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Vitrinite reflectance data  
for  
Chevron *et al* Hopedale E-33

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2008

**GEOLOGICAL SURVEY OF CANADA**

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Chevron *et al* Hopedale E-33

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2008

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**Well information**

**G.S.C. Locality No.:** D175      **Unique Well ID:** 300 E33 56000 58450      **Location:** 55.87343° N, 58.8479° W  
**R.T. Elevation:** 12.8      **Water Depth:** 549.9      **Total Depth:** 2072.2  
**Sampled Interval:** 890 - 2070      **Interval Studied:** 960-2040  
**Depth Units:** Metres referenced to R.T.      **Rig Release Date:** October 1, 1978

**Introduction**

Vitrinite reflectance has been determined on 6 rotary cutting samples from Chevron *et al* Hopedale E-33, which was classified as an exploratory well located in the Hopedale Basin on the Labrador Shelf. The well status is Plugged and Abandoned.

Sample preparation followed the procedures listed in Appendix I. Data acquisition and manipulation was done on a Zeiss Photometer III system with a custom interface to a computer for data storage and statistical summaries.

Analysis of the well reveals thermal maturity levels given in Table I. Specific maturity levels, as set out in this report, are based on those of Powell and Snowdon(1983) with modified terminology (Appendix II).

Table I  
**Inferred Hydrocarbon Thermal Maturity Levels**

Depth in metres	Vitrinite Reflectance* %Ro	Hydrocarbon generation levels** for type II or III kerogen
550 [sea floor]	(0.30)	immature
1630	0.4	immature approaching maturity
2072 [T.D.]	(0.45)	immature approaching maturity

\*()s indicate Ro's extrapolated from linear regression slope: 0.122 log Ro/km

\*\* Actual hydrocarbon products depend on type of organic matter present (Powell and Snowdon, 1983).

**Remarks**

Sample coverage for vitrinite reflectance analysis (Figure 1, Table II) was reasonably complete over the section penetrated between 960 and 2040 m at Hopedale E-33. The data were plotted on a log Ro vs. linear depth scale. A regression line fitted through the data yielded a maturity slope of 0.1217 log Ro/km. Because there is a significant variation in the number of readings from one sample point to another (Table II) the regression line was weighted based on the 'n' value for each point. The relative size of the point symbols provide an indication of the number of readings. The 'error bars' displayed on the maturity profile indicate one standard deviation on either side of the mean and may be deceptively small for samples with very few readings.

The histogram display (Figure 2) shows the variability in the reflectance populations, which represent the maturity of the sediments with depth. Plotting reflectance histograms on a log scale may help reveal any trends present in the Ro data. It also can help to demonstrate the effects of cavings, geology, casing points and other influences on the vitrinite reflectance populations.

These vitrinite reflectance data show that the thermal maturity of the lower section of Hopedale E-33 is only marginally suitable to generate hydrocarbons within the drilled section, between 960 and 2072 m (T.D.), provided potential source rocks of the proper organic matter type and traps are present.

## **Method**

Data obtained for this report were measured on polished whole rock mounts. Whole rock preparations provide the operator with a view of the organic matter in its original rock matrix.

## **Discussion**

The measurement for the sample at 1740 m is significantly higher than the maturity indicated for this depth by the calculated regression line fitted through the data points. A vertical trend in vitrinite reflectance data (three deepest samples) is often seen just as the section enters the oil window (Carr, 2000). The reflectance at 2000 m is believed to be suppressed by the initial generation of hydrocarbons. Alternatively, the lithology of the Cartwright formation is sandstone dominated which can produce higher reflectance values due to oxidation and/or thermal flux due to fluid migration through the sands.

## **References**

Carr, A. D.

2000: Suppression and retardation of vitrinite reflectance, Part 1. Formation and significance for hydrocarbon generation. *Journal of Petroleum Geology*, vol. 23(3), pp 313-343.

Powell, T. G. and Snowdon, L. R.

1983: A composite hydrocarbon generation model. *Erdöl und Kohle, Erdgas, Petrochemie*, v. 36, p. 163-170.

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Table II

**Summary of vitrinite reflectance**

Sample* Labels	Depth in metres	Mean Ro (SD) non-rotated	Number of Readings	
			Total	Edited
C396-05	960	0.34 ( $\pm 0.04$ )	13	10
C397-05	1100	0.34 ( $\pm 0.06$ )	26	23
C398-05	1300	0.36 ( $\pm 0.06$ )	25	23
C399-05	1740	0.47 ( $\pm 0.05$ )	9	8
C400-05	2000	0.42 ( $\pm 0.05$ )	23	18
C401-05	2040	0.46 ( $\pm 0.02$ )	19	14

\*Sample labels prefixes: 'C' indicates whole rock stubs prepared at GSC - Calgary

Table III

**Formation Tops (Moir, pers. comm.)**

Formation	Depth in metres
Saglek	840
Mokami	982
Leif Mb	1071-1093
Kenamu	1593
Cartwright	1696
Markland	1920
Snorri Mb	1920-1948
Bjarni	1980
(unnamed Paleozoic)	2009
(unnamed Precambrian)	2070

Depth  
Scale

kft km

# Vitrinite Reflectance based Maturation Profile

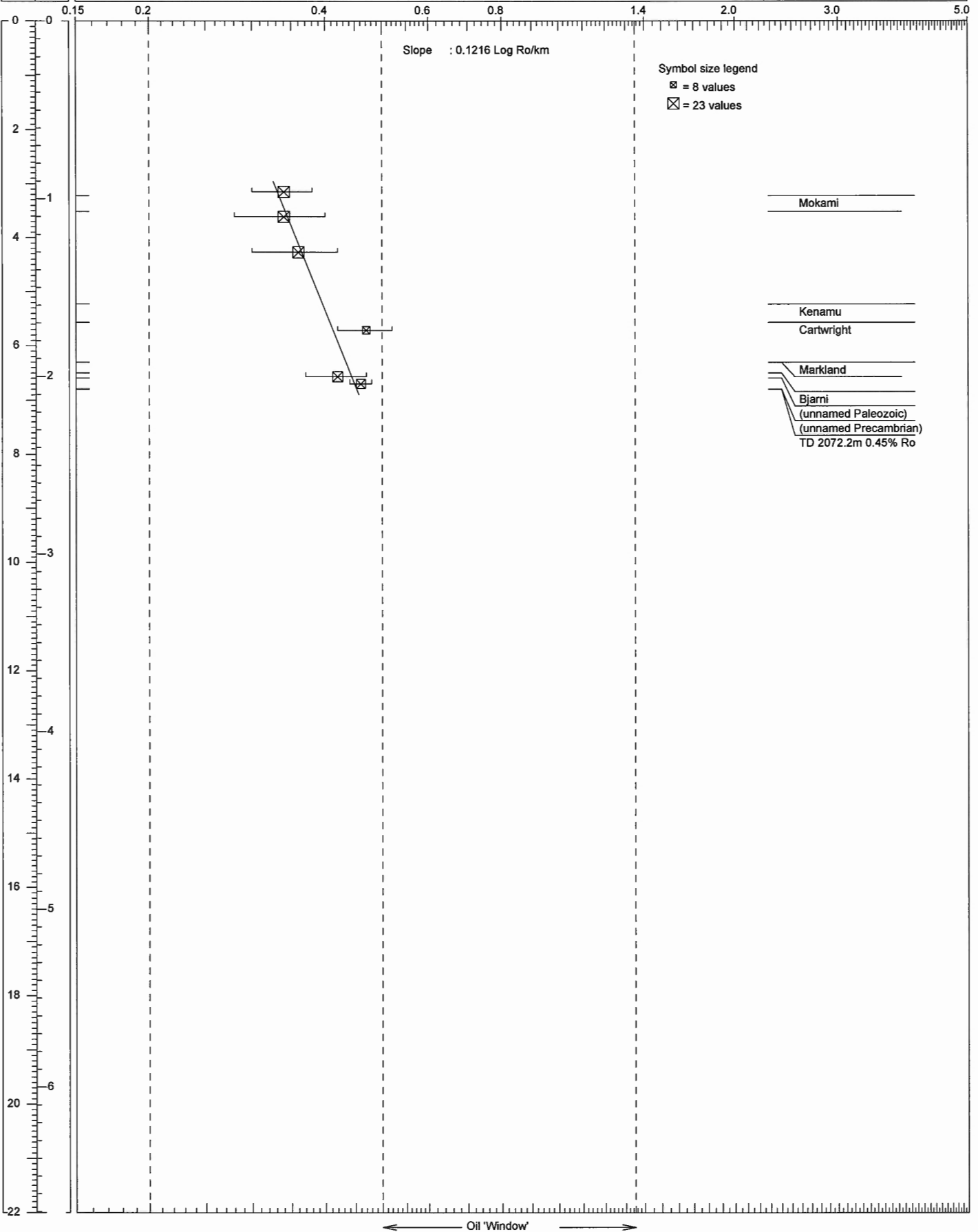


Figure 1. VR/depth plot for Hopedale E-33

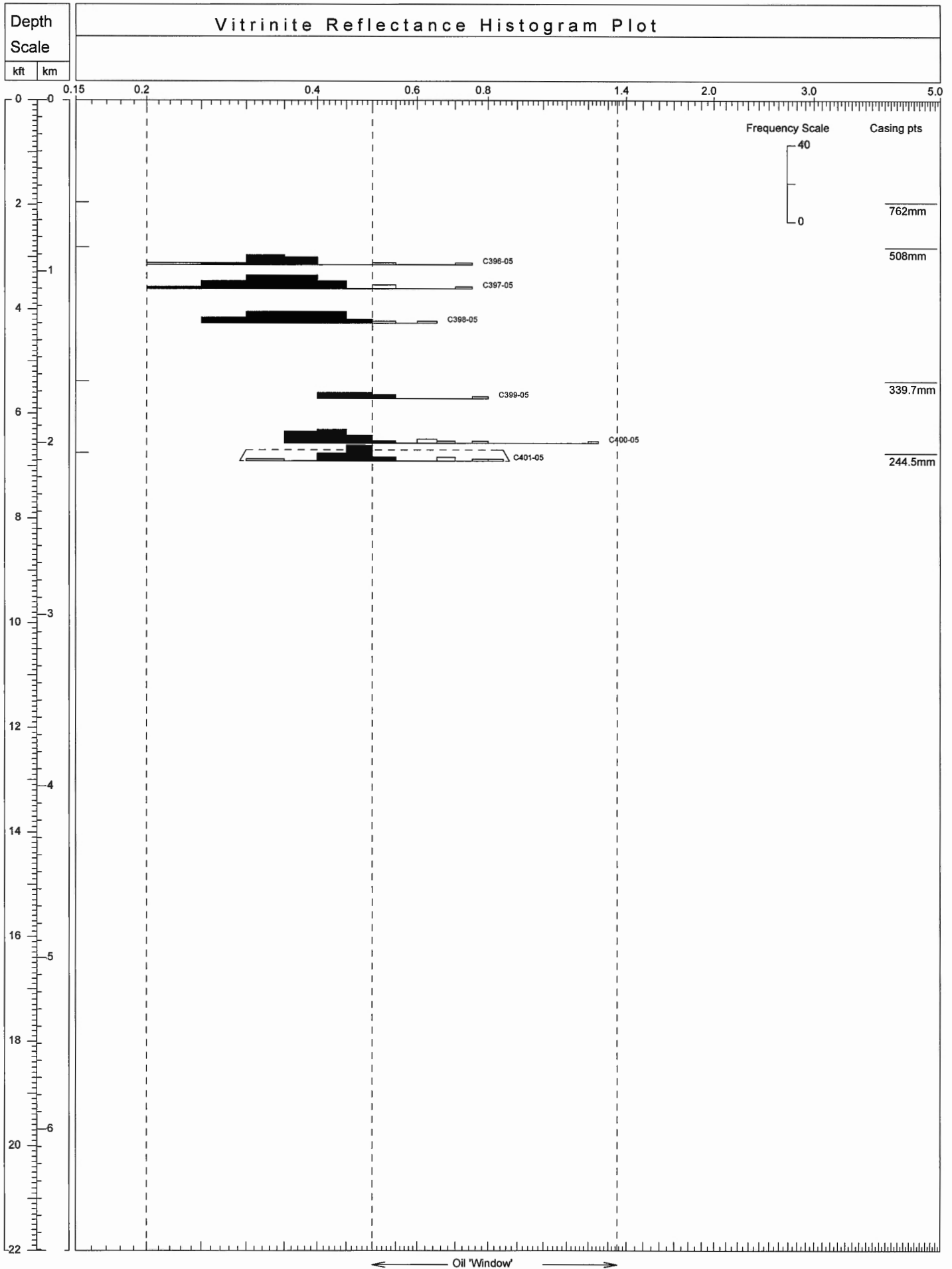
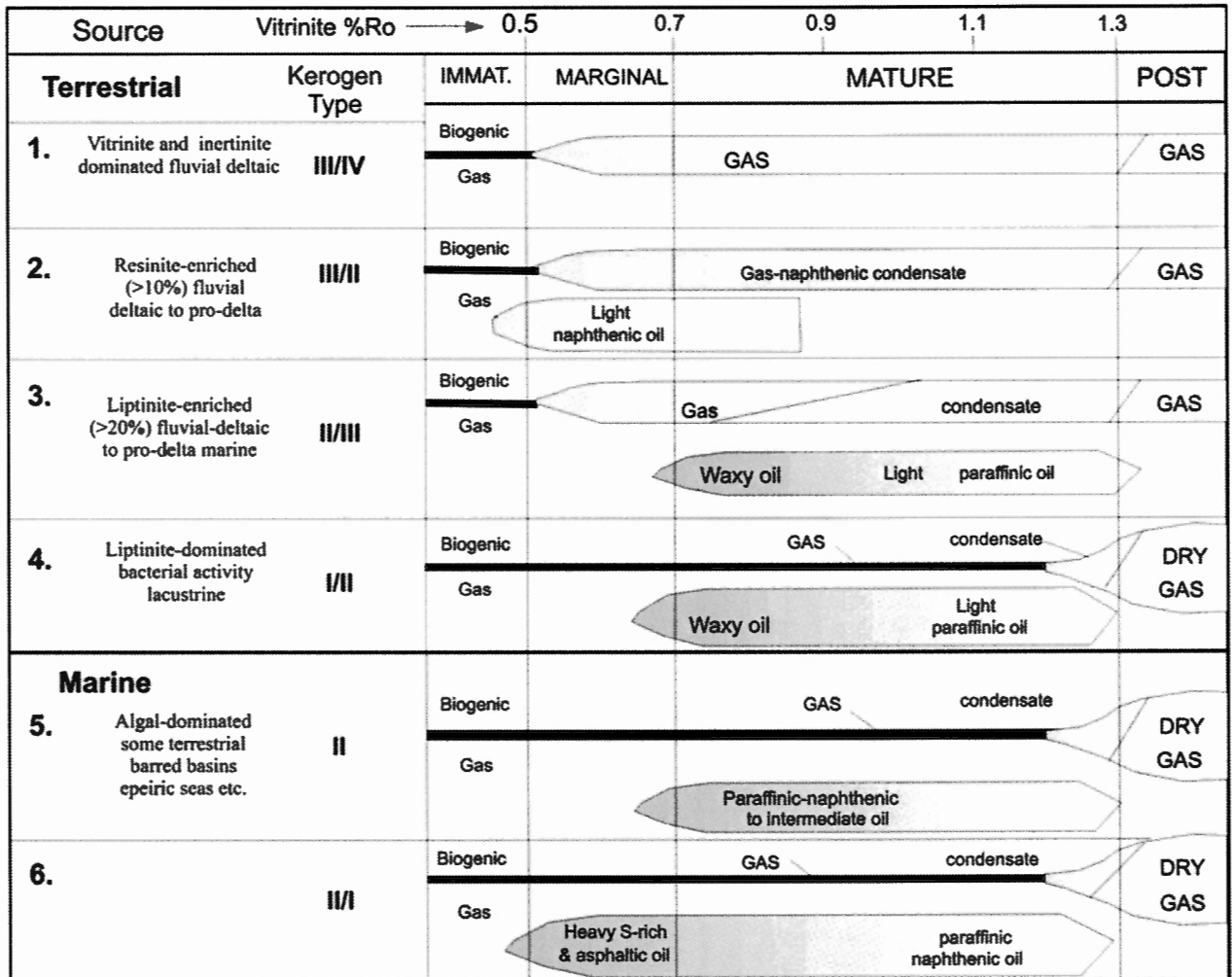


Figure 2. VR histograms/depth plot for Hopedale E-33



Appendix I (Powell and Snowdon 1983)



*Hydrocarbon generation model compiled from Powell and Snowdon (1983) illustrating the different thresholds of hydrocarbon generation and products as related to thermal maturity, kerogen type and paleodepositional environment.*

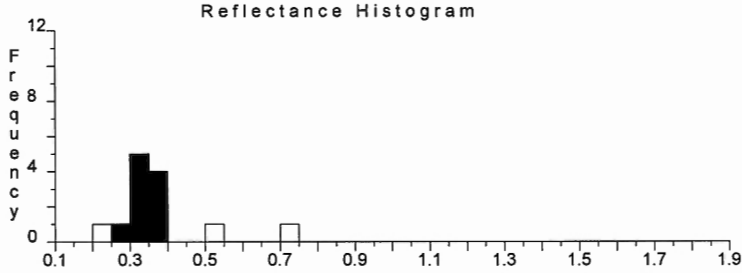
## Appendix II

### Data listings and basic statistics

# Data listings and basic statistics for: Hopedale E-33

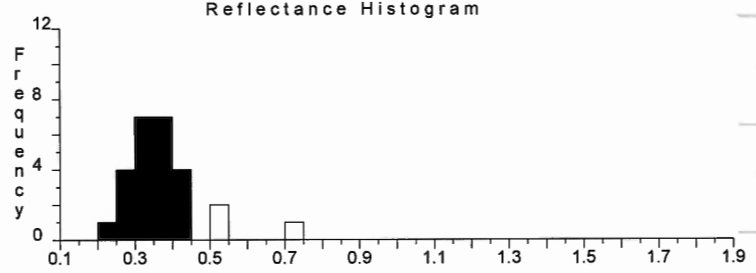
C396-05

Col >	1	2	3	4	5	6	7	8	9	0
Row 1	(0.26)	(0.33)	(0.32)	(0.30)	0.71	0.53	0.22	(0.37)	(0.38)	(0.32)
Row 2	(0.32)	(0.38)	(0.38)							
Total	Mean 0.37	Stand Dev 0.13	Pts 13	Min 0.22	Max 0.71	Sum 4.82				
(Edit)	0.34	0.04	10	0.26	0.38	3.36				



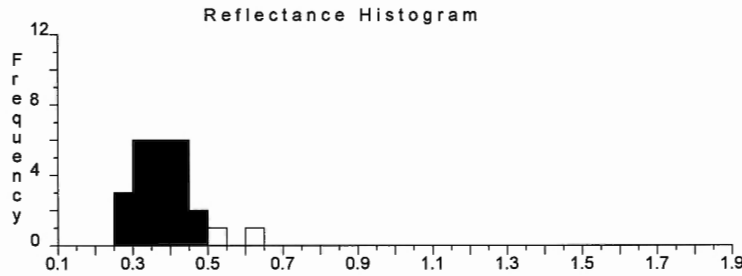
C397-05

Col >	1	2	3	4	5	6	7	8	9	0
Row 1	(0.41)	(0.30)	(0.37)	(0.23)	(0.36)	(0.44)	(0.37)	(0.44)	0.71	0.51
Row 2	0.51	(0.25)	(0.31)	(0.35)	(0.42)	(0.35)	(0.32)	(0.27)	(0.27)	(0.36)
Row 3	(0.31)	(0.30)	(0.34)	(0.38)	(0.29)	(0.32)				
Total	Mean 0.36	Stand Dev 0.10	Pts 26	Min 0.23	Max 0.71	Sum 9.49				
(Edit)	0.34	0.06	23	0.23	0.44	7.76				



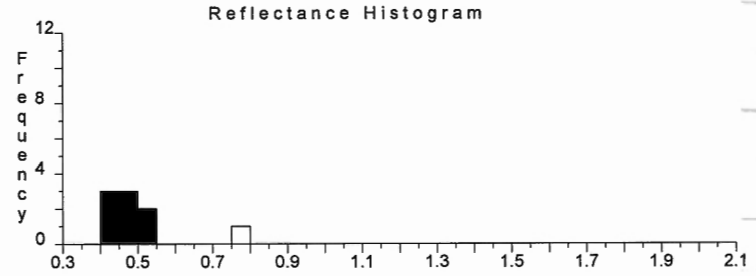
C398-05

Col >	1	2	3	4	5	6	7	8	9	0
Row 1	(0.26)	(0.27)	(0.25)	(0.41)	(0.31)	0.53	(0.41)	(0.43)	0.62	(0.36)
Row 2	(0.45)	(0.41)	(0.37)	(0.39)	(0.31)	(0.40)	(0.36)	(0.32)	(0.34)	(0.37)
Row 3	(0.34)	(0.36)	(0.34)	(0.43)	(0.46)					
Total	Mean 0.38	Stand Dev 0.08	Pts 25	Min 0.25	Max 0.62	Sum 9.50				
(Edit)	0.36	0.06	23	0.25	0.46	8.35				



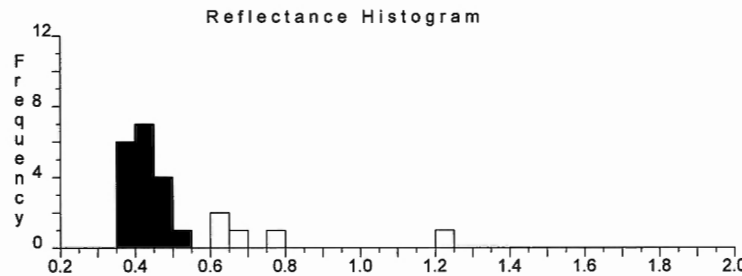
C399-05

Col >	1	2	3	4	5	6	7	8
Row 1	(0.41)	(0.44)	(0.48)	(0.54)	0.79	(0.51)	(0.41)	(0.48)
Row 2								
Row 3								
Total	Mean 0.50	Stand Dev 0.12	Pts 9	Min 0.41	Max 0.79	Sum 4.52		
(Edit)	0.47	0.05	8	0.41	0.54	3.73		



C400-05

Col >	1	2	3	4	5	6	7	8	9	0
Row 1	(0.43)	(0.48)	1.21	(0.43)	(0.41)	(0.38)	(0.35)	(0.47)	(0.40)	(0.42)
Row 2	(0.43)	(0.46)	0.69	(0.46)	(0.50)	(0.35)	(0.35)	0.60	(0.39)	(0.42)
Row 3	0.76	0.61	(0.37)							
Total	Mean 0.49	Stand Dev 0.19	Pts 23	Min 0.35	Max 1.21	Sum 11.37				
(Edit)	0.42	0.05	18	0.35	0.50	7.50				



C401-05

Col >	1	2	3	4	5	6	7	8	9	0
Row 1	0.84	(0.47)	(0.50)	(0.44)	(0.48)	(0.46)	0.31	(0.48)	(0.50)	0.77
Row 2	(0.42)	0.69	(0.48)	(0.47)	(0.44)	(0.44)	0.68	(0.45)	(0.48)	
Row 3										
Total	Mean 0.52	Stand Dev 0.13	Pts 19	Min 0.31	Max 0.84	Sum 9.80				
(Edit)	0.46	0.02	14	0.42	0.50	6.51				

