

G.I.C. O.F. 187 PALYNOLOGICAL BIOSTRATIGRAPHY OF THE INTERVAL
395-420 M, PANTHER P-52, GRAND BANKS

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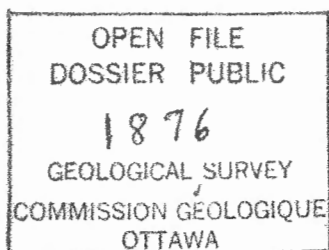
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BUJAK DAVIES GROUP

PALYNOLOGICAL BIOSTRATIGRAPHY
OF THE INTERVAL 395-4203M,
PANTHER P-52

REPORT # 87-0066
NOVEMBER, 1987

CALGARY, ALBERTA



PALYNOLOGICAL SUMMARY: PANTHER P-52

- 395-525m: Cannosphaeropsis sp. A Zone or older (late Miocene or older)
- 555-675m: Apteodinium sp. B Zone (early Miocene)
- 695-705m: Chiropteridium mespilanum Zone (late Oligocene)
- 725-1115m: Areosphaeridium arcuatum Zone (early Oligocene)
- 1135-1625m: Diphyes colligerum Zone (late Eocene)
- 1645-2235m: Adnatosphaeridium reticulense Zone (middle Eocene)
- 2255-2625m: Areoligera senonensis Zone (early Eocene)
- 2645-2655m: possible Palaeoperidinium pyrophorum Zone (possible early Paleocene)
- 2675-2805m: Pilosisorites sp. A Zone: Subzone 2C (middle Kimmeridgian)
- 2825-2865m: Pilosisorites sp. A Zone: Subzone 2B (early to middle Kimmeridgian)
- 2885-2955m: Pilosisorites sp. A Zone: Subzone 2A (early Kimmeridgian)
- 2975-4080m: Scriniodinium crystallinum Zone: Subzones 1A-B (early Kimmeridgian)
- 4110-4203m: Gonyaulacysta jurassica Zone: Subzone 0B (late Oxfordian)

SELECTED PALYNOMORPHS395-525m: Cannosphaeropsis sp. A Zone or older (late Miocene or older)

395-405m: Corylus #LA
Ericipites compactipolleniatus
Systematophora ancyrea

425-435m: Quercoidites #LA

455-465m: Pterocaryapollenites stellatus

485-495m: Liquidambar sp. A
Retitricolpites #LA

515-525m: Operculodinium centrocarpum
Operculodinium wallii
Tectatodinium pellitum

555-675m: Apteodinium sp. B Zone (early Miocene)

555-565m: Apteodinium sp. B, Williams and Brideaux, 1975
Cribroperidinium guiseppi
Dapsilidinium pastielsii
Lingulodinium machaerophorum
Reticulatosphaera actinocoronata
Rouseisporites #LA

605-615m: Hystriochokolpoma riguidiae

635-645m: Juglanspollenites nigripites

695-705m: Chiropteridium mespilanum Zone (late Oligocene)

This interval may represent Lower Oligocene strata devoid of marker species.

695-705m: Chiropteridium mespilanum
 Homotryblium floripes

725-1115m: Areosphaeridium arcuatum Zone (early Oligocene)

725-735m: Glaphyrocysta intricata (large form)

785-795m: Spiniferites pseudofurcatus
 Tiliaepollenites vespites
 Trinovantedinium #LA

815-825m: Dinopterygium cladoides
 Palaeocystodinium golzowense
 Paralecaniella indentata

845-855m: Distatodinium paradoxum

875-885m: Areosphaeridium arcuatum (large form)
 Areosphaeridium multicornutum (large form)
 Cordosphaeridium cantharellum
 Dapsilidinium simplex

905-915m: Wetzeliella gochti

985-995m: Wetzeliella articulata

- 1015-1025m: Thalassiphora pelagica
- 1045-1055m: Lentinia serrata
- 1105-1115m: Deflandrea heterophlycta

1135-1625m: Diphyes colligerum Zone (late Eocene)

- 1135-1145m: Areosphaeridium arcuatum (small form)
- 1165-1175m: Cordosphaeridium gracile (questionable
identification)
Deflandrea phosphoritica
Distatodinium craterum
Systematophora placacantha
- 1225-1235m: Phthanoperidinium comatum
- 1255-1265m: Areoligera undulata (questionable identification)
Impagidinium californiense
- 1285-1295m: Achomosphaera allicornu
Heteraulacacysta porosa
Kisselovia coleothrypta
Pentadinium laticinctum laticinctum
Phthanoperidinium multispinosum
- 1315-1325m: Gochtodinium simplex
Phthanoperidinium levimurum
- 1345-1355m: Areoligera sentosa (questionable identification)
- 1375-1385m: Glaphyrocysta semitecta

1405-1415m: Homotryblium pallidum

1465-1475m: Eocladopyxis peniculatum

1615-1625m: Rhombodinium draco

1645-2235m: Adnatosphaeridium reticulense Zone (middle Eocene)

1645-1655m: Deflandrea eocenica

1705-1715m: Hystrichokolpoma unispinum

1765-1775m: Glaphyrocysta spineta
Momipites coryloides

1825-1835m: Areoligera senonensis (rare)

1885-1895m: Spinidinium densispinatum

1975-1985m: Areoligera sentosa

2045-2055m: Glaphyrocysta laciniiforme

2095-2105m: Hystrichosphaeridium patulum

2165-2175m: Deflandrea #LR

2255-2625m: Areoligera senonensis Zone (early Eocene)

- 2255-2265m: Systematophora #LE
- 2285-2295m: Areoligera senonensis (common)
Camazonosporites #LB
- 2315-2325m: Lentinia wetzelii
- 2345-2355m: Hystriochokolpoma #LP
Hystriochokolpoma salacium
Phthanoperidinium #LG
- 2375-2385m: Nematosphaeropsis #LA
Systematophora #LC
- 2435-2445m: Luxadinium propatulum (derived)
- 2465-2475m: Chatangiella sp. indet. (derived)
- 2495-2505m: Achilleodinium biformoides
Adnatosphaeridium multispinosum
Apectodinium homomorphum (common)
Apectodinium hyperacanthum
Diphyes #LA
Hafniasphaera cryptovesiculata
Hafniasphaera septata
Turbiosphaera filosa
Wetzeliiella meckelfeldensis
- 2525-2535m: Areoligera senonensis (abundant)
Cordosphaeridium inodes inodes

Deflandrea oebisfeldensis

Diphyes colligerum

Dracodinium solidum

2555-2565m: Cordosphaeridium inodes longipes

Dracodinium condylos

2585-2595m: Cannosphaeropsis utinensis

Operculodinium tiara

2645-2655m: possible Palaeoperidinium pyrophorum Zone (possible early Paleocene)

2645-2655m: Adnatosphaeridium vittatum

Distaltriangulisporites perplexus (questionable identification - ?derived)

Lanternosphaeridium radiatum

Pervosphaeridium pseudhystrichodinium

Phelodinium magnificum

2675-2805m: Pilosporites sp. A Zone: Subzone 2C (middle Kimmeridgian)

2675-2685m: Alisporites thomasii

Araucariacites punctatus

Cerebropollenites macroverrucosus

Corollina vignollensis

Endoscrinium galeritum

Exesisporites scabratus

Imbatodinium kondratjevii

Meiourogoniaulax valensii

Muderongia sp. A

Pityosporites dividius
Prolixosphaeridium mixtispinum
Senoniasphaera jurassica
Systematophora fasciculigera

2705-2715m: Amphorula #EE
Corollina chateauvovii
Gonyaulacysta helicoidea
Inaperturopollenites granulatus
Muderongia sp. A (common)
Oligosphaeridium pulcherrimum cf.

2735-2745m: Hystrihogonyaulax cladophora
Meiourogoniaulax dicrypta
Occisucysta balios

2765-2775m: Alisporites #EG
Corollina echinata
Cribroperidinium #EZ
Ctenidodinium #ER
Gonyaulacysta kunazeviensis
Meiourogoniaulax porosa

2825-2865m: Pilosporites sp. A Zone: Subzone 2B (early to middle
Kimmeridgian)

2825-2835m: Epiplosphaera reticulospinosa
Meiourogoniaulax callomonii

2855-2865m: Sentusidinium cuculliforme

2885-2955m: Pilosisporites sp. A Zone: Subzone 2A (early Kimmeridgian)

2885-2895m: Ctenidodinium chondrum (questionable identification)
Systematophora ovata

2915-2925m: Ctenidodinium chondrum

2975-4080m: Scriniodinium crystallinum Zone: Subzones 1A-B (early Kimmeridgian)

2975-2985m: Meiourogoniaulax pila

3005-3015m: Breedoxiella #EB

3035-3045m: Cerebropollenites #EF
Corollina vignollensis (common)

3065-3075m: Inaperturopollenites granulatus
Subtilisphaera inaffecta

3095-3105m: Exesisporites scabratus (common)

3200-3210m: Ctenidodinium #ER
Fromea irregulare

3230-3240m: Kraeuselisporites #EA

3350-3360m: Leptodinium amabile

3380-3390m: Hystrichosphaerina orbifera
Paragoniaulacysta borealis (questionable
identification)

- 3410-3420m: Ctenidodinium pachydermum
- 3500-3510m: Exesisporites scabratus (common)
- 3740-3750m: Kraeuselisporites #EB
- 3950-3960m: Cicatricosisporites abacus
- 4040-4050m: Cicatricosisporites #E0

4110-4203m: Gonyaulacysta jurassica Zone: Subzone OB (late Oxfordian)

- 4110-4120m: Convolutispora klukiformis
Foraminispora paucispina
- 4130-4140m: Polycingulatisporites triangularis
- 4160-4170m: Tuberositriletes major

APPENDIX AAlphabetical Listing of Species Shown on Occurrence Chart:Marine Dinoflagellates

Index
number Taxon names

85	Achilleodinium biformoides	93	Deflandrea oebisfeldensis
41	Achomosphaera alaicornu	35	Deflandrea phosphoritica
125	Achomosphaera neptunii	132	Dingodinium jurassicum
7	Achomosphaera ramulifera	22	Dinopterygium cladoides
64	Achomosphaera sagena	88	Diphyes #LA
86	Adnatosphaeridium multispinosum	81	Diphyes colligerum
101	Adnatosphaeridium vittatum	36	Distatodinium craterum
145	Amphorula #EA	24	Distatodinium paradoxum
158	Amphorula #ED	98	Dracodinium condylos
116	Amphorula #EE	94	Dracodinium solidum
143	Amphorula metaelliptica	108	Endoscrinium galeritum
149	Amphorula spp.	139	Endoscrinium pharo
77	Apectodinium homomorphum	52	Eocladopyxis peniculatum
87	Apectodinium hyperacanthum	136	Epiplosphaera reticulospinosa
159	Apteodinium nuciforme	118	Escharisphaeridia rudis
8	Apteodinium sp. A, Williams & Brid. 1975	152	Fromea irregulare
60	Areoligera senonensis	19	Glaphyrocysta intricata (large form)
48	Areoligera sentosa	67	Glaphyrocysta laciniiforme
39	Areoligera undulata	50	Glaphyrocysta semitecta
25	Areosphaeridium arcuatum (large form)	59	Glaphyrocysta spineta
33	Areosphaeridium arcuatum (small form)	46	Gochtodinium simplex
63	Areosphaeridium diktyoplokus	119	Gonyaulacysta helicoidea
26	Areosphaeridium multicornutum (large)	151	Gonyaulacysta jurassica
57	Areosphaeridium multicornutum (small)	133	Gonyaulacysta kunzeviensis
146	Breodoxiella #EB	89	Hafniasphaera cryptovesiculata
160	Caddosphaera halosa	66	Hafniasphaera septata
99	Cannosphaeropsis utinensis	42	Heteraulacacysta porosa
4	Ceratiacean #LA	18	Homotryblum floripes
80	Ceratiopsis depressa	51	Homotryblum pallidum
83	Ceratiopsis diebelii	120	Hystrichodinium lanceatum
16	Chiropteridium mespilum	126	Hystrichogonyaulax cladophora
106	Cometodinium #EA	75	Hystrichokolpoma #LP
17	Cordosphaeridium cantharellum	13	Hystrichokolpoma rigaudiae
53	Cordosphaeridium funiculatum	74	Hystrichokolpoma salacium
34	Cordosphaeridium gracile	58	Hystrichokolpoma unispinum
92	Cordosphaeridium inodes inodes	69	Hystrichosphaeridium patulum
97	Cordosphaeridium inodes longipes	154	Hystrichosphaerina orbifera
129	Cribroperidinium #EZ	84	Hystrichosphaeropsis #LA
9	Cribroperidinium giuseppi	109	Imbatodinium kondratjevii
147	Cribroperidinium granuligerum	40	Impagidinium californiense
163	Cribroperidinium spp.	82	Isabelidinium #LP
130	Ctenidodinium #ER	43	Kisselovia coleothrypta
117	Ctenidodinium chondrum	121	Lanterna bulgaria
131	Ctenidodinium culmulum	102	Lanternosphaeridium radiatum
157	Ctenidodinium pachydermum	14	Lanternosphaeridium axiale
61	Cyclonephelium brevispinum	31	Lentinia serrata
107	Cyclonephelium distinctum	65	Lentinia wetzelii
10	Dapsilidinium pastielsii	162	Leptodinium aceras
27	Dapsilidinium simplex	140	Leptodinium amabile
71	Deflandrea #LR	122	Leptodinium sp. G
56	Deflandrea eocenica	15	Lingulodinium brevispinum
32	Deflandrea heterophlycta	11	Lingulodinium machaerophorum
		137	Meiourugonyaulax callomonii
		123	Meiourugonyaulax deflandrei
		127	Meiourugonyaulax dicrypta
		134	Meiourugonyaulax porosa

APPENDIX AAlphabetical Listing of Species Shown on Occurrence Chart:Marine Dinoflagellates

110	Meiourugonyaulax valensii
138	Mendicodinium groenlandicum
148	Milliododinium jubaris
111	Muderongia sp. A
76	Nematosphaeropsis #LA
128	Occisucysta balios
124	Oligosphaeridium pulcherrimum cf.
2	Operculodinium centrocarpum
100	Operculodinium tiara
5	Operculodinium wallii
23	Palaeocystodinium golzowense
103	Palaeocystodinium sp. T
155	Paragonyaulacysta borealis
112	Pareodinia ceratophora
156	Pareodinia sp. C
44	Pentadinium laticinctum laticinctum
104	Pervosphaeridium pseudhystrichodinium
105	Phelodinium magnificum
70	Phthanoperidinium #LG
49	Phthanoperidinium alectrolophum
38	Phthanoperidinium comatum
78	Phthanoperidinium echinatum
47	Phthanoperidinium levimurum
45	Phthanoperidinium multispinosum
73	Polysphaeridium subtile
113	Prolisosphaeridium mixtispinum
72	Pterodinium aliferum
12	Reticulatosphaera actinocoronata
55	Rhombodinium draco
114	Senoniasphaera jurassica
141	Sentusidinium cuculliiforme
161	Sentusidinium spp.
62	Spinidinium densispinatum
95	Spiniferites membranaceus
68	Spiniferites monilis
20	Spiniferites pseudofurcatus
3	Spiniferites ramosus
150	Subtilisphaera inaffecta
153	Subtilisphaera paeminosa
79	Systematophora #LC
54	Systematophora #LE
1	Systematophora ancyrea
144	Systematophora areolata
115	Systematophora fasciculigera
142	Systematophora ovata
37	Systematophora placacantha
164	Systematophora spp.
135	Tanyosphaeridium magneticum
6	Tectatodinium pellitum
96	Thalassiphora patula
30	Thalassiphora pelagica
21	Trinovantedinium #LA
90	Turbiosphaera filosa
29	Wetzeliella articulata
28	Wetzeliella gochtii
91	Wetzeliella meckelfeldensis

APPENDIX A (cont'd.)Alphabetical Listing of Species Shown on Occurrence Chart:Pollen and Spores

Index number	Taxon names		
59	Aequitriradites subverrucosus	37	Perinopollenites elatoides
45	Alisporites #EG	6	Piceapollenites spp.
27	Alisporites thomasi	7	Pinuspollenites spp.
10	Alnipollenites verus	38	Pityosporites dividuus
28	Araucariacites australis	23	Plicatella crimensis
29	Araucariacites punctatus	70	Polycingulatisporites triangularis
1	Betulaceopollenites betuloides	14	Pterocaryapollenites stellatus
71	Callialasporites infrapunctatus	13	Quercoidites #LA
65	Callialasporites monoalaspurus	17	Retitricolpites #LA
46	Callialasporites trilobatus	53	Rotverruisporites obscurilaesuratus
40	Callialasporites turbatus	18	Rouseisporites #LA
25	Camarozonosporites #LB	48	Sequoiapollenites spp.
58	Campania #EA	8	Stereisporites antiquasporites
19	Caryapollenites simplex	9	Taxodiaceapollenites hiatus
30	Cedripites canadensis	21	Tiliaepollenites vespipites
54	Cerebropollenites #EF : gony	57	Trilobosporites valangiensis
73	Cerebropollenites epilargos	22	Tsugaepollenites igniculus
31	Cerebropollenites macroverrucosus	15	Tsugaepollenites igniculus
32	Cerebropollenites mesozoicus	72	Tuberositriteles major
33	Chasmatosporites major	39	Uvaesporites subequatorialis
66	Cicatricosisporites #ED	51	Varirugosisporites granituberculatus
64	Cicatricosisporites abacus	49	Varirugosisporites mutabilis
67	Cicatricosisporites spp.		
62	Contignisporites notabilis		
68	Convolutispora klukiformis		
50	Corollina #EV		
41	Corollina chateaubovii		
47	Corollina echinata		
34	Corollina vignollensis		
42	Coronatipora valdensis		
2	Corylus #LA		
11	Cyathidites spp.		
55	Deltoidospora hallii		
3	Ericipites compactipolleniatus		
35	Exesisporites scabratus		
69	Foraminispora paucispina		
26	Foveotriteles subtriangularis		
36	Gleicheniidites senonicus		
60	Impardecispora spp.		
43	Inaperturopollenites granulatus		
63	Interlobites spp.		
20	Juglanspollenites nigripites		
56	Kraeuselisporites #EA		
61	Kraeuselisporites #EB		
4	Laevigatosporites ovatus		
44	Leiotriteles mecklenburgensis		
16	Liquidambar sp. A		
12	Lycopodiumsporites annotinioides		
52	Meiourugonyaulax pila		
24	Momipites coryloides		
5	Osmundacidites claytonites		

APPENDIX A (cont'd.)Alphabetical Listing of Species Shown on Occurrence Chart:Algae, Fungi and Miscellaneous Palynomorphs

Index number	Taxon names
4	Dicellaesporites #LA
5	foraminiferal liners
3	Micrhystridium fragile
1	Paralecaniella indentata
2	Pediastrum boryanum

Alphabetical Listing of Species Shown on Occurrence Chart:Reworked Palynomorphs

Index number	Taxon names
9	*Aquilapollenites spp.
1	*Chatangiella spp.
15	*Chatangiella tripartita
5	*Cicatricosisporites spp.
7	*Densosporites spp.
16	*Distaltriangulisporites perplexus
4	*Isabelidium spp.
2	*Laciniadinium spp.
14	*Muderongia asymmetrica
10	*Odontochitina spp.
8	*Oligosphaeridium spp.
3	*Palaeohystrichophora infusorioides
11	*Palaeoperidinium pyrophorum
12	*Spinidium spp.
6	*Spinidium vestitum
13	*Surculosphaeridium longifurcatum

APPENDIX BList of Samples for Palynological Analysis

395.00 : cuttings	2125.00 : cuttings	3800.00 : cuttings
425.00 : cuttings	2165.00 : cuttings	3830.00 : cuttings
455.00 : cuttings	2195.00 : cuttings	3860.00 : cuttings
485.00 : cuttings	2225.00 : cuttings	3890.00 : cuttings
515.00 : cuttings	2255.00 : cuttings	3920.00 : cuttings
555.00 : cuttings	2285.00 : cuttings	3950.00 : cuttings
605.00 : cuttings	2315.00 : cuttings	3980.00 : cuttings
635.00 : cuttings	2345.00 : cuttings	4010.00 : cuttings
665.00 : cuttings	2375.00 : cuttings	4040.00 : cuttings
695.00 : cuttings	2405.00 : cuttings	4070.00 : cuttings
725.00 : cuttings	2435.00 : cuttings	4110.00 : cuttings
755.00 : cuttings	2465.00 : cuttings	4130.00 : cuttings
785.00 : cuttings	2495.00 : cuttings	4160.00 : cuttings
815.00 : cuttings	2525.00 : cuttings	4195.00 : cuttings
845.00 : cuttings	2555.00 : cuttings	
875.00 : cuttings	2585.00 : cuttings	
905.00 : cuttings	2615.00 : cuttings	
955.00 : cuttings	2645.00 : cuttings	
985.00 : cuttings	2675.00 : cuttings	
1015.00 : cuttings	2705.00 : cuttings	
1045.00 : cuttings	2735.00 : cuttings	
1075.00 : cuttings	2765.00 : cuttings	
1105.00 : cuttings	2795.00 : cuttings	
1135.00 : cuttings	2825.00 : cuttings	
1165.00 : cuttings	2855.00 : cuttings	
1195.00 : cuttings	2885.00 : cuttings	
1225.00 : cuttings	2915.00 : cuttings	
1255.00 : cuttings	2945.00 : cuttings	
1285.00 : cuttings	2975.00 : cuttings	
1315.00 : cuttings	3005.00 : cuttings	
1345.00 : cuttings	3035.00 : cuttings	
1375.00 : cuttings	3065.00 : cuttings	
1405.00 : cuttings	3095.00 : cuttings	
1435.00 : cuttings	3125.00 : cuttings	
1465.00 : cuttings	3155.00 : cuttings	
1495.00 : cuttings	3200.00 : cuttings	
1525.00 : cuttings	3230.00 : cuttings	
1585.00 : cuttings	3260.00 : cuttings	
1615.00 : cuttings	3290.00 : cuttings	
1645.00 : cuttings	3320.00 : cuttings	
1675.00 : cuttings	3350.00 : cuttings	
1705.00 : cuttings	3380.00 : cuttings	
1735.00 : cuttings	3410.00 : cuttings	
1765.00 : cuttings	3440.00 : cuttings	
1795.00 : cuttings	3470.00 : cuttings	
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2045.00 : cuttings	3740.00 : cuttings	
2095.00 : cuttings	3770.00 : cuttings	