GLOBAL SCIENTIFIC FORUM

VIRTUAL EVENT

INTERNATIONAL CONFERENCE ON EARTH SCIENCE & CLIMATE CHANGE

Theme:
New Challenges and Innovations in Earth Science and Climate Change to lead a sustainable life

APRIL 27-28, 2022

EARTH SCIENCE 2022

Global Scientific Forum LLC
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PROGRAM-AT-A-GLANCE

EARTH SCIENCE 2022

DAY 1

APRIL 27, 2022

Scientific Program

GMT-Greenwich Mean Time

09:00-09:10	**Opening Ceremony | Introduction**
Keynote 09:10-09:35	**Title: Realize 100% Renewable Energy in Low-Latitude Pacific Ocean by Sailing Mega-Solar Raft Project** **Takaji Kokusho,** *Chuo University, Japan*
Keynote 09:35-10:00	**Title: Estimation of atmospheric CO_2 amount reduction through a decarbonation method based on seawater electrolysis, aimed to create a global-scale CO_2 capture strategy** **Katsuyoshi Tatenuma,** *Kaken Inc., Japan*
Keynote 10:00-10:25	**Title: A synthesis of aquatic sedimentary heavy metals (Cu, Pb, and Zn) from the ASEAN-5 emerging developing countries: The Ecological-Health risk perspective** **Chee Kong Yap,** *Universiti Putra Malaysia, Malaysia*
Refreshment Break 10:25-10:35	
Keynote 10:35-11:00	**Title: Nature-based solutions to mitigate pollutants and climate change impacts at the Black Sea region** **Valasia Iakovoglou,** *International Hellenic University, Greece*
Keynote 11:00-11:25	**Title: The message from water: Water's relationship with Hado (vibration)** **Michiko Hayashi,** *Emoto Peace Project, Japan*
11:25-11:45	**Title: On the discovery of a Roman fortified site in Gafsa, Southern Tunisia, based on high-resolution X-band satellite radar data** **Nabil Bachagha,** *Central South University, China*

11:45-12:05	**Title: Theoretical-practical analysis of the risk of floods in the Madeira Archipelago – The case study of the municipalities of Funchal, Machico, Ribeira Brava and São Vicente** **Sérgio António Neves Lousada,** *University of Madeira (UMa), Portugal*
12:05-12:25	**Title: Landslide risk assessment: a balance between nature and human activity** **Simone Mineo,** *University of Catania, Italy*
12:25-12:45	**Title: Cross drill sowing (30x30cm2) with bidirectional improved the performance and profitability of wheat in heat stress conditions** **Iqtidar Hussain,** *Gomal University, Pakistan*
12:45-13:05	**Title: The preservation of *in vitro* collection of sweet potatoes (IPOMOEA BATATAS L.) at the Institute of Vegetable and Melons Growing of National Academy of Agrarian Sciences of Ukraine** **Anna Mozgovska,** *Institute of Vegetable and Melons Growing of National Academy of Agrarian Sciences of Ukraine, Ukraine*
Lunch Break 13:05-13:35	
13:35-13:55	**Title: Gravity and seismic structural modelling of petroleum systems of Kerio Valley Basin, Kenya** **Faith Ndunge Sila,** *Kenyatta University, Kenya*
13:55-14:15	**Title: Corn cobs efficiently reduced ammonia volatilization and improved nutrient value of stored dairy effluents** **David Nartey Obemah,** *CSIR-Soil Research Institute, Ghana*
14:15-14:35	**Title: Disrupting the disruption: A digital learning HeXie ecology model** **Na Li,** *University of Liverpool, UK*
Keynote 14:35-14:55	**Title: Usefulness of tree species as urban health indicators** **Bibi Dina,** *University of Debrecen, Hungary*
Keynote 14:55-15:15	**Title: Working at the demand end to mitiate and adapt to climate change** **Joanna Kane-Potaka,** *SmarterFoods, USA*

Refreshment Break 15:15-15:25	
Keynote 15:25-15:50	**Title: Climate crisis is here: Why can't society deal with it and how can we?** **Alan Betts,** *Atmospheric Research, USA*
Keynote 15:50-16:15	**Title: Sustainable fuel: Clean and green hydrogen** **Nishant Tiwary,** *Harvard University, USA*
16:15-16:35	**Title: Radioecological monitoring of transboundary territories: Problems and their solutions** **Marina Li,** *Scientific - research radiological laboratory of the Ministry of Health, the Republic of Uzbekistan*
16:35-16:55	**Title: Improving the reliability design of mechanical systems such as refrigerator** **Seongwoo Woo,** *Ethiopian Technical University, Ethiopia*
16:55-17:15	**Title: Assessment of a littoral envionment using optical indicators: Case of Gabes cement plant-Tunisia** **Khaoula Ben Atia Zrouga,** *University of Sousse, Tunisia*
End of Day 1	

DAY 2

APRIL 28, 2022

Scientific Program

GMT-Greenwich Mean Time

10:00-10:20	**Title: Climate change sustainable use of nature resources and high-quality development** **Zhong-Sheng Guo,** *Northwestern A & F University, China*
10:20-10:40	**Title: Multi-geodetic techniques detecting land surface deformation through CMONOC stations in Southwestern China** **Shuguang Wu,** *Naval University of Engineering, China*
10:40-11:00	**Title: Assessment of patulin in different cultivars of apples, juices, and distribution in decay portion** **Shahzad Zafar Iqbal,** *Government College University Faisalabad, Pakistan*
Refreshment Break 11:00-11:10	
11:10-11:30	**Title: Assessment and monitoring of grassland ecosystems desertification in Kazakhstan using remote sensing and GIS applications** **Yegizbayeva Asset,** *JSC National Center of Space Research and Technology, Kazakhstan*
11:30-11:50	**Title: Afghanistan water resources: Opportunities and threat** **Noor Ahmad Akhundzadah,** *Kabul University, Afghanistan*
11:50-12:10	**Title: Simulation of urban expansion in Estonia by integrated cellular automata and agent - Based models** **Najmeh Mozaffaree Pour,** *University of Tartu, Estonia*
12:10-12:30	**Title: Advanced remote sensing techniques for lithological identification and mineral exploration** **Safaa Sayed,** *National Authority for Remote Sensing and Space Sciences (NARSS), Egypt*
12:30-12:50	**Title: Impact of land use/land cover change on hydrological components in urbanizing catchment: A case of Chongwe River catchment, Zambia** **Tewodros Tena,** *The Copperbelt University, Zambia*
12:50-13:10	**Title: Vulnerability mapping of agriculture to sand and dust storms** **Ali Darvishi Boloorani,** *University of Tehran, Iran*

Lunch Break 13:10-13:40

13:40-14:00	**Title: Challenges and opportunities of cropping in Haor (Wetland) ecosystem in Bangladesh** **Shoaib J. U,** *Soil Resource Development Institute, Bangladesh*
14:00-14:20	**Title: Field-based data collection for monitoring of Hispar Glacier Hunza Valley Pakistan** **Syed Hammad Ali,** *Glacier Monitoring & Research Center (GMRC), Pakistan*
14:20-14:40	**Title: Prospective hazard of Glacial Lake outburst flood in the Hindu Kush Region of Pakistan** **Naveed Mustafaf,** *Pakistan Agricultural Research Council, Pakistan*
14:40-15:00	**Title: Biofuels and sustainable future** **Sama Rahimi Devin,** *Shiraz University, Iran*

Refreshment Break 15:00-15:10

15:10-15:30	**Title: Reveal implication of climate change impacts on precipitations using pressure change and stochastically downscaled hourly precipitation series** **Ziwen Yu,** *University of Florida IFAS, USA*
15:30-15:50	**Title: Optimization of chahbani buried diffuser installation for Jemna oasis suistanibility (North Africa)** **Nesrine Zemni,** *University of Carthage, Tunisia*
15:50-16:10	**Title: Current status of morphological and molecular biodiversity conservation of wild olive (Olea europaea L. subsp. europaea var. sylvestris) from various sites prospected along northern Algeria** **FALEK Wahiba,** *University of the Mentouri Brothers - Constantine 1, Algeria*
16:10-16:30	**Title: Transport-related CO_2-emissions, the pros and cons of going electric** **Jaap M. Vleugel,** *Delft University of Technology, the Netherlands*
16:30-16:50	**Title: Factors that impact greenhouse gas emissions in Saudi Arabia: Decomposition analysis using LMDI** **Reema Alajmi,** *King Saud University, Saudi Arabia*

End of Day 2

Closing Remarks

BOOKMARK YOUR DATES

2ND INTERNATIONAL CONFERENCE ON EARTH SCIENCE AND CLIMATE CHANGE

April 24-25, 2023 | Dubai, UAE

https://www.globalscientificforum.com/conferences/earth-science-climate-change

Keynote Forum

DAY 1

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Realize 100% renewable energy in low-latitude Pacific Ocean by sailing mega-solar raft project

Takaji Kokusho

Chuo University, Japan

A global energy project is proposed in order to switch future human energy to 100% renewable by utilizing rich solar energy in the low-latitude Pacific Ocean as the last natural energy frontier. For that goal, a wind-sailing Mega-Solar-Raft with its ultimate area of 25 km^2 is to be developed to generate huge electricity equivalent to a 1 GW nuclear power station by vast solar modules covering the raft. Solar energy density 8 kWh/m2, 2~3 times higher than that in medium latitude countries, is targeted as the MSRs navigate vast open seas in the low-latitude Pacific Ocean, where rich sunshine, favorable winds/waves and almost zero risk of tropical storms are available. The generated electricity is transformed to H_2-gas or other chemicals or directly charged to huge number of standardized battery packages of electric vehicles and periodically shuttled by ships. Three major technological breakthroughs for the system are flexible solar module integrated with sail cloths, efficient energy transportation and low-cost rafts. Associated technologies and costs are estimated, which reveals that the target cost of solar modules for this energy system is attainable as well as major technological challenges to realize better feasibility.

https://kokasahi.com/koktak/realize-100-renewable-energy-in-low-latitude-pacific-ocean-282.

BIOGRAPHY

- KOKUSHO, Takaji; PhD (Dr. Eng.), Registered Engineer.
- Professor, Emeritus, Chuo University, Tokyo, Japan, since 2015.
- PhD. (Doctor of Engineering) from the University of Tokyo,
- “Dynamic soil properties and nonlinear seismic response of ground” in 1982.
- MS Degree from Duke University USA in 1975.
- MS Degree from the University of Tokyo in 1969.
- BS Degree from the University of Tokyo in 1967.

Research Topics:

- Dynamic soil properties and their evaluation
- Dynamic response of ground
- Liquefaction of sand/gravelly fines-containing sands
- Earthquake-induced slope failure
- Siting technology of energy facilities

Academic Society Activities:

- Ishihara Lecturer at 6th International Conference on Earthquake Geotechnical Engineering (Christchurch) (2015)
- Chairman of TC4 (Earthquake Geotechnical Engineering), ISSMGE (2005-2009)
- Chairman of Organizing Committee of IS-2009 Tokyo by TC4, ISSMGE (2009)
- Chairman of Asian Technical Committee No.3 (ATC3-Geotechnology for Natural Hazards) of ISSMGE (1998-2005)

Awards:

- Research paper Award from Japanese Geotechnical Society (2020, 2017, 2014)
- Research paper Award from Japan Society for Civil Engineers (2005)
- Distinguished Technology Award from Japanese Geotechnical Society (1984)
- Research Encouragement Award from Japan Society for Civil Engineers (1980)

Publications in English

- Innovative Earthquake Soil Dynamics (2017): CRC Press, London.
- Performance-Based Design in Earthquake Geotechnical Engineering - from Case History to Practice-
- edited and written (2009): CRC Press, London.
- Earthquake Geotechnical Case Histories for Performance-Based Design: edited and written (2009): CRC Press, London.
- Kokusho, T., Emoto, E. and Kato, T. (2013): Sailing solar cell raft project and weather and marine conditions in low-latitude Pacific Ocean, *Journal of Energy Engineering*, ASCE, 139(1), 2–7.

EARTH SCIENCE 2022
Volume 1

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Estimation of atmospheric CO_2 amount reduction through a decarbonation method based on seawater electrolysis, aimed to create a global-scale CO_2 capture strategy

Katsuyoshi Tatenuma

Kaken Inc., Japan

It is well known that global warming is caused by an increase in the concentration of CO_2 in the atmosphere. The atmospheric CO_2 concentration dramatically increased in the last 300 years, due to fossil fuels consumption and deforestation. From approximately 280 ppm before the start of the industrial revolution, about a 140 ppm upsurge was estimated. This phenomenon is understood to be responsible for a rise in global temperature, which will lead to glaciers melting and sea levels rising. Consequently, the research focused on atmospheric carbon capture and storage is fundamental for achieving the goals of the Paris Agreement concerning climate change mitigation. A primary strategy to face these problems is to reduce the consumption of fossil fuels, by introducing, as an example, electric engines and renewable energies. Nevertheless, another essential task is the sequestration of the existing CO_2 excess in the atmosphere and its stable storage. From this point of view, for several years the most promising technique was the geological sequestration through injection and confinement of liquefied CO_2 into selected deep underground rock formations (such as saline reservoirs and depleted oil/gas fields). However, the hazard of potential CO_2 leakage is the main weak point related to this method. A more recent alternative was the geochemical sequestration, based on CO_2 injection into minerals that may drive carbonation reactions, producing stable carbonate rocks and implying a negligible risk of return to the atmosphere. In our opinion, geochemical sequestration can be efficiently used and optimized by exploiting both seawater electrolysis and the oceans' natural CO_2 absorption feature. Consequently, in our presentation, we show an estimation of the atmospheric CO_2 amount reduction achievable through a decarbonating method based on seawater electrolysis.

BIOGRAPHY

Dr. Tatenuma Katsuyoshi has been managing Kaken Inc., a research and developmental company in the chemical field, in Mito Japan, for 40 years over. The favorite R&D fields of Dr. Tatenuma are mainly chemical analysis, nuclear medicine and its materials, and recently he is developing a new type of disinfectant and environmental purifier materials.

Dr. Spaziani studied Environmental Sciences at the Tuscia University (Viterbo, Italy). From 2004 to 2011 he joined the Environmental Chemistry research group of ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) in Roma (Italy). He received his Ph.D. degree in 2010. From mid-2011 to late-2018 he worked in Japan and joined the research group of Kaken Inc. in Mito, where he focused on the development of innovative materials for environmental and nuclear-fusion energy applications.

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A synthesis of aquatic sedimentary heavy metals (Cu, Pb, and Zn) from the ASEAN-5 emerging developing countries: The ecological-health risk perspective

Chee Kong Yap

Universiti Putra Malaysia, Malaysia

The ASEAN-5 countries (Malaysia, Indonesia, Thailand, Philippines, and Vietnam) is an ever-increasing major economy developmental hub in Asia besides having wealthy natural resources. However, heavy metal (HM) pollution in the region is of increasing environmental and public concern. This study compiled the concentrations of Cu, Pb, and Zn in the aquatic sediments of the ASEAN-5 countries published in the literature from 1981 to February 2021. The mean values of Cu, Pb, and Zn in aquatic sediments were elevated and localized in high human activity sites and compared to the earth's upper continental crust and reference values. All reports (100%) showed the Zn ER values were categorized as being between 'low potential ecological risk' and 'considerable potential ecological risk'. Almost all Cu ER values (97.7%) also showed similar ranges of the above two risk categories except for a few reports. Almost all reports (96%) showed Pb ER values categorized as between 'low potential ecological risk' and 'moderate potential ecological risk' except for a few reports. For the ingestion and dermal contact pathways for sediments from the ASEAN-5 countries, all non-carcinogenic risk (NCR) values (HI values 1.0) for Cu, Pb, and Zn reflected no NCR. The synthesis carried out in this review provided the basis for us to consider Cu, Pb, and Zn as being of localized elevated levels. This provided evidence for the ASEAN-5 group of countries to be considered as being a new socio-economic corridor. Beyond any reasonable doubt, an ever-increasing anthropogenic input of HMs is to be expected to a certain degree. This review provided the most fundamental useful baseline data for the future management and sustainable development of the aquatic ecosystems in the region.

BIOGRAPHY

Prof. Dr. Chee Kong Yap is working as a full professor in Universiti Putra Malaysia (UPM) since 2021. Prof Yap is an academician for more than 18 years in UPM and 23 years as a researcher. Prof Yap has supervised more than 80 undergraduates and 30 postgraduate students in the fields of ecotoxicology, environmental biology, environmental sciences, water quality and ecotoxicological genetics. Prof Yap has published more than 325 papers in refereed academic journals, 5 books (three of them published in NOVA Science Publishers, USA) and 32 book chapters. As on April 2022, 212 of them have now been indexed in Elsevier's Scopus with an H-index of 30 (>2951 citations). Prof Yap has also been invited in honorary as Editorial Board members for more than 30 international academic journals. Prof Yap has been an invited visiting researcher at National Institute of Environmental Studies, Tsukuba (Japan), an invited visiting professor at Nihon University (Japan) and Hokkaido University (Japan), and an invited visiting researcher at Kobe University (Japan). .

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Nature-based solutions to mitigate pollutants and climate change impacts at the black sea region

Valasia Iakovoglou

International Hellenic University, Greece

Climate change as well as the anthropogenic activities pose many challenges for the long-term sustainability of ecosystems and economic prosperity. The Black Sea is considered highly degraded and polluted. Sparce research has been conducted on the input of inland pollutants and litter that derive from rivers and streams that contaminate those sea waters. The aim of this study was to identify the major sources of pollutants while suggesting nature-based solutions to mitigate the problem for long-term sustainable management. Five countries participate in this study; Greece, Romania, Armenia, Moldova and Turkey. Surface and stream bank erosion were evaluated at the pilot area of each country. Traditional erosion pin and runoff plots and newly applied innovative technological methods such UAVs and laser scanning were used to estimate the target highly eroded areas. These methods will allow to target the sites that contribute the highest erosion/litter pollutant levels. In these areas the optimal nature-based solutions for each country pilot area will be suggested. The focus is on nature-based solutions since they are more effective for long-term sustainable management and also can help mitigate climate change impacts.

BIOGRAPHY

Dr. Valasia Iakovoglou is a distinct graduate of Iowa State University, USA. She has more than 25-yrs of national/international research and teaching experience as an Ecophysiologist/Silviculture expert in seedling production and Restoration/Conservation of Ecosystems with emphasis on Biodiversity under the challenges of Climate Change. She has received numerous scholarships, awards and recognitions. She is an editor of nine international journals and a reviewer in more than fifteen with one of them being the Intergovernmental Panel on Climate Change (IPCC). She has more than 100 publications (books/book chapters, peer-reviewed scientific articles). She is active in many scientific societies such as the Mediterranean Experts of Climate and environmental Change (MedECC) as weill as Board Member of associations such as the "Association of Inter-Balkan Woman's Cooperation Societies (AIWCS)" of UNESCO Center, where she is responsible for the "Education" sector. Since 2018, she is the Director of the Ecotourism Sector of the UNESCO chair Con-E-Ect and since 2021 she is the Country Chair for Farming and AgriTourism, G100 Women of the World.

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The message from water: Water's relationship with Hado (Vibration)

Michiko Hayashi

Emoto Peace Project, Japan

Michiko will talk about the world's renown author and water researcher, Dr. Masaru Emoto's groundbreaking discovery on water and will show water crystal photos. Everything is Hado (vibration), and water retains memory and it transmits information it absorbs. Vibration is energy, it's information and it is life. Words we use, our thoughts, intentions, prayers are deeply connected to water. They are so powerful and return to self, thus they affect not only our health but also everything on earth and Mother Earth itself. Water shows how consciousness is powerfull through its crystals.

BIOGRAPHY

Global Director and Ambassador of "EMOTO PEACE PROJECT" non profit organization. Researcher of water at Office Masaru Emoto, LLC. Worked as a personal assistant to Dr. Masaru Emoto for nearly11 years. He was the founder of the Emoto Peace Project, the pioneer of HADO (vibration), researcher of water, and author of world best-seller "The Message from Water", "The Hidden Messages in Water", etc. She is the successor of his legacy. She is one of the authors of anthologies "Womb to Thrive"Love Letters to Water". She gives lectures on Message from Water all around the world to make the world a harmonious and peaceful place.

Scientifc Abstracts

DAY 1

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On the discovery of a roman fortified site in Gafsa, Southern Tunisia, based on high-resolution x-band satellite radar data

Nabil Bachagha and **Wenbin Xu**

Central South University, China

The increasing availability of multiplatform, multiband, very high-resolution (VHR) satellite synthetic aperture radar (SAR) data has attracted the attention of a growing number of scientists and archaeologists. In particular, over the last two decades, archaeological research has benefited from SAR development mainly due to its unique ability to acquire scenes both at night and during the day and under all weather conditions, its penetration capability, and the provided polarimetric and interferometric information. This paper explored the potential of a novel method (nonlocal (NL)-SAR) using TerraSAR-X (TSX) and Constellation of Small Satellites for Mediterranean Basin Observation (COSMO)-SkyMed (CSK) data to detect buried archaeological remains in steep, rugged terrain. In this investigation, two test sites were selected in southern Tunisia, home to some of the most valuable and well-preserved limes from the Roman Empire. To enhance the subtle signals linked to archaeological features, the speckle noise introduced into SAR data by the environment and SAR system must be mitigated. Accordingly, the NL-SAR method was applied to SAR data pertaining to these two significant test sites. Overall, the investigation (i) revealed a fortified settlement from the Roman Empire and (ii) identified an unknown urban area abandoned during this period via a field survey, thus successfully confirming the capability of SAR data to reveal unknown, concealed archaeological sites, even in areas with a complex topography.

BIOGRAPHY

Biography Nabil Bachagha has completed his PhD from the University of Chinese Academy of sciencein2020. He is now a postdoc researcher in the laboratory of volcano & earthquake research at Central South University. He has published over 8 papers in peer-reviewed journals and has been serving as an editorial and reviewer board member.

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Theoretical-practical analysis of the risk of floods in the Madeira Archipelago – The case study of the municipalities of Funchal, Machico, Ribeira Brava and São Vicente

Sérgio António Neves Lousada

University of Madeira, Portugal

The Madeira island has a history of floods, it is evident that phenomena previously considered rare have become increasingly frequent, driven by global climate change. In addition to the cyclical aspect of climatic variation operating on the planet, anthropic actions have contributed considerably to the aggravation of this problem, especially regarding to floods. This phenomenon occurs due to the disordered growth of cities that has caused an increase in the impermeabilization index of soil, which is the main responsible for surface runoff and the consequent flooding of urban centers. Therefore, the present study intends to carry out a comparative analysis between the various parameters indicative of susceptibility to floods - the hydrographic basins of four cities, namely: Funchal, Machico, Ribeira Brava and São Vicente. After that, an analysis of the downstream flow capacity will also be carried out, in order to verify the propensity to overflow according to the expected peak flow rate for the respective hydrographic basins. For this study, the *ArcGIS software,* will be used, which allows to obtain more accurate and reliable values in comparison with the classic cartographic methodology. Having verified the inability to drain the estimated precipitous flow for a return time of 100 years, a Detention Basin will be designed to regulate and control the flow. Finally, it is also intended to address the importance of urban planning that aims to reduce environmental impacts and mitigate the destructive effects of extreme climatic phenomena, in order to reduce material, human and social losses.

BIOGRAPHY

Sérgio António Neves Lousada holds an International Ph.D. in Civil Engineering - Hydraulics. He teaches at the University of Madeira, field of Hydraulics, Environment and Water Resources and Construction. Furthermore, he collaborates with the VALORIZA - Research Center for the Enhancement of Endogenous Resources, Polytechnic Institute of Portalegre (IPP), Portugal; CITUR - Madeira - Centre for Tourism Research, Development and Innovation, Madeira, Portugal; and Institute of Research on Territorial Governance and Inter-Organizational Cooperation, Dąbrowa Górnicza, Poland. Moreover, he holds an International Master's Degree in Ports and Coasts Engineering.

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Landslide risk assessment: A balance between nature and human activity

Simone Mineo

University of Catania, Italy

Rockfalls are fast and unpredictable landslides, with a high destructive power, acknowledged among the most studied geomorphic processes in mountainous areas, where structures and infrastructures represent common elements at risk. In this frame, risk assessment is an essential procedure for mitigation works and territorial management planning. Numerous approaches for hazard and risk zonation are available in literature, and their degree of complexity varies according to the final purpose of the computation. Qualitative methodologies allow quick hazard or risk estimation based on field data and technical assumptions, while quantitative approaches involve specific probabilistic computations. In both cases, the presence of human activity threatened by rock fall occurrence is the key variable. There is indeed a weak balance between nature and human presence and its maintenance results from the knowledge of the factors involved into such interaction and on the activity performed for prevention or mitigation. In this study, two cases are presented with reference to the risk assessment along a mountainous road and at a natural slope in a cultural heritage site. In both cases, the methodological approach is based on the knowledge of the geological setting and rock mass conditions, which were estimated through field surveys and laboratory tests. Achieved results demonstrate that the rock fall risk is strongly conditioned by the state of activity of instability features and the presence of human activity along the main rock fall potential trajectories. This study allows achieving key information and a risk level zonation, representing a practical tool for territorial and disaster risk management purposes.

BIOGRAPHY

Biography Dr. Simone Mineo has completed his PhD in Earth, Environmental and Resources Sciences at the age of 30 from Naples University Federico II (Italy). Within a few years, thanks to his intense scientific activity, he obtained the Italian scientific qualification as associate university professor and he is currently a Researcher of Engineering Geology at Catania University (Italy). He has published over 30 papers in international journals and attended several conferences as speaker and invited lecturer. He is currently an Editorial Board member of Journal of Mountain Science (Springer) and Guest Editor of a Special Issue published on Applied Sciences (MDPI).

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Cross drill sowing (30x30cm2) with bidirectional improved the performance and profitability of wheat in heat stress conditions

Iqtidar Hussain

Gomal University, Pakistan

Sowing method play a significant role in germination, emergence and establishment of seedlings in any crop. These Seedlings convert into number of tillers which finally increase the plants population in wheat. Better sowing method of a crop leads to better production by ensuring seed placement at proper depth and resulting in uniform emergence and crop stand. Different sowing methods are being used by farmers according to their wisdom but limited information is available about the production potential and economic efficiency of sowing methods. To evaluate better sowing method for better production of wheat and its economic efficiency under tube well irrigated conditions was studied through field experiments conducted during year 2018-19 and 2019-20 at Agronomic research area, Gomal University, Dera Ismail Khan, Pakistan. Five sowing methods such as drill sowing (DS), bed sowing (BS), cross drill (30x30cm2) (CD) and ridge sowing (RS) were evaluated in RCBD replicated thrice. Data regarding yield and yield contributing factors during both years of study revealed that performance of wheat was better when sown by DS and CD. DS and CD produced significantly higher plant population 10.84% and 9.84%, grains per spike 13.45%, 12.11%, 1000-grain weight 4.96% and 4.53% and grain yield 11.95% and 11.19% respectively during 2018-19 and 2020-21 than BC. Moreover a strong correlation of wheat grain yield was observed with its yield contributing attributes (spikes, grains and 1000 grain weight). Economic analysis of different sowing methods during both years of study revealed the profitability of DS and CD as more benefit-cost ratio (BCR) 7.18, 6.54% over BC, respectively was recorded with these sowing methods. Significant reductions of weeds are also seen in CD. It was concluded that DS and CD are suitable methods for better wheat production and profitability under tube well irrigated conditions in heat stress areas.

BIOGRAPHY

Dr. Iqtidar Hussain is serving Department of Agronomy as Assistant Professor in the Faculty of Agriculture Gomal University since 2014. He did PhD in 37 years from Gomal University in Agronomy (plant sciences). He has substantially improved his capacity building through meaningful participation as key note speaker/ resource person/ focal person/ organizer in various training sessions, seminar, conference and workshops at national and internal levels. He got distinction to become members of Member of Soil Science Society of Pakistan, Weed Science Society of Pakistan, Pakistan Botany Society and Pakistan Allelopathty Society. He succeeded in publishing 90 research articles in national as well as International repute research journals.

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The preservation of *in vitro* collection of sweet potatoes (IPOMOEA BATATAS L.) at the Institute of Vegetable and Melons Growing of National Academy of Agrarian Sciences of Ukraine

Anna Mozgovska, Tatiana Ivchenko, Nataliya Bashtan and **Tatiana Miroshnichenko**

Institute of Vegetable and Melons Growing of National Academy of Agrarian Sciences of Ukraine, Ukraine

Sweet potato is a perennial plant [1]. Depending on the variety, plants are fully used by humans for food [2]. Especially in developing countries, the diet includes leaves, young shoots, seeds, root tubers [3]. However, in Ukraine sweet potatoes are grown as an annual plant for root tubers. In the conditions of the eastern forest-steppe of Ukraine in the laboratory of biotechnology of the Institute of Vegetable and Melon NAAS the assessment of 13 samples of sweet potato of domestic and foreign selection has already been carried out. These samples were stored in in vitro culture on MS medium, which was modified IOC 0.01 mg / g, vitamins 1 mg / l, sucrose 30 g/l, agar 6 g/l. It was found that genotypes differed greatly in biometric parameters of regenerants. Samples that are characterized by short shoots (5.1-5.6 cm): Betty, Purple, Blanca, J-12, Hernandez, Okinawa; middle stems (6.0-6.5 cm): V-1, V-6, A-7, Bonita; long stems (6.8-7.3 cm): Orleans, D-2 and Murasaki. The highest leaf density in sweet potato samples was obtained in the sample Orleans, D-2, Murasaki (7.1-7.4 pcs/plant), and the lowest in Betty, Purple, Blanca, J-12, Hernandez, Okinawa (4.0-4.2 pcs/plant). This confirmed that the longer the shoot, the more leaves on it. And this has led to good photosynthesis and will be a high resistance to disease in the future. Samples Betty, Purple, Blanca, J-12, Hernandez, Okinawa had short roots (score 3), samples V-1, V-6, A-7, Bonita also had a long root system (score 4), and samples Orleans, D-2, Murasaki (score 5). In the latter group, this allowed the regenerants to have thick shoots and green color.

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Gravity and seismic structural modelling of petroleum systems of Kerio Valley Basin, Kenya

Faith Ndunge Sila

Kenyatta University, Kenya

Kerio valley basin is one of the sedimentary basins in Kenya known to have hydrocarbon formation potential. Exploration is ongoing in the area with different geophysical methods being employed. The existence of such hydrocarbons developed interest in petroleum system structures and basin modelling in this research. The research utilized 2D seismic data and gravity data from National oil Corporation of Kenya with the aim of determining density variation within the basin, their characteristics and model petroleum system structures of Kerio Valley basin. Gravity data collected in the basin was processed and interpreted using Golden surfer 8 to provide information about rock density contrast forming the sedimentary layers resulting from deposition and compaction of rocks due to pressure as the basin evolved. Data was uploaded in Euler deconvolution software with structural index of 1 and 0.5 in window size. It was again loaded in GRAV2DC for forward modelling and the average density contrast values used were 2.2g/cm3,2.5g/cm3,2.28g/cm3 and 2.6g/cm3 respectively from the top to the most bottom stratigraphic layer formed due to deposition and compaction of different rocks over a period of time. Seismic data was interpreted in Petrel software, the value used for heat flow was 68Mw/m2 and paleo water depth were and 68m, 112m, 700m, 840m and 900m as model input. During this period, the basin passed through tectonic regime and transformed into a sedimentary basin. I-D model showed that the source rocks are mature and has potential to produce hydrocarbon as shown by vitrinite reflectance. Temperature curves shows that temperature was maximum during Miocene volcanics and has been decreasing over a period of time. Analysis showed that Kerio valley basin is a hydrocarbon potential area since it has a mature developed petroleum system.

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Corn cobs efficiently reduced ammonia volatilization and improved nutrient value of stored dairy effluents

David Nartey Obemah

CSIR-Soil Research Institute, Ghana

Dairy farms produce considerable nutrient-rich effluent, which is generally stored before use as a soil amendment. Unfortunately, a portion of the dairy effluent N can be lost through volatilization during open pond storage to the atmosphere. Adding covering materials to effluent during storage could increase contact with NH4+ and modify effluent pH, reducing NH3 volatilization and retaining the effluent N as fertilizer for crop application. Here the mitigation effect of cover materials on ammonia (NH3) volatilization from open stored effluents was measured. A pilot-scale study was conducted using effluent collected at the Youran Dairy Farm Company Limited, Luhe County, Jiangsu, China, from 15 June to 15 August 2019. The study included seven treatments: control without amendment (Control), 30-mm × 25-mm corn cob pieces (CC), light expanded clay aggregate - LECA (CP), lactic acid (LA) and lactic acid plus CC (CCL), CP (CPL) or 20-mm plastic balls (PBL). The NH3 emission from the Control treatment was 120.1 g Nm−2, which was increased by 38.1% in the CP treatment, possibly due to increased effluent pH. The application of CC reduced NH3 loss by 69.2%, hereby compared with hanging the Control, possibly due to high physical resistance, adsorption ofNH4+ and effluent pH reduction. The lactic acid amendment alone and other materials also reduced NH3 volatilization by 27.4% and 31.0–46.7%, respectively. After 62 days of storage, effluent N conserved in the CC and CCL treatments were 21.0% and 22.0% higher than in the Control ($P < 0.05$). Our results suggest that application of corn cob pieces, alone or in combination with lactic acid, as effluent cover could effectively mitigate NH3 volatilization and retain N, t the fertilizer value of the stored dairy effluent and co-applied as a soil amendment after two months of open storage.

BIOGRAPHY

David Nartey Obemah completed his PhD at 38 years from the Insttitue of Soil Science, University of Chinese Academy of Sciences, Nanjing-China. He is the Research Scientist of CSIR-Soil Researh Institute, Kumasi-Ghana. He has published over 15 papers in reputed journals and serves as an editorial board member.

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Disrupting the disruption: A digital learning HeXie ecology model

Na Li [1,2], Henk Huijser [3], Youmin Xi [4], Maria Limniou [1], Xiaojun Zhang [2] and Megan Yih Chyn A. Kek [5]

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[2]*Academy of Future Education, Xi'an Jiaotong-Liverpool University, China*
[3]*Learning and Teaching Unit, Queensland University of Technology, Australia*
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[5]*The Institute of International Studies, Australia*

Broad societal disruptions (i.e., the industrial revolution, digitalisation, and globalisation) have created a need for an increasingly adaptive higher education system in recent decades. However, the response to these disruptions by universities has generally been slow. Most recently, online learning environments have had to be leveraged by universities to overcome the difficulties in teaching and learning due to COVID-19 restrictions. Thus, universities have had to explore and adopt all potential digital learning opportunities that are able to keep students and teachers engaged in a short period. This paper proposes a digital learning HeXie ecology model, which conceptualises elements and relationships pertaining to the societal need for a more agile and digitally resilient higher education system that is better placed to confront disruptive events (such as pandemics) and that is able to produce graduates who are well-equipped to deal with disruption and uncertainty more broadly. Specifically, we propose a digital learning ecology that emphasises the role of self-directed learning and its dynamic interaction between formal, informal, and lifelong learning across a five-level ecosystem: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. This study contributes to the theoretical literature related to flexible learning ecologies by adopting and incorporating the Chinese HeXie concept into such ecologies.

BIOGRAPHY

Na Li is an Assistant Professor of Practice within the Educational Development Unit of the Academy of Future Education. Na has worked in higher education for 10 years and published widely in the field of digital learning ecology and virtual learning environments. Na serves as the guest editor of Education Sciences and the verified journal reviewer for Interactive Learning Environments (ILE), Education and Information Technologies (EAIT), and Australasian Journal of Educational Technology (AJET).

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Usefulness of tree species as urban health indicators

Bibi Dina, Lajtos Domonkos, Molnár Vanda Éva, Tóthmérész Béla and **Simon Edina**

University of Debrecen, Hungary

We used the Air Pollution Tolerance Index (APTI), the amount of PM5 and PM10, and the elemental analysis of leaves to explore the sensitivity of tree species to air pollution. We assessed the tolerance of Robinia pseudoacacia, Acer saccharinum, Tilia × europaea, Acer platanoides, Fraxinus excelsior, Betula pendula, Celtis occidentalis, and Platanus × acerifolia to the amount of dust, APTI, and the elemental concentration of leaves. Leaves were collected in Debrecen (Hungary), which has a high intensity of vehicular traffic. The highest amount of PM (both PM10 and PM5) was found on the leaves of A. saccharinum and B. pendula. Our results demonstrated that A. saccharinum was moderately tolerant, while P. acerifolia was intermediate, based on the APTI value. There was a significant difference in the parameters of APTI and the elemental concentration of leaves among species. We found that tree leaves are reliable bioindicators of air pollution in urban areas. Based on the value of APTI, A. saccharinum and P. acerifolia, and based on PM, A. saccharinum and B. Pendula are recommended as pollutant-accumulator species, while other studied species with lower APTI values are useful bioindicators of air pollution. The results support landscape engineers and urban developers in finding the best tree species that are tolerant to pollution and in using those as proxies of urban environmental health.

BIOGRAPHY

Dina Bibi has completed her Master's at the age of 24 years from University of Debrecen. Now she is working in Ecology Department as a Researcher. She has published 2 papers in journals.

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Working at the demand end to mitiate and adapt to climate change

Joanna Kane-Potaka

SmarterFoods, USA

One key adaptation and mitigation solution to climate change and building farmer resilience is changing the demand for smarter foods. This is finally being recognized and included in climate change analyses in the latest IPPC reports. Shifting to balanced sustainable healthy diets is one of the seven solutions IPCC lists for Agriculture, Forestry and Other Land Use (AFOLU) to mitigate climate change. A recent Economist Intelligence Unit (EIU) report showed a massive 71% increase in the number of searches for sustainable goods over five years. It is important that any solutions follow a 'smarter foods' triple bottom line of being healthy for the people and planet and good for the farmer. This triple nexus should be taken into account for any solution. Driving demand for smarter foods means also tackling socio-cultural practices. It also not only requires engaging with consumers but the whole value chain, e.g. food processors play an important role in making healhly sustainable foods tasty and available and there needs to be a shift in investments, research and development, and government support. Diversifying staples with smarter foods, in particular can have big impact given that these foods are typically 70% of the plate across Asia and Africa and provide the majority of calories. Smarter staples can therefore make a big impact on climate change, nutrition and health and farmer resilience.

BIOGRAPHY

Joanna is Australian and a marketing specialist, having worked largely in agriculture and food, including with various international nonprofit organizations in Sri Lanka, Italy, Malaysia, the Philippines and India. She founded the Smart Food initiative which was selected by USAID and Australia in the top 10 global food innovations.

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Climate crisis is here: Why can't society deal with it and how can we?

Alan Betts

Atmospheric Research, USA

The climate crisis has several distinct parts. The rapid burning of the fossil fuels is heating the planet as the greenhouse gases increase (primarily CO_2, water vapor and also methane). Heat is stored mostly in the oceans and reflective ice and snow are melting, so that winters and the polar regions are waming the fastest. This is turn is driving rapid climate change on a global scale.

Society has failed to deal with this crisis because policy is dictated by the rich and powerful and the corporations that are linked to the fossil fuel empire whose goal is to maximize profit. Webs of lies about climate change have been used for 40 years to confuse the public, and politicians have been bribed (in the USA) to oppose climate legislation. This misuse of human power is historic and it means most decisions are made without ethics or wisdom. Scientific research is expected to work within this frame. However a stable climate is incompatible with business-as-usual, since it treats the earth system as simply there to be exploited for profit. The reality is the indigenous understanding of the living Earth system is correct and it really is the "Truth that will set us free" from the business lies. I realized fifty years ago that a climate crisis was coming because no-one accepted responsibility for the Earth. In parallel with my research I spent decades exploring and listening to the living Earth until I could see some of the historical and present issues. Since human societies have refused to deal with the climate crisis, the living Earth system is now selecting climate modes to deal with our industrial society. This is difficult for scientists and society to grasp; but we have no choice because the living Earth system has powers, insights and responsibilities that are far beyond humanity.

BIOGRAPHY

Alan Betts completed his PhD at the age of 25 years from Imperial College, London. He is the director of Atmospheric Research and a climate advisor to Vermont. He is a Fellow of the American Geophysical Union, the American Meteorological Society (AMS), the Royal Meteorological Society, and the American Association for the Advancement of Science. He is the author of more than 175 reviewed papers in the scientific literature. He was the the AMS Jule Charney Award winner in 2007. In 2016, Alan Betts was the first recipient of the Bert Bolin Global Environmental Change Award from the American Geophysical Union. Atmospheric Research was established in Vermont in 1979 to understand the Earth's weather and climate, and to help society understand the existential challenge of global climate change and how to deal with it.

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Sustainable fuel: Clean and green hydrogen

Nishant Tiwary

Harvard University, USA

Clean/Green Hydrogen (CH/GH): In our uphill battle against climate change, there is an urgent need to decarbonize sectors by deploying clean technologies. Hydrogen holds the key to achieving net-zero emissions as it's a reliable, light, storable, energy-dense (3x of diesel), comprehensive, and low/zero-emission fuel in bounty supply. It can unlock energy transition even in the most critical and hard-to-decarbonize sectors, including steel, refineries, cement, heavy-duty vehicles, fertilizers, aviation, and power. Hydrogen's uses for energy storage enable "sector coupling" by connecting distinct energy systems such as heat, power, industry, and transportation as well as balancing intermittent supply from renewables. It can majorly strengthen global energy security for economies by reducing financial stress in terms of import bills and providing strategic gain in the post-Ukraine war world. If all announced industrial plans are realized, Hydrogen and Hydrogen-based fuel cells can help meet the supply and demand gap as the global demand for Hydrogen increases up to 105 Mt by 2030 (200 Mt in NZE scenario) and 1318 Mt in 2050. As per International Energy Agency (IEA) findings, strong demand growth and adoption of Hydrogen will avoid up to 60 Gt CO_2 emissions during 2021-2050 in NZE Scenario, averaging 2GT/year, or 16.7 Mt CO_2 by 2050 (>0.5 GT/year) as per current trends. As per Barclays, by 2050, the Hydrogen market will grow up to 800 Mt, cut carbon emissions by 15%, and provide annual revenues of over $1 T. The green Hydrogen transition offers investment opportunities worth $11.7 T by 2050.

BIOGRAPHY

A John F. Kennedy Fellow at Harvard, Nishant Tiwary is passionate about sustainable finance and impact investing to combat Climate Change. An international speaker, economist, and climate leader at Harvard, he has contributed to the path-breaking initiatives in Energy Transition, Sustainable Development, Infrastructure Finance, and Climate Action space. Nishant is the author of Celebrating Bihar Series published by the Oxford University Press in more than a hundred countries.

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Radioecological monitoring of transboundary territories: Problems and their solutions

Marina Li

Scientific - Research Radiological Laboratory of the Ministry of Health, The Republic of Uzbekistan

In the interaction of human society with nature, along with positive, negative consequences arise. The negative consequences include the depletion of non-renewable resources, undermining the ability of nature to self-regulation. Several radioactive tailings of the Republic of Kyrgyzstan are located on unstable slopes along the banks of the Mailuu-Suu River, a tributary of the Syr Darya, which is one of the main waterways of Central Asia, flowing through the Ferghana Valley of the Republic of Uzbekistan (where about 8 million people live). Tailings ponds are located in the zone prone to landslide, in the zone of increased tectonic activity with a possible oscillation frequency of up to 8-9 points on the Richter scale.Landslides caused by an earthquake can flush radioactive soil into the waters of the Syr Darya River, which can lead to radioactive contamination of the water supply of several million people in the Kyrgyz Republic and neighboring countries.The region has a large number of storage facilities for polymetallic and radioactive ore processing wastes. There is a constant threat of possible environmental disasters due to the destruction of storage facilities located in areas with high seismicity and landslide processes.In order to reduce the risk to public health, it is necessary to constantly monitor the state of the zone of contamination with radionuclides, its individual especially hazardous areas. Control should be carried out with laboratory tests for the timely and rapid adoption of measures to protect public health.

BIOGRAPHY

Marina Li has completed his PhD at the age of 40 years from Tashkent Institute of Postgraduate Medical Education. She is the head of Scientific - research radiological laboratory of the Ministry of Health. She has published over 40 papers in reputed journal. She is co-chair of the regional group on water safety.

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Improving the reliability design of mechanical systems such as refrigerator

Seongwoo Woo

Ethiopian Technical University, Ethiopia

To enhance the lifetime of mechanical system such as automobile, new reliability methodology – parametric Accelerated Life Testing (ALT) – suggests to produce the reliability quantitative (RQ) specifications—mission cycle—for identifying the design defects and modifying them. It incorporates: (1) a parametric ALT plan formed on system BX lifetime that will be X percent of the cumulated failure, (2) a load examination for ALT, (3) a customized parametric ALTs with the design alternatives, and (4) an assessment if the system design(s) fulfill the objective BX lifetime. So we suggest a BX life concept, life-stress (LS) model with a new effort idea, accelerated factor, and sample size equation. This new parametric ALT should help an engineer to discover the missing design parameters of the mechanical system influencing reliability in the design process. As the improper designs are experimentally identified, the mechanical system can recognize the reliability as computed by the growth in lifetime, LB, and the decrease in failure rate, . Consequently, companies can escape recalls due to the product failures from the marketplace. As an experiment instance, two cases were investigated: 1) problematic reciprocating compressors in the French-door refrigerators returned from the marketplace and 2) the redesign of hinge kit system (HKS) in a domestic refrigerator. After a customized parametric ALT, the mechanical systems such as compressor and HKS with design alternatives were anticipated to fulfill the lifetime – B1 life 10 years.

BIOGRAPHY

Dr Woo has a BS and MS in Mechanical Engineering, and he has obtained PhD in Mechanical Engineering from Texas A&M. He majors in energy system such as HVAC and its heat transfer, optimal design and control of refrigerator, reliability design of thermal components, and failure Analysis of thermal components in marketplace using the Non-destructive such as SEM & XRAY. In 1992.03–1997 he worked in Agency for Defense Development, Chinhae, South Korea, where he has researcher in charge of Development of Naval weapon System. He was working as a Senior Reliability Engineer in Refrigerator Division, Digital Appliance, SAMSUNG Electronics. Now he is working as associate professor in mechanical department, Ethiopian Technical University.

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Assessment of a littoral envionment using optical indicators: Case of Gabes cement plant-Tunisia

Khaoula Ben Atia Zrouga [1,2], Faiza Khebour Allouche [1,2], Afef Ben Amor [3]

[1]Horticultural Sciences and Landscape Department, Higher Agronomic Institute of Chott Mariem, University of Sousse, Tunisia
[2]Lr GREE TEAM (LR17AGR01) INAT, University of Carthage, Tunisia
[3]Drylands and Oases Cropping Institute of Arid Regions of Mednine, University of Gabes, Tunisia

Air pollution caused by the Gabes cement plant affects several components of the ecosystem, including vegetation and soil. In order to know the effects of this industry on these two components, essentially on those defining the environments that surround it, an approach based on the interpretation of remote sensing data has been put in place. Six satellite images (OLI and Sentinel 2A) covering a period from 1987 to 2020 were used for this purpose. After atmospheric and radiometric correction scenes, different radiometric vegetation and soil indices (NDVI, EVI, ARVI and SI) were calculated according distances from the factory (6 and 20 km).

Regarding the examination of radiometric indices, most sites close to the cement plant show high levels of salinity radiometric index but lower values of vegetation radiometric indices. Then, the spatio-temporal obtained results of different radiometric indices approved that ARVI varies spatio-temporally. A reversible spatio-temporal degradation was noted between 1987 to 2020 with a strong resilience of the plant cover in 2016. In addition, the cement plant distant sites have the higher contents of vegetation RIs.

BIOGRAPHY

Khaoula Ben Atia Zrouga has completed here PhD at the age of 32 years from Higher Agronomic Institute of Chott Meriem of Sousse-Tunisia. She has published 2 papers in reputed journals (International Journal of Phytoremediation and Algerian Journal of Engineering and Technology).

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Theme:

New Challenges and Innovations in Earth Science and Climate Change to lead a sustainable life

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Climate change Sustainable use of nature resources and high-quality development

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[1]*Institute of Soil and Water Conservation, Northwestern A & F University, China*
[2]*Institute of Soil and Water Conservation Chinese Academy of Science, Ministry of Water Resources, China*

Climate change will change plant growth and plant utilization of resources, lead to soil and vegetation degradation or waste of natural resources, and affect high-quality development. In order to solve this problem, we have conducted theoretical and empirical research on the sustainable utilization and high-quality development of natural resources for many years and put forward the concepts of resources use limit by plant, the natural resources shortage period, the key period of plant water relation regulation and vegetation carry capacity. The results showed that resources use limit by plant is the limit plant use natural resources., which includes spatial resources use limit by plant in the regions where are enough soil water and soil nutrient; soil water resources use limit by plants in the water-limited regions and soil nutrient resources use limit by plants, the natural resources shortage period, which is the days on which natural resources is smaller than the resources use limit by plant, key period of plant resources relation regulation and vegetation carry capacity. we have to estimate the resources use limit by plant, the natural resources shortage period, the key period of plant water relation regulation and vegetation carry capacity in the kay period of plant water relation regulation. when the natural resources shortage period is more than the key period of plant resources relation regulation, vegetation carry capacity in the kay period of plant resources relation regulation has to be used to regulate plant resources relation and realize the sustainable use of nature resources and get the maximum yield and results and to realize Sustainable use of nature resources and high-quality development.

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Multi-geodetic techniques detecting land surface deformation through CMONOC stations in Southwestern China

Shuguang Wu, Houpu Li and Hua Ouyang

Naval University of Engineering, China

The hydrological, geological and meteorological conditions in southwestern China are relatively complex, and the land surface deformation also presents various changing features. In order to deeply explore the characteristics of surface deformation in Southwest China and identify regional abnormal signals, we combine three earth observation techniques (GPS, GRACE, SLM), to jointly detect the vertical deformation of the CMONOC stations in the southwest region. The results show that GPS, GRACE and SLM have strong correlation in their monthly displacement series at GPS stations. After excluding the non-clustered stations according to the clustering results, the correlation coefficients of GPS/GRACE and GPS/SLM are enhanced. Also, the RMS reduction rates of the GPS series increase after the GRACE and SLM series are deducted. Then we focus on the analysis of the reasons why some GPS stations are not included in their surrounding clusters, as well as a special cluster in the Sichuan Basin. This study finds that the vertical displacements of the four riverside GPS stations in the Three Gorges Reservoir (TGR) area are obviously negatively correlated with the water level of the TGR, and the Three Gorges Dam (TGD) has an impact on the consistency of the GPS annual signals of its upstream and downstream GPS stations.

BIOGRAPHY

Shuguang Wu has completed his PhD at the age of 29 years from Wuhan University in 2021. He is a lecture in Naval University of Engineering. His major is geodesy and surveying engineering, and his study interest is GNSS precise processing and land surface deformation. He has published over 20 papers in reputed journals.

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Assessment of patulin in different cultivars of apples, juices, and distribution in decay portion

Shahzad Zafar Iqbal [1], Mehnaz Akbar [1], Ahmad Faizal Abdull Razis [2,3], Sunusi Usman [2], Nada Basheir Ali [3], Muhammad Waqas [1] and Muhammad Rafique Asi [4]

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[2]Natural Medicines and Products Research Laboratory, Institute of Bioscience, Universiti Putra Malaysia, Malaysia
[3]Department of Food Science, Faculty of Food Science and Technology, Universiti Putra Malaysia, Malaysia
[4]Food Toxicology Lab, Plant Protection Division, Nuclear Institute for Agriculture and Biology, Pakistan

A total of 1480 samples, of which 740 samples of apples (Amri, Gacha, Kala Kulu, and Golden apples) and 740 samples of apple juices were analyzed for patulin (PAT) incidence, using HPLC, which was equipped with a UV detector. About 67.5% and 61.6% samples of apples and juices were found to be positive with PAT, respectively. The elevated averages of 310.8 ± 21.5 µg/kg and 290.8 ± 14.6 µg/kg in Golden apples and juices were observed, respectively. The findings have documented that 44.8% of apple samples have levels higher than the European Union (EU) permissible limit (i.e., 50 µg/kg). Furthermore, 41.0% of samples of apple juices having the values of PAT higher than the EU permissible limit. The findings have shown that a level of 5080 ± 230 µg/kg was found in the apple Gacha cultivar, which was inoculated artificially with Penicillium expansum. PAT's maximum dietary intake was estimated to be 0.016 and 0.018 µg/ kg/day in males and female individuals who were found consuming the Golden apple cultivar. The results have shown that even removing the decayed portion of apples, a considerable amount of PAT penetrates juice samples.

BIOGRAPHY

Dr. Shahzad Zafar Iqbal has done Doctor of Philosophy degrees from the University of Agriculture Faisalabad, in 2011. He joined Government College University Faisalabad as Assistant Professor in June 2011, however he proceeded for Postdoctoral Fellowship in Food Safety Research Centre, Universiti Putra Malaysia in February 2013. During postdoctoral fellow ship, he has developed many collaborations (Universität Tübingen, Rutgers University, USA), he spent 2 months has visiting scientist in Rutgers, USA in June-July 2017. He has more than 65 research publications, 12 book chapters and 2 international books on Food safety and food toxins.

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Assessment and monitoring of grassland ecosystems desertification in Kazakhstan using remote sensing and GIS applications

Yegizbayeva Asset[1, 2] and
Koshim Asima[2]

[1]JSC "National Center of Space Research and Technology", Kazakhstan
[2]al-Farabi Kazakh National University, Kazakhstan

Desertification is a severe concern in the world's semi-arid climatic zones, particularly in Central Asia, hurting the economy and ecosystems directly. Desertification process involves several complicated phenomena that need extensive monitoring and research based on interdisciplinary techniques. The main cause of desertification in Kazakistan is water scarcity, unsustainable agricultural practices, and animal overgrazing. The stress factors may vary in different parts of the country and is now very essential to identify the major threats of desertification in different regions. It also needs to answer the questions of how agriculture can cause land degradation and up to what extent it can reverse by changing the agricultural practices. The total area of Kazakstan - is 2 725 000 км^2, and countries climate is characterized as temperate continental, with cold winter and hot summer. Kazakhstan is generally composed of plains, lowlands, a small number of hill mountains, several inland rivers, and landlocked lakes. The current study focuses on the evaluation, monitoring, and mapping of land degradation, with an emphasis on the growing and decreasing patterns seen in Kazakhstan's grassland ecosystems. Using vegetation, soil, and moisture budget change indices generated from satellite imageries, the desertification tendency for grasslands was examined between the years 2000 and 2018 MODIS NDVI Landsat-8, ESA Land use land cover, 250 m resolution. Using modified Mediterranean desertification and land use methodology (MEDALUS), the extent of desertification has been divided into five categories: primitive state, latent state, moderate desertification, medium desertification, and high-degree desertification. The above-selected indicators were determined according to the standard framework scheme DPSIR (Driving force - Pressure - State - Impact - Response). According to the study results, a total of 77 percent of the region has shown drying patterns, with about 55 percent of this area is somewhat deteriorated, 22 percent undergoing moderate degradation, and one percent suffering from significant degradation. The obtained results correlated with previous researchers' outcomes. The modified model would improve the preference for desertification processes in large areas like Kazakhstan. For territories damaged by the process of desertification, required activities like land reclamation with the development of technologies for landscaping and rational use of land resources.

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Afghanistan water resources: Opportunities and threat

Noor Ahmad Akhundzadah

Kabul University, Afghanistan

Afghanistan surface water is divided into five major River basins as, Kabul, Helmand, Harirud-Murghab, Northern and Amu-Darya River Basins. Through the major river basins, Afghanistan has significant volume of water resources fed by precipitation in the high mountains. Most of the winter's snow accumulation in mountains melts in the summer which contributing to long term storage of water resources. FAO estimated the total annual renewable water potential 75 Billion Cubic Meters (BMC) of which 57 BMC is surface water and 18BMC is groundwater. Total hydroelectric capacity is estimated 23000 Mega Watt (MW), of which 20000 MW is in the north-east on the Amu Darya basin. The total capacity of solar electricity is estimated 222000 MW and the country's total wind electric capacity is estimated approximately 150000 MW. Also, there huge geothermal resources for electricity production in the country. Water resources conservation, management and energy resources development are the integral part of economic development and environmental restoration in Afghanistan. Since 1960s, climate change impacts have greatly changed the hydrological condition and land cover in the main river basins. In this study, water resources potential and hydropower capacity of Afghanistan is investigated as opportunity; the climate change impacts on water resources is investigated as a threat and climate change mitigation through using renewable energy resources of the country is proposed as opportunities for sustainable development. In this study, existing historical Hydrometeorological data and hydropower is used. Solar and wind energy potential are estimated from the reliable online resources.

BIOGRAPHY

I received my Bachelor in geology from Kabul University, Master in Agriculture, and Ph.D. in hydrogeology from Tokyo University of Agriculture and Technology. I have one-year post-doctoral research work in the related field in Tokyo University of Agriculture and Technology. I worked for two years in CTI Engineering International Company in Japan in field of water resources investigation and development (2010-2012). I have been assistant Prof. and dean of Faculty of Environment at Kabul University and responsible for instructing applied hydrology, environmental geology and natural disaster and hazards. I am board member of different committee in Kabul University and National Environmental Protection Agency.

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Simulation of urban expansion in Estonia by integrated cellular automata and agent-based models

Najmeh Mozaffaree Pour and Tõnu Oja

University of Tartu, Estonia

From 1990 to 2018, built-up areas in Tallinn, Estonia's capital city, increased by 25.03%, while its population decreased by −10.19%. Investigating the factors affecting urban expansion and modeling it are critical steps to detect future expansion trends and plan for a more sustainable environment. In recent years, different models have been used to investigate, predict, and simulate urban expansion. In this paper, we coupled the cellular automata, agent-based, and Markov models (CA–Agent model) in a novel manner to address the complexity of the dynamic simulation, generate heterogeneity in space, define more complicated rules, and employ the suitability analysis. In the CA–Agent model, cells are dynamic agents, and the model's outcome emerges from cellular agents' interactions over time using the rules of behavior and their decisions concerning the adjacent neighboring cells and probabilities of spatial changes. We performed the CA–Agent model run two times for 2018 and 2030. The first simulated results were used to validate the performance of the model. Kappa showed 0.86, indicating a relatively high model fit, so we conducted the second 12-year run up to the year 2030. The results illustrated that using these model parameters; the overall built-up areas will reach 175.24 sq. km with an increase of 30.25% in total from 1990 to 2030. Thus, implementing the CA–Agent model in the study area illustrated the temporal changes of land conversion and represented the present spatial planning results requiring regulation of urban expansion encroachment on agricultural and forest lands.

BIOGRAPHY

Najmeh Mozaffaree Pour is a Ph.D. student and junior research fellow in Geoinformatics at the University of Tartu. Her academic background in urban planning and management led her to start a project about spatial data analysis related to urbanization in Estonia. Besides, she knew strategic planning, analysis, and management of sustainable resources. She is interested in methods, techniques, and analysis tools in visualizing and simulating urban systems and land use/land cover.

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Advanced remote sensing techniques for lithological identification and mineral exploration

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National Authority for Remote Sensing and Space Sciences (NARSS), Egypt

Advanced image processing technique such as Machine Learning (ML) techniques were designed to recognize professionally and to detect accurately objects such as lithology and minerals within remote sensing (RS) data. They provide researchers with statistical resources to assist predictive analysis and understanding of data-to-phenomena interactions under investigation. Large volume geospatial remote sensing data analysis using machine learning algorithms give good promise in geoscience studies field. These geospatial data are characterized by complex noise and a high grade of similarity and or variability. The preference of ML techniques and the details of how these techniques were used to the context of geoscience data. The main goal of the present article is to introduce machine learning techniques as a means of detecting and emphasizing the spatial spreading of lithological units and mineralized alteration zones were present. Also, a full comparison of machine learning techniques has been conducted, for supervised lithological classification and minerals exploration applications. In this article, best suggestion procedures that facing geoscientists for remote sensing supervised classification using ML techniques were established for geological features extraction/recognition (i.e. lithology, structure, minerals). By focusing on both data preparation and integration, the optimization of both trained classifiers and segmentation process as well as accuracy assessment for a geological application and spatial evaluation of output results. Various cases of studies in a prospective region of economic mineralization were analyzed using several machine learning techniques using multispectral and hyperspectral technologies. In addition, comparing the results of pixel-based and object-based machine learning algorithms for lithological units' detection in Wadi Allaqi area, in South Eastern Desert of Egypt were established. The proposed Spectral Information Divergence (SID), Spectral Angle Mapper (SAM), Random Trees (RT), Bayes, Decision Tree (DT), Support Vector Machine (SVM), and K-Nearest Neighbor (KNN) supervised classification ML techniques have been discussed and used to assign the classes of the objects after applying the segmentation process. The accuracy assessments were assumed for lithological units detection using both cross-validation and advanced grid

search techniques of all applied ML classifier results. Mineral identification/mapping using multispectral and hyperspectral RS technology is a critical, but challenging process for detecting of undiscovered mineral exploration areas. One of the aims of this article is to focus on the advanced image processing techniques that used to detect the spatial distribution of hydrothermal mineralized alteration zones using multispectral and hyperspectral RS data. The recent image processing techniques such as ML algorithms, unmixing techniques (i.e. FCLS and NCLS), Spectral Angle Mapper (SAM) were applied for mineral exploration detection of iron ore in El-Baharia depression, Western Desert of Egypt and talc-copper mineralization in Darhib-Abu Jurdi metavolcanic belt, Eastern Desert.

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Impact of land use/land cover change on hydrological components in urbanizing catchment: A case of Chongwe river catchment, Zambia

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Chongwe River Catchment, which covers an area of about 5168.67 km2, is a sub-catchment of the Zambezi River Basin. It receives a mean annual rainfall of between 800 and 1000 mm. This study assessed the impact of land use land cover (LULC) changes on the catchment's hydrological components, such as runoff/streamflow, evapotranspiration, and water abstractions. LULC change data, detected from 1984, 1994, 2014, and 2017 USGS Landsat imagery using a maximum likelihood supervised classifier, were integrated into the Water Evaluation and Planning (WEAP) Model along with soil, slope, and hydro-climate data. The hydrological components and the catchment water balance were estimated using the WEAP model. The hydrological balance model used the average precipitation over 52 years and 34 years of streamflow measurement data for four stations. Due to growing anthropogenic and socio-economic activities, the catchment is experiencing changes in land use/land cover (LULC) and its hydrology. The catchment has faced severe water shortages, particularly from July to October. The results showed that between 1984 and 2017, urbanization/built-up area increased by 382.77% at 6.97 km2/year, irrigated agriculture increased by 745.62% at 1.70 km2/year, rainfed farms/ranch/grassland increased by 14.67% at 14.53 km2/year, forest land decreased by 41.11% at 22.33 km2/year, and water bodies decreased by 73.95% at 0.87 km2/year. Streamflow increased at 0.13 Mm3 per annum in the wet seasons and showed a high variation with a flow volume of 79.68 Mm3 in February and 1.01 Mm3 in September. Annual actual evapotranspiration decreased from 840.6 mm to 796.3 mm, while annual water abstraction increased from 8.94 mm to 23.2 mm from 1984 to 2017. The pattern of LULC change between 1984 and 2017 has negatively impacted the hydrology of the Chongwe River Catchment. Urbanization has made a disproportionately substantial contribution to the LULC change and impact on the surface runoff, indicating that intensive anthropogenic activities exacerbate to alter the hydrological characteristics of the catchment. From these findings, an integrated catchment management and protection approach is proposed to mitigate the negative impacts of LULC dynamics on hydrological components in the Chongwe River Catchment. These results provide essential information for land-use planners and water managers towards sustainable and equitable management of limited earth resources.

BIOGRAPHY

Tewodros Mitiku Tena (Ph.D.) has completed his Ph.D. from the Copper belt University. He is working as Senior Water Resources Management and Development Specialist at Groundwater Resources Management Project under the Federal Institute for Geosciences and Natural Resources (BGR). He has more than 20 years of development, academic, and research experience in water resources, environment, and natural resources management. He has published over 16 papers in reputed journals.

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Vulnerability mapping of agriculture to sand and dust storms

Ali Darvishi Boloorani, Masoud Soleimani, Mohsen Bakhtiari, Najmeh Neysani Samany, Ramin Papi and **Saham Mirzaei**

University of Tehran, Iran

Sand and Dust Storms (SDS), as a global environmental crisis, occur under a wide range of circumstances in agricultural lands. This phenomenon arises from the interaction of natural drivers, such as climate change and drought, and anthropogenic factors, such as mismanagement of water, soil, and plant resources. SDS vulnerability can be implemented in four main domains of an area (from local to global scale) including human health, socio-economic, environment, and agro-ecology. In this study, the proposed methodology for SDS vulnerability assessment is for agriculture that is carried out using three components of sensitivity, capacity, and exposure. Assessment/mapping of these components is performed using measurable indicators, each of them represents an environmental variable. Accordingly, indicators of Air temperature, Soil moisture, Soil organic carbon (SOC), Precipitation, Palmer drought severity index (PDSI), Livestock grazing index (LGI), Land degradability index (LDI), Fractional vegetation cover (FVC), Rural health center (RHC), Rural health house (RHH), Literacy rate (LR), and Active population (15>age>65) are developed to address the concept of SDS vulnerability in agriculture. The proposed methodology is mainly focused on the long-term circumstances which cause vulnerability of agriculture to SDS. Therefore, the proposed SDS vulnerability methodology is developed in a comprehensive manner that covers the spatial-temporal pattern of vegetation, soil erosion status, hydroclimate characteristics, and human roles.

BIOGRAPHY

Ali Darvishi Boloorani has been an Associate Professor in the Department of Remote Sensing and GIS, Faculty of Geography, the University of Tehran since 2009. He was a Senior Researcher (2019-2021) in the Key Laboratory of Digital Land and Resources, East China University of Technology, Nanchang, Jiangxi, China. Ali completed his Ph.D. in environmental geoinformatics at the University of Gottingen, Germany in 2008. Ali is currently working with the Food and Agricultural Organization (FAO) on a project named "Catalysing investments and actions to enhance resilience against Sand and Dust Storms (SDS) in agriculture. He has published more than 60 peer-reviewed journal articles and conference papers and book chapters.

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Challenges and opportunities of cropping in Haor (Wetland) ecosystem in Bangladesh

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Haors are bowl-shaped depressions of considerable aerial extent lying between the natural levees of rivers in the northeast region of Bangladesh. In most cases, Haors have formed as a result of peripheral faulting leading to the depression. It is a concave landscape with irregular relief. There are 373 Haors spread over Sylhet, Sunamganj, Moulavi Bazar, Habiganj, Netrokona, Kishoreganj, Brammanbaria districts in Bangladesh (CEGIS, 2012). The haor area covers 0.9 mha of 2.0 mha of these districts. There are four major Haor based livelihood groups, viz. agricultural, fisherman, boatman and aquatic plants have been identified and they are fully dependent on the Haor ecosystem services. There are 0.71 m ha cultivable lands, produce 5.25 m ton paddy/yr approx. 3% agricultural product of GDP (BHWDB, 2012-CEGIS,2012). About 12.92 million people directly or indirectly lives in this area (BBS-2017). During winter, these haors became a vast stretch of green lands covered by vegetables on higher levees and winter rice-Oryza sativa (Boro- mostly MV/Hybrid) in lower parts. Farmers are used to harvest 5-6.5 ton/ha (Islam, 2011) In monsoon Haors receive surface runoff water as flash flood from upper riparian (from India) in rivers, canals and basins to become vast stretches of turbulent water and causes damage to standing rice- Oryza sativa (Boro- winter rice) if it comes in early April and also causes substantial damage to homesteads in July to September. At that time, it turns into a vast inland sea within which the villages appear as islands. However, they all but dry up in the post-monsoon period. Haor receives 2000 to 3000mm rainfall annually. But the Haor near to homesteads and urban have trend of pollution by the domestic and urban waste. To get the services of the Haor in context of present flash flood, land use shifting may be the best options to ensure food security of the Haor peoples from flash flood hazard and getting benefit from the haor ecosystem.

BIOGRAPHY

Jalal Uddin Md. Shoaib, former Chief Scientific Officer, Soil Resource Development Institute, Ministry of Agriculture; Former Country Director, UNCCD-TSP; Former Project Coordinator SLM project Department of Environment (DoE), Ministry of Environment, Forest and Climate Change.

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Field-based data collection for monitoring of Hispar Glacier Hunza Valley Pakistan

Syed Hammad Ali

Glacier Monitoring & Research Center (GMRC), Pakistan

The Indus River is the backbone of Pakistan's irrigation and Hydropower generation which draws a major part of its flow from snow and glacier melt. Glaciers in the Karakoram region are important climate indicators, impact on downstream water availability and potentially influence natural hazards in Pakistan. However, field-based glacier measurements are inadequate, especially in remote high mountain of Karakoram Range which are essential to understand glacial dynamics and processes and to assess possible risks. In situ measurements are one of the key methods for improving the understanding of climate-glacier interactions and enable ground truthing and can be used for calibrating both remotely-sensed information and modelled output. Karakoram region experience repeated cloud cover all through the monsoon and seasonal snow cover make it hard to get appropriate freely available satellite imagery for small-scale applications. In addition, the very steep mountainous terrain reduces data accuracy and mountains frequently obscure parts of the area of interest. Thus ground-based information is necessary to georectify satellite images and verifies data. This paper presents a description of the In-situ monitoring (i.e. Snout survey, ablation, velocity, density, and discharge measurements and impact of debris type & thickness on the melting of glacier) carried out on Hispar Glacier during the field season 2021. Surface movement of the glacier was monitored during the study period on the installed stakes profiles. Using a distance-weighted average method surface velocity is calculated. The stake wise net ablation ranges from 51cm to 375cm. This study is important for policy makers, planners, and industry to estimate, and adapt to, downstream water availability, for hydropower plants, irrigation, and drinking water and also important to raise awareness about and sensitize local people to the changes in the glaciers that feed their rivers. Climate change is a worldwide concern with high relevance for the international community, and consideration should be paid consequently to providing financial and practical support for glacier in situ measurements in this region.

BIOGRAPHY

Syed Hammad Ali is working as Glaciologist in the Glacier Monitoring Research Centre (GMRC), Water and Power Development Authority (WAPDA) Pakistan. He has an asset of having M.Sc in Environmental Sciences from Punjab University, Pakistan and M.S by Research in Glaciology from Kathmandu University, Nepal. He is involved in several research and field activities in the glaciers of Karakoram Range in Pakistan. He also travelled to Suyok Zpapadniy Glacier, in Kyrgyzstan and Lirung Glacier in Nepal for the Mass Balance Measurements and Analysis with World Glacier Monitoring Services (WGMS) and Kathmandu University, Nepal. He also participated as a reviewer in the Intergovernmental Penal on Climate Change (IPCC) and Association of Polar Early Career Scientists (APECS) group review of the Second Order Draft of the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) 2018. He is an author of several articles and research papers published in National & International Journals. He holds the citizenship of Pakistan.

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Prospective hazard of glacial lake outburst flood in the Hindu Kush region of Pakistan

Naveed Mustafaf

Pakistan Agricultural Research Council, Pakistan

The receding behaviour of glaciers perceived in most of the Hindu Kush–Karakoram–Himalaya (HKH) region has given rise to the development and enlargement of several glacial lakes in the region. The expansion of lakes under changing climate generally postures high risk of glacial lake outburst flood (GLOF) hazard for the downstream mountainous communities. In this study, the threat of glacial lake outburst flood was probed in in the Hindu Kush region of Pakistan using LANDSAT-8 OLI (Operational Land Imager) image data of 2013 period coupled with ground information. The results of present study revealed that in the Hindu Kush range (722) during 2013. The lakes exhibited an overall increase of about 26% in number and 7% in area in the region during 2001–2013 periods. The increase in lake number was 91% within 2500–3500 m, 20% within 3500–4500 m and 31% within 4500–5500 m elevation range. Among total identified lakes during 2013, 36 were characterized as potentially dangerous glacial lakes (PDGLs) that can pose GLOF hazard in the HKH region. A regular monitoring of Cryosphere changes and critical glacial lakes is essential to develop sustainable risk management strategies for this region in future.

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Biofuels and sustainable future

Sama Rahimi Devin

Shiraz University, Iran

Global energy demand is growing rapidly due to declining fossil fuels, continued global population growth and an industrial economy. Increasing consumption of imported oil can lead to turmoil in economic growth. Given the growing demand for petroleum fuels and the consequent impact of global warming, the development of alternative energy is a top priority in research and developments sector. Bioenergy produced from biomass is a sustainable alternative energy source that has been accepted in various sectors including public policy, industry and government. Biofuels are mainly composed of wood, vegetable oils, forest products, agricultural products, agricultural residues or municipal waste, pet waste and aquatic plants. In this study, we summarize the different types of biofuels, production and applications from an ecological perspective.

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Reveal implication of climate change impacts on precipitations using pressure change and stochastically downscaled hourly precipitation series

Ziwen Yu, Chi Zhang, Songzi Wu, Franco Montalto, Stefan Jacobson, Upmanu Lall, Daniel Bader and **Radley Horton**

University of Florida IFAS, USA

Physically, the formation of precipitation is a result of ascending air which reduces air pressure and condenses moisture into drops, either by irregular terrain or atmospheric phenomena (e.g., via frontal lifting). Instead of using statistics-based methods for investigating climate change impacts on precipitation, in this paper, pressure change events (PCEs) will be used as a physical indicator of the stability of atmospheric systems to reveal the impact of temperature on precipitation in the tropical areas of Florida and in NE US. PCE based analysis will be conducted for data in both regions to indicate the relationship between temperature and precipitation. The data from NE US will be applied in a stochastic precipitation generators (SPGs) built on PCE to produce hourly synthetic precipitation series under non-stationary conditions informed by average monthly temperature (AMT) projection from Global Climate Models (GCMs) that have higher-confidence than precipitation in these models. The synthetic series depicts the trend of precipitation under climate change, especially for extreme events. With a 100-year, continuous, synthetic hourly precipitation series using GCM AMT projections for the Northeast US, the Clausius–Clapeyron (CC) relationship can be generally embodied, but more so for high intensity PCE. The amplification of extreme precipitation events varies for a given temperature depending on the PCE type. For decreasing PCE, extreme precipitation intensification starts at AMT of 22°C and at 12°C for increasing PCE. Our approach may provide more physically plausible weather ensembles for numerous applications involving climate change.

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Optimization of chahbani buried diffuser installation for Jemna Oasis suistanibility (North Africa)

Nesrine Zemni [1], Fethi Bouksila [1], Fairouz Slama [2] and Rachida Bouhlila [2]

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[2]University of Tunis El Manar, National Engineering School of Tunis (ENIT), 2LR99ES19 Laboratory of Modelling in Hydraulics and Environment (LMHE), Tunisia

In arid areas, the irrational irrigation with brakish water could have a negative impact not only in economic terms, but also in terms of global health and environmental damage. Micro irrigation appears to be a guarantee of economic, environmental and social sustainability in many irrigated areas in the world. However, inadequate design of this irrigation system reduce the water efficiency and in some cases lead to soil salinization.In this context, an assessment of an innovative subsurface irrigation system was conducted in Saharan Tunisian Jemna oasis to determin its optimum installation design regarding soil salinization and crop yield. Field investigations were conducted during two crop years (2018, 2019). Dielectric sensors were installed at six soil depths until 1.20 m for soil water moisture (θ) and pore electrical conductivity (ECp) real time monitoring. The HYDRUS (2D/3D) numerical model was calibrated then applied to investigate four different buried diffuser optimization (opt) positions from the trunk of the palm tree (X) and soil depths (Z) on root water uptake, relative yield production (Yr) and soil salinity distribution. According to buried diffuser position scenarios, installation of the buried diffuser at the canopy of the date palm T1opt (X=1.5 m) as used in the region, showed the least Yr (37%). However, for the same lateral distance, X=0.5m, the Yr was equal to 54 % and 71%, for T2Opt (Z=0.3 m) and T4Opt (Z=0.6 m), respectively. According to simulation results, all position scenarios showed salt accumulation on the top soil layers and supplemental leaching using surface irrigation is thus recommended.

BIOGRAPHY

Nesrine Zemni is a Hydraulic engineer graduated from the National Agronomic Institute of Tunis (INAT), 2013. She holds a master in modelling in hydraulics and the environment from National Engineers School of Tunis (ENIT), 2015. She obtained her PhD in hydraulic engineering from ENIT. Her research fields are numerical modelling of water flow and solute transport in porous media, soil salinity, smart irrigation, TDR and FDR technique.

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Current status of morphological and molecular biodiversity conservation of wild olive (Olea europaea L. subsp. europaea var. sylvestris) from various sites prospected along northern Algeria

FALEK Wahiba

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The Mediterranean wild olive tree (Olea europaea subsp. europaea var. sylvestris) is economically and ecologically important. The effects of human activities can lead to genetic erosion of its genetic heritage, which has great value for the conservation of biological diversity in natural environments. In this study, a large number of wild olives (179) were collected along an altitudinal gradient climatic from Western to East Algeria. Intra- and interspecific diversity and phylogenetic affinities were analysed by 25 morphological characters and sixteen SSRs markers were selected. Phylomorphological results revealed a high level of diversity including three morphological pools. These pools are the most discriminating for differentiation accessions. The polymorphic of 16 SSRs were evaluated through the values of the genetic diversity indices. Genetic structure by the Bayesian group revealed K=2, the first genetic pool (Gp1) includes 78 genotypes collected in the northwest of the country. Second genetic pool (Gp2) contains 86 genotypes mainly collected in North-East Algeria. For K= 3, Gp2 revealed Gp2.1 of the northeast coast genotypes and Gp2.2 includes the genotypes of the interior mountainous regions. AMOVA revealed most of the molecular variance within the population (85%). Indeed, the geographical origin and the type of climate are the main factors determining the population structure of the local oleaster, thus becoming crucial in addressing future challenges posed by climate change. A deeper understanding of the genetic basis of resistance in the genetic material of the wild olive tree could improve the performance of cultivars through the implementation of olive breeding programs.

BIOGRAPHY

Dr. Wahiba FALEK defended his PhD in Biotechnology thesis from National School of Biotechnology Constantine Algeria in January 2022. She is the licensee teacher and researcher at Institute of Nutrition, Food and Agro-Food Technologies (INATAA), University of the Mentouri Brothers Constantine1 since 2013. she is co-author in two new international publications. (https://www.researchgate.net/profile/Wahiba-Falek-3, https://orcid.org/0000-0002-6132-5250)

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Transport-related CO_2-emissions, the pros and cons of going electric

Jaap M. Vleugel

Delft University of Technology, the Netherlands

Transport is responsible for about one quarter of global CO_2-emissions. It is also a main source of local air pollution. There are two main ways to reduce these emission: Via technology and behaviour. With respect to the first, for decades attention was focussed on fuel efficiency and emission control (by catalyzers). While progress was made in this area, changes in behaviour – reduce mileage and transport goods more efficiently – turned out to be much more difficult to achieve. Demand for transport keeps rising due to a growing (world) population, increasing demand for goods and purchasing power. As a consequence, the growth in demand tends to outpace the technical advancements made. Climate change has led to a new direction in the technical field: Emission reduction by introducing electric vehicles in passenger and freight transport. The presention is meant to expose the challenges and possible social, economic and technical side-effects of electrifying mobility. It finishes with recommendations for decision-making.

BIOGRAPHY

Jaap Vleugel graduated as a general economist and subsequently worked for eight years as a micro- economic researcher at Free University Amsterdam. He wrote a PhD about transport and land use scenarios. For the past two decades he was employed at Delft University of Technology, first as senior researcher, then he gradually became senior lecturer and coordinator of bachelor, master and PDEng courses. His students carry out many projects for business and governments involved with transport and logistics. He regularly publishes about his work and has been serving as reviewer for many journals as well as editorial board member.

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Factors that impact greenhouse gas emissions in Saudi Arabia: Decomposition analysis using LMDI

Reema Alajmi
King Saud University, Saudi Arabia

Over the past three decades, Saudi Arabia's greenhouse gas (GHG) emissions have increased sharply. This study exposes the factors that affect GHG emissions in nine sectors via the logarithmic mean Divisia index (LMDI) method for 1990 to 2016. The analysis demonstrates that the energy effect was a leading factor increasing greenhouse gas emissions, at 386.76 million tonnes of carbon dioxide-equivalent ($MTCO_2e$). Activity and population effects also contributed to the increase in emissions at 339.56 ($MTCO_2e$) and 267.38 ($MTCO_2e$), respectively, but the energy effect was greater than the other effects. Results reveal that activity, energy and population effects are greater in the electricity sector than the transport sector. The electricity sector increased greenhouse gas emissions by 4298.05 ($MTCO_2e$) and transport, 2243.63 ($MTCO_2e$). Therefore, policymakers need to consider climate change when they are developing economic growth plans to achieve sustainable development. This may be done through adopting a new policy to transfer from traditional sources to renewable energy sources or focusing on raising energy efficiency and changing energy structure to impact the growth of greenhouse gas emissions.

BIOGRAPHY

Reema has completed her PhD in 2018 from Swansea University School of Management. She is the assisstant proferssor, at King Saud Unversity. She has published 6 papers some in reputed journals and published a book. Also, she peer reviewed for some papers in reputed journals. .

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