

NEWSLETTER & INFORMATION SERVICE OF THE E.G.U.

ISSUE 13, NOVEMBER 2005 AVAILABLE ON-LINE AT www.the-eggs.org



An Interview with Shaun Quegan

The ENSEMBLES Project Providing ensemble-based predictions of climate changes and their impacts

European Spatial Planning Adapting to Climate Events

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



John Ludden EGU President

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John Ludden obtained his PhD from the University of Manchester, UK, 1976, on Igneous Petrology. He is Directeur Adjoint, INSU/SDU, CNRS Directeur de Recherche, classe exceptionelle. He was Director of CNRS Federation de Recherche Eau-Sol-Terre FR-EST during 1996 - 2002.

For the years 2003 - 2007 he is Core Group member of the ESF Life and Environmental Sciences Committee. He served as president of the European Union of Geosciences during

2003 - 2004. During 2003 - 2004 he was also a member of the ESF Refereeing Task Force.

John Ludden is Council Member of the European Association of Geochemistry, Vice-president of the International Association of Applied Geochemistry and member of CE - Committee on Research Infrastructure.

His research interests include crustal evolution, mafic magmatism through time, early Earth processes. He was Cochief scientist at ODP Leg 185, "The Subduction Factory" and transect leader for the Abitibi-Grenville LITHOPROBE project.

Atmospheric Sciences: Prize winners of the 2005 YSOPP awards

Ana Aguiar, Andrew Vlasenko, and Charlotte Stenby received the 2005 YSOPP Atmospheric Science awards during the last EGU Assembly in Wien.

The following students received the Young Scientist Outstanding Poster Paper (YSOPP) Atmospheric Sciences awards during the last EGU Assembly in Wien:

Ana Aguiar (aguiar@atm.ox.ac.uk) for the poster entitled Instabilities of a barotropic rotating shear layer in a rotating fluid by Aguiar A.; Read, P. Ana Aguiar is currently a 2nd year DPhil student at the Department of Atmospheric, Oceanic and Planetary Physics in the University of Oxford, under the supervision of Professor Peter Read. The present work aims to study the response of a detached shear layer to boundary conditions of different topography, combined with either prograde or retrograde mechanical forcings, in a barotropic rotating fluid. Her particular interests are in laboratory experiments and numerical simulation of hydrodynamic instabilities and their applications in geophysical and planetary fluid dynamics.

Andrew Vlasenko (<u>nevasit@list.ru</u>) for the poster entitled The role of surface active agents in the processes of heat (mass) transfer in a system ocean-atmosphere by Vlasenko, A.V.; Lapchin, V.B. Andrew Vlasenko received his BSc degree in Physical Oceanography at Moscow Institute of Physics and Technology (State University) in 2004. His MSc thesis concerns the problem of ocean-atmosphere interaction with the focus on theoretical and numerical modelling of gravity/ capillary convection.

Charlotte Stenby (stenby@mpch-mainz.mpg.de) for the poster entitled Ozonolysis of monoterpenes: Temperature dependence of SOA yields by Stenby, C.; Winterhalter, R.; Nielsen, O. J.; Moortgat, G. K. Charlotte Stenby is a Ph.D.student at the Max Planck Institute for Chemistry, Department of Atmospheric Chemistry. He is working with secondary organic aerosols produced by ozonolysis of volatile organic compounds of biogenic origin. The main interest is the influence of the temperature on the formation and growth of the secondary particles.

You can download the poster as pdf-file at <u>http://meetings.</u> copernicus.org/egu2006/ysopp_awardees.html.

Jelle Bijma new Biogeosciences Division President

After a very successful term, the founding president of the Biogeosciences Division of EGU, Jean-Pierre Gattuso, has stepped down. He will be succeeded by Jelle Bijma for the next term.

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Jelle has studied biology (1979-1984) at the State University of Groningen (The Netherlands). His later PhD advisor, Bert Boekschoten, got him interested early in the playground between biology and geology. He picked up geology as a subsidary subject and, when rewarded a Dutch-Israeli fulbright Scholarship in 1984, he did his Master degree on biological and paleoceanographic aspects of planktonic foraminifera in the laboratory of Jonathan Erez in Israel. In 1985 he moved on to the Institute and Museum for Geology and Paleontology at the University of Tübingen (Germany) where he worked as a research assistant with Christoph Hemleben for 8 years. During this time he participated in several cruises of RV "Meteor", carried out many field campaigns to the Caribbean and finally received his PhD degree in Marine Biology and Actuo-micropaleontology.

In 1993 he moved to the Alfred-Wegener Institute for Polar and Marine Research (AWI), where, with the generous support of its scientific director Max Tilzer, he founded the interdisciplinary Carbon Group (together with his colleagues Dieter Wolf-Gladrow and Ulf Riebesell). At that time he also teamed up with Howard Spero (UC Davis) David Lea (UC Santa Barbara) to continue laboratory cultures of planktonic foraminifera in Catalina Island and Puerto Rico. In 1997, he joined the expanding Department of Marine Geosciences at the University of Bremen, led by Gerold Wefer, where he was allowed to continue his cooperation with the UC colleagues for two years. Finally, after 9 years of post doctoral research experience in various aspects of foraminiferal ecology, stable isotope and trace element geochemistry and paleoceanography, he was offered a permanent position in 1999 as senior research scientist at the AWI. He went back to the "Carbon Group" at AWI, which recently evolved into the section "Marine Biogeosciences".

Since 2004 he is also adjunct professor of Marine Geosciences at the International University Bremen (IUB). Currently his principal research interests focus on the mechanistic understanding of geochemical proxy-relationships, the marine carbon cycle and its impact on climate change. He is editor of the EGU open journal "Biogeosciences", involved in many (inter)national collaboration projects and author or co-author of more than 40 scientific papers and several popular science articles.

Special ISI Report on ACP

ACP now among top 50% geosciences journals

Following up on the latest Journal Citation Report, the Institute of Scientific Information (ISI) has published a special report on Atmospheric Chemistry and Physics (ACP) in the "In Cites" section of the ISI Essential Science Indicators:

http://www.in-cites.com/journals/2005menu.html

http://www.copernicus.org/EGU/acp/journal_impact_ factor.html

The journal impact factor has increased from 2.3 in 2003 to 2.7 in 2004, which is well among the top journals in "meteorology & atmospheric sciences" (incl. climate sciences), "multidisciplinary geosciences", and "environmental sciences"

(ISI journal categories). For details on the impact factor and other statistical parameters and bibliometric data of ACP and related journals go to <u>http://www.copernicus.org/EGU/acp/acp_icr2004.pdf</u>

According to a recent analysis for in-cites, the journal Atmospheric Chemistry & Physics has entered the top 50% of journals in the field of Geosciences.

Ulrich Poeschl ACP Executive Editor

ACP/EGU contribution to a recent UNESCO/CODATA workshop

An International Workshop 'Creating the Information Commons for e-Science: Toward Institutional Policies and Guidelines for Action'

An International Workshop, 'Creating the Information Commons for e-Science: Toward Institutional Policies and Guidelines for Action', took recently place at the UNESCO headquarters, Paris, France.

The workshop was sponsored by the Committee on Data for Science and Technology (CODATA), the International Council for Scientific and Technical Information (ICSTI), the International Network for the Availability of Scientific Publications (INASP), the International Council for Science (ICSU), the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Academy of Sciences for the Developing World (TWAS) in collaboration with the Organization for Economic Co-operation and Development, OECD.

The workshop aimed to promote development of institutional policies and guidelines for action in support of the "information commons" for e-science. The work plan comprised four objectives:

--Review opportunities/challenges for realising global collaborative e-science on the emerging "cyber-infrastructure."

--Review government and university mechanisms for managing publicly funded scientific information in the digitally networked research environment; identify problems and develop procedural solutions.

--Identify and analyse institutional, economic, policy, and legal benefits/drawbacks to providing public access to and unrestricted use of publicly funded scientific information.

--Put forward resolutions/recommendations that enable the

scientific community to more effectively utilise publicly funded scientific data and information.

At the first WSIS meeting (Geneva, December 2003), 175 countries adopted a Declaration of Principles and Plan of Action recognising that science has a central role in the development of the information society. Delegates affirmed the principle of promoting "universal access, with equal opportunities for all, to scientific knowledge and the creation and dissemination of scientific and technical information".

Now, in anticipation of the final WSIS meeting (Tunis, November 2005), this workshop focused on taking practical steps to ensure that both mechanisms and policies related to the production, dissemination, management, and application of scientific data and information support and strengthen the WSIS Principles and Plan of Action.

Ulrich Pöschl, chief ACP Editor, made an ECP/EGU contribution to the workshop entitled 'Atmospheric Chemistry & Physics (ACP): An Interactive Open Access Journal of the European Geosciences Union (EGU) for Improved Scientific Communication and Quality Assurance by Public Peer Review & Interactive Discussion'. Below an abstract of the contribution.

The traditional ways of scientific publishing and peer review do not live up to the needs of efficient communication and quality assurance in today's rapidly developing and highly diverse world of science. Thus research and teaching are increasingly inhibited by a lack of scientific information density, accessibility, and reliability. Substantial improvement can be achieved by open access publishing with a two-stage publication process, public peer review, and interactive discussion (interactive open access journal concept). This approach enables rapid publication and dissemination of new scientific results in discussion papers followed by thorough and transparent peer review which is open for comments from the global scientific community (permanently archived and fully citable), and it leads to final revised papers with maximum quality assurance and information density.

The concept has been successfully realized and applied in the international scientific journal Atmospheric Chemistry and Physics (ACP, <u>www.atmos-chem-phys.org</u>), which is edited by a globally distributed network of scientists, including the Nobel Laureate Paul Crutzen, and published by the innovative scientific service provider Copernicus (<u>www.copernicus.org</u>) on behalf of the European Geosciences Union (EGU, <u>www. copernicus.org/EGU</u>).

The achievements of ACP, including publication and citation statistics as well as the feedback from colleagues around the world, show that the opportunities and advantages of open access, public peer review, and interactive discussion are very much appreciated by authors, referees, and the scientific community. The ISI Journal Citation Report 2004 confirms that only three years after its launch ACP was already firmly established among the top journals in the fields of environmental and geosciences.

http://www.copernicus.org/EGU/acp/acpd/published_ papers.html, http://www.cosis.net/members/journals/df/ ranking.php?j_id=1, http://www.copernicus.org/EGU/acp/ journal_impact_factor.html

EGU has adopted the interactive open access journal concept of ACP for all future publication activities. Over the past couple of years, three new sister journals have been launched (Biogeosciences, Climate of the Past, Ocean Science) and one traditional journal has been adapted to the new publishing approach (Hydrology and Earth System Sciences). Further EGU interactive open access journals are in preparation (Geology, Geodesy, etc.).

http://www.copernicus.org/EGU/publication/mission_ statement_for_publications.html

Moreover, multiple scientific societies and commercial publishers in related and different fields of science, including biology, engineering, and economics, have expressed interest in adopting the interactive open access publishing concept. Overall, the EGU interactive open access journals clearly demonstrate that

1) scientific societies can take a lead in open access publishing with innovative techniques of manuscript processing and quality assurance;

2) open access publishing allows to enhance scientific quality assurance by interactive forms of review and discussion open to the whole scientific community;

3) high quality open access journals can be financed by modest service charges levied from the authors and research funding agencies (sustainability of "author pays" business model for open access publishing);

4) two-stage (or multi-stage) publication processes with public peer review and interactive discussion indeed foster scientific discussion; enhance the effectiveness and transparency of scientific quality assurance; and achieve rapid publication and dissemination of new scientific results.

Based on the experiences of the EGU interactive open access journals and other innovative and successful open access publishing initiatives, the following measures are proposed to pave the way for substantial large-scale improvement of scholarly communication and scientific quality assurance:

1) support open access publishing by transformation of subscription charge funds into open access service charge funds to create a more dynamic and innovative market for the exchange of scientific information;

2) promote the implementation of two-stage (or multi-stage) publication processes with interactive forms of peer review and public discussion as new standards of scientific publishing and quality assurance;

3) exploit the full potential of open access and interactive public discussion to develop new and improved tools and (statistical) indicators for the assessment of the impact and quality of scientific publications.

References:

Interactive journal concept for improved scientific publishing and quality assurance, Learned Publishing, 17, 105-113, 2004 (www.atmos-chem-phys.org/ad_page.html)

Interactive peer review enhances journal quality, Research Information, September/October 2004 (<u>www.atmos-chemphys.org/ad_page.html</u>)

ISI Essential Science Indicators, InCites Journals, August 2005 (www.in-cites.com/journals/AtmosphericChe-N-Phy. html).

Venus Exploration Analysis Group (VEXAG)

Recently, at the request of NASA, a Venus Exploration Analysis Group (VEXAG) has been formed. This Group is intended to represent the interests of the scientific community interested in the further exploration of planet Venus, and provide input to NASA on potential future Venus missions. We would particularly like to see broad international participation in VEXAG activities.

If you have a wish to participate in VEXAG or simply want to stay informed of Venus-related activities internationally, please register at out web site http://www.lpi.usra.edu/vexag. While this site is still under construction, it is intended to act as a locus for information on Venus activities, and as an archive for and connection to Venus data.

VEXAG is chartered by NASA's Solar System Exploration Division and reports its findings to NASA. Open to all interested scientists, VEXAG regularly evaluates Venus exploration goals, scientific objectives, investigations and critical measurement requirements, including especially recommendations in the NRC Decadal Survey and the Solar System Exploration Strategic Roadmap.

VEXAG is currently co-Chaired by Sushil Atreva, University of Michigan, Ann Arbor, and Janet Luhmann, University of California, Berkeley.

recently formed at the request of NASA

Two focus Groups have been formed within VEXAG, namely:

* Planetary Formation and Evolution: Surface and Interior, Volcanism, Geodynamics, etc. Focus Group Lead: Steve Mackwell, LPI

* Atmospheric Evolution: Dynamics/Meteorology, Chemistry, Solar Wind Interaction, Escape, etc. Focus Group Lead: Kevin Baines, JPL

In addition to interested members of the scientific community, each focus group will include technology experts, NASA representatives, international partner representatives, EPO experts, and the two VEXAG co-chairs. The current focus groups and their leads are listed above. Other focus groups may be added, as needed.

> Stephen Mackwell Director, Lunar and Planetary Institute Houston / Texas, USA mackwell@lpi.usra.edu

European Science Foundation (ESF) Call for Scientific Programme Proposals

The European Science Foundation is pleased to announce a Call for Proposals for new Scientific Programmes.

An ESF Scientific Programme is a networking activity bringing together nationally funded research activities for four to five years, to address a major scientific issue or a science-driven topic of research infrastructure, at the European level. For more information see:

http://www.esf.org/esf genericpage.php?language=0§ion=2&domain=0&genericpage=2309 The deadline for receipt of proposals is 4 November 2005; 24:00hrs CET.

ESF

EU research: The EU's new Research Framework Programme 2007-2013

On 6 April the European Commission adopted a proposal for a new EU programme for Research. The proposal aims to "provide new impetus to increase Europe's growth and competitiveness, recognising that knowledge is Europe's greatest resource".

The programme places greater emphasis than in the past on research that is relevant to the needs of European industry. The programme will also for the first time provide support for the best in European investigator-driven research, with the creation of a European Research Council. Another priority will be to make participation in the programme simpler and easier, through measures addressing the procedures, plus a rationalisation of instruments.

This note sets out the details of the Commission's proposal, which is now to be debated by the Member States (Council) and European Parliament, before a final Decision is adopted.

What is the Commission's proposal?

The Commission has put forward a proposal for the EU Seventh Research Framework Programme 2007-2013 (FP7), subtitled "Building the European research area of knowledge for growth". The Commission proposes in particular to double the FP7 budget compared with FP6, rising to EUR 67.8 billion over the period 2007-2013. According to the Commission proposal, FP7 will be organised in four specific programmes.

1. Cooperation

Objective: to gain European leadership in key areas through co-operation of industry and research institutions. Support will be given to research activities carried out in trans-national cooperation, from collaborative projects and networks to the coordination of national research programmes.

The Cooperation programme is organised into sub-programmes which will be operationally autonomous and at the same time coherent and consistent, and allow for joint, crossthematic approaches to research subjects of common interest. Nine themes have been identified:

- * Health
- * Food, agriculture and biotechnology
- * Information and communication technologies

* Nanosciences and nanotechnologies, materials and new production technologies

- * Energy
- * Environment (including climate change)
- * Transport (including aeronautics)
- * Socio-economic sciences and the humanities
- * Security and Space

In addition, two themes are covered by the Euratom Framework Programme:

- * Fusion energy research
- * Nuclear fission and radiation protection.

2. Ideas

Objective: To strengthen the excellence of our science base by fostering competition at European level. An autono-

mous European Research Council will be created to support "frontier research" carried out by research teams, either individually or in partnership, competing at European level, in all scientific and technological fields, including engineering, socio-economic sciences and the humanities.

3. People

Objective: To reinforce career prospects and mobility for our researchers Activities supporting individual researchers, referred to as "Marie Curie" actions, will be reinforced with the aim of strengthening the human potential of European research through support to training, mobility and the development of European research careers.

4. Capacities

Objective: To develop research capacities, so that the European science community has the best possible capacities at its service. Activities will be supported to enhance research and innovation capacity throughout Europe: research infrastructures; regional research driven clusters; stimulating the research potential in the EU's "convergence" regions; clustering regional actors in research to develop "regions of knowledge"; research for and by SMEs; "science in society" issues; "horizontal" activities of international co-operation.

The details of these programmes will be set out in specific legislative proposals later in the year.

What is different about this Framework programme compared to its predecessors?

There is an element of continuity with the past in the proposed Seventh Framework Programme. Projects undertaken by consortia of European partners will remain at the core of the programme, and the themes for these projects will remain more or less as now. The programme will continue to develop the concept of a European Research Area. Funds will be used to develop and increase those elements of previous programmes that worked well: Marie Curie, SME actions, collaborative projects, Networks of Excellence. The aim of continuity will be strengthened through a programme that lasts 7 years (with the possibility of a mid-term review).

There are also several new elements. A key feature of FP7 will be a simplification of its operation. Measures are being considered, in line with the future revision of the Financial Regulation, to make the programme more straightforward for potential participants. The programme places greater emphasis than in the past on research that is relevant to the needs of European industry. The programme will also for the first time provide support for the best in European investigator-driven research, with the creation of a European Research Council. Another priority will be to make participation in the programme

simpler and easier, through measures addressing the procedures, plus a rationalisation of instruments.

The European Commission has established a sounding board composed of representatives of small companies and research teams – groups which seem to face the biggest difficulties in participating in the programme. This sounding board will advise on whether measures proposed to make the programme simpler will in fact have the required effect.

The programme will have more focus than in the past on developing research that responds to the needs of European industry, through the work of Technology Platforms and the new "Joint Technology Initiatives". These will be projects in fields of major European interest on subjects identified through dialogue with industry, in particular in the European Technology Platforms.

The programme will establish for the first time a "European Research Council", funding the best of European science, as assessed by peer review of European scientists. This will be the first time that a body like this has existed at European level, identifying the very best of European research wherever and however it is carried out.

International co-operation will be integrated into all four programmes, allowing projects to be carried out with international partners.

Another new element will be the development of "regions of knowledge", bringing together research partners – such as universities, research centres, enterprises and regional authorities - in a region to strengthen their research potential.

FP7 will also comprise a "Risk-Sharing Finance Facility" aimed at fostering private investment in research by improving access to European Investment Bank (EIB) loans for large European research actions. This mechanism will enable broader EIB lending to RTD actions.

The new proposal is based on a year-long process of consultations with interested parties. The main elements of the proposal have been under discussion for some time and are unlikely to present any surprises.

In February of this year, an expert panel led by Dr Erkki Ormala, Vice President of Technology Policy at Nokia, presented its evaluation report on the previous 5 years of European Research and Development Programmes. It found that these programmes had made a major contribution to the development of Europe's knowledge base and had had a positive effect on Europe's potential for innovation. However, the panel found that if this positive effect was to be continued, more resources would be needed in the future. The panel also recommended more industry participation, especially SMEs; streamlined and simplified administration; and more emphasis on radical innovation and risk-taking.

The Commission has also had numerous meetings with groups of scientists, scientific organisations and other umbrella bodies, at political or technical level, to discuss its ideas for the new programme and to involve the views of the wider community as much as possible.

How will the Commission go about making the programme simpler?

The Commission is proposing a series of measures to address issues relating to implementation at every level of the programme. These measures include: * Rationalising the funding schemes – a new approach based on a simpler set of funding instruments

* Using simpler, less bureaucratic languages, that is free of jargon and user-friendly

* Reducing the number and size of documents

* Reducing the number of request to participants and instituting a lights submission procedure

* Reducing a priori controls (i.e. controls before the project is approved)

* Increasing the autonomy of consortia

* Streamlining the selection process

* Exploring new modes of funding and simplifying the costbased funding system.

(Note from the Editor: To what extend the Programme will be simplified, remains to be seen after implementation. There have been complains from participants of FP5 and FP6 programmes that from the financial resources dedicated to research, an increasing proportion was actually devoted to administration costs)

Even with the proposed increase in funds, the European research budget will represent less than 10% of public spending on research and development within the European Union, unless Member States follow the EU's lead and fulfil their commitment to devote more national resources to research and development.

The reasons for proposing the increase in resources for the budget are several:

* The structure of the EU's budget should reflect the political priorities of the EU.

* Spending on research at EU level has a leverage effect on other sources of private and public funding. Therefore a ¤70 billion programme at European level, although a small proportion of the total needed of the overall amount (about 0.1% of EU GDP, when the objective is to invest 3% of EU GDP) will nonetheless help to encourage greater spending overall.

* The political, economic and scientific context requires the development of a number of new actions that must be given sufficient funds if they are to fulfil their objectives.

* It is also the case that there are already significant numbers of high quality proposals that have to be rejected due to a lack of available funds. An increase in resources at European level would given an added boost to a whole range of scientific activities are European level that have up to now been left aside.

The European Commission will be responsible for implementing and managing FP7.

As the Commission will manage a doubled R&D budget without an increase in staff numbers, it proposes to have all logistical and administrative tasks, i.e. not related to policy, undertaken outside its services. As a consequence, part of the activities it currently carries out will be transferred to external structures operating under the Commission's responsibility, in particular those tasks which generate a large number of small operations, without providing significant feedback for the definition of programmes and policies. The activities of the European Research Council will also be part of an external structure, working autonomously under the governance of an assembly of eminent scientists.

EU Water Initiative – Research Component

Review of international S&T cooperation projects addressing integrated water resources management – Lessons to be learnt

Integrated water resources management is a key concept of the European Water Framework Directive (WFD) that also influences water policies and management discourses in many parts of the world.

As part of its commitment to the EU Water Initiative, the European Commission has invited 10 renowned experts, five from Europe and five from Africa, Asia, Latin America and the Mediterranean to review what lessons can be learnt from some 50 international S&T cooperation projects addressing integrated water resources management (IWRM) over the last 10 years, how much research results have been used to inform practice and how this should inform future cooperation in IWRM.

They will carry out most of their work in three working sessions in Brussels, scheduled as follows:

- 1. 18-22 July 2005
- 2. 19-21 September 2005
- 3. 24-29 October 2005.

The principal expected outputs of the review are:

- 1. A technical report
- 2. A policy brief
- 3. A brochure for a general public.

The draft technical report is scheduled for early November 2005 and will be validated by a large mirror group of experts in different parts of the world.

This international review is intended to be complementary to a more European-focused review process carried out under the auspices of the NeWater Project. Both reviews are closely coordinated.

Their combined results and the of experiences analysed will be presented to the 4th World Water Forum in Mexico City, 16-22 March 2006.

EC

Dr. Martin Grabert appointed as new Director of ESF-COST Office

He takes over from Tony Mayer, who recently retired after two years at the helm of this Brussels-based organisation

14 July 2005.- The European Science Foundation (ESF) today announced the appointment of Dr. Martin Grabert as the new Director of the ESF-COST Office, the intergovernmental framework for European co-operation in the field of scientific and technical research.

Dr. Grabert is currently Managing Director of the European liaison office of the German scientific research organisations (KoWi), and in his new role he takes over from Tony Mayer, who recently retired after two years at the helm of this Brusselsbased organisation. Dr. Grabert was selected from a shortlist of several high level applicants by a selection committee which included COST President Prof. Francesco Fedi and Prof. Bertil Andersson, CEO of the European Science Foundation.

"I'm very much looking forward to this new challenge," Dr. Grabert said. "The ESF-COST Office has an important role to play in the co-ordination of large, pan-European projects in the fields of science and technology. Its mission is to foster closer co-operation between the various national bodies of its 34 Member States, which it does by being science-driven rather than focusing on political concerns, and this science-driven focus is something I fully intend to continue and build on."

Dr. Grabert added that he would also be working to encourage even closer collaboration with the European Science Foundation. "Joint action is without a doubt the only way forward for scientific achievement in Europe. I want to help create a climate of mutual trust between our two organisations, an essential ingredient for the success of the kind of pan-European projects that we're involved in. I'm already very impressed by the high quality of the COST Technical Committees and how they interact with the ESF Standing Committees, and my predecessor Tony Mayer has put an efficient and talented team in place here at the ESF-COST Office that provides an ideal basis on which we can all build for the future."

Born in Berlin and an aircraft engineer by training, Dr. Grabert has worked in Brussels since 1991, and he expressed optimism that his experience and good contacts in the European Commission would prove helpful when it comes to securing additional funding for the ESF-COST Office and its projects.

Dr. Grabert takes up his new position in September 2005.

ESF, Reference URL http://www.esf.org/esf_pressarea_page.php?language =0§ion=6&year=2005&newsrelease=91

DFG Establishes 11 New Research Units

14.5 million awarded for three-year funding period; 3 units in Natural Sciences

15 July 2005.- At its meeting on 5 July 2005 the Grants Committee on General Research Funding of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) approved funding for 11 new Research Units. In these interdisciplinary research groups several researchers and scientists collaborate to study a specific research topic over a period of six years. The DFG Research Unit programme seeks to promote the collaboration of outstanding researchers, thus also creating new areas of research at universities. Approximately ¤14.5 million has been made available to the newly established units for the next three years, with prospective funding for a further three years.

The Research Unit "Coupling Flow and Deformation Processes for the Modelling of Large-Scale Slope Motion" located at the universities of Stuttgart, Berlin and Potsdam will develop models to improve the understanding of hydrologic, hydraulic and geological processes in landslides, slope slippage and rockfalls under water.

Bloom in the Baltic

In the Research Unit "Non-linear Dynamics of Complex Continua", experimental physicists, chemists, theoretical physicists and fluid mechanics engineers from the University of Bayreuth will cooperate to study specific complex fluids whose motion equations are currently still being modelled and for which a unified description is sought.

The Research Unit "Dated Speleothems: Records of the Paleozoic Environment" located in Heidelberg will investigate the basic mechanisms involved in the growth and composition of calcareous sinter in caves, known as "speleothems". The researchers aim to gain new insights into Central Europe's climatic history, including information on precipitation levels and temperature fluctuations in the past.

http://www.dfg.de/for/en

Bloom stretched around 200 kilometres

29 July 2005.- A colourful summer marine phytoplankton bloom fills much of the Baltic Sea in this Envisat image of the 13th of July, 2005.

Such blooms are common at this time of year in the Baltic Sea due to the combination of warm weather and waters rich in phosphorous nutrients. This phosphorous comes from the sea floor, having been released for surface layer phytoplankton to consume when autumn and winter storms mix the water mass – at the start of 2005 a severe storm caused mixing in a deep column of water.

The bloom seen here stretched around 200 kilometres from Lithuania, Latvia and the Russian territory of Kalingrad to the Swedish coast, surrounding the Swedish islands of Gotland and Öland. Blooms in the Baltic Sea are routinely monitored by the Finnish Environmental Institute (SYKE).

Envisat's Medium Resolution Imaging Spectrometer (MERIS) instrument is optimised for ocean colour detection, but also returns multispectral information on land cover, clouds and atmospheric aerosols.

MERIS acquires continuous daytime observations in Reduced Resolution mode as part of its background mission. This is a detail from a MERIS Reduced Resolution image acquired on 13 July 2005, with a spatial resolution of 1200 metres.



ESA

Figure ©ESA

Luxembourg becomes ESA's 17th Member State

Following its ratification of the ESA Convention, Luxembourg has become ESA's 17th Member State with effect from 30 June 2005.

5 August 2005.- Cooperation between ESA and Luxembourg began with the signing of a dedicated agreement on 12 September 2000 enabling Luxembourg to participate in the Agency's ARTES telecommunications programme.

The agreement between ESA and Luxembourg concerning the accession of the Grand Duchy to the ESA Convention was signed by Erna Hennicot-Schoepges, Minister for Culture, Higher Education and Research, on behalf of the Luxembourg government, and Jean-Jacques Dordain, Director General, on ESA's behalf, on 6 May 2004. The latter agreement made possible the application of transitional measures to deal with the practicalities of Luxembourg's accession to the ESA Convention, such as the participation of observers at the meetings of Council and other delegate bodies and increased coordination on industrial policy matters.

ESA

CryoSat Mission lost due to launch failure

Launch of CryoSat ended in a failure due to an anomaly in the launch sequence

Paris, 8 October 2005.- Today at 21.00 h CEST Mr. Jury Bakhvalov, First Deputy Director General of the Khrunichev Space Center on behalf of the Russian State Commission officially confirmed that the launch of CryoSat ended in a failure due to an anomaly in the launch sequence and expressed his regret to ESA and all partners involved.

Preliminary analysis of the telemetry data indicates that the first stage performed nominally. The second stage performed nominally until main engine cut-off was to occur. Due to a missing command from the onboard flight control system the main engine continued to operate until depletion of the remaining fuel.

As a consequence, the separation of the second stage from upper stage did not occur. Thus, the combined stack of the two stages and the CryoSat satellite fell into the nominal drop zone north of Greenland close to the North Pole into high seas with no consequences to populated areas. An investigating commission by the Russian State authorities has been established to further analyze the reasons for the failure, results are expected within the next weeks. This commission will work in close cooperation with a failure investigation board consisting of Eurockot, ESA and Khrunichev representatives.

This information is released at the same time by Eurockot and ESA.

An interview with Volker Liebig, Director of Earth Observation at ESA, on the loss of CryoSat is available online at

http://www.esa.int/SPECIALS/Cryosat/SEM10R5Y3EE_ 0.html

ESA PR No. 44-2005

ESA-NRSCC Dragon Cooperation Programme

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ESA, together with the National Remote Sensing Centre of China (NRSCC), have created a dedicated three-year Earth Observation exploitation programme called Dragon (2004 to 2007). The Dragon programme focuses on science and applications development in P.R. China using mainly data from the ERS and Envisat missions. There are numerous Dragon Programme research themes, which range from flood monitoring, agriculture and forests, to seismic activity, oceanography and climate. The latest Dragon Symposium took place in Santorini, Greece between 27 June and 1 July 2005, and was attended by 120 scientists including 50 from PRC. Progress and early results were reported during the event and updates were given on project teaming, including Greek



Tropospheric NO2 vertical columns over northeast China as measured by SCIAMACHY on Envisat, averaged between December 2003 and November 2004 (Credits: Institute of Environmental Physics, University of Bremen et al.)

scientists joining as co-investigators. Supporting in-situ data measurements required to validate satellite results were detailed and reports were made from an associated young scientist training programme.

Presentations included details of research being done into the synergistic use of ASAR with Envisat's optical Medium Resolution Imaging Spectrometer (MERIS) and also how ocean colour measurements made by MERIS can reveal marine phytoplankton populations, as well as suspended sediment. Researchers are building up a database of water optical properties as well as atmospheric correction for the region and developing a method of monitoring "red tide" events. MERIS is also being used to look at the estuary of the Yangtze River, whose waters have some of the highest sediment concentrations in the world. Teams are using Envisat's heatsensitive Advanced Along Track Scanning Radiometer (AATSR) in conjunction with ASAR and MERIS to study the Kuroshio Current, which is the Chinese equivalent of Europe's Gulf Stream, flowing from the Philippines to northern Japan.

German Chair for ESA Council

Sigmar Wittig becomes new chair of the ESA Council for the next two years

Paris, 22 June 2005.- Sigmar Wittig, currently Chairman of the Executive Board of the German Aerospace Centre (DLR), is the new Chair of the ESA Council for the next two years (as from 1 July).

Professor Wittig was unanimously elected at the 179th Council meeting, held at the European Space Operations Centre (ESOC) in Darmstadt, Germany on 21-22 June. He will take over from Mr Per Tegnér of Sweden, whose term of office ends on 30 June.

Born on 25 February 1940 in Nimptsch, Sigmar Wittig studied mechanical engineering and was awarded a PhD from

the University of Aachen. After nine years in the United States (1967 - 1976), he worked for many years (1976 - 2002) as professor and head of the institute for thermal turbomachinery at the University of Karlsruhe, eventually becoming University President in 1994.

In March 2002, he was appointed Chairman of the Executive Board of the DLR and has been Head of the German Delegation to ESA since then.

ESA PR 35-2005

Portuguese wildfires



MERIS image acquired 21 August ©ESA

Fires have destroyed more than 140 000 hectares of land

23 August 2005.- Plumes of smoke from serious wildfires across Portugal fan into the Atlantic in this Envisat satellite view acquired on 21 August.

Dozens of wildfires were reported throughout the country, which has suffered one of its worst droughts for decades. Fanned by high winds, the fires have destroyed more than 140 000 hectares of land and killed at least 15 people.

Stricken areas include the vicinity of the city of Coimbra, Portugal's third largest city, around 200 km northeast of Lisbon.

Other fires were burning in the northern districts of Viseu and Viana do Castelo. Firefighting aircraft from France, Germany, Italy and the Netherlands participated in control activities following an appeal for help by Portugal's government. This international assistance supplemented a national firefighting effort of 49 aircraft, around 800 vehicles and 3000 firefighters.

The image here come from the Medium Resolution Imaging Spectrometer (MERIS) aboard Envisat, operating in Reduced Resolution mode for a spatial resolution of 1200 metres.

ESA

SMART-1's tribute to Cassini during the last EGU Assembly

This image from SMART-1 was dedicated to the Cassini-Huygens mission team at the occasion of the European Geoscience Union conference in Vienna, April 2005, when new results from both missions were presented.

20 June 2005.- The crater Cassini on our Moon was named in honour of Jean-Dominique Cassini, one of the most important scientists of the 17th and 18th centuries. The joint NASA/ESA/ASI spacecraft, which is now in orbit around Saturn as part of the Cassini-Huygens mission, bears his name.

This lunar crater has a diameter of 57 km and is located at 40° North on the edge of Mare Imbrium (Sea of Rains). The crater is partly flooded by lava that later filled the large mare basin. The three smaller craters (two inside Cassini and one outside)were formed after the lava flooding.

Mare Imbrium is the second largest basin on the visible side of the Moon, with a diameter of 1250 km, and is one of the youngest of the lunar maria (the youngest is Mare Orientale) at between 3700 and 3900 million years old.

It is surrounded by three concentric rings of mountains, uplifted by the huge impact event that excavated it. Some upland hills are seen here to the north-west of Cassini crater (seen at top left, north is up).

The image was taken with the highly compact, lightweight and rugged AMIE camera on board SMART-1. AMIE stands for the Advanced Moon Micro-Imager Experiment (AMIE) experiment.

AMIE is based on work done by ESA's Technological Research Programme and developed SPACE-X, Space Exploration Institute, in Neuchatel, Switzerland.



Fig.1: Crater Cassini on the Moon, as seen by SMART-1 ©ESA

From ESA News Portal

CryoSat Mission lost due to launch failure

Launch of CryoSat ended in a failure due to an anomaly in the launch sequence

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ESA PR No. 44-2005

Impact of air pollutant and CH4 emission controls on tropospheric O3 and radiative forcing 1990-2030

Control of methane emissions appears an efficient option to reduce tropospheric ozone as well as radiative forcing, according to new model calculations

To explore the relationship between tropospheric ozone and radiative forcing with changing emissions, the authors compiled two sets of global scenarios for the emissions of the ozone precursors methane (CH4), carbon monoxide (CO), non-methane volatile organic compounds (NMVOC) and nitrogen oxides (NOx) up to the year 2030 and implemented them in two global Chemistry Transport Models. The "Current Legislation" (CLE) scenario reflects the current perspectives of individual countries on future economic development and takes the anticipated effects of presently decided emission control legislation in the individual countries into account. In addition, the authors developed a "Maximum technically Feasible Reduction" (MFR) scenario that outlines the scope for emission reductions offered by full implementation of the presently available emission control technologies, while maintaining the projected levels of anthropogenic activities. Whereas the resulting projections of methane emissions lie within the range suggested by other greenhouse gas projections, the recent pollution control legislation of many Asian countries, requiring introduction of catalytic converters for vehicles, leads to significantly lower growth in emissions of the air pollutants NOx, NMVOC and CO than was suggested by the widely used and more pessimistic IPCC (Intergovernmental Panel on Climate Change) SRES (Special Report on Emission Scenarios) scenarios (Nakicenovic et al., 2000), which made Businessas-Usual assumptions regarding emission control technology. With the TM3 and STOCHEM models several long-term integrations (1990-2030) were performed, to assess global, hemispheric and regional changes in CH4, CO, hydroxyl radicals, ozone and the radiative climate forcings resulting from these two emission scenarios. Both models reproduce broadly the

observed trends in CO, and CH4 concentrations from 1990 to 2002.

For the "current legislation" case, both models indicate an increase of the annual average ozone levels in the Northern Hemisphere by 5ppby, and up to 15ppby over the Indian subcontinent, comparing the 2020s (2020-2030) with the 1990s (1990-2000). The corresponding higher ozone and methane burdens in the atmosphere increase radiative forcing by approximately 0.2 Wm-2. Full application of today's emissions control technologies, however, would bring down ozone below the levels experienced in the 1990s and would reduce the radiative forcing of ozone and methane to approximately -0.1 Wm-2. This can be compared to the 0.14-0.47 Wm-2 increase of methane and ozone radiative forcings associated with the SRES scenarios. While methane reductions lead to lower ozone burdens and to less radiative forcing, further reductions of the air pollutants NOx and NMVOC result in lower ozone. but at the same time increase the lifetime of methane. Control of methane emissions appears an efficient option to reduce tropospheric ozone as well as radiative forcing.

The full article is available online free of charge at

http://www.copernicus.org/EGU/acp/acp/5/1731/acp-5-1731.pdf

Dentener, F., Stevenson, D., Cofala, J., Mechler, R., Amann, M., Bergamaschi, P., Raes, F. and Derwent, R., The impact of air pollutant and methane emission controls on tropospheric ozone and radiative forcing: CTM calculations for the period 1990-2030, ACP, 5, 1731-1755, 2005.

Solubilization of particles in sediment traps

Carbon storage in the oceans must be revisited.

The oceans absorb about 50% of the CO2 released in the atmosphere by human activities. This uptake takes place via the biological pump whereby algae use CO2 and nutrients to produce organic matter. Some of this material,

ballasted by carbonate or silicate shells, sinks to the deep ocean and is sequestered from the atmosphere. The efficiency of this CO2 sink depends on the ratio in which carbon is exported per unit of the limiting nutrient.

This export is often quantified by measuring the major elements (carbon, nitrogen, phosphorus, silica) in sinking particles using so-called sediment traps. In this paper, Antia demonstrates that a significant and varying amount of these elements are solubilized between the time of trapping and the time of collection of the traps, biasing the estimation of these key elemental ratios. Her results suggest that carbon storage in the oceans must be revisited.

The full article is available online free of charge at http://www.copernicus.org/EGU/bg/bg/2/189/bg-2-189.pdf

Antia A. N., Solubilization of particles in sediment traps: revising the stoichiometry of mixed layer export, Biogeosciences, 2, 189-204, 2005

Sources and sinks of acetone, methanol, and acetaldehyde in North Atlantic marine air

Startling observation that OVOCs account for up to 85% of all non-methane hydrocarbons (NMHCs) measured in marine air

Little known about the occurrence of OVOCs (oxygenated VOCs) in the background atmosphere. Startling observation that they account for up to 85% of all non-methane hydrocarbons (NMHCs) measured in marine air conditions, and that they account for 80% of the loss of OH sink due to

all organic gases combined.

This is something quite unexpected and surprising: OVOCs have not been previously considered to be quite so important in clean marine air. OH is critical in determining the atmospheric lifetime of many gases, including climatically important gases such as methane. The full article is available online free of charge at www.copernicus.org/EGU/acp/acp/5/1963/acp-5-1963.pdf

Lewis A. C., J. R. Hopkins, L. J. Carpenter, J. Stanton, K. A. Read, M.J. Pilling, Sources and sinks of acetone, methanol, and acetaldehyde in North Atlantic marine air, Atmos. Chem. Phys., 5, 1963–1974, 2005.

Naturally driven variability in the global secondary organic aerosol over a decade

Interesting model prediction that SOAs have increased over the last decade.

SOAs (secondary organic aerosols) are important compared to anthropogenic SOAs. Much less is known about SOAs than other inorganic (e.g. sulphate) aerosol. SOAs are important for global models because their radiative properties are entirely different compared to those of inorganic aerosols.

The response of the global budget of SOA to temperature and moisture changes as well as to biogenic emission changes over a decade (1984-1993) has been evaluated using a global 3-dimensional chemistry transport model. Over the studied decade, the computed natural variations (8%) in the chemical SOA production from biogenic VOC oxidation equal the chemical SOA production from anthropogenic VOC oxidation. Maximum values are calculated for 1990 (warmer and drier) and minimum values for 1986 (colder and wetter). The SOA computed variability results from a 7% increase in biogenic VOC emissions from 1986 to 1990 combined with 8.5% and 6% increases in the wet and dry deposition of SOA and leads to about 11.5% increase in the SOA burden of biogenic origin.

The present study also demonstrates the importance of the hydrological cycle in determining the built up and fate of SOA in the atmosphere. It also reveals the existence of significant positive and negative feedback mechanisms in the atmosphere responsible for the non linear relationship between emissions of biogenic VOC and SOA burden.

Tsigaridis K., J. Lathière, M. Kanakidou, D. A. Hauglustaine, Naturally driven variability in the global secondary organic aerosol over a decade, Atmos. Chem. Phys., 5, 1891-1904, 2005.

Nanoparticle formation by ozonolysis of inducible plant volatiles

First laboratory experiments of aerosol formation from oxidation of plant VOCs

The authors present the first laboratory experiments of aerosol formation from oxidation of volatile organic species emitted by living plants, a process which for half a century has been known to take place in the atmosphere. Cabbage plants were treated with methyl jasmonate in order to induce the production of monoterpenes and certain less-volatile sesqui- and homoterpenes. Ozone was introduced into the growth chamber in which the plants were placed, and the subsequent aerosol formation and growth of aerosols were monitored by measuring the particle size distributions continuously during the experiments.

The observations show similar particle formation rates as in the atmosphere but much higher growth rates. The results indicate that the concentrations of nonvolatile oxidation products of plant released precursors needed to induce the nucleation are roughly an order-of-magnitude higher than their concentrations during atmospheric nucleation events. The results therefore suggest that if oxidized organics are involved in atmospheric nucleation events, their role is to participate in the growth of pre-existing molecular clusters rather than to form such clusters through homogeneous or ion-induced nucleation.

The full article is available online free of charge at <u>http://www.copernicus.org/EGU/acp/acp/5/1489/acp-5-</u>1489.pdf

Joutsensaari J., M. Loivamäki, T. Vuorinen, P. Miettinen, A. -M. Nerg, J. K. Holopainen, A. Laaksonen, Nanoparticle formation by ozonolysis of inducible plant volatiles, Atmos. Chem. Phys., 5, 1489–1495, 2005.

Parametric sensitivity and uncertainty analysis of dimethylsulfide oxidation

Key parameters identified are related to DMS emissions, vertical mixing, heterogeneous removal, and the DMS+OH abstraction and addition reactions.

Local and global sensitivity and uncertainty methods are applied to a box model of the dimethylsulfide (DMS) oxidation cycle in the remote marine boundary layer in order to determine the key physical and chemical parameters and sources of uncertainty. The model considers 58 uncertain parameters, and simulates the diurnal gas-phase cycles of DMS, SO2, methanesulfonic acid (MSA), and H2SO4 for clear-sky summertime conditions observed over the Southern Ocean. The results of this study depend on many underlying assumptions, including the DMS mechanism, simulation conditions, and probability distribution functions of the uncertain parameters. A local direct integration method is used to calculate first-order local sensitivity coefficients for infinitesimal perturbations about the parameter means. Key parameters identified by this analysis are related to DMS emissions, vertical mixing, heterogeneous removal, and the DMS+OH abstraction and addition reactions. MSA and H2SO4 are also sensitive to numerous rate constants, which limits the ability of using parameterized mechanisms to predict their concentrations.

The full article is available online free of charge at http://www.copernicus.org/EGU/acp/acp/5/1505/acp-5-1505.pdf

> D. D. Lucas, R. G. Prinn, Parametric sensitivity and uncertainty analysis of dimethylsulfide oxidation in the clear-sky remote marine boundary layer, Atmos. Chem. Phys., 5, 1505-1525, 2005.

An Interview with Shaun Quegan Shaun is Director of the UK's NERC Centre

for Terrestrial Carbon Dynamics

Shaun is Director of the UK's National Environmental Research Council's Centre for Terrestrial Carbon Dynamics and Director of the Sheffield Centre for Earth Observation Science. He's also just handed over Chairmanship of the Terrestrial Carbon Observation Panel (part of the Global Terrestrial Observing System partnership) to Riccardo Valentini.

13 June 2005.- Back in the 1980s, UK mathematician and physicist Shaun Quegan took an early interest in the technology of radar-based Earth Observation. Over time, his interest has shifted from making it work to putting it to use in understanding both the role of land-based life in the planet's carbon cycle and the interplay between the carbon cycle and global warming. He also applies his expertise to China through participation in ESA's Dragon Programme.

Today Shaun is Director of the UK's National Environmental Research Council's Centre for Terrestrial Carbon Dynamics and Director of the Sheffield Centre for Earth Observation Science. He's also just handed over Chairmanship of the Terrestrial Carbon Observation Panel (part of the Global Terrestrial Observing System partnership) to Riccardo Valentini.

For ESA he is a member of the Agency's Earth Science Advisory Committee and last year became a participant in Dragon, a three-year programme of cooperation between European and Chinese scientists based mainly on ESA satellite data.

How did you get started working in Earth Observation?

After my doctorate on ionospheric modelling in the early 1980s, I had the great good fortune to find a job with a superb group of scientists working on Synthetic Aperture Radar (SAR) at the then Marconi Research Centre. There were so many interesting problems to work on in trying to recover information from SAR imagery, and they seemed to suit my talents perfectly. Initially, the emphasis of my work was on image interpretation from a physics and signal processing point of view, but gradually my interest shifted towards applications and environmental science.

These days, I see remote sensing as just there to do a job – the technology might be fun, but its purpose is to improve what we know about the Earth; lose sight of that, and remote sensing misses the point. And answering questions in environmental science is intrinsically a lot more interesting than the nuts and bolts of making the technology work. That's not to say I don't still have an interest in these nuts and bolts – I've just finished a paper on radar polarimetry with a student – nor do I underestimate the importance of understanding the

measurements and using the very best methods to get at the information they contain. But my real concern is to know how these measurements will help us to understand more about the environment.

What led you to take a particular interest in the carbon cycle?

First of all it is fundamentally important – what drives climate change is essentially carbon. The main greenhouse gases going into the atmosphere are carbon dioxide and methane, both carbon compounds. We ourselves are made of carbon, and everything we think of as life is carbon-based, as are the fossil fuels which are the main drivers of our economy. The Kyoto Protocol is all about carbon, and reducing carbon emissions into the atmosphere.

The carbon cycle is also a basic component of how the Earth works, in which the atmosphere, land and ocean all interact. Understanding it requires inputs from a huge range of people – including researchers like ecologists and oceanographers who understand the underlying processes involved. So it's a great area to work in.

Can you describe the Centre for Terrestrial Carbon Dynamics you are responsible for?

The Centre is one of seven UK centres of excellence based on Earth Observation, sponsored by the National Environmental Research Council (NERC). Our particular remit is carbon, and a large part of our work is modelling how the land absorbs or gives out carbon, working to improve the accuracy of these carbon flux estimates, and trying to put a value on the level of uncertainty in them. We need to do that because they are important in terms of policy, forming inputs to the Intergovernmental Panel on Climate Change (IPCC) and being part of the body of knowledge underlying climate change.

CTCD involves five institutions: the Universities of Sheffield, York and Edinburgh, University College London and Forest Research, the research arm of the UK's Forestry Commission. It also involves a wide range of disciplines: several researchers are Earth Observation specialists, but as part of a team including ecologists, mathematicians, statisticians, researchers into the atmosphere, vegetation and gas transfer, and soil scientists. And as the Centre continues to develop, these boundaries between disciplines are becoming blurred: almost everybody works on some aspect of modelling and uncertainty.

How are these carbon flux models utilised?

With our models – they operate at scales varying from individual forest stands up to the globe - we try and encapsulate our current state of understanding of the processes involved, then transfuse them with our best data, to arrive at estimates or predictions of terrestrial carbon fluxes and how sure we are of those numbers.

Our global scale models were designed to understand long-term behaviour of the Earth system: if we put this amount of carbon into the planet's atmosphere, how will the land respond? Because what happens is – to give ballpark figures – we pump about 8 billion tonnes of carbon into the atmosphere annually and only 3.3. billion tonnes stays there. The rest must be absorbed either by the land or the ocean. The interesting question is: where exactly does all this extra carbon go? It's getting soaked up somewhere. How long can it continue to get soaked up? Will we in fact reach some limit so that the land just can't take this excess any more? If so, what determines this limit, when will it be reached, and what are the consequences?

A lot of the models of this type were designed ten to 15 years ago. At that time, global-scale data were relatively scarce, so the models are internally consistent systems based on process understanding, and not particularly data-friendly, except for their use of climate and soil data. Now we're at a stage when there are all sorts of useful data, a lot of it coming from space, and our best understanding of what is happening will come from combining this information with the understanding enshrined in the models.

We also work with simpler models, and ones better tuned to using data. By working with different types and complexities of models, we are learning how to bring data and process understanding together as effectively as possible.

What particular benefits does Earth Observation bring to you?

One of our primary interests is absorbed radiation, because this powers photosynthesis – this is really critical, because it drives the whole carbon assimilation process. So satellitederived radiance maps are extremely useful to us. Satellites also provide a multitude of other relevant information types: forest extent, land cover and land use change, soil moisture, snow cover, fire events and damage, biomass and forest age, multispectral information on plant properties from sensors like Envisat's MERIS (Medium Resolution Imaging Spectrometer), and atmospheric measurements of gases like methane.

Up to now, radar data have not played a major part in the Centre's programme, but I expect this to change when the JAXA PALSAR goes into space later this year. This is because the longer wavelength of PALSAR gives more information about forests than the C-band SARs on ERS and ASAR. That said, one of the big achievements of ESA's ERS missions was to map forest biomass across Central Siberia, using a technique called SAR Interferometry (InSAR) to combine radar images from the twin spacecraft while they were flying in tandem. And there's no doubt we could do a lot more that's relevant to carbon with ERS and ASAR, given sufficient effort and resource.

I'm also hoping that at least one carbon-specific mission will come out of ESA's latest Earth Explorer call for ideas, although the thing about carbon is that, because it cuts across so many apparently different areas, even a mission focused on other scientific topics may be useful – for instance, the water and carbon cycles are intimately intertwined.

How easy is it to combine your models with real observational data?

In some of our models with simplified representations of carbon processes, using some satellite data is easy – ingesting data is how they operate – but they may not give the best estimates of carbon flux. In contrast, we have models that contain the best possible representations of carbon processes, but getting them to work with data is much harder. Few space measurements can be used directly in these carbon models, and it needs people who understand both the data and the models to bring the two together in a way that's meaningful. I've already said that many sorts of space data can help us, but each type involves serious effort to turn it into information relevant to the carbon models. Which types we focus on at any time depends on our judgement of how best to use our most important resource, the Centre research staff and PhDs.

I should add that I would like to see ESA going further not only to make its satellite data widely available but also to present it in a way that is suited to a broader scientific community. Whereas atmospheric science is full of people happy to work from raw data, the ecological community does not have this hard core of mathematicians and physicists. Ecologists are also dealing with quantities that are rather more complex than gas concentrations and temperatures. They have to take a different approach when integrating data into their models. There is tremendous scope for providing this community with higher-level products. This would greatly increase their use of Earth Observation data. With this approach I would expect the ecological community to make extensive use of ESA's MERIS sensor data in particular.

You've been attending ESA's Carbon from Space Workshop in Italy on 6-8 June?

It's been really useful and interesting. The meeting has been covering many of the issues involved in making Earth Observation data talk to carbon models. A main topic is the prospects for directly observing atmospheric carbon dioxide from space, which is likely to revolutionise our ability to measure and understand the carbon cycle. It also looks at the wider issue of how we can fit different sorts of space information from the atmosphere, ocean and land, into understanding the carbon cycle.

Is the answer to climate change simply to plant lots more trees?

Unfortunately not – to put it bluntly, we have to emit less carbon. Research shows that new forests don't become an instant sink of carbon. In fact, depending on where you plant them and the soil type and how you treat the ground, you may actually emit huge amounts of carbon while you're getting a new forest started. It can take 15 to 20 years for a forest stand

to get to a carbon neutral point, after which you get a net carbon gain – but even if you planted the whole world with trees, once you've got mature forests across the globe, then that's it – you can soak up carbon for a certain amount of time, but then it saturates. Even in a warmer, more carbon-rich atmosphere where plants grow more abundantly, there's a physiological limit to their carbon absorption. All you are doing is buying time while you try and find a real solution, which involves weaning ourselves off carbon.

Otherwise we have to take the consequences of a world that's rapidly warming, and we don't really know what they'll be. Globally we have a pretty good idea, but regionally we certainly don't; for example, we can't predict with any confidence what will happen to regional precipitation patterns.

What work are you carrying out as part of ESA's Dragon Programme?

Dragon allows me to make full use of my experience in radar. The project I'm working on is using Earth Observation to map land cover, agriculture and forestry in southwest China, with colleagues from the University of Fuzhou, and European partners Thuy Le Toan from CESBIO, Toulouse, and Mike Wooding from RSAC.

I'm also fortunate to have a visiting Chinese researcher, He Guojin, working with me in Sheffield for a year. He's the Director of the Information Processing Department in the China Remote Sensing Satellite Ground Station, Beijing, and having him here has allowed the work go much faster and greatly eased communication with our Chinese partners.

We first of all constructed a processing chain that takes advantage of dual-polarisation time-series data from the Envisat Advanced Synthetic Aperture Radar (ASAR) to reduce the speckle in the images and improve their interpretability. We are now using optical Landsat Thematic Mapper imagery and existing land cover maps to characterise and understand the radar signatures from different land cover types.

By discovering what drives the radar signal response and learning the signatures of different land covers, we will then develop classification algorithms that can be applied both to our region and more generally across China and similar subtropical areas. We're also particularly looking forward to discriminating the development of the seasonal rice crop using multi-temporal and polarised ASAR images.

It is obvious from the radar and optical data that the Chinese maps are out of date for the area that we're looking at,

but using the radar and optical imagery together you get a good understanding of what the land cover actually is.

One of the issues about exploiting radar data is that you see more information, which can be good and bad. You might want a nice, smooth map that clearly demarcates agriculture, water, forests, etc. – that comes out in the optical image, because in some ways it's a simpler signal. Radar contains more detail, because it is more responsive to a greater range of environmental effects. The fact that radar isn't affected by cloud is a big advantage, as this means one can guarantee getting an image if the radar is switched on. This means, for example, that forests can be distinguished from other types of vegetation using their temportal stability in the radar images, while this distinction does not emerge from the optical imagery.

For me, a key element of the Dragon Programme is the transfer to China of European know-how about how to get the information we want from radar data. As one aspect of this, Guojin and I have made available and implemented the optimised SAR processing chain at Fuzhou. And while the Dragon project is not strictly carbon-related, the collaboration has spawned a proposal to establish a project looking at carbon sequestration in subtropical areas. If this comes off, then it moves this work bang into the middle of my main research area, which is a very welcome and unexpected spin-off from Dragon.

Are you attending the next Dragon Programme symposium?

Yes – it is taking place on the island of Santorini from 27 June to 1 July*. Attending helps set our own Dragon work in a larger context, and learn more about what the other 14 European-Chinese teams are doing, in the fields of the atmosphere and ocean as well as land.

The symposium is the first one hosted by ESA's new member state Greece, and should be a useful opportunity to meet the Chinese Earth Observation community; I'm told this will be the largest scientific delegation in the Earth Observation field ever to venture outside China for cooperation purposes. I hope to meet many potential future colleagues.

From ESA (<u>http://www.esa.int/esaEO/SEMF751DU8E_</u> planet_0.html)

*This Symposium has already taken place. See at the News section of this Issue of the Eggs

The ENSEMBLES Project

Providing ensemble-based predictions of climate changes and their impacts

By Chris Hewitt

The main objective of the ENSEMBLES project is to provide probabilistic estimates of climatic risk through ensemble integrations of Earth system models. The project will develop an ensemble climate forecast system for use across a range of timescales (seasonal, decadal and longer) and spatial scales (global, regional and local). This modelling system will be used to construct scenarios of future climate change which will provide a basis for quantitative risk assessment of climate change and climate variability. Emphasis will be placed on changes in extreme events (for example the severity and frequency of heatwaves, drought, forest fires, storminess and flooding), and the effects of high-impact but low-probability events such as a shutdown of the thermohaline circulation in the North Atlantic. The project will also validate the ensemble prediction system using quality-controlled, high-resolution gridded data sets for Europe; quantify and reduce the uncertainty in the representation of physical, chemical, biological, and human-related feedbacks in the Earth system (including water resource, land-use, and air quality issues, and carbon cycle feedbacks); and link the outputs of the ensemble prediction system to a range of applications, including agriculture, health, energy and water resources. The 5 year project is funded by the European Commission's Sixth Framework Programme as an "Integrated Project", and is now into its second year.

Background

Predicting the future climate is a major challenge due to the complex nature of the Earth system. The only tools for this task are physically-based climate models of the key components of the Earth system (Figure 1). However, predictions of natural climate variability and the human impact on climate are inherently probabilistic, due to uncertainties in the representation of key processes within models, initial conditions used for the forecasts, and climatic forcing factors such as future concentrations of atmospheric carbon dioxide. Hence, estimates of climatic risk are best made through multiple integrations of models of the Earth system in which the uncertainties are explicitly incorporated by using different representations of processes within a model and different models, slightly varying the initial conditions, and exploring different scenarios of climatic forcing.

The ensuing ensemble of results (see Figure 2 for an example) allows us to quantify the uncertainty in the climate projections by using statistical techniques. The EN-SEMBLES project will develop an ensemble



climate forecast system for use across a range of timescales (seasonal, decadal and longer) and spatial scales (global, regional and local). Hindcasts made by the model system for the 20th century will be validated against guality controlled, highresolution gridded datasets for Europe. The model system will be used to construct scenarios of future climate change which will provide a basis for quantitative risk assessment of climate change and climate variability, to provide policy relevant information on climate change and its interactions with society. Emphasis will be placed on changes in extreme events (for example the severity and frequency of heatwaves, drought, forest fires, storminess and flooding), and the effects of highimpact but low-probability events such as a shutdown of the thermohaline circulation in the North Atlantic. The outputs of the ensemble prediction system will be used to drive a wide range of applications, including agriculture, health, energy and water resources. In turn, feedbacks to the climate system from some of these impact areas will also be addressed.



Figure 2: An example of the predicted change in summer-average precipitation over Europe from a small ensemble of model simulations

Objectives

The main objectives of ENSEMBLES are to:

* develop an ensemble prediction system based on stateof-the-art global and regional Earth system models developed in Europe, and evaluate the system using climate observations;

* quantify and reduce uncertainty in the representation of physical, chemical, biological and human-related feedbacks in the Earth system (including water resource, land use, and air quality issues, and carbon cycle feedbacks);

* apply the outputs of the ensemble prediction system to a range of applications, including agriculture, health, food security, energy, water resources, weather risk and insurance.

ENSEMBLES is being coordinated by the Hadley Centre at the Met Office in the UK. It is a 5-year Integrated Project funded under the Global Change and Ecosystems thematic priority of the European Commission's 6th Framework Programme. The project started in September 2004 and is a major undertaking by 66 institutions from 19 countries, mainly in Europe. EN-SEMBLES directly addresses key objectives of the United Nations Framework Convention on Climate Change (UNFCCC) including the Kyoto Protocol, and the Intergovernmental Panel on Climate Change (IPCC), two of the most important international agencies formulating climate change policy. The relevant objectives of the UNFCCC and IPCC are to:

* provide the best available scientific information and assessment on climate change and its impacts, to provide input for policy makers concerning the assessment of dangerous anthropogenic interference with the climate system;

* reduce uncertainties in knowledge of the climate system and the adverse impacts of climate change;

* promote the development and implementation of education and training programmes;

* increase the awareness and public access to information on climate change.

The findings of the ENSEMBLES project will therefore be of great practical value to policy makers, stakeholders and the public. The results will be disseminated through web sites and informative leaflets intended to improve the understanding of climate change for wide-ranging audiences, along with the production of policy-oriented publications for bodies such as the UNFCCC and IPCC.



Figure 3: Globally averaged annual mean near surface temperature projections from 2000 to 2100 under the three IPCC SRES scenarios (A1B, A2 and B1) using the CNRM, IPSL, METO-HC, DMI and MPI models (3 simulations with the MPI model)

Progress

Work in the first year of the project has concentrated on developing methodologies and techniques, testing models that will be used in the project, such as impacts models, and using global general circulation models (GCMs) to perform historical simulations for 1860-2000 and climate change projections for the 21st Century using the IPCC SRES (Intergovernmental Panel on Climate Change Special Report on Emissions Scenarios) forcing, the so-called A2, A1B, and B1 scenarios. It is important to have the global model results available at an early stage for use in other parts of the project. Some specific achievements are as follows.

- The multi-model ensemble system for seasonal to decadal prediction is being installed on the supercomputer at ECMWF.

- The database of ocean conditions for initialising the multimodel ensemble system has been updated based on the ENACT (enhanced ocean data assimilation and climate prediction) project under the EC's 5th Framework Programme. Results have been analysed from a large set of decadal hindcasts, constructed from small ensembles of simulations using the HadCM3 coupled ocean-atmosphere GCM sampling uncertainties in the initial conditions and including anthropogenic and natural variations in radiative forcing. The results reveal evidence of skill in predictions of surface temperature up to a decade ahead, both globally and in many regions. Improvements in regional skill are found relative to previously available predictions with the same model that only include projected changes in anthropogenic forcing.

The first simulations for the 21st Century for the multi-model ensemble are now available. Simulations for all three IPCC SRES scenarios reveal a clear signal-to-noise response for near surface temperature changes. Simulated changes are in the range of 1°C to 4°C (Figure 3). The signal-to-noise ratio for precipitation is lower than for temperature (not shown).

An approach to sampling modelling uncertainties has been further developed, whereby parameters within the climate model associated with modelling the physical processes are varied based on a range provided by experts. New and larger ensembles have been analysed and demonstrate the importance of non-linear interactions between processes in broadening the



Figure 4: Anomalies in global mean land surface air temperatures from observations (green line) and from the HadCM3 perturbed physics ensemble (black, blue and red lines, the latter denoting the models with the lowest and highest respective climate sensitivities). Anomalies are computed with respect to years 1900 to 2000 and the model temperatures have been interpolated into the observational grid, and grid-boxes with missing observational data have been omitted

range of uncertainty. The approach has also been extended to produce an ensemble of transient climate change simulations using HadCM3 (Figure 4). This experiment revealed technical issues associated with the spin up of the models, leading to a revised methodology now being used to generate new ensembles simulating the response to IPCC SRES forcings.

Other methods of sampling modelling uncertainty and constructing probabilistic predictions have also been further developed, including strategies for the generation of ensemble members, the use of observational constraints and the effects of prior assumptions in affecting the posterior, likelihoodweighted distributions (Figure 5).







Figure 6: common domain for regional climate model simulations



A common minimum European domain and common resolution across the different regional climate models (RCMs) have been defined (Figure 6). The RCM simulations will be conducted first at ~50km (horizontal resolution of 0.44° latitude and longitude) and then at ~25km (horizontal resolution of 0.22°) later in the project. Several partners have now started RCM simulations for this common domain at 50km resolution, taking boundary conditions from the ERA40 (a 40-year European Re-Analysis covering the period mid-1957 to present) dataset. The purpose of these simulations is to crease an ensemble for detection and attribution of regional climate change and assessment of regional model performance on interannual and shorter time scales over several decades. The multi-decade period is important so that the capability of the models to simulate variability and extremes can be assessed in different phases of longer-term climate variability.

Acknowledgements

ENSEMBLES is a research project (contract GOCE-CT-2003-505539) supported by the European Commission under the 6th Framework Programme 2002-2006 (Project Officer Georgios Amanitidis). Results provided by the following EN-SEMBLES participants are shown or quoted in this article: Dave Griggs (ENSEMBLES Co-ordinator), Matthew Collins, Tom Holt, James Murphy, Burkhardt Rockel, Jean-Francois Royer, Markku Rummukainen and Thomas Spangehl.

For more information about the project see the website: <u>http://www.ensembles-eu.org</u>, or e-mail to <u>ensemblesfp6@metoffice.gov.uk</u>

Dr. Chris Hewitt Met Office, Hadley Centre, Fitzroy Road, Exeter, EX1 3PB, U.K. <u>ensemblesfp6@metoffice.gov.uk</u>

European Spatial Planning

Adapting to Climate Events

by Chitra Nadarajah Jill D. Rankin

"Europeans must learn how to live with a changing climate...strategies are needed at European, national, regional and local levels to adapt to a changing climate " - European Environment Agency



There is a growing consensus amongst scientists and government officials that mitigation policies and actions such as the Kyoto Protocol will not go far enough to protect us from the impacts of climate change. Some impacts are now inevitable and adaptation is therefore essential to help us deal with the unavoidable impacts.

Planning has a crucial part to play in adapting to climate change, however planning systems are currently poorly developed and are unable to deal adequately with the impacts of climate change. Challenges facing the planning process include dealing with decision-making within longer timescales and a lack of flexibility. Difficulties also remain in translating what the scientists are telling us into planning action.

ESPACE (European Spatial Planning: Adapting to Climate Events), is a four year project funded by the European Commission's North West Europe INTERREG IIIB Programme and the UK Office of the Deputy Prime Minister. It is one of the first projects of its kind to focus on increasing the awareness of the need to adapt to climate change and to begin to provide some of the necessary policy guidance, tools and mechanisms to

articles

incorporate adaptation into planning systems and processes.

Fluvial flooding and stresses on water resources is a major issue that is common throughout North West Europe. ESPACE is focussing on developing strategies to manage our water resources and plan for a future with a changing climate (Figure 1).

The core objectives of the ESPACE Project include the development of:

* A new approach to spatial planning for North West Europe;

* Adaptation strategies and policy guidance for local, regional, national and European levels;

* Recommendations on how these policies could be integrated into spatial planning regimes.

To address climate change, a global issue transcending political boundaries, ESPACE has been founded by a transnational group of 10 Partners, also known as the 'ESPACE

Partnership' spanning four North West European countries and bringing together representatives from all levels of civic society. They include, Hampshire County Council (Lead Partner), the Environment Agency, South East Climate Change Partnership, South East England Regional Assembly, Surrey County Council and West Sussex County Council from the UK, Regionaal Landschap Zenne, Zuun en Zoniën from Belgium, Waterschap Rivierenland and Ministerie van VROM from the Netherlands and Bayerisches Landesamt für Wasserwirtschaft from Germany.

During the four years of the project (2003-2007), ESPACE Partners will be undertaking a range of actions to help identify how best to adapt to climate change.

Development of Tools and Models

One of the key areas of work is the development of a suite of new tools and models for practitioners and policy makers to test existing policies and to look at how they stand up to the impacts of climate change. Last year the Environment Agency (EA) started work on developing a Decision Testing Tool to enable strategic decisions to be simulated and tested against a range of future climate change scenarios. It will build on existing approaches from the EA and the UK Climate Impacts Programme (UKCIP) and will enable the end user to assess how sustainable various decisions are to the uncertain future that climate change will bring.

The EA are currently piloting the approach on the Thames Estuary where they are planning flood risk management for the next 100 years. The pilot involves using part of the UKCIP interactive decision making framework process in combination with one of the EA's decision support tools (MDSF) to filter strategic options for flood risk both at an estuary wide level and at a local scale. The cost and benefits of strategic flood risk options such as using differing levels of flood defence standards will then be tested under differing climate scenarios. In addition to the pilot, the EA has been doing more work on Flood Ranger, a sort of 'Sim City' for planners given a changing climate. Flood Ranger has already proved to be an effective visualisation tool in engaging people on the issue. Through ESPACE, this application has now been expanded to allow real environments to



Figure 2 - A screen shot from the new Flood Ranger Professional showing The Thames in 2060(Environment Agency)

be simulated and real decisions tested using the outputs from modelling the EA's decision support tools (Figure 2).

Using the Main River catchment in Germany as a case study area, the Bavarian Water Management Agency (LFW) are developing a suite of models to simulate the impact of regional climatic changes on water management (e.g. - changes to the discharge levels and flood frequencies). The modelling work has already had an impact at a National level - in 2004 the results of the model simulations were used to formulate the first ever statement for the adaptation of flood protection by the Bavarian Ministry. To integrate the modelling results into future decision making activities, LFW are now developing a 'decision support model' that will help policy and decision makers visualise the changes in climate and possible solutions in their area. An Internet interface is currently being considered as part of this visualisation process to allow the decisions to be refined in response to climate change, for example, alterations to the design levels of flood protection.

The current regional water system in The Netherlands is not large enough to cope with the predicted increase in the frequency and intensity of rainfall. In an attempt to 'make space for water', Waterschap Rivierenland (WSRL) has developed a range of Guiding Models that can be used in regional planning in the search for water storage areas (ESPACE Project 2004a). In these models, several functions are interconnected to water such as ecology, cultural history, agriculture, tourism and urban issues. This ensures that the models can be used as a holistic tool for planning by taking the characteristics of the local environment into account in the decision making process. A handbook has now been produced that will allow the user to choose which Guiding Model is most relevant to their geographical location and planning system. WSRL are now in the process of calculating exactly how much space will be required for the storage areas. This 'watertask' involves identifying 'hot spots' in the water system that will be unable to cope with increasing quantities of water as a result of climate change and should therefore be given more space. The involvement of key decision makers and land owners is crucial in ensuring that any proposals are accepted and that the stakeholders' needs are taken into account. To facilitate this, WSRL are currently developing two tools. The first is a 'Communications Tool' that

helps stakeholders to visualise the 'hot spots' in the water system and the second 'Measurement Tool', is designed to initiate a dialogue about the types of storage that could be used and to ensure that there is support for the end decision.

The role of regional planning

Some of the most severe effects of climate change in the UK will be experienced in the South East of England. By the 2080s, the average annual temperature in the region could be up to 4.5oC higher. Hotter, drier summers could be followed by warmer wetter winters with rainfall potentially increasing by 15 to 20% by the 2050s (SECCP 2002).

Regional planning has a crucial role to play in mitigating and adapting to these impacts, providing that climate change is incorporated into the regional planning process early on. Recognising this, the South East England Regional Assembly together with other ESPACE Partners, is developing the new Regional Spatial Strategy – the South East Plan that will provide a framework for development and land use in the South East up to 2026. The process of developing the plan will be used by the ESPACE Project to develop a model for the development and incorporation of adaptation policies into spatial planning across other regions of Europe.

Climate change has been identified as a cross-cutting issue for the South East Plan and is specifically addressed through a range of adaptation measures including:

* Ensuring that we use and manage water resources more efficiently

* Avoiding development in areas of high flood risk

* Making space for water and flood storage

* Reducing water run-off from developed areas through sustainable drainage

* Making buildings more resilient to flooding and other effects of climate change (figure 3).

Planning approaches used by other European regions have been integrated into the development of the Plan. These include approaches developed by ESPACE Partner, Watersc-



Figure 3 - Design of buildings should take flooding and other climate impacts into account. The living area in this Belgian house has been designed above flooding levels.' (ESPACE Project)

hap Rivierenland (NL), such as the concepts of making space for water (increased flood storage) and water test (ensuring a developments' impact on the water environment is assessed and minimised).

The Environment Agency (EA) and the South East's water companies, are working in conjunction with the Assembly to model water resource availability and sensitivity of water bodies to additional waste water treatment effluent (arising from new homes) to ensure that the spatial pattern of development takes account of any significant constraints and that necessary infrastructure is planned and delivered on time. Climate change impacts have been factored into this work.

In the Netherlands, several policies and agreements on water management and spatial planning have been developed, including the National Policy for Water Management in the 21st Century (2001), the National Agreement on Water (2003) and the National Document on Spatial Planning (in progress). All of these policies are of direct relevance to the objectives of ES-PACE and provide a model for the delivery of adaptation policies through spatial planning. The National Policy for Water Management in the 21st Century sets out how to integrate water management issues into spatial plans with policies to identify and safeguard land for water storage in combination with other functions. Dutch partners, Waterschap Rivierenland and Ministerie van VROM are undertaking several pieces of work as part of ESPACE to implement these policies. This includes the development of the Guiding Models and the production of quidance to enable delivery of multiple benefits (flood prevention and water management, recreation, wildlife and landscape enhancement) as well as the assessment of appropriate land uses for areas at risk of different levels of flooding. Later this year, the Ministerie van VROM will be holding a Dutch National meeting to further develop this work and to begin to identify the gaps and barriers in the Netherlands to the implementation of adaptation strategies at the national, regional, local levels and to strengthen cooperation with key stakeholders such as the water boards, municipalities and provinces and national government.

Raising Awareness

To ensure that adaptation is recognised as an integral part of managing climate change, ESPACE aims to address the low level of awareness amongst the public, policy makers and practitioners of the range of impacts of climate change and the immediate need for implementing adaptation measures.

West Sussex County Council (WSCC) is running an awareness raising campaign 'A Climate for Change' that focuses on two areas: firstly, assessing changes in the level of understanding of climate change across West Sussex in response to awareness raising campaigns; and secondly, developing a case study for the Manhood Peninsula - a coastal area in West Sussex. The output from the campaign work will be a transferable, best practice model to engage local communities and businesses across North West Europe in planning for climate change.

WSCC has carried out a survey of nearly 1,500 households in West Sussex to estab-



Figure 4 The Climate Change survey investigated what proportion of people perceived that temperatures and rainfall have changed in the last 10 years (West Sussex County Council)

lish the current levels of awareness of climate change (Figure 4). The results will provide an understanding of the language and words the public use to describe climate change and will inform the development of an awareness raising campaign for schools, youth groups, local communities and businesses. Belgian Partner, Regionaal Landschap Zenne, Zuun en Zoniën (RLZZZ) is also involved in this action as the key stakeholders they work with do not vet recognise climate change as a real threat. RLZZZ has now carried out a similar survey and together with WSCC, hope to learn how best to engage with their stakeholders and local communities on the subject of climate change.

The second strand of the WSCC awareness campaign focuses on the Manhood Peninsula which is one of the lowest lying coastal areas in the UK (Figure 5). Climate change will exacerbate the vulnerability of this low area due to rising sea levels, increasing storm surge frequency and stresses on water resources. Adapting to these impacts will therefore be key to safeguarding the livelihood of local residents, businesses and farmers. By using the area as a case study, WSCC will demonstrate how adaptation strategies need to be developed

through close liaison with the local community and relevant organisations.

Another method for delivering key messages and raising awareness of climate change is the effective use of partnerships. ESPACE Partner, South East Climate Change Partnership (SECCP) is developing a partnership model that can be used to raise awareness and ensure that there is more acceptance to adapting to climate change amongst planning practitioners and policy makers. SECCP itself is an example of a successful regional climate change partnership that has engaged with a range of stakeholders from the public, private and voluntary sectors and has also raised awareness, generated new projects and research. Their role in ESPACE is to develop this model further so that it can be transferred to other regions within North West Europe(ESPACE Project 2004b).

Increasing awareness of climate change is the first step in initiating change in the planning process. The second step involves translating this increased understanding into practical action through changes in the behavior of individuals and organisations. ES-PACE Partner, Hampshire County Council recognises that little is known about how best to change behavior and is looking into the processes of behavior change to assist with developing a greater understanding of how to engage with stakeholders on the topic of climate change. This work has three key objectives:

* To understand how to present information and/or opportunities for action to stakeholder groups

* Identify how institutions can best influence stakeholder behaviour on climate change

* Develop a general process that can be applied across **ESPACE**

There is a very real need to understand more about how to effect behavioral changes and this work will go a long way to addressing this.

Building consensus across Europe

A major aspect of the ESPACE Project is engaging with a wide network of organisations across North West Europe. To achieve this, ESPACE has established the 'Extended Partnership' - a targeted network of organisations that are interested in being part of the delivery process of ESPACE and who can act as ambassadors for the project, disseminating to others. The Extended Partnership provides organisations with the unique opportunity to: be involved in the process of developing spatial planning guidance that takes account of climate change; attend relevant workshops and conferences that will provide a range of information on spatial planning and climate change; access a wide network of contacts and experts across North West Europe; and access the outputs of the project such as the 'Information and Knowledge Base Report' that provides a comprehensive understanding of spatial planning networks, how they work and how to influence them for all four Partner countries (ESPACE Project 2004c).

The recommendations from ESPACE will have a real trans-



Figure 5 - The Manhood peninsula, Selsey, West Sussex is one of the lowest-lying areas in the UK and is the focus of a case-study looking at how to engage with the local community when developing climate change adaptation strategies (West Sussex County Council/PPL).

national impact upon spatial planning across Europe. Whether those involved in planning choose to make the changes needed to take account of climate change or not is beyond the remit of ESPACE, as this is dependant on political, economic and social factors. However, through the ESPACE actions, especially raising awareness and the Extended Partnership, ES-PACE ensures that an explicit decision will have to be made to take account of climate change or to disregard it.

For further information on ESPACE or on joining the Extended Partnership, please contact us at:

www.espace-project.org

ESPACE Project Environment Department The Castle Winchester Hampshire SO23 8UD UK

Chitra Nadarajah ESPACE Project Manager Tel:+44 (0) 1962 846771 chitra.nadarajah@hants.gov.uk

Jill Rankin ESPACE Communications Officer Tel:+44(0) 1962 846775 jill.rankin@hants.gov.uk

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The following references are available for Extended Partners to download from the ESPACE website library:

EEA 2004 Impacts of Europe's changing climate EEA Report No 2/2004. EEA (European Environment Agency) OPOCE (Office for Official Publications of the European Communities) ISBN: 92-9167-692-6

ESPACE Project 2004a Guiding models for water storage. (In English and Dutch). Prepared for Waterschap Rivierenland, Provincie Gelderland and Ministerie van VROM in association with NovioConsult and Robbert de Koning Landschaparchitect BNT.

ESPACE Project 2004b Climate change & partnership approaches - a discussion paper. Prepared by South East Climate Change Partnership.

ESPACE Project 2004c Developing a Knowledge and Information Base. Prepared for Hampshire County Council, by Land Use Consultants in association with Royal Haskoning and Institut für Stadtplanung und Staedtebau, University Duisburg-Essen

SECCP 2002 Climate change impacts - Looking ahead for the South East. A guide from the South East Climate Change Partnership.

> Chitra Nadarajah Jill D. Rankin ESPACE Project, Hampshire County Council (Lead Partner)

New web site for science education

Today sees the launch of the new "Xplora" portal, a new European gateway for science education. Such initiatives will be an important part of improving Europe's economic position in coming years, as more researchers are needed to drive innovation. "Xplora" provides resources for primary and secondary education, and is aimed at teachers, pupils, scientists, communication professionals and others involved in science education. Xplora has been developed with funds from the Science and Society action of the EU's Sixth Framework Programme for Research and Development.

Brussels, 09 June 2005.- The aim of Xplora is to stimulate science education to make it more interesting for young people. Key features include:

* Megalab - giving insight into innovative practical science approaches and projects

* Fully searchable standards-based database of digital learning resources for science education

* Virtual events - online expert discussions for schools

* Guidance on freely available Open Source tools for science education

* Tools for creating online communities

* Science education news, information, teaching tips and ideas, simulations and science activities

The project that has developed Xplora – known as Pencil – is unique in bringing together science education experts in formal and informal teaching methods to develop innovative approaches and materials that raise pupils' interest, knowledge and motivation. Pencil involves more than 13 scientific institutions, and is part of the wider Nucleus framework, a cluster of

science education projects involving Europe's major research laboratories, such as CERN and the European Space Agency. In addition, Xplora has set up content partnerships with other science institutions and organisations. The Portal is supported by a team of specialist science teachers from across Europe, who ensure that the content is of good quality and relevance, and propose activities, resources and content.

Xplora will be launched at the Ecsite conference in Vantaa, Finland, which is being held 10-12 June. The patrons of the Xplora portal are Professor Benoit Mandelbrot, the eminent mathematician who discovered fractals, and Ray Kurzweill, a leading expert in artificial intelligence. It is operated by European Schoolnet, a network of 28 Ministries of Education.

For more information

- * Xplora portal: www.xplora.org
- * Pencil: www.xplora.org/pencil
- * Nucleus: www.xplora.org/nucleus

New MRes in Catchment Dynamics and Management

New Master of Research course in Catchment Dynamics and Management at the University of Leeds

he Department of Geography at the University of Leeds is launching an exciting new course this year: a Master of Research in Catchment Dynamics and Management.

The MRes in Catchment Dynamics and Management is a new programme, seeking to attract students from across the world. The University of Leeds has a world-class reputation for catchment dynamics and management research and this programme builds on this success. This new programme provides a skilled pool of research-orientated staff for the water industry to draw on either at the MRes level or after further PhD study.

This programme aims to attract students from around the world who seek training in catchment dynamics and management research skills. The programme is unique and ideal for those who might be interested in studying for a PhD or training graduates who want to pursue a research career in industry and the environmental sector.

You can find more details on the school website at: <u>http://</u> www.geog.leeds.ac.uk/mastersinfo/MResCatchment/

> Dr Joseph Holden School of Geography University of Leeds Leeds LS2 9JT j.holden@leeds.ac.uk

First internet-built student satellite ready for launch

SSETI Express, a low Earth orbit spacecraft designed and built by European university students under the supervision of ESA's Education Department, is to be launched from the Plesetsk Cosmodrome on a Russian Cosmos 3M launcher on 27 September in the morning.

Paris, 7 September 2005.- Background Note for Editors:

SSETI Express (SSETI stands for Student Space Exploration and Technology Initiative) is a small spacecraft, similar in size and shape to a washing machine (approx. 60x60x90 cm). Weighing about 62 kg, it has a payload of 24 kg. Onboard the student-built spacecraft will be three pico-satellites, extremely small satellites that weigh around 1 kg each. These will be deployed once SSETI Express is in orbit, marking a first not only for the students but also for the space sector. In addition to acting as a test bed for many designs, including a cold-gas attitude control system, SSETI Express will take pictures of the Earth and function as a radio transponder.

The SSETI Express satellite was designed and built mainly by students under the supervision of ESA's Education Department. The principal sub-systems (power control unit, UHF unit for communications, onboard computer to control the satellite, attitude control system, propulsion system and camera) were developed at various European universities. The challenge has been for the 23 university groups, spread across Europe and from very different backgrounds, to work together via the internet to jointly build the satellite. ESA has provided support, drawing up the specifications, harmonising efforts, supervising construction and testing, and organising the launch.

ESA's Test Centre at Noordwijk (the Netherlands) made its facilities and experts available to SSETI Express for thorough testing. The satellite underwent electromagnetic compatibility testing in a special chamber. SSETI Express was then mounted on a shaker table and subjected to vibration and shocks representative of those it will experience during launch. The harsh environment of space - vacuum, extreme thermal conditions, etc. - was simulated in one of the vacuum chambers at ESTEC.

SSETI Express has taken 18 months to progress from kickoff to flight readiness review, which probably makes it the fastest spacecraft design and construction project ever, hence the name "Express". By using donated materials, equipment and expertise - from ESA, universities and industry - total hard-ware expenditure by ESA's Education Department has been kept below 100 000.

The Student Space Exploration and Technology Initiative (SSETI), which has provided the framework for the SSETI Express mission, was set up by ESA's Education Department in 2000 to involve European students in real space missions. The initiative aims to give students practical experience and encourage them to work in the fields of space technology and science, thereby helping to prepare talented experts for the future.

Since its creation, SSETI has developed a network of students, educational institutions and organisations to facilitate work on various spacecraft projects. More than 400 European students have made an active, long-term contribution to this initiative, either as part of their degree or in their spare time. In addition, many hundreds more have been involved with or inspired by SSETI.

SSETI students are currently working on three main projects:

* SSETI Express

* SSETI ESEO, the European Student Earth Orbiter, a 120 kg spacecraft designed for Ariane 5 and scheduled for launch in 2008

* SSETI ESMO, the European Student Moon Orbiter, scheduled for launch in 2010-12. It will conduct experiments both on its way to the Moon and once lunar orbit is achieved.

ESA PR No. 39-2005

6 new job positions

6 new jobs can be viewed at http://www.the-eggs.org/jobs.php

You can post in this Newsletter, free of charge, available openings in your Institution or group at http://www.the-eggs.org/submit/jobs.php

On-line job positions are updated at least every week.

Electron Microprobe Analysis and Scanning Electron Microscopy in Geology



Authors: S. J. B. Reed Publisher: Cambridge University Press ISBN: 052184875X YEAR : 2005 EDITION : 2nd PAGES : 250 PRICE : 51.20 €

Now fully updated to cover recent developments, this book covers the closely related techniques of electron microprobe analysis (EMPA) and scanning electron microscopy (SEM) specifically from a geological viewpoint. Topics discussed include: principles of electron-target interactions, electron beam instrumentation, X-ray spectrometry, general principles of SEM image formation, production of X-ray 'maps' showing elemental distributions, procedures for qualitative and quantitative X-ray analysis (both energy-dispersive and wavelength-dispersive), the use of both 'true' electron microprobes and SEMs fitted with X-ray spectrometers, and practical matters such as sample preparation and treatment of results. Throughout, there is an emphasis on geological aspects not mentioned in similar books aimed at a more general readership. The book avoids unnecessary technical detail in order to be easily accessible, and forms an up-to-date text on EMPA and SEM for geological postgraduate and postdoctoral researchers, as well as those working in industrial laboratories.

Environmental Change. Key Issues and Alternative Perspectives



Authors: Frank Oldfield Publisher: Cambridge University Press ISBN: 0521829364 YEAR : 2005 EDITION : 1st PAGES : 392 PRICE : 102.40 €

Environmental Change: Key Issues and Alternative Approaches describes and explains the current and future significance of past and contemporary environmental and climatic change. It outlines the conceptual framework for studies of environmental change by posing key questions and presenting the results of the most recent and relevant research. It provides a non-specialist introduction to models in environmental change research and to the study of past environmental changes. Covering the last 400 000 years, special emphasis is placed on past periods of rapid warming, the nature of climatic variability over the last 1000 years and the dramatic and accelerating changes in the Earth system heralded by the industrial revolution. The book is extensively referenced and illustrated. This book provides a balanced, non-specialist basis for understanding and exploring the scientific issues underlying global change for advanced undergraduates in Geography, Environmental, Earth, Biological and Ecological Sciences.

Fundamentals of Structural Geology



Authors: David D. Pollard, Raymond C. Fletcher Publisher: Cambridge University Press ISBN: 0521839270 YEAR : 2005 EDITION : 1st PAGES : 520 PRICE : 65.82 €

Fundamentals of Structural Geology provides a new framework for the investigation of geological structures by integrating field mapping and mechanical analysis. Assuming a basic knowledge of physical geology, introductory calculus and physics, it emphasizes the observational data, modern mapping technology, principles of continuum mechanics, and the mathematical and computational skills, necessary to quantitatively map, describe, model, and explain deformation in Earth's lithosphere. By starting from the fundamental conservation laws of mass and momentum, the constitutive laws of material behavior, and the kinematic relationships for strain and rate of deformation, the authors demonstrate the relevance of solid and fluid mechanics to structural geology. This book offers a modern quantitative approach to structural geology for advanced students and researchers in structural geology and tectonics. It is supported by a website hosting images from the book, additional colour images, student exercises and MATLAB scripts. Solutions to the exercises are available to instructors.

Hydrology. An Introduction



Authors: Wilfried Brutsaert Publisher: Cambridge University Press ISBN: 0521824796 YEAR : 2005 EDITION : 1st PAGES : 640 PRICE : 58.50 €

Water in its different forms has always been a source of wonder, curiosity and practical concern for humans everywhere. Hydrology - An Introduction presents a coherent introduction to the fundamental principles of hydrology, based on the course that Wilfried Brutsaert has taught at Cornell University for the last thirty years. Hydrologic phenomena are dealt with at spatial and temporal scales at which they occur in nature. The physics and mathematics necessary to describe these phenomena are introduced and developed, and readers will require a working knowledge of calculus and basic fluid mechanics. The book will be invaluable as a textbook for entry-level courses in hydrology directed at advanced seniors and graduate students in physical science and engineering. In addition, the book will be more broadly of interest to professional scientists and engineers in hydrology, glaciology and other earth sciences.

Thermodynamics of Natural Systems



Authors: G. M. Anderson Publisher: Cambridge University Press ISBN: 0521847729 YEAR : 2005 EDITION : 2nd PAGES : 664 PRICE : 65.84 €

Thermodynamics deals with energy levels and the transfer of energy between states of matter, and is therefore fundamental to all branches of science. This new edition provides a relatively advanced treatment of the subject, specifically tailored for the interests of the Earth sciences. The first four chapters explain all necessary concepts, using a simple graphical approach. Throughout the rest of the book the author emphasizes the use of thermodynamics to construct mathematical simulations of real systems. This helps to make the many abstract concepts acceptable. Many computer programs are mentioned and used throughout the text, especially SUPCRT92, a widely used source of thermodynamic data. An associated website includes links to useful information sites and computer programs and problem sets. Building on the more elementary material in the first edition, this textbook will be ideal for advanced undergraduate and graduate students in geology, geochemistry, geophysics and environmental science.

Worlds on Fire. Volcanoes on the Earth, the Moon, Mars, Venus and Io.



Authors: Charles Frankel Publisher: Cambridge University Press ISBN: 0521803934 YEAR : 2005 EDITION : 1st PAGES : 384 PRICE : 36.56 €

Worlds on Fire takes the reader on a fascinating tour of the mightiest volcanoes in the Solar System. From Kilauea volcano in Hawaii and Mount Etna in Sicily, it leaps to the lava fields and rilles of the Moon, retraces the historic footsteps of the Apollo astronauts and describes new volcanic provinces to explore. The three largest volcanoes of Mars - Olympus Mons, Alba Patera and Arsia Mons - are profiled, amongst others. The strange world of Venus, revealed by radar, opens our perspective of volcanism to features never seen before: pancake domes of puffed-up lava, and gigantic fault rings sitting over buried magma chambers. The tour of the Solar System ends with the only current eruptions outside Earth: the spectacular volcanoes of Io - Jupiter's fiery moon. This highly readable book, illustrated with the most recent imagery from spacecraft, will appeal to general readers, and students of Earth and planetary sciences.

Fascinating blend of scientific analysis and philosophical evaluation



Dirk Schulze-Makuch, Louis N. Irwin Published by: Springer ISBN: 3-540-20627-2 YEAR : 2004 EDITION : 1st #PAGES : 172 PRICE : 64.15 €

In their book "Life in the Universe", Dirk Shulze-Makuch and Louis Irwin make a very interesting analysis of what we mean by the term "life", how to detect it and where it might be and in what form on other planets and satellites in the Solar System, as well as elsewhere in the Universe.

In their book "Life in the Universe", Dirk Shulze-Makuch and Louis Irwin make a very interesting analysis of what we mean by the term "life", how to detect it and where it might be and in what form on other planets and satellites in the Solar System, as well as elsewhere in the Universe. The authors push their interpretations as to what could constitute a life form deliberately, leaving one with the impression of having been intrigued at the same time as wryly shaking one's head. From the point of view of a "hard earther", who appreciates solid, factual evidence. I found the book a fascinating blend of serious scientific analysis of what life is and a philosophical evaluation of what it could be. Although I do not necessarily concur with the authors' vision of the Solar System planets and satellites as repositories of life, I did appreciate the relatively detailed evocation of the principals of life, including life as we do not know it. The book is well written and readable for an educated non-specialist.

Shulze-Makuch and Irwin start their book with an overview chapter setting out the main themes and theses before jumping into the core of the matter with an examination of the criteria of life. After discussing problems related to traditional definitions of life, they conclude that the boundary between non-living and living must be transitional and that life cannot be defined by one single characteristic. They propose a definition of life that is adapted to different environmental situations on different planets, not just the Earth. Thus, they define life as a structure (1) composed of a bounded microenvironment in thermodynamic disequilibrium with its external environment, (2) that is capable of transforming energy and the environment to maintain a low entropy state, and (3) that is capable of information transmission and coding. However, one wonders where the capability of evolution fits into this scenario? After discussing the first cells and their possible earliest stages of evolution, they end the chapter with the intriguing observation that the chemical composition of life on Earth resembles more closely the composition of the stars than the planets!

The following chapter is a review of the early geological record of the Earth and life from which the authors conclude that the most primitive life forms must be simple, that life arose quickly when the conditions were conducive and that it was changes in the physical environment that led to an increase in complexity. This is one of the few chapters where I had some difficulty with the superficiality of the review based on inadequate sources, probably because it is the areas in which I have had more reading. Shulze-Makuch and Irwin base themselves on a book by Margulis and Sagan (1995) regarding the early geological and environmental evolution of the Earth. Although brilliant, Margulis and her son are not earth scientists and their understanding of this field is rather limited. There are other reviews that would have given Shulze-Makuch and Irwin better insight, such as Nisbet and Sleep (2001) (and, more recently Nisbet and Fowler, 2004; Westall, 2004). Another problem is the obsession with complete sterilisation of the Earth during the late heavy bombardment signifying that life could only have started after the bombardment. There is no evidence that the Earth was sterilised between 4.0-3.85 Ga, the scientists who made this hypothesis (Sleep et al., 1989) estimate that the Earth may have been hit by between 0 and 6 planet sterilising bolides! Other studies indicate that even if the Earth had been hit by very large impactor, only the top 400 m of the ocean would have boiled off (Ryder, 2003). If life arose quickly, as soon as the conditions were favourable, then it would have arisen as soon as the temperature of the condensed water was below 80°C (relatively abundant water existed at the surface probably by 4.4 Ga, Wilde et al., 2001). Moreover, Shulze-Makuch and Irwin themselves state elsewhere in the book that the most common forms of life (as we know it) are probably chemosynthetic microorganisms that live in the subsurface and would therefore be protected from large-scale external perturbations. Life did not start only after 3.85 Ga - the diversity and level of evolution demonstrated by the earliest microfossils of about 3.5 Ga indicate that it must have had a long period of evolution (Westall and Southam, in review). I have digressed somewhat here, simply because this is the part of the book that I feel best capable of critically appraising on a scientific level.....

Chapter 4 deals with the problem of energy. This is a large chapter and one of the most important ones in the book. The basic hypothesis here is that life needs energy in order to organise materials, maintain a low state of entropy and to perform work. The authors first look at the energy sources for life as we know it, oxidation/reduction chemistry and light, noting that both these forms of energy are equally competitive from a purely energetic point of view. They then go on to list and analyse individually other potential forms of energy, such as heat, pressure, stress, magnetic waves, kinetic energy, osmotic/ion gradients. Although chemical and light energy is the most efficient, Shulze-Makuch and Irwin conclude that earliest life on Earth could have used other forms of energy that were later out-competed and that other, promising forms of energy include thermal, ionic/osmotic gradients and kinetic energy in a fluid.

The following chapter considers the building blocks of life and explains the advantages of carbon - its ability to form millions of complex, stable molecules with itself, O, N and H, the variety of structures thus formed, their chirality, the polymer backbones, the energetically favourable redox reactions, the fact that water is an ideal solvent, and the fact that carbon is abundant in the universe. Other polymer-forming elements, such as B. N. Si, P and S are discussed. Si-based life does not seem to be a probability since it does not form ubiquitous polymeric compounds as does C. The conditions under which life based on other elements (not necessarily just one) would have to exist are very different to those on Earth and the authors cite Titan as one possible example. The advantages of life in a solvent rather than in a gas or solid are listed in Chapter 6, with water being the best solvent on warmer planets and other solvents, such as methanol, ammonium or water/ammonium mixtures being better on colder planets (for instance an H2O/ NH3 mixture in the subsurface of Titan). Schulze-Makuch and Irwin note that HCN, HF and H2S would not be suitable solvents under any temperature conditions. Obviously the nature of the solvent is important with respect to the elemental composition of the building bricks of the particular life form on a particular planet.

Having established the advantages of carbon-based life forms in a liquid water solvent, Schulze-Makuch and Irwin then address the subsurface, surface, atmosphere and space habitats in which such life forms could exist. The subsurface provides the most stable, protected environment and is probably the most widespread environment in which life is found/could be found on other planets and satellites. The surface environment, on the other hand, is subjected to extreme conditions and environmental changes including variations in temperature and humidity, wind, radiation effects, meteorite impacts, supernovae explosions and so on. Although potentially more hostile, the surface environment does offer the advantage of access to a powerful source of energy, sunlight, and with it (as well as through environmental stresses) the potential for evolution to more complex life forms. The authors discuss the possibility of life associated with water vapour droplets in the atmosphere of, for instance, Venus, and note that life in space will be limited to resistant dormant forms entombed in a protecting coating of dust or rock that could survive for possibly even up to a million years in a boulder on an interplanetary trajectory.

Exotic forms of life are the subject of the penultimate chapter; they include spin configurations based on p-hydrogen and o-oxygen, unbounded space clouds (Fred Hoyle's "black cloud" scenario), and life on planets around a neutron star or a brown dwarf. Other ideas such as plasma life or pure energy are put into the science fiction category while the authors note "we believe that in this book we have already pushed the limits of what it means to be alive" (p. 146).

The book concludes with a chapter on searching for life on other planets, cataloguing in a series of tables the types of signatures of life: biosignatures that record the functional processes of aggregates of organisms that alter their environment; geosignatures that are the result of the alteration of the geological environment owing to biological processes, such as limestone and ironstone deposits; and geoindicators that are planetary-scale signatures, such as an atmosphere or ice cover, indicating that a planet is capable of hosting life but not necessarily that it does actually contain life. Unfortunately the discussion of the morphological biosignatures is dismissed with a reference to the current debate concerning the uncertain biogenicity of carbonaceous filaments described by Schopf (1993) originally as fossil cyanobacteria and by Brasier et al., (2002) as abiogenic artefacts. This does not do justice to the wealth of documentation available on early life. On the other hand, the authors do suggest that a variety of biosignatures relating to biofilm formation (composition, biostructures - e.g; bioetching or pitting but not actual fossils - and biominerals) constitute a reasonable biosignature. This chapter contains other interesting tables in which the presence of various bio/ geosignatures and geoindicators are listed for different planets and satellites in the Solar System and the consequent plausibility of life (senso lato) is assessed. Again, with this chapter, because I have more personal experience, I feel that the treatment of the subject is somewhat cavalier.

All in all, I enjoyed reading this book. Based on the parts that I was able to critically evaluate, I recognise that specialists in other fields may have problems with the way the authors have treated specific topics. However, the authors themselves admit that the literature cited could be more extensive and there are a number of general books that should perhaps have been listed, for instance, Brack (1998) and Horneck and Baumstark-Khan (2002). The structure of the book greatly aids its readability - each chapter starts with a brief overview of a particular topic, then comes a more or less detailed analysis of specific points, ending with a concluding paragraph. At each point, the relevance of a specific topic for the possibilities of life on another planet or satellite is evoked. There are also useful tables summarising various characteristics described in the chapter and their relevance to life in the universe. Relevant figures also provide useful visual aids. I recommend this book for interested non-specialists with the proviso that the authors have deliberately pushed their hypothesis to the extreme (as they state themselves) and, if the reader wishes to delve deeper into a particular field he/she should not rely only on the literature cited and should obtain more recent, up to date documentation.

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> Dr. Frances Westall, Centre de Biophysique Moléculaire, CNRS <u>westall@cnrs-orleans.fr</u>

Project team announces discovery of location of Homer's Ithaca Odysseus Unbound. The Search for Homer's Ithaca.



Robert Bittlestone, James Diggle, John Underhill Published by: Cambridge University Press ISBN: 0521853575 YEAR : 2005 EDITION : 1st #PAGES : 618 PRICE : 36.55 €

What is potentially one of the most exciting classical discoveries for over 130 years was revealed in London today (Thursday September 29 2005).

What is potentially one of the most exciting classical discoveries for over 130 years was revealed in London today (Thursday September 29 2005).

At a conference held at the Foreign Press Association, Robert Bittlestone (Chairman of management consultancy Metapraxis Ltd), James Diggle (Professor of Greek and Latin at Cambridge University) and John Underhill (Professor of Stratigraphy at Edinburgh University) announced that they had found new and compelling evidence in support of the location of ancient Ithaca, the island described in great detail in Homer's Odyssey.

By deploying computer-based technology, advanced satellite imagery and 3D global visualisation techniques developed by NASA, as well as intensive field expeditions, the project team was able to analyse and visualise a mass of data, including literary, geological and archaeological clues.

Their conclusion is that Homer's Ithaca was not the Greek island now called Ithaki but was instead located on what is believed to have been the previously separated western peninsula of today's island of Kefallinia, an area now called Paliki (see map).

Major geological changes in landscape

This conclusion is based on a radical geological hypothesis first proposed by Bittlestone in 2003. He noticed that Homer's description of Ithaca has puzzled scholars for millennia because it does not agree with the location of today's island of Ithaki:

"Around are many islands, close to each other, Doulichion and Same and wooded Zacynthos. Ithaca itself lies low, furthest to sea Towards dusk [i.e.west]; the rest, apart, face dawn and sun [i.e. east]."

Odyssey 9.23-26

This presents two contradictions because today's island of Ithaki lies to the east of the other islands, not to the west, and it is not low-lying but mountainous. Over the centuries there have been many previous attempts to explain this mismatch, including a learned treatise by William Gladstone. The consensus has been that the contradictions occurred because Homer lived much later than the events of the Odyssey and several hundred kilometres to the east in what is now western Turkey, so perhaps he was either ignorant of or uninterested in the actual geography.

Bittlestone asked instead the question: "What if Homer has been right all along? What if this mismatch has occurred not because of geographical errors by the poet, but because of geological changes in the landscape? Could something unprecedented have altered the layout of these islands since the time of the Trojan War around 1200 BC?"

Since 2003 an international project team of geologists, classicists and archaeologists in the UK, in Greece and worldwide has been advising on this hypothesis and the results that have emerged are astonishing. The team has been able to reconstruct the former layout of these islands and it provides a compelling solution to the long-established enigma of the location of Homer's Ithaca.

Reconciliation of the Odyssey's geographical descriptions – Odysseus' homeland "No longer a mystery"

Homer's descriptions of Ithaca in the Odyssey indicate that at that time there were two separate islands called Same and Ithaca. Bittlestone, Diggle and Underhill believe that Same was the main part of today's island of Kefallinia and ancient Ithaca was its western peninsula, now called Paliki. At that time they were probably separated by a narrow seaway which they have called "Strabo's Channel" after the geographer Strabo (64BC-AD21), who also sought to identify Homer's Ithaca and who in fact described this marine passage without realising its significance.

Over the last three millennia land-mass uplift and catastrophic rockfalls due to periodic earthquakes have filled in this region, which is now an isthmus called Thinia. This is believed to have made the single island of Kefallinia out of the former islands of Ithaca and Same. The name of Ithaca was subsequently transferred to today's island of Ithaki, which was formerly the "lost island" of Doulichion mentioned above.

Furthermore, almost all of the 26 locations that are described in detail in the Odyssey can be identified today in Northern Paliki and its neighbourhood. James Diggle and John Underhill have been working with Robert Bittlestone since 2003 in the development of these radical new findings and their explanation is set out in the forthcoming book from Cambridge University Press: Odysseus Unbound: The Search for Homer's Ithaca.4 The book records the contribution and advice of over 40 individuals, including academic experts from all over the world.

Formation of charitable foundation to carry work forward

The Odysseus Unbound authors recognise that the identification of this new location for ancient Ithaca is likely to be regarded as a matter of international interest and of national significance within Greece itself.

They are cooperating closely in this research with the Hellenic Ministry of Culture and with the Athens-based Institute of Geology and Mineral Exploration (IGME). Deputy Minister of Culture Petros Tatoulis issued the following statement on September 26th: "The Hellenic Ministry of Culture welcomes the release of the book Odysseus Unbound: The Search for Homer's Ithaca (Robert Bittlestone, with James Diggle and John Underhill: Cambridge University Press, 2005). The book opens exciting prospects for future research regarding the location of Homeric Ithaca. The Ministry eagerly follows Mr. Bittlestone's hypothesis and looks forward to staying informed about any future developments".

IGME issued the following statement on September 28th:

"The Institute of Geology and Mineral Exploration in Athens has facilitated the geological researches of Professor John Underhill in the Ionian Islands since 1982. The results of his recent investigation of the Holocene geomorphology5 of western Kefallinia are unexpected and thought-provoking. We are pleased to be working closely with him and his team at the University of Edinburgh with the joint objective of furthering our understanding of the geological history and the tectonic setting of these islands. We have already started on a program of collaborative marine surveys and we look forward to advancing our knowledge of this region together."

The new charitable Foundation will form the basis for international fund-raising and sponsorship. Referring to the research conducted so far as Phase A, the team proposes a Phase B project from 2006-2007 with the objective of definitive geological assessment and non-invasive archaeology, to be followed by a Phase C project from 2008-2012 to involve archaeological excavation of the key sites, including Odysseus' palace and Ithaca city.

In the new book Robert Bittlestone asks us to consider "Are there priceless archaeological treasures to be found in Paliki? Could there be Linear B tablets? Might the Gold of Homer's Troy be complemented by the Gold of Homer's Ithaca? We shall learn only if we have the courage and the confidence to look." He adds today:

"This project represents a unique opportunity for philanthropic individuals and organisations to make a permanent contribution to society by funding research into our Bronze Age ancestors: they represent the unknown architects of our western civilisation".

Press release issued on behalf of the authors.

EGU General Assembly 2006 (Meeting)

02/04/2006 - 07/04/2006 - Vienna, Austria

The EGU General Assembly 2006 will bring together geoscientists from all over Europe and the rest of the world into one meeting covering all disciplines of the Earth, Planetary and Space Sciences. Especially for young scientists the EGU appeals to provide a forum to present their work and discuss their ideas with experts in all fields of geosciences.

The EGU invites all geoscientists to participate in the assembly, submit contributions to the topical sessions and share their research with colleagues and friends. The EGU is looking forward to cordially welcome you in Vienna!

organizer info: EGU Office Max Planck Strasse 13 37191 Katlenburg Lindau Germany egu.meetings@copernicus.org http://meetings.copernicus.org/egu2006/

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16th Annual V.M. Goldschmidt Conference 2006 (Meeting)

27/08/2006 - 01/09/2006 - Melbourne, Australia

The 16th Annual V.M. Goldschmidt Conference 2006 is endorsed by the European Association for Geochemistry, Geochemical Society and Geological Society of Australia.

The Conference, held annually, is the premier event within the profession which aims to focus on geochemical, experimental, cosmochemical and isotope research. The expected number of delegates for Goldschmidt 2006 is between 1000 - 1500 comprising:

- Geologists
- Geochemists
- Cosmochemists
- Hydrogeologists
- Geochronologists
- Biogeochemists

The aims and objectives are to bring together geochemists and isotope geologists from around the world to discuss the latest developments in their fields and to promote networking and the establishment of new research initiatives and collaboration.

The Conference will be held at the state of the art, Melbourne Exhibition and Convention Centre.

For a copy of the updated program and list of speakers visit the website.

organizer info: www.goldschmidt2006.org

3rd European Symposium on NMR Spectroscopy (Meeting)

06/08/2006 - 09/09/2006 - Freising, Germany

3rd European Symposium on NMR Spectroscopy in Soil, Geo and Environmental Sciences:

Nuclear magnetic resonance (NMR) spectroscopy and magnetic resonance imaging (MRI) have developed into important and widely used analytical tools in soil and geosciences. The aim of this symposium is to bring together scientists with related interests in the potential applications and limitations of these techniques for research in soil, geosciences and environmental sciences.

An introduction to the techniques will be given by experts in the field of NMR, and applications and state of the art will be presented by scientists having successfully applied those techniques. Knowledge of NMR theory is not necessarily required for participation as developing applications is an important objective of the symposium, and a short introduction course will be offered prior to the symposium.

Topics inlude

1. 1D and 2D NMR spectroscopy in solid and liquid state for elucidating the structure of natural organic matter, including multinuclear spectroscopy

2. Application of NMR and MRI spectroscopy for investigating physical properties of soils

3. NMR as a possible tool for studying soil minerals and their interactions with $\ensuremath{\mathsf{SOM}}$

4. New advances in the application of NMR for revealing the nature and the behaviour of pollutants in soils

5. New approaches and technical developments with respect to NMR and MRI in soil and geosciences

http://www.wzw.tum.de/bk/nmr06

UDMS 2006: 25TH URBAN DATA MANAGEMENT SYMPOSIUM (Meeting)

15/05/2005 - 17/05/2005 - AALBORG, DENMARK

UDMS, the Urban Data Management Society, has organised international symposia at various locations in Europe in order to promote the development of information systems in local government since 1971.

An important aim of UDMS has been to provide a forum for people to discuss new approaches, to consider new technologies and to share practical experiences in the field of urban data management.

The focus has been on urban applications but regional and rural issues have always been well represented and have grown recently in importance.

For the next symposium, the 25th, that will be held at Aalborg University, the organising committee invites you to submit a paper concerning the topics listed below.



THEME 1): COOPERATION AMONG LOCAL AND RE-GIONAL/NATIONAL AUTHORITIES

- TOPICS:

Structuring of the administrative system Local administration reform International cooperation EU initiatives and projects

THEME 2): INFORMATION SYSTEMS FOR SUSTAIN-ABLE DEVELOPMENT

- TOPICS:

GIS support to cross-sectoral approach Requirements for data, technology and organisation

THEME 3): ACCESS, USE AND MAINTENANCE OF URBAN AND REGIONAL DATA

- TOPICS: Geospatial portals Integration of data from multiple sources Data availability and transparency issues Data interchange Environment and security Interoperability Enterprise GIS- datamodeling

THEME 4): SPATIAL DATA INFRASTRUCTURES - TOPICS:

Spatial data infrastructures, especially at the regional and local level

Data infrastructures for location based services

THEME 5): E-GOVERNANCE - TOPICS: Spatially-enabled e-governance GIS components of e-government

THEME 6): APPLICATIONS

- TOPICS:

Disaster and risk management

Real time GIS, especially for environmental monitoring and control

GIS for tax assessment Modeling/Simulation in urban planning Cadastral systems Urban and rural planning and management Remote sensing

THEME 7): THE THIRD DIMENSION - TOPICS: 3D urban and regional data modeling 3D applications

THEME 8): PARTICIPATORY SYSTEMS - TOPICS: Community engagement Public participation GIS

THEME 9): TELEGEOMATICS - TOPICS: Location methods Location based computing and services Real time guidance Traffic information All accepted papers will be published and distributed to all participants at the symposium.

IMPORTANT DATES:

Abstract submission deadline: September 30, 2005 Notification of acceptance: November 15, 2005 Paper delivered by: January 15, 2006

organizer info: UDMS - Urban Data Management Society http://www.udms.net

For further information: UDMS Executive Secretary Mrs. Elfriede M. Fendel Section GIS technology OTB Research Institute for Housing, Urban and Mobility Studies Delft University of Technology Jaffalaan 9 NL-2628 BX Delft The Netherlands e-mail: <u>e.fendel@otb.tudelft.nl</u>

Biohydrology 2006 (Meeting)

20/09/2006 - 22/09/2006 - Prague, Czech Republic

International Conference BIOHYDROLOGY 2006, Impact of biological factors on soil hydrology:

Biohydrology 2006 is the first international conference to discuss exclusively the interactions between hydrological and biological processes in soil. The picturesque setting of Prague will provide an ideal opportunity for hydrologists, biologists and soil scientists to discuss recent research developments. Key-note lectures from internationally renowned scientists, combined with volunteered papers and posters, will examine the wide range of processes that drive soil biology/hydrology interactions from the micro- to regional-scale.

Conference topics

1. Biological influence on soil hydrological cycling, Keynote speakers: Prof. J. Cermak, Dr. P.D. Hallett, Dr. A. Kleidon, Prof. C.J. Ritsema

In this session we aim to present fundamental research on biology-hydrology interactions in soil, and new measurement and modelling techniques that are helping us unravel this complex problem. Contributions can vary from (1) the effect of vegetation (evapotranspiration, entropy production, etc.) on the land surface climate (precipitation, temperature, etc.), through (2) the impact of biopores on infiltration and water and solute transport in soils, up to (3) the hydrological impacts and implications of soil water repellency at various spatial and temporal scales.

2. Interactions between microbiology and soil hydrology, Key-note speakers: Prof. D. Or, Dr. M. Roper, Dr. W.R. Whalley, Prof. I.M. Young

Roots, fungi and bacteria gain a competitive advantage by manipulating the uptake and retention of water and solutes at their surfaces. There is growing recognition that this is driven by biological exudates that alter the properties of water and the pore structure of soil. Waxes from plant leaves and soil fauna also drive changes to pore structure that impact hydrology. This session will focus on the impact of biology and biological exudates on several microscale hydrological processes: (1) contact angles and surface tension of water, (2) pore structure formation and (3) the role of specific organisms.

3. Changing biohydrology for soil sustainability, Key-note speakers: Prof. J.L. Cisar, Dr. S.H. Doerr, Prof. M.T. Hernandez, Prof. B. Zhang

Biopores, soil water repellency, and soil degrading processes have major repercussions for soil hydrological processes, plant growth, and soil erosion. The impacts can be both positive and negative, with careful land management providing the right balance. This session will examine how land management can reduce unwanted impacts related to biohydrological processes, such as water repellency, preferential flow, rapid leaching of agricultural chemicals, and poor water retention. It will also consider positive effects such as soil stabilisation, aggregation and land restoration. The main areas of discussion will be: (1) reducing bypass flow and leaching losses, (2) remediation of soil water repellency using clay/advanced water management/surfactants etc., and (3) restoration of degraded soils with vegetation, waste composts, or microbes.

Conference Chairman: Dr. Louis W. Dekker, ALTERRA Green World Research, Wageningen, The Netherlands.

organizer info:

Institute of Hydrodynamics, Academy of Sciences of the Czech Republic, Prague, Czech Republic

Institute of Hydrology, Slovak Academy of Sciences, Bratislava, Slovakia

ALTERRA Green World Research, Wageningen, The Netherlands

Scottish Crop Research Institute, Invergowrie, Dundee, UK

University of Wales Swansea, Swansea, UK <u>http://www.ih.savba.sk/biohydrology2006/</u>

HydroEco2006, Int. Multidiscipl. Conf. on Hydrology and Ecology, The Groundwater/Ecology Connection (Meeting)

11/09/2006 - 14/09/2006 - Karlovy Vary (Carlsbad), Czech Republic

This conference will be a great opportunity to learn how interactions between groundwater and ecology be better understood, measured, simulated, and managed, thus helping to improve the technological basis for policy decisions for issues such as reconstruction of ecologically valuable environments and the use of water resources in these environments.

The disciplines include hydrology, ecology, eco-technology, biology, chemistry, geochemistry, environmental biogeochemistry, and subsurface microbiology. The unifying theme is the importance of groundwater, groundwater/surface water, and hyporheic zone interaction to the ecological systems and processes of concern. The conference will be held in the splendid Grandhotel Pupp (http://www.pupp.cz/), in the city of Karlovy Vary (Carlsbad in English), the most famous Czech spa town, about 130 km west of Prague. The conference will include plenary oral and poster presentations (no parallel sessions).

organizer info:

Faculty of Science, Charles University (Universita Karlova), Prague, Czech Republic; International Commission on Groundwater (ICGW) of IAHS; T. G. Masaryk Water Research Institute (VÚV), Prague; US Geological Survey (USGS) http://web.natur.cuni.cz/hydroeco2006/

Karel Kovar, Netherlands Environmental Assessment Agency (MNP), P.O.Box 303, 3720 AH BILTHOVEN, The Netherlands karel.kovar@mnp.nl

EUROSPRITE 2005 Campaign

The EU research training network Coupling of Atmospheric Layers (CAL), founded to study high-altitude discharges (red sprites, blue jets, elves, etc.) and their impact on the atmosphere, is at the moment conducting an observational campaign to observe these phenomena over Europe. Between 18 July 2005 to 18 September 2005, cameras installed at the Observatory of Pic du Midi de Bigorre in the French Pyrenees and Puy de Dome in the Massif Central in the south-east France are being remotely operated by 8 young scientists funded by the CAL network, from different countries in Europe via the Internet. Information and daily updates from the campaign are available at the blog, set up specially for this purpose. We invite you to join us in this interesting event. If you have EM-, satellite- or other measurements that could be correlated with our sprite observations please feel free to contact Dr. N.B. Crosby who is responsible for the CAL training and outreach activities.

The web site of the project is at www.dsri.dk/cal/

Dr. Norma Bock Crosby Belgian Institute for Space Aeronomy Ringlaan-3-Avenue Circulaire B-1180 Brussels, Belgium <u>norma.crosby@oma.be</u>