

A trial of automatic structure analysis for magnetic survey in case of sharp boundaries of magnetization

*Shin'ya Sakanaka¹

1. Graduate school of International Resource Sciences, Akita University

Utilizing the modern computing technology, highly complex structure can be automatically analyzed by inverse technique in geophysical exploration. Usually a number of blocks are assigned in the structure model numerically constructed and finally the parameters like as magnetization, density, and conductivity are determined for respective blocks. If the number of the blocks is larger than the number of observed data, that is so-called the under-determined problem. To solve the under-determined problem in inversion analysis, we have to include additional condition like as smoothness. The smoothness is one of promising condition in order to solve the under-determined problem and widely used. The resulted structure model with smoothness is a reasonable model in various cases. However, a structure model with non-smoothness is sometimes necessary in specific problem. We have an opportunity to conduct a magnetic survey at the site above the dacite intrusive rocks. This is one of stereotypes of structure with non-smoothness boundary. We want to have the technique to automatically analyze this kind of structure with sharp boundaries. Here we try to show one of effective algorithm to seek the numerical model with sharp boundaries. The algorithm is a kind of grid searches but effectively saving the amount of calculation. Firstly the structure model with two parameters alone, i.e. with two kinds of the values of the magnetization. Next the structure model with three parameters and more. So far, the algorithm is able to apply to the magnetization in magnetic survey or density in gravity survey. But this kind of algorithm is expected to apply to the problems with conductivity in the future.

Keywords: magnetic survey, grid search, Inversion