The Matter Valley is surrounded by some of the highest peaks of the Alps. In contrast to the numerous mountain peaks exceeding 4,000 meters, the valley bottom is located between 500 and 1,600 meters, resulting in extreme altitudinal differences and a continental climate of the character. Thus, a periglacial belt of considerable vertical extent is formed and underlined by discontinuous permafrost above 2,400 m a.s.l. (cf. Figure 1). The asymmetric shape of the Matter Valley is caused by the geological conditions and characterized by a comparatively steeper western flank. Due to the high relief energy, all kinds of natural hazards typical for high mountain environments occur: the catastrophic mass movements (avalanches, rockfalls, debris flows, floods and even earthquakes). In 1855 catastrophic mass movements caused several rockfall deposits which destroyed numerous buildings. Due to the global warming St. Niklaus has to face an intensification of natural hazards, in particular of debris flows, rockfalls and rockslide activity areas of debris flows (cf. Figure 4). Numerous investigations concerning natural hazards amounted to one million Swiss francs per year. During the last century, this torrent induced twelve debris flow events with an increased frequency within the last 15 years. Heavy precipitation was the trigger event for most of these debris flows (REBETEZ et al. 1997). Events originating from the upper segment occurred also in connection with high snow melt rates. The last large event happened on 24th September 1993 and deposited a cone of 60,000 m$^3$ (DIKAU et al. 1998). This blocked the main valley and dammed up a lake. Events of even bigger magnitude have to be expected, if ongoing climate warming leads to further permafrost degradation in the catchment area (cf. Figure 3). In contrast to avalanche hazards, no planning standards for the management of debris flow hazards exist in the Canton du Valais so far. The described installations were financed by federal (17%), cantonal (30%) and communal (53%) funds. In addition, an early warning station, which stops traffic on the cantonal road in case of a debris flow event, was installed in the lower steep section of the torrent.

In March 2002, the Canton du Valais initiated the drilling of a 36 meter deep borehole in the Ritigraben catchment at an altitude of 2,615 meters (Figure 6). It was instrumental with thermistors for continuous monitoring of permafrost temperatures. A weather station collects hourly meteorological data, which can supply a real-time overview of meteorological conditions (expecially precipitation rates). Ground temperatures are only slightly below freezing and the active layer reached a thickness of 3.5 meters in summer 2002.

**Permafrost Degradation and Natural Hazard Management in the Matter Valley, Swiss Alps**

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