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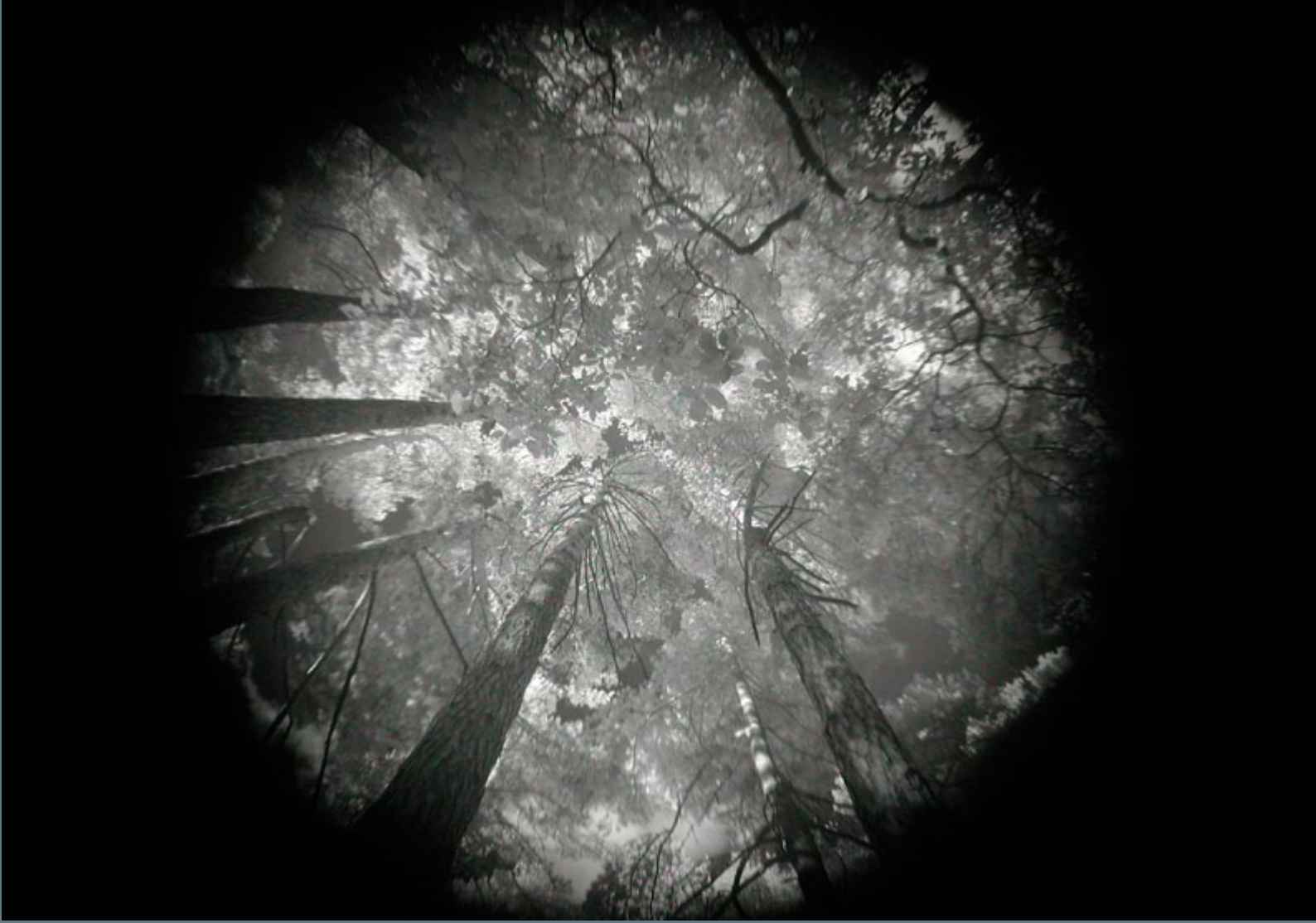


- European Geosciences Union Awards and Medals 2011
- SHORT STORY: Geomorphologists and palaeontologists unite linking early hominid settlements to tectonic activity

EDITORS

Managing Editor: Kostas Kourtidis
Department of Environmental Engineering, School of Engineering
Demokritus University of Thrace
Vas. Sofias 12, GR-67100 Xanthi, Greece
tel. +30-25410-79383, fax. +30-25410-79379
email: kourtidis@the-eggs.org

Biogeosciences: Jean-Pierre Gattuso
Laboratoire d'Oceanographie de Villefranche, UMR 7093 CNRS-UPMC
B. P. 28, F-06234 Villefranche-sur-mer Cedex France
tel. +33-(0)493763859, fax. +33-(0)493763834
email: gattuso@obs-vlfr.fr

Atmospheric Sciences: Hans Xiang-Yu Huang
Danish Meteorological Institute, Lyngbyvej 100, 2100 Copenhagen, Denmark
tel. +45-39157423, fax. +45-39157460
e-mail: xyh@dmi.dk

Climate: Yu Shaocai
Atmospheric Sciences Modeling Division (E243-01), National Exposure Research Laboratory U.S. Environmental Protection Agency
RTP, NC 27711, USA
tel. +1-919-541-0362, fax. +1-919-541-1379
e-mail: yu.shaocai@epamail.epa.gov

GENERAL CONTACT

For general matters please contact Kostas Kourtidis, at: kourtidis@the-eggs.org

SUBMISSION OF MATERIAL
For material submission, please contact the Editor-in-chief or the appropriate Section Editor.

ADVERTISING
For advertising information, please contact: support@the-eggs.org

TECHNICAL
For technical questions, please contact: support@dotsoft.gr

Cover photo: This is a picture taken with an old Nikon Coolpix 990, with its original built-in filter blocking near infra-red radiation removed and an extra cold mirror filter, blocking most of the visible light. A fish-eye lens has been used to get hemispherical pictures of forest canopies for forest structure analyses. The image points upwards to a Scots pine canopy in the Prades Mountains (Catalonia, NE Spain), affected by drought-induced mortality. Distributed by EGU via www.imaggeo.net

10 Years of Interactive Open Access Publishing

presently, the EGU publishes 14 international open access journals through Copernicus Publications

Since 2001, the European Geosciences Union or EGU (formerly EGS and EUG) and the open access publishing house Copernicus Publications have been publishing a large number of well-known geoscientific journals, implementing innovative open access fundamentals to achieve the highest standards of transparency and quality. EGU is a signatory of the Berlin Open Access Declaration 2003, and its open access publishing activities are supported by major scientific institutions across Europe, amongst them the Max Planck Society (MPG, Germany) and the Centre National de Recherche Scientifique (CNRS, France) who have recognized the success of the concept.

A central aim of the EGU is the pursuit of excellence and free accessibility of scientific publications in all areas of geosciences and planetary and solar system sciences for the benefit of scientists and humanity worldwide. "The European Geosciences Union is pleased to have been able to play its historic role in the development of Interactive Open Access Publishing. Young scientists today are presented with real high-quality alternatives for the choice of their medium of publication. That is the accomplishment of Interactive Open Access Publishing. On behalf of the EGU I extend the warmest congratulations to all of the essential players that have been and continue to be involved in the process" says Donald B. Dingwell, the EGU president.

The concept behind this branch of open access publishing is to offer worldwide, cost-free access to publications that provide high-quality and up-to-date geoscientific information. As one of the first to embark on this modern approach to publishing, the EGU, Europe's premier geosciences union with more than 10,000 members, together with the publishing house Copernicus Publications, transferred their scientific journals to this completely new business model, which in 2001 was still in its infancy.

"Our main goal was an advancement of scientific quality control through increased transparency and efficiency. It was also clear that scientific publications should be freely accessible. With 'open access', we embarked on establishing a new model of public and transparent peer review – under the concept of interactive open access publishing", says Ulrich Pöschl, chair of the EGU publications committee.

The concept of public peer-review is based on publishing a manuscript after a short initial review as a 'discussion paper'. The expert opinions then appear online in the form of citable commentaries in a freely accessible forum. This allows the scientific community to be involved in the discussion, and if the reviews are positive the authors can publish their final revised manuscript as an appraised article in the actual journal.

This innovative approach was implemented in a series of new journals, and also in traditional, long-established journals. In the introduction phase, the costs of the open access platform were underwritten by the EGU and Copernicus in order for the authors to test the new offer free-of-charge. After establishment of the periodicals, moderate publication fees were introduced in order to guarantee a sustainable independent business. "Since 2007, as in only after six years, we've moved our open access accounting numbers into the black. We've demonstrated that open access not only offers free access to the sciences and enables improved quality control, but that it also is sustainable economically" says Martin Rasmussen, managing director of Copernicus Publications since 2004.

Since 2008, the Max Planck Society (MPG, Germany) and the Centre National de Recherche Scientifique (CNRS, France) together with other European institutions cover the publication charges for authors that are affiliated with them. Their aim is to support freely-available scientific literature and therefore a free circulation of knowledge among the whole scientific community and the public.

At this time, the EGU publishes 14 international open access journals through Copernicus Publications across all geoscientific disciplines: ANGEO, ACP, AMT, BG, CP, ESD, GMD, GI, HESS, NHESS, NPG, OS, SE, and TC. More details about all the EGU open access journals. Currently a total of 11 EGU titles have a Thomson Reuters Impact Factor, placing them in the top echelon of their respective discipline.

New Media and Communications Officer at the EGU Office

will coordinate media-related and science information communications

Bárbara Ferreira, the newest staff member of the EGU office in Munich, has recently started working as the Union's Media and Communications Officer. She will coordinate media-related and science information communications between the EGU and its membership, the working media, and the public at large.

Before joining EGU, Bárbara worked as a science writer at the European Southern Observatory, based in Garching near Munich, and at the Parliamentary Office of Science and Technology in London. Her studies include an undergraduate degree from the University of Porto (Portugal) and a PhD from the University of Cambridge (UK), which she completed in 2010. On her free time, Bárbara keeps a Nature Network blog, Dinner Party Science.

Bárbara can be reached at +49 (0)89 2180-6703 or media@egu.eu.

EGU Executive Office

EGU President is new ERC Secretary General

term started on 1 September

Donald B. Dingwell, the current President of EGU, has started his term as Secretary General of the European Research Council (ERC) on 1 September, following appointment by the ERC Scientific Council.

The ERC is the first European funding body for frontier research. Its Secretary General is the permanent representative of the Scientific Council, the governing body that defines ERC's funding strategies, in Brussels. Until December 2013, Donald B. Dingwell will be liasing between the Scientific Council and the ERC Executive Agency, the body that implements the policies and manages day-to-day operations. He is the third Secretary General to be appointed since the foundation of the ERC in 2007.

Geoscientific Instrumentation, Methods and Data Systems

New open-access EGU journal

I am pleased to announce the launch of "Geoscientific Instrumentation, Methods and Data Systems" (GI) (www.geoscientific-instrumentation-methods-and-data-systems.net). A unique feature of the journal is the emphasis on synergy between science and technology that facilitates advances in GI.

I personally invite you and your colleagues to submit manuscripts to the journal. Your recent presentations at the EGU General Assembly could be extended to a brief, concise article and could receive credit for peer-reviewed publication in the new journal. The journal provides a rapid forum for the dissemination of original research articles as well as review articles related to all aspects of geoscientific instrumentation. Manuscript should be submitted to the journal online at: http://www.geoscientific-instrumentation-methods-and-data-systems.net/submission/manuscript_submission.html.

This interactive open access journal comprises of a two-stage publication process. Discussion papers, including comments of pre-selected referees and interested colleagues, will be published in Geoscientific Instrumentation, Methods and Data Systems Discussions (GID). Final peer-reviewed papers will be published in Geoscientific Instrumentation, Methods and Data Systems (GI).

The open access publication offers free access to the journal online without the need for a subscription. Publication charge is waived to encourage submission to this new journal.

Please do not hesitate to contact me if you have any questions about the journal.

Walter Schmidt
President
Geosciences Instrumentation and Data Systems
European Geosciences Union
walter.schmidt@fmi.fi

European Geosciences Union Awards and Medals 2011

Short Citations

EGU Awards and Medals during the last General Assembly in April 2011 in Vienna

Union Medals and Awards

Alfred Wegener Medal

The Alfred Wegener Medal and honorary membership is awarded to Gerold Wefer for his pioneering contributions on the applicability of stable isotopes in marine calcareous organisms to reconstruction of the ocean history down to the seasonal scale and his exceptional devotion in serving the marine community.

Alfred Wegener Medal is awarded to Gerold Wefer

Arthur Holmes Medal

The Arthur Holmes Medal and Honorary Membership are awarded to William E. Dietrich for seminal contributions to our understanding of the evolution of the landscape of the Earth.

Arthur Holmes Medal and Honorary Membership are awarded to William E. Dietrich

Jean Dominique Cassini Medal

The Jean Dominique Cassini Medal and Honorary Membership are awarded to Jean-Pierre Lebreton for his scientific leadership in ESA's Huygens mission to Titan, which made it an outstanding success, his involvement in the Rosetta and Venus Express missions, and his work as Co-Chair of the Europa Jupiter System Mission.

Jean Dominique Cassini Medal and Honorary Membership are awarded to Jean-Pierre Lebreton

Arne Richter Award for Outstanding Young Scientists #1

Olivier Galland

For his remarkable contribution to the understanding of volcanic and magma emplacement processes.

Arne Richter Award for Outstanding Young Scientists #2

Florian Pappenberger

For his contributions to hydrological modelling, operational hydrological forecasting and uncertainty assessment.

Arne Richter Award is awarded to Florian Pappenberger

Arne Richter Award for Outstanding Young Scientists #3

Yuri Y. Shprits

For his outstanding work on the dynamic modelling of the Earth's Van Allen radiation belts, which allows a better understanding of how particles are accelerated to very high energies.

Arne Richter Award is awarded to Yuri Y. Shprits

Arne Richter Award for Outstanding Young Scientists #4

Boris J.P. Kaus

For his contribution to the understanding of geodynamical processes over a wide range of scales from crystal mushes to the lithosphere and mantle.

Arne Richter Award is awarded to Boris J.P. Kaus

Union Service Award #1

Andreas Güntner

In recognition of his service for the Union as Coordinator of the Outstanding Young Scientist Poster Presentation Award, and his exceptional dedication to organising sessions and activities within the Division on Hydrological Sciences.

Union Service Award #2

Herbert Summesberger

For his invaluable and unselfish contribution to the organization, the attractiveness and the success of the GIFT workshops for the last 7 years.

Union Service Award is awarded to Herbert Summesberger

Division Medals

Augustus Love Medal

The Augustus Love Medal is awarded to Bradford Hager for his outstanding contributions in modelling the geoid and large-scale mantle flow, and for his pioneering application of space-geodetic techniques to problems in tectonics.

Augustus Love Medal is awarded to Bradford Hager

Beno Gutenberg Medal

The EGU Beno Gutenberg Medal is awarded to Thomas Guy Masters in recognition of his outstanding contributions in seismic investigations of Earth's large-scale structure, including in particular the deep mantle and core.

EGU Beno Gutenberg Medal is awarded to Thomas Guy Masters

Christiaan Huygens Medal

The European Geosciences Union awards the Christiaan Huygens Medal to Martin Hürlimann for his outstanding work in innovative instrumentation and analysis methods in the field of nuclear magnetic resonance to characterize fluid saturated porous media with geophysical application to sub-surface measurements.

David Bates Medal

Dmitriy V. Titov is awarded the David Bates Medal for his exceptional contribution to the field of atmospheric sciences of the terrestrial planets and major role in the definition and outstanding success of the ESA Venus Express mission.

Fridtjof Nansen Medal

The Fridtjof Nansen Medal is awarded to Bert Rudels for his leadership in developing ocean observing systems for climate research and forecasting and for fundamental contributions to our understanding of the ocean's role in climate.

Fridtjof Nansen Medal is awarded to Bert Rudels

Hannes Alfvén Medal

The Hannes Alfvén Medal is awarded to Syun-Ichi Akasofu for his outstanding achievements in Solar-Terrestrial Physics, establishing the substorm as a fundamental concept of magnetospheric physics.

Hannes Alfvén Medal is awarded to Syun-Ichi Akasofu

Hans Oeschger Medal

The Hans Oeschger Medal is awarded to Robert Delmas for his seminal contributions to ice core glaciochemistry and his pioneering research on reconstructing changes in the composition of the atmosphere.

Hans Oeschger Medal is awarded to Robert Delmas

Henry Darcy Medal

The Henry Darcy Medal is awarded to Ján Szolgay for outstanding contributions to regional hydrology and water resources management.

Henry Darcy Medal is awarded to Ján Szolgay

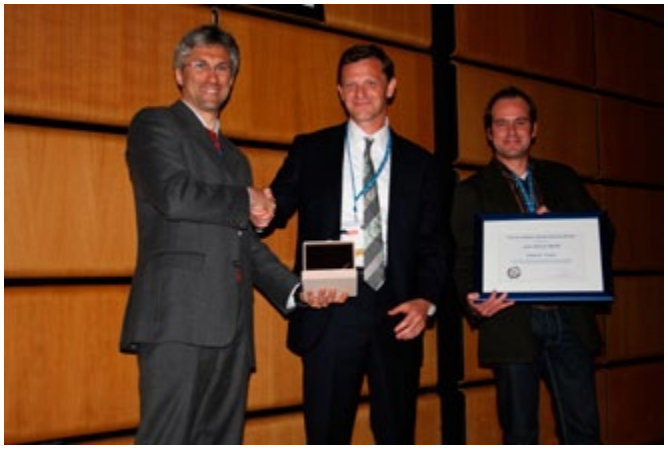
Jean Baptiste Lamarck Medal

The Jean Baptiste Lamarck Medal is awarded to Malcolm Barrie Hart for his internationally acclaimed research on the taxonomy, evolution, ecology and applied biostratigraphy of foraminifera, including the origin of planktonic foraminifera, the causes and consequences of oceanic anoxia and mass extinction events, and the local biotic impact of volcanic eruptions.

Jean Baptiste Lamarck Medal is awarded to Malcolm Barrie Hart

John Dalton Medal

The John Dalton Medal is awarded to Peter A. Troch for his seminal contributions to hydrology in the areas of modelling, remote sensing and development of new ecohydrologic theories.



John Dalton Medal is awarded to Peter A. Troch

Julius Bartels Medal

The Julius Bartels Medal is awarded to Hermann Lühr for his leadership roles in ground and space magnetometry in Europe, in particular as Principal Investigator of the magnetic field investigation of the CHAMP mission that has yielded much new information on a wide range of terrestrial magnetic phenomena.

Lewis Fry Richardson Medal

The Lewis Fry Richardson Medal is awarded to Catherine Nicolis for her highly original contributions to the understanding of the behaviour of stochastic and deterministic non-linear systems and the application of these ideas in meteorology and climate dynamics.

Lewis Fry Richardson Medal is awarded to Catherine Nicolis

Louis Agassiz Medal

The Louis Agassiz Medal is awarded to Julian A. Dowdeswell for outstanding contributions to the study of polar ice masses and to the understanding of the processes and patterns of sedimentation in glacier-influenced marine environments.

Louis Agassiz Medal is awarded to Julian A. Dowdeswell

Louis Néel Medal

The Louis Néel Medal is awarded to Ernest Henry Rutter for his major experimental and field contributions to our fundamental understanding of the deformation behaviour of the Earth's lithosphere. In particular, his systematic laboratory studies have led to a greatly improved understanding of natural rock deformation.

Milutin Milankovic Medal

The Milutin Milankovic medal is awarded to Andrey Ganopolski for his pioneering contributions to the development of Earth system models of intermediate complexity and to the understanding of the role of climate system feedbacks and the link between Milankovich forcing and global glaciation.

Milutin Milankovic medal is awarded to Andrey Ganopolski

Petrus Peregrinus Medal

The Petrus Peregrinus Medal is awarded to Peter L. Olson for his insightful contributions to our understanding of the core mantle interactions by combining theory, numerical models and laboratory fluid dynamics model.

Petrus Peregrinus Medal is awarded to Peter L. Olson

Philippe Douchaufour Medal

The Philippe Duchaufour Medal is awarded to Stefan Doerr for his internationally recognised achievements in the field of soil science, with special emphasis on his contributions to soil hydrology and erosion, particularly through his research into soil water repellency.

Philippe Duchaufour Medal is awarded to Stefan Doerr

Plinius Medal

The Plinius Medal is awarded to Raphaël Paris in recognition and appreciation of his outstanding contributions to multidisciplinary research in the field of natural hazards and risk mitigation, with special focus on volcanic hazard, on volcanic slope instabilities, of tsunamigenic eruptive and gravitational processes, and on studies of tsunami onshore deposits.

Plinius Medal is awarded to Raphaël Paris

Ralph Alger Bagnold Medal

The Ralph Alger Bagnold Medal is awarded to Stuart Lane for his critical contributions to our understanding of the basic processes in rivers affecting river flow, sediment transport and river ecology through the combination of detailed field work, advanced data collection techniques and critical theoretical insights as well as for his leadership in communicating geomorphological expertise to practitioners' in landscape management and planning.

Ralph Alger Bagnold Medal is awarded to Stuart Lane

Robert Wilhelm Bunsen Medal

The Robert Wilhelm Bunsen Medal is awarded to Michael Manga for his outstanding contribution to volcanology and to the physics of transport and eruption of multiphase magma. His contribution elegantly links observations, lab experiments and theory, and has significantly advanced physical volcanology.

Robert Wilhelm Bunsen Medal is awarded to Michael Manga

Stephan Mueller Medal

The Stephan Mueller Medal is awarded to Laurent Jolivet for his contribution to a deeper understanding of the tectonic evolution of the lithosphere at convergent plate boundaries. Using rock mechanics and new concepts on coupling between metamorphic reactions and deformation he has generated new insights on how the crust deforms at depth and returns to the surface.

Stephan Mueller Medal is awarded to Laurent Jolivet

Vening Meinesz Medal

The Vening Meinesz Medal is awarded to Harald Schuh for his work in the field of Very Long Baseline Interferometry (VLBI) and his important contribution to space geodetic research.

Vening Meinesz Medal is awarded to Harald Schuh

Vilhelm Bjerknes Medal

The Vilhelm Bjerknes Medal is awarded to Karin Labitzke in recognition of his fundamental achievements in the observational study of the stratosphere and mesosphere. She has made many important contributions to increasing our understanding of these regions of the atmosphere and has led the way in discovering the influence of the 11-year solar cycle on the Northern Hemisphere stratospheric polar vortex as modulated by the Quasi-Biennial Oscillation.

Vilhelm Bjerknes Medal is awarded to Karin Labitzke

Vladimir Ivanovich Vernadsky Medal

The Vladimir Ivanovich Vernadsky Medal is awarded to Ulf Riebesell for his important contributions to biogeosciences, in particular to biological oceanography and marine biogeochemistry.

Vladimir Ivanovich Vernadsky Medal is awarded to Ulf Riebesell

Ian McHarg Medal

The Ian McHarg medal is awarded to Monique Petitdidier for her exemplar work in support of African scientists and her recognition of the importance of outreach and 'science citizenship'.

Ian McHarg medal is awarded to Monique Petitdidier

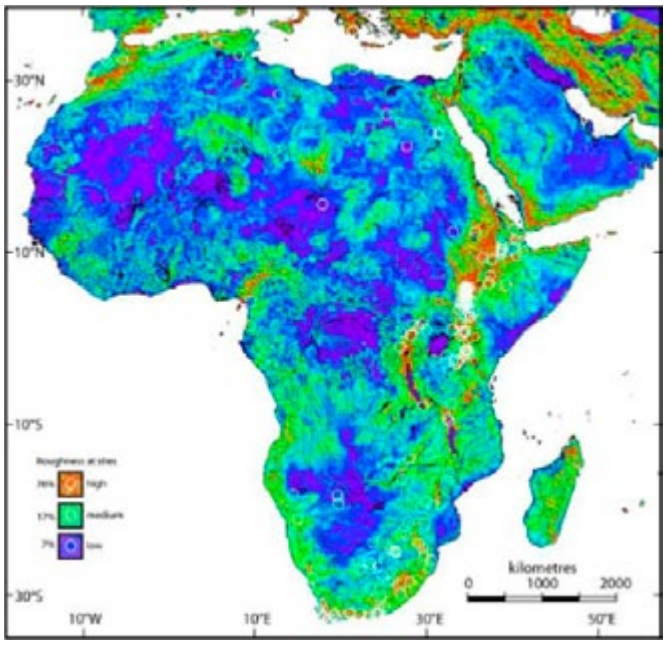
SHORT STORY: Geomorphologists and palaeontologists unite linking early hominid settlements to tectonic activity

evidence that early human ancestor Australopithecus africanus settled in sites around South Africa that all share landscapes shaped by tectonic motions near active faults

Groucho Marx said of San Francisco "If they'd lower taxes and get rid of the smog and clean up the traffic mess, I really believe I'd settle here until the next earthquake". While Groucho's complaints about taxes, smog and traffic might have been different to those of his early hominin ancestors, a case study published earlier this year in the Journal of Human Evolution suggests that his attraction to a tectonically active area may be deeply engrained in his Australopithecus roots.

Palaeoanthropologist Sally Reynolds of the Institut de Physique du Globe (IPGP) [www.ipgp.fr/index2.php?Largeur=1680] in Paris has made new connections between her own field and geomorphology to provide compelling evidence that early human ancestor Australopithecus africanus settled in sites around South Africa that all share landscapes shaped by tectonic motions near active faults.

Reynolds' field studies in 2007 of the Taung, Sterkfontein, and Makapansgat hominin sites provide a fossil record that shows 3.3 million years of diverse fauna that inhabit the grasslands, boreal, and aquatic environments associated with the presence of wetland combined with seasonal variation. For example, if she had found an otter fossil, she would at one time have inferred simply that there had been a marsh there and looked at an elevation model to learn something about the landscape. But after meeting geomorphologists Geoff Bailey from the University of York [http://www.york.ac.uk/archaeology/] and Geoffrey King from the IPGP, she started to look deeper into what created the landscape, and how geomorphology affected fauna interaction with overall landscape patterns.



Regions characterised by topographic roughness and location of early hominin sites; CREDIT: Reynolds et al. 2007

"When you have hominins returning to a landscape again and again over 3.3 million years, what is it about such a landscape that makes it so attractive over time?" she asks. The answer is tectonics.

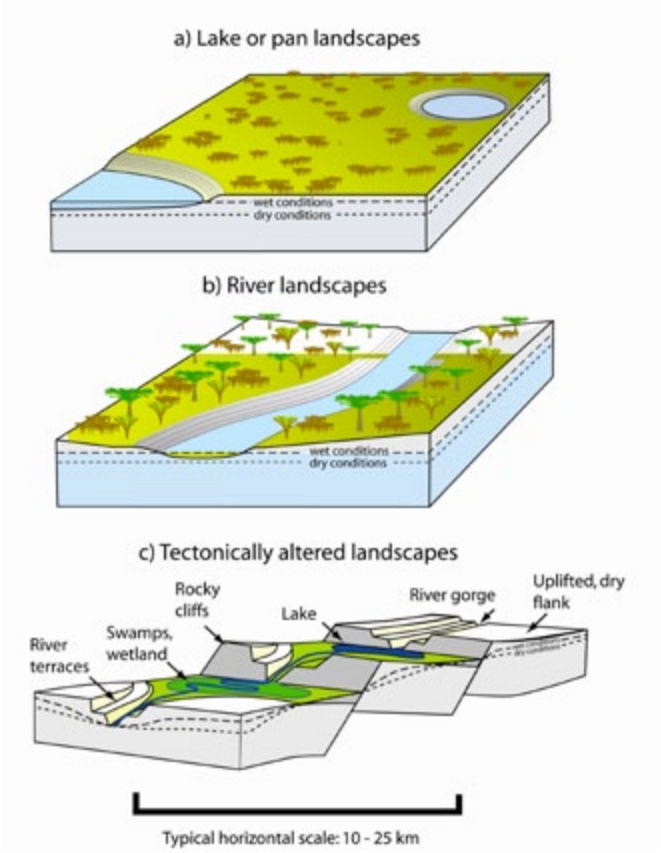
Bailey and King reconstructed features of the wider landscape using digital elevation data and satellite images to show the 'roughness', or topographic heterogeneity, associated with sites across Africa. Along with Reynolds, they demonstrated a clear correlation between roughness and high proportionality of hominin sites. And roughness is an indicator of tectonic activity.

Early hominins would have required a source of food, shelter in the form of trees or cliffs, and a source of drinking water. This would have led them to landscapes characterised by modified surface water and marshy areas. But while previous models have identified lake and river landscapes as providing the necessary wetlands to attract human settlement at the time, Reynolds says that "without some kind of modifying activity, [these] would be very difficult to sustain through time". Tectonic rifts create the necessary activity to prevent the complete erosion of a wetland area over millions of years.

Until now, researchers have asked many questions about how early hominins dispersed out of East Africa into Europe and Asia, but minimal attention has been given to dispersal within Africa. This is partly due to a lack of fossil sites. Now, however, the tectonic rifts between East and South Africa are begging for attention.

"We can start with landscape instead of fossils to get clues!" Reynolds emphasises. Tectonic clues provide a new lead for tracing dispersion of early hominins in Africa and further. While tectonic landscapes as probable sites for dispersal was first proposed in the 1970s, according to Reynolds, the connection has now been established and the two fields can progress together.

"This work has given people a way to look at old data in a completely new way", Reynolds adds. Her case study provides a framework from which to look for new sites, trace hominin roots, and test a new model.



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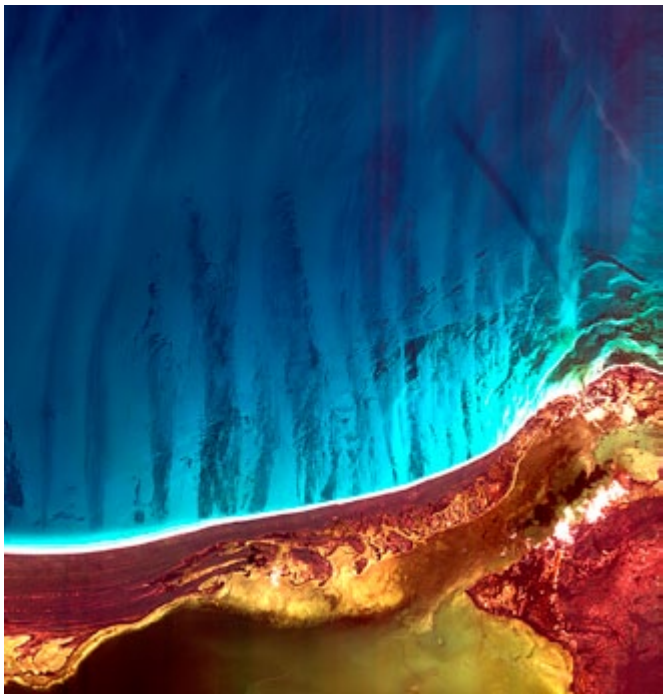
S.C. Reynolds, et al., Landscapes and their relation to hominin habitats: Case studies from Australopithecus sites in eastern and southern Africa, J. Human Evolution 60: 281-198 (2011).

Rachel Berkowitz
EGU science correspondent
Cambridge, UK

Rachel Berkowitz is a PhD student at Cambridge University Department of Earth Sciences.

EARTH FROM SPACE

Holbox Island and the Yalahau Lagoon



Holbox Island and the Yalahau Lagoon on the northeast corner of Mexico's Yucatan Peninsula, Credits: KARI

25 March 2011.- Holbox Island and the Yalahau Lagoon on the northeast corner of Mexico's Yucatan Peninsula are featured in this satellite image.

Holbox is a 42-km-long island running along the peninsula's coast that is separated from the mainland by Yalahau Lagoon.

One of the world's most important ecosystems, Holbox and its surrounding waters are part of the Yum Balam Biosphere Reserve.

Its unspoiled beaches of fine white coralline sands are important for turtle nesting, and over 500 bird species can be found here.

Caboe Catoche, the cape at the eastern tip of the island (right), is where the Gulf of Mexico and the Caribbean Sea meet. Their mingling waters create a kaleidoscope of turquoise and emerald hues.

Located where the currents of the Gulf, Caribbean and the Atlantic Ocean mix to create nutrient-rich waters, this area supports an abundant and diverse array of marine life.

In addition to dolphins, manta rays and several shark species, the plankton-rich waters support the world's largest known congregation of whale sharks – our planet's largest fish – for five months of the year.

The freshwater lagoon has a deep rocky hole that surrounds the island, making the water appear black. It is thought that Holbox, which in Mayan translates as 'black hole', was named after the dark lagoon water.

The Korea Multi-purpose Satellite (Kompsat-2) of the Korea Aerospace Research Institute acquired this image on 12 March.

ESA

MARS FROM SPACE

Ceraunius Tholus

Neighbouring volcanoes on Mars, credits: ESA

1 April 2011.- ESA's Mars Express has returned images of mist-capped volcanoes located in the northern hemisphere of the red planet. Long after volcanic activity ceased, the area was transformed by meteor impacts that deposited ejected material over the lower flanks of the volcanoes.

Permanent and transient features are on display in this newly released image of Mars. The image is derived from data acquired during three orbits of ESA's Mars Express between 25 November 2004 and 22 June 2006. In that time, these dead volcanoes were not expected to change but, during the middle orbit, Mars Express captured icy clouds drifting past the summit of Ceraunius Tholus.

By the time Mars Express crossed again and took the final strip of data needed for this image, the clouds had long since dispersed and so there is a sharp line across them in the finished mosaic.

The Latin word "tholus" means a conical dome and the base of Ceraunius Tholus is 130 km across, while the peak rises 5.5 km above the surrounding plains. At its summit is a large caldera 25 km across. With similar morphology to its neighbour and lying 60 km to the north, Uranius Tholus is a smaller volcano, with a base diameter of 62 km and a height of 4.5 km.

The flanks of Ceraunius Tholus are relatively steep, at about 8° inclination, and are etched with valleys. They are deeply cut in many places, suggesting that soft and easily eroded material, such as layers of ash, were deposited during the volcano's eruptions.

The largest and deepest of these valleys is about 3.5 km wide and 300 m deep. It terminates inside an otherwise unrelated elongated impact crater that happens to lie between the two volcanoes, and has created a fascinating fan shape of deposits.

Although the source of the fan is still being debated in scientific circles, it may have been formed when material from a lava channel or tube was washed downwards by a melting ice cap on the volcano.

Certainly, the summit crater – the caldera – is flat and smooth, so it may have contained a lake early in Mars' history when the atmosphere was denser. It is also possible that the water was produced when volcanic activity melted buried ice lenses. An ice lens forms when moisture seeps below the surface and forms a frozen layer between the top 'soil' and the rocky layer below.

The elongated crater between the two volcanoes is called Rahe. It measures 35 km by 18 km and is the result of an oblique impact by a meteorite.

A smaller impact crater 13 km across can be seen to the west of Uranius Tholus. This one also formed after all the volcanic activity ended and served to cover the lower flanks of the volcanoes with ejected material, with the result that only the upper regions of the original structures are now visible.

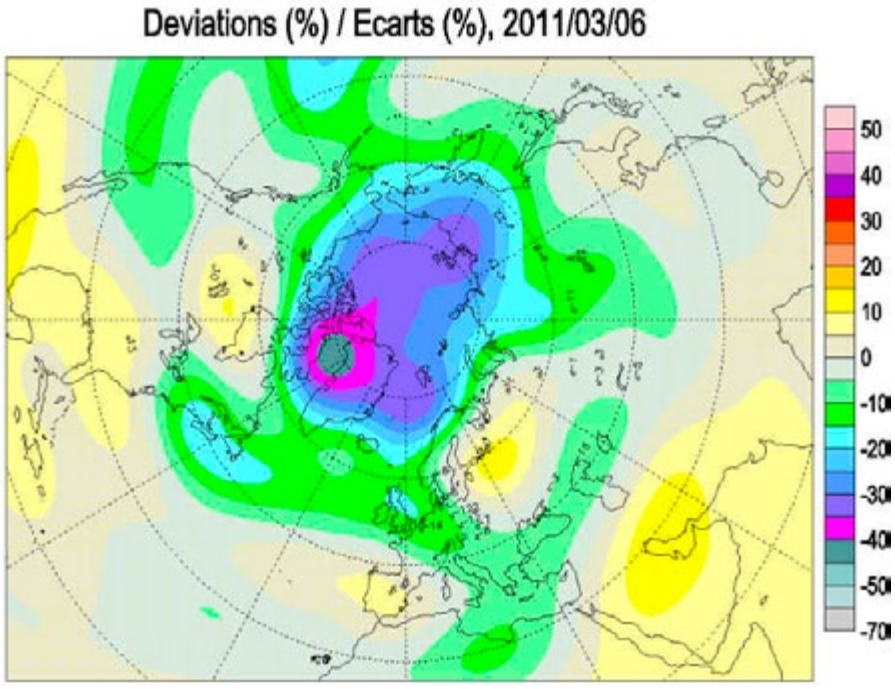
ESA

Cold Winter Lets UV rays Shine Through

unprecedented level of stratospheric ozone depletion over the Arctic this spring

A report released in April by the World Meteorological Association (WMO) in Geneva describes an unprecedented level of stratospheric ozone depletion over the Arctic this spring. While this depletion was unprecedented, it was not unexpected and it provided a chance to evaluate the effectiveness of the 1987 Montreal Protocol [http://www.epa.gov/ozone/intpol/] that phased out production and consumption of ozone-depleting products. It appears that extremely low temperatures in conjunction with heterogeneous chemical processes are behind the most recent depletion.

Low stratospheric temperatures enhance the presence of condensed gases, including water vapour, which in turn provides surfaces on which these processes can occur. Naturally occurring trace gases such as HCl and ClONO2 then find an abundance of nucleation sites for redox reactions between Hcl and nitrate that lead to the formation of other compounds such as ClO and later, OClO, that can destroy ozone. With the persistence of these anomalous cold temperatures, regions of depleted ozone will likely persist into the springtime bringing with them an increase in UV transmission in particular if the ozone depletion spreads to lower latitudes where the sun angle is higher. Additionally, Cl-H bonds are broken by UV rays, which aids the reaction process.



Total ozone measurements in Dobson units (DU) for 6 March 2011 from the World Ozone and Ultraviolet Radiation Data Centre (http://www.woudc.org/index_e.html), and deviations from 1978-1988 level using total ozone mapping spectrometer data. CREDIT: Alfred Wegener Institute for Polar and Marine Research in the Helmholtz Association in Germany

"In the Arctic, there are periods where 60-70% of ozone in a certain height range can disappear", says Geir Braathen, Senior Scientific Officer of the Atmospheric Environment Research Division of the WMO [http://www.wmo.int/pages/prog/arep/gaw/ozone/].

Thermal variations in the upper polar atmosphere can have a significant effect on the net production of ozone and while temperature forecasts are reliable in the Antarctic, they are less so in the Arctic, with the result that large ozone depletions are known only when they occur.

One of the two studies reported in the WMO report describes ozone profiles taken several days apart, and isolates the chemical effects from other processes that change the local concentration (e.g., advection). In the second study, spectrometers made ozone measurements from the ground to the top of the atmosphere (TOA) and a reactive transport model in which ozone is treated as a non-reactive tracer then used to evaluate the relative importance of chemistry on ozone levels. The studies

showed an ozone loss between 15 and 23km above the ground, in a region corresponding to temperatures of -78oC, and a shift of ozone-poor regions from the north pole south to Greenland and Scandinavia in late March.

While the Montreal Protocol largely phased out the ozone-depleting chlorofluorocarbons (CFCs), the long atmospheric lifespan of these compounds is not expected to allow the Antarctic ozone hole to recover to pre-1980 levels until 2045-2060. Arctic ozone layers should recover one to two decades earlier. The 2011 ozone depletion is attributed to climate effects on existing gases rather than an increased concentration of reservoir gases.

"The big problem now is hydrochlorofluorocarbons (HCFCs), which are still allowed in developing countries until 2015", explains Braathen. But he lauds the Protocol as a big success, saying that these compounds should come down to a level that won't create an ozone hole, and show less sensitivity to temperature variations with the enhanced presence of nucleation surfaces on which ozone-depleting reactions can occur. Developed countries are providing assistance for developing countries to exchange old CFC-producing technologies for modern ones that are more benign.

But the linkage between climate and ozone is cause for concern. General Circulation Models (GCMs) show that Brewer-Dobson circulation can intensify with climate change resulting in lower ozone mixing ratios in tropical regions with the associated higher UV radiation exposure.

"The amount of ozone in the atmosphere is a competition between production and destruction", says Braathen. If the natural processes that destroy ozone become slower, production will gain over destruction and ozone will increase. The WMO will be keeping their eye on the Arctic ozone layer in the coming years and will "remain vigilant for respecting the Montreal Protocol".

Rachel Berkowitz
EGU science correspondent
Cambridge, UK

Rachel Berkowitz is a PhD student at Cambridge University Department of Earth Sciences.

Structure of N2O reductase

a new binding site for nitrous oxide (N2O)

15 August 2011.- Nitrous oxide (N2O) affects the earth's climate in two ways. First, N2O is a greenhouse gas that is 300 times stronger than carbon dioxide (CO2). Second, under the effect of UV radiation, it contributes to the destruction of the ozone layer. N2O is also a by-product of industrial farming. Nitrous oxide reductase, an enzyme containing copper, plays a key role in the biochemical process by reducing N2O to N2. This enzyme is highly sensitive to oxygen and is often precipitated in the reaction chain, meaning large amounts of N2O are released by fertilised fields in the farming industry.

The functionality and mechanisms of this important enzyme had been researched by Anja Pomowski who successfully clarified the structure of a N2O reductase, primed under the strict exclusion of dioxygen (02). Dr Pomowski belongs to the research group headed by Prof. Oliver Einsle, at the Institute of Organic Chemistry and Biochemistry of the University of Freiburg and a member of the BIOSS Cluster of Excellence. Together with Prof Dr Walter Zumft from the Karlsruhe Institute of Technology and Prof Dr Peter Kroneck from the University of Konstanz, the team presented their results in Nature. The newly discovered structure shows that the substances in the metal centre of the enzyme have been described incompletely thus far, and that they contain an additional sulphur atom. The team also identified the binding of the N2O substrate to the metal centre.

Anja Pomowski, Walter G. Zumft, Peter M.H. Kroneck, Oliver Einsle (2011) N2O binding at a [4Cu:2S] copper-sulphur cluster in nitrous oxide reductase, Nature: DOI:10.1038/nature10332.

World War Two Bombing Raids Offer Insight into the Effects of Aviation on Climate

Wartime Weather Records Reveal Impact of Contrails Caused by USAAF Raids

05 July 2011.- Allied bombing raids of the Second World War offer an opportunity to study the effect thousands of aircraft had on the English climate. A relevant study was published in the International Journal of Climatology.

The research, led by Prof. Rob MacKenzie and Prof. Roger Timmis, used historical data to investigate the levels of Aircraft Induced Cloudiness (AIC) caused by the contrails of Allied bombers flying from England to targets in Europe. The team focused their research on 1943 to 1945 after the United States Army Air force (USAAF) joined the air campaign.

When the USAAF joined the Allied air campaign in 1943 it led to a huge increase in the number of planes based in East Anglia, the Midlands and the West Country. Civil aviation was rare in the 1940s, so USAAF combat missions provide a strong contrast between areas with busy skies and areas with little or no flight activity.

The study involved retrieval of historical records, both from the Meteorological office and from the military. The importance of weather conditions to the success of bombing missions meant

Caption Formation of B-17F Flying Fortress bombers of USAAF 92nd Bomb Group over Europe, circa 1943 Source: United States Air Force http://ww2db.com/image.php?image_id=7197

that the Second World War prompted intensive weather observations.

The team focused on larger raids between 1943 and 1945 that involved over 1000 aircraft and that were followed by raid-free days with similar weather. The resulting top 20 raids revealed 11th May 1944 as the best case study.

The team found that on the morning of the 11th 1444 aircraft took off from airfields across south east England into a clear sky with few clouds. However, the contrails from these aircraft significantly suppressed the morning temperature increase across those areas which were heavily over flown.

CERN's CLOUD experiment provides unprecedented insight into cloud formation

in the lowest troposphere sulphuric acid, water and ammonia alone, even with the enhancement of cosmic rays, are not sufficient to explain atmospheric observations of aerosol formation

Geneva, 25 August 2011.- In a paper published in Nature, the CLOUD experiment at CERN has reported its first results. The CLOUD experiment has been designed to study the effect of cosmic rays on the formation of atmospheric aerosols under controlled laboratory conditions. Atmospheric aerosols are thought to be responsible for a large fraction of the seeds that form cloud droplets.

The CLOUD results show that trace vapours assumed until now to account for aerosol formation in the lower atmosphere can explain only a tiny fraction of the observed atmospheric aerosol production. The results also show that ionisation from cosmic rays significantly enhances aerosol formation.

The CLOUD results show that a few kilometres up in the atmosphere sulphuric acid and water vapour can rapidly form clusters, and that cosmic rays enhance the formation rate by up to tenfold or more.

However, in the lowest layer of the atmosphere, within about a kilometre of Earth's surface, the results show that additional vapours such as ammonia are required. Further, the CLOUD results show that sulphuric acid, water and ammonia alone – even with the enhancement of cosmic rays - are not sufficient to explain atmospheric observations of aerosol formation. Additional vapours must therefore be involved, and finding out their identity will be the next step for CLOUD.

CERN Press office

Polarity reversals

role for methane speculated

An article in the December 2010 issue of Reports on Progress in Physics could be of some interest to the Earth Science community.

It is a geoscience-related piece, titled 'Abrupt global events in the Earth's history: a physics perspective' by Gregory Ryskin of the Robert R. McCormick School of Engineering and Applied Science at Northwestern University.

The article deals with quasi-periodicity of the geological record over the last 542 Myr, on timescales close, in the order of magnitude, to 1 Myr. What is the origin of this quasi-periodicity? What is the nature of the global events that define the boundaries of the geological time scale? The author proposes a single mechanism responsible for all three types of such events: mass extinctions, geomagnetic polarity reversals, and sea-level fluctuations. The mechanism involves significant energy release, is fast, capable of reversing the magnetic field and is sought within the Earth itself. The reversal requirement, according to the author, makes it incompatible with

the consensus model of the origin of the geomagnetic field—the hydromagnetic dynamo in the Earth's fluid core. The author argues that seemingly unconnected geophysical and geological data can be understood if the source of the Earth's main magnetic field is a ~200 km thick lithosphere, repeatedly magnetized as a result of methane-driven oceanic eruptions, which produce ocean flow capable of dynamo action.

Reference

Ryskin G., Abrupt global events in the Earth's history: a physics perspective, Rep. Prog. Phys. 73, 12, 122801 doi: 10.1088/0034-4885/73/12/122801, 2010.

Enhanced nitrogen fixation in the immediate aftermath of the latest Permian marine mass extinction

perturbation of the marine nitrogen cycle might have contributed to high temperatures following the main marine mass extinction through the release of the greenhouse gas nitrous oxide

Based on corresponding organic carbon and nitrogen isotopic records, Shucheng Xie of China University of Geosciences and colleagues suggest that nitrogen fixation was the main source of nutrient nitrogen in the ocean directly after the end-Permian mass extinction, the largest extinction since the beginning of animal life on Earth. Therefore, the ocean was deficient in available biotic nitrogen owing to high energy demand for nitrogen fixation. This would be caused by widespread ocean anoxia that enhanced denitrification and/or anaerobic ammonium oxidation at this time. The widespread ocean anoxia would also be the direct mechanism of the end-Permian mass extinction. On the other hand, perturbation of the marine nitrogen cycle might have contributed to high temperatures following the main marine mass extinction through the release of the greenhouse gas nitrous oxide. Cyanobacteria and/or other anaerobic heterotrophic nitrogen-fixing organisms were supposed to be the main nitrogen fixers, which might be different from those in synchronous deep-water settings.

Reference

Shucheng Xie et al., GEOLOGY, doi: 10.1130/G32024.1.

Remote Sensing in Schools project (FIS)

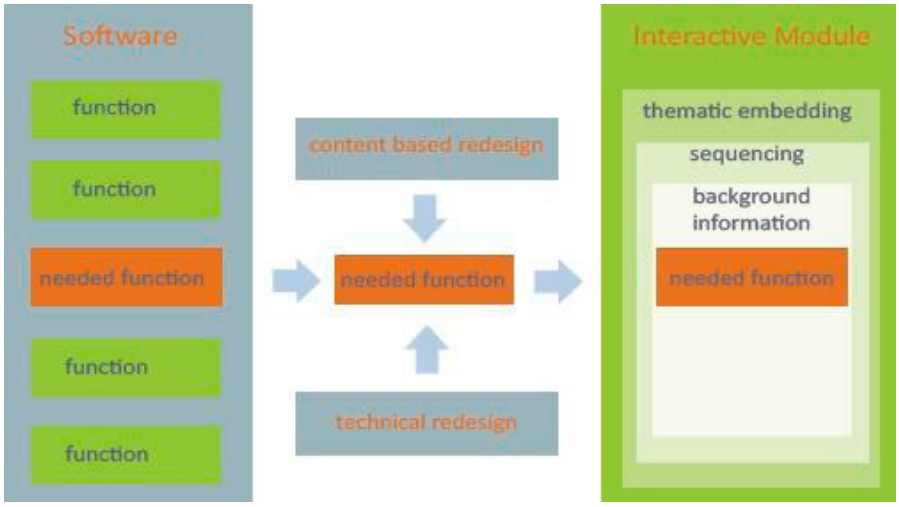
FIS is a German acronym for "Remote Sensing in Schools". The project aims at a more intensive use of remote sensing in school lessons by using digital, interactive learning modules.

FIS − Fernerkundung in Schulen FIS is a German acronym for "Remote Sensing in Schools". The project aims at a more intensive use of remote sensing in school lessons. We consider this important because not only is remote sensing of growing relevance in the modern information society, but it also offers a range of possibilities to get pupils interested in natural sciences or engineering by employing fascinating satellite images and modern technology.

The project is carried out by the Geographic Institute of Bonn University (Germany) together with partners from secondary schools. FIS is funded by the German Aerospace Centre (DLR) and the German Federal Ministry for Economics and Technology (BMWi).

Existing results show that many teachers are interested in remote sensing and, at same time, motivated to integrate it into their teaching. Despite the good intention, in the end, the implementation often fails due to the complexity and poor setup of the information provided. Therefore, the FIS-Project developed a new didactical concept, which bases upon the principles of intermediality, interactivity and interdisciplinarity.

Especially the preparation and implementation of digital learning materials takes the center stage of FIS. These interactive materials consist of tools for image analysis embedded in tasks, background information and explanatory animations. They aim at an independent disclosing and solving of problems.



Redesigning of existing remote sensing software to reduce their complexity based on the principles of self reliant learning.

Remote Sensing and Digital Learning

Today, none of the existing remote sensing software solutions allows a straightforward use of digital satellite images in schools. To be nonetheless able to work with this kind of material, interactive lessons are created and evaluated in the course of FIS. Those learning modules allow the implementation of functionalities, which are derived from remote sensing software, but are redesigned to reduce the complexity for the specific use in the lesson.

Using digital interactive learning modules we can integrate a wide range of remote sensing techniques in regular lessons in a sustainable manner. Working directives and background information form a structure in which the needed image analysis function is embedded. This way the modules can be used without instruction in a lesson that is based mainly on self reliant learning and is lead only to a low extend by the teacher.

Natural-Scientific Knowledge Transfer

Cross-linked thinking is one of the underlying principles of the learning applications produced in the project. Consequently the subject matter will be discussed in different classes. The basic principles of remote sensing are covered in the natural sciences like math (statistics, projections, transformations), physics (sensor technology, optics, radiance characteristics) or computer science (databases, data types, import/export of data), while in the more applied sciences, like geography (global change, urbanization, ecological disasters) or biology (biodiversity, ecosystems, landscape change), satellite data is analyzed to answer a certain research question.

Teaching Materials Online

The digital learning materials developed in the FIS-Project are compatible with Windows as well as other OS via the Flash plug-in and can be started without the need of installation. They are downloadable in English language at the web site of the FIS-Project (www.geographie.uni-bonn.de/fis). In the future they will be integrated in the forthcoming learning portal.

An example for our digital learning materials is the teaching unit “Tsunami” as a part of the subject field “endangerment of habitats” in grade 7. After they got background information, the students are asked to visually compare two overlying satellite images taken before and after the tsunami 2004 in South-East Asia with the help of an interactive controller. The pupils are invited to put themselves in the position of a resident and consider possible consequences of the destructions.

Besides, there is information provided in an info box clearly explaining the procedure of change detection in a short film. In the last part of the module, after the students have understood the principles of change detection, they compare another before and after image using a tool to select different ranges of color values and thereby extracting information about the extent of the destruction directly from the digital image data.

Andreas Rienow, Dr. Kerstin Voß, Bonn University, Department of Geography, Meckenheimer Allee 166, 53115 Bonn, Germany
a.rienow@geographie.uni-bonn.de

EUMETSAT celebrates 25th anniversary and bid farewell to Dr. Lars Prahm

who was succeeded by Alain Ratier on 29 July

Darmstadt, 28 July – The European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT, holded the main celebratory event for its 25th anniversary at its headquarters in Darmstadt, Germany, on 28 July. The actual anniversary was on 19 June, but the celebratory event was being held to coincide with the departure of the outgoing Director-General, Dr. Lars Prahm, who was succeeded by Alain Ratier on 29 July.

The anniversary event was attended by former EUMETSAT Directors-General, Council chairmen, and representatives of the European organisations and international partners with which EUMETSAT has developed ever increasing cooperation over its 25 years of existence. Following the welcoming address by Dr. Prahm, Declan Murphy, Council Chairman in 2004-2008 and author of the latest EUMETSAT history book, along with the first two Directors-General, John Morgan and Dr. Tillmann Mohr, traced the organisation’s origins, history and achievements.

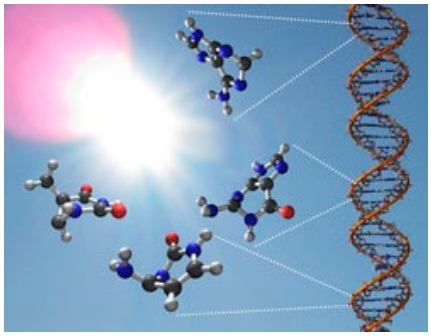
European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) http://www.eumetsat.int/Home/Main/News/Press_Releases/808657?l=en

New insight into DNA’s protection against UV light

The effect of sunlight on our skin often helps people feel healthy and happy, but while tanning may be a desired side effect, it can also initiate damaging processes that lead to serious illnesses such as skin cancer. Researchers in Austria have studied the shielding mechanisms that allow DNA (deoxyribonucleic acid) to protect itself from the exposure to the UV (ultraviolet) light emitted by the Sun. The results were published in the journal Proceedings of the National Academy of Sciences of the United States of America (PNAS).

Scientists led by Hans Lischka, a professor at the University of Vienna’s Institute for Theoretical Chemistry in Austria set out to decipher the ultra-fast processes of the photostability of the nucleobases, without which DNA and RNA would suffer rapid degradation from UV rays.

The researchers said the process under scrutiny was ‘simple, yet highly



The special structures of DNA nucleobases, which — after exposure to solar radiation — are responsible for the ultrafast radiationless deactivation to the electronic ground state. ©Felix Plasser, University of Vienna.

complex', adding that 'as soon as the UV light excites the electrons into a higher energy level, ultra-fast decay brings them back to its original state'. According to them, 'In this way electronic energy is converted into heat.' Despite the complexity of this process, Professor Lischka's team explained that it 'occurs in an incredibly short time dimension, in up to a quadrillionth of a second'.

Professor Lischka, together with his colleague Mario Barbatti and experts from the Czech Academy of Sciences in Prague, created a vivid dynamic picture of the photostability of the nucleobases using innovative computer simulation techniques.

They showed how the DNA components — the nucleotides that are responsible in DNA and RNA for the formation of base pairs — protect themselves against decomposition under UV irradiation. They said the main innovation of their study was 'in the detailed calculation of the coupling of the electronic dynamics with that of the atomic nuclei'.

They managed to achieve this with the help of quantum chemical methods developed at the Institute for Theoretical Chemistry. 'The calculated states of motion of the nucleobases show a quite remarkable dynamic behavior in time that spans several orders of magnitude,' the team said. The scientists explained that these orders of magnitude went from 'the pico/trillionth to the femto/quadrillionth-second range'.

The researchers said the newly developed methods could be used for the elucidation of dynamics in DNA nucleobases, and also for studies of photophysical processes in DNA itself and in the area of photovoltaics which is of high technological interest. 'The new methods allow a better understanding of the fundamental processes of transport of electronic excitation energy and of charge separation for production of electricity,' the scientists concluded.

Plastic products leach toxic substances

products that leach are soft to semi-soft products made from plasticised PVC or polyurethane, as well as epoxy products and textiles

17 May 2011.- Many plastic products contain hazardous chemicals that can leach to the surroundings. In studies conducted at the University of Gothenburg, a third of the tested plastic products released toxic substances, including 5 out of 13 products intended for children.

"Considering how common plastic products are, how quickly the production of plastic has increased and the amount of chemicals that humans and the environment are exposed to, it is important to replace the most hazardous substances in plastic products with less hazardous alternatives", says Delilah Lithner of the Department of Plant and Environmental Sciences at the University of Gothenburg.

Plastics exist in many different chemical compositions and are widespread in the society and the environment. Global annual production of plastics has doubled over the past 15 years, to 245 million tonnes in 2008. The plastic polymers are not regarded as toxic, but there may be toxic residual chemicals, chemical additives and degradation products in the plastic products that can leach out as they are not bound to the plastic polymer. Plastics also cause many waste problems.

In her research, Lithner studied the toxicity of 83 randomly selected plastic products and synthetic textiles. The newly purchased products were leached in pure (deionised) water for 1–3 days. The acute toxicity of the water was then tested using water fleas (Daphnia magna).

"A third of all the 83 plastic products and synthetic chemicals that were tested released substances that were acutely toxic to the water fleas, despite the leaching being mild. Five out of 13 products that were intended for children were toxic, for example bath toys and buoyancy aids such as inflatable armbands", says Delilah Lithner.

The products that resulted in toxic water were soft to semi-soft products made from plasticised PVC or polyurethane, as well as epoxy products and textiles made from various plastic fibres. The toxicity was mainly caused by fat-soluble organic substances.

Lithner also studied the chemicals used to make around 50 different plastic polymers and has identified the plastic polymers for which the most hazardous chemicals are used. They were then ranked on the basis of the environmental and health hazard classifications that exist for the chemicals. Examples of plastic polymers made from the most hazardous chemicals are certain polyurethanes, polyacrylonitriles, PVC, epoxy and certain styrene copolymers. The results are of great benefit for further assessing environmental and health risks associated with plastic materials.

The thesis Environmental and health hazards of chemicals in plastic polymers and products was successfully defended in public on 6th May 2011.

http://hdl.handle.net/2077/24978

University of Gothenburg

Geological record of ice shelf break-up and grounding line retreat

in August all the north pole carbon dioxide ice has gone, leaving just a bright cap of water ice

5 August 2011.- A newly released image from ESA's Mars Express shows the north pole of Mars during the red planet's summer solstice. All the carbon dioxide ice has gone, leaving just a bright cap of water ice.

This image was captured by the orbiter's High-Resolution Stereo Camera on 17 May 2010 and shows part of the northern polar region of Mars during the summer solstice. The solstice is the longest day and the beginning of the summer for the planet's northern hemisphere.

The ice shield is covered by frozen water and carbon dioxide ice in winter and spring but by this point in the martian year all of the carbon dioxide ice has warmed and evaporated into the planet's atmosphere.

Only water ice is left behind, which shows up as bright white areas in this picture. From these layers, large bursts of water vapour are occasionally released into the atmosphere.

The polar ice follows the seasons. In winter, part of the atmosphere recondenses as frost and snow on the northern cap. These seasonal deposits can extend as far south as 45°N latitude and be up to a metre thick.

Another phenomenon occurs on the curved scarps of the northern polar cap, such as the Rupes Tenuis slope (on the left of this image). During spring, the seasonal carbon dioxide layer is covered by water frost. At certain times, winds remove the the millimetre-thick top layer of frozen water, revealing the carbon dioxide ice below.

ESA

Credits: ESA/DLR/FU Berlin (G. Neukum)

Climate change in the Holocene

24 January 2011.- The Roman Conquest, the Black Death and the discovery of America – by modifying the nature of the forests – have had a significant impact on the environment.

"Humans didn't wait for the industrial revolution to provoke environment and climate change. They have been having an influence for at least 8000 years". Jed Kaplan, professor at EPFL and his colleague Kristen Krumhardt have developed a model that demonstrates the link between population increase and deforestation. The method enables a fairly precise estimate of human-origin carbon emissions before the advent of industrialization.

The story of our influence on the climate began with the first farmers. "For each individual, it was necessary to clear a very large area of forest", explains Jed Kaplan. However, with time, irrigation, better tools, seeds and fertilizer became more effficient. This development was a critical factor, which would partially counterbalance the increase in population, and contain the impact of human pressure on the natural environment.

The relationship between population levels and agricultural land-use is therefore not simply proportional. In the Middle Ages, Europe had fewer forests than today, although since then the population has increased more than five fold. Standard models simply state that the bigger the population, the more forest is cleared; but this doesn't correspond to the historical reality.

The influence of the Roman Empire and the Black Death on the climate

The results of this research tell a very different story from that which has been circulating up until now. They show, for example, a first major boom in carbon emissions already 2000 years before our era, corresponding to the expansion of civilizations in China and around the mediterranean.

Certain historical events, almost invisible in the preceding models, now show up strongly. A good example is the re-growth of the forests as a consequence of the fall of the Roman Empire. The Black Death, a plague which resulted in the death of more than a third of the European population, also led to a fall in carbon emissions.

Reference

Holocene carbon emissions as a result of anthropogenic land cover change, The Holocene 0959683610386983, first published on December 30, 2010.

Looking into a Huge Storm on Saturn

last December

17 May 2011.- The atmosphere of the planet Saturn normally appears placid and calm. But about once per Saturn year (about thirty Earth years), as spring comes to the northern hemisphere of the giant planet, something stirs deep below the clouds that leads to a dramatic planet-wide disturbance (eso9014 - http://www.eso.org/public/news/eso9014/).

The latest such storm was first detected by the radio and plasma wave science instrument on NASA's Cassini spacecraft, in orbit around the planet, and also tracked by amateur astronomers in December 2010. It has now been studied in detail using the VISIR infrared camera on ESO's Very Large Telescope (VLT) in conjunction with observations from the CIRS instrument on Cassini.

This is only the sixth of these huge storms to be spotted since 1876. It is the first ever to be studied in the thermal infrared — to see the variations of temperature within a Saturnian storm — and the first ever to be observed by an orbiting spacecraft.

"This disturbance in the northern hemisphere of Saturn has created a gigantic, violent and complex eruption of bright cloud material, which has spread to encircle the entire planet", explains Leigh Fletcher (University of Oxford, UK), lead author of the new study. "Having both the VLT and Cassini investigating this storm at the same time gives us a great chance to put the Cassini observations into context. Previous studies of these storms have only been able to use reflected sunlight, but now, by observing thermal infrared light for the first time, we can reveal hidden regions of the atmosphere and measure the really substantial changes in temperatures and winds associated with this event".

The storm may have originated deep down in the water clouds where a phenomenon similar to a thunderstorm drove the creation of a giant convective plume: just as hot air rises in a heated room, this mass of gas headed upwards and punched through Saturn's usually serene upper atmosphere. These huge disturbances interact with the circulating winds moving east and west and cause dramatic temperature changes high up in the atmosphere.

Thermal infrared images of Saturn from the VISIR instrument on ESO's VLT (centre and right) and an amateur visible-light image (left) from Trevor Barry (Broken Hill, Australia) obtained on 19 January 2011 during the mature phase of the northern storm. The second image is taken at a wavelength that reveals the structures in Saturn's lower atmosphere, showing the churning storm clouds and the central cooler vortex. The third image is sensitive to much higher altitudes in Saturn's normally peaceful stratosphere, where we see the unexpected beacons of infrared emission flanking the central cool region over the storm. Credit: ESO/University of Oxford/L. N. Fletcher/T. Barry

"Our new observations show that the storm had a major effect on the atmosphere, transporting energy and material over great distances, modifying the atmospheric winds — creating meandering jet streams and forming giant vortices — and disrupting Saturn's slow seasonal evolution", adds Glenn Orton (Jet Propulsion Laboratory, Pasadena, USA), another member of the team.

Some of the unexpected features seen in the new imaging from VISIR have been named stratospheric beacons. These are very strong temperature changes high in the Saturnian stratosphere, 250-300 km above the cloud tops of the lower atmosphere, that show how far up into the atmosphere the effects of the storm extend. The temperature in Saturn's stratosphere is normally around -130 degrees Celsius at this season but the beacons are measured to be 15-20 degrees Celsius warmer.

The beacons are completely invisible in reflected sunlight but can outshine the emission from the rest of the planet in the thermal infrared light detected by VISIR. They had never been detected before, so astronomers are not sure if they are common features in such storms.

"We were lucky to have an observing run scheduled for early in 2011, which ESO allowed us to bring forward so that we could observe the storm as soon as possible. It was another stroke of luck that Cassini's CIRS instrument could also observe the storm at the same time, so we had imaging from VLT and spectroscopy of Cassini to compare", concludes Leigh Fletcher. "We are continuing to observe this once-in-a-generation event".

This research was presented in a paper that appeared in the journal Science on 19 May 2011.

European Southern Observatory

In memoriam

Angioletta Coradini (1946 – 2011)

The EGU Planetary and Solar System Sciences Division is very sad to announce that our valued colleague and friend, Angioletta Coradini, passed away on September 4, 2011. Angioletta Coradini started her scientific career in 1969 working on her thesis in Physics at the Rome University "La Sapienza" on the origin of the glassy particles found in the lunar soils. She continued working on the lunar samples returned by the Apollo missions during the seventies, when she joint as tenure researcher the Istituto di Astrofisica Spaziale of the Italian National Reseach Council (CNR). At the same time she started to study the formation of the solar system together with her colleagues G. Magni and C. Federico, becoming in a short time a leading expert in that field.

During the eighties she expanded her interest in space instrumentation through a collaboration with the JPL Team who developed the TIMS (Thermal Infrared Mass Spectroscope), gaining experience which allowed her to became the Co-I of the Cassini VIMS Spectrometer, leading the Italian team of the visual channel of VIMS. Angioletta Coradini showed another dimension of her talent in the management of space experiment, with a long series of successes starting from the PI-ship of VIRTIS on Rosetta. Other experiments in which Angioletta was involved include VIR on DAWN, now in orbit around the Vesta asteroid, JIRAM on the Juno mission en route to Jupiter, the infrared spectrometers on Venus Express, Bepi Colombo, and many other projects.

At the same time she was Head of the Planetology Departement of the Istituto di Astrofisica Spaziale (1982-1986), Director of the CNR National Group of Astronomy (1984-1990), Director of the CNR (after INAF) Istituto di Fisica dello Spazio Interplanetario (2003-2011). All in all, Angioletta was one of the world-recognized leading experts in Planetary Sciences, with varied interests ranging from minor bodies to outer planets, and theory on the formation of our Solar system. In all of this, she made fundamental contributions, in addition to her involvement in the development and management of some of the most important space missions in this field.

In recognition of her contributions to the planetary field she had received several awards and recognitions and she will be remembered in future tributes. She will be sorely missed by family, colleagues and friends, all of us who knew her and appreciated her human and scientific qualities.

Athena Coustenis
EGU Plan. & Solar System Sciences President

Ice sheet on the move

huge network of glaciers, carrying ice thousands of kilometres across Antarctica, has been discovered

18 August 2011.- A huge network of glaciers, carrying ice thousands of kilometres across Antarctica, has been discovered as a result of space agencies' efforts to focus their satellites on Earth's icy regions during the International Polar Year.

The International Polar Year (IPY) was carried out in 2007 and 2008.

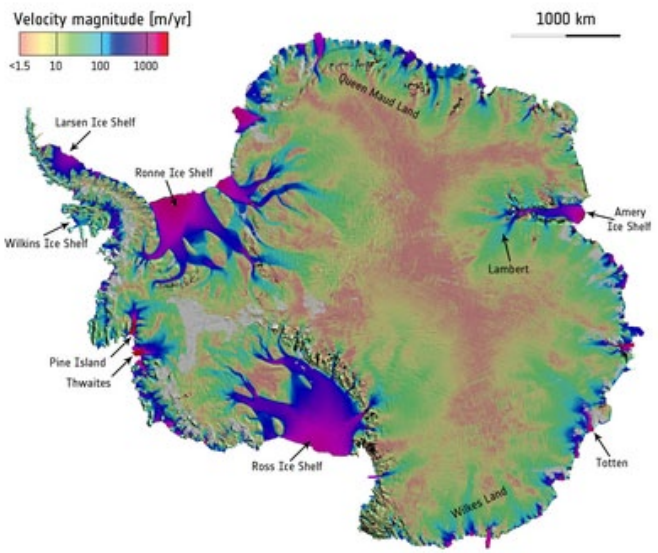
Piecing together radar data points that were collected over Antarctica by satellites such as ESA's Envisat, the Canadian Space Agency's (CSA) Radarsat and Japan Aerospace Exploration Agency's (JAXA) ALOS, a team has created the first map of ice motion over the entire continent of Antarctica.

The map, which was created by scientists from the University of California Irvine and NASA's Jet Propulsion Laboratory, reveals the flow of the large glaciers, and their tributaries – effectively rivers of ice – that reach thousands of kilometres inland.

A paper outlining the results was published this week in Science.

Lead author, Eric Rignot said, "This is like seeing a map of all the oceans' currents for the first time. We're seeing amazing flows from the heart of the continent that have never been described before".

Abstract in Science: Ice Flow of the Antarctic Ice Sheet (http://www.sciencemag.org/content/early/2011/08/17/science.1208336)



This is the first map of ice velocity over the entire continent of Antarctica. It is derived from ALOS PALSAR, Envisat ASAR, Radarsat-2, ERS-1 and ERS-2 satellite radar interferometry overlaid on a MODIS mosaic of Antarctica. These new findings are critical to measuring the global impact to sea-level rise resulting from ice flowing into the ocean.
Credits: E. Rignot et al

Cassini samples the icy spray of Enceladus' water plumes

plumes create the faint E-ring

22 June 2011.- The NASA/ESA/ASI Cassini-Huygens mission has directly sampled the water plumes jetting into space from Saturn's moon Enceladus. The findings from these fly-throughs are the strongest evidence yet for the existence of large-scale saltwater reservoirs beneath the moon's icy crust.

Enceladus' water plumes shoot water vapour and tiny grains of ice into space. They originate from the tiger stripe surface fractures at the moon's south pole, and create the faint E-ring, which traces the orbit of Enceladus around Saturn.

The Cassini spacecraft discovered the plumes in 2005 and more recently has been able to fly directly through them.

During three of Cassini's passes in 2008 and 2009, the Cosmic Dust Analyser measured the composition of freshly ejected plume grains. The icy particles hit the detector target at speeds of 6.5–17.5 km/s, and vaporised instantly. Electrical fields inside the instrument then separated the various constituents of the resulting impact cloud for analysis.

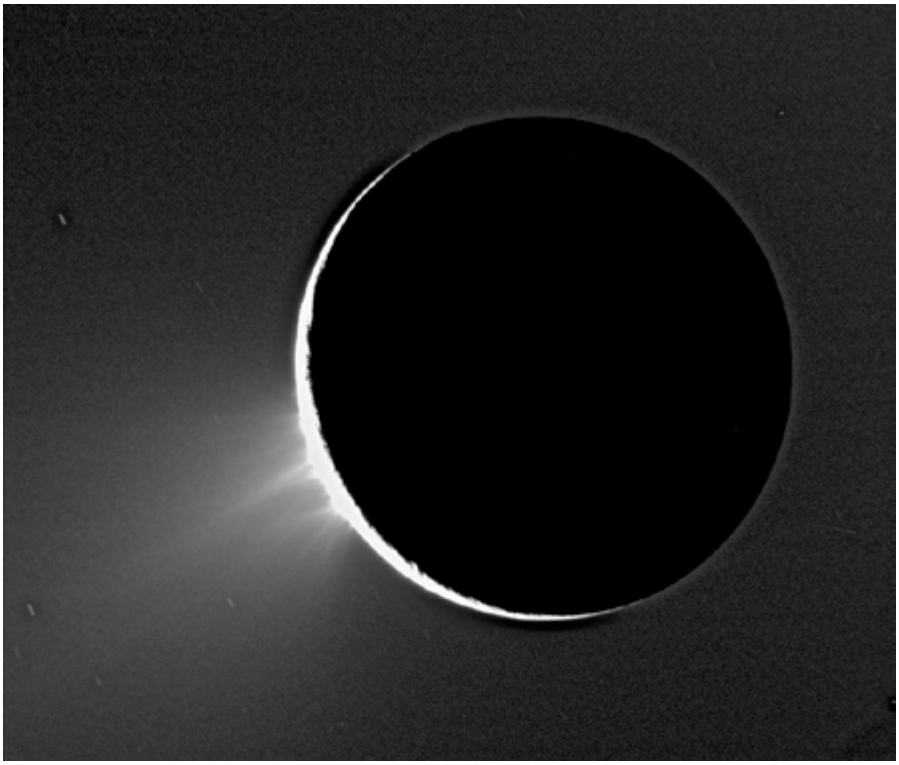
Far away from Enceladus, the data show that the ejected grains are relatively small and mostly salt-poor, closely matching the composition of the E-ring. Closer to the moon, however, Cassini has found that relatively large, salt-rich ice grains dominate.

It appears as though more than 99% of the total mass of ejected solids is in salt-rich grains, but most of these are heavy and fall back to the moon, so never make it into the E-ring.

The salt-rich particles have an 'ocean-like' composition which indicates that most, if not all, of the expelled ice comes from liquid saltwater, rather than from the icy surface of the moon.

When salty water freezes slowly, the salt is squeezed out, leaving pure water ice behind. So, if the plumes were coming from the surface ice, there should be very little salt in them.

"There currently is no plausible way to produce a steady outflow of salt-rich grains from solid ice across the tiger stripes other than from saltwater under Enceladus' icy surface", says Frank Postberg, Universität Heidelberg, Germany, who is the lead author on the paper announcing these results.



Sunlight scattering through Enceladus's water plumes. Credits: NASA/JPL/Space Science Institute

The picture the team envisages instead is that deep underneath Enceladus' surface, perhaps 80 km down, there is a layer of water between the rocky core and the icy mantle, kept liquid by tidal forces generated by Saturn and some neighbouring moons, as well as by the heat generated by radioactive decay.

Salt in the rock dissolves into the water, which accumulates in liquid reservoirs beneath the icy crust. When the outermost layer cracks open, the reservoir is exposed to space. The drop in pressure causes the liquid to evaporate, with some of it flash-freezing into salty ice grains: together these create the plumes.

Roughly 200 kg of water vapour is lost every second in the plumes, with smaller amounts of ice grains. According to the team's calculations, the water reservoirs must have large evaporating surfaces, otherwise they would easily freeze over, stopping the plumes.

"Enceladus is a tiny icy moon located in a region of the outer Solar System where no liquid water was expected to exist, because of its large distance from the Sun", says Nicolas Altobelli, ESA's Project Scientist for the Cassini-Huygens mission.

"This finding is therefore a crucial new piece of evidence showing that environmental conditions favourable to the emergence of life may be sustainable on icy bodies orbiting gas giant planets".

ESA

General overview: European Integrated project on Aerosol Cloud Climate and Air Quality interactions

integrating aerosol research from nano to global scales

In this paper the authors describe and summarize the main achievements of the European Aerosol Cloud Climate and Air Quality Interactions project (EUCAARI). EUCAARI started on 1 January 2007 and ended on 31 December 2010 leaving a rich legacy 5 including: (a) a comprehensive database with a year of observations of the physical, chemical and optical properties of aerosol particles over Europe, (b) the first comprehensive aerosol measurements in four developing countries, (c) a database of airborne measurements of aerosols and clouds over Europe during May 2008, (d) comprehensive modeling tools to study aerosol processes fron nano to global scale and their ef10 fects on climate and air quality. In addition a new Pan-European aerosol emissions inventory was developed and evaluated, a new cluster spectrometer was built and tested in the field and several new aerosol parameterizations and computations modules for chemical transport and global climate models were developed and evaluated. This work enabled EUCAARI to improve their understanding of aerosol radiative forcing and air quality-climate interactions. The EUCAARI results can be utilized in European 5 and global environmental policy to assess the aerosol impacts and the corresponding abatement strategies.

The full paper is available free of charge at http://www.atmos-chem-phys-discuss.net/11/17941/2011/acpd-11-17941-2011.pdf

M. Kulmala et al.: Integrating aerosol research from nano to global scales, Atmos. Chem. Phys. Discuss., 11, 17941–18160, doi:10.5194/acpd-11-17941-2011.

In situ observations of new particle formation in the tropical upper troposphere

the role of clouds and the nucleation mechanism

New particle formation (NPF), which generates nucleation mode aerosol, was observed in the tropical Upper Troposphere (UT) and Tropical Tropopause Layer (TTL) by in situ airborne measurements over South America (January–March 2005), Australia (November–December 2005), West Africa (August 2006) and Central America (2004–2007). Particularly intense NPF was found at the bottom of the TTL. Measurements with a set of condensation particle counters (CPCs) with different dp50 (50% lower size detection efficiency diameter or “cut-off diameter”) were conducted on board the M-55 Geophysica in the altitude range of 12.0–20.5 km and on board the DLR Falcon-20 at up to 11.5 km altitude. On board the NASA WB-57F size distributions were measured over Central America in the 4 to 1000 nm diameter range with a system of nucleation mode aerosol spectrometers. Nucleation mode particle concentrations (NNM) were derived from these measurements which allow for identifying many NPF events with NNM in the range of thousands of particles per cm3. Over Australia and West Africa, The authors identified NPF in the outflow of tropical convection, in particular of a Mesoscale Convective System (MCS). Newly formed particles with NNM > 1000 cm−3 were found to coexist with ice cloud particles (dp > 2 ìm) as long as cloud particle concentrations remained below 2 cm−3. The occurrence of NPF within the upper troposphere and the TTL was generally confined within 340 K to 380 K potential temperature, but NPF was of particular strength between 350 K and 370 K (i.e. ~1–4 km below the cold point tropopause). Analyses of the aerosol volatility (at 250 °C) show that in the TTL on average 75–90% of the particles were volatile, compared to typically only 50% in the extra-tropical UT, indicative for the particles to mainly consist of H2SO4-H2O and possibly organic compounds. Along two flight segments over Central and South America (24 February 2005 and 7 August 2006, at 12.5 km altitude) in cloud free air, above thin cirrus, particularly high NNM were observed. Recent lifting had influenced the probed air masses, and NNM reached up to 16 000 particles cm−3 (ambient concentration). A sensitivity study using an aerosol model, which includes neutral and ion induced nucleation processes, simulates NNM in reasonable agreement with the in situ observations of clear-air NPF. Based on new, stringent multi-CPC criteria, their measurements corroborate the hypothesis that the tropical UT and the TTL are regions supplying freshly nucleated particles. Their findings narrow the altitude of the main source region to the bottom TTL, i.e. to the level of main tropical convection outflow, and, by means of measurements of carbon monoxide, they indicate the importance of anthropogenic emissions in NPF. After growth and/or coalescence the nucleation mode particles may act as cloud condensation nuclei in the tropical UT, or, upon ascent into the stratosphere, contribute to maintain the stratospheric background aerosol.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/9983/2011/acp-11-9983-2011.pdf

Weigel, R., Borrmann, S., Kazil, J., Minikin, A., Stohl, A., Wilson, J. C., Reeves, J. M., Kunkel, D., de Reus, M., Frey, W., Lovejoy, E. R., Volk, C. M., Viciani, S., D’Amato, F., Schiller, C., Peter, T., Schlager, H., Cairo, F., Law, K. S., Shur, G. N., Belyaev, G. V., and Curtius, J.: In situ observations of new particle formation in the tropical upper troposphere: the role of clouds and the nucleation mechanism, Atmos. Chem. Phys., 11, 9983-10010, doi:10.5194/acp-11-9983-2011, 2011.

Towards understanding how surface life can affect interior geological processes

a non-equilibrium thermodynamics approach

Life has significantly altered the Earth's atmosphere, oceans and crust. To what extent has it also affected interior geological processes? To address this question, three models of geological processes are formulated: mantle convection, continental crust uplift and erosion and oceanic crust recycling. These processes are characterised as non-equilibrium thermodynamic systems. Their states of disequilibrium are maintained by the power generated from the dissipation of energy from the interior of the Earth. Altering the thickness of continental crust via weathering and erosion affects the upper mantle temperature which leads to changes in rates of oceanic crust recycling and consequently rates of outgassing of carbon dioxide into the atmosphere. Estimates for the power generated by various elements in the Earth system are shown. This includes, inter alia, surface life generation of 264 TW of power, much greater than those of geological processes such as mantle convection at 12 TW. This high power results from life's ability to harvest energy directly from the sun. Life need only utilise a small fraction of the generated free chemical energy for geochemical transformations at the surface, such as affecting rates of weathering and erosion of continental rocks, in order to affect interior, geological processes. Consequently when assessing the effects of life on Earth, and potentially any planet with a significant biosphere, dynamical models may be required that better capture the coupled nature of biologically-mediated surface and interior processes.

The full paper is available free of charge at http://www.earth-syst-dynam.net/2/139/2011/esd-2-139-2011.pdf

Dyke, J. G., Gans, F., and Kleidon, A.: Towards understanding how surface life can affect interior geological processes: a non-equilibrium thermodynamics approach, Earth Syst. Dynam., 2, 139-160, doi:10.5194/esd-2-139-2011, 2011.

The H2O-O2 water vapour complex in the Earth's atmosphere

Preliminary estimates rank water vapour complexes among the ten most abundant species in the boundary layer

Until recently, abundance estimates for bound molecular complexes have been affected by uncertainties of a factor 10–100. This is due to the difficulty of accurately obtaining the equilibrium constant, either from laboratory experiments or by statistical thermodynamic calculations. In this paper, the authors firstly present laboratory experiments that they performed in order to determine the molecular structure of H2O-O2. They also derive global abundance estimates for H2O-O2 in the Earth's atmosphere. The equilibrium constant Kp evaluated using the "anharmonic oscillator approach" (AHOA) (Sabu et al., 2005) was employed: the AHOA explains well the structure of the complex obtained by the present experiment. The Kp calculated by this method shows a realistic temperature dependence. They used this Kp to derive global abundance estimates for H2O-O2 in the Earth's atmosphere. The distribution of H2O-O2 follows that of water vapour in the troposphere and seems inversely proportional to temperature in the lower stratosphere. Preliminary estimates at the surface show amount of H2O-O2 is comparable to CO or N2O, ranking water vapour complexes among the ten most abundant species in the boundary layer.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/8607/2011/acp-11-8607-2011.pdf

Kasai, Y., Dupuy, E., Saito, R., Hashimoto, K., Sabu, A., Kondo, S., Sumiyoshi, Y., and Endo, Y.: The H2O-O2 water vapour complex in the Earth's atmosphere, Atmos. Chem. Phys., 11, 8607-8612, doi:10.5194/acp-11-8607-2011, 2011.

Analyses of impacts of China's international trade on its water resources and uses

China's economic gains come at a high cost to its water resources

This study provides an insight into the impact of China's international trade of goods and services on its water resources and uses. Virtual water flows associated with China's international trade are quantified in an input-output framework.

The analysis is scaled down to the sectoral and provincial levels to trace the origins and destinations of virtual water flows associated with the international trade. The results show that China is a net virtual water exporter of 4.8 × 1010 m3 yr−1, accounting for 2.1% of its renewable water resources and 8.6% of the total water use. Water scarce regions tend to have higher percentages of virtual water export relative to their water resources and water uses. In the water scarce Huang-Huai-Hai region, the net virtual water export accounts for 8.0% of the region's water resources and 11.3% of its water uses. For individual sectors, major net virtual water exporters are those where agriculture provides raw materials in the initial process

of the production chain. The results suggest that China's economic gains from being a world "manufacture factory" have come at a high cost to its water resources.

The full paper is available free of charge at http://www.hydrol-earth-syst-sci.net/15/2871/2011/hess-15-2871-2011.pdf

Zhang, Z. Y., Yang, H., Shi, M. J., Zehnder, A. J. B., and Abbaspour, K. C.: Analyses of impacts of China's international trade on its water resources and uses, Hydrol. Earth Syst. Sci., 15, 2871-2880, doi:10.5194/hess-15-2871-2011, 2011.

Projections of UV radiation changes in the 21st century: impact of ozone recovery and cloud effects

At mid and high latitudes, changes in clouds and stratospheric ozone transport by global circulation changes due to greenhouse gases will sustain the erythemal irradiance at levels below those in 1965, despite the removal of ozone depleting substances

Monthly averaged surface erythemal solar irradiance (UV-Ery) for local noon from 1960 to 2100 has been derived using radiative transfer calculations and projections of ozone, temperature and cloud change from 14 chemistry climate models (CCM), as part of the CCMVal-2 activity of SPARC. The author's calculations show the influence of ozone depletion and recovery on erythemal irradiance. In addition, they investigate UV-Ery changes caused by climate change due to increasing greenhouse gas concentrations. The latter include effects of both stratospheric ozone and cloud changes. The derived estimates provide a global picture of the likely changes in erythemal irradiance during the 21st century. Uncertainties arise from the assumed scenarios, different parameterizations – particularly of cloud effects on UV-Ery – and the spread in the CCM projections.

The calculations suggest that relative to 1980, annually mean UV-Ery in the 2090s will be on average ~12 % lower at high latitudes in both hemispheres, ~3 % lower at mid latitudes, and marginally higher (~1 %) in the tropics. The largest reduction (~16 %) is projected for Antarctica in October. Cloud effects are responsible for 2–3 % of the reduction in UV-Ery at high latitudes, but they slightly moderate it at mid-latitudes (~1 %). The year of return of erythemal irradiance to values of certain milestones (1965 and 1980) depends largely on the return of column ozone to the corresponding levels and is associated with large uncertainties mainly due to the spread of the model projections. The inclusion of cloud effects in the calculations has only a small effect of the return years. At mid and high latitudes, changes in clouds and stratospheric ozone transport by global circulation changes due to greenhouse gases will sustain the erythemal irradiance at levels below those in 1965, despite the removal of ozone depleting substances. At northern high latitudes (60°–90°), the projected decreases in cloud transmittance towards the end of the 21st century will reduce the yearly average surface erythemal irradiance by ~5 % with respect to the 1960s.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/7533/2011/acp-11-7533-2011.pdf

Bais, A. F., Tourpali, K., Kazantzidis, A., Akiyoshi, H., Bekki, S., Braesicke, P., Chipperfield, M. P., Dameris, M., Eyring, V., Garny, H., Iachetti, D., Jöckel, P., Kubin, A., Langematz, U., Mancini, E., Michou, M., Morgenstern, O., Nakamura, T., Newman, P. A., Pitari, G., Plummer, D. A., Rozanov, E., Shepherd, T. G., Shibata, K., Tian, W., and Yamashita, Y.: Projections of UV radiation changes in the 21st century: impact of ozone recovery and cloud effects, Atmos. Chem. Phys., 11, 7533-7545, doi:10.5194/acp-11-7533-2011, 2011.

Jetstream and rainfall distribution in the Mediterranean region

the rainfall distribution downstream to cross-jet circulations is strongly influenced by relative positions of Atlantic and African jet

This is a study on the impact of the jetstream in the Euro-Atlantic region on the rainfall distribution in the Mediterranean region; the study, based on data analysis, is restricted to the Mediterranean rainy season, which lasts from September to May. During this season, most of the weather systems originate over the Atlantic and are carried towards the Mediterranean region by the westerly flow. In the upper troposphere of the Euro-Atlantic region this flow is characterized by two jets: the Atlantic jet, which crosses the ocean with a northeasterly tilt, and the African jet, which flows above the coast of North Africa.

This study shows that the cross-jet circulation of the Atlantic jet favors storm activity in its exit region, while the cross-jet circulation of the African jet suppresses this kind of activity in its entrance region, with the 1st jet-stormtrack covariance mode explaining nearly 50% of the variability. It follows that the rainfall distribution downstream to these cross-jet circulations is strongly influenced by their relative positions. Specifically, in fall, rainfall is abundant in the western Mediterranean basin (WM), when the Atlantic jet is relatively strong but its northeasterly tilt is small, and the African jet is in its easternmost position. In winter, rainfall is abundant in the eastern Mediterranean basin (EM); this is when the Atlantic jet reaches the Scandinavian peninsula and the African jet is in its westernmost position. In spring, when the two jets weaken, the Atlantic jet retreats over the ocean, but the African jet stays in its winter position, rainfall is abundant in the Alpine region and in the Balkans. In addition, the covariance between precipitation and the jetstream has been evaluated. In fall, the latitudinal displacement of the Atlantic jet and the longitudinal displacement of the African jet modulate rainfall anomalies in the WM, with 38% explained covariance. In winter, the latitudinal displacement of the Atlantic jet produces rainfall anomalies in the western and central Mediterranean, with 45% explained covariance. In spring, the latitudinal displacement of the African jet produces rainfall anomalies, with 38% explained covariance.

The full paper is available free of charge at http://www.nat-hazards-earth-syst-sci.net/11/2469/2011/nhess-11-2469-2011.pdf

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Getting around Antarctica

new high-resolution mappings of the grounded and freely-floating boundaries of the Antarctic ice sheet created for the International Polar Year

Two ice-dynamic transitions of the Antarctic ice sheet – the boundary of grounded ice features and the freely-floating boundary – are mapped at 15-m resolution by participants of the International Polar Year project ASAID using customized software combining Landsat-7 imagery and ICESat/GLAS laser altimetry.

The grounded ice boundary is 53 610 km long; 74 % abuts to floating ice shelves or outlet glaciers, 19 % is adjacent to open or sea-ice covered ocean, and 7 % of the boundary ice terminates on land. The freely-floating boundary, called here the hydrostatic line, is the most landward position on ice shelves that expresses the full amplitude of oscillating ocean tides. It extends 27 521 km and is discontinuous. Positional (one-sigma) accuracies of the grounded ice boundary vary an order of magnitude ranging from ±52 m for the land and open-ocean terminating segments to ±502 m for the outlet glaciers. The hydrostatic line is less well positioned with errors over 2 km. Elevations along each line are selected from 6 candidate digital elevation models based on their agreement with ICESat elevation values and surface shape inferred from the Landsat imagery. Elevations along the hydrostatic line are converted to ice thicknesses by applying a firn-correction factor and a flotation criterion. BEDMAP-compiled data and other airborne data are compared to the ASAID elevations and ice thicknesses to arrive at quantitative (one-sigma) uncertainties of surface elevations of ±3.6, ±9.6, ±11.4, ±30 and ±100 m for five ASAID-assigned confidence levels. Over one-half of the surface elevations along the grounded ice boundary and over one-third of the hydrostatic line elevations are ranked in the highest two confidence categories. A comparison between ASAID-calculated ice shelf thicknesses and BEDMAP-compiled data indicate a thin-ice bias of 41.2 ± 71.3 m for the ASAID ice thicknesses. The relationship between the seaward offset of the hydrostatic line from the grounded ice boundary only weakly matches a prediction based on beam theory. The mapped products along with the customized software to generate them and a variety of intermediate products are available from the National Snow and Ice Data Center.

The full paper is available free of charge at http://www.the-cryosphere.net/5/569/2011/tc-5-569-2011.pdf

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Carlo Laj to receive AGU award

for Excellence in Geophysical Education

Carlo Laj, Chair of the EGU Education Committee and member of the EGU EONS Forum (http://www.egu.eu/inside-egu/committees/forum-on-outreach.html, http://www.egu.eu/media-outreach/egu-media-outreach-overview.html), will receive this December the AGU award for Excellence in Geophysical Education. Carlo is the driving force behind EGU's GIFT (Geophysical Information for Teachers) Workshops (http://www.egu.eu/media-outreach/gift/home.html), which he has been organising successfully since 2003. Established in 1995, the AGU Excellence in Geophysical Education Award (EGEA) is awarded not more than once annually to an individual, group, or team. The award is "to acknowledge a sustained commitment to excellence in geophysical education by a team, individual, or group. To educators who have had a major impact on geophysical education at any level (kindergarten through postgraduate), who have been outstanding teachers and trainers for a number of years, or who have made a long-lasting, positive impact on geophysical education through professional service". Robert D. Ballard was the first recipient of this award. The Eggs warmly congratulates Carlo for this well-deserved award.

Geosciences Information for Teachers (GIFT) Symposium

on water, April 23-25, 2012

Vienna, April 23-25, 2012
«Water!»

PRELIMINARY PROGRAM AND APPLICATION FORM

The 2012-GIFT (Geosciences Information for Teachers) symposium will take place on April 23-25, 2012 during the General Assembly of EGU in Vienna Austria. The general theme of the workshop is « Water!» and will be dedicated to the study of the hydrological problems of our planet.

The water cycle, also known as the hydrological cycle, describes the continuous movement of water on, above and below the surface of the Earth. It also involves the exchange of heat energy, which leads to temperature changes. The water cycle figures significantly in the maintenance of life, society and ecosystems on Earth. However, several problems threaten water resources today, which are related to the unsustainable use of water and the lack of adequate supply of water in many parts of the world. Such problems are caused by an ever increasing population, consumerism, urbanization and changes in agricultural practice.

In addition, as the water cycle involves heat exchange, it has a two-way feedback with our climate as well. In particular, the effects of atmospheric global warming on the water cycle are significant. Observed warming over several decades has been linked to changes in the large-scale hydrological cycle such as:

- increasing atmospheric water vapor content;
- changing precipitation patterns, intensity and extremes;
- reduced snow cover and widespread melting of ice;
- and changes in soil moisture and runoff.

As a consequence, water resources have already been deeply affected by global warming: sea levels have risen, glaciers have retreated. The hydrological cycle is heavily affected by land use change which in turn affects groundwater recharge. The above problems cause concerns in almost every sector of everyday life, and geo-engineers are seeking ways of mitigation. All water bodies are going to be affected by global warming, making knowledge of the water cycle essential for any kind of human activity. Entire regions on Earth would face extreme temperatures eventually associated with torrential rainfalls whilst other regions would experience scarcity of water and droughts.

In the GIFT workshop "Water!" all the different aspects of the water cycle will be described and discussed. Talks will focus on global freshwater availability and distribution, overexploitation of water, strategies for sustainable use of water in the future and the threats by environmental change. Particular regions where global warming will have a major impact, such as the regions depending on the water supply from the Himalayan, Alpine and Andes mountain glaciers will be used as exemplars. The use of naturally occurring isotopes to "fingerprint" sources of water in precipitation and rivers, and the presence of 'ancient' water beneath the deserts and other areas, will also be discussed..

Focus will also be put on climate model simulations for the 21st century, mitigation measures to reduce the magnitude of impacts of global warming on water resources, and water resources management and its impacts on other policy areas.

As in every GIFT Symposium, contributions by the attending teachers on particular "off-the-program" activities that they may have had in their classrooms are particularly welcomed, either as poster or oral presentations, even if their subject is not directly related to the theme of the workshop.

Also, a first step will be a guided visit to the Vienna Museum of Natural Sciences, on Sunday April 22 afternoon, followed by a small reception as an ice-breaker event.

Application to participate in the 2012 GIFT Teachers Symposium

EGU General Assembly April 23-25, 2012 Vienna Austria

Grants are available to support teachers to participate in the 2012 Geosciences Information for Teachers (GIFT) Symposium at the 2012 European Geosciences Union (EGU)

General Assembly in Vienna, Austria. Selected teachers will receive a travel /hotel stipend and free registration to the meeting.

Participating teachers will be selected based on their teaching experience and a supporting statement from their school administration. Selected teachers will be expected to attend the entire workshop and submit a statement within 1 year after the workshop on their impression of the workshop and how they plan to use this experience in their future teaching activities.

To apply please submit the following information:

• Applicant name, contact information, E-mail address
• School name and address
• List the subjects you teach, and the ages of students
• The workshop will be conducted in English. Please describe your capability to understand and speak English.
• A description of any leadership activities you have taken at your school or in national educational activities (examples: training new teachers, developing curriculum, etc.).
• A letter of recommendation from the senior administrator in your school supporting your application (by attached pdf document).
• (Optional) There will be opportunities for teachers to present any creative science activities they have developed for their classrooms to other teachers at the workshop. These presentations can be in the form of a talk, a poster or a demonstration. If you would like to present a science activity, please provide a title and description for inclusion in the program.

Applications should be received as soon as possible and in any case no later than November 30, 2011.

Send your application via email to any of the members of the Committee on Education (list at : (http://www.egu.eu/media-outreach/gift/committee-on-education.html) preferentially the one in your country if there is one.

International Summer School (ISSAOS) 2011 Terrestrial Atmosphere and Cosmic Rays

The International Summer School on Atmospheric and Oceanic Sciences (ISSAOS) 2011 on TERRESTRIAL ATMOSPHERE AND COSMIC RAYS will be held 5th - 8th September 2011 at Laboratori Nazionali del Gran Sasso, Assergi (L'Aquila) - ITALY

International Summer School on Atmospheric and Oceanic Sciences (ISSAOS) 2011 TERRESTRIAL ATMOSPHERE AND COSMIC RAYS 5th - 8th September 2011 Laboratori Nazionali del Gran Sasso, Assergi (L'Aquila) - ITALY

First announcement: general information

The 11th edition of the International Summer School on Atmospheric and Oceanic Sciences (ISSAOS 2011), has been organized by the CETEMPS (Center of Excellence for the Forecast of Severe Weather by Remote Sensing and Numerical Modelling) in collaboration with the Italian National Institute for Nuclear Physics (INFN), and will cover the recent developments in the understanding of the cosmic rays – terrestrial atmosphere interactions. The ISSAOS 2011 will provide a series of lectures on the following topics:

- Fundamentals of terrestrial atmospheric physics; Fundamentals of cosmic rays physics;
- Cosmic rays induced ionization effects on cloud formation and atmospheric chemistry;
- Atmosphere as a calorimeter for the detection of cosmic rays;
- Cosmic rays and climate.

The participants will benefit of the guidance of highly qualified senior researchers:

- Dr. Dimitra Atri , University of Kansas
- Prof. Paolo Privitera, University of Chicago
- Prof. Vitaliy Rusov, Odessa National Polytechnic University
- Prof. Nir J. Shaviv, The Hebrew University of Jerusalem
- Prof. Henrik Svensmark, Danish Space Research Institute
- Prof. Guido Visconti, Cetemps, Università Degli Studi dell'Aquila
- Prof. Lawrence Wiencke, Colorado School of Mines
- Prof. Fangqun Yu , State University of New York.

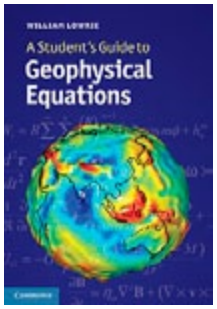
There will be wide opportunities for interdisciplinary approaches to facilitate the communications and scientific exchanges among these different communities, in order to enhance the coordination of specific scientific efforts and advocate for a common view of major scientific needs and priority areas for the future. A guided tour to the National Laboratories of Gran Sasso (LNGS) is also scheduled. Visit our website for further details on topics, registration and other information: http://cetemps.aquila.infn.it/issaos.

DEADLINE FOR REGISTRATION BY BANK TRANSFER: 10 AUGUST 2011

We look forward to see you in L'Aquila in September. ISSAOS organizing committee email: issaos@aquila.infn.it, URL: http://cetemps.aquila.infn.it/issaos, SKYPE: ISSAOSaquila, FACEBOOK: ISSAOS (group).

Vincenzo Rizi
CETEMPS/Dipartimento di Fisica
Università Degli Studi dell'Aquila
Via Vetoio Località Coppito
67010 L'Aquila Italy
mobile +39 3666802761
Tel. +39 0862 433083
FAX +39 0862 433089
email: vincenzo.rizi@aquila.infn.it
URLs: http://cetemps.aquila.infn.it/
http://www.fisica.aquila.infn.it/
http://www.ing.univaq.it/main/rubrica.php

A Student's Guide to Geophysical Equations



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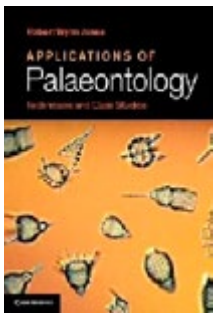
PRICE : 22.30 €
Paperback

The advent of accessible student computing packages has meant that geophysics students can now easily manipulate datasets and gain first-hand modeling experience – essential in developing an intuitive understanding of the physics of the Earth. Yet to gain a more in-depth understanding of physical theory, and to develop new models and solutions, it is necessary to be able to derive the relevant equations from first principles. This compact, handy book fills a gap left by most modern geophysics textbooks, which generally do not have space to derive all of the important formulae, showing the intermediate steps. This guide presents full derivations for the classical equations of gravitation, gravity, tides, earth rotation, heat, geomagnetism and foundational seismology, illustrated with simple schematic diagrams. It supports students through the successive steps and explains the logical sequence of a derivation – facilitating self-study and helping students to tackle homework exercises and prepare for exams.

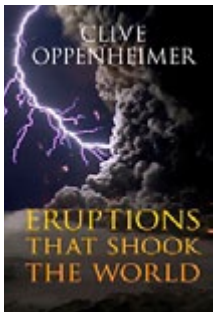
Applications of Palaeontology



Authors: Robert Wynn Jones
Publisher: Cambridge University Press
ISBN: 9781107005235
YEAR : 2011
EDITION : 1st
PAGES : 406
PRICE : 92.00 €
Hardback

Palaeontology, the scientific study of fossils, has developed from a descriptive science to an analytical science used to interpret relationships between earth and life history. This book provides a comprehensive and thematic treatment of applied palaeontology, covering the use of fossils in the ordering of rocks in time and in space, in biostratigraphy, palaeobiology and sequence stratigraphy. Robert Wynn Jones presents a practical workflow for applied palaeontology, including sample acquisition, preparation and analysis, and interpretation and integration. He then presents numerous case studies that demonstrate the applicability and value of the subject to areas such as petroleum, mineral and coal exploration and exploitation, engineering geology and environmental science. Specialist applications outside of the geosciences (including archaeology, forensic science, medical palynology, entomopalynology and melissopalynology) are also addressed. Abundantly illustrated and referenced, Applications of Palaeontology provides a user-friendly reference for academic researchers and professionals across a range of disciplines and industry settings.

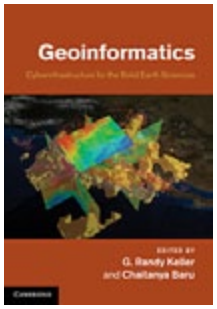
Eruptions that Shook the World



Authors: Clive Oppenheimer
Publisher: Cambridge University Press
ISBN: 9780521641128
YEAR : 2011
EDITION : 1st
PAGES : 392
PRICE : 21.00 €
Hardback

What does it take for a volcanic eruption to really shake the world? Did volcanic eruptions extinguish the dinosaurs, or help humans to evolve, only to decimate their populations with a super-eruption 73,000 years ago? Did they contribute to the ebb and flow of ancient empires, the French Revolution and the rise of fascism in Europe in the 19th century? These are some of the claims made for volcanic cataclysm. Volcanologist Clive Oppenheimer explores rich geological, historical, archaeological and palaeoenvironmental records (such as ice cores and tree rings) to tell the stories behind some of the greatest volcanic events of the past quarter of a billion years. He shows how a forensic approach to volcanology reveals the richness and complexity behind cause and effect, and argues that important lessons for future catastrophe risk management can be drawn from understanding events that took place even at the dawn of human origins.

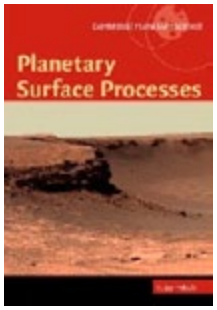
Geoinformatics



Authors: G. Randy Keller, Chaitanya Baru
Publisher: Cambridge University Press
ISBN: 9780521897150
YEAR : 2011
EDITION : 1st
PAGES : 374
PRICE : 90.00 €
Hardback

Advanced information technology infrastructure is increasingly being employed in the Earth sciences to provide researchers with efficient access to massive central databases and to integrate diversely formatted information from a variety of sources. These geoinformatics initiatives enable manipulation, modeling and visualization of data in a consistent way, and are helping to develop integrated Earth models at various scales, and from the near surface to the deep interior. This book uses a series of case studies to demonstrate computer and database use across the geosciences. Chapters are thematically grouped into sections that cover data collection and management; modeling and community computational codes; visualization and data representation; knowledge management and data integration; and web services and scientific workflows. Geoinformatics is a fascinating and accessible introduction to this emerging field for readers across the solid Earth sciences and an invaluable reference for researchers interested in initiating new cyberinfrastructure projects of their own.

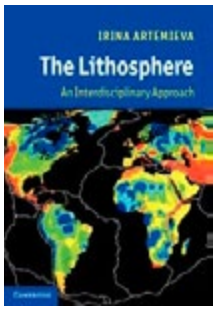
Planetary Surface Processes



Authors: H. Jay Melosh
Publisher: Cambridge University Press
ISBN: 9780521514187
YEAR : 2011
EDITION : 1st
PAGES : 500
PRICE : 52.00 €
Hardback

Planetary Surface Processes is the first advanced textbook to cover the full range of geologic processes that shape the surfaces of planetary-scale bodies. Using a modern, quantitative approach, this book reconsiders geologic processes outside the traditional terrestrial context. It highlights processes that are contingent upon Earth's unique circumstances and processes that are universal. For example, it shows explicitly that equations predicting the velocity of a river are dependent on gravity: traditional geomorphology textbooks fail to take this into account. This textbook is a one-stop source of information on planetary surface processes, providing readers with the necessary background to interpret new data from NASA, ESA and other space missions. Based on a course taught by the author at the University of Arizona for 25 years, it is aimed at advanced students, and is also an invaluable resource for researchers, professional planetary scientists and space-mission engineers.

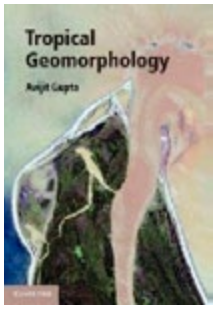
The Lithosphere



Authors: Irina Artemieva
Publisher: Cambridge University Press
ISBN: 9780521843966
YEAR : 2011
EDITION : 1st
PAGES : 773
PRICE : 104.00 €
Hardback

Presenting a coherent synthesis of lithosphere studies, this book covers a range of geophysical methods (seismic reflection, refraction, and receiver function methods; elastic and anelastic seismic tomography; electromagnetic and magnetotelluric methods; thermal, gravity and rheological models), complemented by petrologic and laboratory data on rock properties. It also provides a critical discussion of the uncertainties, assumptions, and resolution issues that are inherent in the different methods and models of the lithosphere. Multidisciplinary in scope, global in geographical extent, and covering a wide variety of tectonics settings across 3.5 billion years of Earth history, this book presents a comprehensive overview of lithospheric structure and evolution. It is a core reference for researchers and advanced students in geophysics, geodynamics, tectonics, petrology, and geochemistry, and for petroleum and mining industry professionals.

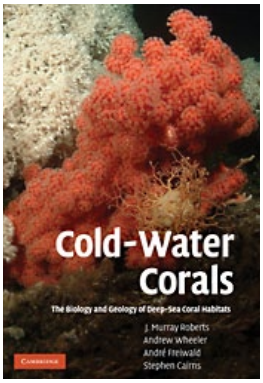
Tropical Geomorphology



Authors: Avijit Gupta
Publisher: Cambridge University Press
ISBN: 9780521879903
YEAR : 2011
EDITION : 1st
PAGES : 386
PRICE : 52.00 €
Hardback

Although similar geomorphic processes take place in other regions, in the tropics these processes operate at different rates and with varying intensities. Tropical geomorphology therefore provides many new discoveries regarding geomorphic processes. This textbook describes both the humid and arid tropics. It provides thoroughly up-to-date concepts and relevant case studies, and emphasises the importance of geomorphology in the management and sustainable development of the tropical environment, including climate change scenarios. The text is supported by a large number of illustrations, including satellite images. Student exercises accompany each chapter. Tropical Geomorphology is an ideal textbook for any course on tropical geomorphology or the tropical environment, and is also invaluable as a reference text for researchers and environmental managers in the tropics.

Cold-Water Corals



J. Murray Roberts, Andrew J. Wheeler, André Freiwald and Stephen D. Cairns
Published by: Cambridge University Press
ISBN: 9780521884853
YEAR : 2009
EDITION : 1st
#PAGES : 352
PRICE : 93.00 €

Cold water corals, The Biology and Geology of Deep Sea Coral habitats, by J Murray Roberts, Andrew Wheeler, Andre Freiwald and Stephen D.

Cold water corals, The Biology and Geology of Deep Sea Coral habitats, by J Murray Roberts, Andrew Wheeler, Andre Freiwald and Stephen D. Cairns, Cambridge University Press 2009, reprinted 2010.

This book aims to summarise and synthesise the state of the art of this rapidly developing, strongly multidisciplinary field of research, which expanded almost exponentially over the last 20 years, as illustrated by the rise in number of publications since the mid 90's compared to the period before. The book is intended for scientists and students of the marine sciences. As the book is crossing the boundaries between biology, geology, chemistry and physics, the main group of users will be the advanced students and professionals with a keen interest in the fascinating and exciting world of Cold Water Coral (CWC) research.

Before diving into the various more specialistic fields making up the body of the book,it opens with a (short) chapter on the history of CWC research which dates back to the mid 18th century notes on corals in a book by the Reverend Poppidan, Bishop of Bergen, Norway, published in 1752. This chapter not only provides a fast overview on important steps and pioneer scientists of CWC research, notably in the UK and USA, but also highlights the modern research approaches and technology implied currently in CWC studies. A forward looking glance is offered by a short section on new and future technologies to be applied, especially the use of 3D seabed mapping and application of seabed observatories allowing long time, in – situ monitoring and measurement of parameters and observations in real time.

A practical tool used throughout the book is the inclusion of topical boxes, 12 in total, each outlining a specific approach, technology or background data (these boxes are outlined which separates them clearly from the surrounding texts), the first giving a fast introduction to seabed mapping with sound. The accompanying illustration would have gained quality and clearness however, if it had been printed in colour, rather than the current grey tones.

The following well written and nicely composed chapter describes the essentials of CWC taxonomy. In a series of (mostly very small, if not too small) maps the global distribution of the main CWC species s illustrated. This chapter is further accompanied by a number of very nice hand drawings, depicting individual coral details and colonies. Unfortunately, the source or author of these drawings is not presented or named in the adjoining figure captions. Following the taxonomy, a relatively short section is devoted to environmental controls on cold water coral distribution.which to my surprise did not include any referenceto laboratory experiments carried out over the last few years. The role and importance of temperature , food, oxygen and currents are lightly touched in relation to distribution, and some examples of settings on seamounts and continental slopes (mainly in the Pacific Ocean)are given, complemented with an extensive Table providing depth ranges of families and number of deepwater species in that range . The following sections deal with global CWC biodiversity,phylogeny, linkages and connectivity, the latter fields in strong development and therefore carefully presented and illustrated, as well as complemented with well composed topical boxes addressing the principles of PCR (Polymerase Chain Reaction)and the basics of population genetic principles.

The exciting developments in the basic understanding of cold water coral biology over the last decade are presented in the (extensive) chapter on biology, which opens with a well written introduction of anatomy of, and the differences between the various coral orders. This is followed by a short treatment of morphology, and an extensive section on food supply and nutrition The latter surprisingly, starts with a rather long discussion of the role of gas seeps and the hydraulic theory (initially presented by Martin Hovland in the mid 90's). This section draws on the stable isotope ratios of carbon in both skel-

etons and coral tissue as a way to define possible influence of methane seeps and/or hydrocarbon flows. The principle of stable isotope ratios is condensed in a topical box for easy understanding. Next the role of hydrography in association with CWC, such as Taylor columns and Ekman drainage is sketched, with an emphasis on NE European examples. Surprisingly little attention is given here to results of (sub)recent seabed lander studies. Food and food particles pathways form the body of thenext section, which is quite extensive and well treated.

As a result of all these above sketched processes, inevitably growth of CWC takes place and consequently the growth and growth rates of individual species is discussed, including the pitfalls of linear extension versus radial thickening or height of colonies above the seabed. This section is accompanied by an excellent Table providing info on species and depth, growth rates and growth parameters each supported by the proper references. Growth bands and chronologies are given next, with some discussion of dating limitations and problems, followed by a section on longevity and carbon sources (and inclusion in skeletons of CWC),paving the way for the next chapter on Reefs and mounds. However, a good (be it relatively quite lengthy) section on ecophysiology is presented followed by reproduction, larval biology and dispersal mechanisms, the latter opening with the remark that our understanding of reproductive ecology of cold water corals is in its infancy and just starting to develop, while also little is known of larval biology and dispersal potential. Knowledge of these is considered essential for designing meaningful marine protected areas to ensure long term conservation.

The chapter on reefs and mounds opens with a short deliberation on the interactions between organisms and sedimentary environments. Reef initiation and development is outlined, with some discussion on reef development cycles and processes. Sections on reef sedimentation, matrix sediments and deposits are supported by a topical box presenting a classification of limestones and criteria used and are followed by a short section on classification of (geological) reef and reef forms, also complemented with a topical box on structural classification of cold water coral reefs.

These sections form the precursor toa rather extensive discussion on carbonate mound terminology, meaning and development, the latter with a strong, almost exclusive emphasis on the studies done in the Porcupine Bight over the last decade, inclusive of the IODP Challenger mound drilling the results of which arehighlighted as case study in a box . However, spreading of this case study box over 5 pages reduces thepotential intent of providing a fast overview!The mound development section is composed by short contributions dealing with mound initiation, mound growth and accumulation rates and with a discussion of climate controls on mound growth, showing that (in the NE Atlantic) a mound represents several reef sequences in a stacked pattern,with reef growth halted in glacial periods.However, in the lower latitudes Lopheliapertusa appears to grow preferentially during glacial periods, and in the NW Atlantic seamounts off New England D. Dianthus is found more abundant in glacial periods. The well presented overview of diagenetic processes shows that this field is studied only to a limited extent, for example the role and importance of within mound organic matter decay is only poorly known and effects so far little understood. A short discussion on late stage mound development and burial by sediment drift deposits-sadly enough exclusively related to Porcupine Bight examples, precedes a discussion of mound morphology features addressing mound shapes and dimensionsThe chapter ends with a map and description of the currently known, (admittedly underestimated) global distribution of coral carbonate mounds and gives way to the treatment of the importance of cold water corals for habitat forming, their ecology and significance as local hot spots of biodiversity.

This chapter sets in with a topical box that shortly outlines the meaning and consideration of biodiversity concepts, followed by considerations concerning the history, use and application of terminology implied in considering a “habitat”, correctly discriminating habitat and facies. Once clarified, the terms are used to describe reefs (supported by a case study box highlighting the Sula Ridge, Norway) and Gorgonian forests and coral gardens with examples from Atlantic Canada and a case study example of the Aleutian Island coral gardens. These are nicely illustrated with artists’ drawings emphasising these complex coral habitats. Biodiversity estimates, mega-, macro- and meio-faunal and microbial diversity aspects of coral habitats are presented followed by discussion on seamounts, endemism and the possible presence of refugia. This interesting chapter is then continued with a summary of species interactions (such as symbiosis) and the relationship to fish assemblages. The chapter concludes with a highly interesting discussion on habitat modeling and especially, on predictive habitat modeling, a tool which is in strong development and may lead to surprising detailed maps (down to species level) that can be used be used for conservation measures.

The next chapter, on Paleontology puts the cold water corals in a temporal perspective by considering and discussing the fossil record of calcified Scleractinia, to clarify their early evolution and phylogeny and to provide a unified theory for their origin, starting with the Triassic. This section includes an account of the effects of the Permo-Triassic extinction event that wiped out over 90 % of marine species, showing that ecosystem recovery only took place during the Mid Triassic and showing that in this period the global carbonate and carbon cycle was significantly perturbated. Effects on Scleractinia are shortly sketched and lead to interesting thoughts and observations on the importance of calcification for skeletal composition and considerations about variations in seawater chemistry affecting skeleton construction, illustrated with the Sandberg curve showing changes in calcitic and aragoniticbiomineralisation over time. A parallel is sketched with present day developments of high(er)ocean acidity and enhanced levels of oceanic CO2 in the oceans. Then development of a-photic bioherms in the Early Jurassic is introduced, development of deep water coral thickets in the Cretaceous followed by the dramatic mass extinctions at the Cretaceous Tertiary boundary causing loss of 45 % of Scleractinian coral species and a surprisingly fast recovery within 4Million Years. Next follows the development and demise of other groups (Dendrophylliidae, Oculinidae, Caryophylliidae),noting that the majority of modern cold water corals appeared during the Cretaceous, at the latest by the early Cenozoic, with a likely link for their development to the onset of glaciations, including cyclic changes of climate and ocean currents. In the following parts of this chapter the taphonomy, coral framework growth and breakdown, and preservation of associated fauna is discussed in length.

The following chapter puts the corals in their paleoceanographic perspective by presenting a good overview of calcification processes and seawater carbonate chemistry (in topical box), by showing effects of incorporation of C and O isotopes

in coral carbonate skeletons and by providing a detailed account of biomineralisation and its governing conditions and parameters. Tracing past seawater temperature records through application of various methods (oxygen/carbon isotope ratios, Mg/Ca ratios, Sr/Ca ratios) allows detailed reconstruction of past watermass and ventilation histories. More recent work includes tracing of past pollution and sea water nutrient chemistry on the basis of incorporation of either isotopes or elements (P, Ca) in the skeletons of cold water corals. This field is in strong development.

The book ends with a chapter considering (human)impacts such as trawling, oil and gas recovery, cable and pipe line laying, mining, climate change and coral collection upon cold coral ecosystems and sadly enough, inevitably one comes to the recognitionthat the unique and beautiful cold water coral ecosystems treated and described in detail in the preceding chapters are in danger, that they deserve and need immediate conservation and protection measures. Someexamples of government enforced control and monitoring of marine protected areas are presented in topical boxes; these are shown to be directly effective in maintaining and guarding closed areas. Measures to prevent damage by man-made activities by UN and EC agencies are addressed in some detail, and have already been implemented by some countries such as USA, Norway, Ireland and England. At the end, the contents of the book come together in the recognition that “the intricate and complicated ecosystems of the deep sea, the largest environment on planet earth are too often out of sight and out of mind” while “we owe to future generations to conserve and protect the natural world”. This is more than convincingly demonstrated for the Cold Water Corals.

Prof. Dr. Tjeerd C.E. van Weering [Tjeerd.van.Weering@nioz.nl]

International Summer School (ISSAOS) 2011 TERRESTRIAL ATMOSPHERE AND COSMIC RAYS - (Course)

05/09/2011 - 08/09/2011 - Assergi (L'Aquila) - ITALY

First announcement: general information

The 11th edition of the International Summer School on Atmospheric and Oceanic Sciences (ISSAOS 2011), has been organized by the CETEMPS (Center of Excellence for the Forecast of Severe Weather by Remote Sensing and Numerical Modelling) in collaboration with the Italian National Institute for Nuclear Physics (INFN), and will cover the recent developments in the understanding of the cosmic rays – terrestrial atmosphere interactions.

The ISSAOS 2011 will provide a series of lectures on the following topics: Fundamentals of terrestrial atmospheric physics; Fundamentals of cosmic rays physics; Cosmic rays induced ionization effects on cloud formation and atmospheric chemistry; Atmosphere as a calorimeter for the detection of cosmic rays; Cosmic rays and climate.

The participants will benefit of the guidance of highly qualified senior researchers:

- Dr. Dimitra Atri , University of Kansas,
- Prof. Paolo Privitera, University of Chicago,
- Prof. Vitaliy Rusov, Odessa National Polytechnic University,
- Prof. Nir J. Shaviv, The Hebrew University of Jerusalem,
- Prof. Henrik Svensmark, Danish Space Research Institute,
- Prof. Guido Visconti, Cetemps, Università Degli Studi dell'Aquila,
- Prof. Lawrence Wiencke, Colorado School of Mines,
- Prof. Fangqun Yu , State University of New York.

There will be wide opportunities for interdisciplinary approaches to facilitate the communications and scientific exchanges among these different communities, in order to enhance the coordination of specific scientific efforts and advocate for a common view of major scientific needs and priority areas for the future. A guided tour to the National Laboratories of Gran Sasso (LNGS) is also scheduled. Visit our website for further details on topics, registration and other information: http://cetemps.aquila.infn.it/issaos

DEADLINE FOR REGISTRATION BY BANK TRANSFER: 10 AUGUST 2011.

We look forward to see you in L'Aquila in September.

Organizer:

Laboratori Nazionali del Gran Sasso, organizing committee email: issaos@aquila.infn.it, SKYPE: ISSAOSaquila, FACEBOOK: ISSAOS (group)

http://cetemps.aquila.infn.it/issaos

Vincenzo Rizi
CETEMPS/Dipartimento di Fisica - Università Degli Studi dell'Aquila
Via Vetoio Località Coppito - 67010 L'Aquila Italy
mobile +39 3666802761
Tel. +39 0862 433083
FAX +39 0862 433089
email: vincenzo.rizi@aquila.infn.it
URLs: http://cetemps.aquila.infn.it/
http://www.fisica.aquila.infn.it/
http://www.ing.univaq.it/main/rubrica.php

48th Oholo Conference – Emerging Remote Sensing Techniques and Assoc. Modeling for Air Pollution - (Meeting)

06/11/2011 - 10/11/2011 - Eilat, Israel

The meeting is part of IIBR annual OHOLO conferences, which are varied in their topics from year to year. This year meeting is planned to be held on 6-9 of November in Eilat, a beautiful resort town located in the southern part of Israel on a shore of Red Sea.

The conference topics will include:

- Detection and mapping gaseous and aerosol plumes
- Aerosol measurement and characterization
- Atmospheric parameters profiling and retrieval
- Model development and validation using remote-sensed data
- Assimilation of remote-sensed observations in numerical models
- Field campaigns and test-beds
- Networks and Sensor fusion

The website of 48th OHOLO Conference is now activated and it contains all information, as well as registration and abstract submission forms.

Organizer:

FW: 48th Oholo Conference – Emerging Remote Sensing Techniques and Associated Modeling for Air Pollution Applications – Eilat, Israel November 6-10, 2011

IIBR, Israel

http://www.oholoconference.com

Dr. Dorita Rostkier-Edelstein
IIBR, Israel
doritar@iibr.gov.il

Arctic Frontiers 2012 - Energies of the High North – Call for Papers - (Meeting)

22/01/2012 - 27/01/2012 - Tromsø, Norway

The Arctic Frontiers (AFT) conference is a central arena for discussions of arctic issues. The conference brings together representatives from science, politics, and civil society to share perspectives on how upcoming challenges in the Arctic may be addressed to ensure sustainable development.

Arctic Frontiers (AFT) holds its 6th annual conference in Tromsø from 22-27 January 2012, Norway, with the title "Energies of the High North". Arctic Frontiers 2012 will discuss the global energy outlook, and assess the potential of traditional and renewable energy resources in the North.

Arctic Frontiers is composed of a policy section and a scientific section. This call for papers addresses only the scientific

section from January 25th to January 27th 2012.

The parallel sessions address 4 connected, interwoven and interdisciplinary themes:

1) Arctic Geology, Hydrocarbon Reservoirs & Gas Hydrates.
2) Technological development & Environmental challenges.
3) Social, political and economic aspects of energy projects in the High North.
4) Renewable and Alternative Energy.

Interested scientists are invited to submit abstracts to one of these four sessions for both oral and poster presentations.

Deadline for submission of abstracts: October 24th 2011.

For more information, download the complete Call for Papers and the abstract submission form on the AFT homepage.
http://www.arcticfrontiers.com/

10th International Conference on Southern Hemisphere Meteorology and Oceanography (ICSHMO) - (Meeting)

23/04/2012 - 27/04/2012 - Noumea, New Caledonia

In this conference, there will be a session of particular interest to the ocean colour community "Climate Change on the Southern Hemisphere" by Robert Frouin (Scripps Institution of Oceanography, San Diego, USA) and Jens Kruger (SOPAC, SPC, Nadi, Fiji).

The ocean and atmosphere of the Southern Hemisphere have undergone substantial changes in the past half century. These include rising atmospheric carbon dioxide levels, ozone losses, higher aerosol concentrations, increasing surface temperatures, shifts in circulation patterns, decreasing ocean pH, and retreating Antarctic sea ice. This session will address, via observations and/or modeling, trends in the physical and biological environment, the causes and mechanisms responsible for the observed changes, the effects on weather, currents, biogeochemical cycles, and ecosystems, the various feedbacks and linkages, and the prediction of future impacts for projected scenarios of climate change.

Abstract submissions will open on June 15th.

http://www.colloque.ird.fr/icshmo-2012/

26th International Laser Radar Conference (ILRC 26) - (Meeting)

25/06/2012 - 29/06/2012 - Porto Heli, Peloponnesus, Greece

For 44 years now, the International Laser Radar Conference (ILRC) traditionally remains the world recognized venue where scientists and engineers from all over the world working in the field of the optical remote sensing applied to the atmospheres of earth and other planets and the oceans, meet together to report on new results and developments and obtain a comprehensive and state-of-the-art knowledge at a vast range of topics (technology, devices, applications, education) associated with the laser radar (lidar) technique. Additionally, ILRC remains an enjoyable and stimulating meeting at which the international lidar community can get together to discuss and even argue over controversial topics and future directions. A primary focus of the Conference is to encourage young scientists to attend and present work, ensuring the vitality of the field of laser remote sensing.

Recent ILRC Conferences reported on an increased research activity in areas such as space-based lidars, advances in lidar components and techniques, co-analysis of data from ground-based and airborne/space-borne lidars coupled with other data from ground or airborne/space-borne sensors, studies of the atmospheric dynamics and structure, middle and upper atmosphere physics and chemistry, measurements of atmospheric parameters (density, temperature, humidity, winds, turbulence etc.), measurements and characterization of climate-change and air pollution related aerosols, clouds and trace gases, and finally on the spread of lidar network activities throughout the world and assimilation of observations into forecast models.

The 26th International Laser Radar Conference (ILRC 26) will be held at Porto Heli, Peloponnesus, Greece on June 25-29, 2012.

At its 44 year anniversary, we believe that ILRC, in addition to serving its traditional role as a venue for presentation of recent results, should actively address the state and future of laser remote sensing. Consequently we will develop a program that will make use of invited talks and conference themes to describe current and future needs for atmospheric, earth and ocean measurements, present emerging technologies and platforms that promise to increase the impact and application of laser remote sensing, discuss the deployment of lidars, as part of multi-dimensional, multi-sensor observation networks and show examples and ideas on the analysis and assimilation into models of multi-parameter, geographically extensive data sets. Additionally, specific issues such as the lidar applications in Climate Change, as well as historical building restorations and lidar educational activities will be encouraged.

This time the Conference goes "green" aiming at reducing its environmental effect (carbon footprint) through a series of actions and implementations and ideas to be " taken away at their home" by the participants.

The Conference is held biennially under the oversight of the International Coordination-group for Laser Atmospheric Studies (ICLAS - International Coordination group for Laser Atmospheric Studies), of the International Radiation Commission (IRC). The 2012 Conference will be co-hosted and supported by the National Technical University of Athens and the Aristotelian University of Thessaloniki, Greece. It is also supported by the European Space Agency (ESA), the National Aeronautics and Space Administration (NASA) and many national and international partners and agencies.

Co-Chairmen
Assoc. Prof. Dr. Alex PAPAYANNIS
Laser Remote Sensing Unit (LRSU)
Physics Department
National Technical University of Athens (NTUA)
Athens 15780, Greece

Email: apdlidar@central.ntua.gr
Website: http://www.physics.ntua.gr/~papayannis/

Assoc. Prof. Dr. Dimitrios Balis
Laboratory of Atmospheric Physics (LAP)
Aristotelian University of Thessaloniki (AUTH)
54124 Thessaloniki, Greece
Email: balis@auth.gr
Website: http://lap.physics.auth.gr/index.asp?lang=en

http://ilrc26-2012.gr/mdlcms/index.php

Circum-Antarctic Ridges: InterRidge International Workshop - (Meeting)

28/09/2011 - 30/09/2011 - Observatoire Midi-Pyrenees

The Circum-Antarctic Ridges InterRidge Workshop will aim at:

Reviewing the state of the art of the research on Circum-Antarctic ridges

Reviewing important scientific issues covering geosciences to biology

Reviewing the latest tools and technical possibilities which can allow work in these challenging latitudes

Encouraging a collaborating effort between various IR countries to address these specific issues

Forming an IR Working group on Circum-Antarctic ridge research

Deadline for abstracts: 4 Sept 2011
Deadline for registration: 11 Sept 2011

Field excursion on 28 Sept to lherzolites at Etang de Lers, French Pyrenees Further details and registration at: http://www.interridge.org/circum_antarctic. Some funding is available for students and early-career scientists – please apply via the registration form by 31 August 2011.

Organizer:
Dr Anne Briais
Observatoire Midi-Pyrenees
14 Edouard Belin
Toulouse
France

http://www.interridge.org/circum-antarctic

Dr Debbie Milton
National Oceanography Centre, Southampton
european Way
Southampton SO14 3ZH
UK

InterRidge: Third Decadal Plan 2014-2023 - (Meeting)

03/12/2011 - 03/12/2011 - San Francisco, USA

The InterRidge Office warmly invites all to a discussion meeting on InterRidge's Third Decadal Plan 2014-2023. We have planned a full discussion day to identify the science challenges for mid-ocean ridge research in the next decade. We will be asking participants to identify priorities in research and to propose how InterRidge can enable new scientific goals to be met.

Registration Deadline: 21 November 2011

Meeting details: Parc 55 Wyndham Hotel, 55 Cyril Magnin Street, San Francisco
Enquiries to Debbie Milton: coordinator@interridge.org

Organizer:

Dr Debbie Milton
National Oceanography Centre, Southampton
European Way
Southampton SO14 3ZH
UK

http://www.interridge.org/third_decade

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European Way - Southampton SO14 3ZH - UK

Ocean Mantle Dynamics: From Spreading Center to Subduction Zone - (Meeting)

02/10/2011 - 06/10/2011 - Tokyo, Japan

In this meeting, we focus on three objectives of crustal and mantle imaging, with an emphasis on mantle dynamics:

1) the structure of oceanic lithosphere (including the crust and sub-crust) and asthenosphere

2) melt migration beneath the spreading axis to form oceanic crust

3) the role of water, especially for subduction and back-arc spreading dynamics.

Important Dates
Field trip deadline: 3 September, 2011
Registration deadline: 10 September, 2011
Abstracts for poster presentations deadline: 10 September, 2011

Organizer:
Dr Nobukazu Seama
http://ofgs.aori.u-tokyo.ac.jp/intridgej/WS_2011/

Dr Debbie Milton
National Oceanography Centre, Southampton
European Way - Southampton SO14 3ZH - UK

Fifth Korea-Japan-China Joint Conference on Meteorology - (Meeting)

24/10/2011 - 26/10/2011 - Busan, Korea

The Local Organizing Committee (LOC) of Korea-Japan-China Joint Conference, Korean Meteorological Society extends a warm welcome to all participants in Joint Conference on Meteorology, which will be held in BEXCO, Busan, Korea from 24 to 26 October 2011.

This conference will bring an opportunity to strengthen the mutual cooperation and friendship in the field of the Atmospheric Science on the basis of equal benefits, organization of regional activities, and active dissemination of the activities of the meteorological societies of Korea, Japan, and China to the world community. Therefore, we are honored to host such a significant conference in the beautiful seaside metropolitan city of Busan, Korea.

Abstract closing date: August 31, 2011

Organizer:
Korean Meteorological Society
Meteorological Society of Japan
Chinese Meteorological Society

Hosted by:
Local Organizing Committee (LOC) of Korea-Japan-China Joint Conference, Korean Meteorological Society

http://www.komes.or.kr/5th-kjc-jcm-2011/index.html

8th International Conference on Urban Climate – ICUC 8 and 10th Symposium on the Urban Environment - (Meeting)

06/08/2012 - 10/08/2012 - Dublin, Ireland

The International Association for Urban Climate (IAUC) and the American Meteorological Society (AMS) Board of the Urban Environment (BUE) warmly invite you to the joint 8th International Conference on Urban Climate (ICUC8) and AMS 10th Symposium on the Urban Environment to be held in Dublin, Ireland from August 6–10, 2012. These meetings are preeminent events for the presentation of research on the urban climate effect at all scales and have set important benchmarks for the development of the field. The aims of this joint conference are to provide an international forum where the world's urban climatologists can discuss modern developments in research, and the application of climatic knowledge to the design of better cities.

Closing Date for Submissions of Abstracts December 31, 2011.

http://www.icuc8.org/

HydroPredict2012, Internat. Conference on Predictions for Hydrology, Ecology, and Water Resources - (Meeting)

24/09/2012 - 27/09/2012 - Vienna, Austria

HydroPredict2012 Scope

Water resources systems being the main link between the people and the climate are affected by human activities (such as land use change) and impacts originating from climate change. Thus, any assumption related to stationarity of the water resources system characteristics is highly questionable, maybe not valid any more. Usually we conclude that direct human interventions into the water cycle are mostly observable at the small catchment scale while the climate change impacts dominate at the large catchment scale. However, there are examples where the previous statement becomes questionable – impacts in large basins like the Aral Sea, the Tchad, and the Nile are caused by water management practices, while the hydrology of small high Alpine catchments with major contributions from glacier runoff is predominantly affected by climate change, with human impacts being relatively small.

HydroPredict2012 Objectives

The objectives of HydroPredict2012 conference are:

(i) to present tools and methods which assist in assessing and discriminating between human and climate change induced impacts on water resources;

(ii) to discuss the predictive capability of simulation models used for water resources issues, including the model output uncertainty,

(iii) to present tools and methods for adaptation to changing global conditions;

(iv) to address water management strategies and other issues to reduce vulnerability and to increase the resilience of water resources systems; and

(v) to analyze the role of water resources within the complex social-economic-climatic system.

Organizer:

1) Universität für Bodenkultur Wien (BOKU), University of Natural Resources and Life Sciences, Vienna, Austria

2) International Commission on Groundwater (ICGW), of the International Association of Hydrological Sciences (IAHS)

3) Charles University, Prague, Czech Republic

http://web.natur.cuni.cz/hydropredict2012/

Karel Kovar, PBL Netherlands Environmental Assessment Agency, PO Box 303, 3720 AH Bilthoven, The Netherlands

Ocean Sciences Meeting - (Meeting)

20/02/2012 - 24/02/2012 - Salt Lake City, Utah, USA

We encourage you to submit abstracts to our session at the upcoming Ocean Sciences Meeting in Salt Lake City February 20-24, 2012. Much of the ongoing work with GOCI, HICO and planning for GEO-CAPE would be very appropriate for this session (http://www.sgmeet.com/osm2012).

Remote Sensing of the Coastal Ocean using Hyperspectral and Geostationary Satellite Imagers (Session 121)

Curtiss O. Davis, (OSU), Yu-Hwan Ahn, (KORDI), Jeffery Bowles (NRL-DC) and Robert Arnone (NRL-DC).

The coastal ocean is one of the most valuable and over-utilized resources on the earth. Over a quarter of the World population live in the coastal zone and the coastal ocean is heavily impacted by urban and agricultural runoff, overfishing, transportation, oil and gas production and many other uses. The coastal ocean is also optically complex with plankton blooms and coastal runoff and highly dynamic driven by tides and diurnal winds. Two new approaches are now available to address these issues; hyperspectral imaging to resolve the optical complexity of the coastal ocean and imaging from geostationary satellites to resolve the temporal dynamics. The Hyperspectral Imager for the Coastal Ocean (HICO) was launched in September 2009 and operates on the International Space Station. The first geostationary ocean color radiometer the Korean Geostationary Ocean Color Imager (GOCI) was launched in June of 2010. This session invites presentations on the processing and analysis of HICO and GOCI data, on science conducted in preparation for future hyperspectral or geostationary imagers and on plans and designs for those instruments.

http://www.sgmeet.com/osm2012

Biogeosciences-Academic

Post-Doc: Carbon cycling in central forest of Africa (DR Congo)

Company: Laboratory of Applied Physical Chemistry – Ghent University
Location: Belgium and DR Congo-Gent and Kisangani
Date Posted: 07/07/2011
[show details...]

Interdisciplinary / Other-Academic

Postdoctoral researcher

Company: Laboratory of Applied Physical Chemistry – Ghent University
Location: Belgium-Gent
Date Posted: 25/08/2011
[show details...]

Ocean Sciences-Academic

BOUSSOLE Post-doctoral positions/Plankton phenology session at Ocean Sciences 2012

Company: CNRS/INSU
Location: France-Villefranche-sur-Mer
Date Posted: 16/09/2011
[show details...]

Planetary and Solar System Sciences-Academic

Two tenure-track positions in planetary sciences

Company: Polish Academy of Sciences, Institute of Geological Sciences
Location: Poland-Wroclaw
Date Posted: 01/09/2011
[show details...]

Planetary and Solar System Sciences-Academic

4 PhD grants in planetary sciences

Company: Polish Academy of Sciences, Institute of Geological Sciences
Location: Poland-Wroclaw
Date Posted: 01/09/2011
[show details...]

Atmospheric Sciences-Academic

PhD and a post-doc position within the ERC project MODES

Company: University of Ljubljana
Location: Slovenia-Ljubljana
Date Posted: 06/09/2011
[show details...]

Climate-Academic

ASSISTANT PROFESSOR OF REGIONAL CLIMATE CHANGE MODELING

Company: The Department of Land, Air and Water Resources and the College of Agricultural and Environmental Sciences, University of California, Davis
Location: USA-Davis, California
Date Posted: 16/09/2011
[show details...]

Atmospheric Sciences-Academic

PhD student position on the ESA-funded project at the Univeristy of Ljubljana

Company: University of Ljubljana
Location: Slovenia-Ljubljana
Date Posted: 19/09/2011
[show details...]

Atmospheric Sciences-Academic

A two-year postdoc position in regional climate modeling at Uni Bjerknes Centre

Company: Uni Research
Location: Norway-Bergen
Date Posted: 26/09/2011
[show details...]

Interdisciplinary / Other-Other

Applied Mathematician or Physicist

Company: British Antarctic Survey
Location: United Kingdom-Cambridge
Date Posted: 27/09/2011
[show details...]

More details on these jobs can be found online at www.the-eggs.org (click on the button "Job Positions" on the left). Job positions online are updated twice a week.