



# the eggs

## E.G.U. NEWSLETTER

ISSUE 28, NOVEMBER 2009

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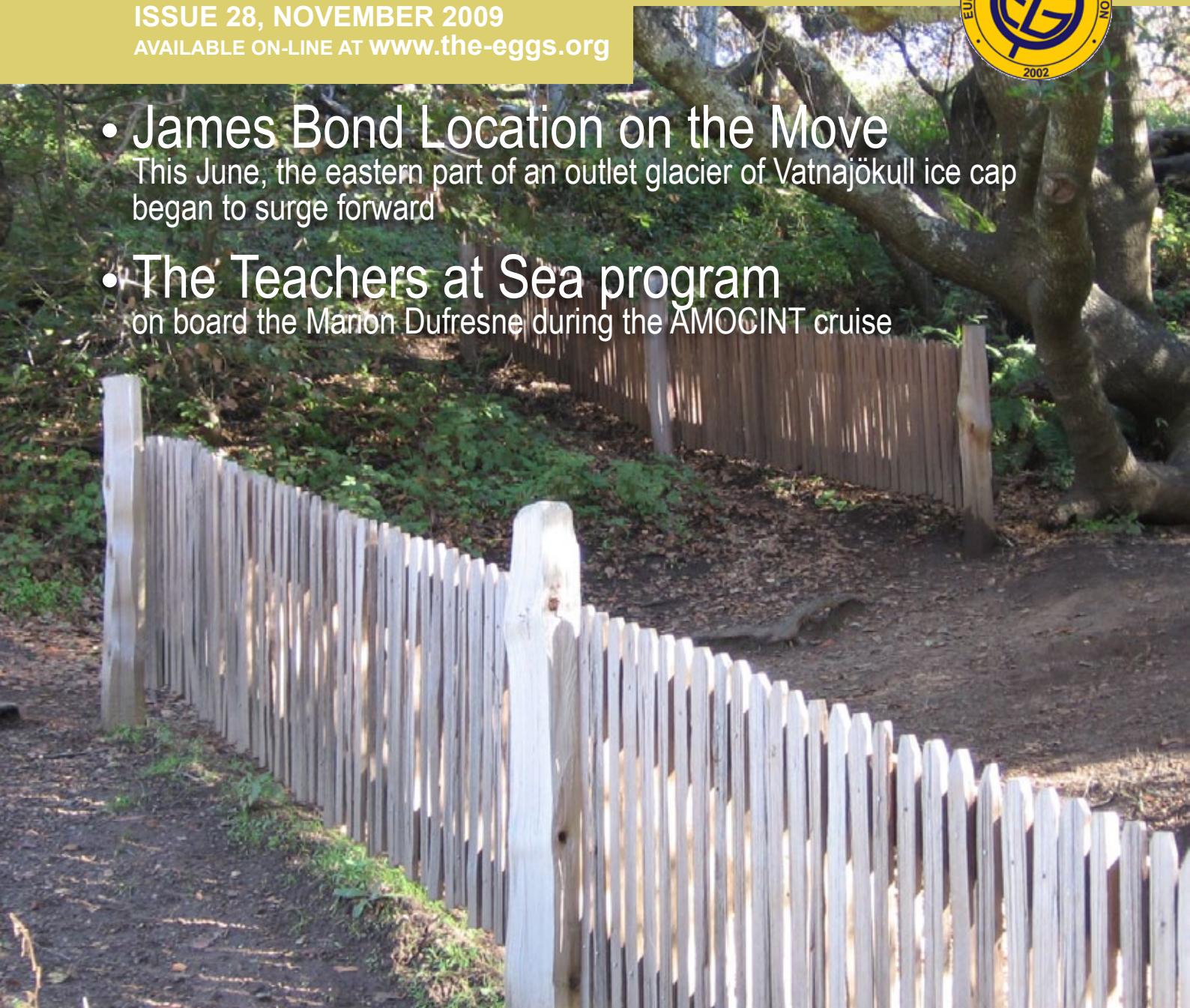


- **James Bond Location on the Move**

This June, the eastern part of an outlet glacier of Vatnajökull ice cap began to surge forward

- **The Teachers at Sea program**

on board the Marion Dufresne during the AMOCINT cruise







#### EDITORS

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

**Assistant Editor:** Magdeline Pokar  
Bristol Glaciology Center,  
School of Geographical Sciences, University of Bristol  
University Road  
Bristol, BS8 1SS, United Kingdom  
tel. +44(0)117 928 8186, fax. +44(0)117 928 7878  
email: M.Pokar@bristol.ac.uk

**Hydrological Sciences:** Guenther Bloeschl  
Institut für Hydraulik, Gewässerkunde und Wasserwirtschaft  
Technische Universität Wien Karlsplatz 13/223,  
A-1040 Wien, Austria  
tel. +43-1-58801-22315, fax. +43-1-58801-22399  
email: bloeschl@hydro.tuwien.ac.at

**Biogeosciences:** Jean-Pierre Gattuso  
Laboratoire d'Océanographie de Villefranche, UMR 7093 CNRS-UPMC

B. P. 28, F-06234 Villefranche-sur-mer Cedex France  
tel. +33-(0)493763859, fax. +33-(0)493763834  
email: gattuso@obs-vlfr.fr

**Geodesy:** Susanna Zerbini  
Department of Physics, Sector of Geophysics University of Bologna,  
Viale Berti Pichat 8 40127 Bologna, Italy  
tel. +39-051-2095019, fax +39-051-2095058  
e-mail: zerbini@df.unibo.it

**Geodynamics:** Bert L.A. Vermeersen  
Delft University of Technology DEOS - Fac. Aerospace Engineering  
Astrodynamics and Satellite Systems Kluyverweg 1, NL-2629  
HS Delft The Netherlands  
tel. +31-15-2786272 fax. +31-15-2785322 8  
e-mail: B.Vermeersen@lr.tudelft.nl

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

**Seismology:** Marco Mucciarelli  
Università della Basilicata Di S.G.G.  
Campus Macchia Romana, 85100 Potenza Italy  
tel. (39) 0971-205094, fax. (39) 0971-205070  
e-mail: mucciarelli@unibas.it

**Climate:** Yu Shaocai  
Atmospheric Sciences Modeling Division (E243-01), National  
Exposure Research Laboratory U.S. Environmental Protection  
Agency

RTP, NC 27711, USA  
tel. +1-919-541-0362, fax. +1-919-541-1379  
e-mail: yu.shaocai@epamail.epa.gov

**Atmospheric Chemistry:** Kostas Kourtidis  
Department of Environmental Engineering,  
School of Engineering, Demokritus University of Thrace  
Vas. Sofias 12, GR-67100 Xanthi, Greece  
tel. +30-25410-79383, fax. +30-25410-79379  
e-mail: kourtidis@env.duth.gr

#### GENERAL CONTACT

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

#### SUBMISSION OF MATERIAL

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

#### ADVERTISING

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

#### TECHNICAL

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

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*Cover photo: Earthquake surface deformation, from the 1906 San Francisco Earthquake, is  
shown by this fence at Point Reyes National Seashore. Image Credit: Simon Schneider, R&D  
Programme GEOTECHNOLOGIEN, Potsdam - Germany. Distributed by EGU via [www.imag-geo.net](http://www.imag-geo.net)*

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# Large visibility in the media

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of the last General Assembly in Vienna

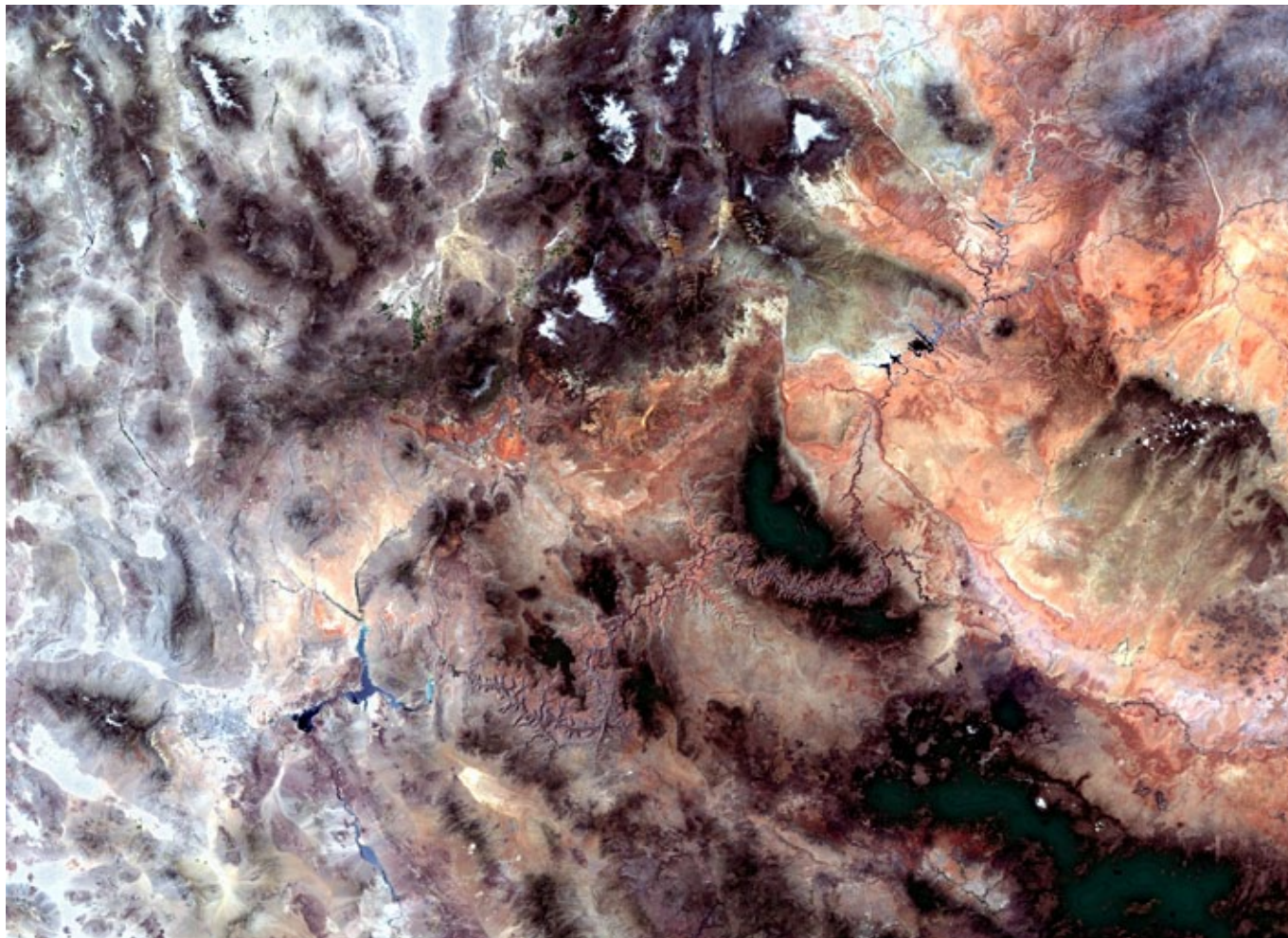
The last General Assembly of the Union in Vienna has received considerable coverage in the media. Radio, TV and newspaper coverage has increased this year in the Austrian and international media, as a result of the operations of the EGU Press Office. The EGU Press Office, run by press officer Dr. Dick van der Wateren, has been operating for a couple of years now, establishing strong ties between science journalists and geoscientists. Read more about the media coverage of the last Assembly at <http://www.egu-media.net/content/view/197/7/>





## EARTH FROM SPACE

Grand Canyon



*Grand Canyon, Credits: ESA*

24 July 2009.- The Grand Canyon, one of the seven natural wonders of the world, is featured in this Envisat image. The canyon (the rock-like formation stretching across the centre of the image in hues of pink, violet and gray), is located in the U.S. state of Arizona.

Canyon walls, rock structures, old lava flows, buttes, ravines, stair-step topography and brilliant colours mark its grandeur. In 1979, it was designated a UNESCO World Heritage site.

Although a number of processes combined to create the Grand Canyon, it was formed primarily by the eroding action of the Colorado River that began about six million years ago. Other contributing factors include vulcanism, continental drift and the semiarid climate.

As water erosion sculpted this majestic showplace, it revealed layers and layers of exposed rocks that provide us with a profound record of geologic events. As some of Earth's old-

est rock lies at the bottom of the canyon, it is said to be 1800 m and a billion years deep. It is about 443 km long and 8 to 29 km wide.

For thousands of years, Native American tribes inhabited the canyon. Many of their descendants, such as the Havasupai and Hualapai, continue to live in the region.

Also visible in the image are the Colorado Plateau (upper right corner), the Mogollon Plateau (dark area under Colorado Plateau), Lake Meade (Y-shaped water body left of the canyon), Las Vegas, Nevada (bright white and blue area left of Lake Meade) and the southern tip of Utah (upper left).

This image was acquired by Envisat's Medium Resolution Imaging Spectrometer (MERIS) instrument on 10 May 2009, working in Full Resolution mode to provide a spatial resolution of 300 m.

**ESA**



## MetOp maps global atmospheric ammonia

first complete map of global ammonia concentrations

7 July 2009.- Using radiation measurements by the MetOp satellite, the first complete map of global ammonia concentrations has been derived. The map is based on observations throughout 2008.

Ammonia emissions contribute to soil acidification, reductions in biodiversity and the formation of atmospheric particulate matter.

Lieven Clarisse and Pierre Coheur from the University of Bruxelles, Cathy Clerbaux from the French Scientific Research Centre (CNRS) and colleagues developed a methodology to be used with MetOp's Infrared Atmospheric

Sounding Interferometer (IASI) sensor to isolate the signature of ammonia.

Most of the hotspots appeared over agricultural regions in Europe, North America and Asia, as expected. However, the measurements taken from space over agricultural valleys, such as Italy's Po Valley, Uzbekistan's Fergana Valley and the US's Snake River Valley in Idaho, were higher than the current inventories. The scientists also identified some sources in Central Asia not included in current inventories.

Areas with biomass burning also had high ammonia emissions. Although more work is needed to accurately de-

tect low-level ammonia emissions from space, the techniques demonstrated by the team are very promising.

MetOp, launched in 2006, is the first of three meteorological satellites developed under a joint programme being carried out by ESA and the European Meteorological Satellite Organisation (EUMESAT). The IASI sensor was developed by CNES in cooperation with EUMETSAT.

The results were published online in Nature Geoscience in June.

ESA

## Ulysses

systems switched off

30 June 2009.- Ulysses mission ended today, after a decision was taken to end the mission due to continuing weak power and the unavailability of ground station time.

Today's final communication pass via NASA's 70-m Deep Space Network started at 17:35 CEST and the satellite's radio communications switched into receive-only mode at 22:10 CEST. Last telemetry was received as expected at 22:15 CEST. No further contact with Ulysses is planned.

The joint ESA/NASA mission op-

erations team under Nigel Angold, ESA Mission Operations Manager, monitored the final activity from the Ulysses Mission Support Area (MSA) at NASA's Jet Propulsion Laboratory (JPL), California, USA.

Launched by Space Shuttle Discovery on 6 October 1990, the 18-year, 8-month mission has returned a wealth of scientific data on the space environment above and below the poles of the Sun.

During today's final activities, ESA and NASA mission controllers radi-

ated up a series of instructions that progressively switched off systems on Ulysses. At the time of sending the last commands, Ulysses was located approximately 5.4 astronomical units from Earth. During its life, Ulysses made nearly three complete orbits of the Sun.

More info about Ulysses can be found at <http://ulysses.esa.int/science-e/www/area/index.cfm?fareaid=11> and <http://ulysses.jpl.nasa.gov/>

ESA

## The Amazon River is around 11 million years old

according to borehole results published recently

07 July 2009.- The Amazon River originated as a transcontinental river around 11 million years ago and took its present shape approximately 2.4 million years ago. These are the most significant results of a study on two boreholes drilled in proximity of the mouth of the Amazon River by Petrobras, the national oil company of Brazil. A team by the Institute for Biodiversity and Ecosystem Dynamics (IBED) of the University of Amsterdam, the University of Liverpool and Petrobras used this new oceanic record to reconstruct the history of the

Amazon River. The study was published in the journal 'Geology' in July 2009.

Until recently the Amazon Fan, a sediment column of around 10 kilometres in thickness, proved hard to explore and drilling expeditions such as the Ocean Drilling Program could only reach a fraction of it. Recent exploration efforts by Petrobras lifted the veil, and sedimentological and paleontological analysis on samples from two boreholes, one of which 4.5 kilometres below sea floor, now permit an insight into the history of both Amazon River and Fan.

Prior to this publication the exact age of the Amazon River was unknown. This research has implications for our understanding of South American paleogeography and the evolution of aquatic organisms in Amazonia and the Atlantic coast.

**J. Figueiredo, C. Hoorn, P. van der Ven and E. Soares. 'Late Miocene onset of the Amazon River and the Amazon deep-sea fan: Evidence from the Foz do Amazonas Basin'. *Geology*, 37, 619–622.**



## Cassini detected sodium salts in ice grains of Saturn's E-ring

which is primarily replenished by material from the plumes of water vapour and ice grains emitted by Saturn's moon Enceladus

24 June 2009.- European scientists on the joint NASA/ESA Cassini mission have detected, for the first time, sodium salts in ice grains of Saturn's E-ring, which is primarily replenished by material from the plumes of water vapour and ice grains emitted by Saturn's moon Enceladus. The detection of salty ice indicates that the little moon harbours a reservoir of liquid water, perhaps even an ocean, beneath its surface.

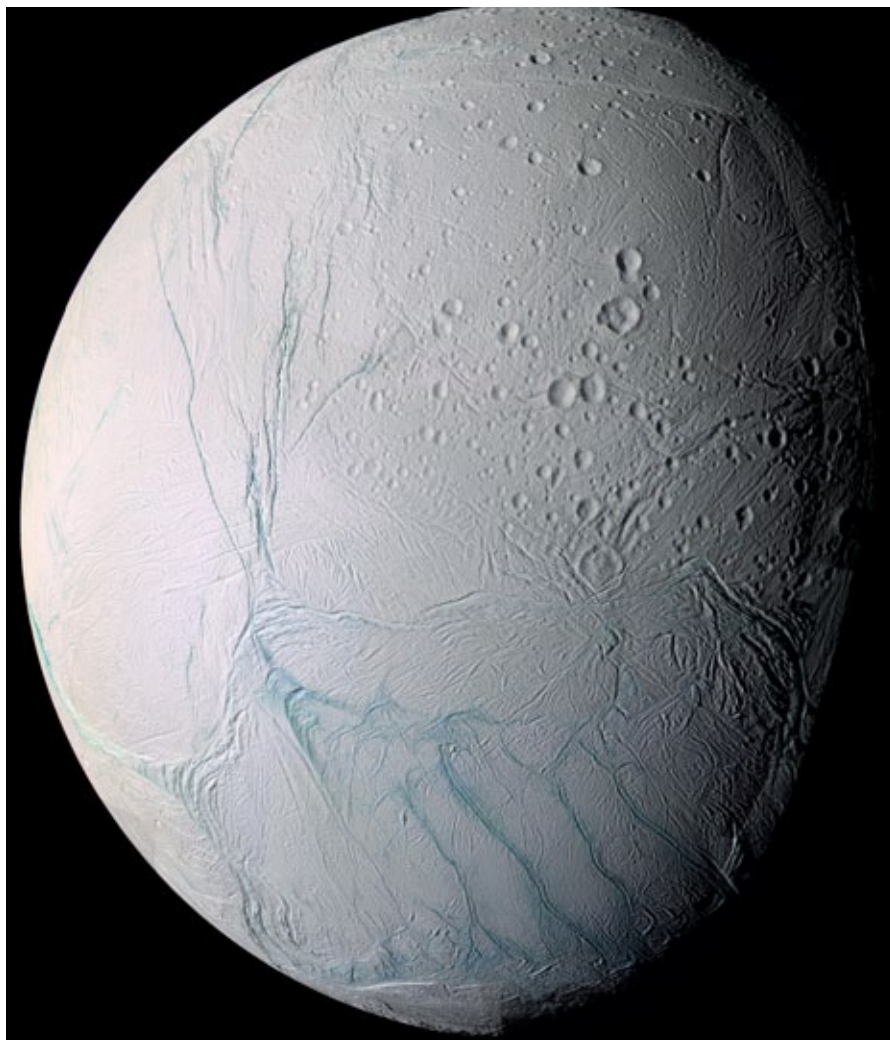
Cassini discovered the water-ice plumes on Enceladus in 2005. These plumes, emitted from fractures near its south pole, expel tiny ice grains and vapour, some of which escape the moon's gravity, replenishing Saturn's outermost ring, the E-ring.

Cassini's Cosmic Dust Analyzer, led by Principal Investigator Ralf Srama, of the Max Planck Institute for Nuclear Physics in Heidelberg, Germany, has examined the composition of these grains and found sodium salt (or table salt) within them.

"We believe that the salty material deep inside Enceladus washed out from rock at the bottom of a liquid layer," said Frank Postberg, Cassini scientist on the Cosmic Dust Analyzer at the Max Planck Institute for Nuclear Physics in Heidelberg, Germany. Postberg is lead author of a study that appears in the 25 June issue of the journal *Nature*.

Scientists working on the Cosmic Dust Analyser conclude that liquid water must be present because it is the only way to dissolve significant amounts of minerals to account for the levels of salt detected. The process of sublimation - the mechanism by which vapour is released directly from solid ice in the crust - cannot account for the presence of salt.

The makeup of the E-ring grains, determined through the chemical analysis of thousands of high-speed particle hits registered by Cassini, provides indirect information about the composition of the plumes and about what lies inside Enceladus. The E-ring particles are almost pure water-ice, but nearly every time the dust analyzer checked for composition, it found at least some sodium within the particles.



*Enceladus' craters and complex, fractured terrains, credit: ESA*

"Our measurements imply that besides table salt, the grains also contain carbonates like soda; both components in concentrations that match the predicted composition of an Enceladus ocean," said Postberg. "The carbonates also provide a slightly alkaline pH value. If the liquid source is an ocean, then that, coupled with the heat measured at the surface near the moon's South Pole and the organic compounds found within the plumes, could provide a suitable environment on Enceladus for the formation of life precursors."

In another study published in *Nature*, researchers doing ground-based observations did not see sodium, an important component of salt. That team notes that the amount of sodium being

expelled from Enceladus is actually less than what is observed around many other planetary bodies. These scientists were looking for sodium in the plume vapour and couldn't see it in the expelled ice grains. They argue that, if the plume vapour does come from ocean water, then the evaporation must happen slowly deep underground, rather than as a violent geyser erupting into space.

Finding salt in the plume gives evidence for liquid water below the surface. The lack of detection of sodium vapour in the plume gives hints about what the water reservoir might look like," said Sascha Kempf, Cassini scientist on the Cosmic Dust Analyzer from the Max Planck Institute for Nuclear Physics.

Postberg added, "The original pic-



ture of the plumes as violently erupting Yellowstone-like geysers is changing. They seem more like steady jets of vapour and ice fed by a large water reservoir. However, we can't decide yet if the water is currently 'trapped' within huge pockets in Enceladus's thick ice crust or is still connected to a large ocean in contact with the rocky core."

"Potential plume sources on Enceladus are an active area of research with evidence continuing to converge on a possible salt-water ocean," said Linda

Spilker, Cassini deputy project scientist. "Our next opportunity to gather data on Enceladus will come during two flybys in November."

"The discovery of the Enceladus plume is one of the top scientific achievements of the Cassini-Huygens mission so far. These new results are inviting Cassini to making further in situ analysis of their composition; they are also whetting our appetite to further investigate whether Enceladus is habitable," said Jean-Pierre Lebreton, ESA's

Huygens Project Scientist.

Determining the nature and origin of the plume is a top priority for Cassini during its extended tour, called the Cassini Equinox Mission.

**Reference: Sodium salts in E-ring ice grains from an ocean below the surface of Enceladus, F. Postberg<sup>1</sup>, S. Kempf, J. Schmidt, N. Brilliantov, A. Beinsen, B. Abel, U. Buck and R. Srama, 25 June 2009, Author: ESA**

## Declining Aral Sea

shrinks further

10 July 2009.- These Envisat images highlight the dramatic retreat of the Aral Sea's shoreline from 2006 to 2009. The Aral Sea was once the world's fourth-largest inland body of water, but it has been steadily shrinking over the past 50 years since the rivers that fed it were diverted for irrigation projects.

By the end of the 1980s, it had split into the Small Aral Sea (north), located in Kazakhstan, and the horse-shoe shaped Large Aral Sea (south), shared by Kazakhstan and Uzbekistan.

By 2000, the Large Aral Sea had split into two – an eastern and western lobe. As visible in the images, the eastern lobe retreated substantially between 2006 and 2009. It appears to have lost about 80% of its water since the 2006 acquisition, at which time the eastern lobe had a length of about 150 km and a width of about 70 km.

The sea's entire southern section is expected to dry out completely by 2020, but efforts are underway to save the northern part.

The Kok-Aral dike, a joint project of the World Bank and the Kazakhstan government, was constructed between the northern and southern sections of the sea to prevent water flowing into the southern section. Since its completion in 2005, the water level has risen in the northern section by an average of 4 m.

As the Aral Sea evaporated, it left behind a 40 000 sq km zone of dry, white salt terrain now called the Aral Karakum Desert. Each year violent sandstorms pick up at least 150 000 tonnes of salt and sand from the Aral Karakum and



*Declining Aral Sea, Credit: ESA*

transport it across hundreds of km, causing severe health problems for the local population and making regional winters colder and summers hotter. In an attempt to mitigate these effects, vegetation that thrives in dry, saline conditions is being planted in the former seabed.

In 2007, the Kazakhstan government secured another loan from the World Bank to implement the second stage, which includes the building of a second dam, of the project aimed at reversing this man-made environmental disaster.

Envisat acquired these images on 1 July 2006 and 6 July 2009 with its Me-

dium Resolution Imaging Spectrometer (MERIS) instrument while working in Full Resolution Mode to provide a spatial resolution of 300 m.

See at the 5th EGGS issue for an image of Aral Sea acquired a couple of years ago (July 2003) at <http://www.the-eggs.org/news.php?id=106&typeid=0>.

ESA



## Industry Information Day on the GMES Sentinel Data Policy

ESA and EC jointly organise an information day on GMES Data Policy

Paris, 22 September 2009.- ESA and the EC jointly organised an information day on the GMES (Global Monitoring for the Environment and Security) Sentinel Data Policy, which took place on Friday 11 September 2009 in Brussels.

The meeting intended to inform about and collect views on the Sentinel Data Policy (Sentinels being the satellites of the GMES initiative), in particular from the European value adding and service industry, GMES services, other potential Sentinel data users, satellite data providers and distributors. Thus, it responded directly to an action requested by ESA member states. The meeting was attended by approximately 100 participants.

The agenda comprised information about the GMES governance and information policy in general and the Sentinel Data Policy in particular. To gather the view of the European value adding industry and satellite data providers, the European Association of Remote Sensing Companies (EARSC) collected and

provided a comprehensive summary of their members' view on the Sentinel Data Policy. Furthermore, individual contributions from industry and governmental departments were gathered in the subsequent discussion session.

The overall feedback by industry representatives to the proposed open access data policy for Sentinels was very positive, the support to a free and open data policy prevailed. The reason for presenting the Sentinel Data Policy at this point, with the first launch for a Sentinel mission being in 2012, was to provide an appropriate planning horizon and framework for ESA to develop a GMES Space Component Operations concept and for the service and value adding industry to prepare business plans for the post 2012/2013 time frame.

SMEs and value adding companies are expected to benefit from full and open access to Sentinel data. This was also supported by the presentation of the EARSC chairman and the representative of the European Commission's

Directorate-General for Environment, both expecting a macroeconomic benefit from a full and open Sentinel Data Policy.

Given the enormous data throughput and high demand of data by users, systematic product generation and on-line distribution would be paramount to implement such a system.

Further questions were raised concerning the output of and access conditions to information generated by GMES Services. The Commission confirmed its intention to apply a full and open access principle. The objectives and implementation mechanisms of the GMES Data and Information Policy are part of the Commission's Proposal for a Programme Regulation currently under decision procedure in the EU context.

On an international level ESA and the EC will continue to work through international agreements and organisations such as GEO to support international data exchange.

## ESF LESC - PESC Science Position Paper

on the Next Generation of Elevated CO<sub>2</sub> Experiments on Crops and Ecosystems

One of the largest challenges facing mankind is to understand the causes and dynamics of global climate changes, to predict their extent and scope, and to develop strategies to limit their impact.

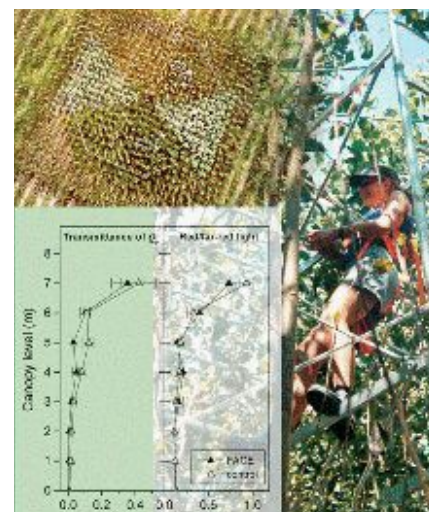
Climate change is driven mainly by anthropogenic release of greenhouse gases, of which the major one is carbon dioxide (CO<sub>2</sub>). The response of plants to rising CO<sub>2</sub> plays a crucial role in determining how fast and how far atmospheric CO<sub>2</sub> levels will rise. The response to CO<sub>2</sub> will interact with changes in the climate to determine how ecosystems and agricultural land-systems are affected.

The response of agricultural land systems and terrestrial ecosystems to future atmospheric CO<sub>2</sub> concentrations is studied in Free Air Carbon dioxide Enrichment (FACE) facilities. These are

large open-air experiments, in which the atmospheric CO<sub>2</sub> concentration is locally elevated to the levels expected in the future.

Now is the time to redefine the scientific goals and organization of future FACE facilities. It is important to close present gaps in understanding, define new questions and, more generally, to maximise the generation of knowledge. This will support and inform ecosystem and global modelling to obtain more reliable predictions of climate change, and allow us to develop strategies to mitigate some of the feared negative aspects of the future global climate.

Download the "ESF LESC - PESC Science Position Paper" as a PDF document at <http://www.esf.org/publications/position-papers>

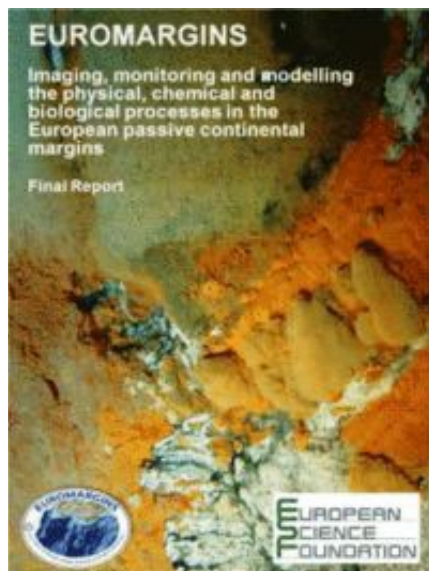


ESF, LESC-PESC Science Position Paper



## Ending for EUROMARGINS, the first EUROCORES on geosciences

The programme focused on studying the eastern and western Mediterranean and the North-East- Atlantic sedimentary systems and deep-seated structures



The EUROMARGINS Programme launched by the European Science Foundation (ESF) in the early 2000s focused on studying the eastern and western Mediterranean and the North-East- Atlantic sedimentary systems and deep-seated structures. Margins are sites of some of the world's larg-

est sediment accumulation centres and are among the best indicators for past changes in sea-level, climate, sediment transport and fluxes. The margins around Europe are prone to major natural geohazards where seismic activity and submarine slope failures may trigger tsunamis. Since the majority of the population lives within a short distance to the coastal zone, our understanding of geohazards and their development is of societal relevance. Our comprehension of how the margins around Europe have changed and are changing draw on only a small number of variables that have been geophysically imaged and modelled very carefully with emphasis on the Norwegian and Greenland rifted continental margins, the margins surrounding the Iberian Peninsula, and the Mediterranean margins. There are many new discoveries related to fluids that are emitted to the ocean via the seafloor.

Fluid seeps are highly variable and dynamic biological hotspot locations. Presently, the global inventory of fluid storage systems, such as gas hydrate in continental margins, attracts much attention regarding future energy re-

sources, climate threat and geohazards. This is one of the instances where EUROMARGINS research has contributed significantly. Geohazard studies along the European margins provided new insights into the role fluid flow may play as a trigger for submarine slope failures. Many publications resulted from the EUROMARGINS Programme. In particular, a special issue in the Marine Geology journal provides one of several excellent examples of the integrated research of the Programme. The eleven papers of the special volume released in May 2009 focus on the Norwegian-Greenland, the Algerian, the Iberian and the eastern Mediterranean margins including the Nile deep-sea fan. The EUROMARGINS final report is also available on the ESF website: [www.esf.org/euro-margins](http://www.esf.org/euro-margins)

**Professor Juergen Mienert**  
**Chair of EUROMARGINS Scientific Committee**  
*(from ESF Newsletter No. 7 June 2009)*

## Small fluctuations in solar activity, large influence on the climate

Modelling shows sun spot frequency to have strong influence on cloud formation and precipitation

27 August 2009.- Research teams from the USA and Germany have simulated the complex interaction between solar radiation, atmosphere, and the ocean. As the journal Science reports in its latest issue, Gerald Meehl of the US-National Center for Atmospheric Research (NCAR) and his team have been able to calculate how the extremely small variations in radiation brings about a comparatively significant change in the System Atmosphere-Ocean.

Taking into consideration the complete radiation spectrum of the sun, the radiation intensity within one sun spot cycle varies by around 0.1% only. In-

terplay mechanisms in the stratosphere and the troposphere, however, create measurable changes in the water temperature of the Pacific and in precipitation.

The initial process runs from the top downwards: increased solar radiation leads to more ozone and higher temperatures in the stratosphere. The ultraviolet radiation share varies much more strongly than the other shares in the spectrum, i.e. by five to eight per cent, and that forms more ozone. As a result, especially the tropical stratosphere becomes warmer, which in turn leads to changed atmospheric circulation. Thus,

the interrelated typical precipitation patterns in the tropics are displaced.

The second process takes place in the opposite way: the higher solar activity leads to more evaporation in the cloud free areas. With the trade winds, the increased amounts of moisture are transported to the equator, where they lead to stronger precipitation, lower water temperatures in the East Pacific and reduced cloud formation, which in turn allows for increased evaporation. It is this positive back coupling that appears to strengthen the process.



## Spanish Deimos-1 delivers first images

satellite is part of the Disaster Monitoring Constellation

14 August 2009.- This image of plains and agricultural fields in central Spain was one of the first images acquired by Spain's recently launched Deimos-1 satellite.

Deimos-1 was launched together with Britain's UK-DMC2 satellite from Kazakhstan on 29 July 2009. As the newest members of the Disaster Monitoring Constellation, both satellites have the ability to acquire larger areas (650 km) and provide sharper images (22 m). The first Deimos-1 images were acquired and processed via a ground station located in Valladolid, Spain.

Agricultural fields and the city of La Roda (in white, top left) are visible in this image acquired over Castilla-La Mancha on 5 August. The Jucar River (visible flowing southerly then easterly) has dams located on its upper and lower course.

Circular shapes indicate centre pivot irrigation is being employed to water the fields. Both Deimos-1 and UK-DMC2 satellites will be used by ESA as Contributing Missions to Global Monitoring for Environment and Security (GMES).



*Deimos-1 image acquired on 5 August 2009 - see also text, Credit: Deimos Imaging*

Deimos-1 and UK-DMC2 will supply the African imagery coverage requested by GMES services as well as contribute to emergency rapid mapping and burn

scar mapping. The satellites will also be supported by ESA as Third Party Missions to provide data for research purposes.

## WMO Professor Mariolopoulos Trust Fund Award for 2010

Nominations should be received before December 31, 2009

20 July 2009.- The "Mariolopoulos-Kanaginis Foundation for the Environmental Sciences" is a non-profit non-governmental Organization aiming at promoting and awarding atmospheric environmental research. The "WMO Professor Mariolopoulos Trust Fund Award", established by its Board of Directors under the auspices of the World Meteorological Organization (WMO) of the UN, is granted every two years and accompanied by a prize of US\$ 2,000 and a Certificate.

The Award Ceremony for 2008 was held on September 13, 2008 in Athens during the International Symposium "Climate Extremes During Recent Millennia and their Impacts on Mediterranean Societies" which held at the National and Kapodistrian University of Athens. The prize was awarded to Dr Sabine Wust and Dr Nouredine Semane for their papers with collaborators entitled:

"Non Linear Resonant Wave-Wave Interaction (Triad): Case Studies Based on Rocket Data and First Application to Satellite Data" and "An Observed and Analyzed Stratospheric Ozone Intrusion Over the High Canadian Arctic UTLS Region During the Summer of 2003" correspondingly.

Dr Elena Manaenkova, representing the Secretary-General of WMO, made a brief introduction to the "WMO Professor Mariolopoulos Trust Fund Award". The Ceremony was attended by representatives of the Academy of Athens, the Hellenic National Meteorological Service, the Ministry of Finance, the Ministry of Education, the General Secretariat for Research and Technology, the Greek Meteorological Society and many distinguished scientists.

The "WMO Professor Mariolopoulos Trust Fund Award" is granted for an outstanding research paper in atmo-

spheric sciences, published or accepted during the last two years in a refereed journal by a young scientist (age below 35 years by the date of publication). Nominations could be made by the National Committees of the International Association of Meteorological and Atmospheric Sciences (IAMAS), IAMAS Commissions and/or by the Directors of the National Meteorological Services. The nominations and the papers must be submitted in one of the official WMO languages (English, French, Spanish, Russian). Non-English papers should be accompanied by a translation of the paper in English. Three reprints of the paper should be submitted together with the nomination letter to:

**Prof. Christos S. Zerefos**  
**"WMO Professor Mariolopoulos**  
**Trust Fund Award"**  
**Koumbari 6, 10674 Athens**  
**Greece**



A brief curriculum vitae of the nominee should accompany all nominations. Papers that have previously won prize are not eligible.

Deadline for submission has been extended to December 31, 2009. The method of selection includes the establishment of a Reviewing Committee comprised of distinguished scientists in the field of atmospheric sciences. The Committee members will be designated

by the Secretary-General of WMO, by the Directorate General of Research of the European Union and by the Board of Directors of the Foundation. The Foundation may decide not to give the award, if none of the papers submitted is of a sufficient high scientific standard.

The award will normally be presented to the awardee at an appropriate scientific meeting / Ceremony by the Secretary-General of WMO or a rep-

resentative of WMO or the Foundation and can be shared between co-authors, provided the previous criteria are met by the lead author.

More details could be found on the address: [www.mariolopoulosfoundation.gr](http://www.mariolopoulosfoundation.gr)

**Mariolopoulos - Kanaginis  
Foundation**

## New framework to link up Europe's polar research

The framework, led by ESF's European Polar Board, aims to streamline links between the many national research programmes in the Arctic and Antarctic,

More than 26 leading scientific institutions across Europe signed up to closer research cooperation through a new European Polar Framework agreement earlier this month in Brussels.

The framework aims to streamline links between the many national research programmes in the Arctic and Antarctic, led by the European Science Foundation (ESF) European Polar Board. It will make it easier for agencies to launch joint funding calls, share scientific data and for countries to host scientists in each others' research stations, creating international teams similar to those in the International Space Station and the Integrated Ocean Drilling Programme.

Signatures for the agreement come from organisations involved in financing, organising or conducting polar research, including national programme authorities, research funders and polar institutes. The framework agreement is a major outcome from the four-year EUROPOLAR ERA-NET initiative, funded by the European Commission under Framework Programme 6, which ended in February this year.

"Recent environmental shifts in the Poles have been large and rapid. By linking together Europe's polar research more closely we can get a better grasp on the wide-ranging series of changes taking place," said Dr Paul Egerton, Executive Director of the ESF European Polar Board, an international committee of leaders of polar programmes hosted by the ESF.

He continues: "This flexible, open agreement will improve cooperation between countries. It will also help implement key recommendations of last year's European Commission Arctic Communication Paper. An international network of polar observatories could be one outcome of this cooperation. Joined-up observations will help predict the course, magnitude and consequences of future changes, enabling us to create adaptable responses to them".

In addition to improving links between existing observatories in the Arctic and Antarctic, the new framework includes commitments to collaborate on new multinational research initiatives and to converge national polar programmes where appropriate. For example, invitations for research proposals would focus on answering questions with global or European relevance, around topics such as life and bio-systems in extreme environments.

The Polar Regions react more rapidly and intensely to global changes than any other part of the planet. Shrinking Arctic sea-ice cover, potentially opening new sea lanes to the north of Eurasia and North America, and the calving of vast table icebergs from the Antarctic ice shelves are the latest examples of these changes.

Much of the information needed to understand these events can only be collected by dedicated research vessels, from permanently manned stations or during multidisciplinary expeditions with considerable logistical demands. These complex interdisciplinary experiments demand closer international cooperation.

The ESF European Polar Board is also coordinating the world's biggest Arctic project: ERICON Aurora Borealis, Europe's Arctic flagship. The €800 million research icebreaker will be the world's first international ship and will be a unique platform for ocean observations to understand all aspects of global change from the seabed to the atmosphere.

The full list of signatories to the European Polar Framework memorandum of understanding:

- Fonds Zur Förderung der Wissenschaftlichen Forschung (FWF), Austria - Funding Agency
- Belgian Federal Science Policy Office (BELSPO), Belgium - Funding agency
- British Antarctic Survey (BAS), United Kingdom - National Operator
- Fonds de la Recherche Scientifique (FRS-FNRS), Belgium - Funding Agency
- Fonds voor Wetenschappelijk Onderzoek – Vlaanderen (FWO), Belgium - Funding Agency
- Agency of Culture, Education, Research and the Church Affairs (KIIIA), Greenland - Agency
- Bulgarian Antarctic Institute-centre for Polar Studies, Bulgaria - National Operator
- Ministerstvo školství, mládeže a tělovýchovy České republiky (MSMT), Czech Republic - National Programme Authority
- Sihtasutus Eesti Teadusfond (ETF), Estonia - Funding Agency
- L'Institut Polaire Français Paul-Emile Victor (IPEV), France



- National Operator
  - Alfred-Wegener-Institut für Polar - und Meeresforschung (AWI), Germany - National Operator
  - Programma Nazionale di Ricerche in Antartide (PNRA), Italy - National Antarctic Programme
  - Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), The Netherlands - Funding Agency
  - Norsk Polarinstitutt (NPI), Norway - National Operator
  - Norges forskningsråd (RCN), Norway - Funding Agency
  - Ministerul Educației, Cercetării și Inovării - National Authority for Scientific Research (ANCS), Romania - National Programme Authority
  - Ministerio de Ciencia e Innovación (MICINN), Spain - National Programme Authority
  - Vetenskapsrådet (VR), Sweden - Funding Agency
  - Swedish Polar Research Secretariat, Sweden - National Operator
- Natural Environment Research Council (NERC), United Kingdom - Funding Agency
- Fundação para a Ciência e a Tecnologia (FCT), Portugal - Funding Agency
- Romanian Antarctic Foundation (FAR), Romania - National Operator
- European Polar Board-European Science Foundation (EPB-ESF) International Non-Governmental Organisation
- Fonds National de la Recherche (FNR), Luxembourg - Funding Agency
- Istituto Nazionale di Oceanografia e Geofisica Sperimentale (OGS), Italy - Marine Polar Operator
- Consiglio Nazionale delle Ricerche (CNR), Italy - National Arctic Operator

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# Measuring Change in a Changing World

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## Investigations of the impact of ocean acidification

A technical note on approaches and software tools

Although future changes in the seawater carbonate chemistry are well constrained, their impact on marine organisms and ecosystems remains poorly known. The biological response to ocean acidification is a recent field of research as most purposeful experiments have only been carried out in the late 1990s. The potentially dire consequences of ocean acidification attract scientists and students with a limited knowledge of the carbonate chemistry and its experimental manipulation. Hence, some guidelines on carbonate chemistry manipulations may be helpful for the growing ocean acidification community to maintain comparability. Perturbation experiments are one of the key approaches used to investigate the biological response to elevated pCO<sub>2</sub>. They are based on measurements of physiological or metabolic processes in organisms and communities exposed to seawater with normal or altered carbonate chemistry. Seawater chemistry can be manipulated in different

ways depending on the facilities available and on the question being addressed. The goal of this paper is (1) to examine the benefits and drawbacks of various manipulation techniques and (2) to describe a new version of the R software package seacarb which includes new functions aimed at assisting the design of ocean acidification perturbation experiments. Three approaches closely mimic the on-going and future changes in the seawater carbonate chemistry: gas bubbling, addition of high-CO<sub>2</sub> seawater as well as combined additions of acid and bicarbonate and/or carbonate.

The full paper is available free of charge at <http://www.biogeosciences.net/6/2121/2009/bg-6-2121-2009.html>

**Gattuso, J.-P. and Lavigne, H.: Technical Note: Approaches and software tools to investigate the impact of ocean acidification, *Biogeosciences*, 6, 2121-2133, 2009.**

## A few prospective ideas on climate reconstruction

from a statistical single proxy approach towards a multi-proxy and dynamical approach

Important progresses have been made in palaeoclimatological studies by using statistical methods. But they are in somewhere limited as they take the present as an absolute reference. This is particularly true for the modern analogue technique. The availability of mechanistic models to simulate the proxies measured in the sediment cores gives now the possibility to relax this constraint. In particular, vegetation models provide outputs comparable to pollen data (assuming that there is a relationship between plant productivity and pollen counts). The input of such models is, among others, climate. The idea behind paleoclimatological reconstructions is then to obtain inputs, given outputs. This procedure, called model inversion, can be achieved with appropriate algorithms in the frame of the Bayesian statistical theory. But the authors have chosen to present it in an intuitive way, avoiding the mathematics behind it. Starting from a relative simple application, based on an equilibrium BIOME3 model with a single proxy (pollen), the approach has evolved into two directions: (1) by using several proxies measured on the same core (e.g. lake-level status and  $\delta^{13}C$ ) when they are related to a component of the vegetation, and (2) by using a more complex vegetation model, the

dynamic vegetation model LPJ-GUESS. Examples presented (most of them being already published) concern Last Glacial Maximum in Europe and Africa, Holocene in a site of the Swiss Jura, an Eemian site in France. The main results are that: (1) pollen alone is not able to provide exhaustive information on precipitation, (2) assuming past CO<sub>2</sub> equivalent to modern one may induce biases in climate reconstruction, (3) vegetation models seem to be too much constrained by temperature relative to precipitation in temperate regions. This paper attempts to organise some recent ideas in the palaeoclimatological reconstruction domain and to propose perspectives in that effervescent domain.

The full paper is available free of charge at <http://www.clim-past.net/5/571/2009/cp-5-571-2009.html>

**Guiot, J., Wu, H. B., Garreta, V., Hatté, C., and Magny, M.: A few prospective ideas on climate reconstruction: from a statistical single proxy approach towards a multi-proxy and dynamical approach, *Clim. Past*, 5, 571-583, 2009.**



## Climatology of planetary waves with periods of 2–20 days

from airglow observations taken with a Spectral Airglow Temperature Imager

The presence of planetary wave type oscillations at mid-latitudes in the mesosphere/lower thermosphere region has been investigated using airglow observations. The observations were taken with a Spectral Airglow Temperature Imager (SATI) installed at Sierra Nevada Observatory (37.06° N, 3.38° W) at 2900 m height. Airglow data of the column emission rate of the O<sub>2</sub> Atmospheric (0-1) band and of the OH Meinel (6-2) band and deduced rotational temperatures from 1998 to 2007 have been used in this study. From these observations a climatology of planetary wave type oscillations at this location is inferred. It has been found that the planetary wave type oscillations of 5-day period is predominant in our data throughout the year, with activity greater than 50% during March/April and October/November months. The planetary wave type oscillations of 2-day period is predominant during both solstices, being predominant during winter solstice in O<sub>2</sub> while a 10-day oscillation

appears throughout the year with activity around 20% and with maximum activity during spring and autumn equinoxes. The 16-day oscillation has maximum occurrence during autumn-winter while its activity is almost disappeared during spring-summer. No clear seasonal dependence of the amplitude of the planetary wave type oscillations was observed in the cases considered in this study.

The full paper is available free of charge at <http://www.ann-geophys.net/27/3645/2009/angeo-27-3645-2009.html>

**López-González, M. J., Rodríguez, E., García-Comas, M., Costa, V., Shepherd, M. G., Shepherd, G. G., Aushev, V. M., and Sargoytchev, S.: Climatology of planetary wave type oscillations with periods of 2–20 days derived from O<sub>2</sub> atmospheric and OH(6-2) airglow observations at mid-latitude with SATI, *Ann. Geophys.*, 27, 3645-3662, 2009.**

## Precipitation of solid phase calcium carbonates and their effect on application of SA–T–P models

how broad salinity and temperature ranges are for seawater thermodynamic models that are functions of absolute salinity, temperature and pressure?

At the present time, little is known about how broad salinity and temperature ranges are for seawater thermodynamic models that are functions of absolute salinity (SA), temperature (T) and pressure (P). Such models rely on fixed compositional ratios of the major components (e.g., Na/Cl, Mg/Cl, Ca/Cl, SO<sub>4</sub>/Cl, etc.). As seawater evaporates or freezes, solid phases [e.g., CaCO<sub>3</sub>(s) or CaSO<sub>4</sub>2H<sub>2</sub>O(s)] will eventually precipitate. This will change the compositional ratios, and these salinity models will no longer be applicable. A future complicating factor is the lowering of seawater pH as the atmospheric partial pressures of CO<sub>2</sub> increase. A geochemical model (FREZCHEM) was used to quantify the SA–T boundaries at P=0.1 MPa and the range of these boundaries for future atmospheric CO<sub>2</sub> increases. An omega supersaturation model for CaCO<sub>3</sub> minerals based on pseudo-homogeneous nucleation was extended from 25–40°C to 3°C. CaCO<sub>3</sub> minerals were the boundary defining minerals (first to precipitate) between 3°C (at SA=104 g kg<sup>-1</sup>) and 40°C (at SA=66 g kg<sup>-1</sup>). At 2.82°C, calcite(CaCO<sub>3</sub>) transitioned to ikaite(CaCO<sub>3</sub>6H<sub>2</sub>O) as the dominant boundary defining mineral for colder temperatures,

which culminated in a low temperature boundary of –4.93°C. Increasing atmospheric CO<sub>2</sub> from 385 iatm (390 MPa) (in Year 2008) to 550 iatm (557 MPa) (in Year 2100) would increase the SA and T boundaries as much as 11 g kg<sup>-1</sup> and 0.66°C, respectively. The model-calculated calcite-ikaite transition temperature of 2.82°C is in excellent agreement with ikaite formation in natural environments that occurs at temperatures of 3°C or lower. Furthermore, these results provide a quantitative theoretical explanation (FREZCHEM model calculation) for why ikaite is the solid phase CaCO<sub>3</sub> mineral that precipitates during seawater freezing.

The full paper is available free of charge at <http://www.ocean-sci.net/5/285/2009/os-5-285-2009.html>

**Marion, G. M., Millero, F. J., and Feistel, R.: Precipitation of solid phase calcium carbonates and their effect on application of seawater SA–T–P models, *Ocean Sci.*, 5, 285-291, 2009.**



## Magnetosheath cavities: case studies

using Cluster observations

This paper presents examples of magnetosheath cavities in Cluster spacecraft observations. The cavities are accompanied by high energy particles in the magnetosheath and characterized by depressed magnetic fields and densities. Flow speeds decrease and temperatures increase within the cavities. All magnetosheath parameters show increased variability within the cavities when the energetic particle flux is high. The authors predict outward motion of the magnetopause boundary in response to the decreases in the magnetosheath ram pressure caused by the high energy particles within the magnetosheath cavities. For their events, the magnetopause distance is predicted to be 30% larger during the times of high

energy particle flux in the magnetosheath than that predicted using concurrent upstream solar wind pressure observations. Their events show no preference to occur for a particular IMF direction or solar wind plasma condition.

The full paper is available free of charge at <http://www.ann-geophys.net/27/3765/2009/angeo-27-3765-2009.html>

**Katircioğlu, F. T., Kaymaz, Z., Sibeck, D. G., and Dandouras, I.: Magnetosheath cavities: case studies using Cluster observations, *Ann. Geophys.*, 27, 3765-3780, 2009.**





# Yet another reason for more sleep in winter

people who sleep fewer than seven hours a night are nearly three times more likely to get a cold than those who average eight or more hours of sleep

In a column in the first issue of The EGGS, <http://www.the-eggs.org/columns.php?id=16&typeid=3>, we have examined the suitability of sofas to be classified as lab equipment. The examination was based on the positive effects of afternoon siestas on mental productivity and the obvious relationship between a sofa and a siesta (resulting in a - less obvious at first sight - positive relationship between sofas and mental productivity).

We have not treated night sleep in that instance, and hence we feel obliged to our readers to come back to that matter on a manner timely to the season and the media coverage of new and old influenza viruses.

According to a new Carnegie Mellon University study, people who sleep fewer than seven hours a night are nearly three times more likely to get a cold than those who average eight or more hours of sleep, the study found. For people who wake up periodically or have trouble falling asleep, the news is even worse.

According to the lead author of the study, Sheldon Cohen, Robert E. Doherty Professor of Psychology at Carnegie Mellon, 'Although sleep's relationship with the immune system is well-documented, this is the first evidence that even relatively minor sleep disturbances can influence the body's reaction to cold viruses. It provides yet another reason why people should make time in their schedules to get a complete night of rest'.

In the study, published Jan. 2009 in the Archives of Internal Medicine, 153 healthy volunteers were introduced to a cold virus. They were then sequestered in a hotel for five days and monitored for symptoms, such as sneezing, nasal congestion and sore throats. Of the study subjects, 54 developed a cold. Additionally, for two weeks prior to their participation in the study, the volunteers were interviewed daily regarding the quality of their sleep the previous night.

In the measurement category of sleep duration, people who reported less than seven hours of sleep were about three times more likely to become symptomatic than were subjects who reported eight or more each night (Well, we do not think this is surprising, as we might assume that hibernating animals do not catch ANY colds while pursuing their long winter habits).

With sleep efficiency, the percentage of time one actually sleeps between lying down to sleep and waking up the next morning, those who scored lower than 92% sleep efficiency were five-and-a-half times more likely to develop colds than those with efficiency scores above 98%.

Hence, we conclude here that the efficiency of night sleep might be comparable to (or even higher than) the efficiency of vaccination. We do not claim, however, that one should take the writings of this column as medical advice.

-Ed.





# James Bond Location on the Move

## This June, the eastern part of an outlet glacier of Vatnajökull ice cap began to surge forward

A large glacial lake or proglacial lagoon with numerous glittering icebergs, has also been used for filming many commercials and fashion shots. The lake started to form in the 1940's in front of a huge outlet glacier from the Vatnajökull ice cap, after the outlet had retreated for at least two decades due to warming climate.



*Aerial view of surging glacier, Breidamerkurjökull, Vatnajökull Ice Cap, Iceland. Credit: Ragnar Th. Sigurdsson, Arctic Images.*

Scenes in two James Bond films were shot in Iceland, A View to a Kill in 1984 and Die Another Day in 2002. The location, a large glacial lake or proglacial lagoon with numerous glittering icebergs (Jökulsarlön), has also been used for filming many commercials and fashion shots. The lake started to form in the 1940's in front of a huge outlet glacier (Breidamerkurjökull) from the Vatnajökull ice cap, after the outlet had retreated for at least two decades due to warming climate. Some filming also took place on the outlet glacier itself.

The Vatnajökull ice cap is one of the world's largest, single ice masses outside Greenland and Antarctica, covering over 8,000 square kilometres and noted for volcanic activity. The proglacial lagoon, some 200 metres deep and fast growing beyond 10-15 square kilometres, is separated by a narrow strip of land from battering waves of the North Atlantic Ocean. Long, high ice cliffs line the lake at the glacier margin where huge icebergs calve with thundering sounds from the main ice stream, then only to strand and melt in the lake. Only small ice floes reach the sea. The lake stretches far inland beneath the ice and a deep groove in the bedrock farther still. The landscape under the ice has been revealed through radio-echo soundings.

In early June, the eastern part of the outlet glacier began to surge forward in a similar manner as many other periodically surging outlets of the Vatnajökull ice cap. Glacier surges turn the glacier surface into a maze of ice towers and crevasses and a surging glacier can advance many kilometres within a few months, despite copious retreat before each surge. In the



*Aerial view of surging glacier, North valley, Vatnajökull Ice Cap, Iceland. Credit: Ragnar Th. Sigurdsson, Arctic Images.*



case of Breiðamerkurjökull the surge may be associated with the fact the the eastern part is partly floating on water and thinning fast in the lower reaches. At a given point a large section of the glacier, much larger than before, is lifted by water and starts to break up. This might be accentuated by the fact that the Breiðamerkur outlet glacier is not known to have surged before.



*Aerial view of Arctic Terns feeding on krill and capelin. Glacial surge, Breiðamerkurjökull, Vatnajökull Ice Cap, Iceland. Credit: Ragnar Th. Sigurdsson, Arctic Images.*

The broken surface has sent an enormous amount of icebergs into the lake, almost filling it completely. The sight-seeing boats operated for years at the southern shore can hardly move, not until melting has cleared some of the icy stretches. Scientists, the road authorities and many others are concerned



*Aerial view of surging glacial patterns during glacial surge at Breiðamerkurjökull, Vatnajökull Ice Cap, Iceland. Credit: Ragnar Th. Sigurdsson, Arctic Images.*

about future development. The sudden rush of ice and water through the narrow strip of land in front of the lake, in the short river Jökulsá, could speed up an already commenced erosion process so that sooner or later the lake would connect directly to the ocean. In that case Iceland will have a new fjord and the main road, linking the west of Iceland with the east by a bridge across the river, is then breached. Some kind of a ferry system would have to do.

**Text: Ari Trausti Gudmundsson, geophysicist**

**Photographs: Ragnar Th. Sigurdsson, ARCTIC IMAGES, ICELAND**

**[www.arctic-images.com](http://www.arctic-images.com)**



# The Teachers at Sea program

## on board the Marion Dufresne during the AMOCINT cruise

With the joint support of the French Polar Institute (IPEV) and of the European Geosciences Union (EGU), a program for High Schools was conducted along side the scientific work on board the Marion Dufresne, during the MD168 AMOCINT, IMAGES-XVII cruise. 5 teachers from France, Norway, Portugal, Spain and the United States of America, were invited to participate to the cruise and to gather information on its scientific goals, to participate to the work going on in order to have a as precise and complete as possible grasp of the sciences being done on board.

### The start

The Teachers at Sea program started with the following message sent to all the land-based teachers for whom we had the email addresses (about 200) to invite them not only to use the material sent from the Marion Dufresne, but also to take this opportunity to ask all kind of questions which they would discuss with their students:

Dear teacher!

The focus of a 3 week research cruise of the Research Vessel Marion Dufresne, of the French Polar Institute (IPEV), in the North Atlantic from Gran Canaria to Brest, through the Açores, the Charlie-Gibbs fracture zone, and in the North on the Voering plateau, will be to collect deep sea cores to help answer the puzzling questions about changes in the Atlantic Meridional Overturning Circulation during the last interstadials climatic stages, i.e. stages during which the climate was warm, similar to the present day climate. The goals of the AMOCINT cruise under the guidance of Catherine Kissel and Helga Kleiven (chief and Co-Chief Scientists) will be to survey and core sites for sampling high sedimentation rate interglacial sections available to the Calypso coring system of the RV Marion Dufresne, to produce time series of North Atlantic circulation parameters with century scale resolution for the last insterglacial and previous interglacials over the past 800.000 year and to provide detailed comparisons with ice core records from Antarctica and Greenland.

Finally, one of the aims is also to conduct detailed site surveys for targeted IODP (Integrated Ocean Drilling Program) drilling to recover thick marine sections over the past intergalcials at key locations for monitoring Atlantic Meridional Overturning Circulation (AMOC) variability.

Besides a number of noted research scientists from around the world onboard will be 5 teachers immersing themselves in the experience of life at sea and research with the guidance of one scientist. Their students will be taking part in this cruise



*Aerial view of surging glacial patterns during glacial surge at Breidamerkurjokull, Vatnajokull Ice Cap, Iceland. Credit: Ragnar Th. Sigurdsson, Arctic Images.*

by sending emails, participating in blogs, and journaling about the daily exploits of those onboard. You can join the "Core-Education" Team as they journey over the ocean by sending them emails about the science and the research. Send your emails to [coredu@marion.ipev.fr](mailto:coredu@marion.ipev.fr) and they will enjoy getting back to you.

Hélder Pereira, Jean Aufauvre, Angela Skeeles-Worley, Gertrud Cigen, Catalina Sureda and Carlo Laj (advisor).

### The cruise

Specifically, the teachers` program was to participate to the scientific activities on board and to relate these activities to their fellow teachers around the world by means of almost daily reports that were e-mailed to about 200 teachers. First, the teachers were introduced to the different aspects of the cruise,



the characteristics of the Marion-Dufresne itself, its electric powered engines, its Dynamic Positioning System, and finally to the two unique coring systems, the Calypso and the Calypso Square corer. Then, in order to be fully immersed in the scientific work, the teachers participated together with the scientists and technician on board to two 4-hours shifts per day (8h total per day). During these shifts, they were involved in every step of the process of obtaining the cores, cutting, opening and labeling them, archiving, and measuring some of the physical parameters, and finally sediment description.



*Image 2: The R/V Marion Dufresne.*

Participation to the regular shifts was invaluable for realizing that there are many professional tasks that are absolutely necessary for an oceanographic cruise to be successful. This is true for the crew in charge of the navigation, that in charge of the vessel propulsion, and also for the people in charge of the coring process (the Malagasy team and the IPEV crew on board) and other aspects such as technical fitting of the tools, repairing and maintenance of the tools. This is certainly one aspect of the scientific cruise often ignored when reading reports or scientific publications only.



*Image 3: The giant CALYPSO corer.*

Participation to the shifts was also important to get the teachers in contact not only with the scientists leading the scientific aspects of AMOCINT, but also with the 6 students from

the University of Brest participating to the second educational program that was going on during AMOCINT the 10th edition of the University of the Sea, under the direction of Prof. Jacques Deverchère of the University of Brest. The coexistence of these two programs was most exciting and constructive.

Using all the information gathered, and that obtained by their participation to the different shifts, it was possible to establish almost daily reports of the scientific progress of the cruise and to send regular logs to the participating land-based teachers. These reports were written by all the teachers together and e-mailed to as many teachers as possible in different schools mainly in Europe and in the USA, taking advantage of a list of addresses of teachers having participated to the Geosciences Information for teachers (GIFT) workshops of the European Geosciences Union. Although many schools were already closed for summer vacations during most of the cruise, we received some enthusiastic responses from many teachers, and the material sent will be used in the classrooms from the beginning of the 2008-2009 school year.



*Image 4: The CALYPSO square corer (CASQ) back on the deck.*

Also, taking advantage of the large amount of sediment collected by the CASQ corer, we have systematically taken part of the sediment for the schools. We have written some simple instructions on how to extract foraminifera from the sediment, how to identify the clearest warm and cold species, so that the teachers will be able to show that at any particular site there have been significant climatic fluctuations in the past.

In parallel with these activities, a power-point presentation describing all the different scientific and social aspects of the life on board was prepared, also containing a series of digital photographs that were too big to be sent via e-mail. This presentation will be recorded on CDs that will be distributed to the different teachers and also uploaded on the EGU and IPEV homepages, from where it will be possible to download them freely and used in the classrooms. Worldwide.

Finally, during the transit period between coring zones, I organized conferences given by scientists and PhD students on board, on different aspects of oceanographic and paleoclimatic research related to the AMOCINT cruise (the list is below). The students of the University of the Sea also attended these conferences and gave very interesting and lively oral reports on their scientific work (results of their first year stage of practical work).





*Image 5: Handling the retrieved core.*

The Teachers at Sea program gives the teachers a renewed sense of teaching science the way science is practiced. The 5 AMOCINT teachers have been informed on every detail of the cruise, from the scientific proposal to the details of the cruise, and finally to the analysis of the cores that, although limited on board, is what science is about. This is different from a textbook, which is mostly an accumulation of facts. Here the teachers are exposed to the practices of science and in turn we can expect them to motivate their students accordingly. Exposure to authentic science, such as that the 5 teachers have experienced during AMOCINT, may be a pivotal experience for them, causing them to change at least in part their teaching methods, possibly creating more future scientists or at least adults with positive attitudes towards science. This is particu-

larly true for AMOCINT, which is part of a research program focused on future global climate change, with a special attention to interglacial periods such as the one we experience now. This is clearly of high societal importance and both the work done on board and the conferences held during the cruise stressed that there are a lot of questions for the future and there are difficulties in making predictions, a message to be transmitted to the next generation and especially to the teachers. Teachers as multipliers in educational sectors and partners for students are the best actors to make students (the next generation) aware about these problems in the school.

#### Acknowledgements

All the participants to the Teachers at Sea program wish to deeply thank the Institut Polaire Paul Emile Victor (IPEV) and the European Geosciences Union (EGU) for their generous financial contributions which made this program possible. The IPEV group on board, as well as the scientific team and the CMA-CGM crew, are also thanked for their constant help during the cruise. We particularly thank Gérard Jugie and Hélène Leau (IPEV), Catherine Kissel and Helga (Kikki) Kleiven and Jacques Deverchère for their involvement and constant help to the Teachers at Sea program.

**Carlo Laj**  
**Laboratoire des Sciences du climat et de**  
**l'Environnement/IPSL,**  
**Laboratoire CEA/CNRS/UVSQ**  
**91198 Gif-sur-Yvette Cedex**  
**France**





## Oceans4schools

ocean colour and other ocean subjects for schools

The site contains information on various topics, like:

Light and colour in the ocean: What light is, how colours are created, and what they tell us about the water.

Plant life in the ocean: Why the most important use for ocean colour is the study of marine plants.

Why measure ocean colour? Some practical and scientific uses for ocean colour measurements.

Ocean colour satellites: How ocean colour is measured from space, and what must be done to get useful information from the measurements.

Other topics include sea Floor, currents, waves, climate and biology of the ocean, climate change and its impact on coral reefs as well as a glossary -not too extensive, but nevertheless useful, if new terms continue to get added.

A teachers corner (requiring registration) is also there.

<http://www.noc.soton.ac.uk/o4s/>



Imaggeo is the online open access geosciences image repository of the European Geosciences Union. Every geoscientist who is an amateur photographer (but also other people) can submit their images to this repository.

Being open access, images from Imaggeo can be used by scientists for their presentations or publications as well as by the press.

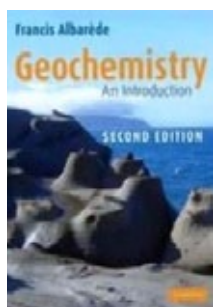
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[www.imaggeo.net](http://www.imaggeo.net)





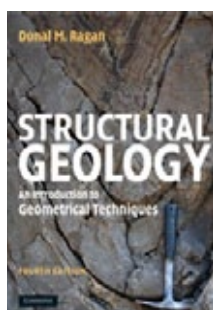
## Geochemistry: An Introduction



Authors: Francis Albarede  
 Publisher: Cambridge University Press  
 ISBN: 9780521706933  
 YEAR : 2009  
 EDITION : 2nd  
 PAGES : 342  
 PRICE : 41.00 €  
 Paperback

Geochemistry utilizes the principles of chemistry to explain the mechanisms regulating the workings – past and present – of the major geological systems such as the Earth's mantle, its crust, its oceans, and its atmosphere. Geochemistry only really came of age as a science in the 1950s, when it was able to provide geologists with the means to analyze chemical elements or to determine the abundances of isotopes, and more significantly still when geologists, chemists, and physicists managed to bridge the chasms of mutual ignorance that had separated their various fields of inquiry. Geochemistry has been at the forefront of advances in a number of widely differing domains. It has made important contributions to our understanding of many terrestrial and planetary processes, such as mantle convection, the formation of planets, the origin of granite and basalt, sedimentation, changes in the Earth's oceans and climates, and the origin of mineral deposits, to mention only a few important issues. And the way geochemists are perceived has also changed substantially over recent decades, from laboratory workers in their white coats providing age measurements for geologists or assays for mining engineers to today's perception of them as scientists in their own right developing their own areas of investigation, testing their own models, and making daily use of the most demanding concepts of chemistry and physics. Moreover, because geochemists generate much of their raw data in the form of chemical or isotopic analyses of rocks and fluids, the development of analytical techniques has become particularly significant within this discipline.

## Structural Geology



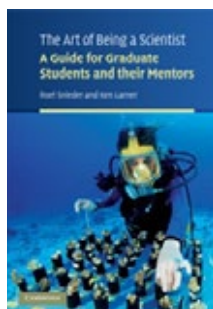
Authors: Donal M. Ragan  
 Publisher: Cambridge University Press  
 ISBN: 9780521745833  
 YEAR : 2009  
 EDITION : 4th  
 PAGES : 611  
 PRICE : 38.00 €  
 Paperback

The first steps in the study of geological structures are largely geometrical. This is true in the historical development of our knowledge of such structures, in the initial stages of any field investigation, and in the education of a structural geologist. This concern for geometry includes the methods of describing and illustrating the form and orientation of geological structures, and the solution of various dimensional aspects of these structures. This book attempts to fill a need for an introduction to the geometrical techniques used in structural geology. I have sought an approach which is basic yet modern. The topics covered include well-established techniques, newer approaches which hold promise and an introduction to certain fundamental mechanical concepts and methods. Students who go no further in structural geology should have a working knowledge of the basic geometrical techniques and at least some appreciation of where the field is headed. Those who do go on, either in advanced courses or on their own should have the necessary foundation.



## The Art of Being a Scientist

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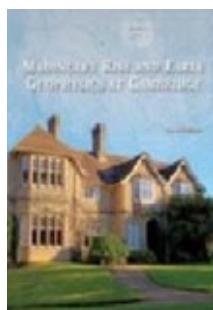


Authors: Roel Snieder and Ken Larner  
 Publisher: Cambridge University Press  
 ISBN: 9780521743525  
 YEAR : 2009  
 EDITION : 1st  
 PAGES : 286  
 PRICE : 23.00 €  
 Paperback

This is a hands-on guide for graduate students and young researchers wishing to perfect the practical skills needed for a successful research career. By teaching junior scientists to develop effective research habits, the book helps to make the experience of graduate study a more efficient and rewarding one. The authors have taught a graduate course on the topics covered for many years, and provide a sample curriculum for instructors in graduate schools wanting to teach a similar course. Topics covered include choosing a research topic, department, and advisor; making workplans; the ethics of research; using scientific literature; perfecting oral and written communication; publishing papers; writing proposals; managing time effectively; and planning a scientific career and applying for jobs in research and industry. The wealth of advice is invaluable to students, junior researchers and mentors in all fields of science, engineering, and the humanities.

## Volcanic and Tectonic Hazard Assessment for Nuclear Facilities

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Authors: Charles B. Connor, Neil A. Chapman and Laura J. Connor  
 Publisher: Cambridge University Press  
 ISBN: 9780521887977  
 YEAR : 2009  
 EDITION : 1st  
 PAGES : 623  
 PRICE : 88.00 €  
 Hardback

Geoscientists worldwide are developing and applying methodologies to estimate geologic hazards associated with the siting of nuclear facilities, including nuclear power plants and underground repositories for long-lived radioactive wastes. Understanding such hazards, particularly in the context of the long functional lifetimes of many nuclear facilities, is a challenging task. This book documents the current state of the art in volcanic and tectonic hazard assessment for proposed nuclear facilities, which must be located in areas where the risks associated with geologic processes can be quantified and are demonstrably low. Specific topics include overviews of volcanic and tectonic processes, the history of development of hazard assessment methodologies, description of current techniques for characterizing hazards, and development of probabilistic methods for estimating risks and uncertainties. Examples of hazard assessments are drawn from around the world, including the United States, Great Britain, Sweden, Switzerland and Japan. This volume will promote much interest and debate about this important topic among research scientists and graduate students actively developing methods in geologic hazard assessment, geologists and engineers charged with assessing the safety of nuclear facilities and those with regulatory responsibility to evaluate such assessments.





## 1st International Conference on Climate Change and Developing Countries - (Meeting)

19/02/2010 - 22/02/2010 - Kottayam, Kerala, India

The conference, is being organized by CEET and has two parallel sessions, one related to scientific research and the other on social aspects and policies mainly relating to third world countries. The organizers request researchers and interested students to participate and enrich the various sessions of the conference.

CEET is an organization of academics, scientists, journalists, activists and writers and you may get all the information about our activities from <http://www.ceetindia.org/>.

In addition to scientific activities, Kottayam (<http://www.photoradchem.org/2007/kottayam.html>) and the state of Kerala in general (<http://www.keralatourism.com/>), generally identified as "God's Own Country" are worth visiting.

**CEET**

<http://www.ceetindia.org/>

## Locale Air Quality and its Interactions with Vegetation: Call for abstracts - (Meeting)

21/01/2010 - 22/01/2010 - Antwerp, Belgium

During this one-and-a-half-day symposium, the focus will be on the state-of-the-art knowledge of plant-atmosphere interactions on local scale and within urban areas. Topics of interest are plant-atmosphere interactions in urban areas, assessments of local air quality and vegetation interactions, and model implementation of plant-atmosphere interactions.

The conference will take place in the historical city centre of Antwerp in the Cultural Conference Centre Elzenveld.

Please view invitation to submit abstracts at

<https://secure.vito.be/vitoevenement/vdocuments/028600/brochure/N/Air%20Quality%20and%20vegetation%202010.pdf>

and visit the website for more information.

### Important dates

Deadline for abstract submission: September 30, 2009

Notification of acceptance: October 31, 2009

Deadline full paper abstract: December 31, 2009

Deadline registration: January 18, 2010

**VITO (Flemish Institute for Technological Research) and Antwerp University. Within the framework of the CLIMAQS project funded by IWT-Flanders.**

<http://www.vito.be/eq-vegetation-workshop>

## Second International Sclerochronology Conference (ISC2010) - (Meeting)

24/07/2010 - 28/07/2010 - Mainz, Germany

The 2nd International Sclerochronology Conference (ISC2010) will take place next summer: July 24-28, 2010 (plus two days with workshops, round-table discussions and a field trip) at the University of Mainz, Germany. The first circular is available at <http://www.scleroconferences.de/>.

For pre-registrations please send to [ISC2010@uni-mainz.de](mailto:ISC2010@uni-mainz.de).

**Institute of Geosciences -Geocycles**

**University of Mainz**

**Joh.-Joachim-Becherweg 21**

**55128 Mainz**

Organization committee:

Bernd R. Schöne-chairman

Meghan Burchell

David P. Gillikin

Andy L.A. Johnson

Claire E. Lazareth

Kazushige Tanabe

Thomas Tütken

[official page:]

<http://www.paleontology.uni-mainz.de/ISC2010/>

**Claire E. Lazareth**

**LOCEAN - PALEOPROXUS**

**IPSL/LOCEAN (UMR 7159), UPMC/CNRS/IRD/MNH**

**Centre IRD France Nord**

**32, avenue Henri Varagnat**

**93 143 Bondy cedex**

[claire.lazareth@ird.fr](mailto:claire.lazareth@ird.fr)

## Field Forum: Significance of along-strike variations for the 3-D architecture of orogens - (Meeting)

16/05/2010 - 22/05/2010 - Samos, Greece

Significance of along-strike variations for the 3-D architecture of orogens: The Hellenides and Anatolides in the eastern Mediterranean

Along-strike variations are a common characteristic of orogens and have been described in the European Alps, the North American Cordillera, the Andes, and the Hellenide-Anatolide orogen of southeastern Europe. The causes for along-strike variations might be different, but preorogenic paleogeography, continental architecture, and kinematic/geometric variations at the lithospheric scale potentially play an important role. Along-strike changes in orogens have a profound impact on how major orogenic processes proceed in time and space.

For the Hellenide-Anatolide orogen, along-strike variations can be well studied in westernmost Turkey and the adjacent Greek island of Samos. This field forum will focus on the following observables:



- topography;
- structures (from surface structures to geophysical data);
- paleogeographic domains;
- magmatic and metamorphic rock distribution; and
- the geometry of extensional faults and shear zones, associated sedimentary basin distribution and geothermal fields.

From the observables, we will try to infer processes, such as:

- the spatial and temporal progression of subduction zone retreat in the region;
- the dynamics of crustal accretion;
- the thermal-mechanical evolution of the orogenic belt; and
- the dynamics of continental extension.

## SIGNIFICANCE

The idea for this broad, field-based international conference is born out of recent transdisciplinary field-based studies pointing out major along-strike variations in the Hellenide-Anatolide orogen that bear strongly on future research directions. These studies showed that differences in preorogenic paleogeography caused the Hellenide orogen of eastern Greece and the Anatolide Belt of western Turkey to evolve in sharply different ways. We believe that better identification and understanding of those differences will potentially clarify how eastern Mediterranean subduction zones evolved, how preorogenic architecture controls crustal thickening and the subsequent exhumation of high-pressure rocks, and how large-scale continental extension evolves.

Recent geodetic studies and numerical models also address the problem of lateral variations in orogens; however, model assumptions outstrip field-based observations, the latter of which are much more complicated and exceed the capacity of any numerical and scaled analog material simulations, especially in 3-D.

These studies also bear on a number of new and innovative methods for interpretation of geochronologic data for direct dating of deformation and metamorphism. Deciphering temporal aspects of orogenic processes is an important objective in tectonics. The key to successful dating of orogenic processes directly depends on appropriate sampling in the field; therefore, it is crucial that this aspect be discussed thoroughly in the field.

The key objective of this field forum is to bring together modelers and geodetic experts with colleagues from the more traditional, observational approaches of seismology, structural geology, petrology, and geochronology in the field to discuss outcrops in the field. Topics covered will include what conclusions can be drawn from field observations, how critical it is to sample appropriately, and what sorts of information can be retrieved from a certain outcrop. The conveners expect that this mixture of scientists and topics will provide a basis for better integrated research strategies for investigating along-strike variations in orogens, subduction-zone processes, and subsequent continental extension.

The spatial and temporal evolution of the Hellenide-Anatolide orogen is also significant economically because of its key importance to understanding spatial controls on faults and basins for hydrocarbon generation, metallogeny, and geothermal resources.

## ITINERARY

Participants will arrive on Sunday, 16 May 2010, on the Greek island of Samos, where the first two days of the Field Forum will take place. Samos is located in the internal zone of the Hellenide orogen, which is mainly made up by the Cycladic Blueschist Unit, the most deeply exhumed unit in the central Hellenides. The forum ends in western Turkey on Sunday, 23 May.

**Day 1, 17 May:** The first field trip will introduce the participants to the Cycladic Blueschist Unit (CBU) to observe in detail at the contact between the CBU and the underlying Kerketas Nappe. The contact is superbly exposed along a 1–2-km ridge section and then again at the top of the 1400-m-high mountain. The latter is considered part of the Tripolitza Unit, which is well exposed farther south in the External Hellenides but is also exposed in a few windows within the Internal Hellenides (i.e., on Samos).

**Day 2, 18 May:** This day will be devoted to talks and discussions. Key participants will give ~30-minute overview talks highlighting the problems and consequences of along-strike variations. We will also ask a few other participants to give ~15-minute talks, and most participants will be encouraged to present posters.

**Day 3, 19 May:** In the morning, the group will take the ferry from Samos to the town of Kusadasi on the Turkish west coast. In western Turkey, the Menderes Nappes occur structurally below the Cycladic Blueschist Unit. The Menderes Nappes have an entirely different paleogeographic and tectonic history than the Kerketas Nappe in Samos. We intend to overnight in the town of Selcuk, from which critical outcrops can be reached within less than one hour, including outcrops of the Cycladic Blueschist Unit and the Ephesus fault. There will also be an opportunity to visit the ruins of Ephesus at the end of the day.

**Day 4, 20 May:** We will examine the cross section at Balıkaya Tepesi in the Aydin Mountains, where the juxtaposition of the Cycladic Blueschist Unit and the Menderes Nappes is well exposed. The outcrops provide evidence for the thrusting of the Cycladic Blueschist Unit onto the Menderes Nappes. The mylonites have been dated, and field discussions may focus on how mylonitization can be dated directly.

**Day 5, 21 May:** We will concentrate on the southern margin of the Menderes Massif between Lake Bafa and Selimiye. The Lake Bafa area provides access to the contact between multiply deformed magmatic and metapelitic rocks within the Menderes Nappes. The Selimiye shear zone is a controversial feature, interpreted both as extensional and contractional. This shear zone is of key importance for understanding the emplacement of the high-pressure rocks of the Cycladic Blueschist Unit above greenschist-facies rocks of the Menderes Nappes. We will provide evidence for sustained contractional deformation across the Menderes Nappes.

**Day 6, 22 May:** This cross section across the Bozdag and Aydin Mountains will wrap up nicely the tectonics of the region. The cross section provides an outline of the geometry of the Alpine nappe stack, including the fabric evolution that was used to define the tectonic units. The section also provides



an overview of the low-angle detachments and the high-angle normal faults that define the young extensional history and the topographic evolution of the central Menderes Massif, which is distinctly different from that of the adjacent Greek islands. There may also be the opportunity to visit a geothermal site.

## EXPRESSIONS OF INTEREST

Logistical constraints limit participation to 35 people. Participant selection will ensure broad representation by nationality, occupation (i.e., faculty, graduate students, and industry and government scientists), and research interest (i.e., structural geology, metamorphic petrology, isotope geochronology, sedimentology, geomorphology, and geodynamics). Interested individuals should inform the organizing committee by 9 December 2009 of their desire to participate by sending an e-mail outlining how they will contribute to the theme of the forum to Uwe Ring at [uwe.ring@canterbury.ac.nz](mailto:uwe.ring@canterbury.ac.nz). Registration fees are still to be determined; please check [www.geosociety.org](http://www.geosociety.org) for updates.

**Uwe Ring, Dept. of Geological Sciences, Canterbury University, Christchurch 8004, New Zealand, [uwe.ring@canterbury.ac.nz](mailto:uwe.ring@canterbury.ac.nz)**

**Klaus Gessner, Centre for Exploration Targeting M006, The University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Australia, [klaus.gessner@uwa.edu.au](mailto:klaus.gessner@uwa.edu.au)**

**Talip Güngör, Dept. of Geology, Dokuz Eylül University, [talip.gungor@deu.edu.tr](mailto:talip.gungor@deu.edu.tr)**

**Nikos Skarpelis, Dept. of Geology and Geoenvironment, University of Athens, Greece, [skarpelis@geol.uoa.gr](mailto:skarpelis@geol.uoa.gr)**

**Dov Avigad, Institute of Earth Sciences, The Hebrew University of Jerusalem, Jerusalem 91904, [avigad@vms.huji.ac.il](mailto:avigad@vms.huji.ac.il)**

**Olivier Vanderhaeghe, G2R, Nancy-Université, BP 239 54006 Vandoeuvre-les-Nancy, France, [olivier.vanderhaeghe@g2r.uhp-nancy.fr](mailto:olivier.vanderhaeghe@g2r.uhp-nancy.fr)**

[www.geosociety.org](http://www.geosociety.org)

## 6th IMA Conference on Modelling Permeable Rocks - (Meeting)

29/03/2010 - 01/04/2010 - Edinburgh, Scotland, United Kingdom

This conference provides an excellent opportunity for people from different disciplines (geology, statistics, mathematics and engineering) to share ideas on modelling permeable and fractured rocks. The emphasis will be on new developments in the mathematical modelling of geological patterns for the purposes of improving prediction of flow and hydro-mechanical behaviour rather than on purely descriptive work. For the 6th Conference in the series, we shall have a special focus on modelling requirements for the geological storage of CO<sub>2</sub>. However, we shall also include applications for the oil industry, hydrogeology and nuclear waste disposal.

## Keynote Speakers

- \*Martin Blunt (Imperial College, London, UK)
- \*Peter Frykman (GEUS, Denmark)
- \*Philip Ringrose (StatoilHydro ASA, Norway)
- \*Susan Stipp (Copenhagen University, Denmark)

Submit a one page abstract for the conference on the topics listed below. The format for these abstracts is available on the IMA website: <http://www.ima.org.uk/mathematics/proceedings.htm>

Abstracts should be submitted online at <http://online.ima.org.uk/> or emailed to [conferences@ima.org.uk](mailto:conferences@ima.org.uk)

Closing date for Abstracts: 30 October 2009  
Notification of Acceptance: December 2009

## Suggested Topics

- \* Faults and fractures, influence of geomechanics
- \* Process modelling/pattern formation
- \* Quantitative techniques for data collection
- \* Geostatistical techniques
- \* Uncertainty in modelling heterogeneity
- \* Integration and upscaling of data into flow models

## University of Edinburgh

Amy Marsh  
Conference Officer  
The Institute of Mathematics and its Applications Catherine Richards House  
16 Nelson Street  
Southend-on-Sea  
Essex SS1 1EF  
United Kingdom

[http://www.ima.org.uk/Conferences/modelling\\_permeable\\_rocks.html/index.html](http://www.ima.org.uk/Conferences/modelling_permeable_rocks.html/index.html)

## 5th International Symposium on Computational Wind Engineering - (Meeting)

23/05/2010 - 27/05/2010 - Chapel Hill, North Carolina, USA

Scientists, academics, technologists, architects and engineers from around the world will assemble at the Fifth International Symposium on Computational Wind Engineering (CWE2010), which will include technical sessions with presentations and discussions on all topics related to computational wind-engineering development and application.

The theme for CWE2010 is Computational Wind Engineering (CWE) applications for Homeland and Societal Security. This theme includes natural and human-caused hazards and disasters. A special session is being planned on the integration of multiscale CWE models with endpoints for human health and property effects. Special topic sessions will include Com-



putational Fluid Dynamics (CFD) model development and validation, inclusion of boundary layers and turbulence, use in supporting disaster preparedness for wind damage, fire damage, and environmental contamination, and use in developing wind energy systems and their siting.

CWE2010 will include keynote speakers on the future of high performance computing hardware and software as it may influence the future of CWE. Each international symposium on CWE reflects the significant scientific advances in the rapidly developing computational wind engineering sciences linked to advances in high performance computing hardware and software. The future of computing will change the ability and opportunities for CWE.

The International Association for Wind Engineering (IAWE) co-convenes the Computational Wind Engineering (CWE) symposium every four years in rotation with one of its three global regional organizations. The American Association for Wind Engineering (AAWE) will co-convene the 2010 event.

For more information or questions not answered herein contact the symposium chairperson Alan Huber at [chairman@cwe2010.org](mailto:chairman@cwe2010.org).

### Important Dates

Abstracts Due: October 1, 2009 (300-500 words)  
Notification of Acceptance: December 2009  
Full Papers Due: March 1, 2010 (Eight-page limit)

**International Association for Wind Engineering (IAWE),  
American Association for Wind Engineering (AAWE)**

<http://www.cwe2010.org/>

## European Gliding Observatories Meeting and Glider School - (Meeting)

16/11/2009 - 20/11/2009 - Larnaca, Cyprus

The 4th European Gliding Observatories (EGO) Meeting and Glider School aims at bringing scientists, engineers, technicians, students, and industry together to discuss past experiences and future plans related to glider oceanography. It will emphasize the international and operational aspects that gliders bring to oceanography.

The school portion will consist of two days after the meeting to allow new users to experience first hand the operation of gliders, from the mechanical design, to programming and communications, deployment and recovery, and data processing. Papers are invited in three primary areas:

I. Gliders and process studies (such as air/sea interaction, ocean dynamics, small- and meso-scale features, physical and biogeochemical coupling)

II. Gliders and operational systems (such as glider roles in near real time observing and forecasting systems, complementing with other platforms like floats, satellites, and moorings, sampling strategies, data assimilation, online and automated procedures for single gliders or 'fleets', and 'globalization' of glider sampling)

III. Technology of gliders and sensors (such as latest developments in glider design, sensor design, calibration, new autonomous platforms).

Informal technical workshops to discuss problems, ideas, and solutions will also take place during the meeting. Those who wish to attend the school must submit a one page description of the motivation for doing so.

### Important dates

Glider Meeting: 16-18 November 2009  
Glider School: 19-20 November 2009  
Abstract submission: 1 October 2009  
Registration: 15 October 2009

**Daniel Hayes**  
**Oceanography Center**  
**University of Cyprus**  
**P.O. Box 20537**  
**1678 Nicosia**  
**Cyprus**  
[dhayes@ucy.ac.cy](mailto:dhayes@ucy.ac.cy)

<http://www.cyprusconferences.org/ego2009>

## 6th Conference on Image Information Mining - (Meeting)

03/11/2009 - 05/11/2009 - Torrejon air base - Madrid,  
Spain

Today the analysis of a few, very high resolution, multi-spectral images can be complex and challenging. In addition, the emerging needs from major applications (e.g.: mapping, global monitoring, disaster management support, non proliferation, etc.) and large programmes / initiatives (e.g.: Kopernikus, GEO, GEOSS), and the continuous increase in archives' size and EO sensors' variety, require new methodologies and tools for information mining and management, supported by shared knowledge. The manual process performed by experts to mine information from images is currently too complex and expensive to be applied systematically on even a small subset of the acquired scenes. This limits the full exploitation of the petabytes of archived or new data. The issue might become even more challenging in future since more missions - including constellations - are being planned, with broader sensor variety, higher data rates and increasing complexity. As an example, ENVISAT alone accumulates 400 terabytes of data every year. The problem is common also to other domains, like medicine, multimedia, and to a broad spectrum of other sensors' data.

Results from current R&D activity might ease the access to the imagery (today mostly retrieved using spatio-temporal and a few more attributes) also through their information content. The need to access information also in large volumes of image data has stimulated the research in the field of content-based image retrieval during last decade. Many new concepts have been developed and prototyped. However the dramatic increase in volume, details, diversity and complexity, and the user demand for simultaneous access to multi-domain data urgently require new approaches for image information mining, multi-domain information management, and knowledge management and sharing (in support of information mining and training).



This year's conference continues to focus on automation in support of applications and services for geospatial intelligence, for which Image Information Mining is considered of very high interest and appropriate. This theme proves most successful when cross-cued from other intelligence disciplines, therefore the conference topics are broadened towards more generic Information Mining. In addition, because the future will be marked by an explosion of satellite imaging missions, the conference is expected to bring new stimulating ideas, concepts or methods also for the use of multi-temporal images.

Presentations should focus on theory and applications leading to improve automation in geospatial information extraction and understanding from optical and SAR EO images and heterogeneous sources:

- \* Automatic image pre-processing (geo-referencing, orthorectification, radiometric calibration, etc.)
- \* Automated feature and information extraction from optical and SAR EO images
- \* Multi-temporal analysis
- \* Challenges for metre resolution optical and SAR EO images
- \* Geospatial Intelligence: synergies across images, maps and geo information
- \* Models, semantics and spatial syntax for image understanding
- \* Information mining from heterogeneous sources
- \* Human-machine communication for spatio-temporal reasoning
- \* Knowledge discovery and sharing
- \* Scenarios and constraints in Environment, Security and Intelligence applications
- \* System architectures for geospatial information processing

The main target audience includes the European space agencies and organisations, aerospace industry and research centres, research and academic institutions, commercial companies, value adders or service providers involved in any of above areas.

The "Panel on mining multi-temporal / -modal EO images and geo-information" will include topics like (final list will be made available with the programme):

- \* Users view points
- \* Multi-temporal EO images
- \* Multi-modal radar
- \* Geo-referenced text mining

### Important Dates

Extensive abstract, with indication if it is for interactive presentation or poster session, via e-mail to [mihai.datcu@dlr.de](mailto:mihai.datcu@dlr.de), copy [Sergio.D'Elia@esa.int](mailto:Sergio.D'Elia@esa.int), (subject: IIM ESA-EUSC-JRC 2009) by mid June, 2009.

Notification or acceptance (and format for article submission) will be provided to authors by mid September, 2009. A limited number of demonstrations can be accepted: demonstration description and resource requirements shall be provided by e-mail to (Lucio Colaiacono) [l.colaiacomo@eusc.europa.eu](mailto:l.colaiacomo@eusc.europa.eu) (subject IIM ESA-EUSC-JRC 2009) by end September, 2009.

Deadline for registration to the Conference is mid October, 2009

**S. D'Elia, ESA**  
**L. Colaiacono, EUSC**  
**I. Sarantzis, EUSC**  
**M. Lafitte, EUSC**  
**J. Ebeltsjes, EUSC**  
**P. Soille, JRC**  
**C. Gomez, EARSC**  
**K. Seidel, ETHZ**  
**R. King, MSU**

[http://earth.esa.int/rtd/Events/ESA-EUSC-JRC\\_2009/index.html](http://earth.esa.int/rtd/Events/ESA-EUSC-JRC_2009/index.html)

## ESF-FWF-LFUI research conference on CO2 Geological Storage: latest progress - (Meeting)

22/11/2009 - 27/11/2009 - University Centre Obergurgl (Ötz Valley, near Innsbruck), Austria

The aim of this conference is to draw conclusions from the last decades of research on CO2 geological storage and to outline the future challenges related to its industrial implementation.

Conference sessions will focus on:

- \* Site Selection and Characterisation
- \* Modelling CO2 Behaviour in the Reservoir
- \* Local Risk Assessment
- \* Monitoring a Storage Site
- \* Steps towards Worldwide Demonstration
- \* Industrial Deployment

A number of grants are available to support the attendance of young researchers.

If you would like to participate, please fill in an online application form via the conference website.

Note that applications must be submitted by 11 September.

Further information: visit <http://www.esf.org/conferences/09293> or contact Ms. Anne Blondeel Oman, ESF conference officer ([ablondeel@esf.org](mailto:ablondeel@esf.org))

Download PDF: [http://www.egu.eu/download/Flyer\\_09-293.pdf](http://www.egu.eu/download/Flyer_09-293.pdf)

**European Science Foundation in partnership with the Austrian Science Fund (FWF) and Leopold-Franzens University Innsbruck (LFUI)**

<http://www.esf.org/conferences/09293>

**Chair: Dr. Isabelle Czernichowski-Lauriol, CO2GeoNet - BRGM, FR**





### Climate-Academic

#### Tenure-Track Associate/Assistant Professor Position in Climate Change Science Terrestrial Biogeochemistry

Company: Cornell University  
Location: USA-Ithaca, New York  
Date Posted: 28/08/2009  
[\[show details...\]](#)

### Biogeosciences-Academic

#### TENURE-TRACK FACULTY POSITION IN AQUATIC LANDSCAPE / AQUATIC ECOSYSTEM ECOLOGY

Company: Université du Québec à Montréal  
Location: Canada-Montréal  
Date Posted: 24/09/2009  
[\[show details...\]](#)

### Ocean Sciences-Academic

#### Faculty Positions

Company: Scripps Institution of Oceanography - UC San Diego  
Location: USA-San Diego, CA  
Date Posted: 24/09/2009  
[\[show details...\]](#)

### Geodynamics-Academic

#### Assistant Professor at MIT Department of Earth, Atmospheric and Planetary Sciences

Company: Massachusetts Institute of Technology Department of Earth, Atmospheric and Planetary Sciences  
Location: USA-Massachusetts  
Date Posted: 25/09/2009  
[\[show details...\]](#)

### Geodynamics-Academic

#### Postdoctoral Position in Computational Geodynamics and Seismology

Company: University of Hawaii  
Location: USA-Honolulu, Hawaii  
Date Posted: 14/10/2009  
[\[show details...\]](#)

### Biogeosciences-Academic

#### Ph.D. Positions in Urban Biogeosciences at UCSB

Company: University of California, Santa Barbara  
Location: USA-California, Santa Barbara  
Date Posted: 14/10/2009  
[\[show details...\]](#)

### Atmospheric Sciences-Academic

#### Post-Doctoral Fellow in Carbon Cycle Science

Company: Boston University  
Location: USA-Boston  
Date Posted: 14/10/2009  
[\[show details...\]](#)

### Interdisciplinary / Other-Academic

#### Assistant Professor

Company: University of Illinois  
Location: USA-Urbana, IL  
Date Posted: 15/10/2009  
[\[show details...\]](#)

### Interdisciplinary / Other-Other

#### Marine Geophysicist/Geologist

Company: GNS Science  
Location: New Zealand-Lower Hutt  
Date Posted: 15/10/2009  
[\[show details...\]](#)

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