Report No. EPGS-DOM.3-88MPA

Vitrinite reflectance (Ro) of dispersed organics from Husky-Bow Valley et al. Glooscap C-63

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G.S.C. Locality No.: D231 **Location:** 43°12'09.83"N, 62°09'56.75"W

R.T. Elevation: 23m **Water Depth:** 122m **Total Depth:**4552m

Sample Interval: 317 - 4552m **Interval Studied:** 420 - 3520m

Depth Units: Meters referenced to R.T.

Vitrinite reflectance has been determined on 15 rotary cuttings samples (Table II) from Husky-Bow Valley et al. Glooscap C-63 which was classified as a wildcat well and is located on the Scotian Shelf approximately 200 km south southeast of Halifax, Nova Scotia. The well was plugged and abandoned as a dry hole.

Data acquisition and manipulation for this report utilized the Zeiss Photo-multiplier III Zonax system interfaced with a PC AT microcomputer which provides reliable data acquisition and fast statistical summaries.

Sample preparation followed the procedures listed in Appendix I. The analysis of the well revealed the thermal maturation intervals given in Table I. The specific maturation levels, as set out in this report, were based on those of Dow (1977) with modified terminology (Appendix II).

Table I
Inferred Thermal Maturation Levels*

(Seafloor)-1153m	0.25 - 0.4	% Ro	immature
1153-1742m	0.4 - 0.5	% Ro	immature approaching maturity
1742-2223m	0.5 - 0.6	% Ro	marginally mature
2223m	0.6	% Ro	onset of significant oil generation
2982m	0.8	% Ro	peak of oil generation
3570m	1.0	% Ro	onset of significant wet gas generation
4051m	(1.2)	% Ro	onset of significant dry gas generation
4362m	(1.35)	% Ro	oil floor
4552m T.D.	(1.45)	% Ro	beyond oil preservation limit
5399m	(2.0)	% Ro	wet gas preservation limit
6468m	(3.0)	% Ro	dry gas preservation limit

Note: ( ) indicate Ro extrapolated at 0.165 log Ro/km

* Maturation levels are provided for all types of organic matter. Actual hydrocarbon products depend on type of organic matter present.

Remarks

Sample coverage of vitrinite reflectance analysis (Figure 1, Table II) was good over the upper part (1000 - 2600m) of the section penetrated by Glooscap C-63. Samples from the lower section which yielded fewer measurable vitrinite particles were mostly from non-shale lithologies. The data are plotted on a log Ro vs. linear depth scale and a linear regression line was calculated by the least squares method (Figure 1). The 'error bars' plotted on the maturation profile indicate one standard deviation on either side of the mean and may be deceivingly small for samples with very few readings. The slope of the maturation line is 0.165 log Ro/km.

Selection of the reflectance population which represented the true maturation of the sediments was aided significantly by the histogram display plot (Figure 2). This interpretation tool helps to reveal linear trends (populations) in the Ro data. It also demonstrates the effects of cavings, geology, casing points and other factors on the vitrinite reflectance populations.

The lithology strip plot (Figure 1) was produced directly from the E.P.G. LITHFILE database which extracts data from digitized CANSTRAT logs.

The vitrinite reflectance data provides evidence that the thermal regime at Glooscap C-63 was suitable for the generation and preservation of hydrocarbons within the drilled section assuming potential source rocks and traps were present.

References

Dow, W.G., 1977. Kerogen studies and geological interpretations. Journal of Geochemical Exploration, no. 7, p. 77-99

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Table II

Summary of kerogen - based vitrinite reflectance

Seq. #	Sample #	Depths in meters	Mean Ro (SD) non-rotated	Number of Readings Total	Edited
1	K0705A	420-460	0.37(±.05)	33	30
2	K0705B	690-730	0.31(±.05)	31	30
3	K0705C	860-885	0.38(±.06)	8	2
4	K0706A	1020-1060	0.40(±.07)	11	6
5	K0706B	1200-1240	0.39(±.05)	42	28
6	K0706C	1410-1450	0.44(±.03)	37	24
7	K0707A	1590-1630	0.49(±.06)	35	15
8	K0707B	1860-1900	0.46(±.05)	24	17
9	K0707C	2040-2080	0.49(±.07)	45	39
10	K0708A	2250-2290	0.63(±.06)	55	28
11	K0708B	2400-2440	0.56(±.08)	12	7
12	K0708C	2550-2590	0.83(±.07)	67	43
13	K0709A	2730-2770	0.77(±.06)	10	7
14	K0709B	3000-3040	0.79(±.00)	5	1
15	K0710A	3480-3520	1.09(±.01)	23	2

Note: All samples are kerogen concentrate type.

Table III

Formation Tops (Wade, pers. comm.)

Formation	Depth
Banquereau	in casing
Wyandot	957.0m
Dawson Canyon	1078.2m
Petrel Mbr	1092.4-98.2m
Shortland shale	1320.1m
Missisauga	2211.5m
Roseway/Artimon equiv	2501.3m
Abenaki	2696.0m
Baccaro Mbr	2696.0m
Misaine Mbr	3258.0m
Scatarie Mbr	3345.0m
Mohican	3475.5m
"Glooscap volcanics"	3894.0m
Argo	4045.5m
T.D.	4552m

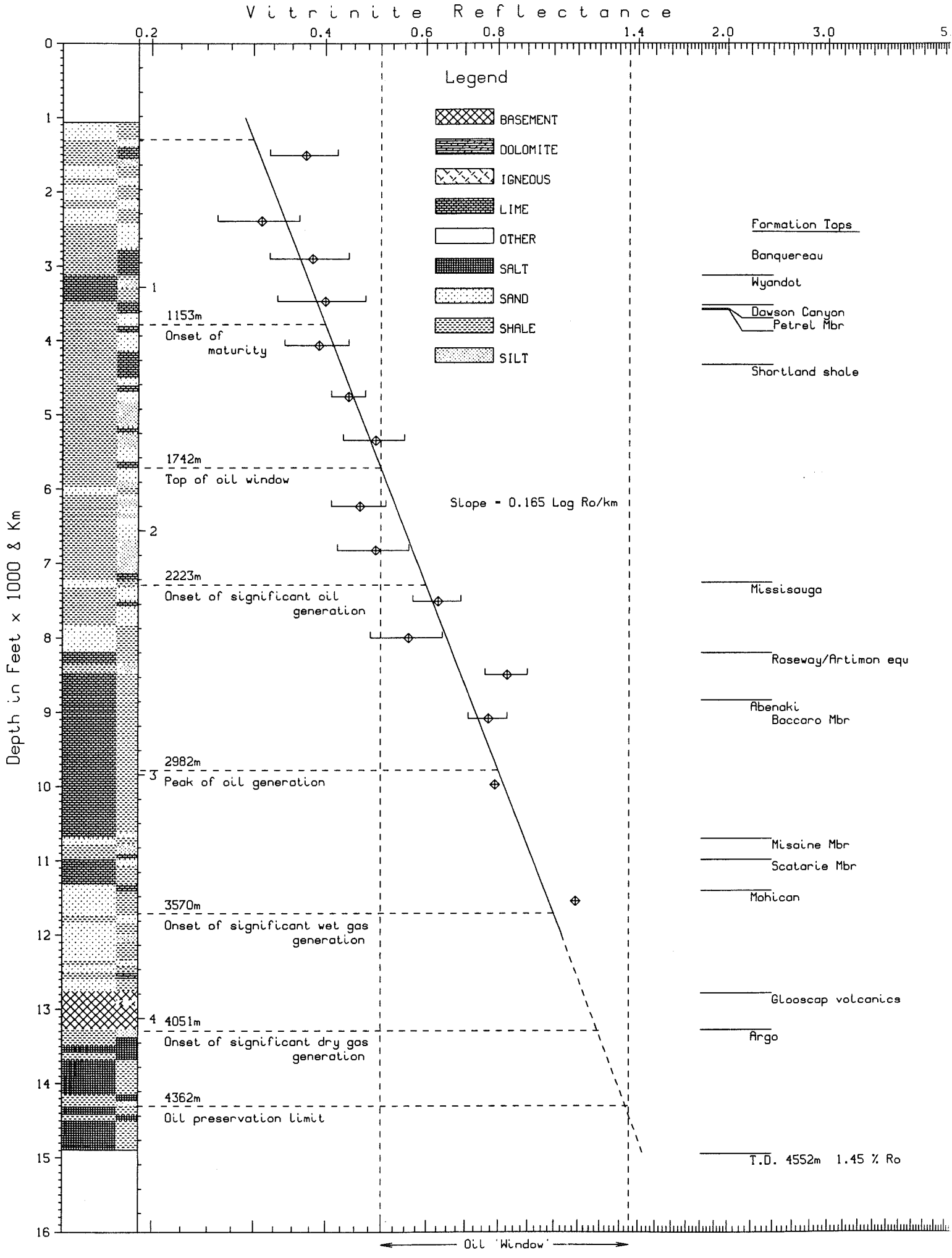


Fig. 1 Glooscap C-63 < Maturation Profile >

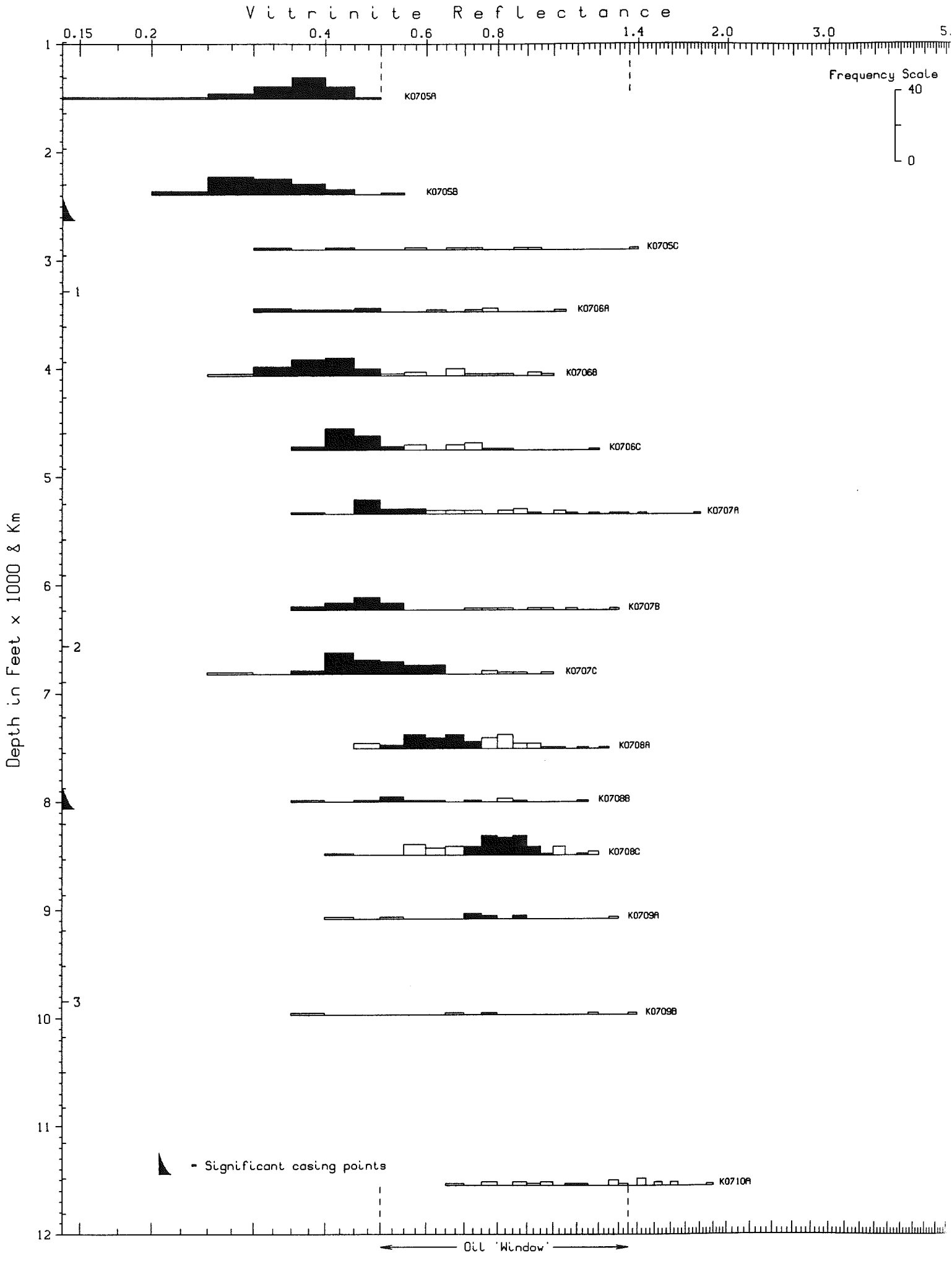


Fig. 2 Glooscap C-63 < Histograms >

APPENDIX I

Sample Preparation Method

COGLA Lab preparation

Preliminary Wash
Samples dried in oven
Split: a. all of coarse to Petrology Lab
b. ½ medium to Palynology Lab
c. rest of medium and all of fine combined for Micropaleo Lab
Split "b" is delivered to Palynology Lab and treated as follows:

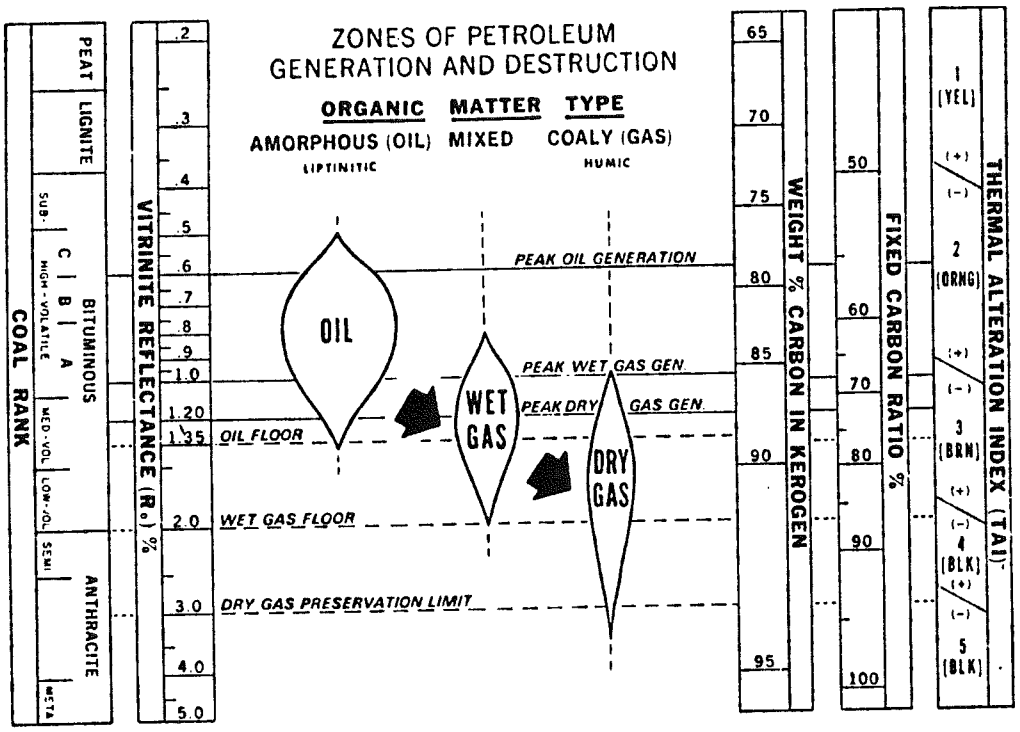
PALYNOLOGY Lab preparation

20-30 grams placed in 250 ml plastic beaker.
Add 10% HC1 till reaction ceases (removes carbonates).
Washed (rinsed) 3 times.
Conc. HF overnight (removes silicates).
Washed (rinsed) 3 times.
Heated (60-65°C) conc. HC1 (remove fluorides caused by HF).
Washed 3 times.
Then put into 15 ml test tube with 4-5 ml 4% Alconox.
Differential centrifuge at 1500 rpm for 90 sec.
Decant.
Wash 3 times with centrifuging.
Float off organic fraction using 2.0 S.G. Znbr solution.
Centrifuge 1000 rpm, 8 min.
Float fraction into second test tube.
Wash 3 times with centrifuging.
Kerogen smear slide made.
Remaining kerogen material delivered to Vitrinite Reflectance Lab.

VITRINITE REFLECTANCE Lab preparation

Excess water pipetted off.
Freeze dried.
Mounted using epoxy resin (EPO-TEK 301) in predrilled plastic stubs.
Polished using modified coal petrology polishing methods.
Examined under oil lens at approximately 800x mag'n.

Appendix II (Dow, 1977)



Note: In this report, the terminology used to describe the various maturation levels has been modified. The 'peak' designation, as used in this figure, has been changed to 'onset of significant' and 0.8 Ro is here used as the 'peak of oil generation' (Table I, Figure 1).

Appendix III

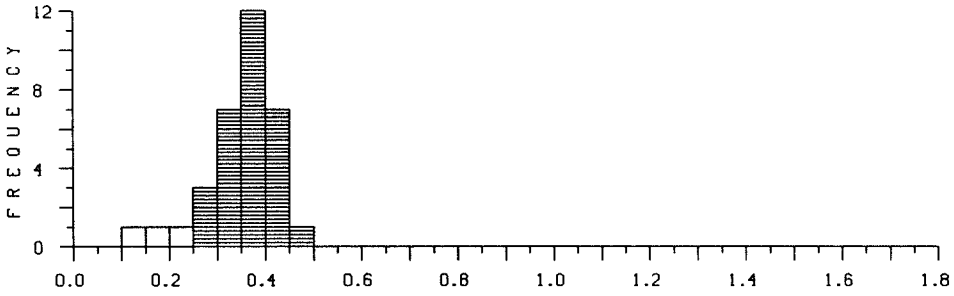
Sample Reports

K0705A,420-460M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.14	.18	.20	.26<	.28<	.29<	.31<	.33<	.33<	.33<
1	.33<	.34<	.34<	.36<	.36<	.36<	.37<	.37<	.37<	.37<
2	.38<	.39<	.39<	.39<	.39<	.40<	.41<	.41<	.41<	.41<
3	.43<	.43<	.46<							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.35	.07	33	.14	.46	11.52
EDIT<	.37	.05	30	.26	.46	11.00

REFLECTANCE HISTOGRAM

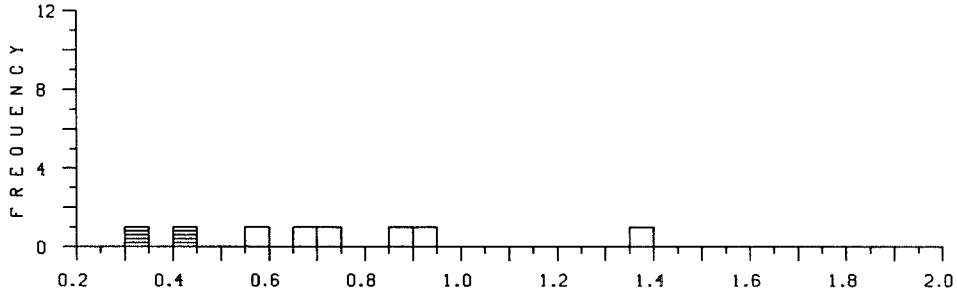


K0705C,860-885M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.34<	.42<	.57	.67	.74	.89	.90	1.37		

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.74	.33	8	.34	1.37	5.90
EDIT<	.38	.06	2	.34	.42	.76

REFLECTANCE HISTOGRAM

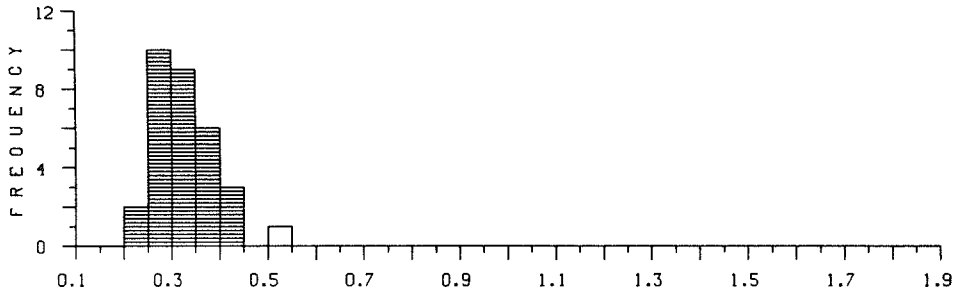


K0705B,690-730M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.21<	.23<	.26<	.26<	.26<	.27<	.27<	.27<	.28<	.28<
1	.28<	.29<	.30<	.30<	.31<	.31<	.31<	.32<	.32<	.33<
2	.33<	.35<	.36<	.36<	.37<	.37<	.39<	.40<	.42<	.42<
3	.54									

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.32	.07	31	.21	.54	9.97
EDIT<	.31	.05	30	.21	.42	9.43

REFLECTANCE HISTOGRAM

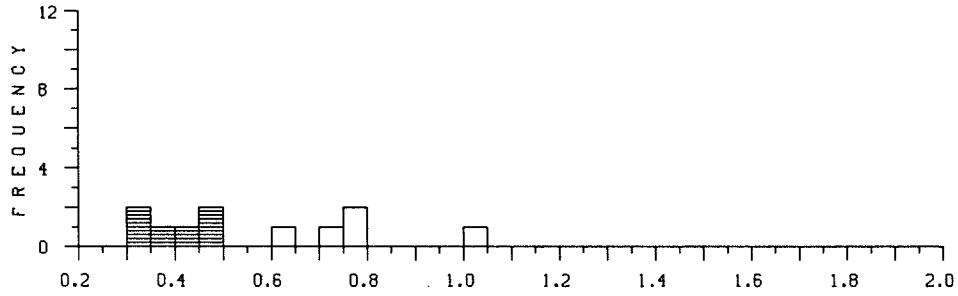


K0706A,1020-1060M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.31<	.34<	.36<	.44<	.46<	.47<	.61	.70	.76	.77
1	1.01									

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.57	.22	11	.31	1.01	6.23
EDIT<	.40	.07	6	.31	.47	2.38

REFLECTANCE HISTOGRAM

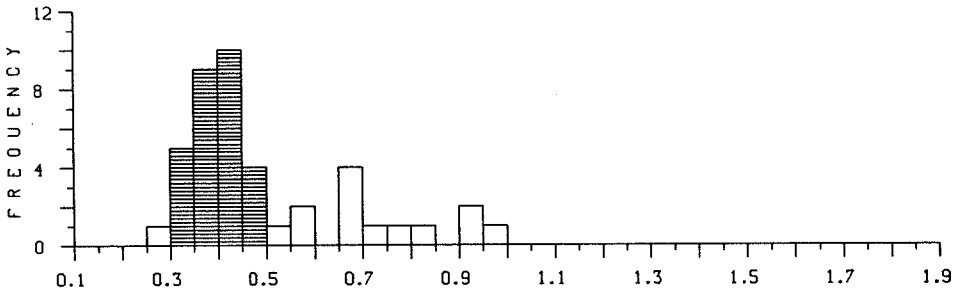


K0706B,1200-1240M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.25	.30<	.33<	.33<	.33<	.34<	.35<	.35<	.36<	.36<
1	.37<	.37<	.37<	.38<	.38<	.40<	.41<	.41<	.41<	.42<
2	.42<	.42<	.43<	.44<	.44<	.45<	.46<	.47<	.48<	.52
3	.56	.58	.65	.66	.68	.68	.73	.77	.84	.90
4	.93	.97								

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.49	.18	42	.25	.97	20.70
EDIT<	.39	.05	28	.30	.48	10.98

REFLECTANCE HISTOGRAM

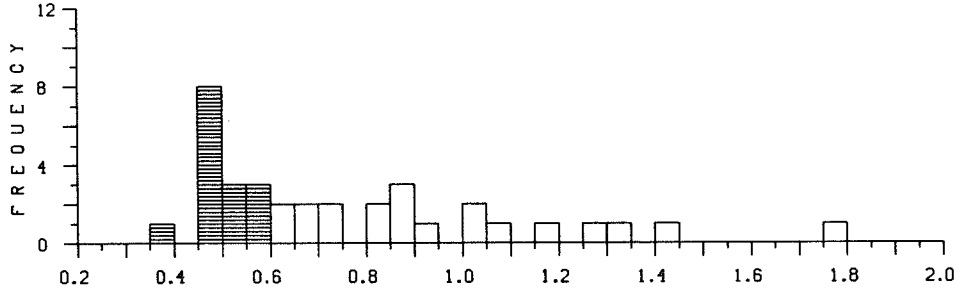


K0707A,1590-1630M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.37<	.45<	.45<	.45<	.46<	.46<	.47<	.48<	.48<	.51<
1	.51<	.54<	.57<	.59<	.59<	.62	.63	.66	.69	.71
2	.72	.81	.81	.87	.88	.88	.94	1.00	1.03	1.09
3	1.16	1.28	1.31	1.43	1.79					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.76	.33	35	.37	1.79	26.69
EDIT<	.49	.06	15	.37	.59	7.38

REFLECTANCE HISTOGRAM

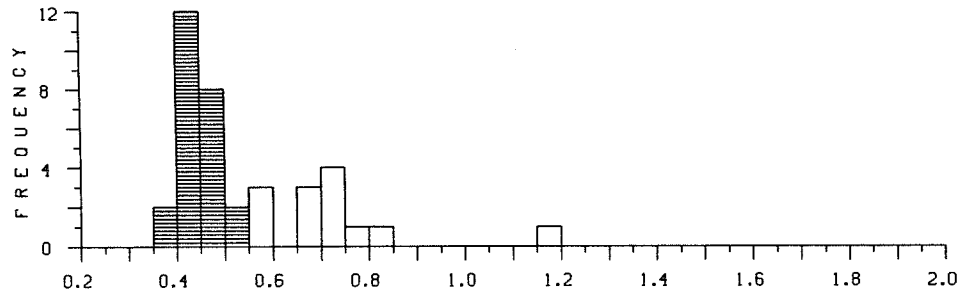


K0706C,1410-1450M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.39<	.39<	.40<	.41<	.41<	.41<	.42<	.42<	.42<	.42<
1	.43<	.43<	.44<	.44<	.45<	.45<	.46<	.46<	.46<	.46<
2	.47<	.49<	.50<	.52<	.55	.55	.58	.66	.68	.69
3	.70	.70	.70	.73	.79	.81	1.16			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.54	.16	37	.39	1.16	19.85
EDIT<	.44	.03	24	.39	.52	10.55

REFLECTANCE HISTOGRAM

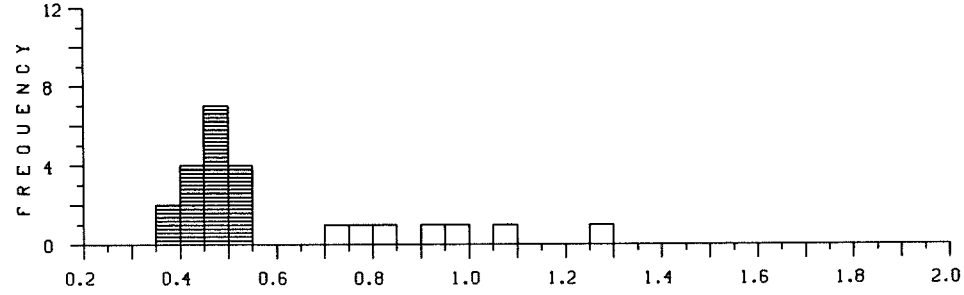


K0707B,1860-1900M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.39<	.39<	.40<	.41<	.42<	.44<	.45<	.46<	.47<	.47<
1	.47<	.49<	.49<	.50<	.52<	.54<	.54<	.72	.76	.81
2	.90	.96	1.05	1.25						

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.60	.24	24	.39	1.25	14.30
EDIT<	.46	.05	17	.39	.54	7.85

REFLECTANCE HISTOGRAM

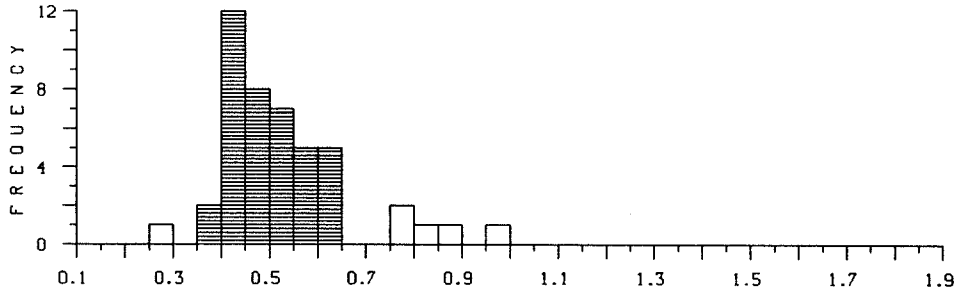


K0707C,2040-2080M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.27	.37<	.38<	.40<	.41<	.41<	.42<	.42<	.43<	.44<
1	.44<	.44<	.44<	.44<	.44<	.45<	.45<	.45<	.46<	.47<
2	.47<	.48<	.49<	.50<	.50<	.51<	.51<	.52<	.52<	.53<
3	.55<	.55<	.55<	.57<	.58<	.60<	.60<	.63<	.63<	.64<
4	.76	.78	.82	.88	.98					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.52	.14	45	.27	.98	23.58
EDIT<	.49	.07	39	.37	.64	19.09

REFLECTANCE HISTOGRAM

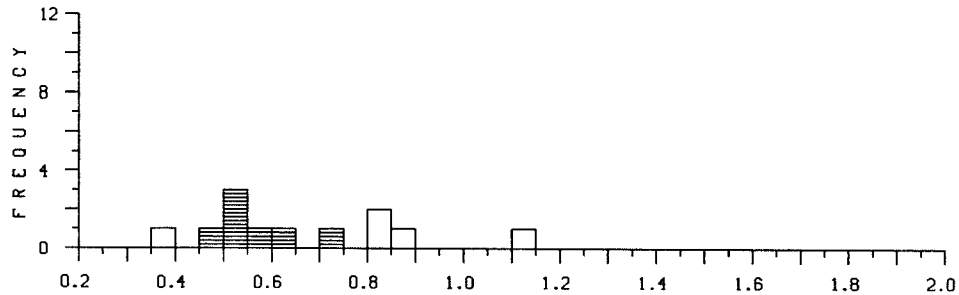


K0708B,2400-2440M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.39	.45<	.52<	.54<	.54<	.57<	.60<	.70<	.80	.84
1	.87	1.10								

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.66	.21	12	.39	1.10	7.92
EDIT<	.56	.08	7	.45	.70	3.92

REFLECTANCE HISTOGRAM

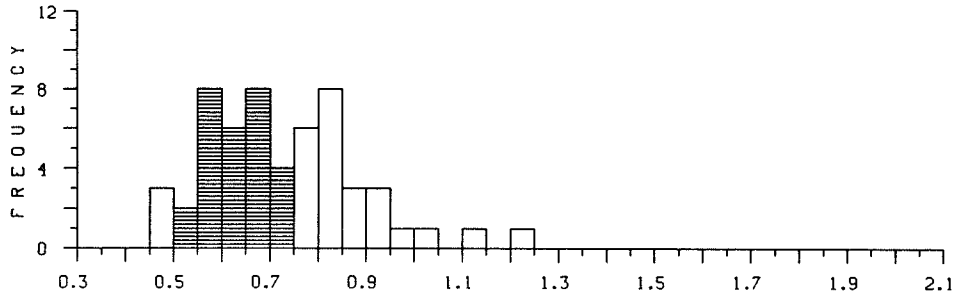


K0708A,2250-2290M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.46	.49	.49	.52<	.53<	.55<	.55<	.55<	.55<	.56<
1	.58<	.58<	.59<	.61<	.63<	.63<	.63<	.63<	.63<	.65<
2	.65<	.66<	.67<	.68<	.68<	.68<	.69<	.70<	.70<	.72<
3	.74<	.75	.76	.76	.76	.77	.79	.81	.81	.82
4	.82	.83	.83	.83	.84	.86	.86	.89	.90	.94
5	.94	.96	1.04	1.14	1.23					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.73	.16	55	.46	1.23	39.92
EDIT<	.63	.06	28	.52	.74	17.54

REFLECTANCE HISTOGRAM

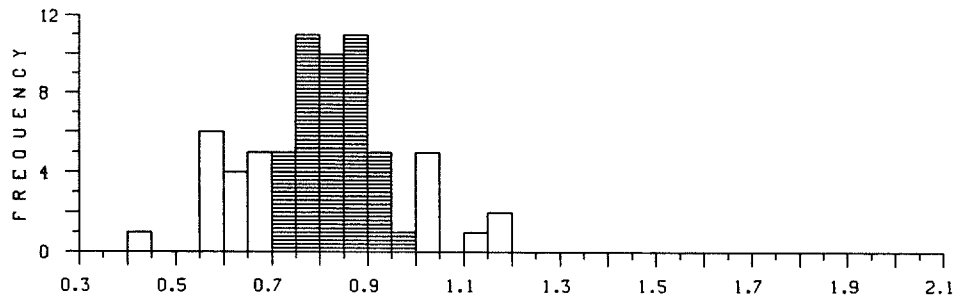


K0708C,2550-2590M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.41	.55	.55	.57	.57	.57	.58	.62	.63	.63
1	.63	.67	.68	.68	.68	.69	.71<	.71<	.73<	.74<
2	.74<	.75<	.75<	.75<	.76<	.76<	.76<	.78<	.79<	.79<
3	.79<	.79<	.80<	.81<	.82<	.82<	.82<	.83<	.84<	.84<
4	.84<	.84<	.85<	.86<	.86<	.86<	.87<	.88<	.88<	.89<
5	.89<	.89<	.89<	.91<	.92<	.94<	.94<	.94<	.96<	1.00
6	1.00	1.01	1.03	1.03	1.11	1.16	1.16			

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.80	.15	67	.41	1.16	53.80
EDIT<	.83	.07	43	.71	.96	35.59

REFLECTANCE HISTOGRAM

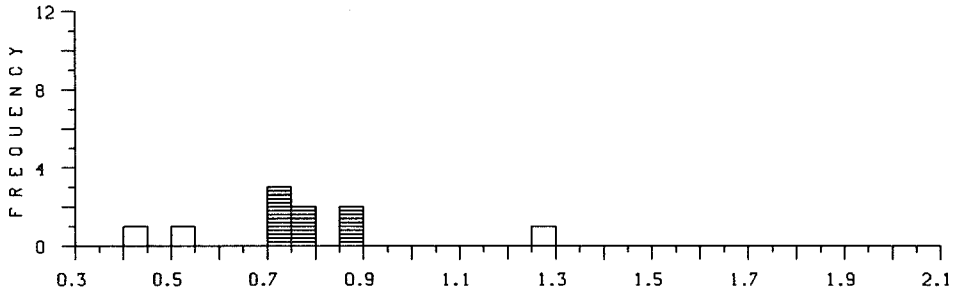


K0709A,2730-2770M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.41	.54	.71<	.72<	.74<	.76<	.76<	.86<	.86<	1.28

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.76	.23	10	.41	1.28	7.64
EDIT<	.77	.06	7	.71	.86	5.41

REFLECTANCE HISTOGRAM

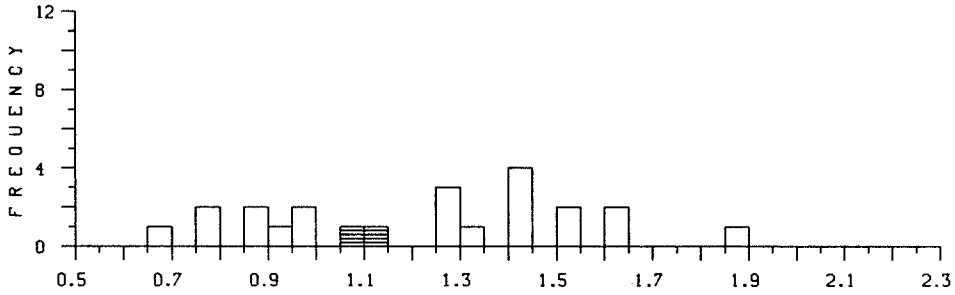


K0710A,3480-3520M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.67	.75	.79	.88	.89	.92	.96	.97	1.08<	1.10<
1	1.28	1.29	1.29	1.31	1.40	1.41	1.42	1.44	1.50	1.53
2	1.60	1.63	1.88							

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	1.22	.32	23	.67	1.88	27.99
EDIT<	1.09	.01	2	1.08	1.10	2.18

REFLECTANCE HISTOGRAM



K0709B,3000-3040M,GLOOSCAP C-63

COL >	1	2	3	4	5	6	7	8	9	0
ROW	.38	.66	.79<	1.19	1.36					

	MEAN	STAND DEV	PTS	MIN	MAX	SUM
TOTAL	.88	.40	5	.38	1.36	4.38
EDIT<	.79	.00	1	.79	.79	.79

REFLECTANCE HISTOGRAM