



Use of seismic tomography applied to periglacial areas : example of one site in Valais (Switzerland)

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In recent years, several events of debris flows occurred in Valais in watersheds with significant paraglacial features. Initially these features were taken for rock glaciers. The first field observations have shown that reality was much more complex with phenomena ranging from the rock glacier to debris covered glacier with all the intermediate forms in the areas where these phenomena interact.

To assess the dynamics of these areas, determining the depth of bedrock is an important preliminary. This coupled with deep knowledge of the composition of the overlying material, determine the amount of volume in motion, and their likely development under different climate scenarios.

The use of geophysics, mostly seismic refraction, in these conditions where the topography is complex, requires the implementation of special techniques (computed tomography), and adding additional information for calibration (boreholes, up-hole, geomorphologic mapping, etc.).

Field observations and calibration by drilling helped highlight the limits of seismic refraction and misinterpretations that may arise in this type of terrain. For example:

- with granular materials like those on paraglacial features, ice plays an important role in the material response to seismic loading,
- seismic velocities recorded can be similar for different materials,
- geometry of the surface topography combined with the bedrock's topography induce artifacts in the tomographic process.

Despite these limitations, a first draft of the three-dimensional structure of the site has been completed.