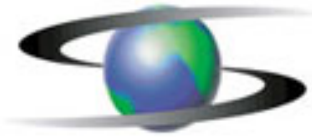

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Open Science Conference

Challenges of a Changing Earth

10-13 July 2001

Last modified **27 October, 2001**

Updates

- Conference Presentations available online
- Post-Conference Briefing
- The Amsterdam Declaration
- Media Room
- Media Coverage & Highlights from the Conference

The Earth's environment and habitability are now, as never before, affected by human activities. This conference presented the latest scientific understanding of natural and human-driven changes on our planet. It examined the effects on our societies and lives, and explored what the future may hold.

A Global Change Open Science Conference
RAI Conference Centre, Amsterdam, Netherlands
10-13 July 2001

Dutch Science Tours
9 July 2001

Challenges of a Changing Earth
Global Change Open Science Conference

Post-Conference Briefing

Participation
Final statistics for the Conference are currently being generated and will be finalised soon. Final total registration was 1329 persons, with about 100 countries represented. We were pleased with the strong participation by scientists from developing countries; over 400 of registrants came from these regions. An estimated 1200 persons attended the Conference at any one time, and a very strong majority also attended the parallel sessions. At times we were unable to accommodate all of the participants who wanted to attend particular parallel sessions, and we appreciate the flexibility that many participants showed in attending alternate sessions.

Role of DIVERSITAS
As the planning for the Global Change Open Science Conference progressed, DIVERSITAS joined IGBP, IHDP and WCRP as the fourth of the international research programmes on global change. Although DIVERSITAS was not formally a sponsor of the Conference, it contributed significantly to the planning of the Conference programme and participated fully in the drafting and presentation of the Amsterdam Declaration. The excellent session on the fourth day of the Conference - 'Does the Earth System Need Biodiversity?' - gave a strong indication of the essential scientific research that DIVERSITAS brings to the collaborative attack on global change questions.

Media Coverage
Coverage of the Conference was strong, beyond our initial expectations. We received solid coverage from the major news services - AP and Reuters - and from major daily newspapers in the Netherlands, Germany, Great Britain, the USA and Australia. Writers from Nature and New Scientist also reported on the event, and the electronic media also covered the meeting strongly. The media room on the Conference website was frequently visited, and the Conference was 'reported from a distance' by media on every continent. For current information on media coverage, please click here. Statistics on the media coverage are being collated now and an analysis of their impact will be undertaken. We will report the results in a few months.

Feedbacks
We welcome comments and criticisms from participants of the Conference, and from those who viewed the Conference from afar. To date the comments we've received have been overwhelmingly positive - and we are most appreciative of those - but we would also like to hear about areas in which we didn't do so well. Constructive criticism will help us do better in future conferences.
Email feedback here.

Amsterdam Declaration
The Amsterdam Declaration, drafted by the leadership of the four international global change research programmes and formally endorsed by a strong majority of the Conference participants, is already being used to alert the world about the reality of global change and the urgent need for action. ICSU's Advisory Committee on the Environment will send copies of

the Declaration to all Heads of State and other senior people in the world's political arena. If you would like to use the Amsterdam Declaration to communicate the global change message within your community, please contact me at will@igbp.kva.se.

Presentations on the Web
All of the plenary presentations that were given in powerpoint format will be available online. Please click here to view those available at the moment.

Conference Publication
The plenary presentations will be published in a single volume by Springer Verlag as part of the IGBP book series. Most of the manuscripts have already been submitted and we are aiming for a late 2001 or very early 2002 publication date. Please check this site later in the year for an update on the publication timetable.

Will Steffen
Secretary, International Organising Committee

The Amsterdam Declaration on Global Change

The scientific communities of four international global change research programmes - the International Geosphere-Biosphere Programme (IGBP), the International Human Dimensions Programme on Global Environmental Change (IHDP), the World Climate Research Programme (WCRP) and the international biodiversity programme DIVERSITAS - recognise that, in addition to the threat of significant climate change, there is growing concern over the ever-increasing human modification of other aspects of the global environment and the consequent implications for human well-being. Basic goods and services supplied by the planetary life support system, such as food, water, clean air and an environment conducive to human health, are being affected increasingly by global change.

Research carried out over the past decade under the auspices of the four programmes to address these concerns has shown that:

- **The Earth System behaves as a single, self-regulating system comprised of physical, chemical, biological and human components**. The interactions and feedbacks between the component parts are complex and exhibit multi-scale temporal and spatial variability. The understanding of the natural dynamics of the Earth System has advanced greatly in recent years and provides a sound basis for evaluating the effects and consequences of human-driven change.

- **Human activities are significantly influencing Earth's environment in many ways in addition to greenhouse gas emissions and climate change.** Anthropogenic changes to Earth's land surface, oceans, coasts and atmosphere and to biological diversity, the water cycle and biogeochemical cycles are clearly identifiable beyond natural variability. They are equal to some of the great forces of nature in their extent and impact. Many are accelerating. Global change is real and is happening *now*.

- **Global change cannot be understood in terms of a simple cause-effect paradigm.** Human-driven changes cause multiple effects that cascade through the Earth System in complex ways. These effects interact with each other and with local- and regional-scale changes in multidimensional patterns that are difficult to understand and even more difficult to predict. Surprises abound.

- **Earth System dynamics are characterised by critical thresholds and abrupt changes. Human activities could inadvertently trigger such changes with severe consequences for Earth's environment and inhabitants.** The Earth System has operated in different states over the last half million years, with abrupt transitions (a decade or less) sometimes occurring between them. Human activities have the potential to switch the Earth System to alternative modes of operation that may prove irreversible and less hospitable to humans and other life. The probability of a human-driven abrupt change in Earth's environment has yet to be quantified but is not negligible.

- **In terms of some key environmental parameters, the Earth System has moved well outside the range of the natural variability exhibited over the last half million years at least.** The *nature* of changes now occurring *simultaneously*

in the Earth System, their *magnitudes* and *rates of change* are unprecedented. *The Earth is currently operating in a no-analogue state.*

On this basis the international global change programmes urge governments, public and private institutions and people of the world to agree that:

- **An ethical framework for global stewardship and strategies for Earth System management are urgently needed.** The accelerating human transformation of the Earth's environment is not sustainable. Therefore, the *business-as-usual* way of dealing with the Earth System is *not* an option. It has to be replaced – as soon as possible – by deliberate strategies of good management that sustain the Earth's environment while meeting social and economic development objectives.

- **A new system of global environmental science is required.** This is beginning to evolve from complementary approaches of the international global change research programmes and needs strengthening and further development. It will draw strongly on the existing and expanding disciplinary base of global change science; integrate across disciplines, environment and development issues and the natural and social sciences; collaborate across national boundaries on the basis of shared and secure infrastructure; intensify efforts to enable the full involvement of developing country scientists; and employ the complementary strengths of nations and regions to build an efficient international system of global environmental science.

The global change programmes are committed to working closely with other sectors of society and across all nations and cultures to meet the challenge of a changing Earth. New partnerships are forming among university, industrial and governmental research institutions. Dialogues are increasing between the scientific community and policymakers at a number of levels. Action is required to formalise, consolidate and strengthen the initiatives being developed. The common goal must be to develop the essential knowledge base needed to respond effectively and quickly to the great challenge of global change.

Berrien Moore III	Arild Underdal	Peter Lemke	Michel Loreau
Chair, IGBP	Chair, IHDP	Chair, WCRP	Co-Chair, DIVERSITAS

Challenges of a Changing Earth: Global Change Open Science Conference
Amsterdam, The Netherlands
13 July 2001

General Information

Rationale and Philosophy

From its inception the IGBP has worked towards an overall goal: to describe and understand the interactive physical, chemical and biological processes that regulate the Earth system, the unique environment it provides for life, the changes that are occurring, and how they are influenced by human actions. IGBP and its Core Projects have now been in the implementation phase for a decade, and the time was right for a first IGBP-wide open science conference to highlight not only the increasingly integrated research across the IGBP community, but also the growing links to WCRP and IHDP.

The Global Change Open Science Conference presented the latest scientific understanding of global environmental change at three levels: (i) the integrated level of the IGBP core projects and the IGBP as a whole; (ii) cross-cutting research involving the WCRP and IHDP, as well as regional research coordinated by START and other groups; and (iii) the individual level of the research projects which contribute to IGBP/WCRP/IHDP networks and provide the broad, substantive base on which the integrating activities of the three programmes are built.
The Conference also looked forward. The last day presented the visionary and creative new approaches in Earth System Science, for studying the thresholds, nonlinearities and teleconnections of a complex planetary system in which human activities are intimately interwoven with natural processes. It outlined a research programme for our current era of increasing human domination of many global-scale processes - the "Anthropocene".

Conference Objectives

- To present the rich variety of research that contributes to and supports the international programmes.
- To point the way towards the next decade of Earth System Science.
- To present the results of the last decade of global change research, emphasising the results of the IGBP synthesis project and collaborative research with the IHDP and the WCRP.

Contacts

Secretary, IOC: Will Steffen
IGBP Media Contact: Susannah Eliott

Organising Institutions

IHDP

Intn'l Organising Committee

Programme

FOR PLENARY AND PARALLEL PRESENTATIONS CLICK HERE .

The Conference was organized around an integrated mix of plenary sessions, parallel sessions and poster viewing, allowing the presentation of both (i) research highlights on major themes and (ii) the broad spectrum of individual research projects contributing to international global change science.

	Day 1	**Day 2**	**Day 3**	**Day 4**
Mon 9	Tue10	Wed 11	Thu 12	Fri 13
Arrival, Registration and Dutch Science Tours	Opening Challenges of a Changing Earth Global Carbon Cycle Air Quality	Global Biogeochemistry Land-Ocean Interactions: Regional-Global Linkages	The Climate System Changing Land Cover and the Climate System	Simulating and Observing the Earth System Does the Earth System Need Biodiversity?
Lunch				
.	Food, Land and Oceans Water Resources Poster Session 1 Reception	Parallel Session A Parallel Session B Sustainability Science	Parallel Session C Poster Session 2 Capacity Building for Global Change Science	Can Technology Spare the Planet? Towards Global Sustainability New Era for Earth System Science

Day 1. Achievements and Challenges

The Conference opened by focussing on four issues of major societal importance – air quality, the carbon cycle, water resources and food and land. The format was paired talks: one by a scientist highlighting major achievements and the other by a policy or private sector representative posing challenges for the future.

0900-0930 Opening Ceremony:

0900-0905 Welcome on behalf of the Royal Netherlands Academy of Arts and Sciences (KNAW) and The Netherlands Organisation for Scientific Research (NOW) by Prof. Dr R.S. Reneman, President of the KNAW
0905-0925 Opening address by Drs J.P. Pronk, Minister of Housing, Land-use Planning and Environment, The Netherlands
0925-0930 Official opening of the Conference: Prof. Jane Lubchenco, President-elect of the International Council for Science (ICSU)

0930-1015 Challenges of a Changing Earth. Towards a Scientific Understanding of Global Change. Prof Berrien Moore III, Institute for the Study of Earth, Oceans & Space, University of New Hampshire, USA

1015-1045 Break

1045-1215 Managing Planetary Metabolism? The Global Carbon Cycle
Chair: Dr Yoshiki Yamagata, Centre for Global Environmental Research, National Institute for Environmental Studies, Tsukuba, Japan
Industry Response to the CO2 Challenge: Mr Charles Nicholson, Senior Group Advisor, British Petroleum
Ocean and Land Carbon Dynamics. 'Sinks Forever' v. 'Sink Saturation': Prof Ian R. Noble, Cooperative Research Centre for Greenhouse Accounting, Canberra, Australia
Carbon and the Science-Policy Nexus: The Kyoto Challenge: Dr Robert T. Watson, Chairman, Intergovernmental Panel on Climate Change (IPCC) and Chief Scientist, The World Bank

1215-1315 Out of Breath? Air Quality in the 21st Century
Chair: Prof. Guy Brasseur, Director, Max Planck Institute for Meteorology, Hamburg, Germany

Atmospheric Chemistry in the Anthropocene Era. Prof Paul J. Crutzen, Max-Planck-Institute for Chemistry, Mainz, Germany

Fires and Haze: The Social and Political Inequality of Air Quality in South East Asia. Simon S.C. Tay, Chairman of the Singapore Institute of International Affairs, Singapore

1315-1415 Lunch

1415-1530 Food, Land and Oceans: Can Productivity AND Ecosystems be Sustained? (Chair: Prof Ken Green, Centre for Research on Organisations, Management and Technical Change, University of Manchester Institute of Science and Technology, UK)
The Centrality and Complexity of Land Change: Myths and Realities: Prof B.L. Turner II, The George Perkins Marsh Institute of Geography, Clark University, USA

Climate Variability and Ocean Ecosystem Dynamics: Dr Michael J. Fogarty, National Oceanic Atmospheric Administration, National Marine Fisheries Service, Woods Hole, USA

Food in the 21st Century: Global Climate of Disparities. Dr Mahendra Shah, Senior Research Scholar, International Institute for Applied Systems Analysis, Austria, and Advisor to the United Nations on Sustainable Development and Agenda 21

1530-1630 Water in a Changing Global Context: The Resource Challenge of the Century?
Chair: Dr Leena Srivastava, Regulatory Studies and Governance Division, Tata Energy Research Institute, New Delhi, India
Will We Have Enough Water of Sufficient Quality? Prof Hartmut Grassl, Max-Planck-Institute for Meteorology, Hamburg, Germany
Will Water Get to the People Who Need It? Dr Madiodio Niasse, Independent Consultant, Dakar, Senegal; former Senior Advisor, World Commission on Dams
1630-1645 Summary: Prof Peter D. Tyson, Climatology Research Group, University of Witwatersrand, South Africa

1645-1845 Poster Session I

1645-1930 Reception/Mixer for all participants and registered accompanying persons

2000-2230 Welcome Reception given by the Mayor of Amsterdam and visit to the Rijksmuseum, Stadhouderskade 42, Amsterdam

Day 2. Advances in Understanding

The heart of the Conference presented some of the exciting scientific advances of the past decade, drawing primarily on the work of the global environmental change programmes. The sessions were organized around broad integrative themes encompassing several Earth System Science disciplines.

0830-1000 Global Biogeochemistry: Understanding the Metabolic System of the Planet
Chair: Prof. Pamela Matson, Department of Geological and Environmental Sciences and The Centre for Environmental Science and Policy, Stanford University, USA
Ocean Biogeochemistry: A Sea of Change: Prof. David M. Karl, School of Ocean and Earth Science and Technology, University of Hawaii, USA
The Past, Present and Future of Carbon on Land: Dr Robert J. Scholes, Commonwealth Scientific and Industrial Research (CSIR), Republic of South Africa
Can New Institutions Solve Atmospheric Problems? The Cases of Acid Rain, Ozone Depletion, and Climate Change: Prof Oran R. Young, Institute on International Environmental Governance, Dartmouth College, USA

1000-1030 Break

1030-1200 Session 2: Land-Ocean Interactions: Regional-Global Linkages
Chair: Dr Roger Harris, Plymouth Marine Laboratory, UK
Emissions from and Deposition to the Ocean: Biogeochemical Interactions and Feedbacks: Prof Tim Jickells, School of Environmental Sciences, University of East Anglia, UK
The Impacts of Dams on Fisheries: The Three Gorges Dam Case Study: Prof Chen-Tung Arthur Chen, Institute of Marine Geology and Chemistry, National Sun Yat-Sen University, Taiwan
Global Change in the Coastal Zone: The Case of Southeast Asia: Prof Liana Talaue-McManus, Marine Science Institute, University of the Philippines

1200-1300 Lunch

1300-1530 Parallel Sessions A

1530-1600 Break

1600-1830 Parallel Sessions B

1830-2000 Sustainability Science
Chair/Organiser: Professor William Clark, Belfer Centre for Science and International Affairs, Harvard University, USA
I. Overview of Sustainability Science
A Birth Announcement: The What, Why and Why Now of Sustainability Science, Prof Jane Lubchenco, Department of Zoology, Oregon State University, USA

Sustainable Science and Climate Change, Prof Bert Bolin, Department of Meteorology, Stockholm University, Sweden

II. Reconceptualizing Nature-Society Interactions
Nature-Society Interactions: Understanding Environment and Development Together, Dr Robert W. Kates, Independent Scholar, Trenton, Maine, USA

Resource Availability, Vulnerability, and Sustainability in the Yaqui Basin: Non-Sustainable Trends in Environment-Society Interactions
Dr P.A. Matson, Centre for Environmental Science and Policy, Department of Geological and Environmental Sciences, Stanford University, USA, I. Ortiz-Monasterio, R.L. Naylor, W. Falcon

Vulnerability as a Human-Environment Interaction: Examples from Southern Yucatán, Prof B. L. Turner II,Graduate School of Geography Clark University, USA

III. Guiding a Transition Toward Sustainability
Building Capacity for Problem-Driven, Interdisciplinary Sustainability Science, Robert W. Corell, Belfer Centre for Science and International Affairs, Harvard University, USA

Day 3. Advances in Understanding

0830-1030 The Climate System: Prediction, Change and Variability
Chair: Prof. W. Lawrence Gates, Lawrence Livermore National Laboratory, University of California, Livermore, CA, USA
Climate Change Fore and Aft: Where on Earth are We Going? Prof Thomas F. Pedersen, Earth and Ocean Sciences, University of British Columbia, Canada
1000 Years of Climate Change. Prof Raymond S. Bradley, Department of Geosciences, University of Massachusetts, USA
The Changing Cryosphere: Impacts of Global Warming in the High Latitudes. Dr Oleg Anisimov, State Hydrology Institute, St Petersburg, Russia
The Coupled Climate System: Variability and Predictability: Prof Antonio J. Busalacchi, Earth System Science Interdisciplinary Center, University of Maryland, USA

1030-1100 Break

1100-1230 Hot Spots of Land-Use Change and the Earth System: A Regional or Global Concern?
Chair: Prof. Eric Odada, College of Biological and Physical Sciences, University of Nairobi, Kenya
Does the Land Surface Matter in Climate? An Introduction:
Dr Pavel Kabat, Climate Change & Biospehre Programme (CCB) & Alterra Green World Research, Wageningen University & Research Centre, The Netherlands

North Africa: A Green Sahara: Dr Victor Brovkin, Dr Martin Claussen, Dr Andrey Ganopolski, Potsdam Institute for Climate Impact Research, Germany

Southeast Asia I: Understanding the Changing Asian Monsoon System: Prof Tetsuo Yasunari, Frontier Research System for Global Change (FRSGC) & Institute of Geoscience, University of Tsukuba, Japan

Southeast Asia II: How Much Can the Asian Monsoon be Modified by Human-Induced Land-Cover Changes? Prof Congbin Fu, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, China

The Amazon Basin and Land-Cover Change: A Future in the Balance?
Dr Carlos Nobre, (National Space Research Institute - INPE, São Jose dos Campos, Brazil); Dr. Paulo Artaxo, Dr. Maria Assuncao Silva Dias and Dr. Reynaldo Victoria (University of Sao Paulo, Brazil)

Does the Land Surface Matter in Climate? A Synthesis: Dr Pavel Kabat, Climate Change & Biospehre Programme (CCB) & Alterra Green World Research, Wageningen University & Research Centre, The Netherlands

1230-1330 Lunch

1330-1600 Parallel Sessions C

1600-1630 Break

1630-1830 Poster Session II
Authors will be available to present their posters

1830-2000 Capacity Building for Global Change Science (RAI Auditorium)
Panel Discussion for Developing Country Scientists. Convener: Prof. Thomas Rosswall, Executive Director of the International Foundation for Science, Stockholm
All nations face the challenge of developing strategies that will ensure sustainable development. The necessary changes require political will and vision but is also dependent on scientific knowledge. However, few international initiatives support capacity building. A major challenge will be to ensure the development of science capacity related to global change issues, which will be of paramount importance for the possibilities to truly develop sustainable societies. The Panel will discuss how the participation of developing country scientists in global change research can be strengthened and what capacity building measures should receive top priority.

Selected panelists will give brief introductions to be further discussed by the audience. The discussions will build on the experiences of IGBP-IHDP-WCRP and their START initiative, the InterAmerican Institute for Global Change Research (IAI), the Asia-Pacific Network (APN) as well as other programmes supporting science capacity building, such as the Third World Academy of Sciences (TWAS) and the International Foundations for Science (IFS).

2000-2130 Public lectures by Global Change scientists for the people of Amsterdam, sponsored by the Royal Netherlands Academy of Arts and Sciences and The Netherlands Organisation for Scientific Research. Conference participants are invited.
Lutherse Kerk (Aula of the University of Amsterdam), Singel 421, Amsterdam

2130-2230 Reception

Challenges of a Changing Earth, Prof. Berrien Moore, University of New Hampshire, USA
Co-Lecture by Prof. Rik Leemans, Wageningen University and Research Centre, Wageningen, The Netherlands

Day 4. Looking to the Future: Earth System Science and Global Sustainability

The Conference's last day presented the visionary and creative new approaches for studying the thresholds, nonlinearities and teleconnections of a complex planetary system in which human activities are intimately interwoven with natural processes. It outlined a research programme for our current era of increasing human domination of many global-scale processes – the "Anthropocene".

0830-1015 Session 1
Simulating and Observing the Earth System
Chair: Dr Taroh Matsuno, Director, Frontier Research System for Global Change, Japan
Coping with Earth System Complexity and Irregularity: Prof H.J. Schellnhuber, Potsdam Institute for Climate Impact Research, Germany

Monitoring Long-term Trends and Short-term Instabilities in the Earth System: A Challenge for Space: Dr Jose Achache, Centre National d'Etudes Spatiales, France
Virtual Realities of the Past, Present and Future: Prof John Mitchell, U.K. Meteorological Office (Hadley Centre), UK
Summary: Prof Chris Rapley, British Antarctic Survey, UK

1015-1045 Break

1045-1200 Session 2
Does the Earth System Need Biodiversity?
Chair: Dr Anne Larigauderie, Executive Director, DIVERSITAS
Why does Earth System Science need Marine Biodiversity?: Prof Katherine Richardson, Institute of Biological Sciences, University of Aarhus, Denmark
Does Biodiversity Matter for Terrestrial Ecosystem Processes and Services? Dr Sandra Diaz, Universidad Nacional de Cordoba, IMBIV-CONICET, Argentina
Summary: Dr Michel Loreau, Pierre et Marie Curie University, Paris, France

1200-1300 Lunch

1300-1415 Session 3
Can Technology Spare the Planet?
Chair: Prof. Mike Brklacich, Global Environmental Change & Human Security Project, Carleton University, Canada
The Great Restoration of Nature: Why and How: Mr Jesse H. Ausubel, Program for the Human Environment, The Rockefeller University, USA
Industrial Transformation: Exploring Systems Change in Production and Consumption: Prof Pier Vellinga, Institute for Environmental Studies, Vrije Universiteit, Amsterdam, The Netherlands
Summary: Prof Robert Wasson, Centre for Resource and Environmental Studies, the Australian National University

1415-1530 Session 4
Towards Global Sustainability
(Chair: Prof Hans Opschoor, Institute of Social Studies, The Netherlands
Challenges and Road Blocks for Local and Global Sustainability: Prof Julia Carabias, Faculty of Science, Universidad Nacional Autonoma de Mexico, Mexico
Research Systems for a Transition toward sustainability: Prof William C. Clark, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, USA
Summary: Dr Jill Jäger, Executive Director, International Human Dimensions Programme on

Global Environmental Change

1530-1600 Break

Color 1600-1645 Closing Session
Chair: Prof Bert Bolin, Stockholm University, Sweden
A New Era for Earth System Science: Dr Peter Lemke (WCRP), Prof Michel Loreau (DIVERSITAS), Prof Berrien Moore III (IGBP), Prof Arild Underdal (IHDP)
Award ceremony for the best student posters
Closing Presentation: Looking Ahead: The Role of Science in the Kyoto Negotiations. Dr Michael Zammit Cutajar, Executive Secretary, United Nations Framework Convention on Climate Change, Bonn, Germany

The Amsterdam Declaraiton: A New Era for Earth System Science: Prof. Peter Lemke (WCRP), Prof. Michel Loreau (DIVERSITAS), Prof. Berrien Moore III (IGBP), Prof. Arild Underdal (IHDP)

Dutch Science Tours - 9 July

The Conference's host nation, the Netherlands, has a rich scientific tradition and has made strong contributions to global environmental change research. Conference week began on 9 July with a relaxed day of visits to Dutch scientific institutions, a chance to meet Dutch colleagues and to see global change research "in action".
Go to www.sciconf.igbp.kva.se/tours.html for more information.

Parallel Sessions

Session A, Wednesday 11 July, 13:00-15:30

	Title	Chair
A1	Global Carbon Cycle	Martin Heimann, Mike Raupach
A2	Megacities and Global Change	Richard C. Rockwell
A3	El Niño-Southern Oscillation in the context of past and future climate variability	Keith Alverson, Gerrit Burgers
A4	Groundtruthing the Earth System	Wolfgang Cramer, Jack Kaye
A5	Global Changes in Biological Diversity	Diana H. Wall
A6	Global Change and Fire	Eric Lambin, Tom Gower
A7	Human Interactions in the Coastal Zone	Han Lindeboom

Session B, Wednesday 11 July, 16:00-18:30

	Title	Chair
B1	Tradeoffs between Food Production and Environment	Mohammed A. Salih, Peter Gregory
B2	Understanding Land-Use Changes to reconstruct, describe or predict changes in land cover	Rik Leemans
B3	The Cryosphere and Global Change - mechanisms and indicators	Vladimir M Kotlyakov
B4	Earth System Analysis	Kamal Puri, Martin Claussen
B5	The Terrestrial Biosphere and Global Change	Pavel Kabat
B6	Transformation Processes in Society	Pier Vellinga
B7	Oceans and Climate Change	Karin Lochte, Tony Busalacchi

Session C, Thursday 12 July, 13:30-16:00

	Title	Chair
C1	Vulnerability of Water Resources to Environmental Change	Soroosh Sorooshian, Claudia Pahl-Wostl, Michel Meybeck
C2	Putting people into the Earth System: Victims or villains, disturbance or solution?	Billie L. Turner II
C3	The atmosphere and Global Change	Marv Geller
C4	Non-Linear Responses and Surprises to Global Change	Ian Noble
C5	Long term perspectives on ecosystem management for sustainability	Frank Oldfield
C6	Science and the Policy Process: IPCC and beyond	John Marks
C7	Global Change and Mountain Regions	Harald Bugmann, Dennis Lettenmaier, P. S. Ramakrishnan

Poster Session

Posters were a prominent feature of the conference and were displayed in an attractive area within of the RAI Conference Centre. Within the 8 Themes listed below, some posters were grouped into closely defined categories (Clusters - see below). There were several Poster Clusters associated with Parallel Sessions. There were two dedicated viewing sessions of all posters (when authorswere requested to stand by their posters) on Days 1 and 3 of the Conference
For information on Parallel Session, click here.
For detailed Conference Programme, click here.

Poster Clusters: Titles & Organisers

Theme 1: Earth System, Planetary Metabolism and Global Element Cycle

P.1.01: Integrated Observations for the Biogeosciences
Cluster Organiser: Dick Olson

P.1.02: ESSIC
Cluster Organiser: Tony Busalacchi

P.1.03: Understanding the Carbon Balance of Terrestrial Ecosystems: Recent Findings from the CarboEurope Cluster of Projects
Cluster Organiser: Annette Freibauer

P.1.04: Integration of climate models with carbon cycle models
Cluster Organiser: Pierre Friedlingstein

P.1.05: Human Dimensions in the Earth System models
Cluster Organiser: Frans Berkhout

P.1.06: Does land surface matter in climate and weather?
Cluster Organiser: Sabine Lütkemeier

P.1.07: How measurable is the Earth system?
Cluster Organiser: Sabine Lütkemeier

P.1.08: The integrity of river and drainage basin systems: Challengers from environmental change
Cluster organiser: Sabine Lütkemeier

P.1.09: Ecosystem Carbon Fluxes: FLUXNET
Cluster Organiser: Pep Canadell

P.1.10: Inverse Analyses of Global and Regional Carbon Fluxes
Cluster Organiser: Kathy Hibbard

P.1.11 Vegetation Ecosystem Model and Analysis Project (VEMAP): Disturbance and Transient Analyses
Cluster Organiser: Kathy Hibbard

P.1.12 Dynamic Global Vegetation Models
Cluster Organiser: Kathy Hibbard

P.1.13 The Global Carbon Cycle and the International Human Dimensions Programme (IHDP)
Cluster Organiser: Kathy Hibbard

P.1.14: Ecosystem Functioning in a Warmer and CO2-rich World"
Cluster organisers: Diane Pataki; Lindsey Rustad

P.1.15 Global Change and Mountain Regions
Cluster Organiser: Sabine Lütkemeier

P.1.16: How to Evaluate Vulnerability in Changing Environmental Conditions
Cluster Organiser: Sabine Lütkemeier

P.1.17 El Niño-Southern Oscillation in the context of past and future climate variability
Cluster organiser: Keith Alverson & Gerrit Burgers

P.1.18: Propagation of uncertainty, including ensemble predictions
Cluster Organiser: Kamal Puri

P.1.19: Earth System Models of Simple, Intermediate, and Full complexity
Cluster Organiser: Martin Claussen

P.1.20: The value of land surface data consolidation
Cluster Organiser: Paul Dirmeyer and Holger Hoff

P.1.21: LBA, integrated regional research in Amazonia
Cluster Organiser: Carlos Nobre and Holger Hoff

P.5.02*: Recent developments in basin- to global-scale ocean carbon cycle modeling.
Cluster Organiser: James Orr

***NOTE THAT THIS CLUSTER HAS BEEN MOVED TO DAY 1 FROM DAY 3 (THEME 5).**

THEME 2: Looking Back to the Future; Palaeo Studies of the Earth System

P.2.0: PAGES POSTERS
Cluster Organiser: Isabelle Larocque

P.2.02: PANASH Paleoenvironments of the Northern and Southern Hemispheres
Cluster Organiser: Raymond Bradley

P.2.03: CLIVAR
Cluster organiser: Jonathan Overpeck

P.2.04: IMAGES International Marine Global Change Study
Cluster Organiser: Michael Sarnthein

P.2.05: POLAR
Cluster organiser: Matti Saarnisto

P.2.06: Past Ecosystem Process and Human Environment Interactions
Cluster organiser: Frank Oldfield

THEME 3: Water Cycle, Water Resources, Water Security

P.3.01: Applied Assessment of Climate Impacts on Natural Resources at the regional (sub-national) Scale
Cluster Organiser: Amy Snover

P.3.02: GEWEX Contributions to Water Cycle Research
Cluster Organiser: Dennis Lettenmairer

P.3.03: Integrated Water Resources Management (IWRM)
Cluster Organiser: Holger Hoff

THEME 4 Climate Variability and Climate Change

P.4.01: The Cryosphere and Global Change – mechanisms and indicators
Cluster Organiser: Howard Cattle

P.4.02: The Arctic and Antarctic Climate Systems
Cluster Organiser: ACSYS Project Office

P.4.03: Downscaling of Climate Information: From Seasonal Climate Forecasts to Applications
Cluster organiser: Neil Ward

P.4.04: Projects in the Asia -Pacific
Cluster Organiser: Gerhard Breulmann, APN

Theme 5: Oceans and Coasts

P.5.01: New approaches to monitoring change in the Global Ocean. GLOBEC
Cluster organiser: Roger Harris

P.5.02: Recent developments in basin- to global-scale ocean carbon cycle modeling.
Cluster Organiser: James Orr

PLEASE NOTE THAT THIS CLUSTER HAS BEEN MOVED TO DAY 1 (TUESDAY)!

P.5.03: Surface Ocean – Lower Atmosphere Study (SOLAS) science
Cluster Organiser: Peter Liss and Phil Williamson

THEME 6: Atmosphere and its Interfaces; Air Quality

P.6.01: East Asia Trace Gas (TRAGNET) Land Use and Net Trace Gas Fluxes in East Asia
Cluster organisers Dennis Ojima

P.6.01: SARAFI 2000
Cluster Organiser: Bob Scholes

P.6.01: Air Quality in Asia
Cluster Organiser: Gerhard Breulmann, APN

THEME 7: Sustaining the Land: Food, Biodiversity and Other Services

P.7.01: Land Use in Temperate East Asia (LUTEA)
Cluster Organiser: Dennis Ojima & Chuluun Togtohyn

P.7.02: Integrated Models of Regional and Global Land Use/Cover Change
Cluster Organiser: Tom Veldkamp

P.7.03: Understanding land-use changes to reconstruct, describe or predict changes in land cover
Cluster organiser: Suzanne Serneels ***Identical with parallel session of same title.

P.7.04: IGU-LUCC Achievements on Long-term Changes of Land Use/Land Cover – Data, Methods and Findings
Cluster Organizer: Yukio Himiyama

P.7.05: Land Use/Land Cover Change Studies in the Miombo Network
Cluster organiser: Paul Desanker

P.7.06: Land use and land cover change in coastal Areas of the Indian sub-continent,
Cluster Organiser: COSTED

P.7.07: Modelling Forest Sector Responses to Climate Change
Cluster organiser: Dr. Franz-W. Badeck, Potsdam Institute for Climate Impact Research (PIK),
PF 60 12 03, 14412 Potsdam.
tel: 49 331 288 2675: FAX: 49 331 288 2695

P.7.08: Land-Use Changes: Causes & Impacts, Monitoring & Modelling
Cluster Organiser: Gabreila Bucini

P.7.09: Land Use Dynamics: Comparative Case Study Analyses
Cluster organiser: William McConnell

P.7.10: Land Cover Dynamics: Empirical Observations and Dianostic Models
Cluster organiser: Krishnan Rajan

P.7.11: .Pilot Analysis of Global Ecosystems (PAGE)
Cluster Organiser: Tony Janetos

P.7.12: LUCC and its impacts in the Asia Pacific
Cluster Organiser: Gerhard Breulmann, APN

THEME: 8 The Human Enterprise and Global Sustainability: Industry, Transport, Institutions Vulnerability

P.8.01: The Earth System: Global-Regional Linkages.
Cluster Organiser; Peter Tyson

P.8.02: At the Interface between Science and Policy
Cluster Organizer: Dr A.P.M. Baede

P.8.03: The Federation of Earth Science Information Partners - ESIP
Cluster organiser: Leigh Welling & Annette Schloss

P.8.04: Human Dimensions Research In Central and Eastern Europe and Russia
Cluster organiser: Maarit Theim

P.8.05: Satellites for Sustainability: Predicting Human Health Risks
Cluster organisers: Nancy G. Maynard, Environment & Health Research, NASA Goddard Space Flight Center/Code 900, Greenbelt, MD 20771

P.8.06: Global Change Research from an Integrated Perspective
Cluster Organiser: Pim Martens

Challenges of a Changing Earth, Global Change Open Science Conference

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