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PRL Ka Amrut Vyakhyaan-05

on

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"FLOODS IN A CHANGING CLIMATE"

Prof. P P Mujumdar

Chairman, Interdisciplinary Centre for Water Research,

Indian Institute of Science, Bangalore

YouTube https://youtu.be/nGgSdZEFkwQ

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Title: "Floods in a Changing Climate"

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Abstract

With an increased climate variability under climate change, the risk of hydrologic extremes of floods is known to be increasing globally. The recently released IPCC report provides clear pointers to enhanced risk of floods in South Asia. While, with the current scientific knowledge, it is not possible to attribute a given extreme event to climate change, recurring patterns and increased frequencies of floods are clearly visible both at larger global scales and at smaller regional scales. The recent (Feb 2021) floods in the Himayalan river basin of Alaknanda induced purportedly by avalanche fall, the Kerala floods of 2018, Chennai floods of 2015 and the Uttarakhand floods of 2013 are the recent Indian examples of devastating floods that claimed hundreds of lives and resulted in huge economic losses. Such recurring floods point to the need of a better scientific understanding of the events. The magnitudes of precipitation induced floods depend on precipitation intensity, volume, timing, antecedent conditions of rivers and hydrologic response the drainage basins. Projecting the flood magnitude and frequency under climate change must therefore consider these critical aspects. Projections with currently available methodologies are however burdened with a high uncertainty, as the climate models typically do not capture the events at the time and space scales at which floods occur. In this talk, a brief overview of the recent work related to hydro-meteorologic aspects of floods in a changing climate is provided. Specifically, the following key issues are addressed : increase in extreme precipitation at a range of spatio-temporal scales and the associated non-stationarity in the process, hydrologic modelling of floods in the face of limited ground observations, detecting human signatures in the extremes and quantifying uncertainties in projections of the extremes.

The Speaker

Prof. P. P. Mujumdar is one of the most distinguished Indian hydro-climatologist of international repute and acclaim. Prof. Mujumdar is currently serving as a Professor in the Department of Civil Engineering and as Chairman, Interdisciplinary Centre for Water Research. His area of specialization is Water Resources with a focus on climate change impacts on hydrology/ water resources, statistical downscaling of GCM outputs, urban flooding, planning and operation of large-scale water resources systems, and uncertainty modeling. His recent research contributions include detection and attribution of hydrologic change, development of downscaling models and quantification and reduction of uncertainty in climate change impact assessment. His teaching interests include Stochastic Hydrology, Water Resources Systems, Surface Water Hydrology and Urban Hydrology. His areas of professional consultancy include urban storm water drainage, floodplain management, river basin planning, reservoir operations, lift irrigation, hydropower development and impact assessment of water resources projects. He has served as the Chairman of the Water Resources Management section of the International Association for Hydro-Environment Engineering and Research (IAHR) and as a reviewer for the 5th Assessment Report (AR5) of the Intergovernmental Panel on Climate Change. He is credited with important contributions as a member of the Editorial Board of the journal "Advances in Water Resources" and the "Water International". He has been a member of several state and national committees dealing with urban flooding, and operational and environmental aspects of water resources in India. Prof. Mujumdar is a recipient of the Alexander von Humboldt Medal of the European Geosciences Union (EGU), the Distinguished Visiting Fellowship of the Royal Academy of Engineering, UK and the CSIR-NGRI-AHI Indian National Hydrology Lecture Award. He is a J C Bose National Fellow and is a Fellow of Indian National Academy of Engineering (INAE), Indian Academy of Sciences (IASc) and Indian National Science Academy (INSA).

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About PRL

The Physical Research Laboratory (PRL), known as the “cradle of space science” in India, is one of the premier research institutes founded in 1947 by Prof. Vikram Sarabhai, a renowned Cosmic Ray Scientist, a great visionary and institution builder. PRL played a seminal role in producing a highly motivated cadre of space scientists and the technologists of highest international repute. The first scientific rocket launched from Thumba on 21st November-1963 and many other rockets launched thereafter contained payloads developed at PRL. Dr. Sarabhai initiated many of these scientific and technical activities at PRL which eventually led to the formation of the Indian Space Research Organization (ISRO). Therefore, PRL is known as the “cradle of space science” in India. Further, the research in the area of Plasma Physics expanded to the formation of the Institute of Plasma Research (IPR).

As an institution PRL is unique in that it conducts fundamental research in a wide range of research areas from the Earth to the cosmos, and comprising Astronomy and Astrophysics; Solar Physics; Space and Atmospheric Sciences; Theoretical Physics; Geosciences; Atomic, Molecular and Optical Physics, Astrochemistry; and Planetary Sciences and Space Exploration. PRL is one of the rare research institutes of international repute wherein research in such diverse fields of sciences is carried out using several state-of-the-art experimental facilities that exist under one umbrella.

Along with the ongoing research, several new initiatives have been taken up during the last few years. The Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory has been operationalized. PRL initiated scientific programmes in frontier areas of research, which include a search for exo-planets, laboratory studies of interstellar grains, laboratory synthesis of cold astromolecules and experimental studies in the field of quantum optics. PRL is also developing several scientific payloads as a part of ISRO’s larger vision and contributing to roadmap for competitive scientific exploration of the solar system and beyond. In particular, PRL has been contributing significantly not only in building instruments for space missions, such as Chandrayaan-1, Chandrayaan-2, AstroSat and upcoming Aditya-L1, Chandrayaan-3 and planetary and space missions, but also by bringing out new and insightful science results.

PRL contributes to several national and international research programmes and to human resource development through its Doctoral and Post-Doctoral Programmes, capacity building programmes, such as UN Course on Space Science, and science and engineering internship programmes. PRL contributes significantly to society through its Outreach Programmes by periodically organizing science exhibitions and Open Houses, planned visits of students of various school and college to PRL, and popular talks at various institutions to not only share the excitements of the advancements of contemporary scientific findings but also to encourage students to take up sciences as their research career.