Development and applications of the process-tracking scheme based on bulk microphysics to determine the properties of snow particles

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New method of diagnosing the characteristics of ice particles has been developed using a bulk microphysics model by Hashimoto et al. (2020). This method tracked 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 was further divided into six components by the temperature and humidity ranges corresponding to the typical growth habits of ice crystals. In preliminary simulations with a two-dimensional domain, the new framework successfully revealed the influences of riming and depositional growths of ice particles within clouds and on surface snowfall. The new approach enables weather prediction models to provide much more information on the characteristics of ice particles regarding crystal habits and the extent of riming. Simulations were also performed in realistic three-dimensional atmospheric conditions regarding recent heavy snow events in Japan. Advantages and limitations of this approach will be discussed in the meeting.

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References
Hashimoto, A., H. Motoyoshi, N. Orikasa, and R. Misumi, 2020: Process-tracking scheme based on bulk microphysics to diagnose the features of snow particles. SOLA, in review.

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