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Simultaneous Vertical Pointing Observation by X-band Doppler Radar and Dual-frequency Wind Profiler for the Coming Era of Doppler Velocity Observation by Space-Borne Radar: Stratiform Precipitation Growth Process near the Bright Bands

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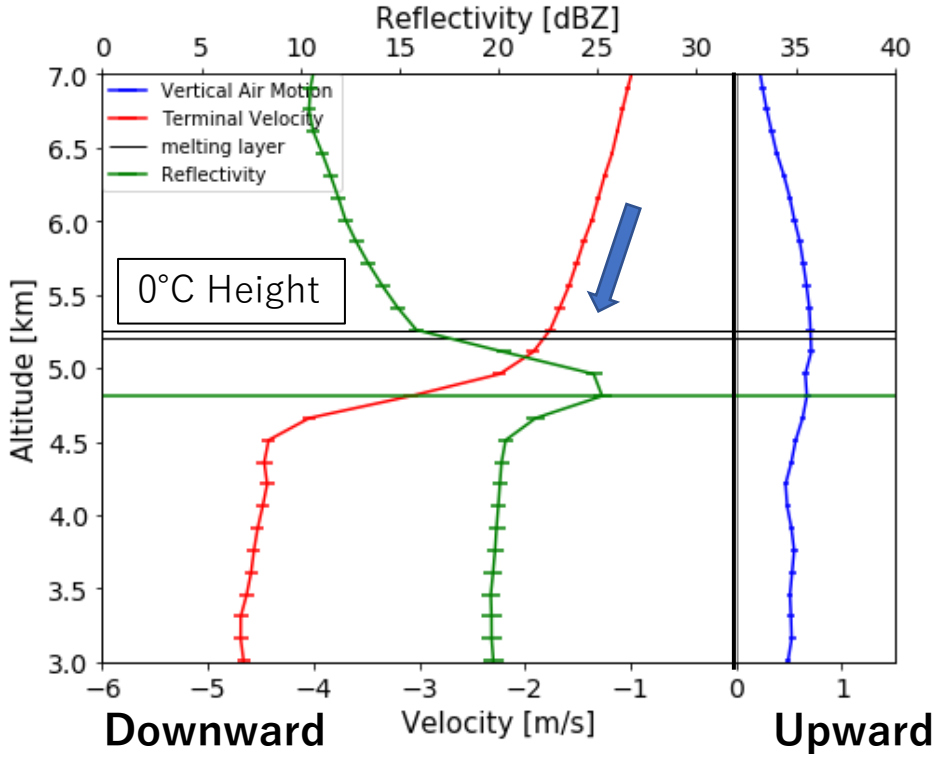
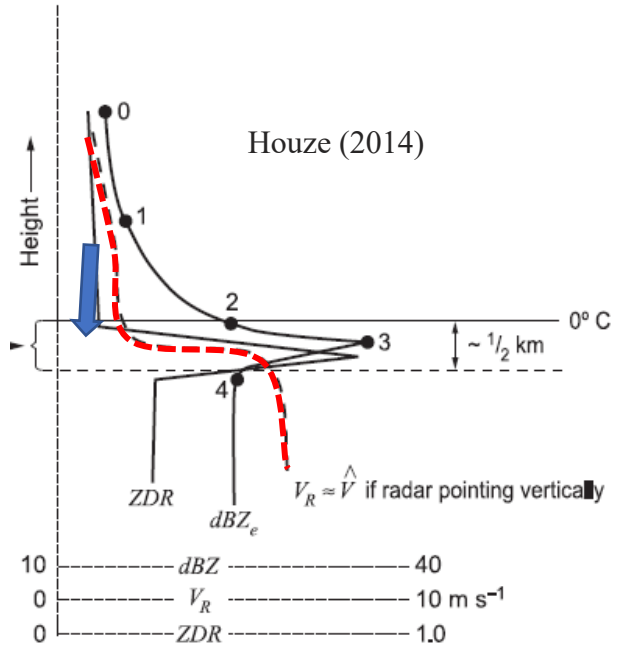
40th anniversary since its completion in 1984

MU radar (46.5 MHz, 6.45m) VHF

Nagoya U. Doppler radar (X)

LQ7 (1.3 GHz, 22cm) UHF





Toward the coming AOS era of Doppler velocity observations by space-borne radars, simultaneous vertical pointing observations by X-band Doppler radar and dual-frequency wind profiler, which consists of a VHF wind profiler (MU radar) and a UHF wind profiler (LQ7), are being conducted at the MU observatory in Shiga Prefecture, Japan. In this study, we focused on the stratiform precipitation processes near the bright band associated with the 2023 Baiu season and summer precipitation cases. Many textbooks describe the change (increase) in the falling velocity of precipitation particles as occurring near the peak of radar reflectivity in the bright band, while above the peak, the growth of ice particles by aggregation (which does not increase the falling velocity of precipitation particles) dominates. On the other hand, in the present observation, the increase in falling velocity of precipitation particles started above the peak of radar reflectivity. This increase is due to an increase in the density of ice particles, suggesting that the growth of ice particles by riming contributes to the increase in precipitation mass.