National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Impacts of Landfalling Tropical Cyclones in the Coastal Environments of India: Vulnerability and Risk Assessment
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Venue	: ER-303, Department of Earth and Atmospheric Sciences
Date and Time	: 23 Sep 2024 (11:00 AM)
Abstract	: Tropical Cyclones (TCs) are regarded as major devastating phenomena that cause loss of lives and infrastructure and ecological-environmental damages over the Indian sub-continent annually. The tropical warm Northern Indian Ocean (NIO) is considered as an active breeding zone for TCs, and the longer coastline and higher population density in the coastal regions and its hinterlands exacerbate the exposure to risk. In this regard, the proposed work emphasizes investigating the impacts, vulnerability, and the future risks associated with this disastrous catastrophic event. Accordingly, a comprehensive framework via., statistical and a hybrid multi-criteria decision-making approach is adopted to analyze the vulnerability to TC impacts and risks over the eastern coastal regions of India, which are considered the primary hotspot for TC strikes. A statistical tool, viz., recurrence interval, a proxy to define the expected risks and a hybrid multi-criteria decision-making technique, viz., fuzzy-analytical Hierarchy process and Technique for Order of Preference by Similarity to Ideal Solution are instituted to determine the vulnerability to TC risks. The results revealed that the coastal districts of West Bengal, Odisha, and Andhra Pradesh are significantly exposed to severe cyclonic wind hazards and TC-induced heavy rainfall events. However, the mega urban agglomerations along the eastern coast, viz., Kolkata and Chennai, are highly exposed to TC vulnerability, predominantly attributed to societal characteristics and topographic features. Therefore, the study would further evaluate the destruction potential induced by TCs, capture the landfall characteristics, and subsequently determine the probable future risks to aid to improving mitigation strategies and cope with future risks associated with TCs.