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Glacial lakes in the Hindukush-Karakoram Mountains and their hazard potential

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Two main types of glacial lakes occur in the mountain ranges of High Asia: the moraine-dammed and the glacier-dammed lake. The first one appears primarily in the Himalayas whereas the later one is confined in particular to the Karakoram and Hindukush Mountains. Since the 1950s moraine-dammed lakes have been increasingly formed in the Himalayas as a consequence of glacier recession and downwasting. Meanwhile in the Karakoram those lakes are surprisingly almost absent. In contrast, in the Karakoram Mountains the main period of lake formation occurred during the end of the 19th century and the beginning of the 20th century. At that time the glaciers were still in an advanced position and dammed the corresponding main valleys. Field investigations were carried out since 1992 among others especially in the Shimshal and Karambar valleys to reconstruct the geomorphological impact of those glacier lake outbursts. Even nowadays the risk of the formation of temporary glacier-dammed lakes prevails.
The reason for the specific regional distribution in both mountain ranges turned out to be chiefly a consequence of the different topographical settings and therefore different glacial settings. However, recent comparative field investigations and the interpretation of satellite images indicate that the size and number of supra- and proglacial lakes start to increase in the Karakoram as well. Recently, small-scaled glacier lake outbursts have caused destructions in villages of the Hunza Valley, especially in Ghulkin and Passu. A very close interconnection exists between glacier tongues and settlement areas due to the dependence of the settlements on the meltwater for irrigation in this semiarid mountain region. Therefore slightest changes in the glacier front position or in the amount of meltwater results in severe consequences for infrastructure and settlements. In the framework on a study on historical glacier oscillations 53 glaciers had been investigated in the years 1992 – 2006. They provide a useful basis for analysing the development of the occurrence of glacial lakes in this mountain region.