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- **International Polar Year in 2007-2008**
  European research priorities in polar regions
- **The Compass in the Ice**
  Paleomagnetic field recontsruction from radionuclides

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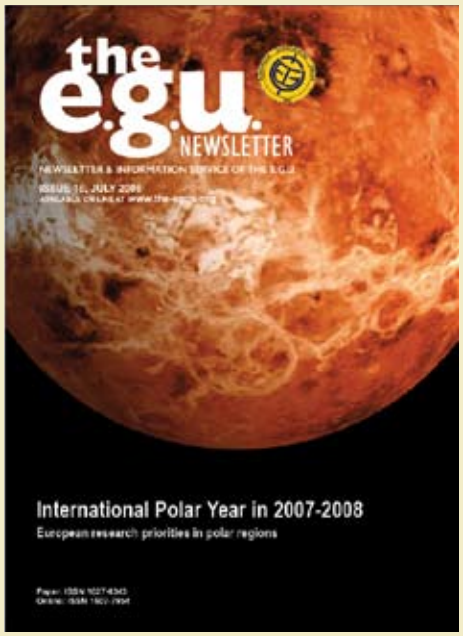

Cover photo: Venus (Credits: ESA)

Opportunities for teachers at the General Assemblies of the EGU

In addition to scientific research sessions, the General Assemblies of the EGU offers a number of Educational Sessions entirely reserved for Elementary to High School teachers, the so-called Geophysical Information for Teachers (GIFT) Workshop.

In addition to scientific research sessions, the General Assembly of the EGU offers a number of Educational Sessions entirely reserved for Elementary to High School teachers. The so-called Geophysical Information for Teachers (GIFT) Workshop last spring, reunited 70 teachers from 17 countries worldwide and took place from Monday April 3 at 8:30 am, to Wednesday April 5, 12:00 noon.

Presentations during the GIFT workshop are given by leading scientists and by experienced science educators. The organization this year also scheduled presentations by the teachers themselves to their fellow teachers, following the successful example from last year.

This was the 4th edition of the GIFT-workshop. After "Seismology", "The Ocean", "The History of the Earth" in the preceding years, the general theme of the 2006 GIFT workshop was "The Polar Regions". This theme has been chosen in preparation of the International Polar Year 2007-2008. The International Polar Year is a major international effort to draw research and public attention to the polar regions, in particular to their role in driving global climate and in turn to the impact of climate changes on the polar regions themselves. Nobel laureate Paul Crutzen delivered also a lecture to teachers during the Workshop.

Dr. Carlo Laj, responsible within the EGU for the GIFT-workshops: *'The joint effort of tens of thousands of participants from over 60 nations during the International Polar Year, needs to be made known to our school children, to make them aware of the importance of the environmental impacts of global change in these regions. The GIFT-workshop has proven to be very useful in stimulating collaborations among teachers in the different countries.*

We think this GIFT workshop is that important, so we have scheduled a few teachers presentations even when not directly related to the polar regions.In the last part of the workshop, we have scheduled a presentation of teachers' oriented programs and activities. We hope that teachers will take advantage of these new possibilities of bringing real time science in their classrooms!'

The GIFT-2007 workshop is already being prepared, for the 2007 General Assembly of the EGU, in Vienna, April 10-15. The general theme will be "Geology, Climate and Environmental problems of large Urban areas" a topic close to everyone's everyday life.

Some of the lectures of this year's workshop can be found below:

FROM EXPLORATION TO SCIENTIFIC WORK: A CENTURY OF HUMAN ENDEAVOUR IN THE POLAR REGIONS

Margarete Pauls, Alfred Wegener Institute, Bremerhaven

SCIENCE, EDUCATION & OUTREACH OPPORTUNITIES DURING THE INTERNATIONAL POLAR YEAR

David Carlson, Director of the IPY International Programme Office

PAST CLIMATE FROM THE ICE CORES NORTH AND SOUTH!

Valırie Masson-Delmotte, Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Gif-sur-Yvette, France

METEORITES FROM ANTARCTICA: ORIGINS FROM MARS AND THE MOON?

Stephen Macko, University of Virginia, USA

ALONE IN THE ARCTIC NIGHT

Stephane Levin, Toulouse, France

ATMOSPHERIC CHEMISTRY AND CLIMATE IN THE ANTHROPOCENE, THE NEW GEOLOGICAL ERA AFFECTED, IN MANY CASES DOMINATED, BY HUMAN ACTIVITY

Paul Crutzen, Max Plank Institute for Chemistry, Mainz, Germany

GREENHOUSE GAZES NATURAL TRENDS: WHAT DO WE

LEARN FROM ICE CORES ANALYSES ?

Jırtme Chappelaz, LGGE, Grenoble, France

AN EDUCATIONAL CD FOR THE POLAR REGIONS
Agathe Weber, International Polar Foundation, Geneva, Switzerland

Hands-on Activity: GOING DOWN IN THE WEDDEL SEA - WHY DEEP WATER FORMATION IS OF VITAL IMPORTANCE"!
Barbara Donner and Missy Holzer, Research Center Ocean Margins,Bremen, Germany, and Chatham High School, Chatham, New Jersey, USA

GIFT-AT-SEA: A VIRTUAL PARTICIPATION TO TWO OCEANOGRAPHIC CRUISES OF THE R/V MARION DUFRESNE
Catherine Kissel and Carlo Laj, LSCE, Gif-sur-Yvette, France

HAS THE ARCTIC OCEAN ALWAYS BEEN COLD?
Martin Jakobsson, Stockholm University, Sweden

A teacher's view of an Arctic oceanographic Expedition
Ruben Fritzon, Vibackeskolan, Alnφ, Sweden

PRESENTATION OF TEACHERS' ORIENTED PROGRAMS

ARGONAUTICA, A SCHOOL PROGRAM RELATED TO OCEANOGRAPHIC SATELLITES
Danielle De Staerke, CNES, Toulouse, France

THE WINDOWS TO THE UNIVERSE GLOBAL GEOSCIENCE EDUCATOR COMMUNITY
Roberta Johnson, Education and Outreach, UCAR, Boulder, CO USA

TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING (TREC)
Janet Warburton, ARCUS, Fairbanks, Alaska, USA

YOUNG REPORTERS FOR THE ENVIRONMENT CAMPAIGN
AND THE POLE PROJECT
Marion Cohen, French Office of the European Fondation for Education, Paris, France

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Gerald Ganssen New President-Elect / Vice-President EGU

Ganssen is associate professor at Vrije Universiteit, Amsterdam, working in the fields of marine geology, paleoceanography and paleoclimatology, and co-editor in chief of the EGU journal Climate of the Past.

27 March 2006.- Gerald M. Ganssen has been elected to be the new President-Elect and Vice-President of the European Geosciences Union, starting in April 2006. In April 2007, Ganssen will be appointed the new president of the EGU. Ganssen is an Associate Professor at the Vrije Universiteit in Amsterdam.

The President of the EGU is elected by the Members of the EGU to serve for a term of 2 years. He/she is elected one year before the beginning of the term of office, and in that period serves as President-Elect, and shall continue as a member of the Council for one year after the term of office, as Past-President. The President-Elect and the Past-President, respectively, are Vice-Presidents of the Union.

Gerald Ganssen has been working since December 1982 at Vrije Universiteit, Amsterdam (associate professor since 2003), working in the fields of marine geology, palaeoceanography, palaeoclimatology. His research interests focus on process-oriented studies on stable oxygen and carbon isotopic proxies and their application in high-resolution marine sediment cores; land-sea interrelationships and processes of climate change. Gerald Ganssen has been a regular participant in ocean research expeditions, either as chief, or as co-chief scientist.

Currently, John Ludden is the EGU President. Professor Ludden will serve as a Past-President/Vice-President for another year (2007-2008).

The new Vice-President was introduced at the General Assembly in Vienna, 02 – 07 April 2006.

Gerald Ganssen's candidature provides the following information for his motivation: "EGU is probably mostly known for its General Assemblies and its publications. These activities run well and it is one of the main tasks for the next president to actively develop these branches and, in particular, to further stimulate the electronic publishing. Other tasks as defined in the by laws of the EGU constitution that will be my specific focus are:

1. Organisation and structuring topical conferences resulting in EGU proceeding series; setting up low cost EGU Ph.D. and Master dissertation publication series for low cost in electronic form which facilitates world-wide distribution and attention.

2. In all important scientific topics, and certainly within the context of recent Climate Changes and (related) Natural

Hazards, we as an independent organisation, unifying Earth Geosciences (including Planetary and Solar Sciences), need to be involved in developing a unified communication strategy in Europe and beyond. EGU should strongly further develop its two-fold strategy to communicate our science to the people who should be aware of economic and social consequences of these changes and have the right to be informed in an unbiased way:

- top down through establishing links that allow influence to be brought to bear on decision-makers (see http://www.copernicus.org/EGU/info/statements.html) and to inform the press;

- bottom up through intensifying our education and outreach activities like GIFT (Geosciences Information For Teachers). This is a well established and appreciated form that provides teachers from various European countries with information on scientific items that they bring to the students. In this way we can help children and students to critically ask the relevant questions to families and friends.

3. Last but not least, EGU is a Union that supports young people and offers them the forum to operate on the European level. In this respect EGU should further deepen the contact to other scientific and educational organisations to stimulate the exchange of students within Europe. By creating an e-communication forum we can advise them, offer possibilities for jobs, fellowships, conferences etc. and thereby introduce them to the growing opportunities and needs within Europe."

EGU Press Release

New EGU journal launched

eEarth publishes short, topical papers in all disciplines of the Earth Sciences.

eEarth (eE) uses an open access interactive format to publish short, topical papers in all disciplines of the Earth Sciences. The length of papers is limited to four journal pages, which corresponds to about 3000 words, a maximum of 30 references and no more than 5 figures and tables.

Its scope ranges from processes in the deep interior of the Earth and the terrestrial planets; magmatism, metamorphism and volcanism; the creation, deformation and destruction of lithosphere; fluids, fluxes, and reservoirs of mineral and energy resources; surface processes such as erosion, transport, deposition of sediments and resulting geomorphology; and the response of the Earth to climate change.

eE uses the innovative two-stage publication process already established with success by other EGU journals. The procedure involves a scientific discussion forum and exploits the full potential of the Internet.

John Ludden (john.ludden@cnrs-dir.fr), EGU President, is the managing editor of the new journal. Editors and associate editors are listed in http://www.copernicus.org/EGU/ee/editors.html .

The home page of the journal is www.electronic-earth.net .

Annales Geophysicae is launching a new section

for rapid and short communications of major scientific results in the sciences of the Sun-Earth system

Annales Geophysicae is launching a new section: AnGeo Communicates. AnGeo Communicates is the place for rapid and short communications of major scientific results in the sciences of the Sun-Earth system, including the science of Space Weather, Solar-Planetary plasma physics and environments, and the Earth's atmosphere and oceans.

AnGeo Communicates accepts contributions restricted in length to four published pages; all papers are reviewed by one referee only; major revisions are not accepted.

AnGeo Communicates publication time is usually two months, using author-produced copy.

Please send your manuscripts as one .pdf or .doc file, or further inquiries to anngeo@cesr.fr with "AnGeo Communicates" in the subject area.

First WMO Greenhouse Gas Bulletin

World Meteorological Organization's (WMO) first annual Greenhouse Gas Bulletin published on 14th of March, 2006.

Geneva, 14 March 2006 (WMO).– Globally averaged concentrations of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) in the planet's atmosphere reached their highest ever-recorded levels in 2004 according to the World Meteorological Organization's (WMO) first annual Greenhouse Gas Bulletin published today. CO_2 was recorded at 377.1 parts per million (ppm), CH_4 at 1783 parts per billion (ppb), and N_2O at 318.6 ppb. These values supersede those of pre-industrial times by 35%, 155% and 18% respectively, and increased over the previous decade by 19ppm, 37ppb and 8ppb in absolute amounts.

WMO Secretary-General, Mr Michel Jarraud, said: "Global observations coordinated by WMO show that levels of carbon dioxide, the most abundant greenhouse gas in the atmosphere, continue to increase steadily and show no signs of levelling off."

The 35% rise in carbon dioxide since the late 1700s has largely been generated by emissions from the combustion of fossil fuels. In 2004, CO_2 increased by 1.8 ppm or 0.47% when compared with the previous year.

In contrast, atmospheric levels of methane have shown signs of reaching a plateau with virtually no rise in 2004 and changing by less than 5 ppb per year since 1999. Human activity such as fossil fuel exploitation, rice agriculture, biomass burning, landfills and ruminant farm animals account for some 60% of atmospheric CH_4, with natural processes including those produced by wetlands and termites responsible for the remaining 40%.

Nitrous oxide in the atmosphere has been steadily rising by about 0.8 ppb per year since 1988. Around one third of N_2O discharged into the air is a result of human activities such as fuel combustion, biomass burning, fertilizer use and some industrial processes.

Observations from some 44 WMO Members are archived and distributed by the World Data Centre for Greenhouse Gases (WDCGG), located at the Japan Meteorological Agency. WMO prepares the Bulletin in cooperation with WDCGG and the Global Atmosphere Watch Scientific Advisory Group for Greenhouse Gases with the assistance of the National Oceanic and Atmospheric Administration's Earth System Research Laboratory. WMO plans to release the 2005 bulletin in November 2006.

The 4-page bulletin is available online in pdf format at http://www.wmo.ch/web/arep/gaw/ghg/ghg-bulletin-en-03-06.pdf

WMO PR No. 744

Venus Express enters orbit

On 11 April 2006, ESA's Venus Express space probe fired its main engine at 09:17 CEST for a 50-minute burn, which brought it into orbit around Venus.

11 April 2006.- This morning, at the end of a 153-day and 400-million km cruise into the inner Solar System beginning with its launch on 9 November 2005, ESA's Venus Express space probe fired its main engine at 09:17 CEST for a 50-minute burn, which brought it into orbit around Venus.

With this firing, the probe reduced its relative velocity toward the planet from 29,000 to about 25,000 km/h and was captured by its gravity field. This orbit insertion manoeuvre was a complete success.

During the next four weeks, the Venus Express probe will perform a series of manoeuvres to reach the scheduled operational orbit for its scientific mission. It will move from its current highly elongated 9-day orbit to a 24-hour polar orbit, culminating at 66,000 kilometres. From this vantage point, the orbiter will conduct an in-depth observation of the structure, chemistry and dynamics of the atmosphere of Venus for at least two Venusian days (486 Earth days).

Enigmatic atmosphere

From previous missions to Venus as well as observations directly from Earth, we already know that our neighbouring planet is shrouded in a thick atmosphere where extremes of temperature and pressure conditions are common. This atmo-

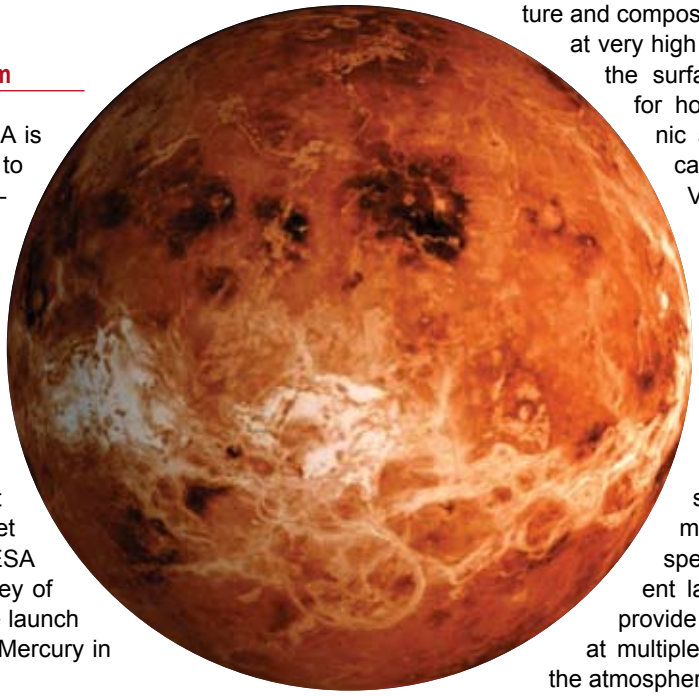
sphere creates a greenhouse effect of tremendous proportions as it spins around the planet in four days in an unexplained 'super-rotation' phenomenon.

The mission of Venus Express will be to carry out a detailed characterisation of this atmosphere, using state-of-the-art sensors in order to answer the questions and solve the mysteries left behind by the first wave of explorers. It will also be the first Venus orbiter to conduct optical observations of the surface through 'visibility windows' discovered in the infrared spectrum.

The commissioning of the onboard scientific instruments will begin shortly and the first raw data are expected within days. The overall science payload is planned to be fully operational within two months.

Europe explores the Solar System

With this latest success, ESA is adding another celestial body to its range of Solar System studies. ESA also operates Mars Express around Mars, SMART-1 around the Moon and is NASA's partner on the Cassini orbiter around Saturn. In addition, ESA is also operating the Rosetta probe en route to comet 67P/Churyumov-Gerasimenko. It should reach its target and become the first spacecraft ever to enter orbit around a comet nucleus by 2014. Meanwhile, ESA also plans to complete the survey of our celestial neighbours with the launch of the BepiColombo mission to Mercury in 2013.



Venus (Credits: ESA)

"With the arrival of Venus Express, ESA is the only space agency to have science operations under way around four planets: Venus, the Moon, Mars and Saturn" underlines Professor David Southwood, the Director of ESA's science programmes. "We are really proud to deliver such a capability to the international science community."

"To better understand our own planet, we need to explore other worlds in particular those with an atmosphere," said Jean-Jacques Dordain, ESA Director General. "We've been on Titan and we already are around Mars. By observing Venus and its complex atmospheric system, we will be able to better understand the mechanisms that steers the evolution of a large planetary atmosphere and the change of climates. In the end, it will help us to get better models of what is actually going on in our own atmosphere, for the benefit of all Earth citizens."

Science package

Venus Express was developed for ESA by a European industrial team led by EADS Astrium incorporating 25 main contractors from 14 European countries. Its design is derived from that of its highly successful predecessor, Mars Express, and its payload accommodates seven instruments including upgraded versions of three instruments developed for Mars Express and two for Rosetta.

The PFS spectrometer will determine the temperature and composition profile of the atmosphere at very high resolution. It will also monitor the surface temperature and search for hot spots from possible volcanic activity. The UV/infrared SpicaV/SOIR spectrometer and the VeRa radioscience experiment will probe the atmosphere by observing the occultation of distant starts or the fading of radio signals on the planetary limb. SpicaV/SOIR will be particularly looking for traces of water molecules, molecular oxygen and sulphur compounds, which are suspected to exist in the atmosphere of Venus. The Virtis spectrometer will map the different layers of the atmosphere and provide imagery of the cloud systems at multiple wavelengths to characterise the atmospheric dynamics.

On the outer edge of the atmosphere, the Aspera instrument and a magnetometer will investigate the interaction with the solar wind and plasma it generates in an open environment without the protection of a magnetosphere like the one we have around Earth.

The VMC wide-angle multi-channel camera will provide imagery in four wavelengths, including one of the 'infrared windows' which will make imaging of the surface possible through the cloud layer. It will provide global images and will assist in the identification of phenomena detected by the other instruments.

ESA PR 13-2006

DFG to fund 3 more programmes in Geosciences

decided by the DFG Senate at its meeting on 6 April 2006.

25 April 2006.- The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) has announced that it will fund 16 new Priority Programmes from the beginning of 2007. This was decided by the DFG Senate at its meeting on 6 April 2006. The new programmes, which were selected from 47 proposals, will receive approximately 57 million euros in funding during their initial funding period. Priority Programmes promote networking between research groups working on a specific topic, both within Germany and internationally. The coordinated, distributed funding of novel problems is intended to give strong impetus to the progress of research in the field addressed. Priority Programmes generally run for a period of six years. This brings the number of Priority Programmes funded by the DFG to 94.

Three new Priority Programmes are in geosciences:

Soil is a reactive surface in which heat, water, gasses and chemical elements are absorbed, stored and transmitted. Biogeochemical processes that occur on this surface play a key part in many ecosystems. Soil scientists, chemists, physicists and biologists will collaborate in the Priority Programme "Biogeochemical Interfaces in Soil" to study the complex physical, chemical and biological processes and interactions in soil.

(Coordinator: Prof. Kai Uwe Totsche, University of Jena)

The Priority Programme "Integrated Analysis of Interglacial Climate Dynamics" aims to use quantitative studies of the palaeoclimate (climactic conditions in the past) to achieve a better understanding of the climatic system and allow more precise predictions of future climate change. The research will work on the assumption that our current climate corresponds to the climate of a warm period and is therefore comparable to past warm periods. An integrated approach will be used to study the data, which will be combined from all climate archives for the first time.

(Coordinator: Prof. Michael Schulz, University of Bremen)

The attempt to model localised extreme weather phenomena, such as tornados, hurricanes or cyclones, in as much detail as possible poses a great challenge for meteorologists. The main problem they face is the fact that, to date, it has been impossible to accurately model physical phenomena that take place on very different scales, both in terms of time and space. This is the issue that the Priority Programme "Synoptic Modelling in Fluid Mechanics and Meteorology" will address. Meteorologists, fluid engineers and mathematicians will cooperate to develop new modelling methods to solve this task.

(Coordinator: Prof. Rupert Klein, Free University of Berlin)

In addition to these programmes, the DFG Senate has also established the programme "Atmospheric and Earth System Research with the 'High Altitude and Long Range Research Aircraft' (HALO)" to support university cooperation in the field of atmospheric research. Many processes in atmospheric research, such as cloud formation and photochemical processes, are still not thoroughly understood. This is primarily because the relevant mechanisms take place on scales of time and space that cannot be measured simultaneously. Due to the combination of its great range (8,000 km) and altitude (15.5 km), the research aircraft HALO has now made it possible to study processes such as the spreading of aerosols over long periods of time and at great distances. The use of HALO will put German atmospheric research at the leading edge of international atmospheric research.

(Coordinator: Prof. Jost Heintzenberg, Institute for Tropospheric Research (IfT), Leipzig)

Reference URL

http://www.dfg.de/en/news/press_releases/index.html

New merged Level-3 chlorophyll product

from SeaWiFS and MODIS-Aqua data.

May 2006.- Last month, NASA's Ocean Biology Processing Group announced the release of a new merged Level-3 chlorophyll product derived from the merging of SeaWiFS and MODIS-Aqua data. This evaluation product is now being created routinely for daily, 8-day, monthly, seasonal and annual time periods. The merged data product provides a substantial (> 50%) increase in coverage over the single mission product at the daily level, decreasing with the increase in the temporal period binned.

The merged Level-3 binned files can be downloaded from NASA's "Ocean Color Web" Level-3 Web Browser http://oceancolor.gsfc.nasa.gov/cgi/level3.pl or via a link from the FTP Page for Ocean Colour Products: http://oceancolor.gsfc.nasa.gov/ftp.html.

IOCCG

Beijing blanketed in dust

The worst sandstorm in five years swept through Beijing, China, overnight Sunday covering the city in some 300 000 tonnes of sand and yellow dust.

21 April 2006.- The worst sandstorm in five years swept through Beijing, China, overnight Sunday covering the city in some 300 000 tonnes of sand and yellow dust. Envisat captured the sand whipping over the capital on 17 April 2006. (Landmass has been outlined in black around the Yellow Sea for reference.)

In 2004, The United Nations Environment Programme (UNEP) said the dust storm problem is plaguing Northeast Asia nearly five times as often as it did in the 1950s and is worsening with growing desertification. To combat the spread of its desert areas, Beijing has been making efforts to plant trees and vegetation.

Hospitals in Beijing reported on Monday a sudden rise in patients with breathing difficulties, while health officials warned children to stay indoors and residents to wear masks outdoors. The Beijing Municipal Environmental Protection Department, Beijing rated the pollution caused by the dust storm grade V – the most serious level in pollution grading.

China's Central Meteorological Bureau announced on Tuesday it was preparing to seed clouds to make rain in hopes it would clear the air. Seeding clouds involves using aircraft to spray moisture-laden clouds with a crystalline substance such as silver iodide, which can prompt moisture contained in the clouds to freeze and fall as rain.

In addition to Beijing, the dust storms have affected Tianjin, Xinjiang in the northwest and other areas in the Jilin province in the northeast. The storm blew dust as far away as South Korea and Japan.

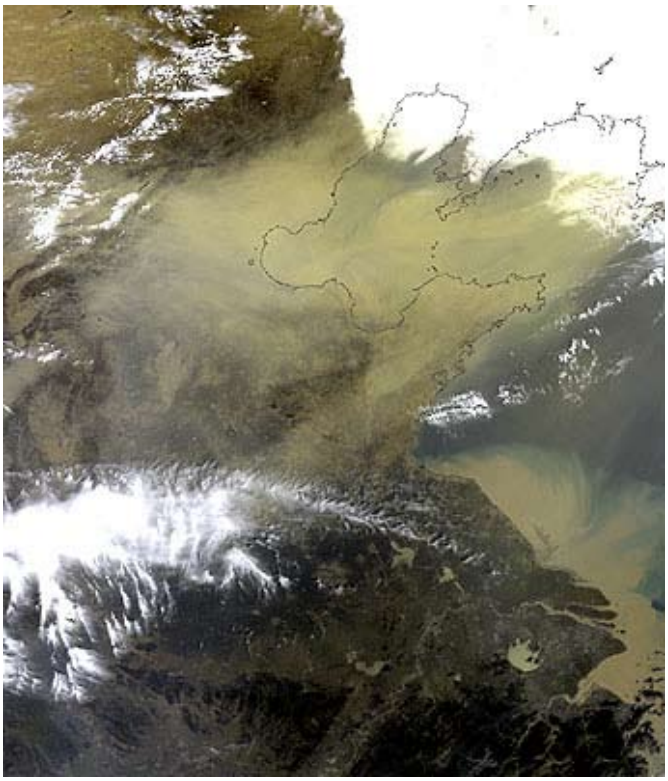


Image from Envisat 17 April 2006. (Landmass has been outlined in black around the Yellow Sea for reference.) [© ESA]

David M. Karl, editor of Biogeosciences, elected to the US National Academy of Sciences

Election to the Academy is considered one of the highest honors that can be accorded a U.S. scientist or engineer.

The National Academy of Sciences (NAS) announced on 25 April 2006 the election of 72 new members and 18 foreign associates in recognition of their distinguished and continuing achievements in original research. Included in this list of notables is David M. Karl from the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawaii at Manoa. Election to the Academy is considered one of the highest honors that can be accorded a U.S. scientist or engineer.

We warmly congratulate David Karl for his election and are very proud to have such a distinguished scientist on the editorial board of Biogeosciences.

Jean-Pierre Gattuso and Juergen Kesselmeier
Co-Editors-in-Chief, Biogeosciences

SPARC's Assessment of Stratospheric Aerosol Properties 1

The SPARC's (Stratospheric Processes And their Role in Climate) Assessment of Stratospheric Aerosol Properties (ASAP) has been completed and is available in the web.

The SPARC's Assessment of Stratospheric Aerosol Properties (ASAP) has been completed and the associated SPARC Report appeared in early 2006 as SPARC Report No.4, and will be available in printed form and by download from the SPARC web site (http://www.atmosp.physics.utoronto.ca/SPARC/index.html#). In the past, stratospheric aerosols have only been integrated into assessments in the context of their effects on ozone chemistry, and have not been critically evaluated themselves. Thus, the objective of this first effort was to perform a systematic analysis of the state of knowledge of stratospheric aerosols. It includes an examination of precursor concentrations and trends, measurements of stratospheric aerosol properties, trends in those properties, and modelling their formation, transport, and distribution under both background and volcanically perturbed conditions.

The ASAP Report covers this material in 350 pages with 150 Figures. In addition, data comprising the basis for the analysis are archived in the ASAP Data Archive at the SPARC Data Center (http://www.sparc.sunysb.edu/) including altitude/latitude gridded fields of aerosol extinction and derived quantities such as surface area densities, and a 'gap-filled' data set for the period 1979 through 2004 based on the SAGE record, which should be of particular interest for future modelling work.

Excerpt from the ASAP Executive summary:

Key Findings

The vast bulk of existing aerosol data does not comprise a complete measurement set and, as a result, many parameters required for scientific or intercomparison purposes are derived indirectly from the base measurements. This is true for space-based measurements where only bulk extinction is measured but also true in degree for most ground-based and in situ systems. Unlike gas species, aerosol cannot be characterized by a single quantity but has a size distribution and variable composition. The fact that each system measures a different set of parameters greatly complicates almost every stage of measurement comparisons, accentuating the need for aerosol models.

Disagreements between the various data sets and models indicate that significant questions remain regarding the ability to characterize stratospheric aerosol during volcanically quiescent periods, particularly in the lower stratosphere. Space-based and in situ measurements of aerosol parameters tend to be consistent following significant volcanic events like El Chichón and Pinatubo. However, during periods of very low aerosol loading, this consistency breaks down and significant differences exist between systems for key parameters including aerosol surface area density and extinction. Comparisons of models and satellite observations of aerosol extinction are generally fairly good at visible wavelengths above the 20-25 km altitude region under non-volcanic conditions, but are less satisfactory for infrared wavelengths. Although integrated aerosol quantities such as surface area density and effective radius can be calculated without approximation from a known size distribution, the satellite and in situ observational bases for size distributions are controlled by a priori assumptions regarding the distribution itself or by having coarse size resolution, respectively. During volcanically quiescent periods, models and observations disagree significantly mainly due to the fraction of the surface area density produced by models residing in particles too small to be measured, especially near nucleation regions. While there are some model short-comings relative to observations particularly in the lower stratosphere, it seems likely that space-based data sets underestimate, perhaps significantly, aerosol surface area density in the lower stratosphere.

The analysis of non-volcanic stratospheric aerosol, although hampered by very limited periods without volcanic influence since systematic measurements began, indicates no long-term trend. Since the beginning of systematic stratospheric aerosol measurements in the early 1970s there have been three periods with little or no volcanic perturbation, although only the period from 1999 onwards can be confidently identified as free of volcanic aerosols. The other periods (late 1970s and late 1980s) are difficult to evaluate, given their brevity and the complex variability observed. In particular, the period in the late 1980s seems likely to have not reached a stable non-volcanic level. Trends derived from six long-term data sets for the late 1970s to the current period are not significantly different from zero.

The dominant stratospheric aerosol precursor gases are OCS and SO2 and, through SO2, human-related activities may influence the observed background stratospheric aerosol. There is general agreement between measured OCS and modelling of its transformation to sulfate aerosol, and observed aerosols. However, there is a significant dearth of SO2 measurements, and the role of tropospheric SO2 in the stratospheric aerosol budget – while significant – remains a matter of some guesswork. In addition, it is not well understood whether decreasing global, human-derived SO2 emissions, or increasing emissions in low latitude developing countries,such as China, dominate the human component of SO2 transport across the tropical tropopause.

Recommendations

The importance of stratospheric aerosol in climate and atmospheric chemistry strongly supports a commitment to continuing both space-based and in situ observations of aerosols into the foreseeable future. Both types of measurements are necessary because neither approach seems likely to independently produce a robust depiction of global, stratospheric aerosol properties.

Observations of SO2 in the upper troposphere and lower stratosphere and of H2SO4 and SO2 in the middle and upper stratosphere would be extremely valuable to improve our modelling and predictive capabilities of stratospheric aerosol. Currently, there is a general scarcity of measurements of key sulfur-bearing gases during their transport from the upper troposphere into the upper stratosphere.

A more complete understanding of the detailed structure of the underlying aerosol size distribution is required to facilitate improvement in the closure between measurement data sets and confidence in derived properties like surface area density. This is becoming increasingly important as measurement systems change and robust conversion between data sets is required to maintain data sets amenable to trend analysis. It is also important to improve aerosol size distribution and composition knowledge in the vicinity of the tropical tropopause where such information is crucial input to microphysical models of stratospheric aerosol. In addition, aerosols in the upper troposphere are not composed purely of H2SO4/H2O but include organics (up to 50 % by mass), mineral dust, soot, and other compounds. Organics are also found in stratospheric aerosols in small quantities. Since the role of non-sulfate aerosols in serving as sites for chemical reactions and as condensation nuclei with concomitant effects on the stratospheric aerosol is not well known, measurements focused on these aerosols are desirable.

The upper troposphere and lower stratosphere, particularly, in the tropics is a crucial region for understanding stratospheric aerosol and warrants detailed scientific investigation. Sensitivity studies in this report show that the lower stratospheric aerosol layer is strongly dependent on input from the tropical upper troposphere.

Future modelling studies should strive to include important but as yet missing or poorly treated elements, such as upper tropospheric and meteoritic particles, and various relevant chemical and dynamical processes. The stratospheric aerosol could be quite sensitive to aerosol input through the tropical tropopause, as suggested in the present report. Also, meteoritic material descending into the stratosphere from the mesosphere may be important to the morphology of stratospheric aerosols, particularly in polar air and perhaps globally. Chemically, in particular the photolysis of sulfuric acid affecting the upper edge of the aerosol layer especially in the polar regions should be included in the models. In addition, a more robust 3-D representation of transport and cloud processes is required to reproduce aerosol observations in the troposphere-stratosphere transition region, as well as to face the challenge of reproducing the seasonal variability of aerosols.

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SPARC

DLR and EADS Astrium release new satellite mission

DLR on behalf of the Federal Ministry of Economics and Technology and EADS Astrium Germany announced at the Berlin Air Show ILA their intention to build a new radar satellite mission called TanDEM-X.

Berlin/Friedrichshafen, 17 May 2006.- The German Aerospace Center / German Space Agency DLR on behalf of the Federal Ministry of Economics and Technology and Europe's leading satellite manufacturer EADS Astrium today announced at the Berlin Air Show ILA their intention to build a new satellite mission called TanDEM-X. Following the official kick-off, development and manufacturing of the new German radar-satellite will now start at EADS Astrium's Friedrichshafen plant. TanDEM-X is scheduled for launch in 2009. Together with the almost identical radar satellite TerraSAR-X which is to be launched in autumn this year, it will form a high-precision radar interferometer.

Like TerraSAR-X, the TanDEM-X project will be carried out within the scope of a public-private partnership between EADS Astrium GmbH and DLR. The spacecraft will cost approx. 85 million Euro, DLR will finance 56 million Euro €, EADS Astrium carries 26 million Euro and three million Euro will be sourced by marketing of flight opportunities for further payloads.

With the aid of the tandem formation TerraSAR-X/TanDEM-X it will be possible to completely measure the Earth's land surface, that is 150 million square kilometres, within a period of only 2.5 years. For a 12m grid (street width), height information can be determined with an accuracy of < 2 meters.

As of 2010, Germany will possess a digital terrain model of the Earth, a worldwide unique data product which can be used in initiatives and programmes, such as the Centre for satellite-based crisis information (ZKI - Zentrum für satellitengestützte Kriseninformation), GMES (Global Monitoring for Environment and Security) and GEOSS (Global Earth Observation System of Systems), and also in security-relevant cooperation agreements.

DLR

European prize for NIOZ researcher

Professor Gerhard J Herndl of the NWO institute Royal Netherlands Institute for Sea Research (NIOZ) on Texel has won the 2006 EUR-OCEANS Roland Wollast Prize for Scientific Achievements.

16 March 2006.- Prof. Gerhard J Herndl of the NWO institute Royal Netherlands Institute for Sea Research (NIOZ) on Texel (NL) has won the 2006 EUR-OCEANS Roland Wollast Prize for Scientific Achievements. He has received the prize during the general meeting of the EUR-OCEANS Network from 15 to 16 March in Barcelona. Gerhard J. Herndl is the first winner of this Roland Wollast prize. Roland Wollast, a world leader in the field of regional and global biogeochemistry, died on July 28, 2004, in Brussels at the age of 72 (see obituary published in this magazine at http://www.the-eggs.org/articles.php?issueSel=21).

Professor Gerhard Herndl is a microbiologist and head of the Department of Biological Oceanography at NIOZ (www.nioz.nl). The EUR-OCEANS Committee praises his considerable achievements in the area of integrating physics, chemistry and biology in scientific marine research. Herndl mainly works on the diversity and ecological role of microorganisms such as bacteria, archaea and viruses in the food web of the open oceans. In doing this he introduces new ecological concepts, research methods and approaches to the field. The report also praises Herndl's leadership qualities.

Herndl recently developed a new measurement and sampling device for the deep sea in close cooperation with the Department of Maritime Technology at NIOZ. This equipment can be used to investigate the activity of deep-sea microorganisms at sea under conditions of high pressure and low temperature. Measurements with the new equipment have revealed that hydrostatic pressure has a substantial impact on the activity of these microorganisms in oceanic deep waters. Further, he has recently shown that deep-ocean archaea are taking up inorganic carbon such as carbon dioxide and can therefore be considered as autotrophic organisms, just like algae in the sunlit surface waters. These new insights were mainly obtained during the scientific maritime expeditions TRANSAT, BADE and ARCHIMEDES led by G.J. Herndl with the NIOZ research vessel Pelagia. These expeditions were funded by the NWO Division for the Earth and Life Sciences.

Professor Gerhard J Herndl, Royal Netherlands Institute for Sea Research (NIOZ).

EUR-OCEANS

EUR-OCEANS is the European Network for excellent research for Ecosystem Analysis of open oceans. This network is partly financed by the Sixth Framework Programme for Research and Technology Development of the European Union (FP6). The network consists of more than 60 oceanographic institutes and universities from 25 countries. EUR-OCEANS was started in January 2005 and will run until December 2008.

NWO

POLDER reprocessing

New POLDER products include bio-optical parameters such as water absorption and backscattering coefficients.

May 2006.- POLDER-1 and POLDER-2 ocean colour data have been reprocessed with several significative improvements. The final scientific ocean colour products are now available on the POLDER website/order desk at http://polder.cnes.fr. Products are available for a total period of 15 months:

* 8 months for POLDER 1 from October 1996 to June 1997
* 7 months for POLDER 2 from April to October 2003

HDF data files can be directly vizualized or downloaded using the "on-line products" menu, and animations of POLDER Level 3 maps can also be viewed here. Alternatively, an ordering interface is available to receive the complete products (register first to create an account and to obtain a password).

New POLDER products include bio-optical parameters such as water absorption and backscattering coefficients. A very good agreement with in-situ measurements has been obtained. Research work is still being undertaken to exploit polarized and directional information.

IOCCG

Strasbourg Office Holds Fourth JSPS Forum in France

It was reposted on research being conducted in Japan and France across a wide cross-section of fields including seismology, sea-bottom mapping, marine biology, oceanography and sea-ice circulation.

On 18 November, the JSPS Strasbourg Office held its fourth JSPS Forum, this time on the theme "Oceanography." Venued at University Louis Pasteur, cosponsored by the University and French Ministry of Higher Education and Research, and supported by Conseil Général du Bas-Rhin and Maison Universitaire France-Japon, the forum attracted over 250 participants.

The Japan Society for the Promotion of Science (JSPS), or Gakushin for short, is an independent administrative institution, established by way of a national law for the purpose of contributing to the advancement of science in all fields of the natural and social sciences and the humanities.

Opening addresses were delivered by Prof. Hubert Whitechurch, professor, Institute of Earth Physics, University Louis Pasteur and Prof. Yoichi Nakatani, director, JSPS Strasbourg Office, followed by remarks from Prof. Alain Beretz, vice president, University Louis Pasteur, speaking on behalf of the University's president, Mr. Ryuichi Shoji, consul general of Japan in Strasbourg, and Prof. Jean-Paul Montagner, deputy director of research, French Ministry of Higher Education and Research.

Moving into the body of the forum, EGU President Dr. John Ludden, director, Earth Sciences Department, CNRS-INSU/SDU, introduced Europe's Deep Sea Floor Frontier Program. His presentation was followed by those of Dr. Masataka Kinoshita, group leader, Ocean Bottom Observation Research Group, JAMSTEC; Dr. Jean Mascle, director, Marine Geodynamic Lab, CNRS-Geosciences Azur, Villefranche-sur-Mer; Dr. Shigenobu Takeda, associate professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo (Dr. Shigenobu Takeda is the recipient of the 2006 JSPS Prize for his study on the role of iron as a limiting nutrient for primary production of marine phyto-plankton); Dr. Philippe Gros, director, Fishery Resources Lab, French Research Institute for Exploitation of the Sea; Dr. Ichiro Yasuda, professor, Ocean Research Institute, The University of Tokyo; and Dr. Bernard Barnier, director, Ocean Current Lab, CNRS-LEGI, Grenoble. They reported on leading-edge research being conducted in Japan and France across a wide cross-section of fields including seismology, sea-bottom mapping, marine biology, oceanography and sea-ice circulation.

During the lunch break, a highly interactive poster session was held by eight young Japanese and French researchers, whose participation was funded by the French Ministry of Higher Education and Research. After the break, Ms. Yoshie Araki of JSPS's Strasbourg Office gave a presentation of JSPS's fellowship and other programs.

Discussions on the above-listed research presentations were chaired respectively by Prof. Jean-Paul Montagner, Dr. Anne-Marie Karpoff, Prof. Jose Honnorez, Prof. Chiaki Mukai, Prof. Hubert Whitechurch, and Prof. Tetsuichi Ito. They were so animated as to flow over into the breaks.

The forum's proceedings were carried over the multimedia Canal-U, providing real-time coverage worldwide. The presentations can be viewed at http://www.canalc2.tv/.

JSPS Strasbourg Office

EuroDiversity programme launched

the European Science Foundation (ESF) launched the EUROCORES Programme EuroDIVERSITY: Challenges of Biodiversity Science.

27 April, 2006.- On behalf of twenty-seven science funding and performing agencies from twenty-one European countries, the European Science Foundation (ESF, www.esf.org) launched the EUROCORES Programme EuroDIVERSITY: Challenges of Biodiversity Science with a scientific kick-off meeting last week in Strasbourg (France). The goal of the EuroDIVERSITY Programme is to support the emergence of an integrated biodiversity science based on an understanding of fundamental ecological and social processes that drive biodiversity changes and their impacts on ecosystem functioning and society. EuroDIVERSITY meets the research need triggered by the increasing human footprint worldwide that threatens and transforms ecosystems at unprecedented rates from local to global scales.

EuroDIVERSITY is coordinated by ESF (contact: eurodiversity@esf.org) and has already mobilized 8 million Euros from national funding agencies that allow more than 120 research teams throughout 10 trans-national collaborative research projects to study biodiversity and ecosystem function issues ranging from the study of microbes to the agricultural landscape during the next 3 years. Extra funding for coordination networking is allocated by the European Commission and will greatly integrate the research teams including over 20 postdocs and PhD students shortly enrolled through this unique research initiative. Strong links will be soon established with other major initiatives and programmes (DIVERSITAS, CBOL, DEEPFIN, EEF etc.).

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Seasonal mean pressure reconstruction for the N. Atlantic 1750–1850 based on early marine data

Analysis of ships' logbooks from the CLIWOC project provide a direct measure of the strength and extension of the Azores High during the 101 years of the study period.

Measurements of wind strength and direction abstracted from European ships' logbooks during the recently finished CLIWOC project have been used to produce the first gridded Sea Level Pressure (SLP) reconstruction for the 1750–1850 period over the North Atlantic based solely on marine data. The reconstruction is based on a spatial regression analysis calibrated by using data taken from the ICOADS database. An objective methodology has been developed to select the optimal calibration period and spatial domain of the reconstruction by testing several thousands of possible models. The finally selected area, limited by the performance of the regression equations and by the availability of data, covers the region between 28° N and 52° N close to the European coast and between 28° N and 44° N in the open Ocean. The results provide a direct measure of the strength and extension of the Azores High during the 101 years of the study period. The comparison with the recent land-based SLP reconstruction by Luterbacher et al. (2002) indicates the presence of a common signal. The interannual variability of the CLIWOC reconstructions is rather high due to the current scarcity of abstracted wind data in the areas with best response in the regression. Guidelines are proposed to optimize the efficiency of future abstraction work.

The article is available free of charge at
http://www.clim-past.net/1/19/2005/cp-1-19-2005.html

D. Gallego, R. Garcia-Herrera, P. Ribera, and P. D. Jones, Seasonal mean pressure reconstruction for the North Atlantic (1750–1850) based on early marine data, Clim. Past, 1, 19-33, 2005.

Biological control of the terrestrial carbon sink

This lecture reviews the past, since 1964 when the International Biological Program began, and the future of our understanding of terrestrial carbon fluxes with focus on photosynthesis, respiration, primary-, ecosystem-, and biome-productivity.

Photosynthetic capacity is related to the nitrogen concentration of leaves, but the capacity is only rarely reached under field conditions. Average rates of photosynthesis and stomatal conductance are closely correlated and operate near 50% of their maximal rate, with light being the limiting factor in humid regions and air humidity and soil water the limiting factor in arid climates. Leaf area is the main factor to extrapolate from leaves to canopies, with maximum surface conductance being dependent on leaf level stomatal conductance. Additionally, gas exchange depends also on rooting depth which determines the water and nutrient availability and on mycorrhizae which regulate the nutrient status. An important anthropogenic disturbance is the nitrogen uptake from air pollutants, which is not balanced by cation uptake from roots and this may lead to damage and breakdown of the plant cover.

Photosynthesis is the main carbon input into ecosystems, but it alone does not represent the ecosystem carbon balance, which is determined by respiration of various kinds. Plant respiration and photosynthesis determine growth (net primary production) and microbial respiration balances the net ecosystem flux. In a spruce forest, 30% of the assimilatory carbon gain is used for respiration of needles, 20% is used for respiration in stems. Soil respiration is about 50% the carbon gain, half of which is root respiration, half is microbial respiration. In addition, disturbances lead to carbon losses, where fire, harvest and grazing bypass the chain of respiration. In total, the carbon balance at the biome level is only about 1% of the photosynthetic carbon input, or may indeed become negative. The recent observed increase in plant growth has different reasons depending on the region of the world: anthropogenic nitrogen deposition is the controlling factor in Europe, increasing global temperatures is the main factor in Siberia, and maybe rising CO2 the factor controlling the carbon fluxes in Amazonia. However, this has not lead to increases in net biome productivity, due to associated losses. Also important is the interaction between biodiversity and biogeochemical processes. It is shown that net primary productivity increases with plant species diversity (50% species loss equals 20% loss in productivity). However, in this extrapolation the action of soil biota is poorly understood although soils contribute the largest number of species and of taxonomic groups to an ecosystem.

The global terrestrial carbon budget strongly depends on areas with pristine old growth forests which are carbon sinks. The management options are very limited, mostly short term, and usually associated with high uncertainty. Unmanaged grasslands appear to be a carbon sink of similar magnitude as forest, but generally these ecosystems lost their C with grazing and agricultural use.

Extrapolation to the future of Earth climate shows that the biota will not be able to balance fossil fuel emissions, and that it will be essential to develop a carbon free energy system in order to maintain the living conditions on earth.

The article is available free of charge at
http://www.biogeosciences.net/3/147/2006/bg-3-147-2006.html

E.-D. Schulze, Biological control of the terrestrial carbon sink, BG, 3, 147-166, 2006

Synoptic climate change as a driver of late Quaternary glaciations

NH climate forcing may not have been the exclusive driver of Quaternary glaciations in New Zealand and synoptic style climate variations might be a better explanation for at least some late Quaternary glacial events.

The relative timing of late Quaternary glacial advances in mid-latitude (40-55° S) mountain belts of the Southern Hemisphere (SH) has become a critical focus in the debate on global climate teleconnections. On the basis of glacial data from New Zealand (NZ) and southern South America it has been argued that interhemispheric synchrony or asynchrony of Quaternary glacial events is due to Northern Hemisphere (NH) forcing of SH climate through either the ocean or atmosphere systems.

The authors present a glacial snow-mass balance model that demonstrates that large scale glaciation in the temperate and hyperhumid Southern Alps of New Zealand can be generated with moderate cooling. This is because the rapid conversion of precipitation from rainfall to snowfall drives massive ice accumulation at small thermal changes (1-4°C). The model is consistent with recent paleo-environmental reconstructions showing that glacial advances in New Zealand during the Last Glacial Maximum (LGM) and the Last Glacial Interglacial Transition (LGIT) occurred under very moderate cooling. The authors suggest that such moderate cooling could be generated by changes in synoptic climatology, specifically through enhanced regional flow of moist westerly air masses. These results imply that NH climate forcing may not have been the exclusive driver of Quaternary glaciations in New Zealand and that synoptic style climate variations are a better explanation for at least some late Quaternary glacial events, in particular during the LGIT (e.g. Younger Dryas and/or Antarctic Cold Reversal).

The article is available free of charge at
http://www.clim-past.net/2/11/2006/cp-2-11-2006.html

H. Rother and J. Shulmeister,Synoptic climate change as a driver of late Quaternary glaciations in the mid-latitudes of the Southern Hemisphere, Clim. Past, 2, 11-19, 2006.

Atmospheric organic aerosols

Assessment of the current state of scientific knowledge, terminology, and research needs concerning the role of organic aerosols in the atmosphere, climate, and global change.

In spite of impressive advances in recent years, our present understanding of organic aerosol (OA) composition, physical and chemical properties, sources and transformation characteristics is still rather limited, and their environmental effects remain highly uncertain. This paper discusses and prioritizes issues related to organic aerosols and their effects on atmospheric processes and climate, providing a basis for future activities in the field. Four main topical areas are addressed: i) sources of OA; ii) formation transformation and removal of OA; iii) physical, chemical and mixing state of OA; iv) atmospheric modelling of OA. Key questions and research priorities regarding these four areas are synthesized in this paper, and outstanding issues for future research are presented for each topical area. In addition, an effort is made to formulate a basic set of consistent and universally applicable terms and definitions for coherent description of atmospheric OA across different scales and disciplines.

The article is available free of charge at
http://www.copernicus.org/EGU/acp/acp/6/2017/acp-6-2017.htm

S. Fuzzi, M. O. Andreae, B. J. Huebert, M. Kulmala, T. C. Bond, M. Boy, S. J. Doherty, A. Guenther, M. Kanakidou, K. Kawamura, V.-M. Kerminen, U. Lohmann, L. M. Russell, U. Pöschl, Critical assessment of the current state of scientific knowledge, terminology, and research needs concerning the role of organic aerosols in the atmosphere, climate, and global change, ACP, 6, 2017-2038, 2006.

1998-2001 satellite observations of instability waves in the Tropical Atlantic Ocean

First multi-year observational study of the sea surface temperature (SST) signature of the Tropical Instability Waves (TIW) in the tropical Atlantic Ocean.

In spite of impressive advances in recent years, our present understanding of organic aerosol (OA) composition, physical and chemical properties, sources and transformation characteristics is still rather limited, and their environmental effects remain highly uncertain. This paper discusses and prioritizes issues related to organic aerosols and their effects on atmospheric processes and climate, providing a basis for future activities in the field. Four main topical areas are addressed: i) sources of OA; ii) formation transformation and removal of OA; iii) physical, chemical and mixing state of OA; iv) atmospheric modelling of OA. Key questions and research priorities regarding these four areas are synthesized in this paper, and outstanding issues for future research are presented for each topical area. In addition, an effort is made to formulate a basic set of consistent and universally applicable terms and definitions for coherent description of atmospheric OA across different scales and disciplines.

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Spatio-temporal filling of missing points in geophysical data sets

Algorithm is demonstrated on synthetic examples, as well as on data sets from oceanography, hydrology, atmospheric sciences, and space physics.

The majority of data sets in the geosciences are obtained from observations and measurements of natural systems, rather than in the laboratory. These data sets are often full of gaps, due to to the conditions under which the measurements are made. Missing data give rise to various problems, for example in spectral estimation or in specifying boundary conditions for numerical models.

Here the authors use Singular Spectrum Analysis (SSA) to fill the gaps in several types of data sets. For a univariate record, the procedure uses only temporal correlations in the data to fill in the missing points. For a multivariate record, multi-channel SSA (M-SSA) takes advantage of both spatial and temporal correlations. Iteratively, estimates of missing data points are produced, which are then used to compute a self-consistent lag-covariance matrix; cross-validation allows to optimize the window width and number of dominant SSA or M-SSA modes to fill the gaps. The optimal parameters of the procedure depend on the distribution in time (and space) of the missing data, as well as on the variance distribution between oscillatory modes and noise. The algorithm is demonstrated on synthetic examples, as well as on data sets from oceanography, hydrology, atmospheric sciences, and space physics: global sea-surface temperature, flood-water records of the Nile River, the Southern Oscillation Index (SOI), and satellite observations of relativistic electrons.

The article is available free of charge at
http://www.nonlin-processes-geophys.net/13/151/2006/npg-13-151-2006.html

D. Kondrashov and M. Ghil, Spatio-temporal filling of missing points in geophysical data sets, Nonlin. Processes Geophys., 13, 151-159, 2006.

International Polar Year in 2007-2008

European research priorities in polar regions

Interviews with Ib Troen and Gérard Jugie

At the European Commission, Ib Troen supervises various joint research programmes being carried out in polar regions. Gérard Jugie is Chairman of the European Polar Board (EPB) and Director of the French Paul Emile Victor Polar Institute (IPEV).

Interview with Ib Troen

Is there a clear European strategy for polar research?

We cannot really talk about a "polar strategy". Within the European scientific community, many researchers are carrying out work in this kind of field. But this community is highly diverse and does not constitute a single entity. Some researchers are interested in how ice evolves, while others are looking at sediments, greenhouse gases or biodiversity. Joint and cross-disciplinary meetings are organised. And research programmes are involving increasing numbers of partners from outside the EU, for example from Russia. These efforts naturally receive political backing. But at the level of the European Commission, there is no research theme that could be qualified as 'polar'.

Should we then be talking about priority themes which are relevant to the polar regions?

That is closer to the reality. For example, one of our priorities is the study of climate development. This type of research is indeed carried out in polar regions and requires the involvement of different disciplines. Research programmes targeting geographical regions tend to be rarer, although there have been some exceptions, notably concerning the Mediterranean basin.

What are the main European programmes being carried out in this type of environment?

In the first instance, the Commission provided support for ice coring projects, such as the GRIP project in Greenland, which was carried out in partnership with the European Science Foundation (ESF). The success of this project certainly contributed to the subsequent decision to launch the EPICA programme, this time in the Antarctic. EPICA has now shown that it can compete on equal terms with identical projects commissioned by other countries, such as the United States or Russia. We should remember that in this last winter, drilling by EPICA broke all records with respect to the age of the ice extracted from a polar ice cap, at 900,000 years.

In other areas, still linked to recent programmes on world climate change, we should also mention the Arctic Ice Cover Simulation Experiment (AICSEX) project, which has focused on the Arctic ice cap, its evolution and modelling. Other programmes concern thermohaline circulation. In this area, new data are now available to help us refine the models and will open up new perspectives for the measurement of marine currents, temperatures, carbon uptake, atmospheric circulation and pollution, etc.

Do you think there is a certain preference for projects in one hemisphere rather than the other?

It is clear that programmes in the Arctic polar regions are more attractive than research carried out in the southern hemisphere. Particularly because the former have a direct impact on the European Union and its citizens, and also because the region is more accessible. In the context of polar research, where a high proportion of the budget is allocated to logistics, this factor is of considerable importance.

What role will polar research have to play in the next Framework Programme?

Climate change remains a crucial theme within the European Union. But it is too soon to say how much priority will be given to it in the next Framework Programme, and which disciplines will be involved. There may be a resurgence of interest in the problem of aerosols, for example, which have an effect on radiation, its absorption and the physics of clouds. The content of the 7th Framework Programme has not yet been decided.

Might the European Union consider a new major infrastructure for polar research?

Not as such. We will not be building a Joint Research Centre, such as ISPRA, in polar or subpolar regions. This type of very costly initiative could be organised in the context of a partnership with Member States. If relevant, we could then provide support for national initiatives. This is clearly a topic for discussion in relation to development of the European Research Area, which we are pursuing while facilitating the coordination of national efforts.

Interview with Gérard Jugie

What role does Europe have to play in research in polar regions?

We have research programmes, logistic resources, and considerable expertise in this field. One of the aims of the EPB is to increase the European countries' awareness of the pivotal role that Europe can play in terms of polar research. All the intellectual, logistic and technical resources of different Member States devoted to polar research endow Europe with a predominant position in this field. The European network of bases in these regions of the world is testimony to this. That said, I prefer not to refer to "polar research" but to the many areas of scientific excellence being developed in polar regions.

We also benefit from federal approaches, such as the Europolar programme. This provides coordination for national research programmes in the context of the European Union ERA-NET system (European Research Area) and aims to better organise and optimise research efforts in polar regions.

Finally, we should not forget Europe's know-how in these extraordinary environments. For example, we have now mastered methods for navigation in sea ice, icebreaking technology and the logistics required for polar travel on land. These are undeniably important skills.

What are the major scientific research challenges in these regions?

The EPICA programme for drilling in the Antarctic ice cap, which during the last summer season almost arrived at the rock underlying the Dome C coring site, is one of the best examples (see Ice coring: a special selection and New European initiatives). This major European project, with which we were associated from the start, responds to one of the major global challenges, namely climate change. It is a remarkable reminder that polar regions constitute excellent witnesses of the changes which have affected our planet.

Polar regions, i.e. lying south or north of 60 degrees latitude, are of extraordinary interest in terms of their specific fauna and flora. We must retain or even enhance our presence in these environments, through the development of new observatories, particularly to study the atmosphere. We need to devote further study to the characteristics of different atmospheric layers at these high latitudes, including interactions between the atmosphere, the local biosphere and the oceans but also the cryosphere, particularly in the Antarctic.

We also need to better understand the Antarctic Ocean, the circulation of floating ice masses and, more generally, the oceanic and thermohaline circulations.

Are there any emerging fields of research?

Absolutely. In astronomy, for example. The Antarctic, and most particularly its plateau, is now of considerable interest to astronomers, with special emphasis being placed on infrared observations. This interest is due to the low levels of humidity and precipitation on the plateau (a maximum of 3.5 cm of water a year), its altitude, the light winds which do not markedly disturb observations, and the lack of light interference. In other words, it is a particularly attractive region and a site here would supplement the major astronomic observatories elsewhere in the world.

Another emerging area, which is of increasing interest to space agencies, is studying isolation of research teams in a very hostile environment. Their psychological and sociological monitoring is the source of much valuable information.

Is research in the Arctic less well endowed than that in the southern hemisphere?

Certainly not. First of all, the Scandinavian countries are particularly active in this area. Secondly, we must not forget the international campaigns that have been ongoing in Greenland for many years. And finally there is Svalbard, with the Ny-Alesund scientific settlement which groups not only Norwegian research stations but also teams from France, the UK, Italy, Korea and Poland. France has another base in that area, which strives to be a model for future research stations. More globally, we must not lose sight of Russian research efforts in the Arctic. No, you cannot say that the Arctic regions have lost their attractiveness for research.

Will the International Polar Year in 2007-2008 revolutionize European research in these extreme regions of our planet?

Not intrinsically, but it will serve to highlight our activities in polar regions. This will allow us to raise the awareness of decision-makers at all levels, from politicians to the man in the street. The last Polar Year (in fact, more precisely an International Geophysics Year), took place fifty years ago, and made it possible to launch a multitude of new research projects in polar regions.

This new Polar Year will regenerate interest in these regions and emphasise the importance to society as a whole of the work carried out there, and should trigger projects for future generations. It is certainly an event which will leave a legacy, particularly in terms of coordination, cooperation and infrastructure.

Will it provide impetus for a shift towards the greater integration of national efforts within the EU?

At present, some countries in Europe are more dynamic than others. I think that the new International Polar Year may act as a catalyst towards greater integration. But in fact, this integration is inevitable, because Europe is now a living entity. I do not know if we shall have a European Polar Agency in 2007, but I am sure that one day, this goal will become a reality.

These interviews were published in the RTD Info Magazine of the European Commission.

The Compass in the Ice

Paleomagnetic field reconstruction from radionuclides

by Jürg Beer

Everyone knows that a freely-moving magnetic needle will align itself to north, making it rather useful for finding one's way in unknown areas or when visibility is poor. The principle of the magnetic compass has been known for more than a thousand years, and has been of inestimable value to navigators. Even migratory birds and other animals seem to have an inbuilt compass which permits them to home in on their destinations with uncanny precision. However, a compass several thousand years ago would not have pointed to the north pole; throughout the earth's history, the geomagnetic field has reversed its polarity again and again.

Even though the earth's magnetic field, or geomagnetic field (Fig. 1) has been investigated in detail for more than 300 years, Einstein referred to it as one of the greatest unsolved mysteries of science. Since then many outstanding questions regarding the origin and alignment of the geomagnetic field (Fig. 2) have been answered (see box). However, the reason why the polarity of the magnetic field has reversed itself on a number of occasions throughout earth's history is still a riddle (Fig. 3). Before an answer to this riddle can be found, the polarity and strength of the magnetic field must be reconstructed as far back in time as possible. EAWAG has been able to show that the measurement of radioisotopes in ice cores represents a new method of calculating the geomagnetic field.

Origin, Orientation and Strength of the Geomagnetic Field

The earth is surrounded by a magnetic field (Fig. 1). The origin of this magnetic field lies in the convection fluxes of fluid iron in the earth's center: as in the case of water, hot iron rises to the outside and cold iron sinks to the center.

The direction of the axis of the magnetic field does not correspond to the earth's axis; i.e. the magnetic poles do not coincide with the geographic poles (Fig. 1). In addition, the magnetic poles are continually migrating. In the last 2000 years, the magnetic north pole has shifted thousands of kilometers over the Arctic (Fig. 2). About 300 years ago it reached Greenland. Today it lies in Canada, and it is unclear where it will go in the future.

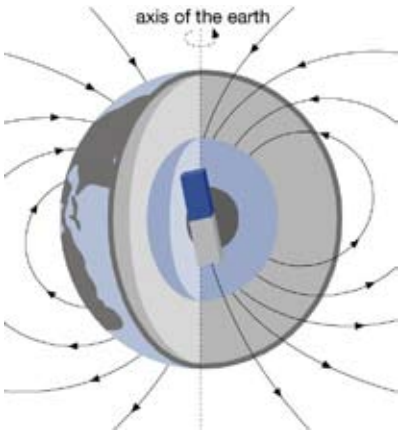

Fig. 1: The geomagnetic field can be depicted in simplified form as a dipole field produced by an imaginary bar magnet located at the earth's center. This bar magnet is slightly askew with respect to the earth's axis of rotation.

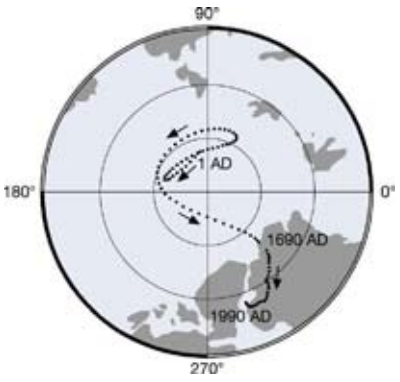

Fig. 2: Migration of the magnetic north pole through the Arctic during the last 2000 years [1]. The migration continues.

Not only has the orientation of the magnetic field varied over time, its strength has done likewise. Of particular interest is when the field strength approaches zero. In this case, when the field intensity increases again, a reversal of polarity can occur, meaning that the magnetic north pole is suddenly in the southern hemisphere, where it usually remains for several hundred thousand years before flipping back again to the northern hemisphere. The timing of a reversal does not appear to follow any particular pattern, and is, therefore, impossible to foresee. The last reversal of polarity, the so-called Brunhes-Matuyama polarity reversal, occurred some 780,000 years ago (Fig. 3).

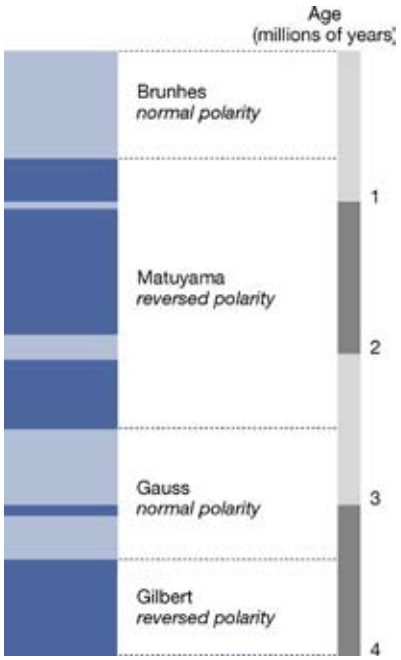

Fig. 3: Reversals of the polarity of the geomagnetic field over the past 4 million years. In the light-blue time periods the polarity was the same as today; in the dark-blue periods the polarity was reversed. Some epochs are named after researchers dedicated to solving the riddles of the geomagnetic field.

Paleo Records Reveal the Earth's Magnetic Field

Traditionally, paleomagnetists use sediments and volcanic rock to reconstruct the geomagnetic field. In sediments, it is the magnetic particles which have been deposited layer by layer throughout the past that are of interest. As long as these particles remained mobile within the sediment, they would align themselves with the magnetic field like a compass needle. The stronger the magnetic field, the more they display this characteristic. This allows the direction and intensity of the earth's past magnetic field to be determined from sediment cores. Similarly, volcanic rock reveals the past through the outpouring of high temperature rock mass from deep within the earth's interior during a volcanic eruption. So long as the lava is fluid, it is not magnetizable. Only during cooling do ferro-magnetic particles align themselves with the geomagnetic field.

These methods of geomagnetic field reconstruction are most applicable when the magnetic field was strong, the sediment homogeneous and rich in magnetic particles, and the recorded magnetic field not disturbed subsequently by other processes.

The Radioisotope Method

The new radioisotope method is based on the analysis of polar ice cores. Although this ice consists almost entirely of only the purest of water, and contains effectively no magnetic particles, it can nevertheless reveal invaluable information concerning the history of the geomagnetic field. This information can be read from the trace amounts of radioisotopes, such as beryllium-10 (10Be) and chlorine-36 (36Cl), found in the ice. A strong geomagnetic field shields the earth from cosmic radiation, reducing the production of radionuclides. When the magnetic shield is "switched off", however, the global nuclide production rate more than doubles. If we assume that the slow change in 10Be and 36Cl found in the ice is caused by the magnetic field, and that the faster solar variations are averaged out, then we have at our disposal a new, completely different method of reconstructing the historical strength of the geomagnetic field. It differs from the traditional methods in that its sensitivity actually increases with decreasing field strength. Another advantage of this new method is that it is hardly affected at all by local variations in the magnetic field.

Is the Radioisotope Method Reliable?

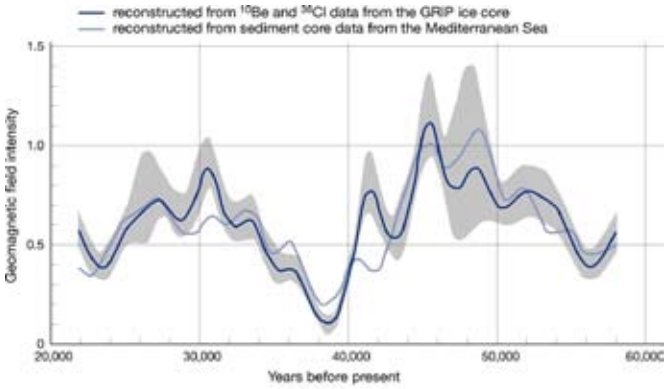

Fig. 4: Reconstruction of the geomagnetic field strength over the time period 20,000–60,000 years before present. Comparison of the radioisotope method (dark-blue curve: combined 10Be and 36Cl data from the GRIP ice core [2]) with traditional methods (light-blue curve: orientation of magnetic particles in a sediment core from the Mediterranean Sea [3]). The gray band represents the range of uncertainty of the radioisotope method. The range of uncertainty of the traditional method is not shown.

In order to assess whether the radioisotope method does in fact produce reliable results, we have made a direct comparison of the two methods. Figure 4 shows the magnetic field strengths as reconstructed from 10Be and 36Cl concentrations in the GRIP ice core from Greenland [2], and from traditional measurements of Mediterranean Sea sediment cores [3]. Apart from a few digressions, the results of the two methods agree well. The radionuclide measurements, for example, confirm that the earth's magnetic field weakened about 40,000 years ago to around 10% of its current strength. However, just before a reversal of polarity could occur, it returned to its old state.

The radioisotope method has therefore passed its baptism of fire. In the future, it can be used to analyze the entire time range covered by ice cores and sediment cores, thereby making it possible to reconstruct the geomagnetic field back to about one million years ago.

And what about the future? When can we expect a new reversal of polarity? For about 2000 years the magnetic field strength has decreased continuously, so if the rate remains constant we will experience another magnetic polarity reversal within about another 2000 years. We humans will not notice this, but for migratory birds, which rely on the geomagnetic

field for orientation, it is unclear what effect this will have on their ability to find their destinations.

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Jürg Beer, physicist and leader of the Radioactive Tracers group in the Department of Surface Waters, is a titular professor at ETH Zurich. His research areas are cosmogenic radionuclides and effect of solar activity on the climate.

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Fig. 5: Juerg Beer.

Teach the Earth

The Science Education Resource Center Portal for Geoscience Faculty

The Science Education Resource Center (SERC) works to improve undergraduate science education through projects that focus on supporting faculty. An office of Carleton College, its work is supported through National Science Foundation grants. The office has special expertise in geoscience education, community organization, workshop leadership, digital libraries, and website development.

At the site, you can find information about:

* **Teaching:** Using visualizations and datasets and models, interactive lectures, fields labs, quantitative literacy, petrology, structural geology, designing courses, assessment and much more....

* **An Earth System Approach:** An overview of this approach with teaching resources, biocomplexity, geology and human health.

* **Integrating Research and Education:** Using research results in geoscience courses, addressing NSF's broader impacts and bringing research on learning to the geosciences.

* **Managing your Career:** Future faculty, early career faculty, professional development resources.

* **Developing Web Resource:** Putting course materials online and making datasets accessible to educators.

* **Departments:** Building strong geoscience departments.

The site is certainly worth a visit from university teachers.

More than 8,000 participants in the last Assembly in Wien

The last EGU General Assembly, Vienna, Austria,
24 – 29 April 2005, draw more than 8,000 participants.
Below the top 10 counties list:

Germany	1354
France	912
USA	906
Italy	731
UK	729
Austria	351
Switzerland	337
Spain	283
The Netherlands	246
Russian Federation	180

ESA Science and Technology site

http://sci.esa.int/

This site, operated by the European Space Agency (ESA), provides a variety of information on themes related to science and technology. The site focuses on ESA's own activities, and the available information is in a number of different formats, such as text, video, images, links to scientific publications, links to missions, event announcements etc.

The targeted audience is mainly informed scientists and engineers (specialised scientists are served through the www.rssd.esa.int site). The site is worth a visit.

SOLAS Summer School 2007 - (Course)

22/10/2007 - 03/11/2007 - Corsica, France

The SOLAS Summer School is a biennial, international event that brings together over 70 students and 20 lecturers for a mix of lectures and practical workshops. It aims to teach the skills and knowledge of the many disciplines needed to understand the nature of ocean-atmosphere interactions. It allows doctoral students and early-career researchers to see how their work fits into the broad canvas of SOLAS, and global change research more generally.

The 2007 school will be held at the Institut d'Etudes Scientifiques de Cargèse in Corsica, France. Early programme lists the lectures and practical workshops that will made up the school 2007 is already available at the website.

Application details (Application not open yet for 2007)

The aim of the SOLAS summer school is to teach the multidisciplinary skills and knowledge needed to understand the nature of ocean-atmosphere interactions. The School allows doctoral students and early-career researchers to see how their work fits into the broad canvas of SOLAS and the global change research effort.

Therefore we welcome applications from scientists early in their careers, either working towards or having recently completed a doctorate on a topic related to SOLAS or showing strong interests in SOLAS research. The School is an international event and we welcome applicants from economically less developed countries.

Applications will be judged on:

* The level and suitability of your qualifications (neither too high, nor too low)
* The relevance of your study and interests to SOLAS themes
* The quality of your responses on the application form, particularly the personal statement.

The evaluation of the applications is independent of funding

In 2003 and 2005, we received 232 and 220 applications of which 72 and 73 were successful, respectively. We expect a greater response for the 2007 School and have a similar number of places available.

Financial support

We have limited funds to support your attendance at the school. Bursaries will be offered to as many students as possible, selected according to the quality of the applications and to the restrictions imposed by the funding agencies. These will cover some or all of the costs of attendance. The number and value of the bursaries that we will be able to provide depends on the number of applications that will be assessed.

Successful applicants will be notified of their level of financial support when they are offered a place at the School. This will allow time for alternative funding to be sought by those who are not offered a bursary.

If you have your own funding available to attend the School (e.g. through your studentship) please indicate this on the application form and allow us to use our resources efficiently. If you do not have any funds to support your own attendance this will not affect the sucess of your application.

Costs of attendance

Registration Fee. Payment of registration fee (approximately 300€) will be required from each student. This is needed to cover the costs of your local transport, your meals at the Institute and some of the other costs associated with running the school. If you receive a bursary, this will cover your registration fee.

Accommodation. A variety of accommodation types, ranging from camping to apartments, are available in the small town of Cargèse, near the Institute where the school is held. You will have to pay for this on departure. Costs are in the range of 3.50€ for camping to 20-35€ for a shared apartment per night.

Food. Lunch and coffee breaks will be provided at the Institute. We estimate that you will need at least 20€ per day to cover breakfast and an evening meal.

Timeline of application

*Sept 2006: Opening of the application. Apply on line.

*Feb 2007: Application deadline. All applications will be sent to two members of the Scientific Committee for review.

*March 2007: Invitations and approximate level of financial support sent to accepted students.

*April 2007: Deadline for student responses.

Organizer:
SOLAS
http://www.solas-int.org/

Implementation of the US EPA Models-3 Air Quality Modelling system - (Course)

30/07/2006 - 08/08/2006 - Sofia, Bulgaria

The Bulgarian National Institute of Meteorology and Hydrology with the support of the EC Network of Excellence ACCENT (Atmospheric Composition Change European Network) and the CMAS Center, NC University, USA, organize a training

course for implementation of the US EPA Models-3 Air Quality Modelling system (WRF-CMAQ-SMOKE) in Sofia, Bulgaria, from 30 July to 8 August 2006. Young scientists from all European countries are encouraged to participate. Special attention is paid to Central and East-European countries and all ACCENT member and associate members.

Deadline for applications: 25 June 2006.

Organizer:
The Bulgarian National Institute of Meteorology and Hydrology
http://info.meteo.bg/ACCENT-CMAS_TW

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Summer Field Courses - MARINE MAMMALS AND THEIR MARINE ENVIRONMENT - (Course)

16/09/2006 - 25/09/2006 - Island of Patmos, Greece

The non-profit environmental organisation Archipelagos conducts for over five years a comprehensive study on the biodiversity of the marine and terrestrial island ecosystems in Greek waters. In addition to our volunteer program, we open three field courses this summer. They are aimed at students and graduates of marine and environmental sciences, as well as all related fields. Course language is English. Field work will be done both during boat-based and during snorkelling-based surveys.

Archipelagos announces its field courses for the summer of 2006, held on the island of Patmos, Northern Dodecanese. These ten-day courses present an integrated perspective by introducing active areas of research in studying the marine biodiversity, with a special emphasis on the marine mammal populations of the Aegean Sea.

Participants of the course will gain from the expertise and hands-on experience during the course. Combined with informational seminars and lectures, they will be trained during this field and laboratory-intensive course in ecologically-relevant research techniques, including bioacoustics, line-transect studies of the ecology of coastal ecosystems for different target species, passive acoustic monitoring, behavioural sampling, acquisition and application of GIS databases with demonstrational computer workshops, and photo-identification of cetacean species in mark-recapture analysis.

The course content is highly applied, as is the daily work of the Archipelagos Institute, which aims at developing sustainable management concepts for the natural wealth of the Aegean Sea in co-operation with the local community. The waters around the islands of the Northern Dodecanese are home to an abundance of habitats (e.g. extended Posidonia seagrass beds) and marine species, many of which are particularly rare and under international protected status, as for example a large population of short-beaked common dolphins (Delphinus delphis), the last known in the entire eastern Mediterranean Sea, or the Mediterranean monk seal (Monachus monachus), with a world wide population of only a few hundred individuals one of the most endangered mammal species altogether. In total six species of marine mammals inhabit the waters of the area. Beside the two former mentioned marine mammals, the are bottlenose dolphins (Tursiops truncatus), Risso's dolphins (Grampus griseus), striped dolphins (Stenella coeruleoalba), sperm whales (Physeter macrocephalus), and Cuvier's beaked whales (Ziphius cavirostris).

The design of the course is aimed at students and graduates of marine and environmental sciences, as well as all related fields. Course language is English.

Field work will be partly done during boat-based surveys and partly during snorkelling-based surveys. Boat surveys depend on weather conditions and might start very early in the morning, when observational conditions are usually best.

Course dates are 5–24 July, 19–28 August and 16–25 September.

Lecturers (beside others):

Frank Veit, PhD - Free University of Berlin, Marine Mammal Research Co-ordinator

Anastasia Miliou, PhD cand. - Scientific Director of Archipelagos Institute

Catriona Lynch, MSc - Archipelagos Institute, Coastal Zone Manager & GIS Expert

Giuseppe Notarbartolo di Sciara (Guest lecturer in the first two courses)

Topics covered in the field course:

--Biology and conservation of marine mammals of the Eastern Aegean Sea.

--Visual survey methods to assess the abundance of cetacean populations.

--Passive acoustics: a modern tool to study cetacean behaviour, habitat characteristics and estimating cetacean abundance.

--First aid to marine mammals & turtles.

--Coastal ecosystems.

--Fish fauna of the Eastern Aegean Sea: biology and conservation.

--Algae and invertebrate biodiversity of the Eastern Aegean Sea.

--Application of GIS (Geographic Information System) analysis in marine biodiversity studies.

--Fisheries: Socio-economical importance and impact on marine ecosystems.

--Management of marine & island ecosystems.

Organizer:
Archipelagos Institute of Marine & Environmental Research of the Aegean Sea
www.archipelage.gr

Ocean Optics Conference 2006 - (Meeting)

09/10/2006 - 13/10/2006 - Montreal, Canada

From the inception, the Ocean Optics Conference series has attracted a diverse audience of professionals and students addressing virtually every facet of optical oceanography including basic research, technological development, environmental management, and policy. Over the course of the 40 year history of the series, the conference has increased in scope and attendance and has become spiced with topics of local interest as the venues have become more varied and representative of the international oceanographic community. In this tradition, Ocean Optics XVIII will convene in Montreal, Quebec, 9-13 October, 2006 and is expected to attract a diverse international audience and focus on many science issues of interest within the research community.

Sessions will generally be topical, derived from the submitted abstracts, and will be comprised of invited overview lectures and contributed papers. All contributed papers will be presented as posters and a subset will be selected by the planning committee for oral presentation.

Another tradition of the Ocean Optics Conference series is the construction and distribution of conference proceedings. Each contributed paper will be submitted as an extended abstract and the collected works distributed to all conference attendees in the form of a word-searchable CD ROM. The cost of the proceedings is included in the registration fee.

Finally, if there is a centerpiece of the conference, it is the banquet where attendees experience fine local cuisine and entertainment, are presented with an interesting and thought-provoking dinner talk, and participate in the Jerlov and Best Student Paper awards ceremonies.

http://www.oceanopticsconference.org/

3rd International Symposium on Integrated Water Resources Management - (Meeting)

26/09/2006 - 28/09/2006 - Bocum, Germany

IWRM – a crucial approach for sustainable development

The ICWRS (International Commission on Water Resources Systems) of IAHS has, since many years, embraced Integrated Water Resources Management (IWRM) as the main topic for its research agenda. The need for integrated approaches to deal with the complex water management issues in both the developed and developing world is recognised throughout the world. However, in many places IWRM is still merely a concept and not yet an established approach with practical applications. As a result, the ICWRS has organised regular symposia on Integrated Water Resources Management, each focussing on a topical aspect of IWRM.

In 2006, the third symposium of the series will be hosted by the Ruhr-University in Bochum, Germany. It will address the very important subject of how to cope with water-related vulnerability of societies. This vulnerability relates to many aspects of water resources: environmental risks, floods, droughts, pollution, water logging and options to create resilience against these risks. The subject is highly relevant and it involves considerable scientific challenges to develop practical tools for quantifying and dealing with vulnerability. Considering the challenges of a fast changing world, joint activities to reduce vulnerability against water related risks are a very important point on the international agenda.

This symposium in Bochum will make a special contribution by providing a platform for the international exchange of research results that relate to IWRM. You are cordially invited to bring your scientific expertise to this symposium and to make this symposium with your personal contribution an outstanding scientific event, which will appropriately address the emerging needs in Integrated Water Resources Management over the next decades.

Under the auspices of:

International Association of Hydrological Sciences (IAHS) - International Commission on Water Resources Systems (ICWRS)

Jointly organised by:

- Ruhr-University Bochum - Institute of Hydrology, Water Resources Management and Environmental Engineering
- UNESCO-IHE Delft (Institute for Water Education)
- German National Committee for the International Hydrological Programme (IHP) of UNESCO and the Hydrology and Water Resources Programme (HWRP) of WMO
- United Nations University Bonn (Institute for Environment and Human Security)

http://www.conventus.de/water

Markus Pahlow
Institute of Hydrology, Water Resources Management and Environmental Engineering, Ruhr-University Bochum, Germany
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International Symposium on Snow Science - (Meeting)

03/09/2007 - 07/09/2007 - Moscow

Snow is a complex and short-lived sediment with many effects on its surroundings. The emphasis will be on the internal processes and external interactions of snow with natural and man-made systems. A better understanding of the interfacial properties of snow is required to define exchange mechanisms that drive chemical, ecological and hydrological processes in many regions of the world. The snow interface also determines how roads, buildings, ski-pistes and other man-made systems are designed and used. How atmospheric interactions contrib-

ute to the formation of snow avalanches and other cold-region natural hazards will be a further conference topic, as will be snow in motion and modelling snow under static and dynamic loadings, since these are key issues in engineering problems.

We hope to bring together researchers working on the physical properties of snow with scientists working on ecological, hydrological and engineering problems in which the understanding snow processes plays a key role. Snow will be examined at all scales - from the microscale of snow structure to the megascale of remote sensing. The conference theme is to pay homage to the International Polar Year 2007? 2008.

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IV ENCUENTRO RUPSUR 2006: VARIABILIDAD Y CAMBIO CLIMÁTICO - (Meeting)

08/11/2006 - 10/11/2006 - Cali- Colombia

El clima se manifiesta en cambios estacionales que ejercen gran influencia sobre las pautas culturales de la sociedad. El fenómeno El Niño Osiclación Sur (ENOS) causa grandes y a veces extremas perturbaciones climáticas.los impactos socioeconómicos y ambientales, recaen de forma desproporcionada sobre los países en desarrollo, en especial sobre los sectores más pobres, poniendo en riesgo el logro de las Metas de Desarrollo del Milenio.

En este contexto, el IV Encuentro de RUPSUR 2006 reune expertos en el tema con el objetivo de compartir conceptos y experiencias sobre el fenómeno El Niño Oscilación Sur (ENOS), analizando los impactos socioeconómico y ambiental, asi como las tendencias y los desafíos en relación con las metas del milenio, a fin de fortalecer la Red de Universidades del Pacífico Sur –RUPSUR- y establecer programas de acción alrededor del tema.

Organizer:
La Universidad del Valle en representación de la Red de Universidades del Pacífico Sur RUPSUR. La RUPSUR esta conformada por investigadores de Universidades de Ecuador, Perú, Chile, Bolivia, Paraguay, Argentina, Venezuela y Colombia.

http://rupsur2006.univalle.edu.co

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