11. DISSERTATION SUMMARY

1. Motivation for the selection of research issues.

The complexity of the occurrence of periglacial landforms in the folded mountain area (Hrubý Jeseník range, the Eastern Sudetes), with the particular role of lithology, is confirmed by the research carried out by Czech geomorphologists in the second half of the 20th century (Prosová, 1954, 1973; Czudek, 1964; Demek, 1968, 1969, 1971). The relief, formed mainly in the periglacial environment, is nowadays covered by vegetation communities, effectively hindering the palaeo-environmental reconstruction. Currently, periglacial relics, i.e. isolated rocks (tors), cliffs or blockfields, with a particular focus on weathered covers, are not a common topic of interest (Štěpančiková and Rowberry, 2008; Demek et al., 2011; Engel et al., 2020). The varied relief of the Hrubý Jesenik mountain range, combined with multiple tectonic and geomorphological history resulting in lithological variability in a relatively small area, was a decisive factor in undertaking my research work.

2. Scientific purpose of the doctoral dissertation.

The goal of this scientific research was a rock medium and its properties in the process of forming periglacial weathered covers located below timberline. The variability of the factors responsible for the occurrence and development of these forms was analysed in terms of the role of geological (the type and structure of the rock material, the degree of its transformation, the presence of discontinuities) and palaeoclimatic conditions.
The main aim was to determine the influence of elements such as:

- climate,
- intensity and type of weathering,
- ways of deposition,
- and morphostructural properties of the bedrock

on the evolution of rock massifs and overlaid sediments.

3. Methodology.

The research included direct measurements of the crack orientation that was preceded by geomorphological and geological recognition. Macroscopic measurements and X-ray diffraction analysis determined the pertographic composition of weathered covers. The

application of electrical resistivity tomography (ERT) and supplementary, vertical electrical sounding (VES) with seismic refraction tomography (SR) allowed a complete characterisation of the geological rock mass in a non-invasive way - particularly its physical properties and the spatial range of structure of the weathered covers on the studied mountain slopes.

4. Research area.

The studies were carried out within the Hrubý Jesenik mountain range (the Eastern Sudetes), situated in the north-eastern region of the Czech Republic - the second highest mountain range of the Czech state territory. The area is considered part of the Silesian-Moravian structure that belongs to the Eastern Sudetes Metamorphic unit. The Proterozoic and Lower Devonian rock complex is folded and strongly metamorphosed with Proterozoic rocks of the Desna Massif (Cymerman, 2004). Situated in the east and intersected by the crosswise fault, the Desna Massif is partitioned on the Praděd Dome and the Orlik Dome, where the study area is situated. Folding during the late Variscan Era caused the metamorphism of rocks to the degree observable now.
The research sites were selected in different parts of individual rock complexes (ridge/ slope/foot of the massif), at different altitudes with high lithological contrast:
• the Orlik massif extends in the NW-SE direction with a ridge length of 9 to10 km and consists of two peaks, Medvědi vrch (1216 m a.s.l.) and Orlik (1204 m a.s.l.) – built of quartzite and metamorphic shales, migmatites and mylonites;
• the Ztracené kameny summit, at 1245 m a.s.l. is located in the main mountain ridge Vysokoholský hřbet (running from the Praděd summit 1492 m a.s.l.) and represents its most extended part in the SW direction - built of quartzite, gneiss and phyllite;
• the Skalni potok valley (655–930 m a.s.l.) is located within Hornoopavská hornatina and extends NW – SE direction - built of gneiss and blastomylonite.

5. Synthetic presentation of the most important results and conclusions.

The conducted field studies provided information on the properties of weathered covers located on the slopes and outcrops evolving in an environment with a changing climate. The diversity of the structure of these covers and their degree of preservation shows the importance of bedrock erosion, depending on the lithological properties of the underlying rocks and the intensity of mass movements controlled by the amount of moisture (water / ice) in the medium. The analysis of the investigation sites confirmed that

the studied sediments are predominantly inherited from the previous glacial period. At the same time, the undisputed role of the periglacial environment in the relief formation should be noticed. the most important results obtained during the conducted research are presented below:

• lithological characteristics (including the main directions of fractures for quartzite and gneiss) and palaeoclimatic conditions of various types of covers considered as periglacial relics,

• the fracture systems and the presence of faults were of key importance in the process of shaping the studied relief,

• the size, type and rate of degradation were closely related to the presence or absence of moisture (water and ice). A large amount of water and the processes of waste transfer transformed ridges and slopes, both in periglacial and non-periglacial environments and very likely that even pre-Pleistocene,

• the analysis of numerous rock rubble confirms their relict, inactive character. At the same time, it was found that their origin - as a result of the impact of cold conditions - may not be only periglacial,

• the properties of the rock mass, along with its morphostructure features and microclimatic conditions within, undoubtedly predispose places located below the timberline to ice preservation