

Review #2 for Braga et al. (2026)

5 October, 2026

Comment on uncertainty:

The authors claim measurement uncertainties of 10% in cloud-droplet number concentration (N_d) and cloud liquid water content (LWC) from the CDP probe in the campaign data that they analyze. This seems overly optimistic compared with other studies. For instance, consider a monodisperse cloud parcel in which all droplets have radius r . LWC can be expressed as

$$LWC = \frac{4}{3}\pi r^3 \rho_l N_d$$

where ρ_l is liquid-water density. Propagating uncertainties leads to:

$$\frac{\delta LWC}{LWC} = 3 \frac{\delta r}{r} + \frac{\delta N_d}{N_d}$$

Where δ is 1-sigma uncertainty. Baumgardner et al. (2017) assess uncertainties in a range of light-scattering probes, including the CDP probe used in the present study, and find that $\frac{\delta r}{r}$ is between 0.1 and 0.5 and $\frac{\delta N_d}{N_d}$ is between 0.1 and 0.3. Even the most optimistic values from these ranges have $\frac{\delta LWC}{LWC} = 0.4$, which is four times larger than the measurement uncertainties claimed by the authors. I therefore recommend changing the uncertainty claimed in the paper to match the review paper by Baumgardner et al. (2017) or arguing more clearly for why a smaller uncertainty range is justified.

Baumgardner, D. B., et al. (2017). *Chapter 9 Cloud Ice Properties : In Situ Measurement Challenges*. 1–23. <https://doi.org/10.1175/AMSMONOGRAPHS-D-16-0011.1>