

High Resolution Modelling of Tropical Cyclone Characteristics using the Lengau Cluster

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Parts of southern Africa and Madagascar are majorly impacted by landfalling tropical cyclones (TCs). Despite the devastating impacts associated with these systems, little is known about the changing attributes of TCs in a warmer world, especially in this region. Therefore, we are undertaking novel, bespoke high resolution climate simulations to generate the first convective-scale (km-scale) ensemble projections of future climate change over southern Africa. These simulations were generated using the Conformal Cubic Atmospheric Model (CCAM) run on the CHPC supercomputer. To optimise modelling of TCs, a set of experiments were conducted using ERA5 reanalysis data, to test different model setups on specific, historical events. Namely, TC Idai (the deadliest event in region), TC Freddy (the longest-lived event), TC Eline (the second longest lived event) and TC Kenneth (the strongest event to make landfall in Mozambique) were considered. This then informed the setup for the downscaling of five CMIP6 models, which enables for the examination of projected changing attributes of tropical cyclones in this region. The outputs from this study will be used in compound flood risk assessments and enable further research into climate change adaptation options and improved early warning in the region.

Presenting Author

Email

Student or Postdoc?

CHPC User

CHPC Research Programme

Workshop Duration

Primary author: Dr STEINKOPF, Jessica (Global Change Institute, Wits University)

Co-author: ENGELBRECHT, Francois (Global Change Institute, University of the Witwatersrand)

Presenter: Dr STEINKOPF, Jessica (Global Change Institute, Wits University)

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