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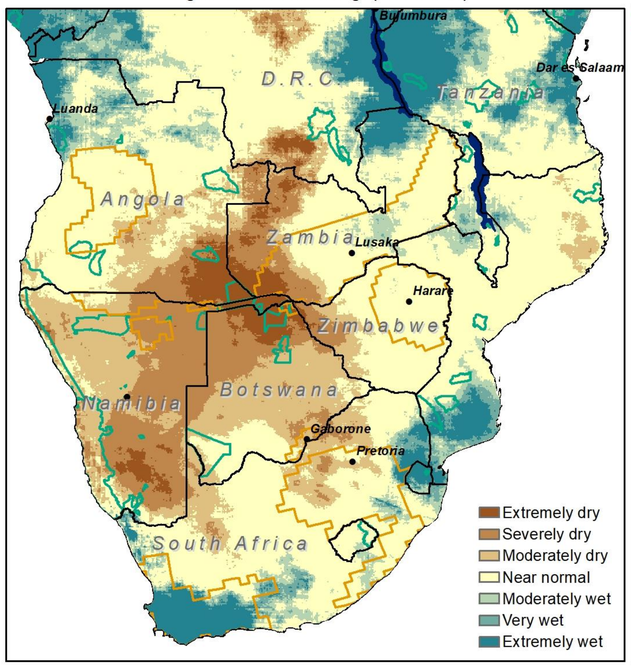
2023 Weather Review
for southern Africa
March 2024

SASSCAL
Southern African Science Service Centre for Climate Change and Adaptive Land Management

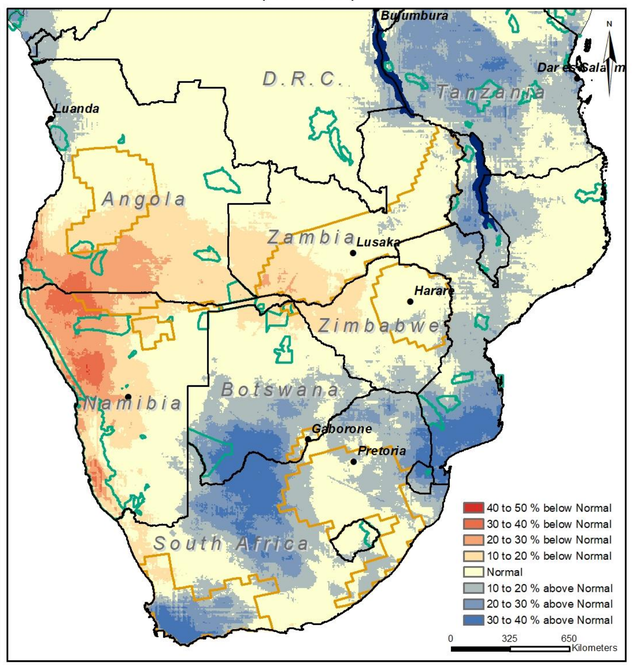
"Human-caused climate change is already affecting many weather and climate extremes in every region across the globe." (IPCC 2023)

Most of southern Africa relies on rain-fed crop production. Therefore, the precipitation impacts the food and water security of the population.

Standardised Precipitation Index (SPI) for 2023 against the 40 Year Average (1981 to 2020)



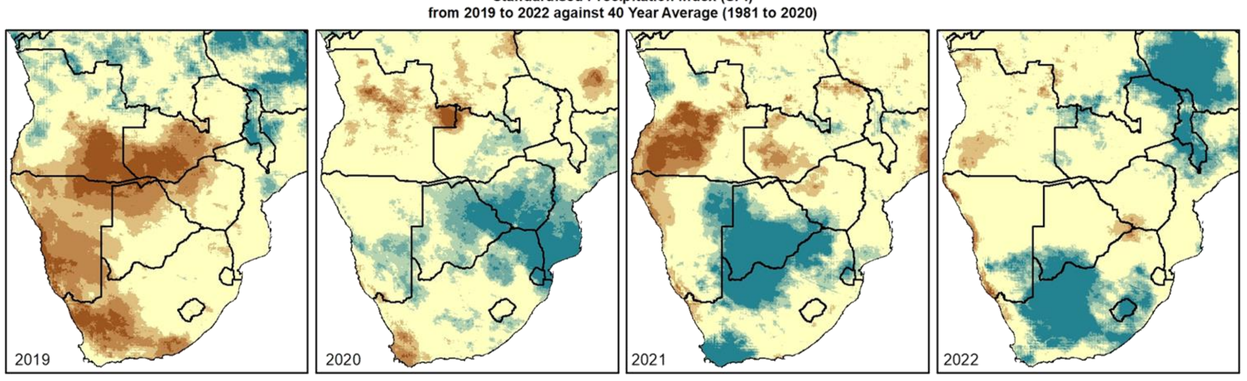
Percentage of Average Rainfall Total for past 5 Years (2019 to 2023) against the average 40 Year Rainfall Total (1981 to 2020)



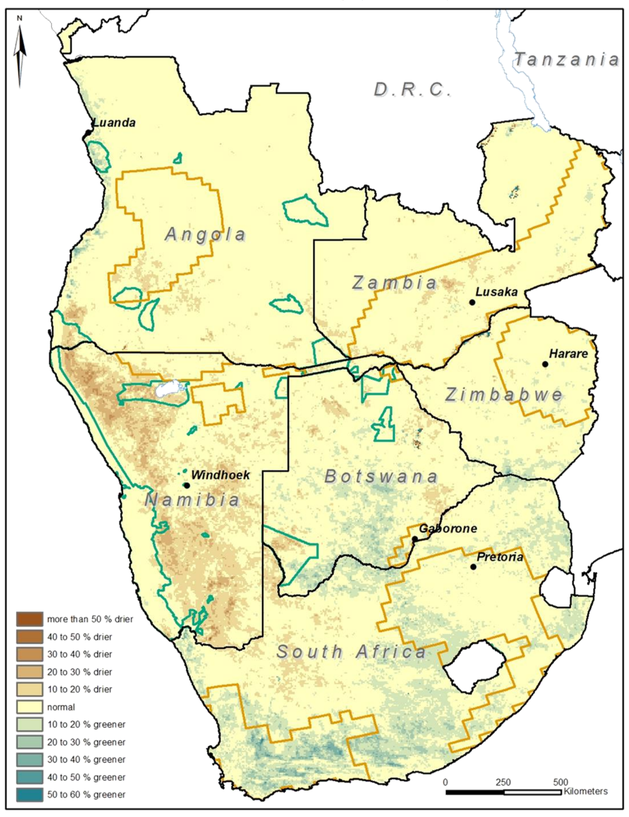
Precipitation

The Standardised Precipitation Index (SPI) of 2023 suggests that the northern, north-western, southern and south-eastern parts of southern Africa, when compared to the previous 40 years, were moderately to extremely wet, while the western and central areas of southern Africa experienced a moderate to extreme drought. Particular south-western Angola and north-western Namibia have been dry for three consecutive years. South Africa's Cape has seen the third wet year in a row.

Standardised Precipitation Index (SPI) from 2019 to 2022 against 40 Year Average (1981 to 2020)



Average annual NDVI Anomaly Percentage (%) for 2023 from Historic Average (2001 to 2022)

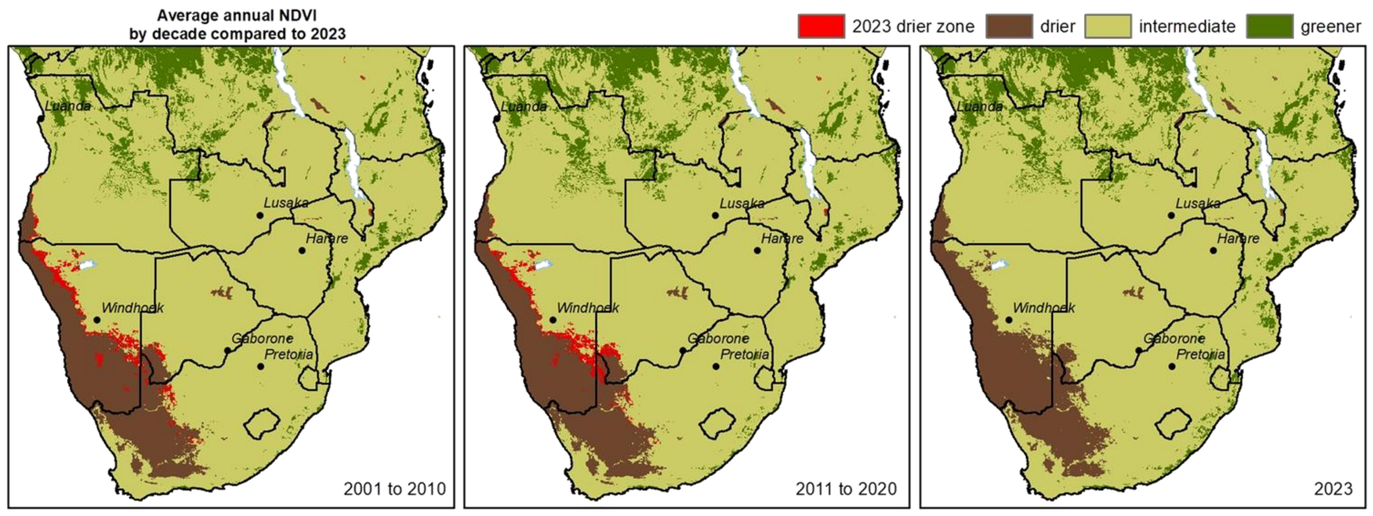


Vegetation

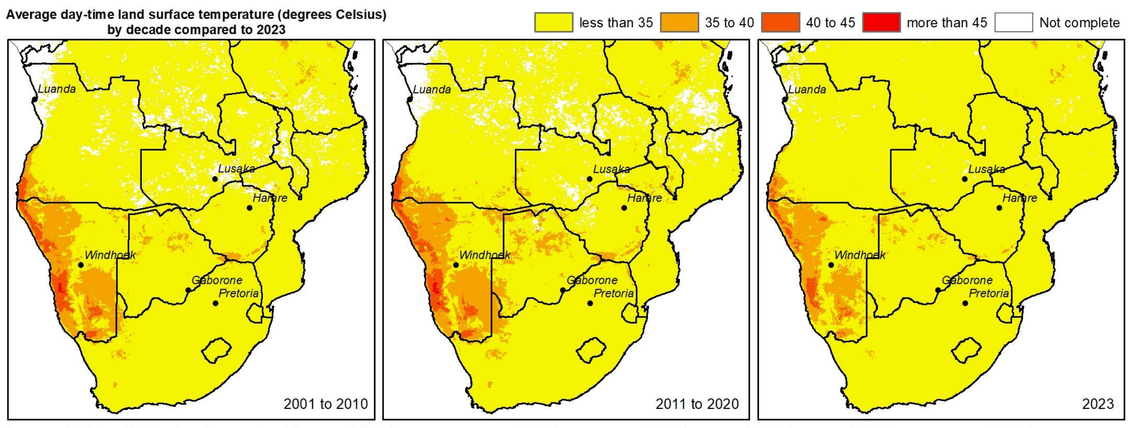
The vegetation cover for 2023, as indirectly estimated by the Normalised Vegetation Index (NDVI), when compared to the previous 21 years (2001 to 2022), suggests that most of southern Africa had normal greenness, with much of Namibia showing drier than normal and southern Botswana and parts of South Africa suggesting greener conditions.

The average annual NDVI of 2023, compared to the average annual NDVI of the decades 2001 to 2010 and 2011 to 2020 (previous page), suggests that the zones with particularly low NDVI, typically extending from south-western Angola down to the western part of South Africa's Cape, were larger than in the previous two decades.

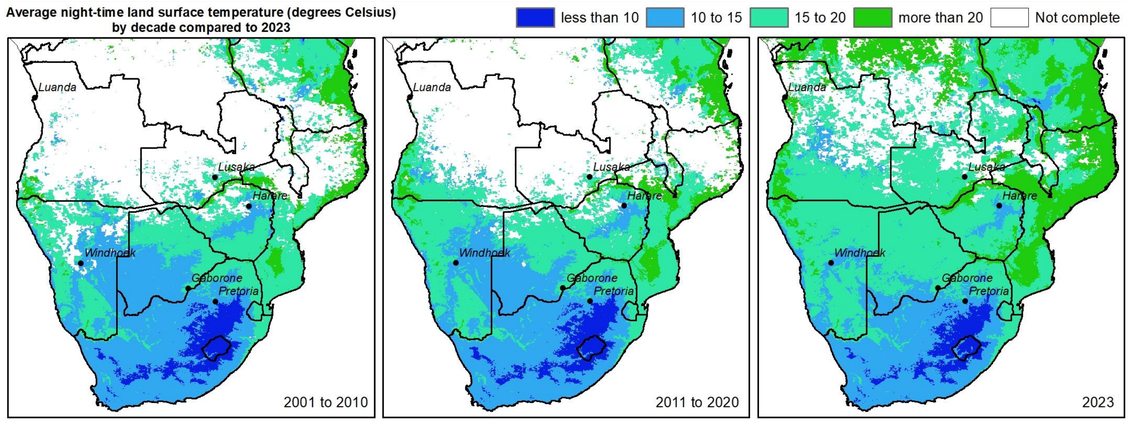
Average annual NDVI by decade compared to 2023



Average day-time land surface temperature (degrees Celsius) by decade compared to 2023



Average night-time land surface temperature (degrees Celsius) by decade compared to 2023



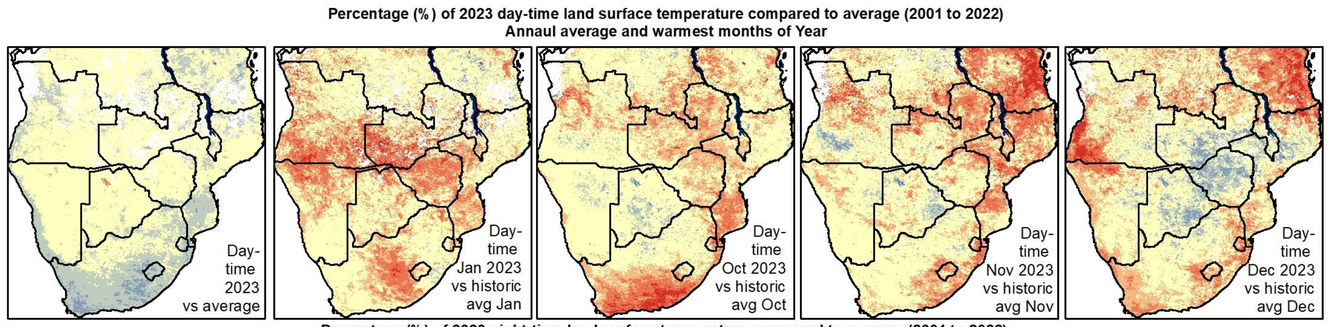
Land Surface Temperature (LST)

LST is influenced by parameters such as surface properties and in particular, whether the soil is bare, has vegetation cover and soil moisture content. Bare soil manifests as higher LST and water bodies manifest as lower LST .

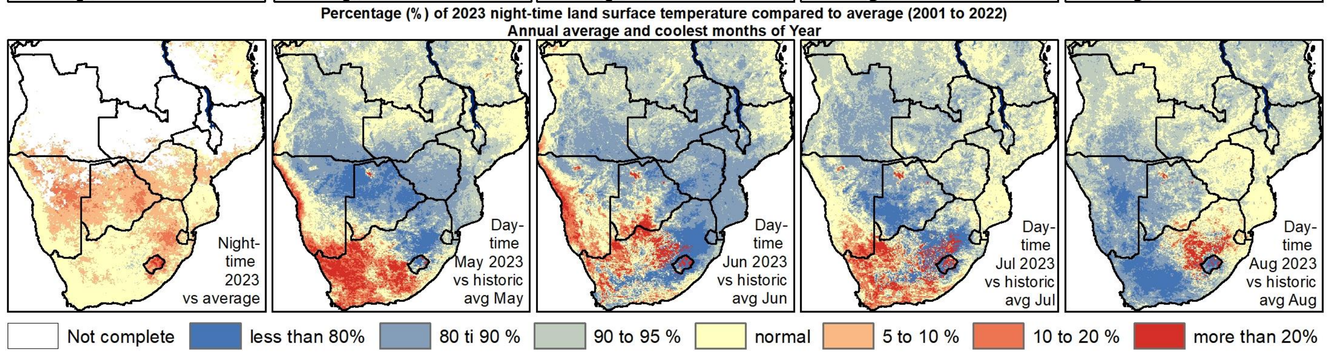
The areas which experienced higher than 35°C day-time LST were smaller in 2023 than in the decades from 2001 to 2010 and 2011 to 2020, but the areas with higher than 15°C night-time LST were larger than in the previous two decades.

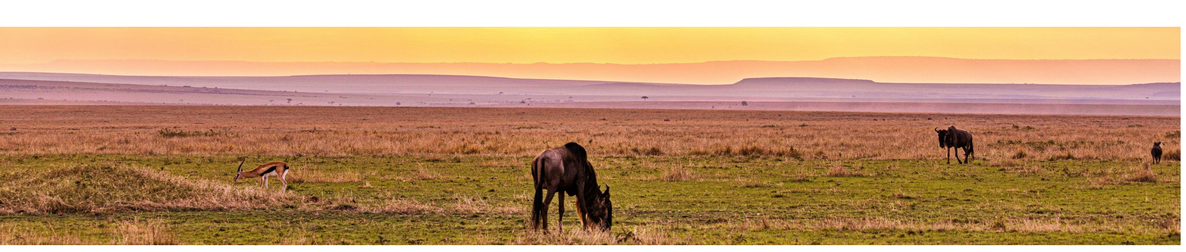
While the percentage of the average annual day-time LST for 2023, compared to the historic average annual day-time LST from 2001 to 2022, was normal for much of southern Africa, with the exception of South Africa and western southern Africa, the warm months' (Jan, Oct to Dec) day-time LST for 2023 were warmer in large parts of southern Africa. Notably, for the cold months' (May to Aug), there were warmer and cooler areas in southern Africa. Generally, 2023's night-time average annual LST was normal or warmer than normal.

Percentage (%) of 2023 day-time land surface temperature compared to average (2001 to 2022) Annual average and warmest months of Year



Percentage (%) of 2023 night-time land surface temperature compared to average (2001 to 2022) Annual average and coolest months of Year





References

1. 2023. IPCC. Climate Change 2023 Synthesis Report .
2. 2015. Funk et al. The climate hazards infrared precipitation with stations—a new environmental record for monitoring extremes.
3. 2021. NASA. Land Surface Temperature.
4. 2019. K Didan, AB Munoz. MODIS Vegetation Index User's Guide .
5. 2008. Herb et al. Ground surface temperature simulation for different land covers.

Data Source: CHC CHIRPS 2.0 Precipitation, MODIS MOD13C2 v061 L3 NDVI, MODIS MOD11C3v061 Land Surface Temperature