ON THE SNOW CRYSTALS OF LOW TEMPERATURE TYPES (ABSTRACT)

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The typical shapes of snow crystals of low temperature types that are known at present are "Gohei twins", "Sea gull", "Spearhead" and so on. Although they were named by one of the authors (K.K.) tentatively, these names appear to be accepted by scientists in the fields of cloud physics, crystal growth and so on. On the other hand, their formation mechanisms except for the gohei twin crystals have not been clarified.

In this paper, the correlation between the gohei twin, sea gull, and spearhead type crystals has been considered based on a number of microphotographs taken by a polarizing microscope during the observation period from December 25, 1985 to January 23, 1986 at Inuvik (68°22′N, 133°42′W), N.W.T., Arctic Canada.

As a result, although we have pointed out that the gohei twin type crystals are two kinds that have tip angles of 56 and 78°, they have another difference besides the difference of their tip angles. Namely, the gohei twin crystals having the tip angle of 56° have a certain kind of finlike appendages along the crystalline boundary of two extended prism planes of the crystals. On the other hand, other twin crystals that have the tip angle of 78° are devoid of finlike appendages along the crystalline boundary. The angles of 13 and 20° between two extended prism planes of the gohei twin crystals pointed out in our previous papers were clarified by the measurement of the tip angles of individual extended prism planes. Furthermore, it was noted that the gohei twin crystals that have the tip angle of 56° are similar to the spearhead type crystals, and the spearhead type crystals were one of the wings of the sea gull type crystals seen from a right angle. However, some parts of the formation mechanisms of snow crystals of low temperature types are obscure and it would be difficult to understand their exact correlation as of this report.

(*Received January 31*, 1987)

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GROWTH OF POLYCRYSTALLINE FROZEN DROPLETS IN A COLD TEMPERATURE RANGE (ABSTRACT)

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Water droplets 20–80 μm in diameter were produced from distilled water. They froze into polycrystalline particles, falling freely in a cupper pipe cooled below −30°C. The growth of these polycrystalline frozen droplets was observed by using a diffusion cloud chamber. The crystal shapes were classified into three types, assemblages of plates at temperatures −28 and −33°C, assemblages of plates and columns at temperatures −33 and −35°C and assemblages of columns at temperatures below −40°C. This result is consistent with the reports that combination of bullets was observed frequently in the polar regions. The effect of the supersaturation on the growth of frozen droplets was also studied.

(*Received March 10, 1987*)