



Scenarios of permafrost changes in the Gokyo valley, Nepal

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Permafrost is of major importance in high alpine regions for hydrology, but also slope stability. Therefore, investigations on potential future permafrost change are of highest relevance. This study investigates permafrost occurrence in Gokyo, Nepal in central Himalaya using a rock glacier inventory and BTS measurements.

Permafrost distribution was modelled using PERMAMAP in combination with the lower limit of rock glaciers in this area. BTS measurements for the winter 2010 provide further information on the climatic conditions. The calculated mean lower limit of permafrost using rock glacier was approximate 5150 meters a.s.l. whereas the results from the PERMAMAP model indicated a much lower altitude of permafrost 4880 meters a.s.l.. The difference can be explained due to the variations of the input data used within the PERMAMAP model. The effects of potential climate change are based on the IPCC scenarios. The temperature rise was applied in the model and showed an altitude increase of the permafrost lower limit of up to 188 meters in the period 2009 to 2039. Based on these results of the Gokyo valley case study it can be concluded, that many Himalayan regions might experience significant environmental changes in the near future.