

Novel technology for the exploration and evaluation of groundwater (fresh/thermal) deposits at depths up to 7000 meters with credibility of 95%

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Summary

Our partner has developed a novel technology that enables exploration of water-bearing formations.

PESE (Point Electromagnetic Scanning of Earth) works on the basis of magnetotelluric methods and represents a versatile, multipotent technology. It is fully developed, available on the market. Our client is looking for partners interested in a joint venture with the aim of initial aquifer exploration. Subsequent utilization would be exploitation of the deposit either for drinking or geothermal purposes.

Challenge to be addressed


Our economy and society face various challenges. We have two pressing issues that are directly linked to water resources. The one that might be more obvious is shrinking reserves of freshwater available for drinking (arid, semi arid areas). The second one is linked to depleting fossil energy resources. This energy demand can be addressed by alternatives such as geothermal energy. In such context the described technology can expand our possibilities to meet those needs.

Innovation and main advantages of the technology

Recent advancements in the field of electromagnetic sounding enabled PESE technology to evolve, hereby ensuring economical aquifer exploration and groundwater exploitation to occur.

Background information: Electromagnetic detection of a reservoir/aquifer is based on the resistivity contrast of the reservoir/aquifer to its surrounding. Time variant magnetic fields of either natural or artificial origin cause eddy currents within the sediment layers. As these eddy currents are time variant as well they cause a secondary electromagnetic field that can be sensed with magnetic or electric sensors placed on the ground.

PESE technology can be used in three different set up (successive exploration):

-  **Airborne electromagnetic set up:** During the initial phase of exploration, regional remote survey of the territory takes place. This is accomplished by a helicopter carrying a towed bird (surveying device).



- ✚ **AMT (Audio-Magnetotellurics) set up:** The following phase represents surface survey of the selected electromagnetic anomalies (spots of possible water-bearing formations). AMT is a passive method that makes use of Earth's natural electromagnetic source (magnetic field, sunwind, lightnings). It is non-invasive, reliable and fast enough to further narrow promising areas of the territory.
- ✚ **CSAMT (Controlled-Source Audio-Magnetotellurics) set up:** In the next phase surface survey continues, applying tCSEM (time domain controlled-source electromagnetics -> variant of CSAMT). This is an active method that uses artificial electromagnetic source, and provides deeper sounding and higher resolution of the aquifer.

The unique combination allows systematic exploration and validation of water-bearing deposits. In the **exploratory phase** remote surveying saves time and reduces expenses while in the **validation phase** high resolution mapping enables optimal delineation of the aquifer. This helps minimize costs associated with trial borings. Beside groundwater resources the technology is capable detecting hydrocarbons (oil, gas) and various minerals (metal ores, halite, etc). It is able to operate onshore, offshore and represents a perfect match in supplementing conventional geophysical (seismic) methods.

Potential areas of use

Exploration and validation of groundwater aquifers either for drinking (fresh water) or geothermal (alternative energy) purposes.

Benefits

- ✚ Greatly increased likelihood of successful aquifer identification
- ✚ Decreased time-frame for exploration
- ✚ Cut back on costs associated with trial borings
- ✚ Provides information to construct multidimensional subsurface models
- ✚ Ability to track mass movement and dynamic changes of the aquifer
- ✚ Innovative approach for auditing production/injection wells or active deposits
- ✚ Environmentally favorable (non-invasive)

Stage of development

The technology is fully developed, available on the market.

Intellectual property status

Secret know-how.



Type of collaboration

- Joint venture

Our client is looking for partners interested in a joint venture with the aim of initial aquifer exploration and validation. The following utilization would be exploitation of the deposit either for drinking or geothermal purposes.

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