Surface temperature extremes over Zimbabwe

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Delivering and exploiting surface temperature observations for Africa

Introduction

Why study extremes of surface temperatures??

✓ Maize belts of sub Saharan Africa are most likely to face increased growing season temperatures.

✓Effect of this depends on phenological phase.

✓For maize, pollen viability affected if exposed to a few days with temperature above 36 ^{o}C at flowering.

Introduction cont'

✓An increase in temperature will stimulate feeding habits of some pests and bring about mutation.

✓This will affect economic thresholds level of most pests.

✓All stakeholders need to be aware of this to generate research on this, all this need temperature data and this has gaps in Africa.

Introduction

✓The energy sectors is a victim and culprit of climate change.

✓Increase temperature would imply more demand in cooling.

✓Sub Saharan Africa currently has a huge energy deficit , might worsen under climate change.

✓How many voices are talking about such challenges in Africa???

climate research in Africa

Research in Africa has put more emphasis on characterization of precipitation (little emphasis on temperature extremes)

BUT , higher yield loses observed in sub Saharan Africa by a 2 ^{o}C increase in temperature compared to 20 % decrease in rainfall.

Climate research limitations in Africa

Africa as a region has challenges in availability of daily quality weather data.

Most of the research is carried out using a course resolution and is not user driven.

Collaborative opportunities ??? Need continuity

Some initiatives to improve data availability

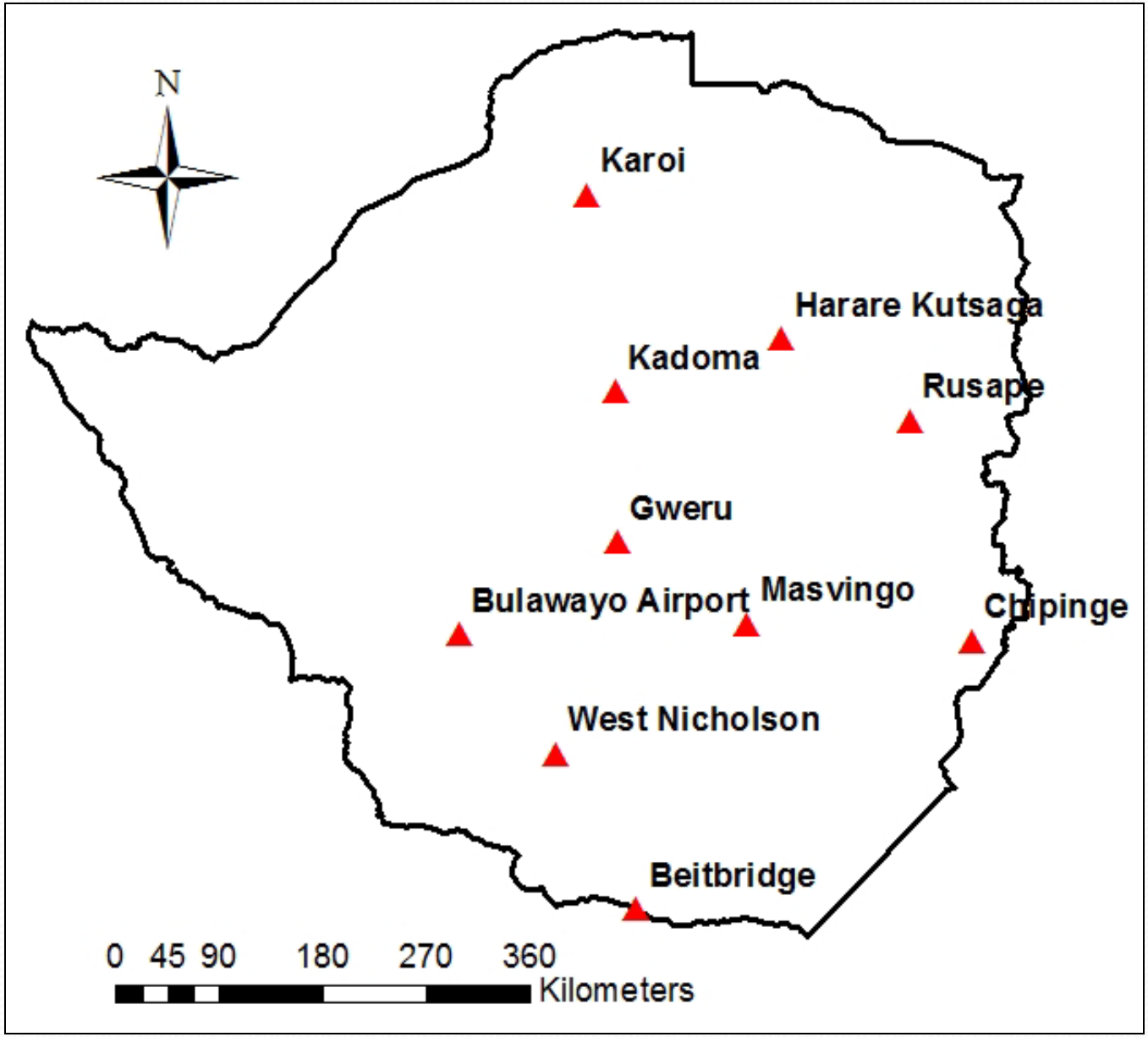
Make use of what is available to influence policy makers e.g use site specific data derived from such sources as the NCDC.

However, for Zimbabwe out of the 44 stations, only 15 stations have data for at least 25 years.

✓Out of the 15, ten stations have data that has less than 20% missing values.

Very few stations had data for the period 2000 - 2010 and also the period before 1980.

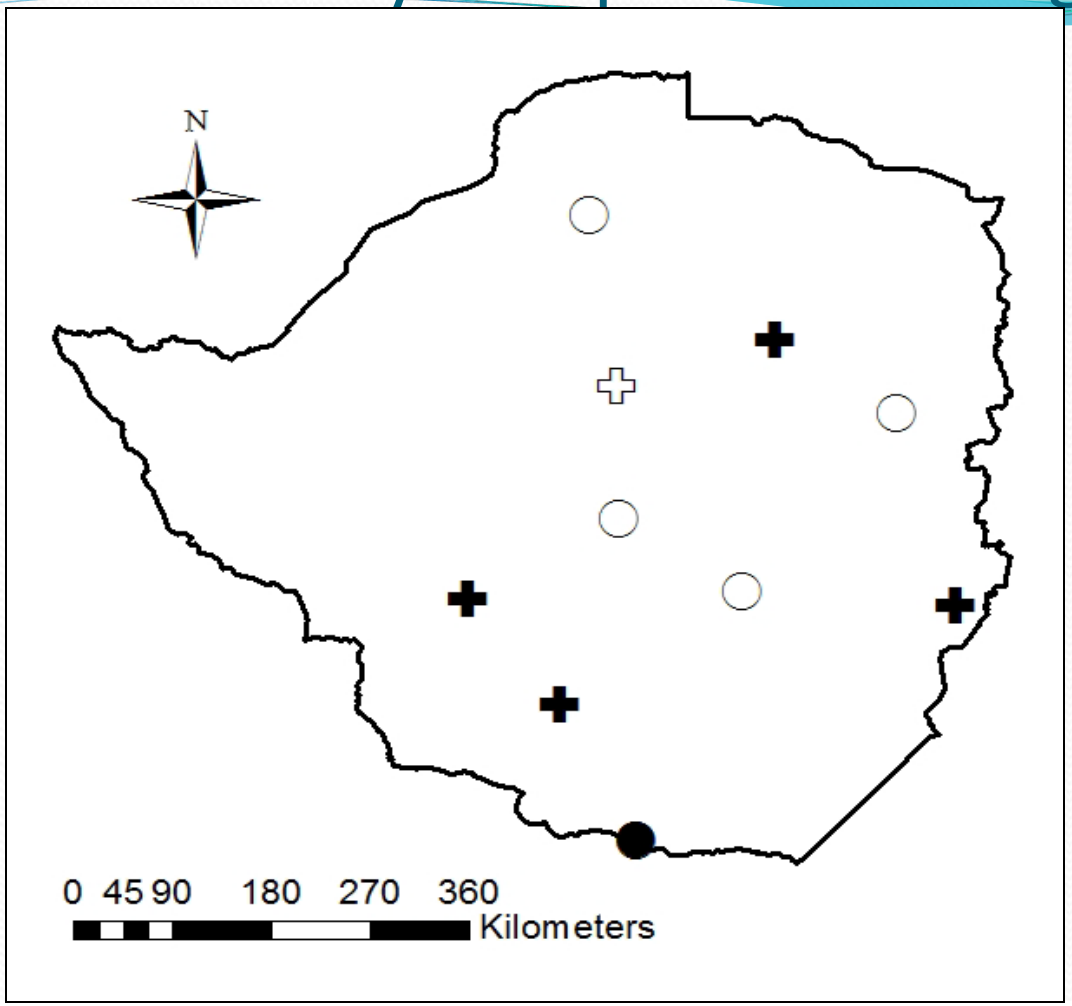
Fig 1: Location of weather Stations



Temperature related indices

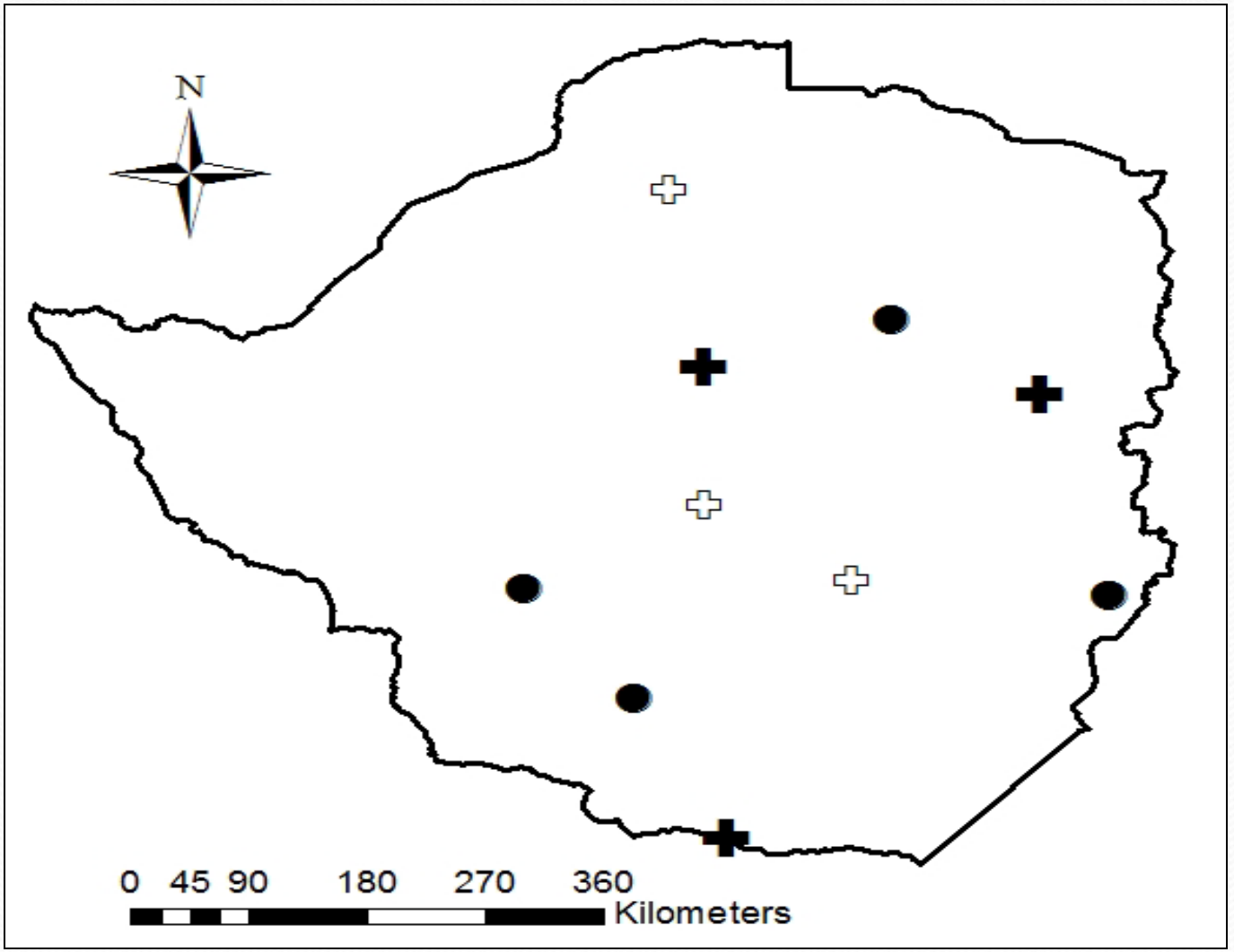
In the current work, we present findings of trends in diurnal temperature range (DTR) and try to attribute the changes of the trends to trends in Tmin .

Fig 2: Trends in Daily Temperature Range



- The symbols (✚) for positive trends, and (●) for negative trends, statistically significant at 95% level, i.e. $p<0.05$.
- The representation of the trends which are statistically non-significant used the symbols (✚) for positive trends, and (○) for negative trends

Fig 3 :Trends in Tmin



Implications of our findings

- There is warming trend, cold extremes are decreasing but warm extremes are increasing at a faster rate since DTR is increasing.
- However, these results are site specific and based on short term data.
- There is need to come up with simulation models to show how such changes are affecting different sectors.

What can be done to improve data availability and benefits

- Capacity development to: handle, analyse and interpret data.

Make use of existing regional networks (e.g Universities – SARUA).

Need to establish thresholds for each sector e.g crop, energy, tourism, fishing with monetary benefits and loses.

Possible solutions to adapt to climate change-breeding for heat stress tolerance.