# Abstract

Submitted PHD thesis is focused on fracturing process of migmatite, which is a low porosity anisotropic rock. Migmatite, from a locality Skalka, was chosen as a suitable experimental material, namely due to its macroscopically visible, plane-parallel structure (foliation). The fracturing was studied by means of uniaxial loading experiments on cylindrical samples with different dip of migmatite foliation: 13° (subhorizontal), 81° (subvertical) and oblique (47° and 67°). The net of eight piezoceramic transducers was employed for ultrasonic sounding (US) measurement and acoustic emission (AE) monitoring during the loading experiments. Realized study of migmatite fracturing is based on the interpretation of both mentioned ultrasonic methods.

Part of this work was a software development, including its testing for processing and interpretation of measured AE and US data. Methodical part of the thesis consists of: development and testing of algorithms for automatic P wave arrival detection; introduction of anisotropic velocity model to describe magnitude and orientation of velocity anisotropy, as well as to localize AE events in anisotropic velocity field; determination of crack initiation stress using first arrival amplitude of US.

Based on the interpretation of AE and US data, there was found a different way of micro and macro fracturing, in dependence of mutual orientation between migmatite foliation and loading axis. The dominance of tension microcracking, in combination with sliding and shearing in foliation plane, lead to a formation of single shear plane and subsequent failure of samples with subhorizontal foliation. In case of samples with oblique foliation, shearing and sliding mechanism played main role in their failure along the foliation. Due to the favourable orientation of primary microcrack system (parallel with loading axis), the combination of tension and shear microcracking lead to a formation of extension macrocracks in foliation plane of sample with subvertical foliation.