

Application in deep mining of gold mine water damage with a magnetic source transient electromagnetic method

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In coal mine water problems, there have been many successful cases of using transient electromagnetic methods to study the characteristics of coal mine floor water, roof water, and fault or collapse column. However, in the application of gold mine water damage, we have not yet found successful cases. At present, in production practice, transient electromagnetic methods in the coal mine water damage data interpretation still remain in the use of late-time apparent resistivity approximation to the level of interpretation. Gold mine water damage data acquisition is located in deep stopes, it needs full space transient electromagnetic data interpretation technology. Based on the above background, the full-space apparent resistivity imaging calculated by using the principle of inverse function is introduced to deal with the transient electromagnetic data of gold mine water damage detection. The study found that this method of interpretation, not only calculates speed and accuracy and also meets the requirements to facilitate rapid processing of measured data. At the same time, it can eliminate false anomalies appearing in the early stage and the transitional stage of apparent resistivity imaging. Through borehole verification and excavation, it proves that the imaging interpretation method is very effective for the prevention and control of gold mine water damage.

The deep stope is located 700 m underground, the roadway is 3 m wide and 3 m high. It is advisable to use a magnetic source, the number of emission turns is 8. Full-domain apparent resistivity is used for the measured data, the apparent resistivity section diagram is shown in Figure 1.

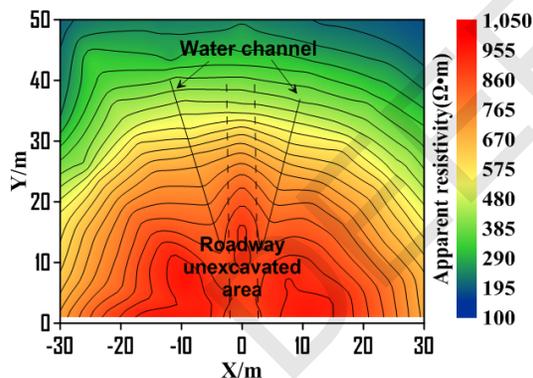


Figure 1. Profile of full-domain apparent resistivity.



Figure 2. Field Drilling Diagram.

It can be seen from the cross-sectional view of the resistivity of Fig. 1 that two left and right two-section bending curves appear 13 m in front of the face of the face. After drilling, the water outlet point appeared 15 m in front of the face of the face, and the water output was 50m³/h. After drilling and excavation, there were two water surge channels crossing each other at the 15 m position, resulting in a large amount of water. The water was verified by drilling as shown in Figure 2.

The magnetic source transient electromagnetic method is used to find out the water damage in the gold ore area, combined with the hydrogeology and borehole verification of the gold ore area, and the effect of preventing and controlling the gold mine water damage is very obvious. But the transient electromagnetic electromagnetic response is the comprehensive information of the normal direction of the loop frame. The electromagnetic response may be the data in front of the wire frame, or the data behind the wire frame, which is the comprehensive reaction at both ends of the wire frame, but the tunnel is behind the face. The

cavity has a large resistivity, so the electromagnetic response is mainly affected by the low resistance in front of the face. In the actual exploration, the water level and geological data should be combined with specific analysis to determine the specific orientation of the anomalous body.

References

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