4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Scientific Tracks & Abstracts

Day 1

Climate Change 2017

Sessions:

Day 1 October 19, 2017

Risks of Climate Change | Renewable Energy to Mitigate Climate Change | Pollution & its Effects on Climate | Solutions for Climate Change

Session Chair
Karl Zeller
Independent Researcher, USA

Session Co-Chair
David Sanborn Scott
University of Victoria, Canada

Session Introduction

Title: **Greenhouse gas sensors fabricated with new materials for monitoring climate change: A review**
Kalathur Santhanam, Rochester Institute of Technology , USA

Title: **Response of East-European forest-steppe soils on climate change varying periodicity**
Yury G. Chendev, Belgorod State University, Russia

Title: **Climate change impact on rice production in Musi river basin in Indonesia**
Koki Homma, Tohoku University, Japan

Title: **Landsat-based vegetation abundance and surface temperature for surface urban heat island studies: The tale of greater Amman municipality in the Hashemite Kingdom of Jordan**
Salahuddin M Jaber, Hashemite University, Jordan

Title: **Spatial-temporal evolution of dust events and the column burden of natural and anthropogenic dust of northern China**
Xin Wang, Lanzhou University, China

Title: **Incremental Control of world Albedo by massive salt leaching using the ancient purpose engineered Qanat- Karez- Falaj technology to control fractional coverage of crystalline white salt precipitation over vast areas of existing endorheic basins**
David Bloch, M.R.Bloch Salt Archive, Isreal

Title: **Mitigation of greenhouse gases emissions with the rice plastic mulch technology in southwest China**
Guangbin Zhang, Chinese Academy of Sciences, China

Title: **Marine cloud brightening essentials for ethicists**
Stephen Salter, University of Edinburgh, Scotland

Title: **Cyber-Attacks in Ukraine show vulnerability of traditional power grids**
Julia E Sullivan, Law Office of Julia E Sullivan LL, USA

Title: **Evaluation of the impact of future HFC replacements on air pollution and global warming**
Elena Jimenez Martinez, University of Castilla-La Mancha, Spain

Title: **Adaptation to sea level rise from Shanghai city, China**
Cheng Heqin, East China Normal University, China

Title: **Hydrogen and Electricity (Hydricity): The essential currencies to escape climate catastrophe**
David Sanborn Scott, University of Victoria, Canada

Title: **Analogy between biofuels and nuclear energy and their contributions in the climate change mitigation**
Moktar Hamdi, University of Carthage, Tunisia

Title: **Preliminary study of Global Warming mitigation by grazing OTEC**
Nai Kuang Liang, Internanational Ocean & Atmosphere Research Fundation, Taiwan

Title: **Applying the scientific method to climate science**
Karl Zeller, Independent Researcher, USA

Kalathur Santhanam et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Greenhouse gas sensors fabricated with new materials for monitoring climate change: A review

Kalathur Santhanam and **N N N Ahamed**
Rochester Institute of Technology, USA

With increasing utilization of fossil fuels in today's technological world, the atmosphere is having increased concentrations of greenhouse gases that need to be controlled in it. For achieving this goal, it is imperative to have sensors that could provide the data on greenhouse effect gases in the environment. The recent literature contains a few publications using new methods and materials for sensing these gases. The first part of this review is focused on the possible effects of greenhouse gases in the atmosphere and the second part surveys the developments of sensors for greenhouse gases with coverage on carbon nano materials and the composites directed towards sensing gases like CO2, CH4 and NOx (Figure 1). With carbon dioxide measurements, due consideration for the dissolved carbon dioxide gas in water (moisture) is focused. The density functional calculations projects Pd doped single walled carbon nanotubes as ideal for the development of NOx sensor. The current trend is to make sensors through 3D printing or inkjet printing to allow the reach of ppb levels of sensitivity that has not been realized before.

Biography

Kalathur Santhanam has been actively working on developing clean energy programs and has been actively developing sensors that would monitor greenhouse gases in the atmosphere. He has published over 150 papers in peer reviewed journals and also co-authored books on hydrogen technology and clean energy. He is teaching courses on clean energy at Rochester Institute of Technology, Rochester.

ksssch@rit.edu

Notes:

Yury G Chendev et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Response of East-European forest-steppe soils on climate change varying periodicity

Yury G Chendev
Belgorod State University, Russia

In the evolution of the geographic environment and soils the paramount importance belongs to climate change. Modern landscapes and soils of Europe formed during Holocene. However, Holocene was heterogeneous on bioclimatic conditions, and history of climate change and natural development of plant cover in different regions of Europe was characterized by individuality. The purpose of the work is the presentation the results of study the forest-steppe soils responses to climate change in Holocene within the Center of the Eastern Europe. The main method of the study is soil-archaeological method or method of chronosequences for surfaced (modern) and buried soils. The objects of research are soils on the territory and in the vicinity of archaeological sites (burial mounds and ancient settlements), including soils buried under earthen deposits of archaeological monuments from 350 to 4600 years old. When comparing the different-aged soils, various morphological, physical and chemical features of forest-steppe soils as indicators of the evolution of climatic and bioclimatic conditions were analyzed. The reaction of soils to climatic changes lasting from decades to millenniums was studied. Climate changes lasting nx1000 years have determined trends in the development of zonal forest-steppe soils - chernozems and gray forest soils (Luvisols). Formation of gray forest soils was delayed in relation to the formation of chernozems. The age of meadow-steppe soil formation in the forest-steppe zone is near 10,000 years.The age of broadleaf-forest soil formation in the forest-steppe zone is less than 4000 years (after the beginning of climate wetting in Late Holocene). Climate changes lasting nx100 years determined the evolutionary dynamics of forest-steppe soils by transformation of their Holocene trends. The development of chernozems in Middle Holocene was interrupted by soil formation under forests as the result of episodic climatic moistening. Development of gray forest soils in Late Holocene was inhibited by episodes of climatic aridizations and returning of steppe environments to former forested areas. Soil responses to decadal climate changes in the 20th century (nx10 years) resulted in dynamics of areas, occupied by saline and non-saline soils, as well as chernozems with different depth of carbonates. Thus, East-European forest-steppe soils are very dynamic systems that respond to climatic changes of varying periodicity. This circumstance should be taken into account in the development of current and long-term plans of economic management of lands and soils of the study region.

Biography

Yury G Chendev is a specialist in field of soil geography, genesis and evolution of soils, palaeogeography, and historical geography. Author more than 200 scientific works (including 5 monographs). He conducted studies in many regions of Russia and foreign countries. He is a participant of many interdisciplinary soil-archaeological expeditions. Dr. Chendev develops theory of evolution of forest-steppe soils in Holocene under influence of natural and anthropogenic factors.

Chendev@bsu.edu.ru

Notes:

Koki Homma et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Climate change impact on rice production in Musi river basin in Indonesia

Koki Homma[1], **Toshio Koike**[2], **Kumiko Tsujimoto**[3] and **Tetsu Ohta**[3]
[1]Tohoku University, Japan
[2]ICHARM, Japan
[3]University of Tokyo, Japan

One of the major agricultural productions in Indonesia is rice production, on which negative climate change impact is anticipated. To assess the impact, simulating water budget and its effect on rice production is recommended. In this study, we developed a coupling model of hydrology and rice growth, and simulated rice yield under some GCM scenarios. After downscaling and bias-correcting GCMs, a hydrological model, the Water and Energy Budget-based Distributed Hydrological Model (WEB-DHM), simulated water flow and soil moisture content in total 60,000 km2 of Musi river basin by 500 m-mesh. Each mesh was categorized such as rainfed rice, shrub and so on based on governmental land use map. Rice growth and yield was simulated by a model, Simulation Model for Rice Weather Relations for rainfed (SIMRIW-Rainfed) based on the weather and soil moisture by WEB-DHM. Weather data from 1985 to 2012 was used for model calibration and validation as the present climate. The simulated rice yield under present climate was well consistent with the statistical data for rice production. Decrease in rice yield was simulated in rainfed paddy fields due to drought. Rice yield in the future (2050-2065) was slightly increased under GCM scenario gfdl_cm2_0, but largely decreased under gfdl_cm2_1. Shift of rainy season is one of the reasons of large decrease under gfdl_cm2_1, change of planting time and duration is one of adaptive strategies.

Biography

Koki Homma is an Agronomist and Crop Physiologist. He graduated from Kyoto University, Japan, supervised by Professor Horie who simulated rice production under future climate conditions in Asia. One of his major activities is the investigation in farmers' fields to evaluate production constraints and climate change impacts in Southeast Asia.

koki.homma.d6@tohoku.ac.jp

Notes:

Salahuddin M Jaber, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Landsat-based vegetation abundance and surface temperature for surface urban heat island studies: The tale of greater Amman municipality in the Hashemite Kingdom of Jordan

Salahuddin M Jaber
Hashemite University, Jordan

This study aimed at evaluating the usability of Landsat for characterizing the spatial and temporal characteristics of vegetation abundance (represented by At-Sensor NDVI (ASNDVI) and Land Surface NDVI (LSNDVI)), Surface Temperature (represented by At-Sensor Brightness Temperature (ASBT) and Land Surface Temperature (LST)), which are important for surface urban heat islands studies, and investigating the types of the relationships between these variables throughout different seasons in different years using TM and OLI/TIRS scenes. The study area is Greater Amman Municipality in Jordan, which represents an urban area with unplanned growth resulted partly from waves of refugee movements reflecting wider political circumstances. Change analysis from 1987 to 2016 showed that, despite the huge strides in population growth, the majority of the municipality showed either no change or small increase in vegetation abundance in summer and winter and either no change or small increase in surface temperature in summer and either no change or small decrease in surface temperature in winter. Correlation analysis showed the presence of negative relationship in summer and positive relationship in winter between vegetation abundance and surface temperature and showed that the differences between ASNDVI and LSNDVI maps and between ASBT and LST maps are not significant.

Biography

Salahuddin M Jaber graduated from Southern Illinois University in Carbondale, Illinois, USA, with a PhD degree in Environmental Resources and Policy with a concentration in GIS, Remote Sensing, and Environmental Modelling. Since his graduation he joined the Department of Water Management and Environment at the Hashemite University in Jordan as an Assistant Professor. In 2015, he has been promoted to Associate Professor. During the last ten years (after PhD) he acquired multiple experiences as a Teacher, Researcher, Administrator, Trainer, Consultant and Supervisor for graduate students.

sjaber@hu.edu.jo

Notes:

Xin Wang et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Spatial-temporal evolution of dust events and the column burden of natural and anthropogenic dust of northern China

Xin Wang[1], **Jianping Huang**[1], **Jun Liu**[1], and **Aiguo Dai**[2]
[1]Lanzhou University, China
[2]State University of New York USA

The evolution of the spatial-temporal varying trends of dust events shows that the dust event occurrences (DEO) remarkable reduced at the beginning of this century by using an ensemble empirical mode decomposition (EEMD) method over northern China. The results indicate that the steady decreased wind speed on Northern Hemisphere was largely responsible for the recent remarkable decline of DEO, however, the anthropogenic dust due to human activities also play key roles. Despite several attempts has been performed to investigate the climate effects due to anthropogenic dust, large uncertainties were still found due to the multi-satellite retrievals. In this study, a new method combining the multi-satellite instruments with the surface observations of dust events is develop in estimating the contribution of anthropogenic dust due to human activities in disturbed soil regions. Statistically, the column burdens of anthropogenic dust may be increased higher than 82% in the eastern areas caused by heavy local air pollution derived by human activities, but only with a limited effect lower than 15% near the desert regions. However, either way the anthropogenic effects of dust column burden are non-negligible. This study highlights the ability of significantly reducing the large uncertainty in estimating the contribution of anthropogenic dust to total atmospheric dust loadings.

Biography

Xin Wang has his expertise in the physical and chemical properties of mineral dust aerosols, and the optical properties of the insoluble light-absorbing impurities in seasonal snow based on both field surveys and model simulations. The foundation in this study is based on a new method combining the multi-satellite instruments with the surface observations of dust events is develop in estimating the contribution of anthropogenic dust due to human activities in disturbed soil regions.

wxin@lzu.edu.cn
xinw0319@gmail.com;

Notes:

David Bloch, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Incremental control of world Albedo by massive salt leaching using the ancient purpose engineered Qanat- Karez- Falaj technology to control fractional coverage of crystalline white salt precipitation over vast areas of existing endorheic basins

David Bloch
M R Bloch Salt Archive, Israel

Huge desert endorheic basins with very substantial areas of flat evaporation pans were in operation specifically for the precipitation of white crystalline sodium chloride. Maintaining a thin white crust layer of salt at critical hot seasons of the year over these huge areas would increase the world albedo to enable precise control of the total short/long wave reflection, in addition to the high albedo of the polar regions. The surface crust of an inland Sabkha basin typically is made up of layers of salts that have re-crystalized and settled or precipitated during the evaporation process of controlled Qanat system flood waters. Leached Salts dissolve quickly in a desert endorheic basin, and over a short intensely hot period, the process of re-crystallizing the salts can produce purer and more concentrated, layered playa cakes. The dissolved salts leached out of the underlying layers in the vast desert basin flats, are intermittently precipitated back on to the basin surface, predominately sodium chloride crystals, one after the other leaving the familiar brilliant white salar playa. The original ancient engineered design of the Qanat and its multiple aligned bore-holes was to control desert endorheic basin flooding without destroying the salt mirror playa or causing erosion of the flat evaporation fields. The Qanat water was primarily needed to extract salt, rather than for simple domestic irrigation. Additionally considerable quantities of subsoil brines existing in such basin water tables would ensure brine supplies, as is demonstrated by the new potash plants in the Tarim basin using the ancient Qanat technology. The grain size of white sodium chloride crystals may be controlled in a similar way to the fine Polar snow crystals which also provide an improved albedo index.

Biography

David Bloch is the founder of M.R.Bloch SALT ARCHIVE – Owner of Chemical Engineering consultancy- MBL Separation Engineering. R&D - Research into Salt [Sodium Chloride] history, economics, religion, physiology, production and general influence upon the civilization of mankind.

commonsalt@outlook.com

Notes:

Guangbin Zhang et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Mitigation of greenhouse gases emissions with the rice plastic mulch technology in southwest China

Guangbin Zhang[1], Jing Ma[1], Yuting Yang[1,2], Gang Liu[1], Yujiao Dong[3], Shihua Lv[3] and **Hua Xu[1],***
[1]Chinese Academy of Sciences, China
[2]University of Chinese Academy of Sciences, China
[3]Sichuan Agriculture Sciences Academy, China

To solve the problem of water shortage, an improved plastic film mulching rice cultivation (PM) has been developed and expanded in recent years in Southwest China. It is a promising alternative to the winter-flooded rice cultivation technology (WF). To explore effects of this technology on CH4 and N2O emissions from winter-flooded paddy fields, a field experiment was conducted in Ziyang, Sichuan Province, China from 2012 to 2015. Meanwhile, the effects of nitrification inhibitors (DCD and CP) were estimated. Results showed that annual CH4 and N2O emissions from winter-flooded paddy fields ranged from 205-738 kg ha^{-1} and 0.05-1.52 kg N ha^{-1}, respectively. Shifting the fields from WF to PM led to significant reduction 30-76% of CH4 emissions and 24-70% of 100-year GWP (CH_4+$N2_O$) though substantial increase of N_2O emissions (10-3975%). Decrease in CH_4 emissions was ascribed to the reduced CH_4 production potential while N_2O emissions were increased as a consequence of more suitable soil water content and single basal application of nitrogen fertilizer in plastic film mulching rice fields. Integrated assessments showed that PM relative to WF significantly enhanced the net ecosystem economic budget (NEEB: balance between the economic benefits: yield gains and input costs; and environmental costs: GWP costs), due to the input costs reduced greatly. If WF was all changed to PM in Sichuan Province, China, the mitigation of 0.53-3.89 Tg CO_2-eq yr^{-1} in 100-year GWP (CH_4+N_2O) and the increase of 1.60-3.32 billion CNY yr^{-1} in NEEB might be achieved. Applying CP under PM conditions reduced 1-10%CH_4emissions and 9-26%N_2O emissions and increased 1-5% grain yields, thus mitigating 6-10% 100-year GWP (CH_4+N_2O) and enhancing 29% NEEB. The results demonstrate that PM and PM+CP increased economic incomes and decreased environmental costs of the fields, which would be the effective management strategies in the regions where are water scarcity.

Biography

Guangbin Zhang major study was the processes of CH4 emission from rice fields with the stable carbon isotope technique combining with microbes (methanogens and methanotrophs) analyses. Recently, he had carried out field experiments to study the mechanism of CH4 emission from a special kind of rice fields that are permanently flooded with highest fluxes in southeast of China. In addition, pot and incubation experiments were performed to investigate the effect of nitrogen fertilization on production, oxidation and emission of the CH4 by measuring the stable carbon isotopes, methanogens and methanotrophs. Meanwhile, integrated effects of nitrogen fertilization and straw application on N2O emission from paddy soils were observed. He is very interested in Soil Ecology, Microbiology, Biogeochemistry, Environmental and Soil Chemistry, and his focus is on the cycling of C and N in the agricultural ecosystem and the responses to global climate change (CO2 concentration and temperature enrichment).

gbzhang@issas.ac.cn

Notes:

Stephen Salter, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Marine cloud brightening essentials for ethicists

Stephen Salter
University of Edinburgh, Scotland

While there are hundreds of papers on the ethics and governance of possible solutions to the world's climate problem, only one of the authors, Clive Hamilton, has ever asked me for information about my work on Latham's idea for marine cloud brightening. Latham wants to exploit the Twomey effect. Twomey measured drop sizes in clouds and their effect on cloud reflectivity. He found that, for the same amount of liquid water in a cloud, a large number of small drops will reflect more than a small number of larger ones. For many conditions doubling the drop number will increase reflectivity by over 0.05. Kohler showed that drop formation requires some form of condensation nucleus. These are scarce in clean mid-ocean air. Latham suggested increasing the number by spraying submicron drops of filtered sea water into the marine boundary layer where turbulence would spread the salt residues left from evaporation. It is the number of nuclei of the right size that matters, not the salt volume. Climate models show that the required cooling need could be done with quite moderate spray volumes. Many papers on climate physics are written for climate physicists and can intimidate outsiders. This paper is written for people from other fields. It will attempt to explain the physics of the Twomey effect and the engineering of the hardware needed to exploit it. It will identify the key design problems of spray production and energy generation in mid-ocean. It suggests the use of wind-driven spray-vessels with electrostatically charged mono-disperse spray from billions of submicron nozzles etched in silicon wafers. It will describe a possible engineering solution using variable-pitch hydrofoils and attempt cost estimates.

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.

S.Salter@ed.ac.uk

Notes:

Julia E Sullivan, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Cyber-attacks in Ukraine show vulnerability of traditional power grids

Julia E Sullivan
Law Office of Julia E Sullivan LL, USA

On December 23, 2015, a well-planned, perfectly-synchronized, brilliantly executed cyber-attack caused a six-hour black-out for hundreds of thousands of customers in and around Ukraine's capital city of Kiev. It was the first documented case of cyber-intruders bringing down a power grid. While there are no known cases of cyber terrorism causing power outages in other countries, experts agree that absolute cyber-security is unattainable. The attack methodology, tactics, techniques, and procedures that were successfully deployed in Ukraine could be deployed against infrastructures in the US and around the world. The presentation analyzes policy changes to increase the resiliency of electric power grids and mitigate the potential consequences of cyber-attacks. Small power production resources originally designed to lower the costs of energy and reduce greenhouse gas emissions also could improve public access to power during cyber-attacks or other emergencies. The resilience and security of supply implications have become increasingly relevant in evaluating the costs and benefits of distributed energy resources and micro grids.

juliasullivan@jeslaw.us

Notes:

Elena Jimenez Martinez, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Evaluation of the impact of future HFC replacements on air pollution and global warming

Elena Jimenez Martinez
University of Castilla-La Mancha, Spain

The phase-out of the consumption and production of (stratospheric) ozone-depleting chlorofluorocarbons (CFCs) was completed in 2010, while the scheduled phase-out of most hydrochlorofluorocarbons (HCFCs) is expected by 2030. During the gradual disappearance of HCFCsover the coming decades, hydrofluorocarbons (HFCs) were proposed as long-term replacements in several industrial applications. Despite HFCs are non-depleting ozone substances,most of themare potent greenhouse gases (GHGs) that affect the radiative forcing of climate change. Their strong IR absorption in the atmospheric window and their long atmospheric lifetime result in high global warming potentials (GWPs). To decrease climate forcing,the emissions of high-GWP HFCs have to be reduced and replaced by substances that have low impact on climate. Among these, hydrofluoroolefins (HFOs) and perfluorinated compounds (PFCs) are expected to be good alternatives to HFCs. For instance, $CF_3(CF2)_2CH=CH_2$ (HFO 1447fz) is currently being considered as a substitute of HCFC-141b as expansion agent in polyurethane foams. Or $CF_3CH=CH_2$ (HFO-1243zf) could replace CF_3CH_2F (HFC-134a) in air-conditioning units.To assess the environmental impact of the potential widespread use of these potential substitutes, an evaluation of the atmospheric chemistry is needed. Degradation of pollutants in the troposphere is usually initiated by OH radicals(the main diurnal oxidant) and, under certain circumstances,by Cl atoms. In our group, the rate coefficients for the OH and Cl reactions with some HFOs and PFCs have been determined under tropospheric conditions of temperature and pressure. Identification of secondary gaseous products and organic aerosols was alsocarried out simulating a clean and polluted atmosphere.The IR spectra of these species were recorded in order to calculate their radiative efficiency. All these resultsallow the estimation of the atmospheric lifetime, GWP and the photochemical ozone creation potential of the HFC substitute. Therefore,we can predict the impact of future emissions on air quality and global warming.

Biography

Elena Jimenez Martinez has a vastexperience in investigating the gas-phase chemistry of primary and secondary pollutants and their atmospheric implications. Her research is focused on the kinetics of different removal processes in the troposphere (reaction with tropospheric oxidants and UV photolysis) together with the formation of secondary pollutants (gaseous and particulate matter). The aim of her research is then the evaluation of the impact of potential CFC replacements, such as fluorinated and perfluorinatedcompounds on air pollution and their contribution on the global warming. A great list of fluorinated compounds has been investigatedup to now. The daytime chemistryof these CFC substitutesis mostly dominated by gas-phase reaction with OH radicals. The obtained OH-rate coefficients for can be included in the chemistry modules of atmospheric models. Dr. Jiménez is also involved in the gas-phase chemistry of interstellar molecules at temperatures down to 110 K (ERC project NANOCOSMOS).

Elena.Jimenez@uclm.es

Notes:

Cheng Heqin et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Adaptation to sea level rise from Shanghai city, China

Cheng Heqin[1,2,3] and **Chen Jiyu**[3,4]
[1]East China Normal University, China
[2]CGS, China
[3]STCSM, China
[4]ACEA, China

Sea level rise (SLR) is a major of climate change. Changing coastal cities are situated in the delta regions expected to be threatened by SLR to various degrees. Shanghai is one of those cities. In recent years, intensifying waterlogging, salt intrusion, wetland loss, and ecosystem degradation in the city have generated the pressing need to create an urban form that is suited to both current and future climates incorporating SLR. However, adaptation planning uptake is slow. This is particularly unfortunate because patterns of urban form interact with mean sea level rise (MSLR) in ways that reduce or intensify its impact. There are currently two main barriers that are significant in arresting the implementation of adaptation planning with reference to the MSLR projections composed of geomorphologic MSLR projections and eustatic MSLR projections from global climate warming, and making a comprehensive risk assessment of MSLR projections. The purpose of this study is to map MSLR projections and their risk assessment approaches, and then the adaptation actions in the city. Grey model approaches with linear fitting and the least squares measured tidal levels during1921-2000 in Wusong Vertical Elevation Datum at 5 tidal gauge stations were utilized to estimate the eustatic MSLR (ESLR) projection from climate warming in the area. Hierarchical partitioning analysis of variability in 2000-2009 is used to analyze urban land subsidence (ULS) projection. Digitized historical nautical charts during 1997-2013 were utilized to map the magnitude of bed erosion, e.g. regional sea level fall (RSLF) projection by anthropogenic geomorphologic changes. MIKE 21 was used to simulate the regional SLR (RSLR) caused by the land reclamation. The total decadal SLR (DSLR) is supposed to consist of ESLR, ULS, RSLF, RSLR and tectonic subsidence. Vladimir algorithm was used to calculate the variation in the tidal datum. ATP was used to make the risk assessment involved in the timing and magnitude of MSLR projections on a shortage of fresh water supply in Shanghai city. Four design frequencies of highest tidal level were assessed. The DSLR is 10-16 cm during 2011-2030. The standard of existing seawall needs to be raised. New fresh water resource needs to be sought. Four adaptation strategies for responding to the total DSLR are proposed. They are control of land subsidence, raising most of the seawall standard from one-in-100-year flood height to one-in-200-year flood height, construction of a Huangpu River tidal barrier, and an integrated ecological engineering projection to cover the salt marsh with artificial oyster reefs from the intertidal flats to the sub-tidal zone.

Biography

Cheng Heqin has her expertise in estuarine and coastal sediment dynamics and morphodynamics, integrated coastal zone management. Her long time measurement data sets of the estuarine tidal level, current velocity, bathymetry, bedforms, channel morphology and transition regime of ripple-dune, response of sediment dynamics to the human interventions in the watershed, fishery model in the East China Sea, semi-analytical model of sediment entrapment in estuaries, impact of sea level rise in the Changjiang (Yangtze) river estuary create new pathways for improving sustainable management strategy of coastal system and adaptation estuarine and coastal cities to sea level rise. She has built this challenging strategy after years of experience in research, evaluation, teaching and administration in institutions. The foundation is based on most of historical data sets and methodology of field measurements, numerical simulation, huge experiences and data analysis results from her colleagues in her institute, Shanghai Water Authority and many other institutes, which referred to be stakeholders of sea level rise.

hqch@sklec.ecnu.edu.cn

Notes:

David Sanborn Scott, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Hydrogen and electricity (Hydricity): The *essential* currencies to escape climate catastrophe

David Sanborn Scott
University of Victoria, Canada

Albert Einstein advised, "*Everything should be kept as simple as possible, but not simpler.*" Following Einstein's wisdom, the following energy system chain shows services, technologies, sources and currencies within five *functional groups*. The role of *energy currencies* in energy systems is analogous to the role of financial currencies in financial systems. Neither is a *source* of energy or wealth, yet both are essential for facilitating energy or financial transactions. Each step, from left towards the right, is a demand-supply step. So where is carbon dioxide emitted? **Service technologies** emit CO_2 when the *currencies* they use contain carbon. **Harvesting technologies** emit CO_2 when the *energy for harvesting* is carbon based—like fossil-fueled mining machinery. So to develop a carbon-free system we must evolve towards using only carbon-free energy sources and carbon-free energy currencies. There are many carbon-free sources—hydraulic, tidal, solar, wind, nuclear and so on. In contrast, *there are only two carbon-free currencies*. The first is the *electronic* currency, electricity. But electricity is a poor candidate for free-range transportation, such as cars, trucks, ships and especially aircraft. That's why we also need a *protonic* (material) carbon-free currency. A *protonic* currency must contain only elements found in atmospheric abundance—otherwise when the fuel is burned, the emissions will be environmentally intrusive. Therefore, any candidate fuel can contain *only* oxygen, nitrogen, and hydrogen. Ammonia (NH_3) satisfies this compositional constraint. But practical issues like low energy mass- density and toxicity make it troublesome. So we're left with hydrogen as the only practical carbon- free fuel that can be universally employed for all tasks that today use carbon-based fuels. Hydrogen can also be used as a clean, efficient substitute for many material-harvesting tasks, such as using H_2 rather than coke for reducing iron ore in steel making. A hydricity world will be cleaner, systemically more robust and more efficient. It will bring cleaner environments, and is essential to any chance we have to escape climate catastrophe.

Biography

David Sanborn Scott, PhD, DSc (hon.), DEng (hon.), is a Fellow of the Canadian Academy of Engineering. Formerly, Chair of Mechanical Engineering, University of Toronto, Scott then travelled west to become Founding Director of the University of Victoria's Institute for Integrated Energy Systems. Dr Scott is the author of Smelling Land; The Hydrogen Defense Against Climate Catastrophe. He chaired Canada's Federal Advisory Group on Hydrogen Opportunities that produced the report *Hydrogen: National Mission for Canada* ESBN 0-662-15544-0. Dr. Scott is currently Vice-President (for North America) of the International Association for Hydrogen Energy. In 2006, he was honored with the IAHE Jules Vern Award for 'Outstanding Contributions to Hydrogen Physics, and Hydrogen Energy Sociology and Philosophy.'

davidsanbornscott@scottpoint.ca

Notes:

Moktar Hamdi, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Analogy between biofuels and nuclear energy and their contributions in the climate change mitigation

Moktar Hamdi
University of Carthage, Tunisia

The nuclear power which is an important technology option in climate change mitigation strategies must be strengthened by innovation to maintain an acceptable level of performance and security. Commercialized nuclear power plants which continue in mitigation of climate change require innovation in term of performance, cost, safety and extension of the useful life to improve reductions of GHG emissions. Through human creativity and critical thinking, sustainable innovative solutions for cleaner and cheaper nuclear energy will be provided thanks to multilateral collaborations and open innovation. Ecosystems use sustainable energy from sun that leads to biofuels energy. Bio-refinery is defined as the sustainable processing of biomass into a spectrum of marketable products and energy (Fig 1). By analogy to bio-refinery, we suggest the new concept of nuclear-refinery which is a facility that integrates nuclear fuels conversion processes and equipment to produce fuels, power, and by- or co-products (Fig. 2). Lessons learned from bio-refinery concept allowed to identify some opportunities for sustainable innovation through nuclear fuel cycle in order to contribute in mitigation of climate change by: Maximizing the production of energy contained in the fuel and maximizing the use of produced energy; minimizing material loss (by- or co-products) and maximizing the reuse of wastes; integration of non-electric applications (cogeneration, desalination); the connection to renewable energy and wastes treatment; use nuclear energy in agro food development (water, processing). The new concept of nuclear refinery and lessons learned from bio-refinery concept should allow overseeing challenges of the sustainability of nuclear power plant and increasing its contribution in the mitigation of climate change.

Biography

Moktar Hamdi is a Professor at University of Carthage. He attended the University of Provence (France), where he took an Engineer degree in industrial and applied microbiology and subsequently obtained a PhD degree in Microbiology, followed by a Post-doctoral period at INSA Toulouse (France). In 1999, he joined National Institute of Applied Sciences and Technology as an Associate Professor being promoted in 2004 to full Professor in Biological Engineering, where he was Head of Department of Biological and Chemical Engineering from 2003 to 2008, and Head of Doctoral School from 2009 to 2012. He is also Director of Research Laboratory in Microbial Ecology and Technology at University of Carthage since 2004. He has published over 180 papers, over 10 patents and some chapters in several books. He is a scientific advisory boards and has served on many editorial boards of many indexed scientific journals.

moktarhamdi11@gmail.com

Notes:

conferenceseries.com

Nai Kuang Liang, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Preliminary study of Global Warming mitigation by grazing OTEC

Nai Kuang Liang
Internanational Ocean & Atmosphere Research Fundation, Taiwan

Global warming means the observed century-scale rise in the average temperature of the Earth's climate system. However, most of the increased heat is stored in the ocean. This causes the sea surface temperature to rise, producing extreme weather. Ocean Thermal Energy Conversion (OTEC) utilizes the temperature difference between the sea surface water and deep seawater to generate electricity. OTEC requires pumping a large amount of deep seawater, which is clean, cold and rich in nutrients. If the used OTEC seawater, i.e. a mixture of warm and cold seawater, is released to the sea surface, an artificial upwelling is then created. The natural upwelling regions result in high levels of primary productivity and thus fishery production. The upwelling area will also present low sea surface temperature. Hence, large enough artificial upwelling may mitigate global warming. This process takes advantage of ocean thermal energy to generate clean energy, to create fishing grounds and improve climate change. An interdisciplinary research program promoted by the UN will be necessary to achieve this goal.

Biography

Nai Kuang Liang has completed his Dr-Ing from Technical University Hannover, Germany. He was the director of Institute of Oceanography, National Taiwan University. He has published papers in artificial upwelling, typhoon swell prediction, ocean thermal energy conversion and coastal protection. He is now Professor Emeritus of National Taiwan University.

liangnk@ntu.edu.tw

Notes:

Karl Zeller et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Applying the scientific method to climate science

Karl Zeller and **Ned Nikolov**
Independent Researcher, USA

Some climate skeptics argue that the assumption of radiant-heat trapping by a free convective atmosphere suggested by Joseph Fourier, which is central to the radiative Greenhouse theory of climate, has not been demonstrated experimentally. In fact, Prof. Svante Arrhenius in his 1896 paper after detailing what Fourier and others think, states "such experiments have not been made as yet, and, as they would require very expensive apparatus beyond that at my disposal, I have not been in a position to execute them". Today, 131 years later, the proposed long-wave radiation trapping mechanism still awaits an empirical validation. Yet the international science community has spent billions of dollars to develop and analyze climate computer models that codify the 19th century theoretical conjecture of Fourier, Tyndall and Arrhenius about the atmosphere's ability to retain radiant heat. We report on the use of actual observations to address Arrhenius' desired experiment. We apply the scientific method by going through the following steps: ask a question: Is earth's climate a special case?; state a hypothesis: the earth's climate is part of a physical continuum spanning a broad range of planetary environments in the solar system; Procedure: apply dimensional analysis to measured planetary data in search of a physically meaningful relationship between planetary temperatures and environmental parameters. Conduct the experiment: gather and vet terrestrial and extra-terrestrial NASA data collected over the past 3 decades; determine dimensional parameters (Table 1) and create dimensionless products; extract meaningful relationships from the dimensionless products; analyze the results to determine if they support the original hypothesis. Draw logical conclusion and formula to a new theory based on them. The above scientific method produced new findings and a therefore macro-level thermodynamic relationship with unexpected but fundamental implications for the climate theory.

Biography

Karl Zeller has completed his PhD in Boundary Layer Fluid Mechanics from Colorado State University. Prior to 2008, he spent more than 40 years working in the fields of Meteorology and Air Pollution for the US Environmental Protection Agency, the US National Oceanic and Atmospheric Administration, The DOI Bureau of Land Management, the USDA Forest Service and for private consulting firms. He has also been an Air Force Reserve (part-time military) Weather Forecaster for 26 years. He is currently a Science Consultant conducting independent climate research. He is a Certified Consulting Meteorologist to the American Meteorological Society.

kzeller@colostate.edu

Notes:

4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Workshop

Day 2

conferenceseries.com

Christopher R Bryant, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

4th World Conference on
CLIMATE CHANGE
October 19-21, 2017 | Rome, Italy

Christopher R Bryant

University of Montreal, Canada

Université de Montréal

Constructing an effective strategic development planning approach to ensure sustainable agricultural development in the face of climate change and variability (CCV) and other stressors and thereby contribute to the maintenance and further development of Food Security

Objectives and process to be used in the workshop: The objective of this workshop ion CCV is currently being recognized and integrated into how different processes involve participants in exchanging and discussing: 1) how different forms of planning for agricultural development and preservation can enhance agriculture's contribution to Food Security; and 2) how to move forwards in ensuring a sustainable and long term development of agriculture by drawing upon the experiences and challenges of selected territories that different participants in the workshop are aware of. The results of the workshop will be used to produce a document for all participants.

4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Scientific Tracks & Abstracts

Day 2

Climate Change 2017

Sessions:

Global Warming Effects & Causes | Climate Change: Biodiversity Scenarios | Oceans & Climate Change | Effective Adaptation | Climate Hazards

Session Chair
Liming Zhou
State University of New York, USA

Session Co-Chair
Nils-Axel Morner
Paleogeophysics & Geodynamics, Sweden

Session Introduction

Title: **Desert amplification and Global Warming**
Liming Zhou, State University of New York, USA

Title: **Geomorphological changes and tsunami risk in a coastal WetlandPost-earthquake in South-Central Chile**
Carolina Martinez, Pontifical Catholic University of Chile, Chile

Title: **Mathematical model to calculate the sensitivity of anthropogenic CO2 on global Earth temperature**
Tino Redemann, Otto von Guericke University Magdeburg, Germany

Title: **CDEFs securities in high carbon reservoir ecosystem of tropical peatland**
Mitsuru Osaki, Hokkaido University, Japan

Title: **Elevated atmospheric CO_2 benefits rhizosphere microenvironment of black locust seedlings in Cd- and Pb-contaminated soils by altering plant physiology**
Xia Jia, Chang'an University, China

Title: **Our Oceans – Our future: New evidence-based sea level records from the Fiji islands indicating no rise in Ocean level**
Nils-Axel Morner, Paleogeophysics & Geodynamics, Sweden

Title: **Properties of black carbon and other insoluble light-Absorbing particles in seasonal snow of northwest China**
Wei Pu, Lanzhou University, China

Title: **Geospatial and temporal analysis of drought in a mountainous environment: The case of Lesotho**
Geofrey Mukwada, University of the Free State, South Africa

Title: **Development of drying cracknetworks in slurries with different thicknesses**
Yue Zhang, Tongji University, China

Title: **Global climate change impact on the electrical energy cost of buildings: Madrid case study**
Roberto San Jose, Technical University of Madrid, Spain

Title: **Development of policy strategy for carbon capture and storage; Case study based in Japan**
Eiji Komatsu, Meiji University, Japan

Title: **Investigation on the tendencies of the land–Ocean warming contrast in the recent decades**
Jianjun Xu, Guangdong Ocean University, China

Title: **Climate change in the coastal Ocean: Trends and processes from the middle Atlantic bight of the U.S.**
Glen Gawarkiewicz, Woods Hole Oceanographic Institution, USA

Title: **Understanding the variability of urban heat islands for climate change adaptation**
Ranhao Sun, Chinese Academy of Sciences, China

Liming Zhou, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Desert amplification and global warming

Liming Zhou
State University of New York, USA

Previous research found that the warming rate observed for the period 1979–2012 increases dramatically with decreasing vegetation greenness over land in mid- and low- latitudes, with the strongest warming rate seen over the driest eco regions such as the Sahara desert and the Arabian Peninsula, suggesting warming amplification over deserts. Here I analyze the observed and projected surface temperature anomalies over land between50°S-50°N for the period 1950–2099 by large-scale ecoregion and find strongest warming consistently and persistently seen over the driest eco regions during various 30-year periods, pointing to desert amplification in a warming climate (similar to polar amplification). This amplification enhances linearly with the global mean greenhouse gases (GHGs) radiative forcing. Possible mechanisms for this amplification are explored by analyzing changes in various variables related to atmospheric profiles, surface radiative forcing, land surface properties, and surface energy and radiation budget. My results show that desert amplification is likely attributable mostly to a stronger GHGs-enhanced downward long wave radiation forcing reaching the surface over drier eco regions as a consequence of a warmer and thus moister atmosphere in response to increasing GHGs. These results indicate that desert amplification may represent a fundamental pattern of global warming associated with water vapor feedbacks over land in low- and mid- latitudes where surface warming rates depend inversely on ecosystem dryness. It is possible that desert amplification might involve two types of water vapor feedbacks that maximize respectively in the tropical upper troposphere and near the surface over deserts, with both being very dry and thus extremely sensitive to changes of water vapor.

Biography

Liming Zhou has research interests in land-atmosphere/climate interaction, land-surface remote sensing, and remote sensing of vegetation dynamics, land-surface modeling, climate modeling, and applications of various remote sensed products in weather, climate, and environmental sciences. During the past decade, he has used satellite data, observations and climate models to understand physical processes/mechanisms and interactions of land-human-climate systems, and to improve model capability to predict climate change and assess its impacts and consequence on our climate and environment. Land surface processes related to vegetation dynamics, deforestation, afforestation, urbanization, desertification, and renewable wind energy are his emphases.

lzhou@albany.edu

Notes:

Carolina Martinez et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Geomorphological changes and tsunami risk in a coastal wetland post-earthquake in south-central Chile

Carolina Martinez[1,3] and **Rafael Aranguiz**[2,3]
[1]Pontifical Catholic University of Chile, Chile
[2]Catholic University of the Most Holy Conception, Chile.
[3]National Research Center for the Integrated Management of Natural Disasters, Chile

In the central Chilean region (33°-38.6°S), the Mw=8.8 earthquake of February 27, 2010, and the associated tsunami generated widespread devastation along 600 km of shoreline. This event caused strong morphologic, environmental and social changes. Coastal uplift larger than 2 m on the west coast of Arauco Peninsula (37°-37.7°S) produced the outcropping of shore platforms, changes in the intertidal zone, and the drying of wetlands. One of the most affected coastal wetlands was the Tubul-Raqui where important geomorphological, ecological and socio-territorial changes were generated. Here, the uplift magnitude was 1.4m. In the 1960s, a group of fishermen and algae (gracilariachilensis) gatherers was organized, forming a settlement of about 2000 residents. This was severely affected by the tsunami of February 27, 2010. In this context, the inundation risk due to tsunami in Tubul, Arauco Gulf was evaluated. The risk of tsunami inundation is analyzed for an extreme event in the town of Tubul (37°S), Bio-Bio Region. Three scenarios were identified for risk assessment, in all of which numerical simulation was applied. Two of the three scenarios were local tsunamis, the events of 1835 and 2010, and the event of 1877 was included to determine the effects of a far field tsunami. The tsunami of 1835 was determined as an extreme event, which gave inundation heights of 10m and run-up of 10m. Vulnerability was analyzed from physical, socioeconomic and educational points of views. Two levels of vulnerability were defined, namely medium and high. These levels were selected based on the poor housing materials, the vulnerable socioeconomic profiles of the population, low educational levels and the population´s reactions to these tsunami events. The results show that natural risk is obtained at the high level in the whole town. These results were also compared with the current reconstruction plan.

Biography

Carolina Martinez is a PhD in Geography. She is a Professor at the Geography Institute at the Pontificia Universidad Católica de Chile (PUC). Her area of research is geomorphology and costal environment dynamics, coastal and natural risk management. Her recent works are focused on analyzing factors of change on tectonic coasts that are recently affected by natural disturbances such as earthquakes, tsunamis and swells. She also studies the socio-territorial effects on costal locations.

camartinezr@uc.cl

Notes:

Tino Redemann et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Mathematical model to calculate the sensitivity of anthropogenic CO_2 on global earth temperature

Tino Redemann[1], **Eckehard Specht**[1] and **Roman Weber**[2]
[1]Otto von Guericke University Magdeburg, Germany
[2]Clausthal University of Technology, Germany

There are countless climate models, which predict the impacts of the anthropogenic CO_2 emissions on the global earth temperature. Because of the large number of influencing parameters used, these models are mostly very complex, so the influences of the particular parameter can hardly be comprehended, i.e. the CO_2 concentration in the atmosphere. Due to this fact, the greenhouse effect is described with simple analytical resolvable equations. Therefore, a simplified uniform surface temperature of the earth is assumed. The radiation exchange between earth, clouds, space and the layers of gas between is calculated with these equations, which were developed for the analogue radiation exchange in industrial furnaces. With this model, the temperature profile in the atmosphere can be described relatively well. The CO_2 in the atmosphere acts as a radiation shield, which increases the heat resistance against the outgoing long-wave radiation from the earth surface. The known average temperature of the Earth was used to validate this model. When the CO_2 in the atmosphere is doubled, the absorptivity increases slightly. Because of this increase, the temperature of the earth surface has to increase about 0.4 Kelvin to compensate the increased heat transport resistance. Since 1860, the Earth's temperature has already risen due to anthropogenic CO_2 emissions by 0.2 Kelvin. The measured increase of about 0.9 Kelvin is attributed to side effects caused by the CO_2 related temperature increase. Therefore, a temperature increase of more than 0.4 Kelvin is predicted for the future. Without CO_2, the temperature of the Earth would be 4 K colder.

Biography

Tino Redemann belongs to the Institute of Fluid Dynamics and Thermodynamics at the Otto-von-Guericke-University Magdeburg and to the Institute for Energy Process Engineering and Fuel Technology at the Clausthal University of Technology in Germany and conduct research in the field of heat radiation in industrial kilns.

tino.redemann@ovgu.de

Notes:

Mitsuru Osaki et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

CDEFs securities in high carbon reservoir ecosystem of tropical peatland

Mitsuru Osaki[1], **Takashi Kohyama**[1], **Takashi Hirano**[1], **Hidenori Takahashi**[2] and **Bambang Setiadi**[3]
[1]Hokkaido University, Japan
[2]Hokkaido Institute of Hydro-climate, Japan
[3]National Research Council of Indonesia, Indonesia

The CDEFs security is new concept on estimation and management of high carbon reservoir ecosystem, especially in tropical peatland such as; climate change security, (bio) diversity security, energy security, food/feed security, and social security. Peatland is typical case, which relate closely with the CDEFs security, because peatland sustains high water table and high carbon reservoir, and high biomass productivity, contributing mitigation and adaptation to climate change security, high bio-diversity, high biomass energy production, high food/feed production, and social security throughout CDEF security. In past, unfortunately tropical peatland management and development have been misleading against high CDEFs security of tropical peatland. Let's remind again what is the tropical peatland principle? Tropical peatland is typical case of wetland, and then water is most functional element among other wetland. Especially, high water table, not moisture is most rational principal for peat formation and peat conservation; because oxygen permeability is a key factor of peat decomposition. Even if peat keeps wet condition, O_2 permeates until water table of peatland, then, peat is decomposed quickly. Internationally, water is most important resource for terrestrial ecosystem. Global Risks 2015 reported top 10 risks in terms of global impact in which water crises is ranked as number one. Thus, it is better to change basically national policy on tropical peatland management used as wet-peatland, not dry-peatland. Wet-peatland functions as large water reservoir which is great benefit, rolling as natural capital such as water dam. Natural capital of wet-peatland as water reservoir is inestimable, because especially wet-peatland securer to supply water in dry season even if El Niño year, which contribute to the national food/feed security, and at same time, to reduction of CO_2 emission. In other words, wet-peatland contributes globally to both mitigation (reduction of CO_2 emission) and adaptation (water supply for plant growth in severe dry) against climate change.

Biography

Mitsuru Osaki is Professor of Research Faculty of Agriculture, Hokkaido University and Professor of Graduate School of Agriculture, Hokkaido University from 2006. He was trained as a Plant Physiologist and Soil Scientist, and obtained his Doctorate degree from the Faculty of Agriculture, Hokkaido University, in Japan in 1981. He worked as an Associate Scientist in Maize Unit of CIMMYT in Mexico from 1982 to 1984. Until 2006, he has been working with the Graduate School of Agriculture, Hokkaido University in Japan, to implement a research and teaching on rhizosphere management. He also has been carried out many collaborative researches and teaching projects on tropical land management and rehabilitation of tropical forest. He is a Project Leader of JST-JICA Project on Wild Fire and Carbon Management in Peat-Forest in Indonesia from 2008 to 2014. He is also interested in sustainability viewed from soil fertility, food production, bio-energy and land management.

mosaki@chem.agr.hokudai.ac.jp

Notes:

Xia Jia, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Elevated atmospheric CO_2 benefits rhizosphere microenvironment of black locust seedlings in Cd- and Pb-contaminated soils by altering plant physiology

Xia Jia
Chang'an University, China

Elevated atmospheric CO_2 and contamination of soil with heavy metals co-occur in natural ecosystems and have important effects on the soil microenvironment by influencing plant physiology. We examined the response of the black locust rhizosphere microenvironment to elevated atmospheric CO_2 (700 ppm) in combination with Cd- and Pb-contamination. Elevated CO_2 led to an increase in organic compounds (total soluble sugars, soluble phenolic acids, free acids, and organic acids), microbial populations, biomass, and activity, and enzyme activity (urease, dehydrogenase, invertase, and β-glucosidase) and changes in microbial community in rhizosphere soils under Cd, Pb, or Cd + Pb treatments relative to ambient CO_2. Elevated CO_2 also corresponded to an increase in chlorophyll a and b in leaves, total sugars, and starch in leaves and stems of black locust seedlings under Cd and Pb stress relative to either metal alone, which indicated that changes in the rhizosphere microenvironment was affected by the response of seedlings physiology. The pH was lower under elevated CO_2 + Pb + Cd than under metals, which led to changes in Cd and Pb fractionation between soils and plants. Therefore, the removal of Cd and Pb in rhizosphere soils and the uptake of Cd and Pb by plants increased under elevated CO_2. The increased removal of Cd and Pb in soils and the high rate of Cd and Pb uptake under elevated CO_2 indicated that black locust seedlings can be used for phytoremediation of contaminated soils under global change scenarios. Furthermore, our study also suggests that elevated CO_2 alters the distribution of heavy metals in soil and plants and stimulates the uptake of plants, thereby probably affecting food quality and safety. Overall, elevated CO_2 benefits the soil microenvironment in the rhizosphere of black locust seedlings in Cd- and Pb-contaminated soils.

Biography

Xia Jia has her expertise in evaluation in the effect of global changes combined with heavy metal-polluted soils on ecosystems. Her research has been in the general field of interrelationships between plants and rhizosphere microenvironment under global changes combined with heavy metals. The long-term objective of her study is to have a better understanding of the response mechanism of ecosystems to the combination of global change and metal-contaminated soils, and eventually apply the knowledge gained in her study to assess the environmental risk of global change combined with heavy metal pollution to ecosystems.

jiaxianavy@163.com

Notes:

Nils-Axel Morner et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Our oceans – Our future: New evidence-based sea level records from the Fiji islands indicating no rise in ocean level

Nils-Axel Morner[1], **Pamela Matlack Klein**[2] and **Willie Soon**[3]
[1]Paleogeophysics & Geodynamics, Sweden
[2]Portuguese Sea Level Project, USA
[3]Astrophysics, USA

The sea level changes in the Fiji Islands have been the focus at the UN conference on Our Oceans, Our Future on June 5-9, hosted by the governments of Sweden and Fiji, and will surely be in the focus again at the COP23 conference in Bonn, November 6-17, hosted by the Government of Fiji. This focus, however, was quite miss-directed,depending on models and preconceived ideas, and ignoring observational facts. Anticipating that this would be the case, we undertook a special sea level investigation in the Fiji Islands themselves, bringing forward evidenced-based observational facts on past and present sea level changes [1]. As an example of what we mean by evidence-based observa-tional facts, we refer to our paper on the sea level changes in the Indian Ocean [2], where we combine multiple observational facts like coastal morphology, stratigraphy, ecology, coastal dynamics, history, archaeology and radiocarbon dating. We have discussed the tide-gauge stations on the island of Vitu Levi [3] and coastal erosion on the Yasawa Islands [4]. Now we summarize our findings with respect to sea level changes [1, 5] as illustrated in Figure 1. The shores of the Yasawa Islands are characterized by a strong coastal stability [1, 4, 5]. The HTL is, on rocky coasts, marked by rock-cut platforms and under-cut notches and sea caves, indicative of multi-decadal sea level stability. At several places we observed the occurrence of coral "mini-atolls" with a living coral rim at 40-60 cm below LTL (Fig. 1). The conclusion is that the regional eustatic ocean level has remained stable in the Fiji region for, at least, several decades, and that there do not exist any observational signs of any present on-going sea level rise. Anyone claiming the opposite does this for reasons other than evidence-based scientific observations.

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, paleoclimate, 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).

morner@pog.nu

Notes:

Wei Pu, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Properties of black carbon and other insoluble light-Absorbing particles in seasonal snow of northwest China

Wei Pu
Lanzhou University, China

Insoluble light-absorbing particles (ILAPs), primarily black carbon (BC), organic carbon (OC), and dust, deposited on snow can reduce snow albedo, which can significantly affect regional and global climate. Hence, understanding ILAPs content in snow is very important for climate prediction. We conducted a large field campaign and collected 284 snow samples at 38 sites in Xinjiang Province and 6 sites in Qinghai Province across northwestern China from January to February 2012. A spectrophotometer combined with chemical analysis was used to measure ILAPs and chemical components in seasonal snow. The results indicate that the cleanest snow was found in northeastern Xinjiang along the border of China, and it presented an estimated black carbon ( ) of approximately 5 ng g-1. The dirtiest snow presented a of approximately 450 ng g-1 near industrial cities in Xinjiang. Overall, the of most of the snow samples collected in this campaign was in the range of 10-150 ng g-1. Vertical variations in the snowpack ILAPs indicated a probable shift in emission sources with the progression of winter. An analysis of the fractional contributions to absorption implied that organic carbon (OC) dominated the 450-nm absorption in Qinghai, while the contributions from BC and OC were comparable in Xinjiang. Finally, a Positive Matrix Factorization (PMF) model was run to explore the sources of particulate light absorption, and the results indicated an optimal three-factor/source solution that included industrial pollution, biomass burning, and soil dust.

Biography

Wei Pu is a PhD candidate in Climatology. He focused on studying insoluble light-absorbing particles (ILAPs) in snow and its effect on snow albedo and subsequent climate change. He has participated in several field campaigns to collect snow in China and has rich experiences in processing snow samples and analyzing ILAPs content. He also has involved in the development of a snow albedo model.

puw09@lzu.edu.cn

Notes:

Geofrey Mukwada, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Geospatial and temporal analysis of drought in a mountainous environment: The case of Lesotho

Geofrey Mukwada
University of the Free State, South Africa

Despite being perched in the relatively high rainfall Drakensberg Mountain Region, Lesotho has recently experienced severe droughts which have placed large numbers of people at risk. Generally rated as a "fragile state" and a typical "Least Developed Country", by the UN Framework Convention on Climate Change (UNFCCC), the country needs technical assistance in terms of climate change preparedness. This paper investigates the spatiotemporal variability of drought in Lesotho, using Standardized Precipitation Index (SPI) values that were calculated from gridded precipitation data. The data were acquired from the CRUTS website through Climate Explorer and were for the 1960-2014 period. The resolution of the data was 0.5o x 0.5o. The calculations were done using the Drought Index Calculator (DrinC) and were for the January, February and March (JFM) months, the prime period during which the country receives most of its precipitation. The resultant SPI values were categorized using McKee's et al. (1993) classification to determine the years when specific grid points experienced droughts of particular levels of severity, including moderate, severe and extremely severe droughts. Time series analysis was then employed to determine drought and wet years alongside amounts of precipitation, and the spatial variability of the SPI values for drought years were interpolated in an ArcGIS (version 10.3) environment. The results indicate that the northern, southern and western parts of the country are more susceptible to drought, compared to the eastern parts of the country. This knowledge is important for drought related disaster management planning and for designing policies that mitigate climate related hazards and enhance vulnerability in the country.

Biography

Geoffrey Mukwada is an Associate Professor in Environmental Geography and is based at the University of the Free State in South Africa. Professor Mukwada's research primarily revolves around natural resource management, climate change and rural livelihoods. He has published more than thirty papers in accredited journals. He is the founding coordinator of the Afromontane Research Unit (ARU) at the University of the Free State and is the current coordinator of the Living and Doing Business in Afromontane Environments theme of the ARU.

mukwadag@ufs.ac.za

Notes:

Yue Zhang et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Development of drying crack networks in slurries with different thicknesses

Yue Zhang and **Wm Ye**
Tongji University, China

Statement of the Problem: As one of the dominant climate-related hazardsall over the world, drought occurs more frequently and widely in recent years.Especially in the field of geotechnical engineering, such extreme condition could trigger intense shrinkage cracking of soils,leading toirrecoverable damageforbothmodern infrastructures and ancient earthen heritages. For a drying soil, previous researchers mainly focused onfinal morphology of crack pattern influenced byambient temperature, RH and mineral types etc.However,the wholeprocess of crack network development is far less investigated,particularly in a quantitative way.

Material & Methodology: Slurries with different initial thicknesses (2, 5, 10 and 15mm)were preparedin circular containers, from low-plastic silty clay with water content 45%.Specimens were exposed to air drying in a laboratory undercontrolledtemperature 20±1oC. During desiccation, the evolving crack networks were recorded regularly using a digital camera and further analyzed resorting to image processing technique. Three geometric parameters, i.e. CIF(crack intensity factor), total crack length (L) and average crack width (W), were quantified.

Findings: As water content dropped below the liquid limit30%, cracks started to initiate on soil surface. Both L and W increased gradually in the following stage, however, the evolution trend was different among specimens.For 15mm slurry,Lstopped increasing at air-entry water content (22%),while W kept growing until shrinkage limit (16%) was reached.In comparison,2mm slurry was dominated by elongationof cracks, accompanied by only slight widening.In addition, CIF increased from 5.26% to 10.32% as thickness increased. Crack patterncut extensively by small and narrow cracks transformed gradually into less fragmented one.

Conclusion & Significance: Thicknesshad a great impact onboth development and final morphology of drying cracking networks. This providessome useful information for understanding the mechanisms in practical issues.

ye_tju@tongji.edu.cn

Notes:

Roberto San Jose et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Global climate change impact on the electrical energy cost of buildings: Madrid case study

Roberto San Jose[1], **Juan L Perez**[1], **Libia Pérez**[1] and **Rosa Maria Gonzalez Barras**[2]
[1]Technical University of Madrid, Spain
[2]Complutense University of Madrid, Spain

This paper studies how global climate change impacts on the electrical energy consumption (total electricity, fans electricity and cooling electricity) and their respective economic cost using buildings covering an area of 1 km by 1 km of Madrid city. The energy demand calculations use meteorological information with 50 meters of spatial resolution, considering the 3D shape of the buildings and land use properties around the buildings. Climatic variables are dynamically downscaled from 1º to 50 m using a nesting approach. Building energy simulations are implemented with the EnergyPlus model. To determinate the cost of impacts, future distribution of the energy source in the two climate scenarios are considered and the corresponding 2012 prices from the Spanish Commission of the Energy. The impacts at energy demand of the area are calculated for years 2030, 2050 and 2100 versus 2011 under two IPCC global climate projections: RCP 4.5 (stabilization emission scenario) and RCP 8.5 (little effort to reduce emissions). It is assumed that the buildings don´t change for the future simulations to isolate effects of the global climate on the energy demand of the buildings. The electrical consumption changes in the 2100 are very important. In the RCP 8.5 we can observe a very strong increment on the electricity demand for cooling the buildings. In the RCP 4.5 decreases of electrical consumption (-14.37%) are observed because due to very important decreases of the temperature. On average, the global climate for year 2100 will have an impact on a typical Madrid buildings block of 117918 euros per year following the RCP 8.5 and the RCP 4.5 will save 110537 euros/per year.

Biography

Roberto San Jose is a Professor in Technical University of Madrid and Director of Environmental Software and Modelling Group in the Computer Science School of UPM. He has more than 300 scientific publications in relevant Journal Citation Index Journal. He completed his PhD in 1982 related to the unstable surface turbulent boundary layer parameterization. He has been involved in air pollution modelling mainly using three-dimensional mesoscale models, such as MM5 and CMAQ. He has been a Full Professor since 2001

roberto@fi.upm.es

Notes:

Eiji Komatsu et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Development of policy strategy for carbon capture and storage; Case study based in Japan

Eiji Komatsu[1], **Kenichiro Yanagi**[1], **Akihiro Nakamura**[1] and **Kenshi Itaoka**[2]
[1]Meiji University, Japan
[2]Kyushu University, Japan

The central aim of the Paris Agreement has been to strengthen the global response to the threat of climate change by restricting the rise in global temperature in this century to less than 2 °C over pre-industrial levels. To achieve this target, an ambitious carbon capture and storage (CCS) growth path will be required, with many projects needed globally by 2050 (Beck et al 2011). Asia is one of the few regions that has an increasing proportion of coal in its primary energy mix until the year 2040 (IEA, 2014). To limit the resulting increase in greenhouse gas (GHG) emissions, development of a policy strategy on CCS, based on specifications for coal storage sites and the regional energy mix, is strongly required. However, most Asian countries, including Japan, have not yet fulfilled this requirement. Ingelson et al (2010) focused on the most serious risks associated with CO2 injection and long-term storage, particularly the risk of leakage, which refers to the possibility of CO2 escaping from the storage site. Several analyses have acknowledged that these potential risks cannot be managed without clarification of responsibility for maintenance, monitoring, and leakage prevention in CO2 storage at the closure of the site as well as post-closure (Finch et al 2009). This paper examines the legal and socio-economic aspects of CCS technologies through a comparative study of the current law and policies of Japan and countries that have developed and an analysis of economic models of CCS lifecycle. This paper also proposes a comprehensive policy strategy for commercial CCS deployment, while addressing issues associated with ensuring effective long-term stewardship of CO2 storage sites, including those related to the protection of public health, safety, and the environment. Finally, the paper discusses the pathways to deep decarbonization using large-scale CCS based on the proposed policy strategy.

Biography

Eiji Komatsu is a Senior Researcher at the Centre for Environmental Law, Meiji University, Japan.He graduated with a PhD in field of Environmental Science from the University of Tsukuba Graduate School of Life and Environmental Sciences, and has experience of regulatoryscience as NIES fellow in National Institute for Environmental Studies, Japan. This study is an importantnationally funded project which is supported by the Environment Research and Technology Development Fund (2-1603) of the Environmental Restoration and Conservation Agency.

ccs2016@meiji.ac.jp

Notes:

Jianjun Xu, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Investigation on the tendencies of the land–Ocean warming contrast in the recent decades

Jianjun Xu
Guangdong Ocean University, China

In this study, the surface climate temperature trends for the land and the oceans (land–ocean warming contrast) have been examined and compared based on five data sets. The five datasets included three reconstructed data sets of surface temperature observations and two data sets derived using the satellite microwave sounding unit retrieval products in the lower troposphere (LT) for the period from January 1980 to December 2014. Unlike previous studies, the current study shows that the warming trends significantly decreased over both the land and ocean since 1992 and reached their minimum (near zero) in the early 2000s, which is consistent with the occurrence of the warming hiatus. However, due to the sharp decrease in the surface warming trend over the land (1992 to 2007) in conjunction with an increase in the ocean surface warming trend after 2002, the combined trend carries an overall positive sign (between 2005 and 2007) due to the greater ocean warming trend. The rate of warming increase in the ocean, which began in 2002, is surprisingly fast and is approaching the highest warming trends observed over the land since 1980. These basic land and ocean trend results are confirmed by all five datasets with slightly different values due to the various techniques used in compiling the data sets. However, there is consistency in the overall trend pattern results.

Biography

Jianjun Xu is a Chair Professor at Guangdong Ocean University, China. He has expertise in satellite remote sense and sun-earth's climate connection, decadal climate change, air-sea interaction, hydrometeorology, mesoscale numerical modeling and satellite data assimilation.

gdouxujj@qq.com

Notes:

Glen Gawarkiewicz, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Climate change in the coastal Ocean: Trends and processes from the middle Atlantic bight of the U.S.

Glen Gawarkiewicz
Woods Hole Oceanographic Institution, USA

Statement of the Problem: There has been increasing attention on changes in the circulation and ecosystems of continental shelves in various regions of the world. A region that is changing rapidly is the Middle Atlantic Bight of the northeastern U.S., where a recent warming trend has been identified and there have been significant impacts on the seasonal movements and spatial distributions of fish. An important question is what types of forcing result in warming events, specifically whether atmospheric forcing via Jet Stream motions or offshore forcing via Gulf Stream interactions have primarily caused large temperature anomalies.

Methodology and Theoretical Orientation: Recent observations have been used to determine the warming trend of temperature over the continental shelf off New Jersey over a 37 year period. The extreme warming event in 2012 has been investigated using both observations and numerical models of ocean circulation. Data collected by fishermen in early 2017 show Gulf Stream water extending across much of the continental shelf.

Findings: Average shelf-wide temperature has been increasing off New Jersey in recent decades although with significant interannual variability. The more recent trend from 2003-2013 is much larger than the trend from 1977-2013. It appears that warm water is encroaching more frequently from the edge of the continental shelf, indicating more influence from Gulf Stream forcing. The extreme warming in 2012 resulted from a northward shift in the position of the Jet Stream that reduced cooling of the coastal ocean by 50 per cent during the winter. During early 2017, warm Gulf Stream water extended across much of the continental shelf south of New England resulting in warm anomalies of 5-6 Deg. C.

Conclusions and Significance: Recent warming has had significant impacts on the continental shelf ecosystem and commercial fisheries. More observations are needed to establish causes and processes affected by this warming. Coastal ocean observatories will be helpful in this regard.

Biography

Glen Gawarkiewicz is a Senior Scientist in the Physical Oceanography Department of the Woods Hole Oceanographic Institution. He is a sea-going oceanographer whose research interests include shelfbreak exchange processes, coastal ocean circulation, coastal ocean observatories, and inter-disciplinary science in the coastal ocean.

gleng@whoi.edu

Notes:

Ranhao Sun, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Understanding the variability of urban heat islands for climate change adaptation

Ranhao Sun
Chinese Academy of Sciences, China

Climate change adaptation in urban areas is among the biggest challenges humanity faces due to the combined effects of urban heating and global warming. The variability of urban heat islands (UHI) is known to influence the effectiveness of climate adaptation strategies, but current understanding of urban climate variability is still limited. Here, we quantify the diurnal and seasonal variabilities of surface UHIs in 245 Chinese cities that vary in population and physical size, and examine their relationships with the underlying drivers. We found that local background climate, urban green spaces, and local anthropogenic heat emissions can explain 32-39%, 3-11%, and 4-12% of the diurnal UHI variability, respectively. These three variables also account for 17%, 7%, and 22% of the summer-winter UHI variability during the daytime, and 29%, 4%, and 26% during the nighttime, respectively. Our research suggests that the improvement of urban climate-change adaptation necessitates the local climate-smart strategies, reduction in local anthropogenic heat emissions, and rational use of green planning for sustainable urban development.

Biography

Ranhao Sun has completed PhD from University of Chinese Academy of Sciences in 2008. He is an Associate Professor at the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (RCEES – CAS). His main areas of expertise are landscape ecology, physical geography, and geographic information systems. His current studies focus on two fields: (1) urban heat island effects in large cities related to landscape design and planning; and (2) ecosystem services evaluation and modeling using GIS and remote sensing technologies.

rhsun@rcees.ac.cn

Notes:

4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Breakout Session

Day 2

Sessions:

Sustainability & Climate Change | Climate Change Law & Policy | Energy Policy | CO_2 Capture and Sequestration | Carbon Cycle

Session Chair
Christopher Bryant
University of Montreal, Canada

Session Co-Chair
Lei Shen
University of Chinese Academy of Sciences, China

Session Introduction

Title: **The key issues in optimizing policy instruments for commercializing carbon capture and storage in Japan**
Akihiro Nakamura, Meiji University, Japan

Title: **Greening energy supply in Tibet, China: A roadmap targeting the substantial increase in energy consumption**
Jianan Zhao, University of Chinese Academy of Sciences, China

Title: **Exploring an Optimal Synergy between Regional Energy Security and Carbon Emission Mitigation: A Review**
Lei Shen, University of Chinese Academy of Sciences, China

Title: **Climate change impacts on groundwater: Literature review**
Chris Moseki, Department of Water and Sanitation, South Africa

Title: **Low carbon energy development and its contribution to realize the reduction target of carbon intensity in China**
Limao Wang, University of Chinese Academy of Sciences, China

Title: **Sustainability, ethics and climate change**
Jose Luis Sanchez Garcia, Catholic University of Valencia, Spain

Title: **The role for strategic environmental assessment (SEA) & environmental impact assessment (EIA) for carbon capture and storage in Japan**
Nakamura Akihiro, Meiji University, Japan

Title: **Toward an Optimal Co-Benefit between Energy Security and Carbon Mitigation in China: a Policy Roadmap**
Shuai Zhong, University of Chinese Academy of Sciences, China

Title: **The application of 13C pulse labeling in the partitioning of soil respiration in a Leymus chinensis steppe in Inner Mongolia, China**
Geng Yuanbo, Chinese Academy of Science, China

Title: **Environmental impact of aircraft emissions and aviation fuel tax in Japan**
Rodrigo Gonzalez, Keio University, Japan

Title: **Carbon footprint for human activities on Antarctic: A review**
Li Wei, Taiyuan University of Technology, China

Title: **Strengthening local government and community resilience to address climate change impact in Indonesia**
Yon Sugiarto, Bogor Agricultural University, Indonesia

Akihiro Nakamura et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

The key issues in optimizing policy instruments for commercializing carbon capture and storage in Japan

Akihiro Nakamura, Yanagi Kenichiro and **Komatsu Eiji**
Meiji University, Japan

This article is a part of our Japanese Government funded research project, which is to develop a comprehensive policy and legal framework for commercializing Carbon Capture and Storage (CCS) in Japan. In November 2016, the Japanese government signed the Paris agreement. Japan is now aiming at achieving the GHG reduction target of 26% by 2030 below 2013 level. The government also targets an 80% reduction of GHG emissions by 2050. The government has acknowledged CCS can play a significant role in potentially reducing a large amount of CO2 domestically, which could reduce 7.1 billion tonnes of CO_2 by 2050. This would allow the country to achieve approximately 21% of potential contribution to reduce CO_2. Thus, the future CCS deployment associated with an appropriate legislative framework in Japan will create potential benefits and meet Japan's climate policy goals. However, to date, a number of the CCS leading nations and regions have been struggling with their failures in policy design such as the United States, the United Kingdom and the European Union (e.g. the lack of financial support for CCS development in the EU primarily incorporated with EU-ETS (Emission Trading Scheme). This article addresses a framework for optimizing policy instruments and will discuss the key issues of the relevant policy mix and instrument selections in order to successfully promote and regulate the future CCS industry in Japan. Throughout this study, a framework is proposed for optimizing policy instrument selections and identifying potential barriers to the relevant selection of the instruments by using the appropriate literature (see table 1). Accessing relevant literature, we have proposed a framework for optimizing a policy mix approach and have addressed the key issues for our future study.

Biography

Akihiro Nakamura is a Research Fellow at Centre for Environmental Law, Meiji University, Japan and Adjunct Researcher working with Associate Professor Kate Crowley, School of Social Sciences, University of Tasmania, Australia. He completed his Graduation with PhD in Public Policy from the University of Tasmania, and has also considerable experience in these fields both in Australia and Japan. His research expertise is in the field of policy instrument analysis in relation to climate change policy.

akihiro_nccs16@meiji.ac.jp

Notes:

Jianan Zhao et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Greening energy supply in Tibet, China: A roadmap targeting the substantial increase in energy consumption

Jianan Zhao, Shuai Zhong, Lei Shen and **Zhi Cao**
University of Chinese Academy of Sciences, China

Since the beginning of 21st century, the rapid development of economy in Tibet creates a substantial increase in energy consumption. Statistics derived from direct and indirect surveys show that total energy consumption has surpassed five million tce, where electricity, petroleum products and biomass energy play the primary role. Furthermore, non-fossil energy including hydroelectricity, photovoltaic power and biomass energy accounts for more than 50% in the total consumption. This paper aims to provide a roadmap targeting the development of both energy supply and consumption under the current trends of sustainable requirement (figure 1). Overall, clean energy is very abundant in Tibet, which is recognized as the region that has the greatest potential in developing hydroelectricity, photovoltaic resources in the future of China. Moreover, the process and scale of clean energy utilization has been extending along with the development of power grid with both of backbone- and distributed- forms covering whole Tibet. In future, it is predicted that the development of hydroelectricity and photovoltaic power is not only to satisfy the consumption in Tibet, but also have surplus power transmitted to other regions in China and even other neighboring countries, such as Nepal and India. Therefore, it is expected that Tibet will become the most important region of clean energy production and transmission in China.

Biography

Jianan Zhao is currently a Professor of Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS). He has his expertise in the relationship between energy resources, regional development and industrial carbon emission. He has published more than 50 academic papers in these areas.

zhaoja@igsnrr.ac.cn

Notes:

Lei Shen et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Exploring an optimal synergy between regional energy security and carbon emission mitigation: A review

Lei Shen, Shuai Zhong, Limao Wang and **Jianan Zhao**
University of Chinese Academy of Sciences, China

Under the objectives of sustainable development, regional energy security (RES) and carbon emission mitigation (CEM), in theory at least, should have significant synergetic benefits. In practice, however, many cases in regard to trade-offs and even conflicts are always found due to the variations in the interest orientation of energy service subjects. And thus the current solution to the conflicts between RES and CEM still lack of a comprehensive and systematic planning. This paper aimed to explore a roadmap for chasing the optimal synergy between RES and CEM. The analysis verified the findings of recent studies that both synergies and conflicts between RES and CEM have significant impacts, and we also established a framework for positioning the basic objectives with core elements of RES and CEM (see Figure 1). This framework was designed with a concern on the multi-scale combining the short- and long-term perspectives in related to national, sub- national and micro-behavior levels: in national level, the energy supply security should be still treated as the core issue, and then the carbon mitigation goals derived from international climate negation could be followed up; in sub-national level, more attention should be paid on the inter-regional cooperation of energy efficiency along with the regional planning of carbon mitigation; in micro-behavior level, the changes in the patterns of energy use and carbon mission should be discussed based on the interactions between macro-policy and micro-behavior. Several solutions for optimizing synergic benefits and resolving conflict problems should be placed from macro- to micro-scales with the perspectives from short-term to long-term: in national-scale, an optimal interval for energy supply to integrate the targets should be provided; in sub-national scale, an optimal interval for synergetic planning should be arranged; in micro-behaviors scale, a roadmap chasing the lowest levels of energy use and carbon emission should be proposed.

Biography

Lei Shen is currently a Professor and Director of Key Lab for Resources Use and Environmental Restoration (RUER), Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS). He was the Consultant of the World Economic Forum in Minerals and Metals Council in 2010 and the World Bank in 2006, and the academic committee of Word Mine Ministry Forum in 2008. He was the Excellent Scientist by China Society of Natural Resources in 2012 and 2013. His expertise is focused on energy policy and mineral economics, involving the areas of regulatory systems surrounding resource extraction, energy intensive industry, cement manufacturing and regional development planning in China, resources-based city transformation and sustainable development, and energy and mineral security and multi-lateral resource cooperation. He also has particular experience in policy for small-scale mining in China.

shenl@igsnrr.ac.cn

Notes:

Chris Moseki, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Climate change impacts on groundwater: Literature review

Chris Moseki
Department of Water and Sanitation, South Africa

Water is indeed a medium through which climate change influences the Earth's ecosystem particularly since any negative impact thereon has ripple effect on almost everything else. The change in frequency, intensity and patterns in rainfall, as well as change in temperature has implication for replenishment of groundwater storage. However, groundwater-residence times can range from days to tens of thousands of years or more, which delays and disperses the effects of climate and challenges efforts to detect responses in the groundwater to climate variability and change. Hence, understanding the potential effects of climate variability and change on groundwater is more complex than with surface water. Several studies relating to the effect of climate changes on surface water bodies have been undertaken while very little research exists on the potential effects of climate change on groundwater. This literature review aims to collate and depict work done previously on climate change impact on groundwater and to serve as a prelude to a research study on what and how appropriate response measures should be taken. A simplistic empirical relationship between mean annual rainfall and recharge was used in research to show that a decrease in rainfall over the central parts of Southern Africa could have dire consequences for groundwater dependent communities. Findings were that 20% decrease in mean annual rainfall volumes could translate to an 80% decline in recharge for areas that currently receive 500 mm rainfall per annum or less. Other studies show that the sea-level rise that accompanies climate change will reduce the freshwater supply in many coastal communities, by infiltrating groundwater and rendering it brackish and undrinkable without excessive treatment. This shows that the impact of climate change on groundwater may be in terms of quality such as deterioration of water by saline intrusion or in terms of quantity.

Biography

Chris Moseki has 15 years experienced in groundwater development and water resources management. He also served as a Research Manager at the Water Research Commission responsible for development of tools and systems for adaptation to climate change over a period of 6 years. He is currently a climate change Specialist Scientist at the Department of Water and Sanitation. His interest includes research in groundwater and climate change as well as resolution of climate and water related problems in the public sector.

mosekic@dws.gov.za

Notes:

Limao Wang et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Low carbon energy development and its contribution to realize the reduction target of carbon intensity in China

Limao Wang and **Chufu Mou**
University of Chinese Academy of Sciences, China

Setting low-carbon development should take account of multi-objectives with concern on different economic and policy background. This paper designed two scenarios to present the low-carbon energy development in China, including the appropriate low-carbon scenario (S1) and the advanced low-carbon scenario (S2), where three economic objectives (represented by the annual GDP growth rate) was set at 4%, 6% and 8% respectively during the period between 2015-2030.The analysis evaluated the development potentials of low carbon energy and their contributions for achieving the national target of cutting down the CO_2 emission per unit GDP by 60%~65% by 2030 (compared to the 2005 level). We provided several findings: (1) under the S1, low-carbon energy will reach 11.94 Gtce, whereas under the S2, it will reach 14.93 Gtce by 2030. It was predicted that if the annual GDP growth rate was set at 4%, 6%, and 8% between 2015 and 2030, China should cut down 143.63, 194.81and 262.73 Gt CO_2 emission, respectively; (2) Low carbon energy would contribute 12.58% (minimum) to 31.19% (maximum) toward the 2030 carbon intensive target; (3) higher GDP growth rate would make lower contribution in carbon mitigation. Maintaining a higher GDP growth rate would require more investment to low carbon energy, along with the optimization in economic restructure and the improvement of carbon productivity.

Biography

Limao Wang is a Professor in Energy Economy and Environmental policy at Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences. He has been active in the area of Energy Economics and Energy Security for nearly 20 years. His current research interests focus on Energy Geopolitics, Energy Consumption and Climate Change Policy.

lmwang@igsnrr.ac.cn

Notes:

Jose Luis Sanchez Garcia, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Sustainability, ethics and climate change

Jose Luis Sanchez Garcia
Catholic University of Valencia, Spain

In this conference, we seek to address the phenomenon of climate change and its repercussions from the field of anthropology, in order to propose a sustainability ethics that we believe to be decisive. For an extension of the general perspective on such a complex phenomenon, we think that the contribution of stratigraphic research should not be overlooked, as it observes, from a geological scope, the succession of variations in the climatic conditions that have taken place in our planet along its long history of 4.6 billion years. Both the stratigraphic and the fossil records provide evidence of major climatic changes taking place in our planet in the past. In the present change, an endogenous multifactorial causality seems to converge with specific anthropogenic factors. We therefore agree on the need to reduce greenhouse gas emissions (GHGs). Since some environmentalist views exclude the human being in their consideration of the ecosystem, and if anything they accommodate man in their approaches as a variable always distorting and deteriorating the environment, we believe that a fundamental rethinking of the question is needed from the perspective of an integral environmentalism. Our position does not exclude the human being from this multifactorial equation, but also considers man as the fundamental, modifiable variable in that process. We thus consider the environmental problem in the broader framework of integral ecology, where the human being takes a central place, understood as a free person and a moral subject, responsible for his actions and a key element in any consideration and review of the process. In this context, the concept of sustainability emerges as a key concept, a concept that must guide human action, and from which it is possible to appeal to the ethical and ecological responsibility of the human being. Man is called to do right in all orders. When he does not respect this orientation, so implicitly embedded in his own conscience, he becomes denatured and suffers the consequences in himself and in the environment where he lives. We believe that it is a priority to seek the foundations of the existence of God, analyzing the theistic theory, a foundation of sustainability for the good of man himself and the planet.

Biography

Jose Luis Sanchez Garcia is a Pro-Vice Chancellor of the Catholic University of Valencia St Vincent Martyr since 2004. He directs Fides et Ratio Chair and exercises the technical direction of the Chair of Theology of the Saint Thomas of Villanueva Charity. He is the Director of Socio-economic and Political Observatory of the Catholic University of Valencia. He has previously held other academic and executive positions at both the Catholic University and the University of Valencia. He is an Expert in Anthropology, Philosophy, Theology and Development of Human Capacities. He holds a Doctorate degree in Philosophy from the Pontifical Lateran University (Rome) and Philosophy and Education Sciences from the University of Valencia. He holds a degree in Theology from the Lateran University and in Philosophy and Letters from the Autonomous University of Barcelona. He is the Director of permanent work and research line "poverty, hunger in the world and emerging foods" which brings together more than 50 researchers.

joseluis.sanchez@ucv.es

Notes:

conferenceseries.com

Nakamura Akihiro et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

4th World Conference on
CLIMATE CHANGE
October 19-21, 2017 | Rome, Italy

The role for strategic environmental assessment (SEA) & environmental impact assessment (EIA) for carbon capture and storage in Japan

Nakamura Akihiro, Yanagi Kenichiro and **Komatsu Eiji**
Meiji University, Japan

Since the Paris Agreement of 4 November 2016 for the first time brought all nations together to share the responsibility of combating climate change and adapting to its effects, there has been wide discussion about CCS considered as one of the significant approaches to greatly reduce CO_2 from the global atmosphere. The Japanese government has set the mid-term target of 26% by 2030 below 2013 level. The government also targets an 80% reduction of GHG emissions by 2050 and has acknowledged CCS can potentially contribute to reduce 7.1 billion tonnes of CO_2 by 2050, resulting in approximately 21% of potential contribution to reduce CO2. Strategic Environmental Assessment (SEA) is a part of an Environmental Impact Assessment (EIA) and provides an opportunity for a country to assess environmental impacts at the planning stage. Both assessments play the significant roles in assisting an efficient process and information transparency for climate and energy policies. The future CCS deployment associated with an appropriate legislative framework will allow potential benefits and meet Japan's climate policy goals. In this regard, this article identifies the key roles of SEA and EIA for the future CCS deployment in Japan. Throughout this study, it addresses there are a number of key issues of SEA/EIA for the existing legislative framework applicable to commercializing CCS in Japan. It clearly addresses the key roles for SEA/EIA in terms of developing CCS deployment in Japan (See Table 1). Accessing relevant literature, we have proposed a potential framework for addressing roles of the SEA/EIA for the future CCS operation in Japan.

Biography

Nakamura Akihiro is a Research Fellow at Centre for Environmental Law, Meiji University, Japan and Adjunct Researcher working with Associate Professor Kate Crowley, School of Social Sciences, University of Tasmania, Australia. He completed his Graduation with PhD in Public Policy from the University of Tasmania, and has also considerable experience in these fields both in Australia and Japan. His research expertise is in the field of policy instrument analysis in relation to climate change policy.

akihiro_nccs16@meiji.ac.jp

Notes:

Shuai Zhong et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Toward an optimal co-benefit between energy security and carbon mitigation in China: A policy roadmap

Shuai Zhong, Lei Shen, Jianan Zhao and **Limao Wang**
University of Chinese Academy of Sciences, China

From a policy perspective, the differences between the objectives of energy security (ES) and carbon mitigation (CM) are evident but related. In this study, we conducted a literature analysis to evaluate available policies around the world with focus on ES and CM. The analysis verified the findings that many policies have huge co-benefits potential, but we also found the conflicts in different cases of certain polices (Figure 1). As the conflicts become more significant and serious, 'policy mix' by taking various measures with a better planning is proposed to bring co-benefits between ES and CM. The findings indicate the necessity to design a policy roadmap integrated with an optimal policy mix, and the computable general equilibrium (CGE) framework has distinct advantages in the areas of policy analysis. Taking China as a case, we obtained this policy roadmap by establishing a multi-objective optimization model and it propose the best solution for improving energy saving and carbon abatement compared to single-objective optimization models. Furthermore, the different values of energy consumption peaks and carbon emission peaks were projected for 2016-2050 under different policy scenarios equipped with various policy mixes. We set the year 2030 as the timeline to define the multiple stages with different priorities in policy objectives: before 2030, policy objective would give priority to economic development; around 2030, policy objective would give priority to peaking carbon emission and reducing carbon intensity by 60-65% (compared to 2005 level); after 2030, policy objective would give priority to economic restructure with sustainable energy supply for supporting the post-industrialization. The comparative analysis on these policy scenarios not only provided an optimal interval for energy supply, but also estimated the highest, optimal and lowest levels of carbon emission peaks, respectively, through evaluating the effects derived from different policy scenarios.

Biography

Shuai Zhong is currently an Assistant Professor in resources economics and policy in Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS). He has contributed to the research on energy security, carbon emission mitigation in cement production, resources-based city transformation and water pricing and management by applying computable general equilibrium (CGE) model. He has made some contributions to CGE analysis by focusing on the issues from multi-regional and dynamic perspectives, such as the optimal allocation of regional resources with a long-term planning.

zhongshuai@igsnrr.ac.cn

Notes:

Geng Yuanbo, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

The application of ^{13}C pulse labeling in the partitioning of soil respiration in a *Leymus chinensis* steppe in Inner Mongolia, China

Geng Yuanbo
Chinese Academy of Science, China

In this study, we researched the soil respiration distinction with ^{13}C pulse labeling technique combining static chamber-Keeling plot method in the Leymus chinensis grassland in Xinlin River basin, Inner-Mongolia. During the observation period, the δ13C value of soil respiration averaged (-17.8±0.8) ‰, which was at the range of -20.7‰~-15.7‰; δ13C of microbial respiration averaged (-21.3±0.5) ‰, ranging from- 22.5‰~-19.0‰. Roots do not reflect newly assimilated C since they have long residence time. The contribution of root respiration to soil respiration averaged (30±6) %, ranging from 7%~69%. The fraction of root respiration to soil respiration began to increase from the middle of July and reached its peak value until the middle of August. Then, it gradually decreased.

Biography

Geng Yuanbo has his expertise in nutrient elements cycle (C, N, Mn etc.) in grassland ecosystem and the carbon emission in cement production. He partitioned soil respiration in steppe by root biomass exponential regression method and stable carbon isotope ^{13}C pulse labeling method in the Xilin River Basin, Inner Mongolia, China. He researched CO2 emission factors from cement industry and corrected CO2 emission classification in cement production process.

gengyb@igsnrr.ac.cn

Notes:

Rodrigo Gonzalez, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Environmental impact of aircraft emissions and aviation fuel tax in Japan

Rodrigo Gonzalez
Keio University, Japan

This investigation analyzed the growing impact of commercial aviation on CO_2 emissions, as well as its potential impact on climate change. It reviewed the effects of the Japanese Aviation Fuel Tax (koukuukinenryouzei), which has been levied on fuel loaded into all domestic flights in Japan since 1972. Using a Bayesian structural time series model, based on monthly observations of fuel consumption between 2004 and 2013 provided by the Ministry of Land, Transport, Infrastructure and Tourism - Japan, this research estimated the effect that this tax has had on the national demand for aviation fuel. It was established that the fuel tax has unequivocally reduced the amount of CO_2 emissions from aircraft.

Biography

Rodrigo Gonzalez is a PhD candidate at Keio University, Japan. He has worked on the field of aviation emissions, domestic aviation and regulations in Japan and carbon and environmental taxes. At present, he is researching on revealed preferences and behavior of flyers and non-flyers toward aviation and the environment, as well as alternative means of transportation (such as the bullet train, "Shinkansen") and more recently, the implications of LCC growth for the environment.

rgonzalez@keio.jp

Notes:

conferenceseries.com

Li Wei et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Carbon footprint for human activities on Antarctic: A review

Li Wei, Li Guomin and **Dou Yinke**
Taiyuan University of Technology, China

The Antarctic affects global climate change and environmental safety greatly. With the human activities increasing, the influence on ecological environment is proliferating and migrating between different levels. Carbon footprint (CF) is nowadays one of the most widely used environmental indicators. Given the uniqueness of Antarctic, this work defines the carbon footprint for human actives on Antarctic based on connotation presented by formers. The calculation methods of carbon footprint were discussed according to the principles of life cycle assessments. The mixed life cycle analyses (MLCA) were presented to calculate the carbon footprint accurately. The MLCA method combines the input-output analysis with bottom –up analysis and employs the advantage of each one. The driving factors were discussed influencing the formation of carbon footprint of human activities on Antarctic. The meta-analyses were used and nearly all studies about carbon footprint for Antarctic were investigated. Lastly, this study put some efforts to establish benign mankind activities in the Antarctic by the study of the behavior of mankind activities.

Biography

Li Wei is a Professor at School of Economics and Management at Taiyuan University of Technology; Director of China Natural Resources Society and Deputy Director of resource economy committee, Executive Director of energy law branch of China Double Law Research Association and Executive Director of energy resources system engineering branch of China Society of Systems Engineering. She is engaged in energy and environmental economics and management research. She makes a breakthrough for first introduction of the complexity theory and method into regional carbon emissions research. She published more than 40 papers and a monograph regional energy-saving potential theory and empirical research, by which she won the first prize of eighth outstanding social science research. She undertook several projects funded by the National Natural Science Foundation or Shanxi Science and Technology Bureau.

xinrongli@126.com

Notes:

Yon Sugiarto et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Strengthening local government and community resilience to address climate change impact in Indonesia

Yon Sugiarto, Perdinan and **IP Santikayasa**
Bogor Agricultural University, Indonesia

At national level, Indonesian government is already paid a serious action to climate change issue. However, for local government and local community this issue is not widely understood. The warming of temperature and changing of rainfall patterns is increasing the risk of climate hazard for agriculture sector and making farmers more suffer. Therefore, the awareness of the local government on climate resilience of the rural communities is necessary. In this study, to increase adaptive capacity to cope with the potential impacts of climate change, we introduced climate-driven agricultural management strategies and designed recommended adaptation options for agricultural management that should be mainstreamed into local development plan, with case study at Subang District, as main production region of rice in West Java, Indonesia. Recommended adaptations were constructed based on climate profile and the impacts of current and future climate on crop production that analyzed using vulnerability and risk assessment. Climate variability analysis revealed that El Nino event could reduce rainfall by up to 18 percent from normal. Future climate shown the potential changing of rainfall pattern on main production region that increase level of drought hazard. Furthermore, the risk assessment result showed that high-risk areas are in the main region of agricultural production of rice, and the potential of risk increases with climate change. Based on the current and future climate challenges, local government should designed recommended adaptation option focused on strategy to manage water resources for agriculture, selected precise planting date to increase rice productivity and reduce the risk of climate change impact. We also proposed the local climate team to disseminate climate resilience more effectively. These result suggest that understanding of local government on climate profile, future climate and the climate change risk could be fundamental to increase adaptive capacity to cope with the potential impacts of climate change.

Biography

Yon Sugiarto is a lecturer at Department of Geophysics and Meteorology, Bogor Agricultural University, Indonesia. He has his expertise in climate change adaptation and disaster risk reduction (CCA-DRR). Since 2009 to 2015, he worked with Adapation Division of Indonesia National Council on Climate Change (DNPI) and responsible for conducted climate change vulnerability and risk assessment. In addition to teaching on campus, he has also worked with UNDP to strengthen community resilience and local government in East Java and East Nusa Tenggara. Currently working with Indonesia Climate Change Trust Fund (ICCTF) to develop a climate-based agricultural management strategy and also with UNICEF to develop Child Centered Climate Change Adaptation in Indonesia . Become a member for national initiatives in the convergence of Climate Change Adaptation and Disaster Risk Reduction in Indonesia.

yons@ipb.ac.id

Notes:

4th World Conference on

CLIMATE CHANGE

October 19-21, 2017 | Rome, Italy

Scientific Tracks & Abstracts

Day 3

Climate Change 2017

Sessions:

Climate Change & Climatology | Climate Change Challenges | Climate Change Economics

Session Chair
Stephen Salter
University of Edinburgh, Scotland

Session Co-Chair
Jaime Senabre
University of Alicante, Spain

Session Introduction

Title: **The future of subtropical rainfall**
Jie He, Princeton University, USA

Title: **Wildland fires, climate change and society**
Jaime Senabre, University of Alicante, Spain

Title: **Selecting GCM scenarios for climate change impact assessment**
Babak Farjad, University of Calgary, Canada

Title: **LIVE WITH THE FLOW: Issues and Interventions in ecologically responsive design approach for coastal areas in Bangladesh**
Simita Roy, University of Asia Pacific, Bangladesh

Title: **Impacts of four northern-hemisphere teleconnection patterns on atmospheric circulations over Eurasia and the Pacific**
Tao Gao, Inner Mongolia Meteorological Institute, CMA, China

Title: **"Potential effect of drought on winter wheat yield using CERES-Wheat model under RCP 8.5 Scenario over the Huang-Huai-Hai Plain"**
Qin Liu, Chinese Academy of Agricultural Sciences, China

Title: **A study of strategy for the forestry carbon emission linking on ETS under post 2020**
Eunhee Choi, Korea Rural Community and Corporation (KRC), Korea

Title: **Solutions for post-territorial sovereignty in maritime states**
Annie Kim, Carleton University, Canada

Title: **Impacts of projected climate changes on soybean production in Karaj Region, Iran**
Hamidreza Ahmadzadeh Araji, Universiti Putra Malaysia, Malaysia

Jie He, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

The future of subtropical rainfall

Jie He
Princeton University, USA

The subtropics encompass many of the world's driest regions and climate models robustly predict a large-scale decline in subtropical precipitation from anthropogenic forcing. This projection has become popularly related to the dry-get-drier paradigm. The expectation that climate change will generally exacerbate the rainfall deficiency of the subtropical regions has excited great concerns. On the other hand, some studies have attributed the subtropical precipitation decline to the pole ward expansion of the Hadley cell. In this talk, I will show that neither the dry-get-drier nor pole ward expansion mechanism is relevant to the large-scale subtropical precipitation decline. It is found that the subtropical precipitation decline forms primarily from the fast adjustment to CO_2 forcing in which neither of the two proposed mechanisms exists. Permitting the increase in moisture and the Hadley cell expansion does not substantially change the characteristics of the large-scale subtropical precipitation decline. This precipitation change should be interpreted as a response to the land-sea warming contrast, direct radiative forcing of CO_2 and in certain regions, pattern of SST changes. In addition, a careful examination of the spatial patterns of the projected precipitation change shows that the subtropical precipitation decline is primarily located over ocean. Over subtropical land regions, the precipitation decline is muted or even reversed by the land-sea warming contrast.

Biography

Jie He has studied changes in hydro-climate and atmospheric circulation from anthropogenic forcing. His research focuses on understanding the physical mechanisms of the climate system using model simulations. His presentation is about the subtropical precipitation has recently been published in *Nature Climate Change*. He has also worked on understanding and reducing uncertainties in climate projections on both global and regional scales. One of his current research projects involves the dynamics of tropical air-sea interactions. The goal is to quantify various coupling feedback processes in order to build a simple and practical framework for understanding model biases and future changes in air-sea interaction. He has also started working on the connection between transient climate sensitivity and regional ocean heat uptake.

jie.he@noaa.gov

Notes:

Jaime Senabre, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Wildland fires, climate change and society

Jaime Senabre
University of Alicante, Spain

Wildland fires are an environmental problem in which many factors influence, but they also represent a natural process in many ecosystems and an evolutionary opportunity. Each ecosystem has a characteristic fire regime (frequency level, size, intensity and seasonality determined) that is considered as natural and necessary for the maintenance of the sustainability and biodiversity of the species. From Environmental Psychology we consider it as a latent risk that can compromise the socio-economic development of future generations, mainly in rural areas. At the ecological level, the problem of forest fires arises when the balance between what is considered as "natural" and sustainable is broken. In Europe, there have been 2.5 million fires that have devastated 20 million hectares in the last 25 years (Legido et al., 2016), 70% of them in southern European countries and 51% in The Iberian Peninsula. The current forest fire regime is likely to change due to its relation to the climate. The rainfall regime is also changing, with a decrease in water availability and an increase in drought periods, especially in Mediterranean countries. This change will not compensate for the increase in temperature and will increase the flammability of forest areas. But we should not make generalizations about the consequences of climate change, since this alone does not generate or generate a greater number of forest fires on the planet; Although this trend of change may facilitate conditions and favor more virulent and large fire scenarios, so it should be considered as a physical facilitator more in the universe of the problem. From a causal and social view of the problem, omitting the role of "the human" (anthropogenic variables) in the probability of occurrence of forest fires would pose the problem in a partial way and would be exaggerating the protagonism granted to other types of factors more difficult control. The human being should be the centerpiece of analysis and evaluation, since it is the main detonator of the forest fires. The real "change" we should not look for in the climate or in other external aspects, but in the possibility of a change of thought and attitude of the human being with respect to the latent risk of forest fires.

Biography

Jaime Senabre (Alicante, 1966). Degree in Psychology. He completed doctoral studies in the Department of Personality, Evaluation and Psychological Treatment of the UNED, related to Stress and Immune System, Mobbing and Trauma. He is Brigade Chief of Wildland firefighter with 20 years of experience. As a psychologist, he collaborates with several companies and institutions in the area of training in Emergency Psychology and Human Resources. Collaborates as Professor of the University of Valencia in the Master in "Intervention and operational coordination in emergencies and catastrophes" and Diploma of University Specialization in "Instructor in Emergency Operative Services".Director and President of the Scientific-Professional Committee of the National Symposium on Forest Fires. He has published numerous articles on forest fires, Stress, Psychosocial Risks and Emotional Trauma, mainly in relation to emergency services. He has collaborated with several magazines published in Spain.Currently, he is attached to the Research Group on "Climate and Territory Planning" of the Faculty of Philosophy and Letters of the University of Alicante.

jasenabre@sinif.es

Notes:

Babak Farjad et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Selecting GCM scenarios for climate change impact assessment

Babak Farjad[1] and **Anil Gupta**[2]
[1]University of Calgary, Canada
[2]Alberta Environment and Parks, Calgary, Canada

Statement of the Problem: One of the main challenges in climate change impact assessment studies is selecting suitable climate change scenarios to be used in a regional environmental modelling system. Using all available Global Circulation Model (GCM) scenarios would be one way to build the complete picture of the range of climate change and variability but may not always be feasible for such studies. On the other hand, there is no recommended standard number of GCM scenarios to use while the number of GCMs is increasing at a rapid pace. This can be a more challenging case when it comes to understanding responses of hydrological regimes to climate change. This is because first using many GCMs to a hydrological model to simulate the hydrological responses is computationally intensive. Second, even though some selected extreme climate change scenarios may appear to be useful, the non-linearity in the impact response can lead to quite different results.

Purpose: The purpose of this study is to shed some light on this issue, this study was undertaken to develop a methodology for selecting representative climate change scenarios that capture all plausible future climate variability affecting the hydrological response of a watershed.

Methodology: The study employs three different methods; fuzzy clustering, k-means clustering, and change factors (CFs) to select climate change scenarios out of a combination of 33 GCM scenarios from the Coupled Model Intercomparison Project, phase 5 (CMIP5) in the Muskeg watershed in Alberta, Canada. The Soil and Water Assessment Tool (SWAT) was calibrated and validated to simulate streamflow under the selected GCM scenarios for the period of 2046-2065 relative to the baseline of 1986-2005 in the watershed. Flow duration curves (FDCs) were constructed to represent peak, mid-range average flow, and low daily flows, for each climate scenario.

Findings: Results revealed that the fuzzy clustering-based method performed well compared to the k-means clustering and change factors (CFs) methods.

Conclusion & Significance: This study gives clear guidance on how to reduce the number of climate change scenarios based on selecting representative scenarios that capture all plausible future variability affecting the hydrological response. However, the most appropriate climate scenarios for a region will not necessarily be the most appropriate for another region due to different climate and geomorphological characteristics.

Biography

Babak Farjad is currently a Postdoctoral Fellow at the University of Calgary. His work involves developing a hydrological modelling system to evaluate and predict the impacts of climate change and human activities on hydrology of the Lower Athabasca River basin in Alberta, Canada. His PhD research was on developing a modeling framework to investigate the impact of climate and land-use/cover change on hydrological processes in the Elbow River watershed in southern Alberta, Canada.

bfarjad@ucalgary.ca

Notes:

Simita Roy, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Live with the flow: Issues and interventions in ecologically responsive design approach for coastal areas in Bangladesh

Simita Roy
University of Asia Pacific, Bangladesh

The coastal region of Bangladesh covers almost about 20% of the country and more than 30% of the cultivable lands of the country. The major problem faced by the coastal region is undeniable and unequivocal climate change which leads to permanent inundation, drainage congestion, salinity intrusion and frequent storm surge inundation. About 53% of the coastal areas of Bangladesh are affected by salinity. The agricultural production of these areas is much lower than the other areas of Bangladesh. Shyamnagar upazilla, Satkhira, is one of the vulnerable coastal areas to the climate change, which was severely affected during the cyclone Aila, 2009. This paper is based on field observations and design thinking in creating a symbiotic relationship between the built environment and the community aiming towards resilience in the context of a changing climate. Discussions regarding design approaches in making a community self-resilient in an ecologically responsive way will be presented by focusing on four issues - cyclone, salinity intrusion, climate change and decreasing rate of mangrove. To achieve the expected result the basis was 'Function Follows Flow'. Primary data and secondary data have used to understand all kinds of flows such as 'flow of water', 'flow of wind' in and around the site. The expected result of this research will give a vision to make a vulnerable indigenous community self-resilient in an ecologically responsive way in case of climate change.

Biography

Simita Roy, has completed her BArch from Bangladesh University of Engineering and Technology (BUET) in 2016. Currently, she is working as Lecturer in University of Asia Pacific (UAP), Dhaka, Bangladesh. Her field of interest is climate change and how architecture can help to mitigate the impact of climate change. She has done a primary research on making a vulnerable indigenous community self-resilient in an ecologically responsive way in case of climate change, which was done as her final year thesis of BArch program.

simita@uap-bd.edu

Notes:

Tao Gao et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Impacts of four northern-hemisphere teleconnection patterns on atmospheric circulations over Eurasia and the Pacific

Tao Gao, Jin-Yi Yu and **Houk Paek**
Inner Mongolia Meteorological Institute, CMA, China

The impacts of four teleconnection patterns on atmospheric circulation components over Eurasia and the Pacific region, from low to high latitudes in the Northern Hemisphere (NH), were investigated comprehensively in this study. The patterns, as identified by the Climate Prediction Center (USA), were the East Atlantic (EA), East Atlantic/Western Russia (EAWR), Polar/Eurasia (POLEUR), and Scandinavian (SCAND) teleconnections. Results indicate that the EA pattern is closely related to the intensity of the subtropical high over different sectors of the NH in all seasons, especially boreal winter. The wave train associated with this pattern serves as an atmospheric bridge that transfers Atlantic influence into the low-latitude region of the Pacific. In addition, the amplitudes of the EAWR, SCAND, and POLEUR patterns were found to have considerable control on the 'Vangengeim–Girs' circulation that forms over the Atlantic–Eurasian region in winter or spring. The EA and EAWR mainly affect the westerlies in winter and spring and the POLEUR and SCAND, respectively in summer and winter. Strong westerlies confine the extension of the North Polar vortex, which generally results in a small weak vortex and a shallow East Asian trough located in a position further east than normal. Furthermore, the North Polar vortex presents significant connections with the patterns during winter and summer. Analyses in this work suggest that the teleconnection patterns in summer could be driven, at least partly, by the Atlantic Multidecadal Oscillation, which to some degree might transmit the influence of the Atlantic Ocean to Eurasia and the Pacific region.

Biography

Tao Gao is now working in the Meteorological Institute of Inner Mongolia, CMA and has her expertise in climate variations and regional climate prediction research direction, especially in dust storm and drought studies for northern China and Inner Mongolia, China. She had visited the Institute of Meteorological and Physics, Agricultural and Science University of Vienna, Austria, Climate Research Division, Science & Technology Branch, Environment Canada, and the Department of Earth System Science, University of California, Irvine, USA as a visiting or a Senior Visiting Scholar supported by China Scholarship Council.

frautao@yahoo.com

Notes:

Qin Liu et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Potential effect of drought on winter wheat yield using CERES-Wheat model under RCP 8.5 Scenario over the Huang-Huai-Hai Plain

Qin Liu and **Hui Ju**
Chinese Academy of Agricultural Sciences, China

Statement of the Problem: Droughts and water shortage are generally accepted to be one of the most critical problems faced by worldwide agriculture, and it is so especially in China where agricultural production and prosperity are largely dependent on the timely, adequate and proper distribution of rainfall. The analysis of potential effect of climatic drought on grain yield is becoming very critical in light of population growth, food security and increasing pressure on water resources. However, there is limited understanding of the spatio-temporal variation inpotential evapotranspiration (ET0) and climatic drought and its effect on grain yield of winter wheat in Huang-Huai-Hai Plain (3H Plain) in which there is an over-exploitation of groundwater region.

Methodology & Theoretical Orientation:we used Penman-Monteith formula, SPEI-PM method, DSSAT-CERES-Wheat model and RCP 8.5 data to explore the characteristics in ET0, climatic droughtand yield reduction rate for winter wheat in response to climate change over the 3H Plain.

Findings: Our work demonstrated the investigation that an increase of ET0 was predicted leading to subsequent drought rise in frequency, duration, severity and intensity under the RCP 8.5 scenario. Annual future ET0 is most sensitive to RH changes and accordingly RS is responsible for the predicted increment of the annual ET0. Analysis of yield reduction rate by drought in different growing period shows that wheat yield decline most in drought of jointing stage, followed by grain filling stage. Irrigation in the jointing stage (60mm) could retrieve yield by 16.3% (short-term) 18.6% (medium-term) and 16.6% (long-term).

Conclusion & Significance:In our work, major agronomic consequences have been drawn regarding the reform of the common agricultural policy in Huang-Huai-Hai Plain, China. Researchers are encouraged to further investigations into how to implement these practices with emphasis of improving the sustainability of these agroecosystems.

Biography

Qin Liu obtained his PhD in 2017 from University of Liege at Belgim. He worked as a Research Scientist at Institute of Environment and Sustainable Development in Agriculture, Chinese Academy of Agricultural Sciences, China. Qin Liu has his expertise in evaluation and passion in climate change and agricultural water resource management based on spatial analysis and crop modelling. He has published more than 30 papers in referred journals and had served as an Editor of Chinese Journal of Agrometeorology.

liuqin02@caas.cn

Notes:

Eunhee Choi et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

A study of strategy for the forestry carbon emission linking on ETS under post 2020

Eunhee Choi[1], **Chung Kook Lee**[2], **Jaeyoon Kim**[2], **Kyu-uk Lee**[2] and **Kyujeong Kim**[2]
[1]Korea Rural Community and Corporation(KRC), Korea
[2]Korea Research Institute on Climate Change(KRIC), Korea

In 2015, the international community concluded the Paris Agreement to reduce greenhouse gas emissions starting in the year 2020. And 147 Partieshave ratified the Agreement and 162 Parties have submitted to the UN their first nationally determined contributions (NDCs), including their reduction goals. The Paris Agreement agreed on SDM(Sustainable Development Mechanism), or a new international carbon market mechanism after 2020, cooperative approaches, and non-market-based approaches. In response, most countries are working to achieve their respective NDCs not only by reducing domestic greenhouse gas emissions, increasing carbon sinksand using the internationally transferred mitigation outcomes (ITMO). Accordingly, there has been a growing interest in registering a project to increase carbon sinks with the International Market Mechanism and contributing to achievement of NDC by acquiring ITMO.The project to increase carbon sinks is generally composed of forestation & reforestation, forest management and REDD+, of which reforestation is the only project that is recognized as the project to increase carbon sinks in the existing CDM. And REDD+ projects were agreed as a greenhouse gas emission reduction project in Article 5 of the Paris Agreement. However, forest management is recognized as a project to increase carbon sinks only by some programs such as the Voluntary Carbon Standard (VCS).Therefore, this study is going to analyze countries and their relevant plans including ITMO and the project to increase carbon sinks by analyzing the NDCs of 147 countries. Then, it will make a comparative analysis on whether an emission trading scheme or a carbon offset scheme for each country recognizes emissions about the project to increase carbon sinks. Based on the results of the analysis, this study is going to analyze the potential for acquiring carbon emissions of the project to increase carbon sinks in the new climate regime, and suggest a plan to activate the project.

Biography

Eunhee Choi has her expertise in Environmental Engineering under Climate Change. Since 2005 she has been the researcher at Rural Research Institute(RRI), Korea Rural Community and Corporation(KRC). Her main Research theme in RRI: Policy and model development related to biomass utilization and greenhousegas reduction. In these days researching on forestry carbon emission under the post-2020.

ehchoi@ekr.or.kr

Notes:

Annie Kim, J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Solutions for post-territorial sovereignty in maritime states

Annie Kim
Carleton University, Canada

Climate change threatens national security. Our research is based on one of the most vulnerable groups: the Alliance of Small Island States (AOSIS), whose lands will be submerged partially or entirely by 2100 (AOSIS, 2015). Their consequential loss of territory would result in the loss of legal status as nation-states. Thus, the need for policy measures and international legal counsel should be recognized as early as possible. We will analyze the feasibility of their relocation plans to optimize an efficient process of resettlement, based upon multiple criteria such as cultural compatibility, the presence of available dispute resolution mechanisms, geographical proximity, and temporal and spatial practicality. Then, we will consider possible solutions to maintain the nation-state status of maritime countries. From an international law perspective, we will explore the possibility of amending international treaties to ensure that the submerged land be recognized as legitimate state territory. This research will analyze possible legal solutions based on historical precedents; support from other countries and international organizations; spatial and temporal implications; and the practical applicability of these methods. This research has implications for the global community because rising sea levels will affect two-thirds of the world population living within 100 kilometers of any coastline (UNEP, 2005). This paper aims to provide a legal reference and practical guide for maritime states in the years to come.

Biography

Annie Kim received her Bachelor of Arts in International Relations with distinctions from Western University. She is pursuing Master's degree at Norman Paterson School of International Affairs at Carleton University in Ottawa. Her various research interests include global environmental politics, Southeast Asian studies, and Cuban history and culture.

anniekim3@cmail.carleton.ca

Notes:

Hamidreza Ahmadzadeh Araji et al., J Earth Sci Clim Change 2017, 8:10(Suppl)
DOI: 10.4172/2157-7617-C1-036

Impacts of projected climate changes on soybean production in Karaj Region, Iran

Hamidreza Ahmadzadeh Araji[1], Aimrun Wayayok[1], Ali Reza MassahBavani[2], Ebrahim Amiri[3], Ahmad Fikri Abdullah[1] and **Jahanfar Daneshian[4]**
[1]Universiti Putra Malaysia, Malaysia
[2]Abouraihan University of Tehran, Tehran
[3]Islamic Azad University, Iran
[4]Seed and Plant Improvement Institute, Iran

Climate change significantly affects water resources and crop production in future. However, response of soybean yield and biomass to water stress, and probable changes of temperature, rainfall, and CO2 rate in each climate region is questionable and still lack of researches worldwide. In this research, two consecutive years of soybean experimental data collected at Karaj Seed and Plant Improvement Institute, and applied to evaluate the capability of the AquaCrop model to simulate soybean final yield, and biomass under projected climate change scenarios. AquaCrop was calibrated in 2010 and validated in 2011 by using four different varieties including L17, Williams*Hobbit, M9, and M7 under three irrigation levels which defined as without water stress (I1), mild water stress (I2), and severe water stress (I3). Statistical analysis, including root mean square error normalized, determination coefficient (R2), and paired t-tests showed that simulated and observed values were the same at 95% confidence level. The results represented that AquaCrop had enough credit to predict yield and biomass in this study. Moreover, impacts of climate change assessed by using 15 GCMs output from downscaling model LARS-WG for the periods 2011–2030 centered at 2020, under A1B, A2 and B1 emission scenarios, for 12 treatments. Ensemble means of yield, biomass from AquaCrop output, and under three emission scenarios for future 2020s compared to calibration year in 2010. The results of yield, and biomass showed increasing for most treatments in 2020s.

Biography

Hamidreza Ahmadzadeh Araji, has bachelor's degree in Agricultural engineering (Irrigation). He has also obtained a Master's Degree of Agricultural Meteorology, which he successfully completed at Tehran Islamic Azad University, Branch of Science, and Research. He is Currently PhD student of Water Resources Engineering at UPM. According to his thesis title, he is working on impacts of climate changes on crop production by using crop modeling.

hamidreza.ahmadzadeharaji@yahoo.com

Notes: