

AN ASSESSMENT OF VTEM AND ZTEM DATA OVER THE POZO SECO SKARN-CRD MOLYBDENUM-GOLD DEPOSIT, MEXICO

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SUMMARY

In the present study the results from two airborne EM surveys over the two CRD deposits. Both EM provide information about the conductive and resistive zones associated with the mineralization. In the case of the economically significant Pozo Seco deposit, both EM systems produced a strong conductive response directly below the actual zone of mineralization, which appears to lie along a major fault zone. Results over the associated José Manto zone were less clear in either EM system but showed a strong IP anomaly.

Key words: airborne EM, VTEM, ZTEM, Skarn-CRD, inversion

INTRODUCTION

Airborne EM (AEM) techniques have been used to search for a variety of mineral deposit styles since the inception of the technology in the late 1940s. However, the application of AEM technology to the search for Carbonate Replacement Deposits (CRD) is relatively new. CRD style occurrences are an important class of economic deposit commonly found in northern Mexico and AEM technology is now being applied to assist in the location and definition of these deposits. In this study, the initial results of application of two AEM techniques to the Pozo Seco CRD deposit located on the Cinco de Mayo property owned by MAG Silver Corp. in northern Chihuahua State, Mexico will be examined.

POZO SECO DEPOSIT

The Pozo Seco deposit was located by MAG Silver in their Cinco de Mayo project area in 2009. Earlier exploration in the area (Robertson and Megaw 2009) had located significant silver, lead and zinc mineralization at the José Manto property approximately 5 km to the NNE. A geological map of the Pozo Seco area is shown in Figure 1¹ and a conceptual cross-section in Figure 2. This section shows the observed variety of different mineralization styles associated with the intrusive system. MAG Silver is continuing to drill off the Pozo Seco discovery and a significant resource of molybdenum and gold has been defined.

AIRBORNE EM SURVEYS

Two AEM systems provided by Geotech Ltd were flown over the Pozo Seco area; VTEM and ZTEM. VTEM is a helicopter borne time domain EM technology (Witherly et al 2004) and ZTEM is as well a helicopter based system that is relatively new adaptation (Kuzmin et al) of Afmag technology first applied to airborne surveying in the 1950s.

¹ Derived from the MAG Silver web site: www.magsilver.com

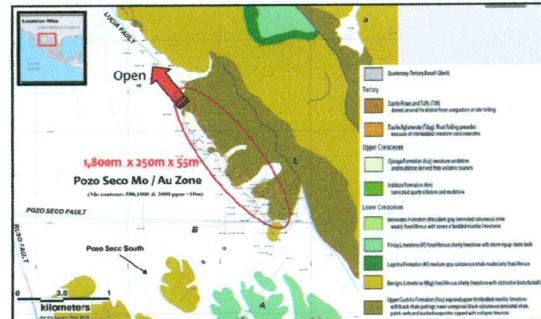


Figure 1: Local geology at Pozo Seco deposit (from MAG Silver).

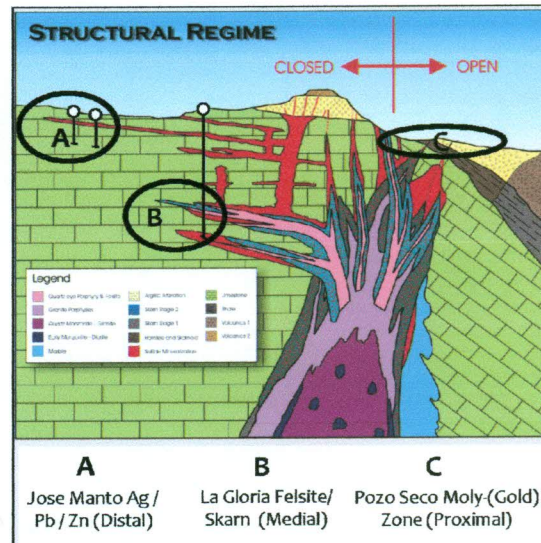


Figure 2: Cross-section (looking south) showing styles of mineralization found in Cinco de Mayo area (from MAG Silver).

Figure 3 shows the location of the two surveys with respect to Pozo Seco deposit and José Manto zone. Over the José Manto zone, the client had acquired IP-resistivity data which were also used in this assessment.

DATA PROCESSING

The two EM data sets were processed using proprietary codes; a layered earth inversion code LEI-1 on the VTEM data and a 2D Occam on the ZTEM (Sattel et al 2010). These codes provide a depth conductance section from the line data. In addition, grid based products were generated for both surveys. Contractor provided products were as well assessed and some of these outcomes are provided in this assessment.

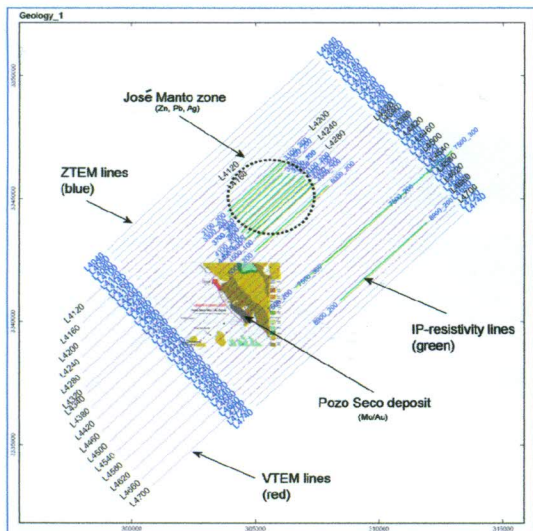


Figure 3: Flight path of VTEM and ZTEM over Pozo Seco deposit.

OUTCOMES

VTEM: Figure 4 shows the basic magnetic and EM outcomes. The locations of the Pozo Seco deposit and José Manto zone are shown as well.

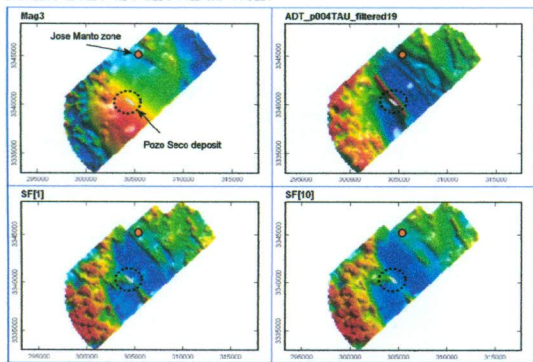


Figure 4: VTEM magnetic and EM outcomes.

The magnetic results show the Pozo Seco deposit to lie along the eastern flank of a large NW-trending high. This feature is believed to be a deep-seated intrusive body. The José Manto zone appears to lie along a fault contact. The EM outcomes are derived from the dB/dT results and show channels 1 and 10 as well as AdTau (time constant) outcomes. These results are all fairly similar and show alternating bands of high and low conductivity that are believed to likely represent different lithologies. The conductive zones are thought likely to be altered sediments. The Pozo Seco deposit lies along a distinctive narrow conductive feature that separates two zones of low conductivity that reflect silicified breccias as well as unaltered limestone and shales. There is some complexity in this linear feature that could be a reflection of secondary structure which is related to the occurrence of the deposit.

Figure 5 shows the depth slices from the EM inversion model from basically at surface to ~200 m depth along with the client-provided geology map for the Pozo Seco area.

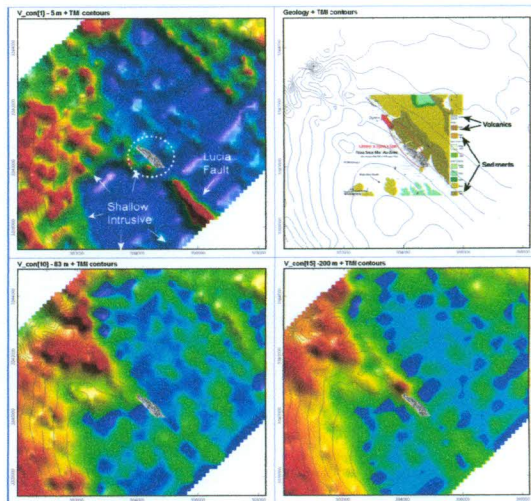


Figure 5: LEI depth slices with TMI (contours) around Pozo Seco deposit.

Referring first to the shallowest depth slice, the deposit is located along the Santa Lucia fault structure that the EM shows to be a complex feature. Just south of the deposit there is a gap in the EM expression of the fault and then further to the SE, the fault appears with a much stronger response than noted elsewhere. However, in the deeper depth slices, this strong SE extension of the fault zone is not apparent. Referring again to the shallowest depth slice, to the west of the deposit, there is an embayment of low conductivity that closely matches the contours of the magnetic high (suspect intrusive). Mapping in the area only shows limestone to be present but this is deemed to be a fairly thin veneer overtop of the intrusive.

Figure 6 shows the VTEM depth conductivity response in section along with an outline of the deposit and the geological section “B-b”.

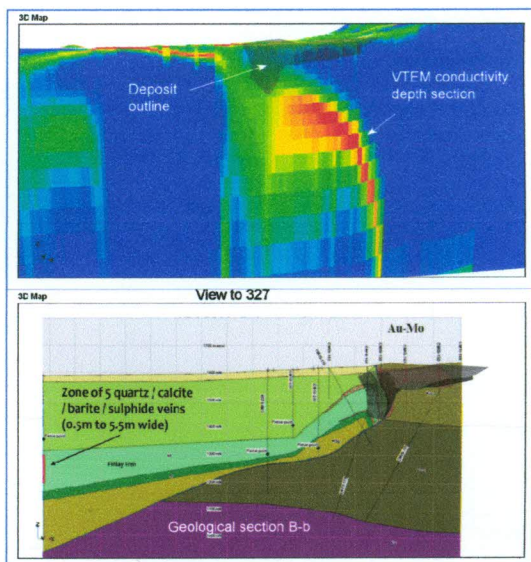


Figure 6: VTEM conductivity depth section, ore deposit and geological section “B-b”.

This shows the deposit to be shallower than the EM response. The deposit itself appears to be located at the overturned fold-nose of a thrust fault dipping to the west. The source of the EM response is unclear but the correlation with a mapped fault suggests that mineralization hosted along the fault structure is causing the VTEM response. An assessment of the VTEM by the survey company showed there to be a very long, single axis conductor associated with the fault. While this shows considerable lateral consistency, the depth slices through the conductivity model show that there is considerable variability of conductivity with depth.

ZTEM: As shown in Figure 3, the ZTEM coverage was slightly off-set from the VTEM. Figure 7 shows the apparent conductance or AppCon (Sattel et al 2010) for the five frequencies the ZTEM operated at. Figure 8 is the same themes but enlarged around the area of the Pozo Seco deposit. This product provides an image of the conductance with the geometric effects of the system removed (cross-over's become peaks).

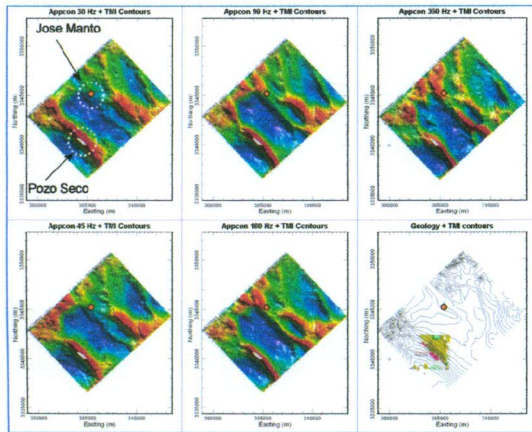


Figure 7: ZTEM AppCon outcomes.

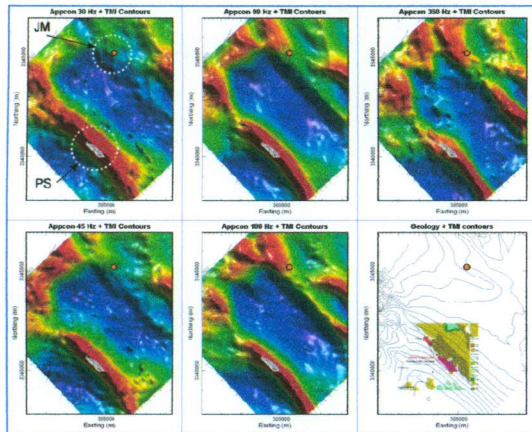


Figure 8: AppCon outcomes focused around Pozo Seco.

These outcomes look similar to the VTEM but with some differences. The two large areas of low conductivity appear in both outcomes. However, the conductivity structure Pozo Seco is hosted along appears more continuous in the ZTEM than the VTEM results, which indicated where there was a gap in the structure just south of the deposit.

Another means to compare the two surveys is through the depth inversion models shown in Figure 9. Here three conductivity slices of roughly equivalent depth are shown for the two surveys.

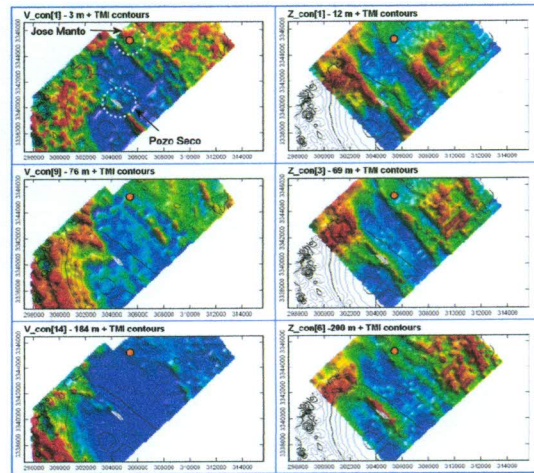


Figure 9: VTEM and ZTEM conductivity depth slices.

In this result, the two shallowest slices both show a gap in the linear conductor, interpreted fault that the deposit lies on. In deeper slices, on the VTEM the structure disappears whereas in the ZTEM the linear persists but without the gap. The significance of the gap regards the formation or location of the deposit is unclear but for this style of deposit, structure is deemed important in providing conduits for mineralizing fluids and barriers that result in solutions being trapped.

Figure 10 shows the ZTEM depth section in perspective that is closest to the geological section B-b; the deposit is shown as well. As with the VTEM results shown in Figure 6, the bulk of the conductivity response is located below the actual deposit, suggesting the ZTEM as well is responding to some aspect of the mineral system and not the economic mineralization directly.

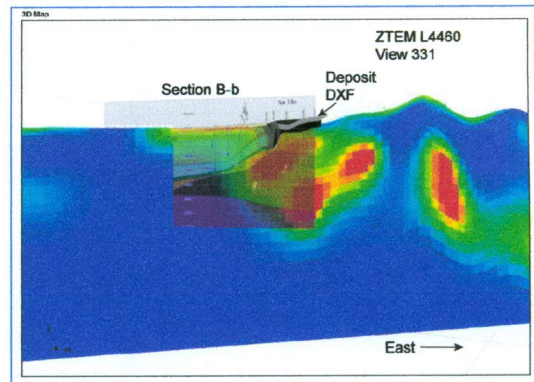


Figure 10: ZTEM L4460 depth section with geological section B-b and deposit outline.

Figure 11 shows a comparison between the VTEM and ZTEM depth sections. Both outcomes show a strong response directly under the deposit but the ZTEM also shows a major conductive zone dipping to the east. Given the

