3d Resistivity Inversion Software S

Download

RISA2D is an open source program for 3D inversion of the data collected by ERT method. The goal of this tool is to aid the user in obtaining an accurate representation of the 3D resistivity values in complex areas of geology by using the data collected by the ERT method. The program is particularly designed for the 2D resistivity inversion and it was developed to fit the computer hardware and software environments in which the user can apply the program. In this way, the code of RISA2D will allow the user to develop and use other inversion routines, as well as to store the results of the inversions in a suitable format, so that they can be compiled and displayed in the standard visualization system, either using the dataset of the 3D resistivity inversion or with the data already acquired by an ERT technique. In addition, the program is very useful in characterizing the subsurface geology by obtaining a resistivity model. The resistance system consists of a hybrid (unstructured-structured) model of the area to be analyzed. RES2D is a non-linear least squares inversion program that can be used to generate a high-resolution 3D resistivity map with accurate results. The maximum number of inversions is limited only by the number of points selected for the inversion. The 3D resistivity models are generated directly from the raw data by inverting the electrical resistivity simultaneously along three dimensions using a two-phase steady state model. In the output file, the program will save all the relevant data and the graphs generated by the software will be printed (in text or PDF format). RES2D allows the user to execute a desired number of inversions in a very easy way.

3d Resistivity Inversion Software S

Soil resistivity is affected by the lithology present in the ground, the related mineralogical/chemical composition and electrical properties of the various soil components; this depends on the value of electrical resistivity (or conductivity) of each component in the rock matrix, which is an established a priori model, with the exception of sedimentary rocks that resistivity (conductivity) is often well defined by porosity and texture. However, typically the geosphere and hydrosphere are characterized by a conductivity value of about 102 &104 m-1 or higher, which is the order of magnitude for the influence of the fine-grained constituents, and since the range of conductivity values is dominated by the lower values, geoelectrical data should be cautiously interpreted and, therefore, the use of inversion software should be warranted. Because of its dependence on conductivity, EIT is able to estimate the lithological properties of the subsurface. F. Schmidt (1995, 1996) studied the suitability of this method for the interpretation of deep EIT data and showed that: 1) a dip-to-dip relationship exists between the lithological rock type and its electrical resistivity and, 2) the resistivity values obtained from an EIT method are representative of the resistivity values recorded in a layer of an average thickness of 3 to 5 m. The interpretation of EIT is based on the assumption that the response is linear, this is not always the case, and one must always keep in mind that other models than linear ones could be used. The two principal inverse algorithms are: i) Model-based inversion, in which the geological model of the entire subsurface is assumed to be known a priori, and the information of interest obtained at each depth is used to complete a three dimensional model, using appropriate equations that make explicit assumptions about the subsurface structure. ii) Unscented K-S transform (UKS) is the most widely used data-driven inversion method. It is based on the combination of the unscented (Gaussian) approximation and the K-S transformation. The unscented K-S (UKS) transformation is an approach to data-driven modeling which is based on a Bayesian probabilistic interpretation of the unscented kinematic wavelets as quantities that define the set of modes, allowed or penalized by the data. The UKS involves the determination of the maximum a posteriori estimate of the location and the resistivity distribution, as well as the determination of the variances of the location estimate and the resistivity model parameters. Then, the user can select a threshold, which is usually a threshold value of a normalized residual between 2 or 3 standard deviations of the mean of the data and the model. The new model is shown to represent the data as well as the original one. 5ec8ef588b