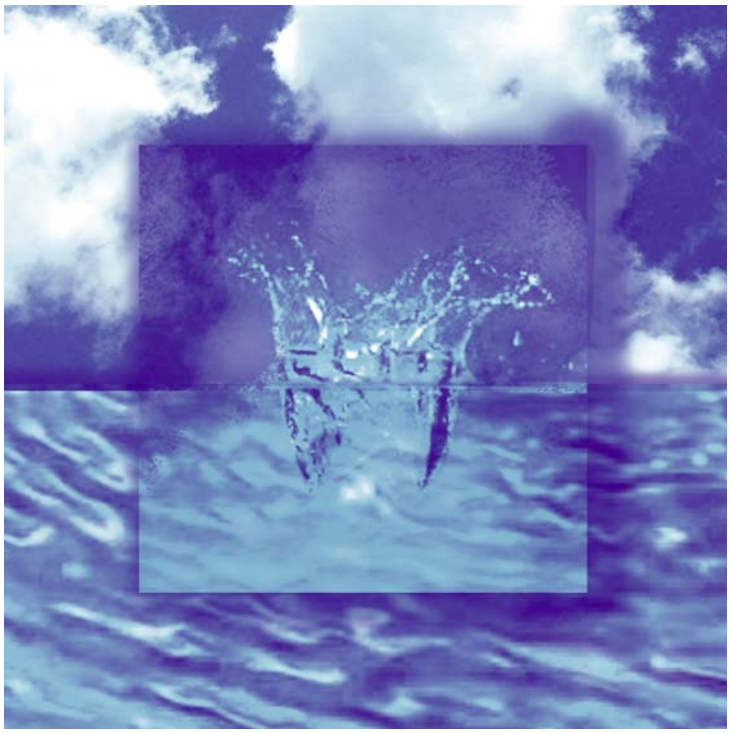
THE PONTIFICAL ACADEMY OF SCIENCES

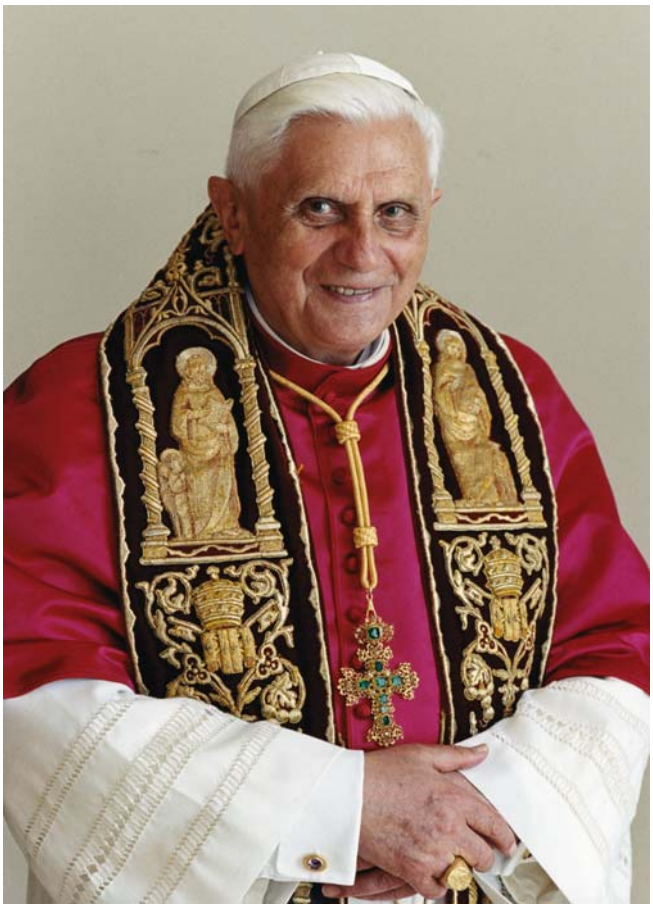
Working Group on

WATER AND THE ENVIRONMENT

12-14 November 2005
Casina Pio IV



VATICAN CITY 2005



'As you can imagine, we will not go into the technical question, or into the possibilities of its application, which would probably still be premature. But we know that it is a question of a kind of important metabolism, which it is in the interest of mankind to discern, since the shortage of reserves of fresh water threatens to hinder its development. Let us just emphasise, in the more general field of scientific research, two attitudes which, it seems to us, should characterise the scientist, and especially the scientist who is a Christian. On the one hand, he must honestly consider the question of the earthly future of mankind and, as a responsible person, help to prepare it, preserve it, and eliminate risks; we think that this solidarity with future generations is a form of charity to which a great many men are sensitive today, in the framework of ecology. But at the same time, the scientist must be animated by the confidence that nature has in store secret possibilities which it is up to intelligence to discover and make use of, in order to reach the development which is in the Creator's plan. This hope in the Author of nature and of the human spirit, rightly understood, is capable of giving new and serene energy to the researcher who is a believer'.

Paul VI, *Address of 19 April 1975 to the participants of the study week on* 'Biological and Artificial Membranes and Desalination of Water'[1]

[1]*Papal Addresses*, The Pontifical Academy of Sciences, Scripta Varia 100, Vatican City 2003, p. 208 f.

The Pontifical Academy of Sciences is sponsoring a workshop on 'Water and the Environment' which will take place November 12-14, 2005. This workshop will have as its goal to discuss the scientific frontiers of the main environmental issues related to the impact of hydrologic dynamics on sustainable development.

The Priority of Water

For the Presocratics, water was the principle of all things, and curiously enough it is only today that we have once again become aware that the survival of humanity and of all other species on earth depends upon the fate of water. Where water is absent, life is absent. Thus water, the common symbol of life for all mankind, valued and respected in all religions and cultures, has also become a symbol of social equity. Today we can say that the problem has two main facets: the first belongs especially to the natural sciences (study the great basins, conserve them and develop them in a sustainable way with relation to the rest of the environment); the second facet pertains more to the social sciences (fair distribution of water). For these reasons, the Pontifical Academy of Sciences, which has already organised several study weeks on this topic in the past, now wants to organise a first workshop referring principally to the first aspect, with a view to a second workshop in conjunction with the Pontifical Academy of Social Sciences.

Workshop Goals

The world is keenly aware of the fundamental role that water resources play for a safe ad sustainable development. Moreover, society is also conscious of the serious danger that these resources are facing because of industrial development, megacities, contamination, and many types of conflicting uses. Concepts like Integrated Water Resources Management are commonly used as 'a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems' (Global Water Partnership TEC Background Paper No. 4).

The above coordinated development needs a solid scientific background that will allow the decision making process to proceed with long term goals and equitable considerations. In this scientific foundation a key role is played by the science of Hydrology and its intimate links with Ecology and also with its sister geophysical sciences like Geomorphology, Geology, Climatology and Meteorology. As Hedin *et al.* have described it (2002, Report to the U.S. National Science Foundation), 'this disciplinary convergence will over the next several decades transform our understanding of basic processes that control the stability and sustainability of natural environmental systems. The ensuing findings will have extraordinary implications for our abilities to predict and manage how humans impact the health of ecosystems across local, regional, and global scales. Such knowledge is a critical component of a safe, sustainable and prosperous future'.

The workshop is addressed to the analysis and discussion of some of the key scientific issues that arise in the formulation described above. Because of the very wide scientific scope of the problem and its associated impacts, the workshop concentrates on some aspects that have a number of connections with the decisions that society faces in relation to water and the environment. The Vatican Academy plans to sponsor a following future meeting that will center on the more applied considerations of this most important scientific area.

Workshop Structure

The workshop is organized around 5 main topics: Biodiversity, Global Hydrology, Climate Change, Land-Atmosphere Interactions, and River Basins. In all of them hydrologic dynamics provides the underlying unifying theme through which all the 5 themes are studied and discussed.

A central purpose of the meeting is to analyze the feedbacks and interactions between the 5 areas described above and explore the main scientific challenges that presently exist for a sound understanding of the hydrologic dynamics underlying some of the world most pressing environmental problems.

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SATURDAY, 12 NOVEMBER

9:00	General Introduction: **Prof. M. GOVIND KUMAR MENON** *The Pontifical Academy of Sciences, Welcome, and Goals*
9:15	Speaker: ◆ **Dr. REZA ARDAKANIAN** *The Fair Distribution of Water* Discussion
BIODIVERSITY AND HYDROLOGIC DYNAMICS	
10:15	Chairperson: **Prof. NICOLA CABIBBO** Speaker: ◆ **Prof. MARINO GATTO** *Threatened Biodiversity: Understanding, Forecasting, Taking Action* Discussion
11:15	Coffee Break
11:45	Speaker: ◆ **Prof. IGNACIO RODRÍGUEZ-ITURBE** *Hydrologic Fluctuations and Vegetation Dynamics* Discussion
13:00	Lunch at the Casina Pio IV
GLOBAL HYDROLOGY AND HYDROLOGIC DYNAMICS	
14.30	Chairperson: **Prof. IGNACIO RODRÍGUEZ-ITURBE** Speaker: ◆ **Dr. PETER M. COX** *Global Hydrology, Climate Change and Ecosystems* Discussion
15.30	Speaker: ◆ **Prof. SOROOSH SOROOSHIAN** *Water Distribution and Availability: An Overview of the Hydrologic Cycle, its Connection to Climate and Impact on Water Resources Management Strategies* Discussion
16.30	Coffee Break
CLIMATE CHANGE AND HYDROLOGIC DYNAMICS	
17:00	Speaker: ◆ **Prof. Dr. LENNART BENGTSSON** *Changes in Global Rainfall and the Hydrological Cycle: Present and Future Perspectives* Discussion

18:00	Speaker: ◆ **Prof. Graham Farquhar** *Worldwide Changes in Evaporative Demand* Discussion
19:00	Final Discussion
19:30	Dinner at Domus Sanctae Marthae

Sunday, 13 November

9:00	Beatification at St. Peter's Basilica of the Servants of God: Charles de Foucauld, Maria Pia Mastena, and Maria Crocifissa Curcio
12:30	Social Lunch at the Casina Pio IV
15:00	Guided Archaeological Visit to Vatican Necropolis

Monday, 14 November

9:00	Chairperson: **Prof. Raymond Hide** Speaker: ◆ **Prof. Ulrike Lohmann** *Impact of Aerosols on the Hydrologic Cycle* Discussion
	LAND-ATMOSPHERE INTERACTIONS
10:00	Speaker: ◆ **Prof. Gabriel Katul** *Bringing Photosynthesis to the Atmosphere: A Feedback on Terrestrial Water Cycling* Discussion
11:00	Coffee Break
11:30	Speaker: ◆ **Prof. Daniel Rosenfeld** *Precipitation Suppression by Anthropogenic Air Pollution: Major Loss of Water Resources Where We Need Them Most* Discussion
12:30	Speaker: ◆ **Dr. Carlos A. Nobre** *Biosphere-Atmosphere Interactions in Amazonia* Discussion
13:30	Lunch at the Casina Pio IV

RIVER BASINS	
15:00	Chairperson: **Prof. Veerabhadran Ramanathan** Speaker: ◆ **Prof. William Dietrich** *Is There a Topographic Signature of Life on Earth?* Discussion
16:00	Speaker: ◆ **Prof. Andrea Rinaldo** *River Basins: Water and Complex Adaptive Systems* Discussion
17:00	Speaker: ◆ **Dr. Moustafa Chahine** *NASA's Measurements of Water from Space* Discussion
18:00	Coffee Break
18:30	Speaker: ◆ **Prof. Malin Falkenmark** *Heading Towards Basin-level Hydrosolidarity – Goal for Land/Water/Ecosystem Coordination* Discussion
19:30	Final Discussion
20:00	Dinner at Domus Sanctae Marthae

LIST OF PARTICIPANTS

Outside Experts

NAME AND TITLE	NAT.	DISCIPLINE AND CHARGE	PAPER
Dr. Reza Ardakanian	**IR** Teheran	Regional Center on Urban Water Management	*The Fair Distribution of Water*
Prof. Dr. Lennart Bengtsson	**D** Hamburg	Max Planck Institute for Metereology	*Changes in Global Rainfall and the Hydrological Cycle: Present and Future Perspectives*
Dr. Moustafa T. Chahine	**USA** Pasadena	Chief Scientist at NASA-JPL Jet Propulsion Laboratory	*NASA's Measurements of Water from Space*
Dr. Peter M. Cox	**UK** Dorchester	CEH – Dorset Winfrith Technology Centre	*Global Hydrology, Climate Change and Ecosystems*
Prof. William E. Dietrich	**USA** Berkeley	University of California, Berkeley Department of Earth and Planetary Science	*Is There a Topographic Signature of Life on Earth?*
Prof. Malin Falkenmark	**S** Stockholm	Stockholm Internatioanl Water Institute (SIWI)	*Heading towards Basin-Level Hydrosolidarity – Goal for Land/Water/Ecosystem Coordination*
Prof. Graham D. Farquhar	**AUS** Canberra	Australian National University Research School of Biological Sciences	*Worldwide Changes in Evaporative Demand*
Prof. Marino Gatto	**I** Milan	Polytechnic of Milan Department of Electronics and Information	*Threatened Biodiversity: Understanding, Forecasting, Taking Action*
Prof. Gabriel G. Katul	**USA** Durham	Duke University Nicholas School of the Environment and Earth Sciences	*Bringing Photosynthesis to the Atmosphere: A Feedback on Terrestrial Water Cycling*
Prof. Ulrike Lohmann	**CH** Zürich	Swiss Federal Institute for Technology (ETH) Institute for Atmospheric and Climate Science	*Impact of Aerosols on the Hydrologic Cycle*
Dr. Carlos A. Nobre	**BR** Cachoeria Paulista	Centre for Weather Forecasts and Climate Studies	*Biosphere-Atmosphere Interactions in Amazonia*
Prof. Andrea Rinaldo	**I** Padua	Padua University 'Dino Tonini' International Hydrology Centre	*River Basins: Water and Complex Adaptive Systems*
Prof. Ignacio J. Rodríguez-Iturbe	**USA** Princeton	Princeton University Department of Civil and Environmental Engineering	*Hydrologic Fluctuations and Vegetation Dynamics*
Prof. Daniel Rosenfeld	**IL** Jerusalem	The Hebrew University of Jerusalem Institute of Earth Sciences – Program of Atmospheric Sciences	*Precipitation Suppression by Anthropogenic Air Pollution: Major Loss of Water Resources*
Prof. Soroosh Sorooshian	**USA** Irvine	University of California, Irvine Department of Civil and Environmental Engineering	*Water Distribution and Availability: An Overview of the Hydrologic Cycle*

Observers

NAME AND TITLE	NAT.	DISCIPLINE AND CHARGE
H.Em. Card. Geraldo Majella Agnelo	**BR** Brasilia	President of National Bishops' Conference of Brazil (C.N.B.B.)
Prof. James Dooge	**IRL** Dublin	Former Foreign Minister of Ireland
H.E. Msgr. Catalino Claudio Giménez Medina	**PY** Asunción	President of the Bishops' Conference of Paraguay (C.E.P.)

Observers

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H.E. Msgr. Estanislao E. Karlic	**RA** Paraná	Former President of the Bishops' Conference of Argentina and Archbishop Emeritus of Paraná
H.E. Msgr. Eduardo Vicente Miras	**RA** Buenos Aires	President of the Bishops' Conference of Argentina (C.E.A.)
Prof. Viliam Novák	**SK** Bratislava	Slovak Academy of Sciences, Institute of Hydrology
Prof. Mary Power	**USA** Berkeley	University of California, Berkeley
Msgr. James Reinert	**V** Vatican City	Pontifical Council for Justice and Peace
Prof. Lucio Ubertini	**I** Rome	La Sapienza University of Rome
Prof. Howard S. Wheater	**UK** London	Imperial College, Faculty of Engineering

Academicians

NAME AND TITLE	NAT.	DISCIPLINE AND CHARGE	PAPER
Prof. Nicola Cabibbo	**I** Rome	Professor of Physics La Sapienza University of Rome President of the Pontifical Academy of Sciences	*Welcome Address*
H.E. Msgr. Marcelo Sánchez Sorondo	**V** Vatican City	Professor of the History of Philosophy LUMSA University of Rome Chancellor of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences	*Presentation of the Activity of the Pontifical Academies*
Prof. Paul J. Crutzen	**D** Mainz	Max Planck Institute for Chemistry Department of Atmospheric Chemistry Member of the Council of the PAS	
Prof. Raymond Hide	**UK** Surrey	Emeritus Professor of Physics, Oxford University Senior Research Investigator in Mathematics, Imperial College, London	
Prof. M. Govind Kumar Menon	**IND** New Delhi	Dr. Vikram Sarabhai Distinguished Professor, Indian Space Research Organisation, Govt. of India Member of the Council of the PAS	*The Pontifical Academy of Sciences, Welcome, and Goals*

PARTICIPANT BIOGRAPHIES

Water and the Environment

Dr. Reza Ardakanian Born in 1958 in Yazd, Iran, holds an MSc and PhD from McMaster University of Canada and teaches/researches in the field of water resources management. He represents the I. R. Iran in the Intergovernmental Council of IHP in UNESCO. He sits on the Governing Board of UNESCO-IHE, an international water education institute based in Delft, the Netherlands. He is a board member of IHA (Intl. Hydropower Association) and President of IR-IHA. Dr. Ardakanian cooperates with the United Nations University as the member of the Advisory Committee for the Institute of Environmental & Human Security based in Bonn, Germany. He is the Founding Director of RCUWM, a regional center on urban water management based in Tehran, Iran and under the auspices of UNESCO. Until 8 October 2005, he was Deputy Minister for Water Affairs in the Ministry of Energy of Iran. In Dec. 2004 he was awarded life membership of 'The International Water Academy'.

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Prof. Dr. Lennart Bengtsson was born in Sweden in 1935 and obtained his PhD in Meteorology from the University of Stockholm. His fields of research are climate modelling, data assimilation and the hydrological cycle. He is currently an Emeritus Scientific Member of the Max Planck Institute for Metereology in Hamburg, Germany. He is also, among other awards and honours, a Fellow of the American Meteorological Society and a Member of the Academia Europea. He has published some 170 scientific papers in the fields of numeri-

cal analysis and data assimilation, numerical weather prediction and climate modelling.

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Dr. Moustafa T. Chahine was born in Beirut, Lebanon, and received his PhD from the University of California at Berkeley. He is currently a 'JPL Senior Research Scientist' at NASA's Jet Propulsion Laboratory, a Division of the California Institute of Technology. He served as 'JPL Chief Scientist' from 1985-2000 and is currently the Principal Investigator on the Atmospheric Infrared Sounder (AIRS), which was launched onboard the NASA Aqua satellite in 2002 to study Earth's water cycle and energy fluxes. Dr. Chahine's primary interests are in remote sensing of planetary atmospheres, and in studies of climate processes. He has served as a member of NASA's Earth System Sciences Committee and as Chair of the World Meteorological Organization's Global Energy and Water Cycle Experiment (GEWEX) from 1989-2000. Among his publications is an essay on 'The hydrological cycle and its influence on climate' published in *Nature* 359, pp. 373-380, 1992. He is Fellow in the American Physical Society, the American Association for the Advancement of Science, the American Geophysical Union and the American and British Meteorological Societies.

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Prof. Peter M. Cox was born in 1964 in London. He started as the Centre for Ecology & Hydrology (CEH) Science Director for Climate Change in December 2004, based in Dorset, having previously been at the Met Office Hadley Centre for Climate Prediction and Research (since 1990). His educational background is in Physics and Theoretical Physics (Physics BSc – Warwick, Part II Maths – Cambridge, Plasma Physics PhD – Imperial), but spent his years at the Hadley Centre thinking about the impacts of ecosystems on the physical climate system. His personal research has focused on modelling the interaction between the land surface and the climate, and he led the team which carried out the first climate projection to include vegetation and the carbon cycle as dynamic interactive elements. As a Science Director at CEH, he aims to improve the links between data and models, and to utilise long-term datasets to detect climate change impacts on ecohydrological systems.

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Prof. William E. Dietrich A member of the U.S. National Academy of Sciences and many other academic societies, his research has focused on both theoretical problems in landscape evolution and practical problems in linking landuse activities to river ecosystems. He has conducted field studies and contributed to papers on runoff generation mechanisms, landslide processes, soil production and transport, channel initiation, sediment transport processes, river meander mechanics, floodplain sedimentation, and river incision into bedrock. He has been awarded numerous research distinctions throughout his career.

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Prof. Malin Falkenmark was born in Stockholm, Sweden in 1925 and is a fil lic graduate from Uppsala University. She is Professor Emerita of Applied and International Hydrology, and since 1991 tied to the Stockholm International Water Insitute (SIWI) and for 12 years in charge of the scientific programme of the annual Stockholm Water Symposia. She has received two Honorary Doctorates (Philosophy from Linköping University in 1975, Technology from Lund University in 2005).

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Prof. Graham Farquhar was born in Australia in 1947 and is Distinguished Professor, FAA, FRS at the Environmental Biology Group Research School of Biological Sciences, Australian National University in Canberra. His research interests are integration of photosynthesis and growth with nitrogen and water use of plants; stomatal physiology; isotopic composition of plants; global change science. He has published extensively on these topics and is a member of several Australian and international learned societies and scientific academies.

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Prof. Marino Gatto Born in 1949, Marino Gatto is Professor of Ecology, Faculty of Civil, Environmental and Land Engineering, Polytechnical School of Milan. He is the president of the Italian Society of Ecology. His cultural background is engineering and mathematical modelling and his research has entirely focused on ecology, sustainability and management of renewable resources since 1974.

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Dr. Gabriel G. Katul was born in 1966 in Beirut, Lebanon where he received his B.E. degree at the American University of Beirut in 1988. He received his M.S. degree in 1990 at Oregon State University and his Ph.D degree in 1993 at the University of California (in Davis). He is currently a professor of micrometeorology and surface hydrology at the Nicholas School of the Environment and Earth Sciences and the Department of Civil and Environmental Engineering at Duke University in Durham, North Carolina. He is currently serving as an associate editor for Boundary Layer Meteorology, Advances in Water Resources, and Water Resources Research. He was a visiting fellow of the Commonwealth Science and Industrial Research Organization in Australia, and has received several honorary awards, including an honorary certificate by La Sección de Agrofísica de la Sociedad Cubana de Física in Habana. He received the Macelwane award and became an elected fellow of the American Geophysical Union in 2002. He has authored more than 115 peer-reviewed manuscripts in mass, energy, and momentum exchange processes near the land-atmosphere interface.

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Prof. Ulrike Lohmann was born in 1966 in Berlin, Germany and obtained her MSc and PhD in climate modelling from the Max Planck Institute for Meteorology, Hamburg, Germany. She was Assistant and Associate Professor and Canada Research Chair at Dalhousie University, Halifax, Canada, before becoming Full Professor at the Institute for Atmospheric and Climate Science at the Swiss Federal Institute for Technology, Zurich, Switzerland. Her research focuses on the role of aerosol particles and clouds in the climate system, with emphasis on the radiation balance and the hydrological cycle. She has published more than 60 peer-reviewed articles. She is a lead author for the Fourth Assessment Report of the Intergovernmental Panel for Climate Change (IPCC) and a member of the scientific steering committees of the International Global Atmospheric Chemistry Program, the International Commission of Clouds and Precipitation and the Global Energy and Water Cycle Experiment (GEWEX) Radiation Panel. She is an editor for Atmospheric Chemistry and Physics and member of the editorial board of Atmospheric Environment.

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Dr. Carlos A. Nobre received his Electrical Engineering Degree from the Instituto Tecnológico de Aeronáutica, Brazil, and his PhD in Meteorology from the Massachusetts Institute of Technology, USA. He is a Senior Scientist at the Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, and former Director of the Brazilian Center for Weather and Climate Forecasting (CPTEC) from 1991 through 2003. He is also a program scientist for the Large Scale Biosphere-Atmosphere Experiment in Amazonia. Chairman-elected (2006-2008) for IGBP. His research interests in Earth System modeling and biosphere-atmosphere interactions in Amazonia.

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Prof. Andrea Rinaldo was born in Venice in 1954. He graduated with honors in Hydraulic Engineering (110/110 summa cum laude) at the University of Padua and earned his PhD at Purdue University in 1983. Professor of Civil and Environmental Engineering (1986-) and Director, 'Dino Tonini' International Centre for Hydrology (1996-) at the University of Padua (Italy). Chair of Hydraulic Constructions (Costruzioni Idrauliche) since 1992. Research Affiliate, Visiting Professor and Research Associate at Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, 1993-2002, he is currently Visiting Professor at Princeton University (2004-). He received several awards and citations, including: the 2005 Dalton Medal of the European Geophysical Society; the AGU Hydrology (formerly Horton) Award (1999); the Fellowship of the American Geophysical Union (2000) together with the membership of several Italian Academies. Associate Editor of Advances in Water Resources (1994-) and Water Resources Research (2000-), he has been keynote lecturer at several international conferences. Author and coauthor of five books (among which: Fractal River Basins: Chance and Self-Organization, Cambridge Univ. Press, 1997 with I. Rodriguez-Iturbe) and more than 100 papers in refereed journals.

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Prof. Ignacio J. Rodríguez-Iturbe is the Theodora Shelton Pitney Professor of Environmental Sciences and Professor of Civil and Environmental Engineering at Princeton University. Born and educated in Venezuela he taught for many years at the Simon Bolivar University in Caracas and at MIT in the USA. His research is in hydrology focusing in ecohydrology, geomorphohydrology and hydrometeorology. He is the author of over 200 papers in international research journals and 3 books in his field. He has been awarded numerous international prizes including the Stockholm Water Prize, the Horton and Macelwane Medals of the American Geophysical Union, the Mexico Prize of Science and Technology and the Venezuelan National Science Prize. He is a member of numerous academies throughout the world and the recipient of several honorary degrees.

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Prof. Daniel Rosenfeld was born in 1952. He received his PhD in meteorology from the Hebrew University of Jerusalem, Israel in 1986 and is currently a full professor at this university. Prof. Rosenfeld is a world-renown expert in clouds and precipitation, including deliberate attempts to augment precipitation through cloud seeding and documentation of the suppressive effects of particulate air pollution on precipitation. These findings, some of which have been documented using techniques derived by Prof. Rosenfeld that makes use of multi-spectral satellite data, have major negative ramifications for water supplies in affected areas and for the world climate. These will have to be considered by groups and individuals deliberating on global fresh water supplies during the 21st Century. Prof. Rosenfeld has published more than 90 refereed papers and chapters in books. He is a 'Fellow' of the American Meteorological Society and received numerous awards. Some of his recent publications are: Rosenfeld D., 2000: Suppression of Rain and Snow by Urban and Industrial Air Pollution, *Science*, 287, 1793-1796; Rosenfeld D. and I. M. Lensky, 1998: Satellite-based insights into precipitation formation processes in continental and maritime convective clouds, *The Bulletin of American Meteorological Society*, 79, 2457-2476.

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Prof. Soroosh Sorooshian UCI-Distinguished Professor of Civil and Environmental Engineering, and Earth System Science, University of California-Irvine, was born in 1948 in Kerman, Iran. After completion of high school education, he moved to the USA and received his PhD in 1978, in Systems Engineering (Water Resources and Hydrologic Systems Analysis) from UCLA. Dr. Sorooshian is a member of the National Academy of Engineering (NAE); Corresponding Member, International Academy of Astronautics (IAA); Fellow, American Association for the Advancement of Science (AAAS); Fellow, American Geophysical Union (AGU); Fellow, American Meteorological Society (AMS); Fellow, International Water Resources Association (IWRA); Chair, Science Steering Group (SSG) of Global Energy and Water Cycle Experiment (GEWEX) of the World Climate Research Programme (WCRP). He has served on numerous advisory committees, including those of NRC, NASA, NOAA, NSF, EPA, and UNESCO. Sorooshian was named by NASA as the recipient of the 2005 Distinguished Public Service Medal. NASA cites Sorooshian for his 'distinguished record in providing scientific leadership for global water cycle research and assuring that NASA science is well integrated into international programs'.

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For the biographies of the Academicians cfr. Pontificia Academia Scientiarvm, *Year Book* (Vatican City 2004), p. 15 ff.

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Memorandum

A bus will leave your hotel every day at 8.30 am for the Academy (thirty minutes before the beginning of the first session). Lunch will be served at the Academy while dinner will be served at the Domus Sanctae Marthae. On 12 and 14 November a bus will depart from the Academy to your hotel at about 8.00 pm at the end of the afternoon session.

Note:

Please give your form for the refunding of expenses to the secretariat at least one day before your departure so that you can be refunded immediately.

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PONTIFICIA ACADEMIA SCIENTIARVM

Working Group on

WATER AND THE ENVIRONMENT

12-14 November 2005