Abstract

In this work I study the advanced geophysical method – the time domain electromagnetics. In the theoretical part I summarize principles of the method, describe several measuring systems and guide the reader through the software for data processing. I further prove reliability of the applied methodology by forward and inverse computations for a simplified model of supposed target structures. The results show that for the selected configuration of field measurements with a depth range of 100–200 m the influence of 3D structures is significant when placed in a distance smaller than approximately 100 m.

In the practical part I test the method in the sedimentary environment and find that results of the method are in accordance with the vertical electrical sounding method. Subsequently, I show that the artificial highly conductive object placed inside the current loop significantly affects the outcomes of the method. Artificial conductive object has only minute effect if placed in a close distance but outside of the current circuit.

Besides the theoretical and experimental findings about the reliability of the method I have applied the method for research of maar volcanoes. I have confirmed with high probability the presence of maar volcano near the Jablonná village. The results measured close to the Jizerka village cannot be unambiguously interpreted.