ANALYTICAL REPORT

SOURCE ROCK
ORGANIC MATTER REFLECTANCE
AND TYPING

OLYMPIC 1

PREPARED FOR
GSWA

JUNE 2016

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SOURCE ROCK ORGANIC MATTER REFLECTANCE AND TYPING

INTRODUCTION

Samples were received (see table below) to be evaluated for the reflectance of organic matter (vitrinite where possible) as well as an assessment of the types of organic matter present. If HAWK pyrolysis was also requested, the equivalent sample number is also indicated. HAWK data are reported separately.

ERC Sample No.		Company Reference	Sample Type	Other information
Vr	HAWK			
E1995		226036	cuttings	Jarlemai Siltstone \ Jurassic (180 - 190 m)
E1996		226035	cuttings	Wallal Sandstone \ Jurassic (320 - 330 m)
E1997		226034	cuttings	Grant Formation \ Permian (460 - 470 m)
E1998		226033	cuttings	Grant Formation \ Permian (560 - 570 m)
E1999		226032	cuttings	Grant/Goldwyer? - Permian \Middle Ordovician? (698 - 705 m)
E2000		226031	cuttings	Grant/Goldwyer? - Permian \Middle Ordovician? (850 - 855 m)
E2001		226030	cuttings	Grant/Goldwyer? - Permian \Middle Ordovician? (975 - 980 m)
E2002		221973	core	Nambeet Fm - Late Ordovician (1154.87 m)
E2003		221974	core	Nambeet Fm - Late Ordovician (1180.15 m)
E2004		221975	core	Nambeet Fm - Late Ordovician (1215.02 m)
E2005		221976	core	Nambeet Fm - Late Ordovician (1245.07 m)
E2006		221977	core	Nambeet Fm - Late Ordovician (1282.74 m)
E2007		221978	core	Nambeet Fm - Late Ordovician (1300.35 m)
E2008		221979	core	Nambeet Fm - Late Ordovician (1318.38 m)
E2009		221980	core	Nambeet Fm - Late Ordovician (1336.42 m)
E2010		221981	core	Nambeet Fm - Late Ordovician (1359.97 m)
E2011		221982	core	Nambeet Fm - Late Ordovician (1380.38 m)

METHODS

Sample preparation methods may vary slightly depending upon whether core/ outcrop or cuttings were received.

With core and outcrop samples, a flat face perpendicular to bedding is prepared by grinding. This is placed in a 30 mm diameter mould along with several randomly oriented grains. The whole is mounted in epoxy resin.

With cuttings, the samples are passed though a 2 mm sieve and where necessary are gently cracked in a mortar and pestle. This is then mounted in epoxy resin.

The epoxy resin mounted samples are polished using a variety of wet and dry papers, diamond polishing compounds and colloidal silica. The polished samples are dried in a desiccator for a minimum of 12 hours prior to analysis.

Analysis is made using a Leica MP4500P system with Hilgers DISKUS software. A mechanical stage is used to traverse the sample in a regular pattern. Mean maximum reflectance in oil of the organic matter is determined by rotating the microscope stage. Reflectance is determined of a 2 μm^2 area at 546nm using a total magnification of 500X.

A visual estimation of organic matter types and abundances was also made using comparison charts under both reflected and blue light excitation. The categories used are:

Descriptor	%
Absent	0
Rare	<0.1
Sparse	0.1< x <0.5
Common	0.5< x <2.0
Abundant	2.0< x <10.0
Major	10.0< x <40.0
Dominant	>40.0

The samples are also examined in blue light fluorescence using a Royal Blue LED as the excitation source.

RESULTS

Results are tabulated as follows. Low resolution images are provided in an appendix for reference purposes. High quality images are provided in a separate image file.

Data presentation

Individual sample results are reported in the following format:

ERC No. Client No.	Depth (ft / m)	$\bar{R}_{Vmax}$ *1	Range*2	SD*3	N*4
x1234	3106 $\bar{R}_I$ *5 Alginite*5 Bitumen*5	0.79	0.64 - 0.91	0.145	25

*1 Mean of all the maximum reflectance readings obtained.

*2 Lowest Rmax and highest Rmax of the population considered to represent the first generation vitrinite population.

*3 Standard Deviation

*4 Number of fields measured (Number of measurements = 2N because 2 maximum values are recorded for each field)

*5 Reflectance of multiple vitrinite populations or of other organic matter types. $\bar{R}_I$ = Inertinite mean maximum reflectance etc; subscripts may be expanded as necessary.

HAWK data, where requested, are reported separately in spread sheet format.

Note that if samples are retained by ERC, they will be held for at least 12 months after reporting but may be discarded after that date.

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA
OLYMPIC-1

ERC# / Client Ref / Type	Depth (m)	$\overline{R}_{vmax}$	Range	SD	N	Sample description including liptinite fluorescence, maceral abundances, mineral fluorescence
						Jurassic
						Jariemal Siltstone
E1995	180-190	0.29	0.24-0.37	0.041	7	Sparse lamalginite and rare liptodetrinite greenish yellow to
226036		0.84	0.57-1.58	0.210	25	yellow. (Sandstone>carbonate>claystone. Dom sparse to
Ctgs	$\overline{R}_I$					common, L>I>V. Liptinite and inertinite sparse, vitrinite rare. Mineral fluorescence weak to moderate orange. Iron oxides sparse. Pyrite sparse.)
						Wallal Sandstone
E1996	320-330	0.38	0.28-0.45	0.036	25	Rare cutinite dull yellow, rare resinite greenish yellow, rare
226035		1.08	0.87-1.23	0.108	10	sporinite weak orange. (Sandstone>siltstone>claystone>coal>
Ctgs	$\overline{R}_I$					carbonate>shaly coal. Coal sparse, V>I>L, vitrite>inertite> duroclarite. Shaly coal rare, V>I>L, duroclarite. Dom rare, V>I>L. All three maceral groups rare. Rare megaspores, could be reworked material. Mineral fluorescence mostly none, weak orange in argillaceous material. Glauconite rare. Iron oxides sparse. Pyrite sparse, locally abundant.)
						Permian
						Grant Formation
E1997	460-470	0.42	0.32-0.54	0.058	25	Sparse lamalginite and rare liptodetrinite yellow to dull
226034		1.02	0.83-1.20	0.102	10	orange, rare *tasmanitid* bright yellow. (Sandstone>
Ctgs	$\overline{R}_I$					claystone>carbonate. Dom sparse, L>I>V. Liptinite sparse, inertinite rare to sparse, vitrinite rare. Mineral fluorescence weak to moderate orange in argillaceous material. Iron oxides abundant. Pyrite sparse.)
E1998	560-570	0.45	0.35-0.61	0.070	19	Rare lamalginite and liptodetrinite yellow to dull orange,
226033		1.02	0.73-1.24	0.180	10	rare *tasmanitid* bright yellow. (Sandstone>siltstone>
Ctgs	$\overline{R}_I$					claystone>carbonate. Dom sparse, L>I>V. Liptinite rare to sparse, inertinite and vitrinite rare. Mineral fluorescence weak to moderate orange in argillaceous material. Iron oxides abundant. Pyrite sparse.)
						Permian/Middle Ordovician?
						Grant/Goldwyer Formation?
E1999	698-705	0.50	0.43-0.62	0.074	4	Rare lamalginite and liptodetrinite yellow. (Coarse sandstone
226032		1.04	0.77-1.22	0.172	9	>inorganic mud additives>siltstone> claystone>igneous
Ctgs	$\overline{R}_I$					rocks>coal. Coal rare, V, vitrite. Dom rare, I>L>V. All three maceral groups rare. Inorganic mud additives major. Mineral fluorescence mostly none, weak to moderate orange in argillaceous material. Iron oxides abundant. Pyrite rare.)
E2000	850-855	0.44	0.39-0.49	0.041	3	Fluorescing liptinite absent. (Coarse sandstone>>siltstone>
226031		1.26	0.97-1.67	0.243	6	igneous rocks. Dom rare, I>V. Inertinite and vitrinite rare,
Ctgs	$\overline{R}_I$					liptinite absent. Mineral fluorescence mostly none, weak to moderate orange in argillaceous material. Iron oxides common. Pyrite sparse.)

ERC# Client Ref Type	Depth (m)	$\overline{R}_{vmax}$	Range	SD	N	GEOLOGICAL SURVEY OF WESTERN AUSTRALIA OLYMPIC-1, p2 Sample description including liptinite fluorescence, maceral abundances, mineral fluorescence
						Permian/Middle Ordovician?
						Grant/Goldwyer Formation?
E2001	975-980	-	-	-	-	Fluorescing liptinite absent. (Fine carbonate>>calcareous
226030	Bioclast 1	1.21	1.15-1.24	0.040	3	claystone>sandstone. Dom rare, Bioclasts only, Bioclast
Ctgs	Bioclast 2	0.90	0.85-0.98	0.056	3	1>Bioclast2. Bioclast 1 is probably graptolite periderms and
	Bitumen	0.93	0.75-1.05	0.093	9	Bioclast 2 is likely chitinozoans. Rare non-fluorescing bitumen in carbonate. Mineral fluorescence moderate to strong orange. Iron oxides rare. Pyrite abundant.)
						Late Ordovician
						Nambeet Formation
E2002	1154.87	-	-	-	-	Fluorescing liptinite absent. (Carbonate and calcareous
221973	Bioclasts	1.33	1.13-1.65	0.138	30	siltstone. Dom common, Bioclasts only. Some bioclasts
Core	Bitumen	0.90	0.66-1.09	0.145	7	have high polishing relief such as one shown in plate 2002G and these are graptolite periderms. Other bioclasts have low polishing relief and these could be a form of coalified filamentous blue-green algae. Weak orange fluorescence was observed in both categories of bioclasts under the blue light excitation. Bioclasts are moderately bireflecting with a mean bireflectance ratio of 0.35. Rare non-fluorescing bitumen in carbonate. Diffuse organic matter abundant. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite abundant.)
E2003	1180.15	-	-	-	-	Fluorescing liptinite absent. (Calcareous claystone with
221974	Bioclasts	1.34	1.21-1.52	0.083	30	carbonate lenses. Dom common, Bioclasts only. Some
Core						bioclasts have high polishing relief and these are graptolite periderms. Other bioclasts have low polishing relief and these could be a form of coalified filamentous blue-green algae. Weak orange fluorescence was observed in both categories of bioclasts under the blue light excitation. Bioclasts are moderately bireflecting with a mean bireflectance ratio of 0.41. Diffuse organic matter abundant. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite abundant.)
E2004	1215.02	-	-	-	-	Rare ?*Gloeocapsomorpha*-related telalginite dull orange.
221975	Bioclasts	1.31	1.09-1.55	0.116	30	(Calcareous claystone with carbonate lenses and bands. Dom
Core	Alginite	0.63	-	-	1	common, bioclasts>alginite. Bioclasts common, alginite rare.
	Graptolite	1.76	-	-	1	Some bioclasts have high polishing relief and these are graptolite periderms. Other bioclasts have low polishing relief and these could be a form of coalified filamentous blue-green algae. Weak orange fluorescence was observed in both categories of bioclasts under the blue light excitation. Rare well preserved graptolite with high reflectance and weak fluorescence. Bioclasts are moderately bireflecting with a mean bireflectance ratio of 0.39. Diffuse organic matter abundant. Diffuse organic matter occur as narrow strands orientated parallel to bedding plane and could be residue left from lamalginite. Mineral fluorescence weak to moderate orange. Iron oxides rare. Pyrite abundant.)

ERC# Client Ref Type	Depth (m)	$\overline{R}_{vmax}$	Range	SD	N	GEOLOGICAL SURVEY OF WESTERN AUSTRALIA OLYMPIC-1, p3 Sample description including liptinite fluorescence, maceral abundances, mineral fluorescence Late Ordovician Nambeet Formation
E2005	1245.07	-	-	-	-	Fluorescing liptinite absent. (Calcareous claystone with
221976	Bioclasts	1.37	1.14-1.63	0.117	30	carbonate lenses and bands. Dom common, bioclasts only.
Core	Graptolite	1.67	-	-	1	Some bioclasts have high polishing relief and these are graptolite periderms. Other bioclasts have low polishing relief and these could be a form of coalified filamentous blue-green algae. Weak orange fluorescence was observed in both categories of bioclasts under the blue light excitation. Rare well preserved graptolite with high reflectance and weak fluorescence. Bioclasts are moderately bireflecting with a mean bireflectance ratio of 0.32. Diffuse organic matter abundant. Diffuse organic matter occur as narrow strands orientated parallel to bedding plane and could be residue left from lamalginite. Mineral fluorescence weak to moderate orange. Iron oxides rare. Pyrite abundant.)
E2006	1282.74	-	-	-	-	Fluorescing liptinite absent. (Calcareous claystone . Dom
221977	Bioclasts	1.39	1.14-1.72	0.138	30	common, bioclasts only. Some bioclasts have high polishing
Core	Graptolite	1.80	-	-	1	relief and these are graptolite periderms. Other bioclasts have low polishing relief and these could be a form of coalified filamentous blue-green algae. Weak orange fluorescence was observed in both categories of bioclasts under the blue light excitation. Rare well preserved graptolite with high reflectance and weak fluorescence. Bioclasts are moderately bireflecting with a mean bireflectance ratio of 0.28. Rare high reflecting graptolite with a maximum reflectance of 1.80%. Diffuse organic matter abundant. Diffuse organic matter occur as narrow strands orientated parallel to bedding plane and could be residue left from lamalginite. Mineral fluorescence weak to moderate orange. Iron oxides rare. Pyrite abundant.)
E2007	1300.35	-	-	-	-	Fluorescing liptinite absent. (Calcareous siltstone with
221978	Bioclasts	1.52	1.21-1.72	0.122	30	carbonate abundant. Dom abundant, bioclasts>graptolites.
Core	Graptolite	1.83	1.70-2.03	0.087	11	Graptolite population is well defined in the sample with higher
	Bitumen	0.84	0.75-0.92	0.056	6	reflectance, strong bireflectance and high polishing relief. Bioclasts have low polishing relief, moderate bireflectance and relatively lower reflectance these could mainly be a form of coalified filamentous blue-green algae with some low reflecting graptolites. Graptolite bireflectance ratio is 0.52 compared with bioclasts where bireflectance ratio is 0.28. Some bioclasts have pitted polished surfaces where as graptolites have smooth polishing surfaces and are often branched. Weak orange fluorescence was observed in both categories of bioclasts and graptolites under the blue light excitation. Rare dull orange fluorescing bitumen. Diffuse organic matter abundant. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite abundant.)

ERC# Client Ref Type	Depth (m)	$\overline{R}_{vmax}$	Range	SD	N	GEOLOGICAL SURVEY OF WESTERN AUSTRALIA OLYMPIC-1, p3 Sample description including liptinite fluorescence, maceral abundances, mineral fluorescence
						Late Ordovician
						Nambeet Formation
E2008	1318.38	-	-	-	-	Rare ?alginite orange to dull orange. (Calcareous claystone.
221979	Bioclasts	1.41	1.18-1.60	0.106	30	Dom abundant, bioclasts>graptolites>?alginite. Bioclasts and
Core	Graptolite	1.68	1.55-1.84	0.080	20	graptolite common, alginite rare. Alginite is different to other
	?Alginite	0.78	0.73-0.84	0.043	4	bioclasts having an orange fluorescence and low reflectance.
	Bitumen	0.78	0.69-0.87	0.090	2	Graptolite population is well defined in the sample with higher reflectance, strong bireflectance and high polishing relief. Bioclasts have low polishing relief, moderate bireflectance and relatively lower reflectance these could mainly be a form of coalified filamentous blue-green algae with some low reflecting graptolites. Graptolite bireflectance ratio is 0.51compared with bioclasts where bireflectance ratio is 0.24. Some bioclasts have pitted polished surfaces where as graptolites have smooth polishing surfaces and are often branched. Weak orange fluorescence was observed in both categories of bioclasts and graptolites under the blue light excitation. Rare dull orange fluorescing bitumen. Diffuse organic matter abundant. Mineral fluorescence patchy moderate to strong orange. Iron oxides rare. Pyrite abundant.)
E2009	1336.42	-	-	-	-	Fluorescing liptinite absent. (Calcareous claystone. Dom
221980	Bioclasts	1.42	1.22-1.65	0.108	30	abundant, bioclasts>graptolites. Bioclasts common,
Core	Graptolite	1.77	1.63-1.95	0.100	6	graptolite rare. Graptolite population is well defined in the
	Bitumen	0.81	0.68-0.97	0.108	7	sample with higher reflectance, strong bireflectance and high polishing relief. Bioclasts have low polishing relief, moderate bireflectance and relatively lower reflectance these could mainly be a form of coalified filamentous blue-green algae with some low reflecting graptolites. Graptolite bireflectance ratio is 0.55compared with bioclasts where bireflectance ratio is 0.30. Some bioclasts have pitted polished surfaces where as graptolites have smooth polishing surfaces and are often branched. Weak orange fluorescence was observed in both categories of bioclasts and graptolites under the blue light excitation. Abundant non-fluorescing granular bitumen disseminated in the mineral matrix of claystone. Rare dull orange fluorescing ?recrystallised bitumen. Mineral fluorescence patchy moderate orange. Iron oxides rare. Pyrite abundant.)

ERC# Client Ref Type	Depth (m)	$\overline{R}_{vmax}$	Range	SD	N	GEOLOGICAL SURVEY OF WESTERN AUSTRALIA OLYMPIC-1, p4 Sample description including liptinite fluorescence, maceral abundances, mineral fluorescence
						Late Ordovician
						Nambeet Formation
E2010	1359.97	-	-	-	-	Fluorescing liptinite absent. (Calcareous claystone with
221981	Bioclasts	1.52	1.24-1.66	0.101	30	carbonate bands. Dom common, bioclasts>graptolites.
Core	Graptolite	1.72	1.52-2.02	0.137	11	Bioclasts sparse to common, graptolite sparse. Graptolite
	Bitumen	0.80	0.75-0.89	0.038	14	population is well defined in the sample with higher reflectance, strong bireflectance and high polishing relief. Most of graptolites occur as narrow strands and these were ignored as no reliable measurements could be made from these clasts. Bioclasts have low polishing relief, moderate bireflectance and relatively lower reflectance these could mainly be a form of coalified filamentous blue-green algae with some low reflecting graptolites. Graptolite bireflectance ratio is 0.43compared with bioclasts where bireflectance ratio is 0.38. Some bioclasts have pitted polished surfaces where as graptolites have smooth polishing surfaces and are often branched. Weak orange fluorescence was observed in both categories of bioclasts and graptolites under the blue light excitation. Common non-fluorescing granular bitumen disseminated in the mineral matrix of claystone. Sparse dull orange fluorescing ? recrystallised bitumen. Common round to oval siliceous oozes with carbonate filled centre and are likely Protozoan skeletal structures. Mineral fluorescence patchy moderate orange. Iron oxides rare. Pyrite abundant.)
E2011	1380.38	-	-	-	-	Rare to sparse ?alginite (Bcl2) dull orange to weak brown.
221982	Bioclast 1	1.57	1.35-1.74	0.102	30	(Calcareous claystone with carbonate bands. Dom common,
Core	Bioclast 2	0.87	0.71-0.98	0.077	13	bcl1 > Bcl2 >graptolites. Bioclast 1sparse to common,
	Graptolite	1.75	1.65-1.85	0.100	2	bioclasts 2 rare to sparse, graptolite rare. Bioclast 1 grains have low polishing relief, moderate bireflectance and relatively lower reflectance. Bioclast 2 grains are low reflecting, weakly fluorescing and have very low bireflectance. Both bioclasts 1 and bioclasts 2 are probably of algal origin, but whether the difference in mean reflectance due to being different species of algae is not certain. Graptolite bireflectance ratio is 0.47 compared with bioclasts where bireflectance ratio is 0.34. Some bioclasts 1 grains have pitted polished surfaces where as graptolites have smooth polishing surfaces and are often branched. Bioclast 2 grain have smooth polishing surfaces. Narrow strings of diffused organic matter, arranged parallel to bedding plane, are present and most bioclasts occur in association with strands of diffuse organic matter. . Mineral fluorescence patchy moderate orange. Iron oxides rare. Pyrite abundant.)

Note: Estimated percentages of Bioclasts are recorded in the Inertinite box in VRW spreadsheets.

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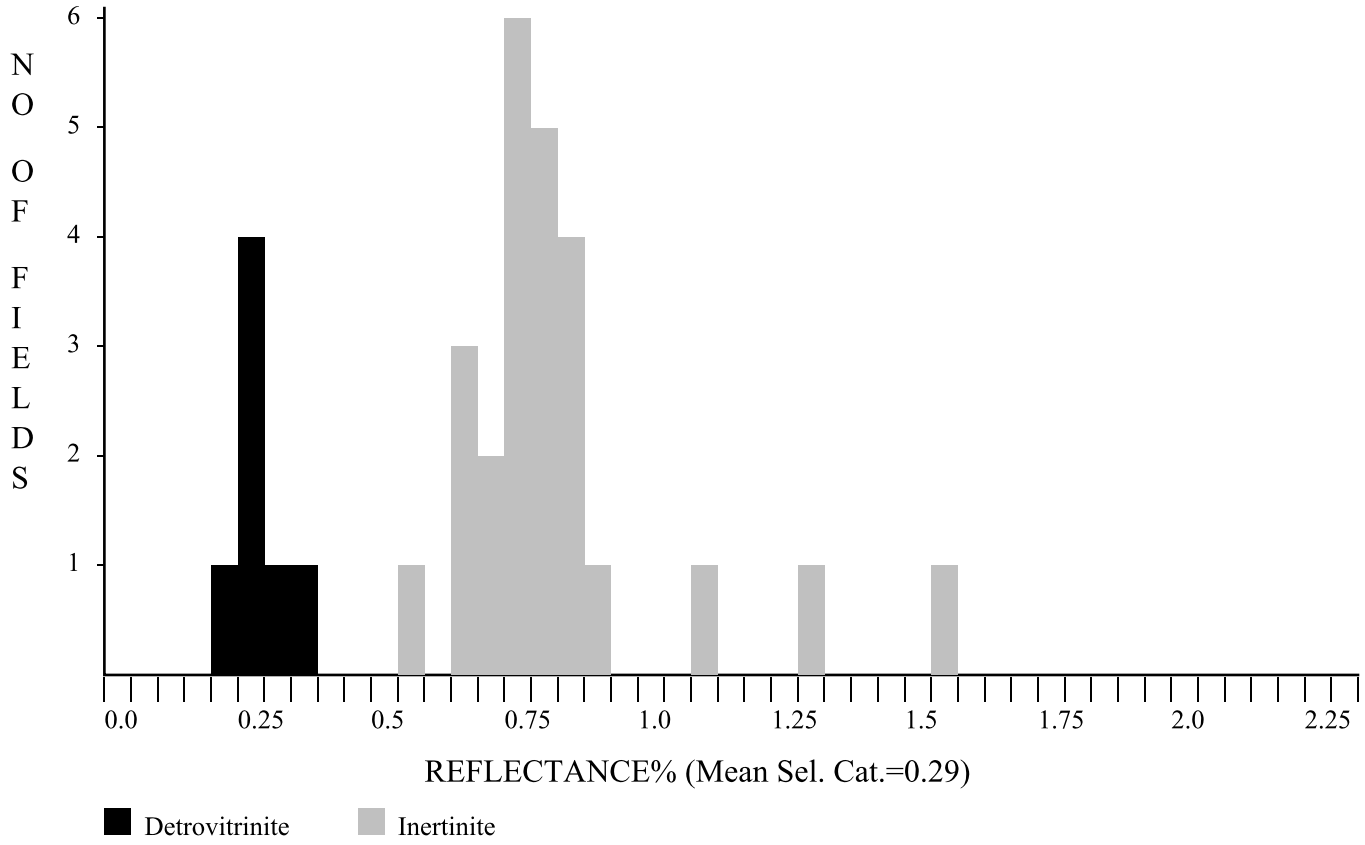
GSWA, Olympic-1, 226036, 180-190m, Ctgs(E1995)



Maceral Category	N	Mean	Standard Deviation
Detrovitrinite	7	0.29	0.041
Inertinite	25	0.84	0.210
Total	32	0.72	0.295

Selected categories: Detrovitrinite:

No. of Readings:	7
Mean of Selected Categories:	0.29
Standard Deviation of Selected categories:	0.041

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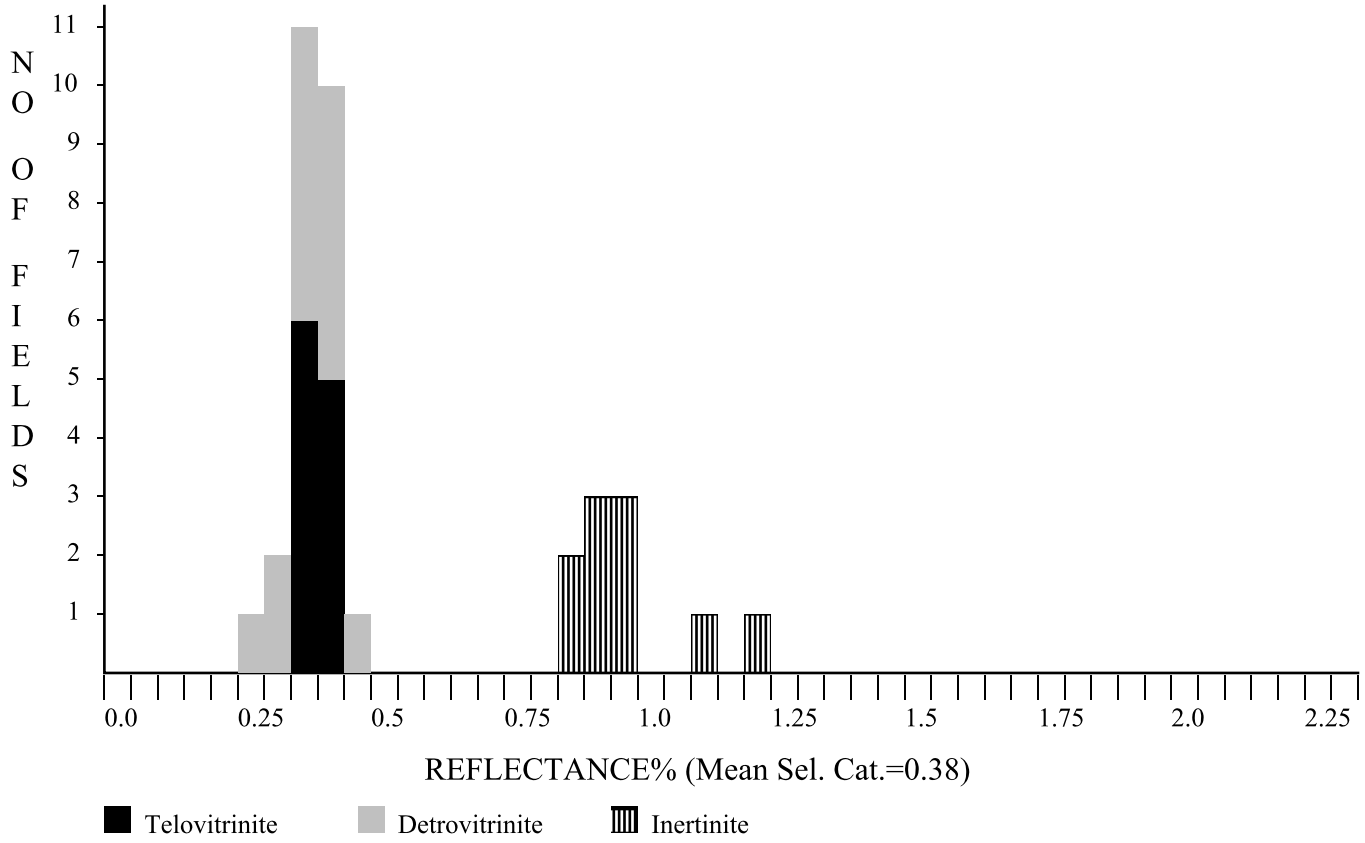
GSWA, Olympic-1, 226035, 320-330m, Ctgs(E1996)



Maceral Category	N	Mean	Standard Deviation
Telovitrinite	11	0.39	0.020
Detrovitrinite	14	0.38	0.043
Inertinite	10	0.97	0.108
Total	35	0.55	0.272

Selected categories: Telovitrinite,Detrovitrinite:

No. of Readings:	25
Mean of Selected Categories:	0.38
Standard Deviation of Selected categories:	0.036

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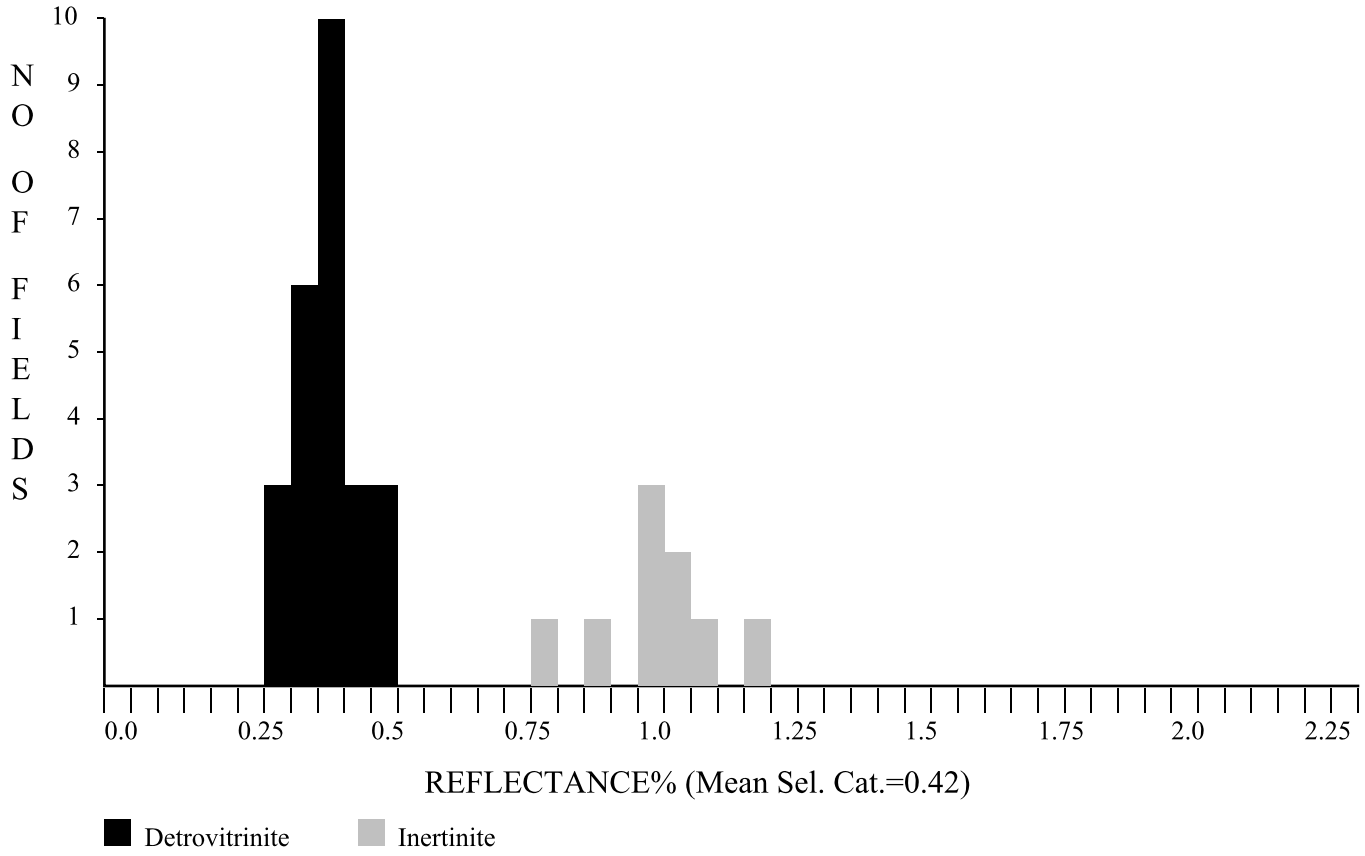
GSWA, Olympic-1, 226034, 460-470m, Ctgs(E1997)



Maceral Category	N	Mean	Standard Deviation
Detrovitrinite	25	0.42	0.058
Inertinite	9	1.02	0.102
Total	34	0.58	0.277

Selected categories: Detrovitrinite:

No. of Readings:	25
Mean of Selected Categories:	0.42
Standard Deviation of Selected categories:	0.058

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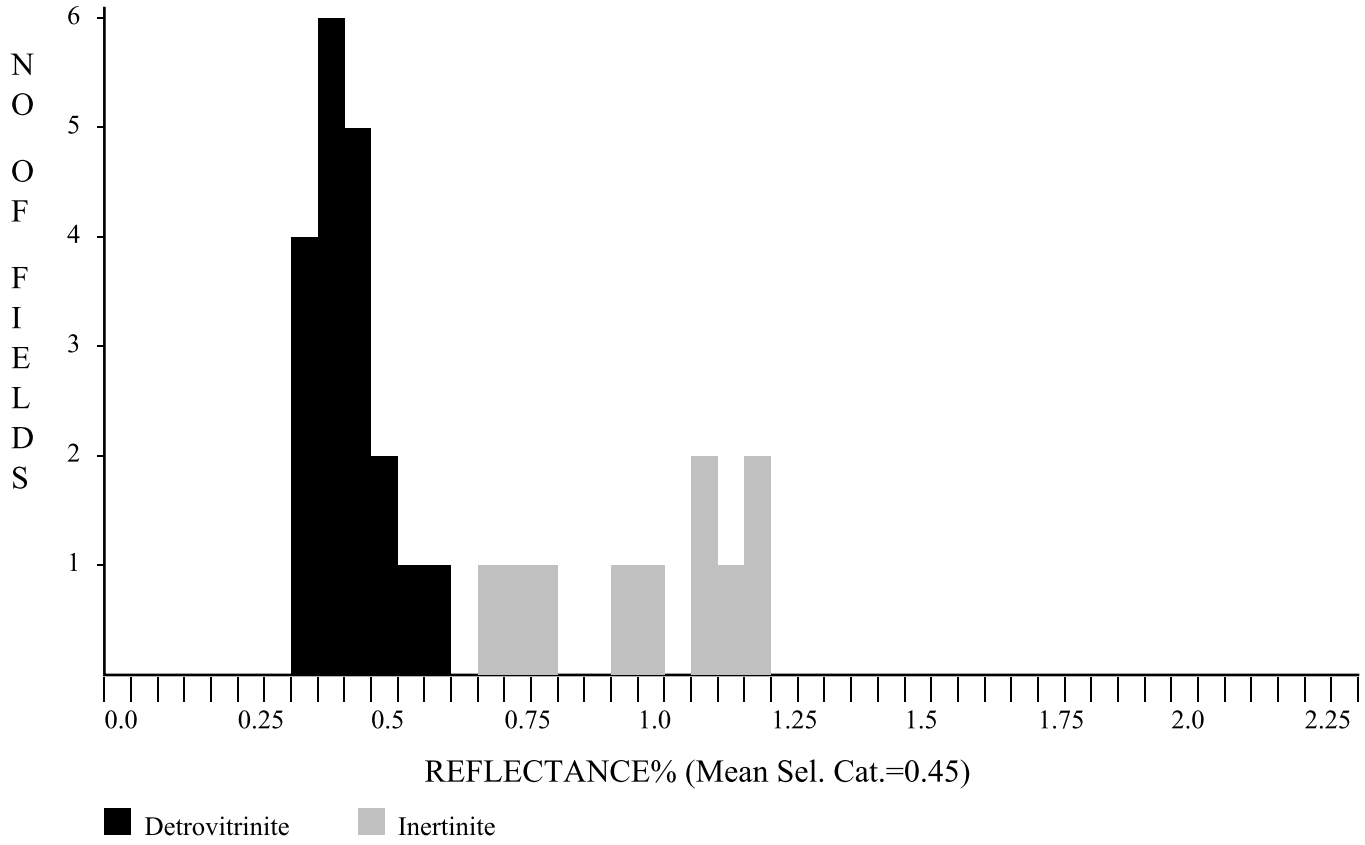
GSWA, Olympic-1, 226033, 560-570m, Ctgs(E1998)



Maceral Category	N	Mean	Standard Deviation
Detrovitrinite	19	0.45	0.070
Inertinite	10	1.02	0.180
Total	29	0.64	0.298

Selected categories: Detrovitrinite:

No. of Readings:	19
Mean of Selected Categories:	0.45
Standard Deviation of Selected categories:	0.070

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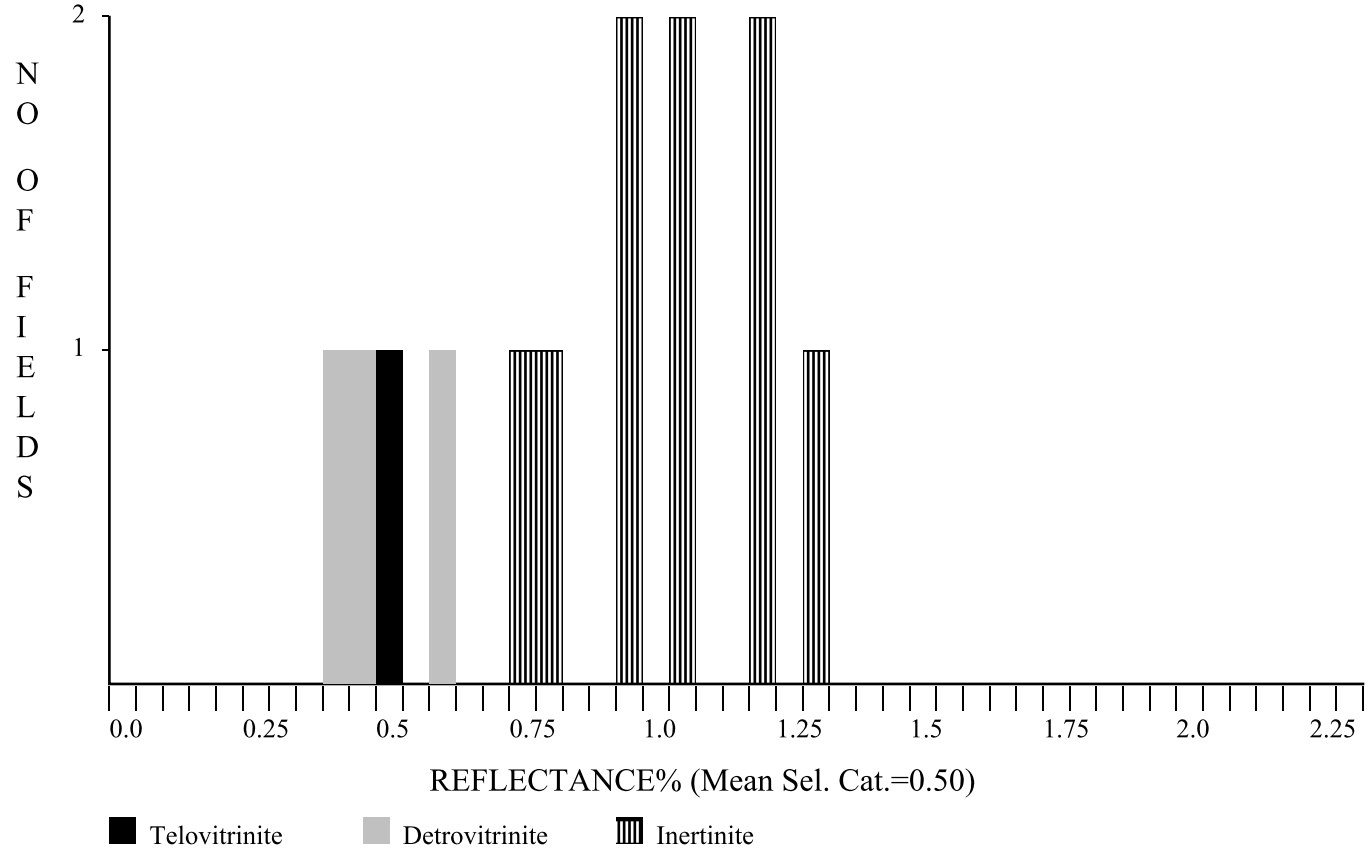
GSWA, Olympic-1, 226032, 698-705m, Ctgs(E1999)



Maceral Category	N	Mean	Standard Deviation
Telovitrinite	1	0.50	0.000
Detrovitrinite	3	0.50	0.085
Inertinite	9	1.04	0.172
Total	13	0.88	0.291

Selected categories: Telovitrinite,Detrovitrinite:

No. of Readings:	4
Mean of Selected Categories:	0.50
Standard Deviation of Selected categories:	0.074

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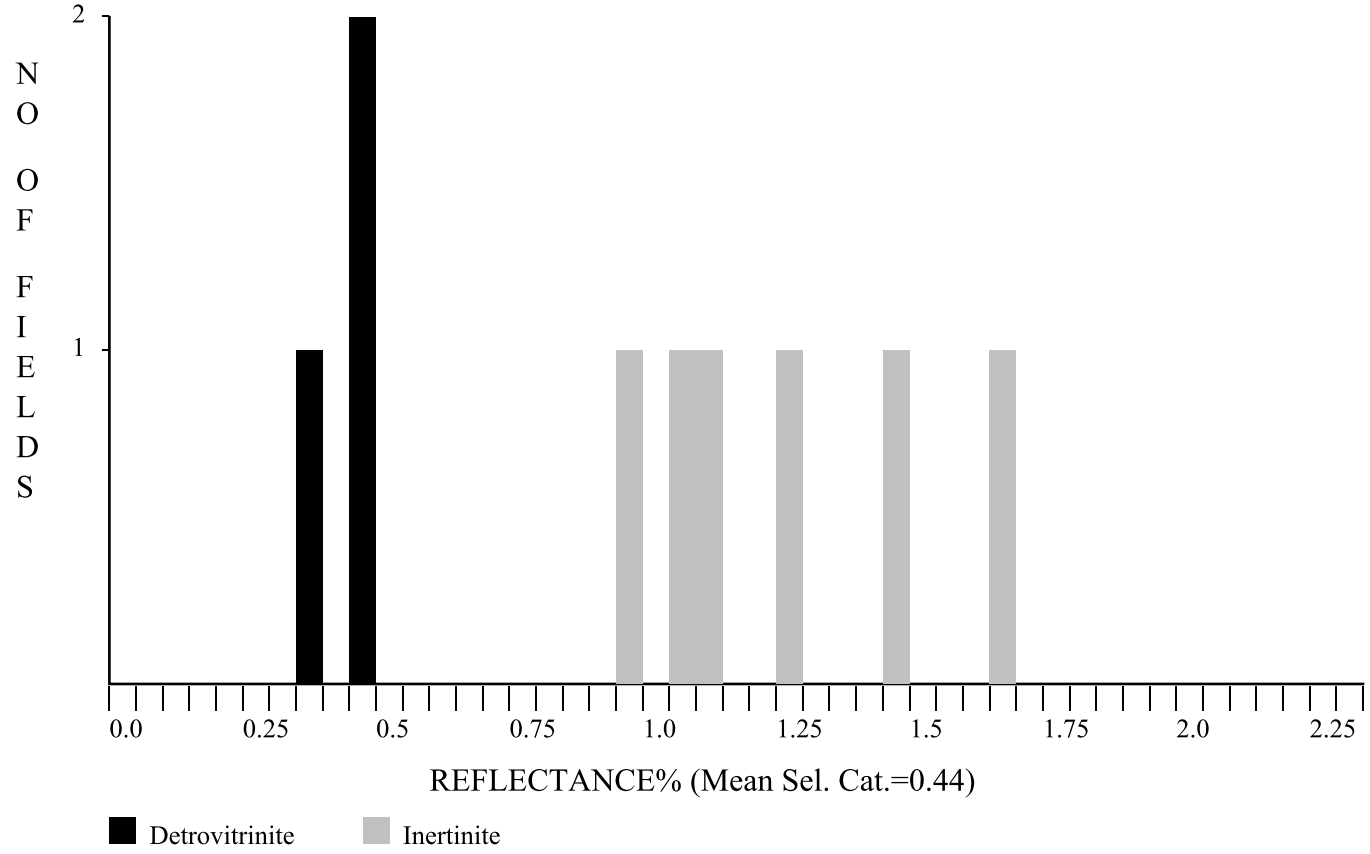
GSWA, Olympic-1, 226031, 850-855m, Ctgs(E2000)



Maceral Category	N	Mean	Standard Deviation
Detrovitrinite	3	0.44	0.041
Inertinite	6	1.26	0.243
Total	9	0.99	0.432

Selected categories: Detrovitrinite:

No. of Readings:	3
Mean of Selected Categories:	0.44
Standard Deviation of Selected categories:	0.041

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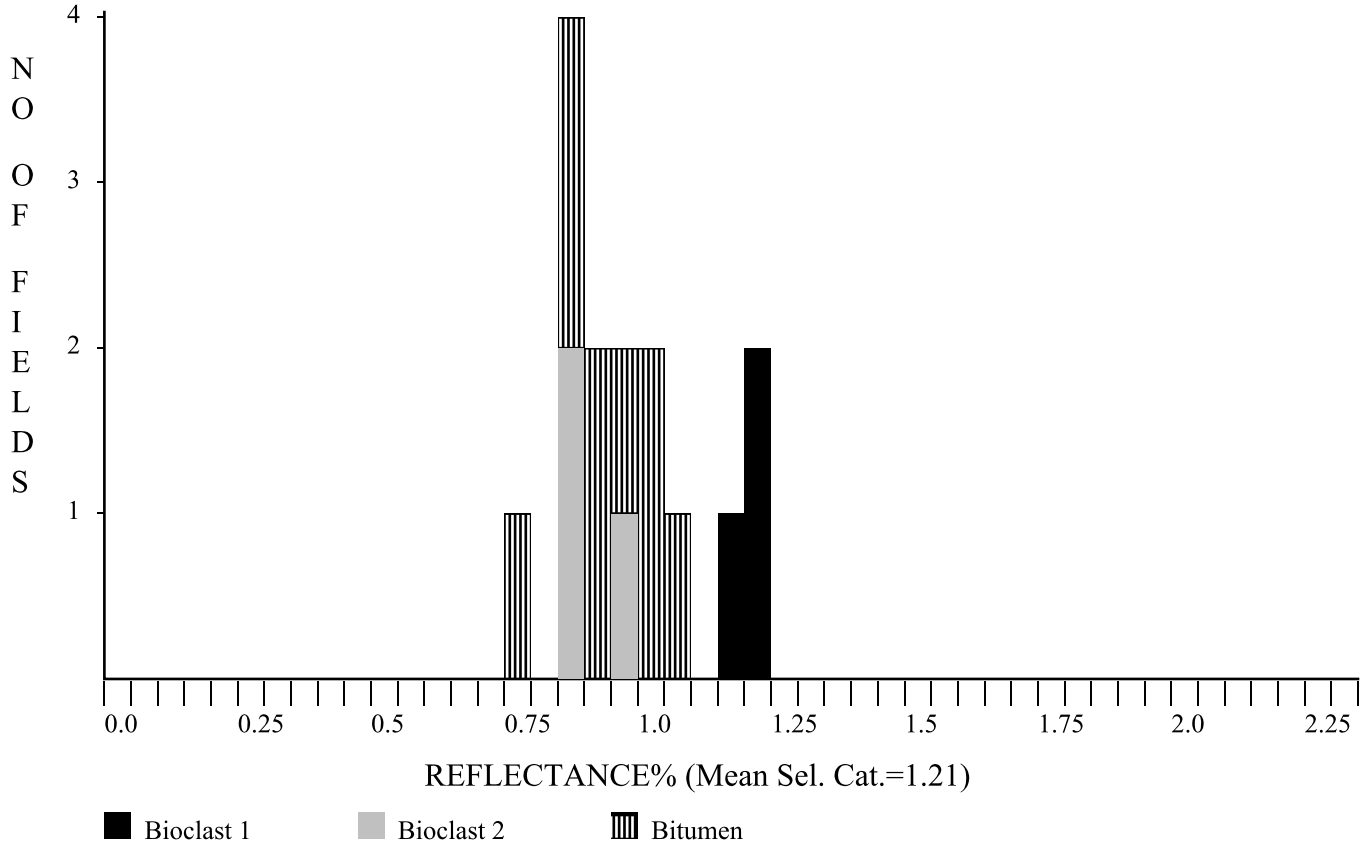
GSWA, Olympic-1, 226030, 975-980m, Ctgs(E2001)



Maceral Category	N	Mean	Standard Deviation
Bioclast 1	3	1.21	0.040
Bioclast 2	3	0.90	0.056
Bitumen	9	0.93	0.093
Total	15	0.98	0.138

Selected categories: Bioclast 1:

No. of Readings:	3
Mean of Selected Categories:	1.21
Standard Deviation of Selected categories:	0.040

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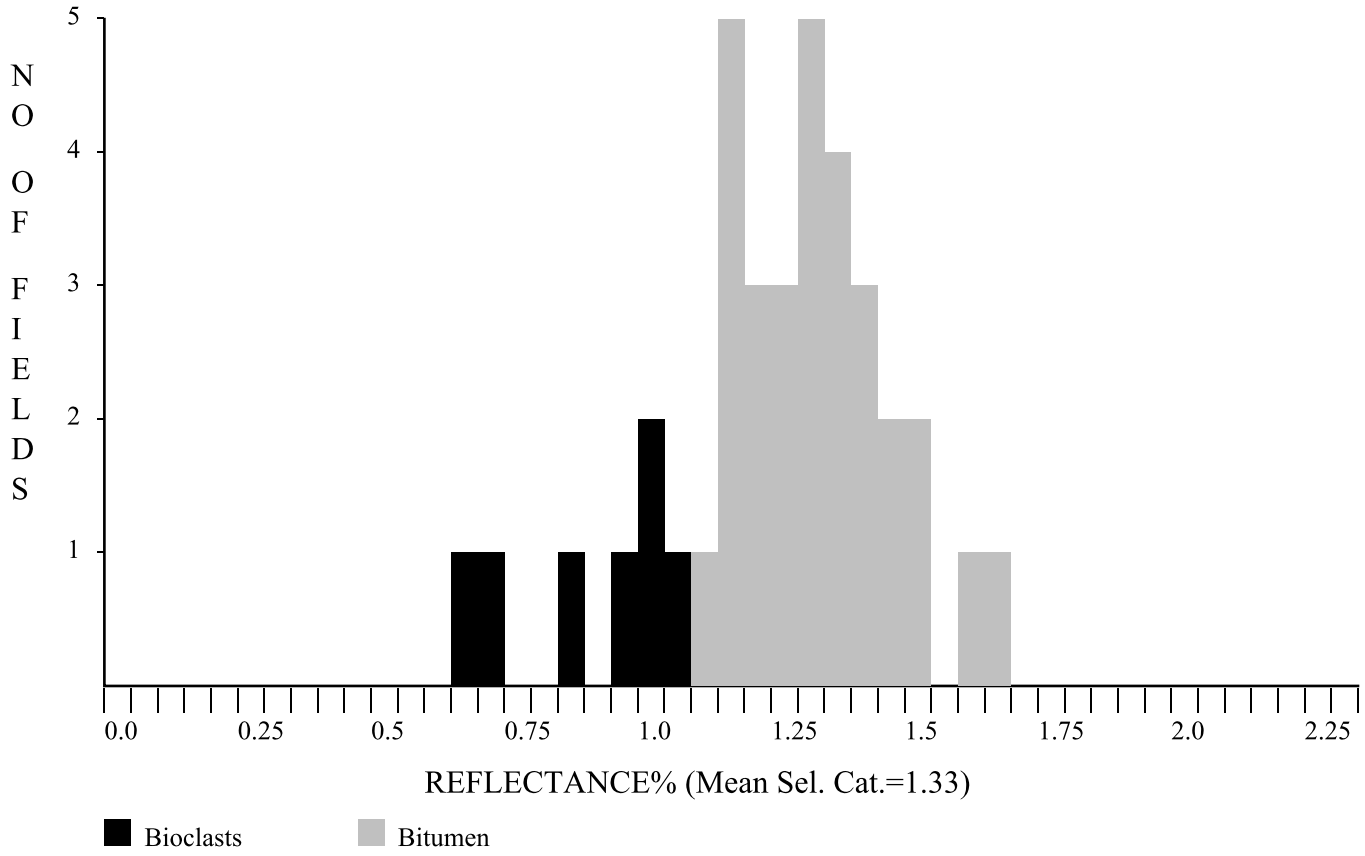
GSWA, Olympic-1, 221973, 1154.87m, Core(E2002)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.33	0.138
Bitumen	7	0.90	0.145
Total	37	1.25	0.218

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.33
Standard Deviation of Selected categories:	0.138

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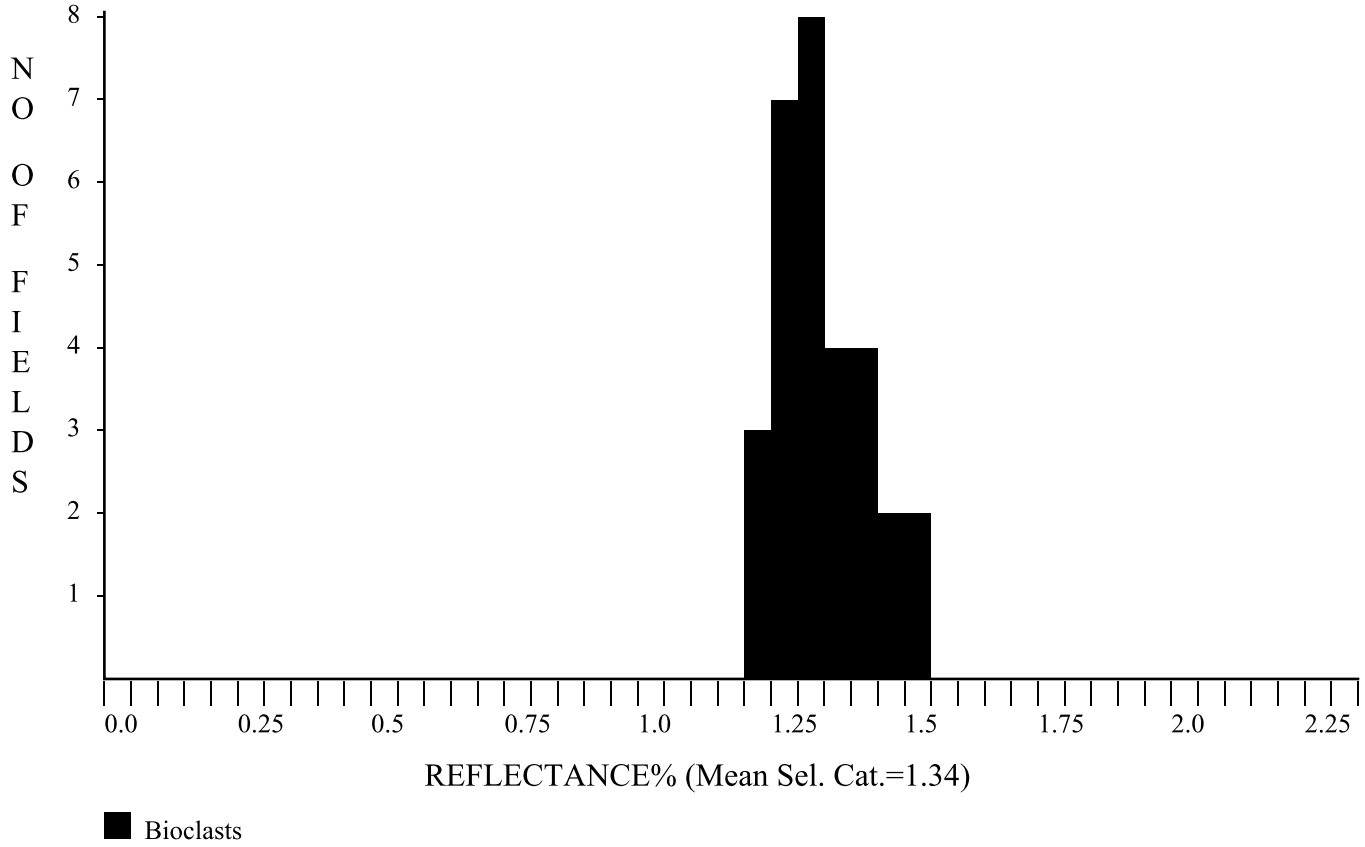
GSWA, Olympic-1, 221974, 1180.15m, core(E2003)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.34	0.083
Total	30	1.34	0.083

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.34
Standard Deviation of Selected categories:	0.083

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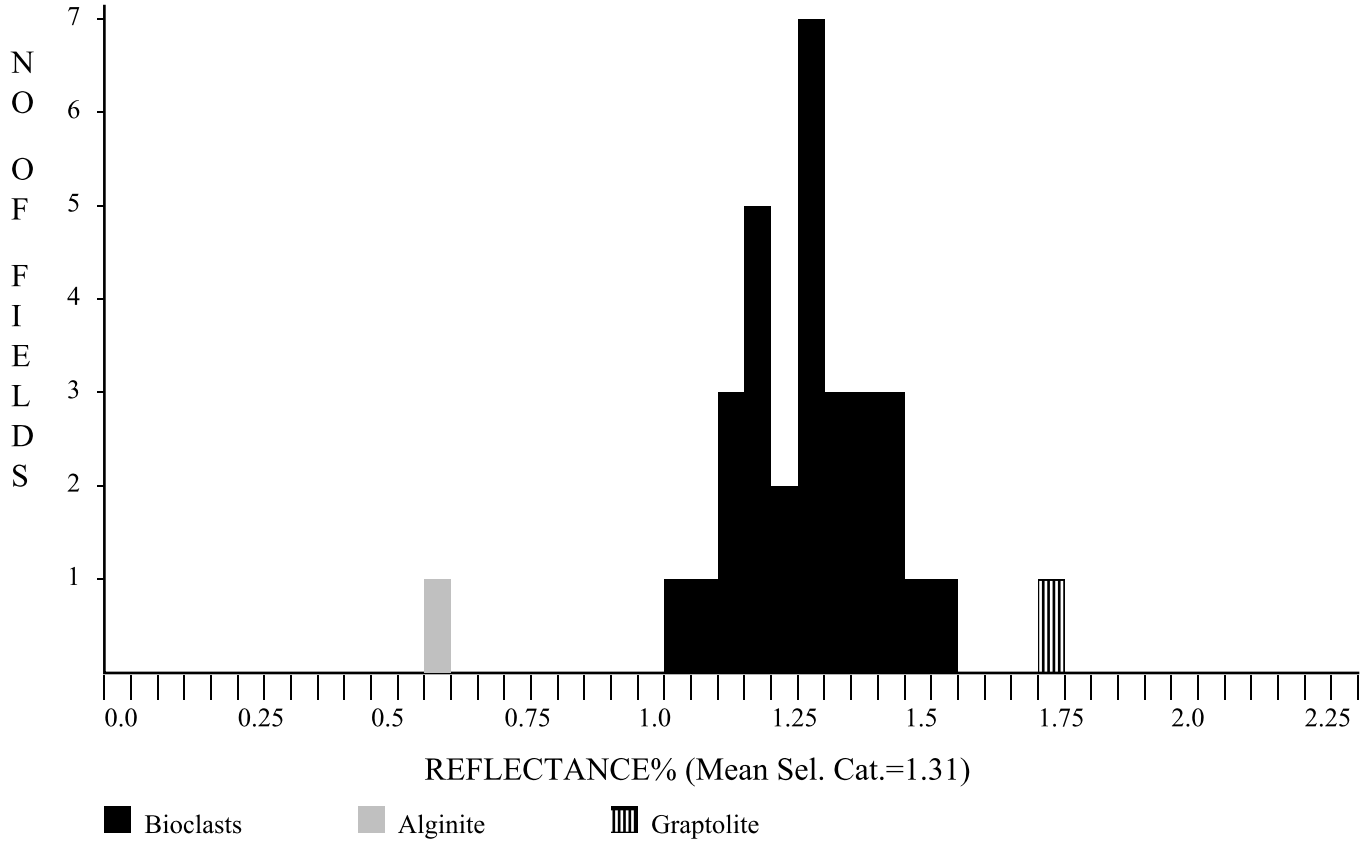
GSWA, Olympic-1, 221975, 1215.02m, core(E2004)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.31	0.116
Alginite	1	0.63	0.000
Graptolite	1	1.76	0.000
Total	32	1.30	0.182

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.31
Standard Deviation of Selected categories:	0.116

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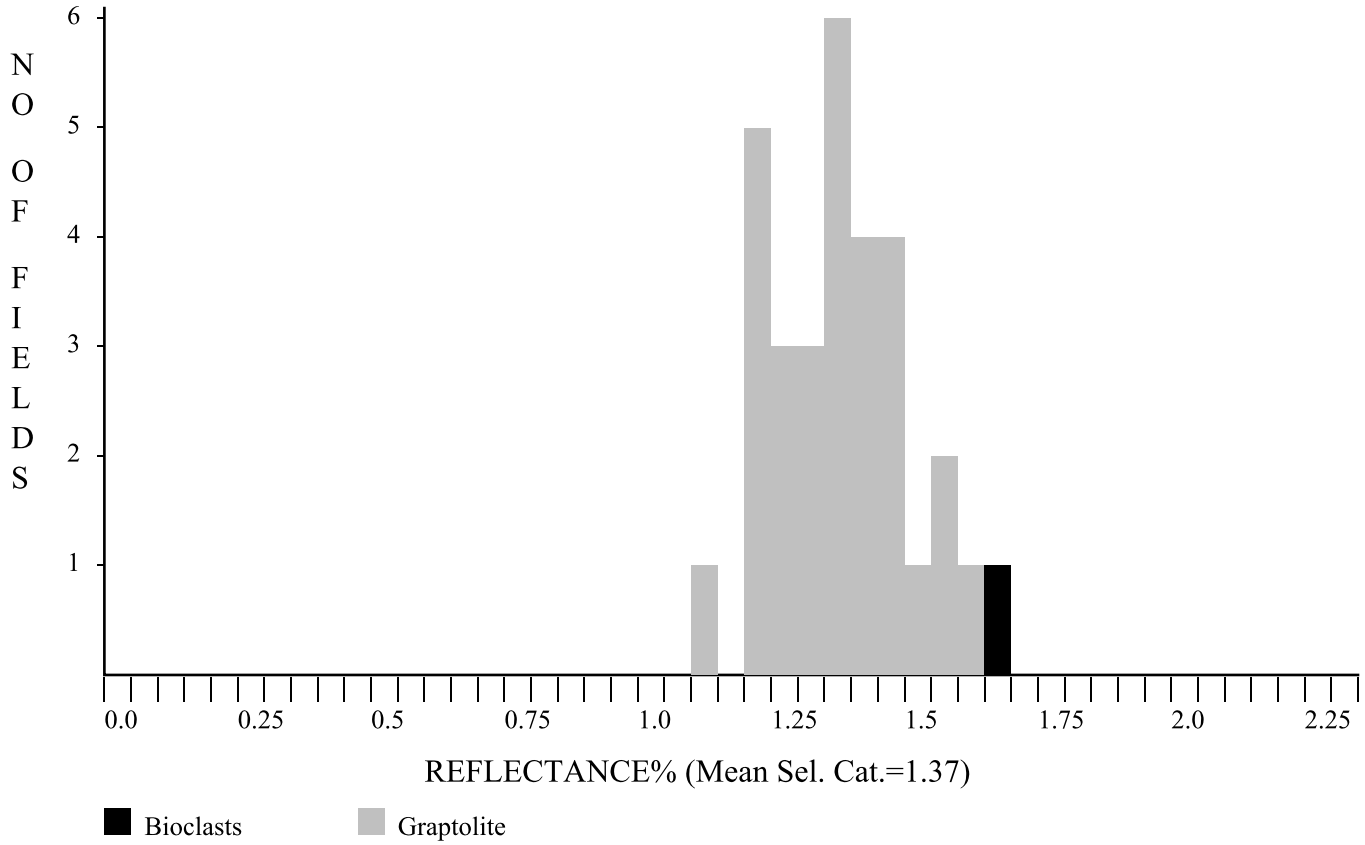
GSWA, Olympic-1, 221976, 1245.07m, core(E2005)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.37	0.117
Graptolite	1	1.67	0.000
Total	31	1.38	0.127

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.37
Standard Deviation of Selected categories:	0.117

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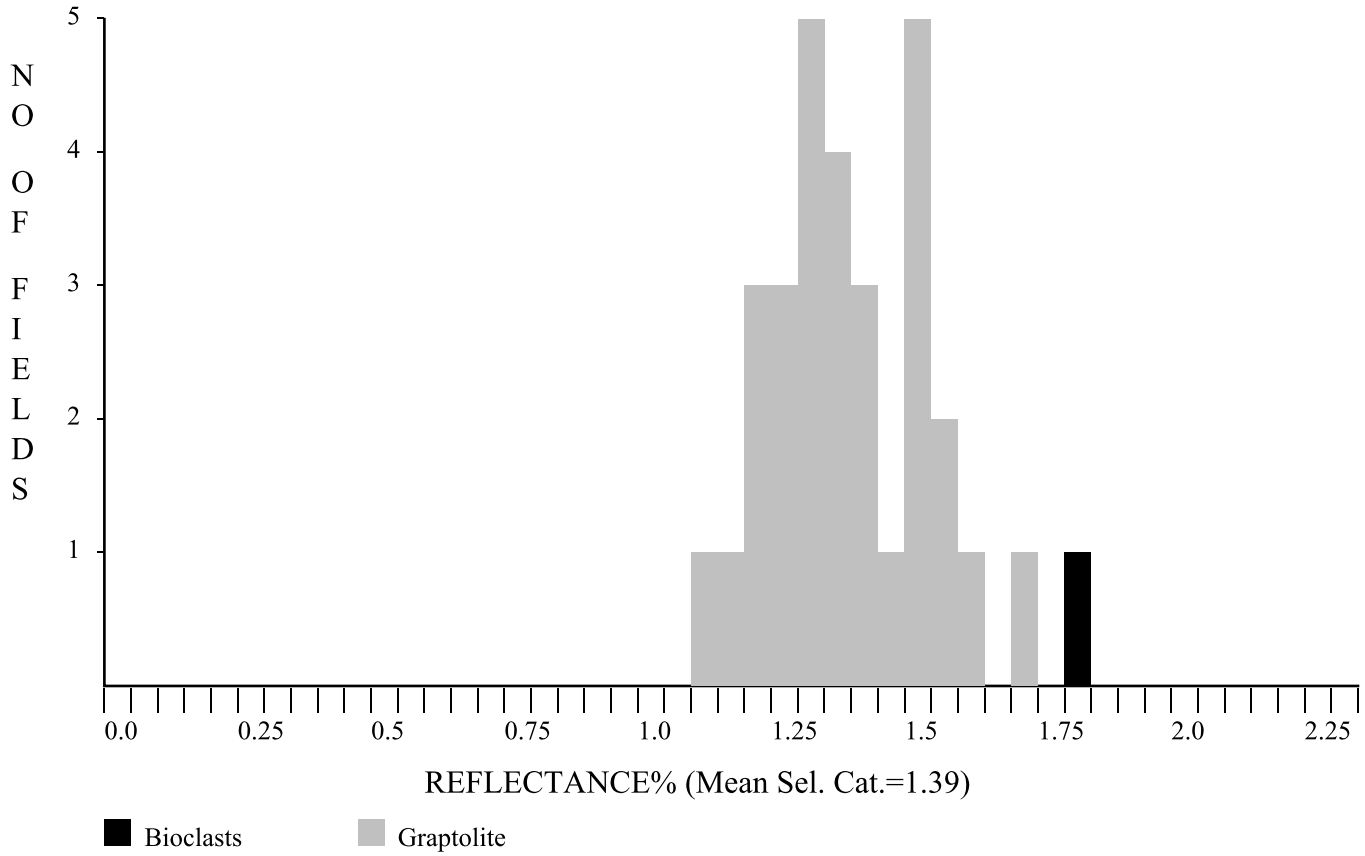
GSWA, Olympic-1, 221977, 1282.74m, core(E2006)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.39	0.138
Graptolite	1	1.80	0.000
Total	31	1.40	0.154

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.39
Standard Deviation of Selected categories:	0.138

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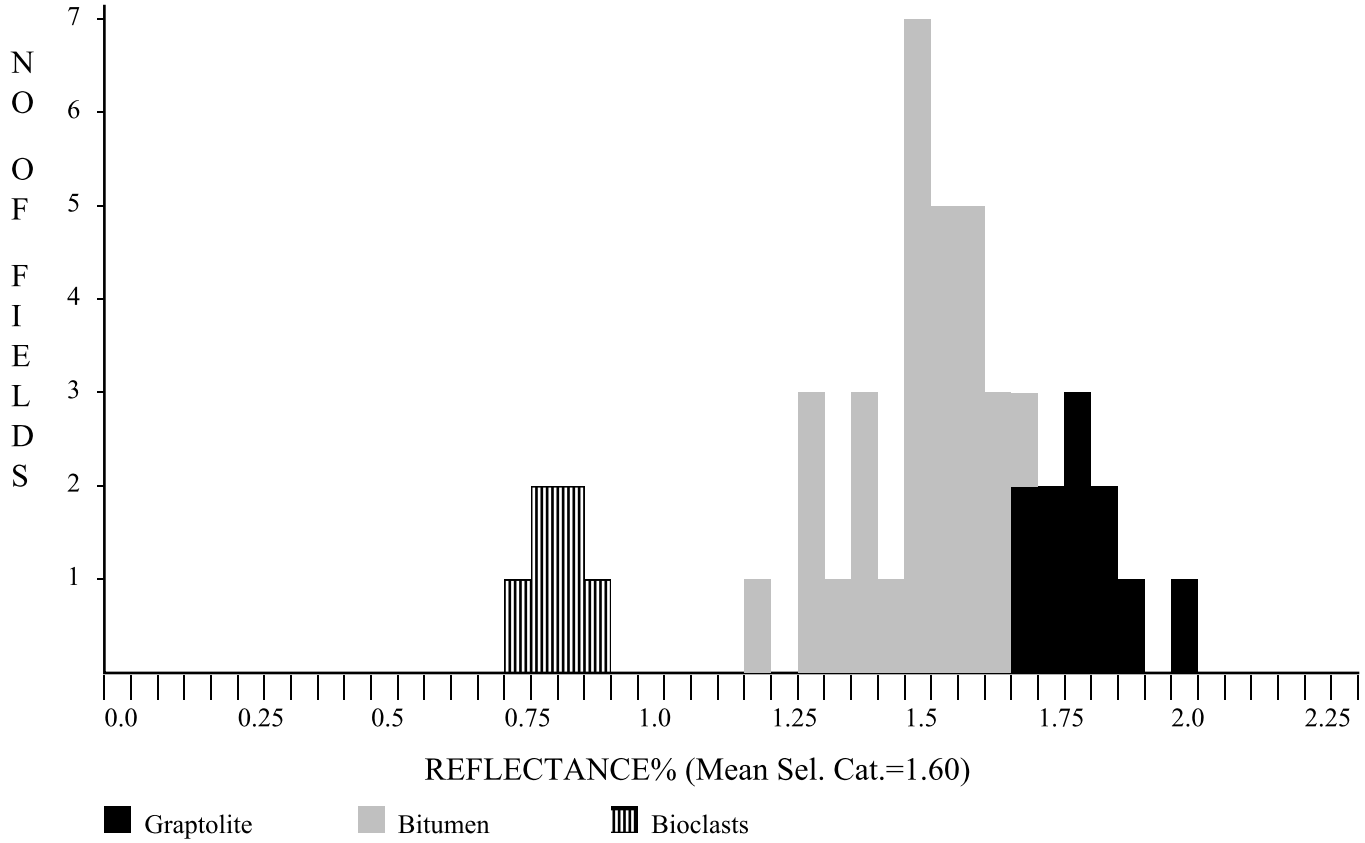
GSWA, Olympic-1, 221978,1300.35m, core(E2007)



Maceral Category	N	Mean	Standard Deviation
Graptolite	11	1.83	0.087
Bitumen	6	0.84	0.056
Bioclasts	30	1.52	0.122
Total	47	1.51	0.306

Selected categories: Graptolite,Bioclasts:

No. of Readings:	41
Mean of Selected Categories:	1.60
Standard Deviation of Selected categories:	0.181

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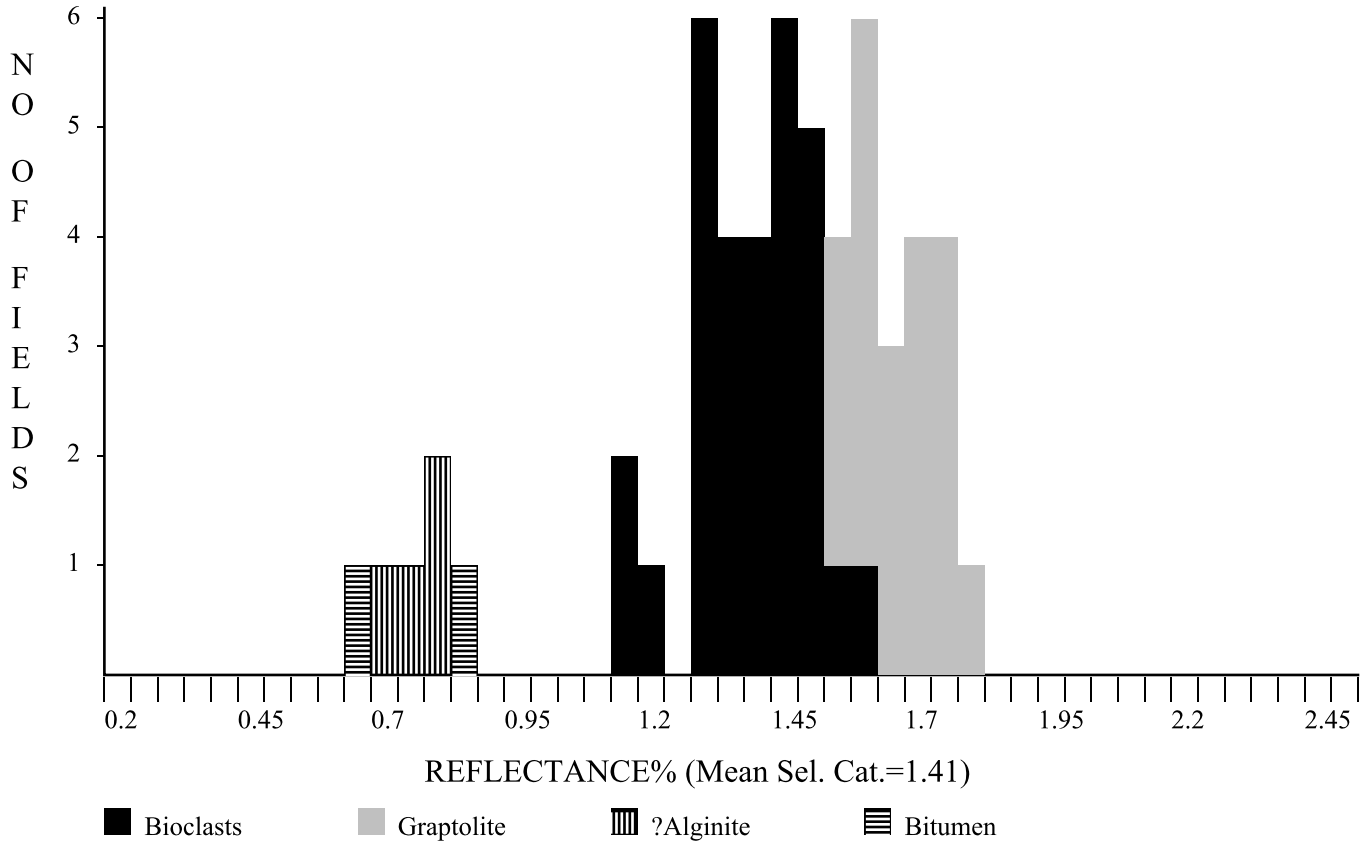
GSWA, Olympic-1, 221979,1318.38m, core(E2008)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.41	0.106
Graptolite	20	1.68	0.080
?Alginite	4	0.78	0.043
Bitumen	2	0.78	0.090
Total	56	1.44	0.276

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.41
Standard Deviation of Selected categories:	0.106

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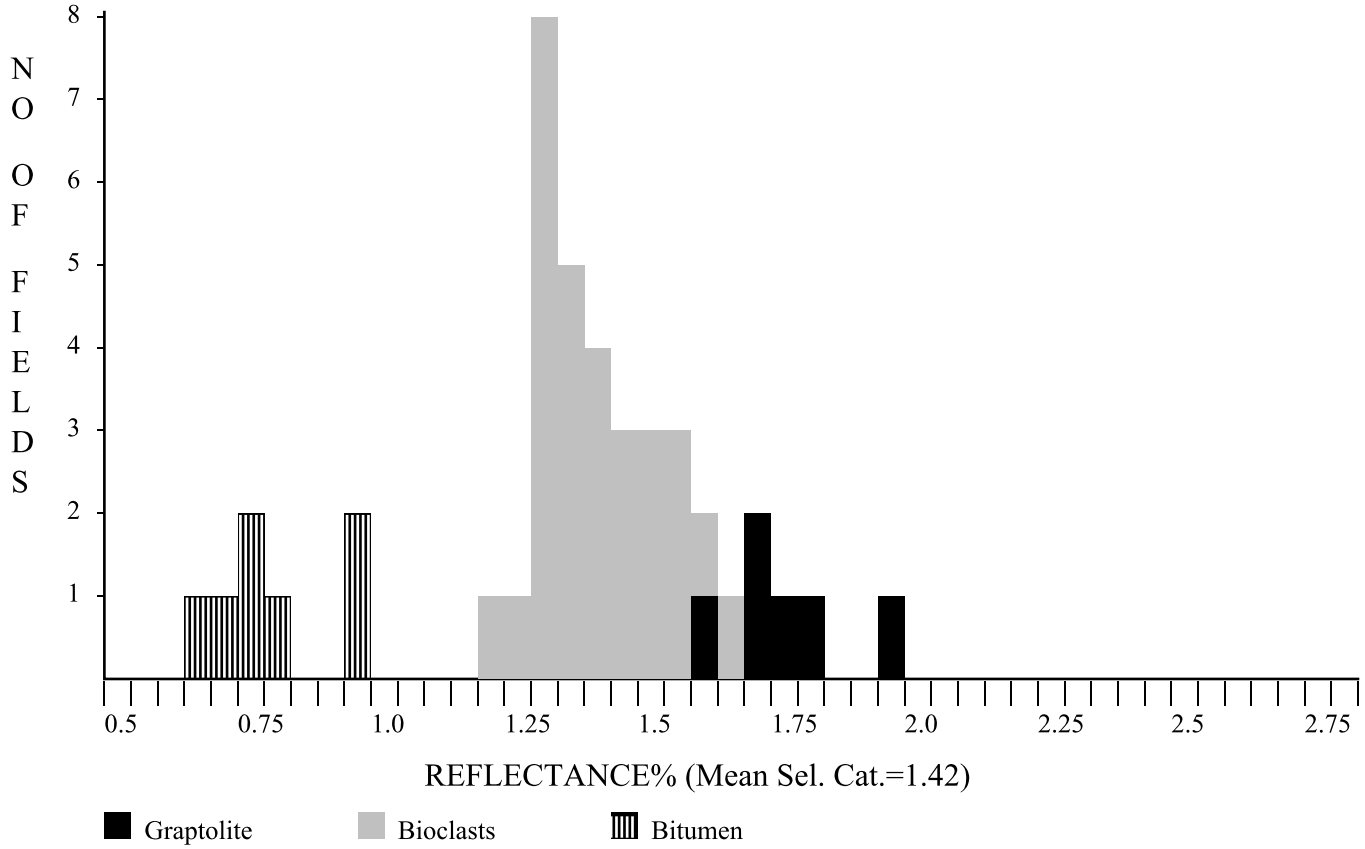
GSWA, Olympic-1, 221980,1336.42m, core(E2009)



Maceral Category	N	Mean	Standard Deviation
Graptolite	6	1.77	0.100
Bioclasts	30	1.42	0.108
Bitumen	7	0.81	0.108
Total	43	1.37	0.295

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.42
Standard Deviation of Selected categories:	0.108

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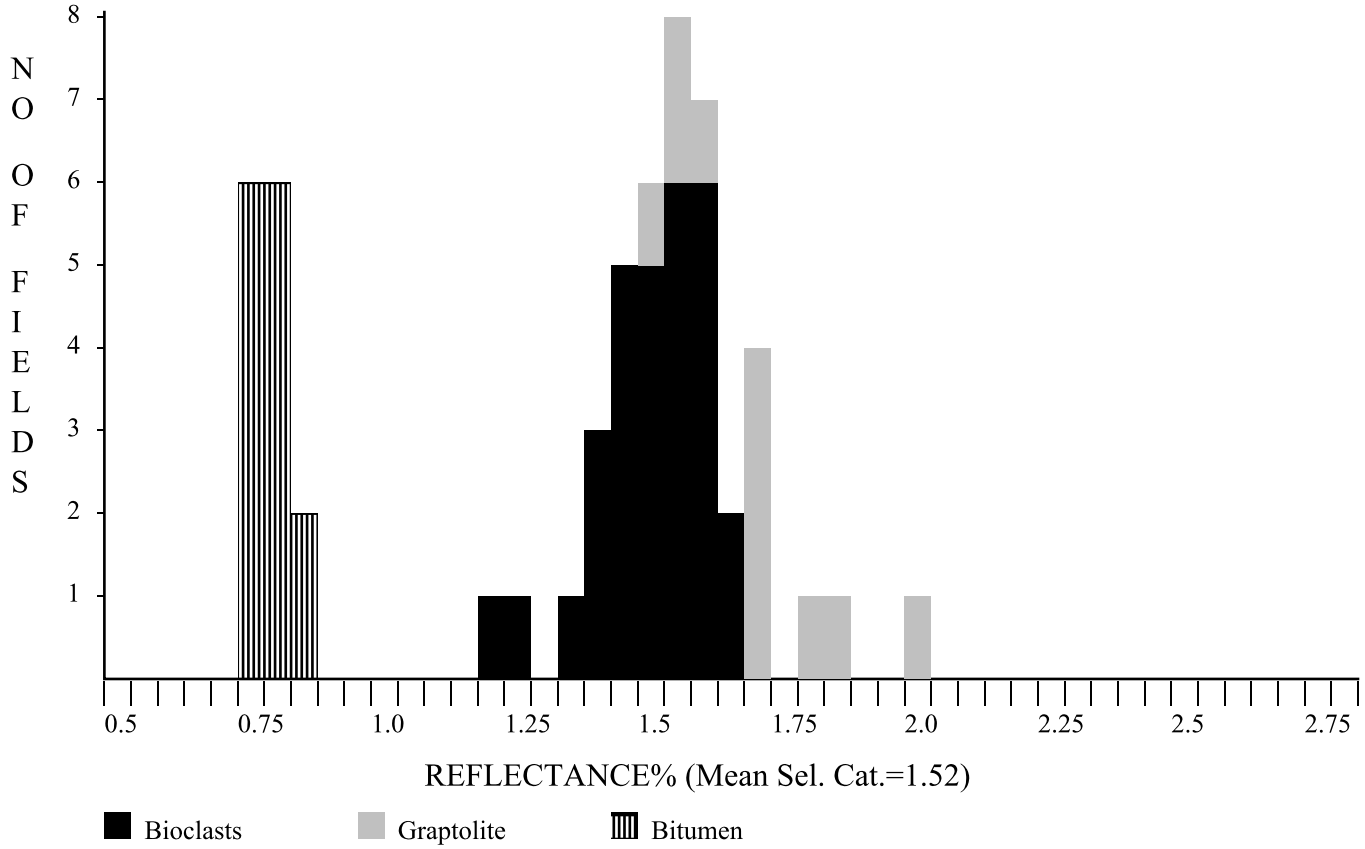
GSWA, Olympic-1, 221981,1359.97m, core(E2010)



Maceral Category	N	Mean	Standard Deviation
Bioclasts	30	1.52	0.101
Graptolite	11	1.72	0.137
Bitumen	14	0.80	0.038
Total	55	1.38	0.356

Selected categories: Bioclasts:

No. of Readings:	30
Mean of Selected Categories:	1.52
Standard Deviation of Selected categories:	0.101

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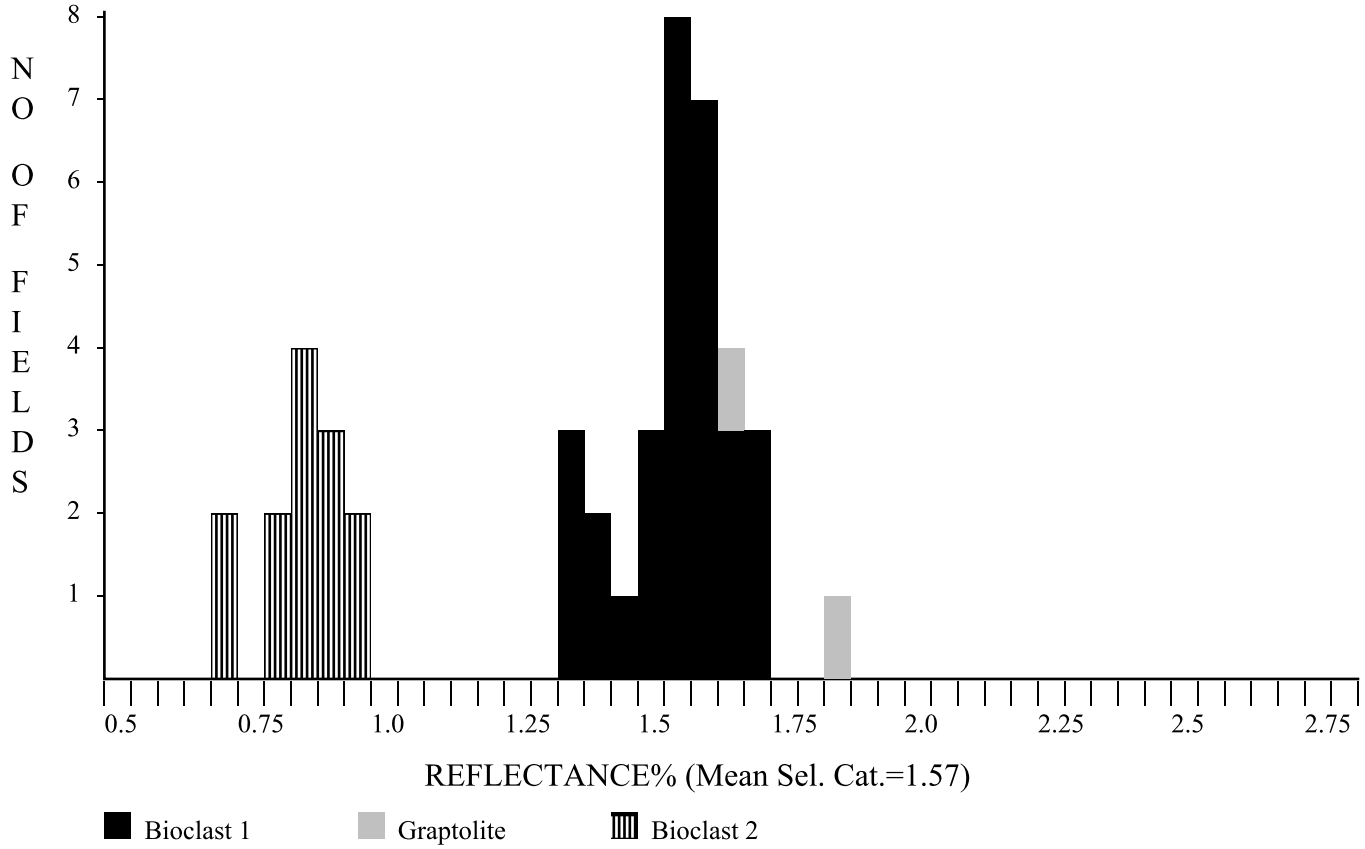
GSWA, Olympic-1, 221982,1380.38m, core(E2011)



Maceral Category	N	Mean	Standard Deviation
Bioclast 1	30	1.57	0.102
Graptolite	2	1.75	0.100
Bioclast 2	13	0.87	0.077
Total	45	1.37	0.337

Selected categories: Bioclast 1:

No. of Readings:	30
Mean of Selected Categories:	1.57
Standard Deviation of Selected categories:	0.102

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Dr Peter Crosdale (MAIG)
Director, ERC
28th June, 2016

APPENDIX - PLATES

High quality images are provided in a separate image file. Images provided in this report are for reference purposes only.

E1995A Detrovitrinite in claystone, Rv max = 0.29%, reflected white light, X50
E1995B Same as E1995A, in fluorescence mode
E1995C Lamalginite in claystone, reflected white light, X50
E1995D Same as E1995C, in fluorescence mode

E1996A Vitrinite in shaly coal, Rv max = 0.41%, reflected white light, X50
E1996B Same as E1996A, in fluorescence mode
E1996C Megaspore in sandstone, reflected white light, X20
E1996D Same as E1996C, in fluorescence mode

E1997A Detrovitrinite in claystone, Rv max = 0.43%, reflected white light, X50
E1997B Same as E1997A, in fluorescence mode
E1997C Tasmanitid in claystone, reflected white light, X50
E1997D Same as E1997C, in fluorescence mode

E1998A Detrovitrinite in claystone, Rv max = 0.46%, reflected white light, X50
E1998B Same as E1998A, in fluorescence mode
E1998C Lamalginite in claystone, reflected white light, X50
E1998D Same as E1998C, in fluorescence mode

E1999A Vitrite coal, Rv max = 0.50%, reflected white light, X50
E1999B Detrovitrinite in siltstone, Rv max = 0.45%, reflected white light, X50
E1999C Same as E1999B, in fluorescence mode
E1999D Lamalginite in siltstone, reflected white light, X50
E1999E Same as E1999D, in fluorescence mode
E1999F Inorganic mud additives, reflected white light, X50

E2000A Detrovitrinite in siltstone, Rv max = 0.49%, reflected white light, X50
E2000B Same as E2000A, in fluorescence mode
E2000C Inertodetrinite in siltstone, RI = 1.25%, reflected white light, X50
E2000D Same as E2000C, in fluorescence mode

E2001A Bioclast type 1 in carbonate, RBcl1 = 1.23%, reflected white light, X50
E2001B Same as E2001A, in fluorescence mode
E2001C Bioclast type 2 in carbonate, RBcl2 = 0.85%, reflected white light, X50
E2001D Same as E2001C, in fluorescence mode
E2001E Bitumen in carbonate, RBit = 1.01%, reflected white light, X50
E2001F Same as E2001E, in fluorescence mode

E2002A Low reflecting Bioclast in carbonate, max reflectance position, RBcl = 1.16%, reflected white light, X50
E2002B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.66%
E2002C Same as E2002A, in fluorescence mode
E2002D Medium reflecting Bioclast in carbonate, max reflectance position, RBcl = 1.40%, reflected white light, X50
E2002E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.65%
E2002F Same as E2002D, in fluorescence mode

E2002G High reflecting Bioclast with affinities to graptolites in carbonate, RBcl = 1.61%, reflected white light, X50
E2002H Same as E2002G, in fluorescence mode
E2002I Bitumen in carbonate, RBit = 0.861%, reflected white light, X50
E2002J Same as E2002I, in fluorescence mode

E2003A Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.38%, reflected white light, X50
E2003B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.82%
E2003C Same as E2003A, in fluorescence mode
E2003D Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.26%, reflected white light, X50
E2003E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.74%
E2003F Same as E2003D, in fluorescence mode

E2004A Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.22%, reflected white light, X50
E2004B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.80%
E2004C Same as E2004A, in fluorescence mode
E2004D Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.41%, reflected white light, X50
E2004E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.91%
E2004F Same as E2004D, in fluorescence mode

E2004G Graptolite in claystone, max reflectance position, RGrp = 1.76%, reflected white light, X50
E2004H Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.61%
E2004I Same as E2004G, in fluorescence mode

E2004J Fluorescing ?Gloeocapsomorpha colony in claystone, RAlg = 0.63%, reflected white light, X50
E2004K Same as E2004J, in fluorescence mode
E2004L Narrow strings of diffuse organic matter arranged parallel to bedding, reflected white light, X50
E2004M Same as E2004J, in fluorescence mode

E2005A Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.22%, reflected white light, X50
E2005B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.91%
E2005C Same as E2005A, in fluorescence mode
E2005D Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.46%, reflected white light, X50
E2005E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 1.00%
E2005F Same as E2005D, in fluorescence mode

E2005G Graptolite in claystone, max reflectance position, RGrp = 1.67%, reflected white light, X50
E2005H Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.83%
E2005I Same as E2004G, in fluorescence mode

E2006A Bioclast in claystone, RBcl max= 1.34%, reflected white light, X50
E2006B Same as E2006A, in fluorescence mode
E2006C High reflecting graptolite in claystone, RBcl = 1.80%, reflected white light, X50
E2006D Same as E2006C, in fluorescence mode

E2007A Graptolite in calcareous siltstone, max reflectance position, RGrp = 2.03%, reflected white light, X50
E2007B Same grain, after rotating stage at 90° to min reflectance position, RGrp = 1.01%
E2007C Same as E2007A, in fluorescence mode
E2007D Bioclast in calcareous siltstone, max reflectance position, RBcl = 1.57%, reflected white light, X50
E2007E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 1.20%
E2007F Same as E2007D, in fluorescence mode

E2007G Bitumen in calcareous siltstone, RBit = 0.75%, reflected white light, X50
E2007H Same as E2007G, in fluorescence mode

E2008A Graptolite in calcareous claystone, max reflectance position, RGrp = 1.77%, reflected white light, X50
E2008B Same grain, after rotating stage at 90° to min reflectance position, RGrp = 1.05%
E2008C Same as E2008A, in fluorescence mode
E2008D Bioclast in calcareous claystone, max reflectance position, RBcl = 1.51%, reflected white light, X50
E2008E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.80%
E2008F Same as E2008D, in fluorescence mode

E2008G ?Alginite in calcareous claystone, RAlg = 0.80%, reflected white light, X50
E2008H Same as E2008G, in fluorescence mode
E2008I Bitumen in calcareous claystone, RBit = 0.87%, reflected white light, X50
E2008J Same as E2008I, in fluorescence mode

E2009A Bioclast in calcareous claystone, max reflectance position, RBcl = 1.51%, reflected white light, X50
E2009B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.95%
E2009C Same as E2009A, in fluorescence mode
E2009D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.73%, reflected white light, X50
E2009E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.88%
E2009F Same as E2009D, in fluorescence mode

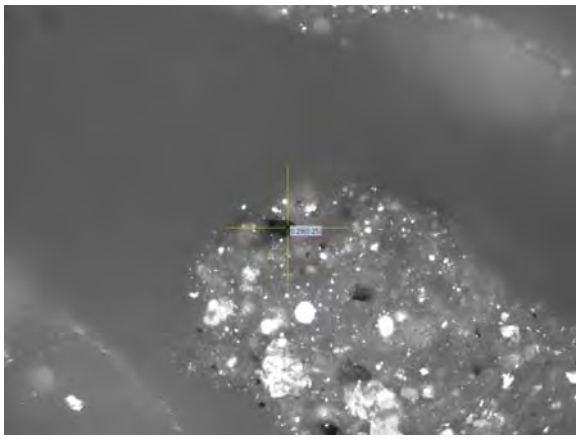
E2009G ?Recrystallised bitumen in calcareous claystone, RBit = 0.75%, reflected white light, X50
E2009H Same as E2009G, in fluorescence mode
E2009I Abundant fine granular bitumen in calcareous claystone, reflected white light, X50
E2009J Same as E2009I, in fluorescence mode
E2009K Thucholites in calcareous claystone, reflected white light, X50
E2009L Same as E2009K, in fluorescence mode

E2010A Bioclast in calcareous claystone, max reflectance position, RBcl = 1.43%, reflected white light, X50
E2010B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.835%
E2010C Same as E2010A, in fluorescence mode
E2010D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.73%, reflected white light, X50
E2010E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.84%
E2010F Same as E2010D, in fluorescence mode

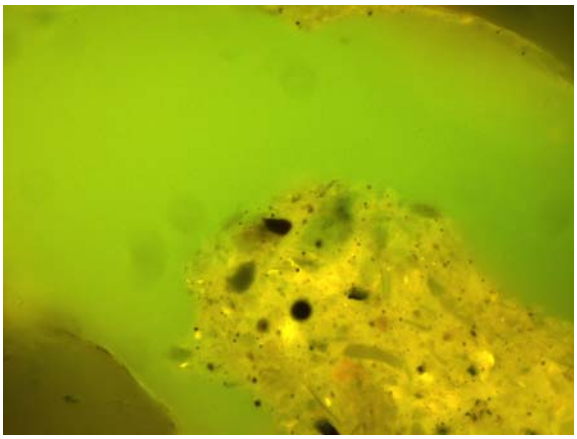
E2010G Thin strand of graptolite in calcareous claystone, reflected white light, X50
E2010H ?Recrystallised bitumen in calcareous claystone, RBit = 0.77%, reflected white light, X50
E2010I Same as E2010H, in fluorescence mode
E2010J Round to oval siliceous oozes with hollow centres filled with carbonate, reflected white light, X50
E2010K Same as E20010J, in fluorescence mode

E2011A Bioclast1 in calcareous claystone, RBcl1 = 1.61%, reflected white light, X50
E2011B Same as E2011A, in fluorescence mode
E2011C Bioclast1 associated with diffuse organic matter in calcareous claystone, RBcl1 = 1.35%, reflected white light, X50
E2011D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.85%, reflected white light, X50
E2011E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.75%
E2011F Same as E2011D, in fluorescence mode

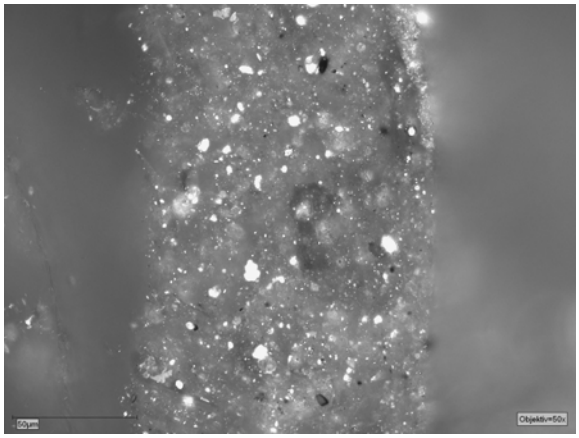
E2011G Bioclast 2 in calcareous claystone, RBcl2 = 0.89%, reflected white light, X50
E2011H Same as E2011G, in fluorescence mode



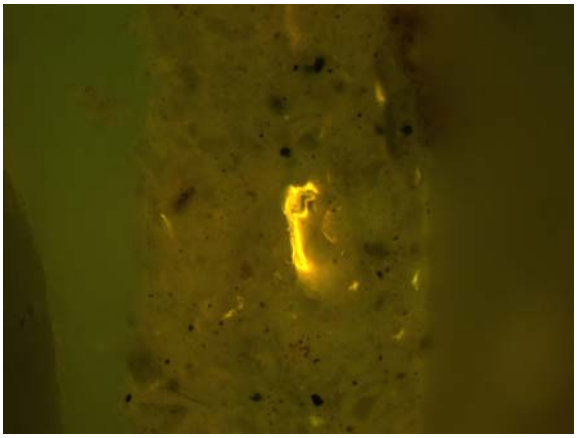
E1995A Detrovitrinite in claystone, Rv max = 0.29%, reflected white light, X50



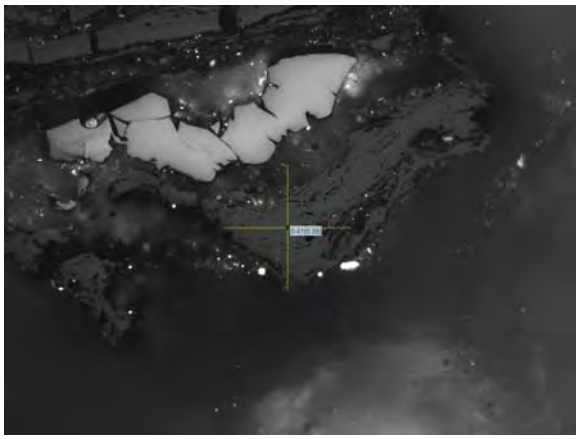
E1995B Same as E1995A, in fluorescence mode



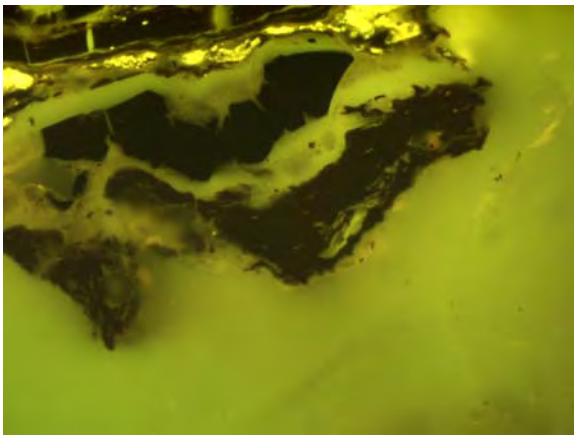
E1995C Lamalginite in claystone, reflected white light, X50



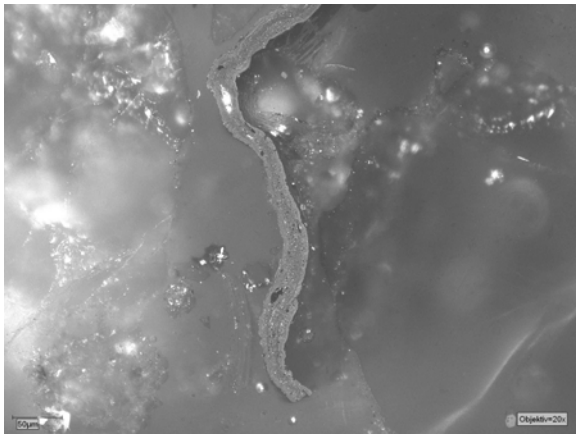
E1995D Same as E1995C, in fluorescence mode



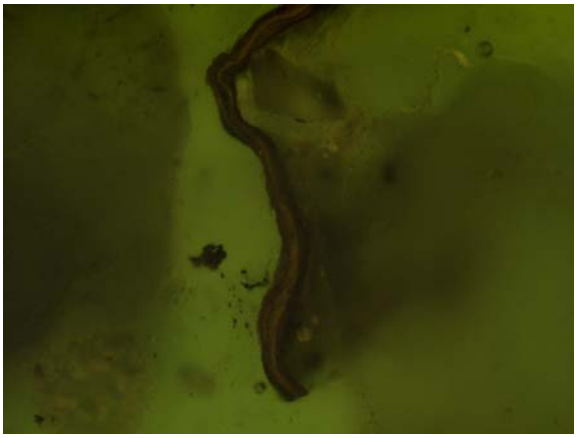
E1996A Vitrinite in shaly coal, Rv max = 0.41%, reflected white light, X50



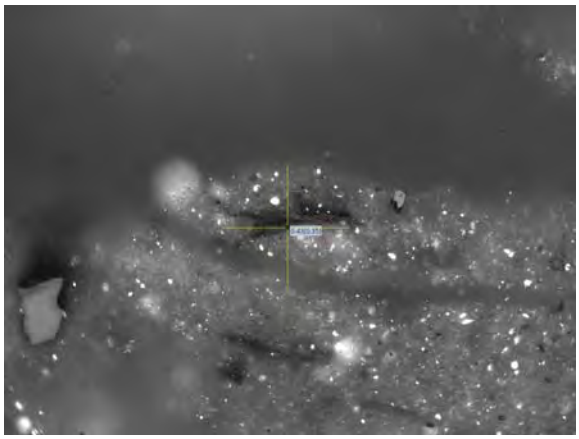
E1996B Same as E1996A, in fluorescence mode



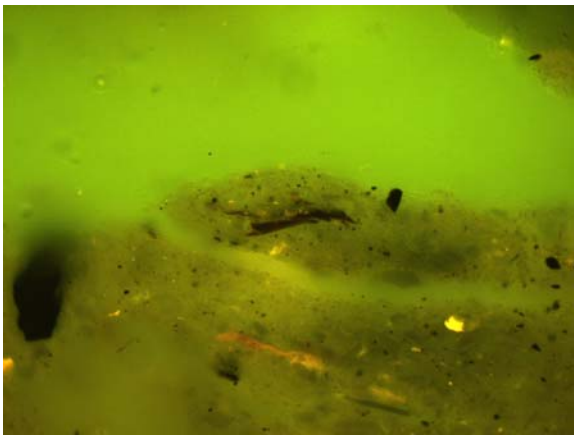
E1996C Megaspore in sandstone, reflected white light, X20



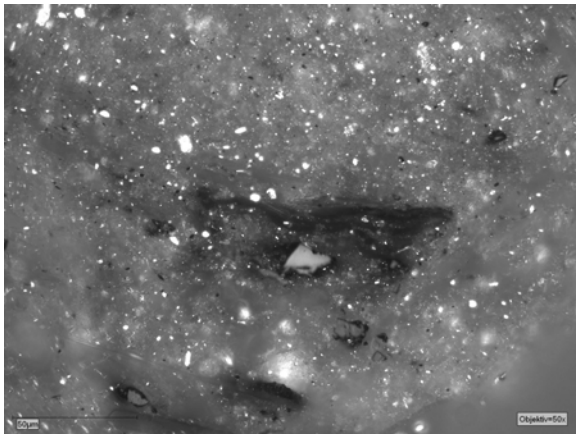
E1996D Same as E1996C, in fluorescence mode



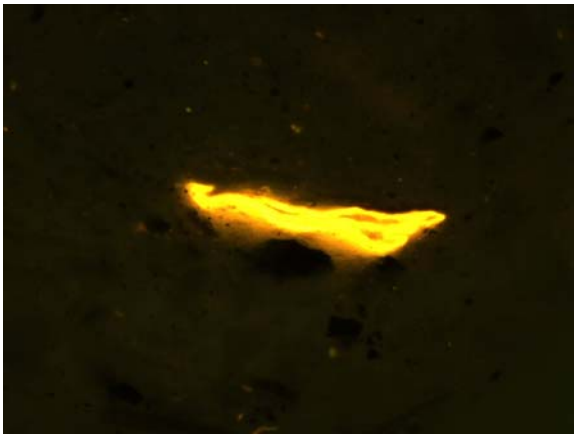
E1997A Detrovitrinite in claystone, Rv max = 0.43%, reflected white light, X50



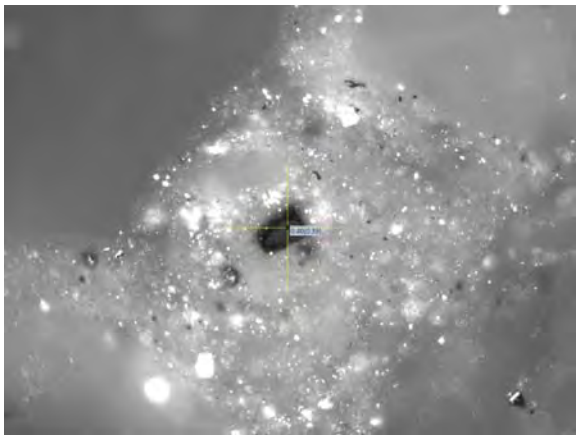
E1997B Same as E1997A, in fluorescence mode



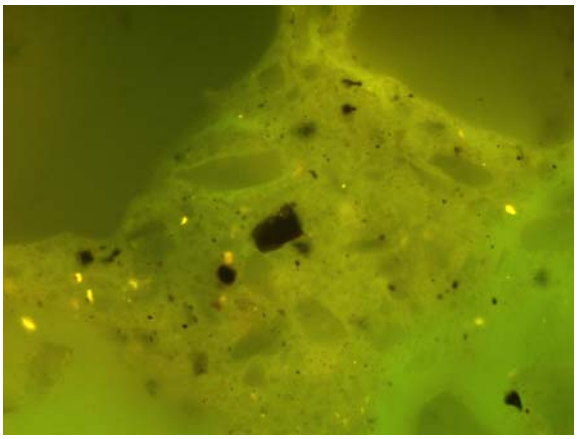
E1997C Tasmanitid in claystone, reflected white light, X50



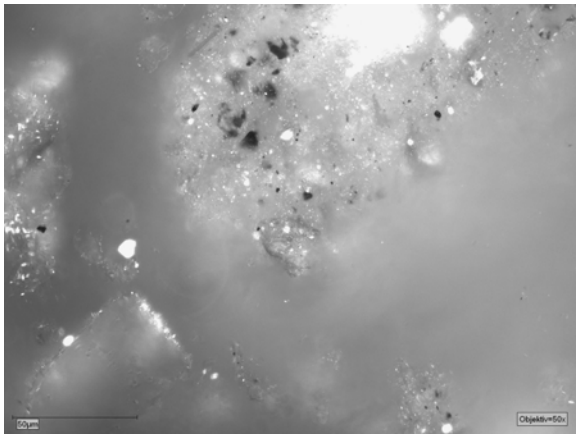
E1997D Same as E1997C, in fluorescence mode



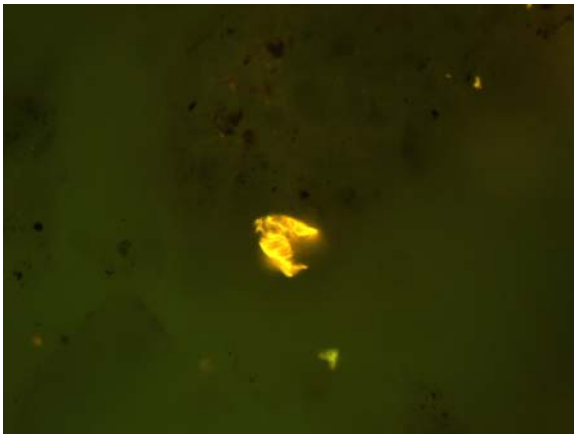
E1998A Detrovitrinite in claystone, Rv max = 0.46%, reflected white light, X50



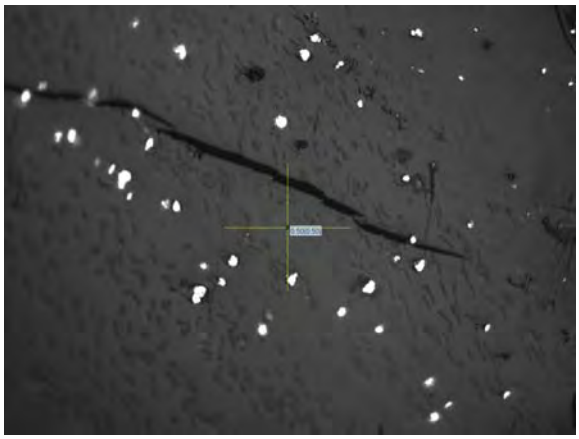
E1998B Same as E1998A, in fluorescence mode



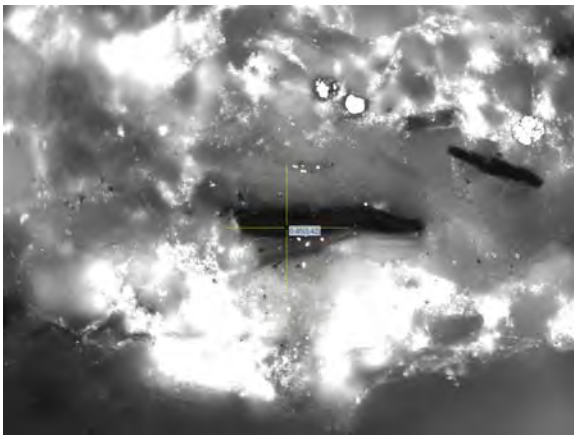
E1998C Lamalginite in claystone, reflected white light, X50



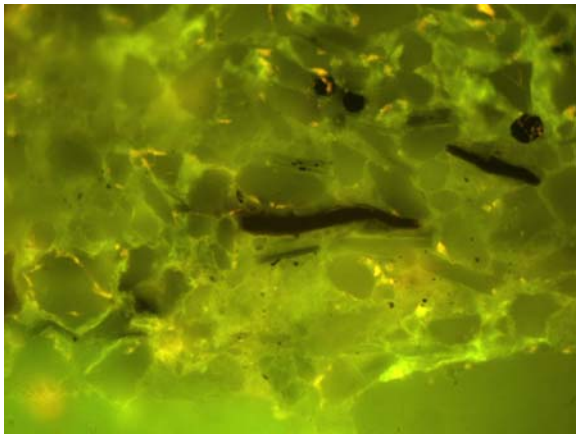
E1998D Same as E1998C, in fluorescence mode



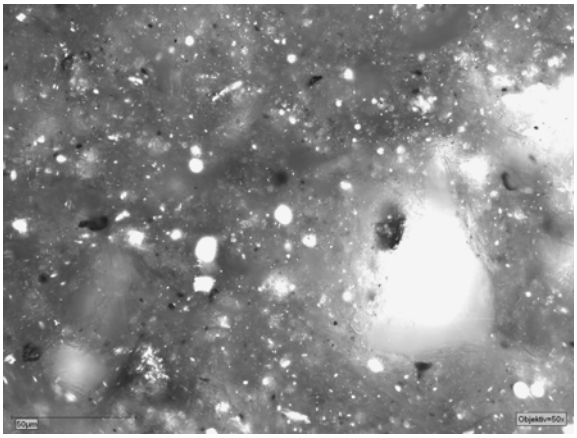
E1999A Vitrite coal, Rv max = 0.50%, reflected white light, X50



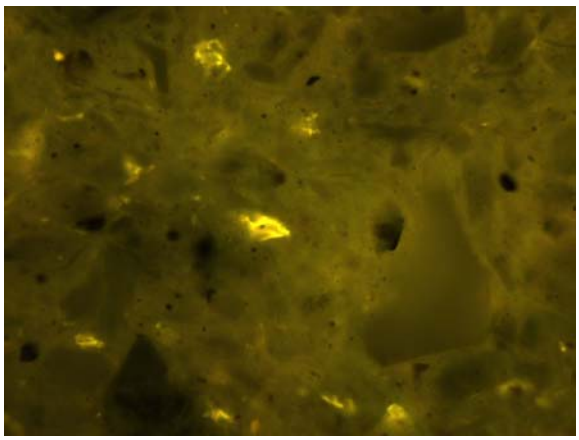
E1999B Detrovitrinite in siltstone, Rv max = 0.45%, reflected white light, X50



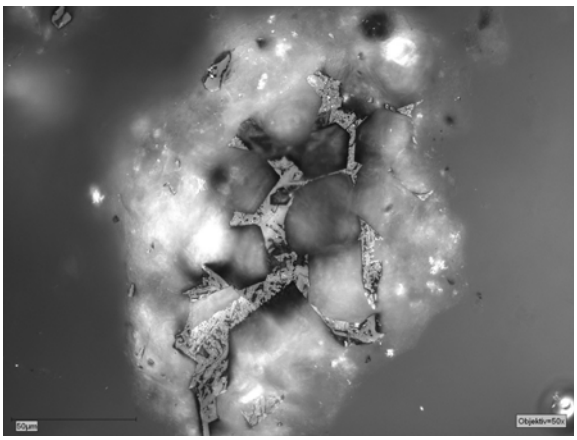
E1999C Same as E1999B, in fluorescence mode



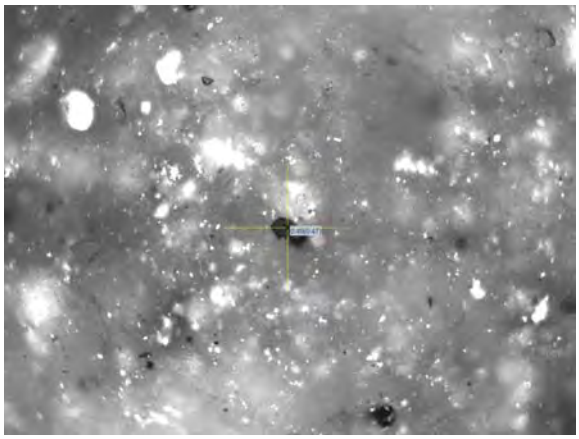
E1999D Lamalginite in siltstone, reflected white light, X50



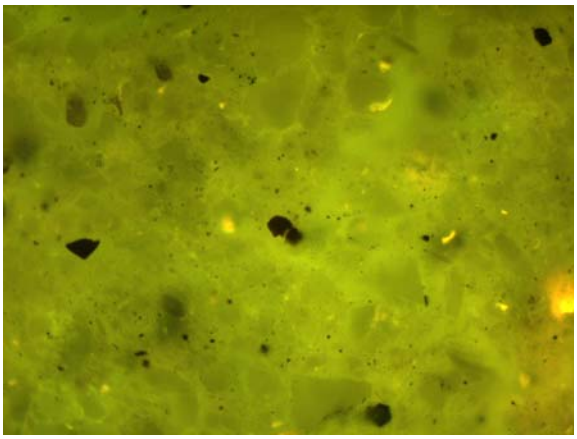
E1999E Same as E1999D, in fluorescence mode



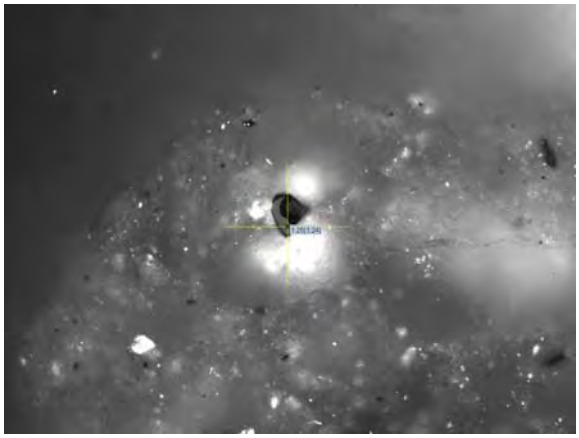
E1999F Inorganic mud additives, reflected white light, X50



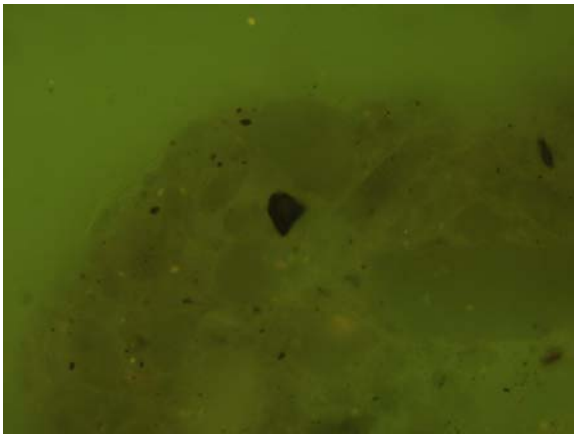
E2000A Detrovitrinite in siltstone, Rv max = 0.49%, reflected white light, X50



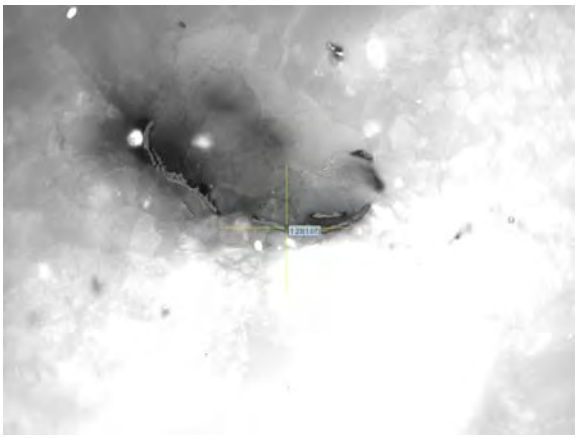
E2000B Same as E2000A, in fluorescence mode



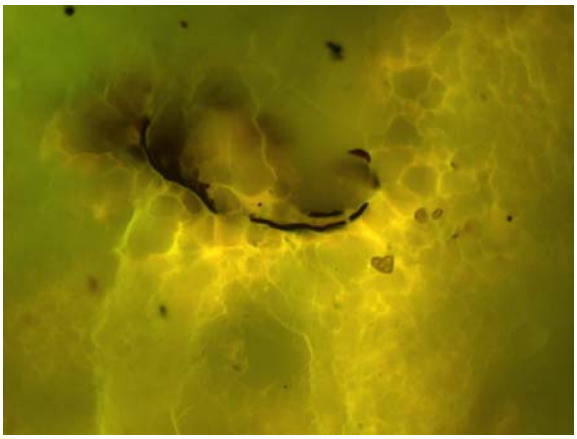
E2000C Inertodetrinite in siltstone, RI = 1.25%, reflected white light, X50



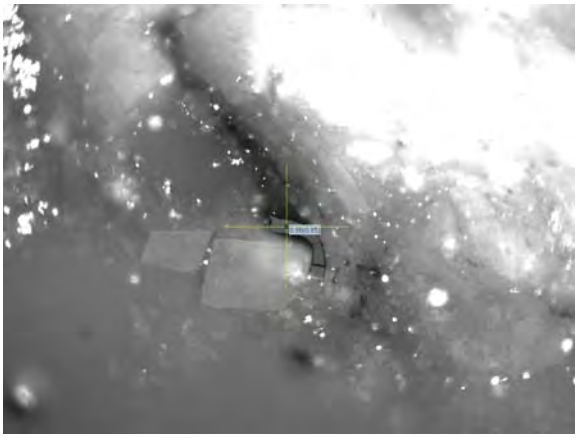
E2000D Same as E2000C, in fluorescence mode



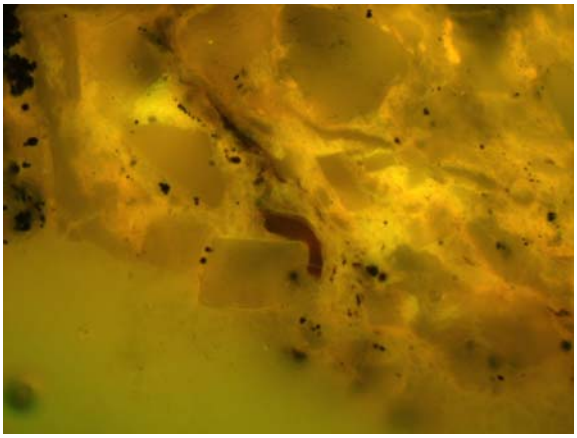
E2001A Bioclast type 1 in carbonate, RBcl1 = 1.23%, reflected white light, X50



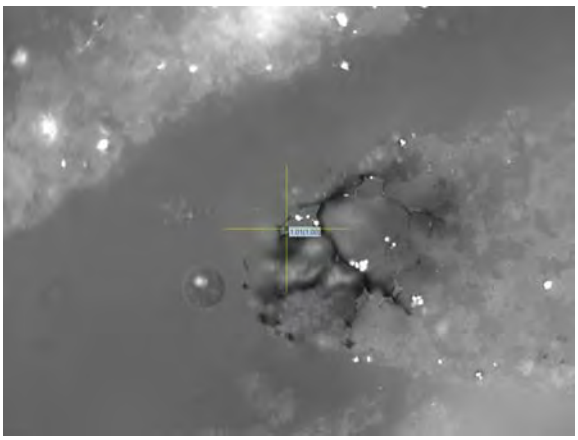
E2001B Same as E2001A, in fluorescence mode



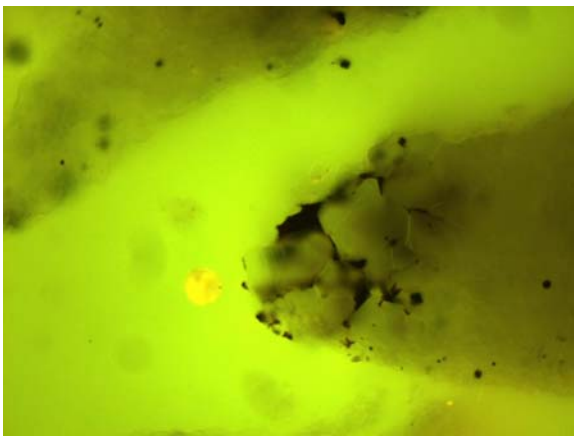
E2001C Bioclast type 2 in carbonate, RBcl2 = 0.85%, reflected white light, X50



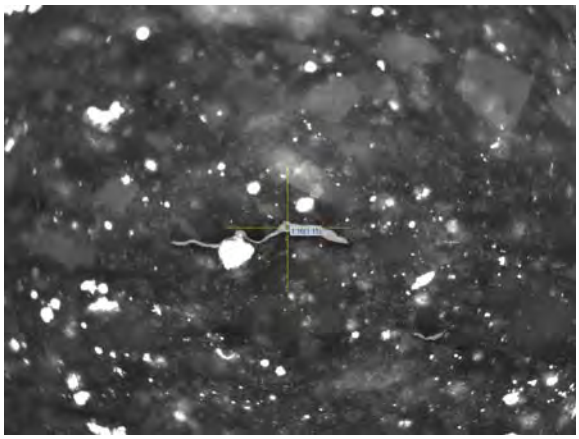
E2001D Same as E2001C, in fluorescence mode



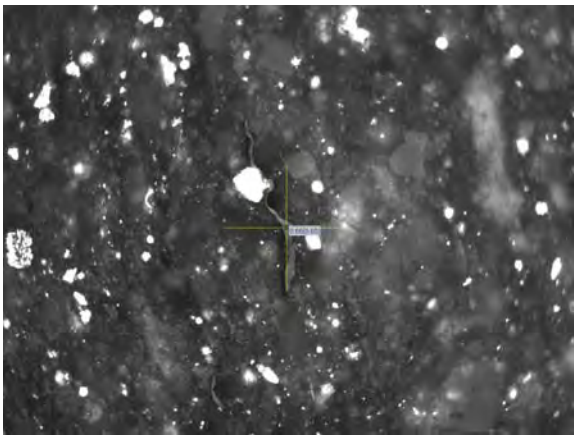
E2001E Bitumen in carbonate, RBit = 1.01%, reflected white light, X50



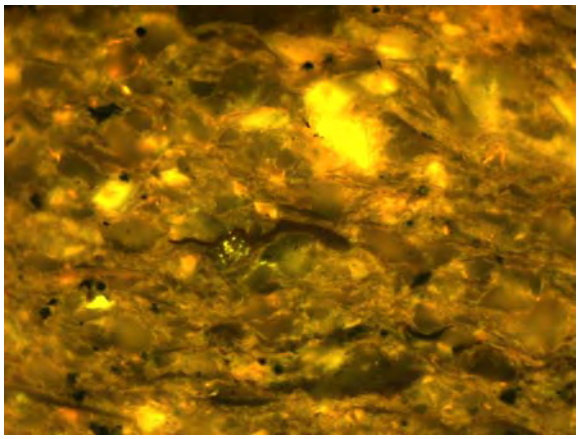
E2001F Same as E2001E, in fluorescence mode



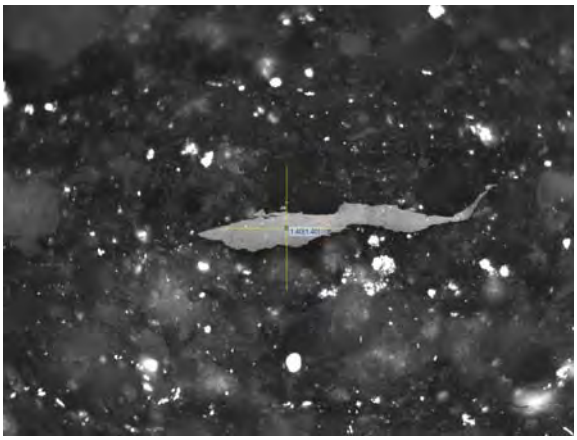
E2002A Low reflecting Bioclast in carbonate, max reflectance position, RBcl = 1.16%, reflected white light, X50



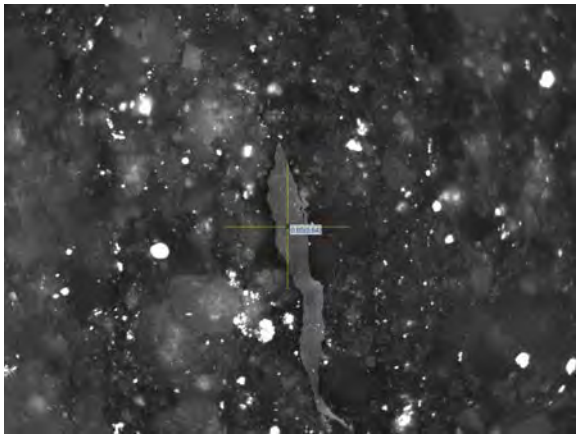
E2002B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.66%



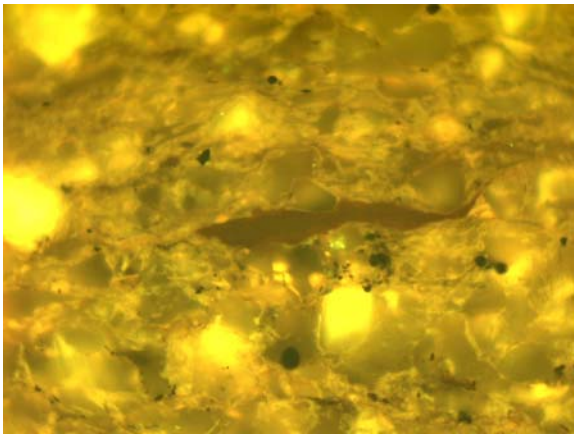
E2002C Same as E2002A, in fluorescence mode



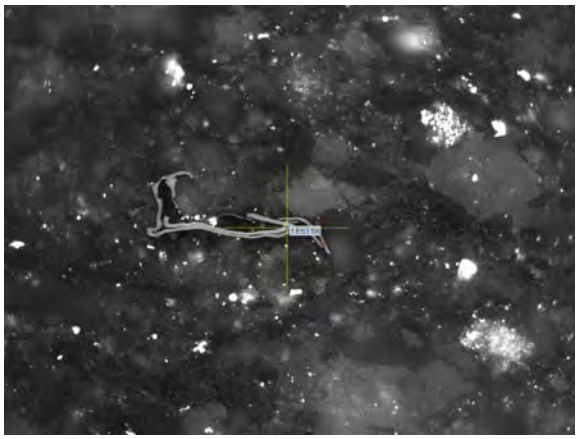
E2002D Medium reflecting Bioclast in carbonate, max reflectance position, RBcl = 1.40%, reflected white light, X50



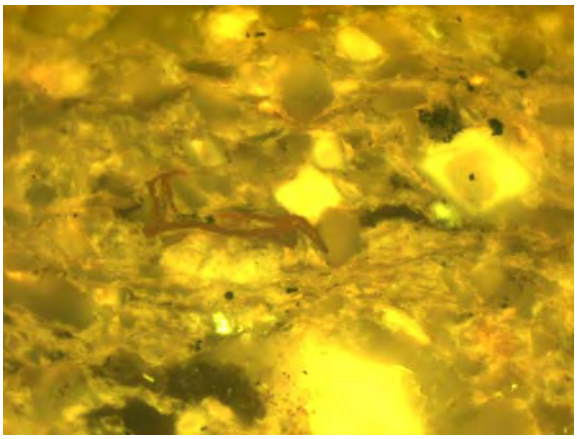
E2002E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.65%



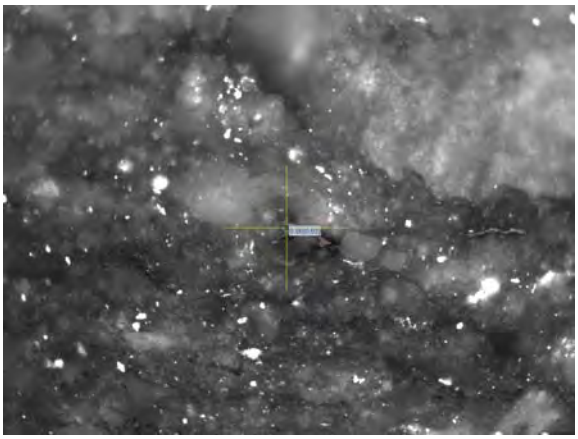
E2002F Same as E2002D, in fluorescence mode



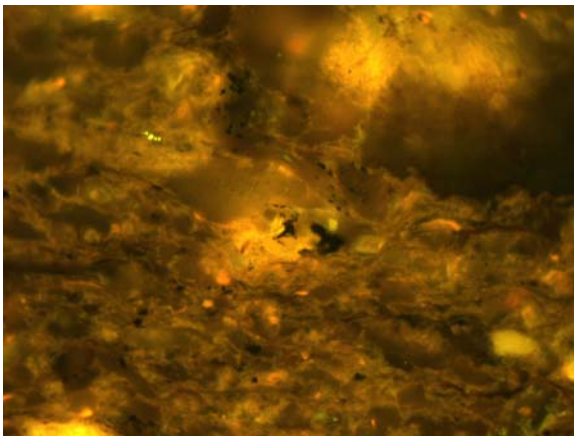
E2002G High reflecting Bioclast with affinities to graptolites in carbonate, RBcl = 1.61%, reflected white light, X50



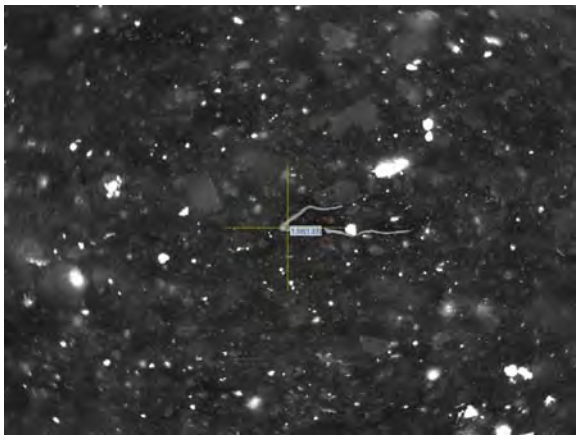
E2002H Same as E2002G, in fluorescence mode



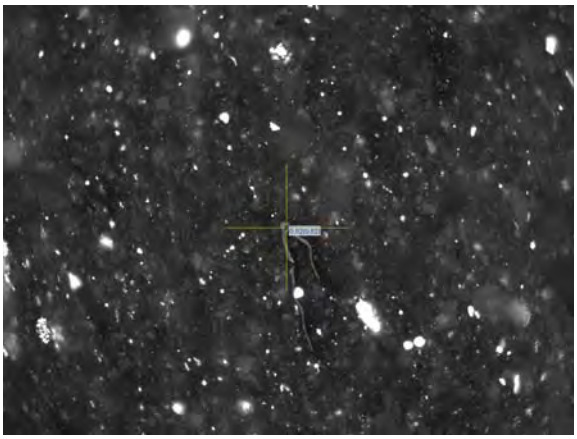
E2002I Bitumen in carbonate, RBit = 0.861%, reflected white light, X50



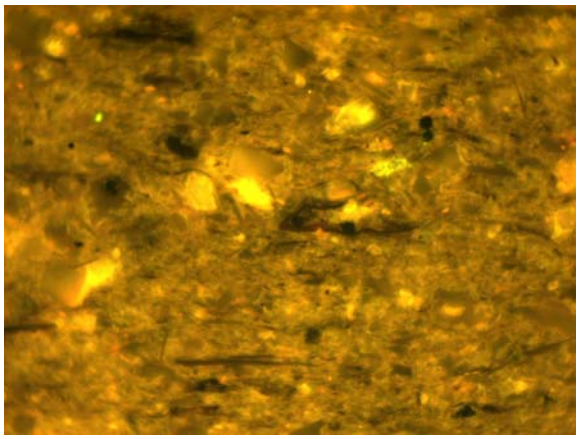
E2002J Same as E2002I, in fluorescence mode



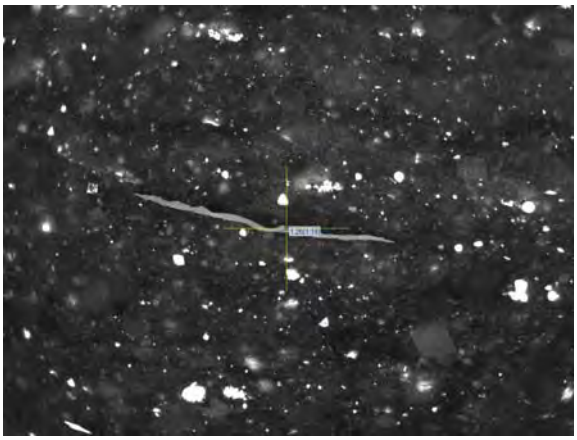
E2003A Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.38%, reflected white light, X50



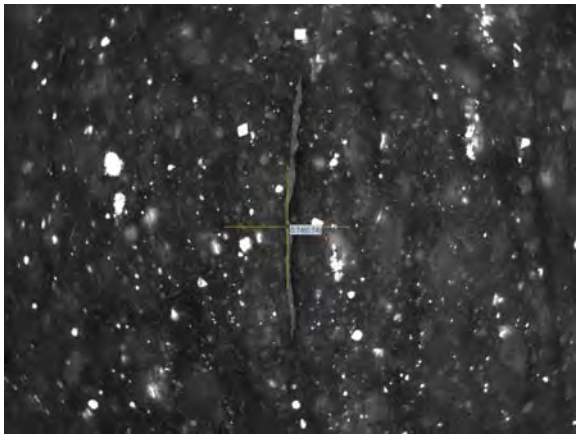
E2003B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.82%



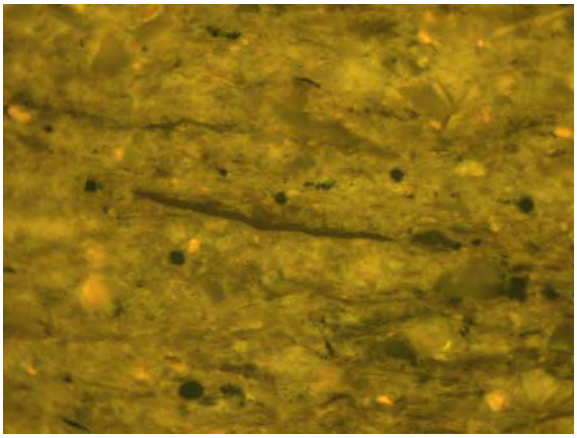
E2003C Same as E2003A, in fluorescence mode



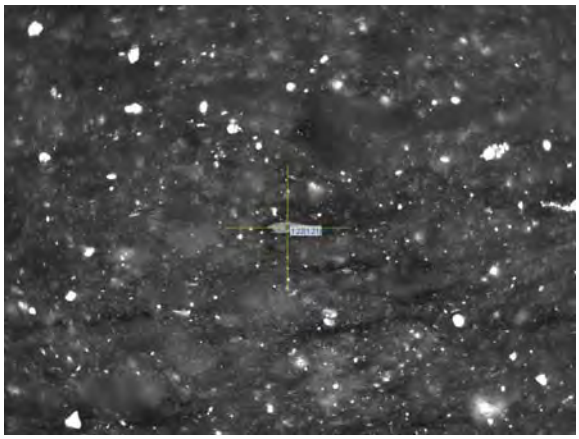
E2003D Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.26%, reflected white light, X50



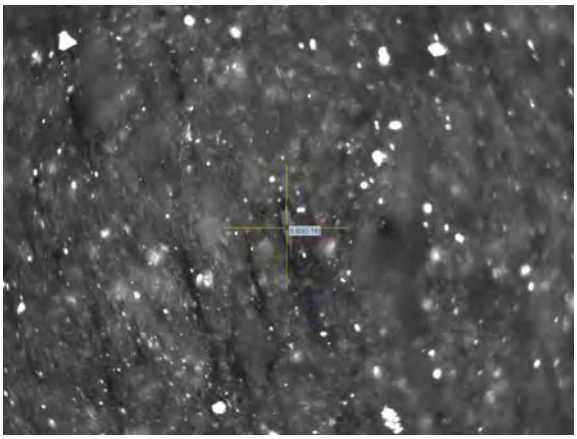
E2003E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.74%



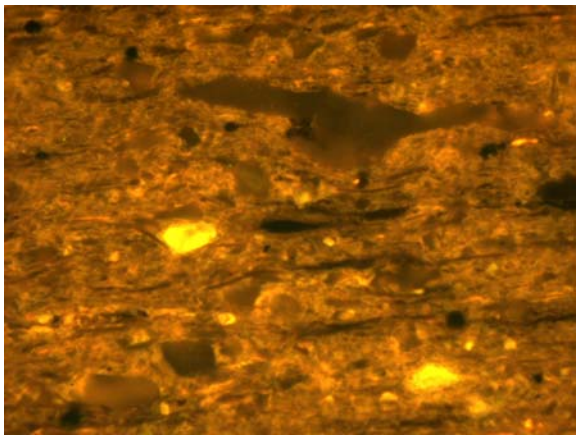
E2003F Same as E2003D, in fluorescence mode



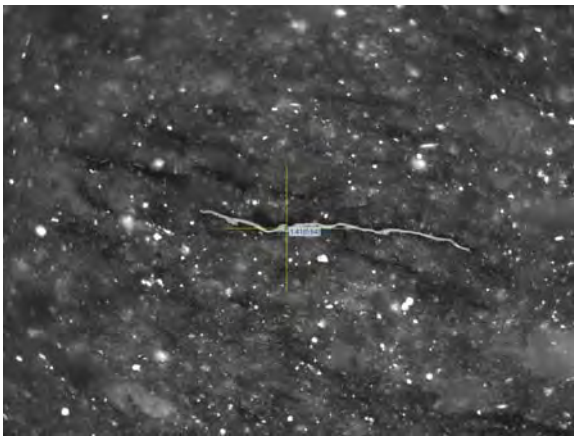
E2004A Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.22%, reflected white light, X50



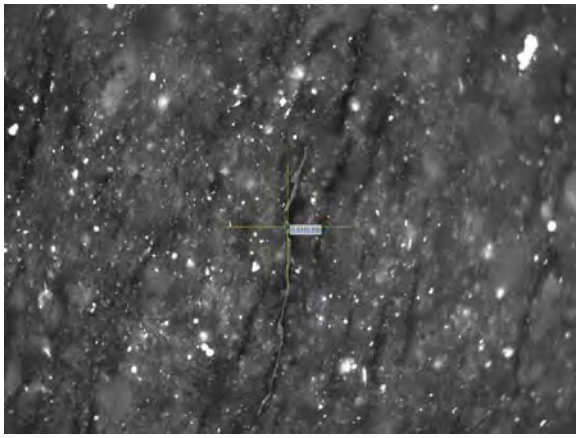
E2004B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.80%



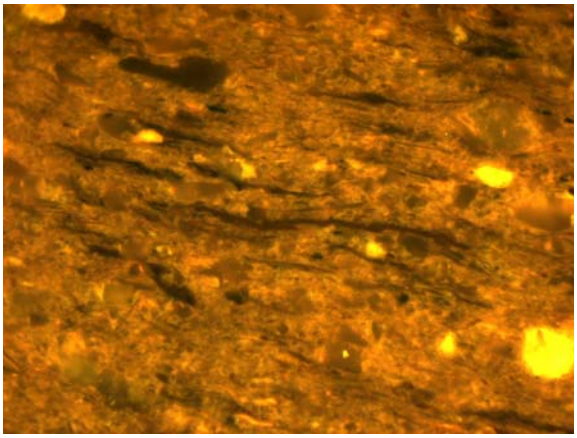
E2004C Same as E2004A, in fluorescence mode



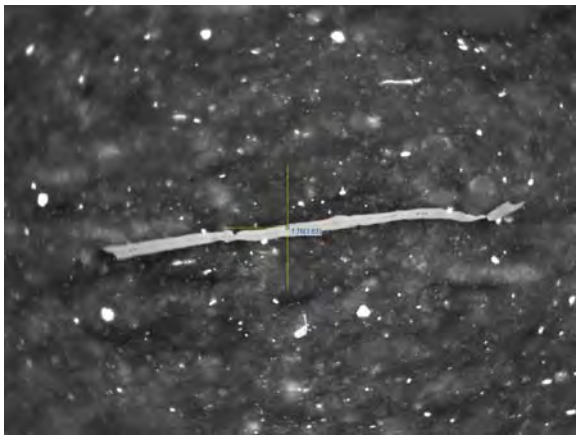
E2004D Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.41%, reflected white light, X50



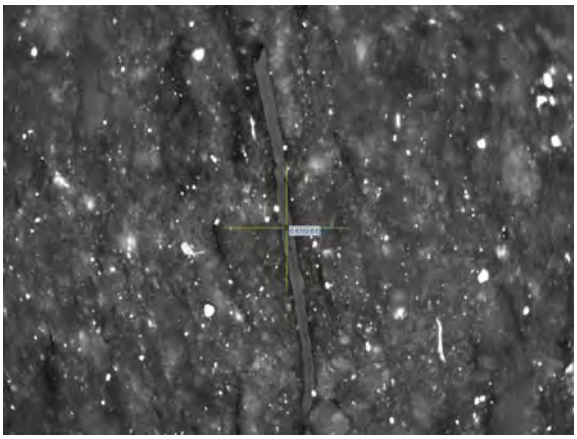
E2004E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.91%



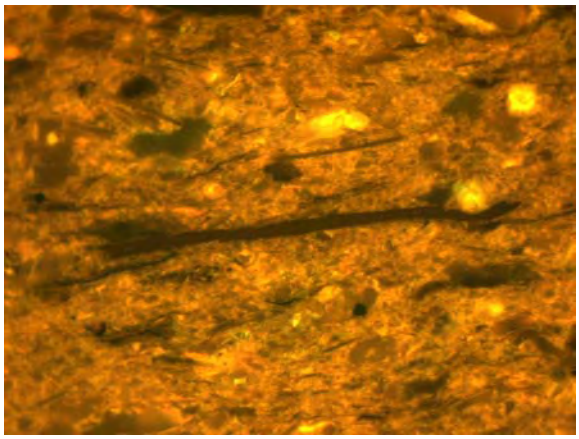
E2004F Same as E2004D, in fluorescence mode



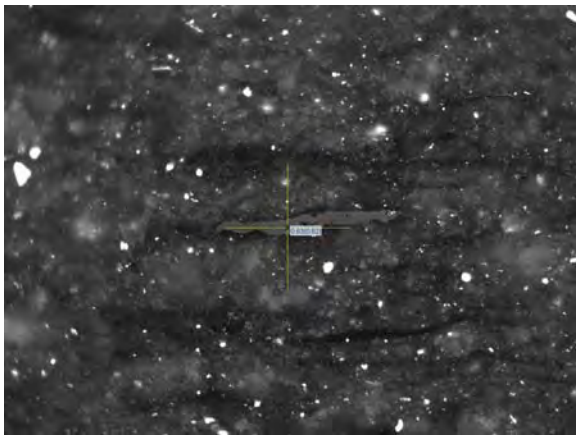
E2004G Graptolite in claystone, max reflectance position, RGrp = 1.76%, reflected white light, X50



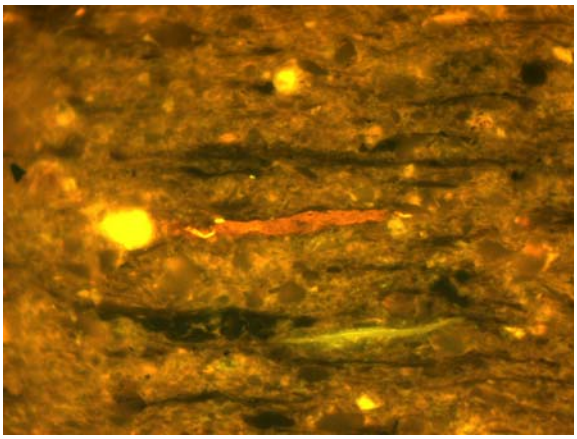
E2004H Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.61%



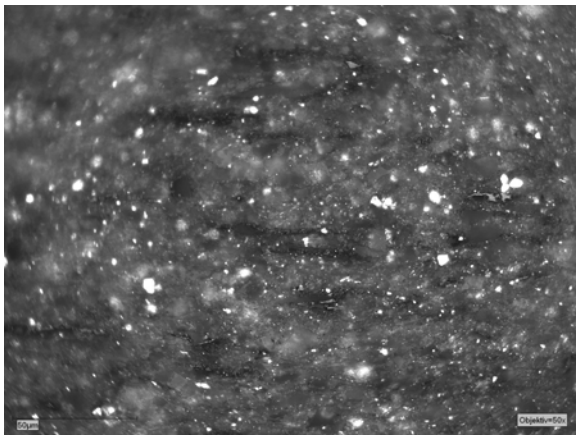
E2004I Same as E2004G, in fluorescence mode



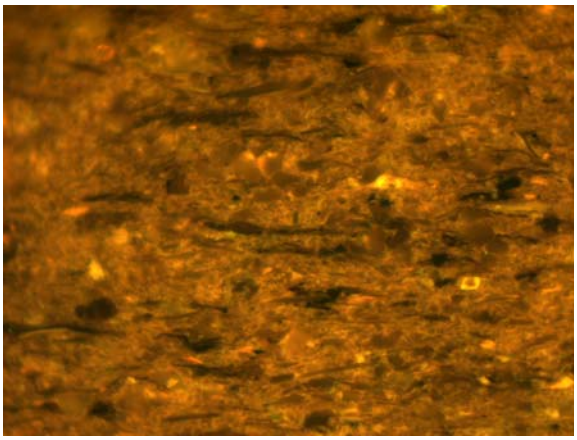
E2004J Fluorescing ?Gloeocapsomorpha colony in claystone, RAlg = 0.63%, reflected white light, X50



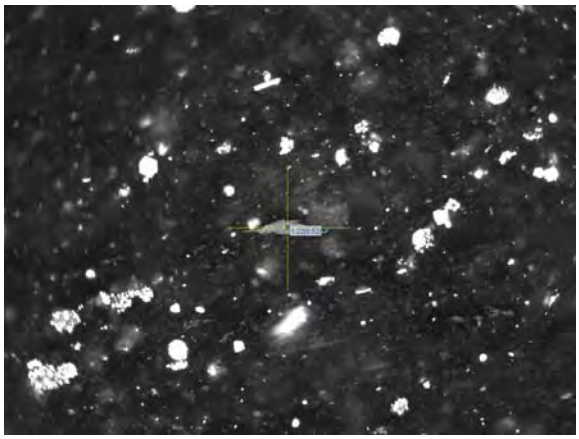
E2004K Same as E2004J, in fluorescence mode



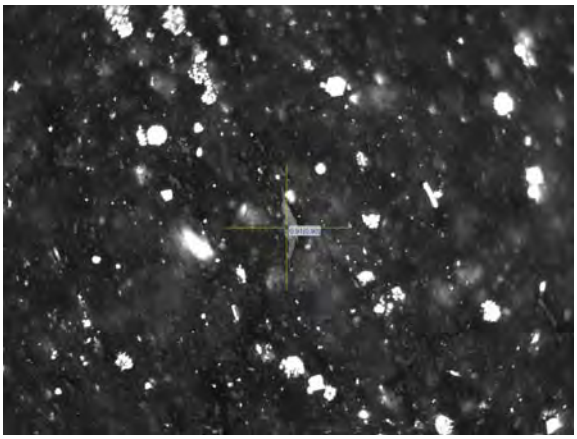
E2004L Narrow strings of diffuse organic matter arranged parallel to bedding, reflected white light, X50



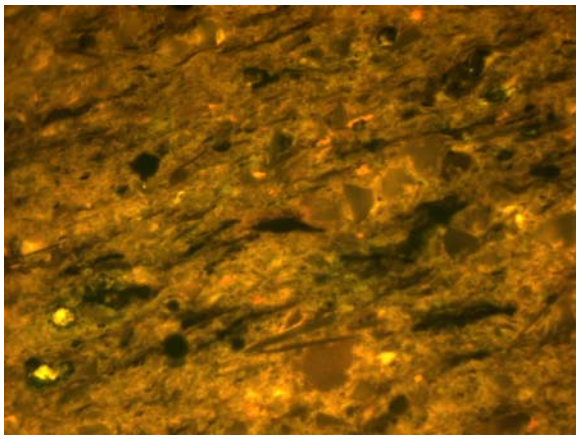
E2004M Same as E2004J, in fluorescence mode



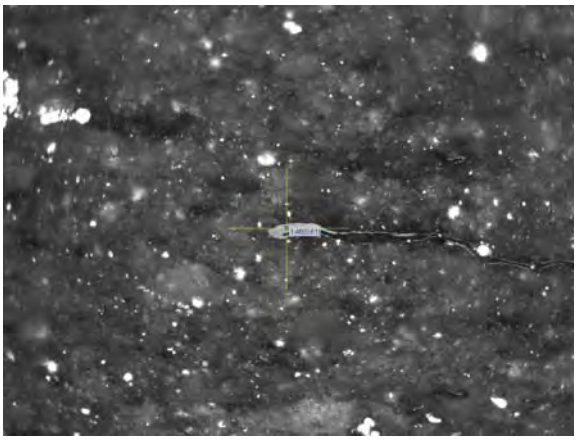
E2005A Low reflecting Bioclast in claystone, max reflectance position, RBcl = 1.22%, reflected white light, X50



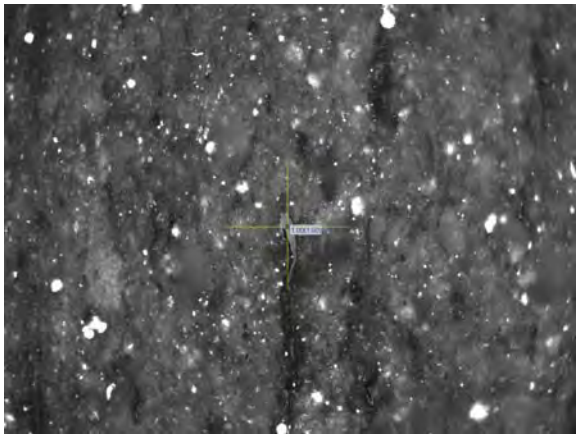
E2005B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.91%



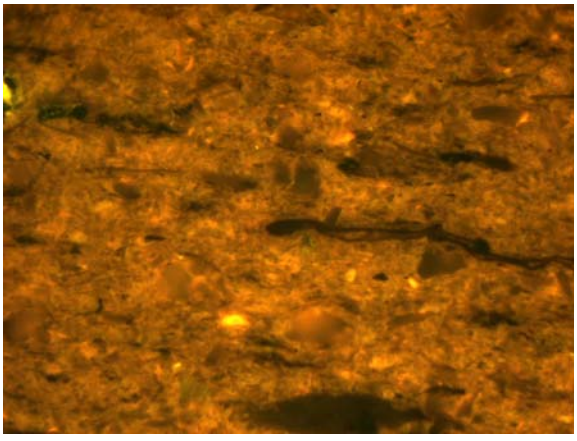
E2005C Same as E2005A, in fluorescence mode



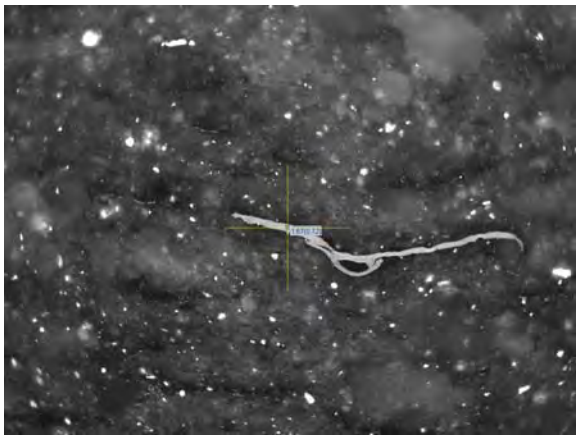
E2005D Medium reflecting Bioclast in claystone, max reflectance position, RBcl = 1.46%, reflected white light, X50



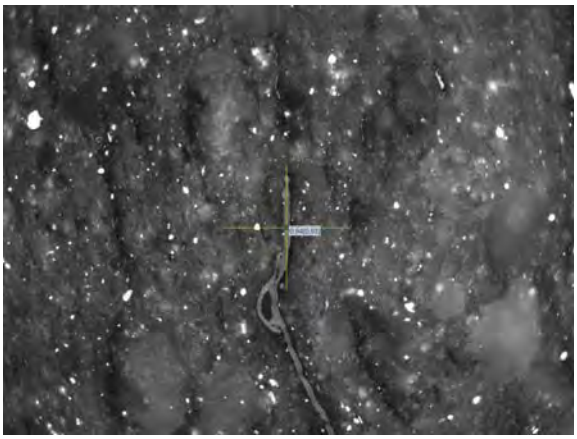
E2005E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 1.00%



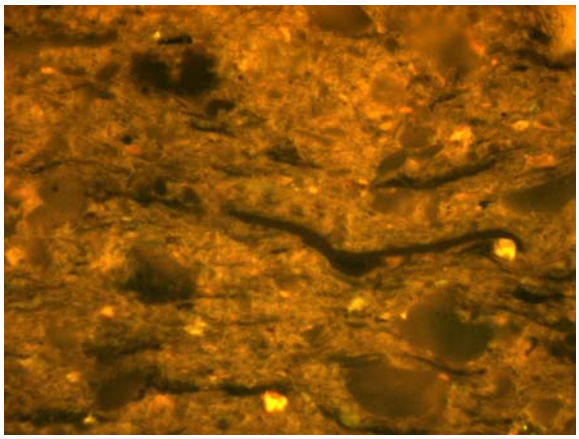
E2005F Same as E2005D, in fluorescence mode



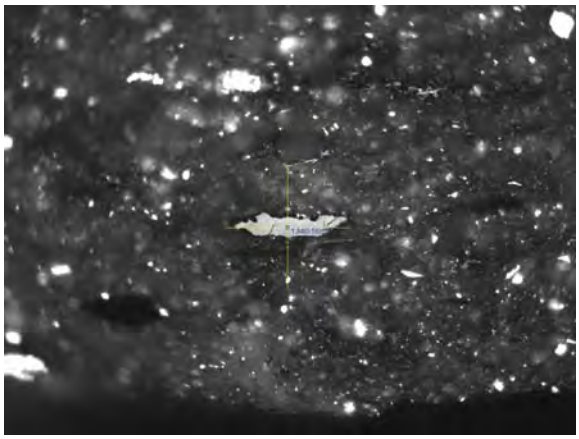
E2005G Graptolite in claystone, max reflectance position, RGrp = 1.67%, reflected white light, X50



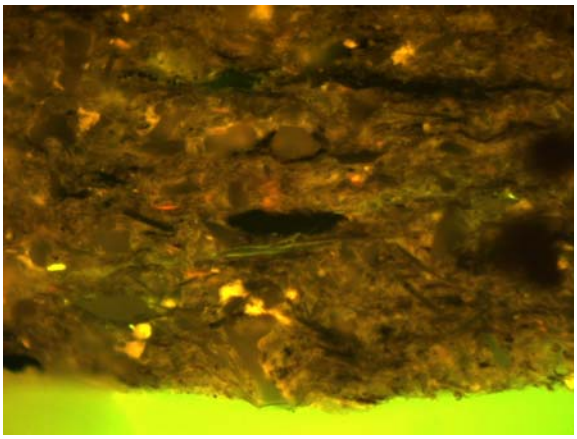
E2005H Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.83%



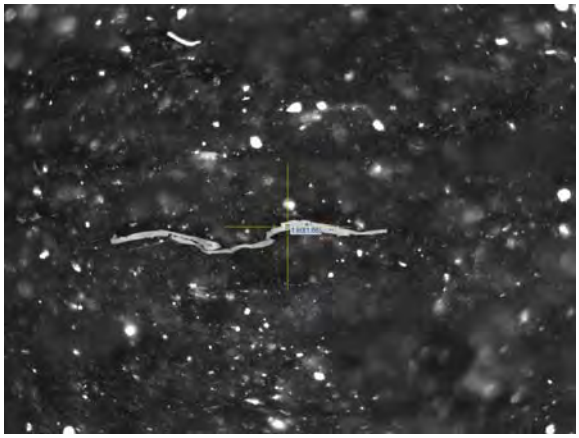
E2005I Same as E2004G, in fluorescence mode



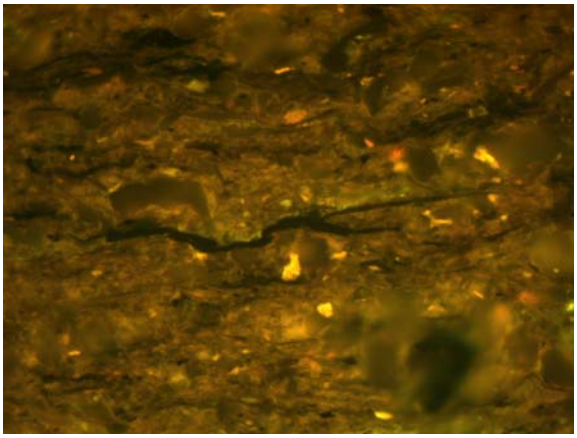
E2006A Bioclast in claystone, RBcl max= 1.34%, reflected white light, X50



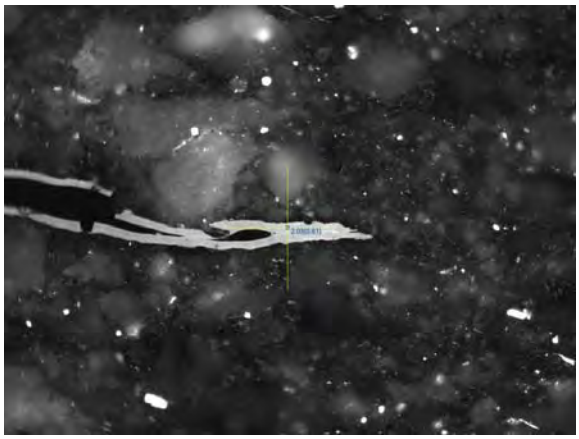
E2006B Same as E2006A, in fluorescence mode



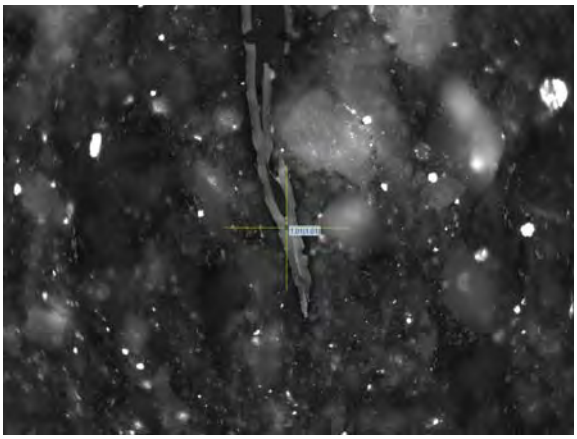
E2006C High reflecting graptolite in claystone, RBcl = 1.80%, reflected white light, X50



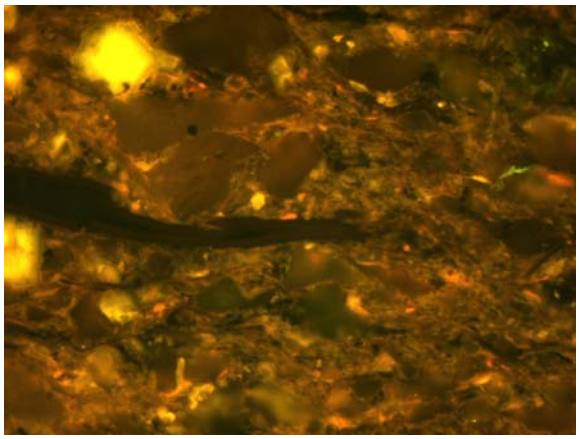
E2006D Same as E2006C, in fluorescence mode



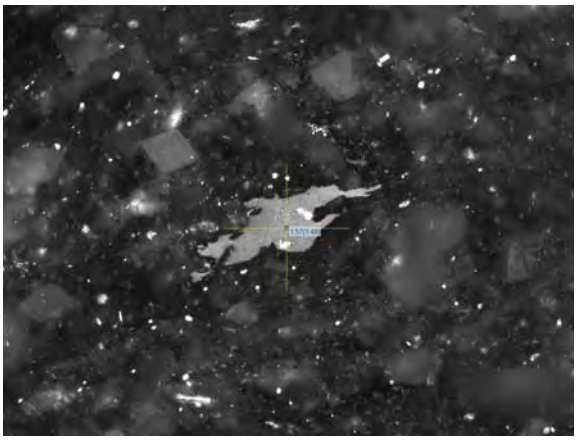
E2007A Graptolite in calcareous siltstone, max reflectance position, RGrp = 2.03%, reflected white light, X50



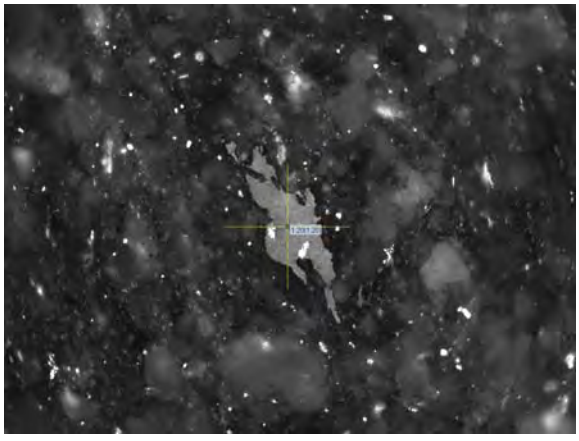
E2007B Same grain, after rotating stage at 90° to min reflectance position, RGrp = 1.01%



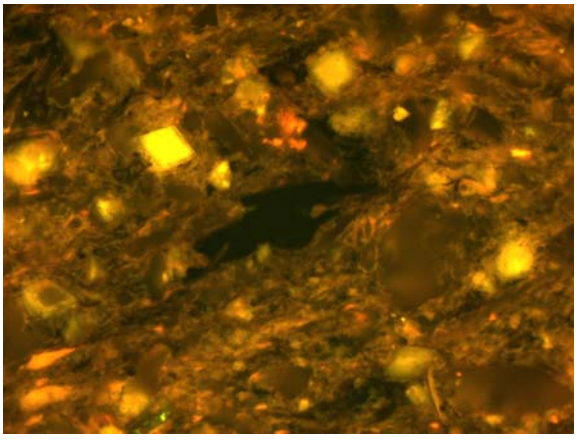
E2007C Same as E2007A, in fluorescence mode



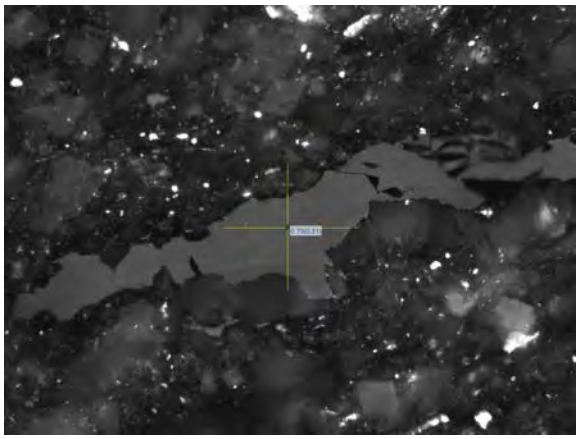
E2007D Bioclast in calcareous siltstone, max reflectance position, RBcl = 1.57%, reflected white light, X50



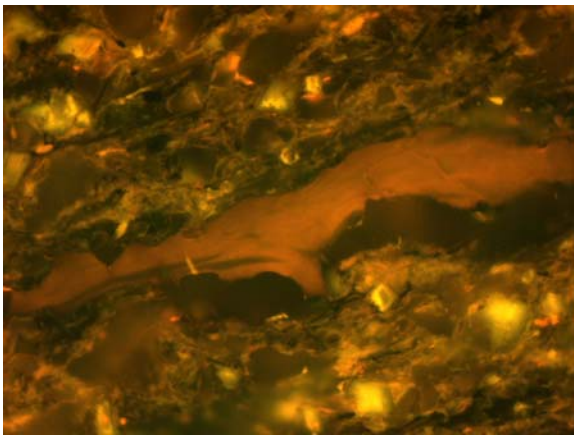
E2007E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 1.20%



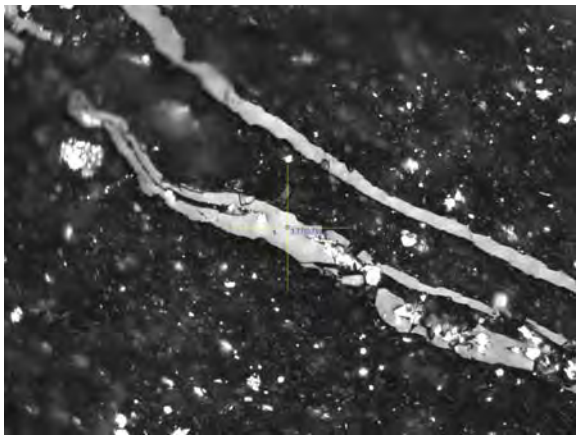
E2007F Same as E2007D, in fluorescence mode



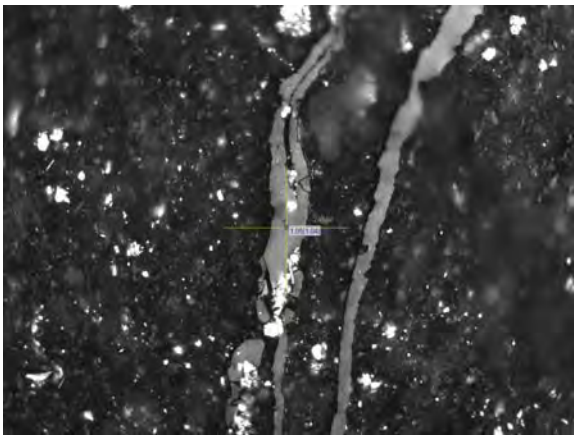
E2007G Bitumen in calcareous siltstone, RBit = 0.75%, reflected white light, X50



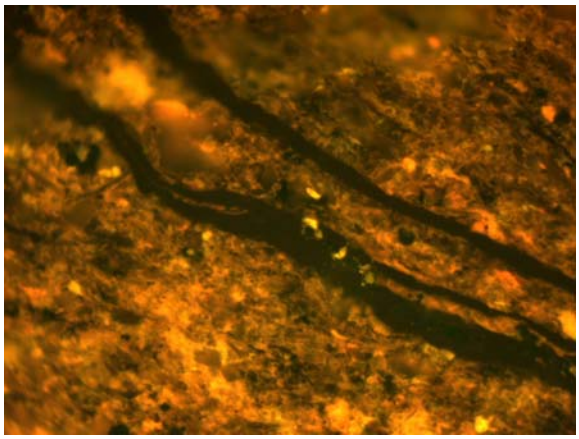
E2007H Same as E2007G, in fluorescence mode



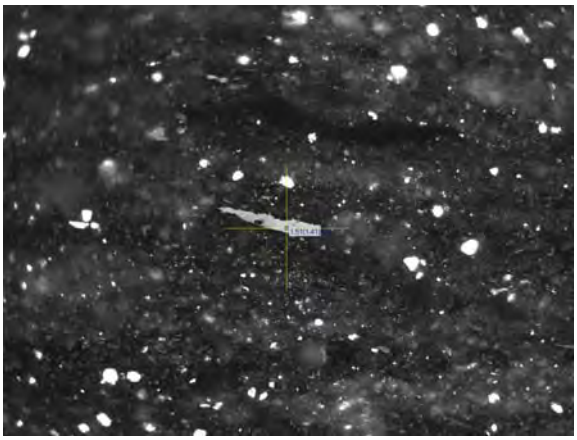
E2008A Graptolite in calcareous claystone, max reflectance position, RGrp = 1.77%, reflected white light, X50



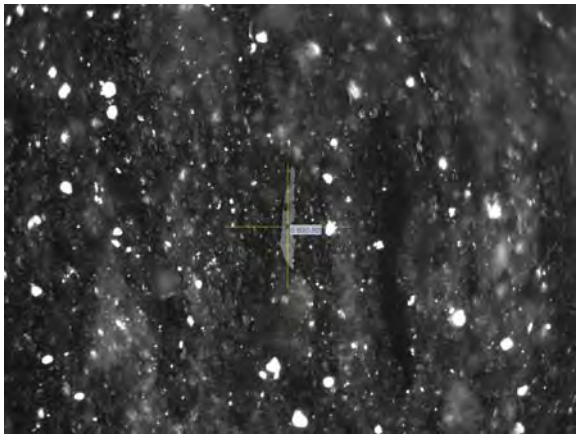
E2008B Same grain, after rotating stage at 90° to min reflectance position, RGrp = 1.05%



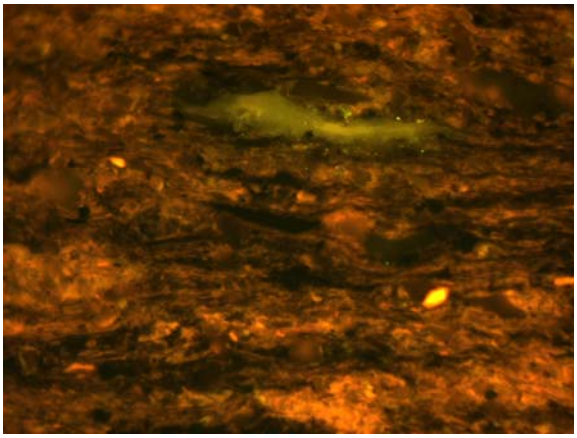
E2008C Same as E2008A, in fluorescence mode



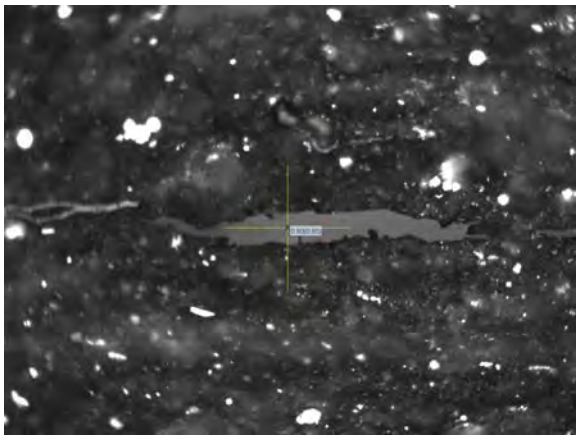
E2008D Bioclast in calcareous claystone, max reflectance position, RBcl = 1.51%, reflected white light, X50



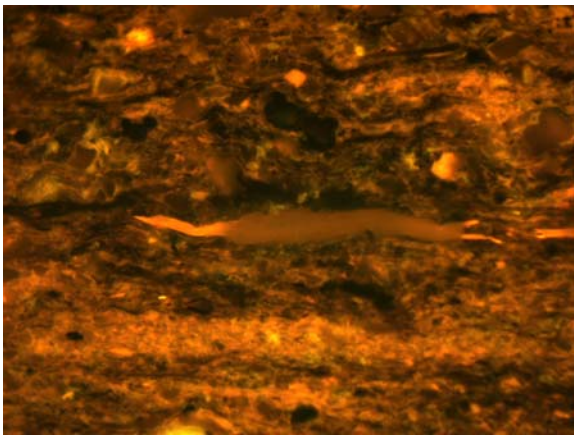
E2008E Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.80%



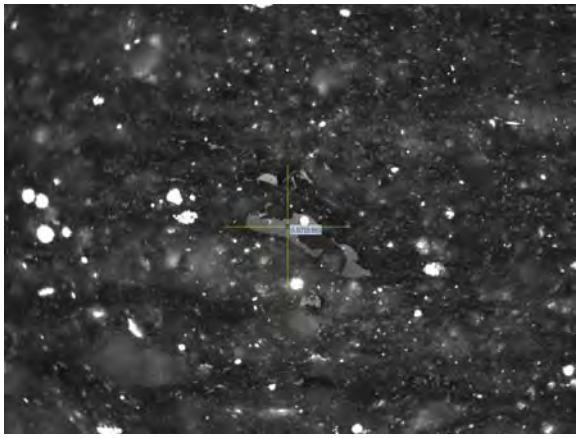
E2008F Same as E2008D, in fluorescence mode



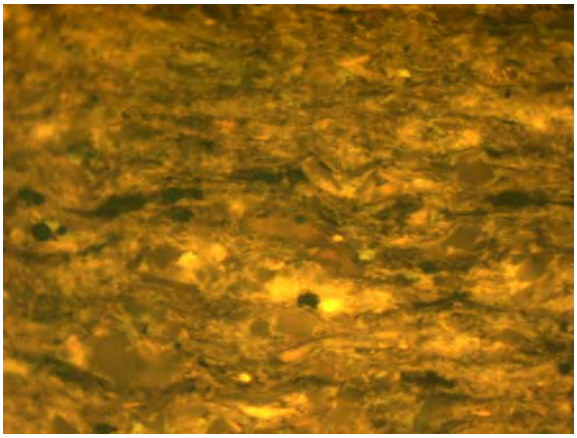
E2008G ?Alginite in calcareous claystone, RAlg = 0.80%, reflected white light, X50



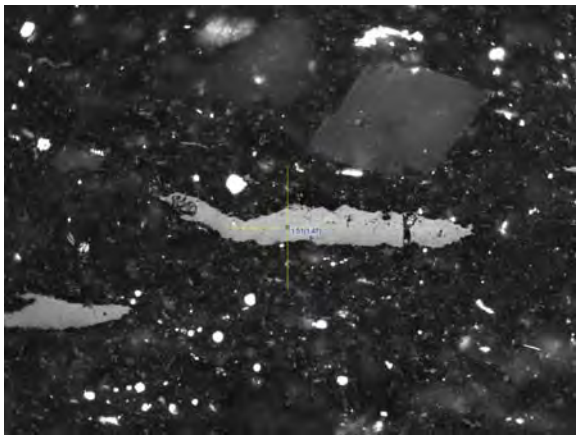
E2008H Same as E2008G, in fluorescence mode



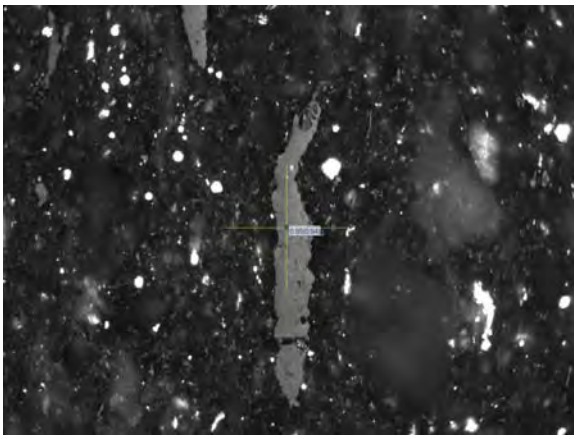
E2008I Bitumen in calcareous claystone, RBit = 0.87%, reflected white light, X50



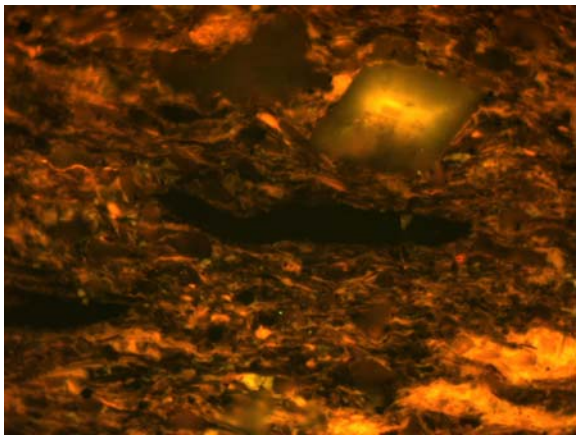
E2008J Same as E2008I, in fluorescence mode



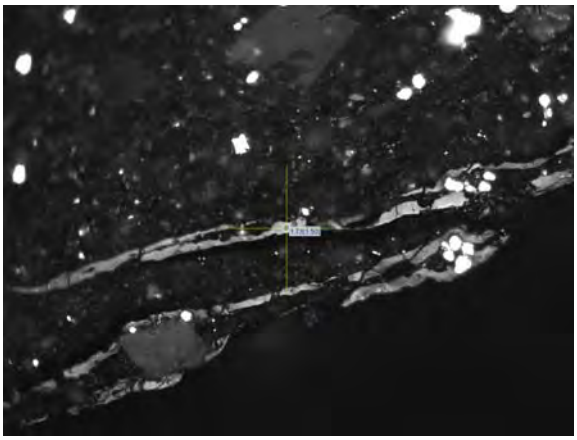
E2009A Bioclast in calcareous claystone, max reflectance position, RBcl = 1.51%, reflected white light, X50



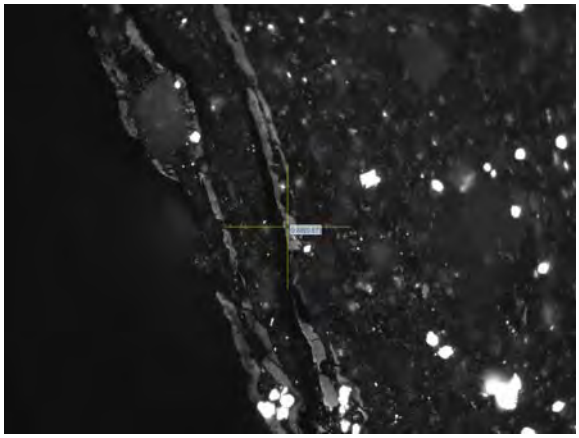
E2009B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.95%



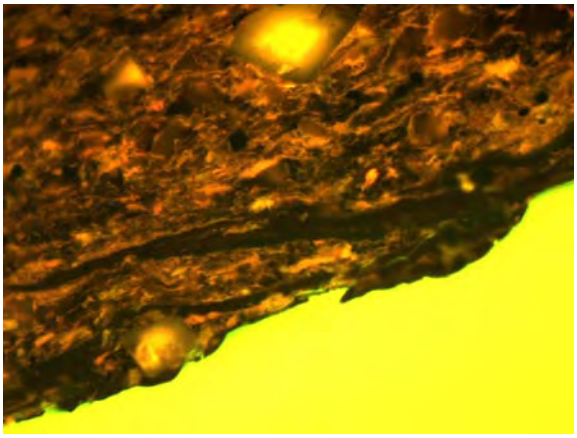
E2009C Same as E2009A, in fluorescence modeu



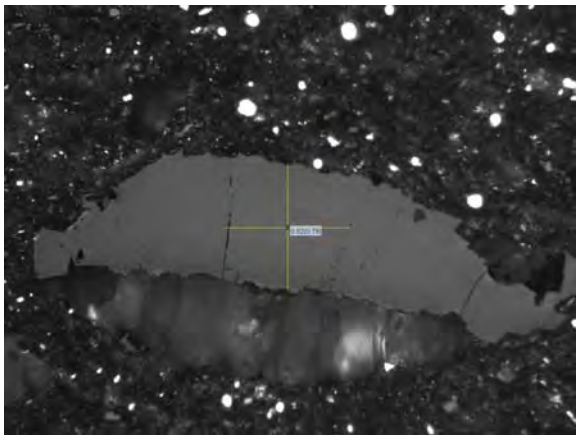
E2009D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.73%, reflected white light, X50



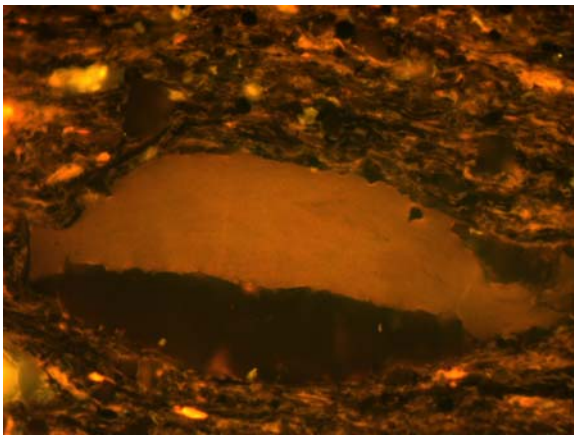
E2009E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.88%



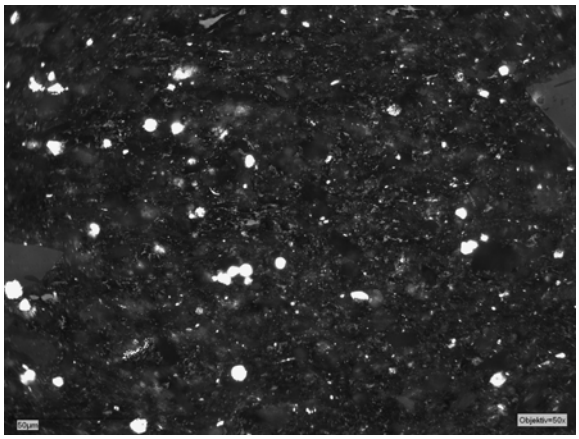
E2009F Same as E2009D, in fluorescence mode



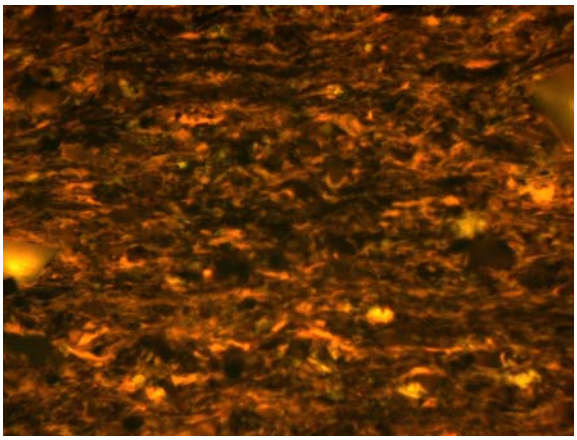
E2009G ?Recrystallised bitumen in calcareous claystone, RBit = 0.75%, reflected white light, X50



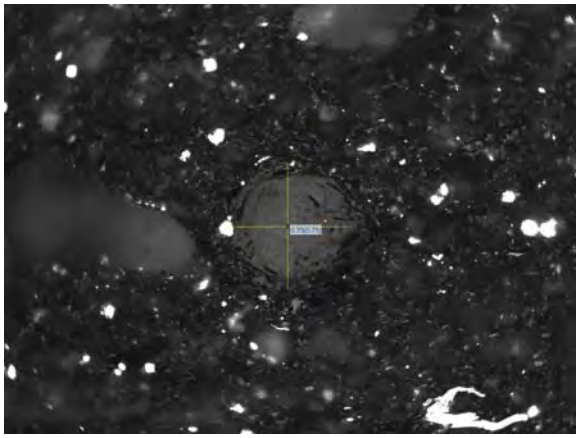
E2009H Same as E2009G, in fluorescence mode



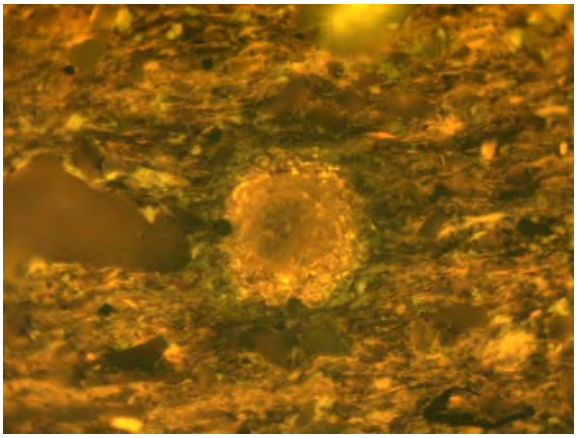
E2009I Abundant fine granular bitumen in calcareous claystone, reflected white light, X50



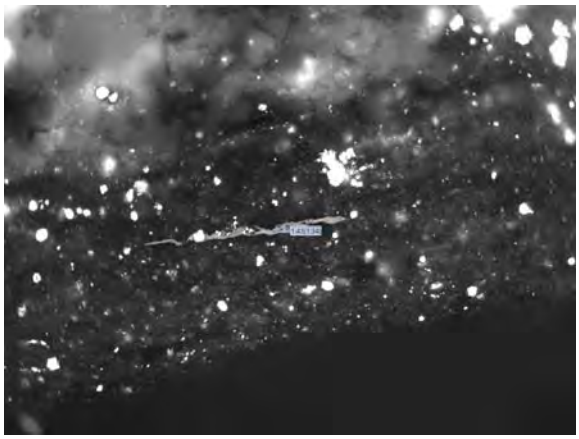
E2009J Same as E2009I, in fluorescence mode



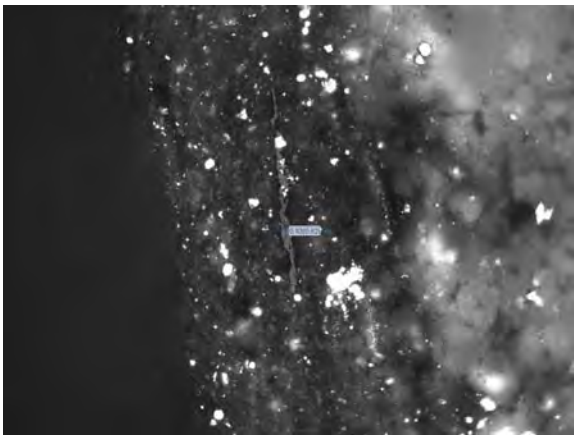
E2009K Thucholites in calcareous claystone, reflected white light, X50



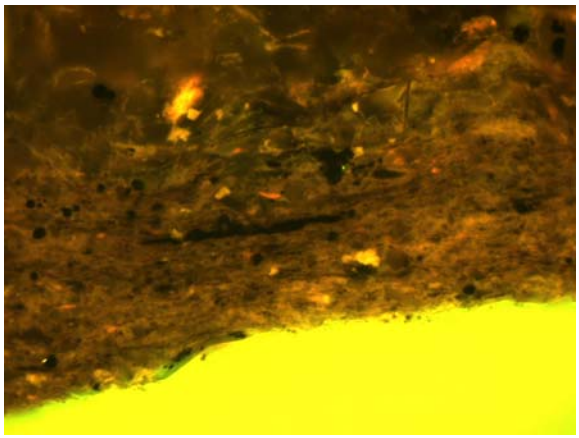
E2009L Same as E2009K, in fluorescence mode



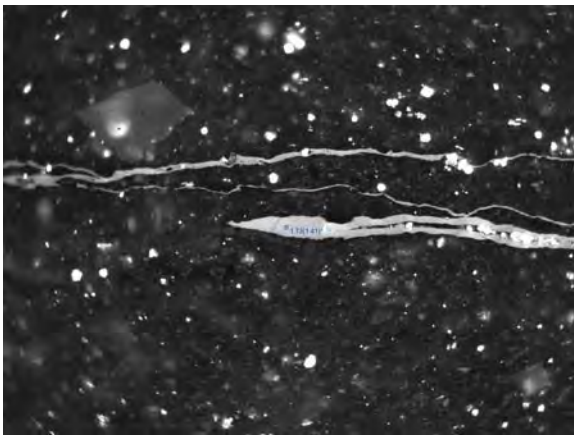
E2010A Bioclast in calcareous claystone, max reflectance position, RBcl = 1.43%, reflected white light, X50



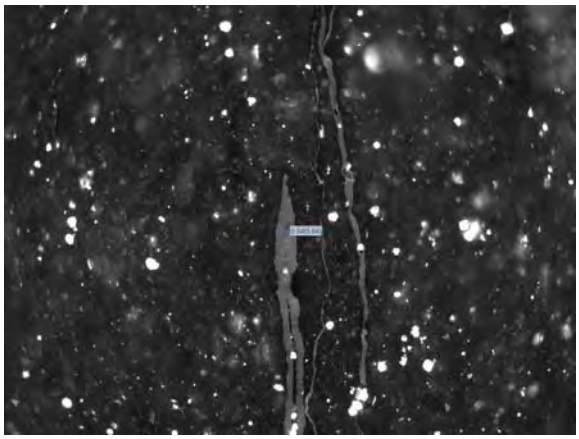
E2010B Same grain, after rotating stage at 90° to min reflectance position, RBcl = 0.835%



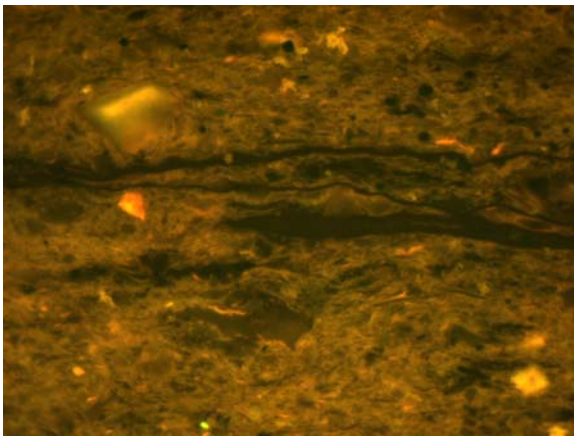
E2010C Same as E2010A, in fluorescence mode



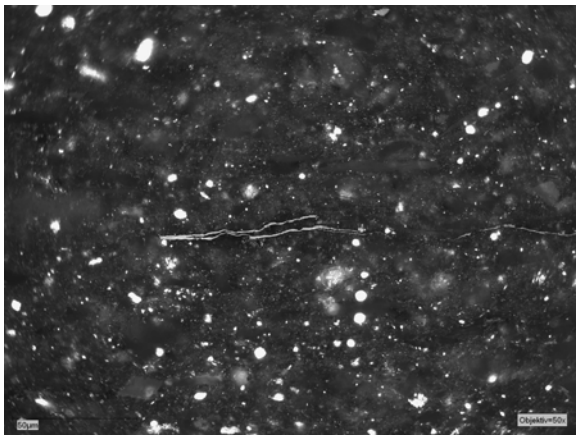
E2010D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.73%, reflected white light, X50



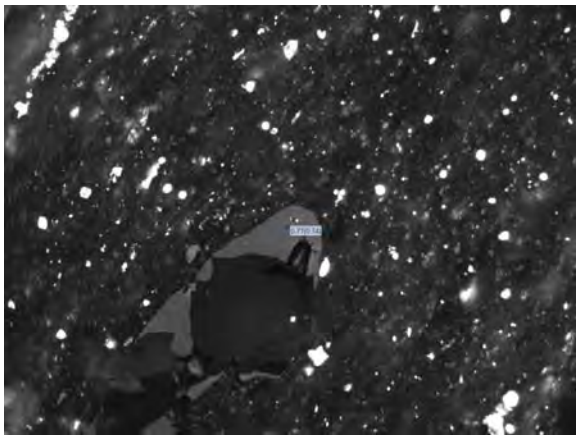
E2010E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.84%



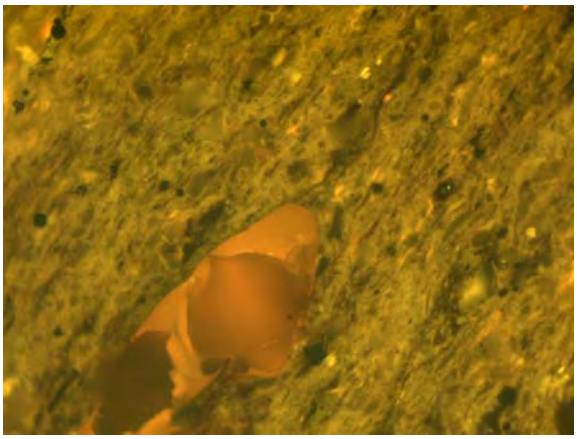
E2010F Same as E2010D, in fluorescence mode



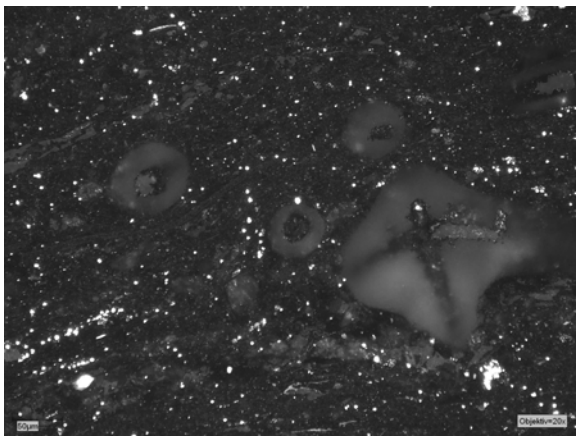
E2010G Thin strand of graptolite in calcareous claystone, reflected white light, X50



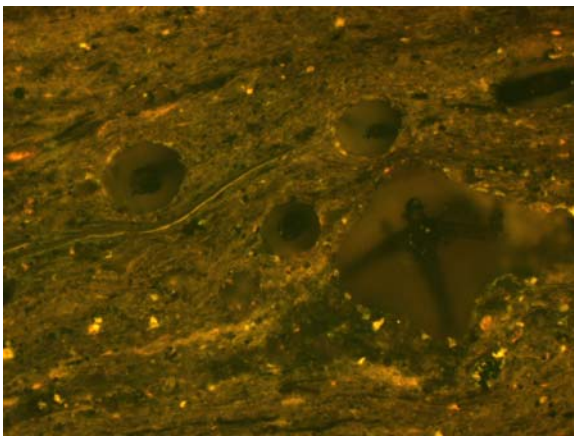
E2010H ?Recrystallised bitumen in calcareous claystone, RBit = 0.77%, reflected white light, X50



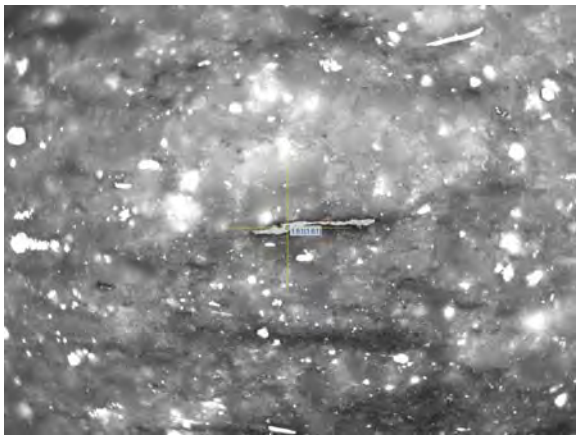
E2010I Same as E2010H, in fluorescence mode



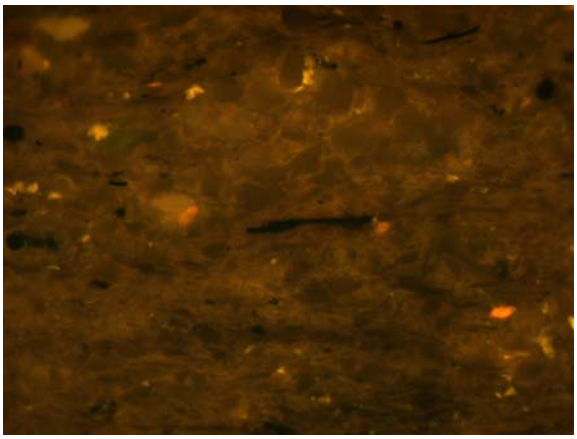
E2010J Round to oval siliceous oozes with hollow centres filled with carbonate, reflected white light, X50



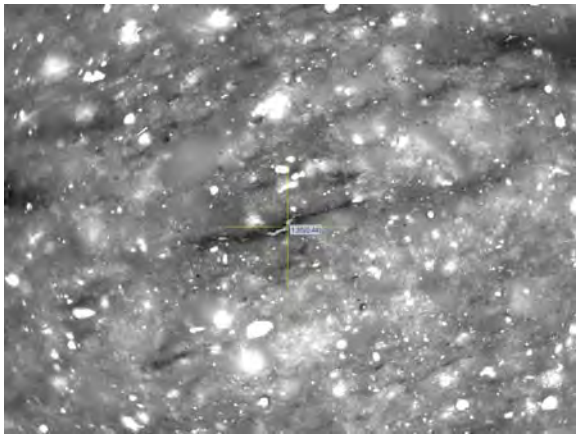
E2010K Same as E20010J, in fluorescence mode



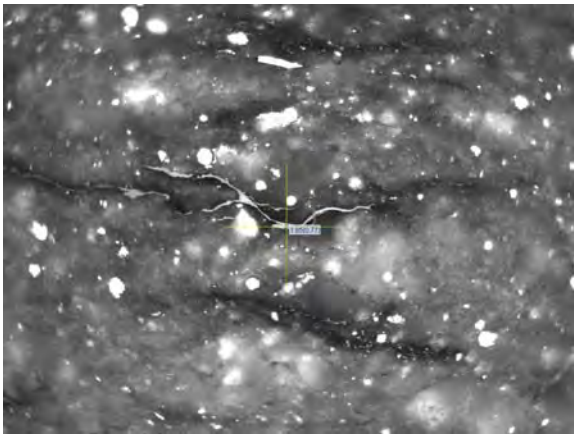
E2011A Bioclast1 in calcareous claystone, RBcl1 = 1.61%, reflected white light, X50



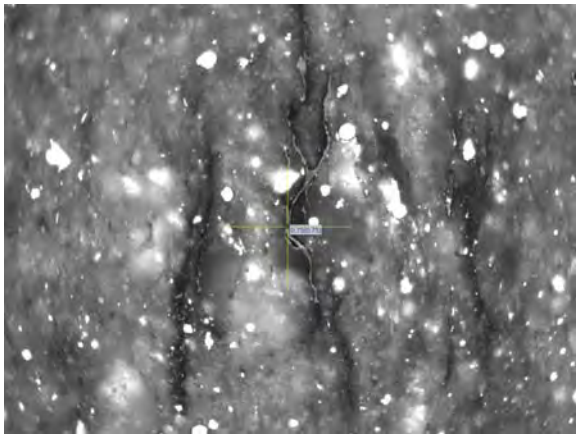
E2011B Same as E2011A, in fluorescence mode



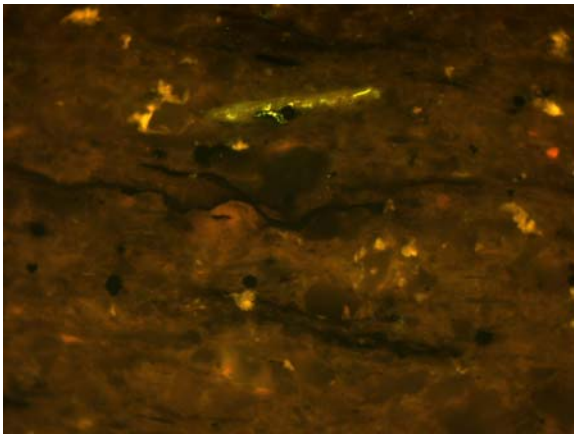
E2011C Bioclast1 associated with diffuse organic matter in calcareous claystone, RBcl1 = 1.35%, reflected white light, X50



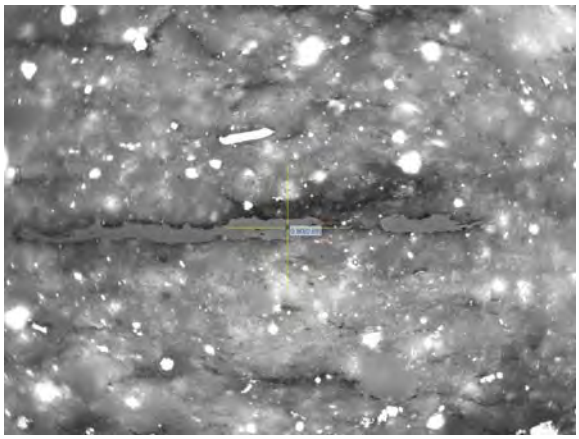
E2011D Graptolite in calcareous claystone, max reflectance position, RGrp= 1.85%, reflected white light, X50



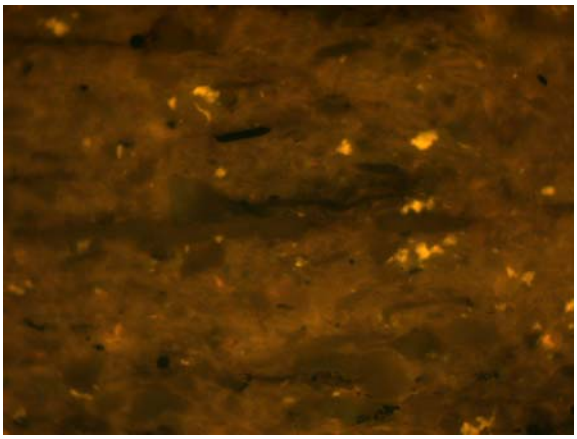
E2011E Same grain, after rotating stage at 90° to min reflectance position, RGrp = 0.75%



E2011F Same as E2011D, in fluorescence mode



E2011G Bioclast 2 in calcareous claystone, RBcl2 = 0.89%, reflected white light, X50



E2011H Same as E2011G, in fluorescence mode