

Application of the microphysics process-tracking scheme to simulations of the intense snowfall event in early 2018, Japan

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In January and February 2018, cold outbreak events brought intense snowfalls to the San-in, Hokuriku, and Tohoku districts of Japan, and caused considerable damage to local societies. The authors performed numerical weather simulations of these snowfalls using the new method of diagnosing characteristics of ice particles proposed by Hashimoto et al. (2020), which tracks the mass compositions of different classes of ice particles using their microphysical process of origin, such as water vapor deposition and riming. The mass composition from depositional growth is further divided into six components by the temperature and humidity ranges corresponding to the typical growth habits of ice crystals.

As a result, the precipitation from longitudinal- or transverse-mode cloud bands was most composed of graupel particles, while rimed snow particles were the major contributor to the JPCZ-related precipitation. The difference of hydrometeor type between the cloud bands and JPCZ-related cloud system was qualitatively supported by observation. On the other hand, in terms of reproducibility of the size and fall velocity at the centre of mass flux distribution (CMF, Ishizaka et al., 2016), there was room for improvement of the model.

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References

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