4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Keynote Forum

Day 1

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Agustin J Colussi, J Earth Sci Clim Change 2017, 8:10(Suppl)
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4th World Conference on

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Agustin J Colussi

Linde Center for Global Environmental Science, USA

Autocatalytic conversion of oceanic dimethyl sulfide emissions into cloud condensations nuclei affecting the Earth's albedo

The oxidation of biogenic dimethyl sulfide (DMS) emissions is a global source of cloud condensation nuclei. The amounts of the nucleating H_2SO_4 (g) species produced in such process, however, remain uncertain. Hydrophobic DMS is mostly oxidized in the gas-phase into H_2SO_4 (g)+DMSO (g) (dimethyl sulfoxide), whereas water-soluble DMSO is oxidized into H_2SO_4 (g) in the gas-phase but into $SO4^{2-}$+$MeSO3^-$ (methane sulfonate) on water surfaces. Thus, R=$MeSO3^-$/non-sea-salt-$SO4^{2-}$ ratios would therefore gauge both the strength of DMS sources and the extent of DMSO heterogeneous oxidation if Rhet=$MeSO3^-$/$SO4^{2-}$ for DMSO(aq)+•OH(g) were known. Here, we report that Rhet=2.7, a value obtained from online electrospray mass spectra of DMSO (aq)+•OH (g) reaction products, which quantifies the $MeSO3^-$ produced in DMSO heterogeneous oxidation on aqueous aerosols for the first time. On this basis, the inverse R-dependence on particle radius in size-segregated aerosol collected over Syowa station and Southern oceans is shown to be consistent with the competition between DMSO gas-phase oxidation and its mass accommodation followed by oxidation on aqueous droplets. Geographical R variations are thus associated with variable contributions of the heterogeneous pathway to DMSO atmospheric oxidation, which increase with the specific surface area of local aerosols.

Biography

Agustin J Colussi is a Research Professor at California Institute of Technology, USA since 1998 and has published more than 200 papers in environmental physical chemistry.

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Chuixiang Yi

Queens College of City University of New York, USA

Forest resilience to warming climate

Forests provide a profound service in partially balancing the global carbon budget, sequestering about one quarter of anthropogenic emissions (2.4 GT C per year). However, many forests are subject to growing stress due to climate change, with drought-induced tree mortality likely increasing globally. Here, I review recent progresses in understanding: (1) how forest resilience responds to on-going climate change? (2) how can we quantify forest resilience and tipping point? And (3) what is the future of forests with on-going climate change?

Biography

Chuixiang Yi is a Micrometeorologist and Theoretical Modeler working on issues of how climate change, affects the carbon cycle, and from that knowledge try to predict environmental changes in the future. Their early results show that temperature is the most important control on carbon flow in high latitudes, while water is the most important control for carbon movement in low latitudes. As a result of global warming effects during the 21st century, we predict that carbon flow from the atmosphere into ecosystems will be strengthened in high latitudes, while being weakened in low latitudes.

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Joseph Tomain

University of Cincinnati, USA

The status of US climate and clean energy policy

On December 12, 2015, 195 nations signed what has been hailed as an historic climate agreement. The agreement went into effect on November 4 this year with 116 signatories. Additionally, one year ago, the Obama administration initiated its Clean Power Plan (CPP), the first major federal effort to merge energy and the environment for the purpose of addressing climate change. Unfortunately, two events have conspired to slow down those efforts. First the CPP has been challenged in court and a decision is expected shortly. Second, the election of Donald Trump raises serious questions about a continued commitment to both efforts in no small part because of the persons he has announced as heading federal energy and environmental agencies. The proposed presentation will address the status of federal climate efforts and will argue that although a transition to a clean future has been occurring for decades now, particularly at the state level, additional initiatives can be undertaken for a successful transition. First, three preconditions must be satisfied: federal leadership, both domestically and globally, will facilitate, but not end, the transition; clean energy resources must be clearly defined and supported and; the transition must be placed in its proper economic and political contexts. In this later regard, a clean power transition is not inimical to economic growth and, therefore, policies supporting competitive clean energy markets are necessary. Once the preconditions have been specified, then the second element is that innovation must occur also along three dimensions; federal innovation policy and funding must support clean energy technologies; business innovations in the private sector must follow; and supporting regulatory innovations must occur at the state and federal levels. The transition to a clean power future that is brought about by innovations in technology, business practices, and regulations will lead to a new political narrative about energy and the environment. The new politics is more democratic in two ways. First, incumbent large-scale energy firms, that have long grown accustom to government regulatory and financial support, must recognize and accept the fact that the energy sector is becoming more competitive and, therefore, incumbent firms must participate in that sector with a variety of new entrants with new products and new technologies. Second, decision-making power over the energy future will shift away from large-scale incumbents to not only smaller new entrants but decision-making power will also shift from federal regulatory authorities to local and state actors and, ultimately, to consumers themselves. The increasing energy market competition, the expansion of choices available to consumers, and the development of new energy resources and products are all part of the democratization of energy.

Biography

Joseph Tomain is Dean Emeritus and the Wilbert and Helen Ziegler Professor of Law. He has written extensively in the energy law field as noted by his recent publications. He also has published books entitled *Achieving Democracy: The Future of Progressive Regulation* (2014 Oxford University Press) and Creon's Ghost: Law, Justice and the Humanities (2009 Oxford University Press). In addition to his teaching and scholarship, he serves on a number of professional and civic organizations. He also has held positions as Visiting Environmental Scholar at Lewis & Clark Law School; Distinguished Visiting Energy Professor at Vermont Law School; Visiting Scholar in the Program of Liberal Studies at University of Notre Dame; Visiting Fellow at Harris Manchester College, Oxford University; Fulbright Senior Specialist in law in Cambodia and; National Endowment for the Humanities Summer Fellow at Stanford University.

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Nils-Axel Morner

Paleogeophysics & Geodynamics, Sweden

Climate change: Evidence of holocene high-Amplitude events

In geology we have a long-term tradition to base our statements and conclusions on observational facts in nature itself. When it comes to climate change during the Holocene, we have very fine observational records in Scandinavia giving evidence of high-amplitude changes and past temperature 2.5 °C warmer than today. Studies of past changes in climate have always been a natural part geology. Already in 1902, Gunnar Anderson [1] was able to demonstrate that climate in Sweden was 2.4 °C warmer than today in Mid Holocene time. During this period marsh turtle, water caltrop and Gotland ag were found in lakes and bogs in southern Sweden. A temperature about 2.5 °C warmer than today was further strengthened by the findings of casts of grape seeds in pottery from the Vrå Culture (~6000 BP). In the mountains pine logs from about 9000 BP are found 200 m above the present tree line. With the onset of the Sub-Atlantic period at about 500 BC, climate deteriorated (cooler and wetter). So-called "recurrence surfaces" in peat bogs provide evidence of dry and warm event of multi-decadal duration (50 years, or so), recorded at 1050 AD, 500 AD, 550 BC, 1200 BC and 2300 BC [2, 3, 4]. These events were all warmer and dryer than today. A stable isotope record from lake Tingstäde Träsk on Gotland [5] provided a continual temperature record of the Holocene; present day temperature was reached 9000 years ago and the Mid Holocene had a temperature 2.5 °C warmer than today. This is in full agreement with the temperature records from Greenland. These records indicate that the present, post-1980, warming is by no means unique; neither in amplitude nor in rate of change.Consequently, there is no scientific reason to advocate an anthropogenic forcing for the present warming.

Biography

Nils-Axel Morner took his Ph.D. in Quaternary Geology at Stockholm University in 1969. Head of the institute of Paleogeophysics & Geodynamics (P&G) at Stockholm University from 1991 up to his retirement in 2005. He has written many hundreds of research papers and several books. He has presented more than 500 papers at major international conferences. He has undertaking field studies in 59 different countries. The P&G institute became an international center for global sea level change, paleo-climate, paleoseismics, neotectonics, paleomagnetism, Earth rotation, planetary-solar-terrestrial interaction, etc. Among his books; Earth Rheology, Isostasy and Eustasy (Wiley, 1984), Climate Change on a Yearly to Millennial Basis (Reidel, 1984), Paleoseismicity of Sweden: a novel paradigm (P&G-print, 2003), The Greatest Lie Ever Told (P&G-print, 2007), The Tsunami Threat: Research & Technology (InTech, 2011), Geochronology: Methods and Case Studies (InTech, 2014), Planetary Influence on the Sun and the Earth, and a Modern Book-Burning (Nova, 2015).

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Vladimir Babeshko, J Earth Sci Clim Change 2017, 8:10(Suppl)
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Vladimir Babeshko

Russian Academy of Sciences, Russia

Climate, some natural anomalies and seismicity

The question of localization in some natural processes described by mixed boundary problems was explored. As a result of research in this problem, taking into account seasonal changes in temperature near the Earth's surface and without taking into account the well-known strong seasonal movements of the atmosphere, trade-wind and other circulations in the atmosphere, is studied along with the behavior of the temperature in the surface layer. As a result, some conformities were found which were not previously described, but which manifest themselves as abnormal phenomena since arise in enough favorable conditions. These are such things as the "bab'eleto" in Russia, "Aitweibersommer" in Germany, "Indian summer" in the United States, summer snowfall, foul weather in one area, while the equanimity is so close. The contact problem of acting of the two semi-infinite Kirchhoff plates on the elastic layer is considered. The vertical stresses acts on the plates and the problem is to study the contact stresses concentrations between the plates and the layer in this block structure. It was proved that the contact stresses concentrations in the end-walls of the plates became singular if the distance between plates is equal to zero. It can induce the destruction of the materials in engineering or appearance of the earthquake in seismology. The influences of the climate change on the seismicity are discussed.

Biography

Vladimir Babeshko has completed his HD (Doctor of Mechanics) in 1974 from Russian Academy of Sciences. For many years he is a Chief of Scientific-Research Center for Forecasting and Preventing Geo Ecological and Technologic Disasters Kuban State University and Southern Research Center, Russian Academy of Sciences. He has 20 patents, published 7 monographs and more than 500 papers in reputed journals such as Russian Academy of Sciences and many others. He is the author of the Theory of the Block Element Method, has discovered the "Starting Earthquake", and has gotten the mathematical explanations of some Weather and Climate Change.

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Day 2

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Guy M Robinson, J Earth Sci Clim Change 2017, 8:10(Suppl)
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4th World Conference on
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Guy M Robinson

University of Adelaide, Australia

Adapting to climate change: Lessons from farmers and peri-urban residents in South Australia

This paper reports on results from two major research projects conducted in South Australia. The first investigates adaptation to climate change in two of the state's major grain and sheep farming regions, using semi-structured interviews. The second uses a postal questionnaire and internet-based surveys of residents in the peri-urban fringes of Adelaide, the state capital, to examine knowledge of and attitudes to climate change and resulting adaptations, especially in the context of increasing risk of wildfires. The research on climate change adaptation in agriculture focused on formal institutions (e.g. government agencies) and communities of practice (e.g. farm systems groups). Both groups noted that farmers autonomously adapt to various risks, including those induced by climate variability; however, the types and levels of adaptation varied among individuals because of barriers to adaptation. The lack of communication and engagement processes established between formal institutions and communities of practice was one major barrier. The paper presents and discusses a model for transferring knowledge and information on climate change among formal institutions, communities of practice, trusted individual advisors and farmers, and for supporting the co-management of climate change across multiple groups in rural areas in Australia and elsewhere. The research in the peri-urban fringe revealed that actions taken by individuals to mitigate climate change were linked to the nature of environmental values held (or their ecological worldview) and place attachment. Individuals with a strong place attachment to the study area (the Adelaide Hills) who possessed knowledge of and/or beliefs in climate change were most likely to take mitigating actions. This was also linked to previous experience of major risk from wildfires. A model developed from this study is proposed as part of a process to develop effective climate change policy and educational strategies.

Biography

Guy M Robinson is a geographer with over forty years of experience in research on environmental management issues. He has worked extensively in the UK, Europe, Australasia and North America on pro-environmental behaviour by farmers and environmentally-friendly actions by householders. With a focus on policy dimensions in this work, he has been editor of the international journal, Land Use Policy, for the last decade. Currently based at the University of Adelaide, he has held positions at the Universities of Oxford, Edinburgh, Kingston London and South Australia. He is a Guest Professor in the Chinese Academy of Sciences. Author of over 200 academic papers, he has written several major books including 'Conflict and Change in the Countryside', 'Methods and Techniques in Human Geography', 'Agricultural Geographies', 'Sustainable Rural Systems' and 'Handbook on the Globalisation of Agriculture'. He is currently leading an Australian Research Council-funded project on 'Bushfires and Biodiversity'.

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4th World Conference on

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Inga Carlman

Mid Sweden University, Sweden

To navigate within environmental limits for the benefit of future generations

The negative effects of a changing climate have become increasingly evident along with the more detailed facts due to ongoing research. In spite of a number of societal steering tools (information, economic and legal) mankind seems to a great deal at loss on how to tackle the problems so as to get substantial results. Vital parts embraced in this problem-picture are e.g. a) the competing paradigms and underlying theoretical assumptions b) the credibility and accuracy of different models and method, c) how to communicate the severeness of the problem to politicians, authorities, industry and the public at large, d) to adapt social steering-tools so as to e.g. make the importance of environmental quality standards understandable and hence change human conduct (Figure 1). This paper analyses a number of models (both natural scientific and social scientific ones) and discusses their benefits and shortcomings. It furthermore brings up a) the role of public administrators to meet modern demands to take responsibility for future generations, and b) principles industry/business apply to stall proposed suggestions to tackle climate change. Finally the paper proposes a number of suggestions on how to minimize barriers and to "level the path" for the generations to come.

Biography

Inga Carlman has worked both as a consultant and as a university lecturer and researcher. She has her expertise in implementing environmental goals, mostly within the fields of renewable energy sources, Environmental Impact Assessment, Public Participation and Environmental Quality standards. Lately her interests has moved toward models/systems in relation to steering instruments. Her work with the nuclear waste problem has given her a deep insights in stakeholders' perspective, long time problems, and law.

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CLIMATE CHANGE

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Rosa Galvez

Laval University, Canada

Climate change and blue algal blooms: An example of extreme conditions

Canada has thousands of lakes with the number of lakes larger than three-square kilometers being estimated to 31 752 by the Atlas of Canada. Hundreds of these lakes are affected by algae blooms and implicate harmful cyanobacteria, posing toxic effects to human health, the environment and the Canadian economy. Toxic blue-green algae thrive in warm, slow-moving water and that is why lakes are particularly vulnerable. Harmful algae bloom during summer seasons. Warmer water due to climate change might favor harmful algae by encouraging blue-green algae survival and preventing water mixing. Moreover, Canada uses de-icing salts for winter road maintenance, which during spring are carried by surface runoff from highways ditches to streams and to lakes; this is provoking the presence of saline cyanobacteria to appear in freshwater environments. Algae need carbon dioxide to survive and higher levels of carbon dioxide in the air and water can lead to rapid growth of algae, especially toxic blue-green algae that can float or think according to their needs. While extreme rainfall events associated to climate change can dilute lake water volumes, these events are also followed by periods of drought that can lead to more algal blooms, or soil erosion carrying the associate undesired nutrients. This presentation will include statistics concerning Canadian lakes water quality; blue algae presence in Quebec province lakes. A case study will be presented: St-Augustin Lake, considered as an example where extreme conditions occur. Actions that can be applied to adapt and attenuate impacts.

Biography

Rosa Galvez background is in Civil engineering. In 1989 and 1994, she obtained her Masters and Doctorate in Environmental Engineering from McGill University, Canada respectively. She is a Full Professor at the Department of Civil and Water Engineering at Laval University in Quebec, Canada, were she served the last 6 years as Chair. Her fields of expertise include Water and Wastewater Treatment Process, Integrated Watershed Management, Municipal and Hazardous waste management, Soil Rehabilitation studies, Environmental Impacts Assessment, Risk Analysis and Aid Decision Methods. She is an internationally recognized researcher, author of hundreds of scientific articles and technical documents. More than 80 students have graduated under her supervision with many of them holding important posts in consulting and academic sectors around the world. She has received substantial funds that have allowed the construction and installation of state-of-the-art environmental laboratories.

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Christopher Bryant

University of Montreal, Canada

Preserving agricultural land and activities in the context of climate change and variability and multiple other stressors: What can land use planning and strategic development planning for agriculture contribute?

While considerable research has been undertaken on the adaptation of agriculture to climate change and variability (CCV) over the last 25 years, little emphasis has been placed on: 1) how agricultural adaptation to CCV has also to be set in the context of multiple other stressors facing agriculture such as increasing demands for agriculture to become sustainable from the environmental and human health perspective and from the perspective of continued urbanization pressures on agricultural lands and activities around cities; and 2) how different forms of planning involving agriculture need to be integrated if agricultural lands and activities are to be successfully maintained to be able to contribute to Food Security. This presentation reviews key elements of research into agricultural adaptation to CCV and how these can be recognized in the integration of land use planning AND strategic development planning for agricultural development. Examples coming from North America and Western Europe will be used to demonstrate what types of progress are needed in planning for agricultural land and activities especially near cities to ensure that agricultural development can contribute substantially more to Food Security than it has in the past.

Biography

Christopher Bryant has been Professor in Geography at the University of Waterloo (20 years) and at the Université de Montréal (24 years); he is currently Adjunct Professor at the Université de Montréal and in the School of Environmental Design and Rural Development, University of Guelph. He is one of the world's leading researchers in agriculture around cities (50 years of research), and he has also spent 26 years of research in the adaptation of agriculture to climate change and variability, as well as 30 years in research in local community development. He is currently in the top 7 % of researchers in the Research Gate network.

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Day 3

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4th World Conference on

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Stephen Salter

University of Edinburgh, Scotland

Can computer models give a win-win result for marine cloud brightening?

The best climate modelers are very careful about putting caveats on their results and admit that there are differences about the polarity let alone magnitude of some of their predictions. However, models are steadily getting better and at present, they are the only tool we have to study climate problems. Much of the effort to date has been concentrated on the comparisons between model results rather than finding the best times and seasons to use geoengineering. This is a bit like testing road vehicles with the steering locked. The broad consensus is that global warming will increase evaporation from the sea and so increase precipitation. If geoengineering with stratospheric sulphur is used to completely cancel the temperature rises it will over-correct the precipitation increases and so produce droughts. In contrast, the model predictions for marine cloud brightening in the troposphere show increases and reductions of precipitation with a trend for reductions in wet places and increases in dry ones. The strongest reductions are over the sea and one case shows that a small reduction in precipitation on land is more than offset by lower evaporation. The effects of marine cloud brightening have a higher frequency response that stratospheric sulphur. It would be very surprising if it produced exactly the same effect through the year in all places so it follows that intelligent choice of where and when to use it would be better, or at least less bad, than steady, all-year everywhere spraying. The paper suggests that it may be possible to improve the usefulness of climate models by borrowing an engineering idea from telecommunications to get an everywhere to everywhere transfer function. The oceans would be divided into a number of regions. The model settings for the concentration of condensation nuclei in each region would be altered up and down in each region with different random sequences each of which would be correlated with model predictions round the world.

Biography

Stephen Salter is emeritus Professor of Engineering Design at the University of Edinburgh. After an Apprenticeship in the aircraft industry he worked on a range of problems including robotics, renewable energy, desalination, oil hydraulics, mine clearance, explosion suppression and voter-friendly traffic-congestion charging.

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