

Weather Clim. Dynam. Discuss., referee comment RC1
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Comment on wcd-2022-47

Anonymous Referee #1

Referee comment on "The impact of the Agulhas Current system on precipitation in southern Africa in regional climate simulations covering the recent past and future" by Nele Tim et al., Weather Clim. Dynam. Discuss.,
<https://doi.org/10.5194/wcd-2022-47-RC1>, 2022

The paper is well written and researched and needs minor improvements.

It is missing some useful references:

2015, Passive suppression of South African rainfall by the Agulhas Current, Earth Interactions, 19, 1-14

2019, South Africa's future climate: trends and projections, in The Geography of South Africa, eds. J. Knight and C.M. Rogerson, Springer Nature, Switzerland, 305-313.

2020, Marine climate change over the eastern Agulhas Bank of South Africa, Ocean Science, 16, 1529-1544.

The first one above (2015) is most relevant. It appears to support some of the findings of the Tim et al paper (under review) and gives evidence on thermodynamic responses to circulation trends.

other comments:

in Fig 4a, 5a the observed GPCP rain trend is given 1997-2018, this period is too short. With trends over the sea masked, why not use the Chirps2 or ERA5 rainfall trend? these cover a longer time period.

in Fig 7a the (Hadley) observed SST trend should be compared with model trend,

in Fig 8a there is a SST warming in the Angola Dome in the tropical E. Atlantic which is said to be related to the Agulhas leakage, however this zone is where most models fail to correctly simulate the shift of anticyclonic winds and tropical rainfall. Thus changes in SST due to Agulhas leakage could be linked to a poleward shift in the subtropical ridge? or inability of model to reflect the teleconnections?

a useful reference on this subject: 2013, Climate trends in southern Africa, S. Afr. J. Science, 109, 53-63 - although using CMIP3 their Fig 1 shows the model bias that continues (with lesser values) in CMIP6.

in Fig 9c,e, 10c,e the color bars are reversed, which may correctly be interpreted, but the caption needs to provide a note on this.