

Accuracy evaluation of MT response calculated with Particle Method

ISHIZU, Keiichi^{1*} ; MIKADA, Hitoshi¹ ; GOTO, Tada-nori¹ ; TAKEKAWA, Junichi¹

¹Graduate School of Engineering, Kyoto University

MT(magnetotelluric) method ,one of the electro-magnetic(EM) sounding methods, is considered as a technique in practice for the exploration of hydrocarbon resources.Conventionally, the finite difference method and the finite element method are often used as a numerical calculation of the electromagnetic field below the surface for the forward and inverse problem of the MT method (e.g.,Baba and Seama,2002; Minami and Toh, 2012).

However,using the finite difference method has a difficulty of including complicated shape in the model like the topography and underground heterogeneous structure.

For overcoming the weak point, the particle method attracts attention of MT users recently.The particle method is one of the techniques to make a model discretization with particles not aligned along lattice or mesh. It is easy for particle method to include any complicated shapes in the model.However, early researches have not discussed the calculation conditions and setting of the parameter which is thought to contribute.For example, the influence radius , one of the parameters in the particle method is important to be adjusted for keeping high accuracy of calculations beforehand in the particle method.

In this study,we performed examination about the better setting of the influence radius to achieve the high accuracy when we use the particle method for the analysis of the electromagnetic field in the MT method.

In our numerical results, the trend is obvious that the calculation error at high frequency was small enough if the influential radius was small.We also found that a relation between the degree of the electric field attenuation and the influential radius which can adjust the calculation error to be smaller.Influence radius and weight in particle method should be optimize.

Keywords: MT, Particle Method