



The investigation of ground temperatures in high mountain areas using IButtons

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Mountain areas are characterized by extreme variability in elevation, exposure to solar radiation and ground material. Many physical processes, that control ground temperatures and thereby permafrost, are highly affected by this variability. An improved understanding of permafrost and related processes in mountain areas therefore requires investigation at high spatial resolutions.

The aim of this project is to investigate ground surface temperatures in high mountain areas. We focus on the effects of topography and local ground properties on surface temperatures at high spatial and temporal resolutions. We distributed 390 mini temperature logger IButtons (www.maxim-ic.com) at Corvatsch in the Upper Engadin (Switzerland) logging surface temperatures at a 3 hour time step. This distributed network of temperature loggers is planned to operate for 3 years.

The programming, distribution and recovery of many IButton devices in high mountain areas is very time-consuming. It requires a systematic recording and storage of relevant metadata such as the geographic coordinates of each IButton as well as other topographic characteristics. To easily handle these requirements and to stream-line field work, we developed an effective working procedure and supporting software to program and read-out IButtons (precision, time resolution, etc.) and to store the temperature measurements in a database together with the relevant metadata. The possibility to connect a GPS device and digital camera to this system makes the recording of meta-data and the reclamation of loggers very efficient.

We present the project together with the main tools of the developed software.