

# Review of “Developments on a 22GHz Microwave Radiometer and Reprocessing of 13-Year Time Series for Water Vapour Studies” by Bell et al

## 1 General Comments

Measurement of water vapour in the middle atmosphere is an important and difficult process; its long-term time series is valuable for climate studies. This paper provides 13-year ground-based measurements with attention to the calibration and comparison with the MLS satellite measurements. It should be published, subject to some minor corrections.

## 2 Specific comments

- Figure 2: What are the orange lines and grey shades for? It would be helpful to provide the information in the caption. And, “(right)” in the caption is confusing. There is only one plot for the MIAWARA time series.
- Figure 8 is shown but not discussed.
- Figure 9: Why is the summer bias larger? Why is the bias below/above 1 hPa negative/positive? The reason should be discussed.
- Figure 10: Putting the profiles before the bias in Figure 9 seems better for the readers to understand the bias pattern. But again, why is the peak altitude in MIAWARA lower than the MLS?

## 3 Technical corrections

- Line 128 and elsewhere: “H2O” should be “H<sub>2</sub>O”.
- Line 139 and elsewhere: “PPMv” or “PPMV” should be “ppmv”.
- Line 194: There are two “that” in this sentence. The second one seems to be a grammar error.
- Line 285: See also papers by Millán et al. (2022), and Zhou et al. (2024).

L. Millán, M. L. Santee, A. Lambert, N. J. Livesey, F. Werne, M. J. Schwartz, et al. (2022). The Hunga Tonga-Hunga Ha’apai Hydration of the Stratosphere. *Geophysical Research Letters*, 49, e2022GL099381, doi:10.1029/2022GL099381, 2022

Zhou, X., Dhomse, S. S., Feng, W., Mann, G., Heddell, S., Pumphrey, H., et al. (2024). Antarctic vortex dehydration in 2023 as a substantial removal pathway for Hunga Tonga-Hunga Ha’apai water vapor. *Geophysical Research Letters*, 51, e2023GL107630. <https://doi.org/10.1029/2023GL107630>