the eggs

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The third biggest ice cap in the world, the Vatnajokull in Iceland, seen from a plane. Credit: Lamquin Nicolas, CNRS/IPSL LMD. Distributed by EGU via www.imaggeo.net
Image Link: http://www.imaggeo.net/index/showImage/image/203

EGU Position Statement on Ocean Acidification

The stetement is EGU's response to the serious concerns across the scientific and resource management communities about the possible but largely unknown ecological and economical impacts of ocean acidification

December 11, 2008.- Impacts of ocean acidification may be just as dramatic as those of global warming (resulting from anthropogenic activities on top of natural variability) and the combination of both are likely to exacerbate consequences, resulting in potentially profound changes throughout marine ecosystems and in the services that they provide to humankind.

Background on Ocean Acidification (OA)

Ocean acidification is a rapidly emerging scientific issue and its possible ecological and economical impacts (which are largely unknown) have raised serious concerns across the scientific and resource management communities.

Since the beginning of the industrial revolution the release of carbon dioxide (CO2) from our industrial and agricultural activities has resulted in atmospheric CO2 concentrations that have increased from approximately 280 to 385 parts per million (ppm). The atmospheric concentration of CO2 is now higher than experienced on Earth for at least the last 800,000 years (direct ice core evidence) and probably the last 25 million years, and is expected to continue to rise at an increasing rate, leading to significant temperature increases in the atmosphere and ocean in the coming decades. The ocean has absorbed about 430 billion tons of carbon dioxide from the atmosphere, or about one-third of anthropogenic carbon emissions. This absorption has benefited humankind by significantly lowering greenhouse gas levels in the atmosphere, thereby reducing anthropogenic global warming. However, the pH of ocean surface waters has already decreased by about 0.1 units, from an average of about 8.21 to 8.10 since the beginning of the industrial revolution. By the middle of this century atmospheric carbon dioxide levels could reach more than 500 ppm, and near the end of the century they could be over 800 ppm. This will result in an additional surface water pH decrease of approximately 0.4 pH units by 2100, implying that the ocean will be about 150% more acidic than at the beginning of the industrial revolution.

The relationship between atmospheric CO2 increase and global change is highly non-linear. On the contrary, the relationship between atmospheric CO2 increase and OA via absorption by the ocean is straightforward and future projections can be carried out with very high confidence, provided that future atmospheric CO2 increase is known. When CO2 is absorbed by seawater, chemical changes occur that reduce seawater pH and the concentration of carbonate ion in a process commonly referred to as ocean acidification. Carbonate ion is a basic building block of skeletons and shells for a large number of marine organisms, including corals, shellfish, and marine plankton. Some of these smaller calcifying plankton are important food sources for higher marine organisms. Hence, if the planktonic preys of larger fish are affected, this will have serious consequences for marine food webs. Also, the abundance of commercially important shellfish species could decline. A decline in coral reefs due to increases in temperature and decreases in carbonate ions would have negative impacts on fisheries and tourism. On the other hand, not all biological impacts from rising atmospheric CO2 are necessarily deleterious for a species. There will likely be ecological `winners` as well as `losers`. The question remains, however, how the `winners` will impact the ecosystem or the biogeochemical cycles as a whole. Thus ocean acidification could have profound impacts on some of the most fundamental biological and geochemical processes of the sea in coming decades.

Ocean acidification is already occurring today and will continue to intensify, closely tracking atmospheric CO2 increase. Given the potential threat to marine ecosystems and its ensuing impact on human society and economy, especially as it acts in conjunction with anthropogenic global warming, there is an urgent need for immediate action. This "double trouble" is arguably the most critical environmental issue that humans will have to face in the immediate future. The impacts of ocean acidification will be global in scope yet are some of the least understood of all climate change phenomena. Given that chemical effects are already measurable and that biological impacts may be dramatic within only decades, Europe must now accept the challenge to better coordinate and stimulate its research on ocean acidification. This is fundamental if we are to fully understand the risks and consequences of OA and to eventually help mitigate ocean acidification.

This rather new recognition that, in addition to the impact of CO2 as a greenhouse gas on global climate change, OA is a direct consequence of the absorption of anthropogenic CO2 emissions, will hopefully help to set in motion an even more stringent CO2 mitigation policy worldwide. The only solutions to avoid excessive OA are a long-term mitigation strategy to limit future release of CO2 to the atmosphere and/or enhance removal of excess CO2 from the atmosphere.

EGU

General Assembly 2009

Vienna, Austria, 19 – 24 April 2009

The 2009 General Assembly of the EGU, bringing together more than 9.000 geoscientists from all over Europe and the rest of the world into one meeting covering all disciplines of the Earth, Planetary and Space Sciences, is approaching.

Visist the programme web site at

http://meetings.copernicus.org/egu2009/

and get informed about sessions and special events, such as:

GB – Great Debates in Geosciences on Monday, 20 April 2009, 17:30–19:00, in Room 28

Planetary dynamics and solar activity have a role in climate change and geodynamics? - A debate dedicated to the memory of Rhodes W. Fairbridge

Convener: S. Duhau, co-Conveners: K. Georgieva , R. Mackey. Richard Mackey will act as Moderator. This debate will discuss these questions:

1) Does solar system dynamics significantly affect solar and planetary dynamos? If it did, could this affect the Earth's climate dynamics?

2) Does solar activity result in geomagnetic field variations? Does it change the Earth's rate of rotation? Do variations in the Earth's geomagnetic field and/or variations in the Earth's rate of rotation affect the planet's climate dynamics.

Townhall Meetings

These are meetings open for all participants in the conference at which new initiatives or decisions are announced to a larger audience following an open discussion on the matter raised. Anyone may organize such a Townhall Meeting subject to approval by the Programme Committee chair.

Four such meetings will be organised this year,

--EPOS (European Plate Observing System)

--Joint IODP ICDP Townhall Meeting

--Earth and Space Sciences Informatics

--The Hydrologic Ensemble Prediction EXperiment (HEPEX)

More info on these meetings can be found at

http://meetingorganizer.copernicus.org/EGU2009/session-programme/TM

European Association for Geochemistry Social Event on Wednesday, 22 April 2009, 19:00–20:00, in front of Room 27. The European Association for Geochemistry invites all geochemists attending the EGU General Assembly 2009 in Vienna for a social event taking place in the lounge in front of room 27.

SC- Short courses

Eight short courses will be organised this year,

--Principles of laser-based isotope ratio measurements (sponsored by: Aerodyne Research Inc, Picarro Inc., and Los Gatos Research)

--Stable Isotopes and Calibration, Standards, Isotopic Scales and Traceability

--How to write (and publish) a scientific paper in hydrology

--Meet the expert in hydrology - Round tables among young and established scientists

--Application of Inductively Coupled Plasma Mass Spectrometry (ICP-MS) in elemental and isotope geoanalysis

--How to Write a Competitive Proposal for Framework 7

--How, when, and why to submit an IUPAC (International Union of Pure and Applied Chemistry) project proposal

--Film entitled "A Sea Change: Imagine a world without fish".

More info on the courses can be found at

http://meetingorganizer.copernicus.org/EGU2009/session-programme/SC

ML – Medal Lectures

http://meetingorganizer.copernicus.org/EGU2009/session-programme/ML

Also, don't forget to participate at the DBM – Division Business Meeting of your Division:

http://meetingorganizer.copernicus.org/EGU2009/session-programme/DBM

Two editors of Climate of the Past funded by ERC

Hubertus Fischer and André Berger

Climate of the Past is pleased to announce that one of our regular editors, Dr. Hubertus Fischer, who recently joined the University of Bern as a new professor, has been recognised by the European Research Council through its 1st ERC advanced grants programme. The EGU Honorary president, an active member of the Climate Division and a guest editor of CP, Professor André Berger, is also among the colleagues awarded grants.

We would like to congratulate both of them for such a success and having them on board the journal is a truly great honour.

Martin Claussen, Gerald M.Ganssen, Hugues Goosse, Denis-Didier Rousseau and Eric Wolff
(CP Co-Editors in Chief)

Annales Geophysicae becomes open access

starting 1 January 2009

EDITORIAL 2009

Dear Readers, Authors and Referees of ANNGEO,

Starting 1 January 2009, Annales Geophysicae is undertaking a major change: the journal is becoming a fully open-access journal. Until now, the journal was partly open-access to readers, i.e. all publications freely accessible after one year. The number of institutional subscriptions allowed the journal to have a policy of a free of charge publication for the authors. Since several years, EGU has moved to a policy of a complete open access for all its journals, i.e. free immediate access to publications, and page charge to authors. This policy is supported by many European scientific institutions: some of them have already signed an agreement with EGU stating that they will pay charges for the publications of their scientists directly to EGU. Consequently to this policy, our journal is constantly loosing its institutional subscriptions and cannot afford its publication expenses anymore. This is the reason why, since 1 January 2009, the authors have to pay a moderate page charge for the publication of their work. We are concerned that some scientists, especially from developing countries, may not be able to pay; for these, Annales obtained from EGU 1000 free pages per year. The authors can ask the editors to obtain the publication of their work free of charge; I will take the decision case by case.

During the Publication Committee meeting it was also decided that Annales will stop the "Oceans and Air-Sea-Ice interactions" section starting 1 January 2009. This section has always been very marginal, publishing a very small number of papers while other EGU journals are devoted to this item. I warmly thank Sergey Gulev for his very efficient work as the Editor of this section. I very much hope that these fundamental changes will not affect the continuing development of Annales.

Now, I would like to give special thanks to Ulf-Peter Hoppe who was the Editor of the "Middle and Upper Atmosphere" section for the last 7 years. He made a huge job increasing the quality of the publications. I am grateful to him for his very fruitful collaboration in conducting this section and also for his constancy in improving our journal, the COSIS system and our relations with authors and referees. He is replaced by Christoph Jacobi. Thanks to him for accepting the editorial responsibilities. Finally, I am grateful to all people of the Editorial Board, the Editors, Yannis Daglis, Mike Pinnock, Fabio D'Andrea, Christoph Jacobi, Bob Forsyth, Kirstie Kauristie, Rumi Nakamura, the Editorial Executive, Sylviane Perret, the Copernicus Publications Editorial Support, Natascha Toepfer and Anne Klingner, and the EGU publication production office for their work.

Wlodek Kofman,
Editor-in-Chief

Election of EGU Treasurer and Division Presidents 2008/2009

The results of the recent elections for EGU Officers are listed below.

EGU Treasurer

Roland Schlich was reelected as EGU Treasurer.

EGU Division Presidents

EGU Division President Atmospheric Sciences (AS): C. B. Hasager

EGU Division President Biogeosciences (BG): G.-J. Reichart

EGU Division President Climate: Past, Present & Future (CL): D. D. Rousseau

EGU Division President Cryospheric Sciences (CR): H. Gudmundsson

EGU Division President Energy, Resources and the Environment (ERE): M. Kühn

EGU Division President Geochemistry, Mineralogy, Petrology & Volcanology (GMPV): P. Papale

EGU Division President Geodesy (G): M. Poutanen

EGU Division President Geodynamics (GD): J. H. Davies

EGU Division President Geomorphology (GM): N. Hovius

EGU Division President Geosciences Instrumentation and Data Systems (GI): A.-M. Harri

EGU Division President Hydrological Sciences (HS): A. Montanari

EGU Division President Magnetism, Palaeomagnetism, Rock Physics & Geomaterials (MPRG): M. Mandea

EGU Division President Natural Hazards (NH): B. D. Malamud (34)

EGU Division President Nonlinear Processes in Geosciences (NP): H. Dijkstra

EGU Division President Ocean Sciences (OS): B. Barnier

EGU Division President Planetary and Solar System Sciences (PS): A. Coustenis

EGU Division President Seismology (SM): R. Carbonell

EGU Division President Soil System Sciences (SSS): T. Miano

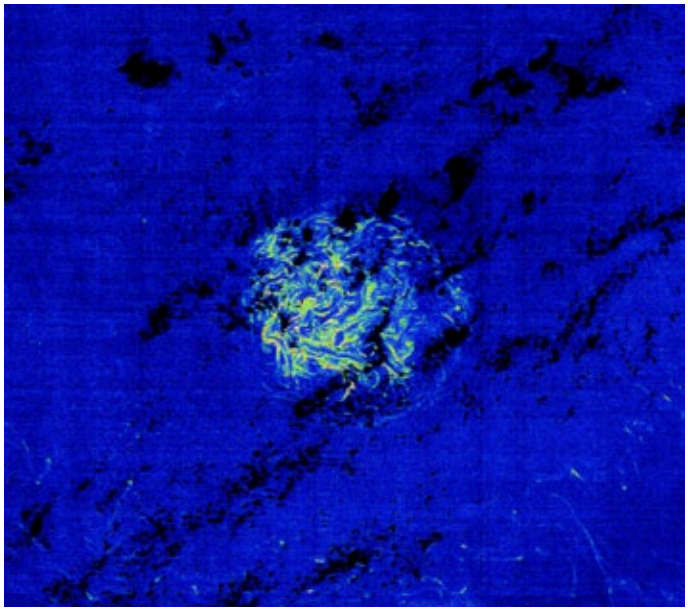
EGU Division President Solar-Terrestrial Sciences (ST): I. Dandouras

EGU Division President Stratigraphy, Sedimentology and Palaeontology (SSP): D. Groecke

EGU Division President Tectonics and Structural Geology (TS): F. Storti

EARTH FROM SPACE

Floating Sargassum seaweed



credit: ESA

28 November 2008.- This Envisat image captures a patch of Sargassum – free-floating seaweed often referred to in nautical lore for entangling ships – off the eastern coast of the United States in the North Atlantic.

The first known satellite image of Sargassum was acquired by Envisat's Medium Resolution Imaging Spectrometer (MERIS) optical sensor in the western Gulf of Mexico during the summer of 2005.

The ability to monitor Sargassum globally allows researchers to understand better the primary productivity of the ocean and better predict climate change.

Sargassum, like other floating marine vegetation, absorbs atmospheric carbon dioxide (CO2) – the most important greenhouse gas that contributes to global warming –through photosynthesis and converts it into organic carbon. This process is known as primary productivity.

Through primary productivity the oceans absorb half of the CO2 emitted into the atmosphere, so they have a profound influence on climate. Increased CO2 absorption amplifies acidity in the water and can lead to a decrease in mussel and crustacean populations in some parts of the world.

Climate modellers are concerned whether the oceans' ability to soak up CO2 might be impaired as a result of a changing climate. To better understand primary productivity and how oceans respond to global warming, it is necessary to monitor the amount of chlorophyll in marine vegetation.

The MERIS instrument is able to detect chlorophyll, the green photosynthetic compound in plants that captures energy from sunlight necessary for photosynthesis, by using the maximum chlorophyll index (MCI).

This full resolution MERIS image was acquired on 4 September 2008. The patch of Sargassum is centred at 35°45'N and 66°21'W and is about 45 km across.

Workshop on Best Practices for Ocean Acidification

Workshop focused on the need for standardised protocols and reporting of data, which is crucial for meaningful comparisons and collaboration within the field of ocean acidification.

The need for standardised protocols and reporting of data is crucial for meaningful comparisons and collaboration within the field of ocean acidification. In November 2008, approximately 40 scientists from 10 countries met at IFM-GEOMAR in Kiel, Germany to establish an international agreement on best practices for ocean acidification research.

The workshop was sponsored by the European Project on Ocean Acidification (EPOCA), the International Ocean Carbon Coordination Project (IOCCP), the US Ocean Carbon and Biogeochemistry Program (OCB), and the Kiel "Future Ocean" Excellence Cluster. It covered seawater carbonate chemistry, experimental design of perturbation experiments, measurements of CO2-sensitive processes and data reporting and usage.

The participants agreed on the recommendations that would appear in a "Guide to Best Practices for Ocean Acidification Research and Data Reporting" as well as on authors and timelines for drafting each section. While this first workshop was kept necessarily small, the development of the Best Practices Guide is meant to be an open community-wide activity. We invite interested experts to visit the EPOCA web site (http://epoca-project.eu/ under "Best practices guide") to review the presentations from the meeting, the timeline for drafting and reviewing the guide, and contacts. The outline of the guide will be uploaded shortly. The guide will also be subject to a 2-months open community discussion prior to publication, which is expected for the end of June 2009.

Author: Lina Hansson

Complex Systems: Water and Life

Gravimetry research from the GRACE satellites, to derive the amount of ground water stored in each catchment, was presented at the Complex Systems: Water and Life Frontiers of Science conference, organized by ESF and COST, 29-31 October, Taormina, Sicily.

13 November 2008.- Observations from satellites now allow the monitoring of changes to water levels in the sea, in rivers and lakes, in ice sheets and even under the ground. As the climate changes, this information will be crucial for monitoring its effects and predicting future impacts in different regions.

Sea level rise in one of the major consequences of global warming, but it is much more difficult to model and predict than temperature. It involves the oceans and their interaction with the atmosphere, the ice sheets, the land waters and even the solid Earth, which modifies the shapes of ocean basins. Measurements from tidal gauges show that for most of the twentieth century, sea levels rose by 1.8 mm per year on average.

Since the 1990s, a number of altimeter satellites have been measuring the height of the ocean surface and this has dramatically improved our understanding of sea level rise. Currently, three altimeter satellites cover the entire globe every 10 to 35 days, and can measure the height of the sea surface to a precision of 1 to 2 cm.

These measurements show that since the start of 1993, sea level has been rising by 3.3 mm a year, almost double the rate of the previous 50 years. “It could be that we are seeing a decadal fluctuation, and in the near future the rate will fall again,” says Anny Cazenave, from the Laboratoire d’Etudes en Géophysique et Océanographie Spatiale (LEGOS) in Toulouse, “but I do not think so. For several years now, the rate of rise has not changed significantly”.

Melting ice fills the sea

Cazenave’s team, and other groups, calculate that for 1993-2003, about half of the sea level rise was due to the oceans expanding as they became warmer, and the other half was due to shrinking land ice. Since 2003, ocean warming has had a temporary break but sea level has continued to rise. Now, about 80% of the annual sea level rise can be attributed to accelerated land ice loss from glaciers, Greenland and Antarctica. This has been revealed by a brand new satellite technique, called space gravimetry.

The GRACE mission comprises two satellites, launched in 2002, which measure how the Earth’s gravity field varies with time. The gravity field depends on how mass is distributed on Earth, and affects the speed of satellites in orbit. By closely monitoring the speed of both satellites, as they orbit the planet, it is possible to measure the change in mass of water or ice in different regions.

The method has shown that the Greenland ice sheet is losing about 150 gigatonnes of ice each year, two thirds of which is large chunks of ice flowing rapidly into the sea. The combined effect of ice loss from Greenland and West Antarctica has contributed about 1 mm per year to the rising seas over the past five years.

Rivers run low

Using GRACE, Cazenave and others have also looked at changes in water storage in river basins. In the period from 2002-2006, they found that some basins, including the Congo and the Mississippi, have been losing water, but river systems in the boreal regions are gaining water.

Meanwhile, scientists at the European Space Agency, collaborating with DeMontfort University in the UK, have begun to use data from the satellites that measure sea level, to assess lake and river levels on land.

Fresh inland water is much in demand, but those managing it suffer from a grave lack of information about how much of it there is. “The number of river gauges is diminishing every day, and many catchments are now entirely unmeasured,” says Jérôme Benveniste of the European Space Agency’s data processing centre ESRIN, in Frascati, Italy. “But we have 16 years’ worth of data on river and lake levels. It’s just a question of processing it all”.

The work Benveniste is leading can recreate water levels in reservoirs, or lakes, and reconstruct the annual ebb and flow in large river basins like the Amazon.

Other teams are combining these surface water level measurements with gravimetry measurements from the GRACE satellites, to derive the amount of ground water stored in each catchment. “International cooperation is essential in achieving this goal, with global coverage and local validation of the data,” says Benveniste. “At the moment, Europe is leading the field”.

This research was presented at the “Complex Systems: Water and Life” Frontiers of Science conference, organized by European Science Foundation (ESF) and COST, 29-31 October, Taormina, Sicily. http://www.esf.org/research-areas/life-earth-and-environmental-sciences/activities/lesc-cost-synergy.html

ESF and ESA

Prof. John Thornes

OBITUARY

Professor John Thornes, a British geomorphologist known internationally for his research on river quality, soil erosion and desertification processes, one of the most influential physical geographers of his generation, died after a short illness on July 17, 2008, aged 68, while on field work in Shropshire, UK. John Thornes has been an EGU member for many years.

His work on river quality took him on the pioneering Hovercraft expedition to the Amazon in 1968; work on soil erosion in semi-arid areas followed. He pioneered further field studies in Amazonia; later he focused on Spain and the Mediterranean lands producing new approaches to the analysis and measurement of changes in the physical landscape with suggestions for improved environmental management. He left London Sschool of Economics for a distinguished career which included a chair at Bedford College, London and, later, chairs at Bristol and King`s College, London.

John Barrie Thornes was born on December 27, 1940 and brought up in Horbury, near Wakefield, UK. As an undergraduate at London University, he met his future wife, Rosemary, whom he married in 1962. He obtained his PhD on erosion and sedimentation in the Alto Duero in Spain at King's College London.

His academic career took him to the London School of Economics with spells as a visiting scholar abroad. His work at this time has influenced the evolution of physical geography in both Spain and the UK.

The results of this work have appeared in numerous scientific papers, distilled into a treatise on Semi-arid Erosional Systems, and a book with Denys Brunsden on Geomorphology and Time.

In 1981 he was appointed to a chair in physical geography and became head of the geography department at Bedford College London, where he became Dean of Science and deputy principal before moving to Bristol in 1985, initially as chair and head of department, and later as Dean of Graduate Studies in the science faculty. Finally he moved back to King`s College London in 1992 to lead its geography department. Many of his students are now in senior positions. Thornes took on the leadership of a series of EU projects, under the title of MEDALUS (Mediterranean Desertification and Land Use) to establish methodologies for evaluating and mitigating desertification. After recovering from a stroke in 1996, he travelled to China and South Africa.

Thornes is survived by his wife and their daughter and son.

One Leibniz prize goes to a geoscientist

and EGU member, Prof. Dr. Antje Boetius, microbial ecology, Max Planck Institute for Marine Microbiology

4 December 2008.- The recipients of this year's Gottfried Wilhelm Leibniz Prize have been officially announced. At its meeting in Bonn today, the Joint Committee of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) named eleven researchers as this year's winners of Germany's most prestigious research prize. One of the eleven winners is the geoscientist and EGU member Prof. Dr. Antje Boetius, microbial ecology, Max Planck Institute for Marine Microbiology, Bremen. Antje Boetius studies bacteria that live on parts of the sea bed. She was the first marine microbiologist to prove the existence of microbial communities consisting of bacteria that reduce sulphate and methanotrophic archaea on the ocean floor. Boetius was the first person to describe this process, called anaerobic oxidation of methane, or AOM, which was of interest to ecologists, geologists, oceanographers, microbiologists and biochemists. Antje Boetius does much of her work in the field. Since 1989 she has been on more than 30 expeditions aboard German and foreign research vessels. After studying biology in Hamburg and obtaining her doctorate in Bremen, she worked at the Baltic Sea Research Institute (IOW) in Warnemnde and at the Max Planck Institute (MPI) for Marine Microbiology in Bremen, before being appointed as an Assistant Professor at the private International Jacobs University Bremen. Since 2003 she has been an Associate Professor and the leader of a research group at the MPI for Marine Microbiology. The very prestigious Leibniz Prize has been awarded since 1986. Recipients are awarded a significant amount of prize money - usually 2.5 million euros - and the freedom to use this prize money for their own research as they see fit over a period of up to seven years.

Edward Norton Lorenz (May 23, 1917 - April 16, 2008)

OBITUARY

Edward Norton Lorenz (born May 23, 1917), an American mathematician and meteorologist and a pioneer of chaos theory died at his home in Cambridge at the age of 90 on April 16, 2008. He discovered the strange attractor notion and coined the term butterfly effect.

Lorenz was born in West Hartford, Connecticut. He studied mathematics at both Dartmouth College in New Hampshire and Harvard University in Cambridge, Massachusetts. During World War II, he served as a weather forecaster for the United States Army Air Corps. After his return from the war, he decided to study meteorology. Lorenz earned two degrees in the area from the Massachusetts Institute of Technology where he later was a professor for many years. Dr. Lorenz was a member of the staff of what was then MIT's Department of Meteorology from 1948 to 1955, when he was appointed to the faculty as an assistant professor. He was promoted to professor in 1962 and was head of the department from 1977 to 1981. He was a Professor Emeritus at MIT from 1981 until his death.

During leaves of absence from MIT, he held research or teaching positions at the Lowell Observatory in Flagstaff, Ariz., the Department of Meteorology at the University of California at Los Angeles, the Det Norske Meteorologiske Insitutt in Oslo, Norway, and the National Center for Atmospheric Research in Boulder, Colo. His publications include the book The Nature and Theory of the General Circulation of the Atmosphere, published by the World Meteorological Organization at Geneva in 1967.

In 1960, Lorenz began a project to simulate weather patterns on a computer system called the Royal McBee. Lacking much memory, the computer was unable to create complex patterns, but it was able to show the interaction between major meteorological events such as tornados, hurricanes, easterlies and westerlies. A variety of factors was represented by a number, and Lorenz could use computer printouts to analyze the results. After watching his systems develop on the computer, Lorenz began to see patterns emerge, and was able to predict with some degree of accuracy what would happen next.

While carrying out an experiment, Lorenz made an accidental discovery. He had completed a run, and wanted to recreate the pattern. Using a printout, Lorenz entered some variables into the computer and expected the simulation to proceed the same as it had before. To his surprise, the pattern began to diverge from the previous run, and after a few months of simulated time, the pattern was completely different.

Lorenz eventually discovered why seemingly identical variables could produce such different results. When Lorenz entered the numbers to recreate the scenerio, he the printout provided him with numbers to the thousandth position (such as .617). However, the computer's internal memory held numbers up to the millionth position (such as .617395); these numbers were used to create the scenerio for the initial run. This small deviation resulted in a completely divergent weather pattern in just a few months. This discovery creates the groundwork of chaos theory: In a system, small deviations can result in large changes. This concept is now known as the Butterfly Effect.

Lorenz continued to be active in his work well into his seventies, winning the Kyoto Prize for basic sciences, in the field of earth and planetary sciences, in 1991. In his later years, he lived in Cambridge, Massachusetts. He was an avid outdoorsman, who enjoyed hiking, climbing, and cross-country skiing. He kept up with these pursuits until very late in his life, and managed to continue most of his regular activities until only a few weeks before his death. According to his daughter, Cheryl Lorenz, Lorenz had `finished a paper a week ago with a colleague.`

He was awarded the Kyoto Prize in 1991 and cited for `profoundly influencing a wide range of basic sciences and brought about one of the most dramatic changes in mankind's view of nature since Sir Isaac Newton.` Lorenz has received many awards for his work, including:

--1969 Carl Gustaf Rossby Research Medal, American Meteorological Society.

--1973 Symons Memorial Gold Medal, Royal Meteorological Society.

--1975 Fellow, National Academy of Sciences (U.S.A.).

--1981 Member, Norwegian Academy of Science and Letters.

--1983 Crafoord Prize, Royal Swedish Academy of Sciences.

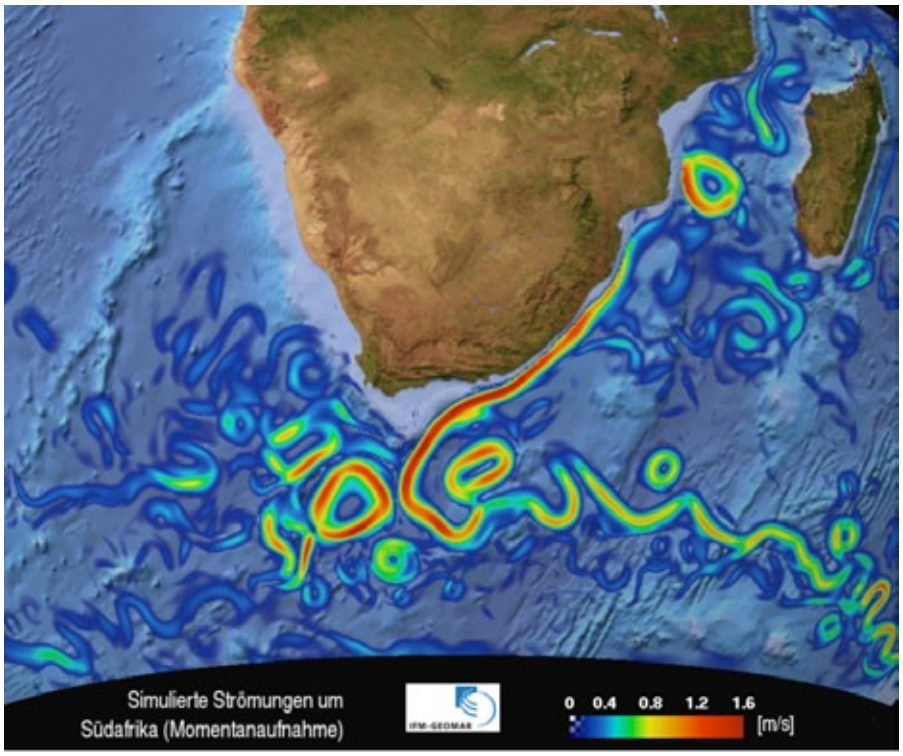
--1984 Honorary Member, Royal Meteorological Society.

--1991 Kyoto Prize for `… his boldest scientific achievement in discovering "deterministic chaos".

--2004 Buys Ballot medal.

Ocean currents off South Africa

may influence Gulf Stream, according to research published in Nature



Currents around South Africa (snapshot). The Agulhas Current (red band) flows along the South African coast. South-west of Cape Town it abruptly turns back into the Indian Ocean. In this process huge rings of water are cut off that flow westward into the Atlantic Ocean. (The colours indicate the strength of the currents.) Credits: IFM-GEOMAR

24 November 2008.- Variations in the strength of the Gulf Stream can in part attributed to currents off South Africa. This is the result of studies recently published in Nature and Geophysical Research Letters by oceanographers of the Leibniz Institute of Marine Sciences (IFM-GEOMAR), Kiel and the University of Cape Town. A newly developed computer model enabled the study of the currents systems in detail.

The Agulhas Current is, like the Gulf Stream, one of the strongest currents in the world ocean. It carries warm and salty water from the tropical Indian Ocean along South Africa's east coast. South-west of Cape Town it makes an abrupt turn back into the Indian Ocean. In this process huge rings of water with diameters of hundreds of kilometre are cut off at intervals of 3 to 4 months. (see Fig.). These so-called "Agulhas Rings" carry extra heat and salt into the South Atlantic.

The new studies show that normal changes from year to year in the formation of Agulhas Rings lead within a few years to an increase in the flux of warm water across the equator from the South to the North Atlantic Ocean.

Studies of this kind can only be carried out using very large computer models, to simulate fine details in the ocean currents. A new, high-resolution ocean model was developed and intensively tested. It calculates the evolution of the currents on a fine mesh of approximately 40 million grid points. For the simulation supercomputers at the University of Kiel and in Stuttgart were used for a period of over 6 months.

References

Biastoch, A., C.W. Böning und J.R.E. Lutjeharms, 2008: Agulhas leakage dynamics affects decadal variability in Atlantic overturning circulation, Nature, 456 (7221), doi:10.1038/nature07426.

Biastoch, A., J.R.E. Lutjeharms, C.W. Böning und M. Scheinert, 2008: Mesoscale perturbations control inter-ocean exchange south of Africa, Geophys. Res. Lett., 35, L20602, doi:10.1029/2008GL035132.

AlphaGalileo, Reference URL:
http://www.ifm-geomar.de

Oxygen escape from the atmosphere

CLUSTER data indicate that oxygen escape from the atmosphere is driven by changes in magnetic field of the earth

28 August 2008.- Oxygen is constantly leaking out of Earth's atmosphere and into space. Now, data from the Cluster sattelite mission show that the Earth's own magnetic field is accelerating the oxygen away.

A new work published in Annales Geophysicae uses data collected by Cluster from 2001 to 2003. During this time, Cluster provided information about oxygen ions, flowing outwards from the polar regions into space. Cluster also measured the strength and direction of the Earth's magnetic field whenever the beams were present.

Hans Nilsson, Swedish Institute of Space Physics and coworkers analysed the data. They discovered that the oxygen ions were being accelerated by changes in the direction of the magnetic field.

Having all four Cluster spacecraft was essential to the analysis because it gave a way to measure the strength and direction of the magnetic field over a wide area.

Energetic particles from the solar

wind can be channelled along the magnetic field lines and, when these impact the atmosphere of the Earth, they can produce aurorae. The same interactions provide the oxygen ions with enough energy to accelerate out of the atmosphere and reach the Earth's magnetic environment.

The Cluster data were captured over the poles with the satellites flying at an altitude of anywhere between 30,000 and 64,000 kilometres. Measurements taken by earlier satellites during the 1980s and 1990s showed that the escaping ions were travelling faster the higher they were observed. This implied that some sort of acceleration mechanism was involved and several possibilities were proposed. Now, the mechanism accounting for most of the acceleration has now been identified.

Reference:

An assessment of the role of the centrifugal acceleration mechanism in high altitude polar cap oxygen ion outflow, H. Nilsson, M. Waara, O. Marghitu, M. Yamauchi, R. Lundin, H. Rème, J-A. Sauvaud, I. Dandouras, E. Lucek, L. M. Kistler, B. Klecker, C. W. Carlson, M. B. Bavassano-Cattaneo, and A. Korth, Annales Geophysicae, 26, 145-157, 2008.

Expert consortium preparing assessment report on cities and climate change

to facilitate and build the connections between science and policy

30 December 2008.- As cities around the world confront the urgent challenge of climate change, there is growing recognition that effective mitigation and adaptation policies must rely on sound scientific research and data. To facilitate and build the connections between science and policy, a consortium of experts from academic and research institutions around the world have formed the Urban Climate Change Research Network (http://www.uccrn.org/Site/Home.html).

The UCCRN has recently announced plans to carry out an International Panel for Cities and Climate Change (IPC3) Assessment Report. This will be an effort similar to IPCC-style syntheses (involving about 50-60 experts) that includes mitigation, impact and adaptation for cities.

The assessment will be divided into separate chapters as well as cross-cutting chapters. This will be the first such assessment focusing on cities, and the outcome will be fed to processes such as the Copenhagen COP-15 and C-40 Summit in addition to the general scientific community.

The leadership in this effort is being taken by colleagues from Columbia University, NASA's Goddard Institute for Space Studies and City University of New York, with support from a number of institutions including the World Bank, Earth Institute and others.

For more information about the project, contact Toshiaki Ichinose (toshiaki@nies.go.jp).

IAUC Newsletter

Topography of Europe

The EUROCORES programme TOPO-EUROPE kicks off

21 November 2008.- Europe's shape is in a constant change: The Mediterranean basin is shrinking, the Alps are rising and pushing North, and Scandinavia is still rebounding after having been crushed by a thick ice sheet in the ice ages. But what did Europe look like in the past, what are the processes controlling all these changes and what has the future in store for us? And how does the topography influence the climate of Europe on geological time scales?

The EUROCORES programme TOPO-EUROPE (4-D Topography Evolution in Europe: Uplift, Subsidence and Sea level Change) sets out to answer these questions. So far the largest programme of the European Collaborative Research Scheme (EUROCORES) with 10 Collaborative Research Projects (CRPs) involving 16 National Funding Organisations and an overall budget of approximately 15 million Euros, TOPO-EUROPE is a concerted action to observe and better understand the evolution of the continent in both space and time. The programme kicked off in El Escorial near Madrid in October 2008 during the fourth TOPO-EUROPE International Workshop.

The TOPO-EUROPE programme is part of a European-wide network of the same name. The network was born in the International Lithosphere Programme (ILP) and developed as a regional research coordinating committee for Europe. "EUROCORES TOPO-EUROPE provides an important stimulus for realising the ambitions of the TOPO-EUROPE initiative at large" said Professor Sierd Cloetingh of Vrije Universiteit Amsterdam, President of the ILP and initiator of both the network and the programme. "The idea is to bring different segments of the European community together from the fields of deep Earth and surface processes and for exactly that EUROCORES is a good instrument". TOPO-EUROPE is also the natural successor of EuroMARGINS, a completed EUROCORES programme on continental margins. The science in TOPO-EUROPE covers a wide spectrum of topics: inter alia, Earth crust and mantle dynamics, source-to-sink relationships and sediment dynamics, plateau formation and plate-reorganisation.

TOPO-EUROPE is highly interdisciplinary, pooling not only solid Earth experts but also coupling them with climate scientists. One of the programme's Collaborative Research Projects called TOPO-ALPS, for example, attempts to unravel the topographic history of the Alps and its tectonic and climatic drivers. "One of the foci in the current

TOPO-EUROPE is to find ways to bring climate in, to determine what role this plays in tectonic and geomorphic problems. This is a frontier of science, so I expect to see more and more of this type of project in the future" explained Professor Sean Willet, the project leader of TOPO-ALPS and a geologist at ETH Zurich, Switzerland.

Another CRP called RESEL-GRACE looks into refining European sea level estimations by combining altimetry, tide gauges and other data with improved glacial isostatic adjustment modelling and tailored regional gravity field models that reflect the redistribution of water masses. "Most important now is to study the impacts of sea level rise and here hardly anything has been done" said Anny Cazenave of Centre National d'Etudes Spatiales (CNES) in Toulouse, France. "The rise, the sedimentology, the tectonics, ocean dynamics and climate need to be combined to develop models for the impacts" continued Cazenave, who is also a lead author of the Nobel prize-winning fourth IPCC report. In RESEL-GRACE, she will identify the most vulnerable ecosystems and economies such as the Nile Delta or the Adriatic and assess the impacts of sea-level rise and concomitant risk of flooding case by case.

There are further applied aspects of the research undertaken in TOPO-EUROPE, which renders the results enormously interesting for the geological surveys of Europe. "A number of issues like geothermal energy, seismic hazards and slope instabilities require a know-how that goes beyond the national borders of Europe" said Cloetingh. New concepts are being developed but need to be validated at the same time with an array of different types of data in order to reach a better geo-prediction that could eventually save lives and protect property.

Next to the collaborations within the EUROCORES programme, a plentitude of synergies is envisaged since the programme is not a stand-alone. The TOPO-IBERIA Research Initiative and the EU EPOS-ESFRI programme will be important partners, and TOPO-EUROPE hopes to team up with the TOPO-Central Asia programme. The TOPO-EUROPE network is part of the ILP research agenda and hence paving the way for a global partnership in the Earth sciences.

The aim of the European Collaborative Research (EUROCORES) Scheme is to enable researchers in different European countries to develop collaboration and scientific synergy in areas where European scale and scope are required to reach the critical mass necessary for top class science in a global context.

The scheme provides a flexible framework which allows national basic research funding and performing organisations to join forces to support excellent European research in and across all scientific areas.

For further information on TOPO-EUROPE, please go to www.esf.org/topoeurope

For further information on the EUROCORES Scheme, please go to www.esf.org/eurocores

For further information on the International Lithosphere Programme (ILP), please go to http://sclilp.gfz-potsdam.de/

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Source: ESF

Coral reefs growing in cold, deep ocean

contraints on cold-water coral growth and carbonate mound formation

04 November 2008.- 800 metres under the surface of the Atlantic the tops of the hills are covered in large coral reefs. NIOZ-researcher Furu Mienis studied the formation of these unknown cold-water relatives of the better-known tropical corals in a recently defended PhD rhesis.

Furu Mienis studied the development of carbonate mounds dominated by cold-water corals in the Atlantic Ocean at depths of six hundred to a thousand metres. These reefs can be found along the eastern continental slope from Morocco to Norway, on the Mid-Atlantic Ridge and on the western continental slope along the east coast of Canada and the United States. Mienis studied the area to the west of Ireland along the edges of the Rockall Trough.

In her research Mienis analysed environmental factors like temperature, current speed and flow direction of seawater as these determine the growth of cold-water corals and the carbonate mounds. The measurements were made using bottom landers, observatories placed on the seabed from the NIOZ oceanographic research vessel 'Pelagia' and brought back to the surface a year later.

Cold-water corals are mainly found on the tops of carbonate mounds in areas where the current is high due to strong internal waves.

The groups of carbonate mounds develop in the direction of the strongest current and their tops are of equal height. The mounds were found to be built up from carbonate debris and sediment particles caught in between coral branches.

Climate change has exerted a considerable influence on the growth of corals and the development of carbonate mounds. For example, corals stopped growing during ice ages. Present-day global warming and the resulting acidification of the oceans may also pose a threat: organisms are less effective at taking up carbonate from seawater that is too acidic. This is true not only for corals but also for some species of algae that are a source of food for the corals.

The research was funded by the Netherlands Organisation for Scientific Research (NWO) and the European Science Foundation (ESF).

Reference URL:
http://www.nwo.nl/nwohome.nsf/pages/NWOA_7KDJTK_Eng

Author: NWO

First comprehensive inventory of life in Antarctic islands

published in December in the Journal of Biogeography

01 December 2008.- The first comprehensive inventory of sea and land animals around a group of Antarctic islands reveals a region that is rich in biodiversity and has more species than the Galapagos. The study was published this week in the Journal of Biogeography by a team from British Antarctic Survey and University of Hamburg. They combed the land, sea and shores of the South Orkney Islands, near the tip of the Antarctic Peninsula, using scuba divers and trawled nets to catch creatures as deep as 1500 metres.

Animals recorded were then checked with a century of literature and modern databases and the team concludes there are over 1224 species in total. Of these, nearly a third were new to the area, whilst five species were new to science. Of the 1224 species that were found, 1026 are marine and most (821) of these live on the seabed. Over 50 major types of animals were recorded and most were found in the sea than on in land - typical only for the polar regions. These include sea urchins, free-swimming worms, crustaceans and molluscs, mites and birds. Five were new to science.

The inventory is part of the Census of Marine Life (COML), a ten-year (started in 2000) international effort to assess and explain the diversity and distribution of marine life in the world's oceans (see www.coml.org).

The abundance of life was unexpected for a location in the polar regions, previously perceived to be poor in biodiversity."

The research team, consisting of 23 scientists from five research institutes, spent seven weeks on the BAS Royal Research Ship James Clark Ross in 2006.

Reference:

Marine, intertidal, freshwater and terrestrial biodiversity of an isolated polar archipelago by David K Barnes, Stefanie Kaiser, Huw Griffiths and Katrin Linse, published, December 2008, the Journal of Biogeography.

Reference URL: http://www.antarctica.ac.uk

High conductivity of the Earth's upper mantle

is due to molten carbonates according to research published in Science

03 December 2008.- Researchers from CNRS, have explained that the high conductivity of the Earth's upper mantle is due to molten carbonates. They demonstrated the very high conductivity of this form of carbon. Appearing in the 28 November issue of Science, their work has revealed the high carbon content of the interior of the upper mantle. This composition can be directly linked to the quantity of carbon dioxide produced by 80% of volcanoes. This result is also important for quantifying the carbon cycle.

Geologists have long claimed that significant amounts of carbon have been present in the Earth's mantle for thousands of years. Up until now, there was very little direct proof of this hypothesis, and samples from the surface of the mantle contained only very small quantities of carbon. Also, for the last thirty years, scientists have been unable to explain the conductivity of the mantle, which is crossed by natural electrical currents at depths of 70 to 350 kms, even though olivine, one of the main mineral components of the upper mantle, is completely isolating.

To explain these phenomena, researchers from the Institut des Sciences de la Terre d'Orléans (ISTO, CNRS / Université de Tours / Université d'Orléans) looked into liquid carbonates, one of the most stable forms of carbon within the mantle, along with graphite and diamond. The Masai volcano is Tanzania is the only place in the world where these carbonates can be observed. Elsewhere, the carbonates are dissolved in basalts and emitted into the atmosphere in gaseous form, as CO2.

Based on lab measurements at CNRS, the researchers established the high conductivity of molten carbonates. Their conductivity is 1000 times higher than that of basalt, which was previously thought to be the only potential conductor in the mantle. Fabrice Gaillard and his team have shown that the conductivity of the Earth's mantle is a result of the presence of small amounts of molten carbonates between chunks of solid rock.

This work shows that the electrical characteristics of the asthenosphere, the conductive part of the upper mantle, are directly connected to the amount of carbonate in the layer. The work also points to varying carbon distribution according to the regions and depth of the mantle. The researchers calculated that the amount of carbon present as liquid carbonate directly within the asthenosphere is between 0.003 and 0.025%, which seems low but makes it possible to explain the amounts of CO2 emitted into the atmosphere by 80% of volcanoes. This nonetheless represents a reservoir of carbon integrated into the mantle which is higher than that present on the surface of the earth. These results are unmatched in helping to quantify the carbon cycle, which plays a major role in the greenhouse effect. Indeed, the CO2 emitted by volcanic activity had never before been evaluated at the source (at the level of the mantle).

Carbonatite Melts and Electrical Conductivity of the Asthenosphere. F. Gaillard, M. Malki, G. Iacono-Marziano, M. Pichavant, B. Scaillet. Science. 28 November 2008

Enceladus

The moon of Saturn imaged by a Cassini flyby

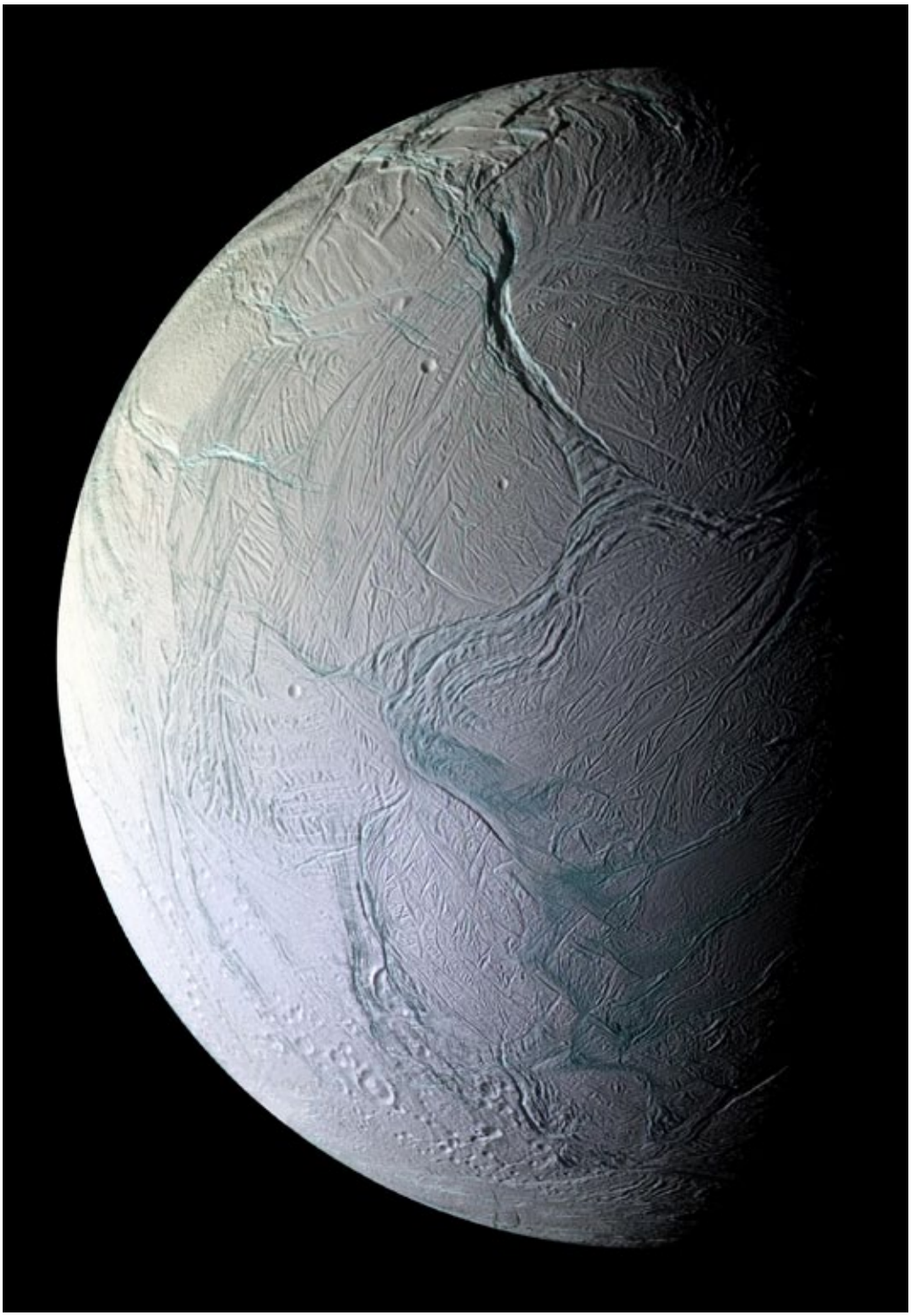

Image Credit: NASA/JPL/Space Science Institute

December 15 2008.- On October 5, 2008, after coming within 100 kilometers of the surface of Enceladus, NASA`s Cassini captured this mosaic of the southern region of the moon`s Saturn-facing hemisphere.

The surface is replete with fractures, folds, and ridges, all signs of remarkable tectonic activity for a relatively small world. In this enhanced-color view, regions that appear blue-green are thought to be coated with larger grains than those that appear white or gray.

Portions of the tiger stripe fractures, or sulci, are visible along the terminator at lower right, surrounded by a circumpolar belt of mountains. The icy moon`s famed jets emanate from at least eight distinct source regions, which lie on or near the tiger stripes. In this view, the most prominent feature is Labtayt Sulci, the approximately one-kilometer deep northward-trending chasm located just above the center of the mosaic.

This false-color mosaic was created from 28 frames by Cassini`s narrow-angle camera. In each frame four images from 338 to 930 nanometers were combined. The mosaic is an orthographic projection centered at 64.49 degrees south latitude, 283.87 west longitude, and it has an image scale of 196 kilometers per pixel. The original images ranged in resolution from 180 to 288 meters and were acquired as the spacecraft receded from Enceladus. The view was acquired at a Sun-Enceladus-spacecraft phase angle of 73 degrees.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory manages the mission for NASA`s Science Mission Directorate.

For more information about the Cassini-Huygens mission visit http://saturn.jpl.nasa.gov/. The Cassini imaging team homepage is at http://ciclops.org.

Chandrayaan-1 probe impacted to the lunar south pole

after being released from the Indian moon orbiter on 14 November

24 November 2008.- The Indian Space Research Organisation's lunar orbiter Chandrayaan-1 released a probe that impacted close to the lunar south pole on 14 November. Following this, the instruments on the spacecraft are being switched on to get the science observations started.

The Moon Impact Probe was dropped close to Shackleton crater, a place close to the south pole, where ice may exist in areas that are never illuminated by the Sun. It carried a video imaging system, a radar altimeter and a mass spectrometer. The imaging system took pictures of the Moon as it approached the surface, the radar was used to determine the altitude, and the mass spectrometer was used to study the thin lunar atmosphere.

The probe was released from the spacecraft at 15:36 CET, on 14 November and took 25 minutes to reach the surface.

ESA

Wilkins Ice Shelf

rifts developed could lead to breaking away from the Antarctic Peninsula

12 December 2008.- New rifts have developed on the Wilkins Ice Shelf that could lead to the opening of the ice bridge that has been preventing the ice shelf from disintegrating and breaking away from the Antarctic Peninsula.

The ice bridge connects the Wilkins Ice Shelf to two islands, Charcot and Latady. As seen in the Envisat image above acquired on 26 November 2008, new rifts (denoted by colourful lines and dates of the events) have formed to the east of Latady Island and appear to be moving in a northerly direction.

Dr Angelika Humbert from the Institute of Geophysics, Münster University, and Dr Matthias Braun from the Center for Remote Sensing, University of Bonn, spotted the newly formed rifts during their daily monitoring activities of the ice sheet via Envisat Advanced Synthetic Aperture Radar (ASAR) acquisitions.

In February 2008 an area of about 400 km² broke off from the ice shelf, narrowing the ice bridge down to a 6 km strip. At the end of May 2008 an area of about 160 km² broke off, reducing the ice bridge to just 2.7 km. Between 30 May and 9 July 2008, the ice shelf experienced further disintegration and lost about 1 350 km².

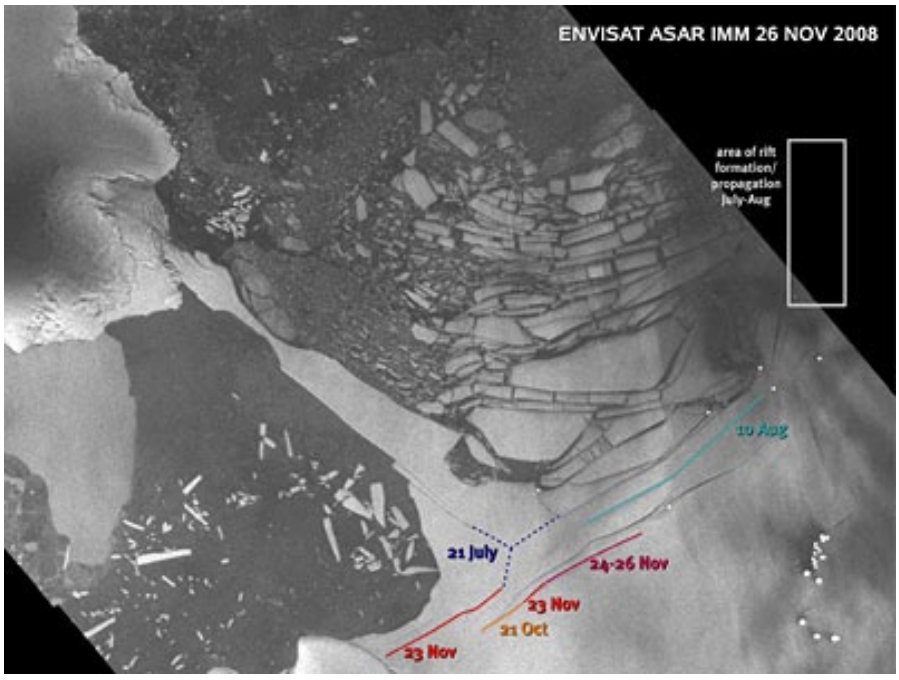

Image credit: ESA/Envisat

The Wilkins Ice Shelf, a broad plate of floating ice south of South America on the Antarctic Peninsula, had been stable for most of the last century before it began retreating in the 1990s. The peninsula has been experiencing extraordinary warming in the past 50 years of 2.5°C.

In the past 20 years, seven ice shelves along the Antarctic Peninsula have retreated or disintegrated, including the most spectacular break-up of the Larsen B Ice Shelf in 2002.

Envisat acquires images of the ice shelf daily with its Advanced Synthetic Aperture Radar (ASAR) instrument. These images are updated automatically on the Wilkins 'Webcam' from Space web page and placed in an animation to allow visitors to spot changes between acquisitions. Individual images can also be viewed in the image archive.

'Webcam from Space' web page at:

http://www.esa.int/esaEO/SEMWZS5DHNF_index_0.html

ESA

European Ministers agree on the role of spaceas a key asset

Earth Observation, provision of essential climate variables and Space Situation Awareness among the priorities

26 November 2008.- The Ministers in charge of space activities in the European Space Agency's 18 Member States and Canada today concluded a two-day Council meeting in The Hague, agreeing to undertake new initiatives in several fields and endorsing the next phases of a set of ongoing programmes.

In keeping with the European Space Policy, designed in cooperation with the European Commission, the measures will further strengthen Europe's role in the development and exploitation of space applications serving public policy objectives and the needs of European citizens and enterprises.

Recognising that space is a strategic asset and that it is of fundamental importance for the independence, security and prosperity of Europe, the Ministers also adopted four Resolutions:

--first, "The role of Space in delivering Europe's global objectives", covering the political and programmatic highlights of the Council;

--second, a resolution establishing the Level of Resources for ESA to cater for Space Science programmes and basic activities in the period 2009-2013;

--third, the renewal of the contribution of ESA Member States to the running costs of the Guiana Space Centre; and

--fourth, a resolution outlining the future evolution of the Agency.

Decisions on programmes/activities

On the programmatic side, the Ministers took decisions concerning the full range of the Agency's mandatory and optional programmes:

The decisions taken concern, among others, the following:

a) The Agency's mandatory activities: Funding of the Level of Resources for 2009-2013 covering the Scientific Programme and basic activities.

b) Continuation of ongoing optional programmes and start of new programmes:

--Subscriptions for the Launcher programmes, including funding of the Guiana Space Centre, Ariane 5 and Vega accompaniment technology programmes, Ariane 5 evolution and the future launchers preparatory programme.

--Subscriptions for the Earth Observation activities, including the second segment of the Global Monitoring for Environment and Security Space Component programme, the Meteosat 3rd generation development programme and a new Climate Change Initiative on the provision of essential climate variables.

--Subscriptions to robotic exploration programmes (the ExoMars programme and preparatory activities on future Mars robotic exploration).

--Subscription to the start of a Space Situational Awareness programme to provide the information to help protect European space systems against space debris and the influence of adverse space weather.

ESA PR 47-2008

New online databases on life in extreme environments

databases of experts, scientific projects and research infrastructures

17 November 2008.- Three open-access databases of experts, scientific projects and research infrastructures are now available online.

These platforms gather and make available information on international experts, scientific projects as well as research infrastructures in the field of research on life in extreme environments. As multi-disciplinary platforms, their scope covers microbes, plants and animals evolving in various marine, polar, terrestrial extreme environments as well as outer space and the deep biosphere.

CAREX databases are intended to be the easy-to-use, open collaborative tools for the scientific community working on life in extreme environments. They allow users to upload specific profiles and to perform detailed search according to very specific criteria.

The databases are available online on the CAREX website: www.carex-eu.org/databases

CAREX (Coordination Action for Research Activities on life in Extreme) is a European Commission FP7 Coordination Action project funded for three years (2008 to 2010). This project tackles the issues of enhancing coordination of European research on life in extreme environments by providing networking and exchange of knowledge opportunities to the scientific community and by developing a strategic European research agenda in the field. CAREX is a truly interdisciplinary initiative as its approach to life in extreme environment research covers microbes, plants and animals evolving in various marine, polar, terrestrial extreme environments as well as outer space and the deep biosphere. The European Science Foundation counts among the nine participating organisations of the project.

Author: ESF

CP Special Issue: Publications by EGU Medalists

three papers by EGU medalists

Paper 1: The origin of the European "Medieval Warm Period", *H. Goosse, O. Arzel, J. Luterbacher, M. E. Mann, H. Renssen, N. Riedwyl, A. Timmermann, E. Xoplaki, and H. Wanner, Clim. Past, 2, 99-113, 2006.*

Proxy records and results of a three dimensional climate model show that European summer temperatures roughly a millennium ago were comparable to those of the last 25 years of the 20th century, supporting the existence of a summer "Medieval Warm Period" in Europe. Those two relatively mild periods were separated by a rather cold era, often referred to as the "Little Ice Age". The autors` modelling results suggest that the warm summer conditions during the early second millennium compared to the climate background state of the 13th–18th century are due to a large extent to the long term cooling induced by changes in land-use in Europe. During the last 200 years, the effect of increasing greenhouse gas concentrations, which was partly levelled off by that of sulphate aerosols, has dominated the climate history over Europe in summer. This induces a clear warming during the last 200 years, allowing summer temperature during the last 25 years to reach back the values simulated for the early second millennium. Volcanic and solar forcing plays a weaker role in this comparison between the last 25 years of the 20th century and the early second millennium. Our hypothesis appears consistent with proxy records but modelling results have to be weighted against the existing uncertainties in the external forcing factors, in particular related to land-use changes, and against the uncertainty of the regional climate sensitivity. Evidence for winter is more equivocal than for summer. The forced response in the model displays a clear temperature maximum at the end of the 20th century. However, the uncertainties are too large to state that this period is the warmest of the past millennium in Europe during winter.

Paper 2: Equatorial insolation: from precession harmonics to eccentricity frequencies, *A. Berger, M. F. Loutre, and J. L. Mélice, Clim. Past, 2, 131-136, 2006.*

Since the paper by Hays et al. (1976), spectral analyses of climate proxy records provide substantial evidence that a fraction of the climatic variance is driven by insolation changes in the frequency ranges of obliquity and precession variations. However, it is the variance components centered near 100 kyr which dominate most Upper Pleistocene climatic records, although the amount of insolation perturbation at the eccentricity driven periods close to 100-kyr (mainly the 95 kyr- and 123 kyr-periods) is much too small to cause directly a climate change of ice-age amplitude. Many attempts to find an explanation to this 100-kyr cycle in climatic records have been made over the last decades. Here the authors show that the double maximum which characterizes the daily irradiation received in tropical latitudes over the course of the year is at the origin in equatorial insolation of not only strong 95 kyr and 123 kyr periods related to eccentricity, but also of a 11-kyr and a 5.5-kyr periods related to precession.

Paper 3: Revisiting the absolute calibration of the Greenland ice-core age-scales, *L. C. Skinner (EGU Outstanding Young Scientist Award winner 2006), Clim. Past, 4, 295-302, 2008.*

Recently, an absolute "calibration" was proposed for the GRIP and GISP2 Greenland ice-core time scales (Shackleton et al., 2004). This calibration attempted to reconcile the stratigraphic integration of ice-core, marine and speleothem archives with the absolute age constraints that marine and speleothem records incorporate. Here Skinner revisits this calibration in light of the new layer-counted chronology of the NGRIP ice-core (GICC05). The GICC05 age-scale differs from the proposed absolute calibration by up to 1200 years late in the last glaciation, with implications both for radiocarbon cycling and the inferred timing of North Atlantic climate events relative to radiometrically dated archives (e.g. relative sea-level). By aligning the stratigraphy of Iberian Margin marine cores with that of the Greenland ice-cores, it can be shown that either: 1) the radiocarbon content of mid-latitude Atlantic surface-waters was extremely depleted (resulting in average surface reservoir ages up to 1700 years prior to ~22 ka BP); or 2) the GICC05 age-scale includes too few years (is up to 1200 years too young). It is shown that both of these possibilities are probably correct to some degree. Based on the assumed accuracy of coral and speleothem U-Th ages, Northeast Atlantic surface reservoir ages should be revised upward by ~350 years, while the NGRIP age-scale appears to be "missing" time. These findings illustrate the utility of integrated stratigraphy as a test for our chronologies, which are rarely truly "absolute".

Links to the papers:
http://www.clim-past.net/special_issue24.html

Three papers by H. Goosse et al., A. Berger et al., and L. C. Skinner

Surface-based Arctic amplification

of air temperatures may be emerging

Rises in surface and lower troposphere air temperatures through the 21st century are projected to be especially pronounced over the Arctic Ocean during the cold season. This Arctic amplification is largely driven by loss of the sea ice cover, allowing for strong heat transfers from the ocean to the atmosphere. Consistent with observed reductions in sea ice extent, fields from both the NCEP/NCAR and JRA-25 reanalyses point to emergence of surface-based Arctic amplification in the last decade.

The full paper is available free of charge at
http://www.the-cryosphere.net/3/11/2009/tc-3-11-2009.html

Serreze, M. C., Barrett, A. P., Stroeve, J. C., Kindig, D. N., and Holland, M. M.: The emergence of surface-based Arctic amplification, The Cryosphere, 3, 11-19, 2009.

Image-model coupling: a simple information theoretic perspective for image sequences

technical note about a new database of trace gases and aerosols from different satellite and groundbased measurement systems

Images are widely used to visualise physical processes. Models may be developed which attempt to replicate those processes and their effects. The technique of coupling model output to images, which is here called "image-model coupling", may be used to help understand the underlying physical processes, and better understand the limitations of the models. An information theoretic framework is presented for image-model coupling in the context of communication along a discrete channel. The physical process may be regarded as a transmitter of images and the model as part of a receiver which decodes or recognises those images. Image-model coupling may therefore be interpreted as image recognition. Of interest are physical processes which exhibit "memory". The response of such a system is not only dependent on the current values of driver variables, but also on the recent history of drivers and/or system description. Examples of such systems in geophysics include the ionosphere and Earth's climate. The discrete channel model is used to help derive expressions for matching images and model output, and help analyse the coupling.

The full paper is available free of charge at
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HESS Opinions "The art of hydrology"

an invited contribution by H. H. G. Savenije, EGU Henry Darcy Medal award 2008.

Hydrological modelling is the same as developing and encoding a hydrological theory. A hydrological model is not a tool but a hypothesis. The whole discussion about the inadequacy of hydrological models we have witnessed of late, is related to the wrong concept of what a model is. Good models don't exist. Instead of looking for the "best" model, we should aim at developing better models. The process of modelling should be top-down, learning from the data while at the same time connection should be established with underlying physical theory (bottom-up). As a result of heterogeneity occurring at all scales in hydrology, there always remains a need for calibration of models. This implies that we need tailor-made and site-specific models. Only flexible models are fit for this modelling process, as opposed to most of the established software or "one-size-fits-all" models. The process of modelling requires imagination, inspiration, creativity, ingenuity, experience and skill. These are qualities that belong to the field of art. Hydrology is an art as much as it is science and engineering.

The full paper is available free of charge at
http://www.hydrol-earth-syst-sci.net/13/157/2009/hess-13-157-2009.html

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This paper is an invited contribution by H. H. G. Savenije, EGU Henry Darcy Medal award 2008.

What would have happened to the ozone layer if chlorofluorocarbons (CFCs) had not been regulated?

17% of the globally-averaged column ozone is destroyed by 2020, 67% is destroyed by 2065 in comparison to 1980, and large ozone depletions in the polar region become year-round rather than just seasonal, according to model results

Ozone depletion by chlorofluorocarbons (CFCs) was first proposed by Molina and Rowland in their 1974 Nature paper. Since that time, the scientific connection between ozone losses and CFCs and other ozone depleting substances (ODSs) has been firmly established with laboratory measurements, atmospheric observations, and modeling studies. This science research led to the implementation of international agreements that largely stopped the production of ODSs. In this study the authors use a fully-coupled radiation-chemical-dynamical model to simulate a future world where ODSs were never regulated and ODS production grew at an annual rate of 3%. In this "world avoided" simulation, 17% of the globally-averaged column ozone is destroyed by 2020, and 67% is destroyed by 2065 in comparison to 1980. Large ozone depletions in the polar region become year-round rather than just seasonal as is currently observed in the Antarctic ozone hole. Very large temperature decreases are observed in response to circulation changes and decreased shortwave radiation absorption by ozone. Ozone levels in the tropical lower stratosphere remain constant until about 2053 and then collapse to near zero by 2058 as a result of heterogeneous chemical processes (as currently observed in the Antarctic ozone hole). The tropical cooling that triggers the ozone collapse is caused by an increase of the tropical upwelling. In response to ozone changes, ultraviolet radiation increases, more than doubling the erythemal radiation in the northern summer midlatitudes by 2060.

The full paper is available free of charge at
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Heavy rains and extreme rainfall-runoff events

in Central Europe from 1951 to 2002

Runoff data were used to better select historically significant precipitation events. The suggested criterion Qx expresses the increase of a stream runoff over up to four days in a row. Tests confirmed that Qx maxima correspond to maxima of areal precipitation in the respective catchment. Ten significant precipitation events in summer half-years from 1951 to 2002 were selected in 25 catchments each, and further studied in respect to spatial extent, simultaneous occurrence in various river basins, seasonal distribution, and temporal variability. Four regions were recognised within Central Europe that show related seasonality and simultaneous occurrence of events. The main coincidence of significant precipitation events was confirmed between the Austrian Alps and Bohemia and Saxony on one hand, and Moravia, Silesia, and Western Slovakia on the other hand. Significant events typically emerge here during peak summer, in the south-eastern area of the Alps during autumn months, in the South-Eastern Carpathians from May to July, and in Western Germany in spring or autumn. Episodes with less significant precipitation events (around 1960 and 1990) alternate with inverse episodes (1970's, second half of the 1990's). A reasonable selection of reference events opens the door to a quantitative evaluation of dynamic and thermodynamic conditions typical for heavy rains in various parts of Central Europe.

The full paper is available free of charge at
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Sensors for physical fluxes at the sea surface: energy, heat, water, salt

A review of current meteorological sensors for flux measurement by the bulk aerodynamic, inertial dissipation and eddy-correlation methods

The current status of meteorological sensors used aboard ships and buoys to measure the air-sea fluxes of momentum, heat, and freshwater is reviewed. Methods of flux measurement by the bulk aerodynamic, inertial dissipation and eddy-correlation methods are considered; and areas are identified where improvements are needed in measurement of the basic variables. In some cases, what is required is the transition from emergent to operational technology, in others new technologies are needed. Uncertainties in measured winds caused by flow distortion over the ship are discussed; and the possible role of computational fluid mechanics models to obtain corrections is considered. Basic studies are also needed on the influence of waves and rain on the fluxes. The issues involved in the specification of sea surface temperature are described, and the relative merits of the available sensors are discussed. The improved capability of buoy-mounted systems will depend on the emergence of low-power instruments, and/or new means of increasing the available power capacity. Other issues covered include the continuing uncertainty about the performance of rain gauges and short-wave radiometers. Also, the requirements for new instruments to extend the range of observations to extreme wind conditions are outlined, and the latest developments in the measurement of aerosol fluxes by eddy-correlation are presented.

The full paper is available free of charge at
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Characterization of a thermodenuder-particle beam mass spectrometer system

for the study of organic aerosol volatility and composition

This paper describes the development and evaluation of a method for measuring the vapor pressure distribution and volatility-dependent mass spectrum of organic aerosol particles using a thermodenuder-particle beam mass spectrometer. The method is well suited for use with the widely used Aerodyne Aerosol Mass Spectrometer (AMS) and other quantitative aerosol mass spectrometers. The data that can be obtained are valuable for modeling organic gas-particle partitioning and for gaining improved composition information from aerosol mass spectra. The method is based on an empirically determined relationship between the thermodenuder temperature at which 50% of the organic aerosol mass evaporates (T50) and the organic component vapor pressure at 25°C (P25). This approach avoids the need for complex modeling of aerosol evaporation, which normally requires detailed information on aerosol composition and physical properties. T50 was measured for a variety of monodisperse, single-component organic aerosols with known P25 values and the results used to create a logP25 vs. T50 calibration curve. Experiments and simulations were used to estimate the uncertainties in P25 introduced by variations in particle size and mass concentration as well as mixing with other components. A vapor pressure distribution and volatility-dependent mass spectrum were then measured for laboratory-generated secondary organic aerosol particles. Vaporization profiles from this method can easily be converted to a volatility basis set representation, which shows the distribution of mass vs. saturation concentration and the gas-particle partitioning of aerosol material. The experiments and simulations indicate that this method can be used to estimate organic aerosol component vapor pressures to within approximately an order of magnitude and that useful mass-spectral separation based on volatility can be achieved.

The full paper is available free of charge at
http://www.atmos-meas-tech.net/2/15/2009/amt-2-15-2009.html

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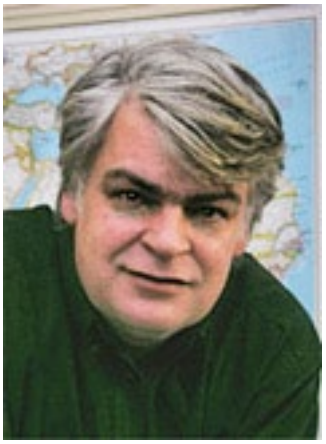
EGU matters…

LETTER FROM THE PRESIDENT

Gerald Gansen, after being EGU President for nearly two years now and his term being finished in April of this year, on these last two years of EGU



Gerald Ganssen, President of the European Geosciences Union

After being EGU President for nearly two years now and my term being finished in April of this year, let me summarise a few achievements.

Our General Assembly is continuously growing. Last year we had nearly 12000 abstracts and 8700 people attending. Both records probably will be broken in 2009, for the abstracts we know already right now, directly after the deadline for submissions.

In 2008, two relatively new divisions did it exceptionally well: Geomorphology and Soil System Sciences with an increase in contributions of 56 and 82 %, respectively.

Vienna 2008 was very successful and the amounts of complaints reduced to an absolute minimum. No reason to lay back. We always try to improve and are open for suggestions.

From next year on we will move to Paris for three years. Why? There are quite some people who suggest staying in Vienna like AGU does in San Francisco. No, we as a European Society want to make use of the offers from different countries for hosting our General Assembly. Other countries, like Austria did from 2005-2009, should get the opportunity to present themselves on this European level. We are curious how it will be in France next year.

What the publications concerns we are really glad that our concept of "Open Access – Public Peer-Review & Interactive Public Discussion" is well accepted by the scientific community. Thanks to the excellent cooperation between all of you contributing as authors, editors and reviewers with our publisher Copernicus (http://www.copernicus.org/), the numbers of journals, publications and impact factors continuously rise.

Within the outreach branch the GIFT workshops (Geophysical Information for Teachers, http://gift.egu.eu/) and associated activities play an important role. Our press office (http://www.egu-media.net/) functions as a medium to communicate science to a broader public. Currently we are intensifying our collaborations with sister organisations like AGU, GSA and EAGE. Last but not least, the EGGS, our EGU newsletter is important for communicating news and views. Please contribute to it actively and submit your comment, article, job advert or whatever.

In summary, EGU matters, please help to improve it.

Hoping to seeing you all in Vienna in the week from April 19th to 24th,

Yours,
Gerald Ganssen, President EGU

Gerald Ganssen currently holds the position of associate professor at the Vrije Universiteit, Amsterdam, working in the fields of marine geology, paleoceanography and paleoclimatology. He is currently President of the EGU, his term ending this April. He was President of the Division `Climate: Past, Present & Future` of EGS and EGU and initiated the EGU e-journal `Climate of the Past`. He serves on several national and international scientific committees and programmes dealing with paleoceanography, modern and past climate and global change in research, training and outreach.

Alp-Water-Scarce: Why we need water management in the Alps

A european project on Water Management Strategies against Water Scarcity in the Alps, by C. de Jong

Since the Alps receive disproportionally higher amounts of precipitation than the surrounding lowlands, they also produce a disproportionally high mountain runoff relative to average lowland runoff. That is why they are considered as Europe's water towers, storing water in the form of lakes, wetlands, rivers, snow, permafrost and glaciers. A good governance of water is crucial, taking into account all important factors. But it is not only global warming that is effecting water availability, it is also water abstraction, both for hydroelectricity, agriculture and transformation of water into snow and snow into water. The long term aim of Alp-Water-Scarce is to reinforce authorities & stakeholders to develop integrated & sustainable water management and to suggest socio-economic adaptation & mitigation strategies against water scarcity.

At the global level, mountain regions play an extremely important role in terms of water resources, climate systems and for surrounding populations. The Alps cover approximately 25% of the surface of Europe, contributing to more than half of Europe's mountain regions. Globally, the discharge flowing from mountain basins to the lowlands varies in importance according in function of the climatic zone and altitude. The Alps are classified as having a very important contribution to the lowlands (or superior relative water yield) (Viviroli et al 2007). Since the Alps receive disproportionally higher amounts of precipitation than the surrounding lowlands, they also produce a disproportionally high mountain runoff relative to average lowland runoff. That is why they are considered as Europe's water towers, storing water in the form of lakes, wetlands, rivers, snow, permafrost and glaciers.

Under the current impacts of climate change that are very marked at the alpine level, the storage capacity of water in the Alps is being reduced due to changes in snowline altitude, snow duration and glacier volume. The risks and vulnerability are considerable. A good governance of water is crucial, taking into account all important factors. But it is not only global warming that is effecting water availability, it is also water abstraction, both for hydroelectricity, agriculture and transformation of water into snow and snow into water. The Alps alone can be subdivided into 4 rough climatic zones, the humid oceanic zone in the west, the arid sub-Mediterranean zone in the south, the most humid central European zone in the north and the very dry central continental zone in the east, with the often forgotten very central alpine valleys. For example, the Wallis is one of the driest regions in the whole Alps. Even with this historic division, it has been observed today that the driest zones of the Alps in the south have wandered further northwards, such as from Gap to Chambery in France.

There are numerous problems associated with water in the Alps, either directly linked to climatological or geological factors, or linked to anthropogenic factors, such as excessive local water abstraction, even in the climatologically most humid zones. Not even the favourable physical characteristics of the Alps always guarantee water availability. For example, Lake Constance a transboundary lake, experienced real water scarcity in 2005, unable to recover its lake levels after the drought in 2003 (Zweckverband Bodensee-Wasserversorgung, 2005). Water levels dropped below the historically measured minimal values (since 1871) to 243 cm, mainly due to drying up of springs and reduction of discharge in the higher valleys, as well as increased lake evaporation.

The European project Alp-Water-Scarce

The European project Alp-Water-Scarce (Water Management Strategies against Water Scarcity in the Alps) is coordinated by the Mountain Institute (University of Savoy) in the frame of the UMS CNRS Mountains 3046 under the responsibility of Carmen de Jong (Alp-Water-Scarce). It started in October 2008 for a period of 3 years in the Alpine Space programme. The project has 17 partners from5 alpine countries, including in alphabetical order from Austria the Carinthian Regional Government, the Government of Styria, Z-GIS from the University of Salzburg and the Institute of Agricultural Economics, from France the Society of Alpine Economics in Annecy and the Local Government of Savoy, from Italy the GAL Appennino Genovese (a stakeholder oriented organization), the Province of Alessandria, the Province of Trento, UNCEM (National Union of Mountain Communes) and the Environmental Agency of Veneto, in Slovenia the Geological Survey of Slovenia, the National Institute of Biology and the Chamber of Agri-

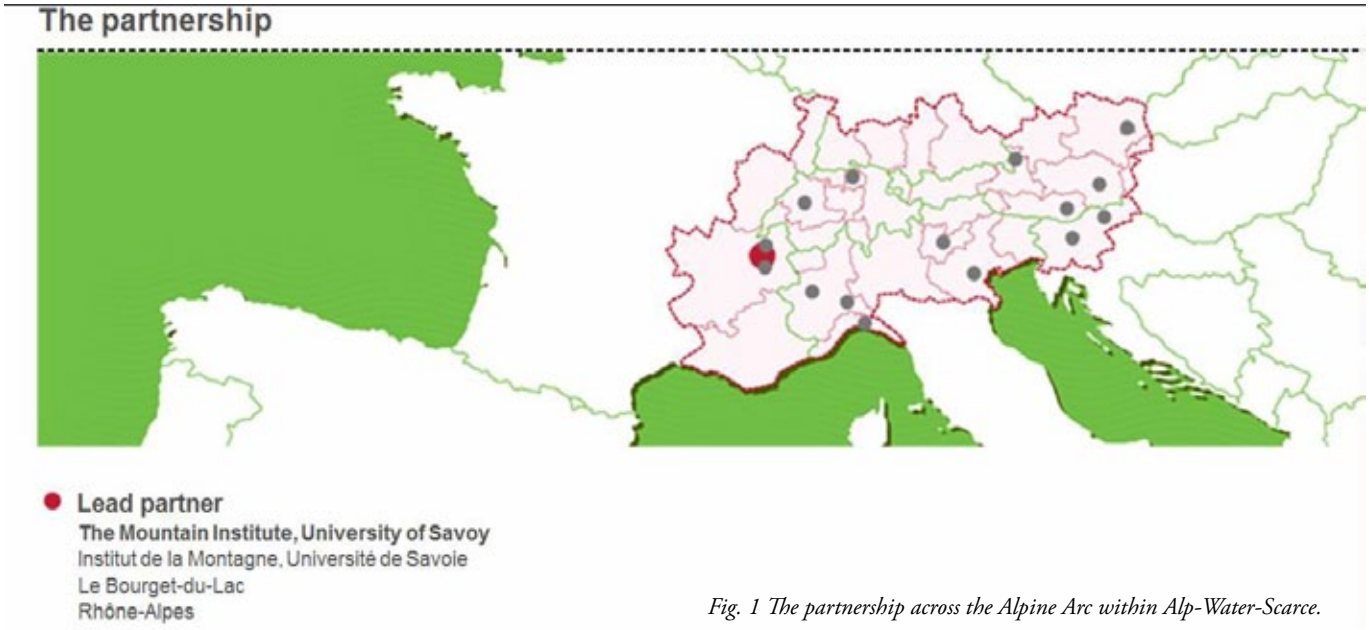


Fig. 1 The partnership across the Alpine Arc within Alp-Water-Scarce.

culture and in Switzerland the EAWAG (a freshwater biological Institute) and the BAFU (National Environment Agency). Most of the principal partners will be subcontracting or even externalizing their project management to universities and research institutes, ensuring a sound scientific basis.

The different geographic and climatic zones are well presented, including 28 pilot sites investigating various emerging problems of water resources, water availability and water management. The joint research and action is necessary since it is expected that in future, even the water-rich Alps, in particular the southern Alps will be effected by droughts resulting from climate change. Increasing anthropogenic water abstraction will exacerbate the water scarcity problems.

Some actual problems related to water

Seasonal decrease in precipitation and the re-distribution of precipitation and groundwater recharge pattern is already in progress in the Southern, Western and Eastern Alps, as well as in the central dry alpine valleys. To give a few example, in the Sattnitz area (Southern Austrian Alps, long time series analyses over the last 200 years indicate a significant decrease of groundwater recharge in the order of 25% in the last 100 years in a region not directly impacted by man but effected by climate change as characterized by an increase in evapotranspiration of forests and the decrease in precipitation (T. HARUM et al., 2008). Consequently the discharge of all springs in the area decreased significantly. Similar developments are observed at the other side of the frontier in Slovenia which have experienced significant decrease in water availability for irrigation in the alpine valleys and underlying lowlands. These have direct effects on drinking water supply, aquatic biology and water quality.

Glacier retreat has direct impacts on water availability and on agriculture. For example, certain communes situated in karst zones in the Swiss Bernise Alps a reliable supply of water will no longer be guaranteed in 30 – 50 years time since with the eventual near total retreat of glaciers, they will have to depend on precipitation only in the future (Gremaud et al 2008). In Italy, downstream of the Monte Rosa area where rice irrigation depends heavily on glacial meltwater discharge, the issue will also be of similar concern. In France, the problems exist both during the summer and during the winter, with direct economical impacts. The poor quality of mountain fruit and nuts harvested during the last few dry summers (with the exception of summer 2007), prevented them from being exported for the first time. In certain summer pastures in Savoy, the transport of water by truck had to be organized to supply the cattle herds since they could not be supplied form the dried of sources (de Jong et al 2008).

Concerning the Alps in general, where seasonal redistribution of precipitation is more important than precipitation decrease, it is predicted that discharge will increase significantly in spring and decrease significantly during the summer.

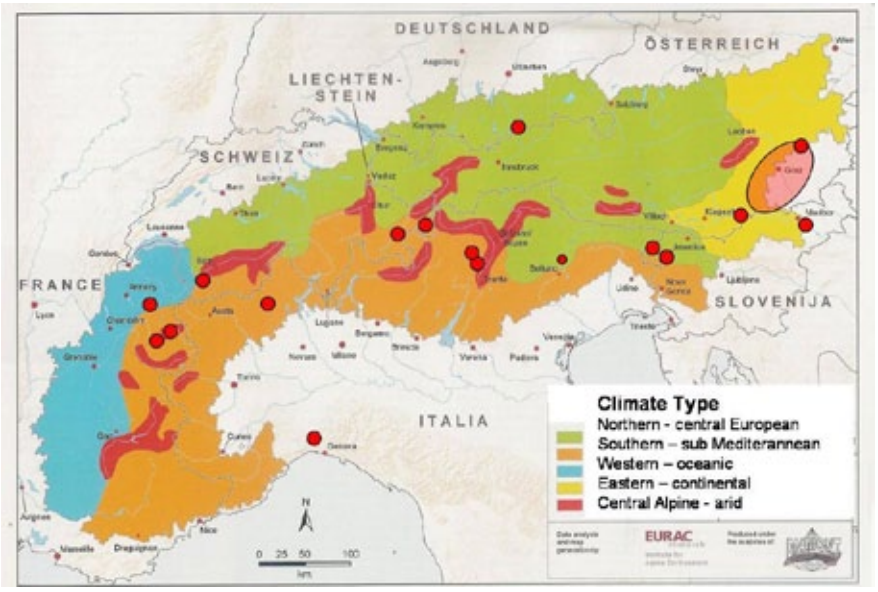
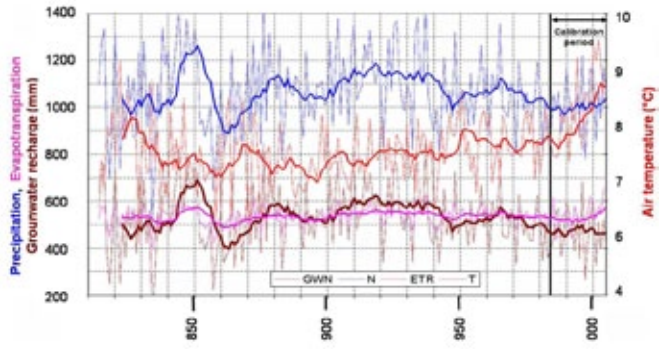
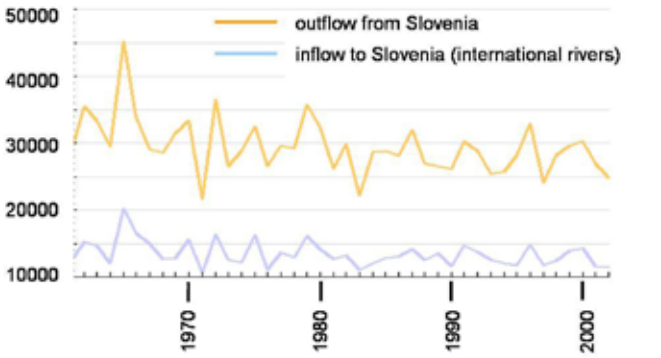


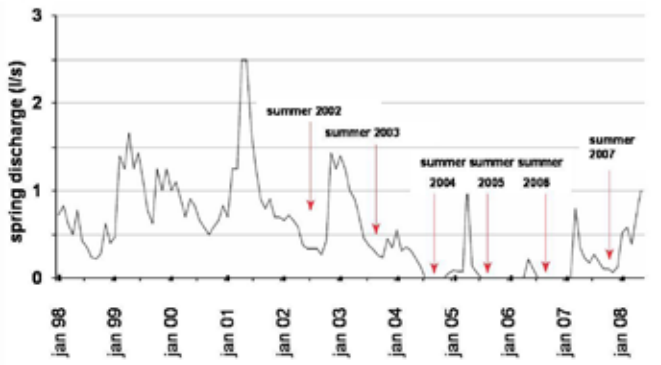
Fig. 2 Study sites with relation to major climatic zones in the Alps. Note study sites are not yet complete. Long time series showing water scarcity developing in terms of:



a) decreasing groundwater recharge in Sattniz area, Austrian Alps



b) decreasing river flow in Slovenia



c) short time series for consecutive summer drying up of a spring in Savoy, France

Simple climatological map of Alps (EURAC 2008) indicating all major climate zones. Three examples indicating long term a) simulation of groundwater recharge for southern Austrian Alps (Harum et al 2008) and b) measurements of surface discharge for Slovenian Alps and c) spring discharge for French Alps respectively.

Temporary drying up of a spring in Savoy

A pragmatic project

The long term aim of Alp-Water-Scarce is to reinforce authorities & stakeholders to develop integrated & sustainable water management and to suggest socio-economic adaptation & mitigation strategies against water scarcity. On the short term, an early warning system against water shortage in the Alps will be based on an operational methodology with strong stakeholder participation taking into account present and future zones as well as time periods of water scarcity. The different peculiarities of the Alpine Space, especially its rapidly changing cryosphere and the periodically highly densely populated tourist sites will form a major focus of the project.

In detail, the objectives are to create a stakeholder interaction forum to define water problems. This forum will accompany the entire project and establish or extend an effective communication network, closely linked to the press and media. The main anthropogenically and naturally defined surface water and groundwater systems will be characterised and their vulnerability towards water scarcity assessed. Different water usages such as drinking water, hydropower, agriculture (irrigation), tourism and artificial snow will be defined in zones with potential future lack of water. A monitoring network will be elaborated based on hydrometeorology, water quality and water abstraction or intensified in those regions necessary. Integrated hydrological regional and subbasin models will be assembled and compared. Climate & anthropogenic scenarios are to be adapted and developed to enable prediction of future vulnerability to water scarcity. Special emphasis will be placed on the definition of optimal ecological flow of surface discharge and groundwater biotopes, supported by the selection and application of aquatic indicators & biodiversity change. Finally, an early warning system for water shortage will be developed and tested in pilot regions, strongly supported by the stakeholder interaction forum. This will form the operational basis for suggestions for water management strategies.

An integrated and transnational approach

Since water is nearly ubiquitous and of transdisciplinary nature it can only be understood and managed in an integrated way. The project is well integrated between decisions makers, politicians and scientists. This crosses different specialist fields such as meteorology, hydrology, hydrogeology, hydraulic engineering, agriculture, biology, ecology, geography, tourism, economics and sociology as well as different sectors such as local users, decision makers and ministries. In addition it requires a combination of approaches such as stakeholder activation, field monitoring, modelling as well as awareness raising, implementation and follow-up. As mentioned before, the Alps play an important role as water towers with surface and subsurface interconnections across transnational catchments. The project will be approached via three main geographical regions over the Alps, high alpine regions, inner alpine dry valleys and pre-alpine basins represented by approximately 28 pilot regions in the 5 countries. This will include agricultural surfaces, pastures, forests, bare soils, glaciers, snow-covered surfaces, wetlands, streams, rivers and lakes. Zones that are sparsely populated with less than 10 persons per km2 will be considered as well as those with densities of 40-80 persons per km2.

Expected results

European projects such as those in the Alpine Space are strictly controlled every 6 months. One of the expected results is the development of an interactive stakeholder forum at the transalpine, national and regional level that will accompany the project along its entire length. The stakeholder forum will be activated via the homepage www.alpwaterscarce.eu, via annual meetings, biannual workshops, individual meet-

ings and a final conference to foster awareness raising. Each partner is expected to establish a network of approximately 20 stakeholders that can participate officially in the project as "observer". This platform is open to all persons and organizations interested. So-called "nomad" biannual workshops will be organized with the 17 partners in the different alpine countries. Each workshop will be open to the public for approximately 2 hours in the afternoon and will be accompanied by a thematic excursion the day after. On the 18th of October, a first meeting of this kind took place with the local stakeholders of Saisies, the mayors and directors of the ropeways to work on water, artificial snow and tourism. Other expected results are the development of an Early Warning System for Water Scarcity in selected pilot regions that already have long term observations and well advanced models. It is also foreseen to predict water quality change as an effect of decreasing groundwater recharge. In all pilot sites, it is planned to apply tools to support decision making. The development of transnational concepts of water management that ensure water supply for human uses and preservation of aquatic biodiversity are amongst the deliverables. Best practice demonstration in target areas as well as exchange of knowledge and experience is anticipated. It is often similar problems that are experiences in similar regions that is why the real advantage of European projects is to find common approaches and solutions. A handbook for water resources management focusing on water scarcity problems confronted by policy makers is to be written. Communication and dissemination of these experiences and results should accompany recommendations and suggestions for resource conflict management and for mitigation measures for stakeholders & end users, increase public participation in sustainable water management process.

Recommendations for mountain water regulations will be developed together with the Alpine Convention.

One of the first results is that the management of water demand and water use is often more difficult than the management of water resources themselves!

Even if the Alpine Space Programmes aim to develop the Alps into a balanced region of excellence in terms of environment, economy etc, Alp-Water-Scarce remains above all an operational programme which requires strong anchorage at the local and regional level. The synergies created between the different actors – scientists, economists and politicians, have to develop into very concrete actions, enabling new perspectives and creating new know-how, development of information and technology.

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EDUCATIONAL CRUISE LOG BOOK

The PACHIDERME cruise onboard R/V Marion Dufresne of the French Polar Institute

During the PACHIDERME (PAcifique-CHIli-Dynamique des Eaux intermediaries) cruise, messages were send in the form of cruise logs to about 150 schools all over the world every 2-3 days, describing different aspects of the science and life on board. This Deep Sea Coring Cruise of the Marion Dufresne off the coast of Chile, February 2007, sponsored by the IMAGES Program, was connected to the Teachers-at-Sea program. A number of the participating teachers was supported by EGU as part of EGUs Education Committee activities. A short description of the cruise and the daily cruise logs are relayed here.

During the PACHIDERME (PAcifique-CHIli-Dynamique des Eaux intermediaries) cruise, messages were send in the form of cruise logs to about 150 schools all over the world every 2-3 days, describing different aspects of the science and life on board. This Deep Sea Coring Cruise of the Marion Dufresne off the coast of Chile, February 2007, sponsored by the IMAGES Program, was connected to the Teachers-at-Sea program. A number of the participating teachers was supported by EGU as part of EGUs Education Committee activities. A short description of the cruise and the daily cruise logs are relayed here.

On February 6, the RV Marion Dufresne left Punta Arenas on the collaborative cruise PACHIDERME (PAcifiqueCHIliDynamique des Eaux intermediaries), including scientists from France, Germany, Norway and Chile. The Pachiderme (MD159) cruise was organized by the Laboratoire des Sciences du Climat (LSCE) at GifsurYvette (France) with significant inputs to the definition of the objectives and to the choice of potential coring sites from the different groups of the various countries involved. The Chief Scientist was Catherine Kissel (LSCECEA/CNRS/UVSQ). The Institut Polaire PaulEmile Victor (IPEV) provided the ship and the scientific technology for the cruise and the scientific program was strongly supported by a team from the IPEV under the direction of Hélène Leau. The cruise started on February 6th, 2007 from Punta Arenas and ended on February 28th, 2007 in Punta Arenas.

The scientific objectives of this cruise were defined within the framework of the IMAGES (International MArine Global changES) program. The purpose of the cruise was to recover long piston cores along a latitudinal transect from 48° to 55°S, including both the inland waterways of the Chilean Fjord region and off the bounding islands along the Chilean outer continental shelf and slope, to document paleoenvironmental, climatic, and oceanographic changes in the southeast Pacific (Fig. 1). A total of 36 localities were investigated (stations 01 and 08 have a double number (37 and 28 respectively) because they have been cored twice at different time). No sediment could be retrieved from 5 out of these 36 stations (stations 09, 10, 29, 32 and 33). A total of 840 m of sediments has been collected during this cruise with an average length of 27 m/station. All cores were split and described onboard. Lithology, sedimentary structures, texture, fossil content and coring disturbances were described for each core section. Spectral analysis of each archive half was carried out using a Minolta CM2006 spectrophotometer. The areas sampled include:

· Magellan Strait (stations 01, 36, 37, and 38)
· Magellan Region (~52-54° S) (Stations 2, 33, 34, and 35)
· Region between 51°S and 48°S (Stations 3, 4, 5, 6 and 32)
· Region off Taitao (~46°S) (Stations 7, 8, 9, 27, 28, and 29)
· Continental slope sites SW of Chiloe (~44°S); Stations 11, 12, 13, and 21)
· Northern offshore transect (~41-42° S; Stations 1417)
· Northern Fjord Sites (Stations 18, 19, 20, 22, 23, 24, 25 and 26)
· Seno Baker (station 30), Canal de Concepción (Station 31)

In the northern fjord region, for example, several sites were cored to study the evolution of this fjord system since the retreat of the Northern Patagonian Ice sheet. Cores in the southern fjord region, on the other hand, offer a unique opportunity to constrain the late glacial iceretreat of glaciers from Cordillera Darwin. In this southern region, core MD073132 at station 38 contained abundant dropstones, banded clays, and no biogenic components, suggesting a very proximal location to the glaciers. Within the oceanic realm, the sedimentary sequences recovered will provide constrains on intermediate water mass extent and property changes at various timescales.

For the first time, middle and high school teachers also

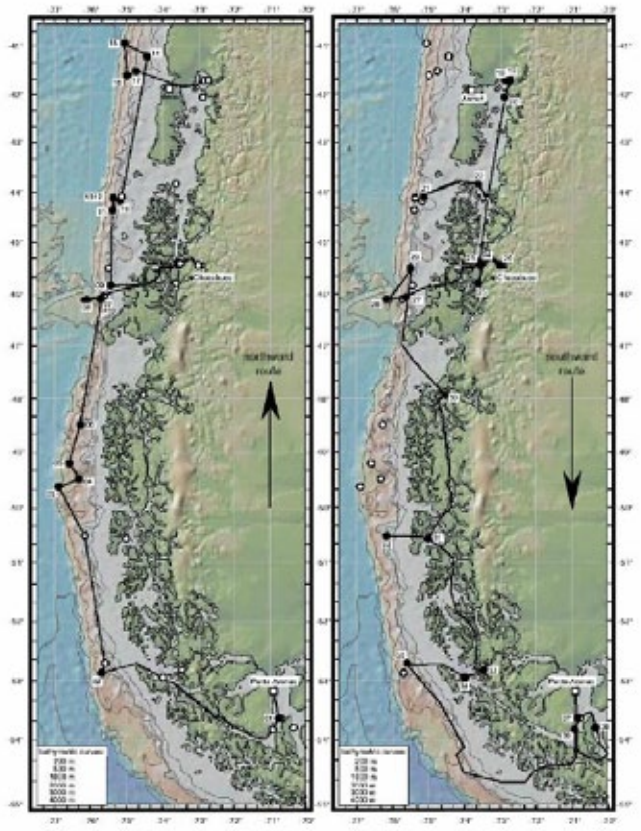

Fig. 1. PACHIDERME cruise track and coring stations, onboard RV Marion Dufresne.

participated on board the Marion Dufresne, as part of a new educational program at sea, lead by Carlo Laj, Chairman of the Committee on Education of EGU. In a "Classroom at sea" fashion, one American teacher of Chatman HS and two Chilean teachers of Talcahuano schools, and COPAS Outreach coordinator Dr. Luis Pinto, participated in the scientific activities on board, kept in contact with 150 schools from 22 different countries, sent regular reports on the cruise and answered questions from the students.

CRUISE LOG BOOK

Saturday, February 10, 2007 - First message

The climate puzzle pieces are hidden in many obscure places around the globe including in the ocean sediments that have accumulated over recent and distant past. Removing these treasure latent cores from the ocean depths provides information about past climates including atmospheric and oceanic conditions. The focus of the upcoming 3 week research cruise of the Research Vessel Marion Dufresne, of the French Polar Institute (IPEV), off the coast of Chile embarking on February 6, 2007 will be to collect 25 deep sea cores to help answer the puzzling questions about climate change. The goals of the PACHIDERME (PAcifique-CHILi-Dynamique des Eaux intermediaries) cruise under the guidance of Chief Scientist Dr. Catherine Kissel will be to determine the thermocline and intermediate water ventilation in the far Southeastern Pacific, to study the past latitudinal intensity variability of the west wind belt, and to study the climatologic chronology of the glaciation and climate change of the region among others.

Besides a number of noted research scientists from around the world onboard will be 4 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 by sending emails, participating in blogs, and journaling about the daily exploits of those onboard. You and your students can join the "Core-Education" Team as they journey up the coast and between the fjords of Chile by sending them emails about the science and the research. Send your emails to coredu@marion.ipev.fr and they will enjoy getting back to you.

Tuesday, February 13, 2007

Hello from
44° 19.81570 S
75° 22.07990 W

Here are few vital statistics for today: The water temperature is 14.82˚C and the air temperature is 19˚C. The winds are from the 3˚ (just about North) at 9 knots.

The weather since leaving Punta Arenas last Tuesday has been variable to say the least with clouds and higher waves to clear skies and calm waters. This is definitely a trip where dressing in layers is important, especially during the nighttime "watches." A watch is a work period, and we have 3 watches on board the Marion Dufresne; 0-4, 4-8, and 8-12, and each of these occurs in both the AM and the PM. Thus everyone works 8 hours during a 24 hour period, although it is usually much more!

The "activity log" sent earlier (let us know if you would like us to resend it) will give you and your students an idea of where we've been and where we've taken cores. We have been coring in the fjord regions as well as in the open ocean. The fjords here are glacial valleys formed during the Quaternary period (over the past 3 million yrs). Cruising through the fjords is like cruising through a canyon since the fjord walls are so high. Some of the mountains lining the fjords actually have snow on them, and this is the Chilean summer! We will send pictures so you understand what we are talking about.

After 8 days of the cruise, we have acquired 10 Calypso (long and thin) sediment cores, and 3 Casq (short and wide) sediment cores. Since there are so many scientists on board, there are also many different types of samples that must be taken. Some of the scientists are interested in the longer time records found in the Calypso cores, whereas some of the scientists are interested in a record of the recent past found in the Casq cores. We will fill you in on the coring process, and what has been found in the cores as our messages progress.

More tomorrow

Send your questions and your requests!

Wednesday, February 14, 2007

Hello from
41˚47'S 73˚51'W

Here is a brief overview of the current weather:
Air Temperature: 16˚C
Wind Direction: 106˚
Wind Speed: 12 kts
Air Pressure: 1009.8
Humidity: 71%
Cloud Type: stratus and altostratus
Percent Sky Cover: 100%
Water Temperature 13˚C

The day started with the processing of a Casq core, and followed with a transit to Ancud to switch our current Chilean

pilots with 2 new Chilean pilots. Because we are coring within the fjord regions we are required to have Chilean pilots assist the Captain in navigating the fjords. Although the fjords may be wide, the water depth varies tremendously such that there may only be a narrow channel that can be navigated, but with the assistance of the pilots and the water depth charts, the Captain and his crew can safely navigate the narrow channels within the broad fjords. The pilots remain on board for approximately 7 days and work 5 hour shifts, and then we must cruise to a location to switch pilots.

Today we are reaching our furthest north location, and therefore will be deploying a satellite transmitter for the Argonautica Program. The focus of the Argonautica program is "to better understand the role of oceans in the climate of the Earth thanks to the data from satellites". The floating ARGOS tracks position and once the data is collected it is transmitted to a satellite where it is then transmitted back to CNES (Centre National d'Études Spatiales) in France. The data can be used to track ocean circulation, and students and teachers can view the data by going to www.cnes-edu.org. Teachers will also find ways use the data in the classroom by visiting the website. Watch the CNES website for the data. ARGOS satellite transmitter ID #:17194. Serial #: 942020

More tomorrow when we tell you about the deployment and tell you more about the cruise.

Friday February 16, 2007

Hello from
41˚42' S 72˚ 46' W
Here is a brief overview of the current weather:
Air Temperature: 13.6 degrees Celsius
Wind Direction: 321˚
Wind Speed: 20 kts
Air Pressure: 1019.1
Humidity: 60%
Cloud Type: cumulus, cirrus, altostratus – at the horizon
Percent Sky Cover: 15% all at the horizon
Water Temperature: 15.6 degrees Celsius

Greetings from picturesque Seno Reloncavi (near Puerto Montt)! Yesterday we were at our furthest north location near Chiloe, and now we are making our way south again to take cores from within the fjord region and the open ocean. For the next 24 hours or so we will be taking cores from Seno Reloncavi which is considered somewhat of an inland sea since it is surrounded by islands and fjords. We are here because this location has a complicated sedimentary sequence caused by the tides and currents coming from the south, and the outflow of the glaciers to the north. This whole area was under ice thousands of years ago, and it is the desire of the scientists to pinpoint more accurately from the sediment cores when the glaciation occurred. Also, hidden within the cores may be information related to the tectonics of the area since this is an active seismic and volcanic region. An interesting aside is that the tidal range in Seno Reloncavi is about 8m!

We are up to 17 Calypso (long) cores and 26 Casq (short) cores, and average water depth for the cores has been 1500m with 3266m being the deepest. The Calypso cores can be as long as 60m and 10 cm in diameter, and are used for longer time records. The Casq cores can be 12m long and 25cm X 25cm, and represent only a shorter period of time. A scientist using the Casq for sampling will retrieve a large sample of well preserved top layers of the core, whereas the scientists employing the Calypso will end up with a longer record of time, but a thinner sample.

You know that we are coring in both the open ocean and in the fjords, but did you know that the sediment accumulation rate is different in both locations? In a confined fjord, the sedimentation rate can be approximately .25cm per year, and whereas it is substantially less in the open ocean. In the fjords the scientists can go back in time about 25,000 years, and in the ocean they can go back hundreds of thousands of years dependent upon the length of the core. Both the Calypso corer and the Casq corer are used in the ocean and the fjords since there is value in each type of sample. The cores are analyzed for the types and quantities of the sediments and microorganisms, along with the time record before the links are made to the global climate record.

Once the corer is back on deck, the sediment core must be removed from the corer, and then the core is cut into 1.5 meter segments. Each segment is labeled lengthwise before it is cut into two halves, the working half, and the archive half. The labeling includes the application of an adhesive measuring tape down the length of the segment, labeling which is the top and bottom, and providing the core number and segment number. Again each long half of the segment must have all this information because one it is cut into two halves, they will be used and stored in different locations.

We'll fill you in on the type of analysis done on board tomorrow!

Sunday February 18, 2007

Hello from
44°4' S 75° 7' W
Here is a brief overview of the current weather:
Air Temperature: 13.3 degrees Celsius
Wind Direction: 7 degrees
Wind Speed: 3 kt
Air Pressure: 1019.5
Humidity: 82%
Cloud Type: altostratus
Percent Sky Cover: 100%
Water Temperature: 14 degrees Celsius

We have left Seno Reloncavi and are now in the coring in the Golfo Corcovado. We have heard that the seas could be very rough in this region, but fortunately for all us, we've come into calm seas!

After the cores have been cut in half, some basic analysis is done on board before they are packaged to ship home. The first stop is the container where the "MST" (Multi-Sensor Track) is located. This is where basic measurements of many parameters are taken using a variety of instruments in a small area. One objective of the MST is to measure the density of the sediment, and this is accomplished by using gamma ray attenuation (reduction). As gamma rays move through the core, the degree in which they are attenuated is directly related to the number of electrons in the gamma ray beam, core thickness and electron density. By measuring the number of unscattered gamma photons that pass through the core, the density of the core material can be determined. In measuring P-wave velocity, a transducer generates ultrasonic compressional waves (P) and sends them across the sediment. Another transducer receives the P-waves, which propagate across the sediment. The MST computer measures the travel time, which is influenced by the temperature of the core. The P-wave transducer

provides an estimate the core thickness, and the value of this thickness is used to correct the density measured by the gamma rays. The P-wave velocity is the ratio between the sediment thickness and the pulse travel time in the sediment.

The MST also has a special digital camera that measures the reflectance of the red, green and blue lights, and creates high resolution images. Another higher resolution photo is taken of every 2 cm of each core segment before it is packaged up for the lab on land. Another instrument on the MST measures "magnetic susceptibility." Each substance has magnetic susceptibility, which depends of its constituent materials. Some particles have a low magnetic susceptibility, like micas, feldspars, and some others have high magnetic susceptibility like magnetite or iron oxides. The point sensor is mounted on a moving arm which allows contact with the sediment. A magnetic field is created. The presence of magnetic material near the sensor changes the magnetic field. This variation gives information about the properties of particles which compose the sediment. Magnetic susceptibility can be useful in determining volcanic ash layers and change in the mineral composition.

The scientists are not done with the core yet! They still need to do a core description for each and every core segment. Description and characterization of the sediment components provide a very precise documentation about the variations in the stratigraphical and lithological variations. It is very useful for scientists who work in various paleoceanographic fields, because they don't always have the opportunity to have a look at the original core. Descriptions show variations in sedimentary features with depth, as follows:

- climatic events: changes in lithologic layers (foraminifera, opal, microfossils, ...) (Biological proxy)

- volcanic events: volcanic minerals like glass which allows to determinate ages (Mineralogical proxy)

- earthquake events : changes in the facies (turbidite, grains, …) (Purely sedimentological proxy)

- disturbances in the sedimentological signal : bioturbation, modification of the deposits structure, diagenesis action, and deformation due to the corer system (Structure proxy).

The first step for sediment core description is to look at several parameters and to write all details seen in the core on logging sheets. Then this information is entered in a picture treatment software program such as Adobe Illustrator. To complete the study of the sediment reflectance, a spectrophotometer analysis is made. The spectrophotometer used on board the Marion Dufresne measures the reflectance of the sediment every five centimeters. Those measurements give information about the composition of the sediment: light sediments involve the presence of carbonates whereas dark sediments indicate the presence of organic matter.

A "smear slide" is also taken that provides a rapid, simple and cheap examination of the types and quantities of sediments in each core segment. Using a toothpick a small sample is taken from each core segment and from any unusual feature in a core, it is "smeared" on to a slide with a drop of water, set with a mounting medium, and then analyzed under a light microscope onboard and a petrologic microscope in the lab on land. All of this happens very rapidly and efficiently since the science crew acts as a team to accomplish all the tasks of the cruise.

Watch for pictures of what we've found under the microscope!

Monday February 19, 2007

Hello from
45degrees 23' S 73 degrees 29' W
Here is a brief overview of the current weather:
Air Temperature: 13.9 degrees Celsius
Wind Direction: 335 degrees
Wind Speed: 8 kts
Air Pressure: 1022.5
Humidity: 62%
Cloud Type: cirrostratus, cumulus
Percent Sky Cover: 25 %
Water Temperature: 12.9 degrees Celsius

We are now coring in the Aysen Fjord. Try to find it on a map using the coordinates from above!

While out at sea it is very easy to lose your sense of time, but we know its Sunday because there were flaky croissant type pastries out for breakfast! I know you all have been curious about the food we have been eating, and so here is a break from our science discussion to talk a little about the meals on the Marion Dufresne. Meals on a ship during a research cruise are an important aspect of keeping up the good cheer. They are a much needed diversion from the hard work, and a way for everyone to socialize and bond. There is a professional chef and cooks on board that plan the menu for the 90+ people, and make sure that the meals are balanced and delicious. Everyone agrees that there is too much food, but when it is all fresh and delicious it isn't until after we've eaten that we realized that it was too much food!

Breakfast is self service between the hours of 7AM and 8:30AM, and consists of juice, coffee, tea, milk, bread/toast, cheese, cold cuts, yogurt, and cereal. We are served lunch and dinner in two shifts by waiters using the European method of serving meaning that they come to each person at the table and serve each part of the meal from a platter. Each table in the dining room has cloth table clothes and cloth napkins, and "real" plates and silverware (like at a restaurant). Lunch and dinner both have an appetizer, entrée with side dishes, and dessert consisting of a selection of cheeses (about 8 different ones) from a cheese tray, and either fruit from a basket or a bowl/plate of a dessert. Some of the foods we have eaten include dishes containing escargot, seafood (shrimp, tuna, mussels, salmon, etc), meats (beef, chicken, pork, lamb, etc) with a variety of cheese, butter, cream, or vegetable sauces. The side dishes have included a variety of potatoes, rice, mixed vegetables, and French bread (of course!).

In comparison to our meals in the United States, the lunches on board are no different than dinners in the US. In other words, we are consuming 2 dinners per day, and fortunately there are ways to work off the calories! Except for the tray of cheese and basket of fruit, none of the food during lunch or dinner has been duplicated since the beginning of the cruise! It will be tough cooking for myself when I get back home, but eating processed or fast food won't be an option after eating the meals I've been served on the Marion Dufresne!

Tuesday February 20, 2007

Hello from
45 degrees 44' S 74 degrees 17' W
Here is a brief overview of the current weather:
Air Temperature: 11.2 degrees Celsius
Wind Direction: 23 degrees

Wind Speed: 8 kts
Air Pressure: 1015.1
Humidity: 85%
Cloud Type: stratus
Percent Sky Cover: 100%
Water Temperature: 12.3 degrees Celsius

We are currently winding our way through the fjords searching for a new coring site. Attempting to find a coring site may be likened to finding a needle in a haystack if the right instruments are not used. As mentioned in a previous log, the topography of the bottoms of the ocean and the fjords is extremely variable, and the sediment depths on both are extremely variable too. With the assistance of the echo sounder we can "see" the sediment depths, and with the skills of navigation officers we can meander safely and efficiently through the ocean and fjords.

The ship is outfitted with 2 synchronous electric motors used for propulsion, and 3 diesel generators creating 8250 kWatts of electrical production capability from the diesel fuel. The use of electric motors is necessary to create a "quite" cruising environment for the echo sounder to work effectively. The vessel has the capabilities of moving at a maximum of 17 knots, but we have been cruising between 6-14 knots depending on where we are. To assist Captain Jean-Paul Hedrich and his navigation crew in their jobs, the ship is outfitted with 3 GPS satellite positioning systems, and an "ultra short baseline underwater objects" positioning system, as well as a dynamic vessel positioning system. All of this is used to keep the ship on course while cruising, and in position while coring. An amazing feat given that the vessel is 120m long!

Interesting for us (and necessary for the scientists) is that we can watch the position of the ship on nautical charts loaded on the computer system as it navigates from location to location. Of course the paper charts are still an important part of this scientific cruise. They assist the Chief Scientist and Principal Investigators in deciding on preliminary coring sites before the echo sounder gives an idea of sediment depths, and they assist the Captain and Chief Scientist in planning a course to the next coring location.

Wednesday February 21, 2007

Hello from
45 degrees 27' S 75 degrees 28' W
Here is a brief overview of the current weather:
Air Temperature: 11.7 degrees Celsius
Wind Direction: 16 degrees
Wind Speed: 22kts
Air Pressure: 1012.7
Humidity: 81%
Cloud Type: altostratus
Percent Sky Cover: 100%
Water Temperature: 14.1 degrees Celsius

We have 26 Calyspo cores, 9 Casq cores, and 6 HAPS cores now and we are making our further south via the open ocean.

You have been introduced to Dr. Catherine Kissel as the Chief Scientist of the PACHIDERME cruise, but you have not learned much about her science specialty, paleomagnetism. As a paleomagnetist, she is using magnetic properties of the sediment as tracers for paleoenvironmental changes.

The sediments are composed of about 90% clay and about 10% biogenic particles. A small fraction of particles are magnetic particles from volcanic origins on land. When the lava cools it records the Earth's magnetic characteristics, and when the volcanic material weathers and erodes, those particles from the volcanoes are carried to the sea. There are numerous volcanoes in Chile, and the offshore sediments should carry a high quantity of magnetic particles. The magnetic particles contain iron, but some don't have spontaneous magnetism where the particles respond to a magnetic, they have induced magnetism where the particles become magnetic when placed in a magnetic field.

The magnetic particles found in sediment cores will be identified and characterized as to the types (iron oxide, iron sulfide, etc), the nature (physical and chemical properties), grain size and concentration. The chemistry of the magnetic particles will help to determine the environment in which the particle formed (ex: iron sulfide is formed in an oxygen depleted area). Grain size and quantity can give an idea about the precipitation (ex: larger grains mean higher precipitation and greater amounts of erosion). A sensitive magnetometer in the lab (not on the ship) will help to determine the character of the magnetic particles.

There are two types of scientists on the PACHIDERME cruise, those studying biogenic sediments, and those studying detrital sediments. Both groups are interested in the magnetic properties of the sediments since parts of the magnetic grains are sensitive to the Earth's magnetic field when they get deposited and because the Earth's magnetic field has varied considerably with time, intensity, and also in direction. This can be used to assign a time-scale to the sediments. This is the work she is doing with Dr. Carlo Laj, the leader of the team for that topic. Working with all the scientists, you can see that Dr. Kissel has an important role not only as the Chief Scientist, but also as a key scientist on board the Marion Dufresne.

Thursday February 22, 2007

Hello from
47 degrees 54' S 74 degrees 29' W
Here is a brief overview of the current weather:
Air Temperature: 12.5 degrees Celsius
Wind Direction: 35 degrees
Wind Speed: 10 kts
Air Pressure: 1013.5
Humidity: 86 %
Cloud Type: stratus
Percent Sky Cover: 100%
Water Temperature: 12.3 degrees Celsius

We just finished coring near Seno Baker and are meandering our way to another coring site through a narrow fjord that closely resembles a canal and even has the name Messier Canal.

Here is a closer look at the composition of the sediments in those cores. Marine sediments can be classified by origin, size and distribution of the sediments. The sediments in the ocean can be classified based on their origin as detrital from terrigenous, volcanic, cosmogenic (extraterrestrial) origins, biogenous from shells of mainly planktic organisms), or hydrogenous (or authigenic) from in situ precipitation, alteration/weathering. They are classified by origin using the 30% rule, if there is more than 30% of any type of component in the sediment it will be classified as such. However, it must be kept in mind that there are no pure detrital, authigenic or biogenic sediments; sediments are always mixtures of different components.

The sediments can be further classified by size as being

gravel (pebbles, cobbles) = > 2mm, sand = 62 …m - 2 mm, silt = 4 - 62 …m, or clay = < 4 …m. The time it takes for each of these sediment sizes to sink to 4km is as follows: pebble = several hours, sand = 2 days, silt = 6 months, clay = 50 yr.

The sediments can be further classified by distribution as neritic sediments (on the continental shelves, current or wave deposited, coarse grained, accumulate very rapidly >10 cm/1000 yr); pelagic sediments (in the open ocean, fine grained, deep sea, material that is deposited from suspension fine grained, accumulate slowly 0.1 to 1 cm /1000 yr, clays & biogenic oozes); hemipelagic –(found on outer shelf and slopes, current or suspension mainly sand size or smaller 1-10 cm/1000 yr, muds).

The sedimentologists and paleoceanographers on the cruise are interested in all the sediments since the layers and composition in the sediment core can give an indication of when a past event occurred based on its placement in the core, and the microfossils present can give an indication of the past ocean conditions. High annual rainfall in the fjord region and high mean annual river discharges greatly enhance the supply of terrigenous sediment which leaves its mark in the sedimentary record. Microfossils include both the remains of microscopic organisms and small parts of larger organisms. These groups are biologically different from one another; they include single-celled protists, as well as multicellular plants and animals. The animal-like protists include foraminifera and radiolaria. The plant-like protists are diatoms, coccolithophores, and dinoflagellates. The radiolarians and diatoms have shells of silica, whereas all the other protists have shells of calcium carbonate (except dinoflagellates which produce an organic cyst). On a very general global scale, the type and percentages of each of these species can be an indication of cooler or warmer climates. Silica shells are generally associated with cooler waters, and calcium carbonate shells are associated with warmer waters. Of course it gets more complicated than this when we start to talk about why there is a preference of warm versus cold water for these protists.

More tomorrow.

Friday, February 23, 2007

Hello from
50 degrees 28' S 76 degrees 8' W
Here is a brief overview of the current weather:
Air Temperature: 10.4 degrees Celsius
Wind Direction: 322 degrees
Wind Speed: 13 kts
Air Pressure: 998.6
Humidity: 90%
Cloud Type: nimbostratus
Percent Sky Cover: 100%
Water Temperature: 11.8 degrees Celsius

We made our way through Canal Messier and are back in the open ocean in the midst of a storm that's creating 3-4 meter swells. Of course the science continues!

Here's an update on ARGOS: A signal was acquired, but has since been lost. The people at CNES are trying to determine the cause of the lost signal. There is a 2 week delay from the time the sensor gives a position out at sea to the time the position can be found on the website. ARGOS was deployed on Wednesday February 14, 2007. You can go to this website to get the data. http://www.jason.oceanobs.com/html/argonautica/donnees_2007_fr.html

So how many people does it take to run a coring operation on a 120 m vessel? Quite a few! We have 100 people on board that work in one area or another, but all work as a team to accomplish the goals of the cruise. Within a watch there is a scientist in charge, a chief of the watch, a chief of the coring deck, an MST operator, a spectrophotometer operator, 2 sedimentologists, and 8 others (including the teachers) to assist with core processing. All of the above listed positions are filled with personnel who are scientists, science technicians from the labs of the scientists, or students studying at the universities of the Principal Investigators. The scientist in charge oversees all the decisions related to the science operations such as the coring sites and the timing of all the coring operations, whereas the chief of the watch oversees the coordination of all the coring activities. The chief of the deck oversees the core processing (labeling preparing the cores for the lab, etc). The MST and spectrophotometer operators operate their instruments and help out in other areas if necessary. The sedimentologists create the core descriptions and the smear slides, and the 8 other personnel assist with core processing and anywhere else as needed. After the cores make their way back to the respective universities or labs, the scientists, technicians, and students will continue the work started on board the Marion Dufresne.

Also assisting with the functioning of the cruise are 40 others who work on the bridge navigating, on the deck with the equipment, or in the kitchen assisting with meal preparation and serving. There is also a doctor on board should anyone need one, and a number of representatives from IPEV (French Polar Institute) who assist with logistics and computer technology. Those on the bridge keep and eye of the weather using local information as well as information from the computer models developed in France, and they also plan the cruise route after obtaining the proposed coring sites from the Chief Scientists among other tasks such as maintaining the safety of all those on board. Those working on the deck have experience with all types of machinery and know all aspects of the coring equipment. When a new piece of equipment is needed or needs repairing, these workers know how to do it.

Saturday February 24, 2007

Hello from
52 degrees 45' S 73 degrees 27' W
Here is a brief overview of the current weather:
Air Temperature: 9.8 degrees Celsius
Wind Direction: 17 degrees
Wind Speed: 35 kts
Air Pressure: 1003.4
Humidity: 78%
Cloud Type: nimbostratus
Percent Sky Cover: 100%
Water Temperature: 10.1 degrees Celsius

We are currently making our way south, navigating between the open ocean and the fjords. While in Bahia Beaufort we were treated to the site of a glacier. The outstanding blue ice against the gray background of the foggy day was a feast for the eyes!

There have been questions about what people do on board the Marion Dufresne, and today's log will tell you a little about the diversions available for the scientists, staff and crew.

A 3 week cruise can be a long time to be working continuously without some way of rejuvenating your energy, and so

the Marion Dufresne offers a few amenities to help keep the energy levels up. There is an exercise room equipped with 2 stationary bicycles, a stair master, a treadmill, a weight bench, and a ping pong table. People can be found using the equipment throughout the day depending upon when their watches fall. Also there is a badminton court that has been used as an indoor soccer field! There is a tournament going on in badminton as well as soccer. So far the scientists are leading in soccer and are ready to take on the navigation crew. The badminton tournament has been going on since the beginning of the cruise, and it progresses by elimination. There are about 3 more rounds to go before the champion is crowned! All of you athletes out there need to keep in mind that it's more challenging to play these sports at sea since you have the added advantage of playing on a stable platform when you plan on land!

Also there are less active ways to spend time such as socializing in the lounge, playing darts, dominoes, Scrabble, Monopoly (French version!), cards, and other games. People can also be found reading books from their personal library or from the extensive library (almost all the books are in French), or watching a movie from the extensive movie collection. Doing laundry, although it's not a fun diversion, it is necessary given the messy nature of coring. Shopping in the ship store for ship memorabilia is another way of spending time as is catching up on emails, and taking, downloading and sharing pictures. Sometimes there are even a few that are up to some antics that keep a smile on everyone's face! Time has been passing by quickly with all there is available to do on board the Marion Dufresne along with working on the science objectives.

Sunday February 25, 2007

Hello From:
54 degrees 12' S 74 degrees 14' W
Here is a brief overview of the current weather:
Air Temperature: 7.6 degrees Celsius
Wind Direction: 47 degrees
Wind Speed: 32 kts
Air Pressure: 994.9
Humidity: 77%
Cloud Type: altostratus/stratus/nimbostratus
Percent Sky Cover: 100%
Water Temperature: 9.9 degrees Celsius

As the PACHIDERME cruise nears the end, here are a couple of notes:

1. When looking up the data from ARGOS beacon on the website (http://www.jason.oceanobs.com/html/argonautica/donnees_2007_fr.html) you need to look for beacon called "Pachiderme."

2. Logs will continue through Tuesday, and that time we will request that no additional emails be sent to coredu@marion.ipev.fr since we may not receive them. Any further questions or comments may be forwarded to Dr. Carlo Laj at Carlo.Laj@lsce.cnrs-gif.fr

Today's Log:

We are out in the open ocean near 54 degrees south and looking for another coring site before the storm hits this evening. We hope to take cover (the best we can!) in the fjord region in the area. The swells have been pretty high (3-4 m), and they are expected to get much higher when the store hits. Meanwhile the science operations continue!

This cruise has been an extra "sensory" experience in many ways. From the first day of the cruise, our senses have been stimulated with all types of sights, scents, sounds, textures, and tastes. When we left the port in Punta Arenas, we were immediately treated to the sights of the majestic fjords, a sight to behold when you're in them as opposed to looking at them on maps. As we made our way into the open ocean, there was not too much to look at other than an occasional whale spout, a few birds (petrels, albatross), a shark and other marine life. But where the ocean was lacking in objects to see, it made it for it in the colors of the water. If you can imagine every shade of blue in a crayon or colored pencil box, and then add every shade of green or brown to the blues, you will have the variety of ocean colors we've seen over the past 3 weeks. It was as if the color changed every time we looked at it given the time of day or the amount of sunlight illuminating the surface. Another sight to behold while on the ocean was the mixture of clouds: stratus, altostratus, cirrus, cirrostratus, cumulus, etc, each one alone and all of them together.

The scents on a working vessel can sometimes be pleasant such as when the kitchen is preparing a meal, and sometimes it reminds of you of hard work. There's nothing like working up an appetite and getting a whiff of fresh baked bread, a hearty stew, or a decadent dessert. On the other hand, the smell of a rotary saw on metal or the scent of diesel is enough to deter any appetite! The closest thing the scent of saw on metal reminds me of is the scent that car brakes give off when they need replacing. Now imagine that scent intensified and occurring almost every day. But ahhh, there is the pleasant scent of the sediment that's enough to please the senses of any sedimentologist! The earthy smell from the sediments is reminiscent of being outside in an open field on a rainy day, and there's nothing wrong with that.

Things that go "bump" in the night and during the day create some of the sounds heard around the ship. Many of the sounds we hear are somewhat random and there's no way to trace them to their origin. But there are other sounds that are more distinct such as the winding sound of the winch reeling in one of the corers, and grinding noise of the saw cutting the PVC core liner segments into 2 halves, the sound of the ocean and the ship battling one against the other, and then there's the clink of the silverware hitting the plates as all the hungry people on board chow down after a tough watch. Traversing through the ship are additional sounds such as that of the roar of a motor, the hiss of steam being released, and the sounds of those carrying on their tasks of cleaning the ship.

Sedimentologists rely on texture for their initial analysis of a sediment sample. Sediment grains come in different sizes, and can be recognized by feeling a sample. Anyone can feel the difference in sediment types, and in the 3 weeks of the cruise we have felt everything from sediments as smooth as butter, to sediments having the consistency of wet grainy mud. Although we may not be able to feel it, a single microscope smear slide of sediment has a plethora of microfossils and sediment particles, and so it always best to take the analysis beyond the basic touch. The ocean textures reveal the hidden energy of motion as the ship rocks and rolls with every swell or skates along as if on a sheet of ice. Fortunately for us the former hasn't been too much of the rule during this cruise.

Tastes can take us back to the sediments if we think about the way a true sedimentologist tests for texture, but here we will focus on the tastes from the galley! The meals on board the Marion Dufresne have been a gastronomic delight with each meal being an adventure from trying to read the French menu to discerning among the robust flavors in each meal. We

will not forget the array of cheeses, the baskets of fruits, the remarkable presentation of the dishes, nor the succulent flavors of the meats, fishes, and vegetables. Our meals have tantalized more senses other than that of taste; our eyes have observed the many colors, our tongues have tossed around the many textures, and our ears have heard the satisfied moans of the sated guests at each table. Compliments to the chef!

When we meet these stimuli in the future whether it's on another cruise or it's purely by happenstance, they will surely trigger our memory of the PACHIDERME cruise on the IPEV Marion Dufresne.

Monday February 26, 2007

Hello from
53 degrees 32' S 70 degrees 16' W
Here is a brief overview of the current weather:
Air Temperature: 6.3 degrees Celsius
Wind Direction: 48 degrees
Wind Speed: 36 kts
Air Pressure: 995.2
Humidity: 73%
Cloud Type: nimbostratus, altostratus, cirrostratus
Percent Sky Cover: 60 %
Water Temperature: 9.4 degrees Celsius

We are currently close to home near Punta Arenas, but we won't be going there since we will be coring through tomorrow. The expense of a cruise like this requires that the scientists maximize their time out at sea; otherwise it is money down the drain. We made it through the storm okay last night, but we didn't find any coring sites like we wanted in the open ocean of the deep south (54 degrees).

Through these logs you've heard a lot about our experiences, whether they were science related or personal. Something we didn't discuss was all the trials and tribulations of "doing" science at sea (or in the field). Because we are working with Mother Nature during the cruise, we need to take advantage of the good conditions (fair weather and calm seas) when they come, and because of this, the majority of our initial coring was done out in the ocean taking advantage of the calm seas. Using a weather report from Valparaiso and output from a weather model in England, the Captain assisted the Chief Scientist in deciding to core in the ocean before any potential storms were in our way. Storms can bring swell big swells, and although we can cruise in 10m waters, but it's impossible to core with swells of that size.

The coring sites listed in the cruise proposal written a couple of years ago were general sites selected because of information from past research cruises and collaboration with those who know about this area. While out on the ocean, using the instrumentation available such as the echo sounder, the scientists were able to discard some of the old sites from the initial proposal and replace them with new sites. But searching for a new site can be a fruitless endeavor, and after a certain number of hours the search must be abandoned in order to look for sites elsewhere. This means a scientist may not get a sediment core for one of their locations, but time is of the essence in getting to the other coring sites of the cruise plan.

Then there's the instruments, and planning for losses and downtime. We were equipped on this cruise with 5 core catchers on February 6, 2007, but over the past 3 weeks we lost 3 core catchers to the ocean. The winch can haul in a weight of 20 tons without any problems, and as the weight gets closer to 25 tons there is a potential that extreme damage could be done to the winch (the sophisticated cable system that hauls the corer back up from the ocean depths). The bolts, holding the core tube, upper end, and core catcher in place, have been calibrated to hold up to 20 tons, and after that they break, releasing the core tube, upper end, and core catcher into the ocean, and protecting the winch from damage. A situation like this arises when the sediment layers are too dense (possibly from a tephra layer), and the corer gets stuck in the sediment. The tubes can be replaced from the stock pile on board, but the core catchers are an expensive piece of equipment to replace, and once the 5 are gone, Calypso coring is done for the cruise.

It's also amazing to think about all the minor things that are needed to run the science lab out in the sea, and if those items whether it's a specific type of tape, lab supplies, storage bags, etc, are forgotten, the operations have to be altered to compensate for missing items. Fortunately the people on board are very experienced and know what's needed to complete the coring operations. When you plan for work at home, it usually isn't necessary to have 2 or more of all your supplies, but out at sea (or in the field) there are no "Home Depot's" or "Walmart's" or "Carrefour's" around the corner, and so bringing extras of supplies is usually a prudent move.

The other challenge of research out at sea (or in the field) is the amount of time it takes to test your hypothesis. The proposal for this cruise was accepted 2 years ago, and it may be another 2 years after we get back before the scientists have the completed their work and draw any conclusions about their findings. As with any science problem, there is always that outside chance that the data won't show what is hoped for, but with all the planning and research done before this cruise, it more than likely it won't happen with data gathered here. Only time will tell…

Tuesday February 27, 2007

Hello from
54 degrees 24' S 69 degrees 37' W
Here is a brief overview of the current weather:
Air Temperature: 4.3 degrees Celsius
Wind Direction: 231 degrees
Wind Speed: 9 kts
Air Pressure: 997.6
Humidity: 82%
Cloud Type: stratus/nimbostratus
Percent Sky Cover: 100%
Water Temperature: 8.2 degrees Celsius

We took our last core last night, and as a farewell on his last cruise, the Captain attached his hat to the weight on the corer. A symbolic and joyous sight for all! On our last full day of the PACHIDERME cruise we are in a fjord near Tierra del Fuego surrounded by glaciers, and working on all the reports and final statistics for the cruise including the final numbers for our treasures from the sea. Besides 35 Calypso cores, 13 Casq cores, 5 HAPS cores, and 1 Gravity Core we come to know the Southern Chilean Pacific Ocean quite intimately as we experienced the variety of her weather conditions, the energy of her waters, and the sediments on her floor. The majestic fjord region conjured up thoughts of the distant past when sights of glaciers 1000's of meters high were the norm. We are sure the sediments from the fjords will provide the clues to this glaciated past.

The PACHIDERME Cruise was an excellent example of how international collaborations can work. It's not often that scientists living thousands of kilometers from one another can work together on the same project. Their collaboration began with the writing of the proposal for this cruise a few years ago (or earlier), continued with collecting the cores on the Marion Dufresne, and will continue long after the cruise is over. We take for granted the power of the Internet to bring together people from all around the world, and here on the cruise these distant relationships were given the opportunity to meet face to face to work on similar scientific interests. We exist in a global community and there is no language barrier for understanding our Earth. We look forward to seeing/reading about the results of this cruise.

Thank you to Dr. Kissel, Dr. Laj, all the scientists, and the crew of the Marion Dufresne for sharing their world with 4 teachers. We will long remember all that has transpired over the past 3 weeks, and our students will be the recipients of the rewards of our experience.

Good Bye, Adios, au revoir…

The Core Education Team
(Missy Holzer, Erika Gutierrez, Edith Poblete, Luis Pinto and Carlo Laj)

EGU General Assembly 2009

Check the meeting programme

See at
http://www.the-eggs.org/news.php?id=583&typeid=1
for some of the special events that will take place during the Vienna 19-24 April 2009 General Assembly

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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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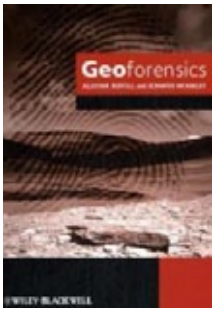
www.imaggeo.net

Applied Geostatistics with SGeMS

Authors: Nicolas Remy, Alexandre Boucher, Jianbing Wu
Publisher: Cambridge University Press
ISBN: 9780521514149
YEAR : 2009
EDITION : 1st
PAGES : 264
PRICE : 57.00 €
Hardback

The Stanford Geostatistical Modeling Software (SGeMS) is an open-source computer package for solving problems involving spatially related variables. It provides geostatistics practitioners with a user-friendly interface, an interactive 3-D visualization, and a wide selection of algorithms. This practical book provides a step-by-step guide to using SGeMS algorithms. It explains the underlying theory, demonstrates their implementation, discusses their potential limitations, and helps the user make an informed decision about the choice of one algorithm over another. Users can complete complex tasks using the embedded scripting language, and new algorithms can be developed and integrated through the SGeMS plug-in mechanism. SGeMS is the first software to provide algorithms for multiple-point statistics, and the book presents an up-to-date discussion of the corresponding theory and applications. Incorporating a CD-ROM with SGeMS software, this book is an essential user-guide for Earth Science graduates and researchers, as well as practitioners of environmental, mining and petroleum engineering.

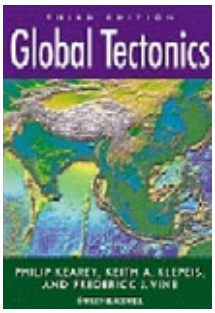
Geoforensics



Authors: Alastair Ruffell and Jennifer McKinley
Publisher: Wiley-Blackwell
ISBN: 9780470057353
YEAR : 2008
EDITION : 1st
PAGES : 332
PRICE : 36.00 €
Paperback

This book is a comprehensive introduction to the application of geoscience to criminal investigations. Clearly structured throughout, the text follows a path from the large-scale application of remote sensing, landforms and geophysics in the first half to the increasingly small-scale examination of rock and soils to trace amounts of material. The two scales of investigation are linked by geoscience applications to forensics that can be applied at a range of dimensions. These include the use of topographic mapping, x-ray imaging, geophysics and remote sensing in assessing whether sediment, rocks or concrete may have hidden or buried materials inside for example, drugs, weapons, bodies. This book describes the wider application of many different geoscience-based methods in assisting law enforcers with investigations such as international and national crimes of genocide and pollution, terrorism and domestic crime as well as accident investigation. The text makes a clear link to the increasingly important aspects of the spatial distribution of geoscience materials (be it soil sampling or the distribution of mud-spatter on clothing), Geographic Information Science and geostatistics. * A comprehensive introduction to the application of geoscience to criminal investigation * Examples taken from an environmental and humanitarian perspective in addition to the terrorist and domestic criminal cases more regularly discussed * A chapter on the use of GIS in criminalistics and information on unusual applications and methods - for example underwater scene mapping and extraterrestrial applications * Material on how geoscience methods and applications are used at a crime scene * Accompanying website (www.wileyeurope.com/college/ruffell)including key images and references to further material * An invaluable text for both undergraduate and postgraduate students taking general forensic science degrees or geoscience courses.

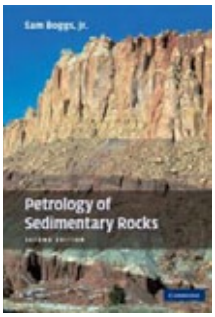
Global Tectonics



Authors: Philip Kearey, Keith A. Klepeis and Frederick J. Vine
Publisher: Wiley-Blackwell
ISBN: 9781405107778
YEAR : 2009
EDITION : 3rd
PAGES : 482
PRICE : 39.00 €
Paperback

The third edition of this widely acclaimed textbook provides a comprehensive introduction to all aspects of global tectonics, and includes major revisions to reflect the most significant recent advances in the field. It is a fully revised third edition of this highly acclaimed text written by eminent authors including one of the pioneers of plate tectonic theory. Major revisions to this new edition reflect the most significant recent advances in the field, including new and expanded chapters on Precambrian tectonics and the supercontinent cycle and the implications of plate tectonics for environmental change. It combines a historical approach with process science to provide a careful balance between geological and geophysical material in both continental and oceanic regimes.

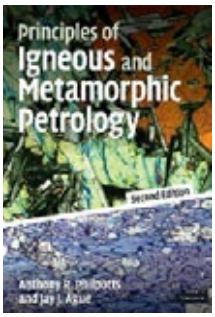
Petrology of Sedimentary Rocks



Authors: Sam Boggs, Jr.
Publisher: Cambridge University Press
ISBN: 9780521897167
YEAR : 2009
EDITION : 2nd
PAGES : 600
PRICE : 77.00 €
Hardback

This textbook outlines the physical, chemical, and biologic properties of the major sedimentary rocks, as revealed by petrographic microscopy, geochemical techniques, and field study. It covers the mineralogy, chemistry, textures, and sedimentary structures that characterise sedimentary rocks, and relates these features to the depositional origin of the rocks and their subsequent alteration by diagenetic processes during burial. In addition to detailed sections on siliciclastic and carbonate rocks, it also discusses evaporites, cherts, iron-rich sedimentary rocks, phosphorites, and carbonaceous sedimentary rocks such as oil shales. This second edition maintains the comprehensive treatment of sedimentary petrography and petrology provided in the first edition, and has been updated with new concepts and cutting-edge techniques like cathodoluminescence imaging of sedimentary rocks and backscattered electron microscopy. It is ideal for advanced undergraduate and graduate courses in sedimentary petrology, and is a key reference for researchers and professional petroleum geoscientists.

Principles of Igneous and Metamorphic Petrology



Authors: Anthony R. Philpotts and Jay J. Ague
Publisher: Cambridge University Press
ISBN: 9780521880060
YEAR : 2009
EDITION : 2nd
PAGES : 667
PRICE : 69.00 €
Hardback

This textbook provides a basic understanding of the formative processes of igneous and metamorphic rock through quantitative applications of simple physical and chemical principles. The book encourages a deeper comprehension of the subject by explaining the petrologic principles rather than simply presenting the student with petrologic facts and terminology. Assuming knowledge of only introductory college-level courses in physics, chemistry, and calculus, it lucidly outlines mathematical derivations fully and at an elementary level, and is ideal for intermediate and advanced courses in igneous and metamorphic petrology. The end-of-chapter quantitative problem sets facilitate student learning by working through simple applications. They also introduce several widely-used thermodynamic software programs for calculating igneous and metamorphic phase equilibria and image analysis software. With over 350 illustrations, this revised edition contains valuable new material on the structure of the Earth's mantle and core, the properties and behaviour of magmas, recent results from satellite imaging, and more.

Microbial Oceanography: Genomes to Biomes - (Course)

06/08/2009 - 00/00/0000 - The University of Hawaii

The Center for Microbial Oceanography: Research and Education (CMORE) with support from the Agouron Institute

http://cmore.soest.hawaii.edu/agouron/2009/

[writer info:]

Matthew Church, Department of Oceanography, University of Hawaii, 1000 Pope Road, Honolulu, HI. 96822 USA. mjchurch@hawaii.edu

Advanced training course on land remote sensing - (Course)

28/06/2009 - 03/07/2009 - Prague, Czech Republic

The second ESA advanced training course on land remote sensing will be held in Prague, Czech Republic, from 28 June to 3 July 2009.

It will be hosted by the Charles University and Czech Technical University, and organised by the Czech Space Office and ESA.

PhD students, post-doctoral and research scientists from Europe (ESA and EU member states), and Canada interested in land remote sensing applications are invited to apply to the 6 day advanced training course on the subject. The on-line application form is available at the following web address:

http://earth.esa.int/landtraining09/application.html

The deadline for applications is 28 February 2009.

Hosted by the Charles University and Czech Technical University and organised by the Czech Space Office and ESA.

http://earth.esa.int/landtraining09/

Cargese International School - (Course)

14/09/2009 - 26/09/2009 - Cargese, Corsica (France)

MAIN TOPICS AND COURSES:

Observations (Satellite instruments, in-situ and remote measurements of water vapour and chemical compounds, clouds in the UT/LS, data evaluation).

Water vapour in the climate system (Role in the radiative processes, dynamical role in the mid-latitudes and in tropics.

Supersaturation processes and the generation of cirrrus clouds.

Processes determining the distribution of water vapour in the free atmosphere (long-range transport, coupling with convection, dehydration at the tropical tropopause).

Modelling water vapour (parameterizations, transport, assimilation of water vapour data, future evolution under climate change).

CONFIRMED SPEAKERS

R. Allan (Univ. Reading), W. Bell (ECMWF) , S. Fueglistaler (Univ. Cambridge), F. Fierli (CNR/Bologna), W. Lahoz (NILU), B. Legras (LMD/IPSL), E. Moyer (U. Chicago), T. Peter (ETH Zurich), R. Roca (LMD/IPSL), W. Randel (NCAR), K. Rosenlof (NOAA), C. Schiller (FZ Julich), S. Sherwood (Univ. Sydney), H. Tost (MPI Mainz).

PURPOSE

Water vapour is a key component of the climate system. It is the most potent greenhouse gas, and its condensed forms (liquid and ice) exert a profound influence on both incoming solar and outgoing infrared radiation. Climate models find that predictions of climate change are very sensitive to water vapour and cloud feedback: water vapour feedback alone doubles the effect of an increase in other greenhouse gases. But there is considerable uncertainty in these calculations: the water vapour feedback occurs mainly in the upper part of the troposphere where there is no physical link between water vapour and temperature. Climate models tend to suggest that the relative humidity of the upper troposphere will remain unchanged in a warmer world (so that the absolute humidity will increase) but since they do not represent explicitly the processes whereby water vapour gets to those altitudes this result is uncertain. A better understanding of the distribution of atmospheric humidity, and the processes that control it above the boundary layer, is therefore of primary importance in climate research. Water vapor is also, by its presence or its absence, an important component of atmospheric chemistry. The fact that the stratosphere is very dry, with only 4 to 6 water molecules per million, is essential in the ozone chemistry. Although modelling of the future evolution of the stratosphere is still in its infancy, variations of vapour water are likely to be a determining factor and the available records already display signs of a recent evolution. The entry of water vapour in the stratosphere is governed by processes occuring in the region of the tropical tropopause which are strongly coupled with tropical convection. The goal of the school is to present a comprehensive overview of the state_of-the-art and recent progresses in the observation, assimilation and understanding of the distribution of atmospheric water vapour and its role in the climate system.

The main lecture courses will be complemented by tutorials, sessions of questions and anwers, theme discussions and poster presentations. The course is aimed primarely at PhD students, postdocs and other young scientists wishing to broaden and deepen their knowledge or to identify new research opportunities.

Registration deadline is 4 May 2009.

COST ACTION ES0604 (http://www.isac.cnr.it/wavacs)

WATER VAPOUR IN THE CLIMATE SYSTEM

http://www.lmd.ens.fr/wavacs

F. Fierli (CNR, Italy), W. Lahoz (NILU, Norway), B. Legras (ENS, France), L. Moyer (U. Chicago, USA)

http://www.lmd.ens.fr/wavacs/

Measurements and Modeling in the Pacific Northwest – Research Experience for Undergraduates - (Course)

28/05/2009 - 31/07/2009 - Pullman, Washington, United States

The Laboratory for Atmospheric Research at Washington State University is seeking motivated undergraduate students interested in atmospheric science to participate in a summer Research Experience for Undergraduates (REU) Program supported by the National Science Foundation. The program will run from May 28 to July 31, 2009, on the campus of Washington State University in Pullman, WA.

Our program will provide an intensive hands-on summer research experience for undergraduate students at all levels with an interest in atmospheric science and air quality engineering using advanced instrumentation and modeling tools. In particular, students will have access to a new mobile laboratory facility, the Mobile Atmospheric Chemistry Laboratory (MACL). This facility consists of a custom built mobile trailer instrumented with gas, particle, and meteorological instrumentation to study atmospheric and aerosol chemistry. Faculty and other mentors will provide one-on-one research training, and a series of workshops will be offered to familiarize students with the fundamental concepts of atmospheric chemistry and its most common research tools.

Participants will receive a stipend plus all housing and travel costs.

Pullman WA is located in the rolling hills of the Palouse, on the eastern edge of the state. It is located 1.5 hours south of Spokane, WA, and 2.5 hours from a Department of Energy government research Laboratory (Pacific Northwest National Laboratory). Pullman is also conveniently located near outdoor activity opportunities such as hiking, biking, fly fishing, and kayaking. Popular destinations including Hells Canyon (ID), the Blue Mountains (OR), and the Columbia River (WA/OR).

A goal of this program is to select a student group that reflects diversity in terms of ethnicity and gender, and includes students that would not otherwise have exposure to research. Freshman and sophomore undergraduates are especially encouraged to apply.

Additional details about the program and application materials are available at:

http://lar.wsu.edu/research/undergrad-opportunities.html

Deadline for receipt of applications is February 27, 2009.

Laboratory for Atmospheric Research
Dept. of Civil and Environmental Engineering
Washington State University, Dana Hall 104
Pullman, WA 99164-2910
http://lar.wsu.edu/

Climatic Change and Impacts on Natural and Protected Areas - (Course)

07/09/2009 - 11/09/2009 - L'Aquila, ITALY

The purpose of the summer school is to revisit the concepts and ideas of a previous workshop held almost 10 years ago, about Global Change and Protected Areas (september 1999 in L'Aquila), to assess progress that has been made in our scientific ability to generate detailed climate projections at the regional scale that are of use to impact modelers, stakeholders and decision-makers working in the context of protected natural areas.

The main objective of the school are thus to provide the students with an insight into climate and impacts modeling techniques, as well as environmental monitoring and decision-makingstrategies for regionsthat are not always easily accessible and rich in data. There will be ample opportunity to sample interdisciplinary aproaches to complex environmental problems and to exchange ideas and questions between the lecturers and the students.

For further information, please contact us at: issaos@aquila.infn.it

Registration Includes: attendance to lectures, notes, coffee breaks and an all-day excursion through the suggestive landscapes of the Gran Sasso-Monti della Laga National park The application form should be submitted online through the ISSAOS 2009 website: http://cetemps.aquila.infn.it/issaos

DIRECTOR OF THE SCHOOL Prof. Martin Beniston, University of Geneva

LOCAL ORGANIZING COMMITEE Barbara Tomassetti, Marco Verdecchia, Valentina Colaiuda, Guido Visconti, CETEMPS - University of L'Aquila.

CETEMPS - Center of Excellence for the Forecast of Severe Weather by Remote sensing and Numerical Modelling
University of L'Aquila
http://cetemps.aquila.infn.it/issaos

ISSAOS 2009 - International Summer School on Atmospheric and Oceanic Sciences
CETEMPS c/o Dipartimento di Fisica
Università degli Studi dell\'Aquila
via Vetoio, 1 (loc. Coppito)
67010 - L\'Aquila, ITALY
email: issaos@aquila.infn.it

3rd International Conference on Sustainable Energy & Environmental Protection (SEEP) - (Meeting)

12/08/2009 - 15/08/2009 - Dublin, Ireland

The Sustainable Energy and Environmental Protection conference provides a forum for both researchers and practitioners around the world to present papers on recent developments in the fields of Sustainable Energy and Environmental Protection. The organising committee of the conference invites papers from researchers and practitioners from academic as well as industry within the scope of the conference subjects.

The scope of SEEP conference "previously VAFSEP" is broad within sustainable energy and environmental protection. The conference particularly welcome papers related to industrial based projects.

Sponsored prizes, will be awarded for the best papers presented by graduate students. Judges will decide on the awards

based on the quality of both the written paper, and the presentation.

An exhibition will be organised in parallel with the SEEP'09 conference. In addition, workshops for young researchers will be arranged. Prospective speakers are requested to indicate their willingness to deliver their 45 minute lecture topic.

Interested contributors are requested to submit abstract(s) of up to 200 words, along with the completed preliminary registration form.

Important Dates:
Receipt of Abstracts: 28/02/2009
Notification of Acceptance: 10/03/2009
Receipt full paper: 20/05/2009

School of Mechanical & Manufacturing Engineering
Dublin City University,
http://www.dcu.ie/conferences/seep/

Call for Papers for the Ninth International Conference on the Mediterranean Coastal Environment - (Meeting)

10/11/2009 - 14/11/2009 - Sochi, Russia

MEDCOAST conferences always aim to achieve high levels of scientific, professional qualities and follow peer-reviewed processes for abstract selection and manuscript acceptance.

TOPICS OF MEDCOAST 2009

* Coastal Systems, Ecosystems, Conservation Issues
* Integrated Coastal Management
* Coastal Management Issues
* Sustainable Developement of Coastal Areas
* Coasta lEngineering, Modelling, Decision Support Systems and Data Management

POSTER SESSION

Certain topics may be better presented in the MEDCOAST 2009 Poster Session. If you wish to make a poster presentation, please so indicate in your abstract.

Prospective Poster Session participants should submit proposals to MEDCOAST 2009 Conference, in the same way as the oral presentations by using the abstract format described opposite, clearly indicating that a poster paper is proposed.

A poster competition will take place and a jury will review and evaluate all poster presentations. Best Poster Prizes will be given during the Closing Session to the winners of the competition.

GUIDELINES FOR ABSTRACT SUBMISSION

Abstracts for MEDCOAST 2009 Conference must be submitted to the MEDCOAST Secretariat no later than 20 April 2009. They should be limited to single-spaced one page at the maximum, and list the names, titles, affiliations, mailing addresses, telephone and facsimile numbers, and e-mail addresses of each author.

Abstracts should be sufficiently informative and must summarise the major theme, findings and conclusions of the paper to be presented in the conference. The last name of each author and co-author(s) should be underlined. In the upper right hand corner of the first page, one of the topics of MEDCOAST 2009 Conference, which is addressed by your paper, must be indicated. If necessary, you may use another topic that is not on the list. In case the paper is co-authored, please indicate at the end of the abstract, the person who will present the paper at the conference.

Abstracts may be submitted by mail, e-mail or fax. However, a soft copy will be requested from the authors of the selected abstracts who have not used e-mail at the initial submission.

Notification of acceptance of the paper presentation, together with the format for preparation of manuscripts and submission instructions, will be e-mailed (or faxed if required) to the first authors from the MEDCOAST Secretariat by 11 May 2009. The final manuscript, prepared in full accordance with the instructions, must be sent by 14 September 2009, in soft copy by e-mail and also by post in a CD from accepted authors for inclusion in the Conference Proceedings.

The Program Committee and the MEDCOAST Secretariat will accept or reject papers based on the information in the abstracts and will assign accepted papers to appropriate poster and oral sessions. The final selection of a paper for inclusion in the conference program and in the proceedings will be made on the basis of peer-reviewing the submitted manuscript.

DEADLINES

Abstract submission: April 20, 2009
Acceptance notification: May 11, 2009
Manuscript submission: September 14, 2009

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Mechanisms of Quaternary Climate Change: Stability of Warm Phases in the Past and in the Future - (Meeting)

06/06/2009 - 09/06/2009 -
Universitätszentrum Obergurgl, Austria

There is an urgent need to predict more accurately how global climate is likely to react to increased emissions of greenhouse gases as a result of human activities. In order to predict the future, it is necessary to determine how global climate has responded during the past to natural variations in forcing factors such as changes in solar input and in the earth's orbital parameters during climatic periods similar to the present. It is well known that millennial scale oscillations have occurred over the last 8000 years, resulting in an advance and retreat of mountain glaciers. The causes for this variability are however poorly understood and a deeper knowledge of the problem requires

an integrated approach through the study of several archives and above all the comparison with previous interglacials.

The difference between past interglacials, their climatic stability, as well as the interaction with polar ice sheets and with the biosphere will be addressed during this conference for a better understanding of future climate. Young scientists from European countries will be therefore exposed to an area of science of paramount importance for the society of tomorrow. The topic treated is timely and relevant, also considering the future implications of the Kyoto Protocol and end of field campaigns associated to the International Polar Year (2007-2008).

This conference is based on the outstanding knowledge acquired during decades of fruitful research programs and it will go a step further in integrating European and international research groups in the field of palaeoclimatology. It will cover several complementary disciplines in the field of climate change and will also aim to involve scientists of other disciplines closely related to climate changes, such as socio-economics and politics. It is therefore perfectly suited to a large variety of researchers.

Closing date for application (as well as for abstract submission): 02 March 2009

ESF-FWF in Partnership with LFUI. With support from European Project for Ice Coring in Antarctica
http://www.esf.org/conferences/09285

CALL FOR ABSTRACTS TO IAGA Session III.01 - (Meeting)

23/08/2009 - 30/08/2009 - Sopron, Hungary

Call for abstracts to “Magnetopause and magnetosheath processes: reconnection, diffusion and boundary dynamics” IAGA Session III.01, August 23-30 2009, Sopron, Hungary.

The magnetopause and its boundary layers are the prime sites of mass, momentum and energy transfer from the solar wind into the magnetosphere. Understanding the physics of these processes is central to magnetospheric physics. Observations of these regions are continuously ongoing owing to several dedicated spacecraft missions. Space data are further supported by observations from ground based observatories. New progresses in simulations (MHD, hybrid and kinetic) and theoretical knowledge allow the physics of reconnection and boundary layer processes to be elucidated as never before.

This session invites contributions on a wide range of magnetopause-related topics, including observations of the structure of the magnetopause current layer, its boundary layers and their transient variations, the signatures of the various forms of plasma interactions, such as magnetic reconnection, and their relevance to solar wind-magnetosphere coupling. The basic physics of reconnection, plasma diffusion and boundary layer formation at the magnetopause, as well as the magnetosheath processes that influence magnetopause dynamics are highly relevant.

Programme (Monday 24 August): Four 1.5-hour oral sessions + 2-hour poster session. Each oral session consists of an invited talk (30 min) and four contributed talks (15 min).

Invited speakers: Marit Oieroset, University of California, Berkeley, USA Antonius Otto, University of Alaska Fairbanks, USA Alessandro Retino, Space Research Institute, Graz, Austria Lisa Rosenqvist (TBC), Swedish Institute of Space Physics, Uppsala, Sweden Contributions for oral and poster presentations are now solicited.

Important deadlines: Abstract submission: April 15, 2009 (online) or March 31, 2009 (post) Grant application: March 31, 2009

Conveners: Claire Foullon, University of Warwick, United Kingdom (claire.foullon@warwick.ac.uk) Charles J. Farrugia, University of New Hampshire, USA (charlie.farrugia@unh.edu) Benoit Lavraud, Centre d’Etude Spatiale des Rayonnements - CNRS, Toulouse, France (benoit.lavraud@cesr.fr)

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

International Association of Geomagnetism and Aeronomy (IAGA)
http://www.iaga2009sopron.hu

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

AMMA: 3rd International Conference - 2nd Announcement - Call for abstracts - (Meeting)

20/07/2009 - 24/07/2009 - Ouagadougou, Burkina Faso

The 3rd AMMA conference aims to bring together researchers from around the world working on WAM processes, predictability and climate change issues as well as on society-environment-climate interactions, to review ongoing research activities and to discuss future contributions and directions within the AMMA programme. It provides an ideal opportunity to broadcast the new knowledge towards a larger community. In this regard, the location of Ouagadougou echoes the objective of raising awareness among regional organisations on the research issues tackled in AMMA.

Three main themes have been selected together with a few sub-themes highlighting the topics to be covered in the conference:

1. Predictability of the West African Monsoon Weather, Climate and Impacts.
2. Society Environment Climate Interactions.
3. West African Monsoon System including atmospheric, oceanic, hydrology and biophere Processes.

The different sessions will promote multidisciplinary approaches to address the geophysical and societal dimensions of AMMA’s major scientific objectives. Mornings will be dedicated to plenary sessions accessible to a wide audience and will include solicited and contributed oral presentations. In the afternoons, parallel sessions will be dedicated to more focused issues and to discussions. Special emphasis will be given to poster sessions which will be used to motivate discussion in the conference. The poster exhibition will be installed all week long to host more focused sessions.

Important dates

Abstract submission deadline: 12 March 2009
Acceptence of abstracts: 15 April 2009
Registration closing: 31 May 2009

Abstracts are to be submitted online following specifications and templates given on the conference webpage. English and French are the conference languages. Abstracts and presentation slides will be required in English. Oral presentations will be given either in English or in French.

www.amma-international.org

Space Climate School and Space Climate Symposium 3 - (Meeting)

15/03/2009 - 22/03/2009 - Saariselkä, Finnish Lapland

The Local Organizing Committee is pleased to announce that Space Climate School and Space Climate Symposium 3 are to be held in Saariselkä, Finnish Lapland, Finland, in March 15-18, 2009 (School) and in March 18-22, 2009 (Symposium). Space Climate School aims to introduce under-graduate and post-graduate students, young space researchers and any other interested to the basics of the key topics of Space Climate, including Earth's climate and Sun-climate relations, in a friendly, encouraging and inspiring atmosphere.

Lecturers include, e.g., J. Beer, J. Haigh, D. Marsh, A. Ferriz Mas, J. Moore, K. Mursula, E. Priest, E. Rodríguez Camino, W. Schmutz and I. Usoskin.

Space Climate Symposium review speakers include, e.g., P. Charbonneau, K. Georgieva, A. Kosovichev, D. Nandi, V. Obridko, E. Priest, J.-P. Rozelot, A. Rouillard, A. Ruzmaikin, N. Shaviv, E. Smith, S. Solanki, B. Tinsley, and B. Tsurutani.

Important Dates: Early registration and hotel special price deadlines are 31 December, 2008. Welcome to Lapland!

Sincerely Yours, Kalevi Mursula for the LOC

University of Oulu
http://spaceweb.oulu.fi/spaceclimate/
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7th International Planetary Probe Workshop (IPPW-7) - (Meeting)

13/06/2009 - 19/06/2009 - Barcelona, Spain

The goal of the workshop is to bring together scientists, technologists, engineers, mission designers, and policy makers interested in the exploration of solar system bodies with atmospheres that allow the use of probes with parachutes. The workshop covers the technological challenges and scientific opportunities associated with entry, descent, landing and flight in planetary atmospheres.

The 7th workshop will build on the success of the previous workshops, to promote international cooperation in probe missions to solar system moons and planets with atmospheres, and to provide the opportunity for students – the next generation of planetary scientists – as well as spacecraft engineers, technologists, mission planners, and policy makers to participate in these endeavours.

The list of session topics includes:
• outlook for probe missions,
• probe mission concepts, ongoing studies and in situ elements,
• planetary entry sensors,
• payloads and systems,
• science from entry and descent probes,
• landing issues, target selection and trajectory reconstructions,
• EDL technology developments; new technologies,
• high mass EDL technologies, and
• drag, aerobraking and aerocapture techniques.

The world's space community is focused on expanding our knowledge of planetary atmospheres and their moons, along with comets and asteroids. The year 2009 has been designated the International Year of Astronomy and will see recent results from the Phoenix Mars mission, the launch of the Mars Science Laboratory, and the imminent (2010) return of Hayabusa. Developments under way include Phobos-Grunt, ExoMars and the Orion Crew Exploration Vehicle. Proposals and studies of relevance to IPPW7 include the international Mars Sample Return programme, MarsNEXT, technology developments for future probes, outer planet probe missions (e.g. to Saturn, Titan, and Neptune), the Marco Polo asteroid sample return, Mars Scout concepts, future missions to Venus, and New Frontiers and Discovery missions. The 7th International Planetary Probe Workshop is a timely event that welcomes your participation.

In addition to the five-day workshop, a two-day short course is normally held on a related topic during the preceding weekend. The topic selected for IPPW7 is Planetary Protection (13-14 June 2009).

The long-standing goals of the International Planetary Probe Workshops are:
• To Review the state-of-the-art in science, mission design, engineering implementation and technology for the in situ robotic exploration of planets and satellites with atmospheres.
• To Share ideas, mission opportunities, and emerging technologies to enable future mission success.
• To Serve as a forum for discussions on innovative methodologies and techniques for upcoming probe missions.
• To Attract young scientists and engineers to the field of entry, descent and flight in planetary atmospheres, enabling them to learn from experienced researchers and practitioners.
• To Foster international collaboration among the communities of scientists, engineers, and mission designers interested in planetary probes.

Al Seiff Award: The Alvin Seiff Award is bestowed annually to an individual by the International Organizing Committee of the International Planetary Probe Workshop. The Award recognizes an individual's outstanding contributions to the technology or science or mission planning for the advancement of knowledge of planets or moons in the solar system by the use of atmospheric probes during their entry, descent and landing.

It also recognizes the individual's mentoring of younger engineers and scientists. These traits are those for which Seiff was legendary in his pioneering of our field. Nominations for the Al Seiff Award may be submitted using the form to be made available on the IPPW-7 website.

Venue: IPPW7 will be held at the Alimara Hotel, Barcelona, Spain. The Short Course on Planetary Protection will be held at the Cosmocaixa Science Centre, Barcelona.

Banquet: The IPPW-7 Banquet will be held on the Wednesday evening, 17 June 2009

Registration: Separate registration and fees will be required for the Short Course and Workshop. Discounts will apply for early registration and student participants.

E-Mail: info@planetaryprobe.eu

Lodging: Available on-site at Alimara Hotel, and at nearby international student residence, Agora.

http://www.planetaryprobe.eu/

CALL FOR PAPERS: IAGA 2009, Session IV.01 - (Meeting)

23/08/2009 - 30/08/2009 - Sopron, Hungary

CALL FOR PAPERS: IAGA 11th Scientific Assembly, Session IV.01: "New Solar and Interplanetary Results", Sopron, Hungary, August 23-30, 2009.

Continuous observations from solar and heliospheric missions have been advancing our knowledge of the physical and dynamical properties of the Sun and the solar wind. These observations, along with theory and models, continue to advance and pose challenges on our understanding of the responsible physical processes.

This session invites contributions covering new results from observations from space and ground-based observatories, theory and modeling of different aspects of the Sun and the heliosphere, including its interior, extended atmospheres and the solar wind. This session is aimed at stimulating exchange and promoting discussion on the recent developments derived from observations and latest research in the field.

Abstract submission deadline: April 15, 2009 (online) or March 31, 2009 (post)

Deadline for application for grant: March 31, 2009

Meeting website: http://www.iaga2009sopron.hu

Convener: Yuan-Kuen Ko Naval Research laboratory Code 7674, 4555 Overlook Ave., SW, Washington DC, 20375, USA tel: +1 202 767-6199, fax: +1 202 404-7997, yko@ssd5.nrl.navy.mil

Co-convener: Michael L. Kaiser NASA Goddard Space Flight Center, Code 674, Greenbelt, MD 20771, USA Michael.Kaiser@nasa.gov

Co-convener: Takashi Sekii National Astronomical Observatory of Japan, Mitaka, Tokyo 181-8588, Japan sekii@solar.mtk.nao.ac.jp

Co-convener: Robert F. Wimmer-Schweingruber Institut fuer Experimentelle und Angewandte Physik University of Kiel, Leibnizstrasse 11, D-24118 Kiel, Germany wimmer@physik.uni-kiel.de

Local Organizing Committee of the IAGA 11th Scientific Assembly

http://www.iaga2009sopron.hu

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iLEAPS and GEWEX Parallel Science Conferences with joint sessions - (Meeting)

24/08/2009 - 28/08/2009 - Melbourne, Australia

The IGBP Integrated Land Ecosystem-Atmospheric Processes Study (iLEAPS) and the WCRP Global Energy and Water Cycle Experiment (GEWEX) core projects are organizing Parallel Science Conferences with joint sessions.

The organizations are also arranging an Early Career Scientist Workshop (ECSW) with state-of-the-art keynote presentations and, for example, training in communicating science to media and policy makers. Parallel iLEAPS and GEWEX Science Conferences: 24-28 August 2009, Melbourne, Australia, at Sofitel Hotel in Melbourne. Early Career Scientist Workshop: 20-22 August 2009, Melbourne, Australia, at the Melbourne University.

DEADLINE FOR ALL ABSTRACT SUBMISSIONS: 15 March 2009. Parallel Science Conferences` abstract submission web page:

http://www.gewex.org/2009gewex_ileaps_conf_abstracts.html. ECSW abstract submission web page can be found at:

http://www.ileaps.org/ecsw/ and registration web page is:

http://www.ileaps.org/ecsw/index.php?option=com_chronocontact&chronoformname=registration_to_ecsw

The overall theme of the Parallel Science Conferences is Water in a Changing Climate - Progress in Land-Atmosphere Interactions, Biogeochemical/Energy/Water Cycles. The parallel conferences will have three joint sessions that broadly cover the following themes:

- Land in the climate system
- Aerosol, cloud, precipitation, climate interactions
- Future generation of integrated observation and modelling systems For more information, please go to the Parallel Conferences` website at

http://www.gewex.org/2009gewex_ileaps_conf.html. More information on the Early Career Scientist Workshop is available at the iLEAPS Melbourne events website at

http://www.ileaps.org/science_conf_2009/ and ECSW website at http://www.ileaps.org/ecsw/.

The IGBP Integrated Land Ecosystem-Atmospheric Processes Study (iLEAPS) and the WCRP Global Energy and Water Cycle Experiment (GEWEX) core projects

http://gewex.org/2009gewex_ileaps_conf.html

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38th Scientific Assembly of the Committee on Space Research (COSPAR) - (Meeting)

18/07/2010 - 25/07/2010 - Bremen, Germany

Abstract Deadline: 19 February 2010

Topics: Approximately 90 meetings covering the fields of COSPAR Scientific Commissions (SC) and Panels:

- SC A: The Earth's Surface, Meteorology and Climate
- SC B: The Earth-Moon System, Planets, and Small Bodies of the Solar System
- SC C: The Upper Atmospheres of the Earth and Planets Including Reference Atmospheres
- SC D: Space Plasmas in the Solar System, Including Planetary Magnetospheres
- SC E: Research in Astrophysics from Space
- SC F: Life Sciences as Related to Space
- SC G: Materials Sciences in Space
- SC H: Fundamental Physics in Space
- Panel on Satellite Dynamics (PSD)
- Panel on Scientific Ballooning (PSB)
- Panel on Potentially Environmentally Detrimental Activities in Space (PEDAS)
- Panel on Radiation Belt Environment Modelling (PRBEM)
- Panel on Space Weather (PSW)
- Panel on Planetary Protection (PPP)
- Panel on Capacity Building (PCB)
- Panel on Education (PE)
- Panel on Exploration (PEX)
- Special events: Interdisciplinary lectures, space agency round table, etc.

Committee on Space Research (COSPAR)
http://www.cospar-assembly.org/

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Modern Challenges in Nonlinear Plasma Physics: A Conference Honoring the Career of D. Papadopoulos - (Meeting)

15/06/2009 - 19/06/2009 - Sani Resort, Greece

Third Announcement

This meeting brings together physicists from three different communities (geospace, lab, solar) to review the recent progress in nonlinear plasma processes and chart the exciting future of these disciplines and their applications. The program includes a number of review talks by acclaimed specialists in these fields (listed below). Proceedings of the conference will be published. For more information please consult the website of the meeting or contact one of the organizers.

Young scientist travel support: while the meeting is open to everyone, postdocs and graduate students are particularly encouraged to attend and apply for travel support. A limited amount of partial travel support (accommodation and/or registration) has been set aside. Please contact the organizers by February 28.

Themes:

1. Building blocks of nonlinear plasmas (Particle acceleration; beam-plasma interactions; nonlinear waves; plasma radiation)
2. Meso- and macroscale structures: formation and stability (Nonlinear evolution of instabilities; magnetic reconnection; turbulence and intermittency; maser mechanisms; hysteresis and storage-release processes in space and lab plasmas; large-scale coherence)
3. Dynamic and interacting plasmas (Multiscale coupling in space and lab plasmas; bursty flows and transitions to turbulence; plasma interaction with solid and magnetic barriers; cascades and power-law regimes)
4. Revealing plasma structure via active experiments (tether and sheath electrodynamics; dusty plasmas; wave excitation and transmission; ionospheric modification)

Invited speakers (confirmed):

V. Angelopoulos, M. Ashour-Abdalla, D.N. Baker, M. Balikhin, R. Bingham, S.V. Bulanov, C.-L. Chang, S.C. Chapman, J. Chen, R.O. Dendy, J.F. Drake, G. Ganguli, W. Gekelman, S. Ghosh, M.L. Goldstein, C.C. Goodrich, W. Horton, U.S. Inan, M.E. Koepke, S.M. Krimigis, M. Lampe, A.T.Y. Lui, G. Milikh, E. Mishin, Y. Omura, G.K. Parks, J.S. Pickett, E. Priest, T. Pulkkinen, R. Sagdeev, M. Scholer, A.S. Sharma, P. Sprangle, R. Stenzel, A.V. Streltsov, A. Ting, B. Tsurutani, M. Velli, J.L. Vomvoridis, T. Wallace, L.M. Zelenyi

Advisory committee:

R.C. Davidson, M.L. Goldstein, A.V. Gurevich, K. Hizanidis, C.F. Kennel, C.S. Liu, R. Sagdeev, A.S. Sharma, P. Sprangle

Executive committee:

K. Akimoto, P.J. Cargill, I.A. Daglis, S.F. Fung, J.D. Huba, X. Shao, D. Vassiliadis (Co-chair), L. Vlahos (Co-chair)

Abstract submission deadline:
March 13, 2009
Pre-registration deadline:
April 17, 2009

For more information please contact:
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Atmospheric Sciences-Academic

Post-doctoral research fellows

Company: Guy Carpenter Asia-Pacific Climate Impact Centre
Location: China-Hong Kong
Date Posted: 02/09/2008
[show details...]

Climate-Academic

PhD position at IMK-FZK

Company: Institut fuer Meteorologie und Klimaforschung (IMK), Forschungszentrum Karlsruhe
Location: Germany-Karlsruhe
Date Posted: 08/01/2009
[show details...]

Interdisciplinary / Other-Academic

Postdoctoral Fellows at the Built Environment Group

Company: Department of Mechanical Engineering, University of Hong Kong
Location: Hong Kong-Hong Kong
Date Posted: 18/02/2009
[show details...]

Research Associates in Energy Efficient Cities

Company: University of Cambridge
Location: England-Cambridge
Date Posted: 03/03/2009
[show details...]

Lecturer in Atmospheric Sciences: Modeling, Meteorology and Chemistry

Company: University of Orleans
Location: France-Orleans
Date Posted: 16/03/2009
[show details...]

PhD Studentship on Energy Efficient Cities

Company: University of Cambridge
Location: United Kingdom-Cambridge
Date Posted: 24/03/2009
[show details...]

Research Associate in Urban Modelling

Company: University of Cambridge
Location: United Kingdom-Cambridge
Date Posted: 24/03/2009
[show details...]

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