

Seismic Tomography and MASW analysis of the results of Spitsbergen seismic experiment – case study

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In recent years, polar studies become theme of interest of many fields of modern geosciences. Seismic experiment conducted in front of Hans Glacier in Horsund region of Svalbard, aims to recognize changes in permafrost during different seasons of the year. This work is the first part of the larger experiment, where complex interpretation of borehole temperatures, ERT and climate projections will be jointly analyzed to model future changes in the deep permafrost in the area of retreating glacier. In this step we present active geophysical measurements with the first data processing recorded in the summer season. Seismic tomography, and MASW methods were conducted to receive initial information about subsurface from 3 seismic lines. Application of different seismic methods to the data set, is aimed to obtain velocity field for further seismic imaging, and to uncertainty estimation of the results. Moreover authors obtained information about VS30 profile, and were able to estimate occurrence of possible low velocity zones. For validation of received data, forward modeling of the results obtained from seismic tomography and MASW were calculated, and compared with the real data. That step was a final test, if the received results comprises in a border of uncertainty with real data-set. As a final result authors will compare those results with second data set collected in the winter season, which can be highly usable to understand changes in permafrost during year cycle. Moreover, comparison of received seismic data with information from ERT tomography profiles performed paralleled to seismic lines, should delivered very accurate and certain final models, based on multiple methods with estimated uncertainty for proper data correlation.

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