Geophysical Research Abstracts
Vol. 14, EGU2012-1089, 2012
EGU General Assembly 2012

Modeling of Geophysical Data Using Artificial Neural Network

A. Khalil and A. Khalaf
National Research Institute of Astronomy & Geophysics Helwan, Egypt

The modeling of geophysical data is a difficult task due to its non-linear nature. In this paper, the neural network (NN) approach is studied to solve two-dimensional geophysical data sets problems. The efficiency of a widespread, supervised training network, the back-propagation technique and its applicability to the resistivity problem is investigated. In particular, the non-linear, two-dimensional problems have been solved by means of these regularized networks. Several NN paradigms have been tried on a basis of trial-and-error for two types of data sets. In the 2-D problem, the batch back propagation paradigm was the most optimum training paradigm for that data set. The network was trained with synthetic examples and tested on another set of synthetic data as well as on the field data. The neural network gave a positive result correlated with that of conventional serial algorithms. It proved to be a fast, accurate and objective method for depth and resistivity estimation 2-D geophysical data. The main advantage of using NN for resistivity inversion is that once the network has been trained, it can perform the inversion of any vertical electrical sounding data set very rapidly. Also, the magnetic model indicates very clearly the existence of subsurface structures at a depth ranging from 1 to about 4 kms.