The validation of cold rain processes of the cloud resolving nonhydrostatic model (horizontal grid spacing is 1km, 1km-NHM), which was developed by the Japan Meteorology Agency (JMA-NHM), is conducted using an aircraft observation for orographic snow clouds. To validate the 1km-NHM statistically, the aircraft data observed during 2 winter seasons over the Echigo Mountains are used.

When the difference of the cloud-top height between 1km-NHM simulated and aircraft observed is relatively small (that is, the errors of numerical simulation is relatively small), 1km-NHM simulated cloud-top temperature is also corresponds to that of the aircraft observation. The frequency distribution of the 1km-NHM simulated horizontal winds and vertical winds are also corresponds to the observed one at every heights and regions, suggesting that the dynamical processes and thermo-dynamical processes of 1km-NHM are well reproduced.

In the well simulated cases, 1km-NHM simulated number concentration of solid particles (Nis) in upper in-cloud regions (> 3 km above sea level (ASL)) is underestimated. Nis in the lower in-cloud regions (< 2km ASL) is corresponds to that of observed one or a little overestimated. Underestimation of LWC near the upper in-cloud regions (> 3km ASL) is significant. Ice water content and total water content are almost corresponds to the aircraft observed or a little underestimated. From the in-situ aircraft observation, it was found that the improvement for the underprediction of LWC and Nis near the upper in-cloud regions is necessary in the microphysics processes of 1km-NHM.