

Rikubetsu- Arctic snow observation by satellite microwave

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The melting of snowy areas and ice sheets is important information for the effects of climate change, the water cycle, and disaster prevention. Satellite observations are used to observe melting. There are methods such as investigating changes in the reflection characteristics of snow and ice with visible and near infrared rays, investigating that the temperature of snow and ice reaches the melting point by infrared observation, and investigating that snow cover contains water from microwave radiation. Microwave observations, which allow observation of melting in all weather and at night, have been used since satellite microwave observations became possible in the 1980s. A method called XPGR (Cross-Polarization Gradient Ratio) has been used as the main observation algorithm since the latter half of the 1990s, and has been used for climate change research as an index of ice sheet melting. In addition, a method called the Diurnal Amplitude variation (DAV) is used to observe melting in snowy areas on land between daytime when melting occurs and nighttime when it freezes. This time, we investigated the characteristics and precautions for use of XPGR and DAV.

In this study, we compared XPGR and DAV using ASMR_E and AMSR2 data. Although it is effective for DAV that the observation times are 13:30 (Ascending) and 01:30 (Descending). It turns out that XPGR should be careful when using Ascending data. XPGR was expected to overlook melting when it melted and the surface moisture increased.

In the future, we plan to analyze the on-site continuous observation data on the Antarctic ice sheet, which enables confirmation of changes in snow and ice temperature and thawing and refreezing on a daily cycle, and confirm the characteristics and effective usage of both.

Keywords: Rikubetsu tyou, Arctic, melt