



EVALUATION OF PERMAFROST CONDITIONS IN NON-ALPINE SCREE SLOPES IN CENTRAL EUROPE BY GEOPHYSICAL METHODS

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Many slope sections covered with blocky material situated in Central European highlands display special microclimatic conditions that resemble those of high latitude or high altitude periglacial areas. In some of these screes even permafrost-like conditions are detected although they are located on elevations fairly below 1000 m a.s.l. These conditions are accompanied by a circulation of air through the open void system, which effects a formation of an ice body during winter by re-sublimation of air humidity, supported by refreezing water from snow melt and precipitation. This ice body is assumed to prevail during the entire summer. Population genetic investigations on alpine and polar beetle species that inhabit the screes proof the continuous existence of the extraordinary cool conditions with probable permafrost throughout the Holocene - i.e. these periglacial-like condition are relatively stable despite all Holocene climatic variations.

Observations of summer ice and numerous temperature measurements lead to the assumption of permafrost with enduring ice in the open voids as an integral factor of the microclimatic system. To evaluate its existence the underground was investigated in seven European screes by means of DC resistivity and refraction seismic in early summer. In order to solve the multi-phase subsurface structures, tomographic survey and inversion techniques are necessary, as 1-dimensional plane layer approximations

are usually invalid. The results clearly reveal seismic and resistivity anomalies e.g. in the Klic scree ($50^{\circ}49'N$, $14^{\circ}04'E$, base at 524 m a.s.l.) in Northern Bohemia. Within a blocky layer of about 10 m high thickness velocity anomalies (2000-3000 m/s) indicate the existence of a small ground ice body, which is confirmed by the synchronous detection of resistivity anomalies in the same place.

These conditions are confined to steep scree slopes in regions with thin winter snow cover to enable air circulation. It is probable, that these effects are also found in alpine regions, where they cause a significant depression of the current lower permafrost limit.