

## Air and ground temperature conditions on alpine and sub-alpine zone of Norikura Volcano, Northern Japanese Alps

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In Japanese mountains, the alpine zone above the forest limit coincides with the periglacial zone, therefore the position of the forest limit and its genesis are important. The forest limit is thought to control by factors such as thermal conditions, prevailing wind, snow cover, and form and deposit of slope surfaces. We observe the air temperatures on the two sites of forest zone, where are forest limit and under limit of subalpine zone of Norikura volcano. In addition, we also observe the air temperature on an alpine zone of Fujimi-dake in Norikura volcano.

The annual mean air temperatures on the forest limit were 0.1 °C in 2014 and -0.3 °C in 2017. The warmth index (WI) on the forest limit were 19.7 °C · months in 2014, 21.8 °C · months in 2015, and 19.8 °C · months in 2017, respectively. This WI value exceeds 15°C · months of Kira's WI for the forest line in Japan. This result supports the proposal that the forest line of Norikura volcano is controlled not by thermal conditions but by other factors such as the prevailing wind or snow cover.

Keywords: air temperature observation, ground temperature observation, forest limit, alpine zone, norikura volcano, Northern Japanese Alps