CCDA-V

Africa, sustainable development and climate change

*Prospects of Paris and beyond*

ClimDev-Africa

# ANALYSIS OF EXTREME TEMPERATURE INDICES OF LONG-TERM HOMOGENISED TEMPERATURE SERIES IN SOUTH AFRICA

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# Problem statement 1/2

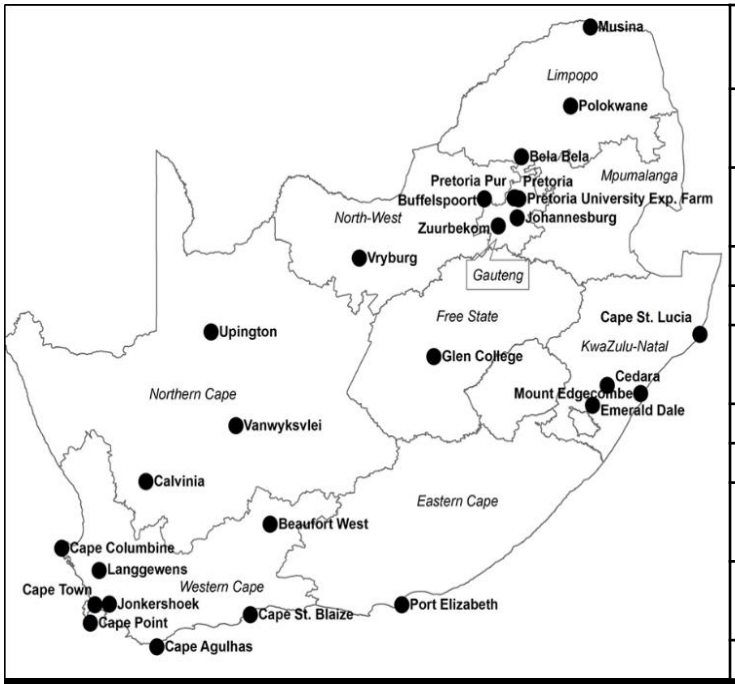
- Temperature extremes can be devastating.
- Insufficient information on trends and variability.
- Inconsistencies exist in available data and information.
- Limitations in extent of period of analysis.

# Problem statement 2/2

- Despite this, consistent trends in daily temperature extremes over southern and western Africa.
- Also, generally greater magnitudes of hot than cold extreme trends.
- Warming trend in SA surface temperatures.
- This concurs with global historical trends.
- Differences in index trends are highlighted.

# Methods

- Data sets (1931-2014) were collected, merged and quality controlled.
- They were homogenised using RHtestV4.
- Artificial changepoints were identified.
- Available metadata was used for inhomogeneity validation.




| Index | Units |
|---|---|
| TX90P | days |
| TX10P | days |
| TXx | °C |
| TXn | °C |
| WSDI | days |
| TNx | °C |
| TNn | °C |
| TN90P | days |
| TN10P | days |
| CSDI | days |

Figure 1. Positions of climate stations with provincial names in italics and the investigated indices with units towards the right.

# Key Findings

- Number of days per year with low minimum temperatures have declined while days with high minimum temperatures have increased.

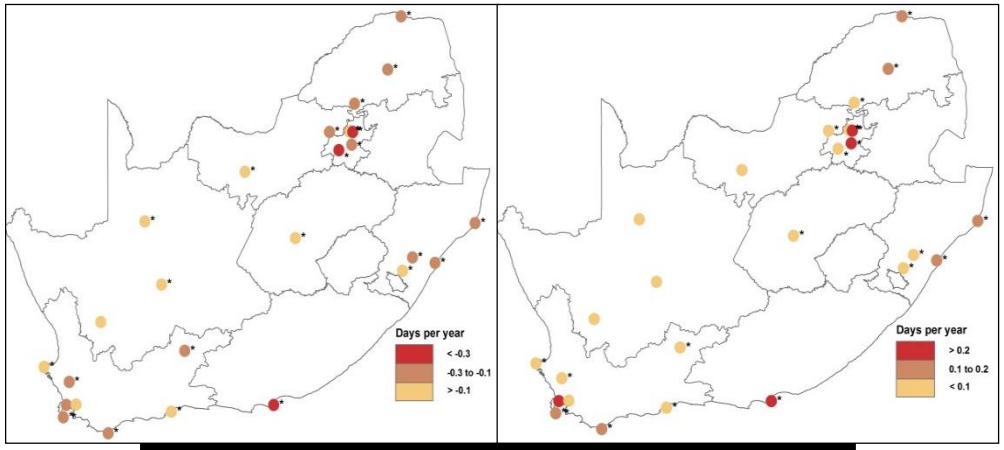



Figure 2 .Number of days per year with low and high minimum temperature.

- Number of days per year with low maximum temperatures have declined while days with high maximum temperatures have increased.

# Key Findings

- Annual absolute minimum, and annual absolute maximum daily minimum temperatures are increasing.
- Significant decreases in cold spell duration are evident over most of the eastern half.

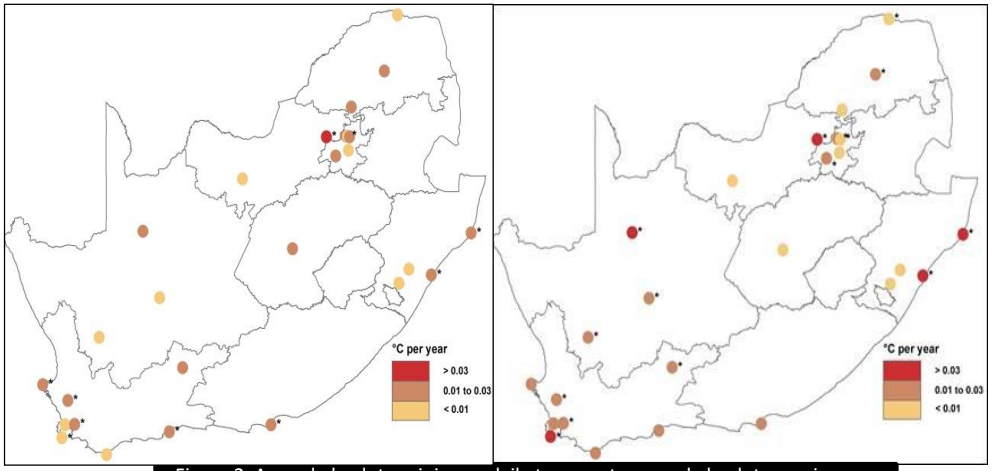



Figure 2. Annual absolute minimum daily temperatures and absolute maximum temperatures.

- While significant increases in warm spell durations are evident over most of the western and northern interior.

# Conclusions/Recommendations

- There has been a general increase in warm temperature extremes and a decrease in cold temperature extremes.
- Results useful in deepening the understanding of temperature extremes in SA.
- They can also be incorporated in decision-making.
- Applications of such work in southern Africa are suggested.
- Software available at WMO ETCCDI website and is userfriendly, recommended for other countries.