

Nakai, S., K. Yamashita, H. Motoyoshi, T. Kumakura, S. Murakami, and T. Katsushima, 2022: Relationships between radar reflectivity factor and liquid-equivalent snowfall rate derived by direct comparison of X-band radar and disdrometer observations in Niigata Prefecture, Japan. *J. Meteor. Soc. Japan*, **100**, 45-56.

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Plain Language Summary: The relationships between the radar reflectivity factor for horizontal polarization (Z_h) at X-band and liquid-equivalent snowfall rate (R), of the form $Z_h = B R^{1.67}$, are presented for six hydrometeor classes of solid precipitation. Snow aggregates demonstrated a stronger or weaker backscattering than graupel of the same R depending on the riming degree and types of constituent ice crystals in the X-band.

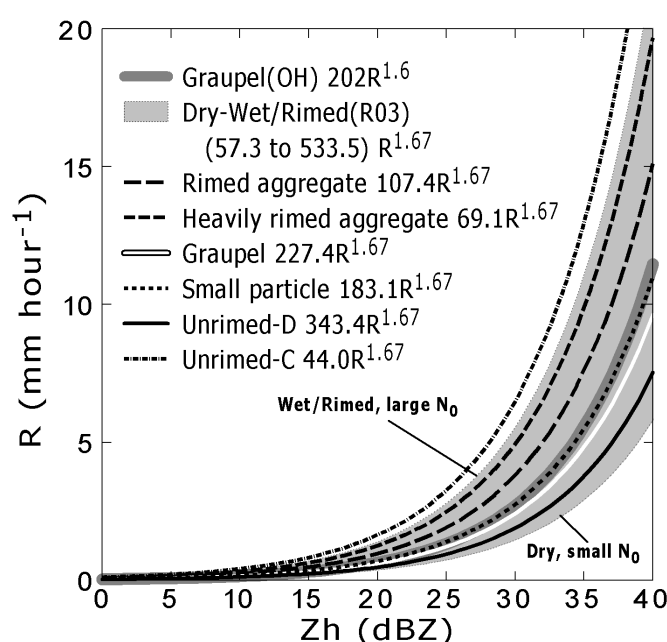


Figure 1. Z_h - R relationships. The relationships derived in this study for rimed snow aggregate (long-dashed), heavily rimed snow aggregate (medium-dashed), graupel (white solid), small-particle (short-dashed), unrimed-D (solid), and unrimed-C (dot-dashed) classes are shown. The relationships in the existing literature (shaded area: the range of relationships of snow aggregate; thick gray line: graupel) are also shown.

- The average B value for the “heavily rimed snow aggregate” was smaller than that for the “rimed snow aggregate”.
- The largest B value was derived for a case of aggregates of unrimed dendritic particle (unrimed-D class). The case involving the aggregates of unrimed low-temperature-type crystals (unrimed-C class) showed the smallest B value.
- For graupel cases, the average B value was roughly twice that of the rimed and heavily rimed snow aggregate classes and much smaller than that of the unrimed-D class.