

## A Process-Based Framework for Characterizing Extreme Rainfall Events

By Dr. Gokul Vishwanathan

Climate and Weather Research Cluster, TMSI



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Host: Dr Sri Raghavan

Registration: [https://nus-sg.zoom.us/webinar/register/WN\\_eA4\\_lwByQ161ZrLPDgyS\\_w](https://nus-sg.zoom.us/webinar/register/WN_eA4_lwByQ161ZrLPDgyS_w)



### **ABSTRACT:**

Extreme rainfall is a global hazard, but it manifests differently across climate regimes, from short, intense convective bursts to long-duration persistent wet spells. Understanding what makes an event “extreme” therefore requires more than a single threshold or metric. This talk presents a process-based, portable framework for defining and characterizing extreme rainfall events using physically meaningful properties, including peak intensity, duration, and total accumulation. The framework is demonstrated for the Auckland Anniversary flood event and validated more broadly using New Zealand as a testbed for several documented high-impact rainfall events. Results show that, for heavy rainfall events in this part of the globe, event accumulation is strongly linked to duration and circulation persistence. The talk concludes by highlighting how this framework naturally motivates process-based modelling experiments using the MPAS atmospheric model to test causality, and how the same workflow can be translated to Southeast Asia to better understand diverse extreme rainfall event types and their dominant drivers.

### **About the Speaker:**

Gokul Vishwanathan is a Research Fellow at the Tropical Marine Science Institute (TMSI), National University of Singapore. He obtained his PhD in Atmospheric Physics at the University of Canterbury, New Zealand. His research interests include atmospheric dynamics and climate change, tropical convection with a particular focus on extreme precipitation events using a combination of observational and modelling approaches.