Vertical distribution of air temperature in the Kamikochi region

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Meteorological observation was conducted in the Kamikochi region to reveal meteorological characteristics and vertical distribution of air temperature. Monthly mean temperature was highest in August and lowest in January. Specific humidity also showed clear annual changes, with a minimum in January and a maximum in August. Solar radiation also indicated seasonal changes. It was largest in May and smallest in December and had a positive relationship with daily-temperature-range (DTR). DTR gradually decreased with increasing altitude.
Strong temperature inversion appeared during winter. Contrastingly, however, the number of days inversion occurred increased during spring and autumn. Inversion intensity was affected by night length; therefore, strong cold air pools appeared in winter. Synoptic types, such as migratory anticyclones, covered the central Japan and were associated with strong inversion. On the other hand, pressure patterns like the North Pacific High covered this region and were related to weak inversion.
Temperature Lapse Rate (TLR) showed clear seasonal change, becoming steeper in spring and shallower in autumn. There was a significant negative relationship between specific humidity and TLR, which means that dryer air led to steeper lapse rates. Steeper TLRs were associated with winter monsoon pressure patterns and migratory anticyclones. Lapse rate became steeper during sunny days because of low humidity. Shallow TLRs, however, appeared frequently on sunny days during autumn. This was probably caused by subsidence inversion with a migratory anticyclone, a major synoptic type in autumn.

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