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Inexpensive Geophysical Instruments Supporting Groundwater Exploration in Developing Nations

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Author(s)

James A. Clark, Richard Page

ABSTRACT

Geophysical methods are often used to aid in exploration for safe and abundant groundwater. In particular resistivity and seismic refraction methods are helpful in determining depth to bedrock and zones of saturation in the subsurface. However the expense of these instruments (\$5000 to \$20,000) has resulted in their limited use in developing countries. This paper describes how to construct these devices for less than \$250 each. The instruments are small, light and robust and are as useful for groundwater exploration as the commercial models for shallow aquifers (less than 35 m deep) where wells can be hand dug, augured or drilled with small portable drill rigs. Data interpretation can be accomplished quickly in the field with free software implemented on a laptop computer. A suite of geophysical instruments and software can therefore be assembled for less than \$850. This paper gives the design for these instruments and essential information needed to use them. It is hoped that these inexpensive geophysical instruments can be widely distributed among drillers and aid workers in developing countries, improving the success rate of water wells.

KEYWORDS

Groundwater Geophysics, Inexpensive, Developing World, Resistivity, Seismic Refraction, Groundwater Exploration

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