Supplement # 1 for the reviewer's comment No. 4

The A_H can be calculated from the radial profile of the attenuated reflectivity Z_a and the two-way PIA (Path Integrated Attenuation) along the propagation path (r_1, r_2) proposed by Meneghini and Nakamura (1990),

$$\mathrm{A(r)} = \frac{a(r)[Z_a]^b C(b,PIA)}{I_a(r_1,r_2)+C(b,PIA)I_a(r,r_2)}, \quad (1)$$

where,

$$I_a(r_1,r_2) = 0.46\mathrm{b}\int_{r_1}^{r_2} a(s)[Z_a(s)]^b ds, \quad (2)$$

$$I_a(r,r_2) = 0.46\mathrm{b}\int_{r}^{r_2} a(s)[Z_a(s)]^b ds, \quad (3)$$

If a is not dependent on range, then Eq. (1) becomes to

$$\mathrm{A(r)} = \frac{[Z_a]^b C(b,PIA)}{I_a(r_1,r_2)+C(b,PIA)I_a(r,r_2)}, \quad (4)$$

where,

$$\mathrm{Ia}(r_1,r_2) = 0.46\mathrm{b}\int_{r_1}^{r_2} [Z_a(s)]^b ds, \quad (5)$$

$$\mathrm{Ia}(r,r_2) = 0.46\mathrm{b}\int_{r}^{r_2} [Z_a(s)]^b ds, \quad (6)$$

$$\mathrm{C(b,PIA)} = \exp(0.23\mathrm{bPIA}) - 1 \quad (7)$$

Bringi et al. (1990) recommended estimating PIA using Φ_{DP} by

$$\mathrm{PIA}(r_1,r_2) = \alpha\left[\Phi_{DP}(r_2) - \Phi_{DP}(r_1)\right] = \alpha\Delta\Phi_{DP}, \quad (8)$$

and Testud et al. (2000) used Eqs. (4) and (7) to obtain radial profiles of A_H at C-band. In this study, A_H was calculated by the method proposed by Ryzhkov et al. (2014). The constant b was set by 0.6 and α was by 0.027 calculated by the ratio A_H to K_{DP} obtained from DSDs.

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