

Changes in the lower limit of mountain permafrost between 1973 and 2004 in the Khumbu Himal, the Nepal Himalayas

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<http://polaris.nipr.ac.jp/~iso/soran/pin.php?nid=10450165>

Because the Khumbu Himal of the Nepal Himalayas lacks long-term climate records from weather stations, mountain permafrost degradation serves as an important indicator of climate warming. In 1973, the permafrost lower limit was estimated to be 5200-5300 m above sea level (ASL) on southern-aspect slopes in this region. Using ground-temperature measurements, we examined the mountain permafrost lower limit on slopes with the same aspect in 2004. The results indicated that the permafrost lower limit was 5400-5500 m ASL in 2004. The permafrost lower limit was estimated to be 5400 to 5500 m on slopes with a southern aspect in the Khumbu Himal in 1991 using seismic reflection soundings. Thus, it is possible that the permafrost lower limit has risen 100-300 m between 1973 and 1991, followed by a stable limit of 5400 to 5500 m over the last decade.