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PARALLEL SESSION C: IMPACTS AND APPLICATIONS
C1: REPRESENTING & PROJECTING EXTREMES

Future changes in extreme rainfall events and circulation patterns over southern Africa

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Changes in precipitation extremes are projected by many global climate models as a response to greenhouse gas increases, and such changes will have significant environmental and social impacts. Hence there is critical need to understand the nature of weather and climate extremes. Results from an ensemble of regional climate models from the Coordinated Regional Downscaling Experiment (CORDEX) project are used to investigate projected changes in extreme precipitation characteristics over southern Africa. Indices for extreme events, which capture moderate extreme events, are calculated on the basis of model data and are compared with indices from two observational gridded datasets at annual basis. The physical drivers of the projected change are evaluated by examining the models ability to simulate circulation patterns over the regions with the aid of Self-Organizing Maps (SOM).

The evaluation data show that the RCMs can adequately simulate the current extreme rainfall climate, however differences exist depending on which observed dataset is used for the evaluation. The synoptic circulation patterns are well simulated which indicates that the differences in precipitation extremes between the regional models

and observations are related to model physics and parameterizations. In an assessment of value the regional downscaling added to GCM results, positive added value was computed generally and found specifically to be a function on the type of metric used and geographical location. This added value over GCMs justifies the additional computational effort of RCM simulation for the generation relevant climate information for regional application. Regional climate models projections indicate that annual total precipitation will decrease while the maximum number of consecutive dry days increases. The decrease in annual total precipitation is primarily associated with increases in the frequency of high-pressure systems over the region and decreases in the occurrence of mid-latitude cyclones. Circulation changes include an increase in the occurrence of the oceanic high-pressure systems, a more dominant high-pressure circulation poleward of the continent and a decreased occurrence of patterns of continental lows and mid-latitude lows.

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