

Clim. Past Discuss., referee comment RC2
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Comment on cp-2021-178

Linden Ashcroft (Referee)

Referee comment on "Wet season rainfall characteristics and temporal changes for Cape Town South Africa, 1841–2018" by Nothabo Elizabeth Ndebele et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-178-RC2>, 2022

This study makes use of a beautiful long-term rainfall record in Cape Town to explore the nature of wet and dry seasons in the region since 1841.

Given the water shortages there in recent years, this paper is timely, relevant, and for the most part has a logical and clear approach. It is well written, and while there are a lot of figures and tables, they communicate the findings in ways that will be accessible to most readers. I have one major comment, and several minor and technical comments for the authors to consider.

Major comment

The main concern I have with this paper is the conclusions drawn from the complex wavelet analysis, particularly in relation to the role of solar variability on rainfall in southern Africa. My understanding is that the impact of solar variation on regional rainfall is likely to be very small, and that modern studies have found a correlation, but no real causation. At the moment these results seem to be the product of statistics, without any connection to what is happening on the ground. If that is the goal of the study, then that needs to be made clearer, but I think consideration of the dynamics would make the paper much more convincing.

The easiest way to address this is to provide additional information in the introduction and conclusion about how solar variations, ENSO and SAM dynamically influence the weather and climate of Cape Town. Perhaps it is worth summarising the key results from the other studies mentioned, for example.

Minor comments

- Lines 17–18: Is a decline of 3 days statistically significant? If so, it should be mentioned.
- Bottom of page 2: Could a gauge reading of 0.1mm also indicate dew, rather than rainfall?
- Line 98: 'and also some' rather than 'as also some'
- Line 130–135 could be expanded a little, with more detail added. Perhaps a table can be included to provide more specific detail about the climate mode indices used, their frequency, and the exact dataset used for their derivation. Which dataset was used to extend the Gong and Wang SAM index back to 1851, for example? Presumably 20CR, but it would be good to clarify this, particularly because there may be some quality issues examining SAM that far back.
- Line 189: Can you please spell out CWT?
- Lines 280-287: interesting analysis!
- Line 318-319: Are the lengths significantly shorter as well? It would be good to clarify this.
- Line 326: Is 17 October Julian day 290, not 289?
- Line 329-330: This is a dramatic statistic that might go better in the abstract than the current information provided in lines 17–18.

Figures

- Figure 3: Is it possible to replot these graphs to be longer, with the same x-axis and stacked on top of each other as four long plots rather as a 2x2 of square plots? I think this would allow for easier comparison across the stations, and make it easier to see the interannual variability.
- Figure 8: Presumably this figure is for SAOO?