



Contribution ID: 107

Type: **Talk**

## **Understanding rainfall distribution over the Drakensberg Mountain Range under weak synoptic conditions.**

*Tuesday, 5 December 2017 12:20 (15 minutes)*

Understanding rainfall variability under weak synoptic forcing is crucial for improving weather forecast and climate projections with Numerical Weather and climate models. Rainfall variability under strong synoptic-scale forcing is dictated by large scale features whereas under weak synoptic-scale forcing, it is dictated by local-scale features. However, most of these local scale features are not well resolved by low resolution numerical weather and climate models which are used for operational weather forecast and climate projections. Consequently, the models may underestimate or overestimate the intensity of climate extremes. The analysis of the characteristics of wet weak synoptic days from observation and reanalysis data over the Drakensberg Mountain Range (DMR) revealed that although the reanalysis data captures the observed characteristics of wet weak synoptics days, it underestimates the frequency and intensity because of its coarse horizontal resolution. Therefore, using Self-organizing maps (SOM) and high resolution simulations with the Weather Research and Forecasting (WRF) model, we investigated the characteristics of rainfall under weak synoptic scale forcing over the DMR. The results of the SOM classification of Wet Weak Synoptic Days rainfall revealed four main rainfall patterns under weak synoptic conditions over the DMR. The simulation of these rainfall patterns with the WRF model revealed that the WRF model greatly improves reanalysis data and brings it closer to observation and that a WRF model horizontal resolution of at least 18km is required to capture most of the local scale processes influencing rainfall formation under weak synoptic conditions. Hence, higher resolutions (less than 18km) simulations may not be necessary which implies a lower computational cost for simulations.

### **HPC content**

Performed high resolution weather simulations with Weather Research and Forecasting (WRF) model on the Lengau cluster of the CSIR Centre for High Performance Computing in Cape Town.

**Primary author:** Mr TAKONG, Ridick Roland (University of Cape Town)

**Presenter:** Mr TAKONG, Ridick Roland (University of Cape Town)

**Session Classification:** Earth Science

**Track Classification:** Earth Systems Modelling