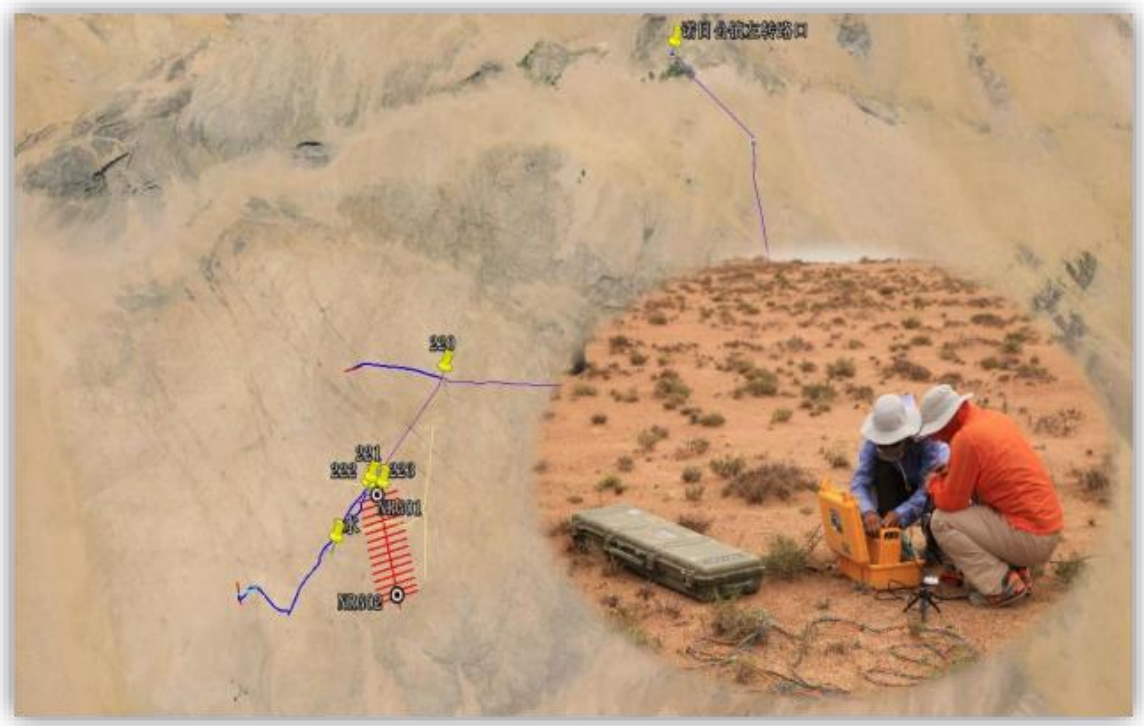
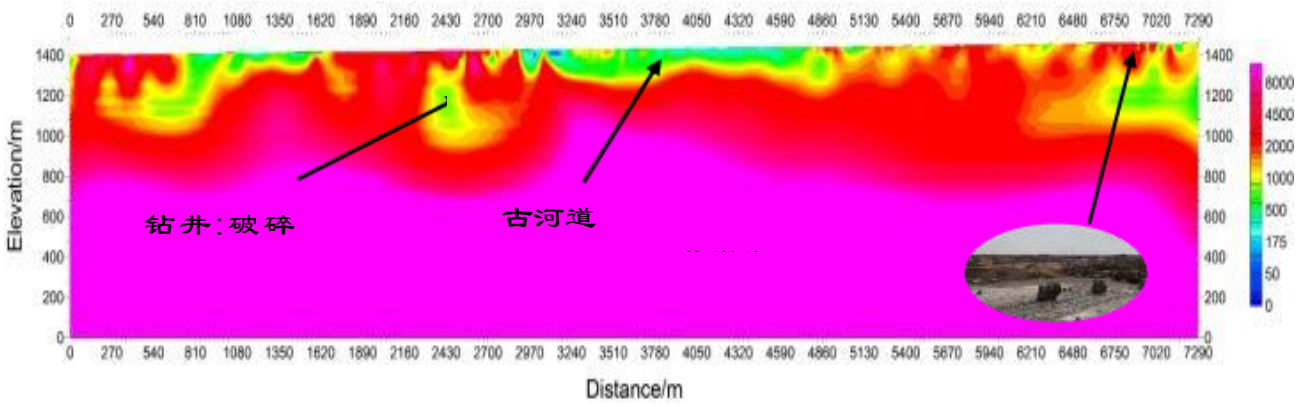
1. Desert geological exploration

Using DRU with 30 receivers, each receiver has 9 channels, with a pole distance of 30 meters, measuring 270 meters at a time. A total of 16 survey lines were completed, with a total length of 59.94 kilometers and a total of 1998 measurement points. The transmission distance is 9 kilometers.



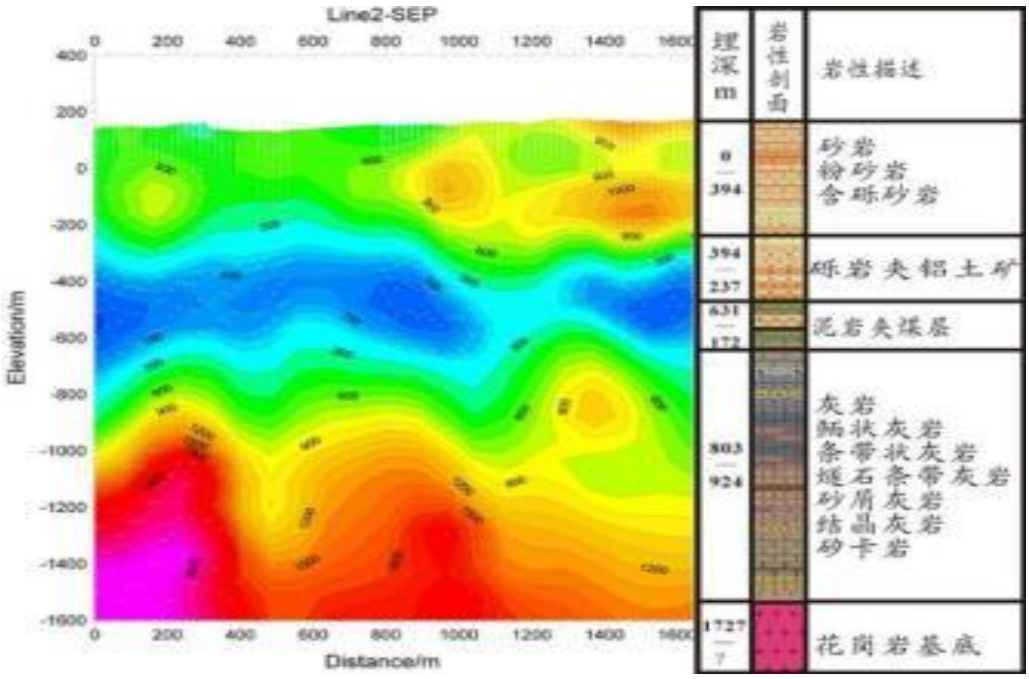
The area mainly exposes granite, with a thin weathered cover layer. The measured resistivity overall presents high resistance. The following is the inversion result of the L16 line.



2. Exploration of Metallic and Non-metallic Resources

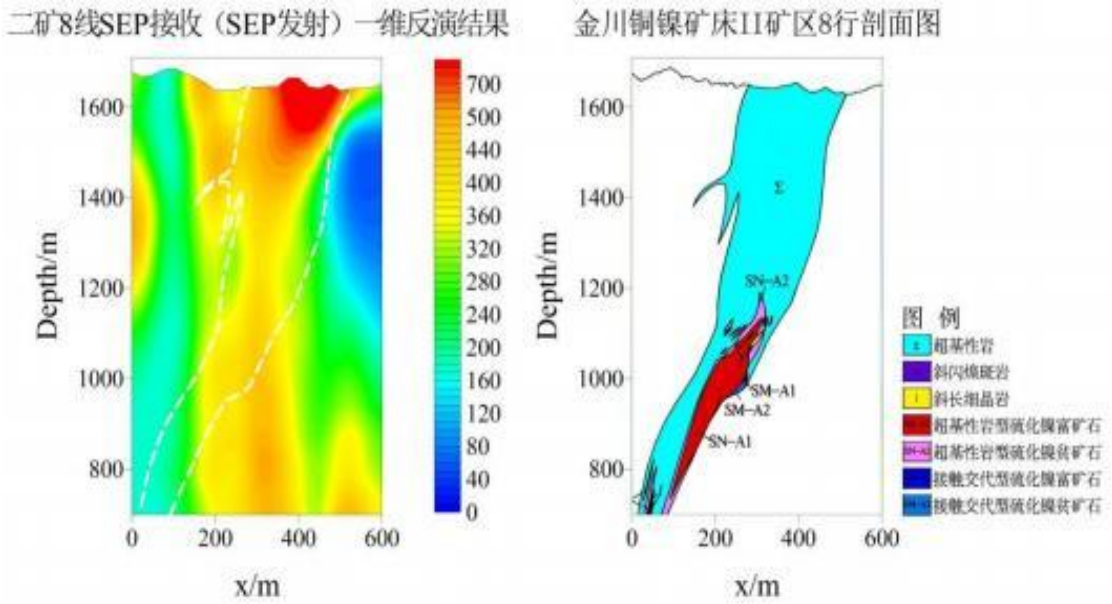
In a certain area, systematic integration and optimization tests were conducted on the self-developed SEP instrument to check the field performance of the entire SEP system. A total of 4 survey lines were completed with a combined length of 15.24km, and 744 physical depth measurement points were recorded.

Taking the L2 line as an example, the inversion results of the SEP system can effectively reflect the lithological differences underground, and they match well with the lithology identified from drilling. Especially for the low-resistance coal layer near a depth of 600m, the inversion results provided a good revelation. This indicates that the data collected by the SEP system is stable and reliable, and it can be used for actual field CSAMT exploration.



The Jinchuan Nickel Mine in a certain city is a known mine currently under exploitation. There is particularly strong anthropogenic electromagnetic interference in this area. Fieldwork conducted here was intended to test the anti-electromagnetic interference capability of SEP. In total, 12 survey lines

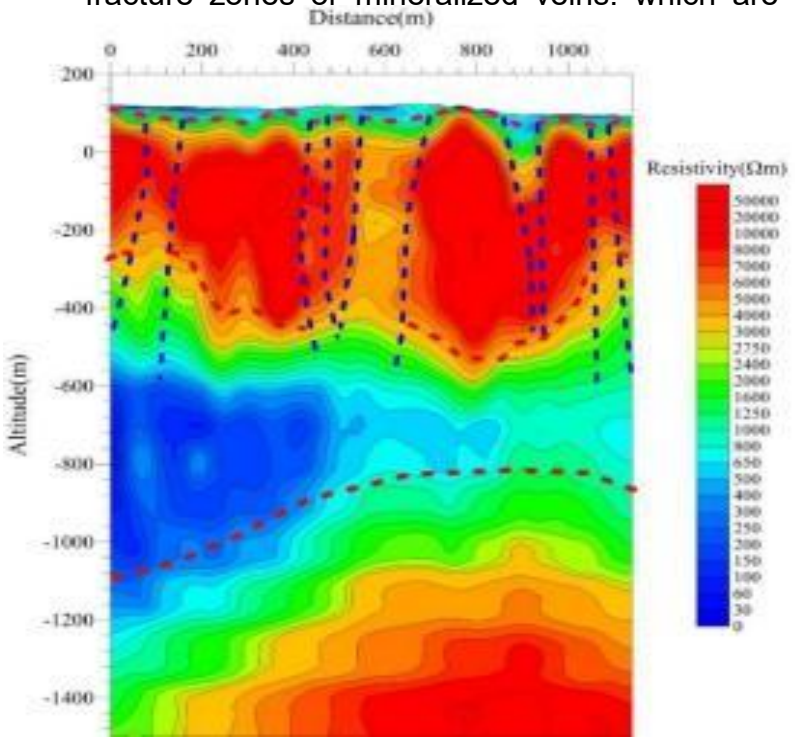
were completed with a combined length of 24.6 kilometers, and 984 physical depth measurement points were recorded. Taking the L8 line in the second mining area as an example, the one-dimensional inversion results are compared with the cross-sectional diagram as shown in the following figure. This demonstrates that the SEP system has a certain anti-interference capability and is capable of handling various complex exploration tasks.



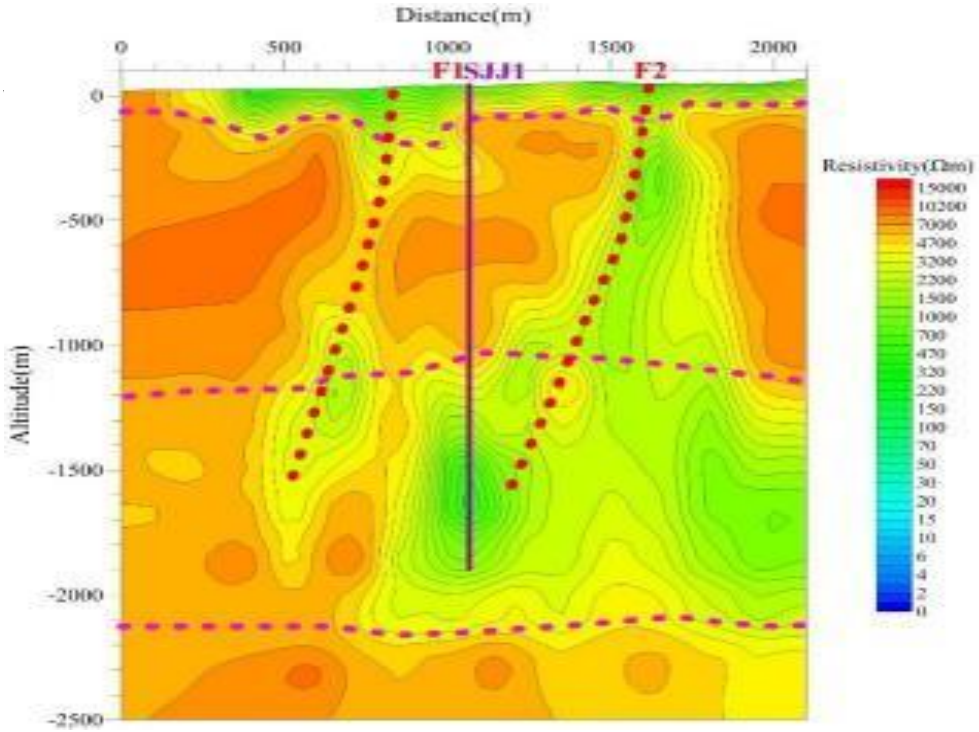
3. Exploration of Water Resources and Geothermal Resources.

Using the SEP system, deep groundwater CSAMT method exploration applications were conducted in multiple locations in Panjin and Xingcheng, Liaoning, achieving satisfactory survey results. From the inversion results, the stratigraphic electrical characteristics of the working area are clearly layered: the surface layer is the Quaternary sediment and weathered water-containing low-resistance stratum; below that is a high-resistance layer, about 300-500 meters thick, gradually thickening from southeast to northwest; further down is a distinct low-resistance layer, 400-700 meters thick. The resistivity of the

lowest layer of the profile gradually increases, showing the high-resistance characteristics of metamorphic rocks, inferred to be the Archean strata. Through the lateral variation characteristics of resistivity, we can identify 4-5 or more low-resistance zones from two resistivity profiles. These positions are fracture zones or mineralized veins. which are consistent with the surface



From the resistivity inversion profile, it can be observed that this area has high-resistance background strata. The profile reveals distinct electrical layering characteristics: the shallow layer is the water-rich Quaternary sediment and weathered layer. Up to a depth of 1400m is a high-resistivity layer, followed by a 700-800m thick lower resistivity layer. The resistivity in this layer varies drastically in some places laterally, indicating that this stratum may contain localized water-rich fracture zones. Moreover, the profile displays two distinct faults passing through. Based on the interpretation, a drilling site was designed. Actual drilling revealed a water-emitting fracture zone at around



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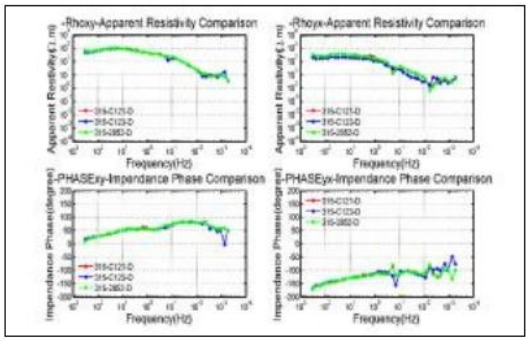
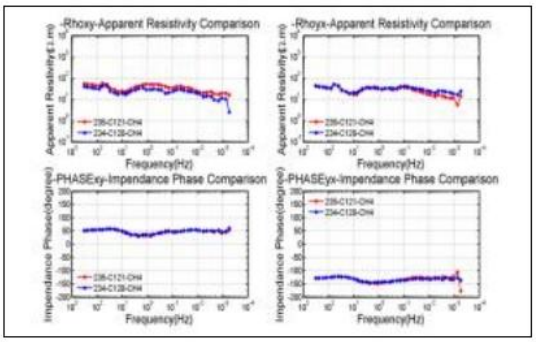
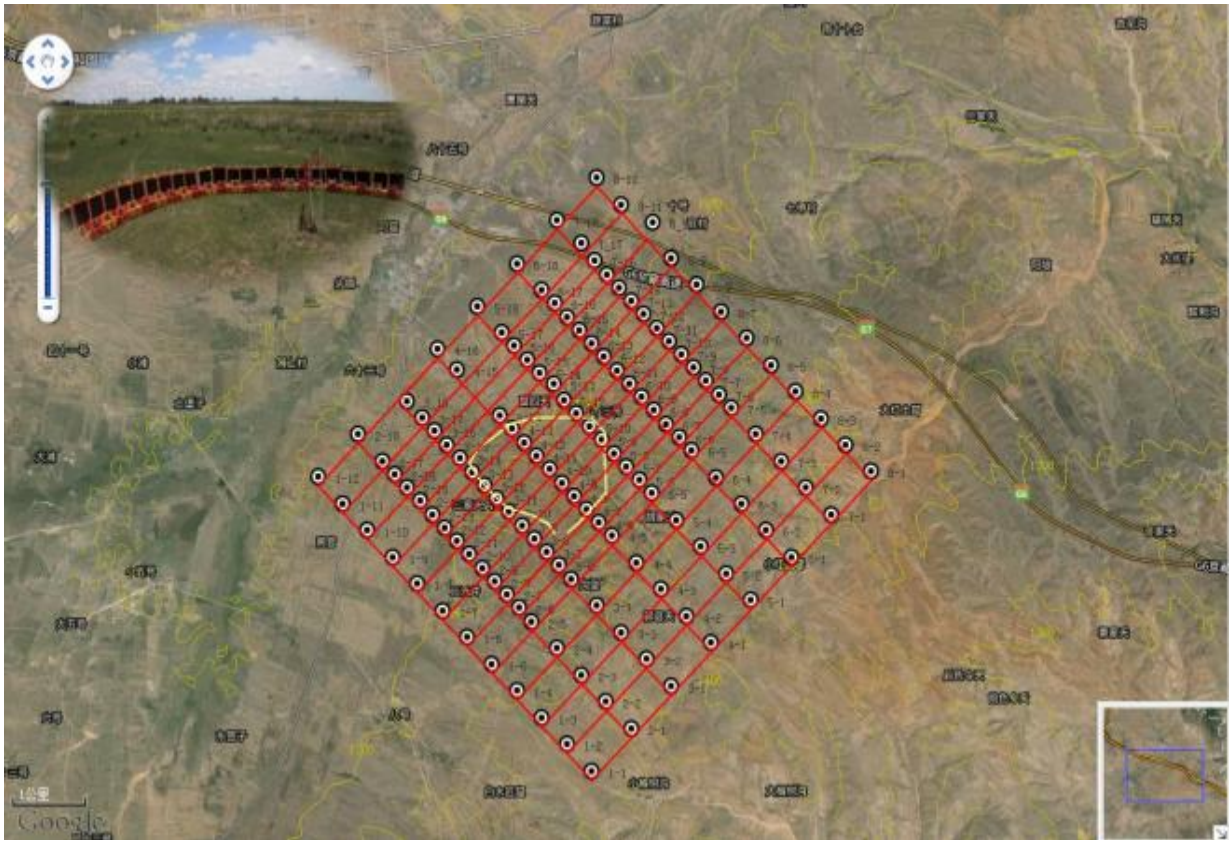
4. Three Rivers Area MT Oil and Gas Exploration

East China Non-Ferrous 814 Team used two DRU receivers for MT method oil and gas exploration in the Sanjiang Plain of Heilongjiang. A total of 45 measurement points were completed, with a pole distance of 80 meters and a total line length of 22 kilometers.



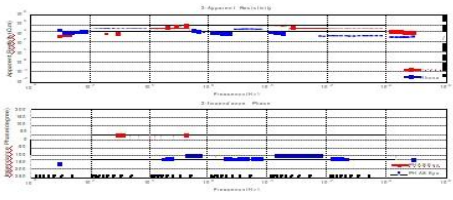


5. Inner Mongolia Molybdenum Mine MT Exploration

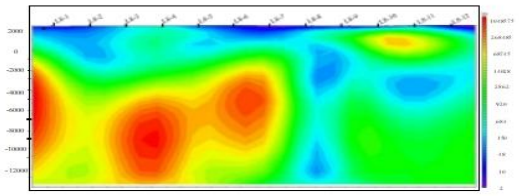


China University of Geosciences used 24 DRU receivers in the Inner Mongolia Molybdenum Mine. A total of 8 MT survey lines were completed, with

a total length of 44 kilometers, including 109 primary survey points and 15 secondary survey points, with a success rate of 95.38%.



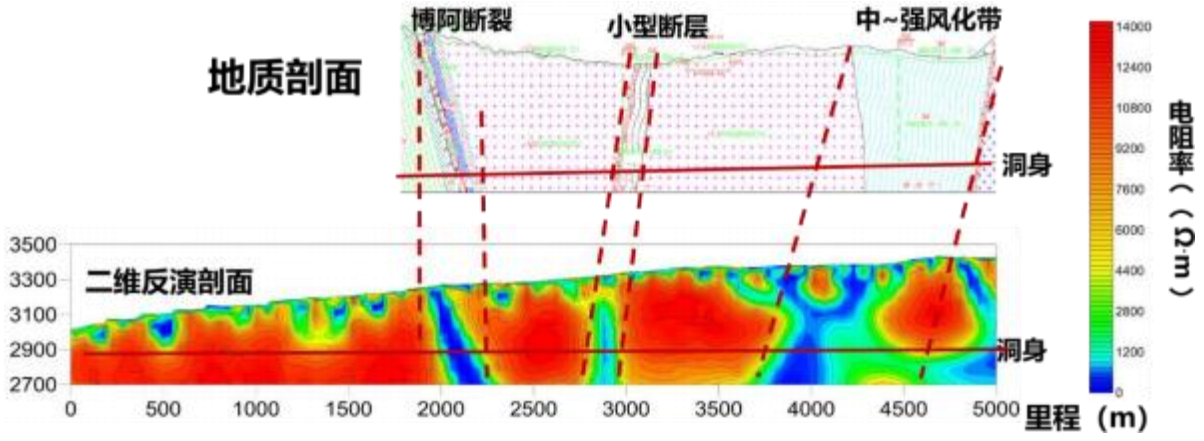
某测点的 MT 测试结果



L7 线反演结果

6. Exploration Project of a Tunnel in Urumqi

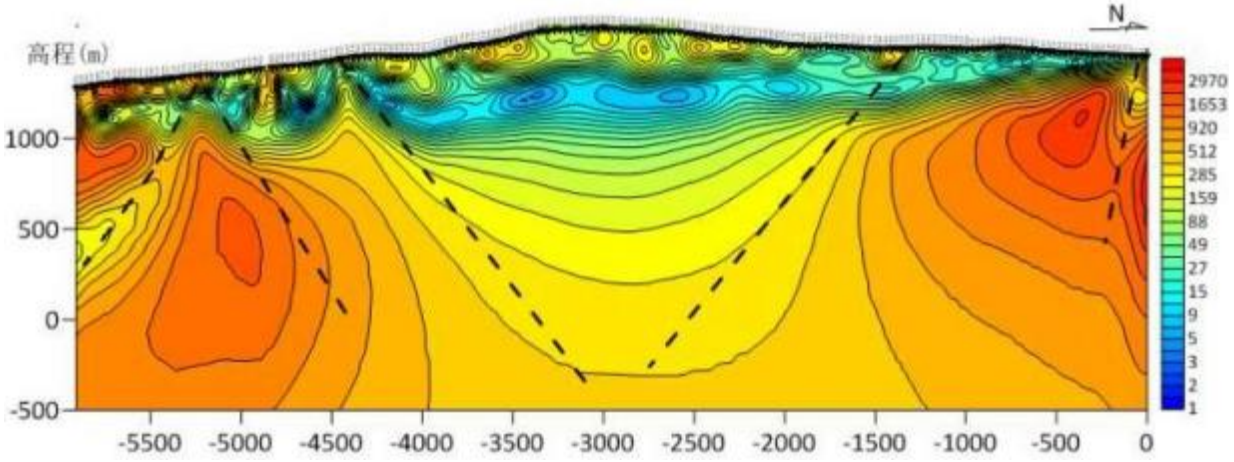
The project was commissioned by the Yangtze River Scientific Academy of the Yangtze River Water Conservancy Commission. They rented a total of 15 DRU receivers to identify the fault fracture zones, influence zones, weak zones, and water-rich zones of the tunnel using the CSAMT method. This provides foundational data for the design of the tunnel. The tunnel extends up to 22 kilometers, located on the southeastern edge of the glaciers in the northwest of our country, with an altitude of over 3200 meters. The area is characterized by high geostress, high seismic intensity, and cold temperatures.



The two-dimensional inversion profile of a certain survey line is shown in the figure. On the eastern side of the survey line, there's a distinct moderate-to-strong weathering zone. The two fractures in the center match the known geological section data. The tunnel body traverses both the fracture zones and the weathering zone. The quality of the survey data is high, and the interpretation results are relatively accurate, providing reliable foundational data for the design and construction of this tunnel.

7. Railway Tunnel Detection Project

This project involves the China Railway Geophysical Exploration Company renting 10 DRU receivers. The CSAMT method was employed to explore a section of the tourist railway tunnel that is buried deeper than 100 meters. In conjunction with geological mapping, validation drilling, and test results, the project aimed to evaluate potential geological hazards for the tunnel and offer engineering recommendations.



The 2D inversion resistivity results of the tunnel exploration data are

shown in the figure. The side boundary overall presents a three-layer electrical property of shallow medium resistance - seismic activity - high resistance. Additionally, multiple fractures are observed, indicating that the geological structure of the profile-controlled area is relatively complex.

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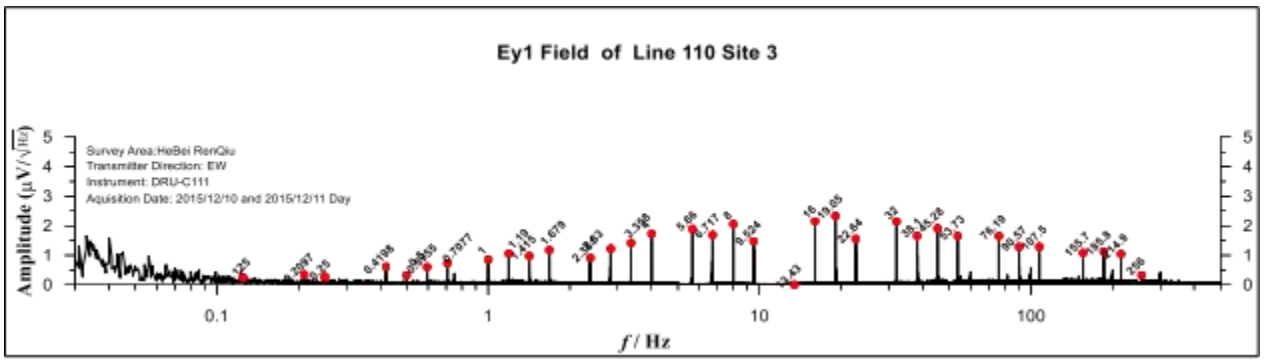
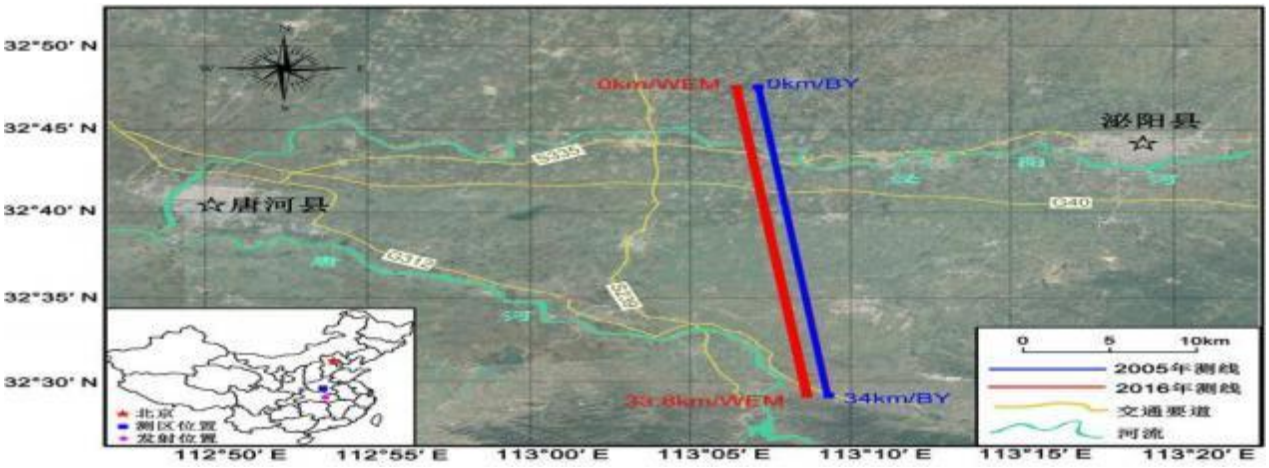
The Extremely Low Frequency Geophysical Exploration (WEM) Project" is one of the major scientific and technological infrastructure construction projects during China's 11th Five-Year Plan. By combining the advantages of the Magnetotelluric Method (MT) and the Controlled Source Audio-frequency Magnetotelluric Method (CSAMT), this approach utilizes a fixed high-power source for electromagnetic wave transmission and performs electromagnetic signal reception nationwide. This artificial source electromagnetic method has been developed and its transmission and reception distance can reach thousands of kilometers.

Using 30 DRU receivers, each receiver can simultaneously measure 3 vector sounding points. The areas where implementation has taken place include Hebei, Inner Mongolia, Sichuan, Henan, Heilongjiang, etc., and reliable data has been obtained in all areas.

When transmitting in the east-west direction, the signal-to-noise ratio (SNR) of the Ey signal is greater than 20dB.

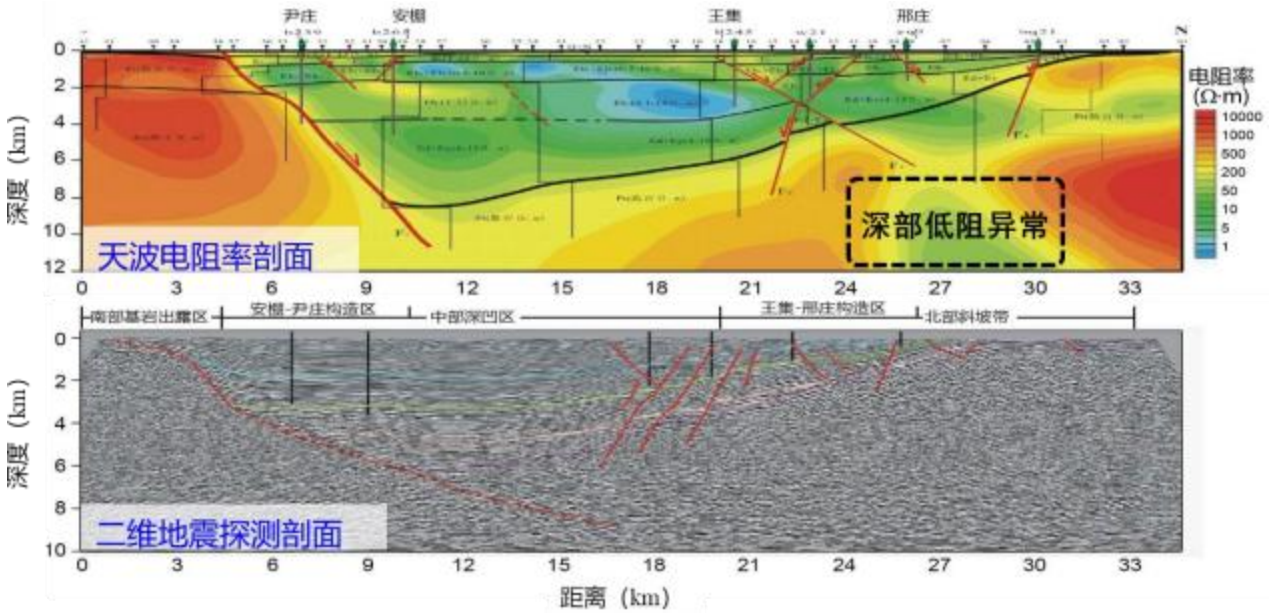


9. Oil-bearing Basin Exploration Project



This project is a demonstration application of the WEM method carried out , by our institute for the exploration of oil-bearing basins. The total length of the survey line is 34km with a point spacing of 80m. The surveyed area is rich in oil and gas resources and has a clear geological structure. The survey line is

280km away from the emission source, which results in a strong signal and high data quality.

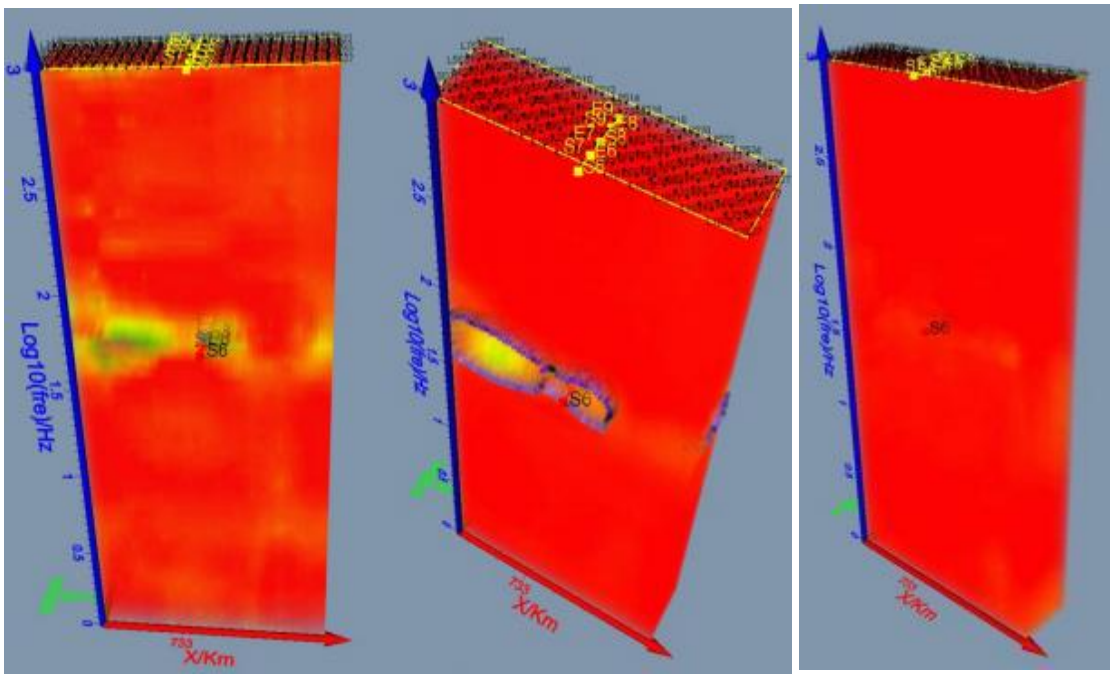


The comparison results of the WEM inversion resistivity profile and the seismic profile for the L1 survey line are shown in the figure. The electrical profile of this side limit matches well with the seismic profile. Moreover, it reveals deep low-resistance anomaly information that seismic exploration failed to display, demonstrating good application results.

10. Shale Gas Hydraulic Fracturing Dynamic Monitoring

This project leased a total of 30 DRU receivers, and carried out monitoring using the CSAMT method and YUTEM method before, during, and after hydraulic fracturing. This project applied the time-lapse electromagnetic exploration technology to numerically describe parameters such as fractures, trends, and volume changes in unconventional oil and gas reservoir reservoir modifications, and achieved three-dimensional and four-dimensional dynamic

imaging from an electrical perspective.



The raw data results are as shown in the above figure, which are respectively the results of the hydraulic fracturing processes for sections 6, 7, 8, and 9. It is evident that the fracturing areas exhibit a low-resistance state. The anomaly in section 6 of the fracturing (1800 m^3) is good, the anomalies in sections 7 and 8 of the fracturing (3700 m^3) are pronounced, while there is no significant reflection in section 9 of the fracturing (135 m^3). The expected results were achieved.