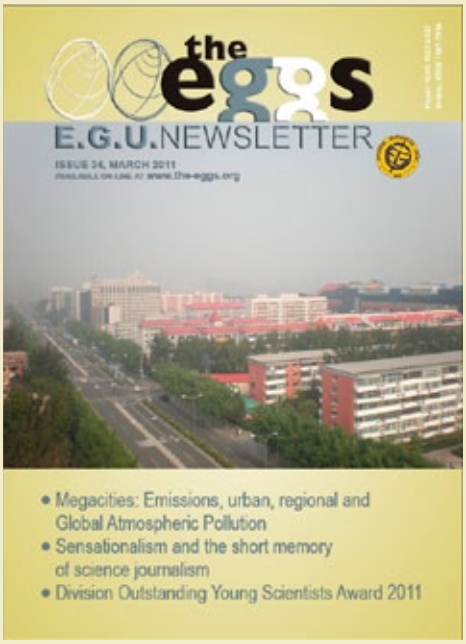
the eggs

E.G.U. NEWSLETTER

Paper: ISSN 1027-6343
Online: ISSN 1607-7954

ISSUE 34, MARCH 2011
AVAILABLE ON-LINE AT www.the-eggs.org

- Megacities: Emissions, urban, regional and Global Atmospheric Pollution
- Sensationalism and the short memory of science journalism
- Division Outstanding Young Scientists Award 2011



THE EGGS | ISSUE 34 | MARCH 2011

This photo was taken on 17 October 2008 from the roof of the Institute of Atmospheric Physics - IAP located in Beijing, China. We can see a view of the city with the famous stadium `Bird`s Nest` scarcely visible through Beijing`s polluted sky. It is quite amazing how the sky turned from very clear (16/08) to hazy (17/08) in one day. Image credit: A. Georgoulias. Distributed by EGU via www.imaggeo.net

New staff member at the EGU Office in Munich

first Science Communications Postdoctoral Fellow

Jennifer Holden has recently started work at the EGU Office in Munich as the EGU's first Science Communications Postdoctoral Fellow. She recently completed her PhD at King's College in London on Environmental Hazards (heavy-metal contamination). Her responsibilities at the EGU Office include outreach to young scientists and co-ordinating the Union's social media activities. Jennifer is the main author of the official EGU General Assembly Blog (egu2011.wordpress.com) and twitter feed (@egu2011).

EGU Office

EGU Election Autumn 2010

results

The EGU Election Autumn 2010 for the next Treasurer as well as for the next Division Presidents was closed on 01 December 2010. In total, we received 1510 ballot papers. The results are as follows:

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EGU Treasurer for the term 2011–2013: Roland Schlich

EGU Division Presidents for the term 2011–2013:
- Atmospheric Sciences (AS): Oksana A. Tarasova
- Biogeosciences (BG): Gert-Jan Reichart
- Climate: Past, Present & Future (CL): Denis-Didier Rousseau
- Cryospheric Sciences (CR): G. Hilmar Gudmundsson
- Earth Magnetism & Rock Physics (EMRP): Georg Dresen
- Earth and Space Science Informatics (ESSI): Stefano Nativi
- Energy, Resources and the Environment (ERE): Michael Kühn
- Geochemistry, Mineralogy, Petrology & Volcanology (GMPV): Nicholas Arndt
- Geodesy (G): MarkkuPoutanen
- Geodynamics (GD): J. Huw Davies
- Geomorphology (GM): Andreas Lang
- Geosciences Instrumentation and Data Systems (GI): Walter Schmidt
- Hydrological Sciences (HS): Gerrit H. de Rooij
- Natural Hazards (NH): Stefano Tinti
- Nonlinear Processes in Geosciences (NP): Hendrik A. Dijkstra
- Ocean Sciences (OS): Bernard Barnier
- Planetary and Solar System Sciences (PS): Athena Coustenis
- Seismology (SM): Charlotte Krawczyk
- Stratigraphy, Sedimentology and Palaeontology (SSP): Darren Gröcke
- Soil System Sciences (SSS): ArtemiCerdà
- Solar-Terrestrial Sciences (ST): Norma B. Crosby
- Tectonics and Structural Geology (TS): FabrizioStorti

All these new council members will be inaugurated during the next EGU plenary meeting 4 April 2011 in Vienna, Austria (see http://meetingorganizer.copernicus.org/EGU2011/session/8792)

EGU Office

European Geosciences Union Honors Karin Labitzke

Vilhelm Bjerknes Medal to be awarded during the General Assembly in Vienna this April

05 January 2011.- The European Geosciences Union has announced that it is awarding a Vilhelm Bjerknes Medal to Karin Labitzke, a professor emerita at Freie Universität Berlin. The world-renowned scientist is being recognized for her lifetime achievements and in particular for her outstanding contributions to atmospheric research. The award ceremony will take place in April 2011 in Vienna.

Karin Labitzke, who was born in 1935, began studying meteorology and physics in 1953 at Freie Universität Berlin. She earned her doctorate in 1962 and in 1970 accepted an appointment at Freie Universität Berlin as a professor of meteorology of the stratosphere. She held this research and teaching position until her retirement in 2000. Karin Labitzke's research took her to Japan, China, and the United States. Her research focuses on the exploration of the stratosphere and the impact of the eleven-year sunspot cycle on the atmosphere.

Megacities: Emissions, urban, regional and Global Atmospheric Pollution

climate effects, and Integrated tools for assessment and mitigation (Project MEGAPOLI)

The EC FP7 Project MEGAPOLI brings together leading European research groups, state-of-the-art scientific tools and key players from non-European countries to investigate the interactions among megacities, air quality and climate. MEGAPOLI includes both basic and applied research, and bridges spatial and temporal scales connecting local emissions, air quality and weather with global atmospheric chemistry and climate.

Background

For the past few hundred years, human population has been clustering in increasingly large settlements. Urban areas with more than about 5 mln people are usually called megacities. In 2007, the world's urban population exceeded the rural. At present, there are about 30 cities worldwide with a population exceeding 7 mln inhabitants. These numbers are expected to grow considerably in the near future. In Europe there are several major centres that clearly qualify as megacities: London, Paris, the Rhine-Ruhr and Po Valley regions, Moscow, and Istanbul.

Our hypothesis is that megacities around the world have an impact on air quality not only locally, but also regionally and globally and therefore can also influence the climate of our planet. Some of the links of megacities, air quality and climate interactions have already been considered by previous studies and are reasonably well-understood. Better understanding and quantifying of these links and complete quantitative picture of the interactions is the focus of MEGAPOLI. The project addresses, at different levels, practically all major megacities around the globe.

Objectives

The main MEGAPOLI objectives are (i) to assess impacts of megacities and large air-pollution hot-spots on local, regional and global air quality, (ii) to quantify feedbacks among megacity air quality, local and regional climate, and global climate change, (iii) to develop improved integrated tools for prediction of air pollution in megacities.

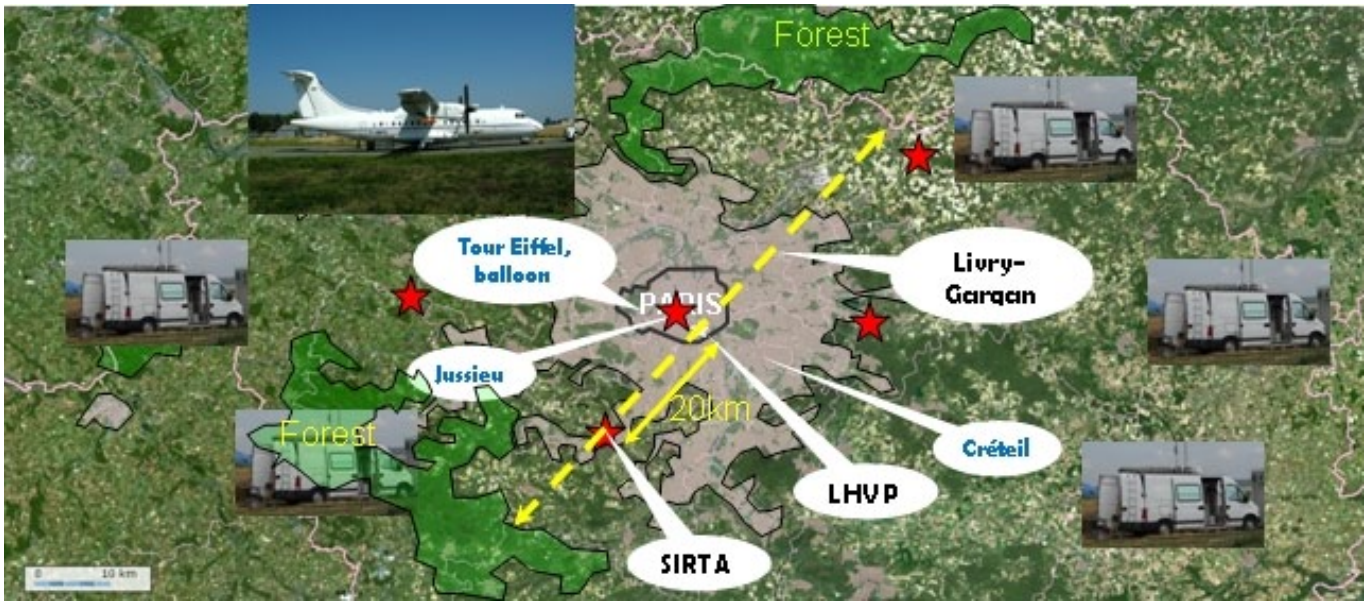

Figure 1: The MEGAPOLI Paris campaign design included 3 primary (in black) and 3 secondary (in blue) fixed ground measurement sites, an aircraft and 5 mobile platforms. Primary sites are devoted to aerosols and gas phase chemistry, secondary sites to active and passive remote sensing. A specific lidar network was set-up during the winter campaign at a central Paris site and at 4 cardinal points (red stars).

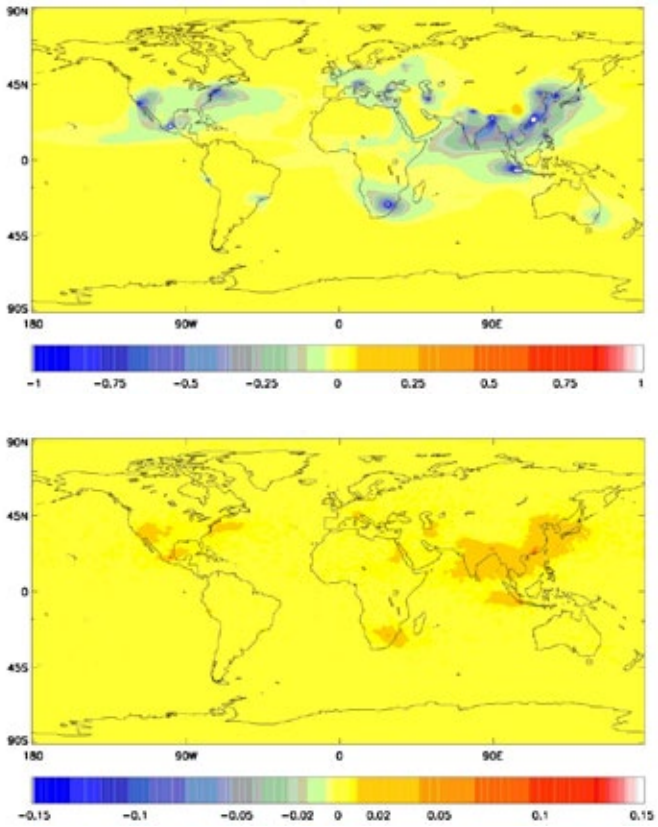

Figure 2: Global distribution of (upper panel) short-wave, SW all-sky and (lower panel) long-wave, LW clear sky - top-of-atmosphere (TOA) radiative forcing due to aerosols from megacities. Forcing is denoted in W/m2/. Contribution of UK Met Office.

Expected results

MEGAPOLI will lead to significant scientific results and innovations including:

(i) Integration of the interactions and processes affecting air quality and climate change on regional to global scales coupled with the capability of estimating the human, ecosystem and economic impact of air pollution resulting from megacities;

(ii) Development of an integrated European methodology and tools to assess the impacts within and from megacities on city to global scales;

(iii) Integration of ground-based, aircraft and satellite technologies with state-of-the-art modelling tools;

(iv) Integrated approaches for addressing the feedbacks and interlink ages between climate change and regional air quality related to megacities;

(v) Integration of knowledge and practical implementation of improved tools according to level of complexity to a range of megacities and hotspots;

(vi) Improved current and future emission estimates for natural and anthropogenic sources of air pollutants;

(vii) Development of an integrated assessment methodology for supporting EU and global policy frameworks. This will be achieved through the assessment of mitigation options and the quantification of impacts from polluted air-masses on larger scale atmospheric dynamics;

(viii) Examination of the important feedbacks among air quality, climate and climate change;

(ix) A robust, global information dissemination gateway on air quality, climate change and mitigation and policy options for European stakeholders strengthening the European Research Area.

Impact

The project is contributing to the strategic goal of promoting sustainable management of the environment and its resources. It will do this by advancing our knowledge on the interactions between air quality, climate and human activities related to large urban centres and hotspots. Megacities, constitute major sources of anthropogenic air pollution and hence affect the lives of hundreds of millions of people in the world directly by the quality of air that they breathe and through complex interactions resulting in climate change. Research within the project will lead to improved modelling and assessment tools. In particular, MEGAPOLI will formulate a European methodology for integrated air quality and climate assessment over multiple scales (urban to global).

Recent achievements

The main scientific results achieved during the first phase of MEGAPOLI include the following:

1. Two intensive measurement campaigns were performed around Paris during summer and winter month periods. The campaigns aimed at better quantifying primary and secondary organic aerosol (SOA) sources for a European megacity, and included 3 primary and 7 secondary fixed ground measurement sites, an aircraft and 5 mobile vans. More than 25 research laboratories participated. We found that the pollution plume was still well defined at more than 100 km downwind from the agglomeration, which gives a clear framework for later studying SOA build-up in the plume. Significant new particle formation events were frequently observed during the campaigns.

2. Prototype inventories for anthropogenic (base year 2005, 6 km resolution) and natural (e.g., fire, sea salt) emissions was compiled. For the 1st level megacities (Paris, London, Rhine-Ruhr area, Po Valley) high-resolution emission data have been collected, for integration with the final European scale emission map. An anthropogenic heat flux (AHF) model (0.25 x 0.25 arc-minute resolution) was developed and used to compute the AHF inventories for Europe and London.

3. A morphology database for Paris has been developed, along with a hierarchy of urban canopy and energy budget parameterisations for different scale models, which are being used to evaluate the surface flux balance modelling and urban features needed for climate and air quality models.

4. New physical and chemical parameterisations and zooming approaches have been implemented and are being tested for several megacities, providing information about the relative importance of the various parameterisations when examining megacity air quality and especially its relation to meteorology. Coupled ACT-NWP models with two-way feedbacks were used to classify meteorological patterns favouring development of urban air pollution episodes in European megacities. Urban aerosols were found to significantly affect several meteorological variables (temperature, inversion layers, radiation budget, cloud processes, precipitation, fog, etc.) in and far from the megacities due to the direct and indirect effects.

5. Substantial progress was made in developing and evaluating the satellite-based methods for the measurement of tro-

pospheric gases and aerosols, especially NO2, in and around megacities.

6. The radiative forcing from megacity emissions on the global scale was examined. Generally, megacities contribute about 2% to 5% of the total global annual anthropogenic emission fluxes for various compounds. Megacity pollutants were found to contribute a radiative forcing of +6.3±0.4 mW/m2 from an increase in the ozone burden, while the impact on CH4 contributes a forcing of -1.0±0.5 mW/m2. The aerosol forcing from megacity pollutants amounts to -8.0±1.6 mW/m2 under present-day conditions.

7. Progress has been made on producing a European framework for online and offline coupling of meteorological and atmospheric chemical transport models.

For more information, please visit the website: http://megapoli.info

EC contribution: 3,398,989 €
Duration: 36 months
Starting date: 01/10/2008
Partners: Danish Meteorological Institute (Denmark), Foundation for Research and Technology, Hellas and University of Patras (Greece), Max Planck Institute for Chemistry (Germany), ARIANET Consulting (Italy), Aristotle University Thessaloniki (Greece), Centre National de Recherche Scientifique (incl. LISA, LaMP, LSCE, GAME, LGGE, SAFIRE) (France), Finnish Meteorological Institute (Finland), Joint Research Center (Italy), International Centre for Theoretical Physics (Italy), King's College London (UK), Nansen Environmental and Remote Sensing Center (Norway), Norwegian Institute for Air Research (Norway), Paul Scherrer Institute (Switzerland), TNO-Built Environment and Geosciences (The Netherlands), UK MetOffice (UK), University of Hamburg (Germany), University of Helsinki (Finland), University of Hertfordshire (UK), University of Stuttgart (Germany), World Meteorological Organization (Switzerland), Charles University Prague (Czech Republic), Institute of Tropospheric Research (Germany), University of Cambridge (UK)

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Sensationalism and the short memory of science journalism

Doron Nof and Nathan Paldor

on the recent media attention on results regarding the parting of Red Sea and the biblical Red-Sea crossing story

Several people, among them a few journalists, have contacted us recently asking in what sense is the recent work of Drews and Han (published in PLoSONE) on the parting of the Red-Sea any different than what we published in the Bulletin of the American Meteorological Society (BAMS) in 1992.

As discussed below, it turns out that there is hardly any scientific difference at all aside from

(i) the point that they used a numerical model whereas we derived a (more reliable) analytical solution, and

(ii) their difference in the location and wind direction.

The dynamics are exactly the same and so are the physical processes in question. The real difference between the two, and the reason for the broad attention that the Drews and Han paper received, is merely the fact that our work was published eighteen years ago. Some people, including science journalists, who should really know better, simply tend to forget or do not bother to check for details. One would hope that the media office of an organization like NCAR would have done better.

In what follows immediately below we address this issue in detail. In 1992, Nof and Paldor presented the first nonlinear analytical calculations addressing the parting of the Red-Sea. Using a steady model, they showed that strong winds acting on bodies of water as long and as shallow as the Gulf of Suez can cause a depression in the sea-level of 5 meters or more, exposing any underwater ridges that are shallower than that. Theoretically, such conditions may lead to the creation of a "land bridge" on which a limited number of people can cross from one side to the other. The ridge is again submerged when the wind subside. Nof and Paldor then imagined that some of the Israeli elders have seen this natural phenomenon, which then provided the origin for the biblical Red-Sea crossing story. Taking the bible as an assembly of stories transmitted from generation to generation with variations and distortions introduced in between, we were not concerned with a detailed matching of the theory to the biblical account, which we considered inaccurate anyway. The reader is referred to http://doronnof.net/red-sea.php for details.

Our work was later followed by the elegant mathematical analysis of Voltzinger and Androsov who derived an analytical solution for the time dependent problem showing the periods that the ridge can be exposed and/or submerged. Perhaps naively, Russian journalists writing in Pravda erroneously presented their work as the first scientific work on the subject.

Taking a more religious approach and attempting to duplicate the bible more accurately, Drews and Han tried to match the wind direction more closely, an issue that we considered marginal and insignificant. Nevertheless, we respect their choice to look at that aspect. Furthermore, we have no issue at all with Drews and Han because authors are not responsible for the manipulation that the media introduces to their work. Our point is that most of the contributions erroneously assigned to them by the NCAR media office were made much earlier in Nof and Paldor (1992).

To illustrate the above point more clearly, we marked the fifteen (15) points made by the NCAR press release on the original release, which is reproduced in the Appendix below. The most important point is point 15, which was also clearly made by us. Disturbingly, points 1, 3, 5, 7, 8, 12 and 13—more than half the points made in the NCAR press release— could and have been made about our earlier work.

In summary, it seems that, in their desire to sensationalize, the NCAR media office has re-invented the Parting of the Red-Sea in much the same way as one would re-invent the wheel. There are serious scientific issues with Drews and Han work too (e.g., the unacceptably small likelihood of 100 km/h winds according to the Weibull statistics, the conventional sea-level rise understanding of 1 millimeter per year suggesting that the areas that the authors are addressing were dry to begin with) but these are not the focus of this piece.

Appendix:

From: UCAR/NCAR Press Office <media@ucar.edu>
Date: September 21, 2010 11:38:24 AM EDT
To: local-pr@ucar.edu, press-release@ucar.edu
Subject: Physics of Red Sea escape route simulated on computers.

2010-24 FOR IMMEDIATE RELEASE: September 21, 2010

Parting the waters:

Computer modeling applies physics to Red Sea escape route

Contacts:
David Hosansky, NCAR/UCAR Media Relations
303-497-8611
hosansky@ucar.edu
Rachael Drummond, NCAR/UCAR Media Relations
303-497-8604
rachaeld@ucar.edu

Note to editors and producers:

Visuals available:
- broadcast-quality scientific animation
- broadcast-quality video of Carl Drews discussing this study
- high-resolution illustration

https://www2.ucar.edu/news/parting-waters-computer-modeling-applies-physics-red-sea-escape-route

BOULDER--The biblical account of the parting of the Red Sea has inspired and mystified people for millennia. A new computer modeling study by researchers at the National Center for Atmospheric Research (NCAR) and the University of Colorado at Boulder (CU) shows how the movement of wind as described in the book of Exodus could have parted the waters.

1) The computer simulations show that a strong east wind, blowing overnight, could have pushed water back at a bend where an ancient river is believed to have merged with a coastal lagoon along the Mediterranean Sea. With the water pushed back into both waterways, a land bridge would have opened at the bend, enabling people to walk across exposed mud flats to safety. As soon as the wind died down, the waters would have rushed back in.

2) The study is intended to present a possible scenario of events that are said to have taken place more than 3,000 years ago, although experts are uncertain whether they actually occurred. The research was based on a reconstruction of the likely locations and depths of Nile delta waterways, which have shifted considerably over time.

3) “The simulations match fairly closely with the account in Exodus”, says Carl Drews of NCAR, the lead author. “The parting of the waters can be understood through fluid dynamics. The wind moves the water in a way that’s in accordance with physical laws, creating a safe passage with water on two sides and then abruptly allowing the water to rush back in”.

4) The study is part of a larger research project by Drews into the impacts of winds on water depths, including the extent to which Pacific Ocean typhoons can drive storm surges. By pinpointing a possible site south of the Mediterranean Sea for the crossing, the study also could be of benefit to experts seeking to research whether such an event ever took place. Archeologists and Egyptologists have found little direct evidence to substantiate many of the events described in Exodus.

The work, published in the online journal, PLoS ONE, arose out of Drews’ master’s thesis in atmospheric and oceanic sciences at CU. The computing time and other resources were supported by the National Science Foundation.

Wind on the water

5) The Exodus account describes Moses and the fleeing Israelites trapped between the Pharaoh\’s advancing chariots and a body of water that has been variously translated as the Red Sea or the Sea of Reeds. In a divine miracle, the account continues, a mighty east wind blows all

night, splitting the waters and leaving a passage of dry land with walls of water on both sides. The Israelites are able to flee to the other shore. But when the Pharaoh\’s army attempts to pursue them in the morning, the waters rush back and drown the soldiers.

6) Scientists from time to time have tried to study whether the parting of the waters, one of the famous miracles in the Bible, can also be understood through natural processes. Some have speculated about a tsunami, which would have caused waters to retreat and advance rapidly. But such an event would not have caused the gradual overnight divide of the waters as described in the Bible, nor would it necessarily have been associated with winds.

7) Other researchers have focused on a phenomenon known as “wind setdown”, in which a particularly strong and persistent wind can lower water levels in one area while piling up water downwind. Wind setdowns, which are the opposite of storm surges, have been widely documented, including an event in the Nile delta in the 19th century when a powerful wind pushed away about five feet of water and exposed dry land.

8) A previous computer modeling study into the Red Sea crossing by a pair of Russian researchers, Naum Voltzinger and Alexei Androsov, found that winds blowing from the northwest at minimal hurricane force (74 miles per hour) could, in theory, have exposed an underwater reef near the modern-day Suez Canal. This would have enabled people to walk across. The Russian study built on earlier work by oceanographers Doron Nof of Florida State University and Nathan Paldor of Hebrew University of Jerusalem that looked at the possible role of wind setdown.

9) The new study, by Drews and CU oceanographer Weiqing Han, found that a reef would have had to be entirely flat for the water to drain off in 12 hours. A more realistic reef with lower and deeper sections would have retained channels that would have been difficult to wade through. In addition, Drews and Han were skeptical that refugees could have crossed during nearly hurricane-force winds.

Reconstructing ancient topography

10) Studying maps of the ancient topography of the Nile delta, the researchers found an alternative site for the crossing about 75 miles north of the Suez reef and just south of the Mediterranean Sea. Although there are uncertainties about the waterways of the time, some oceanographers believe that an ancient branch of the Nile River flowed into a coastal lagoon then known as the Lake of Tanis. The two waterways would have come together to form a U-shaped curve.

11) An extensive analysis of archeological records, satellite measurements, and current-day maps enabled the research team to estimate the water flow and depth that may have existed 3,000 years ago. Drews and Han then used a specialized ocean computer model to simulate the impact of an overnight wind at that site.

12) They found that a wind of 63 miles an hour, lasting for 12 hours, would have pushed back waters estimated to be six feet deep. This would have exposed mud flats for four hours, creating a dry passage about 2 to 2.5 miles long and 3 miles wide. The water would be pushed back into both the lake and the channel of the river, creating barriers of water on both sides of newly exposed mud flats.

13) As soon as the winds stopped, the waters would come rushing back, much like a tidal bore. Anyone still on the mud flats would be at risk of drowning.

14) The set of 14 computer model simulations also showed that dry land could have been exposed in two nearby sites during a windstorm from the east. However, those sites contained only a single body of water and the wind would have pushed the water to one side rather than creating a dry passage through two areas of water.

15) “People have always been fascinated by this Exodus story, wondering if it comes from historical facts”, Drews says. “What this study shows is that the description of the waters parting indeed has a basis in physical laws”.

Doron Nof (1) and Nathan Paldor (2),
1. Department of Earth, Oceans and Atmospheres, The Florida State University, Tallahassee, Florida, 32312.
2. Institute of Earth Sciences, The Hebrew University of Jerusalem.

Division Outstanding Young Scientists Award 2011

new EGU Division Award

recognizes scientific achievements in the field covered by the related Division, made by a young scientist.

The new Division Outstanding Young Scientist Award recognizes scientific achievements in the field covered by the related Division, made by a young scientist.

Division NP: Reik Donner currently works as a Research Associate in the Research Domain "Transdisciplinary Concepts and Methods" at the Potsdam Institute for Climate Impact Research. His scientific work is focused on the development of advanced nonlinear methods of time series analysis and their application to problems from different geoscientific disciplines (in particular, to climate-related questions) as well as other fields of applications. Recent research interests particularly include the development and utilization of complex network approaches for dynamical systems and time series analysis.

Division G: Thomas Hobiger received his M.Sc. and Ph.D. degrees in geodesy and geophysics from the Vienna University of Technology, Austria in 2002 and 2005, respectively. From October 2006 until September 2008 he worked at Kashima Space Research Center, National Institute of Information and Communications Technology (NICT), Japan as a JSPS fellow. In October 2008 he moved to NICT's headquarter in Tokyo and where he holds a tenured position since April 2010. His research interests include troposphere and ionosphere modelling, GNSS, Very Long Baseline Interferometry (VLBI), adjustment theory, software defined radio and high performance computing.

Division EMRP: Philip Benson is a Rock Physicist with diverse and multidisciplinary research interests ranging from Geophysics to Structural geology. In particular, his laboratory work on fluid induced seismicity in active volcanic areas has provided fresh insight into the physical processes that generate the unique and diagnostic seismic signals known as Low Frequency harmonic tremor and which are frequently detected prior to eruption. Philip is currently a Faculty member of the Geological Institute, ETH Zurich where he leads the Rock Deformation research group; moving the laboratory investigation of coupled processes to still higher pressures and temperatures, including magma rheology and dynamics, 'hydro'-fracture in deep geothermal systems, high strain and strain-rate processes, and deep seated earthquake seismicity.

Division GMPV: Istvan Kovacs research interests are water in nominally anhydrous minerals (NAMs), infrared spectroscopy, water and mantle metasomatism, evolution of the subcontinental lithosphere, geodynamics of the Carpathian-Pannonian region.

Division PS: Elias Roussos research focuses on the structure and the dynamics of the radiation belts of the outer planets (e.g. Jupiter and Saturn). I am especially interested in developing methods and tools to study the radiation belts by analysing the perturbations induced by the presence of planetary moons or rings within them. In addition, I am or have been involved in topics of moon-magnetosphere interactions and the interaction of Mars's ionosphere and atmosphere with the solar wind.

Division AS: Raquel Nieto is a member of Environmental Physics Laboratory (EPhysLab) at the University of Vigo in Ourense, Spain, since 2000. Atmospheric science and climatology are the major research lines in my daily work. Climate research focused on the objective synoptic systems detection and the identification and quantification of moisture sources in different climatic regions are now my research activities.

Division CR: Thomas Mölg's focus is on modelling atmosphere-cryosphere interactions in the climate system, and has evolved topically around tropical climate change and high-altitude ice fields. I pay particular attention to the issue of different space-time scales involved in these interactions, and my most recent work attempts to unify small mountain glaciers and large-scale atmospheric dynamics in a physically consistent way - so my interests lie in glaciology as well as in dynamic meteorology/climatology.

Division BG: Woodward Fischer's research stems from questions and issues presented by the historical record of Earth's life and environments. We employ field geology, petrography and geochemical measurements on returned field samples, and laboratory experiments concerning the metabolisms and molecular biology of selected extant organisms, chosen to provide insight into ancient geobiological processes. Our current primary focus is understanding the rise of atmospheric oxygen and critical steps in the evolution of oxygenic photosynthesis. We also have a series of projects working to understand the causes of past behaviour of the global carbon cycle, and its connections to redox perturbations and climate during several major mass extinctions.

Division SSS: João Pedro Nunes is a post-doctoral researcher in the Centre for Environmental and Marine Studies at the University of Aveiro, Portugal. His research has focused on the relations between climate, vegetation cover and soil erosion in Mediterranean landscapes, and how they could be affected by global climate change. He is currently studying the disturbances caused by forest fires on vegetation and soils, and their impact on runoff and erosion processes.

EGU Office

Image of the solar system

Mars Express close flybys of martian moon Phobos

This image has been photometrically enhanced to illuminate darker areas. Resolution: 4.1 m/pixel. Credits: ESA/DLR/FU Berlin (G. Neukum)

21 January 2011.- Mars Express has returned images from the Phobos flyby of 9 January 2011. Mars Express passed Mars' largest moon at a distance of 100km.

Prof. Willy Dansgaard just passed away

1922 – January 8, 2011

Prof. Willy Dansgaard

Prof. Willy Dansgaard, a paleoclimatology giant, an ice-core hero just passed away. Pioneer investigator of Greenland ice-sheet and isotope studies, Willy Dansgaard was already in the Pantheon of Sciences for his immense contribution to Geosciences.

Willi Dansgaard (1922 – January 8, 2011) was a Danish paleoclimatologist. He was Professor Emeritus of Geophysics at the University of Copenhagen and a member of the Royal Danish Academy of Science and Letters, the Royal Swedish Academy of Sciences, the Icelandic Academy of Sciences, and the Danish Geophysical Society.

He was the first paleoclimatologist to demonstrate that measurements of the trace isotopes oxygen-18 and deuterium in accumulated glacier ice could be used as an indicator of past climate. Dansgaard was the first to note deuterium excess, or a water sample's deviation from the global meteoric water line (GMWL) in ice cores. He found that the kinetic differences between hydrogen-1 and deuterium related to the temperature of source water, and the absolute humidity.

He was the first scientist to extract palaeoclimatic information from the American Camp Century ice core from Greenland drilled by the US army Cold Regions Research and Engineering Laboratory (CRREL). Dansgaard also took a leading role in the drilling of the first ice core to bedrock for scientific reasons, the DYE-3 core from South Greenland, 1400 km away from the Camp Century. Confirming findings from the analysis of the Camp Century ice core, the DYE-3 climate profile documented the existence of rapid climate change, during and at the end of the last glacial. The repeated events of abrupt climate change during the glacial has named after Willi Dansgaard and his Swiss colleague, Hans Oeschger, and is known as Dansgaard-Oeschger events.

Wikipedia

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Willi Dansgaard (1922 – January 8, 2011) was a Danish paleoclimatologist. He was Professor Emeritus of Geophysics at the University of Copenhagen and a member of the Royal Danish Academy of Science and Letters, the Royal Swedish Academy of Sciences, the Icelandic Academy of Sciences, and the Danish Geophysical Society.

He was the first paleoclimatologist to demonstrate that measurements of the trace isotopes oxygen-18 and deuterium in accumulated glacier ice could be used as an indicator of past climate. Dansgaard was the first to note deuterium excess, or a water sample's deviation from the global meteoric water line (GMWL) in ice cores. He found that the kinetic differences between hydrogen-1 and deuterium related to the temperature of source water, and the absolute humidity.

He was the first scientist to extract palaeoclimatic information from the American Camp Century ice core from Greenland drilled by the US army Cold Regions Research and Engineering Laboratory (CRREL). Dansgaard also took a leading role in the drilling of the first ice core to bedrock for scientific reasons, the DYE-3 core from South Greenland, 1400 km away from the Camp Century. Confirming findings from the analysis of the Camp Century ice core, the DYE-3 climate profile documented the existence of rapid climate change, during and at the end of the last glacial. The repeated events of abrupt climate change during the glacial has named after Willi Dansgaard and his Swiss colleague, Hans Oeschger, and is known as Dansgaard-Oeschger events.

Wikipedia

Chaotic carbon cycling during the early Mesozoic

in the wake of mass extinctions, major instability in the carbon cycle lasts for millions of years

Diversity loss may have wider-reaching effects than conventionally believed, potentially driving long-term instability in marine food webs. Jessica H. Whiteside of Brown University and Peter Ward of the University of Washington draw together carbon isotope data from sedimentary rocks and fossils of ammonoids (carnivorous, octopus-like creatures with a coiled shell) across two of life's most severe mass extinction events (the end-Permian about 250 million years ago and the end-Triassic about 200 million years ago) to demonstrate that in the wake of mass extinctions, major instability in the carbon cycle lasts for millions of years, and that ecosystems do not recover from extinction until after carbon cycle recovery. The post-extinction ecosystems have unstable food webs, which cause boom/bust cycles that are reflected in the fluctuation of the carbon cycle.

Reference

Jessica H. Whiteside, and Peter D. Ward, Ammonoid diversity and disparity track episodes of chaotic carbon cycling during the early Mesozoic, Geology, 99-102; doi:10.1130/G31401.1.

Geological Society of America

Kamil Crater, Egypt

Ground truth for small-scale meteorite impacts on Earth

Small impact craters (more than 300 m in diameter) are rare on Earth and deeply eroded, so that knowledge of their formation mechanism, and the hazard small impactors constitute to human populations, is largely based on physical models. Luigi Folco of the University of Siena and colleagues report on the geophysical investigation of the Kamil Crater they recently discovered in southern Egypt. The Kamil Crater is a more-than-5000-year-old impact crater 45 m in diameter with a pristine rayed structure. Such well-preserved structures have been previously observed only on extraterrestrial rocky or icy planetary bodies. This feature and the association with an iron meteorite impactor and shock metamorphism provide a unique picture of small-scale hypervelocity impacts on the Earth's crust. Contrary to current models, ground data indicate that iron meteorites with masses on the order of tens of tons can penetrate the atmosphere without substantial fragmentation.

Reference

Kamil Crater (Egypt): Ground truth for small-scale meteorite impacts on Earth. Luigi Folco et al., Geology. Pages 179-182, doi:10.1130/G31624.1.

Geological Society of America

Ostend Declaration calls for a Blue Future for Europe

marine scientists from across Europe gathered in Ostend at the EurOCEAN 2010 Conference (12-13 October) where the Ostend Declaration was adopted

15 October 2010.- Marine scientists from across Europe gathered in Ostend at the EurOCEAN 2010 Conference (12-13 October) where the Ostend Declaration was adopted. This declaration will act as a guideline to address the grand challenges and opportunities facing Europe's seas and oceans in the coming decade.

The Ostend Declaration, adopted at the EurOCEAN 2010 Conference, is the outcome of a preparatory process, an open on-line consultation organised prior to the event and active discussions during the conference which allowed reaching a solid consensus amongst the broader marine and maritime science community, policy-makers, stakeholders and the 430 participants present at the conference.

Representing the Belgium EU Presidency, the Belgian Federal Minister for Science Policy, Sabine Laruelle, expressed her support to the Ostend Declaration and willingness to take up the actions highlighted in the declaration: "The long tradition of support to marine sciences by the Belgian Science Policy Office (BELSPO) will be pursued. For more than 40 years research programmes on marine sciences with special attention to our North Sea have been implemented. Researchers from the North and the South of our country are participating in those programmes, as well as foreign researchers. The importance given to international cooperation in the field of marine sciences is underlined by the participation of BELSPO in marine ERA-NET projects. Such projects will give a crucial input towards the development of the Joint Programming Initiative".

Ostend Declaration

The European marine and maritime research community stands ready to provide knowledge, services and support to the European Union and its Member and Associated States, recognising that

"The Seas and Oceans are one of the Grand Challenges for the 21st Century".

In doing so, we acknowledge:

- the critical role of the oceans in the earth and climate systems;
- the importance of coasts, seas and oceans and their ecosystems to our health and well-being;
- the increasing impacts of global environmental change on the marine environment and the significant socio-economic consequences of those impacts;
- the ongoing need for basic research to address major gaps in our fundamental knowledge of coasts, seas and oceans;
- the enormous opportunities for innovation, sustained wealth and job creation in new and existing maritime sectors such as aquaculture, renewable energy, marine biotechnology and maritime transport; and
- the need to translate these messages to all sectors of society.

Furthermore, we underline the crucial role of marine and maritime science and technology in providing knowledge and understanding of the seas and oceans and their biodiversity in creating new opportunities and technologies which will support and progress:

- job creation through smart, sustainable and inclusive growth (Europe 2020);
- implementation of the Integrated Maritime Policy for the European Union (2007), the European Research Area (EC Green Paper on ERA, 2007) and other policies such as the Common Fisheries Policy;
- Good Environmental Status in our marine waters by 2020 (Marine Strategy Framework Directive); and
- related grand challenges including food, energy and health, as identified in the Lund Declaration (2009).

The marine and maritime research community recognises that significant progress has been made in response to the Galway (2004) and Aberdeen (2007) Declarations, evidenced in the adoption of the Integrated Maritime Policy for Europe (2007), its environmental pillar the Marine Strategy Framework Directive (2008) and the European Strategy for Marine and Maritime Research (2008), and commits to building future progress within this comprehensive policy framework.

Addressing the Seas and Oceans Grand Challenge

The EurOCEAN 2010 Conference identified priority marine and maritime research challenges and opportunities in areas such as food, global environmental change, energy, marine biotechnology, maritime transport and marine spatial planning, including seabed mapping. The Conference delivered an unequivocal message on the societal and economic benefits Europe derives from the seas and oceans and of the crucial role that research and technology must play in addressing the Seas and Oceans Grand Challenge.

The European marine science and technology community, building on existing achievements and initiatives, is ready to address this challenge in partnership with industry and the public sector, and call upon the European Union and its Member and Associated States to facilitate this response by delivering the following proactive and integrating actions:

1. Joint Programming

Develop an integrating framework, combining the assets of European programmes with those of Member States, to address the Grand Challenge of the Seas and Oceans, including the identification and delivery of critical marine research infrastructures. The Joint Programming Initiative on "Healthy and Productive Seas and Oceans" has the appropriate scale of integration and should be actively supported by the European Commission and Member States.

2. European Ocean Observing System

Support the development of a truly integrated and sustainably funded "European Ocean Observing System" to (i) reestablish Europe's global leading role in marine science and technology; (ii) respond to societal needs by supporting major policy initiatives such as the Integrated Maritime Policy and the Marine Strategy Framework Directive; and (iii) support European contributions

to global observing systems. This could be achieved through better coordination of national capabilities with appropriate new investments, in coordination with relevant initiatives (e.g. ESFRI, EMODNET, GMES) and the engagement of end-users.

3. Research to Knowledge

Establish appropriate mechanisms to keep under review current marine and maritime research programmes and projects with a view to enhancing their impact by (i) exploiting the results of this research; and (ii) identifying existing and emerging gaps. This should be supported by a repository for the reports and findings of national and EU marine and maritime research projects, programmes and initiatives, with capacity for archiving, translating, analysing, reporting and developing integrated knowledge products to facilitate policy development, decision making, management actions, innovation, education and public awareness.

To address effectively the Seas and Oceans Grand Challenge it is essential to prioritise initiatives and programmes to enhance:

Innovation

Provide enhanced support for innovation and the commercialisation of new marine/maritime products, processes, services and concepts in support of the Innovation Union and the Europe 2020 Strategy; Promote actions to raise awareness within the marine scientific community of the innovation potential of marine science, and opportunities to make use of it in cooperation with ocean industries.

Training and Career Development

Establish appropriate training and mobility opportunities for marine researchers and technologists and provide stable and attractive career pathways to ensure the highly skilled workforce that will be needed to support expanding marine and maritime sectors;

International Cooperation

Establish at EU level a mechanism to strategically enhance international cooperation (i.e. between European consortia and third country partners) in science and technology, with support for networking initiatives, preparatory phase projects and concrete actions;

Strengthen bilateral/multilateral cooperation with key funding organisations, intergovernmental bodies and marine/maritime science institutions outside Europe to overcome barriers to, and deliver workable solutions for, joint funding of relevant international research programmes and infrastructures.

The European marine and maritime science community is committed to playing its role, in partnership with industry and the public sector, to bridge the gap between science and innovation to support sustainable development.

The land greenhouse gas sink smaller than believed

because methane emissions from the freshwaters of the world counterbalance some of the CO2 absorbed by natural land environments

10 January 2011.- Past analyses of carbon and greenhouse gas exchanges on continents have failed to account for the influence of lakes, impoundments, and running water. A study, published in the journal Science, shows that natural release of the potent greenhouse gas methane from inland waters may be far greater than previously known. By difference, the net absorption of greenhouse gases by natural land environments, such as forests, may therefore be at least 25 % smaller than thought.

This is the conclusion of a study by David Bastviken, Linköping University, Lars Tranvik, Uppsala University, John Downing, Iowa State University, Patrick Crill, Stockholm University, and Alex Enrich-Prast, University Federal of Rio de Janeiro. Methane emissions from lakes and running water have been difficult to assess and are poorly understood.

The authors have summarized methane fluxes from 474 freshwater environments. They have also used updated estimates of the global area of inland waters. Based on these data, they estimated that methane emissions from the freshwaters of the world counter-balance 25 percent of the carbon dioxide absorbed by natural land environments. The large effect of aquatic methane emission is due to the large quantity of gas emission and the stronger greenhouse effect produced by methane molecules compared to carbon dioxide. One implication of this new accounting is that the greenhouse gas sink provided by forests and other land ecosystems is substantially smaller than hitherto believed.

The terrestrial sink may even be lower, because it is difficult to measure methane bubble fluxes and the global area of freshwaters may still be underestimated.

Reference

David Bastviken, Lars J. Tranvik, John A. Downing, Patrick M. Crill, Alex Enrich-Prast, Freshwater Methane Emissions Offset the Continental Carbon Sink, Science, 7 January 2011: 50. [DOI:10.1126/science.1196808].

New Climate Research Centre in Australia

A large number of research fellowship positions and PhD scholarships will be advertised through 2011 and exchange of scholars internationally over the next seven years is encouraged.

In late 2010 the Australian Research Council (ARC) announced a list of successful Centres of Excellence, and this included the ARC Centre of Excellence for Climate System Science. This is a multimillion dollar initiative, over 7 years, substantially focused on the physical and biophysical climate system. The centre has strong international links to a number of European research groups including CNRS in France, the Hadley Centre and the National Centre for Atmospheric Science in the UK.

The goal of the Centre is "to resolve key uncertainties undermining the reliable projection of Australia's climate". To achieve our goal we will work with a suite of partners on understanding key aspects of the climate system using observations, model development with a significant focus on parameterizations, and global and regional climate models.

The Centre will directly contribute to several areas of relevance to the EGU via research programs focused on the atmosphere, oceans and land processes and the coupling of these components in models. Our goal aligns closely with research focused on improving our understanding of global and regional climate variability and change, and in particular the mechanisms responsible for this change. We include a program on assessing and attributing significant trends in global and regional climates. Our research tools will be regional and global climate models; we intend to contribute strongly to the development of the Australian Community Climate and Earth Simulator model.

We are currently developing five research programs around:

• The effects of tropical convection on Australia's climate (including the development of new convection parameterizations).

• Risks, mechanisms, and attribution of changes in Australian climate extremes.

• The role of land surface forcing and feedbacks for regional climate (including the building of new capacity into land surface models).

• Drivers of spatial and temporal climate variability in extratropical Australia.

Mechanisms and attribution of past and future ocean circulation change.

The Centre is hosted by the University of New South Wales in Sydney. The Partner Universities involved in the Centre are Monash University, The University of Melbourne, The Australian National University, and the University of Tasmania.

We collaborate with a series of key groups nationally including the CSIRO, Australian Bureau of Meteorology, the National Computational Infrastructure (NCI), the Department of Climate Change and Energy Efficiency, the NSW Department of Environment, Climate Change and Water, and the Australian National Data Service.

Internationally, we partner with the European groups noted above, plus NASA, NCAR, GFDL and the University of Arizona in the USA.

A large number of research fellowship positions and PhD scholarships will be advertised through 2011. In addition, we will be encouraging exchange of scholars internationally over the next seven years. A web site at www.climatescience.org.au will provide details in due course. In the meantime any questions should be referred to Professor Andy Pitman, the Centre Director, at a.pitman@unsw.edu.au.

Predictive power of dairy cattle methane models insufficient to provide sound environmental advice

Research team takes a close look at models of enteric methane production of dairy cows

04 November 2010.- Canadian and Dutch researchers have shown that current equations to predict methane production of cows are inaccurate. Sound mitigation options to reduce greenhouse gas emissions of dairy farms require a significant improvement of current methane equations, according to a study of the Dutch-Canadian team in the authorative journal Global Change Biology.

The researchers, from University of Guelph and University of Manitoba (Canada) and Wageningen University & Research centre (the Netherlands), compared the observed methane production of cows with that predicted by nine different methane equations that are applied in whole farm greenhouse gas models. "The prediction accuracy of these equations is small, and the equations are not suitable to quantify methane production of cows", says Dr Jan Dijkstra, senior researcher worker at Wageningen University and adjunct professor at University of Guelph. "The predictive power of methane equations will have to be markedly improved if such whole farm models are used for sound decisions by governments to reduce environmental impact of dairying".

On a global basis, according to the FAO livestock is responsible for some 18% of all greenhouse gases emitted. Methane is the most important greenhouse gas on a dairy farm.The FAO estimates that about 52% of all greenhouse gases from the dairy sector is in the form of methane. Several whole-farm models are available that predict the total amount of greenhouse gases (the sum of CO2, CH4 en N2O) of dairy farms. Such whole-farm models are applied to make an inventory of total greenhouse gas emission on farm, and to estimate the effect of management changes (changes in breeding, nutrition, etc.) on greenhouse gas emissions. Methane is the single most important element in such estimates. Methane is 25 times more potent than CO2. Hence, the accuracy of estimation of total greenhouse gas emissions of whole-farm models largely depends on the accuracy of the prediction of methane emitted per cow.

The research team compiled a large dataset of actual observations on methane emissions of dairy cattle. The observations were largely derived from respiration chamber experiments, in which methane produced in the gut of the cow is accurately determined. These observations were used to evaluate the predictive power of equations to predict methane production.

The prediction accuracy of all equations was low. The equations hardly account for the effect of dietary composition on enteric methane production. Most equations do not use any dietary information at all, but estimate methane production based on feed intake or milk production. For example, the widely used IPCC (Intergovernmental Panel on Climate Change) equation that predicts methane production based on energy intake of the cow, cannot distinguish the effect of a higher energy intake on methane due to a rise in feed intake level, from that due to a rise in dietary fat content at the same feed intake level. However, a higher feed intake will increase methane production, whereas a rise in dietary fat content will decrease methane production.

From the analysis, it also appears that the variation in predicted methane production is far smaller that the variation in actually observed methane production. Consequently, the methane equations do not fully represent the range of effects of dietary changes on enteric methane production of cows.

The research team concluded that the low prediction accuracy and poor prediction of variation in observed values may introduce substantial error into inventories of GHG emissions and lead to incorrect mitigation recommendations. For sound inventories and mitigation recommendations, much better methane predictions are required. At present, the researchers are actively developing more detailed and accurate models that predict methane production, based on the fermentation processes in the gastro-intestinal tract of cows.

http://www.wageningenuniversity.nl/UK/newsagenda/news/P059e.htm

Reference

J.L. Ellis, A. Bannink, J. France, E. Kebreab, J. Dijkstra. Evaluation of enteric methane prediction equations for dairy cows used in whole farm models, Global Change Biology, in press.

Wageningen University and Research Centre

Workshop in 3D Earth monitoring

explored possibilities of Synthetic Aperture Radar

2 February 2011.- With interest growing in satellite radar techniques that provide 3D views of Earth's natural and urban environments, researchers from around the world recently gathered to review the latest findings and show how these methods can be used to monitor our changing world.

The technique of Synthetic Aperture Radar (SAR) radar polarimetry allows polarised information to be measured in the signals backscattered from Earth to a satellite sensor. Polarimetric interferometry is achieved by using two polarimetric images, acquired from slightly different angles, to provide information on the 3D structure of the view.

With the opportunity to review the advances made in this field, more than 200 researchers from over 24 countries came together at the biennial POLinSAR workshop held at ESA's centre for Earth observation in Italy.

In response to growing interest in this field, ESA also hosted a week-long course just prior to the event for PhD students.

Currently, data come largely from Canada's Radarsat-2 and Japan's ALOS mission. Germany's newly launched TanDEM-X may play an important role in the future of SAR polarimetry.

Looking to the future, results from some of ESA's airborne campaigns to support the development of the candidate Earth Explorer BIOMASS mission were presented.

These results show how the mission could, if selected for launch, detect and map changes in forest biomass over time.

ESA

Ice-free oases on Snowball Earth

according to evidence from Flinders Ranges in South Australia

13 December 2010.- Between 600 and 700 million year ago, our planet froze in an event called Snowball Earth. Now geologist Dan Le Heron of Royal Holloway, University of London and his team has uncovered evidence for large 'ice-free oases'. The findings are published in the journal Geology.

Exploring the remote Flinders Ranges in South Australia, the team found features formed by violent storms, sandwiched between ancient sediments that were laid down by the global ice sheets.

The features – known to geologists as hummocky cross bedding – are only formed by storm waves in the sea. Patches of sea remained ice free, allowing violent waves to sweep up sand from the sea floor, and leave their mark. In order to form, the surface of the sea had to be free of ice.

Dr Le Heron said: "This is an incredibly exciting discovery. What we've found is the clearest evidence yet that large areas of the Earth's oceans remained ice-free during Snowball Earth.

Reference

Daniel Le Heron et al., Sea ice-free conditions during the Sturtian glaciation (early Cryogenian), South Australia, Geology, December 2010.

GSA

Link between stroke risk and road traffic noise

People are at greater risk of stroke when they are exposed to increased road traffic noise, according to new research.

02/11/2011.- Scientists in Denmark say people who are 65 years and older are at an even greater risk. The results of the study were recently published in the European Heart Journal. Researchers at the Institute of Cancer Epidemiology at the Danish Cancer Society in Copenhagen evaluated 51 485 participants and discovered that for every 10 decibels (dB) more noise, there is a 14% greater risk of having a stroke. Further evaluation revealed that people who are less than 65 years are not at increased risk of stroke, but the risk increased by more than a quarter for every 10dB of increased noise in road traffic. The data also showed indications of a threshold limit at around 60 dB, effectively triggering an even bigger risk of stroke.

'Our study shows that exposure to road traffic noise seems to increase the risk of stroke', explained Dr Mette Sørensen at the Institute of Cancer Epidemiology. 'Previous studies have linked traffic noise with raised blood pressure and heart attacks, and our study adds to the accumulating evidence that traffic noise may cause a range of cardiovascular diseases. These studies highlight the need for action to reduce people's exposure to noise', the project leader said. 'This is the first study ever to investigate the association between exposure to road traffic noise and risk of stroke, and, therefore, more research is needed before any firm conclusions can be made'.

The team based their study on the 1993-1997 Danish 'Diet, Cancer and Health' cohort study that had a 57 053-strong sample aged between 50 and 64. The participants were from the Copenhagen and Aarhus areas. In this latest study, the researchers had access to subjects' medical and residential histories, and their average follow-up was 10 years. During this interim, 1 881 people suffered a stroke.

Dr Sørensen and her team considered in their calculations the impact of air pollution, exposure to railway and aircraft noise, as well as a range of other confounding lifestyle factors like diet, smoking, and alcohol and caffeine consumption.

They also found that information on the subjects and their area of residence were connected to a noise calculation programme that has been used to map noise levels in various locations across the Nordic region for a number of years. Under the programme, speed and traffic composition, as well as road type (e.g. rural highways, motorways) and surfaces, and the position and heights of people's homes above the roads were taken into account.

The researchers said that 35% of people were exposed to noise levels greater than 60dB at the time they joined the study, and 72% resided at the same address throughout the study period. The lowest estimate for noise exposure was 40dB and the highest was 82dB, they pointed out.

Commenting on the results, Dr Sørensen said: 'If we assume that our findings represent the true risk, and the association between traffic noise and stroke is causal, then an estimated 8% of all stroke cases, and 19% of cases in those aged over 65, could be attributed to road traffic noise. The population in this study, however, lived mainly in urban areas and is, therefore, not representative of the whole population in terms of exposure to road traffic noise. However, if we take the exposure distribution of all dwellings in Denmark into account, we find that about 600 new cases of stroke could be attributed to road traffic noise in Denmark each year. There are 5.5 million inhabitants in Denmark and a total of 12.400 new cases of stroke each year'.

The study could only determine if there is a link between road traffic noise and higher risk of stroke, not whether the noise actually heightens risk because of its epidemiological nature.

Source: Research Headlines. Original URL: http://ec.europa.eu/research/headlines/news/article_11_02_11_en.html

The 20th Century Reanalysis Project

New Dataset from 1871 to 2008 of global tropospheric variability

24 January 2011.- New Dataset from 1871 to 2008. A comprehensive reanalysis of all global weather events from 1871 to the present day, and from the earth's surface to the jet stream level, the 20th Century Reanalysis Project, was outlined in the Quarterly Journal of the Royal Meteorological Society.

The dataset required an international effort to collate historical observations and recordings from sources as diverse as 19th century sea captains, turn of the century explorers and medical doctors, pieced together using supercomputers at the US Department Energy's National Energy Research Scientific Computing Center in California and the Oak Ridge Leadership Computing Facility in Tennessee.

Dr. Compo leads the 20th Century Reanalysis Project (20CR) at the National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) and the Cooperative Institute for Research in Environmental Sciences (a joint project of NOAA and the University of Colorado) Climate Diagnostics Center with colleagues Dr. Jeffrey Whitaker of NOAA, Dr. Prashant Sardeshmukh of NOAA and the CIRES Climate Diagnostics Center, and Dr. Rob Allan of the United Kingdom Met Office Hadley Centre. The 20CR is produced in partnership with the Atmospheric Circulation Reconstructions over the Earth (ACRE) initiative, the Global Climate Observing System (GCOS), and 36 other international organisations.

The 20CR dataset provides the first long-term estimates of global tropospheric variability, weather maps from the Earth's surface to the level of the jet-stream, and of their time-varying quality, from 1871 to the present at 6- hourly temporal and 2° spatial resolutions.

Reference

Compo. G, Whitaker. J, Sardeshmukh. P, Matsui. N, Allan. R, Yin. X, Gleason. B, Vose. R, Rutledge. G, Bessemoulin. P, Brönnimann. S, Brunet. M, Crouthamel. R, Grant. A, Groisman. P, Jones. P, Kruk. M, A, Kruger, Marshall. G, Maugeri. M, Mok.h, Nordli. Ø , Ross.T, Trigo. R, Wang. X, Woodruff. S, Worley. S, The Twentieth Century Reanalysis Project, Quarterly Journal of the Royal Meteorological Society, 2011, DOI 10.1002/qj.776.

EUMETSAT Council names future Director-General and sets stage for MTG activities to begin

European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT)

01 December 2010.- EUMETSAT, the European Organisation for the Exploitation of Meteorological Satellites, held its 71st Council meeting in Darmstadt, Germany, on 30 November and 1 December. The meeting was chaired by Prof. Petteri Taalas, Director-General of the Finnish Meteorological Institute. It was the first EUMETSAT Council attended by Romania as a full Member State.

Council appointed Alain Ratier, currently Deputy Director-General of Météo France, to succeed Dr. Lars Prahm as EUMETSAT Director-General starting on 1 August 2011.

Turning to the Meteosat Third Generation (MTG) programme, Council achieved a confirmed funding level of around 86 per cent, with 22 of the 26 Member States having firmly committed to the programme. The remaining four Member States are expected to follow suit soon, pending the completion of national approval procedures.

The funding level is high enough for the MTG programme preliminary activities to proceed in January 2011, pending the approval of Portugal. Dr. Prahm said, "It is extremely important for the MTG programme activities to start as soon as possible".

Council also gave the green light for preparations for the upcoming launches of the Metop-B polar-orbiting satellite from the Baikonur Cosmodrome during the second quarter of 2012 and the third Meteosat Second Generation (MSG-3) geostationary satellite from the Kourou Space Centre during the third quarter of 2012. It will be the first time EUMETSAT prepares two launches for the same year.

Regarding Global Monitoring for Environment and Security (GMES), Council approved the preparation of a Programme Proposalfor a third-party programme for the establishment of GMES user requirements on behalf of the European Commission.

Council also approved implementation of several proposals to expand data access for EUMETSAT's user community. As part of EUMETSAT's increasing cooperation on data exchange with the Indian Space Research Organisation (ISRO), Council approved a near-real-time dissemination system for data from the scatterometer on board ISRO's Oceansat-2 satellite. Council also gave the go-ahead for implementation of a pilot EUMETSAT Advanced Retransmission Service (EARS) Nowcasting service, comprising Cloud Mask, Cloud Type and Cloud Top Temperature and height products.

Furthermore, Council agreed to plans for a set of baseline services for providing fast access to European users to data from the future US NPP/JPSS-1 satellites. In order to do so, the EUMETSAT Director-General received the go-ahead from Council to establish cooperative arrangements for the provision of NPP/JPSS-1 data with direct readout station operators.

Finally, Council approved a data exchange agreement with the Korea Meteorological Administration and authorised the EUMETSAT Director-General to sign it.

Reference URL:

http://www.eumetsat.int/Home/Main/News/Press_Releases/802596?l=en

EUMETSAT

Exoplanet detection

exoplanet circles a red giant from another galaxy

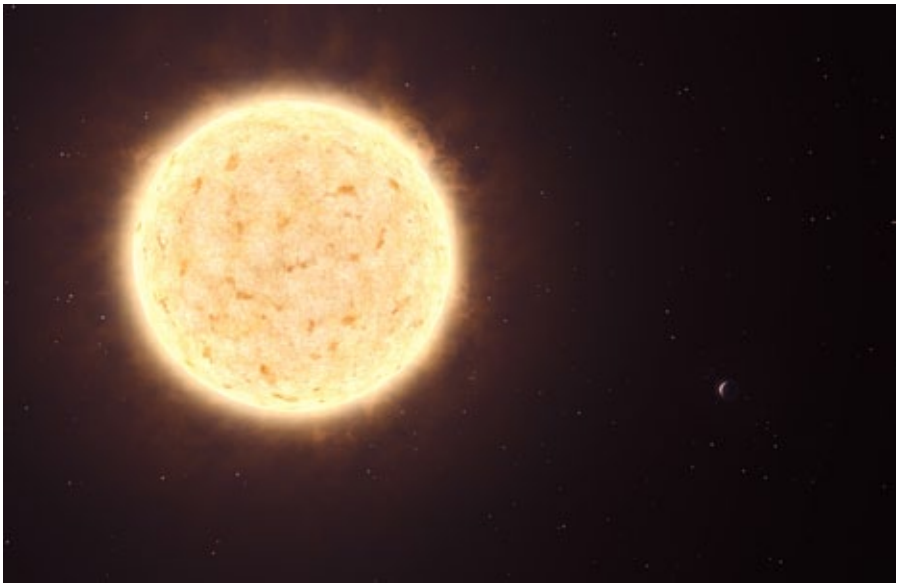
The planet, which has been designated HIP 13044 b, has a minimum mass of 1.25 times the mass of Jupiter. The star system is located about 2000 light-years from Earth in the southern constellation Fornax ("the chemical furnace").

The planet was discovered with the radial velocity method which measures tiny wobbles of a star caused by a planet's gravitational pull. HIP 13044's wobbles were detected with the high-resolution spectrograph FEROS at the 2.2 m MPG-ESO telescope at ESO's La Silla observatory in Chile.

The planet and its host star appear to have originated in a dwarf galaxy that was swallowed by the Milky Way galaxy between six and nine billion years ago. Such galactic cannibalism is an ordinary occurrence in galactic evolution. Typically, remnants of swallowed-up dwarf galaxies can be detected as ribbon-like arrangements of stars known as "stellar streams". In this case, HIP 13044 is part of the so-called "Helmi stream".

The newly discovered system has a number of unusual properties. "We found HIP 13044 b as part of a systematic search for exoplanets around stars that are nearing the end of their life", says MPIA's Johny Setiawan, who led the research. While the host star HIP 13044 was probably rather similar to our own Sun earlier on, it has since gone through the "Red Giant" phase, in which a star cools and expands to hundreds of times the radius of the Sun. It has now settled down into another quiet phase powered by the nuclear fusion of helium, which is expected to last a few million years in total.

The fact that the exoplanet survived the red giant stage provides an intriguing glimpse of one possible fate of our own planetary system: our Sun is expected to become a Red Giant in around five billion years. Setiawan and his colleagues hypothesize that the current close orbit of HIP 13044 b - its present average distance to its host star amounts to a mere 12 per cent of the distance between the Sun and the Earth, with an orbital period of only 16.2 days - was initially much larger, and that the planet migrated inwards during the star's Red Giant phase.



An exoplanet from another galaxy (right) and its star (left): Artist's impression of the yellowish star HIP 13044 and, on the bottom right, its planet HIP 13044 b. HIP 13044 is part of a stellar stream, a remnant of a dwarf galaxy that was swallowed by the Milky Way galaxy billions of years ago. Image: ESO / L. Calçada

There is some evidence that some closer-in planets did likewise, and did not survive: "HIP 13044 is rotating relatively quickly for a star of this particular type", says Setiawan. "One explanation is that HIP 13044 swallowed its inner planets during the Red Giant phase, which would make the star spin more quickly". The survival of HIP 13044 b might be in jeopardy, however. In the next stage of its evolution the star will again expand and may engulf the planet.

With only this single data point, it is impossible to tell how common this particular evolution is. More definite conclusions - and an understanding of how much HIP 13044 tells us about our own planetary system's future - will only be possible once significantly more planets orbiting late-type stars have been found, which is the aim of Setiawan and his colleagues in the ongoing search.

The new planet's host star HIP 13044 appears to contain very few elements heavier than hydrogen and helium (in technical terms, it is "extremely metal-poor") - less than any other star with planets.

Reference:

Setiawan et al., A Giant Planet Around a Metal-poor Star of Extragalactic Origin, Science Express, 18 November 2010

http://goto.mpg.de/mpg/news/201011171/

CryoSat ice data

now open to all

1 February 2011.- ESA's CryoSat Mission Manager Tommaso Parrinello announced the release at the CryoSat Validation workshop, only few weeks after the end of the commissioning phase of the satellite.

More info:

- CryoSat-2 (http://www.esa.int/esaLP/LPcryosat.html)
- Access CryoSat data (http://earth.esa.int/cryosat)

ESA

NASA NExT mission encounters Comet 9P / Tempel 1

15 February.- In July 2005, the Deep Impact spacecraft released a projectile which collided with the nucleus of Comet 9P / Tempel 1. The impact excavated a crater, releasing a bright cloud of material observed by both the main spacecraft and observatories on and near the Earth.

At 0440 GMT on 15 February (2040 Pacific Standard Time on 14 February), the Stardust spacecraft (which itself collected material from a comet and brought it to Earth in 2006) passed 9P / Tempel 1 at a distance of around 200 km, studying the crater made in the 2005 impact and observing any other changes that have taken place in the nucleus in the intervening years. This was the first time that a comet has been visited by two spacecraft.

The craft is on its second mission of exploration called Stardust-NExT, having completed its prime mission collecting cometary particles and returning them to Earth in 2006.

http://stardustnext.jpl.nasa.gov/

RAS honours outstanding astronomers and geophysicists

12 January 2011.- On Friday 14 January the Royal Astronomical Society, the UK's voice for professional astronomers and geophysicists, announced the recipients of the Society's medals and awards for 2011. The prizes honour individuals who have made an outstanding contribution to astronomy and geophysics.

The Society's highest honour is the Gold Medal, one of which is available for award annually for extraordinary achievement in astronomy and another for the same in geophysics.

The Gold Medal for Geophysics is awarded to Professor Eberhard Grün, formerly of the Max-Planck Institut (MPI) für Kernphysik in Heidelberg, in recognition of his work at the forefront of dust in the Solar System.

Over more than 30 years, Eberhard Grün has done a lot to advance our understanding of the dynamics and distribution of dust in our planetary system. He has been Principal Investigator for dust experiments on space missions including Helios 1, Helios 2, Galileo, Ulysses and Cassini, provided dust sensors for Giotto and Express 2 and science contributions to Nozomi, Stardust and Rosetta.

Eberhard pioneered the development and refinement of techniques to detect tiny (sub-micron size) dust grains, which leads to the derivation of the size and spatial distribution of the Solar system dust complex. The size distribution at the distance of the Earth from the Sun, described in his 1985 paper, is still referred to as the 'Grün distribution'.

More recently, he developed the Cosmic Dust Analyser on the Cassini mission, which made key measurements of dust in the Solar System. These include measurements from the Earth's orbit out to Saturn; the discovery of dust streams in the Jupiter system originating from Io, the first direct detection of interstellar dust flowing through the Solar System, the discovery of high velocity streams from Saturn and analysis of the composition of the plumes from Enceladus that provided evidence for a sub-surface ocean on that moon.

At MPI Kernphysik he oversaw the development of the MPI Van de Graaff dust accelerator and was coordinator for the KOSI project that conducted six years of simulations of the processes that take place on a comet's surface, providing the impetus to develop the Rosetta cometary lander.

Price Medal

The Price Medal is available for award every other year, for investigations of outstanding merit in solid-Earth geophysics, oceanography or planetary sciences.

Professor Roger Searle of Durham University wins the Medal this year, for his work on the geological processes on the ocean floor.

His early research saw him pioneering the processing and use of the GLORIA sonar system that he used to define the boundaries of tectonic plates and understand the evolution of rifts and oceanic microplates. More recently he has worked on the effects of hotspots in the mantle on plate accretion processes. His research career has so far led to more than 100 highly-cited peer-review articles.

Available for award annually, the Fowler Prizes are for individuals who have made a particularly noteworthy contribution to the astronomical and geophysical sciences at an early stage of their research career.

Dr James Wookey of the University of Bristol receives the Fowler Prize for geophysics for his outstanding research on the Earth's deep interior.

The Winton Capital Awards are for research by a Post Doctoral Fellow in a UK institution no more than 5 years after the completion of a PhD, whose career has shown the most promising development.

Dr Leigh Fletcher, who currently holds a Glasstone Science Fellowship at the University of Oxford, receives the Winton Capital Award for geophysics.

He has carried out work on the thermal structure, composition and seasonal change of Saturn's atmosphere using data from the Composite Infrared Spectrometer on board the Cassini spacecraft.

Harold Jeffreys Lecturer (G)

Dr Lyndsay Fletcher of the University of Glasgow will give the 2011 Harold Jeffreys Lecture, in recognition of her work as a world-renowned and highly cited solar physicist, who specialises in solar flares, active regions on the Sun and particle acceleration.

RAS

Climate and ancient societies

studied in MILLENNIUM and ACQWA projects supported under the EU Framework Programme

A team has found new evidence of how the climate affected ancient societies. The study, published in Science, reveals how periods of climatic instability often coincided with turbulent times in European history. The study was funded in part by MILLENNIUM and ACQWA, two projects supported under the EU's Sixth and Seventh Framework Programmes (FP6 and FP7) respectively. MILLENNIUM ('European climate of the last millennium') received around EUR 12 million from the 'Sustainable development, global change and ecosystems'. Thematic area of FP6, while ACQWA has clinched almost EUR 6.5 million from FP7's Environment Theme.

Led by the Institute for Forest Growth at the University of Freiburg in Germany and the Swiss Federal Research Institute (WSL), the team was made up of climatologists, geographers, archaeologists and historians. By assessing ancient tree rings from more than 7.000 sub-fossil, historical and living tree samples, they were able to reconstruct the history of central Europe's summer temperature and precipitation over the last 2.500 years, rather than the 1.500 years generally used in past studies.

The team then compared variations in European summer climate with human historical events and episodes such as plagues, migrations and the Thirty Years War. Their conclusions shed new light on how climate change played a crucial role in agrarian wealth and economic growth.

'Climate variations have influenced the agricultural productivity, health risk and conflict level of preindustrial societies', the authors of the study write. 'Discrimination between environmental and anthropogenic impacts on past civilisations, however, remains difficult because of the paucity of high-resolution palaeoclimatic evidence. Here we present tree ring-based reconstructions of central European summer precipitation and temperature variability over the past 2.500 years. Recent warming is unprecedented, but modern hydroclimatic variations may have at times been exceeded in magnitude and duration'.

The researchers point out that the climate data stored within the trees enabled them to compare natural precipitation and temperature fluctuations with the development of European societies. They found that Europe's summer climate during the Roman era, for instance, was relatively warm and wet, and changed little. Increased climate variations from around 250-600 AD, say the researchers, coincided with the fall of the western Roman Empire and the havoc of the Migration Period, during which the population in Europe underwent a major restructuring.

Furthermore, they found that humid and mild summers paralleled the fast political and cultural growth of Medieval Europe, and that a poor climate could have influenced the health conditions that played a part in triggering the economic crisis that emerged during the Black Death plague pandemic in the 14th century.

The researchers note that the temperature minima in the early 17th and 19th centuries coincided with both the settlement abandonment during the Thirty Years' War and the mass migration of many Europeans to America.

'Wet and warm summers occurred during periods of Roman and Medieval prosperity', the authors write. 'Increased climate variability from around 250-600 AD coincided with the demise of the Western Roman Empire and the turmoil of the Migration Period. Historical circumstances may challenge recent political and fiscal reluctance to mitigate projected climate change', they add.

The team advises that the projected global climate change may have a much more significant impact on human societies than what researchers currently believe. Moreover, complex causal links between past climate changes and human responses need further research, they say.

EC

Late Archean euxinic conditions

before the rise of atmospheric oxygen

Life on Earth is thought to have co-evolved with the chemistry of the oceans and atmosphere, and the shift from an anoxic to an oxic world across the Archean-Proterozoic boundary represents a fundamental step in this process. In order to understand the relative influence of biological and geological factors on this transition, scientists must constrain key variables in seawater chemistry before the Great Oxidation Event (circa 2500 million years ago).

Scott et al. present a multi-element (C-S-Fe-Mo) biogeochemical study of circa 2662-million-year-old shales from the Hamersley Province in Western Australia. Data obtained by Clinton T. Scott of the University of California-Riverside and colleagues reveal a sustained episode of iron-limited pyrite formation under an anoxic and sulfidic (euxinic) water column. This is the oldest known occurrence of euxinia in Earth's history and challenges the paradigm of persistently iron-rich Archean oceans. Bulk trace metal chemistry and preservation of strong mass-independent sulfur isotope fractionations in sedimentary pyrites indicate that ocean euxinia was possible prior to oxidative weathering, suggesting that sulfidic waters may have been common throughout the Achaean. C-S-Fe systematics suggest that oxygenic photosynthesis was the primary source of organic carbon in the basin, and the absence of Mo enrichments highlights a potential link between inefficient nitrogen fixation and the delayed arrival of the Great Oxidation Event.

Reference

Clinton T. Scott et al., Late Archean euxinic conditions before the rise of atmospheric oxygen, Geology, 119-122, doi:10.1130/G31571.1.

Geological Society of America

3rd Nobel Laureate Symposium on Global Sustainability

Transforming the World in an Era of Global Change

Stockholm, November 15th 2010.- In May 2011 more than twenty Nobel Laureates, several leading policy makers and some of the world's most renowned thinkers and experts on global sustainability will gather for a transdisciplinary high-level meeting at the Royal Swedish Academy of Sciences in Stockholm to formulate an action plan for planetary stewardship of our future.

On May 16-19, the Third Nobel Laureate Symposium will take place at the Royal Swedish Academy of Sciences in Stockholm in the presence and with the support of HM King Carl XVI Gustaf of Sweden.

The Symposium is part of a series of meetings initiated in 2007 at the Potsdam Institute for Climate Impact Research hosted by the German Chancellor Angela Merkel, followed by a second meeting at St. James Palace under the auspices of the Prince of Wales.

The Third Symposium will take a transdisciplinary approach and adopt a systems perspective on climate change and deteriorating ecosystems by proposing a discussion around how economic, political and social systems can be governed within the boundaries of the planet.

In addition, there will be discussions on the measures needed to ensure sustainable management of our planet's common resources as the need for economic progress continues given welfare development, population growth and poverty control.

"The human pressure on the Earth system has reached a scale which challenges the resilience and the biophysical boundaries of the Earth. By deepening the dialogue around climate and environmental issues from an ecological, economic, social and political perspective among Nobel Laureates and high-level decision makers from business and political life, we seek Planetary Stewardship for global sustainable development", said Professor Johan Rockström, Symposium Chair and Director of Stockholm Resilience Centre at Stockholm University, and Stockholm Environment Institute.

A key topic for the discussions will be how societies can be innovative and boost the planet's resilience rather than reducing it. How can we increase biodiversity, be stewards of ecosystems and increase the options for human welfare on Earth?

"We realise that these issues are extremely difficult and complex to grasp and require transdisciplinary discussions on the highest possible level. By inviting Nobel Laureates, leading policy makers and experts on global sustainability, we ensure transdisciplinary discussions on the highest possible level. The Nobel Prize is, after all, awarded to people contributing to the greatest benefit of mankind, and most Nobel Laureates share a strong commitment to work for a better world", continued Professor Rockström.

The Symposium will conclude with a memorandum signed by key Nobel Laureates. This will be communicated and handed over to the High-level Panel on Global Sustainability appointed by the UN Secretary General. The conclusions of the Panel will feed into the preparations for the 2012 UN Conference on Sustainable Development in Rio de Janeiro and into the ongoing climate negotiations.

The Third Nobel Laureate Symposium on Global Sustainability is being organised by the Royal Swedish Academy of Sciences, Stockholm Environment Institute, Stockholm Resilience Centre at Stockholm University, Beijer Institute of Ecological Economics and Potsdam Institute for Climate Impact Research.

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www.globalsymposium2011.se

Royal Swedish Academy of Sciences, www.kva.se

Stockholm Resilience Centre, www.stockholmresilience.su.se

Stockholm Environment Institute, www.sei.se

The Beijer Institute of Ecological Economics, www.beijer.kva.se

Potsdam Institute of Climate Impact Research, www.pik-potsdam.de

Press release from the Royal Swedish Academy of Sciences

The imbalance of glaciers after disintegration of Larsen-B ice shelf, Antarctic Peninsula

So far there are no signs of slow-down indicating that dynamic thinning and frontal retreat will go on

The outlet glaciers to the embayment of the Larsen-B Ice Shelf started to accelerate soon after the ice shelf disintegrated in March 2002. The authors analyse high resolution radar images of the TerraSAR-X satellite, launched in June 2007, to map the motion of outlet glaciers in detail. The frontal velocities are used to estimate the calving fluxes for 2008/2009. As reference for pre-collapse conditions, when the glaciers were in balanced state, the ice fluxes through the same gates are computed using ice motion maps derived from interferometric data of the ERS-1/ERS-2 satellites in 1995 and 1999. Profiles of satellite laser altimetry from ICESat, crossing the terminus of several glaciers, indicate considerable glacier thinning between 2003 and 2007/2008. This is taken into account for defining the calving cross sections. The difference between the pre- and post-collapse fluxes provides an estimate on the mass imbalance. For the Larsen-B embayment the 2008 mass deficit is estimated at 4.34 ± 1.64 Gt a−1, significantly lower than previously published values. The ice flow acceleration follows a similar pattern on the various glaciers, gradually decreasing in magnitude with distance upstream from the calving front. This suggests stress perturbation at the glacier front being the main factor for acceleration. So far there are no signs of slow-down indicating that dynamic thinning and frontal retreat will go on.

The full paper is available free of charge at http://www.the-cryosphere.net/5/125/2011/tc-5-125-2011.html

Rott, H., Müller, F., Nagler, T., and Floricioiu, D.: The imbalance of glaciers after disintegration of Larsen-B ice shelf, Antarctic Peninsula, The Cryosphere, 5, 125-134, doi:10.5194/tc-5-125-2011, 2011.

Hydroxyl in the stratosphere and mesosphere

Diurnal variability

Diurnal variations in hydroxyl (OH) in the stratosphere and mesosphere are analyzed using measurements from the Aura Microwave Limb Sounder (MLS). The primary driver for OH diurnal variations is the ultraviolet actinic flux that initiates the photochemical production of reactive hydrogen species. The magnitude of this flux is governed largely by changes in solar zenith angle (SZA) throughout the day, and OH diurnal variations are well approximated by an exponential function of the secant of SZA. Measured OH concentrations are fit to a function of the form exp[−betasec(SZA)], where the parameter beta is a function of altitude. The authors examine the magnitude of beta and show that it is related to the optical depths of ultraviolet absorption by ozone and molecular oxygen. Values of beta from SLIMCAT model simulations show the same vertical structure as those from MLS and the average level of agreement between model and measurements is 6%. The vertical profile of beta from MLS can be represented by a simple analytic formulation involving the ozone and water vapor photodissociation rates. This formulation is used to infer the altitude dependence of the primary production mechanisms for OH: the reaction of excited-state atomic oxygen with water vapor versus the direct photodissociation of water vapor.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/955/2011/acp-11-955-2011.html

Minschwaner, K., Manney, G. L., Wang, S. H., and Harwood, R. S.: Hydroxyl in the stratosphere and mesosphere – Part 1: Diurnal variability, Atmos. Chem. Phys., 11, 955-962, doi:10.5194/acp-11-955-2011, 2011.

Near-ubiquity of ice-edge blooms in the Arctic

suggests ongoing changes in Arctic sea-ice may have a significant impact on higher trophic levels and local fish stocks

Ice-edge blooms are significant features of Arctic primary production, yet have received relatively little attention. Here, the authors combine satellite ocean colour and sea-ice data in a pan-Arctic study. Ice-edge blooms occur in all seasonally ice-covered areas and from spring to late summer, being observed in 77–89% of locations for which adequate data exist, and usually peaking within 20 days of ice retreat. They sometimes form long belts along the ice-edge (greater than 100 km), although smaller structures were also found. The bloom peak is on average more than 1 mg m−3, with major blooms more than 10 mg m−3, and is usually located close to the ice-edge, though not always. Some propagate behind the receding ice-edge over hundreds of kilometres and over several months, while others remain stationary. The strong connection between ice retreat

and productivity suggests that the ongoing changes in Arctic sea-ice may have a significant impact on higher trophic levels and local fish stocks.

The full paper is available free of charge at http://www.biogeosciences.net/8/515/2011/bg-8-515-2011.html

Perrette, M., Yool, A., Quartly, G. D., and Popova, E. E.: Near-ubiquity of ice-edge blooms in the Arctic, Biogeosciences, 8, 515-524, doi:10.5194/bg-8-515-2011, 2011.

Bromoform in the tropical boundary layer of the Maritime Continent during OP3

data are consistent with a strong, local coastal source of bromoform in eastern Sabah

The authors report measurements of bromoform made by gas chromatography during the OP3 campaign in 2008. Measurements were made simultaneously for a few days at the World Meteorological Organization (WMO) Global Atmospheric Watch (GAW) site in the Danum Valley, a rainforest location in Sabah, Borneo, and at a nearby coastal site at Kunak. Background values at Kunak were higher than those measured in the rainforest (2–5 ppt compared with 1 ppt) and excursions away from the background were very much higher, reaching 10s of ppt. Measurements of C2Cl4, an industrial tracer, showed no significant difference in background at the two sites. Modelling using two different models can reproduce a number of the observed features. The data are consistent with a strong, local coastal source of bromoform in eastern Sabah and can be used to infer the strength of the source of bromoform in South East Asia. However, they provide only a very weak constraint on global emissions. The global model results highlight the difficulty for short-lived species of extrapolating limited duration, local measurements to a global source.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/529/2011/acp-11-529-2011.html

Pyle, J. A., Ashfold, M. J., Harris, N. R. P., Robinson, A. D., Warwick, N. J., Carver, G. D., Gostlow, B., O'Brien, L. M., Manning, A. J., Phang, S. M., Yong, S. E., Leong, K. P., Ung, E. H., and Ong, S.: Bromoform in the tropical boundary layer of the Maritime Continent during OP3, Atmos. Chem. Phys., 11, 529-542, doi:10.5194/acp-11-529-2011, 2011.

Length and time scales of atmospheric moisture recycling

in the tropics or in mountainous terrain the length scale of recycling can be as low as 500 to 2000 km while in temperate climates the length scale is typically between 3000 to 5000 km

It is difficult to quantify the degree to which terrestrial evaporation supports the occurrence of precipitation within a certain study region (i.e. regional moisture recycling) due to the scale- and shape-dependence of regional moisture recycling ratios.

In this paper the authors present a novel approach to quantify the spatial and temporal scale of moisture recycling, independent of the size and shape of the region under study. In contrast to previous studies, which essentially used curve fitting, the scaling laws presented by them follow directly from the process equation, thus allowing a fair comparison between regions and seasons. The calculation is based on ERA-Interim reanalysis data for the period 1999 to 2008. It is shown that in the tropics or in mountainous terrain the length scale of recycling can be as low as 500 to 2.000 km. In temperate climates the length scale is typically between 3.000 to 5.000 km whereas it amounts to more than 7.000 km in desert areas. The time scale of recycling ranges from 3 to 20 days, with the exception of deserts, where it is much longer. The most distinct seasonal differences can be observed over the Northern Hemisphere: in winter, moisture recycling is insignificant, whereas in summer it plays a major role in the climate. The length and time scales of atmospheric moisture recycling can be useful metrics to quantify local climatic effects of land use change.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/1853/2011/acp-11-1853-2011.html

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Study of sensitivity of pelagic calcification to ocean acidification

confirm previous studies indicating that future anthropogenic CO2 emissions may lead to irreversible changes for several centuries

Ocean acidification might reduce the ability of calcifying plankton to produce and maintain their shells of calcite, or of aragonite, the more soluble form of CaCO3. In addition to possibly large biological impacts, reduced CaCO3 production corresponds to a negative feedback on atmospheric CO2. In order to explore the sensitivity of the ocean carbon cycle to increasing concentrations of atmospheric CO2, the authors use the new biogeochemical Bern3D/PISCES model. The model reproduces the large scale distributions of biogeochemical tracers. With a range of sensitivity studies, they explore the

effect of (i) using different parameterizations of CaCO3 production fitted to available laboratory and field experiments, of (ii) letting calcite and aragonite be produced by auto- and heterotrophic plankton groups, and of (iii) using carbon emissions from the range of the most recent IPCC Representative Concentration Pathways (RCP). Under a high-emission scenario, the CaCO3 production of all the model versions decreases from ~1 Pg C yr−1 to between 0.36 and 0.82 Pg C yr−1 by the year 2100. The changes in CaCO3 production and dissolution resulting from ocean acidification provide only a small feedback on atmospheric CO2 of −1 to −11 ppm by the year 2100, despite the wide range of parameterizations, model versions and scenarios included in their study. A potential upper limit of the CO2-calcification/dissolution feedback of −30 ppm by the year 2100 is computed by setting calcification to zero after 2000 in a high 21st century emission scenario. The similarity of feedback estimates yielded by the model version with calcite produced by nanophytoplankton and the one with calcite, respectively aragonite produced by mesozooplankton suggests that expending biogeochemical models to calcifying zooplankton might not be needed to simulate biogeochemical impacts on the marine carbonate cycle. The changes in saturation state confirm previous studies indicating that future anthropogenic CO2 emissions may lead to irreversible changes for several centuries. Furthermore, due to the long-term changes in the deep ocean, the ratio of open water CaCO3 dissolution to production stabilizes by the year 2500 at a value that is 30–50% higher than at pre-industrial times when carbon emissions are set to zero after 2100.

The full paper is available free of charge at http://www.biogeosciences.net/8/433/2011/bg-8-433-2011.html

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An aircraft-borne chemical ionization

ion trap mass spectrometer (CI-ITMS) for fast PAN and PPN measurements

An airborne chemical ionization ion trap mass spectrometer instrument (CI-ITMS) has been developed for tropospheric and stratospheric fast in-situ measurements of PAN (peroxyacetyl nitrate) and PPN (peroxypropionyl nitrate). The first scientific deployment of the FASTPEX instrument (FASTPEX = Fast Measurement of Peroxyacyl nitrates) took place in the Arctic during 18 missions aboard the DLR research aircraft Falcon, within the framework of the POLARCAT-GRACE campaign in the summer of 2008. The FASTPEX instrument is described and characteristic properties of the employed ion trap mass spectrometer are discussed. Atmospheric data obtained at altitudes of up to ~12 km are presented, from the boundary layer to the lowermost stratosphere. Data were sampled with a time resolution of 2 s and a 2 sigma detection limit of 25 pmol mol−1. An isotopically labelled standard was used for a permanent on-line calibration. For this reason the accuracy of the PAN measurements is better than ±10% for mixing ratios greater than 200 pmol mol−1. PAN mixing ratios in the summer Arctic troposphere were in the order of a few hundred pmol mol−1 and generally correlated well with CO. In the Arctic boundary layer and lowermost stratosphere smaller PAN mixing ratios were observed due to a combination of missing local sources of PAN precursor gases and efficient removal processes (thermolysis/photolysis). PPN, the second most abundant PAN homologue, was measured simultaneously. Observed PPN/PAN ratios range between ~0.03 and 0.3.

The full paper is available free of charge at http://www.atmos-meas-tech.net/4/173/2011/amt-4-173-2011.html

Roiger, A., Aufmhoff, H., Stock, P., Arnold, F., and Schlager, H.: An aircraft-borne chemical ionization – ion trap mass spectrometer (CI-ITMS) for fast PAN and PPN measurements, Atmos. Meas. Tech., 4, 173-188, doi:10.5194/amt-4-173-2011, 2011.

The model of self-generated seismo-electromagnetic oscillations

of the lithosphere-atmosphere system

Very low frequency (VLF) electromagnetic radiation (in diapason 1 kHz–1 MHz) in the atmosphere, generated during an earthquake preparation period, may be connected with the linear size characterising the expected earthquake focus. In order to argue this hypothesis, a very simple quasi-electrostatic model is used: the local VLF radiation may represent the self-generated (own) electromagnetic oscillations of interactive seismoactive segments of the lithosphere-atmosphere system. This model qualitatively explains the well-known precursor effects of earthquakes. In addition, using this model after diagnosing existing data makes it principally possible to forecast an expected earthquake with certain precision.

As a physical basis of the working hypothesis is the atmospheric effect of polarization charges occurring in the surface layer of the Earth, it is possible to test the following constructed model in the Earth's crust, where the reason for polarization charge generation may be different from piezo-electric mechanism, e.g., some other mechanism.

The full paper is available free of charge at http://www.solid-earth.net/2/17/2011/se-2-17-2011.html

Kachakhidze, M. K., Kereselidze, Z. A., and Kachakhidze, N. K.: The model of self-generated seismo-electromagnetic oscillations of the LAI system, Solid Earth, 2, 17-23, doi:10.5194/se-2-17-2011, 2011.

Atmospheric ions and nucleation

a review of observations

This review is based on ca. 260 publications, 93 of which included data on the temporal and spatial variation of the concentration of small ions (<1.6 nm in diameter) especially in the lower troposphere, chemical composition, or formation and growth rates of sub-3 nm ions. This information was collected on tables and figures. The small ions exist all the time in the atmosphere, and the average concentrations of positive and negative small ions are typically 200–2500 cm−3. However, concentrations up to 5000 cm−3 have been observed. The results are in agreement with observations of ion production rates in the atmosphere. The authors also summarised observations on the conversion of small ions to intermediate ions, which can act as embryos for new atmospheric aerosol particles. Those observations include the formation rates (J2[ion]) of 2-nm intermediate ions, growth rates (GR[ion]) of sub-3 nm ions, and information on the chemical composition of the ions. Unfortunately, there were only a few studies which presented J2[ion] and GR[ion]. Based on the publications, the formation rates of 2-nm ions were 0–1.1 cm−3 s−1, while the total 2-nm particle formation rates varied between 0.001 and 60 cm−3 s−1. Due to small changes in J2[ion], the relative importance of ions in 2-nm particle formation was determined by the large changes in J2[tot], and, accordingly the contribution of ions increased with decreasing J2[tot]. Furthermore, small ions were observed to activate for growth earlier than neutral nanometer-sized particles and at lower saturation ratio of condensing vapours.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/767/2011/acp-11-767-2011.html

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Experimental simulation of satellite observations

of 100 kHz radio waves from relativistic electron beams above thunderclouds

Relativistic electron beams above thunderclouds emit 100 kHz radio waves which illuminate the Earth's atmosphere and near-Earth space. This contribution aims to clarify the physical processes which are relevant for the spatial spreading of the radio wave energy below and above the ionosphere and thereby enables an experimental simulation of satellite observations of 100 kHz radio waves from relativistic electron beams above thunderclouds. The simulation uses the DEMETER satellite which observes 100 kHz radio waves from fifty terrestrial Long Range Aid to Navigation (LORAN) transmitters. Their mean luminosity patch in the plasmasphere is a circular area with a radius of 300 km and a power density of 22 uW/Hz as observed at 660 km height above the ground. The luminosity patches exhibit a southward displacement of 450 km with respect to the locations of the LORAN transmitters. The displacement is reduced to 150 km when an upward propagation of the radio waves along the geomagnetic field line is assumed. This residual displacement indicates that the radio waves undergo 150 km sub-ionospheric propagation prior to entering a magnetospheric duct and escaping into near-Earth space. The residual displacement at low (L < 2.14) and high (L > 2.14) geomagnetic latitudes ranges from 100 km to 200 km which suggests that the smaller inclination of the geomagnetic field lines at low latitudes helps to trap the radio waves and to keep them in the magnetospheric duct. Diffuse luminosity areas are observed northward of the magnetic conjugate locations of LORAN transmitters at extremely low geomagnetic latitudes (L < 1.36) in Southeast Asia. This result suggests that the propagation along the geomagnetic field lines results in a spatial spreading of the radio wave energy over distances of 1 Mm. The summative assessment of the electric field intensities measured in space show that nadir observations of terrestrial 100 kHz radio waves, e.g., from relativistic electron beams above thunderclouds, are attenuated by at least 50 dB when taking into account a transionospheric attenuation of 40 dB.

The full paper is available free of charge at http://www.atmos-chem-phys.net/11/667/2011/acp-11-667-2011.html

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Climate change and mountain water resourcesshallow sea

overview and recommendations for research, management and policy

Mountains are essential sources of freshwater for our world, but their role in global water resources could well be significantly altered by climate change. How well do we understand these potential changes today, and what are implications for water resources management, climate change adaptation, and evolving water policy? To answer above questions, the authors have examined 11 case study regions with the goal of providing a global overview, identifying research gaps and formulating recommendations for research, management and policy.

After setting the scene regarding water stress, water management capacity and scientific capacity in their case study regions, they examine the state of knowledge in water resources from a highland-lowland viewpoint, focusing on mountain areas on the one hand and the adjacent lowland areas on the other hand. Based on this review, research priorities are identified, including precipitation, snow water equivalent, soil parameters, evapotranspiration and sublimation, groundwater as well as enhanced warming and feedback mechanisms. In addition, the importance of environmental monitoring at high altitudes is highlighted. The authors then make recommendations how advancements in the management of mountain water resources under climate change could be achieved in the fields of research, water resources management and policy as well as through better interaction between these fields.

They conclude that effective management of mountain water resources urgently requires more detailed regional studies and more reliable scenario projections, and that research on mountain water resources must become more integrative by linking relevant disciplines. In addition, the knowledge exchange between managers and researchers must be improved and oriented towards long-term continuous interaction.

The full paper is available free of charge at http://www.hydrol-earth-syst-sci.net/15/471/2011/hess-15-471-2011.html

Viviroli, D., Archer, D. R., Buytaert, W., Fowler, H. J., Greenwood, G. B., Hamlet, A. F., Huang, Y., Koboltschnig, G., Litaor, M. I., López-Moreno, J. I., Lorentz, S., Schädler, B., Schreier, H., Schwaiger, K., Vuille, M., and Woods, R.: Climate change and mountain water resources: overview and recommendations for research, management and policy, Hydrol. Earth Syst. Sci., 15, 471-504, doi:10.5194/hess-15-471-2011, 2011.

Effect of tidal stream power generation on the region-wide circulation in a shallow sea

both energy extraction estimates and effects on region wide circulation depend on a complex combination of factors

This paper quantifies the backward effect on the ocean currents caused by a tidal stream farm located in the open shallow sea. Recent studies in channels with 1-D models have indicated that the power potential is not given purely by the flux of kinetic energy, as has been commonly assumed. In this study, a 3-D ocean circulation model is used to estimate (i) practically extractable energy resource at different levels of rated generation capacity of the farm, (ii) changes in the strength of currents due to energy extraction, and (iii) alterations in the pattern of residual currents and the pathways of passive tracers. As well as tidal streams, the model also takes into account the wind-driven and density-driven ocean currents. Numerical modelling has been carried out for a hypothetical tidal farm located in the Celtic Sea north of Cornwall, an area known for its high level of tidal energy. Modelling results clearly indicate that the extracted power does not grow linearly with the increase in the rated capacity of the farm. For the case study covered in this paper, a 100-fold increase in the rated generation capacity of the farm results in only 7-fold increase in extracted power. In the case of a high power farm, kinetic energy of currents is altered significantly as far as 10–20 km away from the farm. At high levels of extracted energy the currents tend to avoid flowing through the farm, an effect which is not captured with 1-D models. Residual currents are altered as far as a hundred kilometres away. The magnitude of changes in the dispersion of tracers is highly sensitive to the location. Some of the passive drifters analysed in this study experience significant variations in the end-to-start distance due to energy extraction ranging from 13% to 238% while others are practically unaffected. This study shows that both energy extraction estimates and effects on region wide circulation depend on a complex combination of factors, and the specific figures given in the paper should be generally considered as first estimates.

The full paper is available free of charge at http://www.ocean-sci.net/7/165/2011/os-7-165-2011.html

Shapiro, G. I.: Effect of tidal stream power generation on the region-wide circulation in a shallow sea, Ocean Sci., 7, 165-174, doi:10.5194/os-7-165-2011, 2011.

Past terrestrial water storage (1980–2008) in the Amazon Basin

reconstructed from GRACE and in situ river gauging data

Terrestrial water storage (TWS) composed of surface waters, soil moisture, groundwater and snow where appropriate, is a key element of global and continental water cycle. Since 2002, the Gravity Recovery and Climate Experiment (GRACE) space gravimetry mission provides a new tool to measure large-scale TWS variations. However, for the past few decades, direct estimate of TWS variability is accessible from hydrological modeling only. Here, the authors propose a novel approach that combines GRACE-based TWS spatial patterns with multi-decadal-long in situ river level records, to reconstruct past 2-D TWS over a river basin. Results are presented for the Amazon Basin for the period 1980–2008, focusing on the interannual time scale. Results are compared with past TWS estimated by the global hydrological model ISBA-TRIP. Correlations between reconstructed past interannual TWS variability and known climate forcing modes over the region (e.g., El Niño-Southern Oscillation and Pacific Decadal Oscillation) are also estimated. This method offers new perspective for improving the knowledge of past interannual TWS in world river basins where natural climate variability (as opposed to direct anthropogenic forcing) drives TWS variations.

The full paper is available free of charge at http://www.hydrol-earth-syst-sci.net/15/533/2011/hess-15-533-2011.html

Becker, M., Meyssignac, B., Xavier, L., Cazenave, A., Alkama, R., and Decharme, B.: Past terrestrial water storage (1980–2008) in the Amazon Basin reconstructed from GRACE and in situ river gauging data, Hydrol. Earth Syst. Sci., 15, 533-546, doi:10.5194/hess-15-533-2011, 2011.

Critical analysis of the electrostatic turbulence enhancements

observed by DEMETER over the Sichuan region during the earthquake preparation

In this paper, the authors report initial results from a detailed statistical study of the plasma waves observed by the DEMETER satellite over the Sichuan region during a period of 20 days encompassing the large earthquake of magnitude M =7.9 that occurred on 12 May 2008. The main objective of this paper is to present a statistical method to process and analyze plasma wave data and assist in detecting possible earthquake precursors among larger irregular disturbances arising from the natural variability of the ionized environment of the Earth. This method, presently used for dayside observations, involves two stages. First, VLF wave spectra are processed to recognize the various types of plasma waves usually observed at mid and low latitudes and derive a reduced number of parameters that fully characterize these emissions and may be conveniently used for a detailed statistical study. In a second stage, the authors perform a statistical analysis of the results by taking into account two "reference zones" displaced respectively 30° eastward and westward from the "epicentre zone". Plasma and wave disturbances possibly induced by earthquakes in preparation are likely to maximize close to the "epicentre zone", while natural disturbances associated, in particular, with the varying magnetic activity are rather uniform over a wider longitude sector, thus enabling the use of observations over the reference zones as a base line. The initial results of this study show a deviation of the power spectrum of electrostatic turbulence in the epicentre zone about 6 days prior to the earthquake but no significant anomalous variations can be observed on other characteristics of plasma waves. From the analysis of the data over the two reference~zones and using recently produced sector magnetic activity indices, they conclude that the enhancement of electrostatic turbulence is associated with magnetospheric processes rather than with pre-seismic activity.

The full paper is available free of charge at http://www.nat-hazards-earth-syst-sci.net/11/561/2011/nhess-11-561-2011.html

Onishi, T., Berthelier, J.-J., and Kamogawa, M.: Critical analysis of the electrostatic turbulence enhancements observed by DEMETER over the Sichuan region during the earthquake preparation, Nat. Hazards Earth Syst. Sci., 11, 561-570, doi:10.5194/nhess-11-561-2011, 2011.

Debye-scale solitary structures measured in a beam-plasma laboratory experiment

The velocities of the solitary structures are found to be much lower than the beam velocities, suggesting an excitation mechanism driven by parallel currents associated to the electron beam

Solitary electrostatic pulses have been observed in numerous places of the magnetosphere such as the vicinity of reconnection current sheets, shocks or auroral current systems, and are often thought to be generated by energetic electron beams. The authors present results of a series of experiments conducted at the UCLA large plasma device (LAPD) where a suprathermal electron beam was injected parallel to a static magnetic field. Micro-probes with tips smaller than a Debye length enabled the detection of solitary pulses with positive electric potential and half-widths 4–25 Debye lengths, over a set of experiments with various beam energies, plasma densities and magnetic field strengths. The shape, scales and amplitudes of the structures are similar to those observed in space, and consistent with electron holes. The dependance of these properties on the experimental parameters is shown. The velocities of the solitary structures (1–3 background electron thermal velocities) are found to be much lower than the beam velocities, suggesting an excitation mechanism driven by parallel currents associated to the electron beam.

The full paper is available free of charge at http://www.nonlin-processes-geophys.net/18/41/2011/npg-18-41-2011.html

Lefebvre, B., Chen, L.-J., Gekelman, W., Kintner, P., Pickett, J., Pribyl, P., and Vincena, S.: Debye-scale solitary structures measured in a beam-plasma laboratory experiment, Nonlin. Processes Geophys., 18, 41-47, doi:10.5194/npg-18-41-2011, 2011.

Geosciences Information for Teachers (GIFT) 2011 Workshop: Evolution and Biodiversity

April 3-6, 2011, Austria Center, Vienna

The EGU Committee on Education celebrates 200 years since the birth of Charles Darwin and 150 years after publication of "The Origin of Species" with a GIFT workshop on "Evolution and Biodiversity". In the "Evolution" portion of the workshop, historical aspects of the theory of evolution will be addressed as well as modern views provided by molecular genetics studies that have been developed in the last 10-15 years. These studies provide confirmation of the theory of evolution and allow major aspects of it to be much better understood. Relationships to major geological events, such as the Snowball Earth and its deglaciation will be explored along with climatic influences on the critical intervals in Late Pleistocene human evolution. Special attention will be paid to human evolution. A number of hands-on activities that allow for introduction of critical concepts into the classroom will also be demonstrated.

Another major aspect of the GIFT-2011 workshop will be devoted to "Biodiversity" – the biological richness of an ecosystem – that is the product of nearly 3.5 billion years of evolution. On Dec. 20, 2006 the General Assembly of the UN declared 2010 as the International Year of Biodiversity. In the present Anthopocene, species are being lost at rates far higher than natural extinction rates, to the point that some ecologists believe that we are witnessing the sixth great extinction wave of our planet. Some of the vast resources made available during this year will be accessed for developing with the teachers educational aspects of biodiversity and its conservation.

More info on this and previous GIFT Workshops can be found at

http://www.egu.eu/media-outreach/gift/home.html

Wikis in higher education

can be part of an inexpensive solution to teaching and assessment

03 December 2010.- A wiki, from the Hawaiian word for hurry, wiki-wiki, is a website that allows interlinked pages to be created and edited rapidly. In general, a wiki is editable by its readers or members, as is the case with the online encyclopedia Wikipedia.

Now, Anne Smith, Keith Halcro and Douglas Chalmers have presented the results of an experiment in using a wiki, in a higher education entrepreneurship context. The researchers have found that because wikis can be created, shared and edited among multiple users, that they present an ideal opportunity for learning in student groups. `Web 2.0 is evolving rapidly, and it is clear that these new technologies bring diverse groups together; connecting previously unconnected businesses with universities and students in social learning`, the team says.

The team engaged students on an entrepreneurship course to contribute to wikis in different ways: individually and in groups of three to five students to produce formative and summative assessments. The researchers then monitored and assessed the creativity and techniques used by the students in building a valuable online resource. They also collected data on student experience through questionnaires and reflective reports. Their results suggest that web 2.0 tools such as wikis can be part of an inexpensive solution to teaching and assessment.

Despite the positive results, the team concedes that there are some issues of wiki management and student assessment that must be considered as the approach is developed for wider use in higher education.

Reference

Anne M.J. Smith, Keith Halcro and Douglas Chalmers, Using web 2.0 technology in entrepreneurship education: Wikis as a tool for collaborative and collective learning, Int. J. Innovation in Education, 1, 124-138, 2010.

EGU General Assembly, Vienna, 3-8 April 2011

The EGU General Assembly 2011 will bring together geoscientists from all over the world into one meeting covering all disciplines of the Earth, Planetary and Space Sciences. Especially for young scientists the EGU appeals to provide a forum to present their work and discuss their ideas with experts in all fields of geosciences. The EGU is looking forward to cordially welcome you in Vienna!

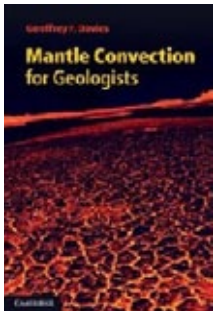
http://meetings.copernicus.org/egu2011/

Biominerals and Fossils Through Time

Authors: Jean-Pierre Cuif, Yannicke Dauphin and James E. Sorauf
Publisher: Cambridge University Press
ISBN: 9780521874731
YEAR : 2011
EDITION : 1st
PAGES : 489
PRICE : 88.00 €
Hardback

Fossils are essential to the reconstruction of the evolution of life and episodes in Earth history. Knowledge of biomineralization - the processes associated with the formation of mineralized biological structures - is essential to properly evaluate data derived from fossils. This book emphasizes skeletal formation and fossilization in a geologic framework in order to understand evolution, relationships between fossil groups, and the use of biomineral materials as geochemical proxies for understanding ancient oceans and climates. The focus is on shells and skeletons of calcareous organisms, and the book explores the fine structures and mode of growth of the characteristic crystalline units, taking advantage of most recent physical methodological advances. The book is richly illustrated and will be of great interest to advanced students and researchers in paleontology, Earth history, evolution, sedimentology, geochemistry, and materials science.

Mantle Convection for Geologists



Authors: Geoffrey F. Davies
Publisher: Cambridge University Press
ISBN: 9780521198004
YEAR : 2011
EDITION : 1st
PAGES : 232
PRICE : 41.00 €
Hardback

Mantle convection is the fundamental agent driving many of the geological features observed at the Earth's surface, including plate tectonics and plume volcanism. Yet many Earth scientists have an incomplete understanding of the process. This book describes the physics and fluid dynamics of mantle convection, explaining what it is, how it works, and how to quantify it in simple terms. It assumes no specialist background: mechanisms are explained simply and the required basic physics is fully reviewed and explained with minimal mathematics. The distinctive forms that convection takes in the Earth's mantle are described within the context of tectonic plates and mantle plumes, and implications are explored for geochemistry and tectonic evolution. Common misconceptions and controversies are addressed - providing a straightforward but rigorous explanation of this key process for students and researchers across a variety of geoscience disciplines.

Mantle Convection for Geologists

Authors: Weeks, W. F.
Publisher: University of Alaska Press
ISBN: 9781602230798
YEAR : 2010
EDITION : 1st
PAGES : 680
PRICE : 65.00 €
Hardback

Covering more than seven percent of the earth's surface, sea ice is crucial to the functioning of the bioshpere- and is a key component in our attempts to understand and combat climate change. With this book, geophysicist W. F. Weeks delivers a natural history of sea ice, a fully comprehensive and up-to-date account of our knowledge of its creation, change, and function. W. F. "Willy" Weeks is a geophysicist with long-term interests in the ice covers of the polar oceans. He received his B.S. and M.S. degrees in geology from the University of Illinois and his Ph.D. in geochemistry from the University of Chicago. He has authored over 300 technical papers on various aspects of the polar regions and has contributed to several monographs on sea ice. In addition to his scientific interests, he is a contrabassist currently playing with orchestras in the Portland, Oregon area.

Darwin Summer School on Biogeosciences - (Course)

04/07/2011 - 15/07/2011 - Utrecht and Texel, The Netherlands

The first edition of the Darwin Summer School will address the perturbation of the global carbon cycle, in the past, present and future. Main subjects will be ocean acidification and the carbon cycle, microbial ecology and biomarkers and terrestrial carbon cycling. Renowned scientists like Jack Middelburg, Jelle Bijma, Henry Hooghiemstra, Stefan Schouten and many others will provide you with the latest results in research on these subjects. This Summer School is all about interdisciplinary research: you are expected to work on the interface of biology, earth sciences, chemistry and physics.

The Darwin Summer School aims at enthusiastic and motivated MSc students who have a background in biogeosciences, and starting PhD students interested in an excellent introduction to the field of biogeosciences.

Darwin Center for Biogeosciences

The Darwin Center for Biogeosciences is a successful network promoting truly interdisciplinary research on how System Earth is working under continuously changing conditions. The Center integrates 20 excellent Dutch research groups into a single national institute. The 64 research projects started to date involve 52 PhD students and 12 postdocs working on research topics such as climate reconstructions, the carbon and nitrogen cycle, microbiological processes and ocean acidification.

Fee

• € 895 - Course + course materials + housing (Utrecht & Texel) + some socials
• € 560 - same as above but without housing in Utrecht

Scholarships

A limited number of scholarships in the form of (partial) fee waivers and/or accommodation intended for talented students is available. There are no travel grants. If you seek financial support you should state your request (by e-mail to darwinfo@geo.uu.nl) by describing the reasons for applying to this Summer School and how your participation will assist you in future studies and your career. You should motivate your financial situation and other means you have available for financing your participation to this Summer School. The applications for scholarships will undergo a selection procedure.

Application deadline: 1 June 2011

http://www.darwincenter.nl/DarwinCenter.aspx?id=561

Comprehensive Nuclear-Test-Ban Treaty: Science and Technology 2011 (CTBT: S&T2011) - (Course)

08/06/2011 - 10/06/2011 - Hofburg Palace, Vienna, Austria

To build and strengthen its relationship with the broader science community in support of the Treaty, the CTBTO invites the community to a scientific conference CTBT: Science and Technology 2011 (S&T2011) to be held from 8 to10 June 2011 at the Hofburg Palace in Vienna, Austria. This multidisciplinary scientific conference, designed to foster partnerships on many levels, will be of interest to working scientists and technologists, science administrators, scientific representatives to the CTBTO's policy-making organs, and representatives of agencies that fund research and development in areas potentially relevant to the Treaty's verification system.

Conference Goals

The three major goals of the conference are to:

1. Discuss advances in science and technology relevant to test ban verification.
2. Explore scientific applications of the CTBT verification infrastructure.
3. Encourage partnerships and knowledge exchange between the CTBTO and the broader scientific community.

Organizer:
Comprehensive Nuclear-Test-Ban Treaty Organization
CTBTO Preparatory Commission
Vienna International Centre
PO Box 1200
1400 Vienna, Austria

http://www.ctbto.org/specials/ctbt-science-and-technology-20118-10-june-2011-vienna-austria/

Ana Elena L. Conjares
International Data Center (IDC)
CTBTO Preparatory Commission
Vienna International Centre
PO Box 1200
1400 Vienna, Austria
sandt@ctbto.org

EMS & ECAM 2011 Conference - (Meeting)

12/09/2011 - 16/09/2011 - Berlin, Germany

We draw your attention to the 11th Annual Meeting of the European Meteorological Society (EMS) and the 10th European Conference on Applications of Meteorology (ECAM).

EMS & ECAM 2011 Conference theme: Forecasting the weather - ensemble techniques in probabilistic weather prediction.

Deadline for abstract submission with application for Young Scientist Travel Award (YSTA) or waiver: 25 March 2011.

DEADLINE FOR ABSTRACT SUBMISSION: 21 APRIL 2011.

The Session programme consists of five programme groups: - ECAM: Applications of Meteorology (AM)
- The atmospheric system and its interactions (ASI)
- Communication and education (CE)
- Numerical weather prediction (NWP)
- Climate (CL)

The call-for-papers leaflet can be downloaded at http://meetings.copernicus.org/ems2011/ems_ecam2011_call_for_papers.pdf

We especially draw your attention on Session AW11 "ENVIRONMENTAL METEOROLOGY (from local to global)" (see scope below):

Information on registration, accommodation, travel routes, awards, visa requirements, social events and exhibition opportunities will also become available on this conference web site. More practical information from the EMS Executive Secretary Martina Junge, E-mail: ems-sec@met.fu-berlin.de

Please do not hesitate to forward this message to colleagues who may be interested in submitting an abstract.

We look forward to receiving your contributions.

http://meetings.copernicus.org/ems2011

GAIA Climate Change and Public Health Workshop - (Meeting)

12/04/2011 - 14/04/2011 - Johns Hopkins University Mt. Washington Conference Center in Baltimore, MD

The GAIA community offers a series of interrelated conferences that address the impacts of climate disruption. You will be able to learn, be heard, and create interactive tools. The first GAIA event will be on the impact of Climate, Climate Change, and Public Health http://gaia.jhuapl.edu/events/cccaph, hosted on April 12-14, 2011, at the Johns Hopkins University Mt. Washington Conference Center in Baltimore, MD.

Another event, Climate Disruption and Security, will be held August 2011 in Washington, DC. We have put together a broad program that includes researchers and practitioners in fields including climate research, public health, informatics, social science, economics, and public policy. You can join us to:
- develop a broader understanding of the issues;
- understand the relevance of your work to others, surface your issues to a wider community;
- determine how we can work together to meet evolving needs;
- define tools you need to help you; and develop more effective strategies for mitigation and adaptation.

GAIA events will include background talks by world-renowned subject matter experts as well as more focused, targeted presentations, workshops, contributed talks and posters. This provides you with a broad perspective as well as focused resources. These contributions will also be published as conference proceedings (see our Call for Participation http://gaia.jhuapl.edu/node/86).

At these GAIA events, we will take advantage of recent advances in networking and social interaction to hold "cyber-enabled" workshops during the conference. It is in this workshop setting that you will participate in the active and ongoing development of "point papers" from our community.

The GAIA events are sponsored by The Johns Hopkins University Applied Physics Laboratory along with our partners: the JHU Bloomberg School of Public Health, JHU Department of Earth and Planetary Sciences, and JHU School for Advanced International Studies, along with participation from the Woods Hole Oceanographic Institution, the Office of the Chief Knowledge Architect of the NASA Jet Propulsion Laboratory, the University of Maryland Center for Integrative Environmental Research, and the NOAA Climate Program Office, among others.

We invite you to participate in this event. More information and registration is at http://gaia.jhuapl.edu.

http://gaia.jhuapl.edu/events

The Mathematics of the Climate System - (Meeting)

12/09/2011 - 15/09/2011 - Reading

This conference will be about the construction and use of mathematical models of the climate system. Such models aid our understanding of how certain climate processes interact. They also enable us to assess, interpret and diagnose more comprehensive climate models. Finally, they provide readily understandable paradigms for dynamical climate-system behaviour.

The conference will focus on three related topics:

1) the extraction of mathematical models from climate data and climate-model output (homogenisation, stochastic model reduction, bistability and metastable states, low frequency variability, data-driven coarse-graining, set-oriented methods, trend identification, time-series analysis);

2) reduced models and their dynamics (linear response theory, bifurcations, extreme events, uncertainty); and

3) testing hypotheses about the climate system using statistical frameworks (emulators, Bayesian methods, nonparametric methods, equitability).

Call For Papers Papers will be accepted for the conference based on a 100-200 word abstract. Abstracts should be submitted by 6 May 2011 either online at http://online.ima.org.uk/ or by email to conferences@ima.org.uk.

Organizer:
Organising Committee
Colin Cotter (Imperial College, London)
Mike Cullen (Met Office, Exeter)
Mike Davey (Met Office and University College London)
Christopher Ferro (University of Exeter)
John Huthnance (National Oceanography Centre)
David Stainforth (London School of Economics)
Paul Williams (Conference Chair) (University of Reading)

http://www.ima.org.uk/Conferences/mcs2011.html

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WCRP Open Science Conference: Climate Research in Service to Society - (Meeting)

24/10/2011 - 28/10/2011 - Denver, Colorado, USA

A better understanding of the behaviour of the climate system and its interactions with other Earth system components is critical to predict its future evolution, reduce vulnerability to high impact weather and climate events, and sustain life. This need is perhaps greater than ever before given that humans have emerged as the dominant agent of future change. Progress will require, moreover, an increasingly holistic approach across scientific disciplines, as well as an unprecedented commitment to the development of a diverse and talented future workforce. To advance on such challenges, the WCRP will assemble for the first time ever its entire research community, and engage other key international research programmes, in a major Open Science Conference (OSC) in October 2011. Through a unique synthesis of research findings, the OSC will assess our current state of knowledge on climate variability and change, identify the most urgent scientific issues and research challenges, and ascertain how the WCRP can best facilitate research and develop partnerships critical for progress.

CONFERENCE PROGRAM

The WCRP OSC is organized around daily themes that reflect integrative aspects of the WCRP programme, as well as connections to other international research programmes. Each day will consist of plenary presentations and discussions by leading scientists and conference participants who are informed by community-based position papers. The plenary sessions will be followed by parallel and poster sessions, which will be the primary means for conference participants to present their research findings. The poster sessions will have their own dedicated time for viewing and one-on-one discussions with authors, thus avoiding overlap with the plenary and parallel sessions. Moreover, groups are encouraged to self-organize and submit cluster of posters addressing a specific topic, preferably as part of one of the planned sessions. All sessions are structured to foster discussion and dialogue.

DAILY THEMES

• The Climate System Components and Their Interactions.
• Observation and Analysis of the Climate System.
• Assessing and Improving Model and Predictive Capabilities.
• Climate Assessments and Future Challenges.
• Translating Scientific Understanding of Climate System into Climate Information for Decision Makers.

IMPORTANT DATES

• December 1, 2010: Abstract submission and registration begins.
• March 31, 2011: Last day to submit request for travel support, to submit abstract for those requesting travel support and for those needing US Visas.
• April 30, 2011: Last day to submit abstracts (everyone!).
• June 30, 2011: Early registration deadline

Organizer:
World Climate Research Programme

http://www.wcrp-climate.org/conference2011/

Nico Caltabiano, National Oceanography Centre, Southampton, UK - caetano@noc.soton.ac.uk

ESF-EMBO SYMPOSIUM: Molecular Bioenergetics of Cyanobacteria: From Cell to Community - (Meeting)

10/04/2011 - 15/04/2011 - Hotel Eden Roc, Sant Feliu de Guixols, Catalonia, Spain

Among all groups of prokaryotes, few have played a bigger role than cyanobacteria on the global scale. The appearance of cyanobacteria, about 3 billion years ago, brought a radical transition of the Earth's environment as the oxygen they produced from their photosynthetic activity turned the anoxic world into an oxic one. Their tremendous diversity in terms of activity and structure make them interesting models for studies covering diverse disciplines such as evolution, biology, environmental science, and geology. Consequently, the techniques and approaches used by cyanobacteriologists to address different scientific problems have also been diverse, often at the interface of biology, chemistry, physics and informatics. The conference will reflect these diversities, offering a rich source for scientific exchanges. The first ESF meeting on the Molecular Bioenergetics of Cyanobacteria took place in 1999. Since then, 5 meetings have been organised. This high-level meeting series has gained strong international visibility and become over the years a "brand name" in this field, attracting the best scientists not only from Europe, but also the rest of the world.

Invited speakers will include:
* Eva-Mari Aro - University of Turku, FI.
* Birgitta Bergman - Stockholm University, SE.
* Franck Chauvat - CEA, FR.
* Karl Forchhammer - University of Tubingen, DE.
* James Golden - University of California, US.
* Susan Golden - University of California, US.
* Antonia Herrero - Centro de Investigaciones Cientificas Isla de la Cartuja, ES.
* Martin Hagemann - University of Rostock, DE.
* Amel Latifi - Universite de la Mediterranee, FR.
* Hans Matthijs - University of Amsterdam, NL.
* Frederic Partensky - CNRS, Roscoff, FR.
* Claudia Steglich - University of Freiburg, DE.
* Imre Vass - Hungarian Academy of Science, HU.
* Annegret Wilde - University of Giessen, DE.
* Cong-Zhao Zhou - University of Science and Technology of China, CN.

A certain number of grants will be available for early stage researchers to cover the conference fee and possibly part of the travel costs. Grant requests should be made by ticking appropriate field(s) in the paragraph "Grant application" of the application form: http://www2.esf.org/asp/esfrcaf.asp?confcode=351&meetno=1.

ESF contact for further information: Jean Kelly - jkelly@esf.org.

Chaired by:
Cheng-Cai Zhang - Universite d'Aix-Marseille II and CNRS, FR;
Elke Dittmann - University of Potsdam, DE &
Conrad Mullineaux - Queen Mary University of London, UK.

Closing date for applications: 27 January 2011.

Organizer:
This conference is organised by the European Science Foundation (ESF),
in partnership with the European Molecular Biology Organization (EMBO).

www.esf.org/conferences/11351

MedCLIVAR Final Conference - Mediterranean Climate: From Past to Future - (Meeting)

06/06/2011 - 09/06/2011 - Lecce, Italy

MedCLIVAR (Mediterranean Climate Variability and Predictability - www.medclivar.eu) is an international programme, sponsored by the European Science Foundation and endorsed by CLIVAR, which aims at coordinating and promoting the study of the Mediterranean climate. The peculiar geographical location and the topographical features of the Mediterranean area makes it a region which is very sensible to global climate change. The vulnerability of Mediterranean environment and societies requires a consolidated knowledge of climate processes and evolution at regional scale. The main goals of MedCLIVAR include reconstruction of Mediterranean climate past evolution, description of patterns and mechanisms characterizing its space-time variability, understanding of regional climate dynamics and identification of the forcing responsible for observed and future changes. The networking activities of MedCLIVAR put together expertise in different research sectors and create a forum where to interchange the results and facilitate synergy.

Objectives of the conference are:
* to discuss the "state of the art" on the Mediterranean climate and analyze its variability and trends;
* to present the available knowledge on future climate change at regional scale;
* to provide a basis for the analysis of climate change impacts on Mediterranean environment and societies;
* to offer a forum for presenting and discussing results of international and national research projects;
* to identify research hotspots and critical issues;
* to bring together experts from complementary fields of climate research and favor exchange of information among them;
* to discuss future targets of climate research in the Mediterranean region.

Invited speakers and talks will include:
* Mediterranean climate: relevant and important scientific issues. P. Lionello - University of Salento, IT & P. Drobinski - LMD Jussieu, FR.
* The circulation of the Mediterranean sea: trends and changes. A. Harzallah - INSTM, TN & V. Zervakis - University of the Aegean, EL.
* Paleoclimatic evidence from the Mediterranean - Part 1: The last hundred thousands of year - Part 2: The past 2000 years. J. Luterbacher - Justus Liebig University Giessen, DE & F. Abrantes - INETI, PT.
* Synoptic patterns: climatology and trends. U. Ulbrich - Freie Universit?t Berlin, DE & A. Jans? - AEMET, ES.
* Mediterranean sea level. M. Tsimplis - NOCS, UK & D. Gomis - Universitat de les Illes Balears, ES.
* Modelling of the Mediterranean climate system. L. Li - Laboratoire de M?t?orologie Dynamique, FR & P. Ruti - ENEA, IT.
* Aerosols chemistry and climate. F. Dulac - CEA, FR & J. Lelieveld - Max-Planck-Institut f?r Chemie, DE.
* The climate of the Mediterranean region in future climate projections. S. Planton - Meteo France, FR.
* The Mediterranean climate research: Integrated and national projects. V. Ducrocq - Meteo France, FR & S. Gualdi - INGV, IT.
* Extremes and impact of climate variability and change. M.C. Llasat - University of Barcelona, ES & E. Xoplaki - Universit?t Bern, CH.
* Discussion panel. V. Artale - ENEA, IT & E. Papathanassiou - Hellenic Centre for Marine. Research, EL.

The conference is open to scientists world-wide, whether from academia or industry. Attendance is possible only after successful application. A certain number of grants will be available for students, postdocs and early stage researchers to cover the conference fee and, possibly, part of the travel costs. Grant requests should be made by ticking appropriate field(s) in the paragraph "Grant application" of the application form: http://www2.esf.org/asp/esfrcaf.asp?confcode=349&meetno=1.

ESF contact for further information: Anne Blondeel - ablondeel@esf.org.

Closing date for applications: 20 February 2011.

Organizer:
This conference is organised by the European Science Foundation (ESF), in partnership with MedCLIVAR.

Organising Committee: Piero Lionello, University of Salento, IT; Uwe Ulbrich, Freie Universitat Berlin, DE; Jurg Luterbacher, Justus Liebig University Giessen, DE; Mikis Tsimplis, NOCS, UK & Pinhas Alpert, Tel-Aviv University, IL.

www.esf.org/conferences/11349

ESF-LFUI Conference: Water Governance: Meeting the Challenges of Global Change - (Meeting)

05/06/2011 - 10/06/2011 - Obergurgl, Austria

The requirements for sustainable management of environmental resources in general, and of water in particular, have been a topic of continued concern. Critical voices have recognized that prevailing environmental resources management approaches have been mechanistic and technocratic

largely neglecting complexity and the human dimension and have argued for a radical paradigm shift. In terms of policy approaches, there has been a tendency to focus on standard policy solutions (e.g. liberalisation of water services) for vastly different policy contexts and situations, many of which have had counter-productive results.

This ongoing debate has been fuelled by prospects of climate and global change which render the conditions under which management has to perform increasingly unpredictable.

Globalization exhibits breathtaking dynamics and leads to large scale changes with unprecedented speed. In particular climate change and the concomitant increase of extreme weather events has exposed the vulnerability and lack of resilience of water resource management regimes. Many problems are not primarily associated with the resource base but can be attributed to governance failures and poor understanding of how ecosystem - human institution interactions further affect ecosystem services and human use. The human dimension has a central role and strong emphasis needs to be given to governance issues.

Governance embraces the full complexity of a wide range of regulatory processes and their interaction. This is reflected in the definition of water governance by UNDP: “Water governance refers to the range of political, social, economic and administrative systems that are in place to regulate development and management of water resources and provisions of water services at different levels of society (UNDP, 2000)”.

A major challenge is to understand how all these different processes in concert determine certain policy outcomes and how change in governance regimes occurs. What is required to increase the adaptive capacity of governance regimes and meet at the same time the normative principles of ‘good water governance? Governance regimes are characterized by self-organization, emergence and diverse leadership.

What is yet lacking in general is a profound understanding of what “managing change” might imply in such diffuse, complex and multi-level networks, how all these complex processes act in concert and under which conditions they lead to a sustainable governance of environmental resources.

The conference will make a major contribution to establishing the state of the art, to identify major future challenges and support the establishment of a scholary community in the emerging field of water governance.

Conference objectives:

* establish state of the art on major recent insights and advances in concepts and methodology in analyses of water governance and policy

* bridge regional and global scales in multi-level analyses of water governance

* strengthen the emerging community of water governance scholars

Provisional list of invited speakers:

* Paula Antunes, New University of Lisbon, PT. Evaluation of sustainable water governance and ecosystem services.

* Frank Biermann, VU Amsterdam, NL. The evolution of law and politics.

* Janos Bogardi, GWSP, Bonn, DE. The global water challenge.

* Declan Conway, University of East Anglia, UK. Climate change adaptation, vulnerability.

* William Cosgrove, Ecoconsult Inc. Montreal, CA. A complementary keynote speech from a policy/practitioner’s perspective.

* Matthias Finger, Management of Public Enterprises, IDHEAP, EPFL, Lausanne, CH.

* Helen Ingram, University of California, Irvine, US. Beyond universal remedies for good water governance.

* Louis Lebel, USER - Unit for Social and Environmental Research and Chiang Mai University, TH. Transitions in water governance: a perspective from developing countries.

* Josefina Maestu, UN-Water Decade Programme of Advocacy and Communication, ES.

* Lyla Mehta, University of Sussex, UK. Politics of scarcity and security aspects.

*Peter Mollinga, SOAS, London, UK. New perspectives on global environmental governance.

* Elinor Ostrom, Indiana University, Bloomington, US. Video Conference - Beyond panaceas, need for shared ontologies on data from socio-ecological systems.

* Claudia Pahl-Wostl, University of Osnabruck, DE.

- The importance of the overall field and the session themes from a scientific perspective.

- Dynamics of governance and role of multi-level and multi-scale learning processes.

* Roger A. Pielke, University of Colorado, and Fellow of the Cooperative Institute for Research in Environmental Sciences (CIRES), US.

* Benoit Rihoux, Universite catholique de Louvain (UCL), BE. Qualitative comparative analysis and related methods.

* Maria Saleth, Madras Institute of Development Studies (MIDS), Chennai, IN. Institutional economics of water - cross-country analyses of water governance regimes and their performance.

* Roland Schulze, University of KwaZulu Natal, Scotsville, ZA.Climate change impacts on water, hydrological regimes.

* Koos Wieriks, Secretary to the Dutch Advisory committee of Water, NL.

The conference is open to scientists world-wide, whether from academia or industry. Attendance is possible only after successful application. A certain number of grants will be available for early-stage researchers to cover the conference fee and possibly part of the travel costs. Grant requests should be made by ticking appropriate field(s) in the paragraph “Grant application” of the application form: http://www2.esf.org/asp/esfrcaf.asp?confcode=364&meetno=1.

ESF contact for further information: Victoria Ibbertson - vibbertson@esf.org.

Chaired by:
Claudia Pahl-Wostl - University of Osnabruck, DE;
Joyeeta Gupta - IVM FU Amsterdam, NL &
Theo Toonen - TU Delft, NL

Closing date for applications: 21 February 2011.

Organizer:
This conference is organised by the European Science Foundation (ESF), in partnership with the Leopold-Franzens-Universitat Innsbruck (LFUI).

www.esf.org/conferences/11364

ESF-LFUI Conference: Charge Transfer in Biosystems - (Meeting)

17/07/2011 - 22/07/2011 - Obergurgl, Austria

The Conference aims at bringing together scientists active world-wide in the theoretical and experimental investigation of charge transfer in biomolecules and complex systems that include a biological component (such as protein/surface and DNA/surface interfaces), to assess the state of the art in the field in terms of methods and knowledge. We also aim at training young scientists who pursue a multidisciplinary career that bridges physics, chemistry, biology and engineering. Another expected outcome is the creation of new collaborations that potentially may open new research avenues and lead to expanding knowledge in the near future.

Charge transfer in biological molecules is a crucial issue for its implications in chemical reactions in living organisms and for the potential exploitation in nanotechnology. The measurement and theoretical description of the phenomena have been traditionally developed and carried out by the chemistry community, with typical instruments and tools. In the last couple of decades, with the advent of nanotechnology and the investigation of nucleic acids and proteins in this context, different communities have also come into play, notably physics and engineering. Therefore, new investigation methods have been prepared and applied, in both experiment and theory. The field is now mature to integrate the various approaches towards a consensus that would boost a deeper investigation of charge transfer in bio-systems in solution and interacting with solid materials, to gain new knowledge towards improving diagnostics and therapeutics on one hand and developing the next-generation nano scale electronic devices on the other hand.

Few events have so far occurred to bring together the various communities that can convoy their expertise to improve the understanding of charge transfer phenomena. Given the latest developments in theoretical methods and experiments, the proposed conference is quite timely and the originality that can emerge from mixing experiences is outstanding.

Invited speakers will include:

* Jacqueline Barton - Caltech, Pasadena, US
* Jochen Blumberger - University of Cambridge, UK
* Krzysztof Bobrowski - Institute of Nuclear Chemistry and Technology, Warsaw, PL
* Thomas Carell - Ludwig-Maximilians University, Munich, DE
* Giovanni Cuniberti - Technical University of Dresden, DE
* P. Leslie Dutton - University of Pennsylvania, Philadelphia, US
* Paolo Facci - CNR-NANO-S3, Modena, IT
* Torsten Fiebig - ANSER, Northwestern University, Evanston, US
* Francesco L. Gervasio - Centro Nacional de Investigaciones Oncologicas, Madrid, ES
* Ferdinand Grozema - Delft University of Technology, NL
* Joshua Jortner - Tel Aviv University, IL
* Rudy Marcus - California Institute of Technology, US
* Dimitra Markovitsi - URA CEA-CNRS, Saclay, FR
* Nicola Marzari - University of Oxford, UK
* Maria-Elisabeth Michel-Beyerle - Nanyang Technological University, Singapore, SG
* Agostino Migliore - Tel Aviv University, IL
* Abraham Nitzan - Tel Aviv University, IL
* Danny Porath - Hebrew University of Jerusalem, IL
* Mark Ratner - Northwestern University, Evanston, US
* Gary Schuster - Georgia Institute of Technology, Atlanta, US
* Spiros Skourtis - University of Cyprus, Nicosia, CY
* Alessandro Troisi - University of Warwick, Coventry, UK
* Hans-Achim Wagenknecht - University of Regensburg, DE

The conference is open to scientists world-wide, whether from academia or industry. Attendance is possible only after successful application. A certain number of grants will be available for early-stage researchers to cover the conference fee and possibly part of the travel costs. Grant requests should be made by ticking appropriate field(s) in the paragraph “Grant application” of the application form http://www2.esf.org/asp/esfrcaf.asp?confcode=354&meetno=1.

ESF contact for further information: Victoria Ibbertson - vibbertson@esf.org.

Chaired by:
Rosa Di Felice - Center S3, CNR-NANO, Modena, IT;
Yuri Berlin - Northwestern University, Evanston, US &
Marcus Elstner - Karlsruhe Institute of Technology, DE.

Closing date for applications: 14 April 2011.

Organizer:
This conference is organised by the European Science Foundation (ESF), in partnership with the Leopold-Franzens-Universitat Innsbruck (LFUI).

www.esf.org/conferences/11354

2nd International Exergy, Life Cycle Assessment, and Sustainability Workshop & Symposium (ELCAS-2) - (Meeting)

19/06/2011 - 21/06/2011 - Nisyros - Greece

The European Cooperation in Science and Technology, COST Action C24(COSTeXergy), invites engineers, researchers, scientists, to join leading researchers in a unique volcanic scenic Greek Island setting for keynote lectures and papers presentations on the occasion of the 2nd International Exergy, Life Cycle Assessment, and Sustainability Workshop & Symposium (ELCAS-2).

The topics covered at ELCAS are many (See website) and are concentrated in the four scientific areas:

- Exergy Analysis and Exergoeconomics
- Life Cycle Assessment
- Energy and the Environment
- Sustainable Development

You are all invited to submit your paper!

The 2nd International Exergy, Life Cycle Assessment, and Sustainability Workshop & Symposium (ELCAS) will provide a multidisciplinary international forum for researchers, scientists, engineers and practitioners from all over the world to exchange information, to present high-quality research results and new

developments in the wide domain covered by exergy, life cycle assessment, the energy and environment, and sustainability issues.

The deadline for submitting your abstract is January 31, 2011.

Detailed Information are available at: http://www.elcasnet.com

Contact:
Dr. Christopher Koroneos
Chairman of The European Cooperation in Science and Technology COST Action C24(COSTeXergy), mail: elcas@aix.meng.auth.gr

Organizer:
The European Cooperation in Science and Technology (COST), COST Action C24(COSTeXergy), and United Nations Environment Program/SETAC Life Cycle Initiative

www.elcasnet.com

Magnetopause and Magnetosheath Processes of the Earth and Planets (IUGG/IAGA Session A08.1) - (Meeting)

28/06/2011 - 07/07/2011 - Melbourne, Australia

CALL FOR ABSTRACTS TO "Magnetopause and Magnetosheath Processes of the Earth and Planets: Reconnection, Diffusion and Boundary Dynamics" XXV IUGG General Assembly/IAGA Session A08.1, 28 June - 7 July 2011, Melbourne, Australia.

The magnetopause and its boundary layers are the prime sites of mass, momentum and energy transfer from the solar wind into the magnetosphere of the Earth and planets. Understanding the physics of these processes is central to magnetospheric physics. Observations of these regions are continuously ongoing owing to several dedicated spacecraft missions. Near-Earth space data are further supported by observations from ground based observatories. Lately, various planetary missions, such as VEX, Galileo, Cassini, have studied the magnetosheaths of Venus, Jupiter and Saturn, and found that, in principle, the same processes are taking place as near the Earth. New progresses in simulations (MHD, hybrid and kinetic) and theoretical knowledge allow the physics of reconnection and boundary layer processes to be elucidated as never before. This session invites contributions on a wide range of magnetopause-related topics, including observations of the structure of the magnetopause current layer, its boundary layers and their transient variations, the signatures of the various forms of plasma interactions, such as magnetic reconnection, and their relevance to solar wind-magnetosphere coupling. The basic physics of reconnection, plasma diffusion and boundary layer formation at the magnetopause, as well as the magnetosheath processes that influence magnetopause dynamics are highly relevant.

Invited speakers:
Sarah Badman, JAXA, Japan,
Philip Pritchett, UCLA, USA
Fouad Sarahoui, LPP - CNRS, France,
Quanqi Shi, Peking University, China.

Contributions for oral and poster presentations are now solicited.

Important deadlines:
Grant application: January 17, 2011.
Abstract submission: February 1, 2011.
Early bird registration: April 11, 2011.

Conveners:
Claire Foullon, University of Warwick, United Kingdom (claire.foullon@warwick.ac.uk), Charles J. Farrugia, University of New Hampshire, USA (charlie.farrugia@unh.edu), Benoit Lavraud, Centre d'Etude Spatiale des Rayonnements - CNRS, Toulouse, France (benoit.lavraud@cesr.fr), Martin Volwerk, Space Research Insitute, Graz, Austria (martin.volwerk@oeaw.ac.at).

For abstract submission, registration, and more information, see the meeting website.

Organizer:
IUGG/IAGA

http://www.iugg2011.com/program-iaga.asp

Claire Foullon, University of Warwick
claire.foullon@warwick.ac.uk

Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes - (Meeting)

02/10/2011 - 06/10/2011 - Kos Island, Greece

The 14th International Conference is aimed towards model developers, model users, environmental protection agencies, and environmental legislation experts. What distinguishes this conference from many others is its focus on common tools and methodologies.

Focus of the conference

The series of international conferences on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes is concerned with the improvement of "modelling culture" both in Europe and at an international level.

There are many aspects of this such as: ensuring that models are scientifically sound; model validation; guidance to ensure proper use of models; promotion of good practices and elimination of bad practices; quality assurance with respect to model development; establishment of reference problems; comparability of input and output; ensuring proper exchange of experiences.

Such issues that are not specific for one particular model, but common to several, are in focus at the 14th International conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes.

At the web site you can download a leaflet in pdf format (direct link:

http://www.harmo14.gr/images/stories/1st_announcement_harmo_14_final.pdf , size 0.1 MB).

The deadline for short abstracts is March 15, 2011. You are encouraged to pre-register at the conference web site. This is not binding, but ensures that you will receive e-mails with updated information on the conference.

http://www.harmo.org/harmo14

XXV IUGG General Assembly - (Meeting)

28/06/2011 - 07/07/2011 - Melbourne, Australia

Organizer:
IUGG 2011 General Assembly Managers
Managed by arinex pty limited
91 – 97 Islington St
Collingwood, Victoria 3066
Australia
Ph: + 61 3 9417 0888
Fax: + 61 3 9417 0899
Email: iugg2011@arinex.com.au

http://www.iugg2011.com

Erin Simmons
91 – 97 Islington St
Collingwood, Victoria 3066, Australia
iugg2011@arinex.com.au

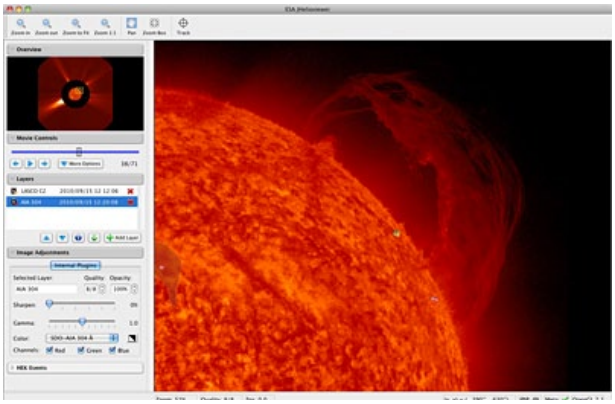
ISUF 2011: Urban Morphology and the Post-carbon City - (Meeting)

26/08/2011 - 29/08/2011 - Montréal, Canada

The Eighteenth International Seminar on Urban Form (ISUF 2011) hosted by Concordia University will take place in Montréal, Canada from Friday 26 August to Monday 29 August 2011. The theme of the conference is Urban Morphology and the Post-carbon City. The objective is to critically explore how interdisciplinary research on urban form can contribute to the debates, formation of policies, and progressive professional practice for addressing the environmental challenges of our times.

Abstracts of papers must be received on or before 31 January 2011 and could be submitted in either English or French at isuf2011@alcor.concordia.ca.

For more information please visit the conference web site: www.isuf2011.com



The Sun for Everyone

http://jhelioviewer.org/

The entire library of images from the SOHO solar and heliospheric observatory.

14 December 2010.- New software developed by ESA makes available online to everyone, everywhere at anytime, the entire library of images from the SOHO solar and heliospheric observatory.

Helioviewer is the visualisation software developed as part of the ESA/NASA Helioviewer Project, to provide a desktop program that enables users to call up images of the Sun from the past 15 years.

More than a million images from SOHO can already be accessed, and new images from NASA's Solar Dynamics Observatory are being added. The downloadable JHelioviewer is complemented by the website Helioviewer.org, a web-based image browser.

What is JHelioviewer?

JHelioviewer is visualization software for solar image data based on the JPEG 2000 compression standard. JPEG 2000 offers many useful new features and has the potential to revolutionize the way high-resolution image data are disseminated and analyzed. The JPEG 2000 Interactive Protocol (JPIP) enables serving data in a highly compressed, quality-progressive, region-of-interest-based stream. These features minimize the data volume transmitted while maximizing its usability. This is especially relevant for solar physics since NASA's Solar Dynamics Observatory has started providing more than a terabyte of image data per day.

Cool Things You Can Do in JHelioviewer

* Browse more than 14 years worth of SOHO data (http://sohowww.nascom.nasa.gov/) as well as the latest high-resolution images from SDO/AIA.
* Create your own movies of the Sun.
* Apply filters like color tables and sharpening to movies in real-time.
* Export movies in various formats.
* Track features of the Sun by compensating the differential solar rotation.

ESA

Marine litter – a new dedicated webpage

http://ec.europa.eu/environment/water/marine/pollution.htm/

The E.C.'s Environment Directorate-General has launched a new website on 'Marine Pollution Awareness'.

18 January 2011.- Marine litter currently represents a vast and growing threat to the marine and coastal environments. Plastic waste, for example, eventually enters the food chain as animals confuse debris with food and may cause serious health problems.

The Marine Strategy Framework Directive (MSFD), adopted in June 2008, aims at achieving 'good environmental status' (GES) of all marine waters of the European Union by 2020. It identifies marine litter as one of eleven chief pressures on the marine environment.

The new website provides also access to presentations and videos from a major workshop on marine litter that took place on 8 November 2010 in Brussels.

SOME INFO, AS APPEARING IN THE WEBSITE:

Sources and pressures

Main sources of marine litter come from:

* Land-based activities:
  - o Land-fills
  - o rivers and floodwaters
  - o industrial outfalls
  - o discharge from storm water drains
  - o untreated municipal sewerage
  - o littering of beaches, coastal areas (tourism)
  - o fishing industry
* Marine based activities
  - o shipping (eg. transport, tourism, fishing)
  - o offshore mining and extraction
  - o illegal dumping at sea
  - o discared fishing gear

In the North Sea, half of the litter comes from ships (Source: UNEP, KIMO).

Facts & Figures

--Approx. 80% of marine litter is land-based.

--In 2004, marine water samples contain 6 times more plastic than plankton, i.e. out of 7 kilo, 6 kilos of plastic vs. 1 kilo of plankton (source: Algalita).

--Cruise ships: 95.000 m³ of sewage from toilets and 5,420,000 m³ of sewage from sinks, galleys and showers are released into the oceans each day (source: Oceana).

--250,000 kg of waste are removed from the North Sea yearly (source: KIMO).

--1 kg out of every 5 kg wasted plastic ends up in oceans.

--Samples of strandline material contain more than 10% plastic per weight. The fragments will increase with production (source: KIMO).

The Marine Litter Express

The incredible journey of the rubber ducks

Waste which enters the ocean can turn up anywhere in the world. In 1992 a container ship in the Pacific Ocean lost 30,000 rubber ducks off the coast of China. These ducks first traveled with the dominant currents in the direction of Australia, but fifteen years later they turned up on the shores of the UK. An interesting story, but it illustrates perfectly how ship-source marine litter is a global problem.

The Garbage Patch - Plastic Soup

The Great Pacific Garbage Patch (GPGP) is a layer of rubbish in the Pacific Ocean which has been growing since the 1950's. It is the result of whirling currents, pulling trash from the world's oceans and floating between California and Hawaii. It is the world's largest landfill: according to estimates it has pulled 3.5 million tons of trash and spans 3.43 million km2, or the size of Europe. The EU has one at its frontdoor: the Atlantic Garbage Patch.

Plastic Beaches

As plastic breaks into ever and ever smaller pieces, these microscopic bits of plastic not only litter the beach, it is - like fine bits of sand -becoming the beach:

- 5000 bits of plastic per m³ of sand on average

"U.K. researchers in Plymouth and Southampton, England, found that microscopic fragments of nylon, polyester, and seven other types of plastic are widespread in sediments around British shores" (source: National Geographic).

The effects of plastic bits entering the body should not be underestimated.

EC

Ocean Sciences-Academic

Tenure assistant professorship with associated CNRS Chair

Company: University of Toulon
Location: France-Toulon
Date Posted: 24/01/2011
[show details...]

Hydrological Sciences-Academic

Five New Faculty Positions in Water-related Sciences

Company: University of Saskatchewan
Location: Canada-Saskatoon
Date Posted: 28/01/2011
[show details...]

Climate-Academic

ASSISTANT PROFESSOR IN REGIONAL CLIMATE CHANGE MODELING

Company: Department of Land, Air and Water Resources in the College of Agricultural and Environmental Sciences, University of California, Davis
Location: USA-Davis, California
Date Posted: 10/02/2011
[show details...]

Planetary and Solar System Sciences-Academic

Assistant Professor in Planetary Physics

Company: University of Toronto Scarborough
Location: Canada-Toronto
Date Posted: 17/02/2011
[show details...]

Atmospheric Sciences-Academic

Graduate Opportunities in Interdisciplinary Studies of Atmospheric Aerosols

Company: University of British Columbia
Location: Canada-Vancouver
Date Posted: 03/03/2011
[show details...]

Tectonics, Structural Geol., Statigr., Sedimentology, Paleontology, Geomorphology-Academic

Post-Doctoral position on fluvial geomorphology

Company: CNRS
Location: France-Paris
Date Posted: 11/03/2011
[show details...]

Solar-Terrestrial Sciences-Other

Post-doctoral Research Associate position on Space Physics

Company: National Observatory of Athens, Institute of Astronomy and Astrophysics
Location: Greece-Athens
Date Posted: 09/02/2011
[show details...]

Interdisciplinary / Other-Other

12 PhD researcher positions

Company: European Marie Curie Initial Training Network
Location: Europe-Netherlands, Paris, Strasbourg, Vienna, Perugia, Padova, Krakow, Lausanne, Delft
Date Posted: 16/02/2011
[show details...]

Interdisciplinary / Other-Other

Executive Director at Global Cool Cities Alliance

Company: Global Cool Cities Alliance (GCCA)
Location: USA-Washington, DC, or San Francisco, CA
Date Posted: 08/03/2011
[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.