

Title: Intensifying precipitation over the Southern Ocean challenges reanalysis-based climate estimates – Insights from Macquarie Island’s 45-year record

Author(s): Zhaoyang Kong et al.

MS No.: egusphere-2025-3496

MS type: Research article

General Comments:

The paper is scientifically sound and the results are promising. However, there are a few items need to be addressed (see Specific Comments section). Therefore, my suggestion it is required some minor revisions before it can be accepted for publication.

Specific Comments:

1. ERA5 precipitation data and trend analysis

Because the size of Macquarie Island is very small, any analysis from 0.25x0.25 ERA5 data has a great uncertainty. This requires some discussions in paper. Also, ERA5 has an ERA5-Land hourly dataset which is on 0.1x0.1 grid. The model physics of land and ocean in this dataset should be represented better for Macquarie Island. I would like authors add one more line from 0.1x0.1 land dataset on Figure 1d and add some discussions. This line can replace 3-other-pts averaged line.

2. Section 2.2.5

I don't see the importance of LHF section in this paper. ERA5 already has precipitation, evaporation, and runoff variables. Either remove all the LHF discussions/plots, or explain it more clearly the role of LHF in this study.

3. Figure 1d

The values for trends are missing, I assume they should be displayed similar to Figure 5 (mm per decade).

4. L88, L102

Time, I suggest rewrite those two sentences using L112 format xx UTC (xx LST).

5. L158 and Fig 4b-middle

This sentence seems out of place. Either reorder figures or put this sentence in proper place. Also, it seems to me that it is redundant to plot LHF and evaporation on the same plot.

6. L168 3.1

I suggest put a abbreviation for each regime, similar to Fig. 2.

Technical Corrections:

2. L156, Eq (2)

$$\text{LHF} = \text{L}_v / 86400 \approx \dots$$

3. Eq (2) and (3)

Change “,” to “.” at the end, or remove them.

4. Code and Data Availability

Add HYSPLIT model code links