

Weather Clim. Dynam. Discuss., referee comment RC1
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Comment on wcd-2022-2

Anonymous Referee #1

Referee comment on "Downstream development associated with two types of ridging South Atlantic Ocean anticyclones over South Africa" by Thando Ndarana et al., Weather Clim. Dynam. Discuss., <https://doi.org/10.5194/wcd-2022-2-RC1>, 2022

The authors aim to build the understanding of the ridging process in the South Atlantic from a downstream development perspective, given the relationship between ridges in this region and extreme rainfall in South Africa. The manuscript builds on a body of existing work by the authors, but I was left somewhat unconvinced that this paper provides a significant step beyond what the authors have already published on this topic given their reliance on the results presented in previous papers.

Major comments:

1.

I was left wondering about the value of separating between Type-N & Type-S ridges. A key finding of the manuscript is that there is "no evidence of downstream development at the surface during the evolution of ridging highs". This finding seems to apply to both ridge types, so I'm not sure what one has gained by providing separate analysis of the two ridge types. I note also that the findings discussed in the abstract are generalisable to both ridge types. Can the manuscript be simplified by focusing on ridges in general? Or can the authors provide stronger motivation, beyond that ridges in general are a source of moisture for South Africa, for the separation into ridge types? It wasn't until I referred to Ndarana et al. (2022) that I understood that there might be differences in the severity of rainfall associated with each ridge type. Can the authors provide clearer justification for the separation into Type-N and Type-S ridges? (e.g. in the Introduction, around Line 56)

2.

The authors rely heavily on composite analysis in the manuscript yet provide no information about the sample size used to produce the composites nor present any significance testing, which makes it difficult to judge how representative the composites are of the dynamics at play. I referred to Ndarana et al. (2022) and note the use of the Brown & Hall (1999) t-value approach to significance. I assume this was applied in the case of this manuscript but see no evidence of that. I have some concern about the marked difference in sample size used for the Type-N and Type-S composites, assuming it is the same as presented in Ndarana et al. (2022). The composites for Type-S ridges appear more intense (e.g. more extreme values) than those for Type-N. Smaller samples can be more affected by extreme events in the sample pool. Can the authors provide evidence to assure the reader that the results for Type-S ridging are not an artefact of the smaller sample size?

3.

Where does blocking fit into the story? In my experience cutoff low pressure systems are associated with the presence of blocking highs. That is, the low pressure system is cutoff from the westerly stream by the blocking high. Could some of the ridges the authors identify be blocks? Can the authors comment on this?

Minor comments:

Line 33: "is" transported

Line 157: incorrect spelling of "shift"

Line 180: the authors note that the eddy kinetic energy associated with type-S events is stronger than that associated with Type-N events – Fig 2a suggests it is marginally stronger? Is this a significant increase between N & S events? Worthy of remarking on? Similar question for vertical motion (velocity).

Figure 2: I think there is some incorrect referencing of the figures. In the caption I think 2e and 2f need to be switched around

Figure 2h: Conversion spelled incorrectly

Figure 2i: incorrectly labelled as 2h

Figure 2i: can the authors make comment about the differences between Type N & Type S in this instance?

Figure 3: label incorrect. The eddy kinetic energy centres are shown in (b) and (f) not (h)

Figure 3: I don't understand the last sentence in the figure caption. There is no Figure 3I

Line 297: ridging not riding

Paragraph 310-327: the authors introduce "Life Cycle" with limited discussion around what this means. The authors have an expectation that the reader is familiar with concept. A brief description of what is meant by LC1 and LC2 would assist the reader.

Line 372: make use *of*