



INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
UNION GEODESIQUE ET GEOPHYSIQUE INTERNATIONALE

International Cooperation in Earth and Space Sciences

*Celebrating the 100th Anniversary of
the International Union of Geodesy and Geophysics*

29 July 2019

Salle II, UNESCO Headquarters

125 avenue de Suffren - Paris 07, France



2

Welcome

Formed in Brussels (Belgium) on 28 July 1919, the International Union of Geodesy and Geophysics (IUGG) celebrates its 100th anniversary in 2019. The centennial year marks an important milestone for IUGG. Since its inception as a union of international scientific associations, IUGG has developed into a prominent scientific organization promoting Earth and space sciences worldwide in the complicated political, economic and scientific landscapes of the 20th and the beginning of the 21st centuries.

Our mission is to advance, strengthen, and promote further Earth and space sciences for the benefit of humanity through international research cooperation and development, and to communicate the knowledge to governments and policymakers. For the decades ahead, IUGG envisions a future Earth that is environmentally sustainable and where societies are resilient against natural hazards.

We celebrate the IUGG centennial not only to remind geoscientists how important international scientific cooperation is and how IUGG science and science diplomacy have developed over the last century, but also to think together about future scientific development, international scientific initiatives, and solutions to the urgent problems of society, especially to those related to the 2030 Agenda for Sustainable Development. We are looking at the past to develop a new future for Earth and space sciences and to promote science for the benefit of all.

Michael G. Sideris, IUGG President (2015-2019)

Alik T. Ismail-Zadeh, IUGG Secretary-General (2007-2019)

International Cooperation in Earth and Space Sciences

Celebrating the 100th Anniversary of the International Union of Geodesy and Geophysics

29 July 2019, Salle II, UNESCO Headquarters, 125 avenue de Suffren - Paris 07, France

PROGRAM

09:30-10:00 Registration

10:00-11:30 *Opening Ceremony*

CHAIR: *Kathryn Waler*, President, International Union of Geodesy and Geophysics (IUGG)

Shamila Nair-Bedouelle, Assistant Director-General for Natural Sciences, United Nations Educational, Scientific and Cultural Organization (UNESCO)

Heide Hackmann, CEO, International Science Council (ISC)

Elena Manaenkova, Deputy Secretary-General, World Meteorological Organization (WMO)

Ricardo Mena, Chief of Support and Monitoring of Sendai Framework Implementation, United Nations Office for Disaster Risk Reduction (UNDRR)

Lassina Zerbo, Executive Secretary, Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)

Presentation of IUGG Commemorative Plaques

Special Session: Guest of Honor: H.S.H. Prince Albert II of Monaco

Presentation of the IUGG Honorary Membership award to the Guest of Honor H.S.H. Prince Albert II

Speech by H.S.H. Prince Albert II

End of Opening Ceremony

11:30-11:45 Coffee Break

11:45-12:45 *SESSION 1: Earth and Space Sciences and Society*

CHAIR: *Kathryn Waler*, IUGG President

11:45-12:05 Centennial of the International Cooperation in Earth and Space Sciences

Alik Ismail-Zadeh

Karlsruhe Institute of Technology, Karlsruhe, Germany

Russian Academy of Sciences, Moscow, Russia

12:05-12:25 Climate and our Planet

Valérie Masson-Delmotte

French Alternative Energies and Atomic Energy Commission, Paris, France

12:25-12:45 Disasters and Society

Marcia McNutt

National Academy of Sciences, Washington, D.C., USA

12:45-13:30 Buffet Lunch

13:30-15:10 SESSION 2: Earth Science for Sustainable Development**CHAIR:** *Chris Rizos*, IUGG President-Elect

13:30-13:50 International Lithosphere Program: Satisfying scientific curiosity and addressing societal needs
Sierd Cloetingh
 Utrecht University, Utrecht, The Netherlands

13:50-14:10 The Earth from space
Kurt Lambeck
 Australian National University, Canberra, Australia

14:10-14:30 Ocean science for sustainable development
Vladimir Ryabinin
 Intergovernmental Oceanographic Commission, UNESCO, Paris, France

14:30-14:50 Water and life
Alberto Montanari
 University of Bologna, Italy

14:50-15:10 Science education in the developing world
Fernando Quevedo, Abdelkrim Aoudia
 Abdus Salam International Center for Theoretical Physics, Trieste, Italy

15:10-15:30 Coffee Break**15:30-16:15 SESSION 3: Strengthening International Cooperation in Science and Education in a Multi-Cultural World (Panel Discussion)****MODERATOR:** *Michael Sideris*, IUGG Immediate Past President**PANELISTS:*****Robin Bell***, Lamont-Doherty Earth Observatory, Columbia University, Palisades, USA***Paul Arthur Berkman***, Fletcher School of Law and Diplomacy, Tufts University, USA***Anny Cazenave***, Observatoire Midi-Pyrénées, Toulouse, France***Athena Coustenis***, Paris Observatory, Meudon, France***Ligia Pérez Cruz***, Institute of Geophysics, National Autonomous University of Mexico, Mexico***Arkady Volozh***, Yandex Company, Russia

- 16:15-17:00** **SESSION 4: 21st Century's Triad: Sustainable Development, Climate Change and Disaster Risk Reduction (Panel Discussion)**
- MODERATOR:** *Alik Ismail-Zadeh*, ISC Secretary, IUGG Immediate Past Secretary General
- PANELISTS:**
- Josef Aschbacher*, Earth Observation Programmes, European Space Agency, Frascati, Italy
- Harsh Gupta*, National Geophysical Research Institute, Hyderabad, India
- Heike Langenberg*, Nature Geoscience
- Carlos Slim*, Telmex, América Móvil, and Grupo Carso, Mexico
- Detlef Stammer*, Center for Earth System Research and Sustainability, University of Hamburg, Germany
- Kristof Vandenberghe*, Earth Sciences and Geo-hazards Risk Reduction, UNESCO, Paris, France
- 17:00-17:10** Closing remarks by the IUGG President
- 17:15-17:45** We Love our Planet!
Music performance by the PhiloGaïa Orchestra
- 18:00-19:00** **Cocktail Reception**

BIOGRAPHIES

Special Guest



H.S.H. Prince Albert II, Sovereign Prince of Monaco

H.S.H. Prince Albert II studied political science, economics, psychology, English literature, the history of art, anthropology, geology, philosophy, sociology, German and music at Amherst College, Massachusetts, in the United States. For His contribution and actions in favor of protection of the environment and the Planet, H.S.H. Prince Albert has been honored by numerous prizes from organizations around the world and awarded the degree of Doctor Honoris Causa from prestigious universities. He received those honors as well when He was Crown Prince, and now Head of State and President of His Foundation.

H.S.H. Prince Albert II visited the North Pole by dog sled from the Russian base of Barneo 140 km away. This journey was the opportunity for him to pay tribute to his great-great grandfather, Prince Albert I of Monaco, a pioneer of modern oceanography, one of the founders of IUGG and the first IUGG Vice President. In 1906, Prince Albert I set out to Spitsbergen, in the archipelago of Svalbard, the most successful of his four Arctic exploration campaigns. The trip also helped to raise the world's awareness of the planetary challenges, which, in the short term, represent risks related to climate change and the dangers of industrial pollution. H.S.H. Prince Albert II took a month-long expedition to Antarctica, where He visited 26 scientific outposts and met with climate-change experts to learn more about the impact of global warming on the continent. During the trip He stopped at the South Pole, making him the only incumbent head of state to have visited North and South Poles.

Created at the beginning of the century on the initiative of Prince Albert I, the Mediterranean Science Commission (CIESM) is an intergovernmental body with 23 member states chaired by H.S.H. Prince Albert II. Its objectives are to promote multilateral international research and facilitate the exchange of information the countries on the north and south sides of the Mediterranean Sea.

H.S.H. Prince Albert II served as the International Patron of the "Year of the Dolphin" declared by the United Nations and the United Nations Environmental Programme in 2007. He said then: "The Year of the Dolphin gives me the opportunity to renew my firm commitment towards protecting marine biodiversity. With this strong initiative we can make a difference to save these fascinating marine mammals from the brink of extinction."

H.S.H. Prince Albert II set up in 2006 the Prince Albert II of Monaco Foundation dedicated to protecting the environment. It encourages sustainable and fair management of natural resources and places man at the center of its projects. It supports the implementation of innovative and ethical solutions in three broad areas: climate change, water and biodiversity.

(Photo credit: Gaetan Luci / Palais Princier)

Chairs



Kathryn (Kathy) Whaler

is Professor of Geophysics at the Grant Institute School of GeoSciences, University of Edinburgh. Kathy served IUGG as Vice President from 2015 to 2019. Kathy a geophysicist with expertise in the fields of core dynamics, crustal magnetization, magnetotellurics, and geomagnetic observations. She received BSc in Mathematical Physics from the University of Sussex and PhD from at the University of Cambridge. Whaler joined the University of Leeds in 1983 as a lecturer, and in 1994, she moved to the University of Edinburgh to take up the Chair of Geophysics. She was the President of the Royal Astronomical Society (2004-2006). She served IAGA as Executive Committee Member (2003-2007), Vice President (2007-2011), and President (2011-2015). She visited the NASA's Goddard Space Flight Center, Harvard University, the University of California at San Diego (as Green Scholar), Victoria University of Wellington, and Göttingen University (as Gauss Professor). Whaler is Fellow of AGU, the Institute of Physics, and the Royal Society of Edinburgh. Whaler has been awarded the Royal Astronomical Society Price Medal, and appointed Officer of the Order of the British Empire for her services to geophysics. Kathy Whaler is IUGG President from 17 July 2019.



Chris Rizos

is Emeritus Professor at the School of Civil and Environmental Engineering, The University of New South Wales (UNSW), Sydney, Australia. Chris served IUGG as a member of the Bureau (2015-2019). He obtained a Bachelor of Surveying, and a PhD in Satellite Geodesy, both from UNSW. Chris joined the staff of the (then) School of Surveying at UNSW in 1987, and retired from academia in 2018. He is regarded as Australia's foremost expert on the technologies and applications of GPS (and GNSS) precise positioning for navigation, surveying and geodesy. Chris has served in a number of positions within the International Association of Geodesy (IAG), an association of IUGG, most recently as President of the IAG (2011-2015). Amongst his many national and international responsibilities are as a member of the Governing Board of the International GNSS Service (IGS), and a member of two national committees of the Australian Academy of Science (in Earth sciences, and Space and Radio Sciences). He is a Fellow of the IAG, a Fellow of the Australian Institute of Navigation, and a Fellow of the US Institute of Navigation. Chris has been awarded fellowships from the Fulbright Foundations and the Alexander von Humboldt Foundation. He is also an Honorary Professor of Wuhan University, China. Chris Rizos is IUGG President-Elect from 17 July 2019.

Moderators



Michael Sideris

is Professor, Department of Geomatics Engineering at the University of Calgary. He is the Immediate Past President of IUGG. Michael is a geodesist with the expertise in the fields of satellite Earth observation. He received his Diploma (Hons) from the National Technical University of Athens, Greece; M.Sc. and PhD from the University of Calgary, Canada. Since 1988 Sideris has been working in the Department of Geomatics Engineering at the University of Calgary, where he is currently Associate Head (Graduate Studies and Research). He has also served the university as Associate Dean of the Faculty of Graduate Studies and Associate Dean Research of the Schulich School of Engineering. He has been visiting Professor at several Asian, Australian, European, and South American universities/institutes. He was Vice President (2003-2007) and President (2007-2011) of the International Association of Geodesy (IAG), IUGG Vice President (2011-2015), and IUGG President (2015-2019). Since 2016 Sideris has been serving on the GEO Program Board. He is an A. von Humboldt International Research Fellow, IAG Fellow, and IAG Honorary President.



Alik Ismail-Zadeh

is Chief Scientist/Research Professor at the Institute of earthquake President Theory and Mathematical Geophysics, Russian Academy of Sciences (RAS) in Moscow. Since 2001 he is also Senior Scientist at Karlsruhe Institute of Technology, Germany. He is Secretary of the International Science Council (ISC) and has served IUGG as Secretary General since 2007 until July 2019. Alik Ismail-Zadeh is a mathematical geophysicist, holds B.Sc. in mathematics from the Baku State University, Azerbaijan, MSc in mathematical physics from the Lomonosov Moscow State University, PhD and DSc (Habilitation) in geophysics from RAS. He was a visiting professor at several universities of China, France, Israel, Italy, Japan, Saudi Arabia, Sweden, UK, and USA. He is a co-founder of the IUGG Commission on Geophysical Risk and Sustainability (Chair, 2004-2007) and a founder of the Natural Hazard Section of the American Geophysical Union [AGU] (Chair, 2009-2012). He has been serving on governing or advisory committees of international and intergovernmental organizations and programs including AGU, CTBTO, UNDRR, and UNESCO. He is Member of Academia Europaea, Honorary Fellow of the Royal Astronomical Society, and IUGG Honorary Member (Fellow).

Speakers



Sierd Cloetingh

is an Utrecht University Distinguished Professor. His research field is Earth Sciences. He published more than 355 papers in international peer-reviewed journals and has been promotor of more than 75 PhD students of 18 different nationalities. Currently he serves as President of the Academia Europaea and President of the Association for European Cooperation in Science & Technology (COST). Past functions include Membership of the Scientific Council (2009-2015) and Vice-President of the European Research Council (ERC), President of the European Geophysical Society (1998-2000), President of the International Lithosphere Program (ILP), Distinguished Professor of the Royal Netherlands Academy for Arts and Sciences (KNAW, 2006-2015), Editor-in-Chief of the international journal "Global and Planetary Change" and Chairman of the TOPO-EUROPE collaborative research program. Cloetingh received honorary doctorates from five European universities and numerous medals and awards. He is member of the Royal Netherlands Academy of Sciences, the Royal Norwegian Academy, the Royal Danish Academy, the German national Academy for Technical Sciences (acatech), the Heidelberg Academy, the Bavarian Academy of Sciences and honorary member of the Hungarian Academy of Sciences. Cloetingh is IUGG Honorary Member (Fellow).



Heide Hackmann

is Chief Executive Officer of the International Science Council. She holds a M. Phil in contemporary social theory from the University of Cambridge, UK, and a PhD in science and technology studies from the University of Twente in the Netherlands. Heide worked as Head of the Department of International Relations and Quality Assessment of the Royal Netherlands Academy of Arts and Sciences. Her career in science policy dates back to the early 1990s, when she worked at the Human Sciences Research Council in South Africa. In 2015-2018 Heide was the Executive Director of the International Council for Science (ICSU) and before joining ICSU, she served eight years as Executive Director of the International Social Science Council (ISSC). Heide is member of the Scientific Advisory Board of the Potsdam Institute for Climate Impact Research in Germany and the Board of the Stockholm Resilience Centre in Sweden. She co-chairs the UN's 10-member group supporting the Technology Facilitation Mechanism (TFM) on the Sustainable Development Goals, she is a member of the World Economic Forum's Global Future Councils and Distinguished Visiting Fellow of IIASA in Austria.



Kurt Lambeck

has been at the Australian National University since 1977, including ten years as Director of the Research School of Earth Sciences. He is a former President of the Australian Academy of Science and a member of the Antarctic Ecosystem and Environment CRC. Before returning to Australia he was Professor at the University of Paris. He has also worked at the Smithsonian and Harvard Observatories in Cambridge, USA. He has studied at the University of New South Wales, the Technical University of Delft, Netherlands, the National Technical University of Athens and Oxford University from which he obtained DPhil and DSc degrees. He has held visiting appointments in Belgium, Britain, Canada, France, Netherlands, Norway and Sweden. He was elected to the Australian Academy of Science in 1984 and to the Royal Society in 1994. He is a foreign member of the Royal Netherlands Academy of Arts and Sciences (1993), Norwegian Academy of Science and Letters (1994), Academia Europaea (1999), the Académie des Sciences, Institut de France (2005), and the US National Academy of Sciences (2009). He has received a number of international prizes and awards. He has published two books and more than 250 papers on subjects in geophysics, geology, geodesy, space science, celestial mechanics, environmental geoscience, and glaciology.



Elena Manaenkova

is Deputy Secretary General of the World Meteorological Organization (WMO). She is a geographer with a specialization in hydrology and meteorology and graduated from the Lomonosov Moscow State University in 1986. Elena holds a Doctorate degree in physics and mathematics from the Hydrometeorological Centre of Russia with specialization in meteorology, climatology, satellite meteorology and remote sensing from satellites. Before joining WMO, she devoted her career to the Russian Federal Service for Hydrometeorology and Environmental Monitoring. Previously, Elena served WMO as Assistant Secretary-General, Director of Cabinet of the Secretary-General and External Relations Department, and Director of Atmospheric Research and Environment Department.

Speakers



Valérie Masson-Delmotte

is a French climate scientist and Research Director at the French Alternative Energies and Atomic Energy Commission, where she works in the Climate and Environment Sciences Laboratory (LSCE).

Valerie served on numerous national and international projects including the Intergovernmental Panel on Climate Change (IPCC). In 2015, she was elected co-chair of Working Group I of the IPCC, which works on the physical basis of climate. She was the co-ordinating lead author of the paleoclimate chapter in IPCC AR5. Since 2014, she has been a member of the French Research Strategic Council. She has published extensively, including several books for the general public, as well as children's books.



Marcia McNutt

is a geophysicist and president of the U.S. National Academy of Sciences. From 2013 to 2016, she served as editor-in-chief of the Science family of journals. Prior to joining Science, she was director of the U.S. Geological

Survey (USGS) from 2009 to 2013. During her tenure, the USGS responded to a number of major disasters, including earthquakes in Haiti, Chile, and Japan, and the Deepwater Horizon oil spill. Before joining the USGS, Marcia served as President and CEO of the Monterey Bay Aquarium Research Institute in Moss Landing, California. Marcia began her academic career at the Massachusetts Institute of Technology (MIT), where she was the E.A. Griswold Professor of Geophysics and directed the Joint Program in Oceanography/Applied Ocean Science & Engineering, jointly offered by MIT and the Woods Hole Oceanographic Institution. Marcia received a BA in physics from Colorado College and her PhD in Earth sciences at the Scripps Institution of Oceanography. Marcia served as president of the American Geophysical Union (AGU) from 2000 to 2002. She is a fellow of AGU, the Geological Society of America (GSA), American Association for the Advancement of Science (AAAS), and the International Association of Geodesy (IAG) of IUGG.



Ricardo Mena

is Chief of Support and Monitoring of Sendai Framework Implementation, United Nations Office for Disaster Risk Reduction (UNDRR), based in Geneva, Switzerland. Mena holds a Master's Degree in Risk Crisis and Disaster

Management from the University of Leicester, UK. He has served the UN System since 1993, occupying various positions in the United Nations Department of Humanitarian Affairs, United Nations Development Programme, United Nations Office for the Coordination of Humanitarian Affairs, and since 2009 in UNDRR. Over his 20 years of experience in disaster risk reduction, Mena has written publications and articles on topics related to disaster risk reduction; he is a founding member of the Network of Social Studies in Disaster Prevention for Latin America, LA RED.



Alberto Montanari

has a background in civil engineering and holds a Ph.D. in hydrology. He has been teaching at the University of Bologna since 1998. His research activity focuses on the estimation of design variables and the development of

schemes and theoretical principles for designing infrastructures for river basin management and the mitigation of natural hazards. He authored more than 100 scientific papers published in international journals. He is a consultant for public bodies for environmental restoration and mitigation of flood risk. Alberto was editor in chief of the scientific journal Water Resources Research of the American Geophysical Union. Alberto chaired the International Commission on Water Resources Systems of the international Association of Hydrological Sciences (IAHS) of IUGG. Montanari is currently President of the European Geosciences Union (EGU).

Speakers



Shamila Nair-Bedouelle

is Assistant Director General of the United Nations Educational, Scientific and Cultural Organization (UNESCO). She holds a PhD in Life Sciences from the University of Capetown in South Africa. She pursued her research career at the Institut Pasteur in Paris and the MIT University Park in Boston. She has been Director of Research at the University of Paris V since 2000 and was nominated First Class Director of Research at the French National Institute for Medical Research (INSERM) in 2017. She joined UNESCO's Sector for Natural Sciences as Chief of the Unit for Africa's Science and Technology Consolidated Plan of Action within the Division for Science Policy and Capacity-building. She managed the United Nations Cluster for Science and Technology in Africa and represented UNESCO at the African Ministerial Council for Science and Technology. Africa remained the focus of her work at the Africa Department, where she evaluated UNESCO's scientific programmes on the continent from January 2012 onwards before taking up her new functions as Director of OzonAction at the United Nations Environmental Programme (UNEP).



Fernando Quevedo

is Director of the Abdus Salam International Center for Theoretical Physics (ICTP) since 2009. Fernando is a theoretical particle physicist with wide-ranging research interests in string theory, phenomenology and cosmology. He has received various honors and awards including Doctorates Honoris Causa from the Universidad del Valle de Guatemala and the Universidad de San Carlos de Guatemala. Fernando obtained his PhD from the University of Texas at Austin in 1986 under the supervision of Nobel Laureate Steven Weinberg. Following a string of research appointments at CERN, McGill University, Institut de Physique in Neuchatel, and the Los Alamos National Laboratory, as well as a brief term as professor of physics at the UNAM (Mexican National Autonomous University), Quevedo joined the University of Cambridge, UK in 1998, where he is currently Professor of Theoretical Physics and Fellow of Gonville and Caius College.



Abdelkrim Aoudia

is a geophysicist and senior scientist at ICTP. His research interests cover mechanics of earthquakes and faulting, structure and rheology of the lithosphere, tectonics and seismic hazard.



Vladimir Ryabinin

is the Executive Secretary of the Intergovernmental Oceanographic Commission (IOC) and UNESCO Assistant Director General. Ryabinin is an oceanographer and geophysicist. He holds PhD (1982) and DSc (1995) degrees in Physical and Mathematical Sciences (Oceanography and Geophysics). He has been working for the Russian Hydrometcenter in Moscow, the Euro-Mediterranean Centre on Insular Coastal Dynamics and the International Ocean Institute in Malta. From 2001 until 2015, Ryabinin was a Senior Scientific Officer in the World Climate Research Programme (WCRP) and a staff member of the World Meteorological Organization (WMO), where he was responsible for the international coordination of climate research with a focus on the polar regions and cryosphere, the ocean, sea level, stratosphere, atmospheric chemistry and climate, and contribution of research into the creation of climate services. Ryabinin has authored and/or co-authored about 100 publications, including a monograph, mostly in the domains of oceanography, meteorology and climate.



Lassina Zerbo

is the Executive Secretary of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). He holds a PhD in Geophysics from the Université de Paris XI, France. His international career started with a position as research geophysicist with BHP Minerals International, Anglo American Exploration. He joined CTBTO as Director of the organization's International Data Centre. Zerbo has been instrumental in cementing the CTBTO's position as the world's centre of excellence for nuclear test-ban verification, as well as in driving forward efforts towards the entry into force and universalization of the Comprehensive Nuclear-Test-Ban Treaty. Zerbo was chosen by the American Association for the Advancement of Science to receive its 2018 Award for Science Diplomacy in recognition of his commitment to eliminating nuclear testing. In 2015 he became a Commander of the National Order of Burkina Faso for his work towards the preservation of peace and international security.

Panelists Session 3



Robin Bell

is Research Professor at Lamont-Doherty Earth Observatory of Columbia University, where she directs research programs in Antarctica, Greenland, and developing technology to monitor our changing planet. Bell has coordinated 10 major aerogeophysical expeditions to Antarctica and Greenland, studying what makes ice sheets collapse. During the International Polar Year, Bell led a major expedition to Antarctica to explore the last unknown mountain range on Earth, the Gamburtsev Mountains. Here, the team discovered that water hidden beneath the ice sheet runs uphill. Using the new IcePod and gravity technologies, Bell's team is presently exploring the Ross Ice Shelf, a floating piece of ice the size of France that covers the least known piece of ocean floor on our planet. Bell received her undergraduate degree in geology from Middlebury College and her Ph.D. in geophysics from Columbia University in 1989. Bell is the current President of the American Geophysical Union.



Paul Arthur Berkman

is Director of the Science Diplomacy Center at The Fletcher School of Law and Diplomacy at Tufts University, USA. He is motivated to establish connections between science, diplomacy and information technology. He was former head of the Arctic Ocean Geopolitics Programme at the University of Cambridge. Berkman is an internationally-renowned scientist, explorer, educator and author who has made significant contributions to the sustainable development of our world during the past three decades. He is especially motivated to establish connections between science, diplomacy and information technology to promote cooperation and prevent discord for good governance of regions beyond sovereign jurisdictions – which account for nearly 70% of the Earth. Berkman has a master's degree and doctorate in biological oceanography from the University of Rhode Island.



Anny Cazenave, IUGG Fellow,

is a space geodesist and one of the pioneers in satellite altimetry. Cazenave works for the French space agency (CNES) and Observatoire Midi-Pyrénées in Toulouse, and also she is director of Earth sciences at the International Space Sciences institute in Bern, Switzerland. Cazenave holds a PhD in Geophysics from the University of Toulouse. Her research interests include the application of space techniques to geosciences. She dedicated a part of her career to researching spatial and temporal variations of gravity, before focusing in the 90's on space oceanography. Through data recorded by satellites Topex/Poseidon, Jason-1 and Jason-2, Cazenave has addressed the issue of global sea level rise. She has been a member of several national and international organizations, such as the Earth system sciences committee of the European Research Council, the scientific committee of the World Climate Research Program of the WMO, the Conseil Supérieur des Programmes of the French Ministry of Education and others.



Athena Coustenis, IUGG Fellow,

is a astrophysicist and atmospheric scientist, and director of research with the French National Centre for Scientific Research (CNRS) based at Paris Observatory in Meudon. Coustenis heads space mission projects for ESA and NASA. Her specialty is Planetology (exploration and study of the Solar System from ground-based and space observations). Her research is devoted to the investigation of planetary atmospheres and surfaces, with emphasis on the outer solar system bodies, in particular icy moons like Titan and Enceladus, Saturn's satellites, and Jupiter's Ganymede and Europa, objects with high astrobiological potential. She also works on the characterization of exoplanetary atmospheres. She has led many observational campaigns from the ground using large telescopes (CFHT, UKIRT, VLT, etc) and has used the Infrared Space Observatory (ISO) to conduct planetary investigations. Coustenis was the President of the International Association of Meteorology and Atmospheric Sciences (IAMAS) of IUGG.



Ligia Pérez Cruz

is an expert in paleoceanography, paleoclimatology, and climate variability. She is the Director of the Oceanographic Vessels Operations and researcher at the Institute of Geophysics of the National Autonomous University of Mexico (UNAM). Pérez-Cruz is the current President of the Mexican Geophysical Union. Her current projects are related to reconstructions of the climate variability during the last 18,000 yrs at different time-scales in the Eastern Tropical Pacific Ocean and the analysis of ancient DNA in marine sediments as a novel window into past marine ecosystems and environmental changes. Also, she investigates the signals of hyperthermal events during the Paleogene in the Chicxulub impact crater rock records. She has participated in 33 cruises. She was a member of the science party of the Expedition 364: Drilling the K-Pg Chicxulub impact crater from the IODP.



Arkady Volozh

is a Russian technology entrepreneur, investor, computer scientist, and philanthropist. He is the founder and CEO of Yandex, a technology company that builds intelligent products and services powered by machine learning. Yandex is one of Europe's largest Internet companies, operating Russia's most popular search engine. Volozh co-founded several IT enterprises and in his early days, and pioneered the development of search with new technology advancements and search software companies. He studied applied mathematics at Gubkin Russian State University of Oil and Gas, graduating in 1986.

Panelists Session 4



Josef Aschbacher

is the European Space Agency's (ESA) Director of Earth Observation Programmes and Head of ESRIN, ESA's centre for Earth Observation, located in Frascati, Italy. Born in Austria, he studied at the University of Innsbruck, graduating with a Master and a

Doctoral Degree in Natural Sciences.

His professional career in ESA began in 1990. From 1991 to 1993 he was seconded as ESA Representative to Southeast Asia to the Asian Institute of Technology in Bangkok, Thailand. From 1994 to 2001 he worked at the European Commission Joint Research Centre in Ispra, Italy. He returned to ESA HQ (Paris) in 2001 as Programme Coordinator where he was primarily responsible for advancing Copernicus activities within ESA. In 2006 he was nominated Head of the Copernicus Space Office, where he led all activities for Copernicus. In 2014, he was promoted to his current position where he is responsible for planning ESA's Earth Observation programmes and for formulating and implementing programmatic and strategic decisions across the Directorate.



Heike Langenberg

heads the editorial team of *Nature Geoscience*. She started out in her editorial career in 1999 as an Associate, then Senior Editor at *Nature* handling manuscripts in the broad area of the climate sciences. A graduate in mathematics of the

Philipps-Universität Marburg, Germany, she ventured into oceanography for her PhD at the University of Hamburg, Germany. Her postdoctoral research at various research institutes in Hamburg was focused on numerical simulations of the ocean and atmosphere at a regional scale.



Detlef Stammer

is a physical oceanographer, professor and Director of the Center for Earth System Research and Sustainability at the University of Hamburg, Germany. Stammer's research interests include the role of the ocean in climate variability and

sea level change. Stammer is Chair of the World Climate Research Programme (WCRP) Joint Scientific Committee. Previously, Stammer co-chaired the Scientific Steering Group of WCRP's Climate and Ocean Variability, Predictability and Change (CLIVAR) Core Project and the WCRP Grand Challenge on Regional Sea-level Change and Coastal Impacts. From 1993 until 2003 he worked as a scientist at MIT and at Scripps Institute of Oceanography at the University of California, San Diego.

Detlef received a Ph.D. in Physical Oceanography from the Institute of Oceanography, Kiel.



Harsh Gupta, IUGG Fellow,

is a geoscientist and seismologist.

Gupta is globally known for his work on artificial water reservoir triggered earthquakes and developing criteria to discriminate them from normal earthquakes.

Gupta is Director-emeritus of the National Geophysical Research Institute in Hyderabad, India, and served the Indian government as Secretary of the Department of Ocean Development, and Member of the National Disaster Management Authority. Gupta headed the team, which set up the Indian Tsunami Warning System.

Gupta is currently a Member of Atomic Energy Regulatory Board, India and President, Geological Society of India. He has been Vice Chancellor, Cochin University of Science and Technology and Professor, University of Texas at Dallas, President of IUGG and Asia Oceania Geosciences Society (AOGS) and is the Founder President of the Asian Seismological Commission (ASC).



Carlos Slim

is a Mexican business magnate, engineer, investor, and philanthropist. Slim is Chief Executive Officer of Telmex, América Móvil, and Grupo Carso. From 2010 to 2013, Slim was ranked as the richest person in the world by the Forbes business

magazine. As of April 2019, he is the fifth-richest person in the world according to Forbes' listing of The World's Billionaires. His conglomerate includes education, health care, industrial manufacturing, transportation, real estate, media, energy, hospitality, entertainment, high-technology, retail, sports and financial services. As of 2016, he is the largest single shareholder of The New York Times Company. Slim invests his funds and time to promote education and science in Mexico and in Latin America.



Kristof Vandenberghe

is Chief of the UNESCO Earth Sciences and Geo-Hazards Risk Reduction Section and Secretary of the International Geoscience and Geoparks Programme. Before assuming this position, he was

Chief of the Executive Office of the Natural Sciences Sector of UNESCO and prior to that, Focal Point Science at the Office of the Director-General, liaising between UNESCO's Science Sector and the Intergovernmental Oceanographic Commission and the Director-General of UNESCO. He joined UNESCO in 2011 as a Program Specialist at the Bureau of Strategic Planning. Earlier he was Deputy General Representative of the Government of Flanders coordinating multilateral relations between OECD, UNESCO, the Council of Europe, and the Flemish Government, and worked for the Foreign Office of the Flemish Government. Vandenberghe graduated at the Ghent University, Belgium, as a biotechnological engineer.

PHILOGAÏA ORCHESTRA



*The PhiloGaïa Orchestra's first concert for the general public: "Trip to the heart of the Earth"
(photo courtesy: Sergey Abramnikov).*

The PhiloGaïa Orchestra Project started from spontaneous improvisation sessions in the Institut de Physique du Globe de Paris (IPGP). IPGP is an institute of higher education and research in Earth and Planetary Sciences, consisting of over 500 researchers, engineers, and Master/PhD students. The IPGP Orchestra was formally founded in 2012, initially to celebrate PhD and habilitation defenses. Musicians in the institute have sought an original way of gathering our passions in geophysics and in music closer than ever. As the number of members and types of instruments change from one concert to another, it is indeed challenging to arrange or compose multiple genres of music (classic, pop, jazz) for a chamber orchestra that sometimes consists only of one clarinet, one bassoon, and one cello. In the course of time, the orchestra has started to perform some concerts outside the institute and also to seek some original and exotic ways to express our passions in geophysics and in music. The PhiloGaïa Orchestra formalizes sequence of musical experiments as a scientific outreach tool and operates with the slogan "We love our planet! It lives, it sings!" The idea is to invite composers to provide the Orchestra with musical themes that are inspired by beautiful figures in geophysical journals, on which the musicians improvise with those figures on the screen during the concert. The project was accepted as a part of Festival of Ideas of Paris, run by Université Sorbonne Paris Cité (USPC), an umbrella university of IPGP. The call took place for the first time in 2016 in USPC with the theme "Être machine (Being a Machine)." This first public 'geomusic' experiment was built around the idea of a trip through the Earth's interior.

www.history-of-geo-and-space-sciences.net



Open Access

History of Geo- and Space Sciences



The International Union of Geodesy and Geophysics: from different spheres to a common globe

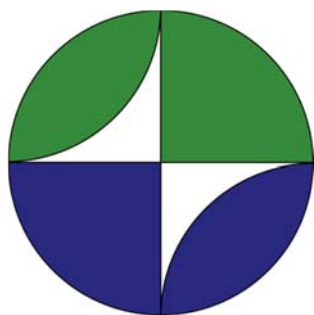
Editors: A. Ismail-Zadeh and J. A. Joselyn

Special Issue

 **Copernicus Publications**
The Innovative Open Access Publisher

Access: https://www.hist-geo-space-sci.net/special_issue996.html

Photo on page 7 by Gaetan Luci / Palais Princier, photo on page 14 by Sergey Abramnikov; all other photos and bios of chair persons, speakers and panelists are taken from the Internet.



INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS
UNION GEODESIQUE ET GEOPHYSIQUE INTERNATIONALE

Contact

IUGG Secretariat

Dr. Franz G. Kuglitsch, Executive Secretary
German Research Centre for Geosciences (GFZ)
Telegrafenberg A17
14473 Potsdam
GERMANY

T: (+49) 331 288 1978
F: (+49) 331 288 1759
secretariat@iugg.org

iugg.org

100.iugg.org