

Use of Quasi-3D Inversion of VES Data Based on Lateral Constraints to Characterize the Aquifer and Mining Sites of an Area Located in the North-East of Figuil, North Cameroon

Authors : Fofie Kokea Ariane Darolle, Gouet Daniel Hervé, Koumetio Fidèle, Yemele David

Abstract : The electrical resistivity method is successfully used in this paper in order to have a clearer picture of the subsurface of the North-East of Figuil in northern Cameroon. It is worth noting that this method is most often used when the objective of the study is to image the shallow subsoils by considering them as a set of stratified ground layers. The problem to be solved is very often environmental, and in this case, it is necessary to perform an inversion of the data in order to have a complete and accurate picture of the parameters of the said layers. In the case of this work, thirty-three (33) Schlumberger VES have been carried out on an irregular grid to investigate the subsurface of the study area. The 1D inversion applied as a preliminary modeling tool and in correlation with the mechanical drillings results indicates a complex subsurface lithology distribution mainly consisting of marbles and schists. Moreover, the quasi-3D inversion with lateral constraint shows that the misfit between the observed field data and the model response is quite good and acceptable with a value low than 10%. The method also reveals existence of two water bearing in the considered area. The first is the schist or weathering aquifer (unsuitable), and the other is the marble or the fracturing aquifer (suitable). The final quasi 3D inversion results and geological models indicate proper sites for groundwaters prospecting and for mining exploitation, thus allowing the economic development of the study area.

Keywords : electrical resistivity method, 1D inversion, quasi 3D inversion, groundwaters, mining

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