



Application of GPR on rough terrain surfaces for monitoring issues using a simple ropeway system

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Ground-penetrating radar (GPR) is an all-purpose method for high detailed subsurface investigations. Detailed data with high resolution and good positioning can be measured in smooth terrain. In rough terrain, especially on blocky talus slopes, rock glaciers, or wet snow avalanche deposits, the applicability of GPR is limited. Measurements on such landforms are affected by several problems: data acquisition is time-consuming, accuracy of antenna positioning is low often causing a misdirection of the radiated wave relative to the ground (reflections from subsurface structures or buried objects are localized beside the GPR Profile). These circumstances reduce the accuracy of GPR measurements and prevent traceability and monitoring activities.

In spring 2009 a GPR was as complementary method in the search for avalanche victims in wet snow avalanche deposits. The surface of the avalanche deposit was very rough, composed of big, icy lumps of snow, timber and boulders. Air filled voids made the search more complicated. For this reason and for the need of well positioned, high detailed data a ropeway for GPR profiling was developed. The use of the ropeway combined with differential GPS (DGPS) allowed a raster of profiles, a high measurement speed and high data accuracy. The system is applicable on other rough terrain and overcomes the limitation mentioned above. Furthermore the repeated positioning of the ropeway on marked locations enables traceable, subsurface monitoring with GPR.

Anticipated development of hardware (ropeway) and data transfer (wireless) will improve the introduced system in the near future.