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C O L L O Q U I U M

Weather-Related Disasters in SA: Insights, Infrastructure & Early Warnings

Dr Mary-Jane Bopape

(National Research Foundation - South African Environmental Observation Network – NRF-SAEON)

DATE: Monday, 21 July 2025 | 16h00–17h00 SAST

VENUES:
- Neelsie Cinema, Stellenbosch University
- Room P215, 2nd Floor, Physics Building, University of the Witwatersrand
- Seminar room K310, Physics building G5, North-West University
- Online

--- A recording of the talk will be published on the NITheCS YouTube channel afterwards ---

ABSTRACT

This presentation will share highlights of a study on weather-related disasters in South Africa (SA) between 1980 and 2023. The study relied on multiple data sources including the Emergency Events Database (EM-DAT), ERA5 reanalysis, EUMETSAT satellite imagery, and synoptic charts from the South African Weather Service. The study identifies floods and storms as the most frequent disaster types. KwaZulu-Natal, particularly the eThekwini Metropolitan Municipality, recorded the highest number of events in the east, while Cape Town reported the most in the west. Interestingly, although eThekwini does not receive significantly more rainfall than surrounding districts, it experiences more disaster events, pointing to the role of urbanisation and other human factors. Cut-off lows and upper troughs, classified as mid-troposphere mid-latitude systems, were the main drivers of these events, while ex-tropical cyclones were responsible for only four disasters. Smaller-scale systems, such as upper perturbations, also played a role, highlighting the need for improved forecasting of less-studied atmospheric features. While the EM-DAT database forms a key part of this analysis, underreporting remains a limitation.

The talk will also highlight national efforts to enhance environmental monitoring and disaster preparedness. This includes initiatives by the DSTI through the NRF-SAEON and three research infrastructures: EFTEON, SMCRI, and SAPRI. The presentation will also address the status and gaps in SA's early warning systems, offering reflections on how observational science can better support risk reduction and resilience.

BIOGRAPHY

Mary-Jane Bopape is the MD of the NRF-SAEON. She holds a PhD degree in meteorology from the University of Pretoria and also held a position as a Postdoctoral Research Fellow at the University of Reading. She worked at the CSIR and SAWS on weather and climate studies. She co-supervises postgraduate students at the Universities of Pretoria, Witwatersrand, Limpopo, Cape Town and North-West. She is one of 21 grantees of the 2019 Climate Research for Development fellowship and a 2021 AIMS Women Fellow in Climate Change Science. She was recognised by the President of South Africa as a pathfinder in 2019. She is a co-recipient of the 2008 World Meteorological Organization award for young researchers. She served as the vice and co-President of the South African Society for Atmospheric Sciences during the 2018-2020 term. She was listed as one of the most influential Africans of 2021 by the *New African* magazine and was honoured as a scientist by Ghana's Humanitarian Awards Global.

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