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Climate Change

Virtual 2020

September 18, 2020

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Climate Change Virtual 2020
Book of Abstracts

CLIMATE CHANGE VIRTUAL 2020

September 18, 2020

Theme:

Exploring the possibilities to overcome climate change challenges

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Thank You All...

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About MAGNUS GROUP

Magnus Group (MG) is initiated to meet a need and to pursue collective goals of the scientific community specifically focusing in the field of Sciences, Engineering and technology to endorse exchanging of the ideas & knowledge which facilitate the collaboration between the scientists, academicians and researchers of same field or interdisciplinary research. Magnus group is proficient in organizing conferences, meetings, seminars and workshops with the ingenious and peerless speakers throughout the world providing you and your organization with broad range of networking opportunities to globalize your research and create your own identity. Our conference and workshops can be well titled as 'ocean of knowledge' where you can sail your boat and pick the pearls, leading the way for innovative research and strategies empowering the strength by overwhelming the complications associated with in the respective fields.

Participation from 90 different countries and 1090 different Universities have contributed to the success of our conferences. Our first International Conference was organized on Oncology and Radiology (ICOR) in Dubai, UAE. Our conferences usually run for 2-3 days completely covering Keynote & Oral sessions along with workshops and poster presentations. Our organization runs promptly with dedicated and proficient employees' managing different conferences throughout the world, without compromising service and quality.

About Climate Change Virtual 2020

"**Climate Change Virtual 2020**" during **September 18, 2020** with the theme "Exploring the possibilities to overcome climate change challenges" will offer you an impressive roaster of speakers, quality attendees and compelling content and is an excellent opportunity for leading academicians and scholars from universities and institutes to interact with the world-class scientists. You can increase your professional skills in this free time and discuss the practical challenges encountered and the solutions adopted.

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KEYNOTE FORUM

CLIMATE CHANGE VIRTUAL 2020

SEPTEMBER 18 2020

Virendra Goswami

Prof. Emeritus & Advocate, India

Application of chemical technology & chemistry to control earth's global warming

The present investigations aim to Control Earth's Global Warming by using innovative Chemical Technology and *physicochemical* Catalytic processes. The increase of temperatures of earth surface has got direct relation with the rise of concentration of various greenhouse gases viz. Carbon-dioxide and Methane, Nitrous Oxide, Chloro-Fluro-Carbons(CFC),resulting major changes in the various climate parameter including rise in Sea-sub-surface temperature effecting marine life; rise of sea levels by melting of polar-ice-caps. Budgets of these gases depend on the exchange between the planetary boundary layer and free troposphere- stratosphere exchange processes. Global Warming (GW) is triggering variable for the release of methane from sources both on land and on the deep ocean floor, while Thawing permafrost, e.g. frozen peat bogs in Siberia, are another variables of the rapid release of CO_2 and CH_4 .

The efforts are to study the spatial and temporal resolutions of atmospheric aerosols and Green House Gases (GHG) measurements and then to develop methods of efficient separations, recovery, disposal, reuse, etc.

Also, the focus is to convert GHG (Methane, CO_2) to ethanol by catalytic processes and develop hybrid fuels like bio- ethanol and bio- diesel and go for electricity from biomass. Methane got mitigated by converting it to non-toxic substance e. g. ethanol/methanol by means of Catalytic Processes. The reduction of GHG and emission of CO_2 have been reduced by the absorption of CO_2 from air by di - π- cyclopentadienyl Cobalt, $C_5H_5C_{o+}$, bio-filtration process and Sequestration technology e. g carbon dioxide air capture & Solar Radiation Management(SRM),reducing the insolation by the addition of stratospheric Sulphur aerosols . The depletion of ozone (O_3) in the stratosphere results GW and hence, the efforts have been made to study the means to produce more O_3 by Catalytic Processes. Next, to control Global Warming and save inhabitation of marine life (Under Water) ; the oxidation process would be employed to treat Groundwater contaminants by making use of the chemical oxidants (hydrogen peroxide, persulfate, permanganate),and Water treatment process by making use of catalytic oxides of first row transition metals(Cobalt Oxides). These oxidants have been able to cause the rapid and complete chemical destruction of many toxic organic chemicals. The emphasis has been given on the study of spatial and temporal resolutions of atmospheric aerosols, small organic compounds and larger biomolecules, toxins, toxic gases, Green House Gases in particular; by entrapping the toxins, Chemical toxicants, by developing High Affinity Toxin Receptors (HART).

Also, develop pollution control devices e.g. catalyst – beds, absorption – beds, pollution – masks, and GHG-Absorption Towers (GAT), involving Carbon-Sinks to limit Greenhouse Gases and inhibit the generation and widespread release of toxic chemical substances along with Magnetic Refrigeration (MRT) using transition metal oxide catalysts (e.g. Cobalt Oxides) in correlation with the magnetic susceptibility values and the catalytic activity have been found an alternative to CFC.

Finally, efforts are to develop Computational Forecasting Climate Chemistry Models (FCCM) to study interactions between Atmospheric Chemistry and Climate forcing as well as Detoxification of toxin and GHG through the Catalytic Processes & Chemical Technology.

Biography

Dr. Virendra Goswami, Ph. D Indian Institute of Technology (IIT), Kharagpur, MS from the University of Wisconsin, USA. Post Doctorate Fellow (PDF) at the University of Illinois, Chicago, USA. 'Visiting Scientist' to UNIDO, ICTP, Italy &International Civil Aviation Organization (ICAO), Canada. Founder President 'Environment & Peace Foundation (EPF). Dr. Virendra Goswami worked at Space Science Engineering Centre, NOAA(NASA) at the University of Wisconsin, USA. Former Vice-Chancellor: Sangam & Sunrise Universities. Had been, Director General of Management Institutes, Director of Engineering Institutes & Wing Commander. Special Invitee by the World Meteorological Organization (WMO) in 2001& 2016. More than 44 years of teaching, research, and administrative experience at Home and Abroad. Presented Papers in the field of Chemical Technology, Atmospheric Sciences, Space Sciences, Satellite Application, Geo-Sciences, Bio-Sciences, Climate Variability, Control of Global Warming & Quality Higher Education at International and National Conferences held in India, USA, UK Latin America, South Africa, Canada and Europe (more than 32 countries of all the Continents). Besides, headed various delegations at the National & International Levels.

Azzeddine Oudjehane

SAIT - Southern Alberta Institute of Technology, Canada

The built environment and climate change: The path to net zero and neutral built infrastructure

In 2015, the Paris climate change conference led the way to combat climate change and accelerate and intensify the actions and investments needed for a sustainable low carbon future. In 2017, Mission 2020 released a strategy by which "countries should commit $300 billion annually to help cities and states fully decarbonise buildings and infrastructure by 2050, with cities upgrading at least 3% of their building stock to zero- or near-zero emissions structures each year". The built environment has a big impact on the environment: Globally, buildings account for about 35% of resources, 40% of energy use, consume 12% of the world's potable water and produce almost 40% of global carbon emissions. The picture is quite similar in Canada: 35% of Canada's GHG emissions, 50% of natural resources consumption, 12% of non-industrial water use and 25% of waste going to landfill.

Over the past couple of years, technology and innovation trends to support greening the built environment encompassed: energy analytics, generative design, Internet of things and AI- artificial intelligence. Concurrently, with natural disasters an ever-present threat that can devastate communities, technology can help community leaders address critical needs and build a more resilient future. Indeed, AI- artificial intelligence with data analytics applied to infrastructure resilience has the capacity to enhance the security and resilience of critical infrastructure, as well as improving planning and response to natural and man-made disasters.

In the wakes of a global pandemic coupled with intensifying climate change impacts, building as usual is no longer a sustainable alternative. This talk will firstly review the current state of applied innovation to tackle resilience and climate change in the built environment, then discuss some of the adaptation and paths to building better and for the future to achieve a Carbon neutral Ir Carbon negative built infrastructure.

Biography

Dr. Azzeddine Oudjehane has over 25 years of experience leading multi-disciplinary projects in R&D, business innovation and market development working with various stakeholders from Academia, Government and Industry. Azzeddine holds graduate degrees in both Applied Science and Business Administration. In 2012, he joined the first undergraduate BSc in Construction Project Management in Canada. Azzeddine strives through teaching excellence to train the next generation of construction project managers in Alberta and Canada, while developing scholarly applied research that meets the needs of the Alberta industries. Alongside his academic position Azzeddine currently serves as the Vice Chair of the Chapter Leadership Board of Directors of the Alberta Chapter of the Canada Green Building Council CaGBC. Azzeddine is also the Treasure and Secretary for the Board of Directors for Value Analysis Canada. With over 100 publications and presentations at international conferences, Dr. Oudjehane serves in various journal review committees and has chaired sessions at conferences. In the past year, he has given several presentations and keynotes on the role of innovation for sustainable construction practices. His most recent applied research work include: Integration of AI and Unmanned Systems in Construction management; Sustainable mass timber design and construction with a zero carbon framework.

Merritt Terry Cooke

China Partnership of Greater Philadelphia, USA

Implementing low-carbon built environment solutions at scale and speed

China Partnership of Greater Philadelphia (CPGP) forged the Greater Philadelphia (PHL)-Tianjin Economic-technological Development Area (TEDA) partnership in 2011. In July 2014, the PHL-TEDA partnership formally joined the U.S.-China EcoPartnership program to jumpstart innovative "Urban Clean Energy Infrastructure" solutions in both regions. This unique combination of real-world technology demonstrations and product showcases was designed to introduce viable new infrastructure breakthroughs quickly into Chinese and U.S. markets. Urban clean energy infrastructure is a sizable, and yet largely untapped opportunity. The PHL-TEDA EcoPartnership serves as an important subnational resource to assist municipalities in the U.S. and China to integrate, at the practical level, their U.S.-China Sustainable City planning efforts with commercially relevant, on- the-ground urban infrastructure project experience.

Among U.S.-China EcoPartnerships, CPGP's PHL-TEDA EcoPartnership is unique in its design as an open platform to facilitate collaboration among businesses, local governments and NGO non-profits. The objective of this collaboration is to bring to scale sustainable-city-type BE Better technologies (built environment technologies that are more energy-efficient, smarter and healthier) to China and to promote sustainable economic development in the U.S. The mechanism for scaling these BE Better technologies is through China's national-level industrial parks. The initial stage focuses on China's northeastern Jing-Jin-Ji region (comprising Beijing, Tianjin and Hebei Province) through collaborations with Green Development League-member National Economic-Technological Development Zones (NETDZ) in Beijing, Tianjin and Langfang. The larger goal is to position for second-stage, nation-wide expansion of the BE Better model through the Green Development League's 36 member-NETDZs nationwide and through the Ministry of Commerce's national Eco Park program.

The three dimensions of 'better' in the BE Better model are (1) greater energy-efficiency, (2) 'smarter' (more Internet of Things connected with greater IoT security and, for industrial users, cleaner and smarter manufacturing processes), and (3) healthier for all occupants of the built environment. CPGP is focusing on industrial park applications in China because our TEDA partner serves as Secretary General to the Green Development League's nationwide network of 36 top NETDZ industrial parks and also leads the PRC Ministry of Commerce's efforts to lower carbon and greenhouse gas emissions across its full network of 219 NETDZs throughout China. In order to give heft and reach to our BE Better program we rely on three primary sets of industry association partnerships: (1) for 'more energy efficient,' with the World Business Council for Sustainable Development, former U.S.-China Eco Partnership member U.S. Business Council for Sustainable Development, and the U.S. Green Building Council; (2) for 'smarter,' with the Industrial Internet Consortium and The IoT Consortium (for connectivity) and with The National Association of Manufacturers (for cleaner and smarter manufacturing); and (3) for 'healthier,' with the International WELL Building Institute and with industry leader Delos. Around these three industry nodes, we are nurturing collaborative 'eco-systems' comprising architecture, engineering, and construction (AEC) companies and a broad array of private sector stakeholder companies, ranging from small entrepreneurs to U.S.-based multinationals.

Biography

Terry Cooke founded the China Partnership of Greater Philadelphia in 2011 as a 501c3 public-private platform to accelerate commercial and research collaboration between the Greater Philadelphia region and China in clean energy and energy-efficient buildings. One of only 36 competitively-selected current EcoPartnerships under the U.S.-China Ten Year Framework, CPGP's PHL-TEDA EcoPartnership is now focusing on "energy-efficient, smart and healthy industrial park built environments" and a Sino-U.S. Eco Park showcase. Terry is currently teaching a course in the University of Pennsylvania's international Masters of Public Administration degree-program under Fox Leadership International and the School of Arts & Sciences. CPGP serves as the principal case-study for the course "China and the U.S. in the 21st Century: Sub-National Sino-American Relations." Terry was a 2010 Public Policy Scholar with the Woodrow Wilson International Center for Scholars in Washington D.C. His book Sustaining U.S.-China Cooperation in Clean Energy was published by the Wilson's Center's Kissinger Institute in September 2012. Previously from 2006-8, Terry served as Director for Asian Corporate Partnership at the World Economic Forum, the host of the Davos Annual Meeting and the 'Summer Davos' in China. In 2003, Terry retired with the rank of Counselor as a career-member of the U.S. Senior Foreign Commercial Service following tours in Taipei, Berlin, Tokyo & Shanghai. Terry received his Ph.D. in Cultural Anthropology from the University of California at Berkeley in 1985, his MA from UCB in 1981 and his BA from Princeton University in 1976.

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SPEAKERS

CLIMATE CHANGE VIRTUAL 2020

SEPTEMBER 18 2020

Deborah January-Bevers*[1], Lindsey Roche[2], Lauren Harper[3]
*[1]J.D., President, Houston Wilderness, Houston, TX (USA)
[2]Humboldt University of Berlin, Berlin, Germany
[3]Columbia University, New York, NY (USA).

Six-step guide for making nature-based infrastructure decisions comparing the benefits of multiple ecosystem services

Natural landscapes serve our well-being in a variety of ways including water purification, flood protection, hurricane protection, carbon capture, recreation and wildlife enhancement. Identifying and understanding the benefits of services provided by local ecosystems can lead to cost-effective solutions to infrastructural and environmental problems while also creating ecosystem-based adaptation in urban/suburban areas. For the storm-prone Greater Houston region, the critical need to better connect the ecosystem services (ES) provided by the diverse assemblages of forests, prairies, wetlands, riparian waterways and estuaries to long-term resilience and disaster protection is taking shape following five years of increased rain events, severe hurricane destruction and sea level rise. Adding to these challenges are the region's unique, clay-rich soil composition, made up largely of Vertisols and Alfisols which greatly influence infiltration and runoff, especially during heavy rain events. These same soils affect environmental enhancement and recovery efforts in the region's bays, estuaries and coastal systems, where the dynamics of various commercial industries intersect with fisheries, coastal wetlands, marine life and the negative effects of climate change and sea level rise. Greater knowledge and understanding of the region's soil composition, by both scientists and decision-makers, can help guide the discussion and implementation of billions of dollars in post-disaster projects targeting improvements in critical ecosystem services.

Based on Houston Wilderness' Ecosystem Services Primer, 2nd Edition, this presentation discusses ways for determining ecosystem services (ES) benefits and values using different established study/valuation methods depending on targeted infrastructure/project goals. In Six Steps designed to aid decision-makers in infrastructure options, the Primer looks at how the framework for comparison and valuation of the natural environment can be improved by laying out a comprehensive and systematic means to ensuring that ecosystems, and the critical services that they provide, are taken into account in policy decisions. The Six Steps include: determining the nature-based infrastructure goals, understanding the role of various ES in decision making, establishing an ES baseline for the targeted area(s), evaluating benefit relevant indicators, considering regional/local challenges, and using optimal ES valuation methods. In this way, the HW ES Primer considers the environment as a whole – bringing together land, water, air, soil and biodiversity, recognizing that their linkages provide a wide variety of services and benefits.

This broader framework allows a shift in emphasis from a focus mainly on valuing environmental damage to highlighting the value of changes in the services provided by the natural environment through use of nature-based infrastructure. Local and regional case examples are discussed, where science-based ES benefits and valuation options were analyzed and practical nature-based solutions were implemented, often as alternatives to more structural, gray infrastructure options.

AudienceTake Away:

- In Six Steps designed to aid decision-makers in considering the impacts/benefits of various infrastructure options, this presentations follows a framework for comparison and valuation of the natural environment and how to improve ES and the critical services that they provide. The Six Steps include: 1) determining the nature-based infrastructure goals, 2)

understanding the role of various ES in decision making, 3) establishing an ES baseline for the targeted area(s), 4) evaluating benefit relevant ES indicators, 5) considering regional/local challenges, and 6) using optimal ES valuation methods. Through a variety of case examples, this presentation Primer illustrates the considerable complexity in understanding and assessing the causal links between infrastructure policy, its effects on ecosystems and related services and then valuing the effects in economic terms. Integrating policy, science and economics disciplines is important when going through the Six Steps. The critical importance of the links to scientific analysis, which form the basis for valuing ecosystem services, is also stressed

- This presentation is based on Houston Wilderness' Ecosystem Services (ES) Primer, 2nd Edition. Targeted uses of the HW ES Primer that will be discussed in the oral presentation include: 1) determining how to best value an ecosystem service(s) depending on the goal of the decision-maker (e.g., making a land-use change, needing to improve air and/or water quality, providing erosion control or increasing carbon sequestration, providing more outdoor recreation in an area, and lowering energy costs); 2) determining how many ecosystem services an area of land provides to humans and wildlife; 3) comparing the ecosystem services of different areas of the region; and 4) accessing the options available to a decision-maker when looking at land-use changes). For example, the ES Primer has been used by various decision-makers to 1) consider ways to quantify multiple impacts to parks systems - due to both nature and man-made events, and 2) cumulatively value the ES impacts from temporary or permanent land-use disturbances, such as new installation of oil and gas pipelines running through public lands, disaster-fund residential home buyouts, enlargements in existing riparian corridors and increased use of nature-based stabilization techniques on developed lands. The HW ES Primer is also used by governmental officials and residential/commercial developers considering nature-based infrastructure projects for large storm-water detention areas and riparian nature-based stabilization techniques, including low impact development, bioswales and carbon sequestration

Biography:

Deborah has been involved with public policy around the Greater Houston region and the State of Texas for over 35 years, currently serving as President & CEO of Houston Wilderness (www.houstonwilderness.org). She received her Bachelor of Arts from the University of Texas at Austin in 1985 and her J.D. from the University of Houston Law Center. She most recently helped create and now implement the 8-county Gulf-Houston Regional Conservation Plan (www.gulfhoustonrcp.org). She is lead author on Houston Wilderness' Ecosystem Services Primer, 2nd Edition and speaks regularly at environmental conferences on Greater Houston's ecological assets and regional ecosystem services case studies.

Surajit Chattopadhyay*[1], Goutami Chattopadhyay[2]
[1]Department or Mathematics, Amity University, Kolkata, West Bengal, India
[2]Department of Atmospheric Sciences, University of Calcutta, Kolkata, West Bengal, India

A frequency domain approach to the Surface Temperature and a Statistical Elucidation of its association with Total Ozone Concentration

We endeavor to demonstrate an association between total column ozone (TCO) and surface temperature (ST) over Kolkata, a highly polluted city belonging to the Gangetic West Bengal (GWB). The period, when the study zone experiences a change from monsoon to post-monsoon, is the focus of the study. A spectral analysis approach is demonstrated to study the existence of any common cycle in TCO and ST time series. We have derived the spectra and observed the existence of common spectra of period 24 on a daily scale. We interpret this as proof of the similarity in the fluctuation pattern of TCO and ST. The pattern of the surface temperature has also been studied through Markov Chain to understand its serial dependence to further understand its complexity.

Audience Take Away:

- The time evolution of the ST time series over the study zone
- The spectra of the time series under consideration
- The association between ST and TCO under the purview of the climate over GWB

Biography:

Dr. Surajit Chattopadhyay, an Associate Professor and Head, Dept of Mathematics, Amity University, Kolkata, India, started his academic career as a Senior Research Fellow of the Dept of Atmospheric Sciences, University of Calcutta, Kolkata, India. The research interest of Dr. Chattopadhyay encompasses Theoretical Climatology and Cosmology. Dr. Chattopadhyay is a Fellow, Royal Astronomical Society, London and Member, IOP, London. At present Dr. Chattopadhyay has 131 publications in SCIE indexed journals including Theoretical and Applied Climatology, Natural Hazards, Meteorological Applications and International Journal of Climatology.

Prof Aaron Yair
Department of Geography, Hebrew University of Jerusalem,
Mt Scopus Campus, Jerusalem, Israel

Contrasting eco-geomorphological responses to climatic changes, during the Upper Pleistocene and Holocene periods, in the South Eastern Mediterranean area

Dryland areas are regarded as highly sensitive to climatic changes. A positive relationship between rainfall and environmental factors is often assumed (water availability, species diversity, etc.) for areas with an average annual rainfall of 100-300 mm. This assumption disregards the fact that a climate change in arid areas is not limited to climatic factors. It is often accompanied by a pronounced variability in surface characteristics. Needless to say, the spatial variability of surface properties may have variable effects on water resources and related environmental variables. The present work deals with the complex relationships among the average annual rainfall, surface properties and the spatial redistribution of water resources in a sandy area located in the Northern Negev Desert Two case studies are considered, The first deals with the hydrological effects of biological topsoil crusts on the water regime, along a rainfall gradient (90-180 mm). This study is based on five monitoring sites where the following data have been considered (rainfall, runoff, soil moisture, surface properties, characteristics of the biological elements, and survival of the perennial shrubs along the rainfall gradient. Data obtained show a decrease in water availability with increasing annual rainfall. The findings are attributed to the decisive role played by the non-uniform properties of the topsoil crust along the rainfall gradient. The second study deals with the negative environmental effects of loess penetration into a semi-arid area, during a wet climatic phase. The loess deposit increased infiltration. However, due to the fact that about 80% of the rain-showers are characterized by a low rain intensity (below 5mm/hr1) the depth of rainwater penetration is limited, leading to a soil salinization process during a wet climatic phase. The opposite effect happened during the dry climatic phase. Sand deposition improved rainwater infiltration, allowing the development of a vegetation cover.

Understanding the spatial variability of soil moisture in drylands areas is the key for the agricultural management of loess or sand covered area. For example: sandy areas were often regarded as improper for agriculture. However, today with the drip irrigation system, they are regarded as excellent soils. The y do not absorb water, allowing to provide exactly the water needs of the different plants. On the other hand, the loess saline soils are using for growing the Salicornia plants. A vegetal salt.

Biography:

Professor Aaron Yair studied geography at the Sorbonne University in Paris, France, and graduated as Master in 1955. He then moved to Israel, where he received his PhD degree in 1967 (Suma com Laude). He was then nominated as lecturer, and later, as full professor.
Chairman of the Department of Geography and of the Institute of Earth Sciences of the Hebrew University. Head of the Watershed Ecology Unit, Blaustein Institute for Desert Research, Ben Gurion University of the Negev. Founder and Director of the Arid Ecosystems Research Centre of the Hebrew University. President of the Association of Israeli Geographers. Visiting scientist at the following universities: Ottawa; Toronto; Leuven; Amsterdam; Paris (Sorbonne); London (UCL and King's college); Dijon (CNRS- Bigeosciences). New Mexico and Nevada (Institute for Desert Research); Cambridge (UK), Belfast University.

Emanuele Calabro and Salvatore Magazu
Department of Mathematics and Informatics Sciences, Physics Sciences and Earth Sciences, University of Messina., Italy

Human-induced ground albedo increasing: How does it affect climate change?

In the last decades, human activities have generated increasing in ground albedo produced by deforestation and overbuilding. Man-made deforestation has caused desertification and a consequent increasing of ground reflected solar radiation. In addition, the areas of cemented land have increased more and more because a large increase in the demand for increasingly wealthy homes and workplaces, inducing overbuilding. Also this phenomenon has given rise to an increasing in ground reflected solar radiation. Both effects have induced an increasing of ground albedo coefficient. The ground albedo solar radiation corresponds to the ratio of reflected/ to the incident light at a considered surface and can be calculated by empirical models.

Overgrazing and deforestation influence Earth's climate because albedo increasing induced by desertification causes an increasing of greenhouse effect in the troposphere.

Nevertheless, ground albedo variations can also affect the energy balance between Earth and air, influencing locally and globally the state of troposphere. In particular it was shown that ground albedo increasing induces surface latent and sensible heat flux decreasing at the surface because of the reduction of solar radiation energy absorbed at the surface, resulting in a reduction in convection and precipitation [1, 2]. Furthermore, another effect due to ground albedo increasing has to be taken into account, that is, the increasing latent and sensible heat flux in air layers in the proximity of the ground, according to the equation $Ir = Hg\,\rho\,(1 - \cos\beta)/2$ in which Ir is the ground reflected solar radiation, Hg is the monthly average of daily global solar radiation impinging on a horizontal surface at a location, β is the slope of a generic air layer and ρ the ground albedo coefficient [3]. The annual global solar radiation absorbed by a hypothetical air surface is given by $IT = Ib + Id + Ir$ where Ib is the direct solar radiation and Id the diffuse solar radiation [3]. It can be calculated using some empirical models and algorithms. The algorithm of [4, 5] and the ground albedo coefficients $\rho = 0.10$, $\rho = 0.45$ and $\rho = 0.55$ corresponding to the conifer forest [6], the desert sand [7] and an average value of cemented soil [8, 9], respectively, were used. Using recent results regarding the Sahara desert expansion [10] and the increase of cemented soil area in Earth's surface due to overbuilding [11], it resulted that the annual global solar radiation acquired by troposphere layers neighboring desert or cemented soil, increases significantly (about 3.5 %) with respect to the annual global solar radiation collected by air layers in proximity of forested ground. This circumstance induces a rise of heat and temperature and a consequent decrease in density in air layers neighboring desert or cemented soil. As a result, air motions in vertical direction following convention rules in meteorology occur, causing air flows between these differently heated air areas due to thermal gradient, as schematized in Fig.1. This thermoconvective process related to human-induced ground albedo increasing represents a cofactor that contributes to greenhouse effect and climatic change.

Audience Take Away:

- The concept of ground albedo should be learned in order to understand how its change can contribute to climate change
- The understand of this topic can lead to avoiding deforestation and overbuilding
- In order to lower greenhouse effect due to human-induced increasing of ground albedo, installing green space over building and within urban paved areas and undertake massive reforestation should be carried out

Biography:

Emanuele Calabrò is Full Professor of Physics at the Technological Technical Institute of Messina (Italy). He received the National Qualifications as University Professor in Applied Physics and in Experimental Physics of Matter. He received the International Prize for Excellence in Research by the Academic Brand Awards-2018. He has published more than 100 refereed papers in ISI journals, monographs and book chapters.

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[2]Lecturer in Maritime Security Study Program, Indonesia Defense University, and Executive Director at Indonesia Institue for Maritime Studies(IIMS)
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Maritime disaster in outermost Island as threat of sovereignty and National Maritime Security in the International Law Perspective

Indonesia is one of the countries in the world that is very vulnerable to natural disasters. Climate change is increasingly extreme globally, and Indonesia's position in the Ring of Fire become the main reasons for frequent maritime disasters such as abrasion and tsunami disasters, and this is a security threat considering that Indonesia as a maritime country which geographically comprises 2/3 of the sea area, and a group of islands. Maritime disasters triggered by climate change, impact on loss of island areas and beaches due to rising sea levels, as happened in several Indonesian islands, such as Tiban Island, Bengkalis Island, six islands in the Kepulauan Seribu and other islands. If this happens in the outermost islands, it will potentially become a threat to territorial sovereignty, national defense, and trigger international border conflicts. In mitigating abrasion disasters on the outermost islands, it needs to be handled wisely and appropriately. This because in International Law, Indonesia has ratified the United Nations Convention on the Law of the Sea (UNCLOS) 1982 in determining territorial boundaries in the sea region, especially those directly adjacent to other countries. This study uses descriptive-qualitative methods in analyzing the problem of the loss of determinants of territorial area measurement, caused by Maritime Disasters from the perspective of International Law. The maritime security concept, explained by Christian Bueger through the Maritime Security Matrix, will help analyze the threat of the Abrasion and Tsunami disaster on the outer islands as a threat. To achieve a "World Maritime Exis", Indonesia needs to pay attention to the impact of natural disasters, especially maritime disasters on the outer islands, to maintain the country's sovereignty through policies related to disaster mitigation.

Keywords: Climate Change; Maritime Disasters; Maritime Security; International Law; Border Conflict; UNCLOS 1982.

Biography:

Agung Imam Zulhatta done his undergraduate Program of International Relations, Faculty of Social and Political Science, Andalas University (UNAND) (2014-2018) and master Program of Maritime Security, Faculty of National Security, Indonesia Defense Univeristy.

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Extreme changes of daily rainfall and temperature patterns in a tropical sub-humid basin: A statistical downscaling assessment for the 21st century

Climate change has exacerbated the occurrence of extreme weather events in many regions worldwide. The objective of this study was to assess extreme temperature and rainfall variations in the Pra River Basin (a tropical sub-humid basin in Ghana), as a case-study potentially applicable to other similar regions globally. The methodology was based on the use of different climate models. Firstly, we tested the capability of the statistical downscaling model SDSM-DC to simulate past extreme climate indices for the period 1981 – 2010 (observed). We then projected temperature indices for the period 2011 – 2100 under CMIP5 RCP4.5 and 8.5 emission scenarios in the basin. Ten rainfall and nine temperature extreme indices were examined and the accuracy of SDSM-DC was evaluated with the Nash-Sutcliffe efficiency and Percent bias. The results show that observed number of heavy precipitation days increased, whilst consecutive wet days and consecutive dry days decreased, although the trend was not significant. Moreover, observed warm and cool temperature generally showed a significant increasing and decreasing trend, respectively. Performance analysis shows that SDSM-DC had a poor accuracy level in simulating rainfall indices; however, whilst simulating TX90p, TX10p, TN10p and DTR, the model was acceptable at more than 50% of the stations. Generally, TX90p showed a significant increasing trend, whereas TX10p, TN10p and DTR showed a significant decreasing trend between 2011 and 2100 under both RCP4.5 and 8.5. By 2100, under the RCP4.5 scenario, TX90p, TX10p, TN10p and DTR could increase by 0.72%, 0.36%, 0.35% and decrease 0.08°C respectively; whereas under the RCP8.5 scenario it could increase by 0.73%, 0.32%, 0.34% and decrease 0.15°C respectively. Therefore, the continuous warming trend poses threat to water resources, food security (including pest invasion, e.g. armyworms) and human health in the basin. The findings are relevant for adaptation and management policies and strategies planning. They also provide insights for improving climate models' capabilities to simulate extreme climate indices at local and regional scales. Analogous simulations in other regions within Ghana and other nations, especially in Sub-Saharan Africa, could help improve the accuracy of these prediction models.

Audience Take Away:

- The observed trend of extreme rainfall implies that both drought and flood adaptation measures could be necessary in the basin in future
- Night temperatures are increasing faster than day, therefore, more energy will be required to cool rooms to make living comfortable and prevent heat-stress and heat-related diseases

- The statistical downscaling model (SDSM-DC) captures temperature extremes better than rainfall at the basin level

Biography:

Dr. Enoch Bessah studied BSc. Agricultural Engineering at the Kwame Nkrumah University of Science and Technology (KNUST), Ghana and graduated in 2011. He then joined the department of the university as a Teaching and Research Assistant for one year and studied MTech in Climate Change and Adapted Land Use at the Federal University of Technology, Minna in Nigeria and graduated in 2014. Enoch received PhD in Environmental Management from Pan African University and University of Ibadan, Nigeria in 2019. He is currently lecturing at KNUST. Enoch has about 10 peer-reviewed publications.

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POSTERS

CLIMATE CHANGE VIRTUAL 2020

SEPTEMBER 18 2020

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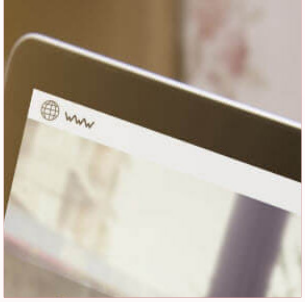
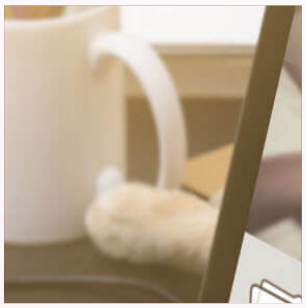
Impact of future climate changes on arbuscular mycorrhizal communities under organic vs. conventional agricultural management systems

Arbuscular mycorrhizae (AM) are the most common symbiotic association of plant roots with soil-borne fungi. AM fungi significantly improve plant growth, nutrient uptake and crop production. In addition, AM fungi can improve plant immunity to tolerate biotic and abiotic stressors. Various agricultural regimes such as the intensity of cultivation, crop rotations and application of fertilizers and pesticides have severe impacts on the AMF diversity and community composition in soil and in plant roots. Moreover, future climate changes (including altered precipitation and temperature patterns) have severe impacts on the mycorrhiza-root associations. However, the impact of interaction between the agricultural management systems and the global future climate changes on AM fungi is poorly understood. For that reason, in our study, we aimed to evaluate impact of various agricultural regimes and future climate changes, together with consideration of the combined effects on diversity and community composition of AM fungi. The study was conducted on the Global Change Experimental Facility (GCEF), a natural field plots undergo realistic scenario of future climate based on several models of climate change in Central Germany for the years between 2070 and 2100. We characterized mycorrhizal communities colonizing roots of wheat (Triticum aestivum) cultivated in organic vs. conventional farming agroecosystems in the plots undergo future and ambient climate conditions using Illumina MiSeq sequencing of 18S rDNA. We found that future climate has a significant impact on both AM fungal community composition and richness. Also, Future climate significantly affect the dynamics of mycorrhizal communities colonizing plant roots at different growth stages. We are recommending application of organic farming systems for better AM fungal root association in the future.

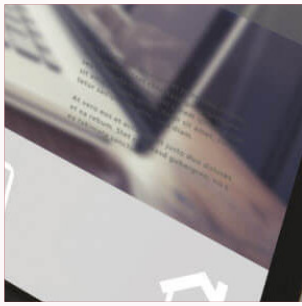
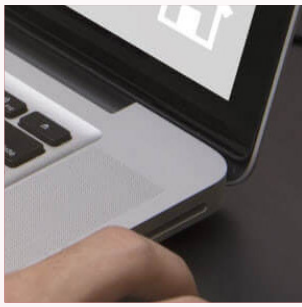
PARTICIPANTS LIST









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