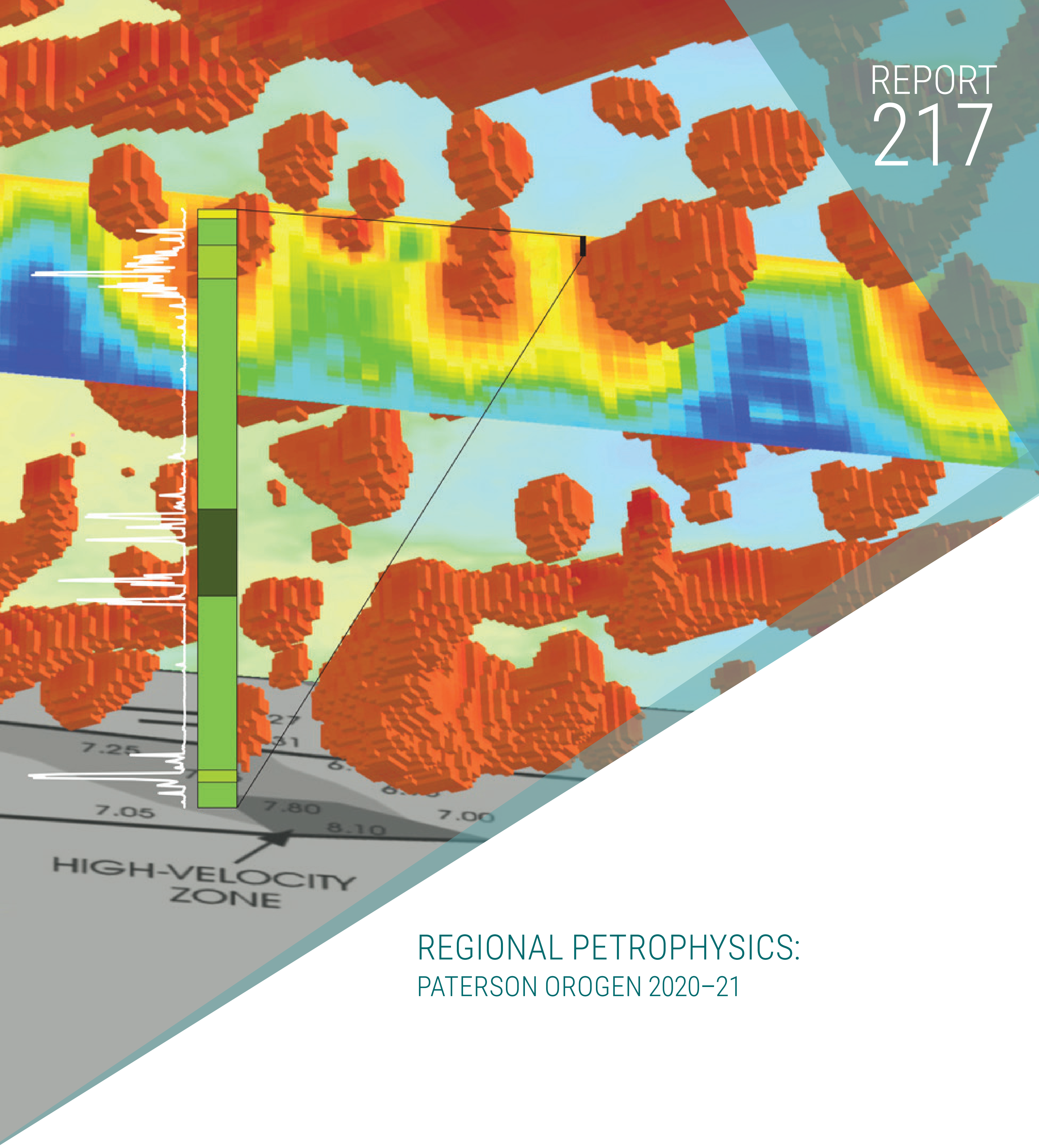

REPORT
217

REGIONAL PETROPHYSICS:
PATERSON OROGEN 2020–21

by

M Markoski, J Trunfull and B Bourne

Government of **Western Australia**
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REPORT 217

REGIONAL PETROPHYSICS: PATERSON OROGEN 2020–21

by
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PERTH 2021

Geological Survey of Western Australia

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Cover photograph: Down core petrophysical data shown in relation to crustal scale density and velocity models

Introduction

The Geological Survey of Western Australia's regional petrophysics project, funded by the Exploration Incentive Scheme (EIS), aims to provide a statewide petrophysical dataset that can be used in the interpretation and planning of geophysical data. The project commenced in 2020, in collaboration with Terra Petrophysics. To date, most samples are from EIS co-funded drillcore, some samples are from core donated or loaned by companies. All the drillcore sampled for petrophysics have accompanying HyLogger data (or will have) and most have open-file company assay data, available from the Mineral Exploration reports database (WAMEX). In 2020–21, a suite of petrophysical measurements have been collected from samples in the Paterson Orogen (n = 274), West Arunta (n = 975), Eucla basement (n = 93), Yamarna (n = 346) and Kalgoorlie Terrane (n = 1651). For each project, a report and datasheet have been produced by Terra Petrophysics. The report contains a description of the methods, a first-pass analysis of the data, a summary of the petrophysical measurements (Appendix 1) and a photo of each sample (Appendix 2). The complete dataset of petrophysical measurements, lithological information and supplementary material can be found in the datasheets, which are available in MAGIX and GeoVIEW.WA. This report describes the petrophysical data acquired from the Paterson Orogen in 2020–21 (Fig. 1; Table 1). The report and datasheet are also available as a downloadable zip file (http://geodownloads.dmp.wa.gov.au/downloads/geophysics/72014.zip).

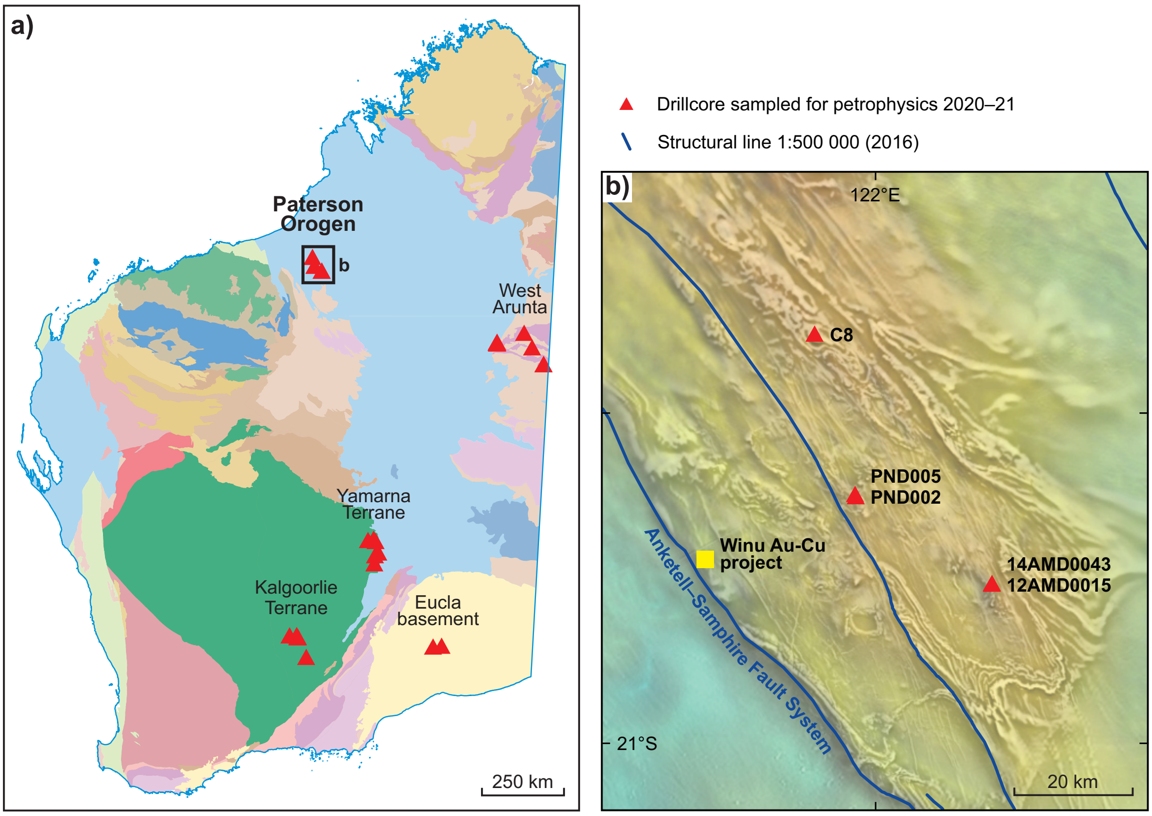

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Figure 1. Drillcores sampled for petrophysical data in 2020–21: a) all drillcores, shown on tectonic units map (2016); b) Paterson Orogen drillcores, shown on Bouguer gravity data (colour) draped with 1VD total magnetic intensity data (grey scale)

Table 1. Paterson Orogen drillcores sampled for petrophysical data in 2020–21

Drillhole	Datum	UTM Zone	Easting	Northing	Azimuth	Dip	Depth (m)	Petrophysical samples	EIS
12AMD0015	GDA 94	51	414194	7704437	210	–55	550.2	90	Yes
14AMD0043	GDA 94	51	414149	7704484	200	–60	300.0	43	Yes
C8	GDA 94	51	386032	7746068	0	–90	252.2	31	Yes
PND002	GDA 94	51	392631	7718872	55	–60	517.4	36	Donated
PND005	GDA 94	51	392526	7719303	58	–60	510.5	74	Yes

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TERRA PETROPHYSICS PTY. LTD.

(ABN 71 613 484 807)

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

PATERSON PROJECT

WESTERN AUSTRALIA

TECHNICAL REPORT NO. 20_032

DATUM / PROJECTION
GDA94 / MGA Zone 51

DISTRIBUTION

1. GSWA – Lucy Brisbout
2. Terra Petrophysics – Barry Bourne
3. Terra Petrophysics – Jarrad Trunfull

Mila Markoski
Geoscientist
February 2021

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1. INTRODUCTION

Terra Petrophysics have performed petrophysical analysis of 274 rock (drill core) samples from the Paterson province of Western Australia. These samples have been selected and provided by GSWA in a joint initiative with Terra Petrophysics to develop an understanding of physical properties of rocks in the region and to assist with the interpretation of geophysical field data. Petrophysical analysis includes measurement of the following physical properties:

- Induced Polarisation (Chargeability) and Galvanic Resistivity
- Inductive Conductivity
- Magnetic Susceptibility
- Remanent Magnetisation; the ratio of induced- to remanent-magnetisation intensity of the sample (known as the Koenigsberger Ratio, Q), as well as an estimate of the total remanent vector (relative to drill hole).
- Dry Bulk Density
- Apparent Porosity
- P-wave Sonic Velocity

During analysis, Terra Petrophysics utilise standards and reference samples to ensure precision and accuracy.

2. PETROPHYSICS

2.1 Sample Preparation

Samples for physical property measurements should be selected for quality and representation of lithology and alteration. Terra recommends samples of 10 to 15 cm length. In this study, all samples were of adequate size and quality. The size and shape of the sample need to be determined for most physical property measurements (e.g., geometric and core size correction factors). All samples are returned to the client after analysis.

Samples are photographed and marked with Terra Petrophysics sample numbers. All samples should be accompanied by a project name, a brief description of each sample as well as ancillary data (geological logging, assays), requested physical property procedures and final disposal requirement for the samples.

Physical property determinations are non-destructive procedures; however, some measurements require the sample to have flat/square edges which requires them to be cut using a rock saw. In addition, samples are required to be submerged in water for 24 hours for measurement. Strongly weathered and friable samples can be damaged by the soaking process, and each sample is inspected prior and the process modified (if required) to ensure that minimal damage occurs.

2.2 Inductive Conductivity

The inductive conductivity measurement is made in the frequency domain at 10,000 Hz via an external magnetic field inducing a small current in the sample. The measurement is most influenced by sample material at the receiver coil and within a 10 cm radius from the centre of the sample.

Inductive conductivity is calculated from the difference in amplitude between the sample and free air measurements. Resulting data are presented in S/m, and the limits of detectability are 0.1 S/m (lower) and 100,000 S/m (upper). Several inductive conductivity measurements will be made at different points and at different angles on the sample.

2.3 Induced Polarisation and Resistivity

The apparent resistivity and induced polarisation (or chargeability) determinations are measured in time domain. The resistivity and chargeability values are measured by passing a constant current through the sample and then switching it on and off at 2 second intervals. Whilst current is flowing through the sample, the resistivity (Ωm) is calculated. When the current is switched off, the voltage across the sample decays to zero and this decay curve is measured. The induced polarisation (mV/V) is calculated between 450 and 1100 milliseconds after turn off (referred to as the Newmont Standard). Resistivity and induced polarisation values are stacked and averaged a minimum of 10 times for one reading. Terra provide the averaged results over several readings.

Some samples (for example, silica rich samples) can be so resistive as to act dielectric. Charged particles do not flow through the sample as if it were conductive, but instead are shifted slightly from their original position due to the potential difference. When the current is switched off, the charged particles slowly relax to their original state and thus generate a decay signal, which is integrated into a chargeability value. Therefore, some very resistive samples can appear to be more chargeable than would be recognised by a field IP survey.

2.4 Wet/Dry Bulk Density and Porosity

The density determinations are calculated using Archimedes' principle. Dry bulk densities are determined by dry weight divided by the buoyancy determined volume of each sample. Porosities are calculated from water saturated weights, dry weights, and the buoyancy-determined volume. All sample are soaked for at least 24 hours (where possible) after dry weights are measured.

The accuracy of the buoyancy technique of density measurement is 0.01 grams per cubic centimetre (g/cm^3). The results of the laboratory density determinations are reported in grams per cubic centimetre. Density measurements can be made on grab samples or drill core. Very large or heavy samples (>1 kg) require coring or breaking prior to the density determination.

2.5 Magnetic Susceptibility and Remanence

Magnetic susceptibility is measured by using a magnetic susceptibility meter to apply an external magnetic field to the sample at an operating frequency of 8 kHz. Magnetic susceptibility is calculated from the frequency difference between the sample and free air measurements. The limits of detectability are approximately 1×10^{-7} SI units and resulting data is presented in SI ($\times 10^{-3}$) units. The measurement is most influenced by sample material at the receiver coil and within a 10 cm radius from the centre of the sample. Magnetic susceptibility measurements can be made on core, hand and surface samples.

For magnetic samples ($>5\times 10^{-3}$ SI) the magnetic remanence can be measured. The measurement of remanence (J_{rem}) in the field and the ratio of remanence to the induced magnetisation ($J_{rem}/J_{ind} = Q$) has in the past been problematic. The induced magnetisation can be estimated using the susceptibility (k, where $J_{ind} = kH$ and typically $H = 40\text{-}50\ Am^{-1}$) which can be measured using a handheld meter, but magnetic remanence is more difficult.

A recent development in field instrumentation uses a miniature fluxgate magnetometer and a pendulum arrangement in which a magnetic rock may be swung generating a transient signal at the fluxgate which is converted to a magnetic moment and magnetisation.

2.6 Velocity

Terra Petrophysics can acquire P-wave velocity measurements on samples with a minimum length of 15 centimetres. Measurements are taken at 50,000 Hz. The velocity measurement limits of detectability are 1500 m/s (lower) to 9999 m/s (upper).

3. RESULTS

A total of 274 samples have undergone petrophysical analysis, and a results table is included as Appendix 1. Each sample is assigned a Terra ID and photographs of the samples have been included in Appendix 2. Raw data for the induced polarisation and resistivity measurements are included in the attached spreadsheet. Various plots of petrophysical data are given in Figures 2 to 15.

A legend corresponding to Figures 2 to 15 is given in Figure 1. The data points have been represented using three different categories: Au content (ppb), which is represented by cool-warm colours; Cu content (ppm), which is represented by symbol size; and lithology, which is represented by shape.

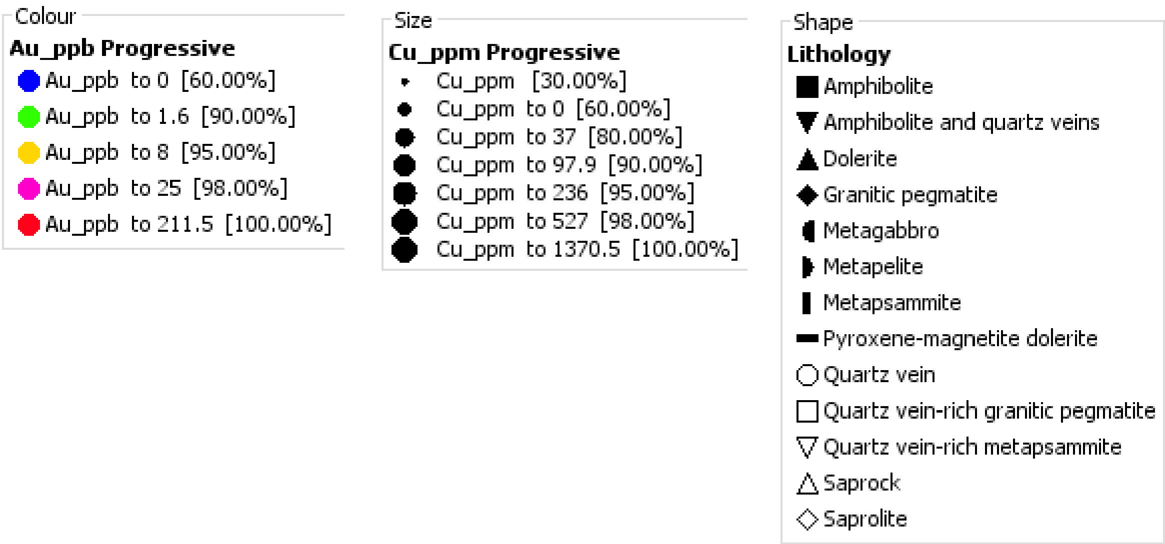


Figure 1. Legend corresponding to Figures 2 to 15.

Figure 2 displays dry bulk density against magnetic susceptibility.

There appears to be a complicated yet positive correlation between these properties, whereby increasing magnetic susceptibility corresponds to increasing density. This could be a function of increasing magnetite and/or pyrrhotite content. The dry bulk density for the data set ranges between 1.51 and 3.07 g/cm^3 and the magnetic susceptibility ranges between 0.001 and 178 $(\times 10^{-3})$ SI.

Samples with higher Cu content appear to correspond with magnetic susceptibility values >1 $\times 10^{-3}$ SI. This may be indicative of magnetic pyrrhotite occurring with chalcopyrite.

Sample 20TR1737, which contains the highest Au and Cu of the sample suite (211.5 ppb Au and 1370.5 ppm Cu) corresponds to a metapelite with a dry bulk density of 2.7 g/cm^3 and magnetic susceptibility of 0.634 $\times 10^{-3}$ SI.

A diagram to convert magnetic susceptibility to theoretical magnetic mineral content is given in Figure 3 (Emerson, 1997). From Figure 3, sample 20TR1987 (amphibolite, which exhibited the highest magnetic susceptibility of 0.178 SI) could be estimated to contain roughly 4% magnetite (red line) or 40% (blue line) monoclinic pyrrhotite. Correspondingly, this sample also contains 89 ppm Cu. Figure 4 shows dry bulk density ranges for common rock types (Emerson, 1990).

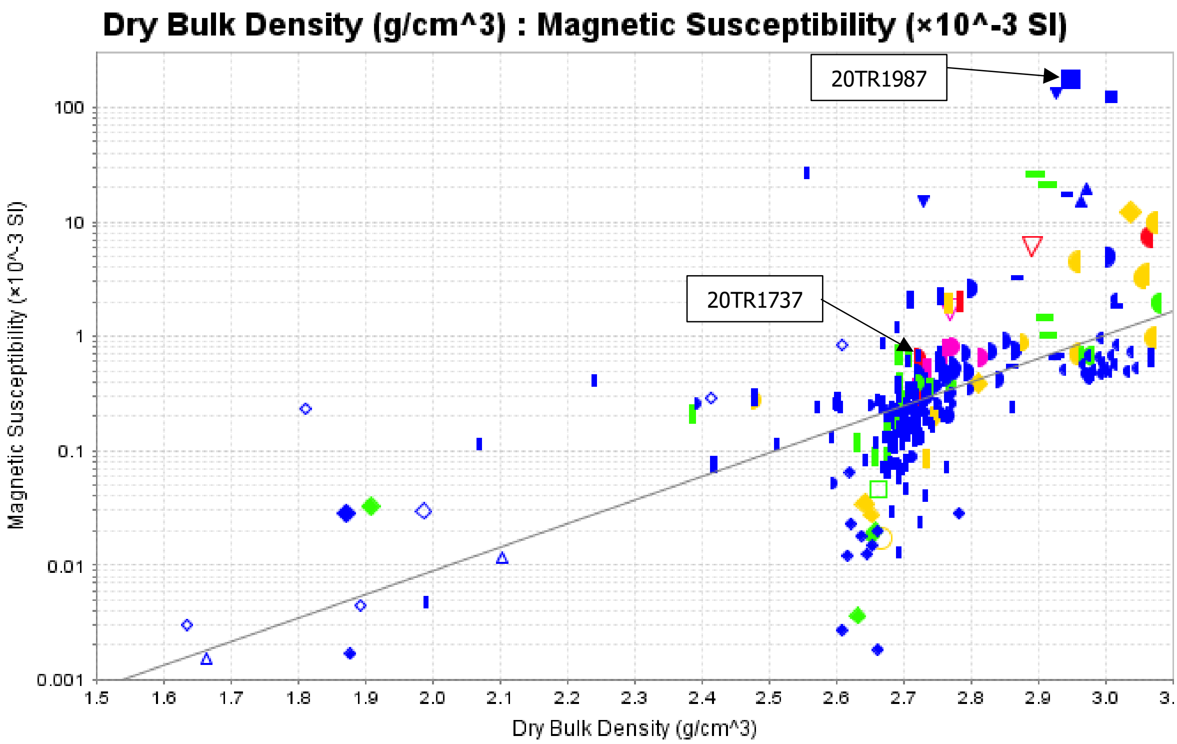


Figure 2. Cross-plot of dry bulk density against magnetic susceptibility with trendline (grey).

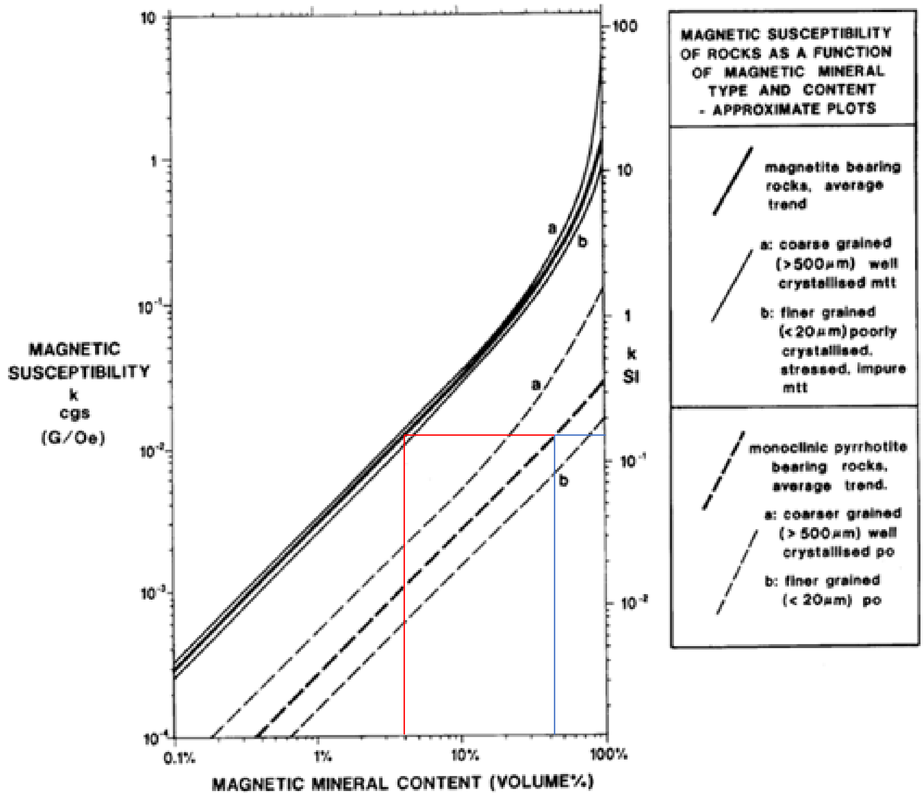


Figure 3. Theoretical magnetic mineral content (magnetite – solid lines; pyrrhotite – dashed lines) as a function of measured magnetic susceptibility (Emerson, 1997)

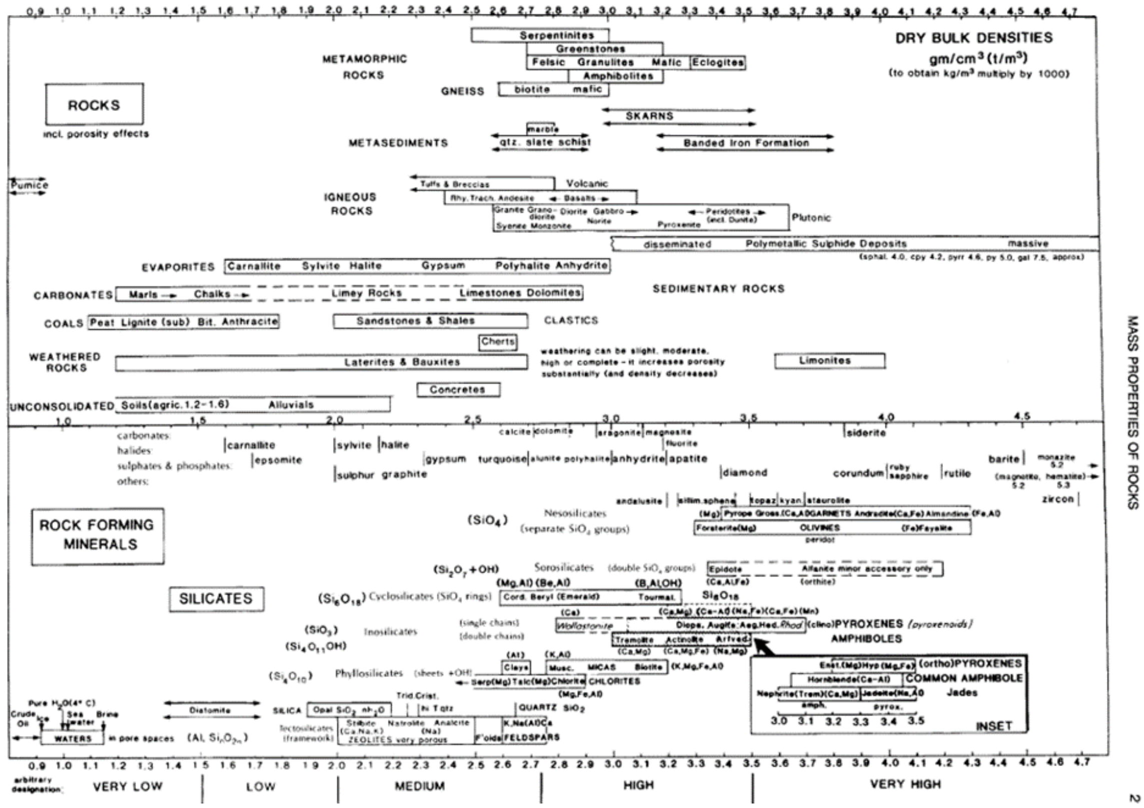


Figure 4. Dry bulk density ranges for common rock types (Emerson, 1990)

Figure 5 shows dry bulk density plotted against galvanic resistivity.

Resistivity data range widely and some samples reach extremely high resistivity values (>> 1,000,000 Ωm). Dry bulk density data range from 1.51 to 3.07 g/cm^3. Circled in red are data with DBD values <2.55 g/cm^3 and resistivity values <1000 Ωm, which comprise highly weathered, clay-rich saprock, saprolite and metapsammite samples.

Data with DBD values >2.55 g/cm^3 generally comprise fresh rock samples. These data appear clustered into two broad populations centred around density values of ~2.7 and ~3.0 g/cm^3, which roughly represent felsic and mafic lithologies respectively. Both populations contain both Au/Cu mineralised and unmineralised samples.

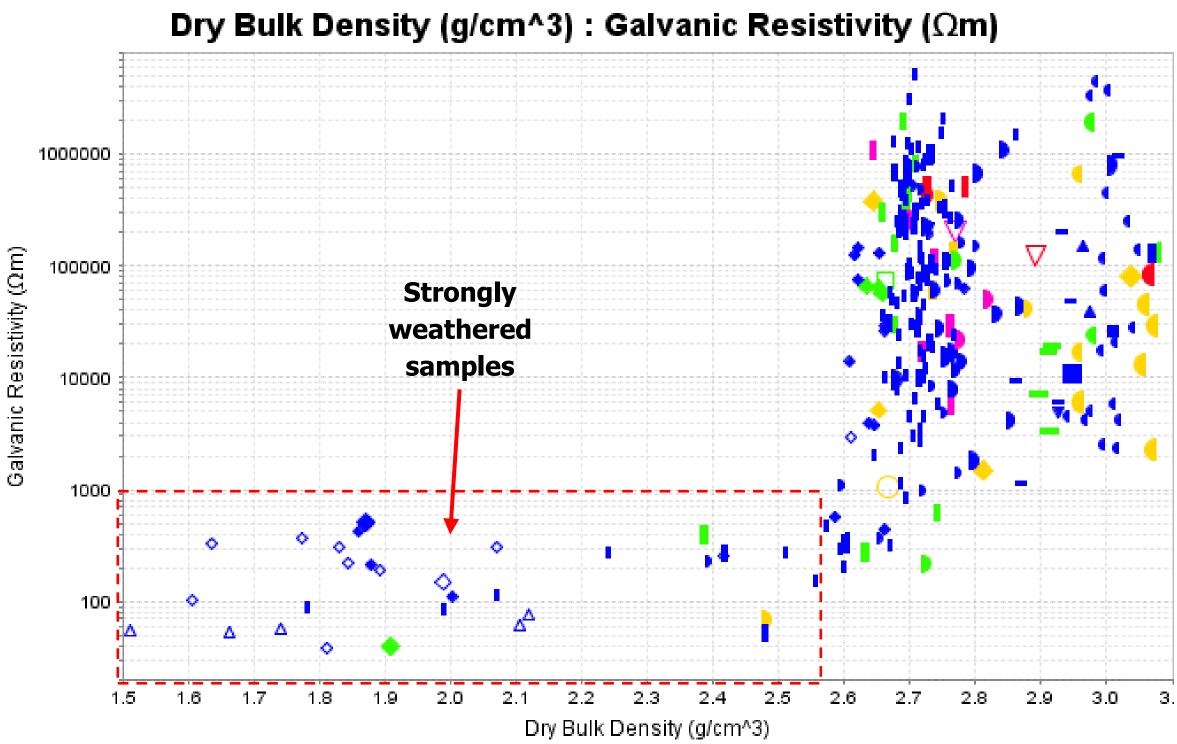


Figure 5. Cross-plot of dry bulk density against resistivity.

Figure 6 shows magnetic susceptibility plotted against galvanic resistivity.

There is no obvious correlation between the two properties. Magnetic susceptibility values range between 0.0015 $\times 10^{-3}$ SI and 178 $\times 10^{-3}$ SI and resistivity values range from 39 to over 1,000,000 Ωm. Samples with higher Cu content appear to correspond with magnetic susceptibility values >1×10^{-3} SI.

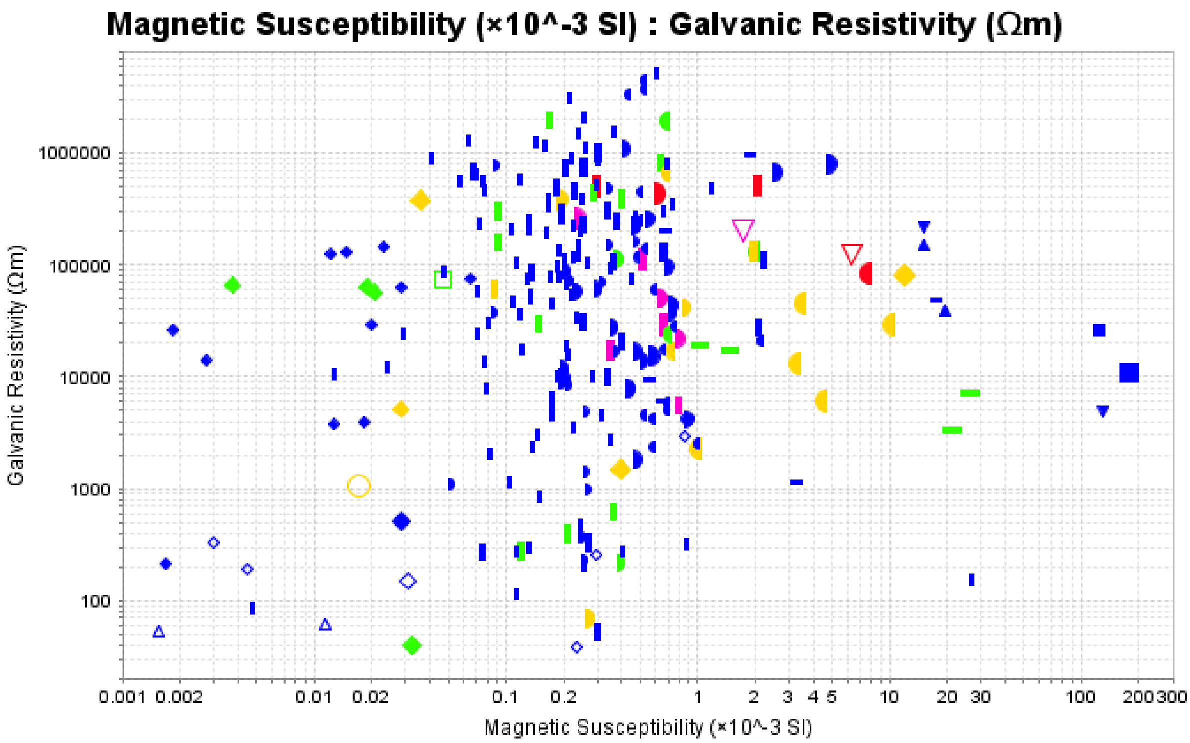


Figure 6. Cross-plot of magnetic susceptibility against resistivity.

Figure 7 shows a cross-plot of chargeability against galvanic resistivity.

Chargeability values range from 0.7 to 245.4 mV/V. Cu mineralised metagabbros, amphibolites, metapelites, some granitic pegmatites and metapsammites exhibited slightly elevated chargeability values (>25 mV/V) but this is generally not distinct enough that IP surveying would be able to indicate mineralised vs. unmineralised zones.

The highest chargeability and lowest resistivity values correspond to unmineralised weathered samples, as indicated by the red box. This strong overburden effect needs to be taken into account if undertaking field IP surveying. The highest chargeability value recorded was 245.4 mV/V for a clay-rich saprock (20TR1974) which also corresponds to a resistivity value of 55 Ωm.

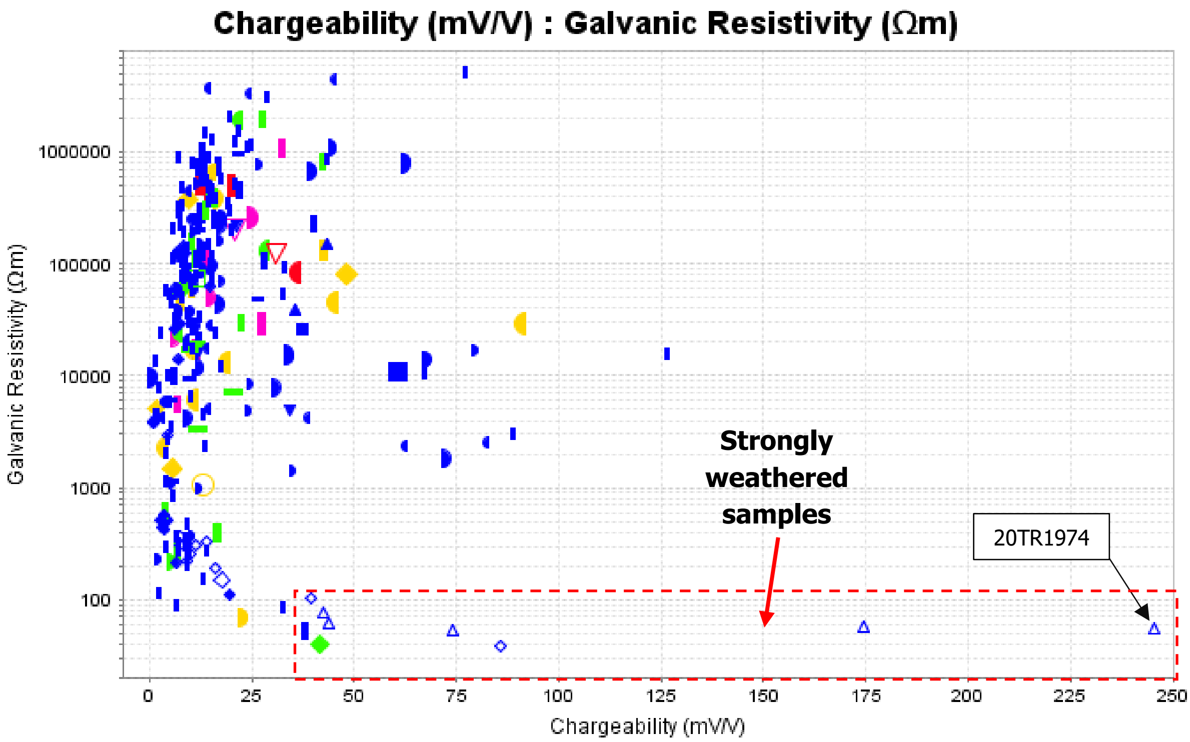


Figure 7. Cross-plot of chargeability against resistivity.

Figure 8 displays chargeability values plotted against magnetic susceptibility.

There appears to be a positive trend (indicated with red dashed line) between Cu ± Au mineralisation, magnetic susceptibility and chargeability. Increasing Cu mineralisation (increasing symbol size) and increasing Au mineralisation (warmer colour) correspond to increasing both, magnetic susceptibility and chargeability.

By combining IP surveying with high resolution magnetic data, it may be possible to define areas of mineralisation better than by using these techniques in isolation.

Sample 20TR1987 (amphibolite) with 89 ppm Cu corresponds to a magnetic susceptibility of 0.178 SI and a chargeability of 60.6 mV/V.

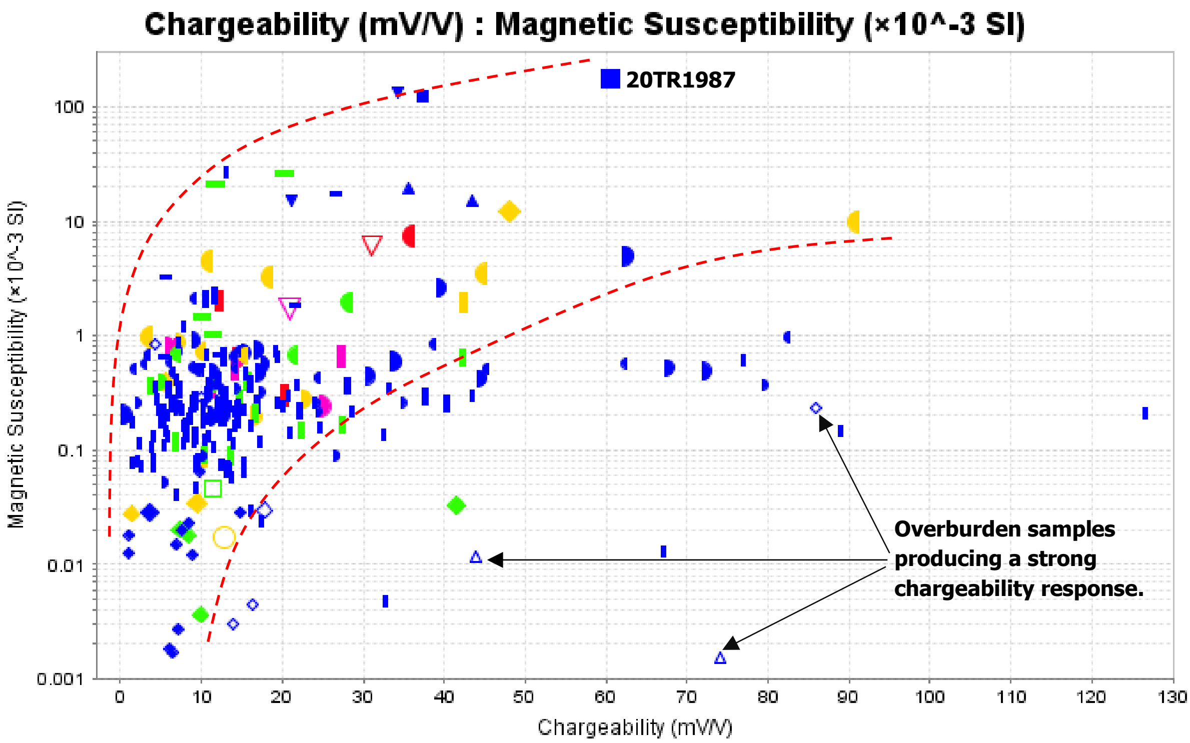


Figure 8. Cross-plot of chargeability against magnetic susceptibility.

Figure 9 displays inductive conductivity plotted against chargeability. Only samples with a non-zero conductivity value are displayed on the plot.

Chargeability of a material is dependent on 4 major factors: the degree of sulphide or metallic mineralisation, presence of clays, the pore-water salinity, and the overall tortuosity of the pore-space network within the rock. Both a high inductive conductivity and a high chargeability may be indicative of the presence of sulphides within the sample, although conductivity tends to better respond to massive (connected) sulphides, while chargeability responds better to disseminated (disconnected) sulphides.

The majority of the samples have inductive conductivity values of less than 3 S/m (considered low) which correspond to a relatively strong chargeability response; however, it appears that inductive EM is less sensitive to surface weathering effects than IP and is more sensitive to mineralisation. While none of the samples measured in the suite contained massive sulphides, there are examples from the region (Winu, Havieron) where this type of mineralisation exists. It may be that inductive conductivity (i.e. EM) is a more effective exploration tool for Cu ± Au mineralisation in the Paterson region.

The effect of weathering on IP vs. EM is further highlighted in Figure 10 and Figure 11 (chargeability vs. dry bulk density and inductive conductivity vs. dry bulk density, respectively). The weathered samples show a much stronger chargeability response than they do EM response.

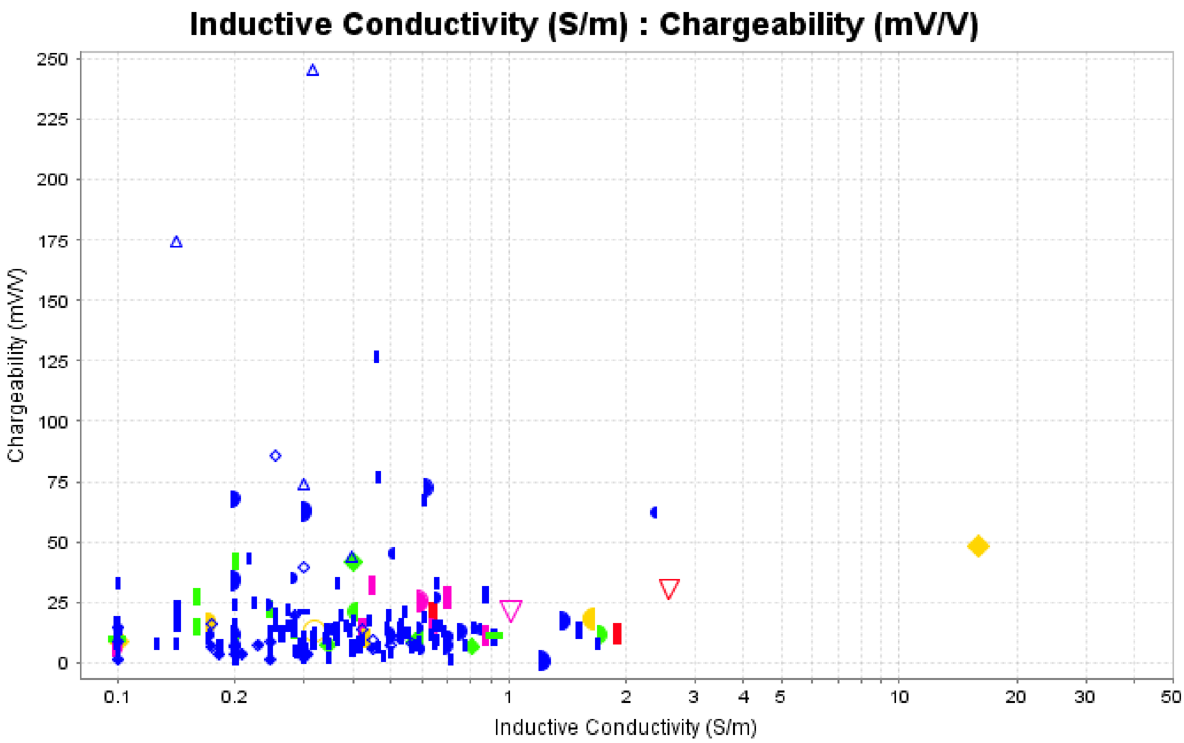


Figure 9. Cross-plot of inductive conductivity against chargeability.

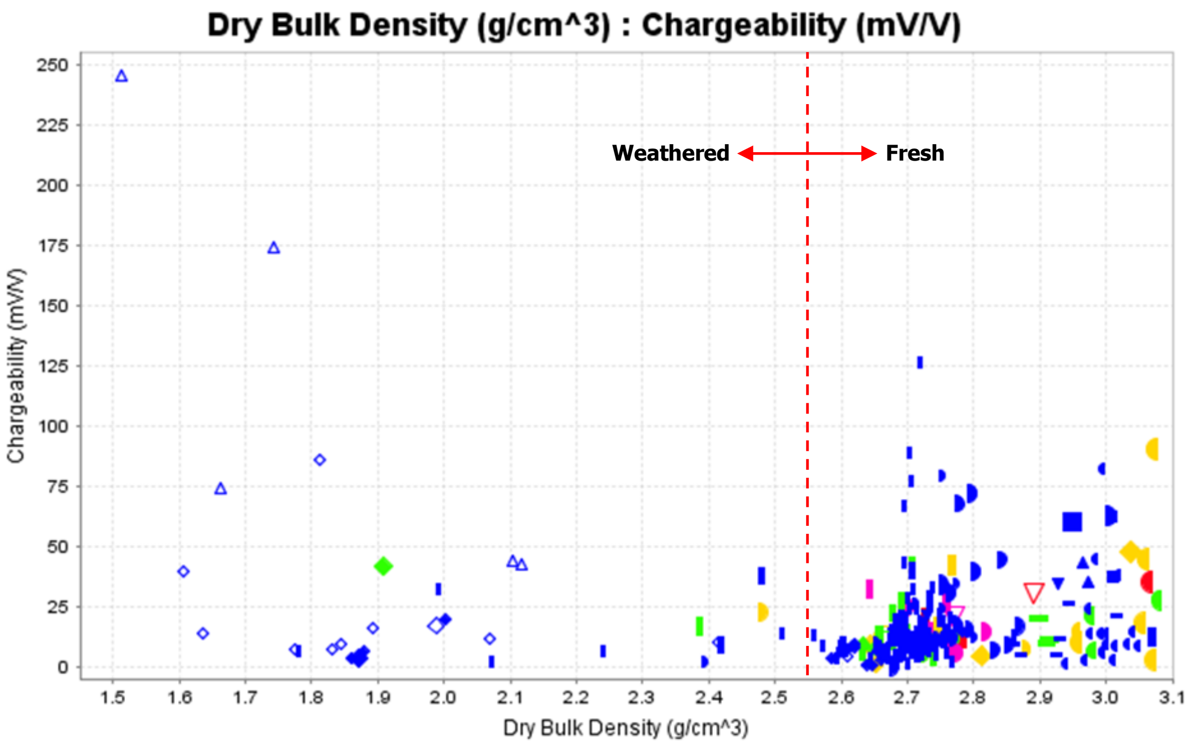


Figure 10. Cross-plot of dry bulk density against chargeability.

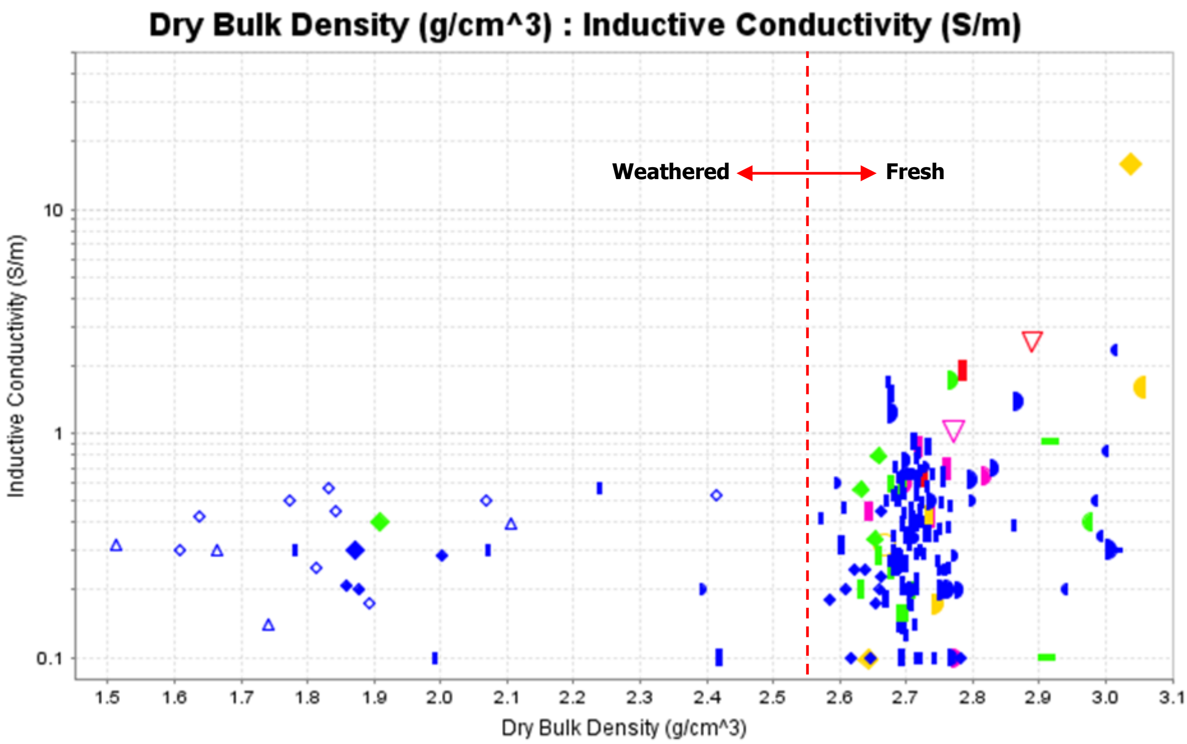
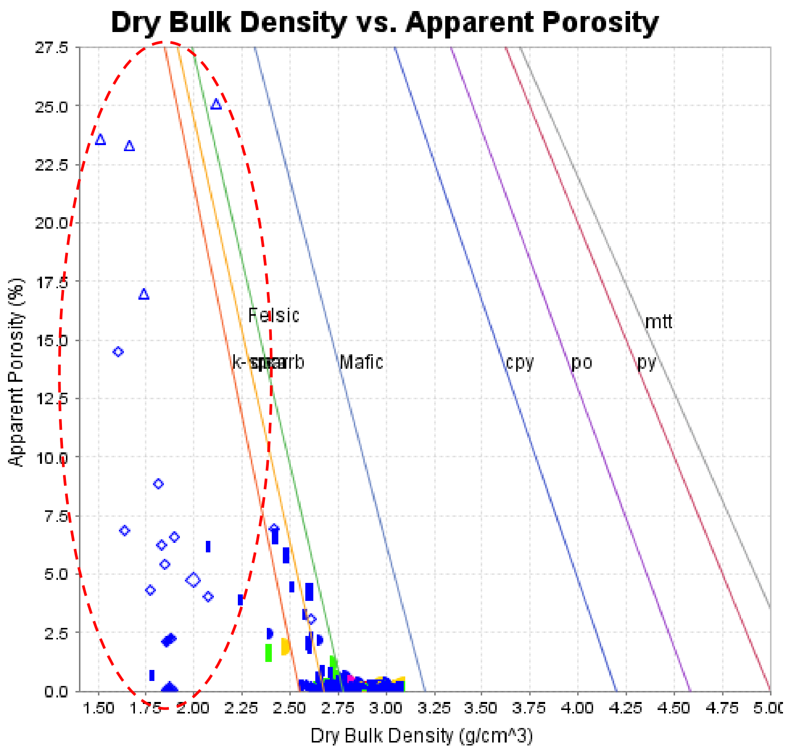


Figure 11. Cross-plot of dry bulk density against inductive conductivity.

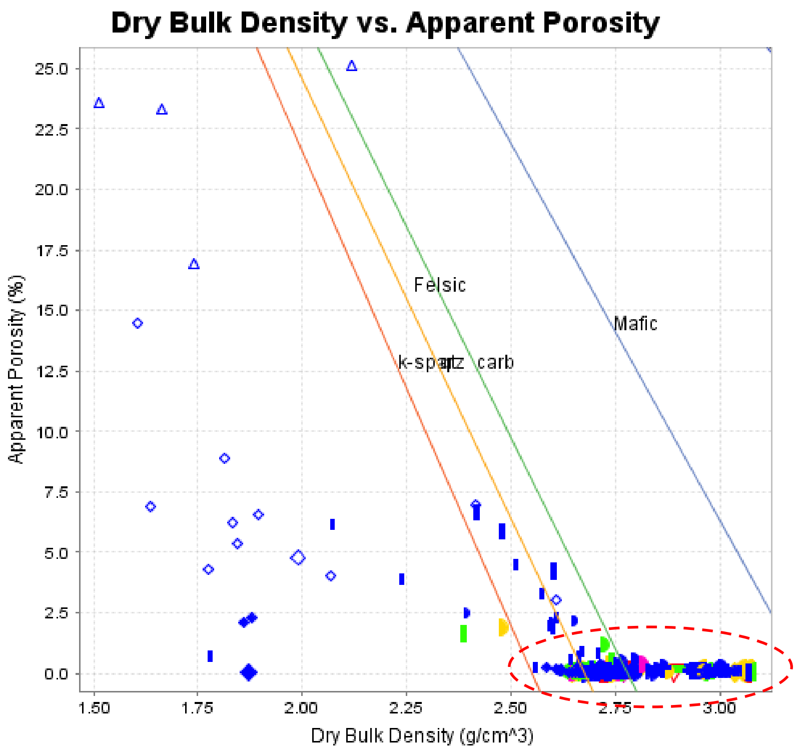
Figure 12 displays dry bulk density against apparent porosity of samples with reference mineral trends (Emerson, 1997), which can be indicative of the rock type being examined. Figure 12 a shows the full extent of data and Figure 12 b zooms into the cluster of data points.

Apparent porosity values from some of the most weathered samples range up to 25%. Circled in red are weathered samples which exhibit higher porosity values compared to the fresh samples. The porosity of some samples may be slightly overestimated and the dry bulk density value slightly underestimated where the samples were extremely friable and could not be soaked without disintegrating, and as a result a saturated mass could not be obtained. These samples have been noted in the data sheet.

Most fresh samples plot between 2.6 and 3.07 g/cm^3 dry bulk density (circled in red in Figure 12 b), between the 'felsic' and 'mafic' lines. These lines do not account for alteration and/or sulphides – a felsic rock containing a high proportion of sulphides may plot nearer the 'mafic' line due to an increased density.



(a)



(b)

Figure 12. Cross-plot of dry bulk density against porosity. (a) shows the full extent of the plot, while (b) shows only the extent of the data.

Figure 13 displays dry bulk density plotted against P-wave velocity. Black lines are contours of acoustic impedance with their separation representing the contrast required to produce a minimum reflection coefficient (R=0.06) detectable by the seismic reflection method. The more contours the data overlaps, the more likely the seismic reflection method is to map geological and/or lithological contrasts. P-wave velocity was unable to be measured on 8 samples due to insufficient sample length (<15 cm).

P wave velocity ranges between 1500 and 6710 m/s and the samples are spread over seven contours in total. There appears to be three main populations – one for felsic rocks, one for mafic rocks and one (more spread out) of weathered rocks. From this plot, it can be inferred that seismic reflection may be capable of detecting the contacts between felsic and mafic lithologies.

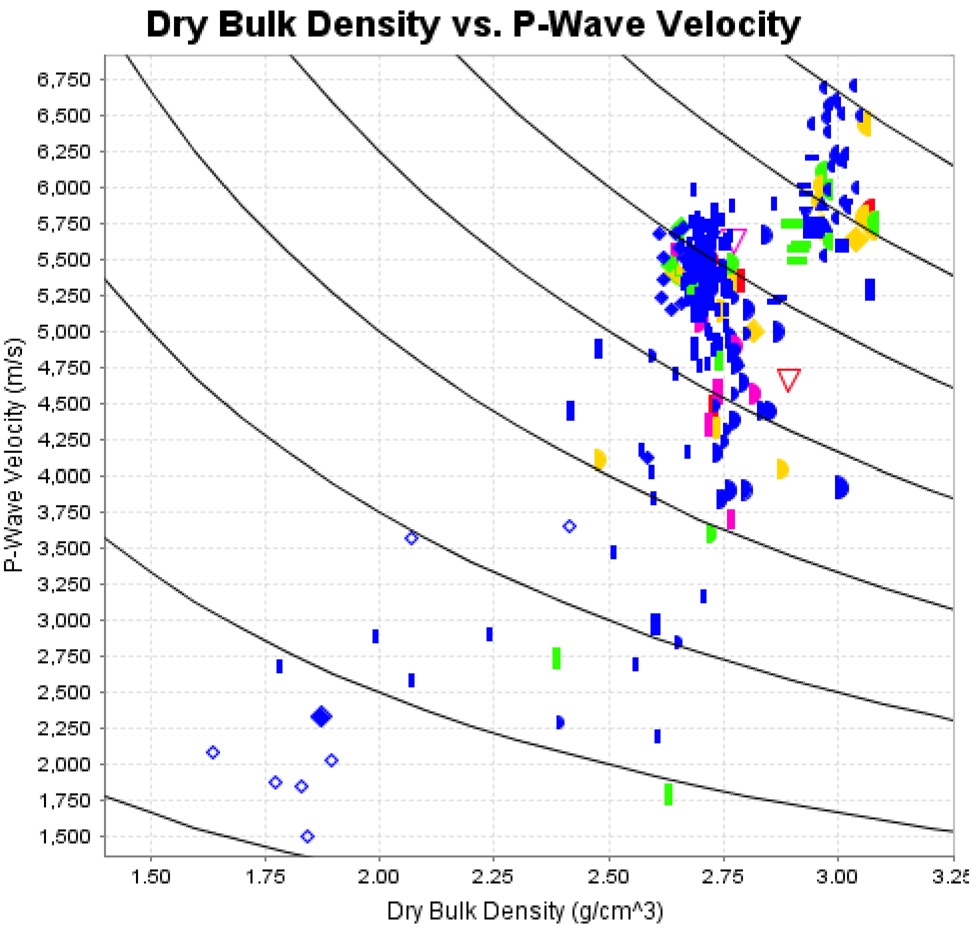


Figure 13. Cross-plot of dry bulk density against sonic (P-wave) velocity.

The induced and remanent magnetic vectors have been measured for samples that exhibited a magnetic susceptibility >5×10^{-3} SI. Measurement samples below this threshold tends to result in noisy, unreliable data. A plot of the intensity of the induced vs. remanent vector intensity (J_{ind} vs. J_{rem}) is shown in Figure 14.

Samples above the dotted line have a remanent magnetisation stronger than an induced magnetisation, i.e. their Koenigsberger Ratio (Q) is >1. Ten samples were found to be remanent magnetisation dominant, and four were induced-magnetisation dominant (Q<1).

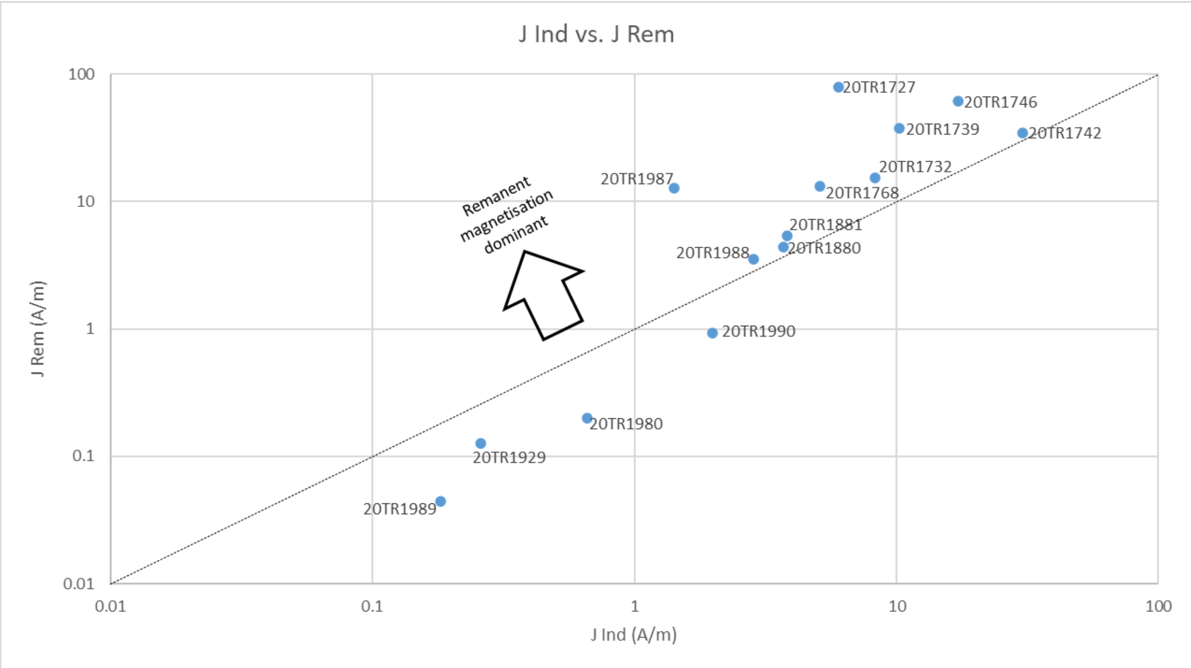


Figure 14. Cross-plot of intensity of J_{ind} versus J_{rem}. Samples above the trend line have Koenigsberger Ratio (Q) greater than 1, indicating they are remanent-magnetisation dominant. Conversely, samples below the trend line have a Q value less than one, indicating they are induced-magnetisation dominant.

A magnetic susceptibility value has been calculated from the induced magnetic vector intensity and compared with the measured magnetic susceptibility. A cross-plot of these two values is shown in Figure 15. Induced- and remanent-dominant samples are distinguished by different colours, where grey represents Q<1 and orange represents Q>1.

Samples with similar magnetic susceptibilities derived via each method plot closer to the trend line. Some variation is expected, especially in remanent-dominant (Q>1) samples where the remanent vector can reduce the apparent amplitude of the induced vector via destructive interference. This can be observed especially in samples with a high pyrrhotite content.

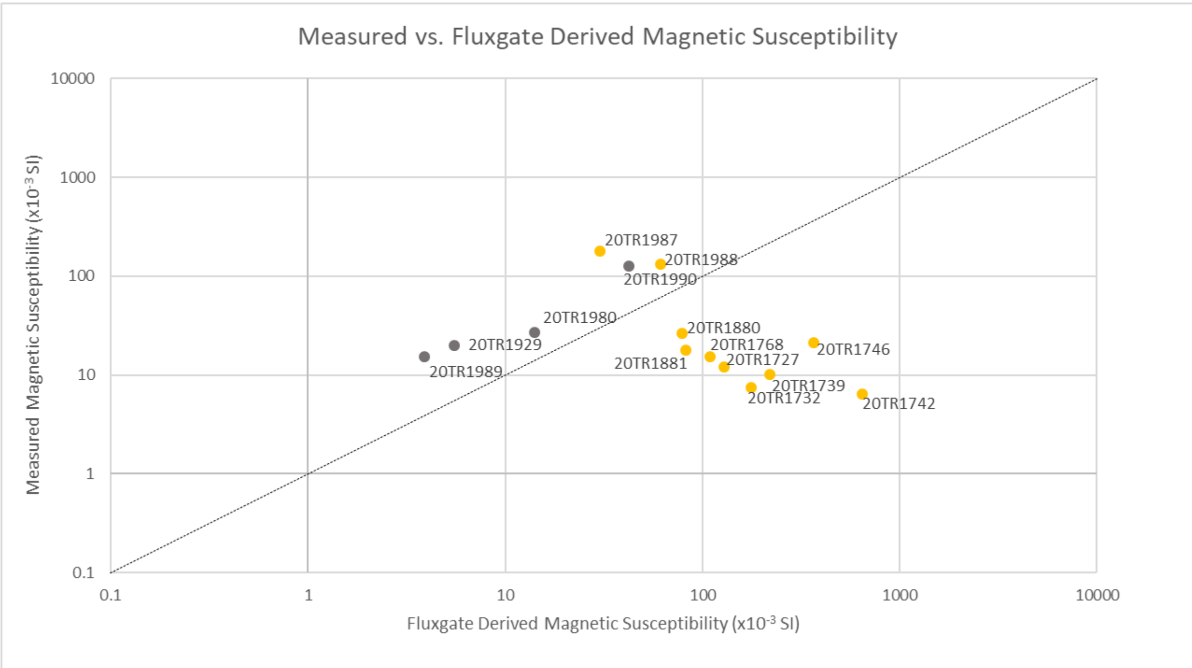


Figure 15. Logarithmic plot of magnetic susceptibility derived from fluxgate against measured magnetic susceptibility. Yellow dots indicate samples with Q>1 and grey dots indicate samples with Q<1.

4. CONCLUSION

Terra Petrophysics has performed petrophysical analysis of 274 rock samples from the Paterson province, Western Australia. Integration of the petrophysical data with geological logging and elemental assays has been performed to aid a better understanding and the potential implications of the physical properties of the data. A summary of the findings is given below.

- A positive correlation between dry bulk density and magnetic susceptibility is observed, which could be a function of increasing magnetite and/or pyrrhotite content. Cu-rich samples correspond with magnetic susceptibility values of $>1 \times 10^{-3}$ SI.
- A wide range of galvanic resistivity values are observed in fresh samples, with some samples showing resistivity values $>1 \times 10^{6}$ Ωm. Weathered samples show resistivity of <1000 Ωm.
- A moderately-high chargeability response is observed in samples such as Cu-mineralised metagabbros, amphibolites, metapelites, some granitic pegmatites and metapsammites. Most samples show a chargeability response of <25 mV/V. Some strongly weathered samples showed a chargeability of up to 250 mV/V.
- There is a strong overburden effect to consider when planning IP surveying. Unmineralised, highly weathered, clay-rich saprock, saprolite and metapsammite samples show a high chargeability and low resistivity response relative to fresh samples.
- There is a weakly positive correlation between Cu ± Au mineralisation, magnetic susceptibility and chargeability. Combining IP surveying with high resolution magnetic data may help define areas of mineralisation.
- Some mineralised samples analysed showed a moderate inductive conductivity response. EM could potentially be an effective exploration tool for Cu ± Au mineralisation related to massive sulphides in the Paterson region.
- Dry bulk density data appears to occur in three distinct groups:
  - Low density weathered samples (~ 1.5 to ~ 2.6 g/cm^3): extremely weathered, clay-rich, mostly unmineralized saprock, saprolites, metapsammite and some pegmatite, with an apparent porosity of up to 25%.
  - Moderate density samples (~2.6 to ~2.9 g/cm^3): fresh metapsammite, metapelite, and pegmatite, with an apparent porosity of less than 1%.
  - High density samples (~ 2.9 to ~ 3.1 g/cm^3): fresh metagabbro, dolerite, amphibolite, with an apparent porosity of less than 1%.
- Variable P-wave velocity and density values within the sample suite create a large spread of acoustic impedance values. Seismic reflection would likely be capable of detecting some lithological contacts (especially between felsic and mafic lithologies).
- Of the samples that exhibited a magnetic susceptibility $>5 \times 10^{-3}$ SI, 10 were remanent-magnetisation dominant and 13 were induced-magnetisation dominant.

5. REFERENCES

Emerson, D.W., 1990, Notes on Mass Properties of Rocks – Density, Porosity, Permeability. Exploration Geophysics, 21, 209-216

Emerson, D.W., and Yang, Y.P. 1997, Insights from laboratory mass property Cross-plots. ASEG Preview, 70, 10-14.

APPENDIX 1 – DATA TABLES

Sample Information					Magnetic Properties		Mass Properties			Seismic Properties		Electrical Properties		
TR Sample ID	**Client Sample ID**	**Drillhole ID**	**From**	**To**	**Magnetic Susceptibility**	**Koenigsberger Ratio (Q)**	**Dry Bulk Density**	**Apparent Porosity**	**Grain Density**	**P-Wave Velocity**	**Acoustic Impedance**	**Galvanic Resistivity**	**Chargeability**	**Inductive Conductivity**
			(m)	(m)	($\times10^{-3}$ SI)		(g/cm^3)	(%)	(g/cm^3)	(m/s)	((g/cm^3) × (m/s))	(Ωm)	(mV/V)	(S/m)
20TR1715	600380	PND002	96.61	96.74	0.678		3.01	0.09%	3.01	5900	17749	5858	3.2	0
20TR1716	600381	PND002	110.70	110.86	0.740		3.04	0.10%	3.04	6000	18228	28278	14.5	0
20TR1717	600382	PND002	120.58	120.76	0.682		2.97	0.16%	2.98	5990	17812	4995	14.1	0
20TR1718	600383	PND002	130.66	130.78	0.660		2.99	0.10%	2.99	6220	18600	17731	13.9	0.35
20TR1719	600384	PND002	140.78	140.89	0.575		3.01	0.11%	3.02	5900	17775	2358	62.2	2.36
20TR1720	600385	PND002	150.02	150.16	1.872		3.02	0.09%	3.02	5790	17467	960896	21.5	0.3
20TR1721	600386	PND002	160.27	160.40	0.972		2.99	0.30%	3.00	5790	17325	2507	82.2	0
20TR1722	600387	PND002	170.89	171.00	3.259		2.87	0.22%	2.88	5240	15041	1128	5.5	0
20TR1723	600388	PND002	180.60	180.71	0.000		2.66	0.30%	2.67	5200	13836	440	3.2	0.2
20TR1724	600389	PND002	200.23	200.345	2.092		3.01	0.05%	3.01	6180	18614	21011	8.9	0
20TR1725	600390	PND002	210.53	210.62	0.852		3.02	0.04%	3.02	5870	17709	4161	38.5	0
20TR1726	600391	PND002	220.33	220.54	4.425		2.96	0.18%	2.96	5720	16903	6009	10.6	0
20TR1727	600392	PND002	230.57	230.686	12.024	23.18	3.04	0.03%	3.04	5640	17132	79969	48.1	15.96
20TR1728	600393	PND002	240.03	240.13	1.956		3.08	0.04%	3.08	5760	17716	130828	27.9	0
20TR1729	600394	PND002	250.89	250.99	0.001		2.63	0.14%	2.63	5480	14416	68318	9.7	0.57
20TR1730	600395	PND002	261.80	261.89	3.437		3.06	0.02%	3.06	6450	19709	45575	44.6	0
20TR1731	600396	PND002	270.84	271	0.018		2.65	0.13%	2.65	5390	14286	65415	8.1	0.34
20TR1732	600397	PND002	280.70	280.81	7.440	1.86	3.06	0.02%	3.06	5840	17884	83227	35.6	0
20TR1733	600398	PND002	291.10	291.2	0.001		2.66	0.06%	2.66	5740	15247	57434	7.2	0.8
20TR1734	600399	PND002	296.65	296.806	0.000		2.64	0.02%	2.64	5550	14671	1097646	32.4	0.45
20TR1735	600400	PND002	299.74	299.85	0.388		2.77	0.02%	2.77	5480	15182	113303	11.7	1.73
20TR1736	600401	PND002	309.41	309.52	0.198		2.75	0.04%	2.75	5150	14151	384861	16.7	0.17
20TR1737	600402	PND002	311.75	311.87	0.634		2.73	0.03%	2.73	5500	14990	434215	14.6	0
20TR1738	600403	PND002	322.31	322.41	2.034		2.78	0.11%	2.79	5360	14921	514828	12.1	1.9
20TR1739	600404	PND002	345.00	345.11	9.970	4.37	3.07	0.08%	3.07	5730	17586	29444	90.6	0
20TR1740	600405	PND002	361.15	361.26	3.223		3.05	0.15%	3.06	5800	17696	13053	18.1	1.6
20TR1741	600406	PND002	390.54	390.65	0.658		2.76	0.11%	2.76	5410	14933	29239	27.3	0.7
20TR1742	600407	PND002	400.05	400.16	6.281	1.21	2.89	0.05%	2.89	4670	13495	127113	31.0	2.56
20TR1743	600408	PND002	416.00	416.10	1.731		2.77	0.05%	2.77	5630	15599	202157	20.9	1.02
20TR1744	600409	PND002	430.78	430.88	0.017		2.67	0.09%	2.67	5470	14586	1049	12.8	0.32
20TR1745	600410	PND002	440.96	441.06	0.147		2.68	0.13%	2.68	5520	14778	29582	22.4	0.24
20TR1746	600411	PND002	458.69	458.79	21.097	3.71	2.91	0.18%	2.92	5580	16258	3372	11.6	0
20TR1747	600412	PND002	470.02	470.12	0.011		2.66	0.08%	2.66	5660	15042	299625	13.5	0.28
20TR1748	600413	PND002	490.28	490.38	0.090		2.68	0.06%	2.68	5330	14267	157723	10.4	0.59
20TR1749	600414	PND002	505.30	505.39	0.647		2.71	0.06%	2.71	5400	14621	832393	42.3	0.2
20TR1750	600415	PND002	512.37	512.47	0.000		2.66	0.15%	2.67	5510	14672	26496	6.1	0.45
20TR1753	600490	12AMD0015	85.29	85.40	0.408		2.24	3.88%	2.33	2900	6494	278	6.8	0.56
20TR1754	600491	12AMD0015	90.88	90.99	0.113		2.07	6.19%	2.21	2590	5362	113	2.2	0.3
20TR1755	600492	12AMD0015	97.00	97.87	0.258		2.39	2.47%	2.45	2290	5482	230	2.2	0.2
20TR1756	600493	12AMD0015	102.29	102.39	0.253		2.65	2.20%	2.71	2850	7563	373	10.4	0
20TR1757	600494	12AMD0015	108.44	108.50	0.254		2.75	0.01%	2.75	5300	14573	2081682	19.4	0.37
20TR1758	600495	12AMD0015	114.29	114.38	0.266		2.73	0.12%	2.73	5380	14692	105429	8.9	0
20TR1759	600496	12AMD0015	120.25	120.37	0.174		2.71	0.85%	2.73	3170	8586	6651	10.1	0.17
20TR1760	600497	12AMD0015	126.12	126.23	0.172		2.70	0.14%	2.70	5150	13903	4556	1.5	0.2
20TR1761	600498	12AMD0015	131.35	131.43	0.260		2.75	0.47%	2.77	4240	11669	4831	24.2	0.24
20TR1762	600499	12AMD0015	136.35	136.44	0.168		2.71	0.14%	2.72	5320	14437	76921	8.0	0.14
20TR1763	600500	12AMD0015	140.87	140.98	0.207		2.73	0.24%	2.74	5400	14764	19163	8.7	0
20TR1764	600501	12AMD0015	146.07	146.16	0.374		2.75	0.43%	2.77	3860	10627	16901	79.6	0
20TR1765	600502	12AMD0015	151.23	151.34	0.449		2.77	0.46%	2.78	3900	10788	7788	30.8	0
20TR1766	600503	12AMD0015	156.19	156.30	0.163		2.69	0.15%	2.70	5550	14948	194810	8.3	0.65
20TR1767	600504	12AMD0015	161.74	161.83	0.259		2.70	0.16%	2.71	5270	14244	1118044	24.0	0.2
20TR1768	600505	12AMD0015	166.60	166.70	15.055	2.51	2.96	0.05%	2.97	5890	17461	153705	43.4	0
20TR1769	600506	12AMD0015	171.72	171.81	0.320		2.77	0.07%	2.78	5240	14533	70761	17.4	0
20TR1770	600507	12AMD0015	176.83	176.94	0.423		2.84	0.03%	2.84	5670	16121	1098779	44.7	0
20TR1771	600508	12AMD0015	181.41	181.52	0.404		2.73	0.10%	2.73	5720	15623	20721	11.9	0
20TR1842	600509	12AMD0015	185.52	185.62	0.746		2.87	0.26%	2.88	5000	14343	44007	17.1	1.4
20TR1772	600510	12AMD0015	190.79	190.89	2.604		2.80	0.06%	2.81	5160	14468	675093	39.7	0
20TR1773	600511	12AMD0015	194.00	194.08	0.247		2.73	0.03%	2.73	5500	14999	388673	14.6	0
20TR1774	600512	12AMD0015	198.18	198.28	0.483		2.77	0.15%	2.77	4960	13716	16789	11.5	0.2
20TR1775	600513	12AMD0015	203.09	203.19	0.241		2.72	0.06%	2.72	5500	14935	122751	7.4	0.77
20TR1776	600514	12AMD0015	207.16	207.26	0.133		2.67	0.04%	2.67	5540	14802	50369	8.0	1.70
20TR1777	600515	12AMD0015	212.92	213.00	0.174		2.74	0.11%	2.74	4920	13489	5977	4.9	0.1
20TR1778	600516	12AMD0015	217.49	217.57	0.252		2.67	0.09%	2.67	5420	14466	31000	6.3	0.18
20TR1779	600517	12AMD0015	222.00	222.10	0.142		2.70	0.05%	2.70	5600	15107	1248732	20.9	0.54

Sample Information					Magnetic Properties		Mass Properties			Seismic Properties		Electrical Properties		
TR Sample ID	Client Sample ID	Drillhole ID	From	To	Magnetic Susceptibility	Koenigsberger Ratio (Q)	Dry Bulk Density	Apparent Porosity	Grain Density	P-Wave Velocity	Acoustic Impedance	Galvanic Resistivity	Chargeability	Inductive Conductivity
			(m)	(m)	($\times 10^{-3}$ SI)		(g/cm^3)	(%)	(g/cm^3)	(m/s)	((g/cm^3) × (m/s))	(Ωm)	(mV/V)	(S/m)
20TR1780	600518	12AMD0015	227.08	227.19	0.302		2.73	0.01%	2.73	5820	15897	1004005	12.8	0.36
20TR1781	600519	12AMD0015	232.00	232.09	0.222		2.72	0.06%	2.72	5670	15413	117742	15.2	0.65
20TR1782	600520	12AMD0015	237.44	237.54	0.079		2.68	0.04%	2.68	5770	15464	7856	2.1	0.35
20TR1783	600521	12AMD0015	241.90	242.00	0.173		2.72	0.04%	2.72	5390	14669	45148	5.4	0.30
20TR1784	600522	12AMD0015	246.33	246.43	0.221		2.69	0.01%	2.69	5680	15282	54392	4.7	0.28
20TR1785	600523	12AMD0015	252.69	252.80	0.523		2.78	0.04%	2.78	4780	13285	14004	67.8	0.2
20TR1786	600524	12AMD0015	256.19	256.29	0.349		2.80	0.08%	2.80	4990	13973	152086	12.5	0.5
20TR1787	600525	12AMD0015	261.08	261.18	0.810		2.78	0.12%	2.78	4910	13633	22218	6.1	0.1
20TR1788	600526	12AMD0015	266.88	266.99	0.106		2.69	0.01%	2.69	5390	14489	208299	11.6	0.63
20TR1789	600527	12AMD0015	272.56	272.66	0.190		2.72	0.01%	2.72	5290	14362	137115	8.7	0.59
20TR1790	600528	12AMD0015	278.85	278.95	0.339		2.71	0.07%	2.71	5550	15031	306498	7.3	0.42
20TR1791	600529	12AMD0015	283.39	283.49	0.664		3.07	0.06%	3.07	5290	16234	132445	12.8	0
20TR1792	600530	12AMD0015	288.15	288.29	0.593		2.75	0.13%	2.76	5430	14958	15330	34.1	0.2
20TR1793	600531	12AMD0015	294.90	295.00	0.202		2.68	0.03%	2.68	5260	14096	9630	0.7	1.24
20TR1794	600532	12AMD0015	300.90	301.00	0.205		2.70	0.02%	2.70	5320	14364	88463	13.0	0.76
20TR1795	600533	12AMD0015	305.88	306.00	0.067		2.68	0.08%	2.68	5450	14583	680132	13.2	1.51
20TR1796	600534	12AMD0015	310.90	311.00	0.204		2.70	0.00%	2.70	5300	14298	727404	12.1	0.26
20TR1797	600535	12AMD0015	315.22	315.32	0.359		2.73	0.07%	2.74	4930	13476	108708	28.1	0.87
20TR1798	600536	12AMD0015	321.17	321.28	0.296		2.73	0.04%	2.73	4470	12189	506229	20.2	0.64
20TR1799	600537	12AMD0015	326.37	326.48	0.514		2.74	0.28%	2.74	4580	12532	114609	14.1	0.42
20TR1800	600538	12AMD0015	331.22	331.32	0.351		2.72	0.15%	2.72	4360	11851	17551	11.4	0.87
20TR1801	600539	12AMD0015	335.11	335.21	0.195		2.69	0.06%	2.69	4890	13143	289395	12.6	0.53
20TR1802	600540	12AMD0015	340.55	340.67	0.254		2.69	0.00%	2.69	5360	14444	746503	16.8	0.14
20TR1803	600541	12AMD0015	347.48	347.58	0.876		2.88	0.08%	2.88	4050	11664	41416	7.4	0
20TR1804	600542	12AMD0015	373.77	353.96	0.735		2.83	0.10%	2.84	4460	12633	37557	7.1	0.7
20TR1805	600543	12AMD0015	358.87	358.99	0.242		2.70	0.09%	2.70	5080	13717	257009	25.2	0.6
20TR1806	600544	12AMD0015	363.53	363.63	0.710		2.79	0.10%	2.80	4650	12992	96123	15.5	0
20TR1807	600545	12AMD0015	368.90	369.00	0.254		2.71	0.03%	2.71	5140	13910	227320	40.2	0
20TR1808	600546	12AMD0015	373.90	374.00	0.224		2.69	0.05%	2.69	5160	13878	467081	22.1	0.14
20TR1809	600547	12AMD0015	378.02	378.12	0.182		2.69	0.02%	2.69	5140	13806	486373	14.4	0.28
20TR1810	600548	12AMD0015	383.26	383.36	0.300		2.74	0.08%	2.74	4160	11391	60998	10.8	0.5
20TR1811	600549	12AMD0015	390.00	390.10	0.219		2.76	0.12%	2.76	4320	11915	72298	11.3	0
20TR1812	600550	12AMD0015	397.38	397.48	0.063		2.68	0.01%	2.68	5620	15039	1296789	15.3	0.27
20TR1813	600551	12AMD0015	403.79	403.90	0.566		2.78	0.06%	2.78	4390	12183	258452	17.8	0
20TR1814	600552	12AMD0015	410.50	410.58	0.226		2.71	0.07%	2.72	5550	15068	3543	5.4	0.1
20TR1815	600553	12AMD0015	416.12	416.22	0.219		2.72	0.00%	2.72	5190	14135	907873	14.2	0.49
20TR1816	600554	12AMD0015	422.60	422.71	0.114		2.70	0.10%	2.70	4760	12850	105810	7.8	0.13
20TR1817	600555	12AMD0015	427.94	428.00	0.799		2.76	0.19%	2.77	3710	10253	5650	7.0	0
20TR1818	600556	12AMD0015	432.83	432.93	0.182		2.71	0.02%	2.71	5390	14582	527647	11.4	0.17
20TR1819	600557	12AMD0015	436.25	436.34	1.181		2.69	0.01%	2.69	5560	14964	489678	7.9	0
20TR1820	600558	12AMD0015	441.53	441.63	0.186		2.73	0.12%	2.74	5340	14592	98820	8.4	0
20TR1821	600559	12AMD0015	445.73	445.83	0.071		2.67	0.07%	2.67	5370	14335	57433	4.1	0.5
20TR1822	600560	12AMD0015	450.76	450.86	0.366		2.75	0.09%	2.75	3840	10543	27710	11.1	0
20TR1823	600561	12AMD0015	455.83	455.92	0.131		2.69	0.01%	2.69	5450	14652	210282	5.9	0.29
20TR1824	600562	12AMD0015	460.90	461.00	0.138		2.69	0.08%	2.69	5550	14913	2396	13.4	0.24
20TR1825	600563	12AMD0015	466.36	466.47	0.237		2.71	0.02%	2.71	5200	14079	58288	7.1	0.2
20TR1826	600564	12AMD0015	473.06	473.16	0.239		2.72	0.06%	2.72	5210	14145	153156	14.3	0
20TR1827	600565	12AMD0015	478.81	479.91	0.226		2.73	0.09%	2.73	4880	13318	228348	7.5	0
20TR1828	600566	12AMD0015	482.51	482.61	0.904		2.85	0.14%	2.86	4450	12697	4166	9.3	0
20TR1829	600567	12AMD0015	488.69	488.77	0.190		2.72	0.07%	2.72	5510	14966	79552	11.3	0.2
20TR1830	600568	12AMD0015	495.28	495.38	0.081		2.70	0.13%	2.71	5310	14353	30727	9.6	0.65
20TR1831	600569	12AMD0015	500.00	500.11	0.135		2.72	0.07%	2.72	5440	14812	84949	9.3	0
20TR1832	600570	12AMD0015	506.77	506.85	0.029		2.68	0.05%	2.68	5430	14563	24002	16.1	0.53
20TR1833	600571	12AMD0015	510.88	510.98	0.202		2.77	0.24%	2.78	4860	13459	11776	12.2	0.1
20TR1834	600572	12AMD0015	515.90	516.00	0.474		2.78	0.08%	2.78	4880	13560	159871	17.3	0
20TR1835	600573	12AMD0015	519.15	519.24	0.481		2.72	0.09%	2.73	5600	15253	226898	17.4	0
20TR1836	600574	12AMD0015	524.90	525.00	2.206		2.76	0.07%	2.76	5300	14603	110428	11.7	0
20TR1837	600575	12AMD0015	529.26	529.36	2.070		2.71	0.15%	2.72	5180	14042	27948	10.6	0.92
20TR1838	600576	12AMD0015	533.31	533.39	0.379		2.69	0.08%	2.69	5430	14618	245948	16.0	0.1
20TR1839	600577	12AMD0015	538.64	538.77	0.690		2.72	0.05%	2.72	5610	15270	820620	10.6	0.1
20TR1840	600578	12AMD0015	543.93	544.00	0.185		2.72	0.12%	2.72	4990	13581	10326	10.7	0.3
20TR1841	600579	12AMD0015	548.45	548.55	0.205		2.72	0.07%	2.72	5500	14937	68804	10.2	0
20TR1843	600416	PND005	100.74	100.78	0.005		1.99	N/A	1.99	2890	N/A	87	32.7	0.1
20TR1844	600417	PND005	105.78	105.89	0.001		1.88	2.29%	1.92	890	1671	213	6.4	0.2

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			(m)	(m)	($\times 10^{-3}$ SI)		(g/cm³)	(%)	(g/cm³)	(m/s)	((g/cm³) × (m/s))	(Ωm)	(mV/V)	(S/m)
20TR1845	600418	PND005	110.56	110.69	0.000		1.86	2.11%	1.90	900	1673	419	3.7	0.21
20TR1846	600419	PND005	115.35	115.41	0.000		2.00	N/A	2.00	1290	N/A	111	19.5	0.28
20TR1847	600420	PND005	120.87	120.93	0.033		1.91	N/A	1.91	1000	N/A	39	41.6	0.4
20TR1848	600421	PND005	125.11	125.23	0.208		2.39	1.66%	2.43	2740	6538	393	16.6	0
20TR1849	600422	PND005	131.31	131.40	0.120		2.63	N/A	2.63	1790	N/A	278	6.8	0.2
20TR1850	600423	PND005	137.66	137.73	0.114		2.51	4.47%	2.63	3470	8713	273	13.9	0
20TR1851	600424	PND005	141.45	141.52	0.276		2.48	1.89%	2.53	4110	10197	69	22.9	0
20TR1852	600425	PND005	145.61	145.71	0.083		2.64	0.58%	2.66	4710	12454	2073	4.0	0
20TR1853	600426	PND005	150.79	150.90	0.131		2.59	2.00%	2.65	4030	10452	295	4.0	0
20TR1854	600427	PND005	155.90	155.98	0.397		2.73	1.18%	2.76	3600	9811	218	5.2	0
20TR1855	600428	PND005	159.93	160.00	0.003		2.65	0.01%	2.65	5680	15033	3729	1.0	0.1
20TR1856	600429	PND005	165.41	165.50	0.000		2.59	0.26%	2.59	4130	10677	573	3.4	0.18
20TR1857	600430	PND005	171.87	171.99	0.020		2.66	0.05%	2.66	5720	15230	29101	7.6	0.23
20TR1858	600431	PND005	177.16	177.27	0.077		2.69	0.05%	2.69	5690	15305	475037	15.1	0.25
20TR1859	600432	PND005	182.63	182.74	0.285		2.70	0.00%	2.70	5660	15268	446318	14.6	0.16
20TR1860	600433	PND005	188.71	188.81	0.145		2.70	0.08%	2.71	5750	15547	2999	88.9	0
20TR1861	600434	PND005	195.44	195.56	0.018		2.64	0.02%	2.64	5160	13610	3909	1.1	0.24
20TR1862	600435	PND005	201.90	202.00	0.077		2.68	0.03%	2.68	5380	14433	13420	1.5	0.71
20TR1863	600436	PND005	205.56	205.62	0.105		2.69	0.12%	2.69	5990	16085	1157	3.7	0.24
20TR1864	600437	PND005	210.14	210.51	0.134		2.71	0.06%	2.71	5500	14890	54233	32.5	0.36
20TR1865	600438	PND005	214.45	214.53	0.361		2.74	0.54%	2.76	4800	13152	635	3.8	0
20TR1866	600439	PND005	218.84	218.92	0.260		2.77	0.25%	2.78	4570	12674	1418	34.9	0.28
20TR1867	600440	PND005	223.19	223.30	0.268		2.72	0.36%	2.73	5290	14382	990	12.1	0
20TR1868	600441	PND005	230.23	230.34	0.028		2.65	0.03%	2.65	5400	14311	5246	1.2	0
20TR1869	600442	PND005	235.67	235.75	0.015		2.65	0.07%	2.66	5580	14807	129055	6.8	0.17
20TR1870	600443	PND005	242.07	242.15	0.213		2.73	0.14%	2.74	4490	12277	8552	24.4	0
20TR1871	600444	PND005	250.22	250.33	0.001		2.78	0.05%	2.78	4770	13271	63972	14.8	0.1
20TR1872	600445	PND005	258.83	258.94	0.615		2.71	0.04%	2.71	5440	14723	5109489	77.0	0.46
20TR1873	600446	PND005	263.90	264.00	0.165		2.69	0.04%	2.69	5610	15109	390429	16.2	0.2
20TR1874	600447	PND005	268.00	268.10	0.243		2.68	0.11%	2.69	5530	14832	200472	20.0	0
20TR1875	600448	PND005	274.76	274.87	0.691		2.69	0.13%	2.70	5420	14599	N/A	N/A	0.6
20TR1876	600449	PND005	280.53	280.63	0.404		2.69	0.09%	2.70	5400	14548	386025	15.7	0
20TR1877	600450	PND005	285.69	285.75	1.974		2.77	0.24%	2.77	5360	14833	133883	42.4	0
20TR1878	600451	PND005	292.85	292.96	0.215		2.70	0.01%	2.70	5610	15149	3099745	28.5	0
20TR1879	600452	PND005	297.42	297.52	0.168		2.69	0.08%	2.69	5380	14477	1951240	27.3	0.16
20TR1880	600453	PND005	302.11	302.20	26.330	1.41	2.90	0.19%	2.90	5750	16659	7244	20.3	0
20TR1881	600454	PND005	304.18	304.27	17.576	1.29	2.94	0.13%	2.95	6210	18279	49174	26.5	0
20TR1882	600455	PND005	309.52	309.60	0.148		2.69	0.27%	2.70	5800	15628	863	5.5	0.4
20TR1883	600456	PND005	316.89	317.00	0.477		2.99	0.12%	3.00	6610	19780	119054	6.3	0
20TR1884	600457	PND005	320.12	320.22	0.501		3.03	0.08%	3.03	6710	20335	255585	9.9	0
20TR1885	600458	PND005	325.10	325.20	0.527		3.05	0.13%	3.05	6500	19799	141324	8.8	0
20TR1886	600459	PND005	330.00	330.11	1.028		2.92	0.20%	2.92	5600	16331	19040	11.5	0.92
20TR1887	600460	PND005	335.84	335.94	0.555		2.86	0.28%	2.87	5210	14906	9473	9.7	0
20TR1888	600461	PND005	340.08	340.18	1.461		2.91	0.17%	2.92	5500	16009	17000	10.0	0.1
20TR1889	600462	PND005	345.38	345.49	0.644		2.93	0.12%	2.93	6010	17580	6031	5.4	0
20TR1890	600463	PND005	353.00	353.12	0.667		2.97	0.14%	2.98	5990	17811	1946223	21.3	0.4
20TR1891	600464	PND005	359.01	359.11	0.429		2.97	0.06%	2.97	6490	19292	3338894	24.2	0
20TR1892	600465	PND005	367.68	367.79	0.972		3.07	0.16%	3.07	5750	17637	2257	3.2	0
20TR1893	600466	PND005	373.12	373.20	0.573		2.97	0.15%	2.97	5530	16398	4235	2.9	0
20TR1894	600467	PND005	380.76	380.86	0.691		2.98	0.06%	2.98	5630	16757	24315	6.8	0
20TR1895	600468	PND005	385.18	385.26	0.719		2.95	0.15%	2.96	5910	17462	17208	9.8	0
20TR1896	600469	PND005	390.46	390.57	0.036		2.64	0.06%	2.64	5420	14319	384481	9.2	0.1
20TR1897	600470	PND005	395.85	395.96	0.393		2.81	0.31%	2.82	5010	14076	1510	5.3	0
20TR1898	600471	PND005	402.04	402.14	0.047		2.66	0.10%	2.67	5450	14515	74262	11.3	0
20TR1899	600472	PND005	409.43	409.50	0.516		2.94	0.06%	2.94	6440	18921	4569	1.6	0.2
20TR1900	600473	PND005	415.00	415.09	0.514		2.98	0.03%	2.98	6150	18341	4426910	45.0	0.5
20TR1901	600474	PND005	423.90	424.00	0.472		2.97	0.02%	2.97	6570	19540	N/A	N/A	0
20TR1902	600475	PND005	431.70	431.80	0.520		3.00	0.03%	3.00	6190	18565	3716869	14.1	0.84
20TR1903	600476	PND005	439.62	439.71	0.469		2.97	0.01%	2.97	6700	19881	N/A	N/A	0
20TR1904	600477	PND005	445.00	445.10	0.678		2.95	0.08%	2.96	6020	17786	666264	15.1	0
20TR1905	600478	PND005	451.44	451.54	0.459		2.98	0.03%	2.98	6590	19639	N/A	N/A	0
20TR1906	600479	PND005	457.02	457.09	0.003		2.61	0.18%	2.61	5680	14817	13880	7.1	0.2
20TR1907	600480	PND005	461.00	461.11	0.444		2.98	0.03%	2.98	6500	19345	N/A	N/A	0
20TR1908	600481	PND005	467.67	467.77	0.003		2.62	0.10%	2.62	5240	13712	124845	8.9	0.1

Sample Information					Magnetic Properties		Mass Properties			Seismic Properties		Electrical Properties		
TR Sample ID	Client Sample ID	Drillhole ID	From	To	Magnetic Susceptibility	Koenigsberger Ratio (Q)	Dry Bulk Density	Apparent Porosity	Grain Density	P-Wave Velocity	Acoustic Impedance	Galvanic Resistivity	Chargeability	Inductive Conductivity
			(m)	(m)	($\times10^{-3}$ SI)		(g/cm³)	(%)	(g/cm³)	(m/s)	((g/cm³) × (m/s))	(Ωm)	(mV/V)	(S/m)
20TR1909	600482	PND005	474.27	474.27	0.674		2.96	0.05%	2.96	6110	18093	N/A	N/A	0
20TR1910	600483	PND005	477.90	478.00	0.462		2.97	0.01%	2.97	6390	19007	N/A	N/A	0
20TR1911	600484	PND005	481.00	481.10	0.485		3.01	0.04%	3.01	6510	19566	N/A	N/A	0
20TR1912	600485	PND005	487.05	487.15	0.023		2.62	0.08%	2.62	5520	14469	144134	8.4	0.25
20TR1913	600486	PND005	492.40	492.50	0.066		2.62	0.14%	2.62	5360	14046	76116	9.8	0
20TR1914	600487	PND005	497.40	497.50	0.675		2.93	0.03%	2.93	5960	17469	199711	12.1	0
20TR1915	600488	PND005	502.00	502.10	0.495		3.00	0.04%	3.00	6580	19730	448330	9.4	0
20TR1916	600489	PND005	507.70	507.70	0.584		2.99	0.03%	2.99	6250	18712	59626	6.0	0
20TR1917	600580	14AMD0043	91.39	91.49	0.002		2.41	6.95%	2.60	3660	8838	258	10.1	0.53
20TR1918	600581	14AMD0043	98.45	98.55	0.052		2.60	2.13%	2.65	4830	12541	1092	5.6	0.6
20TR1919	600582	14AMD0043	103.40	103.49	0.245		2.57	3.31%	2.66	4190	10781	482	9.1	0.42
20TR1920	600583	14AMD0043	110.72	110.84	0.267		2.60	4.23%	2.72	2980	7755	324	9.2	0.32
20TR1921	600584	14AMD0043	115.48	115.59	0.352		2.72	0.25%	2.72	5020	13633	2740	4.3	0.29
20TR1922	600585	14AMD0043	120.37	120.48	0.236		2.71	0.25%	2.72	4780	12974	33932	12.1	0.55
20TR1923	600586	14AMD0043	125.17	125.27	0.733		2.75	0.07%	2.76	5640	15535	348609	19.2	0.61
20TR1924	600587	14AMD0043	129.33	129.44	0.364		2.75	0.03%	2.75	5620	15443	1566898	21.8	0.27
20TR1925	600588	14AMD0043	135.62	135.72	0.244		2.61	2.33%	2.67	2200	5733	364	6.7	0.46
20TR1926	600589	14AMD0043	141.71	141.81	0.239		2.86	0.05%	2.86	5890	16854	1514674	13.4	0.39
20TR1927	600590	14AMD0043	146.81	146.91	0.165		2.72	0.08%	2.72	5310	14434	363877	14.2	0.81
20TR1928	600591	14AMD0043	151.45	151.55	0.663		2.75	0.11%	2.76	5150	14179	299427	19.3	0.49
20TR1929	600592	14AMD0043	155.00	155.09	19.468		2.97	0.15%	2.98	5740	17067	39666	35.6	0
20TR1930	600593	14AMD0043	160.46	160.55	0.348		2.74	0.12%	2.74	5160	14130	94817	33.1	0.65
20TR1931	600594	14AMD0043	165.89	166.00	0.467		2.76	0.13%	2.77	5310	14670	267842	15.5	0.38
20TR1932	600595	14AMD0043	170.91	171.00	0.313		2.72	0.10%	2.72	5410	14716	4517	13.0	0.68
20TR1933	600596	14AMD0043	175.89	176.00	0.014		2.70	0.06%	2.70	5590	15081	580241	17.2	0.44
20TR1934	600597	14AMD0043	180.48	180.58	0.008		2.69	0.11%	2.70	5770	15545	570036	13.8	0.39
20TR1935	600598	14AMD0043	185.51	185.61	0.121		2.72	0.12%	2.72	5740	15590	17717	10.3	0.53
20TR1936	600599	14AMD0043	190.25	190.36	0.166		2.74	0.07%	2.75	5780	15860	334637	7.7	0.35
20TR1937	600600	14AMD0043	195.51	195.62	0.010		2.70	0.16%	2.71	5700	15415	233155	12.4	0.32
20TR1938	600601	14AMD0043	200.88	200.96	0.296		2.76	0.19%	2.77	5670	15669	530785	20.7	0.25
20TR1939	600602	14AMD0043	204.34	204.44	0.001		2.69	0.12%	2.70	5480	14760	10467	67.0	0.61
20TR1940	600603	14AMD0043	209.00	209.11	0.047		2.70	0.14%	2.71	5690	15378	86679	9.2	0.36
20TR1941	600604	14AMD0043	215.88	216.00	0.041		2.73	0.08%	2.73	5780	15794	898564	7.0	0.58
20TR1942	600605	14AMD0043	220.00	220.10	0.001		2.77	0.15%	2.77	5880	16262	24533	2.5	0.48
20TR1943	600606	14AMD0043	225.08	225.18	0.200		2.76	0.15%	2.76	5620	15501	113007	5.7	0.24
20TR1944	600607	14AMD0043	230.00	230.11	0.005		2.72	0.22%	2.73	5740	15637	12346	17.3	0.4
20TR1945	600608	14AMD0043	235.29	235.39	0.210		2.72	0.18%	2.72	5610	15258	15698	126.5	0.46
20TR1946	600609	14AMD0043	240.86	240.96	0.075		2.69	0.16%	2.70	5640	15197	559977	12.6	0.55
20TR1947	600610	14AMD0043	245.00	245.10	0.069		2.70	0.14%	2.70	5650	15252	655672	13.5	0.34
20TR1948	600611	14AMD0043	250.00	250.10	0.130		2.73	0.15%	2.73	5400	14727	74238	8.2	0.29
20TR1949	600612	14AMD0043	255.21	255.31	0.160		2.71	0.13%	2.72	5630	15280	1177840	24.6	0.22
20TR1950	600613	14AMD0043	259.50	259.60	0.485		2.80	0.53%	2.81	3910	10942	1799	72.4	0.62
20TR1951	600614	14AMD0043	263.00	263.10	4.989		3.01	0.22%	3.01	3920	11791	806132	62.7	0.30
20TR1952	600615	14AMD0043	267.91	268.00	0.349		2.72	0.22%	2.72	5380	14611	482192	14.4	0.59
20TR1953	600616	14AMD0043	271.30	271.41	0.450		2.76	0.27%	2.76	5040	13890	75903	15.4	0.67
20TR1954	600617	14AMD0043	276.00	276.10	0.000		2.73	0.16%	2.73	5290	14436	196967	10.8	0.71
20TR1955	600618	14AMD0043	281.73	281.84	0.299		2.69	0.19%	2.70	5420	14604	875251	43.4	0.22
20TR1956	600619	14AMD0043	286.29	286.41	0.089		2.71	0.16%	2.72	5470	14837	772896	26.8	0.66
20TR1957	600620	14AMD0043	292.45	292.52	0.088		2.72	0.29%	2.72	5320	14445	37289	10.3	0.34
20TR1958	600621	14AMD0043	297.04	297.15	0.658		2.82	0.34%	2.83	4570	12884	50079	14.8	0.64
20TR1959	600622	14AMD0043	299.10	299.20	0.087		2.73	0.34%	2.74	4340	11867	60352	10.2	0.43
20TR1960	600623	C8	20.92	21.00	0.000		2.07	4.03%	2.16	3570	7390	305	11.5	0.5
20TR1961	600624	C8	25.00	25.08	0.004		1.89	6.59%	2.03	2030	3844	192	16.2	0.17
20TR1962	600625	C8	30.83	30.94	0.000		1.77	4.33%	1.85	1880	3336	373	7.3	0.5
20TR1963	600626	C8	35.07	35.17	0.000		1.83	6.22%	1.95	1850	3388	311	7.6	0.56
20TR1964	600627	C8	40.32	40.43	0.000		1.84	5.39%	1.95	1510	2783	219	9.3	0.45
20TR1965	600628	C8	44.80	44.86	0.848		2.61	3.06%	2.69	N/A	N/A	2890	4.3	0
20TR1966	600629	C8	49.90	49.93	0.233		1.81	8.89%	1.99	N/A	N/A	39	85.9	0.25
20TR1967	600630	C8	53.00	53.03	0.000		1.61	14.49%	1.88	N/A	N/A	102	39.5	0.3
20TR1968	600631	C8	79.97	80.03	0.031		1.99	4.81%	2.09	N/A	N/A	154	17.6	0
20TR1969	600632	C8	85.50	85.60	0.000		1.64	6.87%	1.76	2080	3404	326	13.8	0.42
20TR1970	600633	C8	90.93	91.00	0.000		2.12	25.09%	2.12	N/A	N/A	77	42.5	0
20TR1971	600634	C8	96.93	97.00	0.003		2.10	N/A	2.10	N/A	N/A	62	43.9	0.40
20TR1972	600635	C8	98.43	98.50	0.001		1.66	23.34%	2.17	N/A	N/A	53	74.2	0.3

Sample Information					Magnetic Properties		Mass Properties			Seismic Properties		Electrical Properties		
TR Sample ID	Client Sample ID	Drillhole ID	From	To	Magnetic Susceptibility	Koenigsberger Ratio (Q)	Dry Bulk Density	Apparent Porosity	Grain Density	P-Wave Velocity	Acoustic Impedance	Galvanic Resistivity	Chargeability	Inductive Conductivity
			(m)	(m)	($\times 10^{-3}$ SI)		(g/cm^3)	(%)	(g/cm^3)	(m/s)	((g/cm^3) × (m/s))	(Ωm)	(mV/V)	(S/m)
20TR1973	600636	C8	101.34	101.37	0.000		1.74	16.95%	2.10	N/A	N/A	58	174.5	0.14
20TR1974	600637	C8	101.48	101.50	0.000		1.51	23.57%	1.98	N/A	N/A	55	245.5	0.32
20TR1975	600638	C8	181.15	181.29	0.000		1.78	0.70%	1.79	2690	4791	88	6.7	0.3
20TR1976	600639	C8	188.82	189.00	0.028		1.87	0.03%	1.87	2330	4360	509	3.5	0.3
20TR1977	600640	C8	193.56	193.66	0.075		2.42	6.63%	2.59	4450	10762	268	9.4	0.1
20TR1978	600641	C8	198.44	198.49	0.257		2.60	1.81%	2.65	3850	10009	204	9.1	0
20TR1979	600642	C8	203.00	203.07	0.297		2.48	5.83%	2.63	4880	12099	53	37.7	0
20TR1980	600643	C8	208.41	208.50	26.849	0.30	2.56	0.24%	2.56	2700	6905	154	13.0	0
20TR1981	600644	C8	211.59	211.70	0.281		2.66	0.68%	2.68	5340	14214	10263	4.6	0
20TR1982	600645	C8	217.36	217.47	0.871		2.67	0.87%	2.69	4170	11136	316	7.0	0
20TR1983	600646	C8	222.90	223.00	0.120		2.66	0.17%	2.66	5600	14884	36366	9.0	0
20TR1984	600647	C8	227.11	227.19	0.109		2.68	0.12%	2.68	5380	14419	47241	5.3	0.3
20TR1985	600648	C8	231.00	231.10	0.131		2.68	0.10%	2.68	5480	14684	250370	10.9	0.24
20TR1986	600649	C8	235.03	235.13	0.338		2.71	0.16%	2.72	5590	15169	10094	5.9	0.4
20TR1987	600650	C8	239.05	239.14	178.292	9.72	2.95	0.13%	2.95	5720	16863	10931	60.6	0
20TR1988	600651	C8	244.74	244.84	130.559	1.23	2.93	0.20%	2.93	5820	17036	4922	34.3	0
20TR1989	600652	C8	249.76	249.86	15.078	0.22	2.73	0.09%	2.73	5660	15451	220713	21.1	0
20TR1990	600653	C8	251.10	251.20	124.578	0.47	3.01	0.16%	3.01	5600	16855	25802	37.3	0

APPENDIX 2 – SAMPLE PHOTOS

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In 2020–21, the Geological Survey of Western Australia (GSWA) commenced a pilot petrophysics project, in collaboration with Terra Petrophysics, and funded by the Exploration Incentive Scheme (EIS). During this project, a suite of physical property measurements were made on EIS co-funded drillcore, stratigraphic drillcore and company drillcore from the Paterson Orogen, West Arunta, Eucla basement and the Kalgoorlie and Yamarna Terranes of the Eastern Goldfields Superterrane. The aim of this project is to provide a petrophysical dataset that can be used to assist with the planning and interpretation of geophysical data, including characterizing the physical property response of stratigraphic units, alteration and mineralization styles, and constraining geophysical models of the subsurface. This Report, produced by Terra Petrophysics, provides a description of the methods used and a first-pass analysis of the petrophysical data acquired in the Paterson Orogen in 2020–21.

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