

## In-situ observations of sublimation processes of snow crystals

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We observed snow crystals using specially designed experimental systems in hand-made igloo-like snow laboratories at the base of Asahi-dake in the Taisetsu area, Hokkaido, Japan. The altitude of the observation site is approximately 1100 m. We visited the site at the end of January or beginning of February in 2015-2017 and stayed 8 nights in total. The temperature range in the snow laboratory during the observation is -6 to -11°C in general and the humidity has been naturally controlled close to 100% because all the walls of the laboratory made of snow.

Our experimental systems are composed of the environment controlled cell and the Mach-Zehnder-type laser interferometer or the Michelson-type white-light interferometer microscope with a long working distance, and the optimized color-filtered optical microscopes. The aim of the environment controlled cell is to control the growth and sublimation of the snow crystals. To control the temperature inside the environment controlled cell, the cell has been sandwiched by two Peltier devices (26 mmf × 3.7 mm) attached with a copper plate with an opening (10 mmf) at the center for optical observations. The opening is covered by a glass plate. To control the vapor pressure of water inside the cell, an evaporation source of water vapor has been prepared at the bottom of the cell. The temperature of the water source is measured by a chromel-alumel thermocouple. A snow crystal is stuck on the tip of a glass rod smaller than 1 mm in diameter and inserted into the cell from the roof of the cell. Temperature near the snow crystal is measured by a platinum resistance temperature detector.

We collected snow crystals directly on a black felt just outside the snow laboratory and selected a snow crystal, which was put onto a glass plate for general observations of the shape and surface textures or onto the tip of the glass rod to observe sublimation and growth rates in the controlled environment. In this presentation, we will report our attempts of in-situ observation and results including sublimation rates of the snow crystal observed using our experimental systems.

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