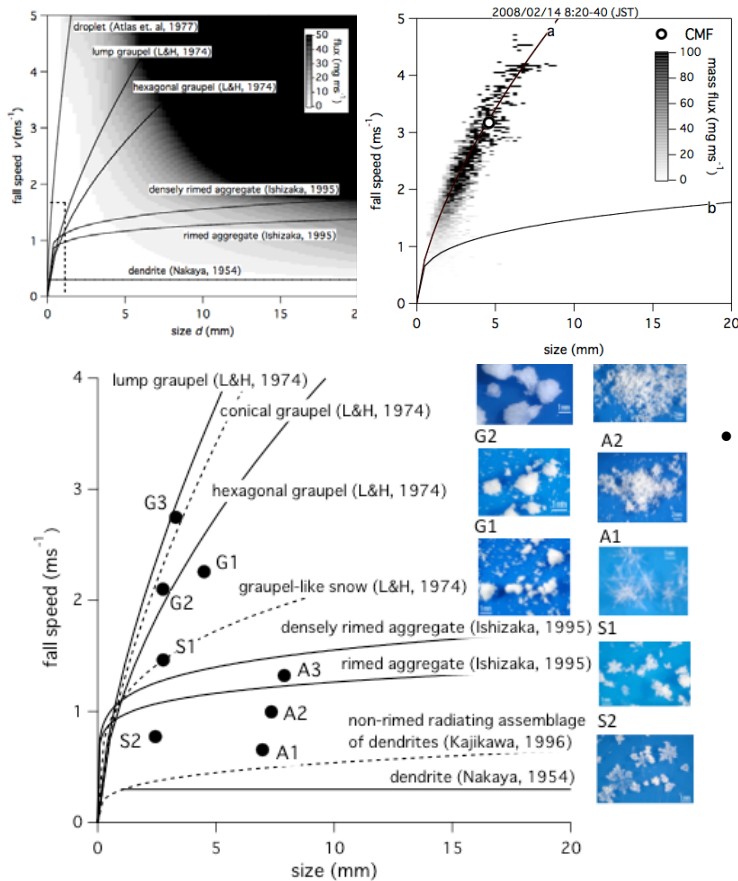
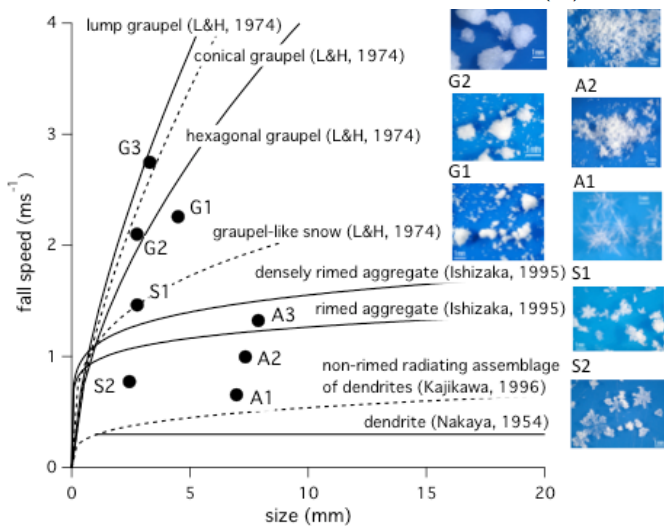


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←Figure 1. (left) The Mass Flux Chart that expresses mass flux of a hydrometeor in a bin of size d and fall speed v with gray-scale shading. (right) Size–fall speed relationships expressed with the accumulated mass flux of each bin for a graupel case. The circles indicate the center of mass flux distribution (CMF) in the case.



←Figure 2. The locations of the CMFs of various cases with different solid precipitation types for short period (10 min or less) in the size–fall speed coordinates. The microscopic photos show the main hydrometeors observed in the cases. The same symbols used in the CMFs and the photos correspond to the same cases.

Figure 2 presents a new method for quantitatively identifying the type of solid hydrometeor mainly contributing to snowfall from the measured size and fall speed data.

- To evaluate the contribution of measured particles to precipitation, the mass flux, defined as the product of mass and fall speed, was introduced. And the mass flux of a hydrometeor with size d and fall speed v is estimated from the empirical size–mass and size–fall speed relationships, resulting in the mass flux table or the mass flux chart (Fig. 1 left).
- Furthermore, we introduced the center of mass flux distribution in the size–fall speed coordinates, CMF (the averages of size and fall speed weighted by the mass flux), derived from the number of measured particles and their estimated mass flux, which can acquire with appropriate apparatus such as an optical disdrometer (Fig. 1 right).
- The CMF locations varied in the size–fall speed coordinates according to the dominant hydrometeors, reflecting slight differences in both size and snow type (Fig. 2). Accordingly we can quantitatively identify the main type of precipitation particles mainly contributing to a targeted snowfall from the location of the CMF (New Method).