montana G.I.S

SH_AEM_Interp.doc

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DATE: 26 September 2010

SUBJECT: Spring Hill SkyTEM interpretation

Executive Summary

The Spring Hill project area is located approximately 30km North-west of Pine Creek in the Northern Territory. In September 2008 Geoforce Pty Ltd completed the collection of 283 line km of SkyTEM AEM data over project area. The data was collected in an East-west orientation with a 150m survey line separation (figure 1).

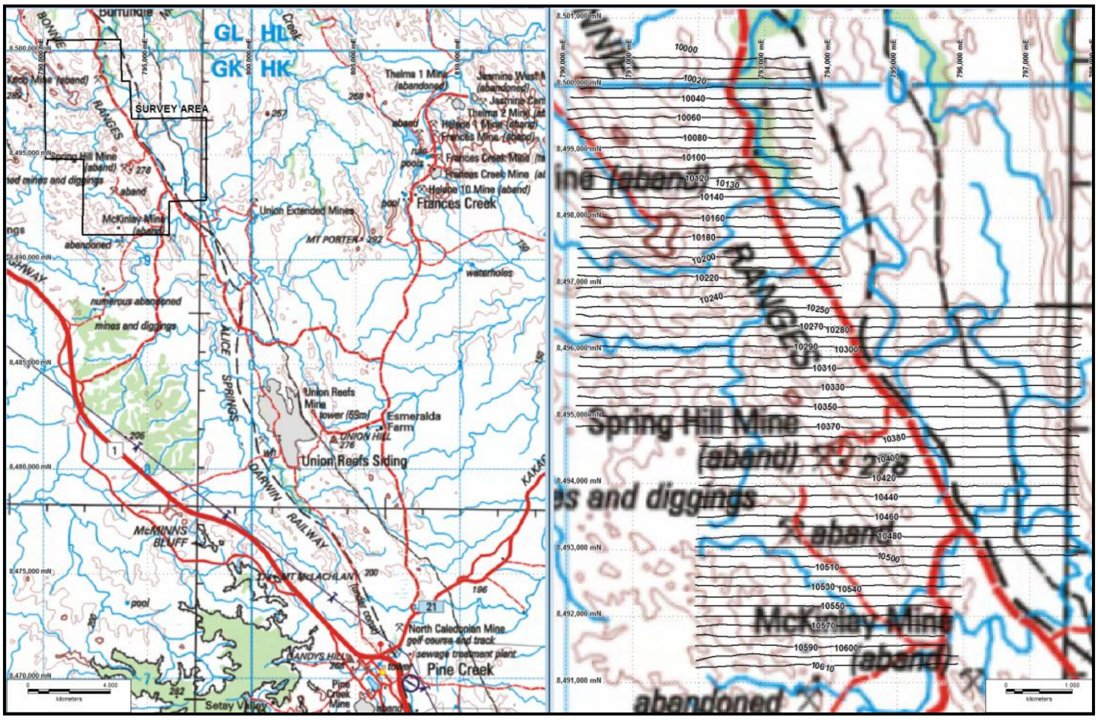

Figure 1: Location of the survey area as well as the flight lines.

In the Spring Hill area, the AEM system is sensitive to massive sulphide conductors and faults within the basement to a depth of approximately 400m from the surface (based on the host rock resistivity and AEM system). The AEM data profiles and Conductivity Depth Images/Models have been interrogated and 35 basement conductors have been identified; of these ten are considered priority 1 (figure 2 & table 1). The prioritisation of anomalies was allocated based purely on its conductive characteristics with the strongest, most coherent conductors given the higher priority. The best of these are anomalies are 12, 25, 28 and 36.

Each anomaly is indexed to enable line to line continuity mapping. This demonstrates that a number of the priority 1 anomalies have an expression over more than one line; some are rated as lower priority on adjacent lines (off line expression?), others have a high priority

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along a linear trend and may be anomalies sourced by a strong litho-logical conductor. This litho-logical conductor appears to be a fold closure connecting anomalies, 26, 22, 20, 21, 23 and 29. There is also a moderate conductor response mapped striking NNW throughout the survey area, however this directly correlates with a track in the area and this high/direct correlation would suggest that the anomaly ids culturally sourced (index 6).

Figure 2: Location of all anomalies identified from analysing the profile data and CDI images. The priority 1 anomalies are displayed in magenta, priority 2 in red, priority 3 anomalies are in orange. The index 6 cultural anomaly is displayed with green dots.

Line	Index	Priority	East	North	Comment
10320	12	1	790377	8495577	good multi-peak conductor
10200	17	1	791567	8497392	good twin peak deep conductor
10210		1	791551	8497260	good twin peak deep conductor
10220		1	791605	8497109	good twin peak deep conductor
10230		1	791782	8496954	good single/double peak conductor
10230	18	1	792188	8496960	good single peak conductor
10180	22	1	790513	8497694	good complex peak conductor
10190		1	790621	8497547	good broad peak conductor
10160	23	1	791686	8498000	good broad peak conductor
10170		1	791788	8497873	good broad peak conductor
10180		1	791869	8497708	good broad peak conductor
10190		1	791881	8497538	good broad peak conductor
10180	25	1	790945	8497714	good broad peak conductor
10160	26	1	790280	8498013	broad single good conductor
10100	28	1	791328	8498898	broad conductor
10040	29	1	790338	8499808	complex broad conductor
10050		1	790445	8499642	good conductor
10060		1	790571	8499512	broad good conductor
10090		1	790915	8499056	broad conductor
10100		1	791001	8498895	moderate conductor
10110		1	791122	8498754	moderate conductor
10120		1	791224	8498573	moderate conductor
10060	36	1	792564	8499501	good complex conductor
10070		1	792574	8499342	good complex conductor
10080		1	792665	8499198	good complex conductor

Table 1: List of priority 1 anomalies, note how anomalies 17, 23 and 29 have long trends with variable conductivity and are most likely lithological.

The Electromagnetic method responds to conductors, such as faults, shale units and massive sulphides within the lower crystalline basement as they are generally better conductors due to:

- The shearing that occurs along the fault plane, generally developing more platy better interconnect minerals.
- The increased conductivity of the minerals developed within the shear/shale units (clays/graphite).
- The generally higher water content within the fault plane/shale units
- The increased porosity/permeability within the fault plane.
- and the electrical interconnectivity of the metallic minerals.

All of the above improves the electrical interconnectivity and decreasing its resistivity in contrast to the more resistive crystalline basement. This results in the amplitude of the later time signal being elevated in respect to the adjacent 'time' signal along the profile.

A stacked profile display of the data along with the stacked display of the CDI's was constructed and analysed to identify and rank all the anomalies from the survey (figures 3 & 4 (attached). The Conductivity Depth Transform is an image that represents the point transform of the observed AEM data amplitude at a specific time, based on the system geometry, into a Conductivity and Depth (hence Conductivity Depth Image - CDI). The interpretation and the conductivity images have been combined into a 3D model enabling the combination of other data to help improve the ranking/prioritisation of the anomalies. This assists in the identification of the conductivity anomalies and their trends (figure 5). A table of all the anomalies identified is listed in Table 2. Note a number of these anomalies occur on more than one line and have varying prioritisation due to changing conductivity characteristics..

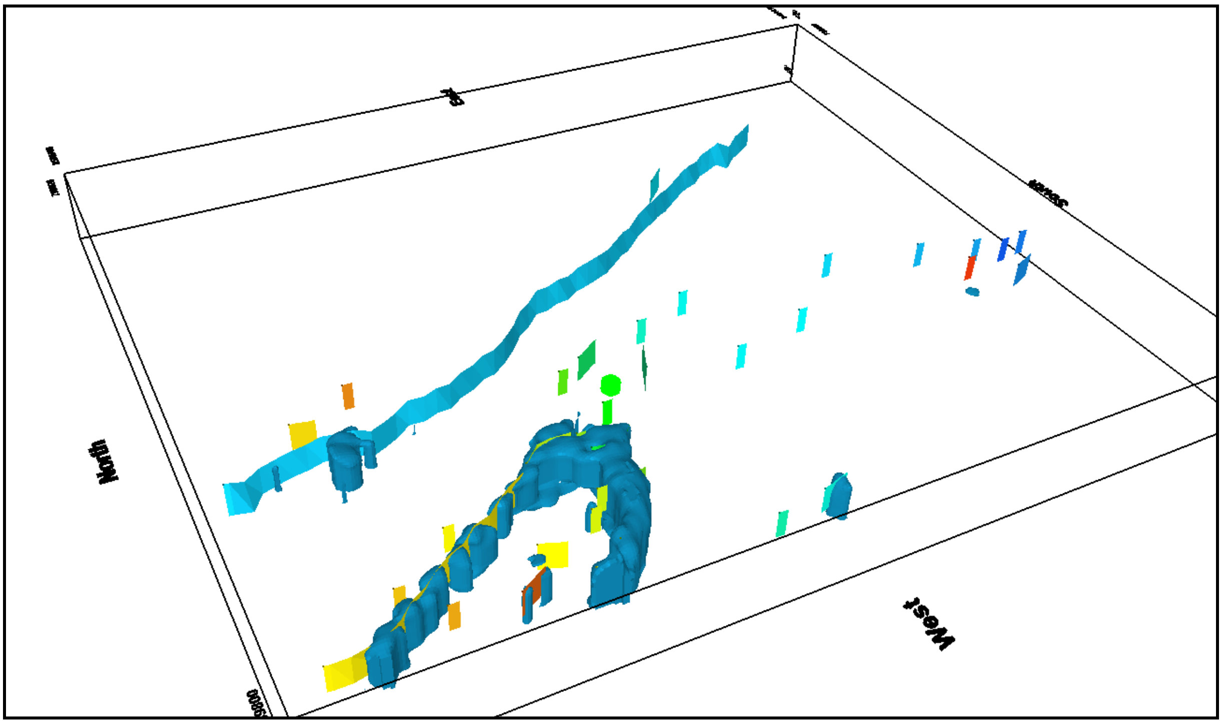

Figure 5: Snap shot of 3D model showing interpreted conductors and conductive shells.

Index	Priority	Stn	East	North	Comment
1	3	2807	792807	8491695	poor conductor
2	3	2827	792827	8491432	poor conductor
3	3	2358	792358	8491872	poor conductor
	3	2434	792434	8491688	poor conductor
4	3	2920	792920	8491996	moderate narrow conductor
5	3	3148	793148	8492594	moderate conductor noisey
7	3	3400	793400	8493644	poor single conductor
8	3	5704	795704	8494541	poor conductor
	3	5825	795825	8494399	poor conductor
9	3	2748	792748	8494398	poor conductor
10	3	2483	792483	8495301	moderate noisey conductor
11	3	3422	793422	8495444	poor conductor
12	2	336	790336	8495757	moderate narrow conductor

	1	377	790377	8495577	good multipeak conductor
13	3	3197	793197	8496050	poor conductor
14	3	314	790314	8496229	moderate noisey conductor single
15	3	2564	792564	8496346	moderate narrow noisey conductor single
	3	2847	792847	8496223	moderate narrow noisey conductor single
16	3	3027	793027	8496812	poor conductor
	3	3106	793106	8496649	poor conductor
17	1	1567	791567	8497392	good twin peak deep conductor
	1	1551	791551	8497260	good twin peak deep conductor
	1	1605	791605	8497109	good twin peak deep conductor
	1	1782	791782	8496954	good single/double peak conductor
18	1	2188	792188	8496960	good single peak conductor
19	3	2845	792845	8497099	good noisey conductor
20	2	925	790925	8497398	good broad complex conductor
	2	1200	791200	8497250	good broad complex conductor
	3	1248	791248	8497107	moderate broad conductor
21	2	1859	791859	8497400	moderate single peak conductor
22	1	513	790513	8497694	good complex peak conductor
	1	621	790621	8497547	good broad peak conductor
23	1	1686	791686	8498000	good broad peak conductor
	1	1788	791788	8497873	good broad peak conductor
	1	1869	791869	8497708	good broad peak conductor
	1	1881	791881	8497538	good broad peak conductor
24	3	1152	791152	8497551	noisy conductor
25	1	945	790945	8497714	good broad peak conductor
26	1	280	790280	8498013	broad single good conductor
	2	288	790288	8497863	noisy conductor
27	2	754	790754	8498297	single peak moderate conductor
	2	722	790722	8498140	single peak moderate conductor
28	1	1328	791328	8498898	broad conductor
29	2	306	790306	8500259	edge of strong conductor
	2	282	790282	8500102	edge of strong conductor
	1	338	790338	8499808	complex broad conductor
	1	445	790445	8499642	good conductor
	1	571	790571	8499512	broad good conductor
	2	686	790686	8499346	broad good conductor
	2	800	790800	8499198	broad good conductor
	1	915	790915	8499056	broad conductor
	1	1001	791001	8498895	moderate conductor
	1	1122	791122	8498754	moderate conductor
	1	1224	791224	8498573	moderate conductor
	2	1312	791312	8498450	moderate conductor
	2	1445	791445	8498292	moderate conductor noisy

	2	1545	791545	8498142	moderate conductor noisy
30	2	3206	793206	8499637	good conductor noisy
	2	3208	793208	8499494	good conductor noisy
31	2	848	790848	8499515	broad good conductor
32	2	491	790491	8499197	moderate conductor noisy
33	2	3487	793487	8499035	moderate conductor noisy
34	2	395	790395	8498623	moderate conductor narrow & noisy
	2	509	790509	8498429	moderate conductor narrow & noisy
35	2	2650	792650	8492292	moderate/good conductor noisy
36	1	2564	792564	8499501	good complex conductor
	1	2574	792574	8499342	good complex conductor
	1	2665	792665	8499198	good complex conductor

Table 2: List of indentified conductors

Of these indentified conductors the best are anomaly 12, 25, 28 and 36 (figures 6a to 6d respectively).

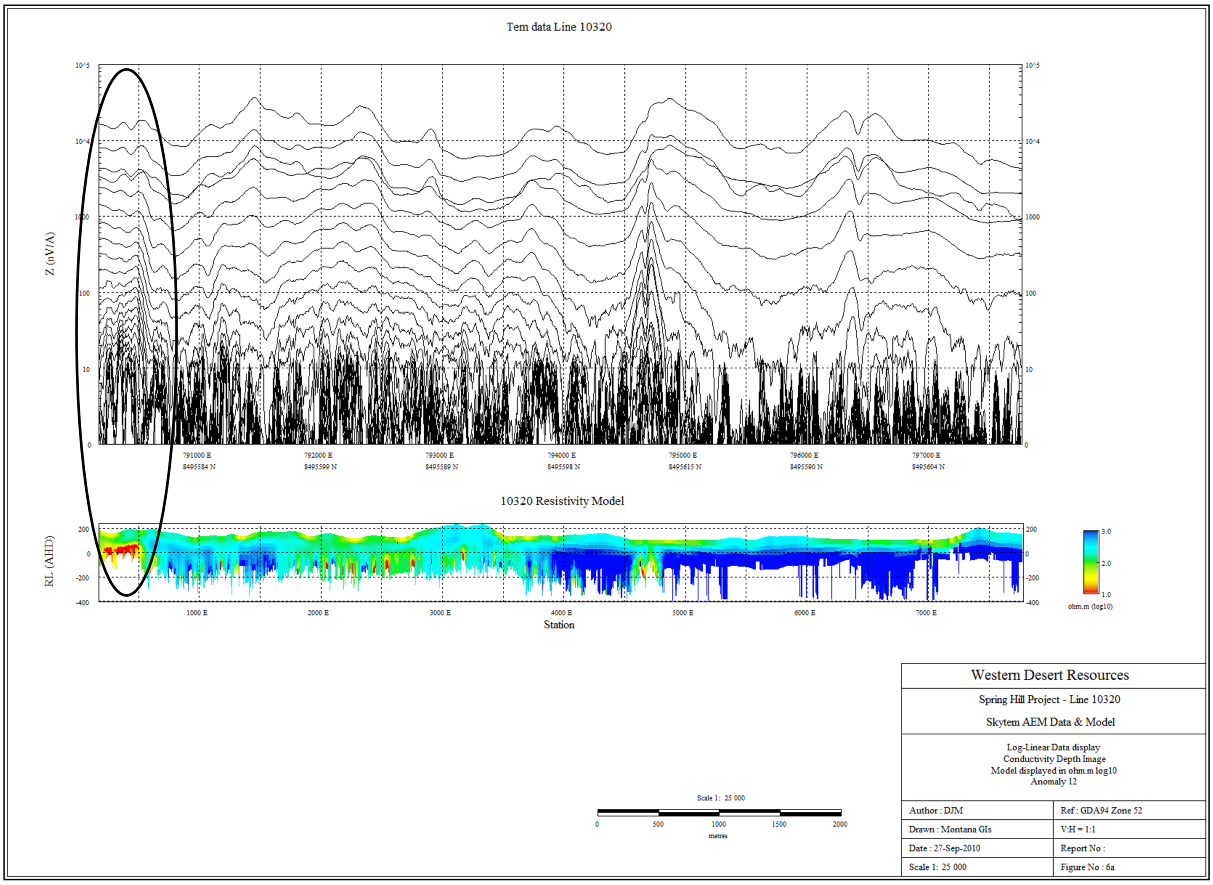

Figure 6a: Data Profile and CDI model for Line 10320, circled on the end of the line is anomaly 12.

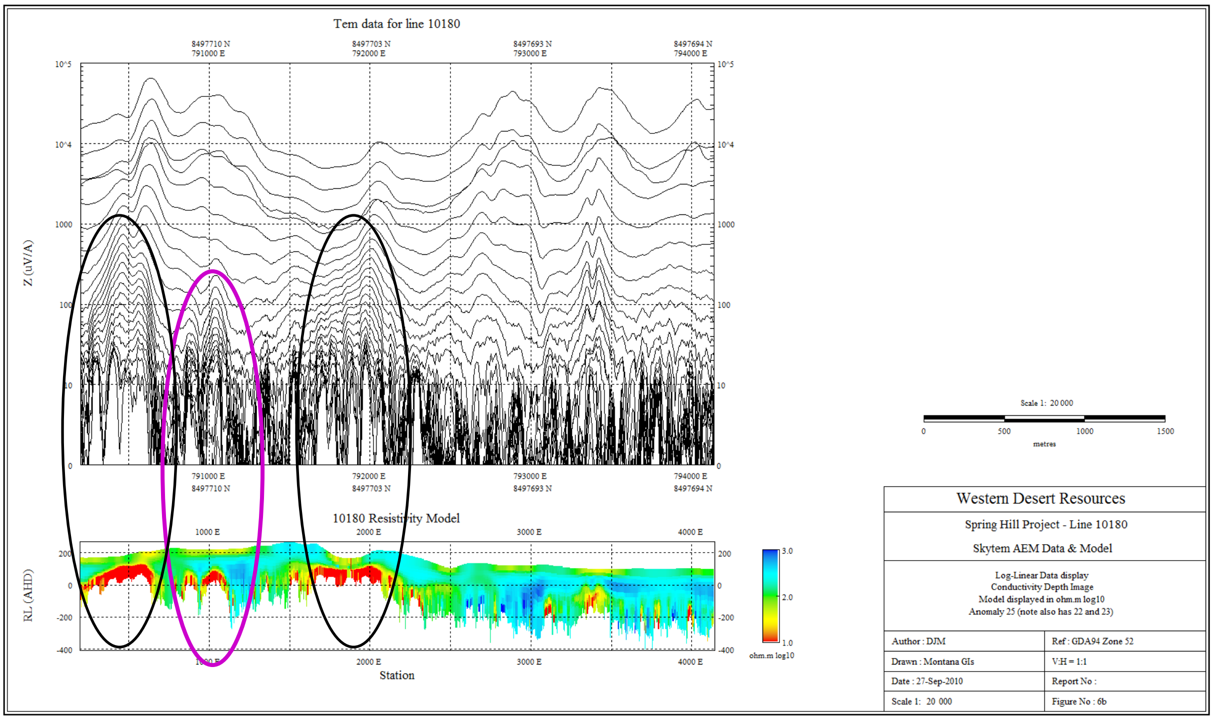

Figure 6b: Data Profile and CDI model for Line 10180, circled in magenta is anomaly 25, also circled are anomalies 22 and 23, these are quite strike continuous anomalies and thought to be lithologically sourced.

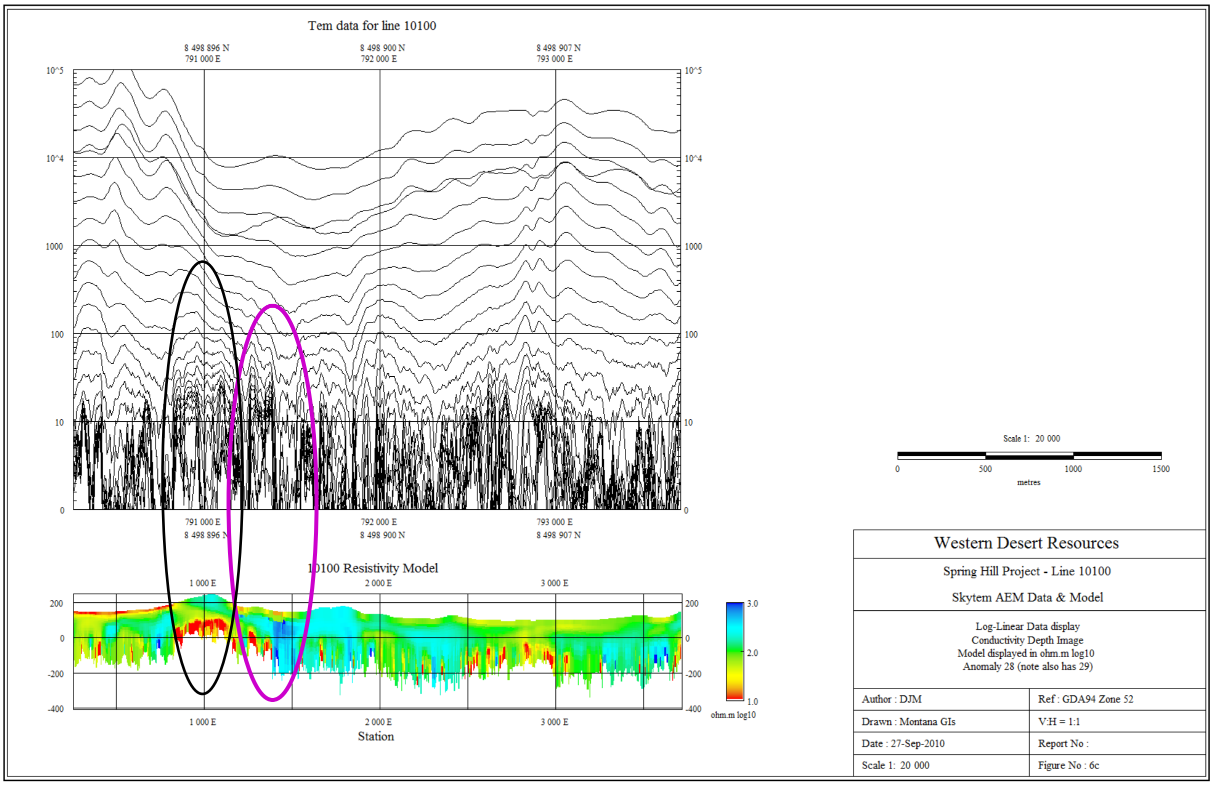

Figure 6c: Data Profile and CDI model for Line 10100, circled in magenta is anomaly 28, also circled is anomaly 29, however it is strike continuous and thought to be lithologically sourced

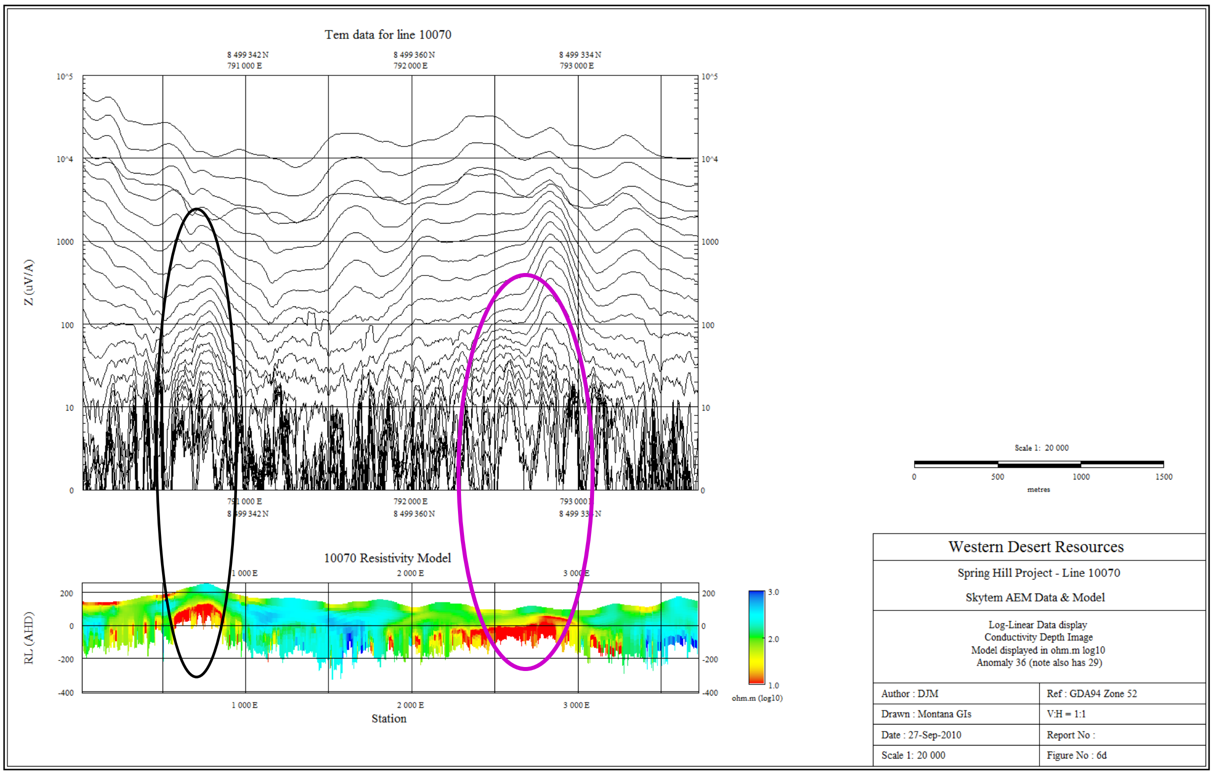

Figure 6d: Data Profile and CDI model for Line 10070, circled in magenta is anomaly 36, also circled is anomaly 29, however it is strike continuous and thought to be lithologically sourced

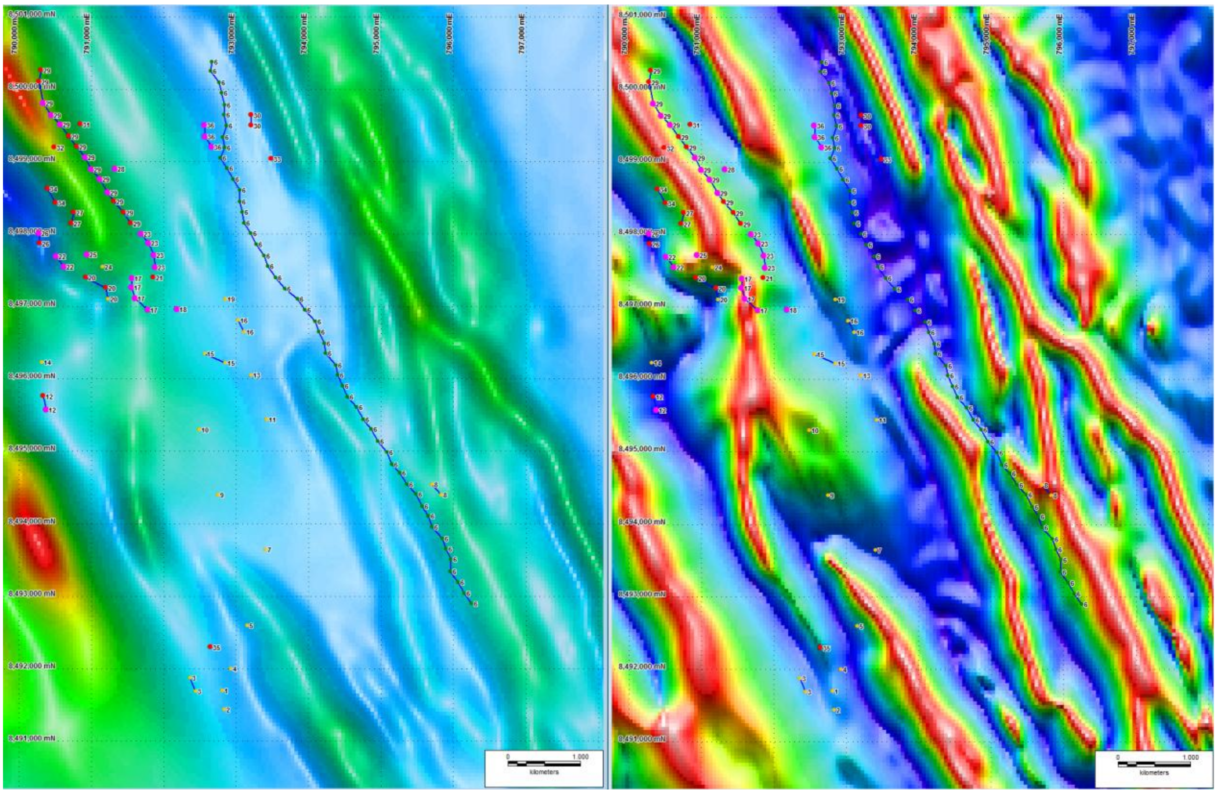

Figure 7: identified anomalies on the RTP magnetic intensity (left) and the Tilt derivative. Note how anomalies 29 and 23 are parallel with the magnetic stratigraphy, also how anomaly.