Moorbath, via Royal Society)
The analysed rocks are interesting for another reason, for they are 3.4 Ga old vertical sheets of basalt or dykes that cut through the more ancient west Greenland crust. They are the first evidence of a brittle crust that cracked under tension to be followed by mantle-derived magma. Some members of the Ameralik dyke swarm show just the isotopic signature predicted for the enriched member of the postulated fundamental mantle division. However, for some yet to be recognised reason, few post-Archaean rocks show any sign of widespread mantle heterogeneity. Such matters could be addressed with any confidence only after mass spectrometry allowed precise discrimination between isotopes of a whole variety of both common and rare elements. That was not so long ago, so a rich trove of future revelations can be anticipated.

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Artist's depiction of the asteroid impact 65 million years ago that caused the K-T mass extinction. (Photo credit: Wikipedia)
Just in time for the festive season I have been sent the URL for an on-line impact simulator written by a team from Imperial College London and the University of Arizona (Collins, G.S. et al. 2005. Earth Impact Effects Program: A Web-based computer program for calculating the regional environmental consequences of a meteoroid impact on Earth. Meteoritics and Planetary Science, v. 40, p. 817–840), with a web presence designed at Purdue University, Indiana. ImpactEarth (http://www.purdue.edu/impactearth/) has been around for two years and has a scientifically pleasing level of precision, thanks to the authors, Gareth Collins, Jay Melosh and Robert Marcus.

The fact that the target shown by the accompanying animation and other graphics seems to be the Washington-New York megalopolis may be a cause for some concern for US readers, especially the Department of Homeland Security, National Security Agency and CIA. They can rest easy, however, as this seems to be a matter of artistic license: the choice of parameters allows for ocean strikes and targets of sedimentary or crystalline rocks. Others are impactor diameter and density, impact angle and speed, plus distance from

ground zero. An element of whimsy allows the casual user to choose inbound humpback whales, school buses and the Empire State Building as well as more astronomically likely scenarios.

There are a number of missing parameters such as direction relative to Earth's rotation, latitude and the likely affect of an ice-cap strike, and no mention in the results of the electromagnetic burst from atmospheric compression on entry – the Diesel effect. However, the thermal effects on bystanders, buildings and vegetation at the 'viewpoint' personalise the experience to some extent. It is the detail about crater dimensions and evolution, lithospheric melting and what might happen to the Earth's axial tilt and day length that the wealth of computations produce surprises. It is not easy to destroy our planet: using a body with a density of 3000 kg m-3 and the diameter of Asia causes no significant melting or changes in axial tilt at speeds less than 12 km s-1, but does change the length of the day by up to 113 hours. This is because the power of impacts and therefore the work done by them is proportional to the square of the speed. Mind you, nothing is left standing as the seismic effect has a Richter Magnitude of more than 15! Yet, curiously, no atmospheric or thermal radiation effects are noted.

Have fun.

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Our tenacious companions.

Male human head louse, Pediculus humanus capitis (credit: Wikipedia)
Until recently humans and lice were inseparable and the same goes for all primates, and nearly all mammals. However, unlike fleas, which happily will suck any blood that is going provided it is easily tapped, lice are tailored to their hosts. Should a baboon louse, for instance, get into your short and curlies it will almost certainly die. In any case, again unlike fleas, the louse cannot leap: they spread through intimate contact. The human head louse spreads especially well among nursery- and infant-school children, as any parent knows, because lessons often involve them literally getting their heads together. Less well known is that Pediculus humanus eschew soiled or greasy hair and it is the well-scrubbed kids who suffer and spread 'beasts on the head'. Conversely, the clothes louse that carries typhus and other infections is deterred by regular laundry and ironing. And then there is the Continue reading →

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Short fuse on clathrate bomb?
Posted on October 31, 2012 by Steve Drury | Leave a comment

Gas hydrate (methane clathrate) block embedded in seabed sediment (Photo credit: Wikipedia)
The biggest tsunami to affect inhabitants of Britain, mentioned in the earlier post Landslides and multiple dangers, emanated from the Storegga Slide in the northern North Sea west of Norway. That submarine debris flow was probably launched by gas hydrates beneath the sea bed breaking down to release methane thereby destabilising soft sediments on the continental slope. Similar slides were implicated in breaking Europe-America communications in the 20th century, such as the Grand Banks Slide of 1929 that severed submarine cables up to 600 km from the source of the slide. Even now, much Internet traffic is carried across oceans along optic-fibre cables, breakages disrupting and slowing services. A more mysterious facet of clathrate breakdown is its possible implication in unexplained and sudden losses of ships. When gas escapes to the surface, the net density of seawater decreases, the more so as the proportion of bubbles increases. Ship design and cargo loading rests on an assumed water density range from fresh to salt water and for different temperatures at high and low latitudes.

Gulf stream map (credit: Wikipedia)
The Atlantic seaboard of the USA hosts some of the best-studied accumulations of clathrates in the top 100-300 m of seabed sediments. Since their discovery these 'cage complexes' of mainly methane and carbon dioxide trapped within molecules of water ice have been studied in detail. Importantly, the temperatures at which they form and the range over which they remain stable depend on pressure and therefore depth below the sea surface. At atmospheric pressure solid methane hydrate is unstable at any likely temperature and requires -20°C to form at a pressure equivalent to 200 m water depth. Yet is stable at temperatures up to 10°C 500 m down and 20°C at a depth of 2 km. Modern sea water cools to around 0°C at depths greater than 1.5 km, so gas hydrates can form virtually anywhere that there is a source of methane or CO2 in seafloor sediment. In the sediments temperature increases sharply with depth beneath the seabed due to geothermal heat flow thereby limiting the clathrate stability zone to the top few hundred metres.

Two factors may lead to clathrate instability: falling sea level and sea-floor pressure or rising sea-floor temperature. Many gas-hydrate deposits, especially on the continental shelf and continental edge are likely to be close to their stability limits, hence the worries about destabilisation should global warming penetrate through the water column. The western North Atlantic is an area of especial concern because the Gulf Stream flows northward from the Caribbean to pass close to the US seaboard off the Carolinas: that massive flow of tropical warm water has been increasing during the last 5 thousand years so that its thermal effects are shifting westwards.

Geophysicists Benjamin Phrampus and Matthew Hornbach of the Southern Methodist University in Dallas, Texas have used thermal modelling to predict that gas-hydrate instability is imminent across 10 thousand square kilometres of the Caroline Rise (Phrampus, B.J. & Hornbach, M.J. 2012. Recent changes to the Gulf Stream causing widespread gas hydrate destabilization. Nature, v. 490, p. 527-530). As a test they analysed two seismic reflection profiles across the Carolina Rise, seeking anomalies known as bottom-simulating reflectors

that signify free gas in the sediments. These are expected at the base of the gas-hydrate zone and their presence helps assess sediment temperature. At depths less than 1 km the base of the gas-hydrates modelled from the present temperature profile through the overlying seawater lies significantly above the base's signature on seismic lines. The deeper levels probably formed under cooler conditions than now – probably eight degrees cooler – and may be unstable. If that is correct, the Caroline Rise area seems set to release around 2.5 Gt of methane to add to atmospheric greenhouse warming. The Storegga Slide also lies close to the northern track of the Gulf-Stream – North Atlantic Drift…

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Una parodia della giustizia?
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Damage caused by the L' Aquila earthquake of 6 April 2009. (credit: Reuters)
Lying above a destructive plate margin, albeit a small one, Italy is prone to earthquakes. Seismometers detect a great many of low magnitude that no one notices and that do no obvious damage to buildings. From 2006 to autumn 2008 the Abruzzo region on the eastern flank of the Appenine mountains of central Italy experienced a background of one low-magnitude tremor every day (Papadopoulos, G.A. et al. 2010. Strong foreshock signal preceding the L'Aquila (Italy) earthquake (Mw 6.3) of 6 April 2009. Natural Hazards and Earth System Sciences, v. 10, p. 19-24). In the following 6 months the rate more than doubled but the epicentres continued to be almost randomly situated. Things changed dramatically in the 10 days following 27 March 2009: the pace increased to twenty times the normal 'background' and epicentres clustered directly beneath the regional capital L' Aquila (population 73 thousand) close to a known fault line. At 3.32 am on 6 April 2009 the Paganica fault failed less than 10 km below L' Aquila, directing most of the Magnitude 6.3 energy at the town. This was the deadliest earthquake in Italy for three decades; 308 people died 1500 were injured and 40 thousand found themselves homeless. Silvio Berlusconi, not a man to flinch from controversy, commented on German TV about the homeless, 'Of course, their current lodgings are a bit temporary. But they should see it like a weekend of camping'.

Former Italian President Silvio Berlusconi (credit: Wikipedia)
L' Aquila has a dismal history of seismic damage, having been devastated before: 7 times since the 14th century. Having grown on a foundation of lake-bed sediments, notorious for amplifying ground movements, the city was clearly in a high-risk status in much the same manner as Mexico City. Shaken several times before and built with no regard to seismicity, much of L' Aquila's centuries-old building stock was incapable of resisting the event of 6 April 2009: up to 11 thousand building were damaged, some collapsing completely.

Not only was the earthquake preceded by an increasing pace of foreshocks, but many local people reported strange 'earth lights' during the months beforehand (Fidani, C. The earthquake lights (EQL) of the 6 April 2009 Aquila earthquake, in Central Italy.Natural Hazards and Earth System Sciences, v. 10, p. 967-978). In fact, so many sightings were made that plans have been outlined for a CCTV monitoring network in rural areas.

So, this disaster was not short of signs that all was not well in Abruzzo, in a seismic sense: historical precedent; poor urban siting; foreshocks and oddities that have come to be associated with impending energy release. But was this litany sufficient to predict the place, date, and magnitude of what was coming? Plate tectonics, local structural geology and worldwide seismicity allow geophysicists to assess risk from earthquakes in the same way as hydrologists can outline flood-prone areas: literally on flood plains. Yet there are few if any records of a devastating earthquake having been predicted anywhere with sufficient accuracy to allow evacuation and mitigation of death and injury. That is despite the fact that teams of seismologists in the western US, Japan, Italy and several other well-off countries continually monitor seismic events even with a power many orders of magnitude less than those which kill or injure. Such bodies are faced with a dreadful choice in the face of evidence like that summarised above: warn tens of thousands to evacuate, organise such an exodus in a few days and prepare accommodation for them, or advise that similar seismic escalations rarely lead to massive damage with an estimate of the probability of risk. Both choices are guesswork for there are no rigorous equations that spell 'doom' or 'all clear' from such data. Earthquakes are not rainstorms or hurricanes, as 250 thousand dead people on the shores of the Indian Ocean bear grim witness.

Despite broad knowledge of the deep uncertainty associated with earthquakes and volcanic eruptions – no longer privy to specialist scientists these days, even in the least developed parts of the world – the Italian authorities saw fit to prosecute six earth scientists and a public official for multiple manslaughter. Because they provided "inaccurate, incomplete and contradictory" information about what might have been the aftermath of tremors felt ahead of 6 April 2009 earthquake, a regional court sentenced all of them to six years in prison – two years more than even the prosecution demanded – and they are to pay the equivalent of £6.7 million in compensation. This was not a jury verdict, but the decision of a single judge, Marco Billi. No scientist, even one poring over data from the Large Hadron Collider in search of the Higgs boson, would every claim that what they report is perfectly accurate, complete and incontrovertible. The L'Aquila Seven never said they were certain that no earthquake would ensue, and the city's people were well aware of what risk they faced in much the same way that Neapolitans living on the slopes of Vesuvius know that one day they may be incinerated.

This is a travesty of justice so bizarre that one must look to the famous adage of Roman Law: qui bono? Certainly not the victims and their mourners, and definitely not science because any sensible Italian geophysicist will in future simply play dumb. There is already a huge world wide outcry, not just from outraged scientists.

Added 25 October 2012: The 12 October issue of Science carried a lengthy summary of proceedings early in the trial (Cartlidge, E. 2012.

Aftershocks in the courtroom. Science, v. 338, p. 185-188). Read Nature's editorial on the L' Aquila verdict here and further comment.

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New twist on lunar origin
Posted on October 22, 2012 by Steve Drury | Leave a comment

Artistic impression of the moon-forming giant impact. (credit: Wikipedia)
Although a few would-be space faring countries have ambitions, a post-Apollo crewed mission to the Moon is unlikely for quite a while. Yet moon-struck curiosity goes on: currently there is a surge in re-examining the lunar samples brought back more than 40 years ago. The Lunar Sample Laboratory Facility in Houston holds about a third of a ton of rock and regolith. I suppose part of the reason why lunar rocks are being re-analysed – in fact some for the first time – is because new or improved methods are available, but frustration among a growing community of planetary geochemists having little more than meteorites to peer at probably plays a role as well. Since Hartman and Davis first suggested it, the giant impact theory for the Moon's origin has dominated geochemical ideas. Most tangible is that of a magma ocean, floated plagioclase crystals from its fractional crystallisation probably having formed the glaring white lunar highlands composed of anorthosite. More subtle are ideas about what happened to the Mars-sized planet that did the damage to Earth and flung vaporised rock into orbit to accrete into the new Moon, and the effects of the stupendous energy on the geochemistry of all three bodies. Directed at all that is new research on isotopes of zinc (Paniello, R.C. et al. 2012. Zinc isotope evidence for the origin of the Moon. Nature, v. 490, p. 376-379).

The focus on zinc is because it is easily vaporised compared with more refractory materials, such as calcium an titanium, and as well as being 'volatile' it has five naturally occurring isotopes with relative atomic masses of 64 (the most abundant), 66, 67, 68 and 70. In general, isotopes of an element behave in slightly different ways during geological and cosmological processes, which changes their proportions in the products; a process known as 'mass-fractionation'. Paniello and colleagues from Washington University, Missouri and the Scripps Institution of Oceanography, California USA found that Moon rocks are enriched in the heavier isotopes of zinc yet depleted in total zinc compared with terrestrial rocks and meteorites supposed to have come from Mars. Unlike those two planets the Moon's zinc deviates from its abundance relative to other elements recorded by chondritic meteorites. This zinc depletion tallies with volatile loss from incandescent vapour blurted from the colliding planets. But it doesn't help with the detailed predictions from the giant-impact model. A variety of scenarios suggest that the Moon should be made from remnants of the inbound impactor's mantle, yet studies of other elements' isotopes indicate that the Moon is rather Earth-like. But not those of zinc, so it looks like they have to be explained by a complete rethink of the whole hypothesis (Elliott, T. 2012. Galvanized lunacy. Nature, v. 490, p. 346-7).

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The shuffling poles
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The mechanical disconnection of the lithosphere from the Earth's deep mantle by a more ductile zone in the upper mantle – the asthenosphere – suggests that the lithosphere might move independently. If that were the case then points on the surface would shift relative to the axis of rotation and the magnetic poles, irrespective of plate tectonics. So it makes sense to speak of absolute and relative motions of tectonic plates. The second relates to plates' motions relative to each other and to the ancient position of the magnetic poles, assumed to be reasonably close to that of the past pole of rotation, yet measurable from the direction of palaeomagnetism retained in rocks on this or that tectonic plate. Plotting palaeomagnetic pole positions through time for each tectonic plate gives the impression that the poles have wandered. Such apparent polar wandering has long been a key element in judging ancient plate motions. Absolute plate motion judges the direction and speed of plates relative to supposedly fixed mantle plumes beneath volcanic hot spots, the classic case being Hawaii, over which the Pacific Plate has moved to leave a chain of extinct volcanoes that become progressively older to the west. But it turns out that between about 80 to 50 Ma there are some gross misfits using the hot-spot frame of reference. An example is the 60° bend of the Hawaiian chain to become the Emperor seamount chain that some have ascribed to hot spots shifting (see http://earth-pages.co.uk/2009/05/01/the-great-bend-of-the-pacific-ocean-floor/).

Age of Pacific Ocean floor, showing the Hawaii-Emperor seamount chain in black. (credit: Wikipedia)
Ideas have shifted dramatically since it became clear that hot spots can shift, and there has been an attempt to estimate their actual motions (Doubrovine, P.V. et al. 2012. Absolute plate motions in a reference frame defined by moving hot spots in the Pacific, Atlantic, and Indian oceans. Journal of Geophysics Research: Solid Earth, v. 117, B09101, doi:10.1029/2011JB009072). It is early days for the revised view of absolute motion of the lithosphere and estimates go back only 120 Ma. However, one outcome has been a realistic examination of whether the positions of the poles have shifted through time; a possibility that is hidden in apparent polar wander paths. Since the mid-Cretaceous it seems that a slow and hesitant, but significant polar shuffle has taken place, varying between 0.1 and 1.0° Ma-1, starting in one direction and then the movement retraced its steps to achieve the current proximity of magnetic poles to the poles of rotation.

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Landslides and multiple dangers
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A landslide in Guerrero, Mexico in August, 1989. (credit: Wikipedia)
Just as modern humans were establishing a permanent foothold in Britain and engaging in the transition to settled farming and livestock husbandry disaster struck some of the most attractive Mesolithic real estate. Around 8 000 years ago the east coast of Scotland, from the Shetland Isles to the Firth of Forth, was struck by a tsunami as big as that affecting the north eastern island of Honshu in the Japan archipelago in 2011. It washed over low lying islands of Shetland and Orkney and roiled up the great inlets or firths of eastern mainland Scotland to leave thick sand deposits containing carcases of whales and other large sea mammals. At that time, Britain was joined to the rest of Europe by marshy lowlands linking East Anglia and the Netherlands dubbed 'Doggerland' at the southern end of a huge gulf that became the North Sea. Final sea level rise removed that initial gateway to Britain, so we cannot judge what damage the tsunami wrought, but tools and animal bones dredged from the area show that it was full of game and people. A disaster, but not one linked to seismicity. The driving force has been recognised in a series of submarine scars off the west coast of Norway that witness massive slides of sediment on the sea bed area known as Storegga. Similar scars around the Hawaiian Islands and those making up the Azores and Canaries in the mid Atlantic bear witness to many large slippage events, on the sea bed and from the islands themselves. Recognising signs of past tsunami damage in coastal areas worldwide reveals plenty of cases triggered by landslides rather than earthquakes.

The March 2011 Sendai tsunami and those which ravaged lands around the Indian Ocean in late 2004 formed because of vertical movements on major faults that dropped or shoved up the oceanic crust itself. Yet any sudden change in the shape of the sea floor will displace all the ocean water above, the difference from seismic tsunamis lies in the energy source: instead of tectonic plate forces, gravitational potential energy is released by slumps and slides. That may happen because of erosion producing unstable steep slopes, build up of sedimentary piles, large outpourings of lavas or slopes being destabilised by minor earthquakes or release of gases from the sediments themselves. The Mesolithic submarine slide at Storegga may have been set in motion by massive release of methane from gas-hydrate deposits, and such is the extent of scarring of the sea floor there that it must have happened before and may do so again.

Copper engraving showing the 1755 Lisbon tsunami overwhelming ships in the harbor. (credit: Wikipedia)
Realisation of the potential for tsunamis to be triggered by submarine and coastal and slides has spurred bathymetric studies in a number of likely areas, including the Gorringe Bank that lies on the Atlantic floor just west of the Iberian Peninsula. It is tectonic in origin but has a thick veneer of sediment brought by Iberian river systems. On its northern flank is a 35 km long scar of a slip that moved 80 km3 of sediment (Lo Iacono, C. And 11 others 2012. Large, deepwater slope failures: implications for landslide generated tsunamis. Geology, v. 40, p. 931-934). The Spanish-British-Italian group estimate that the slip would have generated a 15 m tsunami most likely to have affected the Iberian coast south of Lisbon. Conditions for slides of si,ilar magnitude still exist on the Gorringe Bank. One unstable system ripe for collapse is present far out in the Atlantic on the south-east coast of the island of Picos in the Azores (Hildenbrand, A. et al. 2012. Large-sale active slump on the southeast flan of Picos Island, Azores. Geology, v. 40, p. 939-942). This is in a coastal area where repeated volcanism has piled up lavas on the flanks of the island's main volcanic edifice. Failure has already started, with a number of prominent arcuate scars having developed. The Picos slide moves very slowly sideways but vertical displacements ar estimated at up to a centimetre a year. The volume of the slowly moving mass is an order of magnitude less that the fossil slide on the Gorringe Bank. Yet should it fail entirely, the slopes involved, the absence of water's slowing effect and the height of the mass might ensure comparable energy is delivered to the Atlantic Ocean, though the likely trajectory of tsunamis would be parallel to the coast of Africa rather than directly towards it.

Landslides of all kinds, though hazardous, have long been thought to be less of a risk to life globally than the more spectacular seismic and volcanic hazards, but there are few data to support that view. In an attempt to assess the annual risk properly, David Petley of Durham University, UK 'mined' world-wide landslide records for the seven years since 2004 (Petley, D. 2012. Global patterns of loss of life from landslides. Geology, v. 40, p. 927-930). There were more than 2600 recorded slope-failures that killed people and caused a total of more than 32 thousand fatalities: ten time more than previous vague estimates. This is a minimum because many landslides occur in very remote areas, especially in the mountainous regions of China and the Himalaya. The number of fatalities accompanying each event shows distinct signs, on a country-by-country basis, of a relationship with population density. Several international agencies are emerging that aim at means of measuring disaster risk, one being the Integrated Global Observing Strategy for Geohazards (IGOS).

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Natural Disasters List October 4, 2012-China landslide buries 18 school children! (disaster-report.com)