

# Seasonal variation of a perennial snow patch in the Hyakkandani Valley of Kurobe Gorge

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In the mountainous regions of Japan, there are many perennial snow patches where the winter snow cover does not melt until the following winter, and many surveys have been conducted on these regions. However, most of the research has been done on perennial snow patches in the high mountains, and there have been few studies on perennial snow patches distributed at lower elevations. Near Kanetsuri Station on the Kurobe Gorge Railway, there is an avalanche-fed snow patch (known as Kurobe Mannen Yuki) that forms in Hyakkan Valley. This is one of the rare perennial snow patches at low altitude in Japan, located at around 420m above sea level. Since the mechanism of the variation of the Kurobe Mannen Yuki is still unknown, the purpose of this study is to estimate the area of the Kurobe Mannen Yuki during the ablation period based on field observations and past fixed-point camera images, and to investigate the seasonal changes in the area of the Kurobe Mannen Yuki.

The field observation on August 6, 2021 confirmed that the entire Kurobe Mannen Yuki was iced over, without the firn layer seen in larger snow patches. In addition, the surface of the Kurobe Mannen Yuki was covered with gravel, sand, branches, and other vegetation deposits, especially on the north face near the surrounding slopes. The snow temperatures on the sides of the Kurobe Mannen Yuki were all around 0.0°C, indicating that melting was in progress.

The area of the Kurobe Mannen Yuki was estimated using the Monitoring Camera data for the period from July 9, 2018 to August 22, 2018. The area decreased monotonically during July, but slowed down slightly in the first and second half of August. However, it is necessary to take into account the error in the image analysis used to estimate the area, the amount of solar radiation, and the thermal effects of the vegetation deposits that covered the snow gully.

In addition, from the Live Camera at the confluence of the Kaerazudani Valley, we confirmed the occurrence of sediment discharge in Kaerazudani, about 200m downstream from the Kurobe Mannen Yuki, on August 18, 2021. From the Monitoring Camera data, it was confirmed that riverbanks and sandbanks were submerged due to the increase in the water level of the Kurobe River. The sediment discharge in the Kaerazudani Valley is expected to have a significant impact on the seasonal variation of the Kurobe Mannen Yuki in the next year.