



The recent changes of the supra-glacial debris cover in the Central Karakoram National Park (CKNP, Pakistan)

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Recent investigations of glacier changes in the Karakoram show that there is no clear signal of glacier recession, observed in other mountain ranges like e.g. Himalaya. In contrast, the glaciers in the Karakoram seem to be rather stable with an exceptionally large number of surging events during the last decades. Also elevation changes do not show a unique signal with some glaciers with a mass gain, while other glaciers show ice loss. This phenomenon, well known as "Karakoram anomaly", could be partially explained by the large number of debris covered glaciers in this mountain range. Debris covered glaciers characterized by debris thicknesses deeper than the "critical value" usually display rather passive glacier tongues, where changes in the balance conditions first result in thickness changes and reactions in geometry lag behind.

In this contribution we present results from investigations which focus on the Central Karakoram National Park (CKNP, Pakistan) in the period 2001-2011. The CKNP is an extensive protected nature area in the Karakoram Region, Pakistan, with an area of more than 12,000 km² and a glacier area of more than 30%. We evaluated the glacier coverage in the park and its changes based on Landsat images of 2001 and 2011.

Our analysis of the debris cover distribution on glaciers in the CKNP reveals a rather wide distribution of supra-glacial debris, which is much larger than in other mountain ranges. The total debris covered area is 23% of the glacier area and 34 % of the ablation area.

Moreover the debris cover has increased by almost 10% during the last ten years, indicating generally negative balance conditions for this period. The distribution of the debris cover is clearly depending on altitude, with a maximum at 4300 m a.s.l., while the maximum glacier cover is found at about 5100 m a.s.l. As debris cover is a fundamental parameter for mass balance models, our results will be a basis for new calculations of the ice melt variations for the main part of the Karakoram glaciers.