

## 2014年に実施したブータンヒマラヤでの氷河と山岳永久凍土観測 The research expedition of the glacier and mountain permafrost in the Bhutan Himalayas in 2014

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The glacier and mountain permafrost research expedition was carried out in September and October of 2014 in the central part of the Bhutan Himalayas. The aims of this expedition were 1) to make a rock glaciers inventory and identify the lower limit of mountain permafrost in the Bhutan Himalayas, and 2) to measure the ice thickness of the Gangjula glacier based on the ground penetrating radar (GPR) soundings.

We identified total 81 rock glaciers. Active rock glaciers appeared above 4600 m. We estimated that mean annual air temperature at the terminus of the active rock glaciers are less than -0.8°C based on ERA-Interim data from 1979 to 2013. These indicate that the lower limit of mountain permafrost in Bhutan Himalayas is 4600 m. This lower limit of mountain permafrost is slightly lower than that in Khumbu Himal (5000-5300 m) and that in Kanchenjunga Himal (4800 m).

The Gangjula glacier is a small saddle glacier. Length=1.1 km, width=0.3 km, surface area=0.31km<sup>2</sup>, elevation=4900-5200 m and the ELA=glacier top. We used GSSI SIR3000 + 100MHz antenna and got 6 cross and 1 longitudinal GPR profiles. The results of GPR soundings indicated that the maximum thickness of the Gangjula glacier was 76 m.

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