Onshore field demonstrator for Adepth Minerals in Norway

Client: Adepth Minerals AS
Date: 15th November 2022
Project: 00263 Version: 1.0
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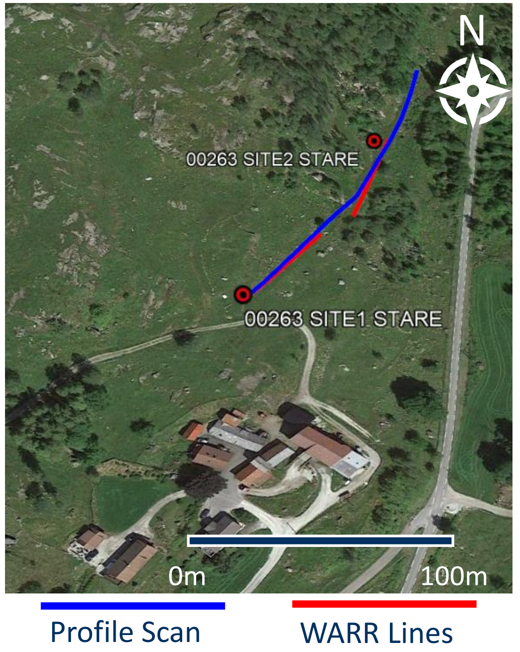
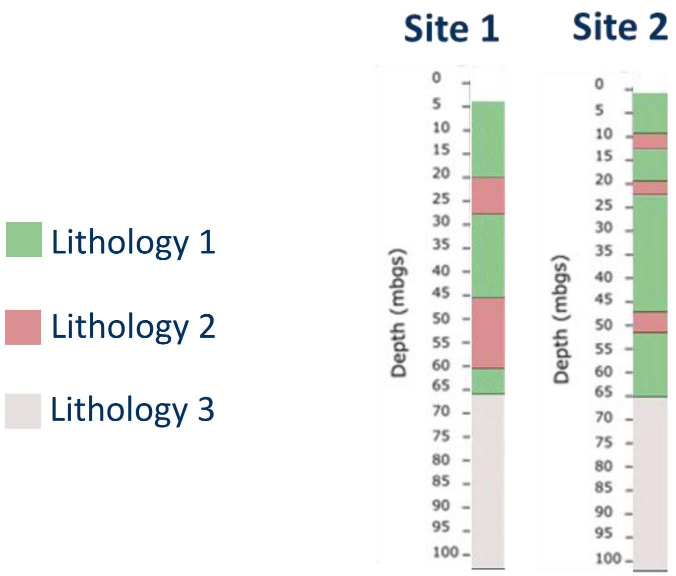
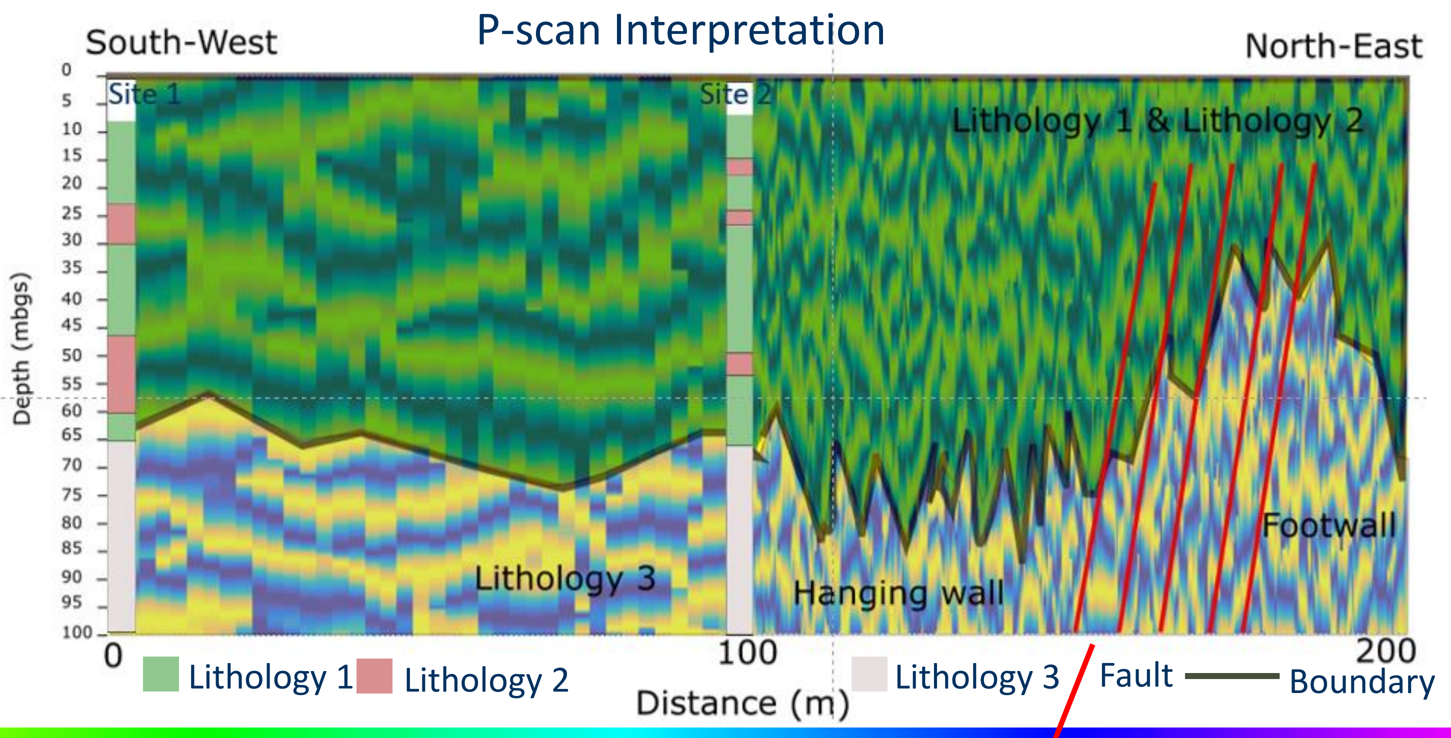
Security: Strictly Confidential

Executive Summary

- Adrok has processed stares, P-scans and WARRs at two sites from near the village of Helleland in South-West Norway down to a maximum depth of 100m below ground level.
- The zonation technique using dielectrics, e-log, weighted mean frequency, total saturation boxes and entropy-standard deviation were used to identify three different lithologies.
- The correlation data for the full 200m P-scan length suggests an area approximately 160-180m which appears increasingly deformed.
- This area could indicate a fault zone which shifts lithology 3 nearer to the surface.







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South-West
North-East
6) Conclusions
Goal 1: Can we use the ADR data to identify lithological changes?
Answer. Potentially Yes
Goal 2: Can we use P-scans to provide a 2D image of the fault between Site 1 and Site 2?
Answer. Potentially Yes
It is recommended that validation in the form of drill logs is made available to Adrok to finalise the interpretation.

1) Introduction

- This is a project part-funded by Adepth to assess Adrok's techniques for identifying changes in geology onshore Norway. If we can convince Adepth that we can successfully identify lithological change then the project will move forward into developing the technology for offshore mineral exploration.

- Data was collected at three sites between 19th and 21st October 2022 approximately 60km south of Stavanger Norway.

- This report covers processing and interpretation for **<u>Site 1 and Site 2 and the profile scan between Sites 1 and Sites 2.</u>**

1) Purpose Goals and Objectives Project Purpose

PURPOSE	To blindly process 2 V-bores and 1 joining Profile Scan to guide Adepth into Adrok's processing and analytical techniques		
GOALS	To identify changes in lithology using ADR parameters.		To provide a 2D image of Sites 1 and Site 2 to map the fault between them.
OBJECTIVES	To provide information to the client down to 100m for Site 1 and Site 2	To provide Harmonics, E-log, Weighted Mean Frequency, Correlation Entropy data, dielectrics and show how this indicates lithology change	To identify a signature in the P-scan that appears across the profile
MEASURES	All data to processed down to approximately 100m below ground level	Produce Zonation images for each setting	A signature that maps the fault and identifies lithology change is identified

Glossary

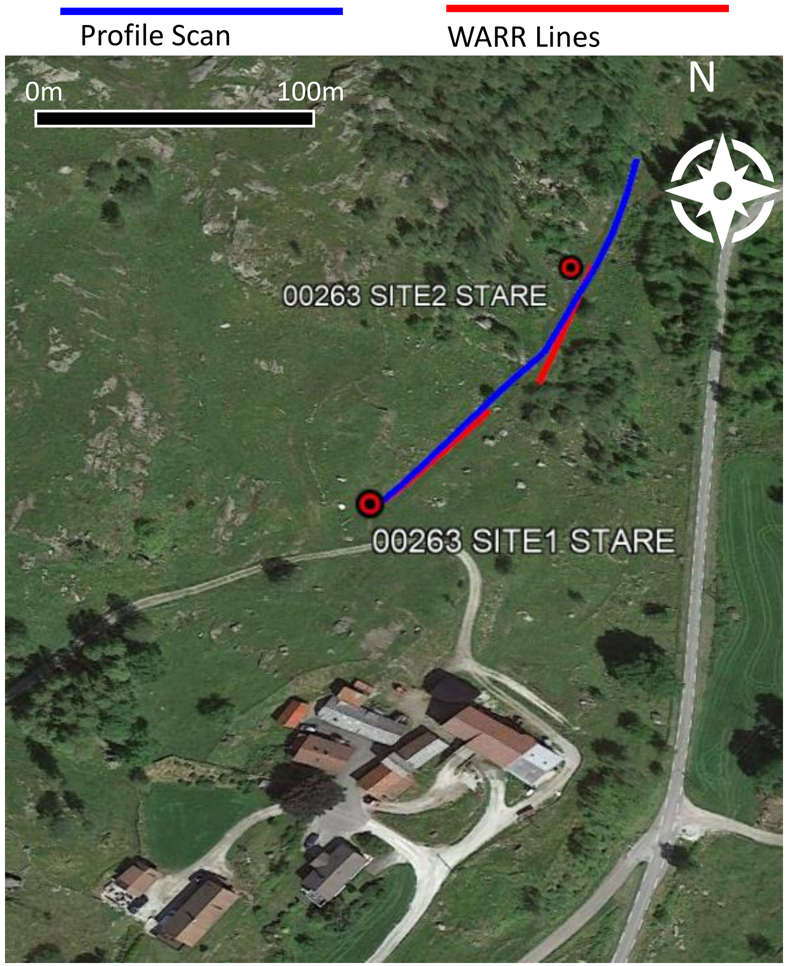
Term	Definition
ADR	Atomic Dielectric Resonance. This technology transmits broadband pulses of radio waves between 1 to 100 MHz into the ground and detects the modulated reflections returned from the subsurface structures.
Correlation Method	Stacks a large number of traces from a series of stare scans and applies mathematical filtering to give a baseline over which the signal can be described as being of high quality. The signal returns are analyzed to show distinct changes in lithology for the area under investigation.
Dielectric constant (ϵr) or DC	The index of the rate of transmission of our ADR wave packet through a medium relative to the transmission rate of the beam through vacuum. This is also sometimes called the transmissivity index, or relative permittivity. The vacuum has a dielectric constant of 1. For a medium such as limestone the dielectric constant (ϵr) is typically 9.
Energy %	Energy reflectivity measurement of a subsurface layer of measured thickness.
Harmonic Analysis	"Harmonic Analysis" is a widely accepted mathematical method that studies the functions of signals as the superposition of waves. Using Fourier transforms to analyse the "harmonics" the technique is often used for assessing materials in a laboratory setting in the chemical industry. Unique harmonic energy frequency and phase peaks are produced and can be analysed in a number of ways producing a range of parametric statistical tests. Different rock types with different mineral assemblages will exhibit different spectral harmonic relationships over these levels.
P-Scan	Profile Scan of the subsurface with fixed focus Antenna spacings at ground level. Both Transmitting and Receiving Antennas are moved simultaneously in parallel along the length of the scan line. This produces an image of the subsurface (from ground level) based on the two-way travel time of Adrok ADR Scanner's beams from Transmitter (Tx) to Receiver (Rx) Antenna. The WARR data converts the P-Scan time-stamps into depths in meters.
Saturation & Boundary Analysis	A multi-input analysis technique, using parametric statistical attributes and analysis of variability. The saturation analysis first computes which intervals of each parameter show areas with multiple datapoints over or under a certain baseline. Then it stacks up all the intervals above the baseline in one log, and the intervals below in a different one. Those are the Minimum and Maximum Saturation areas, finally it ads it up into the Total Saturation logs. As a result this log reflects areas of anomalous overall signal behaviour, where most of the outliers exist. The Boundary analysis works similarly, after creating the intervals, it compares and logs how many intervals start and end at the same exact depths, identifying common boundaries.
Stare	A stationary scan where data collected with both antennae pointing the ground., including Harmonics, and Correlation as input
Training Relationships	These are the relationships between the ADR signal and verified down-hole information. This is they key using ADR for exploration, since once powerful training relationships are defined between the ADR signal and the target lithologies or mineralisation then ADR can be used to target the best are and understand its potential.
WARR	Wide Angle Reflection and Refraction scan to triangulate subsurface depths from the surface ground level. The Transmitting Antenna is moved at ground level along the scan line, away from the stationary Receiving Antenna which is fixed to the start of the scan line. Collected by ADR Scanner at ground level (that produces depth calculations).

Data Collected

2) Data Collected

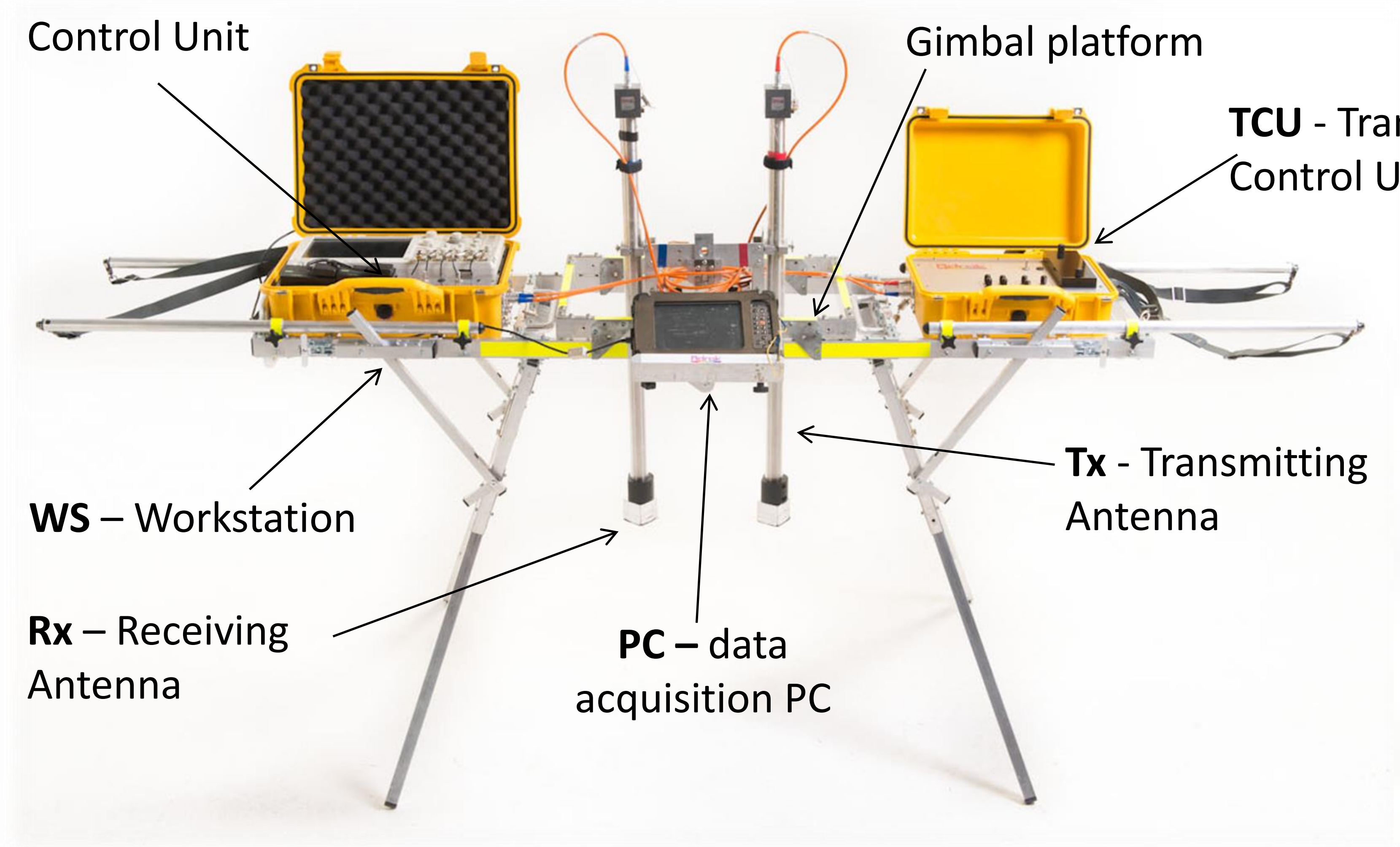
Location

- Data was collected between 19^{th}-21^{st} October 2022 at Site 1 and Site 2

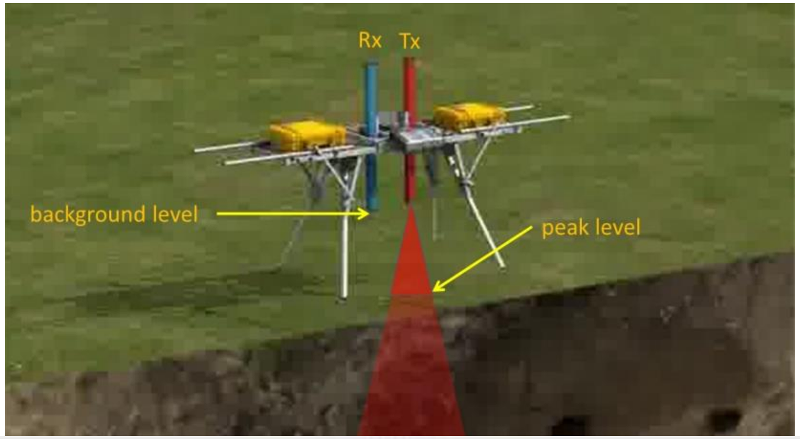


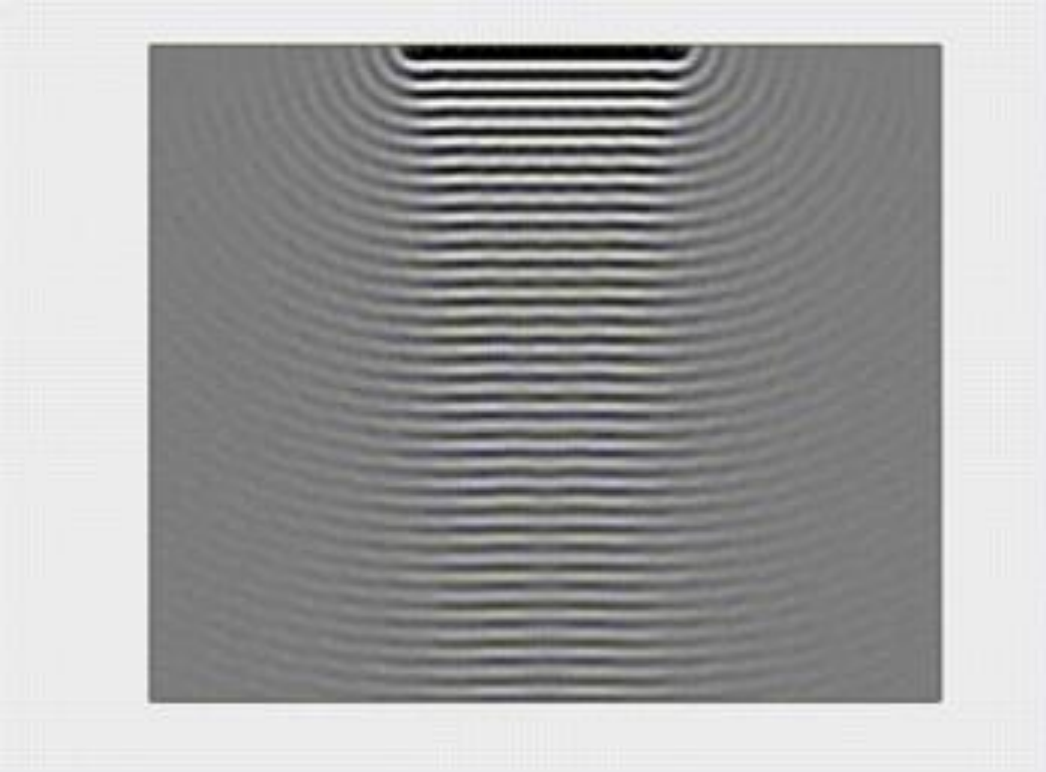
Date of Acquisition	Site Name	Site #	Northing	Easting	Elevation (m)	Dip (degrees)
20/10/2022	Site 1	Site 1	54°33'14.6"	006°49'06.5"	201	90
	Site 2	Site 2	58°31'12.0"	006°09'48.1"	193	90

2) Data Collected: Equipment



2) Data Collected: Scans





- Line of transmitters in Wide Angled Reflection & Refraction (WARR) mode creates beam (Synthetic Aperture Radar, SAR based phased array); separating transmitter (Tx) from stationary receiver (Rx)
- For Stare scans Tx & Rx are stationary. Two antennae types were used for different depth ranges:
  - MINEX to approximately 50m depth penetration
  - PETEX to approximately 100m depth penetration
- Profile Scans (P-Scans) move Tx & Rx along scan line to produce 2-D imagery

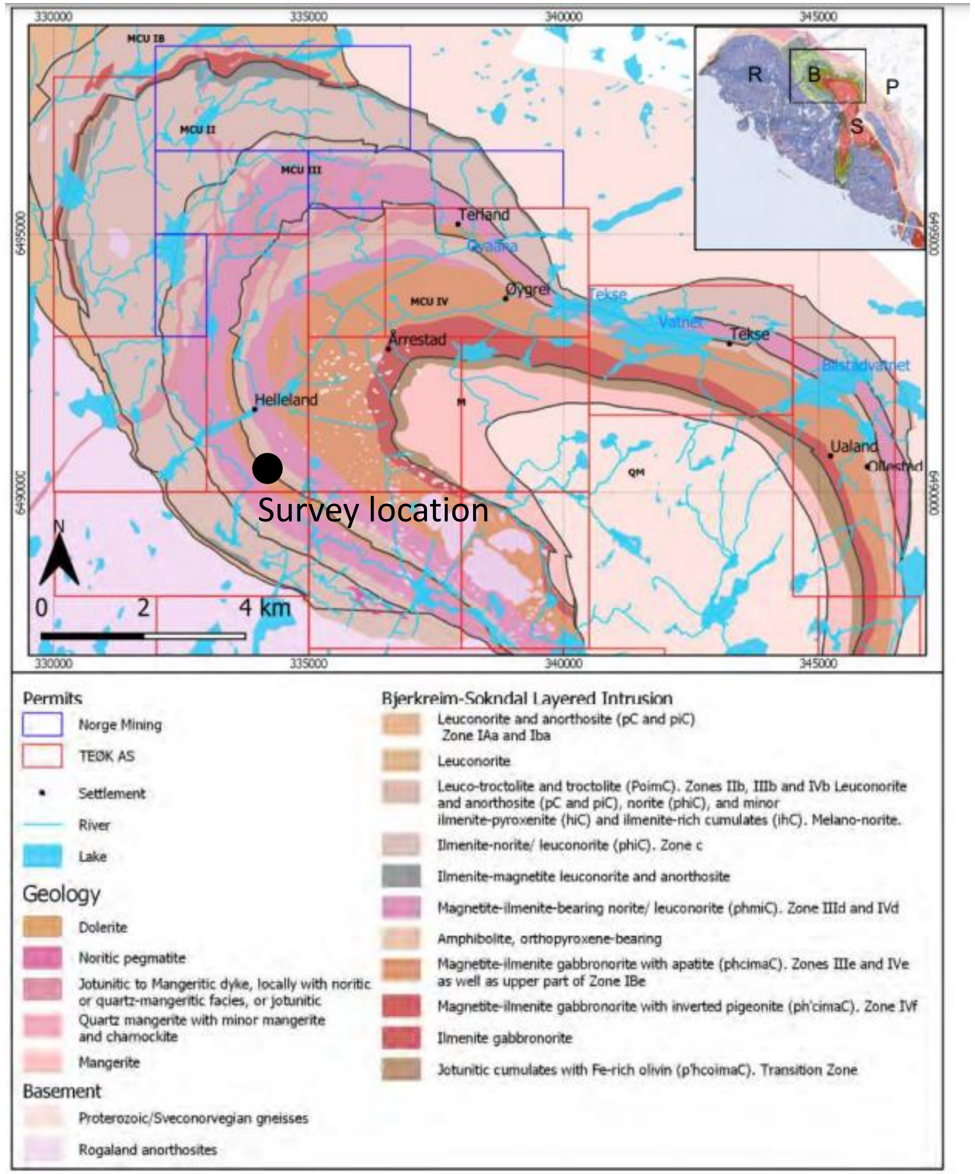
2) Geological Background

- The scans took place over the 900million year old Bjerkreim-Sokndal Layered Intrusions within the Magma Geopark, South-West Norway.

- This multi-layered intrusion is estimated to be up 7km thick in the central area falling to below 50m thick at the edges of this igneous intrusion.

- An estimated 1.55 billion tonnes of mineralisation is thought to occur within this complex of which 240 million tonnes is seen in the Helleland area. This resources is principally composed of vanadium bearing magnetite, ilmenite and apatite.

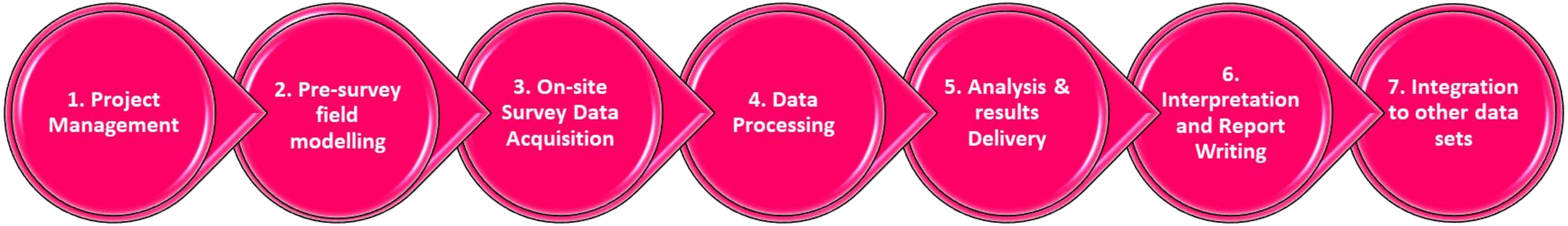
- The survey is located on the outer edge of this intrusion where the intrusion is as low as 50m thick above the basement where mineral grade is thought to be relatively low

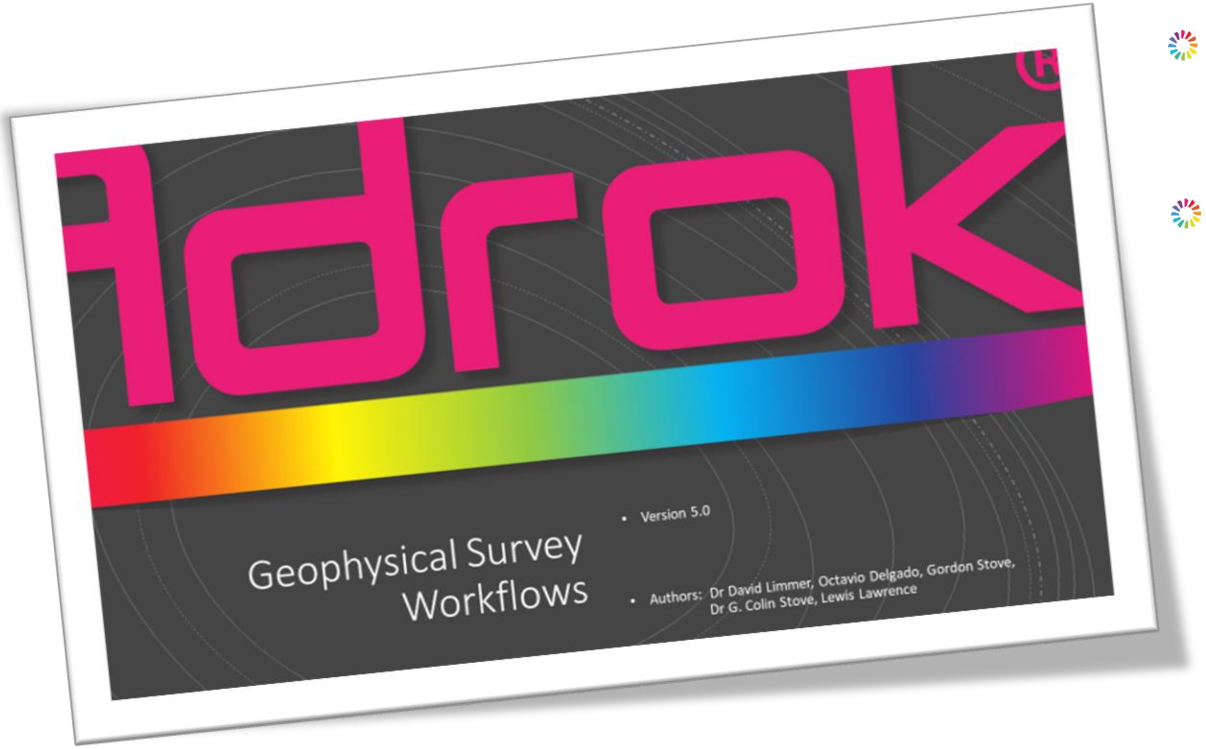


Geology map of the Bjerkreim-Sokndal Intrusion (Source Es7821_Bjerkreim Phase 1 Report_v2-0.docx)

Methodology

3) Methods: Adrok Geophysical Survey Workflows





- The Geophysical Survey Workflows describe which process will be performed in each stage of the project to ensure quality, repeatability and a successful completion.
- G:\Workflows GanG\Adrok Geophysical Survey Workflow v5.0

THE BRITISH ASSESSMENT BUREAU ISO9001 Registration 188208

THE BRITISH ASSESSMENT BUREAU ISO27001 Registration 213059

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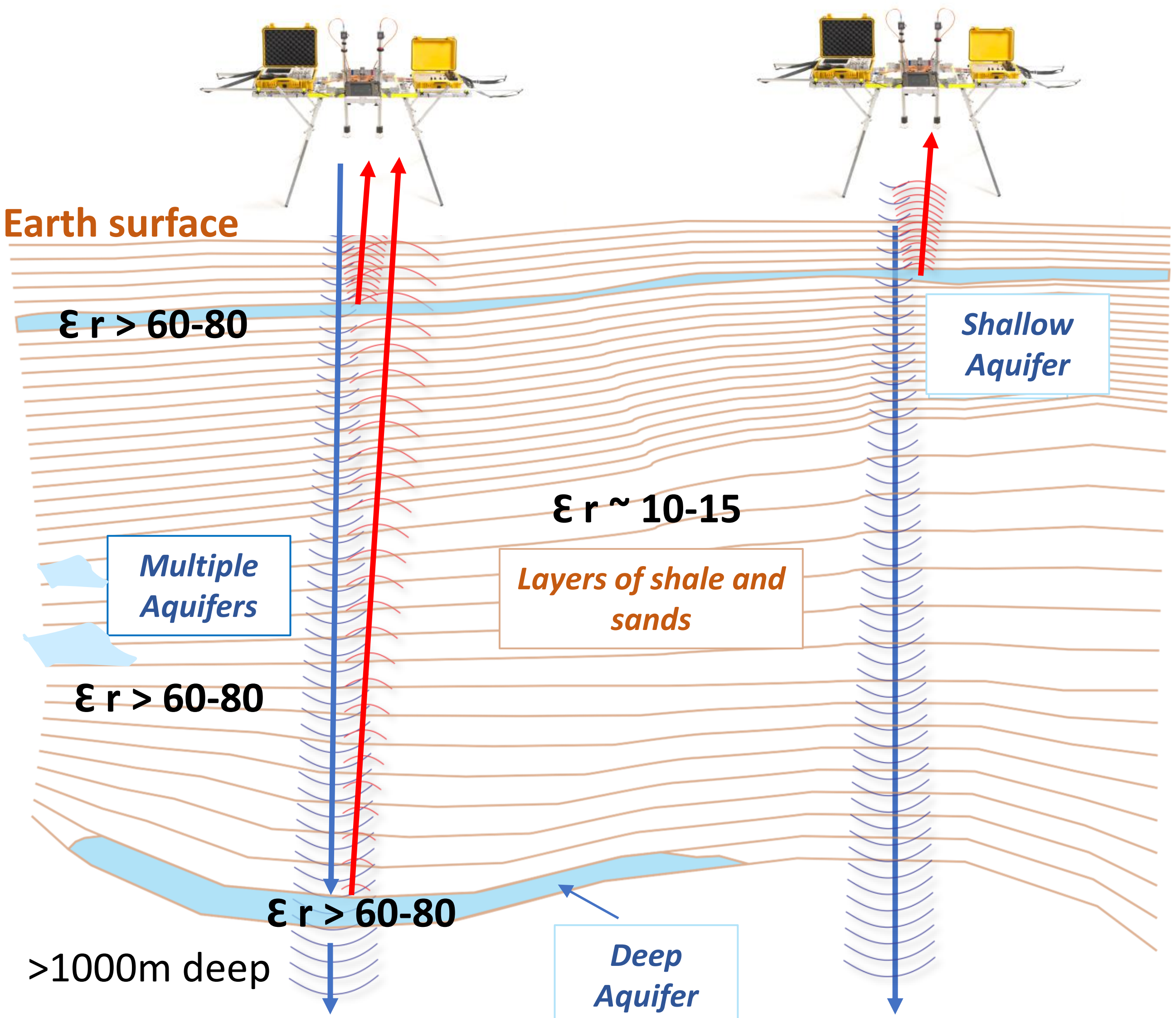
3) **Methods:** Atomic Dielectric Resonance (ADR)



- Transmits broadband pulses of radio waves between **1 to 70 MHz** into the ground.
- Detects the modulated reflections returned from the subsurface structures.
- Measures dielectric permittivity (Ɛ r) and conductivity of material.
- Analyses spectral content of the returns to help classify materials (energy, frequency, phase).
- Time & frequency domain.
- Time ranges typically 20,000ns, 40,000ns & 100,000ns.
- High speed time domain sampling ~5GS/s
- Stack return signals for improved signal-to-noise 20,000, 100,000…..1million.

3) **Methods:** Processing & Analysis

- The flow diagrams below shows a synopsis of Adrok's stare and dielectric processing methodology for this project.

Time-Depth Conversion

Dielectric Calculation

- QAQC by analysing the range of frequencies and by identification of visual anomalies.
- Frequencies indicative of noise removed.
- Dielectrics calculated from frequencies at approximately 1m intervals.

Depth Conversion

- Depths calculated from the dielectrics obtained from frequencies.

Extraction of time-depth conversion

- Extraction of the time to depth conversion form the .xlsx file.

Virtual Borehole Processing

Stare Image Processing

- Stare QAQC by analysing the noise to signal ratio and by identification of visual anomalies.
- Merge of those stares with the best signal to noise ratio taken at a single location to boost signal strength.

Harmonics, EWMF, Correlation Processing

- Completed at both 64 & 128 Pixels per step and 64 & 128 per window for harmonics and EWMF.
- Produced Energy and Frequency parameters, across 32 Harmonics as a .prn in Radamatic.
- Extraction Correlation Entropy at 1-5MHz and 5-10Mhz at 6m and 4m windows

Conversion to readable files

- Conversion to .csv excel file for further analysis.

Virtual Borehole Analysis

Data Analysis on the .csv

- Conversion of time to depth using a DCO file for each parameter.
- Averaging of each harmonic dataset across the 32 (energy) or 11 parameters (frequency).
- Standard Deviation subtracted from both Entropy for both 1-5Mhz and 5-10Mhz for Correlation Data.
- E-logs 'zero' value removed.

Potential Lithology Identification

- Zonation completed from combined interpretation of E-logs, WMF, dielectrics, correlation and peaks and trough analysis from harmonics. Zone thickness measured and recorded as a csv.

3) Methods: P-scan Processing & Analysis

- The flow diagrams below shows a synopsis of Adrok's P-scan processing methodology for this project.

Time-Depth Conversion

Dielectric Calculation

- QAQC by analysing the range of frequencies and by identification of visual anomalies.
- Frequencies indicative of noise removed.
- Dielectrics calculated from frequencies at approximately 1m intervals.

Depth Conversion

- Depths calculated from the dielectrics obtained from frequencies.

Extraction of time-depth conversion

- Extraction of the time to depth conversion form the .xlsx file.

Image Processing

P-scan Image Processing

- P-scan QAQC by analysing the noise to signal ratio and by identification of visual anomalies.
- Merge of those stares with the best signal to noise ratio taken at a single location to boost signal strength.
- Full image correlation

Harmonics, EWMF, Correlation Processing

- Image split into 5m sections
- For each 5m split EWMF & harmonics 128 Pixels per step & 128 per window for harmonics and EWMF.
- Produced Energy and Frequency parameters, across 32 Harmonics as a .prn in Radamatic.
- Extraction Correlation Entropy at 1-5MHz and 5-10Mhz at 6m and 4m windows.

Conversion to readable files

- Conversion to .csv excel file for further analysis.

Virtual Borehole Analysis

Data Analysis on the .csv

- Conversion of time to depth using a DCO file for each parameter.
- Standard Deviation subtracted from both Entropy for both 1-5Mhz and 5-10Mhz for Correlation Data.
- E-logs 'zero' value removed.
- Data compiled into a single file

Potential Lithology & Structural Identification

- Colour coded plots for E-log, Weighted Mean Frequency Correlation Entropy 1-5Mhz and 5-10MHz. Boundaries mapped out from these and compared with stare datasets as a guide.

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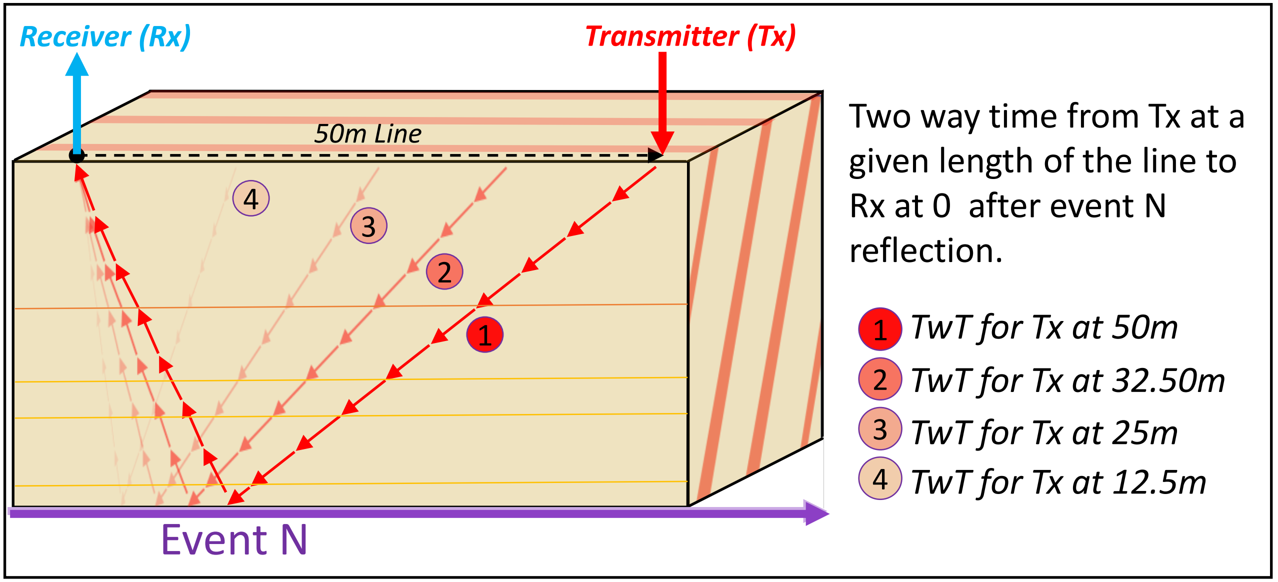
3) Methods: Depth conversion



- WARR stands for Wide Angle Reflection and Refraction. These are 50m long lines that serve as Time-Depth calibration for our Stares, and are taken along the trend of the geology. An operator moves the Transmitter Antenna along a straight line and away from the Receiver Antenna, from, for example, 0m to 50m. Longer lines can be used to obtain deeper penetration.

- After that, and by analysing the Two Way Time (TwT) from common points, we can solve a depth-time equation. This is based on principles of Ray Tracing, solving the problem by repeatedly advancing idealized narrow beams called rays through the medium by discrete amounts. Simple problems can be analysed by propagating a few rays using simple mathematics.

Resolution:

- ✓ We are using a resolution in which we analyse the TWT every 0.5 to 2.5 metres.
- ✓ Rock layer resolution of approximately 30 to 40m.
- ✓ Vertical depth accuracy is approximately +/- 10m.
- ✓ Our analysis checks for the events every 3.3m along the line (that is 15 columns in X) and every 0.5m vertically (for a total of 400 lines in Y). The values acquired take into account the surrounding, averaging from the previous point.
- ✓ Therefore, every WARR is computed based on 6000 points.

Limitations:

- ➢ The manual process can involve intrinsic errors of around 2 to 5%.
- ➢ Strong changes in velocity can alter the depth-conversion significantly in unknown geological settings.
- ➢ Steeply dipping horizons challenge certain mathematical assumptions of the calculations, decreasing overall precision.
- ➢ Therefore, while the order of events will always be correct, the precise depth of the targets or boundaries may be metres away.

3) Methods: Zonation- Saturation Analysis

1 – Energy/Frequency Logs

- Plotted against depth.
- Define Minimum baseline
- Define Maximum baseline

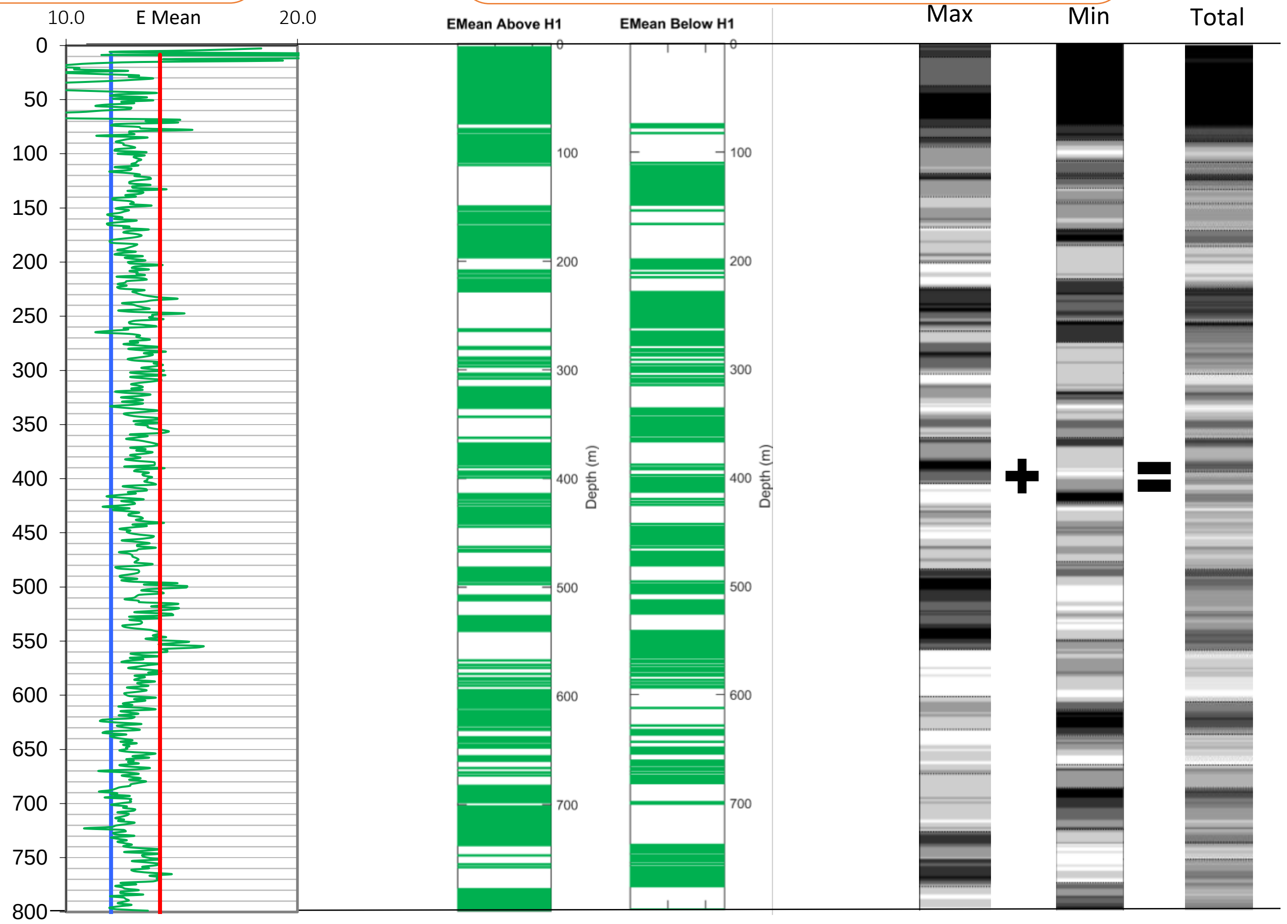
2 – Define MaxMin Boxes Per Parameter

For each Energy and Frequency log, when the data exceeds the baselines, a thinner or thicker box will be plotted.

3 – Define MaxMin Lines Per V-bore

Each Energy and Frequency MaxMin box is added together, with a high saturation signifying many boxes stacking at the same depth.

- For **Max**: All the Max Boxes from each parameter are stacked.
- For **Min**: All the Min Boxes for each parameter are stacked.
- For **Total**: The Max and Min saturations are stacked.



Min Baseline is Median - (SD*1.5)

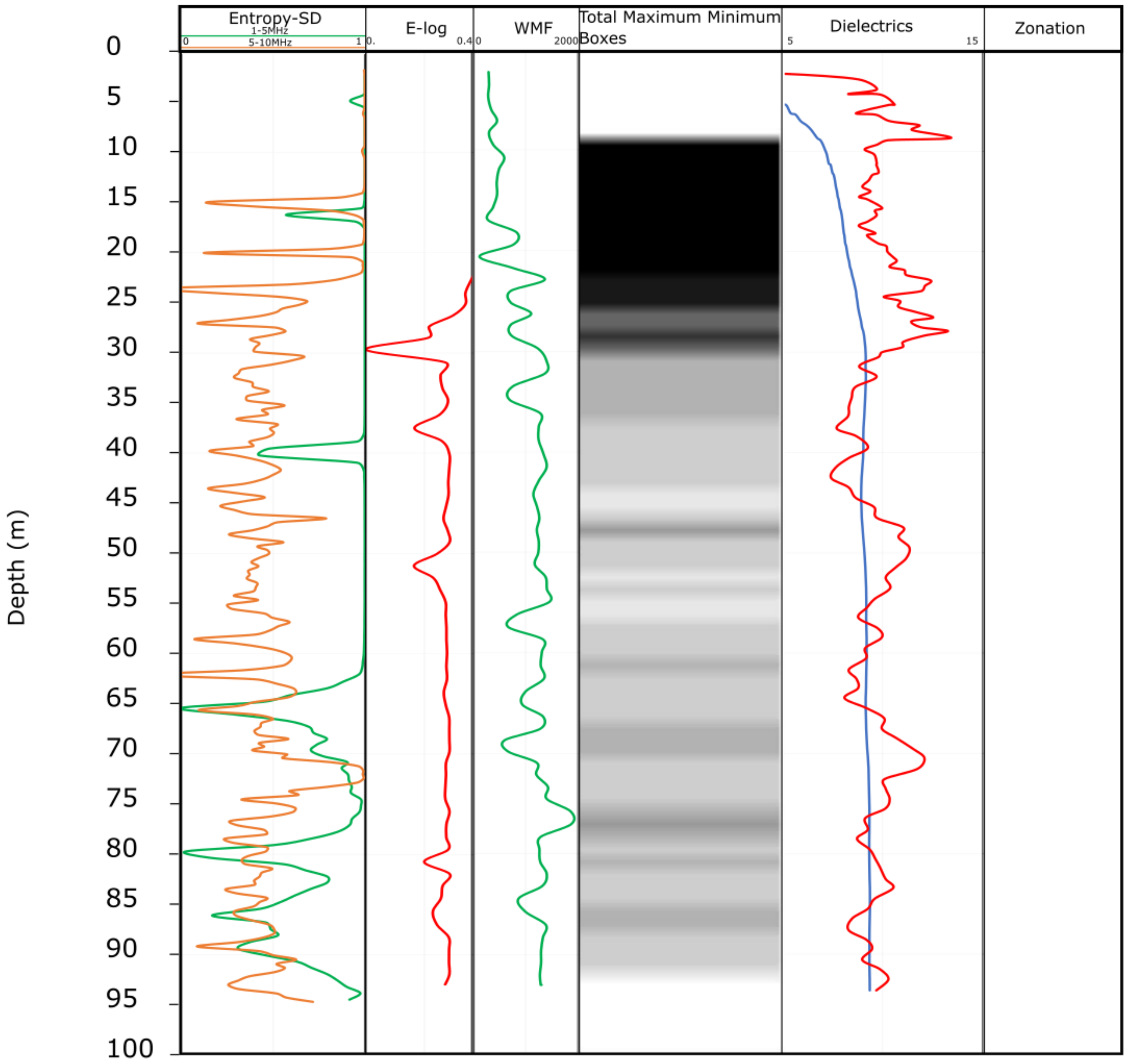
Max Baseline is Median + (SD*1.5)

Figure:
Left: Example outputs stacked to produce Max-Min outputs
Centre: Maximum-Minimum output
Right: Resultant output from stacking energy and frequency parameters

3) **Methods:** Zonation

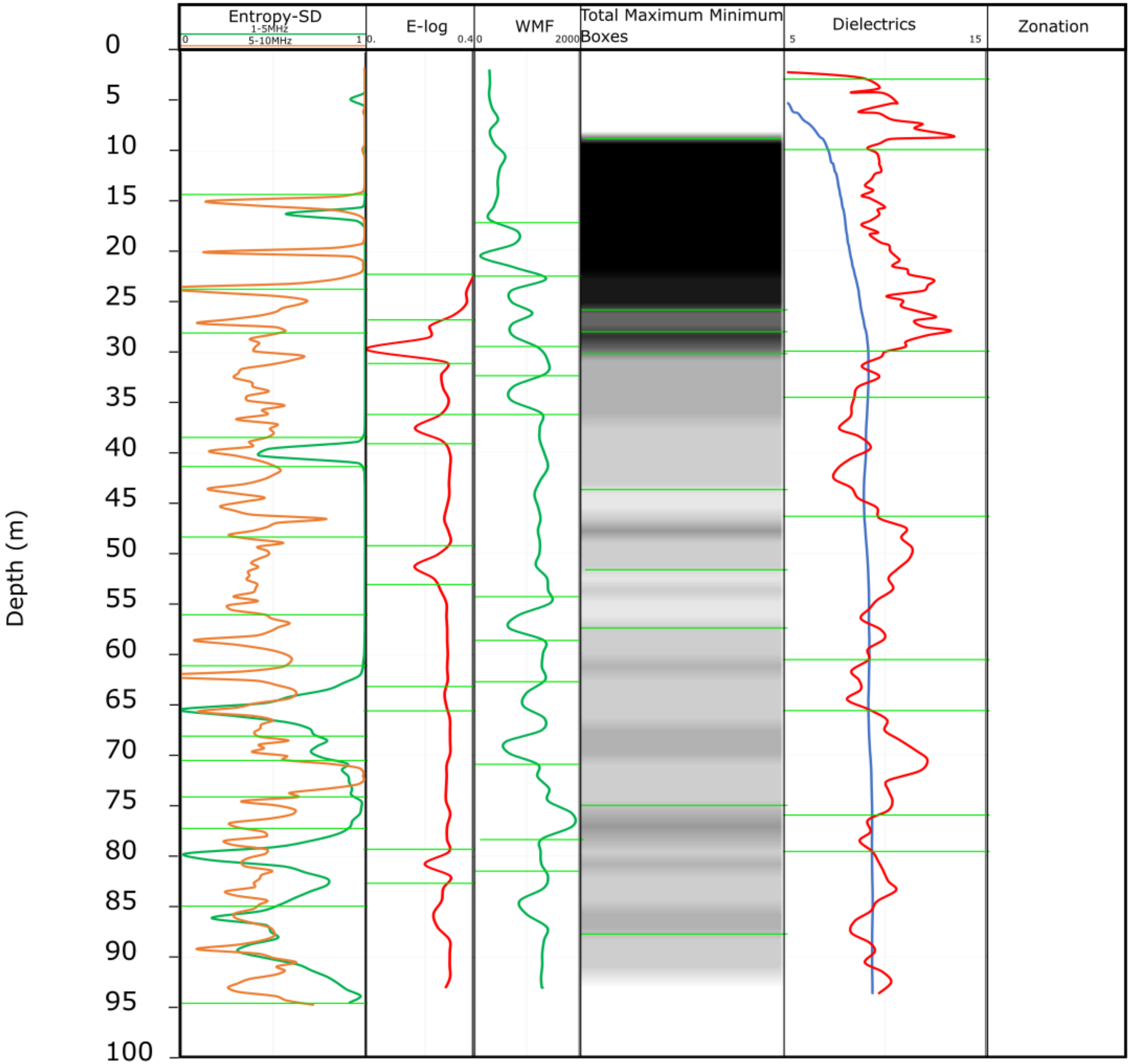
- Zonation Uses the following parameters
  - Correlation Method Entropy- Standard Deviation for both 1-5 and 5-10 Mhz of stacked data.
  - E-log raw data.
  - Weighted Mean Frequency (WMF) raw data.
  - Dielectric Constant log.
  - Saturation Analysis
- Up to three zones have been identified in the two V-bores.

3) **Methods:** Zonation



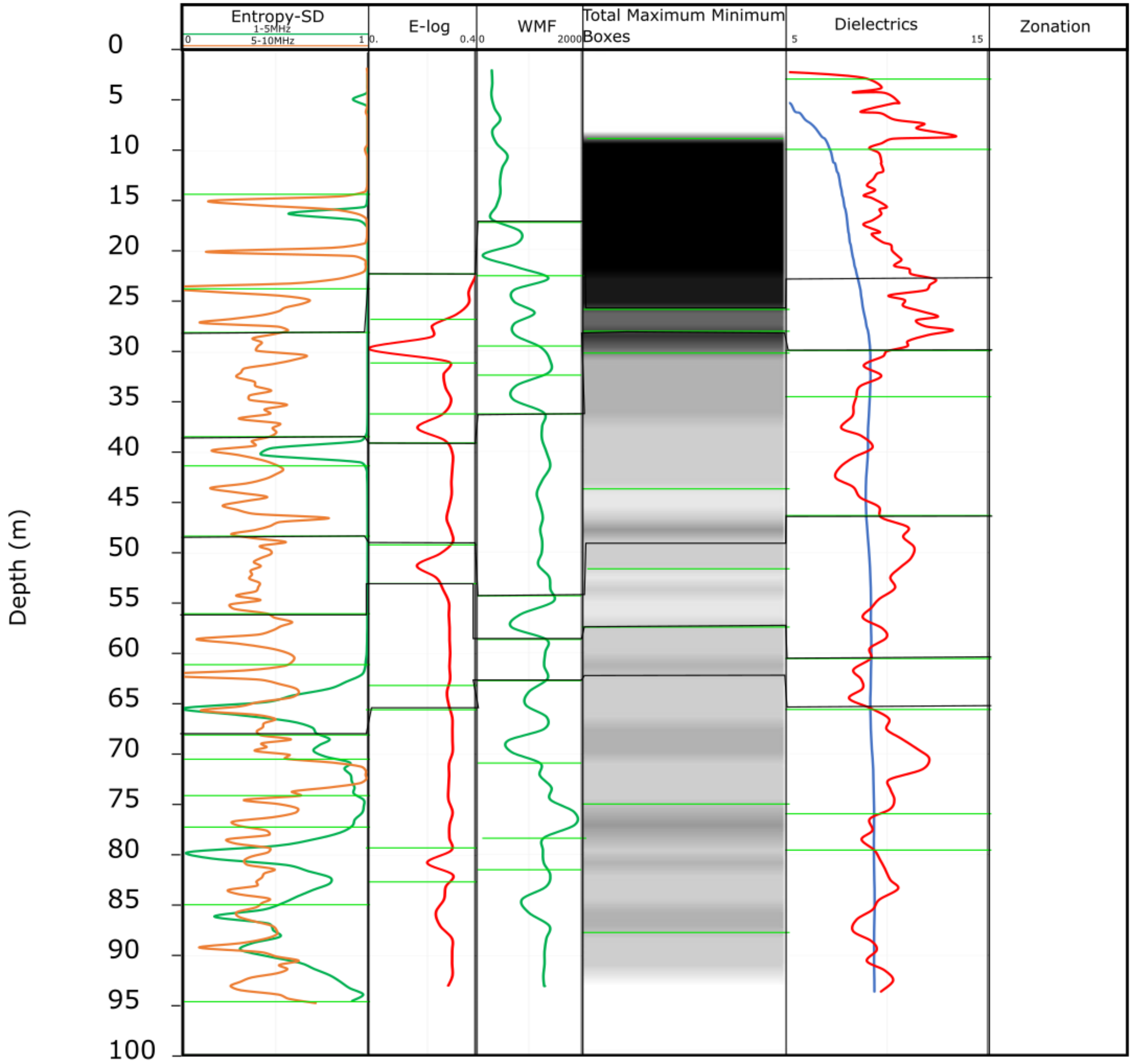
The first stage is to line up all data alongside each other and note down any features.

3) Methods: Zonation



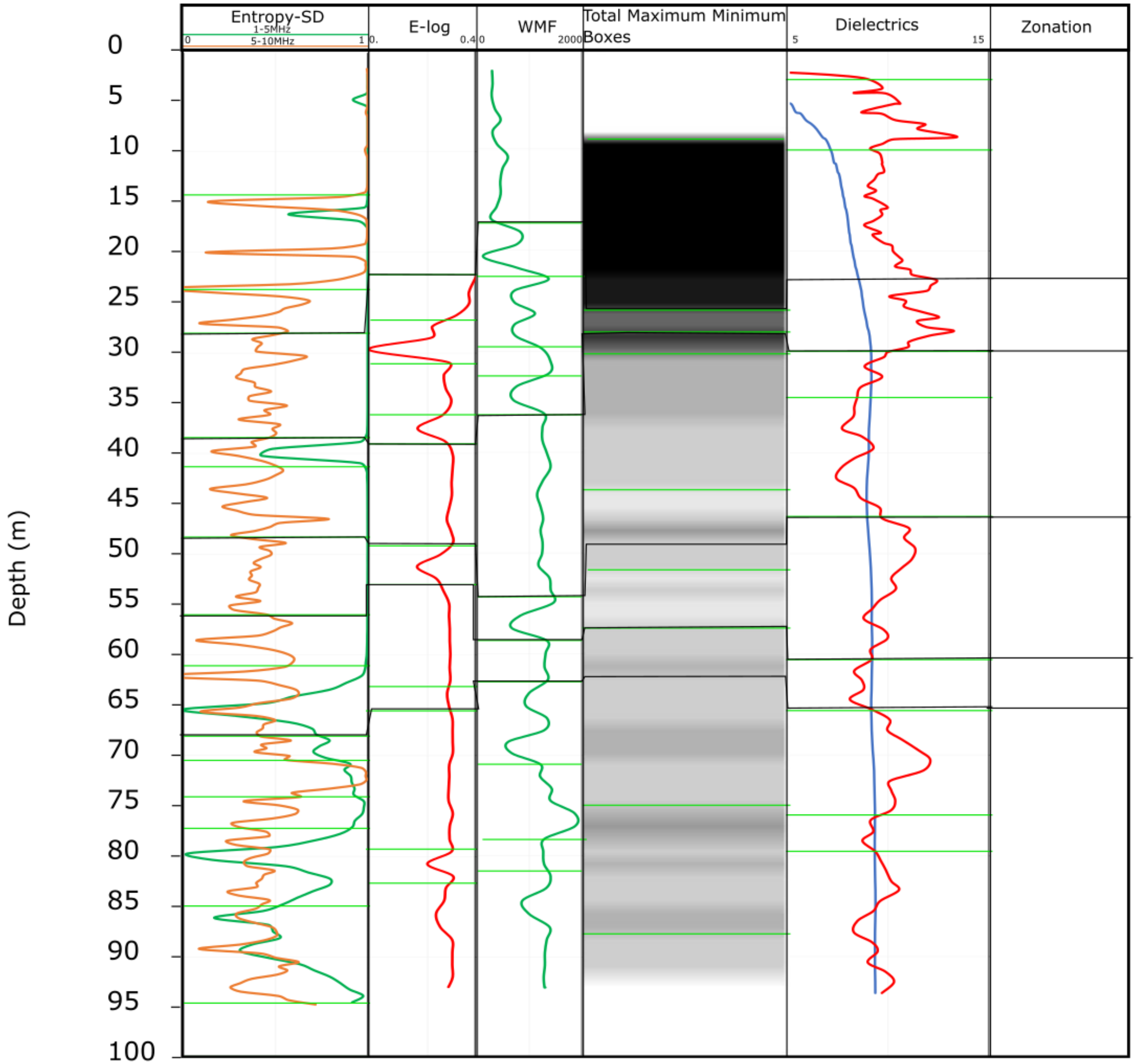
Boundary lines are drawn around distinctive patterns for each parameter.

3) Methods: Zonation



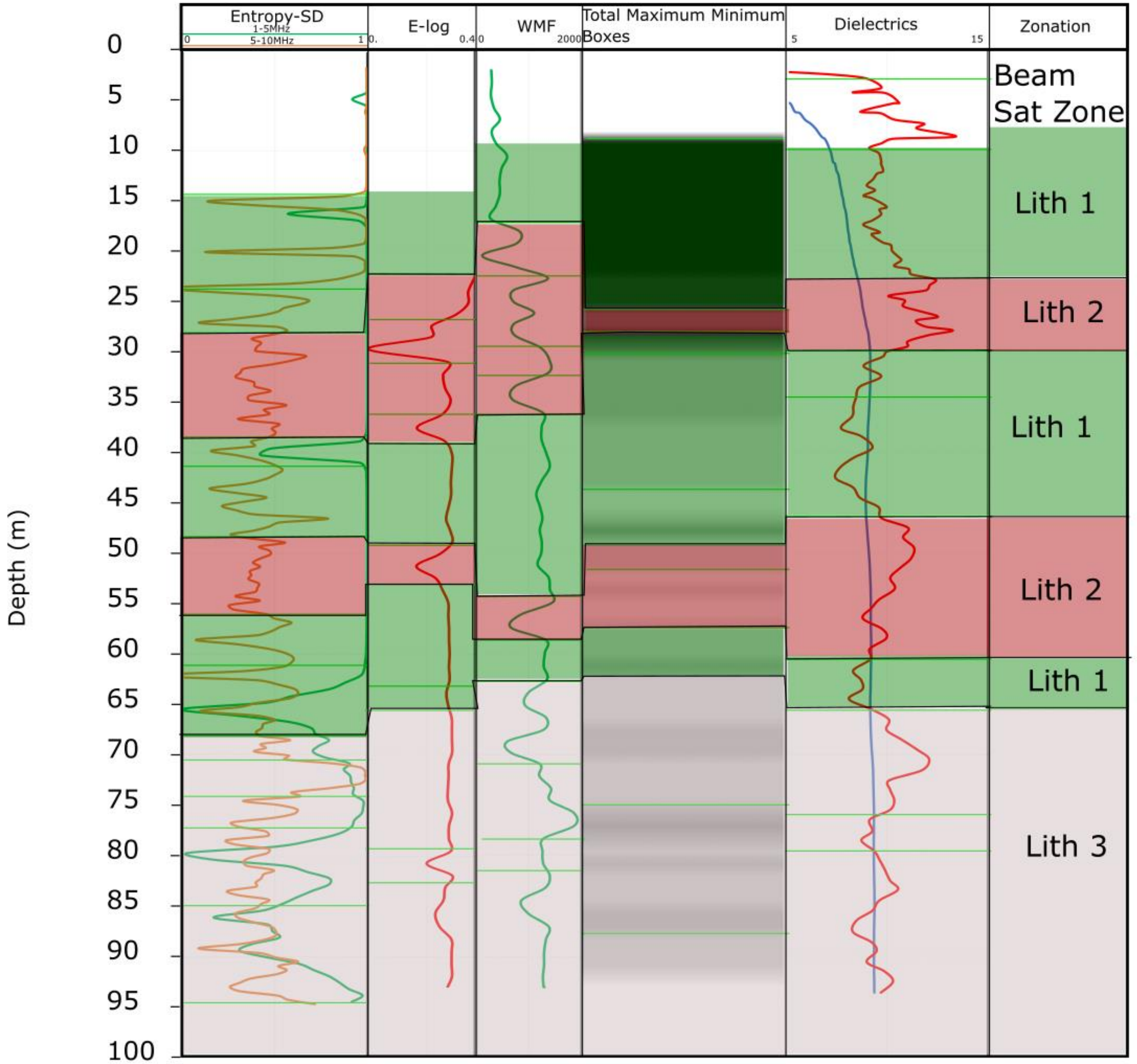
Where boundary lines are seen at near identical depths across parameters, new lines are drawn across the whole section.

3) **Methods:** Zonation



Where boundary lines are seen at near identical depths across parameters, new lines are drawn across the whole section.

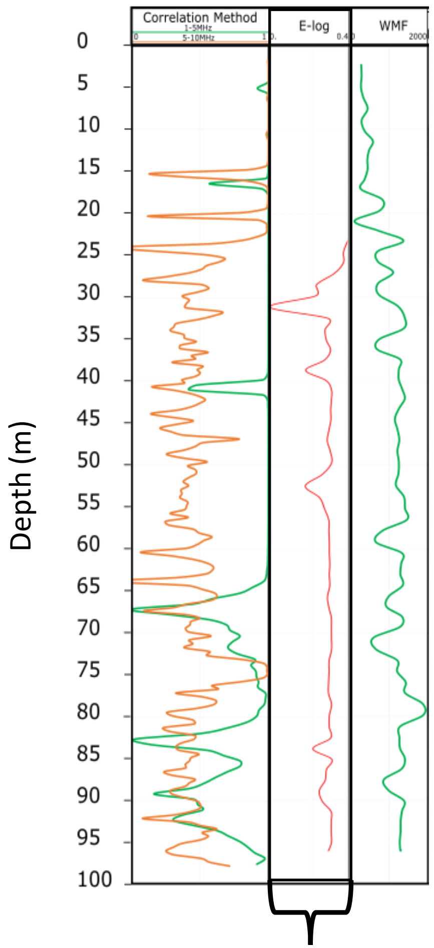
3) Methods: Zonation



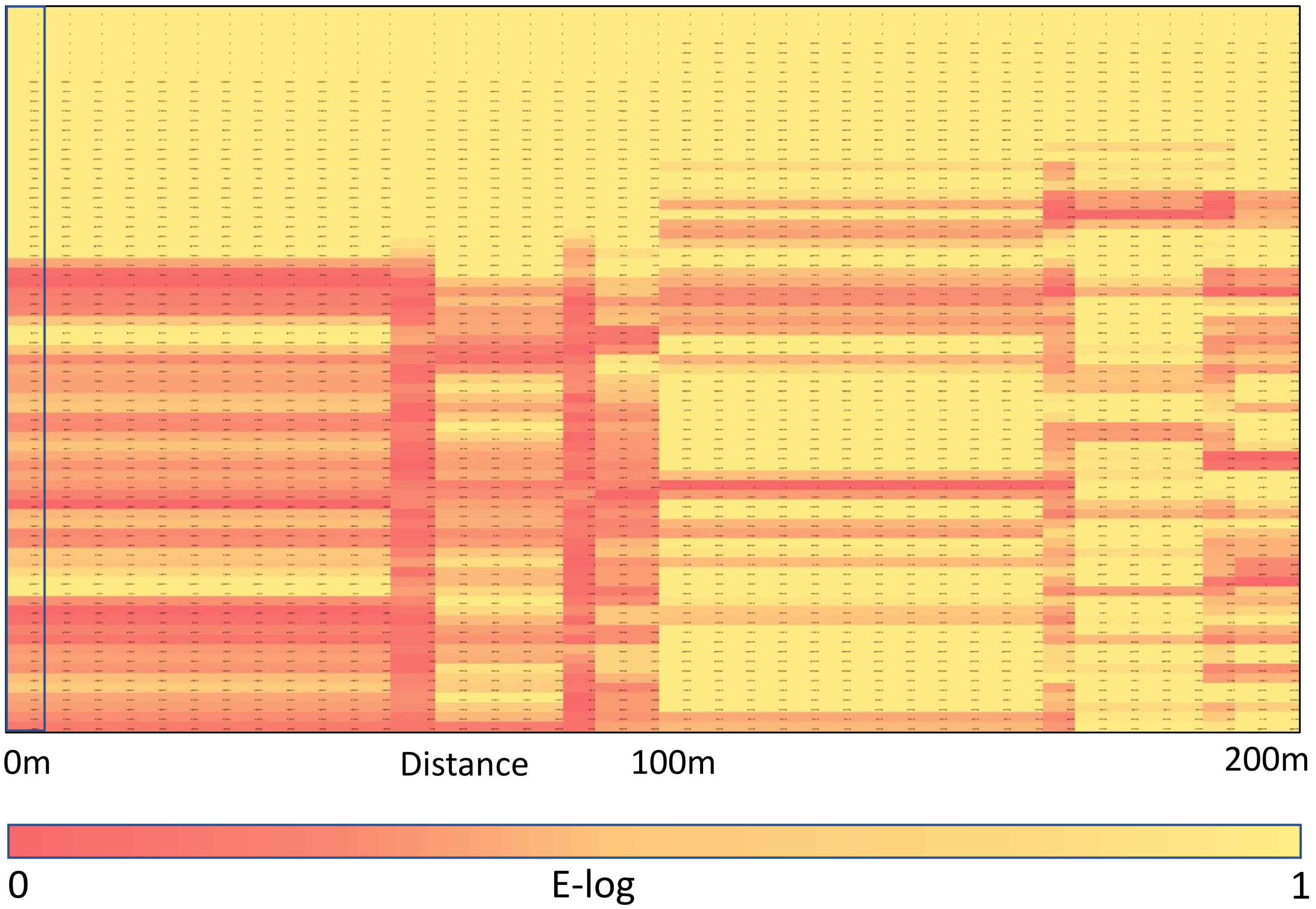
Boxes are then joined around these boundary lines and each box given a number, colour code and quantitative description for each parameter.

If at a specific depth, contradictory indicators are seen (for low dielectrics corresponding to low E-log) then the final zone is defined as the most.

3) Methods: P-scan



Available for every 5m of the P-scan



This was completed for four parameters used for the Zonation:

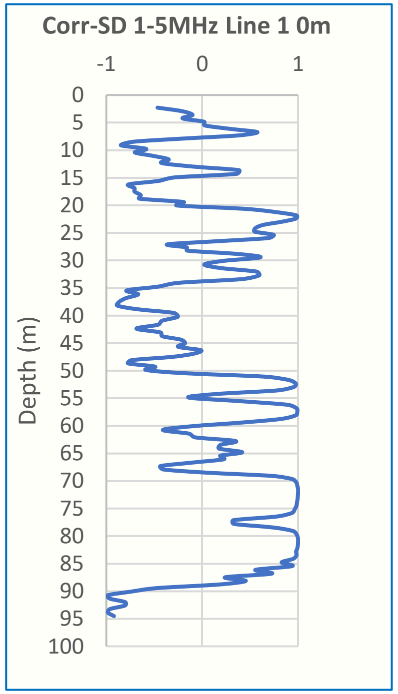
Entropy-Standard Deviation 1-5 MHz, Entropy-Standard Deviation 5-10 MHz, E-log and Weighted Mean Frequency (WMF).

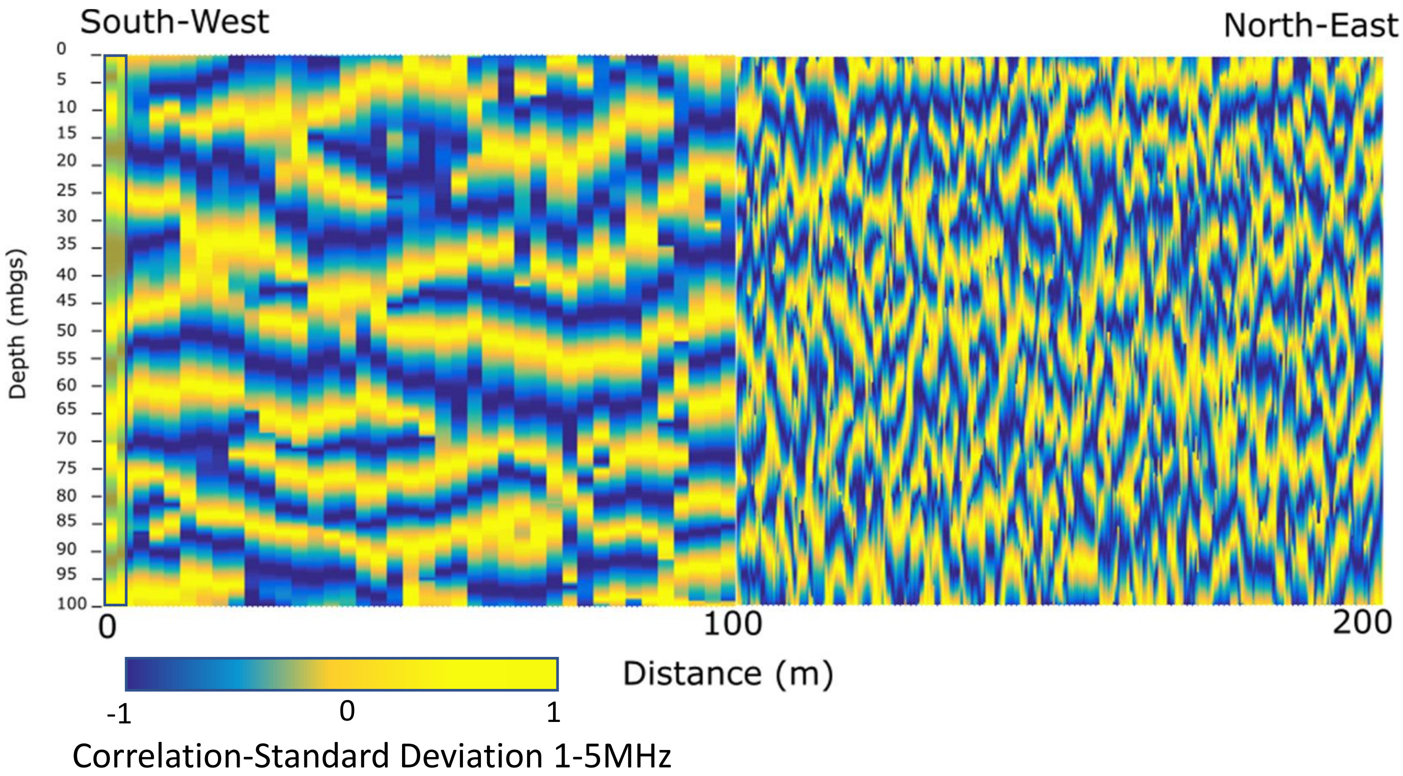
3) Methods: Phase P-scan

Phase P-scan Settings

P-scans at both lines were extracted using the PROScanDCO script with the following settings.

Prestacking 10
Dering 3
Spatial Smoothing 5
Pixels per metre 50

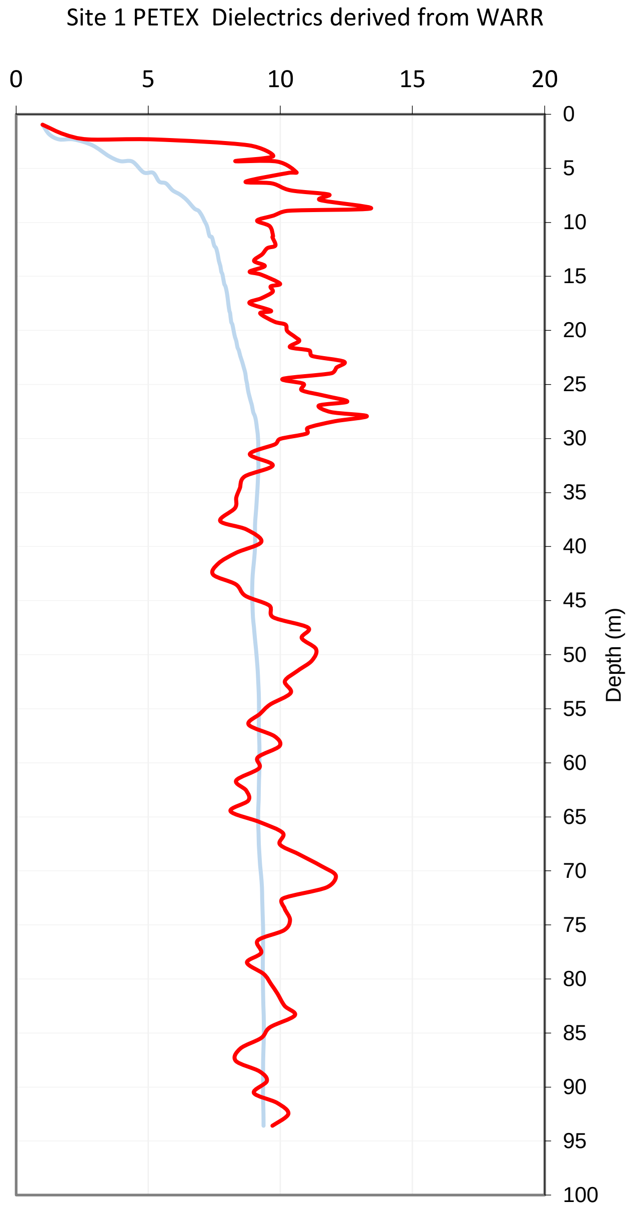




- The 1-5MHz was output for the full 200m P-scan using the phase settings above. The standard deviation was subtracted from the correlation.
- This was used to identify structures across the profile line.

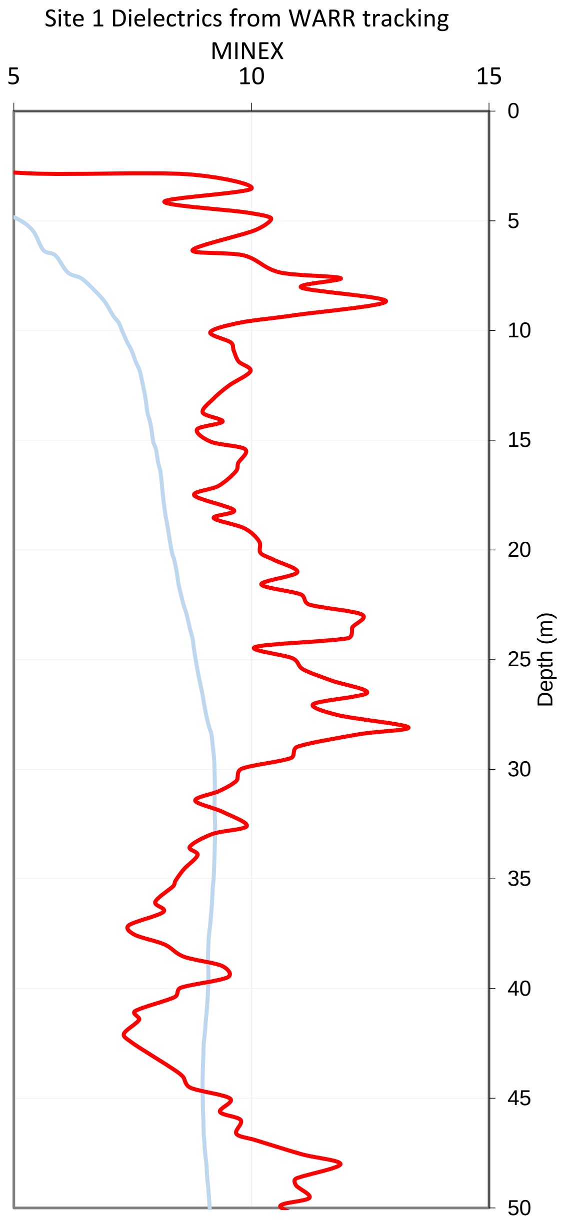
Results: Site 1 and Site 2

4) Site 1 PETEX Dielectrics



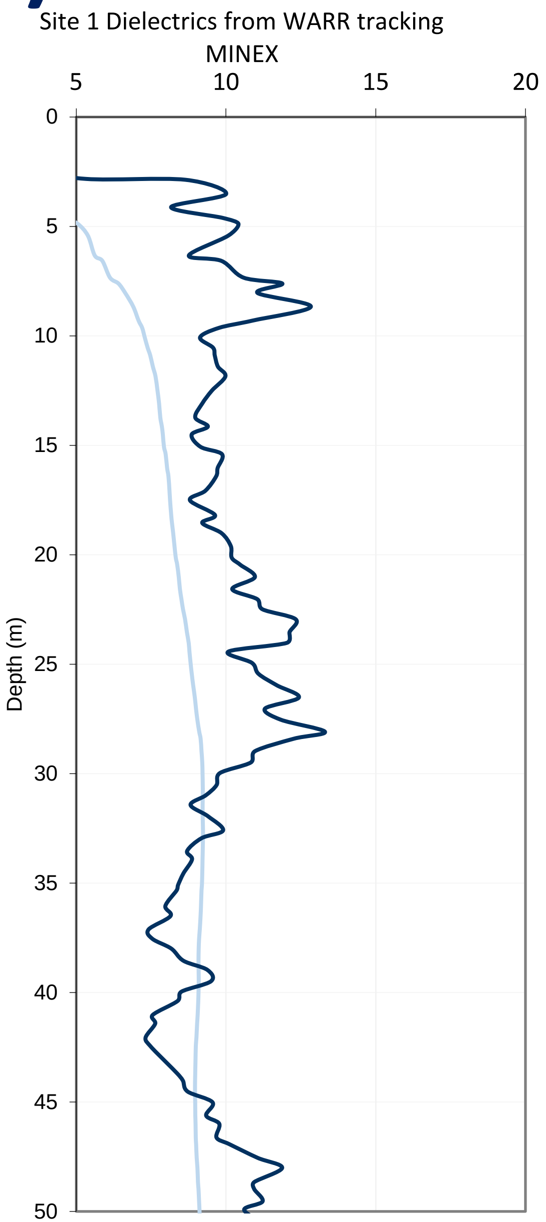
- The dielectric profile is for the Site 1 PETEX antenna is shown.
- Dielectrics as high as 13 are seen, peaking at 8m and 28m
- Lower dielectrics (between 6 and 7)usually occurring as 10m thick troughs are seen at 30m-40m, 55m-65m.

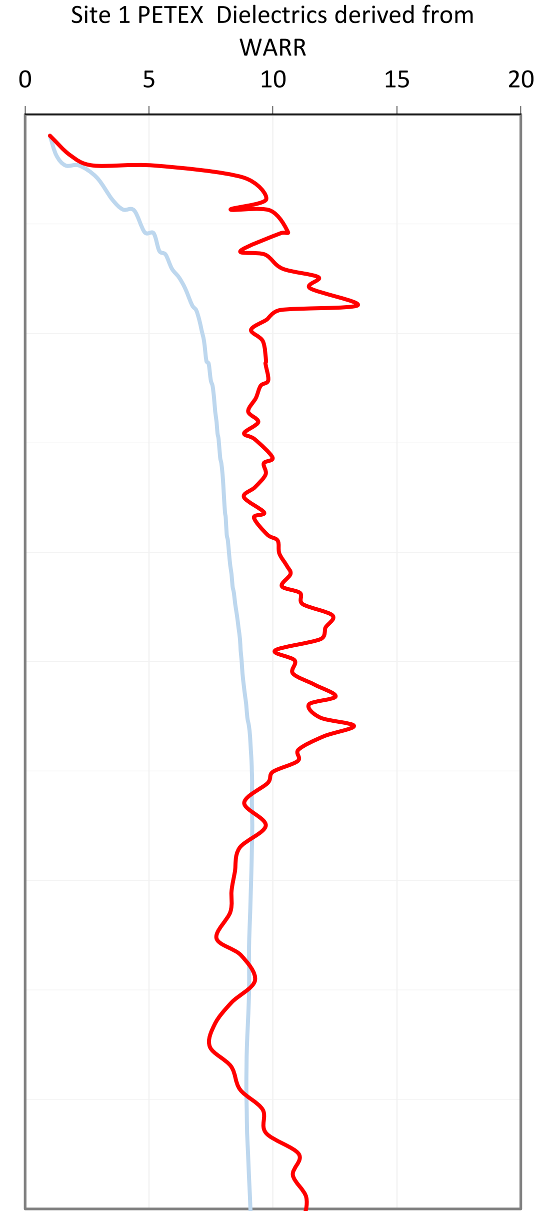
4) Site 1 MINEX Dielectrics



- The dielectric profile is for the Site 1 MINEX antenna is shown.
- Dielectrics as high as 13 are seen, peaking at 8m and 28m with a peak of 11.8 at 48m
- Lower dielectrics (between 7 and 9) usually occurring as 10m thick troughs are seen at 35-45m.

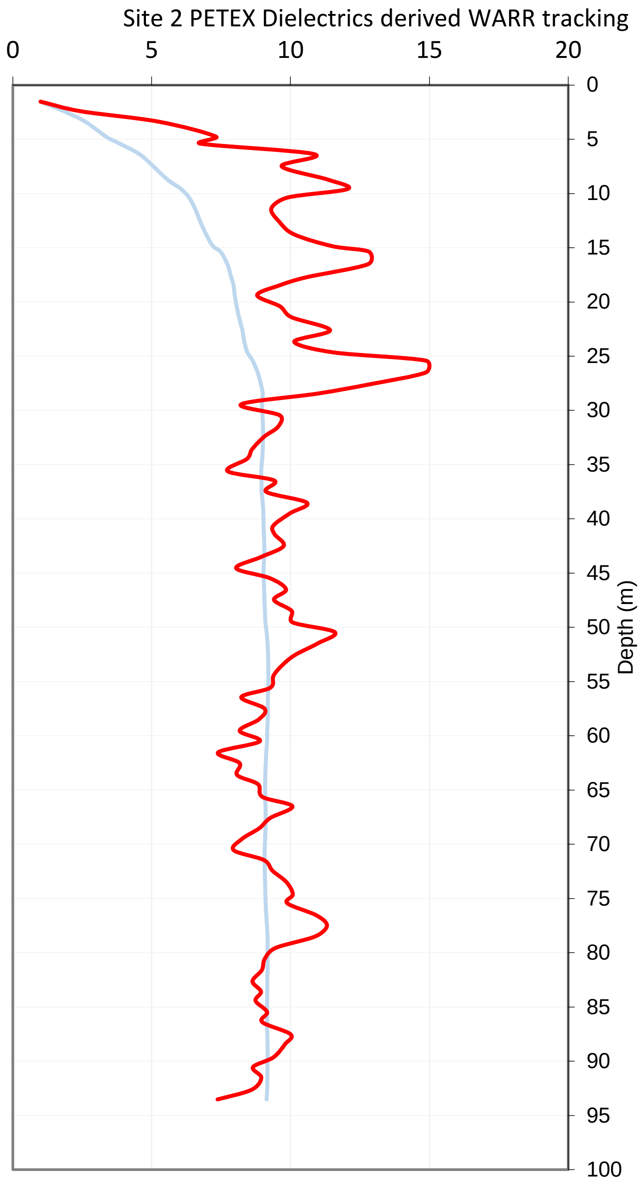
4) Site 1 Dielectrics MINEX vs PETEX Top 50m





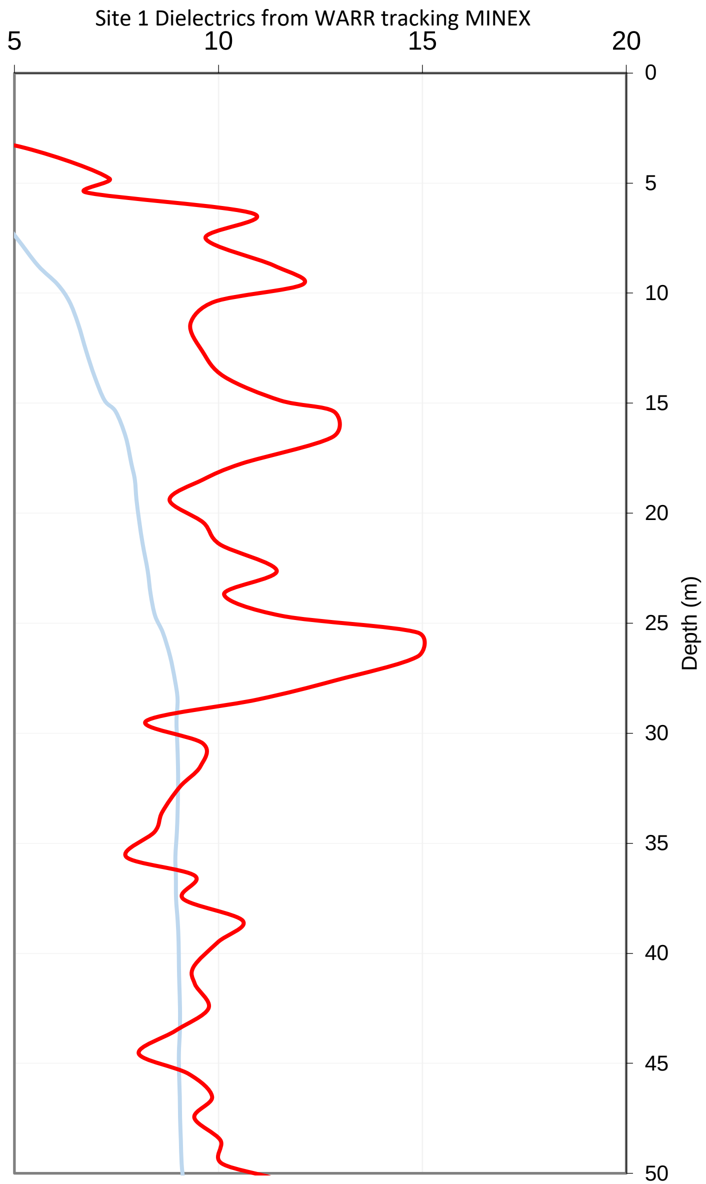
- The dielectrics calculated from the WARR tracking are compared both the MINEX & PETEX dielectrics.
- Patterns and values are virtually identical for the 50m section.
- This suggests repeatability between the PETEX & MINEX settings.
- This is an excellent result.

4) Site 2: PETEX Dielectrics



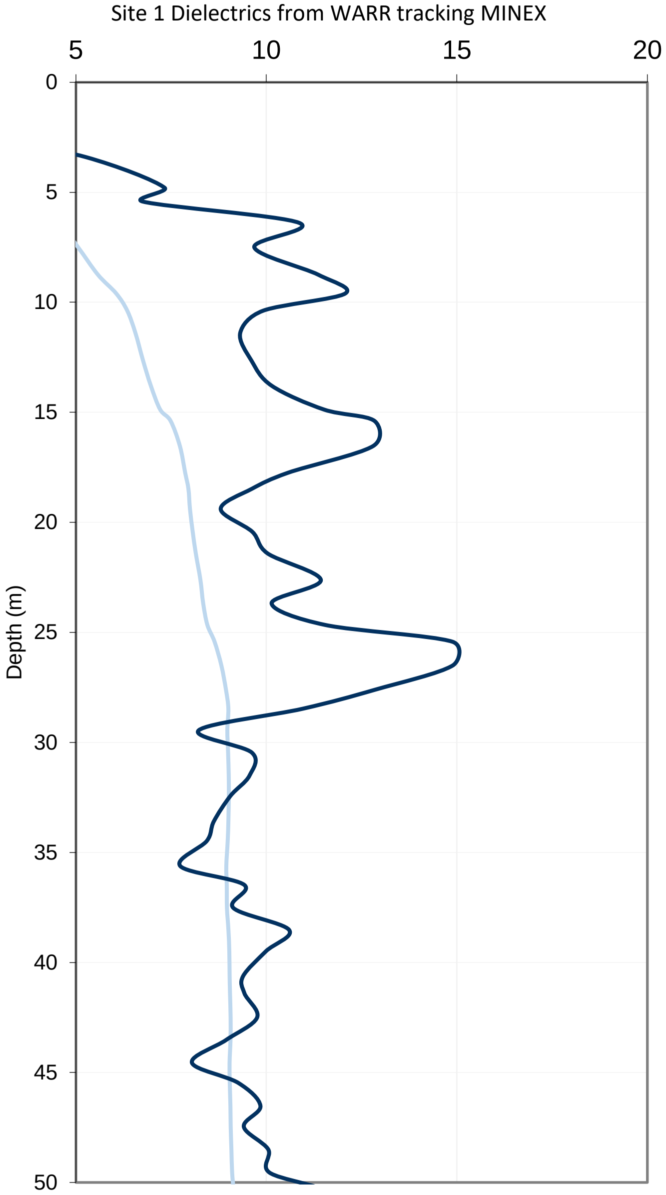
- The dielectric profile is for the Site 2 PETEX antenna is shown.
- Dielectrics as high as 15 are seen, peaking at 26m with peaks of 11 at 50m and 77m.
- Lower dielectrics usually with values of 8-9 are seen regularly between 30-35m, 55m-65m and 67m-72m.

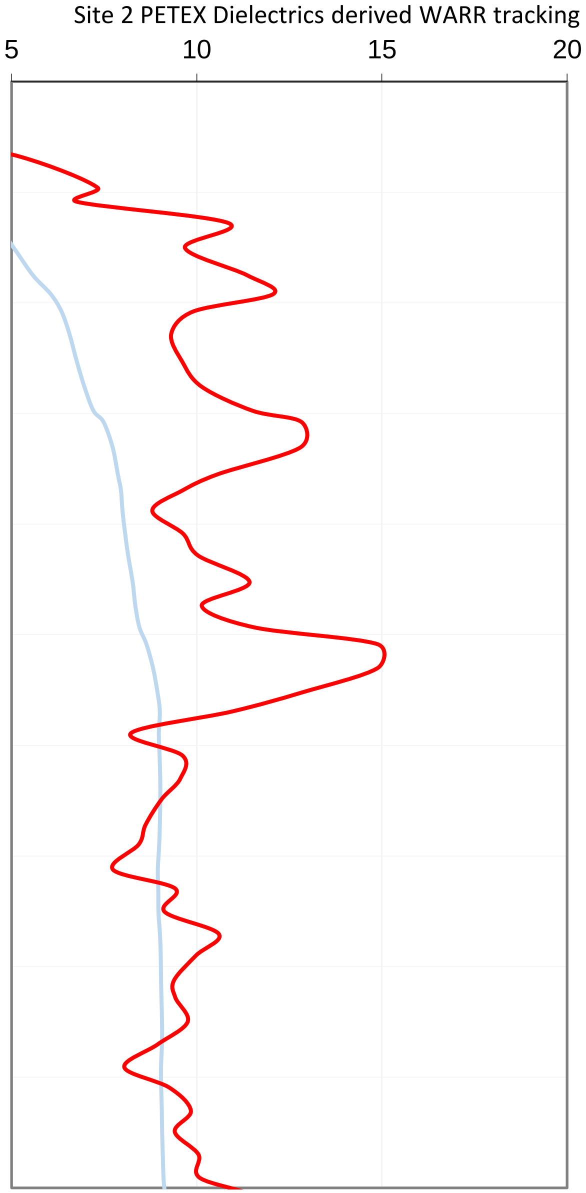
4) Site 2: MINEX Dielectrics



- The dielectric profile is for the Site 2 MINEX antenna is shown.
- Dielectrics as high as 13 are seen, peaking at 8m and 28m with a peak of 11.8 at 48m
- Lower dielectrics (between 7 and 9) usually occurring as 10m thick troughs are seen at 35-45m.

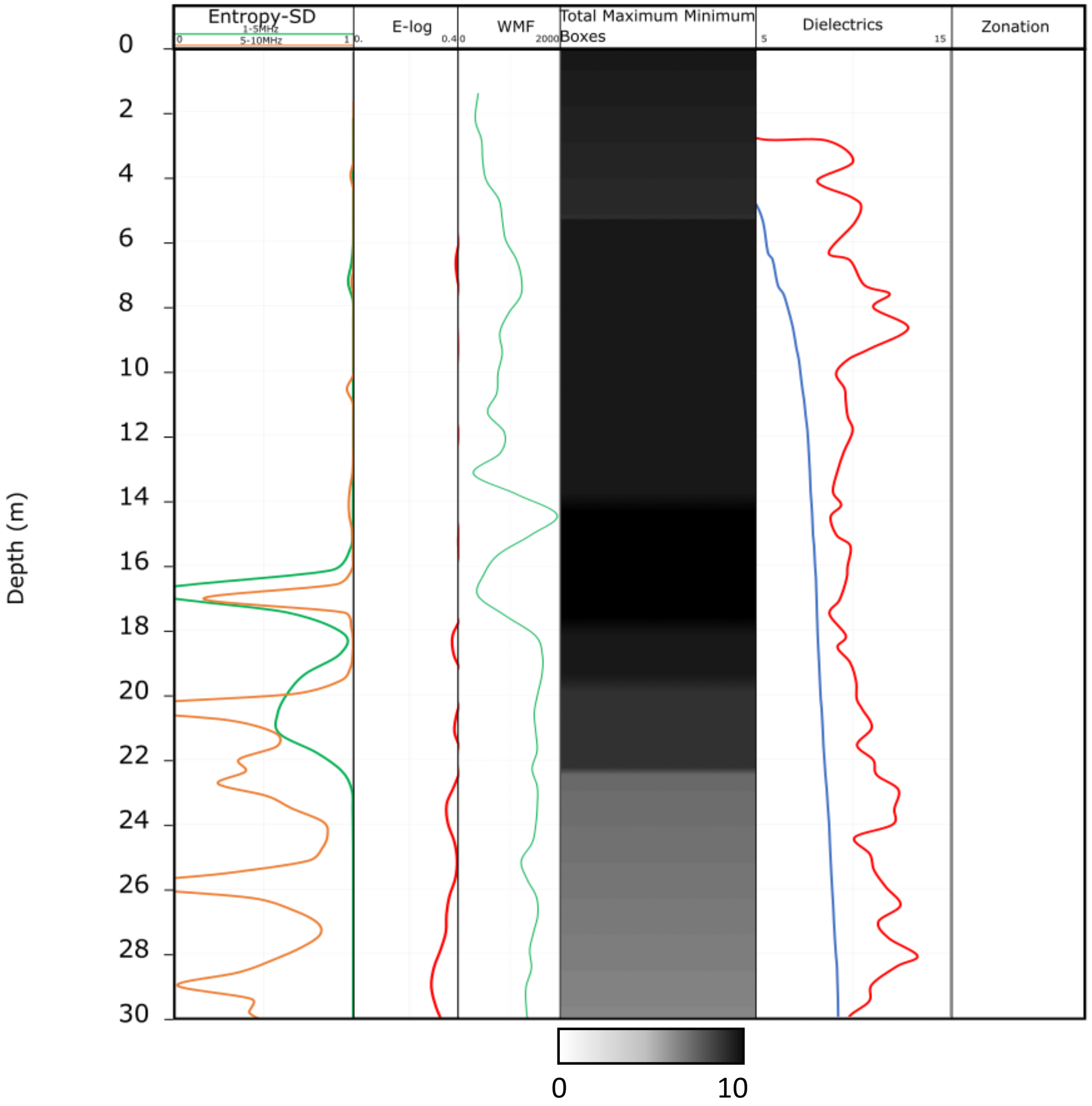
4) **Site 2** Dielectrics MINEX vs PETEX Top 50m





- The dielectrics calculated from the WARR tracking are compared both the MINEX & PETEX dielectrics.
- Patterns and values are virtually identical for the 50m section.
- This suggests repeatability between the PETEX & MINEX settings.
- This is an excellent result.

4) Zonation Site 1 MINEX



The parameters used for the zonation are displayed.

Regular troughs in the 5-10Mhz are seen below 17m but troughs in the 1-5MHz are only seen in between 16-22m.

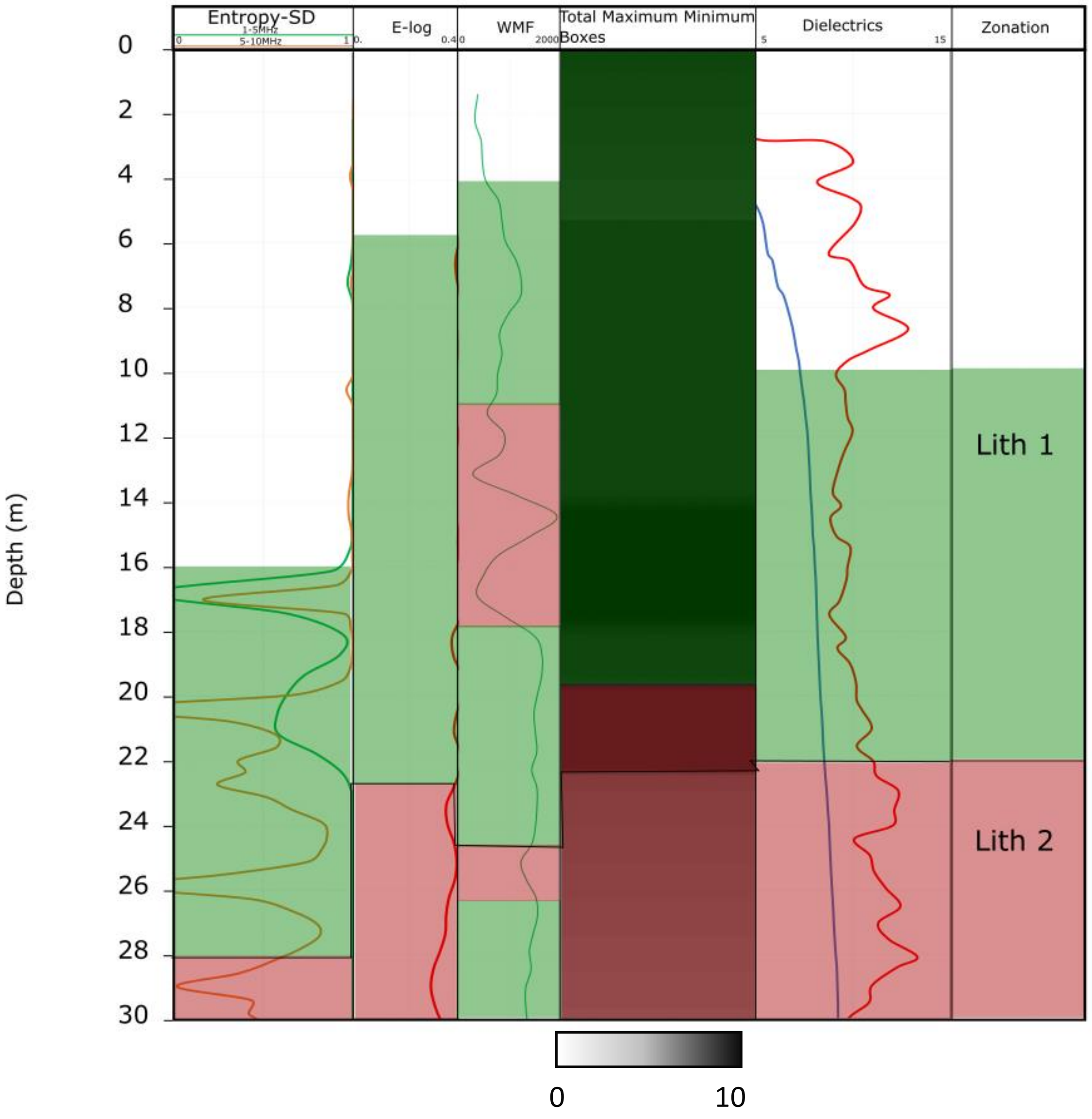
E-logs gradually decrease in value below 18m.

The WMF values remain steady between 0-13m and 18-30m but there is noticeable peak at 14m.

The total maximum-minimum boxes decrease from 8 to 5 below 22m.

The dielectric values have peaks at 8m and 23m but between this values drop from 10 to 7.

4) Zonation Site 1 MINEX



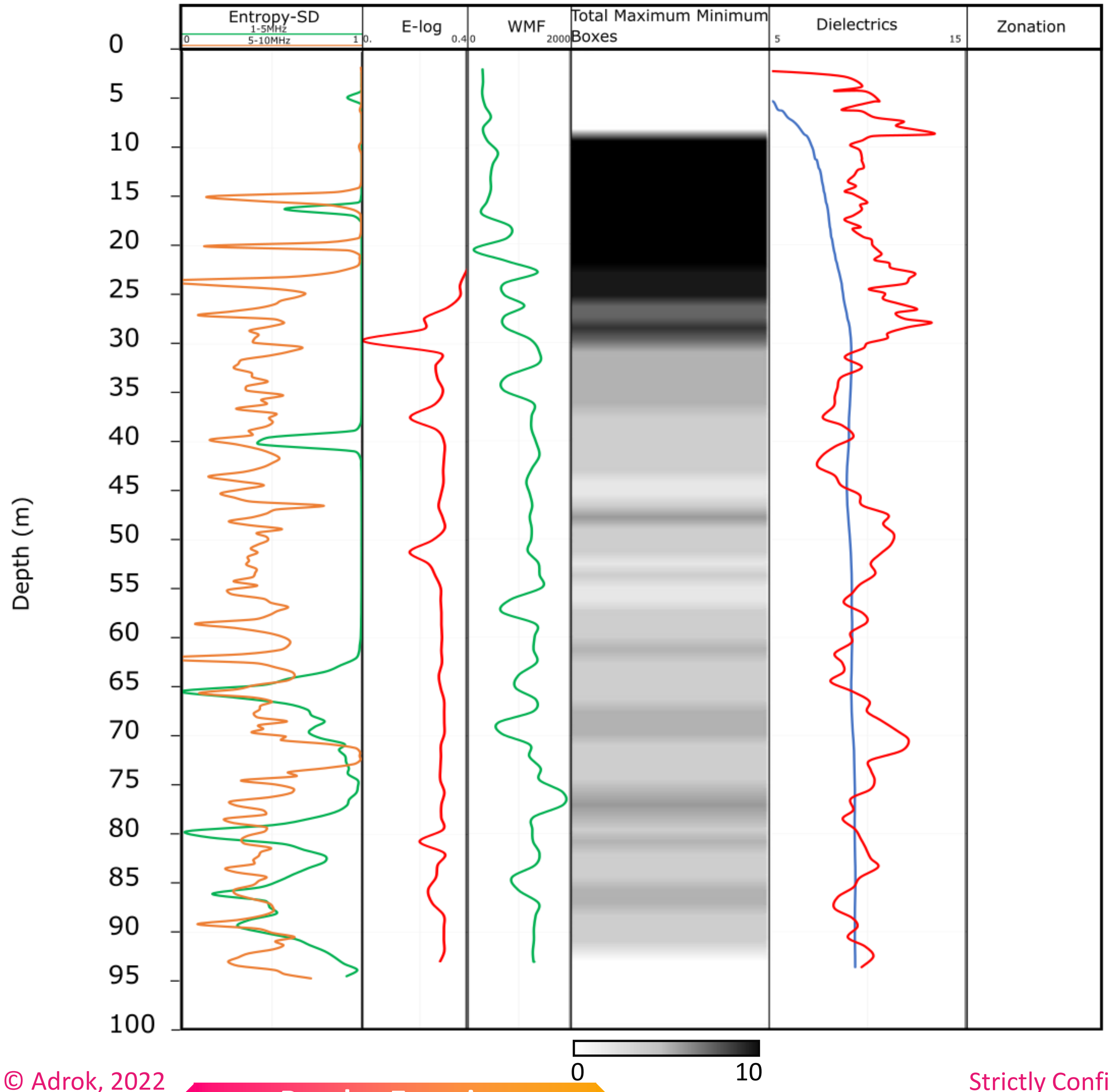
When an interpretation of these features is completed two potential lithologies are identified.

Broad ranges in both the 1-5MHz and 5-10MHz are seen between 16-28m. Below which only a narrower range of values is seen in the 5-10MHz.

For both E-logs and WMF, the lithology interpretation is defined by the presence of peaks and troughs.

In terms of saturation values decrease most significantly below 22m corresponding to an increase dielectrics. These parameters are key to defining the second lithology.

4) Zonation Site 1 PETEX



The parameters used for the zonation are displayed.

The 1-5MHz shows occasional troughs from 1 to 0.5 between 0 to 70m. Values then stay below 0.7 for the rest of the V-bore. In contrast the 5-10MHz remain below 0.5 below 25m.

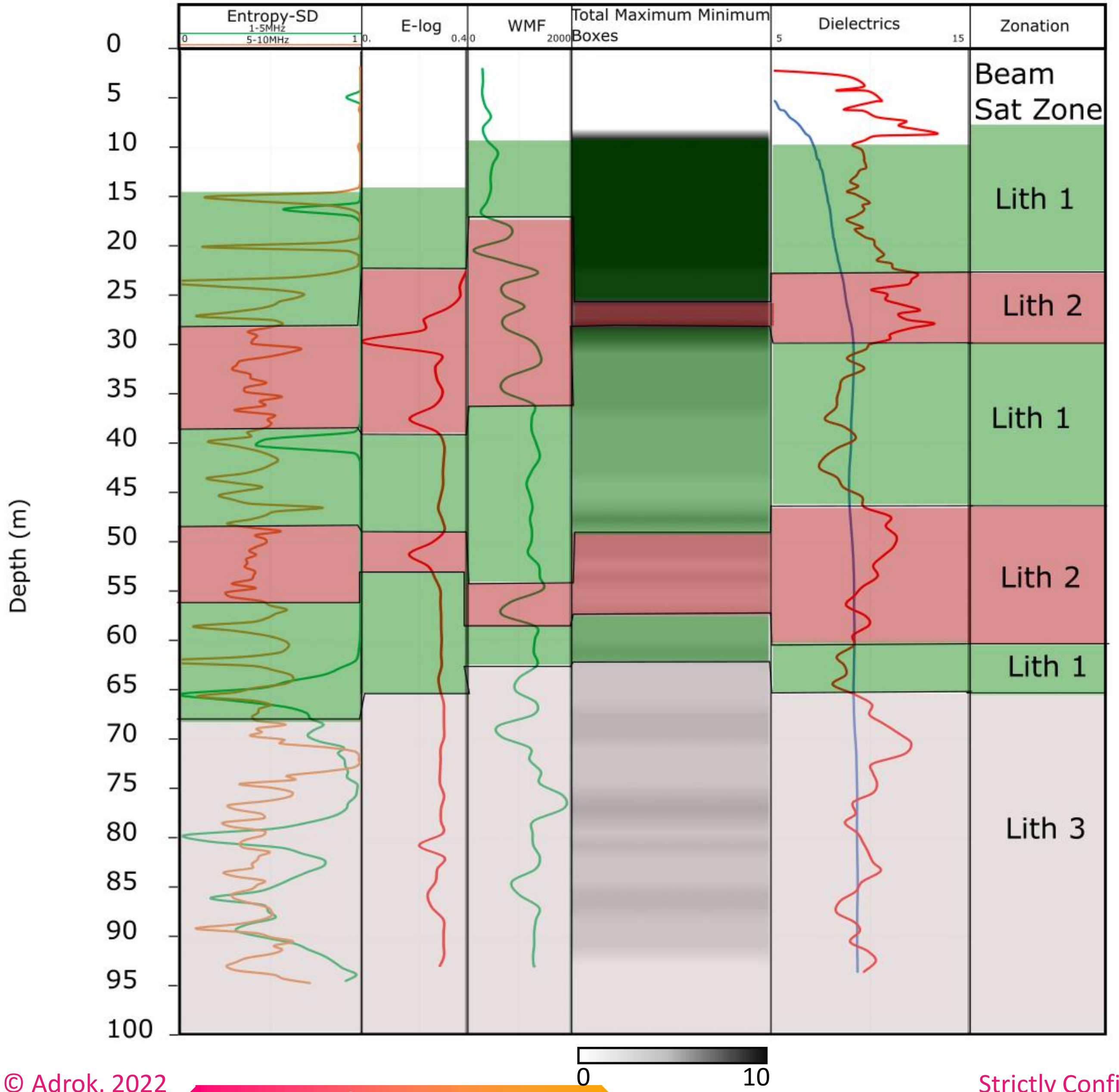
E-log values drop to 0 at 27m but below this they remain between 0.2 and 0.3.

The WMF values stay around 1000 below 26m.

The total maximum-minimum boxes decrease from 8 to 5 below 22m apart from a small increase up to 7 at 78m.

Dielectric values increase up to 15 at 25m before staying between 7 and 11 down to 100m.

4) Zonation Site 1 PETEX

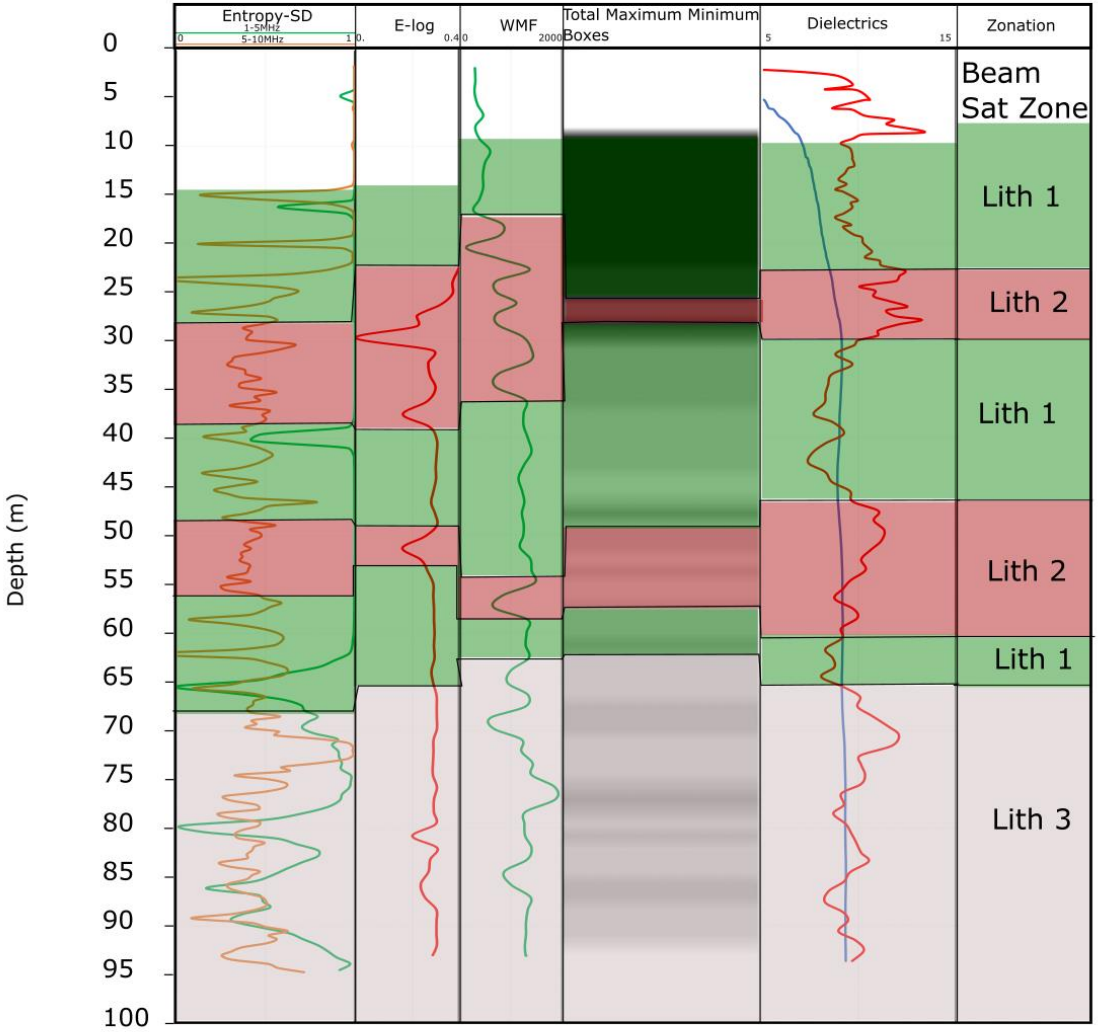


When an interpretation of these features is completed three potential lithologies are identified. The two lithologies identified in the MINEX are seen at the same depths.

A third lithology is defined below 70m. This is defined by the lowest values in the 1-5MHz range and the broadest range of values in the 5-10MHz at the within the same depths as the 1-5MHz.

Also below 70m a broader range of dielectrics than either lithology 1 and lithology 2 is observed and the Total Boxes never exceeds 5.

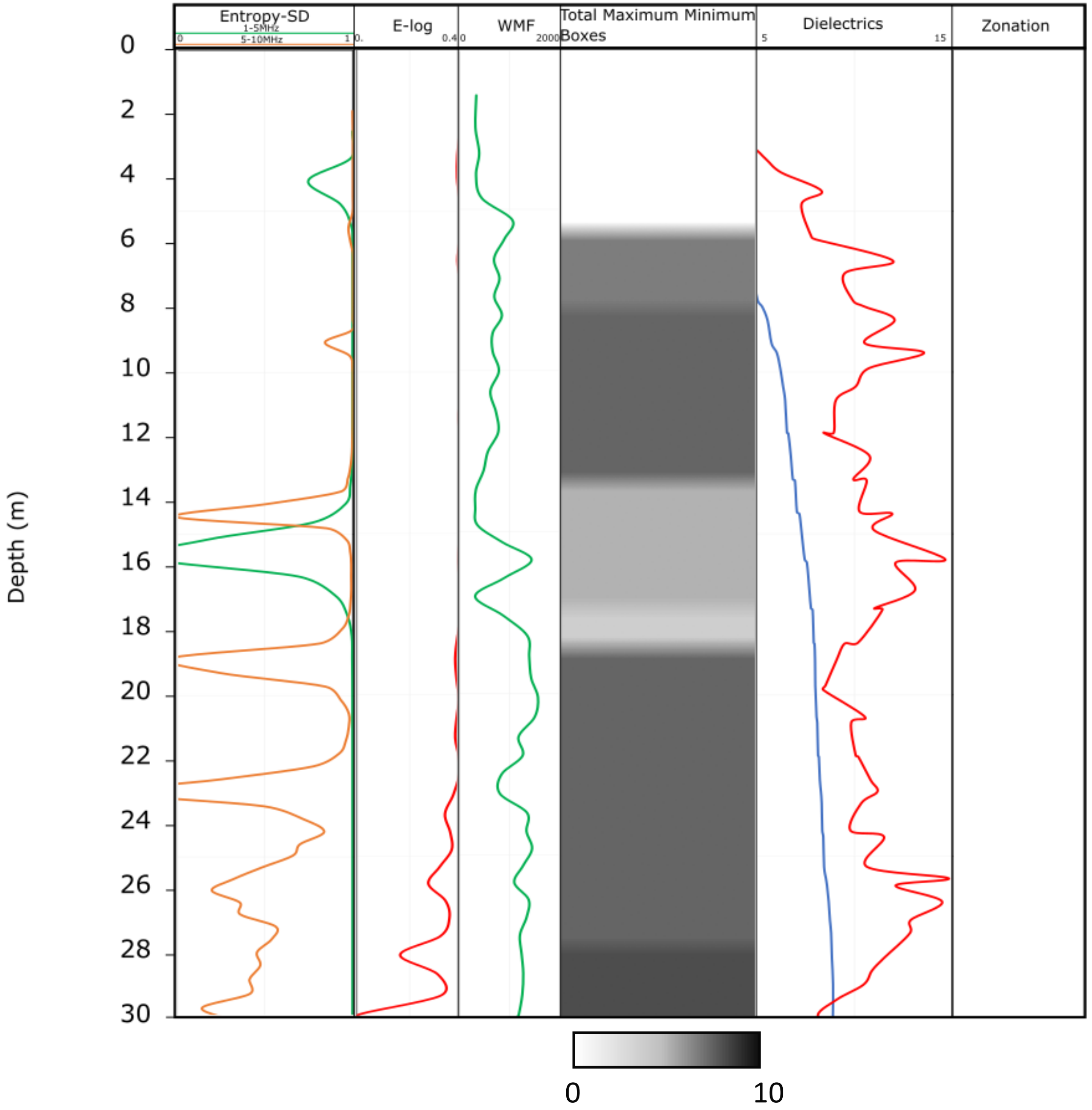
4) Zonation Interpretation Site 1



Depth (m)	Zone Name	Entropy	E-log	WMF	Saturation Boxes	Dielectrics
15-25	1	0-1 5-10MHz 0-1 for 1-5Mhz	One or close to 1	Stable values either near 0 or above 1000	Greater than 5	Usually lower than 9
25-30	2	0-1 5-10MHz 1 for 1-5Mhz	Usually Below 0.2	Usually below 1000	Less than 5 Usually 1-2	Usually greater than 9
30-47	1	0-1 5-10MHz 1 for 1-5Mhz	Above 0.2	Usually above 1000	Greater than 5	Usually lower than 9
47-60	2	0-1 5-10MHz Below 0.5 for 1-5Mhz	Usually Below 0.2	Usually below 1000	Less than 5 Usually 1-2	Usually greater than 9
60-68	1	0-1 5-10MHz 1 for 1-5Mhz	Above 0.2	Usually above 1000	Greater than 5	Usually lower than 9
68-100	3	Below 0.8 for 5-10MHz. Between 0 and 1 for 1-5Mhz	Range betweeen 0.2 to 0.3	Between 0 and 2000	Between 2 and 5	Between 8 and 11

The table above quantitatively defines the criteria for each parameter across the three lithologies.

4) Zonation Site 2 MINEX



The parameters used for the zonation are displayed.

Regular troughs in the 5-10Mhz are seen below 14m but troughs in the 1-5MHz are only seen at 16m.

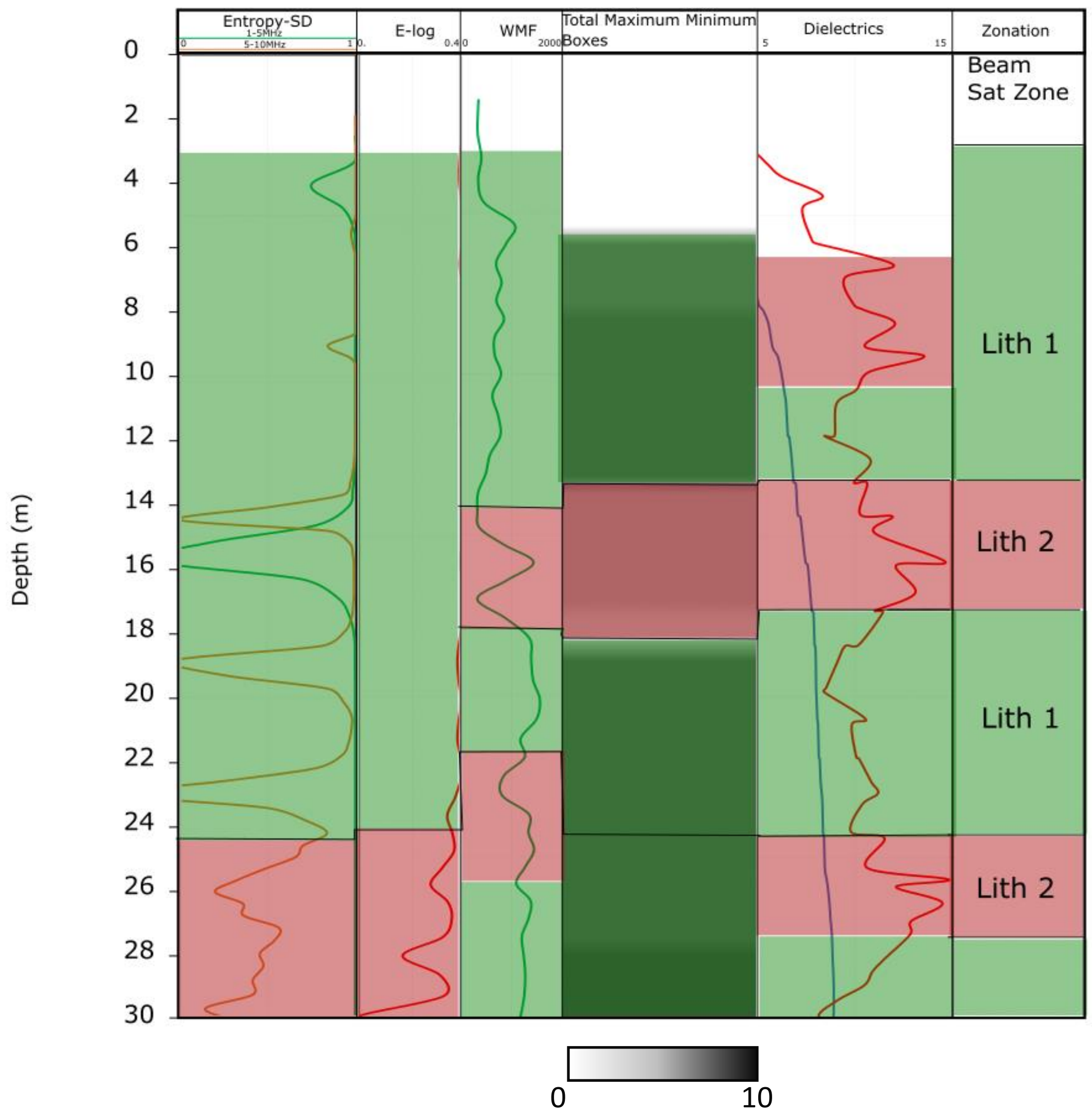
E-logs gradually decrease in value below 18m.

The WMF values remain steady between 0-4m and 6-14m, 18m-30m but there is noticeable peak at 16m.

The total maximum-minimum boxes show a distinct low of 2-3 between 13-19m. Above and below this values remain above 5.

The dielectric values have peaks at 8m and 23m but between this values drop from 10 to 7.

4) Zonation Site 2 MINEX



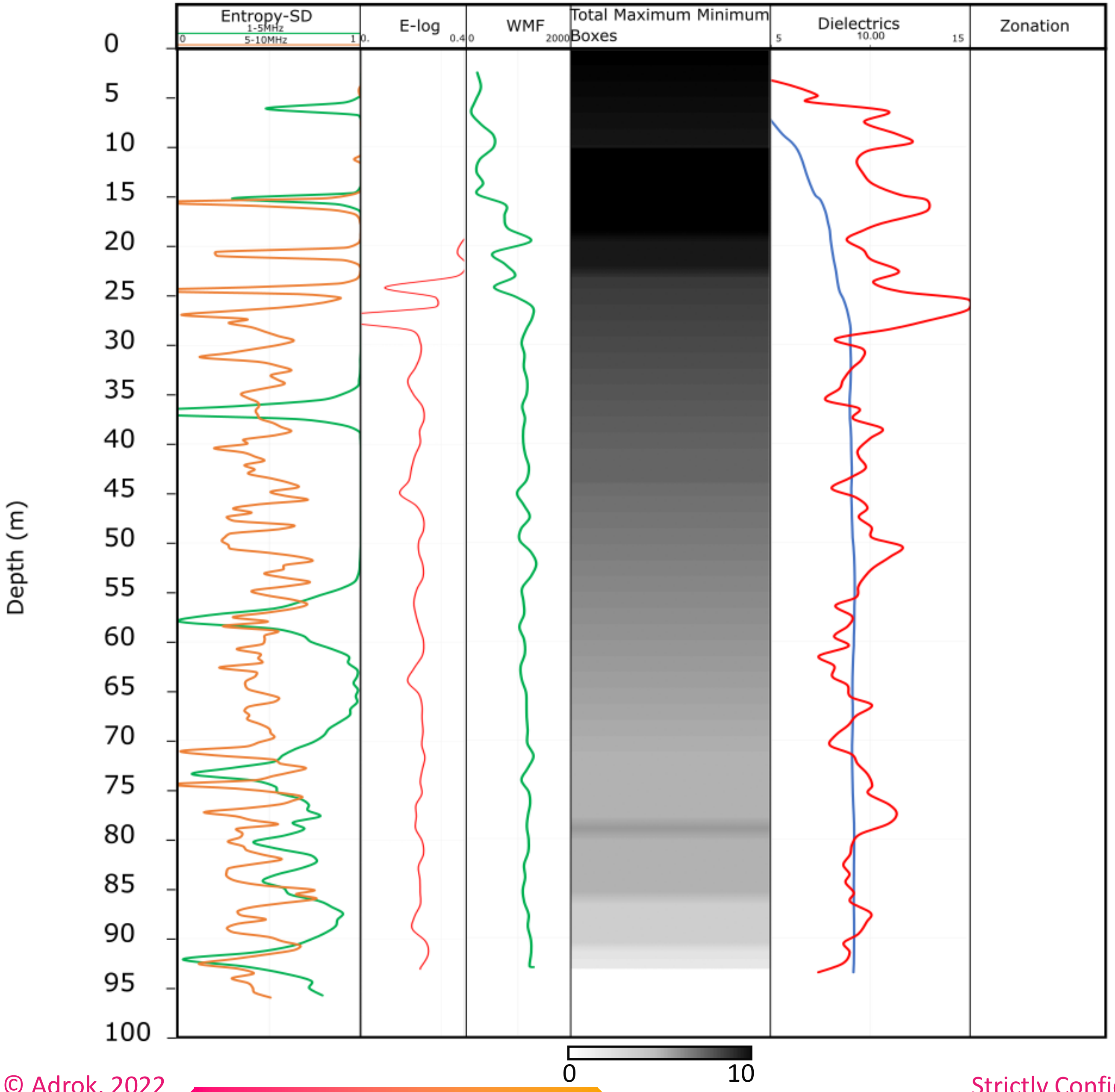
When an interpretation of these features is completed two potential lithologies are identified.

Broad ranges in both the 1-5MHz and 5-10MHz are seen between 14-24m. Below which only a narrower range of values is seen in the 5-10MHz. This is used to define the boundary between lithology 1 and lithology 2.

For both E-logs and WMF, the lithology interpretation is defined by the presence of peaks and troughs.

In terms of saturation values decrease most significantly between 14-18m helping to define the second lithology. Below 18m values increase close to 10 by 30m.

4) Zonation Site 2 PETEX



The parameters used for the zonation are displayed.

The 1-5MHz shows occasional troughs from 1 to 0.1 between 0 to 70m. Values then stay below 0.7 for the rest of the V-bore. In contrast the 5-10MHz remain below 0.5 below 25m.

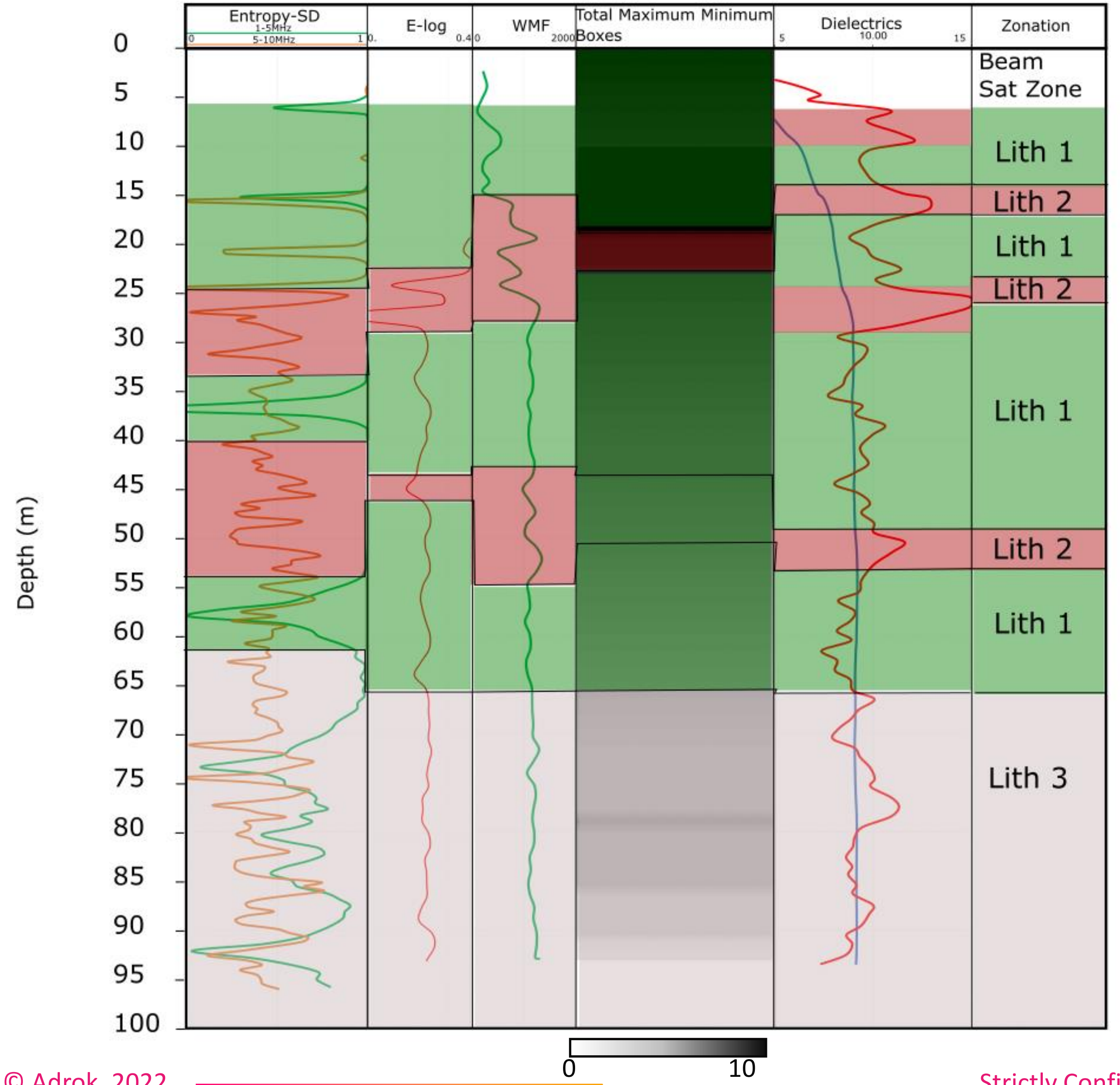
E-log values drop to 0 at 27m but below this they remain between 0.2 and 0.3.

The WMF values stay around 1000 below 27m.

The total maximum-minimum boxes decrease from 10 to 5 below 22m apart from a small increase up to 8 at 78m before decreasing to zero from 85m to 100m.

Dielectric values increase up to 15 at 26m before staying between 7 and 11 down to 100m.

4) Zonation Site 2 PETEX



When an interpretation of these features is completed the same three lithologies identified in Site 1 are identified in Site 2.

A third lithology is defined below 62m. This is defined by the lowest values in the 1-5MHz and the broadest range in the 5-10MHz.

Also below 70m a broader range of dielectrics than either lithology 1 and lithology 2 is observed and the Total Boxes never exceeds 5.

.

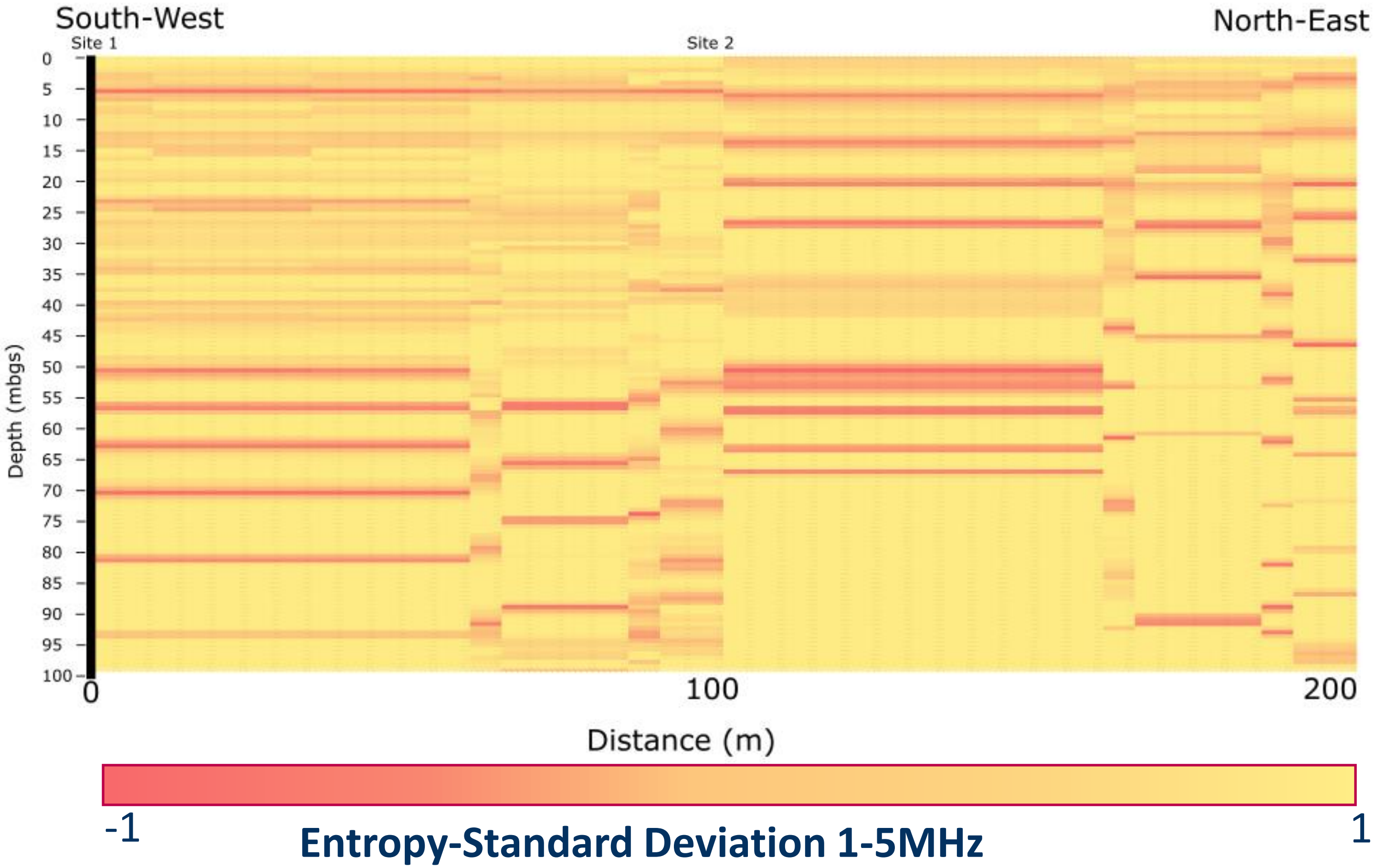
4) P-scan Image Entropy- Standard 1-5MHz

For each parameter used for the zonation, values for calculated at 5m horizontal intervals.

For the Entropy-Standard Deviation 1-5MHz lowest values are seen between 50-80m increasing to 65m beyond after 100m.

Jumps in values are seen between 60-100m and 170-190m.

The results suggests for this parameter suggest very little change in the lithology over the 200m.

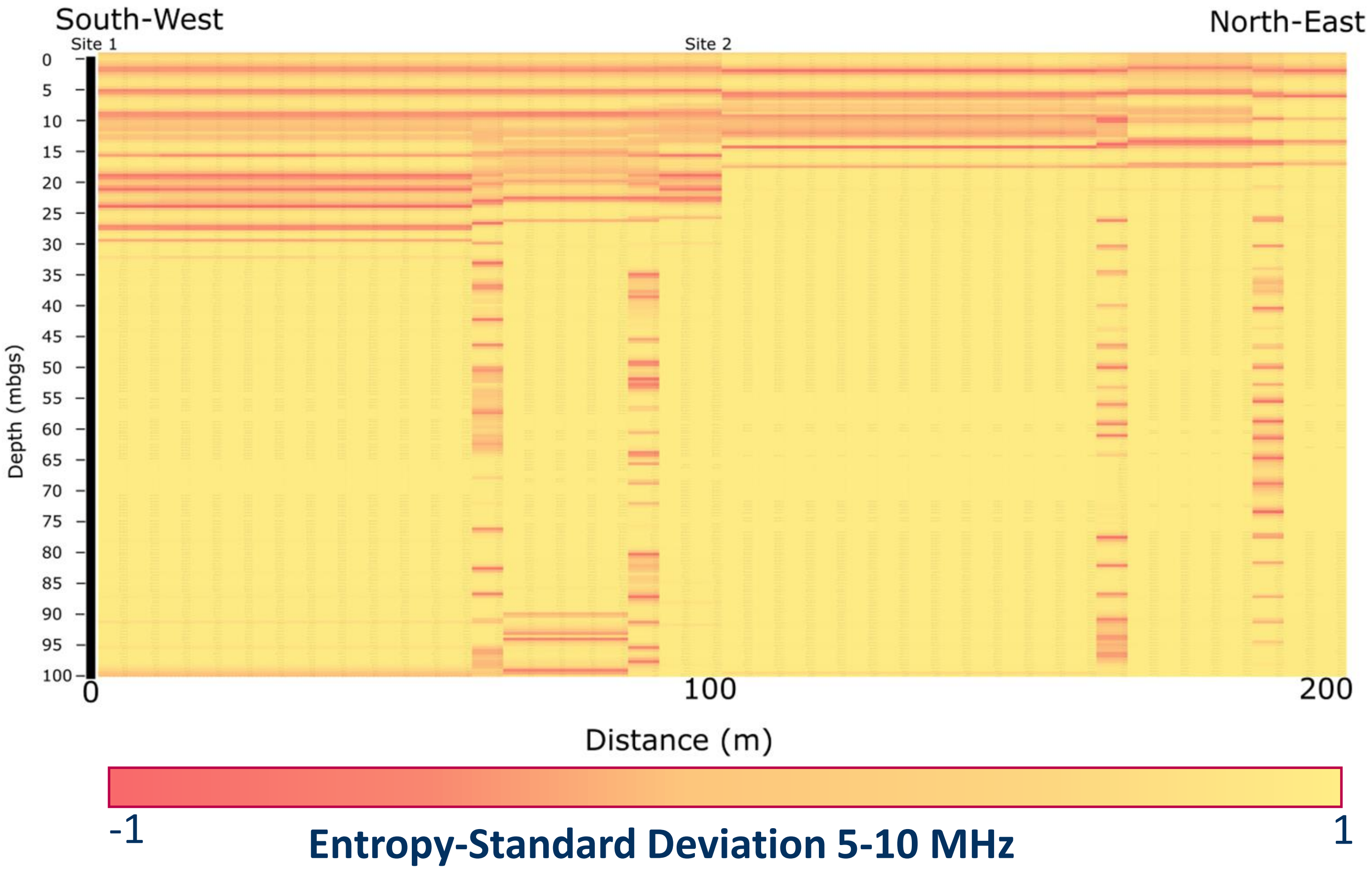


4) P-scan Image Entropy- Standard Deviation 5-10MHz

For each parameter used for the zonation, values for calculated at 5m horizontal intervals.

For the Entropy-Standard Deviation 5-10MHz lowest values are seen in the top 20m but there are troughs regularly between 60m-90m and 160m and 185m.

For the stare data it was shown values are moderate below 25m so the P-scan results suggest some variation in lithology with an increased presence of lithology 2 in these areas.



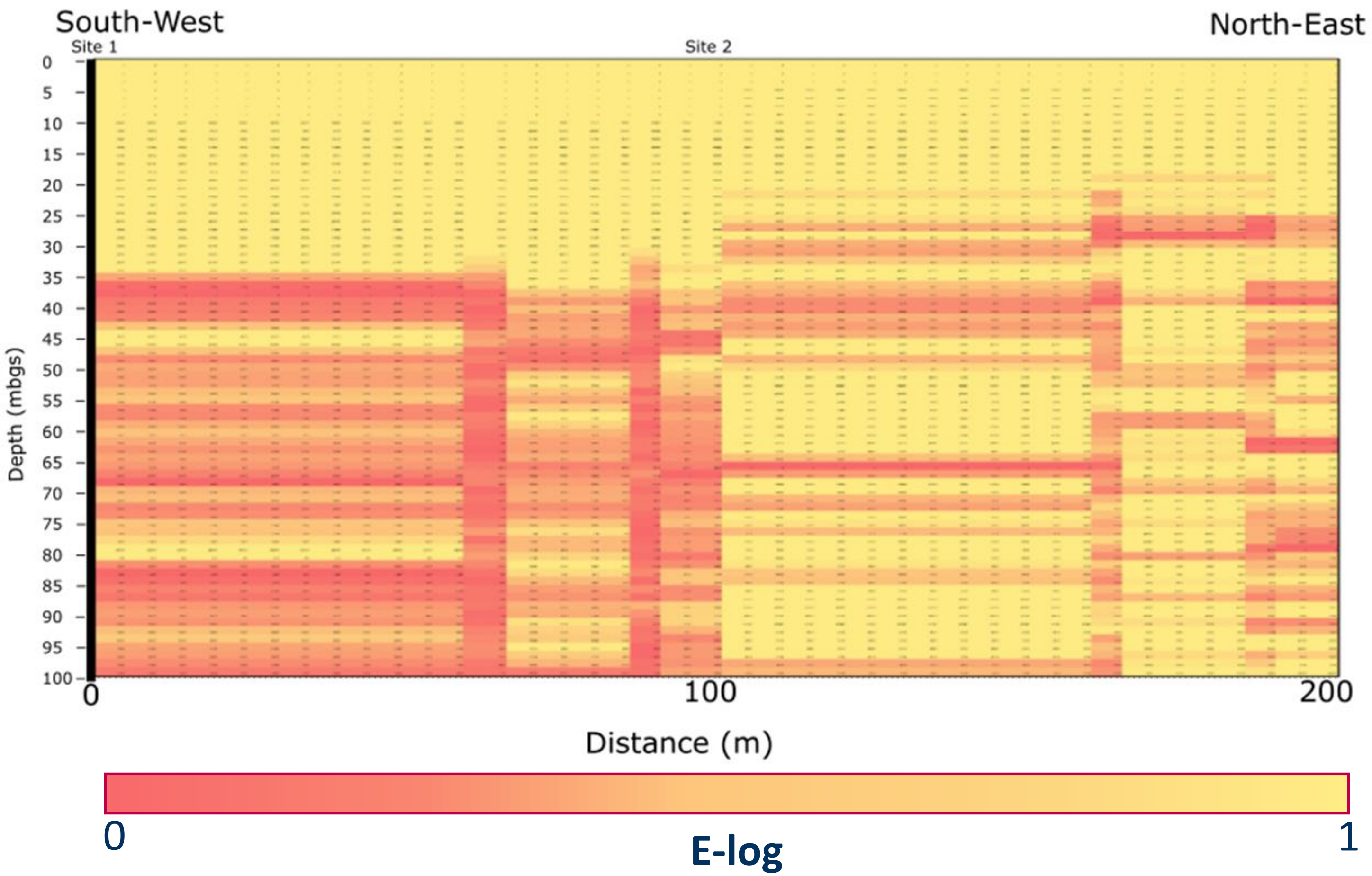
4) P-scan Image E-log

For each parameter used for the zonation, values for calculated at 5m horizontal intervals.

For the E-log, troughs (indicative of lithology 2) are regularly seen at 35m-45m and 65-70m from 0 to 170m.

Between 100m-165m there is an absence of troughs between 45-65m and 75-95m below the ground surface.

When compared with the stares the strong trough at 65m is indicative of the boundary between lithology 1 and lithology 3. This suggests the boundary is consistent up until 170m when the troughs shifts up to 62m.



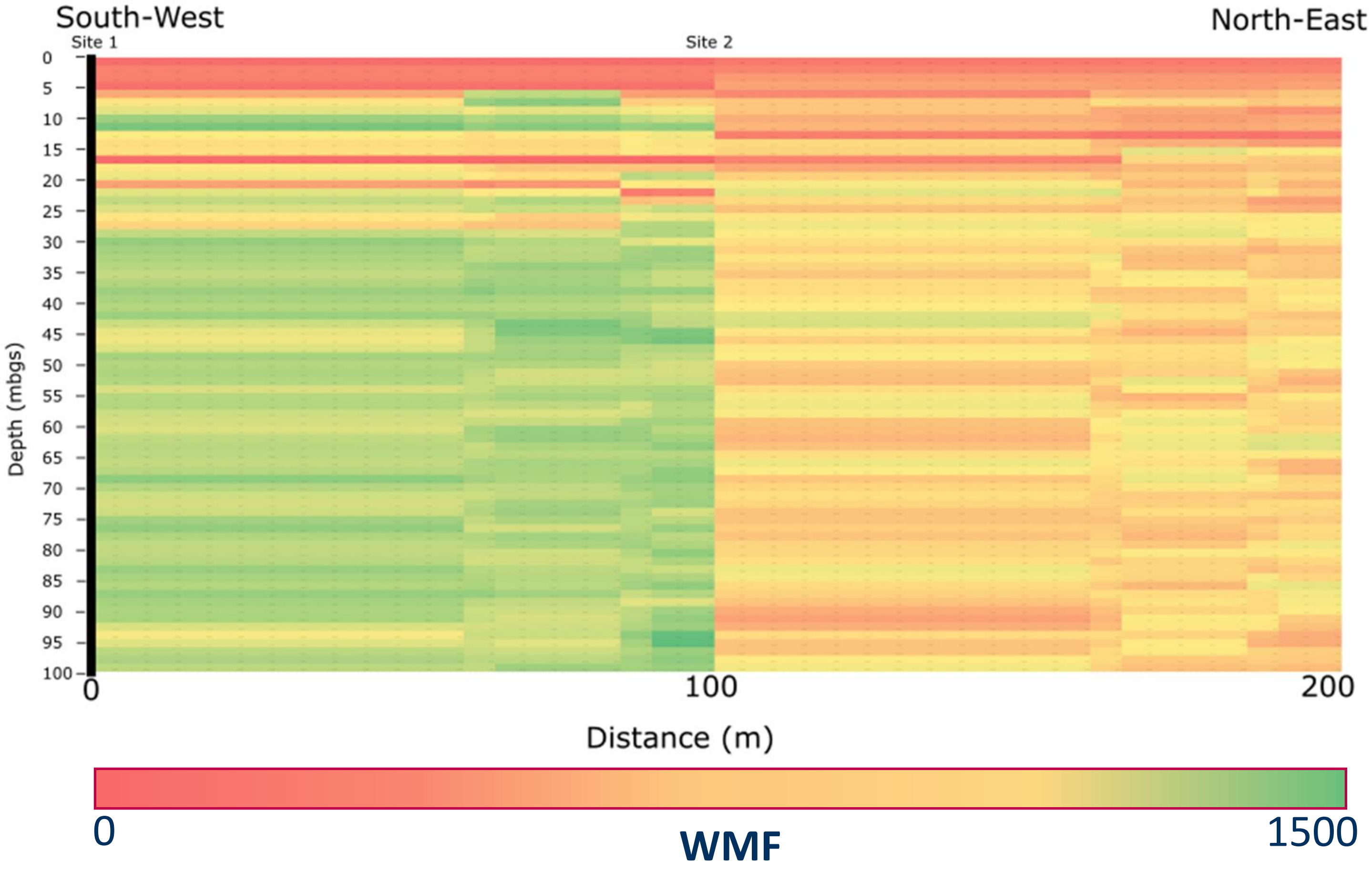
4) P-scan Image WMF

For each parameter used for the zonation, values for calculated at 5m horizontal intervals.

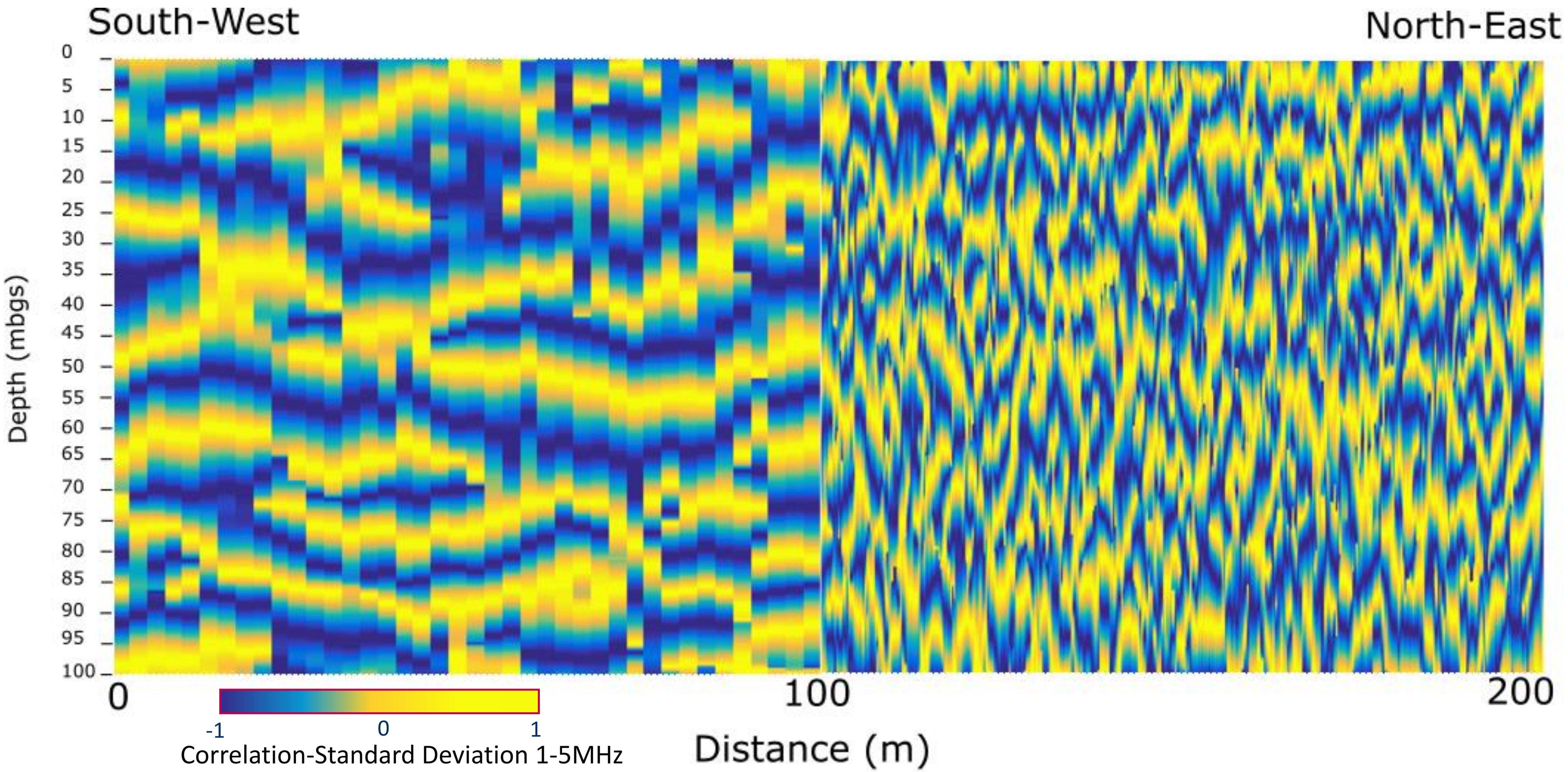
For the WMF, peaks and troughs in close proximity (indicative of lithology 2) are seen between 15-25m throughout the full 200m long section and 40-60m between 0-60m along the profile line.

Below this section the major area of contrast is seen between 100m-170m especially between 50-60m and 80-90m. Between 170-200m this area deviates between 50-70m below ground level.

The stare results suggest little variation below 65m indicative of the boundary between lithology 1 and lithology 3. The P-scan results suggests variability in this zone between 160-180m.

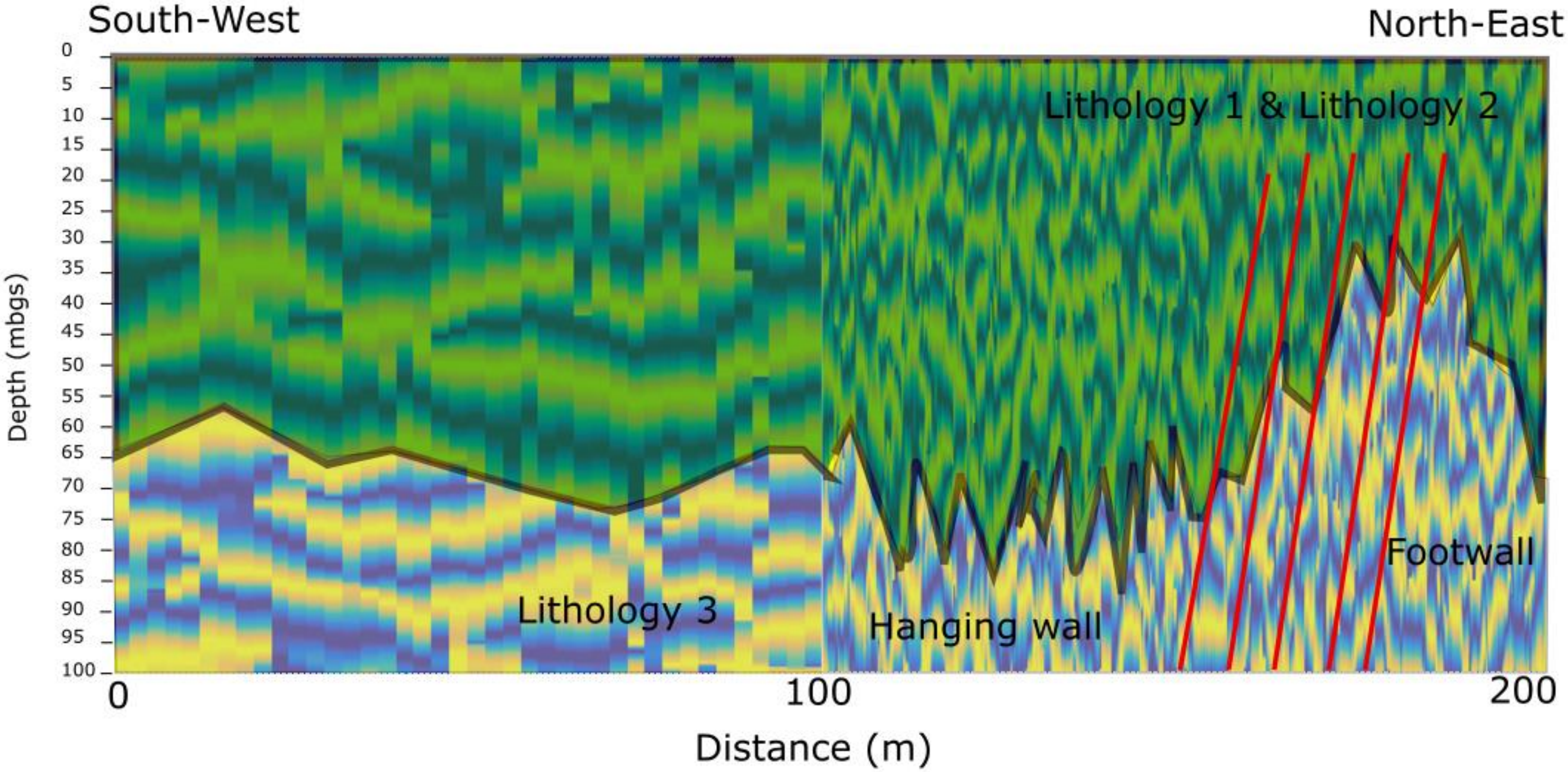


4) P-scan Image Phase (Correlation)



The correlation data has been for the 200m image is shown. This shows a relatively smooth first 100m with strong low and high correlation values running across the whole section between 50-60m. This zone becomes more disjointed in the north-easterly 100m but the highs and lows are still visible across the full section between 50-60m.

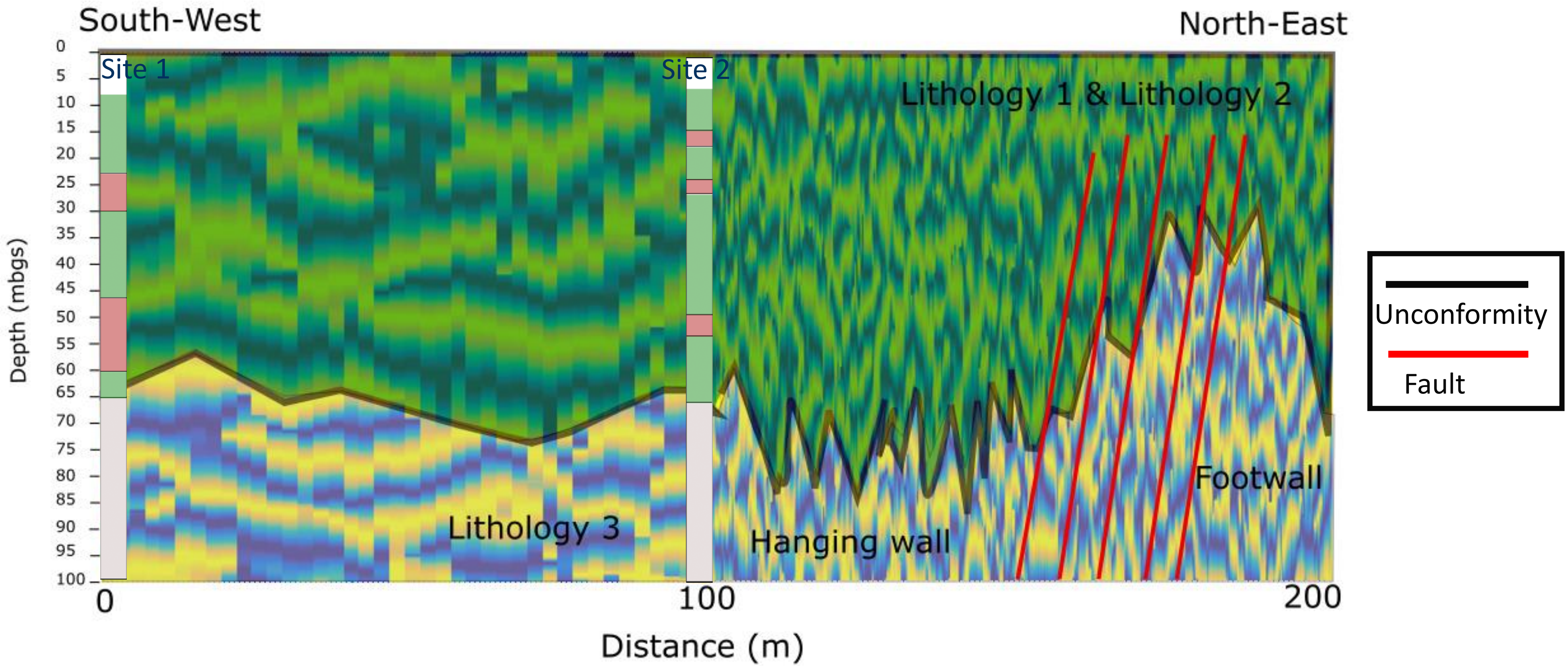
4) P-scan Image Phase (Correlation)



The bottom of this high correlation zone at 65m is interpreted as the boundary between lithologies 1 and 2. Several faults have been identified between 150-180m along the P-scan line. This allows the identification of a footwall in the north-east and a longer hanging wall feature in the south-west.

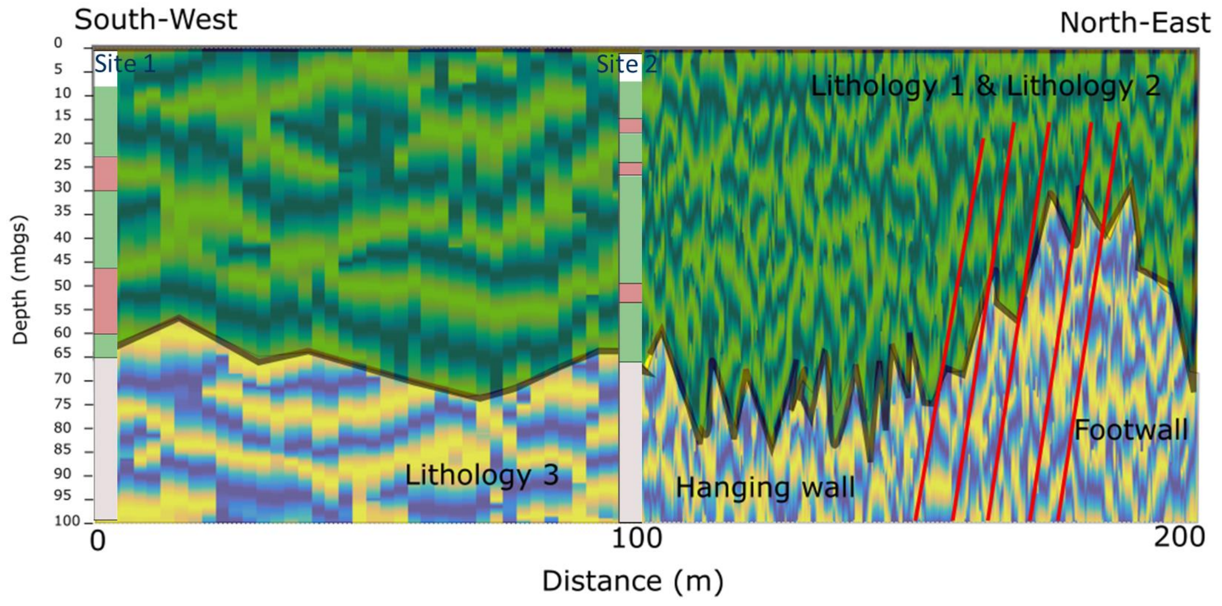
Discussion

5) Discussion: Stares & P-scan



When the stare results are combined with the P-scans, the boundary between Lithology 1 and Lithology 2 can be differentiated across the two V-bores.

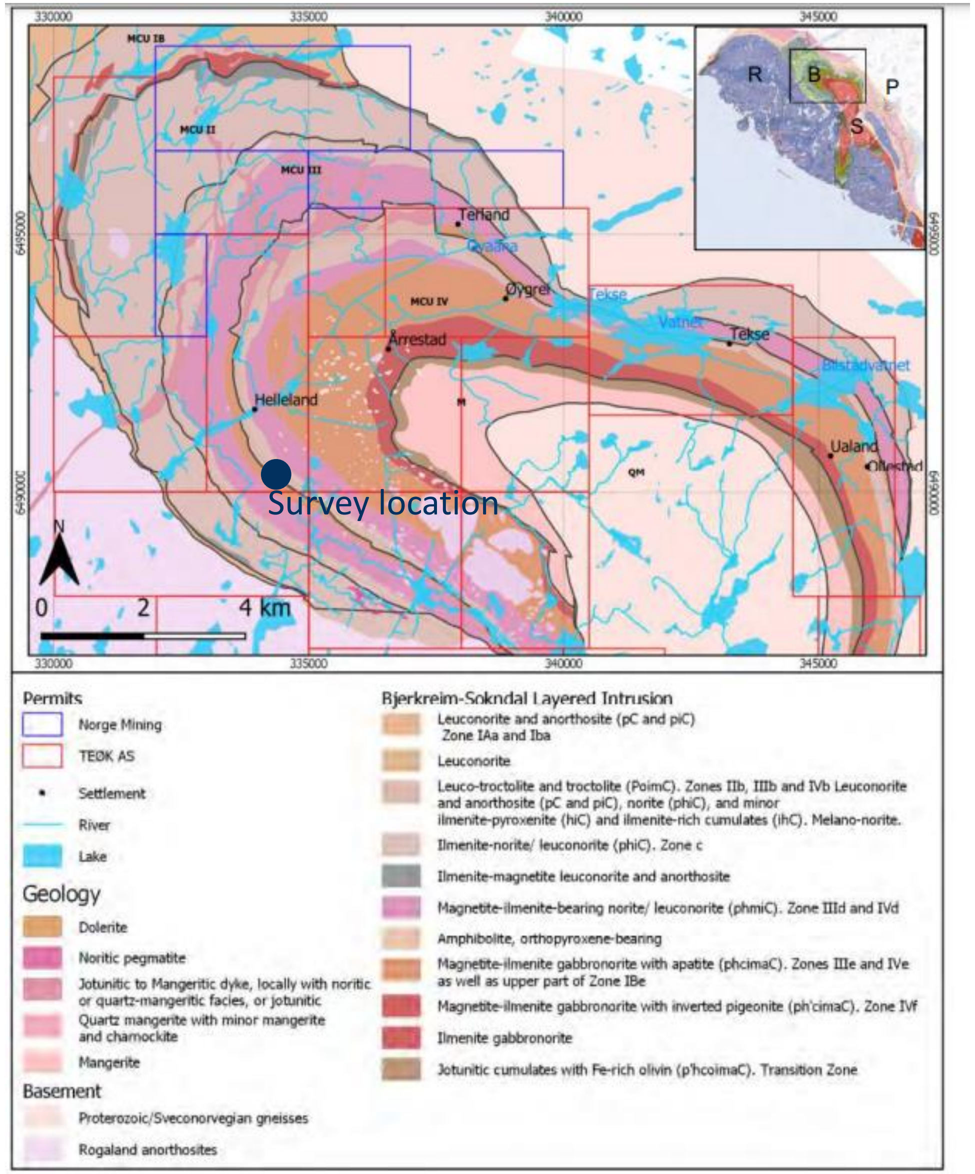
5) Discussion: Validation



When the ADR dataset is looked at with the known regional geology, we note the survey likely imaged through two zones of the Bjerkeim Sokndal Layered Intrusion identified by Adrok as Lithlology 1 and Lithology 3.

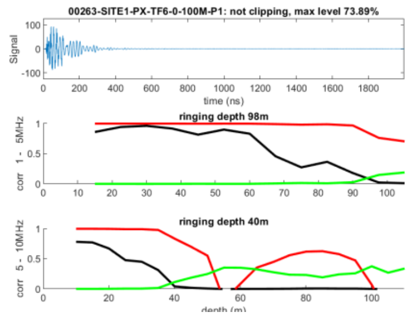
Lithology 2 could be some minor mineralisation within Lithology 1.

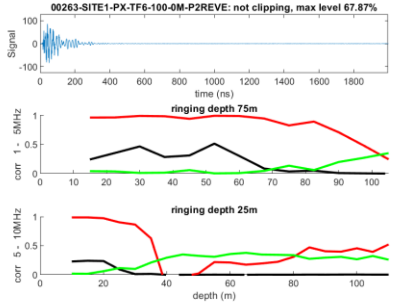
However no drill logs are publicly available to verify these results.

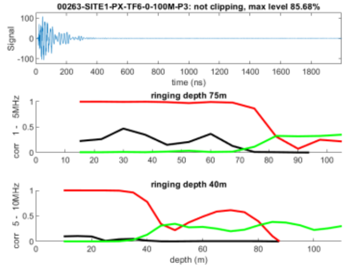


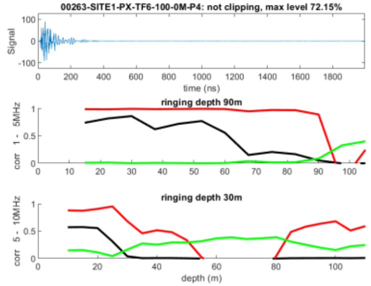
Geology map of the Bjerkreim-Sokndal Intrusion (Source Es7821_Bjerkreim Phase 1 Report_v2-0.docx)

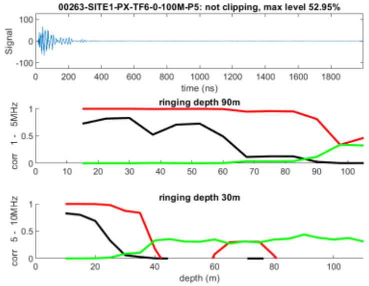
5) Discussion: P-scan data differences (internal)

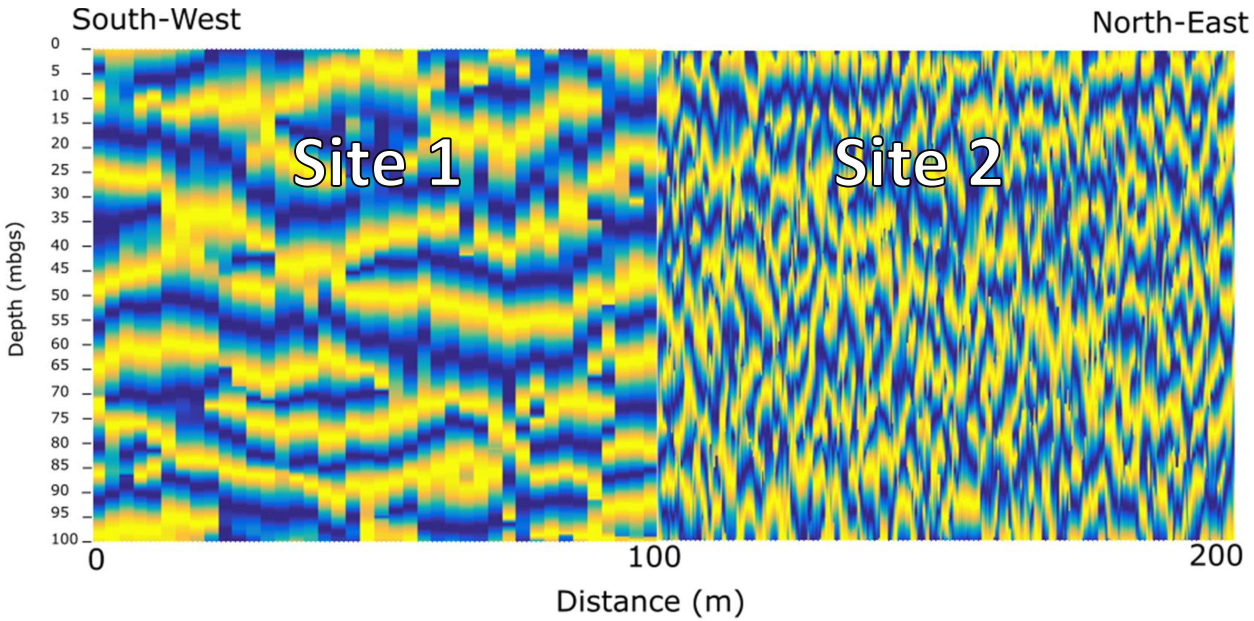


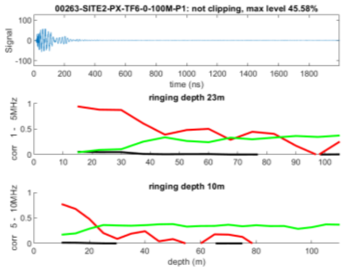


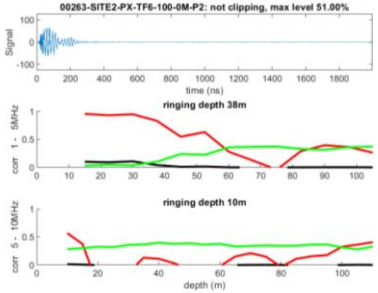


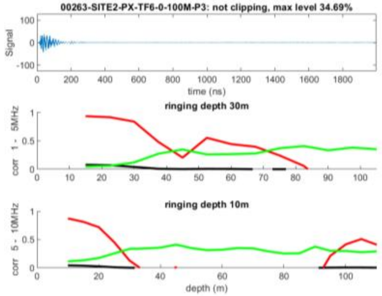


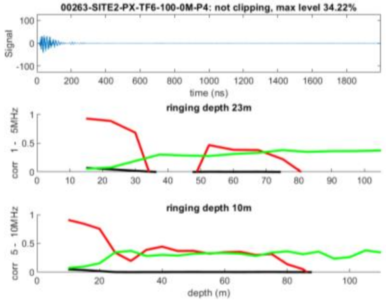












It is noted that the P-scan at Site 1 is smoother than the P-scan at Site 2.
When the QAQC SW results are compared for the P-scans at the two sites,
The results show that there is a consistently stronger signal in Site 1 than
Site 2 with signal strengths up to 30% stronger.

6) Conclusions

Goal 1: **Can we use the ADR data to identify lithological changes?**

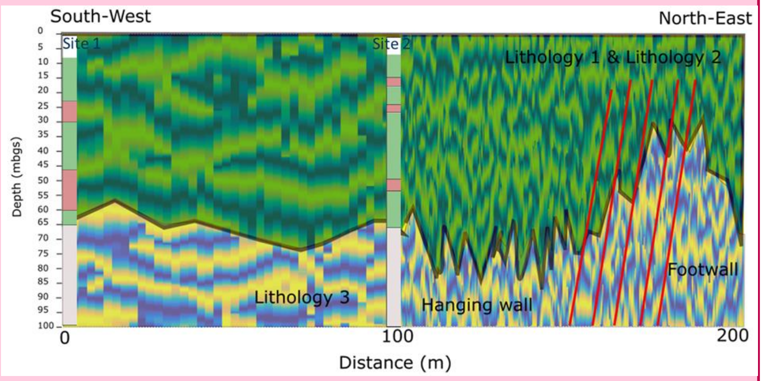
Answer. Potentially Yes

Using the zonation technique consistent patterns are seen in both settings at near identical depths this could transition from mineralogical zone to another but we do not have drill log data to verify this.

Goal 2: **Can we use P-scans to provide a 2D image of the fault between Site 1 and Site 2?**

Answer. Potentially Yes

A 2D profile has been completed which suggests the presence of faults between 150m-180m. Again we do not have any validation for this result.



- It is recommended that validation in the form of drill logs is made available to Adrok to finalise the interpretation.

Appendices

Hole ID	Folder Contents (all data used for this report)
Site 1	Site 1 Location, Site 1 MINEX CorrelationEntropy 1-5MHz, Site 1 MINEX CorrelationEntropy 5-10MHz, Site 1 MINEX Dielectric, Site 1 MINEX Harmonics EWMF, Site 1 MINEX Zonation, Site 1 PETEX CorrelationEntropy 1-5MHz, Site 1 PETEX CorrelationEntropy 5-10MHz, Site 1 PETEX Dielectric, Site 1 PETEX Harmonics EWMF, Site 1 PETEX Zonation, Site 1 P-scan
Site 2	Site 2 Location, Site 2 MINEX CorrelationEntropy 1-5MHz, Site 2 MINEX CorrelationEntropy 5-10MHz, Site 2 MINEX Dielectric, Site 2 MINEX Harmonics EWMF, Site 2 MINEX Zonation, Site 2 PETEX CorrelationEntropy 1-5MHz, Site 2 PETEX CorrelationEntropy 5-10MHz, Site 2 PETEX Dielectric, Site 2 PETEX Harmonics EWMF, Site 2 PETEX Zonation, Site 2 P-scan