

Dear Dr. Sugimoto,

Thank you for valuable comments. We modified the manuscript after your comments. Point-by-point responses are shown below.

Sincerely,

Takuya Kawabata on behalf of authors.

**1. (Page 8, Line 22) If the observation error of Zh is larger than the error investigated in Kawabata et al. 2018, the authors should address that the value of 15 dBZ is conservative one. Why do the authors use such a larger error?**

The reason is that “15 dBZ” is the same with the previous study by Kawabata et al. (2011). We added the phrase “which is the same with Kawabata et al. (2011)” after “15.0 dBZ” (P8L22).

**2. (Page 8, Line 22) Are the observational errors homogeneous spatially or different depending on the distance from the radar site?**

These errors are homogeneous in space, which means observational error covariances are diagonal. We added this sentence at P8L23.

**3. (Page 1, Line 9) The authors revised so that the word “implemented” is used twice in this sentence. The sentence may need to be polished.**

Modified. Thank you.

**4. (Page 3, Lines 8-15) The authors revised to remove the phrase “cloud water”. There are words to be expressed as singular form.**

Modified. Thank you.

**5. (Page 11, Line 14) Start a new line for Brandes et al. (2002).**

Modified. Thank you.

**6. (Page 11, Line 29) Remove this line.**

Modified. Thank you.

**7. (Pages 11-13) Use italic for journal titles.**

Modified. Thank you.