



# **Montana GIS Pty Ltd**

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**Hale Project – EL 24809**

**HOISTEM**

**Heli-borne Time Domain Electromagnetic Survey**

**Data Modelling & Interpretation Report**

**for**

**Thor Mining**

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## **CONTENTS**

1. Summary .....	2
2. Survey Logistics & Location.....	3
3. Observed Data & Resultant Models .....	5
4. 3D Model.....	7
5. Conclusion .....	9

## **FIGURES**

1. High priority target area .....	2
2. Location of Hale Project exploration license .....	3
3. Survey flight line diagram.....	3
4. Observed data and resultant geo-electric model .....	4
5. Interpreted basement topography image .....	5
6. 3D snap shot of the interpreted basement topography .....	5
7. 3D snap shot of the interpreted basement topography with conductors .....	6
8. 3D snap shot with reduce to pole magnetic image.....	7
9a. 3D snap shot with airborne radiometric uranium channel image.....	7
9b. 3D snap shot with showing conductive sediments coincident with .....	8

## **TABLES**

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## 1. SUMMARY

In late November of 2006, a helicopter-borne time domain electromagnetic survey (Hoistem) was flown over the Hale Project Area (EL 24809). The project is located approximately 75km NE of Alice Springs. The survey consisted of 122 traverses with 200m line spacing, collected in a North-South Orientation for a total collection of approximately 926 line kilometres of data.

The Hoistem system maps the palaeo-topography of the crystalline basement due to the significant electrical contrast between the younger overlying unconsolidated sediments (conductors) and the crystalline basement units (resistors). Through modelling the data, the contact between the crystalline basement and overlying sediments can be accurately mapped. From this any topographic lows/palaeo-drainage features can be defined and delineated.

Additionally the modelling of the data establishes the conductivity of the sediments overlying the basement. An area where the conductivity of these sediments is higher may represent zones of higher organic material. Organic material is a good reducer and is a known catalyst inducing uranium rich fluids to precipitate the uranium into the adjacent sediments.

The results of modelling the data have defined a major palaeo-channel that strikes East-South-East across the northern part of the project area. There are also a number of minor palaeo-channels that appear to run into this major channel. Additionally just to the south of the deepest part of the major channel a complex basement topographic low feature is defined.

Several of these areas make interesting target areas. However the highest priority of these is an area towards the eastern edge of the project area. In this area there is an isolated deeper part of the defined palaeo-channel that contains some significantly conductive sediments. In addition to this great environment for hosting a paleo-channel uranium deposit the area is overlain by a significant airborne uranium radiometric anomaly (from NTGS state radiometric data).

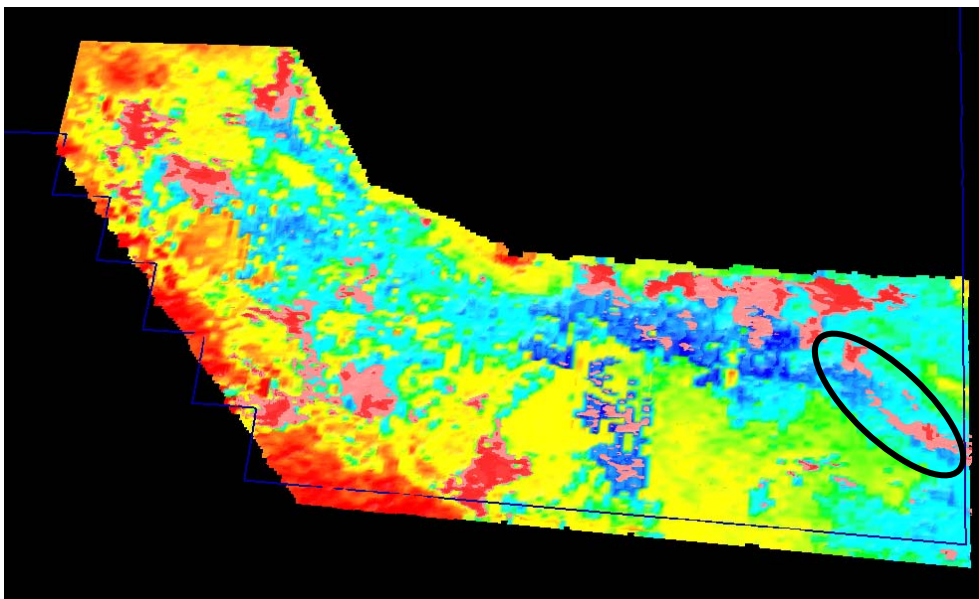


Figure 1: High priority area, with deeper channel, conductive sediments and significant airborne uranium anomaly

## 2. SURVEY LOGISTICS & LOCATION

The logistical report, as supplied by GPX airborne services, outlines the data collection system and survey specific information. However in summary the Hoistem system is a time domain electromagnetic system. It operates with an inloop configuration, having the received co-planar and in the middle of the transmitter loop. It operates at 25hertz with a 5msec on-time pulse and a 15msec off-time. The system is towed below the helicopter and data is collected approximately 35m from the ground. The Hale survey occurred over exploration license EL 24809, which is located approximately 75 km north east of Alice Springs (figure 1). The survey was undertaken in a North-South Orientation with 122 traverses being collected at a line spacing of 200m for a total collection of approximately 926 line kilometres of data (figure 2).

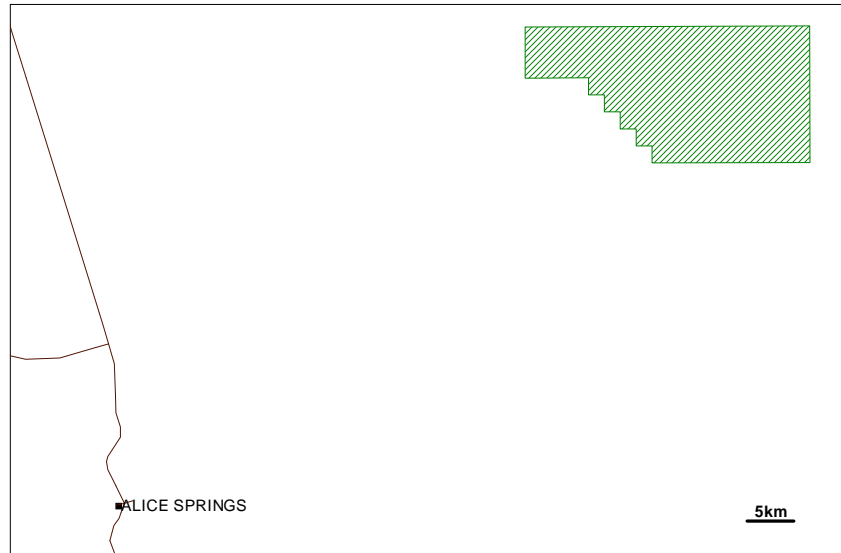


Figure 2: Location of Hale Project Exploration License (EL 24809)

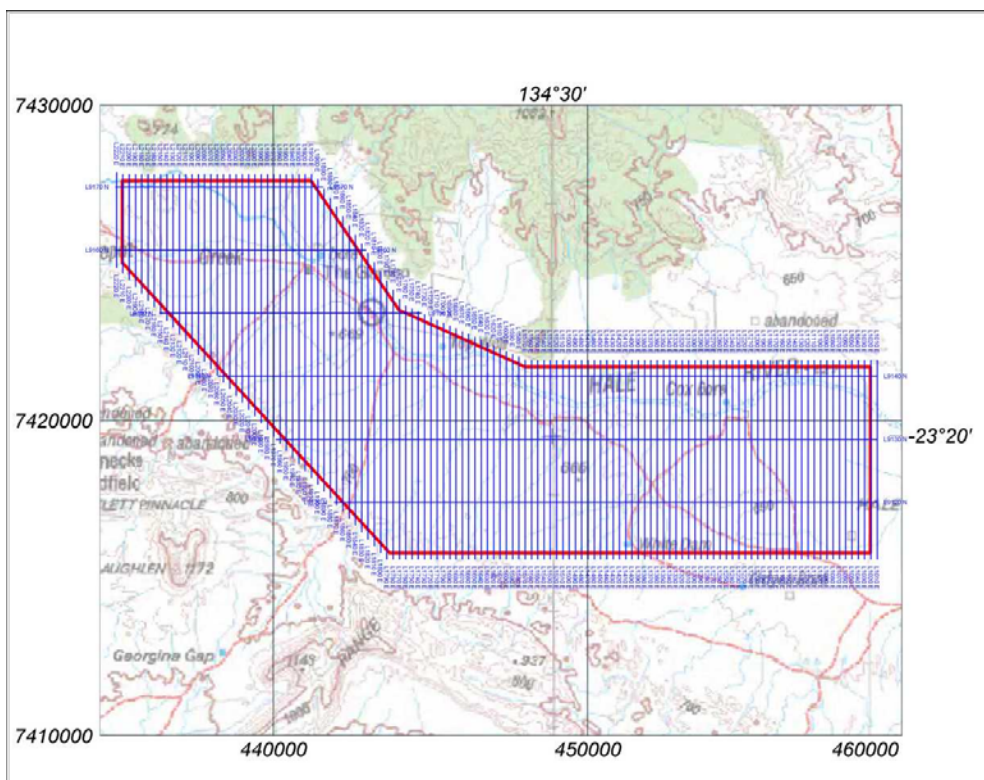


Figure 3: Flight line diagram for the HoisTEM survey over the Hale Project Area

### 3. OBSERVED DATA & MODELLING

The Hoistern Electromagnetic data collected during the survey is of good quality. There doesn't appear to be any bunching of the early time channels due to system response. This allows most of the early time channels to be used in the interpretation and modelling process. The lower data threshold (noise limit) is approximately 0.1  $\mu\text{V}/\text{Amp}$ , for the modelling of the data a lower threshold of 0.2  $\mu\text{V}/\text{Amp}$  was used and the first two time channels were removed.

The Hoistern system maps the palaeo-topography of the crystalline basement due to the significant electrical contrast between the younger overlying unconsolidated sediments (conductors) and the crystalline basement units (resistors). Undertaking 1D layered earth inversions of the observed data along a traverse enables an electrical cross section of the earth to be constructed (figure 3). From this electrical cross section the thickness of the overlying sediments and conversely the palaeo-topography of the basement are interpreted.

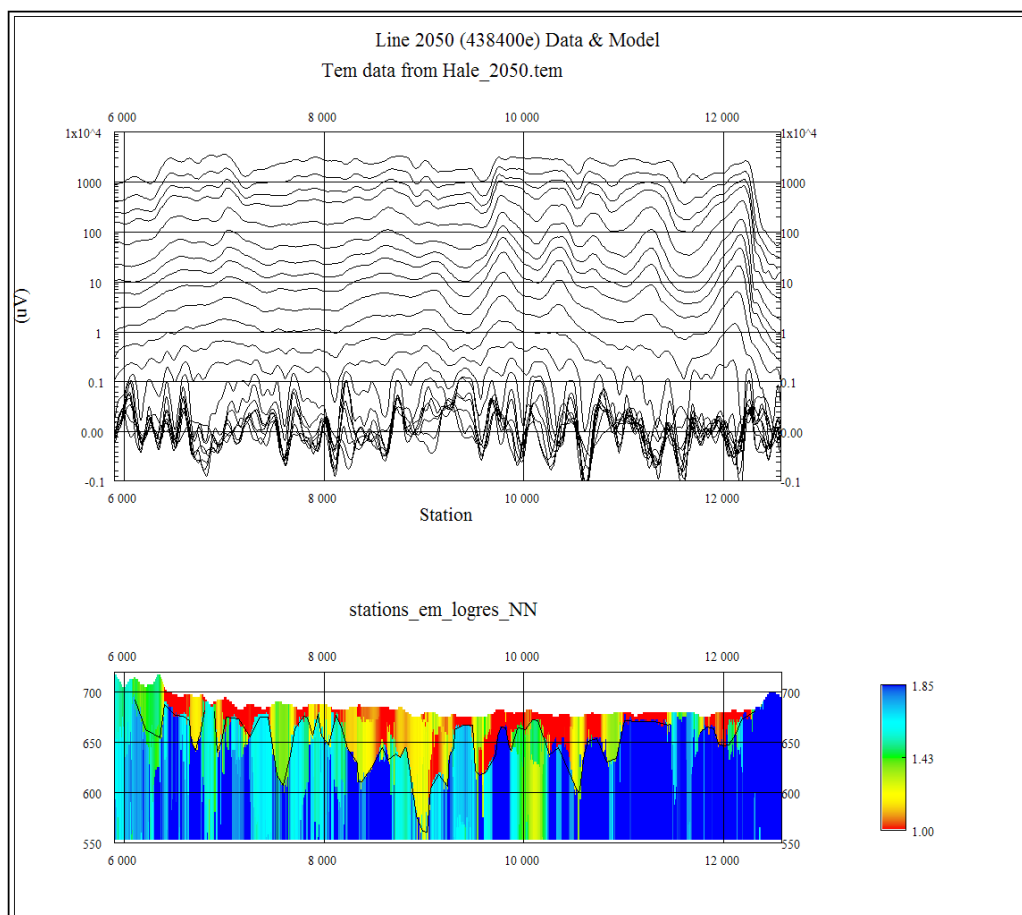


Figure 4: Observed data and resultant geo-electrical cross section model for flight line 2050 (438400e). The black line represents the interpreted top of the basement.

By undertaking the 1D layered earth inversions for every station along every traverse, the sediment cover / crystalline basement contact is interpreted. From this a map of the palaeo-drainage for the area has been compiled (figure 5). The shallow basement is represented by red with the deeper parts of the basement being blue/purple. Interpreted on this is the flow direction of the major channel along with the minor channels that appear to feed into the main channel. Also identified is a complex zone topographically low basement to the south of the major channel.

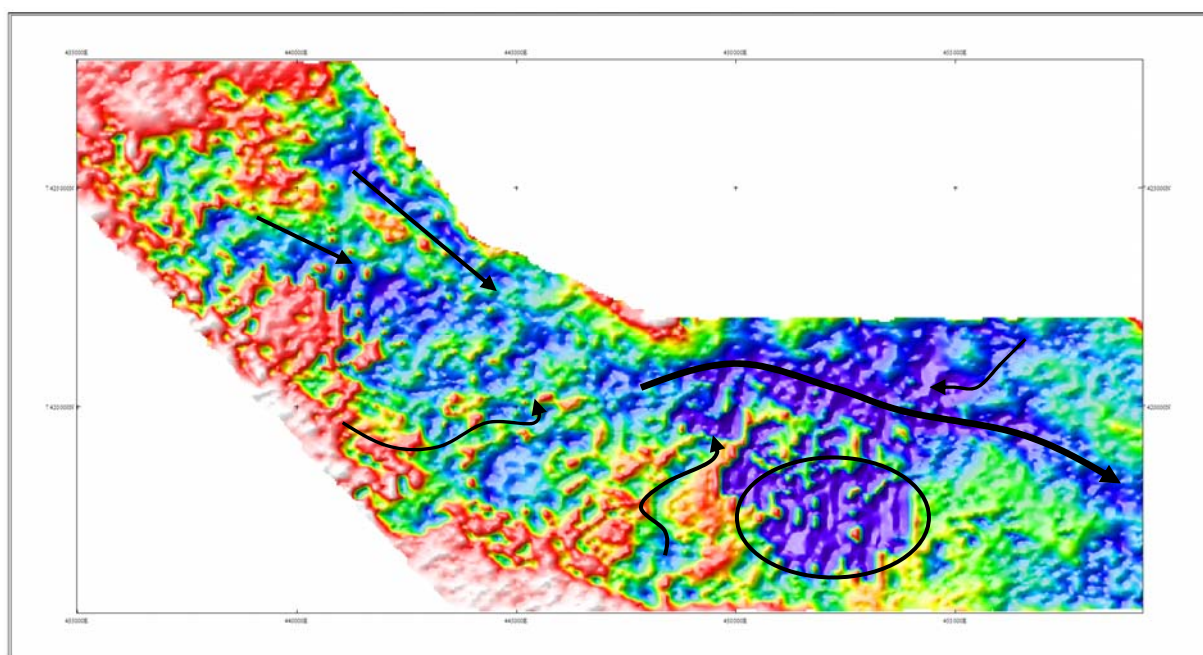


Figure 5: Image plan of the palaeo-channels for the Hale Project Area.

#### 4. THREE DIMENSIONAL MODEL

The interpreted surface of the basement topography can be viewed in 3D modelling software (figure 6). This 3D view enables the basement trends to more easily recognised. Also by three dimensionally gridding all the resultant models conductivity shells of the sediments above the basement can be made (figure 7). The conductivity of these shells is potentially related to the content of the organic material. As organic material is a good fluid reducer the areas of higher conducting shells/organic material represent good locations for trap sites.

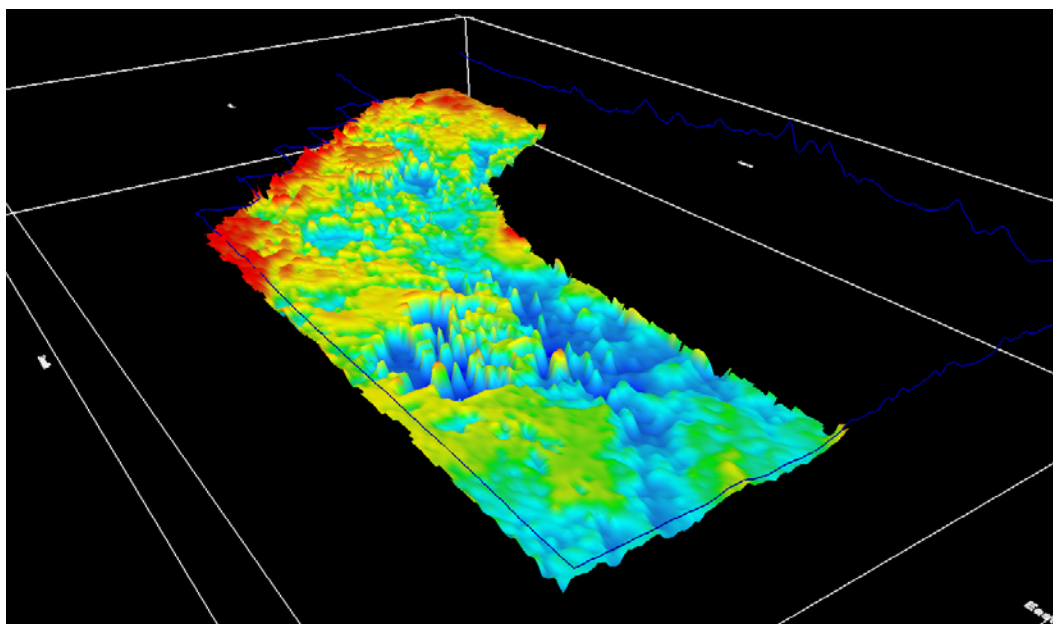


Figure 6: Snap shot of the 3D model showing top of basement surface - i.e. identifying palaeo-drainage.



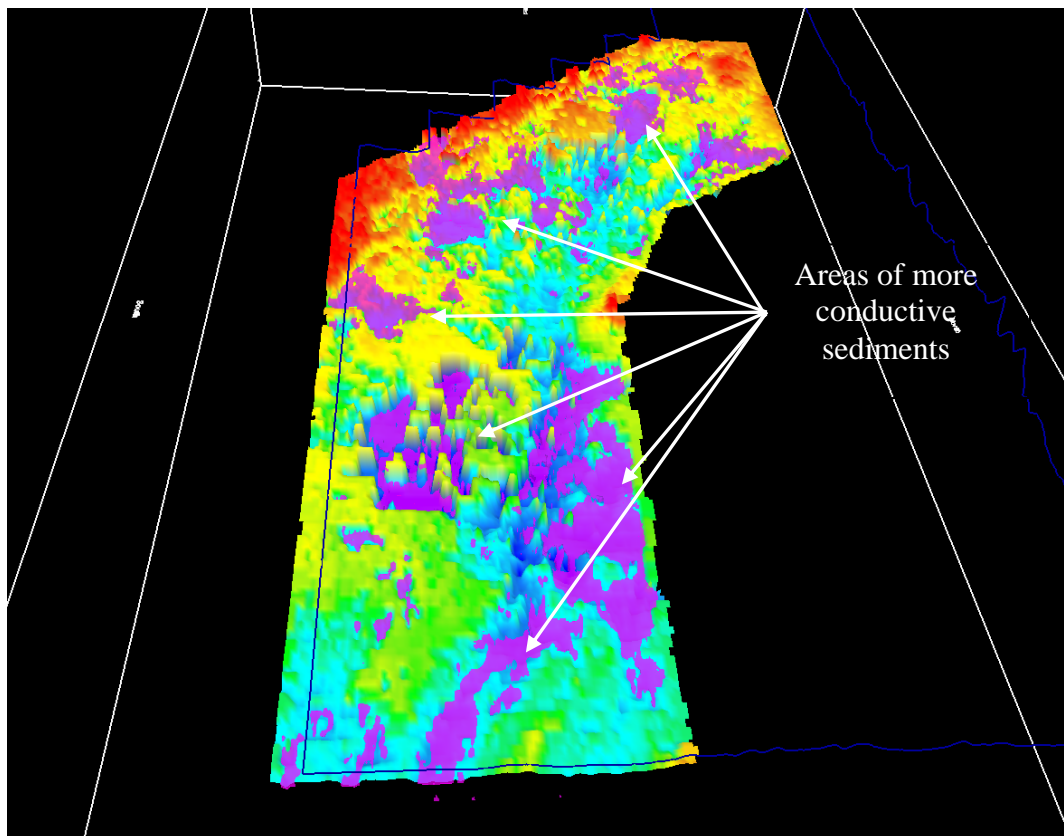


Figure 7: 3D model of the basement topography with shells of the more conductive sediments.

By combining the model derived from the Hoistem with other datasets, various correlations can be identified. These correlations improve confidence in the model as derived from the Hoistem data; as well as assisting to prioritise the best target zones for Uranium mineralisation. Figure 8 is a reduced to pole magnetic image draped on the topography, within this data a major structure is interpreted to be striking across the project area in the location and orientation of the major palaeo-channel. The coincidence and correlation of this structure with the palaeo-channel suggests it may have a controlling influence on the palaeo-channel formation. It may also act as a fluid conjugate transporting Uranium rich fluids and/or providing secondary fluids to evoke uranium precipitation through fluid mixing.

Most interestingly when the image of the uranium channel from the NTGS state airborne radiometric data is overlain on the model, an area of significant uranium anomalism is identified. This area correlates with the location and trend of the palaeo-channel as well as with an area of highly conductive sediments. This area represents an extremely high priority (figure 9a & 9b).

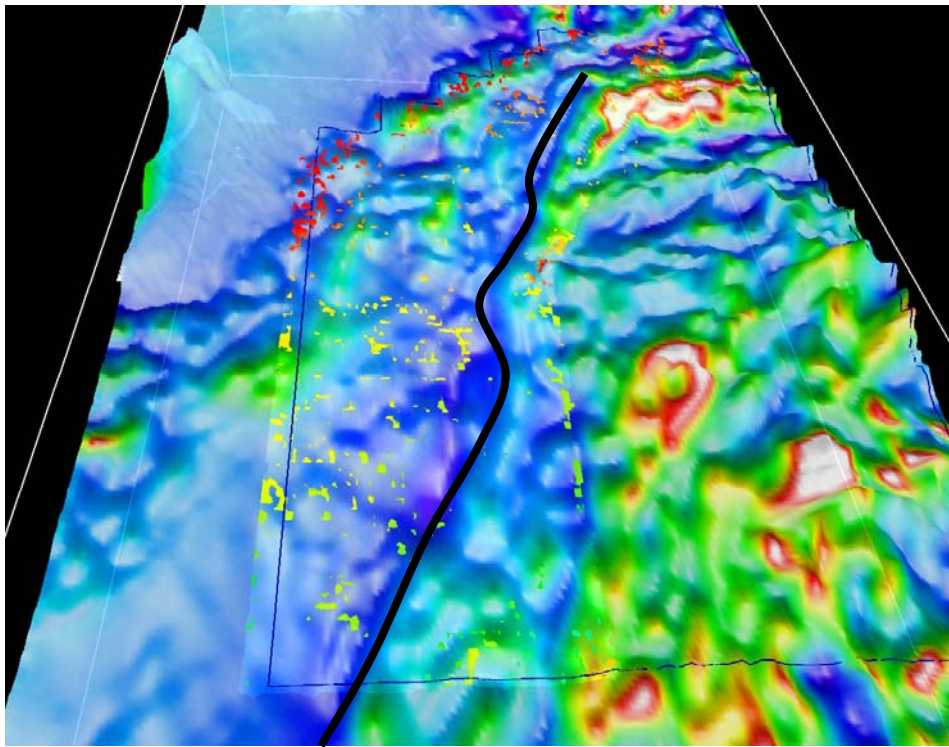


Figure 8: RTP magnetic image with interpreted structure (black line). This structure is coincident with the major palaeo-channel as interpreted from the Hoistern survey.

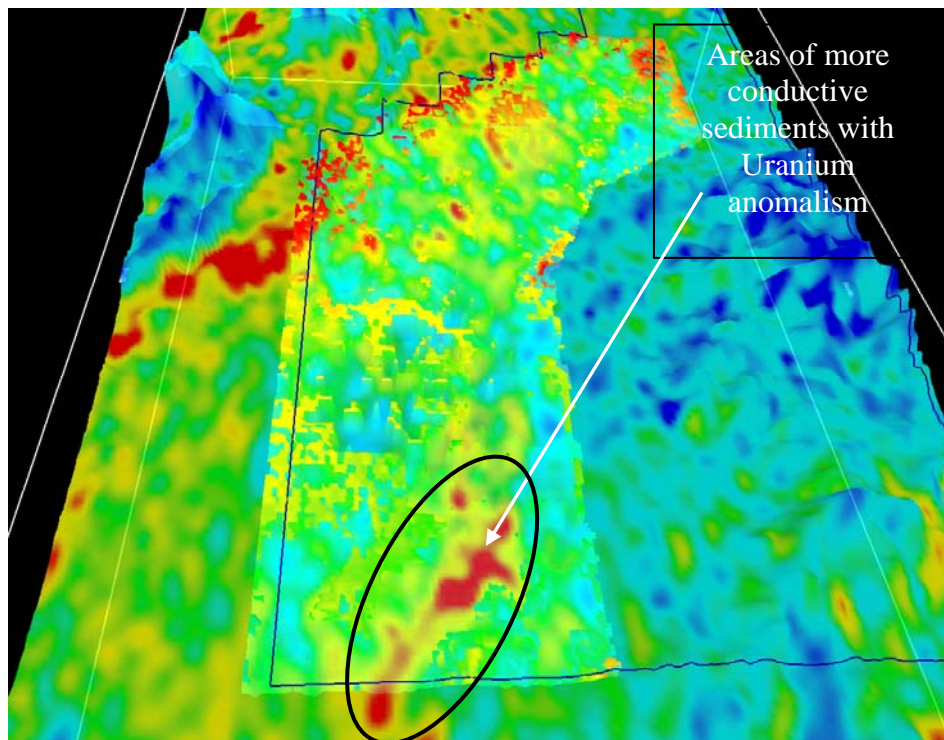


Figure 9a: The 3D model with uranium channel from the NTGS state radiometric data.



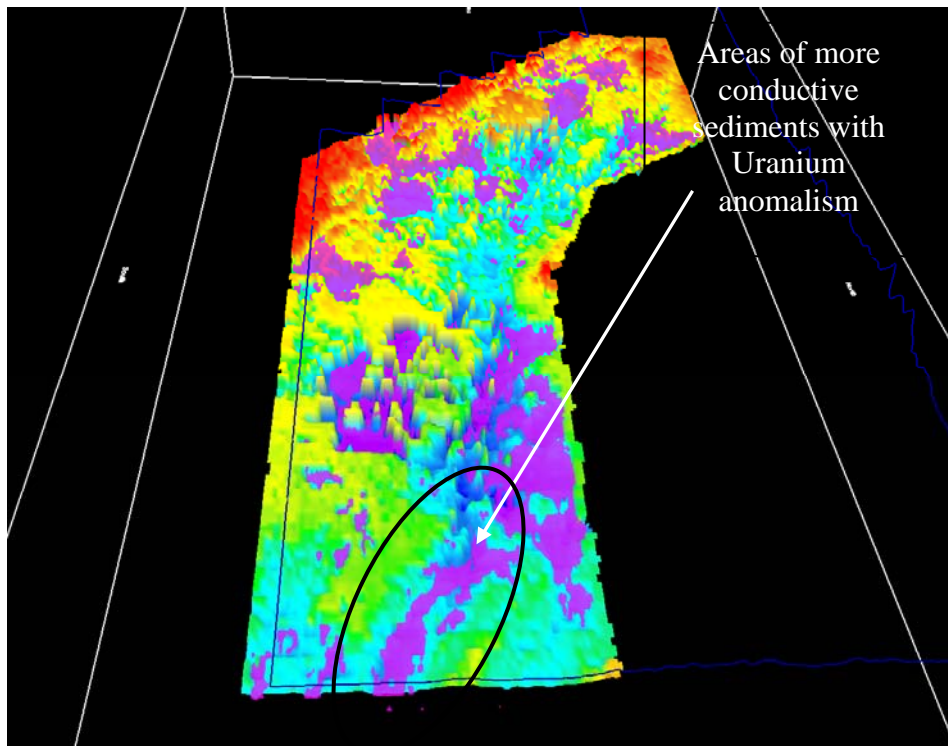


Figure 9b: same snap shot of model as figure 9 but without the radiometric image. This snapshot displays the palaeo-channel with conductive sediments.

## 5. CONCLUSION

Modelling of the Hoistem data has successfully defined the palaeo-topography of the basement. It has also identified areas where the sediments overlying the basement are more conductive and potentially correlating with areas that contain more organic material. These areas with organic material within the palaeo-drainage offer good locations for the deposition of uranium.

The model when combined with other datasets has a number of correlative features. This improves confidence in the model and assists in prioritising target areas. A number of high priority target areas exist; the most prominent of these is in the eastern part of the tenement where conductive sediments are contained within the major palaeo-channel coincident with an airborne uranium channel radiometric anomaly.