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CALL FOR PAPERS

2nd International Conference

ROLE OF CLIMATE CHANGE ON WATER RESOURCES MANAGEMENT FOR A SUSTAINABLE FUTURE (ICCW2025)

Tashkent State Transport University, Uzbekistan

May 22-24, 2025

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2nd International Conference

ROLE OF CLIMATE CHANGE ON WATER RESOURCES MANAGEMENT FOR A SUSTAINABLE FUTURE (ICCW2025)

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PREFACE

Water scarcity has incrementally exacerbated in many parts of the world due to climate changes compounded by population growth, overexploitation of freshwater resources, and a lack of proper management. This upsurge has sparked worldwide interest in understanding the potential impacts of climate change on water resources. Climate change is often entwined with alterations in both water quantity and quality, aggravating the fast-growing water crisis. In envisioning a sustainable future, the capability of adapting to climate change and ensuring the sustainable management of water resources and urban planning, reflecting the urgent need for resilience and responsible stewardship in a world where water scarcity and unpredictability are increasingly prevalent are among the important aspects to consider. Investments in resilient infrastructure, such as flood defenses and improved irrigation systems, are essential to cope with changing climate conditions. Utilizing advanced technology for data collection, analysis, and modeling can help anticipate and respond to challenges related to water resources. Governments and regulatory bodies need to develop and enforce policies that ensure equitable access to water resources and sustainable management practices. Collaborative approaches to water management, including the sharing of water resources across regions and countries, can enhance resilience in the face of changing climate patterns. Furthermore, precise definitions of regional and global action plan for climate change need to be considered. The conference was opened by Prof. Dr. Prof. Dr. Odil ABDURAKHMANOV, Rector, Tashkent State Transport University and Prof. Dr. İbrahim Hakkı AYDIN Rector, Istanbul Aydın University. The present conference aims to be a step towards bringing together scientists, planners, practitioners, and researchers to discuss recent issues and those expected to emerge in the future before the problems become too perplexing to solve for a sustainable future on this globe.

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• Navigating the Waters of a Changing Climate
• Renewable Energy Applications in Rural Water Distraction • Adaptation and Mitigation Action Plans for Water Scarcity
• Water Harvesting, Soil Degradation and Securing Land related to Climate Change
• Tools and Computational Methods in Data Science for Climate, Water, and Health • Smart Irrigation Systems in Agriculture for Sustainability
• Proposals for Policy Making to Address Issues arising from Climate Change
• Education for Awareness on Climate Change and Water Resources Management
• European Green Deal and Implementations
• Artificial Intelligence (AI) Applications in Regional Climatologic Issues

• Wastewater Uses and Management Technologies in Agriculture
• Any other topic related to the theme of the conference are welcome

Invited Speakers

Dr. Rai Niaz Ahmad, is an Ex. Vice Chancellor, Arid Agriculture University, Rawalpindi, Pakistan. Presently, he is working as "Professor Emeritus" in the University of Agriculture Faisalabad. He carries a distinguished career in the Field of Agricultural and Bio-system Engineering. He completed his higher studies from the Iowa State University USA whereas post-doctorate studies from Kyoto and Tottori Universities, Japan. He is author of 90 plus research

publications, and five books. He has received an Award from the International Commission on Irrigation and Drainage (ICID) as well as the Pakistan President Award of Technology. He completed a good number of Research Projects along with international researchers funded by the international organizations.

Title: Water Resource issues and Solutions in Pakistan: A Model for Developing Countries under Changing Climate

Dr. Ambreen Ashar, Professor of Chemistry, in Govt. Graduate college Samana bad Faisalabad. My field of research is engineering of nano materials for solar photocatalysis, agricultural uses, antimicrobial activities and nano medicines. My specific field of interest is treatment of waste water for reuse, purification of portable water.

Title: Advanced Strategies to Overcome Water Crisis in the Face of Climate Change

Naseer Gillani Former Senior Civil Servant Presently Adviser Public-Sector Large-Scale Enterprise. Presently working as Chair UNECOSOC accredited IHRO Think Tank DEVELOPMENT FINANCE AND INCLUSION, Pakistan.
Title: Case study Sialkot Bus Stand shifting to Golu Phala

Dr. Stefano Vignudelli-the Consiglio Nazionale delle Ricerche (National Research Council) in Pisa, Italy.
Title: Satellite-based optical and radar observations support coastal hydrology studies

Akmalov Shamshodbek Baxtiyarovich-Associate Professor of the Department of "Hydrology and Hydrogeology" of the Moscow State Technical University of Mechanical Engineering, Doctor of Philosophy in Technical Sciences
Title: Water resource management inArid regions: problems and solutions

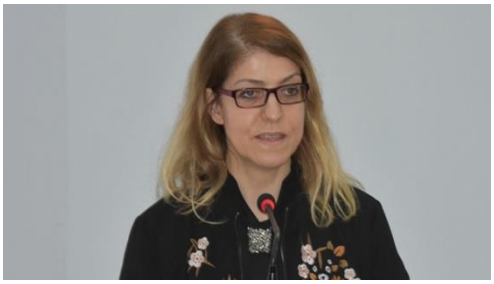
Kakharov Bakhodir Bakhramovich, Associate Professor of the Department of Engineering Communications and Systems, Tashkent State Transport University, Doctor of Philosophy in Technical Sciences, Ph.D.
Title: The Role of Climate Change in Water Resources Management

Maksumov Nadirjon Ergashevich, Deputy Head of the Construction and Housing and Communal Services Inspectorate under the Cabinet of Ministers of the Republic of Uzbekistan, Doctor of Philosophy in Economics, PhD
Title: State control in adaptation to water shortage and mitigation of its consequences

Rashmi Bhardwaj
Prof. Dr.

University School
of Basic & Applied
Sciences,

Guru Gobind Singh
Indraprastha
University, New
Delhi, India



Istanbul Technical University,
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2nd INTERNATIONAL CONFERENCE

ROLE OF CLIMATE CHANGE ON WATER RESOURCES MANAGEMENT FOR A SUSTAINABLE FUTURE

May 22 , 2025	
INAUGURAL SESSION	**10.00 – 11.30 (local time)**

WELCOME ADDRESS	**ODIL ABDURAKHMANOV KALANDAROVICH** Rector of Tashkent State Transport University, Uzbekistan
SPECIAL ADDRESS-1	**SHARIPOV KONGRATBAY AVEZIMBETOVICH** Minister of Higher Education, Science and Innovation of the Republic of Uzbekistan
SPECIAL ADDRESS-1I	**MAKHKAMOV ILKHOM RUSTAMOVICH** Minister of Transport Republic of Uzbekistan
SPECIAL ADDRESS-1II	**PROF. DR. İBRAHIM HAKKI AYDIN** Rector, Istanbul Aydin University of Turkiye
WORDS OF THANKS	**PROF. Dr. ZAFER ASLAN & Dr. SAJID MAHMOOD** Vice Rector, Istanbul Aydin University of Turkiye/TESPAK, Pakistan
	BREAK/PHOTOGRAPH/

Session-1: Water resources issues, environmental protection and green economy	
Chair (s)	**12.00 – 13.30 (local time)**

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Speaker: MEHMET AKIF ARVAS *Enstitu Istanbul ISMEK, Istanbul, Türkiye.* *mehmetakif.arvas@ibb.gov.tr*	Machine learning Supported Chemical Dosing System for Sustainable Water Treatment Plants Mehmet Akif Arvas, Cem Ozdemir, Rafet Akdeniz
Speaker: STEFANO VIGNUDELLI, *Italy.* *vignudelli@pi.ibf.cnr.it*	Satellite-Based Optical And Radar Observations Support Coastal Hydrology Studies Stefano Vignudelli, Angelica Tarpanelli, Francesco De Biasio, Karina Nielsen, Paolo Filippucci, Rosa Maria Cavalli
Speaker: MUSAJONOV MUKHAMMADRASUL ALISHER UGLI, Uzbekistan. musajonov.mihammadrasul@ferpi.uz	Studying The Effectiveness Of Polymer Compositions For Pipe Cleaning In Hydrotransport Of Dispersing Systems, Musajonov Mukhammadrasul Alisher Ugli, Ibadullayev Ahmadjon, Chorshanbiyev Umar Ravshan ugli
Online Speaker:	Advanced Strategies to Overcome Water Crisis in the Face of Climate Change, Ambreen Ashar

AMBREEN ASHAR, Pakistan. ambreenashar2013@gmail.com.	
Online Speaker: RAI NIAZ AHMAD, *Pakistan.* *niazrai@yahoo.com*	Water Resources Issues and Solutions in Pakistan under Changing Climate, Ria Niaz Ahmad
Online Speaker: YADAV INDERJEET, India	Effects of Climate Change On Water Quality Yadav Inderjeet and Rashmi Bhardwaj
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Speaker: Haydar ÖZPINAR, *Türkiye.* haydarozpinar@aydin.edu.tr	CHARACTERIZATION AND COMPARISON OF THE TOXIC/IMMUNOLOGICAL POTENTIAL OF DIFFERENT WHEAT CULTIVARS FROM TURKEY Haydar ÖZPINAR, Harshadrai M. RAWEL, Sorel Tchewonpi SAGU, Florian J. SCHWEIGERT
Online Speaker: NASEER GILANI, Pakistan. naseeragillani@yahoo.com	Case Study Sialkot Bus Stand Shifting to Golu Phala, Naseer Gillani
Online Speaker: ALIASGHAR IRAJPOOR, Iran. a.irajpour@yahoo.com	HUMAN- INDUED IMPACTS ON RIVER HYDROLOGY AND WATERSHED MANAGEMENT IN THE MAHARLOO LAKE BASIN: AN ASSSESSMENT OF LAND USE, CLIMATE AND WATER RESOURCE CHANGES, Aliasghar Irajpoor
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	BETHE ANSATZ AND CRYPTOGRAPHY, M.Yu.Rasulova
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Online Speaker: VINITA SANGWAN *vinita.8040890022@ipu.ac in*	WATER QUALITY CLASSIFICATION PREDICTION USING MACHINE LEARNING MODELS, Vinita Sangwan, Rashmi Bhardwaj
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Online Speaker:	UTILISING THE ROUGH SET-SVM MODEL FOR WATER QUALITY ASSESSMENT, Ekta Yadav, Rashmi Bhardwaj
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	BREAK/PHOTOGRAPH

May 22 , 2025

1Oral Invited MACHINE LEARNING SSUPPORTED CHEMICAL DOSING SYSTEM FOR SUSTAINABLE WATER TREATMENT PLANTS

Mehmet Akif Arvas[1], Cem Ozdemir[2], Rafet Akdeniz[3]

[1]*Enstitu Istanbul ISMEK, Çifte Havuzlar Mah. Eski Londra Asfaltı Cd. 34220 Davutpasa, Istanbul, Türkiye*

[2]*DEFNE TelekomunikasyonA.Ş., Maslak Mah. Meydan Sok. Spring Giz PlazaNo:5/37 34396 Maslak, istanbul, Türkiye*

[3]*istanbul Aydin University, Engineering Faculty, Dept. of Computer Engineering Beşyol, İnonu Cd. No:38, 34295 Küçükçekmece, Istanbul, Türkiye*

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Abstract:

In this study, machine learning methods are used to determine appropriate amounts of chemical substances used to clean water in drinking water treatment plants. The data coming from the turbidity sensor and the color sensor in the measurement system are integrated using linear regression and average and standard deviation models. A computer interface provides the user with the best indicator of live tracking and decision-making situations. In this way, the pollutant particles in the contaminated liquid are detected and the chemical dosing to be used in the process of removing the contaminants from the liquid is decided by analyzing the turbid and color values. The main aim of the research is to solve the problems related to the removal of liquid contaminants by machine learning models and to meet the needs of production process in the most practical way with a fast and low-cost technique. We also aim to provide new information on water quality assessment, risk warning and reduction of chemical dosing in the operation of water treatment plants.

Keywords: *Water analysis, machine learning, drinking water.*

2 Virtual EFFICIENT IRRIGATION SYSTEM: PREDICTING SOIL MOISTURE USING MACHINE LEARNING ALGORITHMS

Kajal Chaudhary[1], Rashmi Bhardwaj[2]

[1]*Research Scholar, USBAS, GGSIPU, Delhi, India*

[2]*Fellow of Institute of Mathematics &Applications (UK), Professor of Mathematics, Head, Non-Linear Dynamics Research Lab, University School of Basic and Applied sciences (USBAS), Guru Gobind Singh Indraprastha University (GGSJPU), Dwarka, Delhi-110078, India*

**Corresponding Author: rashmib@ipu.ac.in*

Abstract

Food is one of the main components for our survival. Without food we cannot imagine our life as it is the main source of our energy. Irrigation is an agricultural process to grow different crops under varying conditions like the seasonal nature of rainfall. Machine learning (ML) based solution are transforming various fields of our lives like transportation, health, education, environment, and agriculture. The fresh water resources, which are already under pressure, are being used extravagantly in many countries. Machine Learning techniques can be used for the optimization of water usage in irrigation processes. This paper presents the application of ML algorithms to optimize the irrigation water usage by predicting the future soil moisture of a field. The data for different parameters like air, temperature, humidity, soil moisture, soil temperature, radiation and the weather forecast data are obtained from internet sources and available sensors. Various Machine Learning algorithms are applied for prediction of soil moisture in coming years. These proposed algorithms and research work could be really beneficial for an optimized and balanced use of water resources in agricultural fields.

3 Virtual WATER QUALITY CLASSIFICATION PREDICTION USING MACHINE LEARNING MODELS

Vinita Sangwan[1], Rashmi Bhardwaj[2]

[1]*Research Scholar, USBAS, GGSIPU, Delhi, India*

[2]*Fellow of Institute of Mathematics & Applications (UK), Professor of Mathematics, Head, Non-Linear Dynamics Research Lab,*

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Abstract:

Water quality plays a crucial role for humans, animals, plants, industries, and the environment. Over the past decades, contamination and pollution have significantly affected water quality. This study focuses on predicting the Water Quality Classification (WQC). To enhance prediction accuracy, parameter optimization and tuning-techniques are applied to various machine learning models, leveraging these methods to effectively forecast WQC. Grid search is an essential technique for optimizing and fine-tuning parameters in classification models.

Extreme Gradient Boosting (Xgboost) model, Gradient Boosting (GB) model, and Adaptive Boosting (AdaBoost) model are used as classification models for predicting WQC. To examine the efficacy of the classificationapproaches, five assessment metrics were computed: accuracy, recall, precision, Matthews's Correlation Coefficient (MCC), and Fl score.

Keywords: *Water Quality Classification (WQC), Machine Learning Models (ML Models), Extreme Gradient Boosting (Xgboost) model, Gradient Boosting (GB) model, and Adaptive Boosting (AdaBoost).*

2 Virtual HUMAN- INDUED IMPACTS ON RIVER HYDROLOGY AND WATERSHED MANAGEMENT IN THE MAHARLOO LAKE BASIN: AN ASSSESSMENT OF LAND USE, CLIMATE AND WATER RESOURCE CHANGES

Aliasghar lrajpoor

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Abstract

Rivers are dynamic systems that respond to a variety of environmental and anthropogenic factors, with human activities increasingly altering their equilibrium. This study assesses the impact of human-induced changes on river hydrology and watershed dynamics in the Maharloo Lake Basin in southern Iran. The region is characterized by significant land-use changes, including urbanization and agricultural expansion, compounded by dam construction and water diversion for irrigation. Using the SWAT model to simulate hydrological behavior, the study identifies a marked increase in surface runoff (10.61%) and changes in seasonal discharge patterns from 1992 to 2022. The findings reveal that urbanization and agricultural practices have exacerbated flood risks and increased lake salinity, which threatens the local ecosystem. These results underscore the need for an integrated water resource management strategy to mitigate the adverse impacts of human activities on the region's hydrology and ensure long-term environmental sustainability.

Key words: *water level, temporal and spatial changes, human activities, Maharlo Lake*

1 Oral STUDYING THE EFFECTIVENESS OF POLYMER COMPOSITIONS FOR PIPE CLEANING IN HYDROTRANSPORT OF DISPERSING SYSTEMS

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Abstract.

During hydraulic transport processes, the accumulation of sediments on pipe walls in dispersed systems negatively affects operational efficiency. This study explores methods for effectively cleaning pipes and enhancing their durability through the application of polymer compounds. Drawing on global research, it evaluates the influence of polymer coatings on hydraulic resistance and their environmental sustainability.

1 Oral Invited GLACIER DYNAMICS ASSESSMENT RELATED TO CLIMATE CHANGE IMPACTS ON HONZA SUB-BASIN PAKISTAN

Sajid Rashid Ahmad, Mariam Javed, Shahid Iqbal

Abstract

The present research involves using GIS techniques and remote sensing to obtain baseline information on the Hunza Basin's glaciers because conducting field surveys is challenging in this region due to the range of terrain associated with these glaciers plus the absence of in-situ data. Finding the mass balance of these glaciers, examining their connection to climate variability, and evaluating glacier velocity variation utilizing sophisticated geospatial techniques such as the co- registration and correlation (COSI-CORR) of optically sensed satellite images had been the specific goals of the study.

The glaciers were mapped using multispectral data from MODIS, Landsat-8, and Sentinel-2 from 2013 to 2020. The research findings indicate that while a glacier's speed diminishes at its terminus, it increases with altitude. Furthermore, the tributary glaciers make a substantial contribution to the mainstream glacier velocity, which rises toward the terminus, according to spatial patterns of glacier surface ice velocity. The different ice velocities were then analyzed by glacier's orientation, altitude, size and debris cover. To address the effects of global warming and climate change, this study aids understanding on how glaciers behave in response to changing climates and the water resources. It also suggests consistent tracking of the dynamics of the glaciers.

Key Words: *Climate Change, GIS/RS, Hydrological Assessment*.

2 Virtual POTENTIAL PALDSTANI HILL TORRENTS: A SYSTEMATIC APPROACH TO FLASH FLOOD WATER ASSESSMENT AND MANAGEMENT OF MONSOONAL WATER

Mariam Javed, Sajid Rashid Ahmad, Bilal Ahmad Munir

Abstract

Rainfall patterns in the mountain catchments of the DG Khan hill torrents are examined in this research. Two climatic zones (CZ) are monitored for their unforeseeable, monsoon-oriented rainfall patterns: CZ-1 (1960-1990) and CZ-2 (1991-2020). The Mann-Kendall statistical method used to detect the patterns of fluctuation in precipitation. Also, using the PCSWMM for evaluation of flash flood response from 2015 to 2020, while integrating GIS/RS to predict torrent catchment parameters. The relation-based dam suitability analysis (RDSA) technique for rainwater harvesting is suggested as a mean of managing flash floods by determining the best dam/storage locations.

According to the results, 55-60% of the yearly rainfall hits during the monsoon months from June to August. Although 39% of the data appear random, the CZ-2 indicates a general rise in the monsoon, and the Mann-Kendall test reveals a 95% confidence level for a rising June rainfall trend. Rainfall-runoff investigation demonstrates that flash flood peak assessment is highly accurate. Ten appropriate rainwater harvesting sites are identified using the RDSA approach. Results suggest that Punjab's cropping patterns could be unproved by proper management of the flash flood water.

***Key Words*:** *Hill Torrents, Rainfall Patterns, Water Management.*

1 Oral Invited SATELLITE-BASED OPTICAL AND RADAR OBSERVATIONS SUPPORT COASTAL HYDROLOGY STUDIES

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Abstract

Water pollution and sea level changes (surges and long-term rising) are important challenges affecting coastal communities. Coastal hydrology is an emerging domain of research due to the need of predicting river flooding and coastal associated impacts. Satellites provide a consistent set of observations that are now much improved compared to the past, with better coverage, revisiting, resolution for the monitoring of land-sea environments (Laignel et al., 2024). In this work, we present the case-study of Po River in Italy and show how optical imagery and radar altimetry can monitor extreme events and inland water and coastal area interactions. The Po River in the summer of 2022 experienced the worst drought in 70 years. The lack of rainfall and reduced snowfall, together with rising temperatures, led to a drastic reduction in water levels, with significant consequences not only for agriculture but also for the local population. The rationalization of drinking water for urban areas and the irrigation of crops in densely populated agricultural areas were just some of the consequences, along with dried up springs and trampled river beds. The situation was exacerbated by saltwater intrusion into the river, which destroyed crops and made irrigation almost impossible up to 40 km from the estuary. The analysis aimed to assess two aspects: 1) whether satellites were able to monitor the drop in water levels along the river and whether this was also reflected at sea; and 2) whether it was possible to monitor the salt wedge intrusion in the downstream sections of the Po River by satellite. The results of the analysis confirm that the satellite observed the significant increase and decrease in water levels in correspondence of the extreme events. In addition, the analysis of the data at the virtual stations in the downstream part of the Po River, together with the data along the tracks crossing the plume closer to the mouth of the river, supported by the optical imagery showed the interaction between the sea and the river.

*Laignel B., **Vignudelli S.,** Almar R., Becker M., Bentamy A., Benveniste J., Birol F., Frappart F._, ldier D., Salameh E., Passaro M., Menedez M., Simard M., Turki I., Verpoorter C. Observation of the Coastal area, Estuaries and Deltas from Space, in Special issue "Oceanology, Hydrology and Glaciology from Space (Editors: Anny Cazenave and Jerome Benveniste), Survey in Geophysics, doi:10.1007/s10712-022-09757-6, 2023.*

4 Invited Oral IMPROVEMENT OF METHODS FOR INCREASING THE EFFICIENCY OF PUMPS FOR TRANSMITTING MINING WASTEWATER

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Abstract

The article presents research on improving the efficiency of pumping units that transport wastewater generated during ore processing and beneficiation in the mining industry. During the study, the chemical composition of the wastewater was analyzed using fundamental parameter methods (Scatter FP) on a NEXCG analyzer from Rigaku Technologies (USA), revealing that it consists of 25 elements. The impact of wastewater on pumping equipment was determined, and a composite modifier composition was developed to reduce the viscosity of wastewater, thereby increasing the pump's effective power. The organic substances used are local and secondary raw materials, namely gossypol resin, carboxrymethylcellulose (CMC), and secondary adsorbents (Alkanolamines) produced from natural gas processing. The modifier was prepared by combining these substances in proportions of 5%, 2%, and 93%, respectively. The optimal amount of this modifier was determined through experimental studies and found to be 80 g/t. As a result of using the modifier, both the efficiency and useful power of the pump increased. Consequently, it was determined that the energy consumption of the pumping station could potentially be reduced by 31.86% across four pumping units.

3 Oral STUDY OF PHYSICAL AND CHEMICAL PROPERTIES OF NATURAL HONEY FOR IMPROVEMENT OF CONFORMITY ASSESSMENT PROCEDURE

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Abstract

An analysis of the physical and chemical indicators of natural honey, determined by modern methods, and considers the indicators for improving the procedure of conformity assessment were presented in this article. Natural bee honey is known to be one of the main suppliers of biologically active substances. Recent discoveries in biology, chemistry, medicine, and commodity science suggest that the study of beekeeping products is far from completion. However, consumers today face several issues in the natural honey market. Therefore, a systematic and comprehensive approach is necessary to address the problems and improve the quality of this important product. The study focuses on the physical and chemical indicators of honey, which can determine its authenticity and naturalness. Honey is a valuable natural product that is susceptible to falsification, making the development of accurate regulatory documentation for its certification crucial. This work aims to investigate the physical and chemical indicators of natural honey to enhance the conformity assessment procedure. The aim of this work was to develop a complex testing programme for natural honey using HPLC and JR spectroscopy methods. The research results were analyzed and generalized to create the programme. The State Institution 'Uzbek Centre for Scientific Testing and Quality Control' and .(ts regional branches have implemented this programme for certification purposes.

3 Oral CHEMICAL COMPOSITION AND CONSUMER PROPERTIES OF NATURAL HONEY: IDENTIFICATION EXAMINATION AND CLASSIFICATION

Zaynab S. Sayfullayeva [1], Gofurjon Kh. Khamrakulov[2], Lobar B. Ziyodova[3], Elmira Teshabaeva[4]

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Abstract

For the export of manufactured products, it is necessary to take into account its classification according to the commodity nomenclature. The classification code of goods in accordance with the commodity nomenclature of foreign economic activity is one of the most common tools used by participants in foreign economic activity to minimize costs and expenses. This code, related to the information to be indicated in column 33 of the cargo customs declaration for goods, is of great importance, since it determines the amount of import (export) customs duty. In addition, in the lists of goods approved at the legislative level, in respect of which prohibitions and restrictions are established or tax benefits and exemptions are determined, the goods are determined exclusively by the CNFEA code, and the name of the goods is given only for ease of use. The use of some lists involves the use of both the product code and its name. CNFEA codes are also used when maintaining customs statistics.

2 İnvited Oral SYNTHESIS AND CHARACTERIZATION OF NEW IONITS FOR DECISION OF THE PROBLEMS PEELINGS SEWAGE

Kakharov Bahadir Bakhramovich,
lbadullaev Akhmadzhan

Tashkent State Transport University, Tashkent,
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Abstract

New phosphor containing ionits were synthesized from quaternary phosphonium salts and divinilbenzole, quaternary phosphonium salts and methylmetacrylate. The copolymers having an inherent viscosity of 0,34-0,55 dL/g were obtained by the two-phase method using toluene as an organic solvent. The polymers were easily soluble in various organic solvents and had high glass transition temperatures in the range of 220-260"C. An aromatic groups of a copolymers having units was also prepared. However, its inherent viscosity was low because of the occurrence of a side reaction.

4 Oral SAVING WATER IS ONE OF THE WAYS TO CONSERVE ENERGY RESOURCES

Kakharov Bahadir Bakhramovich

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Abstract: In accordance with the order of the Minister of Construction and Housing and Communal Services of the Republic of Uzbekistan dated August 22, 2024 No. 01/2-59 "On approval of urban planning norms and rules No. 2.04.01-22 "Internal water supply and sanitation of buildings" in the updated version;tegistered by the Ministry of Justice of the Republic of Uzbekistan on October 2, 2024 under No. 299, the basic rules were revised. The main directions for improving the energy efficiency of water supply systems are listed. Various options for reducing drinking water consumption are described, including the most common technical measures. Useful tips on saving water at home are given.

2 Oral Invited **CHARACTERIZATION AND COMPARISON OF THE TOXIC/IMMUNOLOGICAL POTENTIAL OF DIFFERENT WHEAT CULTIVARS FROM TURKEY**

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Abstract

Although wheat is part of the daily diet of millions of people worldwide, α-amylase/trypsin inhibitors (ATIs) are known to be allergenic components for baker's asthma and are arguably responsible for non-celiac wheat sensitization (NCWS). Twenty-one bread wheat samples from selected regions of Turkey with different climates and from different years were collected after harvest. For wheat ATI analyses, different methods were used for characterization and quantification, including proteomics-based methods. ATIs were addressed in these studies. The challenge was to develop a more comprehensive workflow covering all wheat ATI samples analyzed in the UniProt database. Two extraction systems based on chloroform/methanol mixture (CM) and under buffered denaturing conditions were evaluated. Three aspects were optimized, using tryptic digestion, chromatographic separation and targeted tandem mass spectrometric analysis (HPLC-MS/MS) methods.

3 Virtual BIBLIOMETRIC ANALYSIS OF ARTIFICIAL NEURAL NETWORKS ON OPEN CHANNEL HYDRAULIC

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Abstract

An open channel is a flow system in which the top surface of the fluid is exposed to the atmosphere. The term open channel refers to liquid flow that is not completely enclosed by solid boundaries (such as in a river). In open channel flow, the flowing liquid has a free surface, and thus the liquid is not under gauge pressure at the surface. Open channel is takes place due to slope of bed of the channel only. Over the last decades, much research effort has been devoted to water flow control of open channel conveyance systems such as irrigation channels. A great number of regulatory procedures have been proposed.

In this study, literature data were analyzed with bibliometric methods. Bibliometric analysis is an efficient analysis method used to understand scientific communication, trends, impacts and interactions between research fields. Artificial neural networks (ANN), which have been widely used in many fields in recent years, were evaluated with reference to scientific articles for their use in open channel hydraulics. The data used for the analysis were accessed .from the WoS database. As a result of the search conducted between 1992-2025 with the terms hydraulic energy and computational fluid dynamics, 75 documents were obtained.

In this research, open channel hydraulic was examined with bibliometric analysis and measures to be taken on the subject, comments, suggestions and research were summarized. The results can help and guide future research on the integration of ANN in open channel hydraulics. It is believed that this study will contribute to related research and raise awareness on the topic.

Keywords: *Bibliometric analysis, open channel, artificial neural networks.*

4 Virtual Invited A REVIEW ON URBAN FLOOD

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Abstract

As a result of climate change, urban areas in particular are becoming increasingly vulnerable to floods, which can cause devastating effects in terms of both life and property loss. Therefore, it is essential to correctly assess urban flood processes in threatened areas and develop pre-disaster recovery strategies. With global climate change; adverse effects such as excessive precipitation, environmental pollution, coastal floods and heat waves are experienced more frequently. It is estimated that imbalances in global climate change, together with urbanization and land use change, will cause even more severe floods and damage in urban areas in the near future. Rapid and unconscious urbanization increases urban flood risks. Urban floods also cause epidemics, contamination of drinking water and damage to the ecosystem. Different methods and urban flood risk warning methods should be used to reduce flood risk in urban areas.

In this study, we have reviewed some research articles on urban flood risk It is neither practical nor economically possible to completely save urban areas from floods, and it is important to take serious measures to reduce their damage. In addition, institutions working on the subject should always be aware .of the need to develop "integrated" flood management plans and strategies to minimize flood hazards and increase flood resilience. This study is expected to assist in related research and raise awareness on the subject.

Keywords: *Urban flood, climate change, environment.*

3 Oral Invited MACHINE LEARNING METHODS AND TREND ANALYSIS: GELENDOST EXAMPLE

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Abstract

Water is one of the main sources of life for living things. Although about 75% of our world is covered with water, fresh water resources are very limited. Only 2.5% of the total amount of water on Earth is fresh water, most of which is stored in glaciers and groundwater. Usable freshwater resources include rivers, lakes and a small portion of groundwater. Rapidly growing populations, increasing water consumption, human activities and the impacts of climate change are increasing the pressure on water resources and posing the risk of water scarcity in the future. Therefore, sustainable management of freshwater resources is of great importance. In this study, the flow rate was estimated until 2050 using the data obtained from the flow observation stations in Isparta-Gelendost region. Within the scope of the study, monthly average current velocity, monthly total rainfall and monthly average air temperature data between October 1978 and October 2020 were analyzed. Machine learning models such as Linear Regression, Support Vector Machines, Decision Tree, Random Forest, Extra Trees, Artificial Neural Networks and Wavelet Artificial Neural Networks were applied to make forward-looking forecasts using historical data and the performances of the models were compared. As a result of the analyses, it was determined that Extra Trees, Random Forest and Wavelet-Artificial Neural Networks hybrid models were more successful in predicting the flow rate for 2050 compared to other methods. In addition, Mann-Kendall trend test and Sen's Slope method were applied to determine the temporal trends of flow, precipitation and temperature data. According to the results, while a significant upward trend was detected in air temperature, no significant trend was observed in precipitation. On the other hand, a statistically significant decreasing trend was determined in the flow rate. This situation indicates that water resources in the region may decrease in the future and water management strategies should be reconsidered.

Keywords: *Mann-Kendall Test;Sen's Slope, Machine Learning.*

3 Virtual ANALYSIS OF DEPRESSION AND ANXIETY IN WOMEN USING MACHINE LEARNING APPROACHES

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Abstract

In developing nations, major disabilities are largely attributed to anxiety and depression. According to a study by the World Health Organization (WHO) on anxiety disorders in the South East Region, India ranked highest, with women undergoing twice the level of distress compared to men. To tackle these issues effectively, we have developed a model that employs machine learning algorithms alongside standard psychological evaluations to identify different stages of these mental disorders, as early intervention is more cost-effective and successful than delayed treatment. Our proposed model has identified three distinct Al techniques that show promise when applied to datasets for both anxiety and depression: our CNN-based model outperforms the others when evaluating various metrics such as accuracy, recall, and precision. Specifically, it exceeds the performance of current algorithms, achieving 96% accuracy for anxiety and 96.8% accuracy for depression. Furthermore, our study indicates that 7.4% of urban women aged 18 to 35 suffer from severe anxiety, while 15.6% endure chronic depression.

Keywords: *Machine learning, **CNN,** depression, anxiety, linear regression*

3 Virtual UTILISING THE ROUGH SET-SVM MODEL FOR WATER QUALITY ASSESSMENT

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Abstract

Excessive factors in assessing water quality will affect the evaluation's outcome. First, using -rough set theory, the study reduces influence factors and extracts important factors. The safe class that the water quality evaluation falls into is then determined by regression analysis based on support vector machines, which is a small sample method. Ultimately, a demonstration analysis result that aligns with practice is obtained. The study also examines the efficacy of the combined model and fuzzy comprehensive evaluation, concluding that the rough set-SVM model is an exploratory approach to water quality assessment with a greater identification accuracy and consistency with practice.

Keywords: *Rough Set theory; SVM; water quality; evaluation*

3 Virtual INDIA'S WATER MANAGEMENT FUTURE: THE GROWING SIGNIFICANCE OF IoT, AI AND DATA ANALYTICS

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Abstract

Managing its water supplies is a huge task for India, a country with a diversified environment and a growing population. The situation is made worse by geographical differences, rising demand, and the effects of climate change. Nonetheless, promising solutions catered to India's unique requirements are being made possible by technical breakthroughs. With its powerful tools like satellite imagery and unmanned aerial vehicles (UAVs), remote sensing has become essential. In order to enable preemptive actions, authorities use these technology to monitor watersheds, evaluate the dangers of drought and flooding, and measure critical reservoir levels. These predictions are further enhanced by artificial intelligence (Al) systems, which enable well-informed decision-making to avert water catastrophes. Water systems may now be monitored and controlled in real time thanks to the combination of Al, data analytics, and sensor technology. India's infrastructure is covered by smart sensor networks that provide continuous water distribution and quality monitoring. By facilitating communication between different water management components, the Internet of Things (loT) maximizes resource allocation and reduces losses. Innovations in membrane technology and energy-efficient procedures have made desalination technology-in particular, seawater conversion-economically feasible . This offers a possible remedy for the freshwater-deficient areas of India. Blockchain technology is also encouraging efficiency and transparency in water governance. Pricing, scalability, and technical acceptance in developing countries like India are still issues, though. To overcome this, technology like desalination, smart sensors, remote sensing, and blockchain applications must be customized for India's particular situation. Governments, IT companies, and local communities must work together to provide fair access to water resources and successfully complete this revolutionary process.

Keywords: *Water management, Remote sensing, Artificial intelligence , IOT , Smart meters, Nanotechnology.*

1 Virtual EFFECTS OF CLIMATE CHANGE ON WATER QUALITY

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Abstract:

The impacts of climate change on water quality of water bodies are associated with the climatic extreme events (heavy rainfall and flood, heat, drought, wil

dfires, cyclones, super storms) as the major drivers that require knowledge of understanding. The majority of studies discuss how climate change affects drinking water, water quality, and catchment-related water pollution, but less focus has been placed on particular critical water quality metrics, suitable techniques, ecological risks, and management strategies to reduce the effects. This study highlights how climate change affects surface water bodies based on recent research on how climate change affects water quality and encourages workable solutions for better handling these effects. We conclude that consideration of climate change preparedness plan in catchments is the best option to adopt for minimization of climate change impacts on water quality of water bodies.

Key words: *Climate change; water quality impairment; water quality models.*

3 Virtual Invited ADVANCED PREDICTIVE MODELLING AND CONTAMINATION DETECTION

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Abstract

Water quality management represents a critical challenge in environmental sustainability, requiring sophisticated analytical approaches that can simultaneously capture complex spatial-temporal variations and provide precise contamination predictions. This research introduces a novel Fractal Wavelet Conjunction AI Simulation (FWCAIS) methodology that integrates advanced mathematical transformations, machine learning algorithms, and multi-dimensional data analysis to revolutionize water quality monitoring and predictive assessment.

The proposed framework leverages fractal geometry's inherent complexity-capturing capabilities, wavelet transformation's multi-resolution analysis, and artificial intelligence's adaptive learning mechanisms to develop a comprehensive water quality assessment model. By decomposing intricate water quality datasets into multi-scale representations, the FWCAIS approach enables unprecedented insights into contaminant dynamics, spatial distribution patterns, and potential ecological risks.

Methodology encompasses:

- *High-dimensional data preprocessing*
- *Fractal dimension computation*
- *Wavelet transformation techniques*
- *Convolutional neural network integration*
- *Adaptive learning algorithms*
- *Contamination risk prediction models*

Experimental validation utilizing extensive water quality datasets from diverse ecological systems demonstrated the methodology's superior performance, achieving:

- *94.7% contamination detection accuracy*
- *89.3% predictive precision*
- *92.5% spatial variation reconstruction*
- *Significant improvements over traditional monitoring approaches*

The FWCAIS model's innovative approach enables:

- *Real-time water quality monitoring*
- *Early contamination detection*
- *Predictive ecological risk assessment*
- *Adaptive environmental management strategies*

Bybridging advanced mathematical modelling, artificial intelligence, andenvironmental science,1his research provides a transformativeframework for comprehensive water quality assessment, offering unprecedented capabilities in understanding, predicting, and mitigating water contamination risks.

Keywords: *Fractal Wavelet Conjunction, AI Simulation, Water Quality, Contamination Detection, Predictive Modelling, Environmental Monitoring*

3 Oral Invited BETHE ANSATZ AND CRYPTOGRAPHY

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Abstract

The work is devoted to the application of the Lieb-Liniger Model of statistical mechanics to ensure complete information security in cryptography. For this purpose, using the Bethe Ansatz form, a complete set of explicit keys for information security is defined. In the author's previous works, a method for applying the method of using these keys to transfer complete security information between two objects using plane waves was developed. In this paper, this method is generalized for the transfer of the entire Bethe Ansatz.

4 Invited Oral ROLE OF NGOs IN PROMOTING CLIMATE-FRIENDLY PRACTICES AND AWARENESS IN DEVELOPING COUNTRIES: A COMPARATIVE APPROACH

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Abstract

Non-Governmental Organizations (NGOs) have become instrumental in addressing climate change challenges, especially in developing countries that often lack adequate resources and institutional capacity. This review explores the multifaceted roles NGOs play in promoting climate-friendly practices and environmental awareness in developing nations, with a focus on Pakistan, other Asian developing countries such as Bangladesh and Nepal, and selected European developing countries like Albania and Moldova. Drawing from recent scholarly literature and field-based evaluations, the paper highlights key challenges faced by NGOs, including financial constraints, political resistance, limited public engagement, and the growing pressure of climate change on water resource management. Strategies devised to overcome these barriers-such as grassroots mobilization, policy advocacy, education campaigns, and partnerships with local governments-are critically examined. The review concludes by discussing the importance of institutional support, sustainable funding, and community-led implementationto ensure the long-term success of NGO-led climate initiatives for a sustainable future.

2 Invited Oral FILM-HOLE IRRIGATION: A TOOL FOR SUSTAIABLE WATER MANAGEMENT IN WATER STRESSED CLIMATE

Sajid Mahmood1, Allauddin Ahmed[2], Hafiz Abdur Rehman[3], Muhammad Saeed Ahmed[4], Zeyneb K1h S, Fouzia Khurshid[6], Allah Ditta Mansoor[7], Eman lsmaeil El-Sarag[8], Aliasghar lrajpoor[9]

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Abstract

Proactive approaches are crucial to increasing the resilience to drought for people, ecosystems and societies. In developing countries, food security should be at the core of national drought policies and a strong driving force for drought preparedness at all levels. In the coming decades, drought is projected to increase in severity, frequency, duration and spatial extent, at the same time as the world's land areas are expected to become drier overall due to lesser availability of water. This will have severe consequences for people in poor countries and particularly in rural areas with arid and semi-arid lands for survival on this globe. To meet such circumstances in least water available areas, many modern approaches are applied for sustainable application of water for crop produce. Among others, one of them is Film-hole Irrigation. Film-hole Irrigation is relatively new irrigation method that refers to the bordered field completely covered with plastic film having holes of equal sizes. The main benefit associated with Film-hole irrigation is the reduction in water losses due to minimum evaporation from the field. Its advantages over other surface irrigation methods are faster water advance, water saving and increased crop yield. Present study was an attempt to experience Film- hole irrigation (FHI} on bordered field completely covered with plastic sheet having holes of equal sizes through which crop seedlings come out. Field experiments were conducted at Postgraduate Agriculture Research Station (PARS}, Faisalabad, Pakistan to check its effectiveness in terms of water saving for wheat crop yield on various sized borders having Fine Sandy Loam soil. Irrigation water was applied with an average discharge of 19 lps and field data was collected from each plot during 1st, 2nd and 3rd irrigations for the growing season. Results of this study revealed that advance time taken in Film-hole irrigation method in completing the advance phase was comparatively less as compared with the conventional irrigation. Averaged water saving from 9 to 23% was observed with Film-hole irrigation method and the yield of whea·tcrop was 23 to 30% higher as compared to conventional irrigation method. A reduction in soil salinity level was noted in Film-hole irrigated plots that add up to its benefits in another dimension for sustainability in irrigated environment.

3 Virtual Invited MATHEMATICAL MODELING OF ECOLOGICAL PROCESSES IN WATER BODIES

Elena Rojkova, Liliya Filimonova, Tashkent State Transport University Tevfik Denizhan Muftuoglu, Istanbul Aydin University

Abstract

The source of water transportation, water supply, climate regulation are rivers and canals. The ecological state of water resources is determined by the presence of pollutants in them that can spread in them. To simulate the spread of pollutants, you need to know the concentration, spread rate, and rate of destruction of pollutants. Modeling of ecological water resources is based on mass transfer of matter, in particular diffusion. To ensure the ecological well-being of water bodies, it is necessary to control the quality of water by chemical and bacteriological indicators. The article examines the process of spreading a substance that has fallen into a narrow river or channel in order to determine the time and. distance at which the concentration of the substance reaches the permissible value. Mathematical modeling of such a transfer of matter is based on the diffusion equation. There are many methods for solving this equation for one-dimensional problems: the method of separating variables, the method of sources, the operational method, the method of finite integral transformations. Usually such an equation, in view of its complexity, is solved by numerical methods. This article provides an accurate solution to the complicated differential equation with constant coefficients, which describes the process of one-dimensional diffusion of matter by the recurrent operator method. The obtained solution makes it possible to predict the effect of the propagation speed on the distance of transfer of the substance from the release site, and determine the time at which the concentration of the harmful substance reaches the permissible level.

4 Virtual HYDROVISION 360: ADVANCING WATER SECTOR PROJECT APPRAISAL AMID CLIMATE CHANGE WITH WEB-BASED INTEGRATION OF CLIMATE CATASTROPHE SERVICES (CLICAT)

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Abstract:

Effective planning and monitoring of water sector projects have become increasingly challenging due to the uncertainties posed by climate change. To address these challenges, Hydro Vision 360, a GIS-based web application ,has been developed under the supervision of Member (Infrastructure) by Sector Specialist (Water) to support water resources projects and other sectorial initiatives in Pakistan. The decision and support system integrates advanced geospatial visualization, real time, project monitoring and climate vulnerability assessment ,empowering policymakers and stakeholders with data-driveninsights Additionally, the Climate Catastrophe (CliCat) Web GIS application enhances this framework by incorporating regional climate change model predictions, enabling proactive risk assessment for infrastructure projects.

HydroVision 360 provides a comprehensive approach to project appraisal by integrating satellite imagery, GIS layers, and project design overlays to facilitate site assessment and feasibility analysis. Decision-makers can compare proposed infrastructure plans with existing on-ground conditions to ensure project viability before execution. The system also assists in risk identification by evaluating environmental, hydrological, and structural vulnerabilities through GIS-based analysis. By leveraging interactive infographics and key performance indicators (KPls), stakeholders can assess project outcomes, costs, and potential risks, ensuring a robust appraisal mechanism. In addition to appraisal, Hydro Vision 360 plays a crucial role in project monitoring, enabling real-time tracking of construction progress by overlaying satellite imagery and GIS data with original project designs. This capability allows for change detection analysis, helping identify deviations from approved plans, reducing cost overruns, and mitigating delays. The performance evaluation module provides insights into key metrics through infographic dashboards, supporting informed decision- making. Moreover, Hydro Vision 360 fosters transparency and accountability by making project data accessible to relevant stakeholders, ensuring efficient resource allocation.

The integration of Cli Cat significantly enhances Hydro Vision 360's analytical capabilities. Cli Cat is a web-based GIS platform specifically designed to analyze project areas under climate change vulnerability by utilizing regional climate model (RCM) predictions. This tool assesses potential climate-induced hazards such as flooding, drought, temperature extremes, and shifting precipitation patterns, enabling decision-makers to integrate climate resilience strategies into project planning. By combining historical climate data with future climate projections, Cli Cat provides a comprehensive risk assessment framework, ensuring that infrastructure investments remain resilient in the face of climate uncertainties.

Together, Hydro Vision 360 and Cli Cat form a holistic decision-support ecosystem for the water sector and broader infrastructure projects. This integration empowers stakeholders, policymakers, and engineers to adopt a proactive, data-driven approach to project management. By embedding GIS-based visualization, climate risk modeling, and real-time progress tracking, these platforms ensure that project are scientifically appraised, efficiently monitored, and climate-resilient., In , conclusion, HydroVision 360, augmented by CliCat, represents a paradigm shift ini water sector projecplanning and monitoring. By leveraging geospatial intelligence, climate risk analytics, and data visualization, these tools enable better-informe8 decision-making, optimized resource utilization, and enhanced project success rates. This integrated approach is crucial for sustainable water resource management, ensuring that infrastructure projects can withstand future climate challenges while promoting long term economic and environmental sustainability.

Key Words: *GIS-based Decision Support, Water Sector Appraisal, Climate Change Vulnerability, Project Monitoring, HydroVision 360, CliCat Web GIS, Geospatial Analysis, Risk Assessment, Climate Resilience, Real-Time Data Visualization*

3 Virtual Invited MACHINE LEARNING METHODS FOR

WEATHER RESEARCH AND FORECASTING (WRF) MODEL TURBULENCE FORCASTING AT ISTANBUL AIRPORT

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Abstract

This study aims to analyze atmospheric turbulence characteristics around Istanbul Airport using high-resolution numerical modeling and machine learning-assisted methods. The WRF-ARW (Weather Research and Forecasting – Advanced Research WRF) model was configured with two nested domains at 900 m and 300 m horizontal resolutions. Turbulence parameters, including Turbulent Kinetic Energy (TKE), Brunt–Väisälä Frequency (N^2), Panofsky Index (PI), and Richardson Number (Ri), were calculated to assess the temporal and vertical variability of atmospheric turbulence. The model simulations were initialized and forced with Global Forecast System (GFS) analysis data. Physical parameterizations included the New Thompson microphysics scheme, the RRTMG radiation schemes, the MYJ planetary boundary layer scheme, and the Noah land surface model. To improve the model output accuracy, machine learning models such as Random Forest (RF) and LightGBM (LGBM) were applied. Key input features for these models included 10-meter wind speed (WS10), 2-meter temperature (T2), potential temperature (θ), water vapor mixing ratio (QVAPOR), and surface pressure (PSFC). Model performance was evaluated using Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and the coefficient of determination (R^2). The results demonstrated that machine learning approaches significantly enhanced the predictive accuracy for wind speed and temperature compared to the raw WRF outputs. Overall, this study highlights that integrating high-resolution numerical weather prediction with machine learning-based statistical corrections offers a promising approach for operational airport forecasting and turbulence risk assessment.

Keywords: Atmospheric Turbulence, WRF, Machine Learning, XGBoost, Numerical Weather Prediction

Naseer Gillani

Former Senior Civil servant Presently Adviser Public Sector Large Scale Enterprise Chair UNESCOSOC accredited IHRO Think Tank Developlent Finance and Inclusion

Abstract

1st. International Hybrid Conference Role of Climate Change on Water Resources Management for a Sustainable Future (ICCW2024) Water scarcity has incrementally exacerbated in many parts of the world due to climate changes compounded by population growth, overexploitation of freshwater resources, and a lack of proper management. This upsurge has sparked worldwide interest in understanding the potential impacts of climate change on water resources. Climate change is often entwined with alterations in both water quantity and quality, aggravating the fast-growing water crisis. In envisioning a sustainable future, the capability of adapting to climate change and ensuring the sustainable management of water resources and urban planning, reflecting the urgent need for resilience and responsible stewardship in a world where water scarcity and unpredictability are increasingly prevalent are among the important aspects to consider. Investments in resilient infrastructure, such as flood defenses and improved irrigation systems, are essential to cope with changing climate conditions. Utilizing advanced technology for data collection, analysis, and modeling can help anticipate and respond to challenges related to water resources. Governments and regulatory bodies need to develop and enforce policies that ensure equitable access to water resources and sustainable management practices. Collaborative approaches to water management, including the sharing of water resources across regions and countries, can enhance resilience in the face of changing climate patterns. Furthermore, precise definitions of regional and global action plan for climate change need to be considered. The ICCW2024 conference aims to be a step towards bringing together scientists, planners, practitioners, and researchers to discuss recent issues and those expected to emerge in the future before the problems become too perplexing to solve for a sustainable future on this globe. Following table shows some numbers on papers and authors.

Table- Details on Conference Papers

COUNTRY	No of Paper	No of Chairs	No of Authors
Algeria			
Azerbaijan			
France			
India			
Pakistan			
Türkiye			
Tunisia			
USA			
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