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DICAS DA SEMANA

BOLSAS DE ESTUDO PARA BRASILEIROS
http://canaldoensino.com.br/blog/30-paises-que-oferecem-bolsas-de-estudo-para-brasileiros

ARTIGO DA SEMANA

http://scienze.fanpage.it/il-vulcano-marsili-deve-essere-studiato-piu-a-fondo/#ixzz3anvWREvS
Il vulcano Marsili deve essere studiato più a fondo
Un mostro marino dorme al largo delle coste italiane: è il vulcano più grande d'Europa e non conosciamo a sufficienza quali potrebbero essere i rischi legati alla sua attività.
AMBIENTE 21 MAGGIO 2015 19:38 di Nadia Vitali
ITALY-VOLCANO-STROMBOLI
in foto: Il vulcano Stromboli
Del vulcano Marsili sappiamo relativamente poco: ne conosciamo la collocazione geografica – al largo delle coste campane e calabresi – e possediamo informazioni legate esclusivamente a dati geofisici e a campioni prelevati dalla sua sommità. Ma questo vulcano sottomarino è il più grande d'Europa e del Mediterraneo e questo dovrebbe farne un osservato speciale, data anche la sua vicinanza alla nostra terraferma. A scrivere oggi della necessità di approfondire le conoscenze del Marsili è il vulcanologo Guido Ventura il quale, attraverso il bolg dell'Istituto Nazionale di Geofisica e Vulcanologia, riapre interrogativi importanti: «È vero che è attivo? Esiste un pericolo tsunami legato al possibile distacco di una grande frana (collasso laterale)?»
Eruzioni recenti
Gli scienziati sanno che il vulcano è interessato da un'attività idrotermale e da un'attività sismica e che le due eruzioni più vicine al nostro tempo in cui è stato coinvolto il Marsili risalgono rispettivamente a 5000 e 3000 anni fa. In quell'occasione, si trattò di eventi a basso indice di esplosività, verificatisi nel settore centrale a circa 850 metri di profondità.
Rischi di eruzioni sottomarine
Nel caso in cui si verificasse un'eruzione sottomarina a profondità di 500-100 metri sul Marsili, la sola cosa che vedremmo sarebbe il ribollire dell'acqua, legata al galleggiamento di materiale vulcanico (le pomici). Insomma, rischi estremamente bassi che potrebbero concretizzarsi al massimo in una deviazione temporanea delle rotte navali.
Tempi di ritorno
Una cosa rispetto alla quale ci sono molti dubbi sono i tempi di ritorno delle eruzioni del Marsili: le stime di questo tipo, in genere, si basano su calcoli statistici che prendono in considerazione un elevato numero di datazioni. Nel caso del Marsili, purtroppo, si dispone di appena quattro date.
In altre parole, è come se noi del Vesuvio conoscessimo solo le eruzioni del 1631 e del 1944 e dicessimo che i tempi di ritorno sono di 400 anni, mentre, in realtà, l'attività del Vesuvio tra queste due date è stata pressoché continua – Guido Ventura
Rischio tsunami?
C'è poi il discorso dei collassi laterali e dei possibili tsunami, sempre legati alla eventuale pericolosità delle eruzioni sottomarine: anche in merito a ciò, i dati in possesso degli scienziati non consentono di fornire stime quantitative precise. Ecco perché l'autore dell'articolo sottolinea la necessità di effettuare una stima della stabilità dei versanti del vulcano, di valutare il volume di roccia potenzialmente coinvolto, conoscerne le modalità di movimento lungo il pendio: soltanto la conoscenza di tutti questi parametri può consentire di stabilire se c'è la possibilità di un rischio tsunami.
La valutazione del rischio, un dovere sociale
In buona sostanza, il discorso del vulcanologo mira a puntare l'attenzione su qualcosa che fino ad oggi non ha mai costituito un pericolo ma che non possiamo escludere del tutto che possa costituirlo in futuro. La morfologia del vulcano non sembra presentare tracce di collassi laterali, mentre i franamenti del fondo marino evidenziati sono superficiali e coinvolgono volumi di roccia trascurabili che non sono in grado di procurare tsunami. Il passato delle coste tirreniche non sembra ricordare onde anomale ricollegabili a collassi laterali del Marsili.
Ma questo non può escludere del tutto che in futuro possano verificarsi fatti del genere: ecco perché è importante una valutazione della stabilità del vulcano e della stima della pericolosità potenziale da tsunami. Una valutazione «scientificamente importante e socialmente doverosa».

AMBIENTE BRASIL

29 / 05 / 2015 **Desmate na Amazônia entre fevereiro e abril aumentou 62,7%, aponta Inpe**

Comparação com mesmo período do ano passado inclui degradação florestal. Mato Grosso foi o estado com maior área de desmatamento identificada.

29 / 05 / 2015 **Número de fumantes cai 30,7% em 9 anos no país, diz Ministério da Saúde**

Estudo mostra que 10,8% da população fuma; em 2006, eram 15,6%. Homens fumam mais e Porto Alegre tem maior percentual de fumantes.

29 / 05 / 2015 **Semente de ucuúba ajuda a manter 'floresta em pé', no Pará**

Moradores de Cotijuba fornecem ucuúba para empresa de cosméticos. Pesquisas revelaram que semente tem alto poder hidratante para a pele.

29 / 05 / 2015 **?Chip verde? promete marcar início da indústria de componentes eletrônicos biodegradáveis**

Cientistas da universidade de Wisconsin, nos Estados Unidos, se uniram ao departamento de Agricultura americano para desenvolver o novo semicondutor.

29 / 05 / 2015 **Casos de corrupção afetam construção de novo cosmódromo na Rússia**

Moscou tenta reativar um setor espacial que foi motivo de orgulho durante o período soviético mas que agora acumula fracassos, como a perda este mês do satélite mexicano Centenario, após uma falha no lançamento de um foguete.

29 / 05 / 2015 **Sistema Alto Tietê volta a registrar queda no volume armazenado**

De acordo com a Sabesp, índice desta quinta-feira é de 22,5%. Não choveu sobre as represas que compõem o sistema na quarta-feira (27).

29 / 05 / 2015 **Energia solar fotovoltaica terá investimentos de R$ 7 bilhões em 20 anos**

Dois leilões para energia solar fotovoltaica estão anunciados, para os dias 14 de agosto e 13 de novembro. A expectativa é que a somatória desses dois leilões supere mil megawatts (MW).

29 / 05 / 2015 **Tribunal argentino deve decidir destino de orangotango 'triste' de zoo**

Fêmea chamada Sandra vive em zoológico de Buenos Aires. Em 2014, foi reconhecida como sujeito não humano com direito a liberdade.

29 / 05 / 2015 **Robô com instinto animal é a nova conquista da inteligência artificial**

Esse tipo de inteligência artificial muito básica poderia ajudar no desenho de robôs capazes de sobreviver a avarias depois de catástrofes nucleares e melhorar os algoritmos que governam os carros sem motorista.

29 / 05 / 2015 **Ministra do Meio Ambiente volta a cobrar o fim dos "lixões"**

Quem causar poluição que possa resultar em danos ao meio ambiente, incluindo a disposição inadequada de resíduos sólidos, pode levar multa de R$ 5 mil a R$ 50 milhões.

29 / 05 / 2015 **Nova mancha de petróleo fecha várias praias de Los Angeles/EUA**

Várias praias nos arredores de Los Angeles amanheceram fechadas nesta quinta-feira (28) pelo aparecimento de uma mancha de petróleo - apenas uma semana após um vazamento contaminado em uma área costeira do norte da Califórnia.

29 / 05 / 2015 **Ciência desvenda mistério dos buracos nos queijos suíços**

Partículas de feno que caem no leite durante ordenha provocam buracos. Métodos mais modernos de ordenha têm feito buracos 'desaparecerem'.

29 / 05 / 2015 **Mosquitos com bactéria combatem dengue na Colômbia**

Bactéria Wolbachia impede que 'Aedes aegypti' transmita a dengue. Brasil tem iniciativa similar coordenada pela Fiocruz.

29 / 05 / 2015 **Brasil é um dos países que mais investem em energia eólica, diz associação**

Segundo a Associação Brasileira de Energia Eólica, o Brasil deve alcançar, em 2016, a segunda ou terceira colocação no ranking dos países que mais investem no aproveitamento dos ventos como fonte de energia, subindo ainda para a sexta posição mundial em capacidade instalada.

28 / 05 / 2015 **Desmatamento na Mata Atlântica tem queda de 24%, segundo relatório**

Dados favoráveis indicam proximidade da meta do desmatamento zero. Redução ocorreu no período de 2013 a 2014 comparado a 2012 e 2013.

28 / 05 / 2015 **EUA preveem temporada de furacões menos ativa que o normal no Atlântico**

A temporada de furacões no Atlântico, que começa oficialmente em cinco dias, será menos ativa que o normal com a formação de entre seis e 11 tempestades tropicais, das quais entre três e seis se tornariam furacões.

28 / 05 / 2015 **Curso orienta uso sustentável da Caatinga**

Iniciativa tem o desafio de trazer o conceito do manejo do bioma para o centro do debate do documento "O futuro que queremos", que reúne os compromissos da Rio+20 na conservação das paisagens e recuperação de áreas degradadas.

28 / 05 / 2015 **Pesquisadores descobrem ilha feita de fezes de peixe**

Peixes têm capacidade de produzir 531 mil quilos de areia por ano nas fezes.

28 / 05 / 2015 **Greenpeace pede boicote mundial a madeira ilegal congolesa**

A ONG Greenpeace pediu na terça-feira (26) aos Estados Unidos, à Europa e à China para boicotar madeira ilegal proveniente do norte da República Democrática do Congo pela madeireira Cotrefor, acusada de prejudicar o meio ambiente.

28 / 05 / 2015 **São Paulo reabre processo para criar 'RG' de árvores urbanas**

Segundo estimativas da administração municipal, deverão ser catalogadas 650 mil árvores que estão presentes em calçadas, canteiros e ruas. As árvores de parques e de matas da capital não entram na contagem.

28 / 05 / 2015 **Onda de calor intenso provoca mais de mil mortes na Índia**

Durante a última semana, as temperaturas subiram em todo o território indiano, sobretudo na faixa que atravessa o país de Leste a Oeste, onde foram registrados valores médios acima dos 40 graus Celsius.

28 / 05 / 2015 **EPE propõe discussão de novos reservatórios que podem gerar impactos ambientais**

A Empresa de Pesquisa Energética identificou 71 projetos de reservatórios hidroelétricos que poderiam ser construídos para aumentar em 50,7 gigawatts (GW) médios a capacidade de armazenamento do Brasil.

28 / 05 / 2015 **Governo considera infundadas as críticas à nova lei de biodiversidade**

"A legislação anterior dava prioridade à punição da biopirataria em vez de abordar as necessidades da ciência, da economia e dos povos tradicionais do país", afirmou a ministra do Meio Ambiente, Izabella Teixeira.

28 / 05 / 2015 **Descoberto hominídeo que viveu na mesma época que Lucy na Etiópia**

Achado mostra que vários tipos de pré-humanos viviam juntos na época. Estudo afasta a hipótese antiga de que Lucy seria 'mãe de humanidade'.

28 / 05 / 2015 **Fome afeta 795 milhões de pessoas no mundo, mostra relatório da ONU**

A situação melhorou nas regiões em desenvolvimento, onde a taxa de desnutrição – que mede a proporção de pessoas incapazes de consumir alimentos suficientes para uma vida ativa e saudável - diminuiu para 12,9% da população, contra 23,3% há 25 anos.

28 / 05 / 2015 **Premiê britânico volta atrás em proposta de retomar caça às raposas**

Raposas britânicas respiraram aliviadas nesta quarta-feira depois que primeiro-ministro britânico, David Cameron, voltou atrás momentaneamente em sua promessa de retomar a legalização da tradicional caça destes animais.

28 / 05 / 2015 **Cientistas usam vírus da herpes para curar câncer de pele**

Vírus modificado é inofensivo para células normais mas combate melanoma; pesquisa foi feita com 634 pacientes.

28 / 05 / 2015 **Ministra vai ao Conama e define prioridades**

Na abertura da 118ª reunião do colegiado, Izabella Teixeira pede aos conselheiros ênfase para o combate ao desmatamento, a mitigação das mudanças climáticas e a proteção da biodiversidade.

28 / 05 / 2015 **Construção de lançador de satélites brasileiro deve ser abandonada**

Segundo o vice-diretor do Departamento de Ciência e Tecnologia da Aeronáutica, Wander Golfetto, o programa pode não ser concluído por falta de verba, recursos humanos qualificados e dificuldades tecnológicas.

28 / 05 / 2015 **Papagaio de peito roxo, comum no Brasil, está sob grave ameaça**

Pássaro só pode ser encontrado no Brasil, Paraguai e na Argentina. Estudo aponta 3 mil indivíduos em todo o mundo; 91% está no Brasil.

27 / 05 / 2015 **Acordo do clima é difícil, mas contexto é favorável, diz ministro francês**

COP 21 reunirá representantes de países na França em dezembro. Última tentativa de chegar a acordo global sobre o clima fracassou em 2009.

27 / 05 / 2015 **Galáxia mais luminosa do Universo é descoberta pela Nasa**

Wise J224607.57-052635.0 tem a luz de 300 trilhões de sóis.

27 / 05 / 2015 **Moçambique perdeu metade de seus elefantes em 5 anos por caça ilegal**

ONG estima que 95% dos elefantes foram dizimados na parte norte do país. Organizações estimam que 30 mil são mortos no continente todo ano.

27 / 05 / 2015 **Sistema Alto Tietê registra 5ª queda consecutiva no volume armazenado**

Sabesp aponta que sistema tem 22,7% de volume. Pluviometria acumulada já é 9,56% maior que a média histórica do mês.

27 / 05 / 2015 **Enchentes, inundações e tornado deixam rastro de destruição nos Estados Unidos**

Novo balanço divulgado na terça-feira (26) nos Estados Unidos, sobre as enchentes e inundações provocadas por tempestades que caem desde o último domingo (24), aponta que há mais de 30 pessoas desaparecidas e sete mortes confirmadas no centro do Texas e em Oklahoma.

27 / 05 / 2015 **Protocolo de Montreal ajudou preservação da camada de ozônio, aponta estudo**

Desde que esse protocolo entrou em vigor, restringiu o uso de elementos com altas concentrações em cloro, bromo e outras substâncias prejudiciais para a camada de ozônio, o que provocou que esta fosse melhor preservada e arrefeça a mudança climática.

27 / 05 / 2015 **Judiciário discute planejamento sustentável**

Evento, que se realizará em Brasília, conta com apoio do MMA e ministra Izabella Teixeira fará abertura do encontro. Inscrições podem ser feitas até esta quarta-feira (27).

27 / 05 / 2015 **Estudo propõe atacar o vírus ebola inibindo proteína do próprio corpo**

Ainda não há droga eficaz para tratar doença que matou mais de 11 mil. Cientistas descobriram que doença usa proteína do corpo para se instalar.

27 / 05 / 2015 **China prende 175 saqueadores de túmulos com peças que somam R$ 40 mi**

Entre os objetos recuperados, está um dragão de jade, uma das representações mais antigas do totem chinês.

27 / 05 / 2015 **Cientistas tentam entender motivos de terremotos no Himalaia**

Muitas das questões geológicas sobre a colisão continuam sem resposta. Como o subcontinente indiano chegou tão rápido até onde está hoje em dia? Que tamanho tinha a Índia originalmente? Mesmo a mais simples das perguntas - quando a Índia encontrou a Eurásia, a placa tectônica sobre a qual se assentam a Europa e a Ásia? - provoca debate, com pesquisadores oferecendo respostas que diferem em 30 milhões de anos.

27 / 05 / 2015 **Atividade vulcânica diminui em santuário de iguanas rosadas de Galápagos**

Após a violenta erupção de segunda-feira, o vulcão Wolf nas Ilhas Galápagos, no Equador, diminuiu sua atividade nesta terça-feira (26) e não representa mais uma ameaça para as quinhentas iguanas rosadas que vivem na ilha.

27 / 05 / 2015 **Cientistas fazem 1ª inseminação artificial para salvar espécie de tartaruga**

A espécie é considerada a maior tartaruga de água doce do mundo, e já foi muito comum na China, porém, se tornou praticamente extinta no final dos anos 90 por causa da poluição, da caça e do desenvolvimento urbano. Há apenas quatro animais vivos hoje, e apenas uma fêmea, com 85 anos de vida.

27 / 05 / 2015 **Pico da dengue já passou, diz novo balanço do Ministério da Saúde**

O número de novos casos em abril foi 27% menor do que em março. Segundo o ministério, país já registrou 845,9 mil casos de dengue este ano.

27 / 05 / 2015 **Rei da floresta? Leão escala árvore para fugir de búfalos**

Imagens raras foram tiradas no parque de reserva de Maasai Mara, no Quênia.

27 / 05 / 2015 **Vacina em desenvolvimento pode controlar pressão por seis meses**

Estratégia pode livrar hipertensos da necessidade de tomar remédio diário.

27 / 05 / 2015 **No Sertão de PE, 34% dos criadores declararam vacinação contra aftosa**

Domingo (31) é o último dia para aplicação das doses da vacina. Expectativa é de que mais de 58 mil animais sejam imunizados na região.

26 / 05 / 2015 **Geoengenharia climática pode salvar os recifes de coral**

Os recifes de coral são um dos ecossistemas mais vulneráveis à mudança climática, mas poderiam ser salvos de uma futura destruição com o uso de uma técnica de geoengenharia que defende a injeção de gás na estratosfera.

26 / 05 / 2015 **Etapa mais difícil da volta ao mundo da Solar Impulse é adiada**

A aeronave monolugar estava programada para deixar Nanjing, no leste da China, rumo ao Havaí, no Oceano Pacífico, logo no início da manhã de terça-feira (26). Mas a aguardada sétima e mais longa parte da jornada deste avião movido apenas a energia solar foi atrasada mais uma vez devido a preocupações técnicas sobre o clima.

26 / 05 / 2015 **Medicamento chinês que desacelera Alzheimer entrará em testes clínicos**

Cientistas tiveram resultados positivos em testes com animais. Fármaco teve efeito na melhora da memória e das habilidades cognitivas.

26 / 05 / 2015 **Avanço do Estado Islâmico ameaça ave rara sob risco de extinção**

Apenas uma fêmea sobrevivente do íbis-eremita que vive em Palmira conhece as rotas migratórias para a África, dizem especialistas.

26 / 05 / 2015 **Vacinação contra febre aftosa segue até o dia 31 em Macaé, no RJ**

Imunização é gratuita para proprietários com até 50 cabeças de gado. Campanha faz parte do calendário fixo regido pelo Ministério da Agricultura.

26 / 05 / 2015 **Casos de dengue vão continuar crescendo no país, diz ministro da Saúde**

"Temos 745 mil casos registrados até o dia 18 de abril e sabemos que esse número aumentará, porque continuam chegando novas informações epidemiológicas. O Brasil vive uma situação de epidemia concentrada em nove estados", disse ministro da Saúde, Arthur Chioro.

26 / 05 / 2015 **Erva-daninha americana pode causar onda de alergias na Europa, diz estudo**

Introduzida na Europa no final do século 19, a ambrosia comum é uma planta com caules avermelhados cujas flores são produtoras maciças de pólen.

26 / 05 / 2015 **MP define medidas de preservação para sítios arqueológicos no Sertão**

Extração de granito e água estão degradando áreas naturais e históricas. Casarão histórico corre risco de desabamento na cidade de Pão de Açúcar.

26 / 05 / 2015 **Vulcão entra em erupção nas Ilhas Galápagos**

A última erupção do vulcão Wolf foi registrada em 1982. Área não é habitada por humanos, mas abriga iguanas rosadas únicas.

26 / 05 / 2015 **Emirados Árabes querem assumir liderança regional na indústria espacial**

Os Emirados Árabes Unidos, que visam lançar a primeira sonda robótica árabe rumo a Marte até 2021, revelaram nesta segunda-feira (25) os detalhes do plano estratégico de sua Agência Espacial.

26 / 05 / 2015 **Sistema de agroflorestas é mais vantajoso na produção de orgânicos**

Segundo o extensionista rural da Emater-DF, Rafael Lima de Medeiros, a agrofloresta é um ambiente mais equilibrado do ponto de vista biológico e também um sistema mais vantajoso para o agricultor que sempre vai ter lucro com alguma colheita da área.

26 / 05 / 2015 **Costa britânica é invadida por praga de águas-vivas gigantes**

O tamanho recorde das águas-vivas encontrado no mar de Dorset nos últimos dias pode ter sido causado pela pesca excessiva no local.

26 / 05 / 2015 **Índios fecham via em Brasília em ato por demarcação de terras**

Tribo Kaingang (RS) quer que a presidente retome homologação de terras. Acesso ficou fechado por 50 minutos; PM fez bloqueio pela L4 Norte.

26 / 05 / 2015 **Cantareira terá queda de 26% na captação de água a partir de setembro**

Medida deve deixar sistema estável até fim do ano, mas com volume morto. Novos limites de retirada de água foram definidos em SP nesta segunda-feira (25).

26 / 05 / 2015 **Estado de São Paulo registra queda nos casos de dengue**

Foram 3.510 casos confirmados até o último dia 22, o que representa média diária de 159,5 casos. Em abril, foram 59.128 ocorrências, sendo 1.970 por dia.

25 / 05 / 2015 **Deslizamento no Nepal bloqueia rio e pode fazer enchente chegar à Índia**

A 140 km de Katmandu, rio Kali Gandaki foi bloqueado. Se bloqueio romper, inundações podem chegar até a Índia.

25 / 05 / 2015 **Veja soluções de seis países para vencer a falta de água e o desperdício**

Estação seca se aproxima e já causa preocupação.

25 / 05 / 2015 **Nível do Cantareira tem queda após oito dias de estabilidade**

O nível dos reservatórios do Sistema Cantareira reduziu 0,1 ponto percentual, atingindo no domingo (24) 19,6% de sua capacidade.

25 / 05 / 2015 **Aves silvestres são apreendidas na Zona Noroeste em Santos/SP**

Pássaros foram apreendidos na manhã deste domingo (24). Não há informações sobre onde as aves serão levadas.

25 / 05 / 2015 **Rios Poxim e Cotinguiba causam estragos devido alta no nível da água**

Em Aracaju, conjuntos Sol Nascente, Santa Lúcia e JK foram atingidos. Ponte em Laranjeiras foi interditada e rio transbordou em São Cristóvão.

25 / 05 / 2015 **Implementação do Código Florestal ainda é desafio, dizem ONGs**

Entre os problemas relatados pelos gestores estaduais do Cadastro Ambiental Rural está a resistência de alguns setores produtivos e a dificuldade em acelerar o cadastramento, com qualidade, para que outros instrumentos do código também se desenvolvam.

25 / 05 / 2015 **Volume do Sistema Alto Tietê registra terceira queda consecutiva**

Índice caiu de 23% neste sábado para 22,9% neste domingo (24). Pluviometria acumulada no mês é de 65 mm, 9,06 % maior que a média.

25 / 05 / 2015 **Remédio chinês que desacelera Alzheimer entrará em fase de testes clínicos**

O fármaco, desenvolvido por pesquisadores do Instituto de Saúde e Biomedicina de Cantão da Academia Chinesa de Ciências, vem mostrando efetividade na melhora da memória e das habilidades cognitivas de animais.

25 / 05 / 2015 **Natal/RN recebe evento que discute energia renovável e sustentabilidade**

Energy ExpoBusiness acontece nos dias 2 e 3 de outubro. Evento terá painéis exposição de produtos e serviços ligados ao tema.

25 / 05 / 2015 **Contra a crise hídrica, Unicamp prevê perfurar novos poços artesianos**

Instituição comprou ano passado uma área para expandir o campus. Campus de Campinas tem população diária de 45 mil pessoas.

25 / 05 / 2015 **Rio Grande do Sul tem mais de mil casos confirmados de dengue**

Duas pessoas morreram em decorrência da doença desde o início do ano. Segundo Secretaria da Saúde, mais de 85% contraiu o vírus no estado.

25 / 05 / 2015 **Pesca predatória provoca morte de peixes no mar do nordeste do Pará**

Cardumes de sardinha foram encontrados mortos na praia da Corvina. Pesca de arrasto despreza espécies de menor valor comercial.

25 / 05 / 2015 **Peixe que come larvas é aliado no combate à dengue em Ipameri/GO**

Pescado é colocado em tanques para evitar reprodução do Aedes aegypti. Escolas são premiadas por recolher materiais que servem como criadouros.

25 / 05 / 2015 **Marcas podem ser obrigadas a informar sobre testes com animais no rótulo**

A PL 2470/11 pretende obrigar marcas a informar no rótulo se o produto foi feito a partir de testes com bichos e quais foram as espécies utilizadas. Os animais mais utilizados para testes em laboratório são coelhos, camundongos, cavalos, cães e gatos.

25 / 05 / 2015 **Chip brasileiro ajudará a registrar estado da matéria no Big Bang**

A construção do chamado chip Sampa faz parte do projeto Alice que estuda a colisão dos elementos químicos pesados, como o ferro e o chumbo. Pesquisadores de 30 universidades do mundo esperam observar com o experimento as partículas que formam os átomos dessas substâncias.

23 / 05 / 2015 **Estudo mostra que aquecimento dos oceanos pode provocar desequilíbrio**

Espécies de plânctons podem ser extintas ou migrar para outros locais. Pesquisa foi publicada nessa sexta-feira pela revista Science.

23 / 05 / 2015 **USP confirma tremor de terra de 3.1 pontos em Prudentópolis, no Paraná**

Abalo sísmico foi identificado na madrugada de quinta (21) na área rural. Segundo Defesa Civil, não houve registros de prejuízos no município.

23 / 05 / 2015 **Limpeza de petróleo que vazou na Califórnia, nos EUA, pode levar meses**

400 mil litros foram para o oceano após rompimento de oleoduto. 'Progresso só em uma ou duas semanas', diz Guarda Costeira.

23 / 05 / 2015 **Live Earth é adiado por tempo indeterminado**

Evento global teria shows em todos os continentes no dia 18 de junho. Mais de 100 artistas tocariam; apenas evento em Paris será mantido.

23 / 05 / 2015 **Sangue jovem ajuda na cicatrização de ossos quebrados**

Pesquisa mostrou que sangue jovem repara fraturas ósseas mais rapidamente.

23 / 05 / 2015 **Geleiras da Antártica estão derretendo rapidamente, diz estudo**

Glaciares na costa começaram a afinar desde 2009, segundo cientistas. Especialista na área, no entanto, lançou dúvidas sobre as conclusões.

23 / 05 / 2015 **Começa a Semana dos Alimentos Orgânicos**

Cada Estado é responsável por definir suas atividades e programação, por meio das Comissões da Produção, em articulação e parceria com produtores e entidades do setor público e da sociedade civil locais.

23 / 05 / 2015 **Sem atingir meta, Ministério prorroga vacinação contra gripe até 5 de junho**

Campanha vacinou 46,2% do público-alvo; meta era atingir 80%. Dose protege contra subtipos do vírus influenza: H1N1, H3N2 e B.

23 / 05 / 2015 **Nova espécie de perereca é descoberta em Jundiaí/SP**

A Hylodes japi é uma homenagem ao único lugar onde foi achada: uma floresta preservada por um parque estadual.

23 / 05 / 2015 **A domesticação do cachorro aconteceu há mais de 27.000 anos**

Estimativas anteriores com base em análises de DNA sugerem que os ancestrais comuns dos cães modernos haviam divergido dos lobos há 16.000 anos, após a última idade do gelo.

23 / 05 / 2015 **MMA premia ações na área de biodiversidade**

Patrono do ambientalismo brasileiro, Paulo Nogueira Neto foi homenageado com o prêmio especial. População também participou escolhendo seu favorito pela internet, que teve 63 mil acessos.

23 / 05 / 2015 **Homem de 52 anos é o primeiro a contrair zika vírus no estado de SP**

Secretaria estadual da Saúde confirmou o caso em Sumaré, SP. 'Prima da dengue' também é transmitida pelo Aedes aegypti.

22 / 05 / 2015 **Mudanças climáticas são ameaça à segurança dos EUA, afirma Obama**

Departamento de Defesa avalia vulnerabilidade de 7.000 bases do Exército. 'Clima aumenta riscos de instabilidade e de conflitos', disse o presidente.

22 / 05 / 2015 **SP tem queda de casos, mas dengue não está controlada, diz Prefeitura**

Cidade registrou 2.122 casos na 18ª semana, contra 3.931 na anterior. Em 2015, foram 57.794 doentes, contra 29.011 em todo ano passado.

22 / 05 / 2015 **Por que o Marco da Biodiversidade divide farmacêuticas e ambientalistas?**

Mudança da legislação vai gerar mais pesquisas, argumenta governo, mas comunidades afetadas dizem que foram desrespeitadas.

22 / 05 / 2015 **Preço do ovo dispara nos EUA devido a surto de gripe aviária**

No Meio-Oeste do país, a alta já chega a 85%, para US$ 2,20 por dúzia. A expectativa é de que as cotações continuem a avançar.

22 / 05 / 2015 **Risco de transmissão de fungo faz Brasil suspender importação de café do Peru**

A decisão foi publicada na quinta-feira (21) no Diário Oficial da União e vale até que o governo peruano apresente um plano de trabalho

para erradicar o fungo, que também afeta as culturas de cacau e de cupuaçu.

22 / 05 / 2015 **Maior acelerador de partículas do mundo marca novo recorde**

Na quarta-feira (20), uma colisão de prótons no Grande Colisor de Hádrons alcançou o recorde de energia de 13 TeV (tera-elétron-volts) pela primeira vez.

22 / 05 / 2015 **A um mês do inverno, Rio Grande do Sul registra temperatura de 32,5°C**

Quinta-feira (21) foi de sol e tempo seco na maior parte do estado. São Gabriel registrou a máxima do dia; em Porto Alegre fez 28,1°C.

22 / 05 / 2015 **Cápsula Dragon da SpaceX cai no Oceano Pacifico após abastecer a ISS**

Com este voo da Dragon, a SpaceX já realizou seis missões de abastecimento das 12 previstas em um contrato de US$ 1,6 bilhões assinado com Nasa.

22 / 05 / 2015 **Campanha de vacinação contra gripe atinge 38,6% do público-alvo**

Campanha nacional termina oficialmente nesta sexta-feira (22). Alguns municípios e estados, como SP e SC, prorrogaram localmente.

22 / 05 / 2015 **Índios fazem vigília em frente ao STF a favor da demarcação de terras**

Eles cobram da Justiça para que sejam ouvidos em decisões que os afetam. Com velas e faixas, grupo de 53 indígenas promete passar a noite no local.

22 / 05 / 2015 **Cláudio Carrera Maretti assume a presidência do ICMBio**

"Precisamos fazer uma aliança estratégica para dar visibilidade à biodiversidade", disse a ministra Izabella Teixeira, sugerindo que o novo presidente busque recursos financeiros fora do orçamento da União.

22 / 05 / 2015 **Petição busca melhorar tratamento dado a chimpanzés**

Defensores dos direitos dos animais alcançaram inúmeras vitórias nos últimos anos em seus esforços para melhorar o tratamento dispensado aos chimpanzés. Agora eles desejam que a agência federal faça mudanças similares nas regras de abrigo e tratamento de macacos.

22 / 05 / 2015 **Estudo do plâncton revela um novo mundo de biodiversidade**

Cientistas descobriram um mundo de biodiversidade no plâncton, o conjunto de diminutas plantas, algas, vírus, bactérias e peixes embrionários, que são o alimento favorito das baleias e também um dos maiores provedores de oxigênio do planeta.

22 / 05 / 2015 **Anac libera drone com câmera para combate à dengue em Chapecó, SC**

Primeiro sobrevoo na cidade do Oeste ocorreu nesta quinta-feira (21). Veículo será utilizado para identificar focos do mosquito transmissor.

22 / 05 / 2015 **Cientistas estudam superbactérias antárticas para novos antibióticos**

Foram identificadas mais de 200 bactérias com aplicação na medicina. Uso excessivo de antibióticos fez surgir bactérias muito resistentes.

GSW JOUNAL

From tree-tops to massive sulphide in the Mabel Lake area, British Columbia, Canada
Colin E. Dunn, Robert I. Thompson, Renee Hetherington, Matthias Cornelius, and Christopher R. Ringrose
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 138-149
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/138?source=gsw

Contrasting geochemistry of orogenic gold deposits in Yukon, Canada and Otago, New Zealand
Dave Craw, Jim Mortensen, Doug MacKenzie, and Iain Pitcairn
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 150-166
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/150?source=gsw

Soil gas geochemical exploration in covered terrains of northern Chile: data processing techniques and interpretation of contrast anomalies
Pamela I.C. Castillo, Brian K. Townley, Xavier Emery, Alvaro F. Puig, and Katja Deckart

Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 222-233
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/222?source=gsw

A comprehensive approach to understanding ore deposits using portable X-ray fluorescence (pXRF) data at the Plutonic Gold Mine, Western Australia
Michael F. Gazley, Guillaume Duclaux, Louise A. Fisher, Chelsea M. Tutt, Aaron R. Latham, Rob M. Hough, Sam J. De Beer, and Mike D. Taylor
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 113-124
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/113?source=gsw

Geochemistry in prospectivity modelling: investigating gold mineralization in the Taupo Volcanic Zone, New Zealand
Constance E. Payne and Katie J. Peters
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 193-204
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/193?source=gsw

Gold exploration using heavy minerals in till and weathered bedrock in Petajaselka, northern Finland
Anne Taivalkoski, Pertti Sarala, and Helena Hulkki
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 205-221
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/205?source=gsw

Mobile Metal Ion(R) analysis of European agricultural soils: bioavailability, weathering, geogenic patterns and anthropogenic anomalies
A. Mann, C. Reimann, P. de Caritat, N. Turner, M. Birke, and GEMAS Project Team
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 99-112
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/99?source=gsw

Pyrochlore and columbite-tantalite as indicator minerals for specialty metal deposits
D.A.R. Mackay and G.J. Simandl
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 167-178
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/167?source=gsw

Geochemical and mineralogical dispersal in till from the Mount Polley Cu-Au porphyry deposit, central British Columbia, Canada
S. Hashmi, B.C. Ward, A. Plouffe, M.I. Leybourne, and T. Ferbey
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 234-249
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/234?source=gsw

Implications of high-precision Re-Os molybdenite dating of the Navachab orogenic gold deposit, Namibia
Nick Steven, Robert Creaser, Katharina Wulff, Alex Kisters, Bruce Eglington, and Jodie Miller
Geochemistry: Exploration, Environment, Analysis. 2015; 15(2-3): p. 125-130
http://geea.lyellcollection.org/cgi/content/abstract/15/2-3/125?source=gsw

Kristin D. Morell, Mike Sandiford, C.P. Rajendran, Kusala Rajendran, Abaz Alimanovic, David Fink, and Jaishri Sanwal
Lithosphere. 2015; 7(3): p. 247-256
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/247?source=gsw

Effects of Paleogene faults on the reconstruction of the metamorphic history of the northwestern Thor-Odin culmination of the Monashee complex, southeastern British Columbia
Yvette D. Kuiper, Paul F. Williams, and Michael A. Hamilton
Lithosphere. 2015; 7(3): p. 321-335
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/321?source=gsw

Slip partitioning along a continuously curved fault: Quaternary geologic controls on Denali fault system slip partitioning, growth of the Alaska Range, and the tectonics of south-central Alaska
Sean P. Bemis, Ray J. Weldon, and Gary A. Carver
Lithosphere. 2015; 7(3): p. 235-246
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/235?source=gsw

Kikiktat volcanics of Arctic Alaska--Melting of harzburgitic mantle associated with the Franklin large igneous province
Grant M. Cox, Justin V. Strauss, Galen P. Halverson, Mark D. Schmitz, William C. McClelland, Ross S. Stevenson, and Francis A. Macdonald
Lithosphere. 2015; 7(3): p. 275-295
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/275?source=gsw

Short-term variations in slip rate and size of prehistoric earthquakes during the past 2000 years on the northern San Jacinto fault zone, a major plate-boundary structure in southern California
Nathan W. Onderdonk, Sally F. McGill, and Thomas K. Rockwell
Lithosphere. 2015; 7(3): p. 211-234
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/211?source=gsw

Geology of the coastal Chiapas (Mexico) Miocene plutons and the Tonala shear zone: Syntectonic emplacement and rapid exhumation during sinistral transpression
Roberto S. Molina-Garza, John W. Geissman, Tim F. Wawrzyniec, Tomas A. Pena Alonso, Alexander Iriondo, Bodo Weber, and Jorge Aranda-Gomez
Lithosphere. 2015; 7(3): p. 257-274
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/257?source=gsw

Late Miocene upper-crustal deformation within the interior of the southern Puna Plateau, central Andes
Renjie Zhou and Lindsay M. Schoenbohm
Lithosphere. 2015; 7(3): p. 336-352
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/336?source=gsw

Tracking paleodeformation fields in the Mesozoic central Sierra Nevada arc: Implications for intra-arc cyclic deformation and arc tempos
W. Cao, S. Paterson, V. Memeti, R. Mundil, J.L. Anderson, and K. Schmidt
Lithosphere. 2015; 7(3): p. 296-320
http://lithosphere.gsapubs.org/cgi/content/abstract/7/3/296?source=gsw

Unusual Downhole and Surface Free-Field Records Near the Carquinez Strait Bridges during the 24 August 2014 Mw 6.0 South Napa, California, Earthquake
Mehmet Celebi, S. Farid Ghahari, and Ertugrul Taciroglu
Seismological Research Letters published 27 May 2015, 10.1785/0220150041
http://srl.geoscienceworld.org/cgi/content/full/0220150041v1?source=gsw

Intraplate seismicity in northern Central Europe is induced by the last glaciation
Christian Brandes, Holger Steffen, Rebekka Steffen, and Patrick Wu
Geology published 27 May 2015, 10.1130/G36710.1
http://geology.gsapubs.org/cgi/content/abstract/G36710.1v2?source=gsw

SEG 2015 Conference Announcement
Economic Geology. 2015; 110(5): p. 1374
http://economicgeology.org/cgi/reprint/110/5/1374?source=gsw

Organic carbon burial efficiencies in sediments: The power law of mineralization revisited
Sergei Katsev and Sean A. Crowe
Geology published 26 May 2015, 10.1130/G36626.1
http://geology.gsapubs.org/cgi/content/abstract/G36626.1v1?source=gsw

A unique isotopic fingerprint of sulfate-driven anaerobic oxidation of methane
Gilad Antler, Alexandra V. Turchyn, Barak Herut, and Orit Sivan
Geology published 26 May 2015, 10.1130/G36688.1
http://geology.gsapubs.org/cgi/content/abstract/G36688.1v1?source=gsw

Seismic-Hazard Map of Southeast Missouri and Likely Magnitude of the February 1812 New Madrid Earthquake
Jae-won Chung and J. David Rogers
Bulletin of the Seismological Society of America published 26 May 2015, 10.1785/0120140307
http://www.bssaonline.org/cgi/content/abstract/0120140307v1?source=gsw

Evaluation of controls on silicate weathering in tropical mountainous rivers: Insights from the Isthmus of Panama
Steven T. Goldsmith, Russell S. Harmon, W. Berry Lyons, Brendan A. Harmon, Fred L. Ogden, and Christopher B. Gardner

Geology published 26 May 2015, 10.1130/G36082.1
http://geology.gsapubs.org/cgi/content/abstract/G36082.1v1?source=gsw

The dynamic reference frame of rivers and apparent transience in incision rates
Sean F. Gallen, Frank J. Pazzaglia, Karl W. Wegmann, Joel L. Pederson, and Thomas W. Gardner
Geology published 26 May 2015, 10.1130/G36692.1
http://geology.gsapubs.org/cgi/content/abstract/G36692.1v1?source=gsw

AQUEOUS TRANSPORT OF GULL NESTS AND EGGS: TAPHONOMIC IMPLICATIONS FOR FOSSIL AMNIOTE NESTS
JAMES L. HAYWARD and AMANDA G. SANDLER
Palaios. 2015; 30(5): p. 403-407
http://palaios.sepmonline.org/cgi/content/abstract/30/5/403?source=gsw

Intraplate seismicity in northern Central Europe is induced by the last glaciation
Christian Brandes, Holger Steffen, Rebekka Steffen, and Patrick Wu
Geology published 26 May 2015, 10.1130/G36710.1
http://geology.gsapubs.org/cgi/content/abstract/G36710.1v1?source=gsw

The Miocene Galapagos ash layer record of Integrated Ocean Drilling Program Site Legs 334 and 344: Ocean-island explosive volcanism during plume-ridge interaction
J.C. Schindlbeck, S. Kutterolf, A. Freundt, S.M. Straub, K.-L. Wang, M. Jegen, S.R. Hemming, A.T. Baxter, and M.I. Sandoval
Geology published 26 May 2015, 10.1130/G36645.1
http://geology.gsapubs.org/cgi/content/abstract/G36645.1v1?source=gsw

Archean (3.33 Ga) microbe-sediment systems were diverse and flourished in a hydrothermal context
Frances Westall, Kathleen A. Campbell, Jean Gabriel Breheret, Frederic Foucher, Pascale Gautret, Axelle Hubert, Stephanie Sorieul, Nathalie Grassineau, and Diego M. Guido
Geology published 26 May 2015, 10.1130/G36646.1
http://geology.gsapubs.org/cgi/content/abstract/G36646.1v1?source=gsw

Equation of state of hercynite, FeAl2O4, and high-pressure systematics of Mg-Fe-Cr-Al spinels
F. Nestola, B. Periotto, C. Anzolini, G. B. Andreozzi, A. B. Woodland, D. Lenaz, M. Alvaro, F. Princivalle, and E. Grew
Mineralogical Magazine. 2015; 79(2): p. 285-294
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/285?source=gsw

Crystallographic ordering of aluminium in laueite at Hagendorf-Sud
I. E. Grey, E. Keck, W. G. Mumme, C. M. MacRae, J. R. Price, A. M. Glenn, C. J. Davidson, and S. J. Mills
Mineralogical Magazine. 2015; 79(2): p. 309-319
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/309?source=gsw

Magnesio-arfvedsonite from Jade Mine Tract, Myanmar: mineral description and crystal chemistry
Roberta Oberti, Massimo Boiocchi, Frank C. Hawthorne, Neil A. Ball, George E. Harlow, and S. Krivovichev
Mineralogical Magazine. 2015; 79(2): p. 253-260
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/253?source=gsw

Almeidaite, Pb(Mn,Y)Zn2(Ti,Fe3+)18O36(O,OH)2, a new crichtonite-group mineral, from Novo Horizonte, Bahia, Brazil
Luiz A. D. Menezes Filho, Nikita V. Chukanov, Ramiza K. Rastsvetaeva, Sergey M. Aksenov, Igor V. Pekov, Mario L. S. C. Chaves, R. Peter Richards, Daniel Atencio, Paulo R. G. Brandao, Ricardo Scholz, Klaus Krambrock, Roberto L. Moreira, Frederico S. Guimaraes, Antonio W. Romano, Aba C. Persiano, Luiz C. A. de Oliveira, Jose D. Ardisson, and S. J. Mills
Mineralogical Magazine. 2015; 79(2): p. 269-283
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/269?source=gsw

Byrudite, (Be,{square})(V3+,Ti)3O6, a new mineral from the Byrud emerald mine, South Norway
G. Raade, T. Balić-žunić, C. J. Stanley, and A. Pring
Mineralogical Magazine. 2015; 79(2): p. 261-268
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/261?source=gsw

The crystal structure of cyanotrichite
Stuart J. Mills, Andrew G. Christy, Fernando Colombo, Jason R. Price, and G. D. Gatta
Mineralogical Magazine. 2015; 79(2): p. 321-335
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/321?source=gsw

Palladosilicide, Pd2Si, a new mineral from the Kapalagulu Intrusion, Western Tanzania and the Bushveld Complex, South Africa
L. J. Cabri, A. M. McDonald, C. J. Stanley, N. S. Rudashevsky, G. Poirier, H. R. Wilhelmij, W. Zhe, V. N. Rudashevsky, and M. Rumsey
Mineralogical Magazine. 2015; 79(2): p. 295-307
http://minmag.geoscienceworld.org/cgi/content/abstract/79/2/295?source=gsw

Climat hivernal, amenagement du territoire et dynamique des avalanches au Quebec meridional : une analyse a partir des accidents connus depuis 1825
Bernard Hetu, Guillaume Fortin, and Kati Brown
Canadian Journal of Earth Sciences. 2015; 52(5): p. 307-321
http://cjes.geoscienceworld.org/cgi/content/abstract/52/5/307?source=gsw

Climate change and recent sedimentation in Nastapoka Sound, eastern coast of Hudson Bay
Maxime Jolivel, Michel Allard, and Guillaume St-Onge
Canadian Journal of Earth Sciences. 2015; 52(5): p. 322-337
http://cjes.geoscienceworld.org/cgi/content/abstract/52/5/322?source=gsw

Preliminary study on the pore characterization of lacustrine shale reservoirs using low pressure nitrogen adsorption and field emission scanning electron microscopy methods: a case study of the Upper Jurassic Emuerhe Formation, Mohe basin, northeastern China
Yuguang Hou, Sheng He, Jianguang Wang, Nicholas B. Harris, Chunyang Cheng, and Yongli Li
Canadian Journal of Earth Sciences. 2015; 52(5): p. 294-306
http://cjes.geoscienceworld.org/cgi/content/abstract/52/5/294?source=gsw

Quaternary stratigraphy and evidence for multiple glacial episodes in the north Okanagan Valley, British Columbia
Craig Nichol, Patrick Monahan, Robert Fulton, Jianhua Ping, Xioahua Wei, and Skye Thomson
Canadian Journal of Earth Sciences. 2015; 52(5): p. 338-356
http://cjes.geoscienceworld.org/cgi/content/abstract/52/5/338?source=gsw

What lies beneath: geophysical mapping of a concealed Precambrian intrusive complex along the Iowa-Minnesota border
Benjamin J. Drenth, Raymond R. Anderson, Klaus J. Schulz, Joshua M. Feinberg, Val W. Chandler, and William F. Cannon
Canadian Journal of Earth Sciences. 2015; 52(5): p. 279-293
http://cjes.geoscienceworld.org/cgi/content/abstract/52/5/279?source=gsw

Partial Melting Processes and Cu-Ni-PGE Mineralization in the Footwall of the South Kawishiwi Intrusion at the Spruce Road Deposit, Duluth Complex, Minnesota
Zsolt Benko, Aberra Mogessie, Ferenc Molnar, Mark J. Severson, Steven A. Hauck, and Sara Raič
Economic Geology. 2015; 110(5): p. 1269-1293
http://economicgeology.org/cgi/content/abstract/110/5/1269?source=gsw

Depositional Conditions for the Kuna Formation, Red Dog Zn-Pb-Ag-Barite District, Alaska, Inferred from Isotopic and Chemical Proxies
Craig A. Johnson, Julie A. Dumoulin, Robert A. Burruss, and John F. Slack
Economic Geology. 2015; 110(5): p. 1143-1156
http://economicgeology.org/cgi/content/abstract/110/5/1143?source=gsw

Metamorphosed Proterozoic Zn-Pb-Ag Mineralization in the Foster River Area, Northern Saskatchewan, Canada
Jeffrey A. Steadman and Paul G. Spry
Economic Geology. 2015; 110(5): p. 1193-1214
http://economicgeology.org/cgi/content/abstract/110/5/1193?source=gsw

Styles, Textural Evolution, and Sulfur Isotope Systematics of Cu-Rich Sulfides from the Cambrian Whalesback Volcanogenic Massive Sulfide Deposit, Central Newfoundland, Canada
Jonathan Cloutier, Stephen J. Piercey, Graham Layne, John Heslop, Andrew Hussey, and Glenn Piercey
Economic Geology. 2015; 110(5): p. 1215-1234

http://economicgeology.org/cgi/content/abstract/110/5/1215?source=gsw

Geochemical Stratigraphy of the Keweenawan Midcontinent Rift Volcanic Rocks with Regional Implications for the Genesis of Associated Ni, Cu, Co, and Platinum Group Element Sulfide Mineralization
Reid R. Keays and Peter C. Lightfoot
Economic Geology. 2015; 110(5): p. 1235-1267
http://economicgeology.org/cgi/content/abstract/110/5/1235?source=gsw

The Nickeliferous Archean Madziwa Igneous Complex, Northern Zimbabwe: Petrological Evolution, Magmatic Architecture, and Ore Genesis
M. D. Prendergast and A. H. Wilson
Economic Geology. 2015; 110(5): p. 1295-1312
http://economicgeology.org/cgi/content/abstract/110/5/1295?source=gsw

Application of U-Th-Pb Phosphate Geochronology to Young Orogenic Gold Deposits: New Age Constraints on the Formation of the Grass Valley Gold District, Sierra Nevada Foothills Province, California
Ryan D. Taylor, Richard J. Goldfarb, Thomas Monecke, Ian R. Fletcher, Michael A. Cosca, and Nigel M. Kelly
Economic Geology. 2015; 110(5): p. 1313-1337
http://economicgeology.org/cgi/content/abstract/110/5/1313?source=gsw

Synsedimentary to Early Diagenetic Gold in Black Shale-Hosted Pyrite Nodules at the Golden Mile Deposit, Kalgoorlie, Western Australia
Jeffrey A. Steadman, Ross R. Large, Sebastien Meffre, Paul H. Olin, Leonid V. Danyushevsky, Daniel D. Gregory, Ivan Belousov, Elena Lounejeva, Trevor R. Ireland, and Peter Holden
Economic Geology. 2015; 110(5): p. 1157-1191
http://economicgeology.org/cgi/content/abstract/110/5/1157?source=gsw

Fluid Inclusion and Isotopic Constraints on the Origin of the Paleoproterozoic Yinachang Fe-Cu-(REE) Deposit, Southwest China
Xiaochun Li, Xinfu Zhao, Mei-Fu Zhou, Wei Terry Chen, and Zhuyin Chu
Economic Geology. 2015; 110(5): p. 1339-1369
http://economicgeology.org/cgi/content/abstract/110/5/1339?source=gsw

INTERESTING PAPERS IN OTHER JOURNALS
Economic Geology. 2015; 110(5): p. 1371-1373
http://economicgeology.org/cgi/reprint/110/5/1371?source=gsw

Long-term resilience decline in plant ecosystems across the Danian Dan-C2 hyperthermal event, Boltysh crater, Ukraine
D. W. Jolley, I. Gilmour, M. Gilmour, D. B. Kemp, and S. P. Kelley
Journal of the Geological Society published 21 May 2015, 10.1144/jgs2014-130
http://jgs.lyellcollection.org/cgi/content/abstract/jgs2014-130v1?source=gsw

Low-temperature thermochronology of the Black and Panamint mountains, Death Valley, California: Implications for geodynamic controls on Cenozoic intraplate strain
Tandis S. Bidgoli, Erika Amir, J. Douglas Walker, Daniel F. Stockli, Joseph E. Andrew, and S. John Caskey
Lithosphere published 21 May 2015, 10.1130/L406.1
http://lithosphere.gsapubs.org/cgi/content/abstract/L406.1v1?source=gsw

Reply to Discussion on 'The sole of an ophiolite: the Ordovician Bay of Islands Complex, Newfoundland' Journal, 170, 2013, pp. 715-722
J. F. Dewey and J. F. Casey
Journal of the Geological Society published 21 May 2015, 10.1144/jgs2014-086
http://jgs.lyellcollection.org/cgi/content/abstract/jgs2014-086v1?source=gsw

Application of model-free kinetic analysis methods to dehydration of a HEU-type zeolite rich tuff from Turkey
Guler Narin and G. Christidis
Clay Minerals. 2015; 50(1): p. 77-90
http://claymin.geoscienceworld.org/cgi/content/abstract/50/1/77?source=gsw

Fracturing and fluid flow in a sub-decollement sandstone; or, a leak in the basement
John N. Hooker, Toti E. Larson, Autumn Eakin, Stephen E. Laubach, Peter Eichhubl, Andras Fall, and Randall Marrett
Journal of the Geological Society published 21 May 2015,

10.1144/jgs2014-128
http://jgs.lyellcollection.org/cgi/content/abstract/jgs2014-128v1?source=gsw

Importance of crustal relamination in origin of the orogenic mantle peridotite-high-pressure granulite association: example from the Naměšť Granulite Massif (Bohemian Massif, Czech Republic)
V. Kusbach, V. Janoušek, P. Hasalova, K. Schulmann, C. M. Fanning, V. Erban, and S. Ulrich
Journal of the Geological Society published 21 May 2015, 10.1144/jgs2014-070
http://jgs.lyellcollection.org/cgi/content/abstract/jgs2014-070v1?source=gsw

Magmatism, mantle evolution and geodynamics at the converging plate margins of Italy
A. Peccerillo and M. L. Frezzotti
Journal of the Geological Society published 21 May 2015, 10.1144/jgs2014-085
http://jgs.lyellcollection.org/cgi/content/abstract/jgs2014-085v1?source=gsw

Tectonic and sedimentary linkages between the Belt-Purcell basin and southwestern Laurentia during the Mesoproterozoic, ca. 1.60-1.40 Ga
James V. Jones, Christopher G. Daniel, and Michael F. Doe
Lithosphere published 21 May 2015, 10.1130/L438.1
http://lithosphere.gsapubs.org/cgi/content/abstract/L438.1v1?source=gsw

Removal of Reactive Black 5 from wastewater using natural clinoptilolite modified with apolaccase
Hayrunnisa Nadaroglu, Ekrem Kalkan, Neslihan Celebi, Esen Tasgin, and A. Dakovic
Clay Minerals. 2015; 50(1): p. 65-76
http://claymin.geoscienceworld.org/cgi/content/abstract/50/1/65?source=gsw

Lateral extrusion, underplating, and out-of-sequence thrusting within the Himalayan metamorphic core, Kanchenjunga, Nepal
T.K. Ambrose, K.P. Larson, C. Guilmette, J.M. Cottle, H. Buckingham, and S. Rai
Lithosphere published 21 May 2015, 10.1130/L437.1
http://lithosphere.gsapubs.org/cgi/content/abstract/L437.1v1?source=gsw

GSA Bulletin
March 2015; 127 (3-4)
http://bulletin.geoscienceworld.org/content/127/3-4?etoc

LOW-TEMPERATURE THERMOCHRONOLOGY

Sevier belt exhumation in central Utah constrained from complex zircon (U-Th)/He data sets: Radiation damage and He inheritance effects on partially reset detrital zircons
William R. Guenthner, Peter W. Reiners, Peter G. DeCelles, and Jerry Kendall
Geological Society of America Bulletin, March 2015, v. 127, p. 323-348, First published on August 26, 2014, doi:10.1130/B31032.1

http://bulletin.geoscienceworld.org/content/127/3-4/323.abstract?etoc

---
PRECAMBRIAN GEOLOGY

Neoproterozoic to early Paleozoic extensional and compressional history of East Laurentian margin sequences: The Moine Supergroup, Scottish Caledonides
Peter A. Cawood, Robin A. Strachan, Renaud E. Merle, Ian L. Millar, Staci L. Loewy, Ian W.D. Dalziel, Peter D. Kinny, Fred Jourdan, Alexander A. Nemchin, and James N. Connelly
Geological Society of America Bulletin, March 2015, v. 127, p. 349-371, First published on September 16, 2014, doi:10.1130/B31068.1 OPEN ACCESS ARTICLE

http://bulletin.geoscienceworld.org/content/127/3-4/349.abstract?etoc

Two Paleoproterozoic glacio-eustatic cycles in the Turee Creek Group, Western Australia
Martin J. Van Kranendonk and Rajat Mazumder
Geological Society of America Bulletin, March 2015, v. 127, p. 596-607, First published on October 22, 2014, doi:10.1130/B31025.1

http://bulletin.geoscienceworld.org/content/127/3-4/596.abstract?etoc

---

SEDIMENTARY GEOLOGY

Interactions between axial and transverse drainage systems in the Late Cretaceous Cordilleran foreland basin: Evidence from detrital zircons in the Straight Cliffs Formation, southern Utah, USA
Tyler S. Szwarc, Cari L. Johnson, Lisa E. Stright, and Christopher M. McFarlane
Geological Society of America Bulletin, March 2015, v. 127, p. 372-392, First published on September 16, 2014, doi:10.1130/B31039.1

http://bulletin.geoscienceworld.org/content/127/3-4/372.abstract?etoc

---

GEOCHRONOLOGY

High-resolution chronostratigraphy of the terrestrial Cretaceous-Paleogene transition and recovery interval in the Hell Creek region, Montana
Courtney J. Sprain, Paul R. Renne, Gregory P. Wilson, and William A. Clemens
Geological Society of America Bulletin, March 2015, v. 127, p. 393-409, First published on September 16, 2014, doi:10.1130/B31076.1

http://bulletin.geoscienceworld.org/content/127/3-4/393.abstract?etoc

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ERRATA

Interactions between axial and transverse drainage systems in the Late Cretaceous Cordilleran foreland basin: Evidence from detrital zircons in the Straight Cliffs Formation, southern Utah, USA
Tyler S. Szwarc, Cari L. Johnson, Lisa E. Stright, and Christopher M. McFarlane
Geological Society of America Bulletin, March 2015, v. 127, p. 409 OPEN ACCESS ARTICLE

http://bulletin.geoscienceworld.org/content/127/3-4/409.2?etoc

Xigaze forearc basin revisited (South Tibet): Provenance changes and origin of the Xigaze Ophiolite
Wei An, Xiumian Hu, Eduardo Garzanti, Marcelle K. BouDagher-Fadel, Jiangang Wang, and Gaoyuan Sun
Geological Society of America Bulletin, March 2015, v. 127, p. 409 OPEN ACCESS ARTICLE

http://bulletin.geoscienceworld.org/content/127/3-4/409.1?etoc

---

THERMOCHRONOLOGY

Interplay between the thermal evolution of an orogenic wedge and its retro-wedge basin: An example from the Ukrainian Carpathians
B. Andreucci, A. Castelluccio, S. Corrado, L. Jankowski, S. Mazzoli, R. Szaniawski, and M. Zattin
Geological Society of America Bulletin, March 2015, v. 127, p. 410-427, First published on September 16, 2014, doi:10.1130/B31067.1

http://bulletin.geoscienceworld.org/content/127/3-4/410.abstract?etoc

---

TECTONOPHYSICS: SEDIMENTARY BASINS

Reconstruction of maximum burial along the Northern Apennines thrust wedge (Italy) by indicators of thermal exposure and modeling
C. Caricchi, L. Aldega, and S. Corrado
Geological Society of America Bulletin, March 2015, v. 127, p. 428-442, First published on October 6, 2014, doi:10.1130/B30947.1

http://bulletin.geoscienceworld.org/content/127/3-4/428.abstract?etoc

---
VOLCANOLOGY

Deformation of the substratum of a large shield volcano: Triggering factor for past flank collapses in the old volcanic edifice of La Gomera, Canary Islands
Carlos Fernández, Ramón Casillas, Julio de la Nuez, Encarnación García-Navarro, and Manuel A. Camacho
Geological Society of America Bulletin, March 2015, v. 127, p. 443-463, First published on September 16, 2014, doi:10.1130/B30971.1

http://bulletin.geoscienceworld.org/content/127/3-4/443.abstract?etoc

Reconstructing the deadly eruptive events of 1790 CE at Kīlauea Volcano, Hawai'i
Donald A. Swanson, Samantha J. Weaver, and Bruce F. Houghton
Geological Society of America Bulletin, March 2015, v. 127, p. 503-515, First published on October 6, 2014, doi:10.1130/B31116.1

http://bulletin.geoscienceworld.org/content/127/3-4/503.abstract?etoc

---
TECTONICS: NEOTECTONICS

Constructing forearc architecture over megathrust seismic cycles: Geological snapshots from the Maule earthquake region, Chile
Felipe Aron, José Cembrano, Felipe Astudillo, Richard W. Allmendinger, and Gloria Arancibia
Geological Society of America Bulletin, March 2015, v. 127, p. 464-479, First published on October 6, 2014, doi:10.1130/B31125.1

http://bulletin.geoscienceworld.org/content/127/3-4/464.abstract?etoc

---
STRUCTURAL GEOLOGY

Orogenic pulses in the Alberta Rocky Mountains: Radiometric dating of major faults and comparison with the regional tectono-stratigraphic record
Dinu Ion Pană and Ben A. van der Pluijm
Geological Society of America Bulletin, March 2015, v. 127, p. 480-502, First published on October 6, 2014, doi:10.1130/B31069.1

http://bulletin.geoscienceworld.org/content/127/3-4/480.abstract?etoc

---
STRUCTURAL GEOLOGY: MICROSTRUCTURE/STRAIN/VORTICITY

Insights into rates of fracture growth and sealing from a model for quartz cementation in fractured sandstones
R.H. Lander and S.E. Laubach
Geological Society of America Bulletin, March 2015, v. 127, p. 516-538, First published on October 6, 2014, doi:10.1130/B31092.1 OPEN ACCESS ARTICLE

http://bulletin.geoscienceworld.org/content/127/3-4/516.abstract?etoc

---
GEOMORPHOLOGY

The role of waterfalls and knickzones in controlling the style and pace of landscape adjustment in the western San Gabriel Mountains, California
Roman A. DiBiase, Kelin X Whipple, Michael P. Lamb, and Arjun M. Heimsath
Geological Society of America Bulletin, March 2015, v. 127, p. 539-559, First published on October 22, 2014, doi:10.1130/B31113.1

http://bulletin.geoscienceworld.org/content/127/3-4/539.abstract?etoc

Correlation of fluvial terraces and temporal steady-state incision on the onshore Makran accretionary wedge in southeastern Iran: Insight from channel profiles and ^10Be exposure dating of strath terraces
Negar Haghipour, Jean-Pierre Burg, Susan Ivy-Ochs, Irena Hajdas, Peter Kubik, and Marcus Christl
Geological Society of America Bulletin, March 2015, v. 127, p. 560-583, First published on October 22, 2014, doi:10.1130/B31048.1

http://bulletin.geoscienceworld.org/content/127/3-4/560.abstract?etoc

---
GEOCHEMISTRY

High-resolution carbon isotope (δ^13Ccarb) chemostratigraphy of the lower Permian from the U.S. midcontinent: Checking the pulse of the late Paleozoic ice age
Kate Tierney Cramer and Mariann Bostic
Geological Society of America Bulletin, March 2015, v. 127, p. 584-595, First published on October 22, 2014, doi:10.1130/B31024.1

http://bulletin.geoscienceworld.org/content/127/3-4/584.abstract?etoc

---
QUATERNARY GEOLOGY/GEOMORPHOLOGY

Mapping and measuring Lake Agassiz strandlines in North Dakota and Manitoba using LiDAR DEM data: Comparing techniques, revising correlations, and interpreting anomalous isostatic rebound gradients
James T. Teller and Zhirong Yang
Geological Society of America Bulletin, March 2015, v. 127, p. 608-620, First published on November 6, 2014, doi:10.1130/B31070.1

http://bulletin.geoscienceworld.org/content/127/3-4/608.abstract?etoc

Processes of arroyo filling in northern New Mexico, USA
Jonathan M. Friedman, Kirk R. Vincent, Eleanor R. Griffin, Michael L. Scott, Patrick B. Shafroth, and Gregor T. Auble
Geological Society of America Bulletin, March 2015, v. 127, p. 621-640, First published on September 16, 2014, doi:10.1130/B31046.1

http://bulletin.geoscienceworld.org/content/127/3-4/621.abstract?etoc

Geology
June 2015; 43 (6)
http://geology.geoscienceworld.org/content/43/6?etoc

Articles

Deriving rock uplift histories from data-driven inversion of river profiles
Christoph Glotzbach
Geology, June 2015, v. 43, p. 467-470, First published on April 24, 2015, doi:10.1130/G36702.1

http://geology.geoscienceworld.org/content/43/6/467.abstract?etoc

Compaction-driven melt segregation in migmatites
Roberto F. Weinberg, E. Veveakis, and K. Regenauer-Lieb
Geology, June 2015, v. 43, p. 471-474, First published on April 24, 2015, doi:10.1130/G36562.1

http://geology.geoscienceworld.org/content/43/6/471.abstract?etoc

Forearc hyperextension dismembered the south Tibetan ophiolites
Marco Maffione, Douwe J.J. van Hinsbergen, Louise M.T. Koornneef, Carl Guilmette, Kip Hodges, Nathaniel Borneman, Wentao Huang, Lin Ding, and Paul Kapp
Geology, June 2015, v. 43, p. 475-478, First published on April 24, 2015, doi:10.1130/G36472.1

http://geology.geoscienceworld.org/content/43/6/475.abstract?etoc

Old continental zircons from a young oceanic arc, eastern Taiwan: Implications for Luzon subduction initiation and Asian accretionary orogeny
Wen-Yu Shao, Sun-Lin Chung, Wen-Shan Chen, Hao-Yang Lee, and Lie-Wen Xie
Geology, June 2015, v. 43, p. 479-482, First published on April 24, 2015, doi:10.1130/G36499.1

http://geology.geoscienceworld.org/content/43/6/479.abstract?etoc

Exhumation and uplift coupled with precipitation along the western Dead Sea Rift margin
U. Ryb, A. Matmon, I. Haviv, and L. Benedetti
Geology, June 2015, v. 43, p. 483-486, First published on April 24, 2015, doi:10.1130/G36331.1

http://geology.geoscienceworld.org/content/43/6/483.abstract?etoc

Where does the time go?: Mixing and the depth-dependent distribution of fossil ages
Rebecca C. Terry and Mark Novak
Geology, June 2015, v. 43, p. 487-490, First published on April 24, 2015, doi:10.1130/G36483.1

http://geology.geoscienceworld.org/content/43/6/487.abstract?etoc

Age of Matuyama-Brunhes boundary constrained by U-Pb zircon dating of a widespread tephra
Yusuke Suganuma, Makoto Okada, Kenji Horie, Hiroshi Kaiden, Mami Takehara, Ryoko Senda, Jun-Ichi Kimura, Kenji Kawamura, Yuki Haneda, Osamu Kazaoka, and Martin J. Head
Geology, June 2015, v. 43, p. 491-494, First published on April 24, 2015, doi:10.1130/G36625.1

http://geology.geoscienceworld.org/content/43/6/491.abstract?etoc

Dating shallow thrusts with zircon (U-Th)/He thermochronometry—The shear heating connection
Matteo Maino, Leonardo Casini, Andrea Ceriani, Alessandro Decarlis, Andrea Di Giulio, Silvio Seno, Massimo Setti, and Finlay M. Stuart
Geology, June 2015, v. 43, p. 495-498, First published on April 24, 2015, doi:10.1130/G36492.1

http://geology.geoscienceworld.org/content/43/6/495.abstract?etoc

Cyclical processes in the North American Cordilleran orogenic system
P.G. DeCelles and S.A. Graham
Geology, June 2015, v. 43, p. 499-502, First published on April 27, 2015, doi:10.1130/G36482.1

http://geology.geoscienceworld.org/content/43/6/499.abstract?etoc

Linking reef ecology to island building: Parrotfish identified as major producers of island-building sediment in the Maldives
C.T. Perry, P.S. Kench, M.J. O'Leary, K.M. Morgan, and F. Januchowski-Hartley
Geology, June 2015, v. 43, p. 503-506, First published on April 27, 2015, doi:10.1130/G36623.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/503.abstract?etoc

The survival of benthic macroscopic phototrophs on a Neoproterozoic snowball Earth
Qin Ye, Jinnan Tong, Shuhai Xiao, Shixing Zhu, Zhihui An, Li Tian, and

Jun Hu
Geology, June 2015, v. 43, p. 507-510, First published on April 27, 2015, doi:10.1130/G36640.1

http://geology.geoscienceworld.org/content/43/6/507.abstract?etoc

What makes a delta wave-dominated?
Jaap H. Nienhuis, Andrew D. Ashton, and Liviu Giosan
Geology, June 2015, v. 43, p. 511-514, First published on April 27, 2015, doi:10.1130/G36518.1

http://geology.geoscienceworld.org/content/43/6/511.abstract?etoc

Coral islands defy sea-level rise over the past century: Records from a central Pacific atoll
P.S. Kench, D. Thompson, M.R. Ford, H. Ogawa, and R.F. McLean
Geology, June 2015, v. 43, p. 515-518, First published on April 27, 2015, doi:10.1130/G36555.1

http://geology.geoscienceworld.org/content/43/6/515.abstract?etoc

A three-dimensional surface velocity field for the Mississippi Delta: Implications for coastal restoration and flood potential
Makan A. Karegar, Timothy H. Dixon, and Rocco Malservisi
Geology, June 2015, v. 43, p. 519-522, First published on April 27, 2015, doi:10.1130/G36598.1

http://geology.geoscienceworld.org/content/43/6/519.abstract?etoc

Large landslides lie low: Excess topography in the Himalaya-Karakoram ranges
Jan Henrik Blöthe, Oliver Korup, and Wolfgang Schwanghart
Geology, June 2015, v. 43, p. 523-526, First published on April 27, 2015, doi:10.1130/G36527.1

http://geology.geoscienceworld.org/content/43/6/523.abstract?etoc

One or two oroclines in the Variscan orogen of Iberia? Implications for Pangea amalgamation
Daniel Pastor-Galán, Thomas Groenewegen, Daniël Brouwer, Wout Krijgsman, and Mark J. Dekkers
Geology, June 2015, v. 43, p. 527-530, First published on April 27, 2015, doi:10.1130/G36701.1

http://geology.geoscienceworld.org/content/43/6/527.abstract?etoc

Focal mechanism of prehistoric earthquakes deduced from pseudotachylyte fabric
Eric C. Ferré, John W. Geissman, Alain Chauvet, Alain Vauchez, and Matthew S. Zechmeister
Geology, June 2015, v. 43, p. 531-534, First published on April 27, 2015, doi:10.1130/G36587.1

http://geology.geoscienceworld.org/content/43/6/531.abstract?etoc

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Erratum

The source of gypsum in Mammoth Cave, Kentucky
J. Garrecht Metzger, David A. Fike, G. Robert Osburn, Claire J. Guo, and Aaron N. Aadison
Geology, June 2015, v. 43, p. 534 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/534?etoc

Articles

Geologic record of partial ocean evaporation triggered by giant asteroid impacts, 3.29–3.23 billion years ago
Donald R. Lowe and Gary R. Byerly
Geology, June 2015, v. 43, p. 535-538, First published on May 7, 2015,

doi:10.1130/G36665.1

http://geology.geoscienceworld.org/content/43/6/535.abstract?etoc

Gypsum caves as indicators of climate-driven river incision and aggradation in a rapidly uplifting region
Andrea Columbu, Jo De Waele, Paolo Forti, Paolo Montagna, Vincenzo Picotti, Edwige Pons-Branchu, John Hellstrom, Petra Bajo, and Russell Drysdale
Geology, June 2015, v. 43, p. 539-542, First published on May 7, 2015, doi:10.1130/G36595.1

http://geology.geoscienceworld.org/content/43/6/539.abstract?etoc

Kelp, cobbles, and currents: Biologic reduction of coarse grain entrainment stress
Claire C. Masteller, Noah J. Finnegan, Jonathan A. Warrick, and Ian M. Miller
Geology, June 2015, v. 43, p. 543-546, First published on May 7, 2015, doi:10.1130/G36616.1

http://geology.geoscienceworld.org/content/43/6/543.abstract?etoc

Graphic-textured inclusions in apatite: Evidence for pegmatitic growth in a REE-enriched carbonatitic system
Krisztina Pandur, Kevin M. Ansdell, and Daniel J. Kontak
Geology, June 2015, v. 43, p. 547-550, First published on May 7, 2015, doi:10.1130/G36613.1

http://geology.geoscienceworld.org/content/43/6/547.abstract?etoc

Mantle heterogeneity controls on small-volume basaltic volcanism
Lucy E. McGee, Marc-Alban Millet, Christoph Beier, Ian E.M. Smith, and Jan M. Lindsay
Geology, June 2015, v. 43, p. 551-554, First published on May 7, 2015, doi:10.1130/G36590.1

http://geology.geoscienceworld.org/content/43/6/551.abstract?etoc

Direct measurements of deglacial monsoon strength in a Chinese stalagmite
Ian J. Orland, R. Lawrence Edwards, Hai Cheng, Reinhard Kozdon, Mellissa Cross, and John W. Valley
Geology, June 2015, v. 43, p. 555-558, First published on May 7, 2015, doi:10.1130/G36612.1

http://geology.geoscienceworld.org/content/43/6/555.abstract?etoc

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RESEARCH FOCUS

RESEARCH FOCUS: Life During Neoproterozoic Snowball Earth
Frank A. Corsetti
Geology, June 2015, v. 43, p. 559-560, doi:10.1130/focus062015.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/559?etoc

Forum

Paleogeographic record of Eocene Farallon slab rollback beneath western North America: REPLY
M. Elliot Smith, Alan R. Carroll, Brian R. Jicha, Elizabeth J. Cassel, and Jennifer J. Scott
Geology, June 2015, v. 43, p. e364, doi:10.1130/G36878Y.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/e364?etoc

Glacial cirques and the relationship between equilibrium line altitudes and mountain range height: COMMENT
Jörg Robl, Günther Prasicek, Stefan Hergarten, and Bernhard Salcher

Geology, June 2015, v. 43, p. e365, doi:10.1130/G36757C.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/e365?etoc

Glacial cirques and the relationship between equilibrium line altitudes and mountain range height: COMMENT
Ian S Evans, Adrian M Hall, and Johan Kleman
Geology, June 2015, v. 43, p. e366, doi:10.1130/G36667C.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/e366?etoc

Oxygenation of the Archean atmosphere: New paleosol constraints from eastern India: REPLY
Quentin G. Crowley, Joydip Mukhopadhyay, Sampa Ghosh, Gautam Ghosh, Kalyan Chakrabarti, Brundaban Misra, Kyle Heron, and Sankar Bose
Geology, June 2015, v. 43, p. e367, doi:10.1130/G36880Y.1 OPEN ACCESS ARTICLE

http://geology.geoscienceworld.org/content/43/6/e367?etoc

Economic Geology
August 2015; 110 (5)
http://econgeol.geoscienceworld.org/content/110/5?etoc

Papers

Depositional Conditions for the Kuna Formation, Red Dog Zn-Pb-Ag-Barite District, Alaska, Inferred from Isotopic and Chemical Proxies
Craig A. Johnson, Julie A. Dumoulin, Robert A. Burruss, and John F. Slack
Economic Geology, August 2015, v. 110, p. 1143-1156, doi:10.2113/econgeo.110.5.1143

http://econgeol.geoscienceworld.org/content/110/5/1143.abstract?etoc

Synsedimentary to Early Diagenetic Gold in Black Shale-Hosted Pyrite Nodules at the Golden Mile Deposit, Kalgoorlie, Western Australia
Jeffrey A. Steadman, Ross R. Large, Sebastien Meffre, Paul H. Olin, Leonid V. Danyushevsky, Daniel D. Gregory, Ivan Belousov, Elena Lounejeva, Trevor R. Ireland, and Peter Holden
Economic Geology, August 2015, v. 110, p. 1157-1191, doi:10.2113/econgeo.110.5.1157

http://econgeol.geoscienceworld.org/content/110/5/1157.abstract?etoc

Metamorphosed Proterozoic Zn-Pb-Ag Mineralization in the Foster River Area, Northern Saskatchewan, Canada
Jeffrey A. Steadman and Paul G. Spry
Economic Geology, August 2015, v. 110, p. 1193-1214, doi:10.2113/econgeo.110.5.1193

http://econgeol.geoscienceworld.org/content/110/5/1193.abstract?etoc

Styles, Textural Evolution, and Sulfur Isotope Systematics of Cu-Rich Sulfides from the Cambrian Whalesback Volcanogenic Massive Sulfide Deposit, Central Newfoundland, Canada
Jonathan Cloutier, Stephen J. Piercey, Graham Layne, John Heslop, Andrew Hussey, and Glenn Piercey
Economic Geology, August 2015, v. 110, p. 1215-1234, doi:10.2113/econgeo.110.5.1215

http://econgeol.geoscienceworld.org/content/110/5/1215.abstract?etoc

Geochemical Stratigraphy of the Keweenawan Midcontinent Rift Volcanic Rocks with Regional Implications for the Genesis of Associated Ni, Cu, Co, and Platinum Group Element Sulfide Mineralization
Reid R. Keays and Peter C. Lightfoot
Economic Geology, August 2015, v. 110, p. 1235-1267, doi:10.2113/econgeo.110.5.1235

http://econgeol.geoscienceworld.org/content/110/5/1235.abstract?etoc

Partial Melting Processes and Cu-Ni-PGE Mineralization in the Footwall of the South Kawishiwi Intrusion at the Spruce Road Deposit, Duluth Complex, Minnesota
Zsolt Benkó, Aberra Mogessie, Ferenc Molnár, Mark J. Severson, Steven A. Hauck, and Sara Raič
Economic Geology, August 2015, v. 110, p. 1269-1293,
doi:10.2113/econgeo.110.5.1269

http://econgeol.geoscienceworld.org/content/110/5/1269.abstract?etoc

The Nickeliferous Archean Madziwa Igneous Complex, Northern Zimbabwe: Petrological Evolution, Magmatic Architecture, and Ore Genesis
M. D. Prendergast and A. H. Wilson
Economic Geology, August 2015, v. 110, p. 1295-1312,
doi:10.2113/econgeo.110.5.1295

http://econgeol.geoscienceworld.org/content/110/5/1295.abstract?etoc

Application of U-Th-Pb Phosphate Geochronology to Young Orogenic Gold Deposits: New Age Constraints on the Formation of the Grass Valley Gold District, Sierra Nevada Foothills Province, California
Ryan D. Taylor, Richard J. Goldfarb, Thomas Monecke, Ian R. Fletcher, Michael A. Cosca, and Nigel M. Kelly
Economic Geology, August 2015, v. 110, p. 1313-1337,
doi:10.2113/econgeo.110.5.1313

http://econgeol.geoscienceworld.org/content/110/5/1313.abstract?etoc

Fluid Inclusion and Isotopic Constraints on the Origin of the Paleoproterozoic Yinachang Fe-Cu-(REE) Deposit, Southwest China
Xiaochun Li, Xinfu Zhao, Mei-Fu Zhou, Wei Terry Chen, and Zhuyin Chu
Economic Geology, August 2015, v. 110, p. 1339-1369,
doi:10.2113/econgeo.110.5.1339

http://econgeol.geoscienceworld.org/content/110/5/1339.abstract?etoc

---
Interesting Papers in Other Journals

INTERESTING PAPERS IN OTHER JOURNALS
Economic Geology, August 2015, v. 110, p. 1371-1373,
doi:10.2113/econgeo.110.5.1371

http://econgeol.geoscienceworld.org/content/110/5/1371?etoc

Mineralogical Magazine
April 2015; 79 (2)
http://minmag.geoscienceworld.org/content/79/2?etoc

Articles

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doi:10.1180/minmag.2015.079.2.01

http://minmag.geoscienceworld.org/content/79/2/219.abstract?etoc

Nomenclature for the laueite supergroup
S. J. Mills and I. E. Grey
Mineral Mag, April 2015, v. 79, p. 243-246,
doi:10.1180/minmag.2015.079.2.02

http://minmag.geoscienceworld.org/content/79/2/243.abstract?etoc

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U. Hålenius, F. Hatert, M. Pasero, and S. J. Mills
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doi:10.1180/minmag.2015.079.2.03

http://minmag.geoscienceworld.org/content/79/2/247.extract?etoc

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doi:10.1180/minmag.2015.079.2.05

http://minmag.geoscienceworld.org/content/79/2/261.abstract?etoc

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doi:10.1180/minmag.2015.079.2.07

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doi:10.1180/minmag.2015.079.2.08

http://minmag.geoscienceworld.org/content/79/2/295.abstract?etoc

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doi:10.1180/minmag.2015.079.2.09

http://minmag.geoscienceworld.org/content/79/2/309.abstract?etoc

The crystal structure of cyanotrichite
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Mineral Mag, April 2015, v. 79, p. 321-335,
doi:10.1180/minmag.2015.079.2.10

http://minmag.geoscienceworld.org/content/79/2/321.abstract?etoc

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Geochemistry International

Vol. 53, No. 6, 2015
A simultaneous English language translation of this journal is available from Pleiades Publishing, Ltd. Distributed worldwide by Springer. *Geochemistry International* ISSN 0016-7029.

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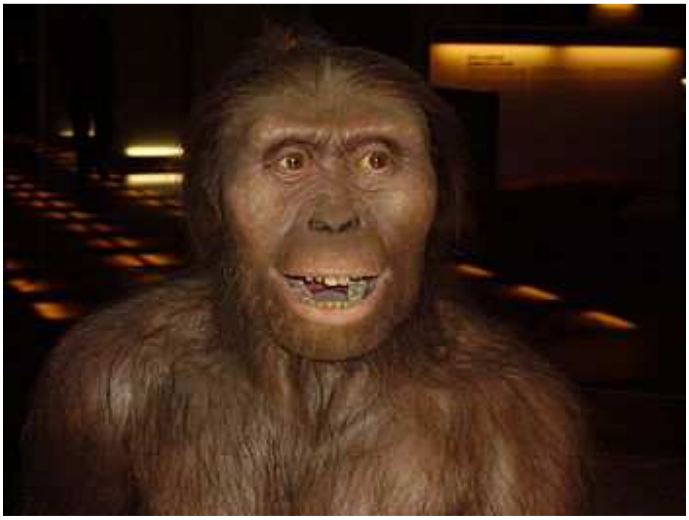
Stone tools go even further back

Posted on May 25, 2015 by Steve Drury | Leave a comment

Shortly after it seemed that the maker of the earliest stone tools (2.6 Ma) may have been *Australopithecus africanus*, thanks to a novel means of analyzing what hominin hands may have been capable of, some actual tools have turned up from even earlier times (Harmand, S. and 20 others 2015. 3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya. *Nature*, v. **521**, p. 310-315). Their age is comparable with that (3.4 Ma) of animal bones from Dikika, Ethiopia showing cut marks and signs of deliberate breaking, which had previously been controversial as they suggested that local *Australopithecus afarensis* of a similar age had made them. What the authors claim to be 'a new beginning to the known archaeological record' almost a million years earlier than the first appearance of Homo fossils in the Lake Turkana area seems to point in that direction. But *A. afarensis* has not been found in that area, although a hominin known as *Kenyanthropus platyops* with roughly the same age as the tools has.



Reconstruction of Australopithecus afarensis (Photo credit: Wikipedia)

Almost 150 stone artefacts turned up at the Lomekwi site, which may have been where knappers habitually worked. They are made of fine-grained basaltic lava, and the cores from which flakes had been struck are large, weighing on average 3.1 kg. It seems that the tool makers may have been forcefully pounding out edged tools for a variety of uses, unlike the single-use hammer stones used by chimpanzees today. Compared with the well known Oldowan tools, however, these are cruder and made by a different knapping technique that seems not to have focused on exploiting the conchoidal fracturing that produces the sharpest tools and is a feature of the later Oldowan tools.

Oldowan 'chopper' from Melka Kunture, Ethiopia. (credit: Wikipedia)

Frederick Engels, whose 1876 essay *The Part played by Labour in the Transition from Ape to Man* was among the first works to take Darwin's ideas on human origins forward, would have had a field day with the new evidence. For him the vital step was freeing of the

hands by a habitual bipedal gait and their manipulation of objects – together with changes to the hands that would arise by such a habit. What the first tool maker looked like, doesn't really matter: the potential that act conferred was paramount. Nevertheless, there is a big step between early hominins and humans, from relatively small brains to those of *H. erectus* that were on the way to modern human capacity. The Lomekwi tools and the improved Oldwan artefacts spanned 1.7 Ma at least before *H. erectus* revolutionised manufacture to produce the bi-facial Acheulian hand 'axe', and going beyond that took almost a million years of little change in both tools and anatomy until the emergence of archaic modern humans.

Related articles

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Tagged Australopithecus afarensis, human evolution, Kenyanthropus, Lake Turkana, Stone tool

A certain shyness about research misconduct in the UK

Posted on May 21, 2015 by Steve Drury | Leave a comment

Since Earth Pages was launched at the start of the 21st century there have been highly publicised cases of gross misconduct by researchers, including plagiarism, 'massaging 'data and even sabotaging the work of others, as well as lesser cases where publications were withdrawn or removed from journals. The most notorious have been from the USA, Japan, the Netherlands and a number of other advanced countries. But sharp practices in science are not well known in the UK; indeed I can't recollect more than one case that reached the same degree of coverage as the most notorious instances. Yet, in 2009, Daniele Fanelli of the University of Edinbugh reported the results of her analysis of accessible information from the UK about this matter. She found that about 2% of British scientists, who had been interviewed or answered questionnaires, answered 'Yes' when asked if they ever fabricated or falsified research data, or if they altered or modified results to improve the outcome. Up to one third admitted other questionable practices or knew of them having been committed by colleagues. Fanelli doesn't refer to more grievous matters such as sabotage or exploitation of students' work.

The silence from British Universities on research misconduct has become such an embarrassment that it was a subject of an Editorial and a News In Focus Report in the 21 May issue of *Nature* . While there are guidelines that urge British universities to publish annual reports of their investigations into misconduct, for 2013-14 only 12 such reports have been published : of the 88 universities contacted by the informal UK Research Integrity Office, 30 institutions responded to UKRIO's survey. These reports covered 21 investigations, mostly unspecified, with 5 cases of plagiarism, 2 of falsification, 2 concerning authorship, 1 of fabrication and 1 breach of confidentiality. Three were upheld and 3 are pending.

These figures speak loudly for themselves: misconduct by researchers (and academics in general) is something that the halls of British academe 'dinnae care to speak aboot'. As the author of UKRIO's survey observed, 'It's just not credible', although many of the universities that she contacted claim that such reports were in progress. A likely story… We all know that the 'filthy snout' (Tom Wolfe *The Bonfire of the Vanities*) does 'come popping to the surface', but is buried in confidentiality by university Research Committees, leaving any victims dangling in a sorry psychological state and allowing journals' peer review system to catch any perpetrators before they reach the press, which it is rarely able to do. It takes a case as severe as that of Andrew Wakefield's fraudulent 1998 paper in the Lancet associating the MMR vaccine with autism to see justice done.

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Posted in Ethics, and the philosophy and practice of science

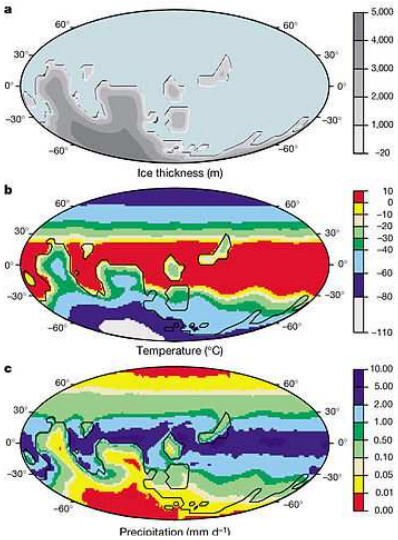
Tagged Research misconduct, UK

Snowball Earth events pinned down

Posted on May 21, 2015 by Steve Drury | Leave a comment

The Period that lasted from 850 to 635 million years ago, the Cryogenian, takes its name from evidence for two and perhaps three episodes of glaciation at low latitudes. It has been suggested that, in some way, they were instrumental in the decisive stage of biological evolution from which metazoan eukaryotes emerged: the spectacular Ediacaran fossil assemblages follow on the heels of the last such event Although controversies about the reality of tropical latitudes experiencing ice caps have died away, there remains the issue of synchronicity of such frigid events on all continents, which is the central feature of so-called 'Snowball Earth' events. While each

continent does reveal evidence for two low latitude glaciations – the Sturtian (~710 Ma) and the later Marinoan (~635 Ma) – in the form of diamictites (sediments probably dropped from floating ice and ice caps) it has proved difficult to date their start and duration. That is, the cold episodes may have been diachronous – similar conditions occurring at different localities at different times. Geochronology has, however, moved on since the early disputes over Snowball Earths and more reliable and precise dates for beginnings and ends are possible and have been achieved in several places (Rooney, A.D. *et al*. 2015. A Cryogenian chronology: Two long-lasting synchronous Neoproterozoic glaciations. *Geology*, v. **43**, p. 459-462).



Computer simulation of conditions during a Snowball Earth period. (credit: Macmillan Publishers Ltd: Hyde et al., Nature 405:425-429, 2000)

Rooney and colleagues from Harvard and the University of Houston in the USA used rhenium-osmium radiometric dating in Canada, Zambia and Mongolia. The Re-Os method is especially useful for sulfide minerals as in the pyritic black shales that occur extensively in the Cryogenian, generally preceding and following the glacial diamictites and their distinctive carbonate caps. Combined with a few ages obtained by other workers using the Re-Os method and U-Pb dating of volcanic units that fortuitously occur immediately beneath or within diamictites, Rooney *et al*. establish coincident start and stop dates and thus durations of both the Sturtian and Marinoan glacial events: 717 to 660 Ma and 640 to 635 Ma respectively on all three continents. Their data is also said to refute the global extent and even the very existence of an earlier, Kaigas glacial event (~740 Ma) previous recorded from diamictites in Namibia, the Congo, Canada and central Asia. This assertion is based on the absence of diamictites with that age in the area that they studied in Canada and their own dating of a diamictite in Zambia, which is one that others assigned to the Kaigas event

The dating is convincing evidence for global glaciation on land and continental margins in the Cryogenian, as all the dates are from areas based on older continental crust. But the concept of Snowball Earth, in its extreme form, is that the oceans were ice-capped too as the name suggests, which remains to be convincingly demonstrated. That would only be achieved by suitably dated diamictites located on obducted oceanic crust in an ophiolite complex. Moreover, there are plenty more Cryogenian diamictites on other palaeo-continents and formed at different palaeolatitudes that remain to be dated (see here)

Related articles

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-  New Studies Reveal Climate Extremes From Fire to Ice

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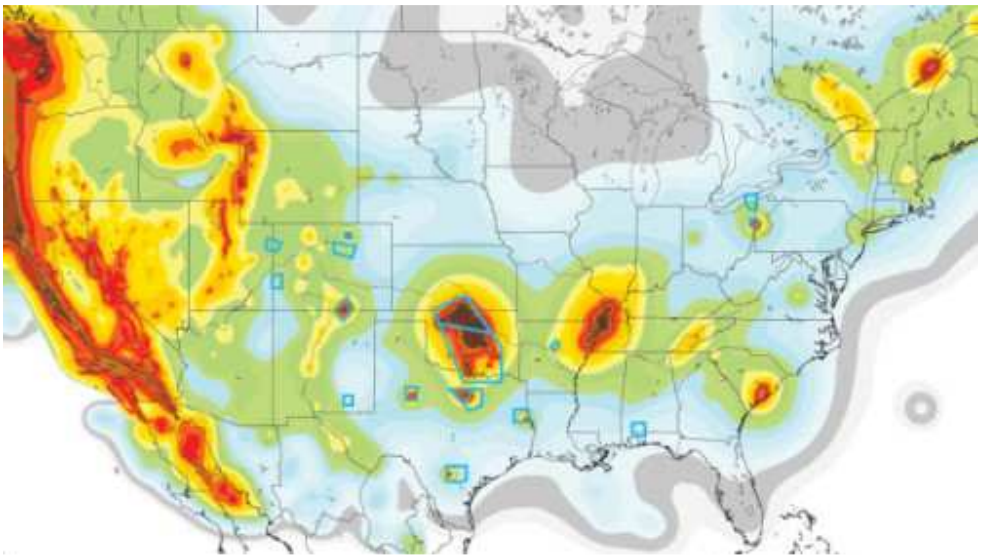
Posted in Climate change and palaeoclimatology

Tagged Global glaciation, Ice Ages, Radiometric dating, Snowball Earth

Earthquake hazard news

Posted on May 10, 2015 by Steve Drury | Leave a comment

Assessments of seismic risk have relied until recently on records of destructive earthquakes going back centuries and their relationship to tectonic features, mainly active faults. They usually predict up to 50 years ahead. The US Geological Survey has now shifted focus to very recent records mainly of small to medium tremors, some of which have appeared in what are tectonically stable areas as well as the background seismicity in tectonically restless regions. This enables the short-term risk (around one year) to be examined. To the scientists' surprise, the new modelling completely changes regional maps of seismic risk. The probabilities in the short-term of potentially dangerous ground movements in 17 oil- and gas-rich areas rival those in areas threatened by continual, tectonic jostling, such as California. The new 'hot spots' relate to industrial activity, primarily the disposal of wastewater from petroleum operations by pumping it into deep aquifers.



USGS map highlighting short-term earthquake risk zones. Blue boxes indicate areas with induced earthquakes (source: US Geological Survey)

Fluid injection increases hydrostatic pressure in aquifers and also in the spaces associated with once inactive fault and fracture systems. All parts of the crust are stressed to some extent but the presence of fluids and over-pressuring increases the tendency for rock failure. While anti-fracking campaigners have focussed partly on seismic risk – fracking has caused tremors around magnitudes 2 to 3 – the process is a rapid one-off injection involving small fluid volumes compared with petroleum waste-water disposal. All petroleum production carries water as well as oil and gas to wellheads. Coming from great depth it is formation water held in pores since sedimentary deposition, which is environmentally damaging because of its high content of dissolved salts and elevated temperature. Environmental protection demands that disposal must return it to depth.

The main worry is that waste water disposal might trigger movements with magnitudes up to 7.0: in 2011 a magnitude 5.6 earthquake hit a town in oil-producing Oklahoma and damaged many buildings. Currently, US building regulations rely on earthquake risk maps that consider a 50-year timescale, but they take little account of industrially induced seismicity. So the new data is likely to cause quite a stir. These are changing times, however, as the oil price fluctuates wildly. So production may well shift from field to field seeking sustainable rates of profit, and induced seismicity may well change as a result.

None of these areas are likely to experience the horrors of the 25 April 2015 magnitude 7.8 earthquake in Nepal. However, it also occurred in an area expected to be relatively stable compared with the rest of the Himalayan region. The only previous major tremor there was recorded in the 14th century. This supposedly 'low-risk' area overlies a zone in which small tremors or microearthquakes occur all the time. Such zones – and this one extends along much of the length of the Himalaya – seem to mark where fault depths are large enough for displacements to take place continually by plastic flow, thereby relieving stresses. Most of the large earthquakes have taken place south of the microseismic zone where the shallow parts of the Indian plate are brittle and have become locked. The recent event is raising concerns that it is a precursor of further large earthquakes in Nepal. Its capital Kathmandu is especially susceptible as it is partly founded on lake sediments that easily liquefy.

Note added: 13 May 2015. Nepal suffered another major shock (magnitude 7.3) on 12 May in the vicinity of Mount Everest. It too seems to have occurred in the zone of microearthquakes formerly thought to mark a zone where the crust fails continually bu plastic deformation thereby relieving stresses. Kathmandu was this time at the edge of the shake zone

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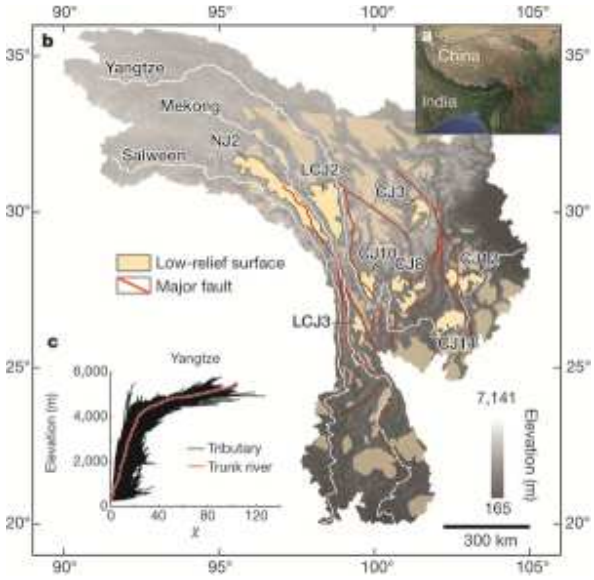
Posted in Environmental geology and geohazards

Tagged Earthquake, Nepal, Seismic risk, US seismicity

Two large, reorganised landscapes

Posted on April 27, 2015 by Steve Drury | Leave a comment

Where tectonic processes proceed quickly it is only to be expected that the land surface undergoes dramatic changes and that big features form. Exactly which processes lay behind very striking landforms may have been worked out long ago; or old ideas from the heyday of geomorphology have perhaps lingered longer than they should. Two tectonically active regions that have a long history of study are the Himalaya and Iceland: one a model of long-lived and rapid uplift driven by collisional tectonics; the other likewise, as a product of extension and rapid build-up of flood basalt flows. Major features of both have been shown to be not quite what they seem. Substantial parts of the India-Asia collision zone contain broad patches of high, low-relief plateaus separated by deeply incised river gorges. In its eastern parts rise 3 of the largest rivers in SE Asia: the Yangtse; the Mekong and the Salween, which flow roughly parallel to the east and south-east for about 1000 km from their sources in the Tibetan Plateau. Their trajectories partly follow some enormous strike-slip fault that accommodated the relative motion of two continent-bearing plates over the last 50 million years. As well as the crustal thickening that attended the collision, vast amounts of uplifted material have been eroded from the three major gorges. Thickening and unloading have been the key to producing the largest tracts of high land on the planet. Yet between the gorges and their many tributaries in the eastern part of the collision zone are many tracts of high land with only moderate relief rather than sharp ridges. Because the Eurasian plate prior to India's impact might reasonably be expected to have been only moderately high, if not low lying, and with a mature and muted landscape, a long-lived theory has been that these elevated plateaus are uplifted relics of this former landscape that were dissected by progressively deepening river incision. Much the same idea has been applied to similar mega features, and even coincident peaks in more completely eroded highlands.



Drainage basins of the Yangtse, Mekong and Salween rivers, with low-relief surfaces in buff and cream. Figure 1 in Yang et al. 2015 (credit: Nature)

In the India-Asian collision zone the supposedly 'relic' plateaus have been used to reconstruct the pre-collision land surface and the degree of bulging it has undergone since. However, the advent of accurate digital terrain elevation data has enabled the modelling of not only the large rivers but also of the tributary streams that make up major drainage. As well as the directional aspects of drainages their along-channel slopes can be analysed (Yong, R. et al. 2015. In situ low-relief landscape formation as a result of river network disruption. Nature, v. 520, p. 526-529). Rong Yang of the Swiss Federal Institute of Technology and colleagues from the same department and Ben-Gurion University of the Negev, Israel have been able to show that matters are far more complex than once believed. The tributary drainages of the Yangtse, Mekong and Salween gorges appear to have been repeatedly been disrupted by the complexities of deformation. One important factor has been drainage capture or piracy, in which drainages with greater energy erode towards the heads of their catchments until they intercept a major drainage in another sub-basin, thereby 'stealing' the energy of the water that it carries. The 'pirate' stream then erodes more powerfully in its lower reaches, whereas the basin burgled of much of its energy becomes more sluggishly evolving thereafter and increasingly left anomalous high in the regional terrain: it evolves to liken what previously it had been supposed to be – a relic of the pre-collision landscape.

Many of the rivers in Iceland occupy gorges that contain a succession of large waterfalls. Upstream of each is a wide rock terrace, and downstream the gorge is eroded into such a terrace. Much of Iceland is composed of lava flows piled one above another, as befits the only substantial land that straddles a constructive plate margin – the mid-Atlantic Ridge. Being famous also for its substantial ice caps that are relics of one far larger during the last glacial maximum, it has proved irresistible for geomorphologists to assign the gorge-fall-terrace repetition to gradual uplift due to isostatic rebound as the former ice cap melted and unloaded the underlying lithosphere. As relative sea-level fell each river gained more gravitational potential energy to cut back up its channel, which resulted in a succession of upstream migrating waterfalls and gorges below them. Individual lava flows, being highly resistant to abrasion cease to be affected once cut by a gorge; hence the terraces. But it is now possible to establish the date when each terrace first became exposed to cosmic-ray bombardment, using the amount of cosmogenic 3He that has accumulated in the basalts that form the terrace surfaces (Baynes, E.R. et al. 2015. Erosion during extreme flood events dominates Holocene canyon evolution in northeast Iceland. Proceedings of the National Academy of Science, doi:10.1073/pnas.1415443112).

Gorge incised in basalt flows, Jökulsárgljúfur National Park, Iceland (credit: Wikipedia)

The British-German team from the University of Edinburgh and Deutsches GeoForschungsZentrum, Potsdam worked on terraces of the Jökulsárgljúfur canyon, discovering that three terraces formed abruptly in the Holocene, at 9, 5 and 2 ka ago, with no evidence for any gradual erosion by abrasion. Each terrace was cut suddenly, probably aided by the highly jointed nature of the overlying lava flow that would encourage toppling of blocks given sufficient energy. The team suggests that each represents not stages in uplift, but individual megafloods, perhaps caused by catastrophic glacial melting during subglacial eruptions or failures of dams formed by moraines or ice lobes.

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What followed the Giant Impact (read Lord Mayor's Show)?

Posted on April 24, 2015 by Steve Drury | Leave a comment

The dominance of the Lunar Highlands by feldspar-rich anorthosites, which form when feldspars that crystallise from magmas float because of their lower density, gave rise to the idea that the Moon initially formed as a totally molten mass. That this probably resulted because the early Earth collided with a Mars-sized protoplanet stems from the almost identical chemical composition of the lunar and terrestrial mantles, as worked out from the composition of younger basalts derived from both, together with the vast energy needed to support a large molten planetary body condensing from a plasma cloud orbiting the Earth. Such a giant impact is also implicated in the final stages of core formation within the Earth.

Artist's depiction (after William K. Hartmann) of the giant impact that is hypothesized to have formed the Moon. (credit: Wikipedia)

A core formed from molten iron alloyed with nickel would have acted as a chemical attractor for all other elements that have an affinity for metallic iron: the siderophile elements, such as gold and platinum. Yet the chemistry of post-moon formation basaltic melts derived from the Earth's mantle contain considerably more of these elements than expected, a feature that has led geochemists to wonder whether a large proportion of the mantle arrived – or was accreted – after the giant impact.

A tool that has proved useful in geochemistry on the scale of entire planets – well, just the Earth and Moon so far – is measuring the isotopic composition of tungsten, a lithophile metal that has great affinity for silicates. One isotope is ^{182}W that forms when a radioactive isotope of hafnium (^{182}Hf) decays. The proportion of ^{182}W relative to other tungsten isotopes has been shown to be about the same in Lunar Highland anorthosites as it is in the Earth's mantle. This feature is believed to reflect Moon formation and its solidification after the parent ^{182}Hf had all decayed away: the decay has a half-life of about 9 Ma and after 60 Ma since the formation of the Solar System (and a nearby supernova that both triggered it and flung unstable isotopes such as ^{182}Hf into what became the Solar nebula) vanishingly small amounts would remain.

Oddly, two papers on tungsten and Earth-Moon evolution, having much the same aims, using similar, newly refined methods and with similar results appeared in the same recent issue of *Nature* (Touboul, M. *et al*. 2015. Tungsten isotopic evidence for disproportional late accretion to the Earth and Moon. *Nature*, v. **520**, p. 530-533. Kruijer, T.S. *et al*. 2015. Lunar tungsten isotopic evidence for the late veneer. *Nature*, v. **520**, p. 534-537). The two of them present analyses of glasses produced by large impacts into the lunar surface and probably the mantle, which flung them all over the place, maintaining the commonality of the ventures that might be explained by there being a limited number of suitable Apollo samples. Both report an excess of ^{182}W in the lunar materials: indeed, almost the same excess given the methodological precisions. And, both conclude that Moon and Earth were identical just after formation, with a disproportional degree of later accretion of Solar nebula material to the Earth and Moon.

So, there we have it: it does look as if Earth continued to grow after it was whacked, and there is confirmation. Both papers conclude, perhaps predictably, that the early Solar System was a violent place about which there is much yet to be learned…

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St Paul and the meteorite?

Posted on April 24, 2015 by Steve Drury | 1 comment

Dateline: Chelyabinsk, Russia 09.20 15 February 2013. As in many parts of Russia drivers in this Oblast in the Urals Economic District use an in-car camera during rush hour, hopefully to have proof of innocence in the event of a traffic accident. On this day, such cameras recorded a massive fireball streaking low across a clear, frosty sky. Some people on foot were temporarily blinded by its light, about 4 times that sunlight, and others were thrown off their feet by a large shock wave. Travelling at about 20 km s-1 the fireball exploded, the blast shattering windows where people were gazing at the remarkable sight, about 1500 needing medical treatment. This event is the first in modern times to record the atmospheric entry of a superbolide and air blast, probably similar to what happened in the deserted area of Tunguska in Siberia on 30 June 1908.

Meteor trail and fireball seen over industrial estate in Chelyabinsk, Russia (credit: Russia Today)

Cut to the Levant in the 1st century of the Common Era: on the road to Damascus a Jewish fundamentalist with Roman citizenship, sworn to destroy the early Christian movement, is on a mission to arrest Christians and take them in chains to Jerusalem. Saul witnesses a great light in the sky and a deafening sound that he believes is the voice of Jesus, saying 'Saul, Saul, why persecutest thou me?'(Acts 9:4). He is flung off his feet, struck blind and convinced of the error of his calling. Three days later, in Damascus '…there fell from his eyes as it had been scales: and he received sight forthwith, and arose, and was baptized' (Acts 9:18), taking the name Paul.

The conversion of Saul by Michaelangelo

William Hartmann of the Planetary Science Institute at the University of Arizona, among the first planetary scientists to propose the giant impact origin for the Moon (see next item) and in his case to visualise it in a famous painting, has drawn a somewhat obvious hypothesis linking the two events (Hartmann, W.K. 2015. Chelyabinsk, Zond IV, and a possible first-century fireball of historical importance.

Meteoritics and Planetary Science, v. 50, p. 368-381: doi: 10.1111/maps.12428). These days such a scary observation is easily rationalised as a natural phenomenon, but in earlier times Hartmann believes such a shock would have convinced witness of the almighty power of the supernatural 'in terms of current cultural conceptions'. He suggests that Saul of Tarsus may, at the time, have been struggling with his conscience about his attacks on his countrymen: hence his conversion. The phrase ' scales fell from his eyes' has entered common parlance for sudden changes in mental state and attitude: in fact it matches an outcome of severe photokeratitis of the eye's epithelial coating, the dead tissue eventually becoming detached, when clear sight is restored to some sufferers.
While claiming to have no intention of undermining anyone's spiritual beliefs, Hartmann suggests that such rare and spectacular events are capable of having emotionally changed influential figures of the past and thereby re-routing the course of history. Hartmann cites modern cases of lesser bolide-entry phenomena, such as destruction of satellites over the US and Russia, which some witnesses misreported as rockets with lighted windows; i.e. UFOs. There are plenty of medieval cases where spiritual connotations were widely attached to strange natural phenomena. I have heard accounts from people living in Asmara, capital of Eritrea, who ascribed saintly intervention to a full solar halo with sun dogs connected by cruciform arcs on a misty morning in 1991. This occurred a few days before the occupying Ethiopian forces surrendered to Eritrean nationalist forces whose struggle for self determination had lasted for the previous three decades.

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The dinosaur they could not kill: Brontosaurus is back

Posted on April 20, 2015 by Steve Drury | Leave a comment

It would be pretty safe to say that everyone has heard of *Brontosaurus*, but in the 1970s the genus vanished from the palaeobiology lexicon. The 'Bone Wars' of post-Civil War US palaeontology stemmed from the astonishing prices that dinosaur skeletons fetched. The frenzy of competition to fill museums unearthed hundreds of specimens, but the financial enthusiasm did not extend to painstaking anatomy. Finding a new genus meant further profit so a slapdash approach to taxonomy might pay well. So it did with the dinosaur family Diplodocidae for Othniel Marsh, one of the fossil marauders. He along with his main competitor, Edward Cope, was a wizard fossicker, but lacked incentive to properly describe what he unearthed. In 1877 Marsh published a brief note about a new genus that he called *Apatosaurus*, then hurried off to for more booty. Two years later he returned from the field with another monster reptile, and casually made a brief case for the 'Thunder Lizard', *Brontosaurus*. Unlike his usage of 'Deceptive Lizard' for *Apatosaurus*, the English translation of *Brontosaurus* caught the public imagination and lingers to this day as the archetype for a mighty yet gentle, extinct beast. Yet, professional palaeontologists were soon onto the lax ways of Marsh and Cope, and by 1903 deemed *Brontosaurus* to be taxonomically indistinguishable from *Apatosaurus*, and as far as science was concerned the 'Thunder Lizard' was no more.

Artist's impression of a Brontosaurus . The idea that it was wholly or mostly aquatic is now considered outdated. (credit: Wikipedia)

But, the legacy of frenzied fossil collecting of a century or more ago is huge collections that never made it to display, which form rich pickings for latter-day palaeontologists with all kinds of anatomical tools now at their disposal: the stuff of almost endless graduate studies. Emanuel Tschopp of the New University of Lisbon with colleagues took up the challenge of the Diplodocidae by examining 49 named specimens and 32 from closely related specimens as controls, measuring up to 477 skeletal features (Tschopp, E. *et al*. 2015. A specimen-level phylogenetic analysis and taxonomic revision of Diplodocidae (Dinosauria, Sauropoda). *PeerJ,* v. **3**, doi10.771/peerj.857). An unintended consequence was their discovery that 6 specimens of what had become *Apatosaurus excelsus* (formerly Marsh's *Brontosaurus*) differed from all other members of its genus in 12 or more key characteristics. It seems to taxonomists

a little unfair that *Brontosaurus* should not be resurrected, and that looks likely.

Had this been about almost any other group of fossils, with the exception perhaps of the ever-popular tyrannosaurs, the lengthy paper would have passed unnoticed except by specialist palaeontologists. In a little over a week the open-access publication had more than 17 thousand views and 3300 copies were downloaded.

See also: Balter, M. 2015. Bully for Brontosaurus. *Science*, v. **348**, p. 168

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Magma rushed into largest layered intrusion

Posted on April 10, 2015 by Steve Drury | Leave a comment

Chances are that the platinum in the catalytic converter that helps prevent your car emitting toxic gases in its exhaust fumes came from a vast igneous intrusion in South Africa known as the Bushveldt complex. The world's most important source of noble metals formed by repeated differentiation of huge volumes of mafic magma to form thin, dense layers rich in sulfides, platinum group metals and chromium ore set in very thick layers of barren gabbro and other mafic to ultramafic rock. The intrusion is exposed over an area the size of Ireland and formed about 2 billion years ago. Its 370 000 to 600 000 km^3 volume suggests that it was the magma chamber that fed flood basalts that erosion has since eroded away. Successive pulses of basaltic magma built up a total thickness of about 8 kilometres of layered rock.

Layered igneous rocks in the Bushveld Complex (credit: Wikipedia)

The final product of the Bushveldt differentiation process was minute pockets of material of more felsic composition trapped within overwhelmingly larger amounts of gabbro. One of the elements that ended up in these roughly granitic inclusions was zirconium that mafic minerals are unable to accommodate while basaltic magma is crystallising. That formed minute crystals of the mineral zircon ($ZrSiO_4$) in the residual pockets, which in turn locked up a variety of other elements, including uranium. Zircon can be dated using uranium's radioactive decay to form lead isotopes, its refusal to enter chemical reactions after its crystallisation makes U/Pb dates of zircon among the most reliable available for geochronology and the precision of such dates has become increasingly exquisite as mass spectrometry has improved. So, the Bushveldt complex now has among the best records of magma chamber evolution (Zeh, A. *et al*. 2015. The Bushveld Complex was emplaced and cooled in less than one million years – results of zirconology, and geotectonic implications. *Earth and Planetary Science Letters*, v. **418**, p. 103-114).

Like a number of younger large igneous provinces, the Bushveldt complex took a very short time to form, about 950 thousand years at 2055 Ma ago. That is from magma emplacement to final crystallization when the zircon ages were set, so the accumulation of magma probably took only 100 thousand years. This suggests that magma blurted into the lower crust at an average rate of around 5 cubic kilometers per year, and quite probably even faster if the magmatism was episodic. It requires a major stretch of the imagination to suggest that this could have occurred by some passive process. Instead, the authors have suggested that while a plume of mantle material rose from well below the lithosphere a large slab of lower lithosphere, formed from dense eclogite, broke off and literally fell into the deeper mantle. The resulting changes in stress in the lower lithosphere would have acted as a pump to drive the plume upwards, causing it to melt as pressure dropped, and to squirt magma into the overlying continental crust. Although the authors do not

mention it, this is reminiscent of the idea of large igneous provinces having sufficient power to eject large masses from the Earth's surface: the Verneshot theory, recently exhumed in late 2014. The main difference is that the originators of the Verneshot theory appealed to explosive gas release.

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Posted in Geochemistry, mineralogy, petrology and volcanology

Tagged Bushveldt complex, Layered intrusion, Magma chamber, Magma differentiation

A new explanation for banded iron formations (BIFs)

Posted on March 27, 2015 by Steve Drury | 2 comments

The main source for iron and steel has for more than half a century been Precambrian rock characterised by intricate interlayering of silica- and iron oxide-rich sediments known as banded iron formations or BIFs. They always appear in what were shallow-water parts of Precambrian sedimentary basins. Although much the same kind of material turns up in sequences from 3.8 to 0.6 Ga, by far the largest accumulations date from 2.6 to 1.8 Ga, epitomised by the vast BIFs of the Palaeoproterozoic Hamersley Basin in Western Australia. This peak of iron-ore deposition brackets the time (~2.4 Ga) when world-wide evidence suggests that the Earth's atmosphere first acquired tangible amounts of free oxygen: the so-called 'Great Oxidation Event'. Yet the preservation of such enormous amounts of oxidised iron compounds in BIFs is paradoxical for two reasons: the amount of freely available atmospheric oxygen at their acme was far lower than today; had the oceans contained much oxygen, dissolved ions of reduced Fe-2 would not have been able to pervade seawater as they had to for BIFs to have accumulated in shallow water. Iron-rich ocean water demands that its chemical state was highly reducing.

Oblique view of an open pit mine in banded iron formation at Mount Tom Price, Hamersley region Western Australia (Credit Google earth)

The paradox of highly oxidised sediments being deposited when oceans were highly reduced was resolved, or seemed to have been, in the late 20th century. It involved a hypothesis that reduced, Fe-rich water entered shallow, restricted basins where photosynthetic organisms – probably cyanobacteria – produced localised enrichments in dissolved oxygen so that the iron precipitated to form BIFs. Later work revealed oddities that seemed to suggest some direct role for the organisms themselves, a contradictory role for the co-dominant silica-rich cherty layers and even that another kind of bacteria that does not produce oxygen directly may have deposited oxidised iron minerals. Much of the research focussed on the Hamersley BIF deposits, and it comes as no surprise that another twist in the BIF saga has recently emerged from the same, enormous repository of evidence (Rasmussen, B. *et al*. 2015. Precipitation of iron silicate nanoparticles in early Precambrian oceans marks Earth's first iron age. *Geology*, v. **43**, p. 303-306).

The cherty laminations have received a great deal less attention than the iron oxides. It turns out that they are heaving with minute particles of iron silicate. These are mainly the minerals stilpnomelane [$K(Fe,Mg)_8(Si, Al)_{12}(O, OH)_{27}$] and greenalite [$(Fe)_{2-3}Si_2O_5(OH)_4$] that account for up to 10% of the chert. They suggest that ferruginous, silica-enriched seawater continually precipitated a mixture of iron silicate and silica, with cyclical increases in the amount of iron-silicate. Being such a tiny size the nanoparticles would have had a very high surface area relative to their mass and would therefore have been highly reactive. The authors suggest that the present mineralogy of BIFs, which includes iron carbonates and, in some cases, sulfides as well as oxides may have resulted from post-depositional mineral reactions. Much the same features occur in 3.46 Ga Archaean BIFs at Marble Bar in Western Australia that are almost a billion years older that the Hamersley deposits, suggesting that a direct biological role in BIF formation may not have been necessary