VITRINITE REFLECTANCE MEASUREMENT

MEGASCOLIDES-2

Sample Details		Mean	Range	Std Dev	N° of Readings	Sample Description Including Liptinite Fluorescence, Maceral Abundances, Mineral Fluorescence
295.0m	2_vmax	0.60	0.50-0.71	0.050	25	Common sporinite and sparse liptodetrinite orange to dull orange, rare cutinite dull orange, rare resinite orange. (Claystone> argillaceous siltstone>sandstone>shaly coal>coal. Shaly coal rare, V>L, vitrite>clarite. Coal rare, V, vitrite. Dom common to abundant, I>L>V. Inertinite and liptinite common, vitrinite sparse. Rare yellow fluorescing oil droplets in siltstone. Mineral fluorescence weak dull orange. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.58	1.16-2.46	0.362	10	
500.0m	2_vmax	0.63	0.53-0.76	0.055	25	Sparse sporinite and rare liptodetrinite orange to dull orange, rare cutinite orange. Siltstone>claystone>sandstone. Dom common I>L>V. Inertinite common, liptinite sparse, vitrinite rare. Rare yellow fluorescing oil droplets in some sandstones. Mineral fluorescence weak dull orange to none. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.68	1.44-1.84	0.148	10	
780.0m	2_vmax	0.68	0.57-0.84	0.059	25	Sparse sporinite and rare liptodetrinite orange to dull orange, rare cutinite orange. (Claystone>siltstone>shaly coal. Shaly coal sparse, V>L, vitrite>clarite. Dom common I>L>V. Inertinite sparse to common, liptinite sparse, vitrinite rare. Rare yellow fluorescing oil droplets in some siltstones. Mineral fluorescence weak dull orange to none. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.56	1.18-2.18	0.328	10	
1120.0m	2_vmax	0.72	0.64-0.85	0.051	25	Abundant sporinite and sparse liptodetrinite orange to dull orange, rare cutinite dull orange, rare resinite yellow.. (Claystone>siltstone> coal. Coal rare, I inertite. Dom abundant L>I>V. Liptinite abundant, inertinite common, vitrinite rare. Mineral fluorescence patchy weak dull orange to none. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.74	1.40-2.08	0.216	10	
1475.0m	2_vmax	0.74	0.62-0.88	0.063	25	Common sporinite and rare liptodetrinite orange to dull orange, sparse cutinite orange to dull orange, sparse lamalginite yellowish orange.. (Claystone>siltstone> sandstone>shaly coal>coal. Shaly coal rare, V>L, vitrite>clarite. Coal rare, V, vitrite. Dom common L>V>I. Liptinite common, vitrinite and inertinite sparse. Rare yellow fluorescing oil droplets in sandstone. Mineral fluorescence weak dull orange to none. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.68	1.36-2.06	0.242	10	
1535.0m	2_vmax	0.79	0.68-0.94	0.056	25	Sparse sporinite and rare liptodetrinite orange to dull orange to weak brown, rare to sparse cutinite dull orange to weak brown. (Claystone>shaly coal. Shaly coal rare, V>L, vitrite>clarite. Dom common L>V>I. Liptinite sparse to common, vitrinite and inertinite sparse. Rare yellow fluorescing oil droplets in sandstone. Mineral fluorescence weak dull orange to none. Iron oxides rare. Pyrite sparse.)
Ctgs	2_lmax	1.75	1.30-2.24	0.347	10	

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1625.0m Ctgs	2_vmax	0.86	0.77-1.03	0.083	9	Sparse sporinite and rare liptodetrinite orange to dull orange to weak brown, rare cutinite dull orange to weak brown. (Claystone. Dom common I>L>V. Inertinite sparse to common, liptinite sparse, vitrinite rare. Mineral fluorescence weak dull orange to none. Iron oxides rare. Pyrite sparse.)
	2_lmax	1.68	1.20-2.04	0.218	25	
1675.0m Ctgs	2_vmax	0.98	0.82-1.10	0.063	25	Rare to sparse sporinite and rare liptodetrinite dull orange to weak brown, rare cutinite dull orange. (Sandstone>argillaceous siltstone> claystone. Dom common, V>L>I. Vitrinite and liptinite sparse, inertinite rare to sparse. A single grain with vitrinite reflectance of 1.60%, could be a heat altered grain. Weak brown fluorescence from most vitrinite. Mineral fluorescence mostly none, weak dull orange in fine grained sediments. Iron oxides rare. Pyrite rare.)
	2_lmax	1.96	1.46-2.96	0.442	10	
1720.0m Ctgs	2_vmax	1.08	0.94-1.21	0.069	17	Rare sporinite and liptodetrinite dull orange to weak brown, rare cutinite dull orange. Claystone>argillaceous siltstone> sandstone. Dom sparse, I>L>V. Inertinite sparse, liptinite rare to sparse, vitrinite rare. Weak fluorescence of liptinite is masked by the mineral fluorescence and the liptinite content of the sample is probably higher than the estimated liptinite content.. Mineral fluorescence weak dull orange to moderate orange in fine grained sediments. Iron oxides rare. Pyrite rare.)
	2_lmax	1.95	1.68-2.32	0.217	10	
1790.0m Ctgs	2_vmax	1.13	1.04-1.29	0.077	14	Rare sporinite and liptodetrinite dull orange to weak brown. (Sandstone>argillaceous siltstone>claystone. Dom sparse, I>L>V. Inertinite sparse, liptinite and vitrinite rare. Weak fluorescence of liptinite is masked by the mineral fluorescence and the liptinite content of the sample is probably higher than the estimated liptinite content.. Mineral fluorescence mostly none, weak dull orange in fine grained sediments. Iron oxides rare. Pyrite rare.)
	2_lmax	1.98	1.54-2.44	0.267	15	
1855.0m P1 Ctgs	2_vmax	1.60	-	-	1	Fluorescing liptinite absent. (Fine claystone>sandstone>argillaceous siltstone. Dom sparse, I>V. Inertinite sparse, vitrinite rare, liptinite absent. Population 1 is probably reworked material.. Mineral fluorescence pervasive dull orange in claystone. Iron oxides rare. Pyrite rare.)
	2_lmax	1.16	1.04-1.29	0.071	7	
P2		2.05	1.64-2.48	0.237	12	
1915.0m Ctgs	2_vmax	1.23	1.08-1.40	0.107	6	Fluorescing liptinite absent. (Silty claystone>argillaceous siltstone. Dom sparse to common, I>V. Inertinite sparse to common, vitrinite rare, liptinite absent. Mineral fluorescence weak dull orange to patchy moderate orange. Iron oxides rare. Pyrite rare.)
	2_lmax	2.05	1.70-2.64	0.234	20	

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1950.0m P1 Ctgs	2_vmax	1.51	1.43-1.58	0.062	3	Fluorescing liptinite absent. (Silty claystone>fine claystone. Dom common, I>V. Inertinite common, vitrinite rare, liptinite absent. P1 may be reworked material or both P1 and P2 may be components of a single vitrinite population with a wider scatter. Mineral fluorescence patchy moderate orange. Iron oxides rare. Pyrite sparse.)
	2_lmax	1.25	1.15-1.36	0.057	9	
	P2	2.11	1.54-2.68	0.316	20	
2000.0m Ctgs	2_vmax	1.29	1.26-1.32	0.028	4	Fluorescing liptinite absent. (Claystone>argillaceous siltstone. Dom common, I>V. Inertinite common, vitrinite rare, liptinite absent. Mineral fluorescence patchy moderate orange. Iron oxides rare. Pyrite sparse.)
	2_lmax	2.05	1.76-2.64	0.227	25	
2045.0m Ctgs	2_vmax	1.43	1.25-1.51	0.060	25	Fluorescing liptinite absent. (Calcareous claystone>carbonate>siltstone>coal>shaly coal. Coal abundant, V>>I, vitrite>inertinite. Shaly coal common, V, vitrite. Coal comprises about 8% of the sample and approximate maceral composition on mineral free basis: vitrinite 99%; inertinite 1%. Dom abundant, V>I. Vitrinite abundant, inertinite sparse, liptinite absent. Vitrinite bireflectance is low with a mean bireflectance ratio of 0.1% and a range of 0.04% to 0.19%. Microfolding common in shaly coal layers. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite sparse.)
2050.0m Ctgs	2_vmax	1.43	1.31-1.55	0.062	26	Fluorescing liptinite absent. (Calcareous claystone>carbonate>coal>siltstone>shaly coal. Coal major, V>>I, vitrite>inertinite. Shaly coal common, V, vitrite. Coal comprises about 12% of the sample and approximate maceral composition on mineral free basis: vitrinite 98%; inertinite 2%. Dom abundant, V>I. Vitrinite abundant, inertinite sparse, liptinite absent. Weak oil cuts from some vitrinite. Vitrinite bireflectance is low with a mean bireflectance ratio of 0.07% and a range of 0.03% to 0.12%. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite sparse.)
2055.0m Ctgs	2_vmax	1.43	1.31-1.59	0.063	27	Fluorescing liptinite absent. (Calcareous siltstone>carbonate>claystone>coal>shaly coal. Coal common, V>I, vitrite>inertinite= vitrinertite(I). Shaly coal sparse, I>V, inertite>vitrinite(V)>vitrite. Dom abundant, I>V. Inertinite abundant, vitrinite common, liptinite absent. Vitrinite bireflectance is low with a mean bireflectance ratio of 0.1% and a range of 0.03% to 0.17%. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite sparse.)

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Sample Details		Mean	Range	Std Dev	N° of Readings	Sample Description Including Liptinite Fluorescence, Maceral Abundances, Mineral Fluorescence
2060.0m Ctgs	2_vmax	1.44	1.32-1.56	0.049	25	Fluorescing liptinite absent. (Calcareous siltstone>carbonate>claystone>coal>shaly coal. Coal common, I>V, inertinite>vitrite. Shaly coal sparse, V, vitrite. Dom abundant, I>V. Inertinite abundant, vitrinite common, liptinite absent. Vitrinite bireflectance is low with a mean bireflectance ratio of 0.12% and a range of 0.05% to 0.18%. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite sparse.)
2070.0m Ctgs	2_vmax 2_lmax	1.47 2.42	- 1.80-2.90	- 0.374	1 5	Fluorescing liptinite absent. (Claystone>>carbonate. Dom rareI>V. Inertinite and vitrinite rare, liptinite absent. Mineral fluorescence mostly none, pervasive dull orange in some grains. Iron oxides rare. Pyrite common.)

The section found in Megascolides-2 is generally similar to that found in Megascolides-1 in terms of organic matter type and rank but the Megascolides-2 samples contain less coal in the shallower part of the section and more coal in the deeper part and reflectances are higher in the deeper section for Megascolides-2.

The lowest 2_vmax value found is 0.60% at 295m, and it is possible that Megascolides-2 shallow section is marginally higher in rank than that is Megascolides-1. By the 1790 to 1950m interval, it appears that the vitrinite reflectance values in Megascolides-2 are about 0.3% higher than those from Megascolides-1. The Megascolides-2 section extends about 150m deeper than Megascolides-1, and the reflectance in the deepest sample with abundant vitrinite (2060m) is 1.44% compared with 1.15% for the deepest sample in Megascolides-1 (1.15% at 1920m).

A number of samples in Megascolides-2 show small populations of higher reflecting vitrinite reported for two of the samples as P1. The P2 populations for these samples are considered more representative of the maturation levels at these horizons. The most likely cause for the presence of the higher reflecting populations is the presence of igneous intrusions.

Small amounts of oil inclusions were found in a number of samples. Much of the section lies within the zone of oil generation with the oil deadline being between 2000 and 2045m. Vitrinite reflectance gradients are very high in parts of the section, and it is possible that contact alteration is more widespread than the small amounts of material reported as P1. Oil has been present within the section although the top of the oil window has probably been breached by erosion. The deeper section will have generated large amounts of wet gas and some dry gas. In addition to the possibility of oil loss through erosion of the top of the section, gas flushing may also be a factor in the balance of hydrocarbon types reservoired within the section.