ERCB/AGS Open File Report 2010-06

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Energy Resources Conservation Board

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May 2010

ISBN 978-0-7785-8630-2

Beaton, A.P., Pawlowicz, J.G., Anderson, S.D.A., Berhane, H. and Rokosh, C.D. (2010): Organic petrography of the Duvernay and Muskwa formations in Alberta: shale gas data release; Energy Resources Conservation Board, ERCB/AGS Open File Report 2010-06, 147 p.

Published May 2010 by:
Energy Resources Conservation Board
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Acknowledgments

The Alberta Energy Innovation Fund, through the Alberta Department of Energy, provided partial funding for this project. The authors thank the Alberta Department of Energy for its support. Thanks also go to Energy Resources Conservation Board Core Research Centre personnel for sampling assistance. Geological Survey of Canada personnel described all of the organic petrography—many thanks for their efforts, particularly Julito Reyes. Lastly, we thank Gisela Hippolt-Squair and Maryanne Protz of Alberta Geological Survey, and Bob Davie of RnD Technical for their help in assembling this report.

Abstract

This report is a data release of organic petrography and maturation (Ro) for selected samples of the Duvernay and Muskwa formations, generated for the Energy Resources Conservation Board/Alberta Geological Survey project on shale gas resources in Alberta. A few samples were also taken from adjoining formations, such as the Majeau Lake, Beaverhill Lake, Ireton, Fort Simpson, Cooking Lake and Swan Hills. This data release complements other reports and data from the same project, as listed in Table 1.

1 Introduction

The Energy Resources Conservation Board/Alberta Geological Survey (ERCB/AGS) initiated a project in 2007 to evaluate shale gas resources in Alberta, to determine the quantity and spatial extent of these resources (Rokosh et al., 2009a–c). Alberta Geological Survey (AGS) is releasing a series of reports to disseminate data and knowledge from the project.

The first formations chosen for evaluation were the Colorado Group (Beaton et al, 2009a; Pawlowicz et al., 2009b), and the Banff and Exshaw formations (Beaton et al., 2009b; Pawlowicz et al., 2009a). We also released four reports containing geochemical and geological data on the Montney, Duvernay and Muskwa formations (Anderson et al., 2010a, b; Beaton et al., 2010a, b). These publications are available for download on the AGS website (http://www.ags.gov.ab.ca/publications).

This report disseminates organic petrography results on samples from principally the Duvernay and Muskwa formations (Appendix 3). A few samples were also taken from adjoining formations, such as the Majeau Lake, Beaverhill Lake, Ireton, Fort Simpson, Cooking Lake and Swan Hills.

In addition to organic petrography, AGS ran a series of analyses on core samples (Table 1). The data generated from the project will be combined with additional data to map and estimate shale gas resources in Alberta.

Table 1. Analyses performed on core samples, and the organization that performed the analyses as part of the shale gas resource evaluation project.

Analysis Type	Company/Analyst	References
Adsorption isotherms	Schlumberger/TerraTek	Beaton et al. (2010a, b)
Mercury porosimetry, helium pycnometry	Department of Physics, University of Alberta (D. Schmitt)	Anderson et al. (2010a, b)
Permeametry	Department of Earth and Atmospheric Sciences, University of Alberta (M. Gingras)	Anderson et al. (20010a, b)
Rock Eval™/TOC	Geological Survey of Canada; Schlumberger/TerraTek	Beaton et al. (20010a, b)
Organic petrography	Geological Survey of Canada (J. Reyes)	This report
Petrographic analysis (thin section)	Vancouver Petrographics, Alberta Geological Survey	Work in progress
Scanning electron microscope (SEM) with energy-dispersive X-ray (EDX)	Department of Earth and Atmospheric Sciences, University of Alberta (D-A. Rollings)	Anderson et al. (2010a, b)
X-Ray diffraction (bulk and clay mineral)	SGS Minerals Services Ltd. (H. Zhou)	Anderson et al. (2010a, b)

2 Sample Location and Description

Figure 1 displays all core sample sites associated with the Duvernay, Muskwa and adjoining formations. Table 2 and Appendix 1 list the locations of the sample sites.

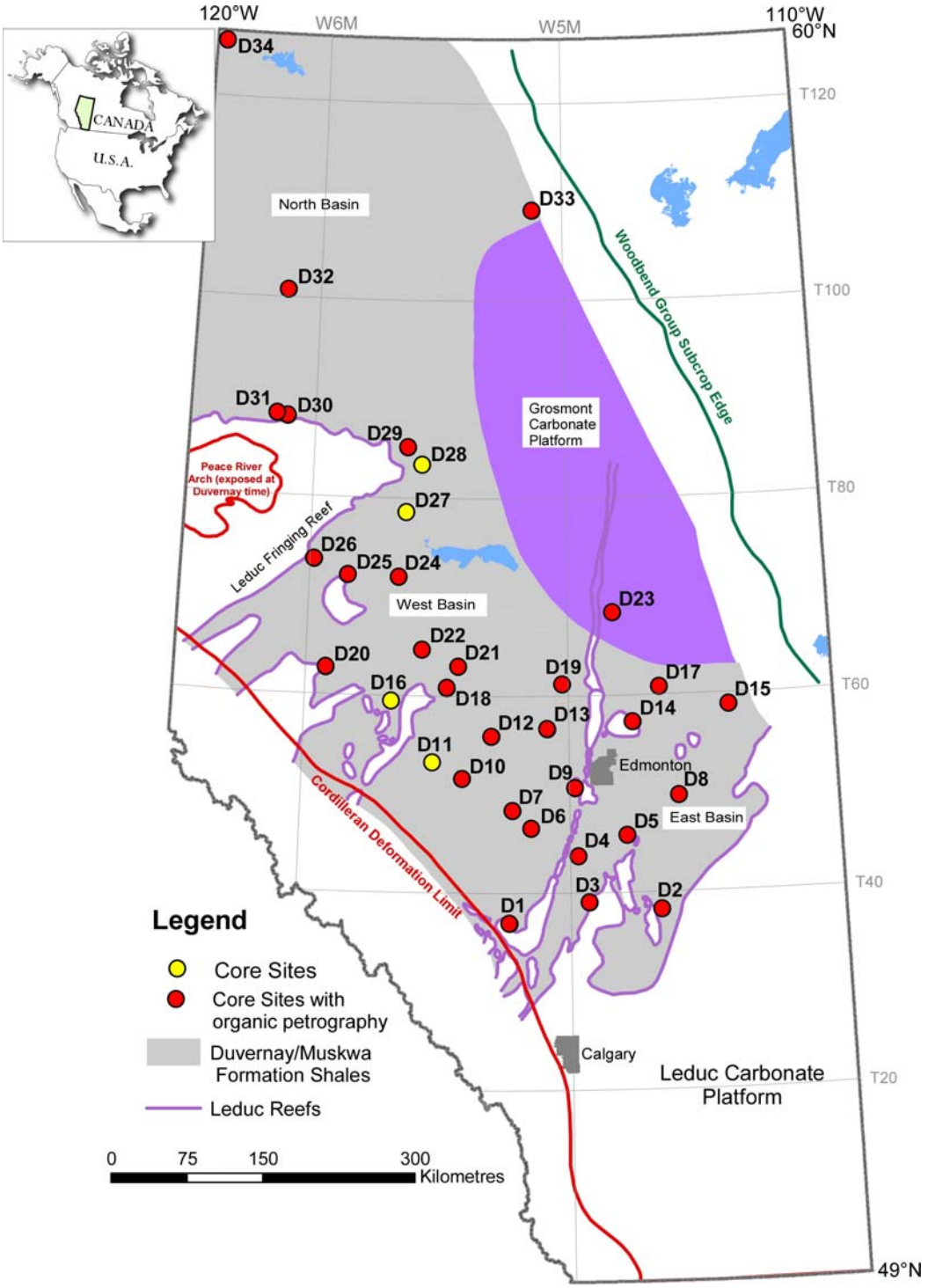

Figure 1. Core sites sampled for organic petrography from the Duvernay, Muskwa and adjoining formations. See Table 2 and Appendix 1 for a list of all sites, and Appendix 2 for the type of analyses run on the samples.

Table 2. Core sample sites in the Duvernay, Muskwa and adjoining formations. Figure 1 shows the site numbers.

Site No.	Location - UWI	Latitude NAD 83	Longitude NAD 83	Year Drilled	Year Sampled	No. of Samples	Project
D1	100/06-14-037-07W5/00	52.178681	-114.895395	1988	2008	5	Duvernay
D2	100/07-29-038-19W4/00	52.293665	-112.680054	1973	2008	3	Duvernay
D3	100/02-19-039-26W4/00	52.364263	-113.729463	1988	2008	4	Duvernay
D4	100/02-08-044-27W4/00	52.772473	-113.882727	1955	2008	8	Duvernay
D5	100/10-08-046-22W4/00	52.954185	-113.157432	1959	2008	6	Duvernay
D6	100/02-06-047-04W5/00	53.020332	-114.571521	1955	2008	7	Duvernay
D7	100/14-29-048-06W5/00	53.176390	-114.845842	1954	2008	7	Duvernay
D8	100/11-11-050-17W4/00	53.302221	-112.380697	1947	2008	7	Duvernay
D9	100/10-04-051-27W4/00	53.375694	-113.919293	1964	2008	5	Duvernay
D10	100/09-06-052-11W5/00	53.463004	-115.601615	1954	2008	14	Duvernay
D11	100/10-30-053-14W5/00	53.608763	-116.049330	1964	2008	14	Duvernay
D12	100/05-17-056-08W5/00	53.836758	-115.164014	1947	2008	2	Duvernay
D13	100/12-01-057-03W5/00	53.899127	-114.322013	1948	2008	3	Duvernay
D14	102/10-27-057-21W4/00	53.957625	-113.035417	1981	2008	12	Duvernay
D15	100/10-09-059-11W4/00	54.087511	-111.587683	1963	2008	5	Duvernay
D16	100/10-31-059-18W5/00	54.146695	-116.686430	1968	2008	5	Duvernay
D17	100/09-09-061-18W4/00	54.262405	-112.629101	1951	2008	2	Duvernay
D18	100/15-11-061-13W5/00	54.265106	-115.836890	1980	2008	4	Duvernay
D19	100/10-21-061-01W5/00	54.292262	-114.086469	1953	2008	4	Duvernay
D20	100/04-11-063-25W5/00	54.429758	-117.680962	1988	2008	3	Duvernay
D21	100/10-13-063-12W5/00	54.452329	-115.674185	1959	2008	4	Duvernay
D22	100/10-05-065-15W5/00	54.599662	-116.225665	1968	2008	5	Duvernay
D23	100/04-33-068-22W4/00	54.923841	-113.307416	1955	2008	5	Duvernay
D24	100/11-18-072-17W5/00	55.238223	-116.607331	1956	2008	2	Duvernay
D25	100/10-24-072-23W5/00	55.252641	-117.396100	1965	2008	5	Duvernay
D26	100/16-04-074-26W5/00	55.386647	-117.930965	2002	2008	8	Duvernay
D27	100/01-01-079-17W5/00	55.812641	-116.513471	2001	2008	2	Duvernay
D28	100/07-34-083-15W5/00	56.235578	-116.276592	1986	2008	3	Duvernay
D29	100/13-20-085-16W5/00	56.389314	-116.500762	1972	2008	4	Duvernay
D30	100/11-17-088-03W6/00	56.634242	-118.443537	1983	2008	4	Duvernay
D31	100/02-30-088-04W6/00	56.656887	-118.620914	1980	2008	4	Duvernay
D32	100/06-11-101-04W6/00	57.750185	-118.537350	1957	2008	2	Duvernay
D33	100/14-19-109-03W5/00	58.485680	-114.495876	1968	2008	6	Duvernay
D34	100/02-04-126-11W6/00	59.913369	-119.842205	1991	2008	8	Duvernay
					Total	182	

3 Analytical Methods and Results

A total of 182 core samples was selected for analysis. The analyses were performed on selected samples, as indicated in Appendix 2, by the laboratories listed in Table 1.

3.1 Organic Petrography

Petrographic analysis of organic components (e.g., Taylor et al., 1998) of shale samples identified organic constituents conducive to hydrocarbon potential, texture and inorganic composition, and thermal maturity of the sample. Julito Reyes of the Geological Survey of Canada (GSC)–Calgary conducted the analyses (http://gsc.nrcan.gc.ca/labs/petrology_e.php). The petrographic descriptions and images in Appendix 3 were edited and documented, including the addition of the AGS sample number and a new scale bar.

Organic petrography is typically performed in both white and ultraviolet reflected light to observe dispersed organic matter and hydrocarbon in a sample. Organic petrography helps identify the type and amount of organic matter present (algae, bitumen, etc.). It also helps determine hydrocarbon potential and modelling organic facies to assist in source-rock exploration and evaluation. Vitrinite reflectance (and reflectance on bitumen) indicates the thermal maturation of a sample, which correlates to hydrocarbon-generation history and potential.

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Appendices

Appendix 1 – Core Sample Location, Depth and Lithology, Duvernay, Muskwa and Adjoining Formations

Legend

Column Label	Label Description
Sample No.	AGS sample number
Site No.	AGS site location number
Location - UWI	Well location - unique well identifier
Sample Depth (Metres)	Depth of core sample in metres (measured from core)
Lithology	Brief lithological description of sample
Formation/Group	Geological formation or group at depth of sample

Sample No.	Site No.	Location - UWI	Sample Depth (Metres)	Lithology	Formation/Group
8127	D30	100/11-17-088-03W6/00	2317.5	shale	Muskwa
8128	D30	100/11-17-088-03W6/00	2319.3	shale	Muskwa
8129	D30	100/11-17-088-03W6/00	2324.4	shale	Muskwa
8130	D30	100/11-17-088-03W6/00	2339.0	carbonate mudstone	Beaverhill Lake
8133	D8	100/11-11-050-17W4/00	1135.1	shale	Ireton
8134	D8	100/11-11-050-17W4/00	1163.1	shale	Ireton
8135	D8	100/11-11-050-17W4/00	1182.6	shale	Duvernay
8136	D8	100/11-11-050-17W4/00	1190.2	shale	Duvernay
8137	D8	100/11-11-050-17W4/00	1204.3	shale	Duvernay
8138	D8	100/11-11-050-17W4/00	1220.4	shale	Duvernay
8139	D8	100/11-11-050-17W4/00	1270.7	carbonate mudstone	Cooking Lake
8140	D25	100/10-24-072-23W5/00	2821.2	shale	Duvernay
8141	D25	100/10-24-072-23W5/00	2825.5	shale	Duvernay
8142	D25	100/10-24-072-23W5/00	2832.2	shale	Duvernay
8143	D25	100/10-24-072-23W5/00	2837.7	shale	Duvernay
8144	D25	100/10-24-072-23W5/00	2844.1	shale	Beaverhill Lake
8145	D33	100/14-19-109-03W5/00	372.0	chalk	Ireton
8146	D33	100/14-19-109-03W5/00	374.0	shale	Ireton
8147	D33	100/14-19-109-03W5/00	410.0	shale	Ireton
8148	D33	100/14-19-109-03W5/00	456.0	shale	Ireton
8149	D33	100/14-19-109-03W5/00	503.0	shale	Ireton
8150	D33	100/14-19-109-03W5/00	553.0	shale	Ireton
8451	D23	100/04-33-068-22W4/00	1030.1	carbonate mudstone	Duvernay
8452	D23	100/04-33-068-22W4/00	1043.6	carbonate mudstone	Duvernay
8453	D23	100/04-33-068-22W4/00	1052.8	carbonate mudstone	Duvernay
8454	D23	100/04-33-068-22W4/00	1054.6	carbonate mudstone	Duvernay
8455	D23	100/04-33-068-22W4/00	1061.6	dolostone	Cooking Lake
8456	D12	100/05-17-056-08W5/00	2358.8	shale	Duvernay
8457	D12	100/05-17-056-08W5/00	2386.9	shale	Duvernay
8458	D15	100/10-09-059-11W4/00	774.3	shale	Duvernay
8459	D15	100/10-09-059-11W4/00	786.1	carbonate mudstone	Duvernay
8460	D15	100/10-09-059-11W4/00	793.7	carbonate mudstone	Duvernay
8461	D15	100/10-09-059-11W4/00	797.7	carbonate mudstone	Duvernay
8462	D15	100/10-09-059-11W4/00	798.6	carbonate mudstone	Duvernay
8463	D14	102/10-27-057-21W4/00	1134.7	carbonate mudstone	Duvernay
8464	D14	102/10-27-057-21W4/00	1136.8	carbonate mudstone	Duvernay
8465	D14	102/10-27-057-21W4/00	1139.4	carbonate mudstone	Duvernay
8466	D14	102/10-27-057-21W4/00	1141.4	carbonate mudstone	Duvernay
8467	D14	102/10-27-057-21W4/00	1149.5	carbonate mudstone	Duvernay
8468	D14	102/10-27-057-21W4/00	1149.8	carbonate mudstone	Duvernay
8469	D14	102/10-27-057-21W4/00	1151.5	carbonate mudstone	Duvernay
8470	D14	102/10-27-057-21W4/00	1153.7	carbonate mudstone	Duvernay
8471	D14	102/10-27-057-21W4/00	1157.4	carbonate mudstone	Duvernay
8472	D14	102/10-27-057-21W4/00	1161.3	carbonate mudstone	Duvernay
8473	D14	102/10-27-057-21W4/00	1162.2	carbonate mudstone	Duvernay
8474	D14	102/10-27-057-21W4/00	1162.6	carbonate mudstone	Duvernay
8476	D12	100/05-17-056-08W5/00	2386.9	duplicate of sample 8457	Duvernay
8479	D21	100/10-13-063-12W5/00	2618.4	shale	Majeau Lake
8480	D21	100/10-13-063-12W5/00	2621.9	shale	Majeau Lake
8481	D21	100/10-13-063-12W5/00	2625.5	shale	Majeau Lake
8482	D21	100/10-13-063-12W5/00	2632.6	carbonate mudstone	Beaverhill Lake
8483	D9	100/10-04-051-27W4/00	1934.9	shale	Duvernay
8484	D9	100/10-04-051-27W4/00	1938.2	shale	Duvernay
8485	D9	100/10-04-051-27W4/00	1941.3	shale	Duvernay
8486	D9	100/10-04-051-27W4/00	1944.3	shale	Duvernay
8487	D9	100/10-04-051-27W4/00	1947.4	shale	Duvernay
8488	D7	100/14-29-048-06W5/00	2638.0	carbonate mudstone	Duvernay
8489	D7	100/14-29-048-06W5/00	2643.2	carbonate mudstone	Duvernay
8490	D7	100/14-29-048-06W5/00	2648.7	shale	Duvernay
8491	D7	100/14-29-048-06W5/00	2652.8	shale	Duvernay
8492	D7	100/14-29-048-06W5/00	2655.7	shale	Duvernay
8493	D7	100/14-29-048-06W5/00	2656.5	shale	Duvernay

Sample No.	Site No.	Location - UWI	Sample Depth (Metres)	Lithology	Formation/Group
8494	D7	100/14-29-048-06W5/00	2660.0	carbonate mudstone	Duvernay
8495	D18	100/15-11-061-13W5/00	2542.8	shale	Majeau Lake
8496	D18	100/15-11-061-13W5/00	2545.1	shale	Majeau Lake
8497	D18	100/15-11-061-13W5/00	2549.7	carbonate mudstone	Majeau Lake
8498	D18	100/15-11-061-13W5/00	2551.8	carbonate mudstone	Beaverhill Lake
8499	D32	100/06-11-101-04W6/00	1651.4	shale	Muskwa
8500	D32	100/06-11-101-04W6/00	1652.3	shale	Muskwa
8978	D3	100/02-19-039-26W4/00	2278.2	carbonate mudstone	Duvernay
8979	D3	100/02-19-039-26W4/00	2280.4	carbonate mudstone	Duvernay
8980	D3	100/02-19-039-26W4/00	2285.4	carbonate mudstone	Duvernay
8981	D3	100/02-19-039-26W4/00	2290.5	carbonate mudstone	Duvernay
8982	D2	100/07-29-038-19W4/00	1773.3	carbonate mudstone	Duvernay
8983	D2	100/07-29-038-19W4/00	1775.9	shale	Duvernay
8984	D2	100/07-29-038-19W4/00	1786.1	carbonate mudstone	Duvernay
8985	D27	100/01-01-079-17W5/00	2217.0	carbonate mudstone	Beaverhill Lake
8986	D27	100/01-01-079-17W5/00	2224.8	carbonate mudstone	Beaverhill Lake
8987	D29	100/13-20-085-16W5/00	1684.9	carbonate mudstone	Ireton
8988	D29	100/13-20-085-16W5/00	1689.5	carbonate mudstone	Ireton
8989	D29	100/13-20-085-16W5/00	1704.1	shale	Duvernay
8990	D28	100/07-34-083-15W5/00	1773.0	shale	Ireton
8991	D28	100/07-34-083-15W5/00	1777.7	shale	Duvernay
8992	D28	100/07-34-083-15W5/00	1781.2	gneiss	PC
8993	D29	100/13-20-085-16W5/00	1704.7	shale	Duvernay
8994	D31	100/02-30-088-04W6/00	2392.0	shale	Ireton
8995	D31	100/02-30-088-04W6/00	2401.2	shale	Muskwa
8996	D31	100/02-30-088-04W6/00	2405.2	shale	Muskwa
8997	D31	100/02-30-088-04W6/00	2413.4	carbonate mudstone	Muskwa
8998	D4	100/02-08-044-27W4/00	2206.8	shale	Ireton
8999	D4	100/02-08-044-27W4/00	2231.4	shale	Ireton
9000	D4	100/02-08-044-27W4/00	2235.3	carbonate mudstone	Duvernay
9201	D20	100/04-11-063-25W5/00	3578.5	carbonate mudstone	Beaverhill Lake
9202	D10	100/09-06-052-11W5/00	3013.9	shale	Duvernay
9203	D10	100/09-06-052-11W5/00	3015.2	shale	Duvernay
9204	D10	100/09-06-052-11W5/00	3015.7	shale	Duvernay
9205	D10	100/09-06-052-11W5/00	3016.3	shale	Duvernay
9206	D10	100/09-06-052-11W5/00	3017.1	shale	Duvernay
9207	D10	100/09-06-052-11W5/00	3018.3	shale	Duvernay
9208	D10	100/09-06-052-11W5/00	3018.7	shale	Duvernay
9209	D10	100/09-06-052-11W5/00	3019.3	shale	Duvernay
9210	D10	100/09-06-052-11W5/00	3020.1	shale	Duvernay
9211	D10	100/09-06-052-11W5/00	3020.9	shale	Duvernay
9212	D10	100/09-06-052-11W5/00	3021.8	carbonate mudstone	Duvernay
9213	D10	100/09-06-052-11W5/00	3023.3	carbonate mudstone	Duvernay
9214	D10	100/09-06-052-11W5/00	3024.7	carbonate mudstone	Duvernay
9215	D10	100/09-06-052-11W5/00	3025.7	carbonate mudstone	Duvernay
9216	D16	100/10-31-059-18W5/00	3196.7	carbonate mudstone	Beaverhill Lake
9217	D16	100/10-31-059-18W5/00	3201.6	carbonate mudstone	Swan Hills
9218	D16	100/10-31-059-18W5/00	3205.3	carbonate mudstone	Swan Hills
9219	D16	100/10-31-059-18W5/00	3210.5	carbonate mudstone	Swan Hills
9220	D16	100/10-31-059-18W5/00	3216.4	carbonate mudstone	Swan Hills
9221	D13	100/12-01-057-03W5/00	1823.8	carbonate mudstone	Duvernay
9222	D13	100/12-01-057-03W5/00	1825.3	shale	Duvernay
9223	D13	100/12-01-057-03W5/00	1829.4	carbonate mudstone	Duvernay
9224	D22	100/10-05-065-15W5/00	2747.8	shale	Duvernay
9225	D22	100/10-05-065-15W5/00	2749.6	shale	Duvernay
9226	D22	100/10-05-065-15W5/00	2752.0	shale	Duvernay
9227	D22	100/10-05-065-15W5/00	2757.7	shale	Duvernay
9228	D22	100/10-05-065-15W5/00	2760.9	shale	Duvernay
9229	D19	100/10-21-061-01W5/00	1461.5	carbonate mudstone	Duvernay
9230	D19	100/10-21-061-01W5/00	1464.9	carbonate mudstone	Duvernay
9231	D19	100/10-21-061-01W5/00	1469.4	carbonate mudstone	Duvernay
9232	D19	100/10-21-061-01W5/00	1473.1	shale	Duvernay

Sample No.	Site No.	Location - UWI	Sample Depth (Metres)	Lithology	Formation/Group
9233	D17	100/09-09-061-18W4/00	897.3	carbonate mudstone	Duvernay
9234	D17	100/09-09-061-18W4/00	957.7	carbonate mudstone	Duvernay
9235	D1	100/06-14-037-07W5/00	3640.3	carbonate mudstone	Duvernay
9236	D1	100/06-14-037-07W5/00	3642.6	carbonate mudstone	Duvernay
9237	D1	100/06-14-037-07W5/00	3649.1	shale	Duvernay
9238	D1	100/06-14-037-07W5/00	3649.7	shale	Duvernay
9239	D1	100/06-14-037-07W5/00	3653.1	shale	Duvernay
9240	D24	100/11-18-072-17W5/00	2362.8	shale	Duvernay
9241	D24	100/11-18-072-17W5/00	2364.9	shale	Duvernay
9242	D4	100/02-08-044-27W4/00	2206.8	duplicate of sample 8998	Ireton
9243	D11	100/10-30-053-14W5/00	3177.4	duplicate of sample 9389	Majeau Lake
9244	D10	100/09-06-052-11W5/00	3015.7	duplicate of sample 9204	Duvernay
9245	D24	100/11-18-072-17W5/00	2362.8	duplicate of sample 9240	Duvernay
9246	D25	100/10-24-072-23W5/00	2757.7	duplicate of sample 9227	Duvernay
9261	D25	100/10-24-072-23W5/00	2821.2 - 2832.2	combined sample # 8140, 8142	Duvernay
9262	D21	100/10-13-063-12W5/00	2621.9 - 2625.5	combined sample # 8480, 8481	Majeau Lake
9263	D11	100/10-30-053-14W5/00	3168.9 - 3169.8	combined sample # 9387, 9388	Majeau Lake
9264	D10	100/09-06-052-11W5/00	3018.3 - 3020.1	combined sample # 9207, 9208, 9209, 9210	Duvernay
9265	D26	100/16-04-074-26W5/00	2940 - 2941.8	combined sample # 9351, 9352	Duvernay
9266	D32	100/06-11-101-04W6/00	1651.4 - 1652.3	combined sample # 8499, 8500	Muskwa
9267	D24	100/11-18-072-17W5/00	2362.8 - 2364.9	combined sample # 9240, 9241	Duvernay
9268	D19	100/10-21-061-01W5/00	1461.5 - 1464.8	combined sample # 9229, 9230	Duvernay
9351	D26	100/16-04-074-26W5/00	2940.0	shale	Duvernay
9352	D26	100/16-04-074-26W5/00	2941.8	shale	Duvernay
9353	D26	100/16-04-074-26W5/00	2942.6	shale	Duvernay
9354	D26	100/16-04-074-26W5/00	2943.8	shale	Majeau Lake
9355	D26	100/16-04-074-26W5/00	2946.3	shale	Beaverhill Lake
9356	D26	100/16-04-074-26W5/00	2948.3	shale	Beaverhill Lake
9357	D26	100/16-04-074-26W5/00	2950.0	carbonate mudstone	Beaverhill Lake
9358	D26	100/16-04-074-26W5/00	2956.4	carbonate mudstone	Beaverhill Lake
9359	D6	100/02-06-047-04W5/00	2628.9	shale	Duvernay
9360	D6	100/02-06-047-04W5/00	2635.3	shale	Duvernay
9361	D6	100/02-06-047-04W5/00	2638.3	shale	Duvernay
9362	D6	100/02-06-047-04W5/00	2639.6	shale	Duvernay
9363	D6	100/02-06-047-04W5/00	2642.6	shale	Duvernay
9364	D6	100/02-06-047-04W5/00	2644.7	shale	Duvernay
9365	D6	100/02-06-047-04W5/00	2647.8	shale	Duvernay
9366	D34	100/02-04-126-11W6/00	1515.0	shale	Muskwa
9367	D34	100/02-04-126-11W6/00	1517.4	shale	Muskwa
9368	D34	100/02-04-126-11W6/00	1519.8	shale	Muskwa
9369	D34	100/02-04-126-11W6/00	1521.2	shale	Muskwa
9370	D34	100/02-04-126-11W6/00	1523.6	shale	Muskwa
9371	D34	100/02-04-126-11W6/00	1526.0	shale	Muskwa
9372	D34	100/02-04-126-11W6/00	1528.4	shale	Muskwa
9373	D34	100/02-04-126-11W6/00	1533.0	shale	Muskwa
9374	D4	100/02-08-044-27W4/00	2243.3	shale	Duvernay
9375	D4	100/02-08-044-27W4/00	2245.8	shale	Duvernay
9376	D4	100/02-08-044-27W4/00	2253.1	shale	Duvernay
9377	D4	100/02-08-044-27W4/00	2256.4	carbonate mudstone	Duvernay
9378	D4	100/02-08-044-27W4/00	2274.7	carbonate mudstone	Cooking Lake
9379	D5	100/10-08-046-22W4/00	1700.8	carbonate mudstone	Duvernay
9380	D5	100/10-08-046-22W4/00	1708.6	carbonate mudstone	Duvernay
9381	D5	100/10-08-046-22W4/00	1721.1	carbonate mudstone	Duvernay
9382	D5	100/10-08-046-22W4/00	1722.1	carbonate mudstone	Duvernay
9383	D5	100/10-08-046-22W4/00	1728.5	carbonate mudstone	Duvernay
9384	D5	100/10-08-046-22W4/00	1741.2	carbonate mudstone	Cooking Lake
9385	D11	100/10-30-053-14W5/00	3167.2	shale	Majeau Lake
9386	D11	100/10-30-053-14W5/00	3167.9	shale	Majeau Lake
9387	D11	100/10-30-053-14W5/00	3168.9	shale	Majeau Lake
9388	D11	100/10-30-053-14W5/00	3169.8	shale	Majeau Lake
9389	D11	100/10-30-053-14W5/00	3170.5	shale	Majeau Lake
9390	D11	100/10-30-053-14W5/00	3171.4	shale	Majeau Lake

Sample No.	Site No.	Location - UWI	Sample Depth (Metres)	Lithology	Formation/Group
9391	D11	100/10-30-053-14W5/00	3172.4	shale	Majeau Lake
9392	D11	100/10-30-053-14W5/00	3172.8	shale	Majeau Lake
9393	D11	100/10-30-053-14W5/00	3173.4	shale	Majeau Lake
9394	D11	100/10-30-053-14W5/00	3173.9	shale	Majeau Lake
9395	D11	100/10-30-053-14W5/00	3175.4	shale	Majeau Lake
9396	D11	100/10-30-053-14W5/00	3176.0	shale	Majeau Lake
9397	D11	100/10-30-053-14W5/00	3176.6	shale	Majeau Lake
9398	D11	100/10-30-053-14W5/00	3177.4	shale	Majeau Lake
9399	D20	100/04-11-063-25W5/00	3576.3	shale	Ireton
9400	D20	100/04-11-063-25W5/00	3576.8	shale	Ireton

Appendix 2 – Core Samples Analyzed, Duvernay, Muskwa and Adjoining Formations

Legend

Y = Sample data presented in this report

x = Sample data presented in other Alberta Geological Survey reports (see Table 1 for details)

z = Data are being analyzed and will be distributed in a future report

Analyses presented in this report

Column Label	Label Description
Sample No.	AGS sample number
Site No.	Site location number
Rock Eval™ TOC	Rock Eval™ pyrolysis is used to identify the type and maturity of organic matter and to detect petroleum potential in sediments. Total Organic Carbon is a measure of the amount of organic carbon in the sediment, measured in weight per cent.
XRD-Bulk	X-Ray diffraction analysis of whole rock mineralogy
XRD-Clay	X-Ray diffraction analysis of clay mineralogy
Organic Pet.	Petrographic imaging and description of organic macerals
Thin Section	Thin section of sample
Adsorption Isotherm	Gas adsorption analysis to determine gas-holding capacity of sample
SEM	Scanning electron microscope
Mini-perm	Analysis to determine permeability
Porosimetry	Analysis to determine pore throat size
Pycnometry	Analysis to determine grain density
Texture with Clay Mineralogy	Determination of sand, silt and clay size distribution in weight per cent with clay mineralogy on clay separates

Sample No.	Site No.	Rock Eval™ TOC	XRD-Bulk	XRD-Clax	Organic Pet.	Thin Section	Adsorption Isotherm	SEM	Mini-perm	Porosimetrx	Pxcnometrx	Texture with Clay Mineralogy
8127	D30	x			Y							
8128	D30	x				z						
8129	D30	x										
8130	D30	x										
8133	D8	x										
8134	D8	x										
8135	D8	x	x									
8136	D8	x			Y							
8137	D8	x										
8138	D8	x										
8139	D8	x										
8140	D25	x			Y							
8141	D25	x										z
8142	D25	x			Y							
8143	D25	x										
8144	D25	x										
8145	D33	x										
8146	D33											
8147	D33	x										
8148	D33											
8149	D33	x			Y							
8150	D33											
8451	D23	x										
8452	D23	x										
8453	D23	x										
8454	D23	x			Y	z						
8455	D23	x										
8456	D12	x	x		Y							
8457	D12	x										
8458	D15	x										
8459	D15	x										
8460	D15	x										
8461	D15	x	x		Y	z						
8462	D15	x										
8463	D14	x										
8464	D14	x			Y							
8465	D14	x										
8466	D14	x										
8467	D14	x			Y							
8468	D14	x										
8469	D14	x										
8470	D14	x			Y							
8471	D14	x										
8472	D14	x										
8473	D14	x										
8474	D14	x			Y							
8476	D12	x										
8479	D21	x						x		x	x	
8480	D21	x	x									
8481	D21	x			Y	z						
8482	D21	x			Y							
8483	D9	x			Y							
8484	D9	x										z
8485	D9	x			Y							
8486	D9	x										
8487	D9	x										
8488	D7											
8489	D7	x										
8490	D7	x			Y							z
8491	D7	x										
8492	D7	x			Y	z						
8493	D7	x								z	x	
8494	D7	x										
8495	D18	x										
8496	D18	x										
8497	D18	x			Y							
8498	D18	x										
8499	D32	x			Y							
8500	D32	x										
8978	D3	x										
8979	D3	x			Y							
8980	D3	x										
8981	D3	x										
8982	D2	x										
8983	D2	x			Y							z
8984	D2	x										
8985	D27	x										
8986	D27	x										
8987	D29											
8988	D29	x										
8989	D29	x			Y							
8990	D28	x										
8991	D28	x										
8992	D28											
8993	D29	x			Y							
8994	D31	x										
8995	D31	x				z	x			x	x	
8996	D31	x	x	x								
8997	D31	x			Y							
8998	D4	x										
8999	D4	x										
9000	D4	x			Y							
9201	D20	x										
9202	D10	x			Y							
9203	D10	x										
9204	D10	x										
9205	D10	x	x	x								
9206	D10	x										z
9207	D10	x										
9208	D10	x						x	x	z	x	
9209	D10	x										
9210	D10	x				z						
9211	D10	x										
9212	D10	x										
9213	D10											
9214	D10	x										

8148	D33											
8149	D33	x			Y							
9215	D10											
9216	D16	x										
9217	D16											
9218	D16	x										
9219	D16											
9220	D16	x										
9221	D13	x										
9222	D13	x			Y							
9223	D13	x										
9224	D22	x										
9225	D22	x										
9226	D22	x				z						
9227	D22	x										
9228	D22	x	x	x	Y					z	x	
9229	D19	x										
9230	D19	x										
9231	D19	x										
9232	D19	x			Y			x				
9233	D17	x			Y							
9234	D17	x										
9235	D1	x	x	x								
9236	D1	x										
9237	D1	x			Y				x			
9238	D1	x				z		x		x	x	
9239	D1	x										
9240	D24	x			Y							
9241	D24	x										
9242	D4	x										
9243	D11	x										
9244	D10	x			Y							
9245	D24	x										
9246	D25	x			Y							
9261	D25	x					x					
9262	D21	x					x					
9263	D11	x					x					
9264	D10	x					x					
9265	D26	x					x					
9266	D32		x	x								
9267	D24		x	x								
9268	D19		x	x								
9351	D26	x			Y							
9352	D26	x										
9353	D26	x										
9354	D26	x										
9355	D26	x										
9356	D26	x										
9357	D26	x										
9358	D26											
9359	D6	x										
9360	D6	x										
9361	D6	x										
9362	D6	x	x	x	Y	z						
9363	D6	x										
9364	D6	x					x					
9365	D6	x						x	x	z	x	
9366	D34	x										z
9367	D34	x				z						
9368	D34	x			Y							
9369	D34	x										
9370	D34	x						x		x	x	
9371	D34	x										
9372	D34	x	x	x								
9373	D34	x					x					
9374	D4	x										
9375	D4	x	x	x								
9376	D4	x										
9377	D4	x			Y							
9378	D4	x			Y							
9379	D5	x										
9380	D5	x	x	x			x					
9381	D5	x										
9382	D5	x			Y							
9383	D5	x										
9384	D5	x										
9385	D11	x										
9386	D11	x	x	x				x	x	z	x	
9387	D11	x										
9388	D11	x										
9389	D11	x										
9390	D11	x										
9391	D11	x										
9392	D11	x				z						
9393	D11	x										
9394	D11	x										
9395	D11	x										
9396	D11	x										
9397	D11	x										
9398	D11	x										
9399	D20	x			Y							
9400	D20	x										

Appendix 3 – Organic Petrography Description and Reflectance, Duvernay, Muskwa and Adjoining Formations

Legend

Column Label	Label Description
AGS Sample Number	AGS sample number
Well Location - UWI	Unique well identifier
Formation	Formation sampled
GSC Photo No.	GSC photo number
ORG_TYPE	Kerogen type (I to IV)
$\%Ro_R$	Vitrinite reflectance (per cent random reflectance in oil)
SD	Standard deviation
N	Number of individual measurements
COMMENTS	Sample observations

Notes

Most of the shale was observed parallel and perpendicular to the bedding.

Not all allochthonous macerals were measured. Those measured are for reference only to determine the %Ro of the reworked maceral; they are not quantitative. Refer to the comments. Histogram data sheet is available upon request.

Key for Organic Type

2	Vitrinite
2.1, 2.2, 2.3	Refers to reworked populations
3	Vitrinite equivalent (04) = 0.618 x %Ro(bitumen) + 0.40 values (Jacob, 1989)
4	Bitumen
40	Inertinite

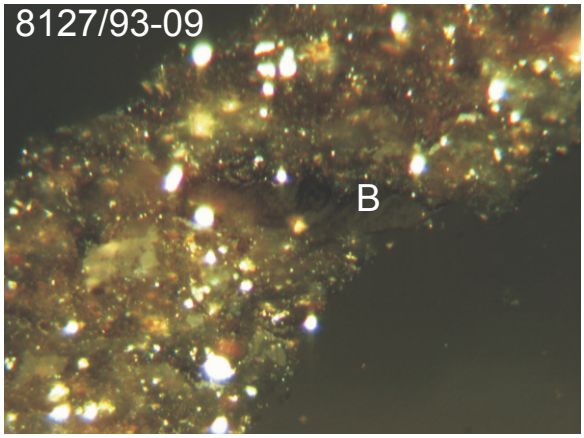
AGS Sample Number	Well Location - UWI	Formation	GSC Photo No.	ORG_TYPE	%Ro_R	SD	N	COMMENTS
8127	100/11-17-088-03W6/00	Muskwa	93/09	2	0.67	0.074	43	Shale with major pyrite (bright whitish yellow mineral) and micrinite-rich amorphous kerogen (am). Minor amount of siliceous microfossil (S, mainly derived from Radiolaria) and Prasinophyte (P) alginite. Long lenses of granular solid bitumen (B), vitrinite (V) and hemorphinite lenses (H) are observed. Rare amount of yellow fluorescing hydrocarbon fluid inclusion (hcfi). Trace amount of allochtonous inertinite (I) macerals. Scale bar applies to all images. T = Tasminites, Sp = Sporinite. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ac =
				4	0.48	0.042	25	
				2	0.97		1	
8136	100/11-11-050-17W4/00	Duvernay	95/09	2	0.44	0.079	27	Amorphous kerogen-rich (am) shale with a major amount of both non-fluorescing and fluorescing Prasinophyte (P) alginite. Very minor to trace amount of yellow fluorescing spiny Micrhystiridium cf. acanthomorphic acritarhs (ac) and non-fluorescing to weak fluorescing, low reflecting, solid bitumen (B). Rare amount of Leiosphaeridia (L) alginite, siliceous microfossils (S, derived from Radiolaria) and chitinous microfossils (ch, fish remain?). Scale bar applies to all images. V = Vitrinite. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). Cc = cocoidal alginite.
				2	0.68	0.021	5	
				4	0.28			
8140	100/10-24-072-23W5/00	Duvernay	96/09	2	0.60	0.071	31	Oil stained shale with major amount of dark brown, amorphous kerogen (am) with some pyrite (Py) and micrinite inclusions. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite and asphaltine. Very minor to trace amount of chitinous microfossils (ch, possibly from fish remain or bone? (opaque) and chitinozoans? (long thin grey lenses)). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; B = Bitumin; I = Inertinite; V = Vitrinite. The measured %Ro may be lower than the actual %Ro due to suppression by soluble hydrocarbon stain.
				4	0.43	0.034	6	
				2?	0.84		1	
8142	100/10-24-072-23W5/00	Duvernay	97/09	2	0.71	0.081	51	Oil-stained shale rich in dark brown amorphous kerogen (am) with some pyrite and micrinite inclusions. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite and asphaltine. Minor amount of chitinous microfossils (ch) (possibly from fish remains or bone? (opaque), and chitinozoans?, long thin grey lenses) Rare amount of acanthomorphic acritarchs (ac), thick-walled Tasmanites (T) alginite and hydrocarbon fluid inclusion (hcfi). Scale bar applies to all images.(In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; B = Bitumin; V = Vitrinite; S = Siliceous microfossil.
				4	0.53	0.039	21	
				4	0.37	0.022	6	
				2.2	1.04	0.109	4	
8454	100/04-33-068-22W4/00	Duvernay	101/09	2	0.47	0.067	30	Organic-rich, carbonaceous shale with mostly long thin continuous lenses of dark brown amorphous and non-amorphous kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing bitumen (B) are also observed proximal to kerogen lenses. Major amount of yellow fluorescing, thick-walled Tasmanites sp. (T), Micrhystridium cf. acanthomorphic arcitarchs (ac), and Prasinophyte (P) alginite. V= Vitrinite. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). Observed parallel and perpendicular to the
				4	0.27	0.025	4	
				2.2	0.66	0.039	22	
				2.2	0.81	0.052	14	
				2.2	1.02		1	
8456	100/05-17-056-08W5/00	Duvernay	102/09	2	0.73	0.074	47	Shale rich in dark brown amorphous kerogen (am) with pyrite and micrinite inclusions in a marl matrix. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite, and chitinous microfossils (ch, possibly from fish remains or bone). Some granular bitumen (B) with a rare amount of allochtonous vitrinite (V) and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.53	0.041	6	
				2.2	0.94	0.041	3	
8461	100/10-09-059-11W4/00	Duvernay	103/09	2	0.34	0.063	11	Organic-rich mudstone with mostly long, thin lenses of dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing bitumen (B) are also observed proximal to amorphous kerogen lenses. Major to minor amount of yellow fluorescing thick-walled Tasmanites (T), Micrhystridium cf. acanthomorphic acritarchs, and rare Prasinophyte (P) and Leiosphaeridia (L) alginite. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light,
				2?	0.53	0.021	5	
					0.789			
8464	102/10-27-057-21W4/00	Duvernay	104/09	2	0.45	0.080	21	Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing to non fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor amount of yellow fluorescing Micrhystridium cf. acanthomorphic acritarchs (ac), and rare Prasinophyte (P), and Leiosphaeridia (L) alginite. Rare amount of allochtonous vitrinite and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). S = Siliceous microfossil;
8467	102/10-27-057-21W4/00	Duvernay	105/09	2	0.44	0.058	29	Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing to non fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor to trace amount of yellow fluorescing thick-walled Tasmanites (T), Micrhystridium cf. acanthomorphic acritarchs (ac) and Prasinophyte (P) alginite. Rare amount of weak fluorescing sporinite (Sp), allochtonous vitrinite (V) and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; ph = Phosphatic nodule.
				2.2	0.67	0.066	3	
				1	0.29		1	
8470	102/10-27-057-21W4/00	Duvernay	106/09	2	0.47	0.071	14	Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Brownish, red fluorescing solid to non-fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor to trace amount of siliceous microfossils (S), yellow fluorescing thick-walled Tasmanites (T), Prasinophyte (P) alginite, and chitinous microfossils (ch, possibly from translucent mineralized fish remains or thin, long grey chitinozoans). Very rare amount of allochtonous vitrinite and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ac = acanthomorphic acritarchs.
				4	0.29	0.041	3	
				2.2	0.68	0.080	9	

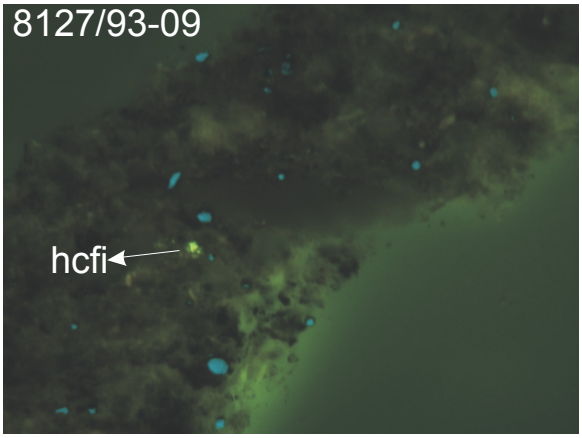
AGS Sample Number	Well Location - UWI	Formation	GSC Photo No.	ORG_TYPE	%Ro_R	SD	N	COMMENTS
8474	102/10-27-057-21W4/00	Duvernay	107/09	2	0.44	0.066	31	Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Brownish red fluorescing solid to non-fluorescing granular bitumen (B) are also observed near amorphous kerogen lenses. Minor to trace amount of siliceous microfossils (S), yellow fluorescing Prasinophyte (P) alginite, spiny acanthomorphic acritarchs (ac) and chitinous microfossils (ch, possibly chitinozoans). Very rare amount of weak fluorescing sporinite (Sp), foraminifera (foram) with well-preserved chamber and allochtonous inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; hcfi = hydrocarbon fluid inclusion; Cc = cocoidal alginite.
				2.2	0.69	0.10	8	
8149	100/14-19-109-03W5/00	Ireton/Ft. Simpson	159/09	2	0.96		1	Organically lean silty shale with a minor amount of both fluorescing and non-fluorescing Prasinophyte (P) alginite. Minor to trace amount of brown-coloured matrix bitumenite (mB), stylocomulate (stylo) lenses and concentrated alginite lenses (A). Very rare siliceous (S) microfossils are also observed. Scale bar appliees to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.58		1	
				2.2	1.35	0.05	3	
8481	100/10-13-063-12W5/00	Majeau Lake	160/09	4	0.63	0.06	47	Organically rich brown shale, mostly composed of an interconnected network of amorphous kerogen with some framboidal pyrite and micrinite inclusions. Minor amount of both fluorescing and non-fluorescing Prasinophyte (P) and an unknown species of alginite (A). Minor to rare amount of brown-coloured matrix bitumenite (mB), bituminite (B) and siliceous (S) microfossils. Very rare allochthonous inertinite maceral (I). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	0.76	0.01	4	
				2.2	0.97		1	
				2.2	1.43		1	
8482	100/10-13-063-12W5/00	Beaverhill Lake	161/09	4	0.55	0.06	15	Organically rich brown shale composed mostly of an interconnected network of amorphous kerogen with some pyrite (Py) inclusions. Minor to rare amount of brown-coloured matrix bitumenite (mB) and fluorescing to non-fluorescing bituminite (B). Major to minor amount of both golden to dull yellow fluorescing and non-fluorescing Prasinophyte (P). Minor to rare amount of spiny Veryachium cf. and spiny acanthomorphic acritarch (ac), chitinous (ch), calcareous (ca) and siliceous (S) microfossils. Very rare allochthonous inertinite maceral (I). Some yellow fluorescing oil stains are also observed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). hcfi = hydrocarbon fluid
				2	0.84	0.03	2	
				2	0.98		1	
8483	100/10-04-051-27W4/00	Duvernay	162/09	2	0.70	0.08	33	Organically rich brown shale composed mostly of an interconnected network of spent amorphous kergen with a high percentage of framboidal pyrite (Py) and micrinite inclusions. Also some micrinite-rich amorphinite/matrix bituminite (mB) with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous (S, derived from chrysophyte alginite, radiolaria, some are scolecodont and microforam remains) microfossils and calcareous nannoplankton (cn). Rare amount of both fluorescing and non-fluorescing Prasinophyte (P). Rare amount of vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ch = chitinous microfossil.
				4	0.56	0.04	25	
8490	100/14-29-048-06W5/0	Duvernay	163/09	4	0.64	0.04	47	Similar to sample AGS 8483/GSC 162-09. Organically rich dark brown shale composed mostly of an interconnected network of spent amorphous kerogen with mostly framboidal pyrite (Py) and micrinite rich amorphinite/matrix bituminite with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous microfossils (S, derived from chrysophyte alginite, radiolaria, some are scolecodont (Sc) and possibly microforam remains) and calcareous nannoplankton. Rare amount of chitinous microfossils (ch) and fluorescing and non-fluorescing Prasinophyte (P). Rare vitrinite macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi) annealed within the siliceous microfossils, the latter of which are derived from foraminifera. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	0.79	0.05	2	
				4	0.45		1	
8492	100/14-29-048-06W5/00	Duvernay	164/09	2	0.78	0.04	65	Organically rich dark brown shale composed mostly of an interconnected network of pyrite (Py) and micrinite rich amorphinite/matrix bituminite with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous (S, derived from chrysophyte alginite, radiolaria (Sr), some are scolecodont and possibly microforams remains and calcareous nannoplankton (cn)) microfossils. Rare amount of chitinous microfossils, and fluorescing and non-fluorescing Prasinophyte (P). Rare vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.63	0.06	3	
8497	100/15-11-061-13W5/00	Majeau Lake	165/09	2	0.76	0.08	16	Organic-rich dark brown shale comprising mostly an interconnected network of pyrite (Py) and micrinite-rich amorphinite / matrix bitumenite (mB) with fluorescing to non-fluorescing bitumen (B) lenses. Minor amount of siliceousmicrofossils (S), derived from chrysophyte alginite, radiolaria (Sr), some are possibly microforam/microfossils remains and calcareous microfossils. Minor to rare amount of fluorescing and non-fluorescing Prasinophyte (P) and chitinous (ch) microfossils. Rare vitrinite (V) macerals and traces of yellow-fluorescing hydrocarbon fluid inclusions (hcfi) annealed within carbonate minerals. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2.2	1.08	0.05	3	
8499	100/06-11-101-04W6/00	Muskwa	166/09	4	0.66	0.06	34	Organic-rich dark brown shale comprising mostly an interconnected network of framboidal pyrite (Py) and micrinite-rich amorphous kerogen with some fluorescing to non-fluorescing primary bitumen (B) lenses. Minor amount of siliceous microfossils (S, derived from chrysophyte alginite, radiolaria (Sr), some are possibly derived from microforam (Sf) remains and calcareous nannoplankton (cn)). Minor to rare amount of fluorescing and non-fluorescing Prasinophyte (P) and chitinous (ch) microfossils. Very rare vitrinite (V) macerals and traces of yellow-fluorescing hydrocarbon fluid inclusions (hcfi) annealed within carbonate minerals and inertinite (I) macerals. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). C = Cocoidal Alginite
				2	0.85	0.07	17	
				4	0.48	0.04	3	

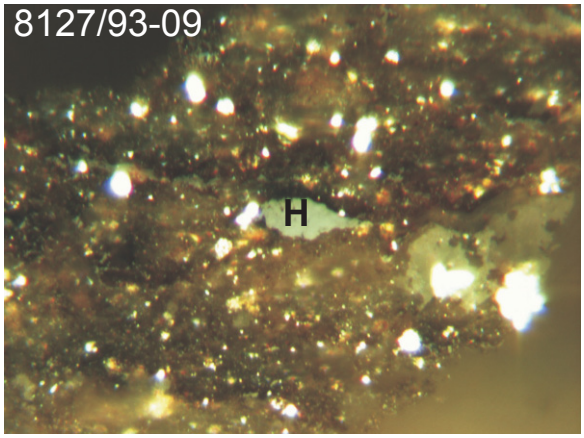
AGS Sample Number	Well Location - UWI	Formation	GSC Photo No.	ORG_TYPE	%Ro_R	SD	N	COMMENTS
8979	100/02-19-039-26W4/00	Duvernay	185/09	2	0.77	0.05	8	Organic-rich, dark brown, coarse-grained silty shale comprising mostly an interconnected network of framboidal pyrite (Py)–rich amorphous kerogen brecciated between carbonate grains. Minor to rare amount of yellow-orange–fluorescing Prasinophyte (P) with a trace amount of non-fluorescing *Tasmanites* (T). Minor amount of both reddish orange–fluorescing to non-fluorescing isotropic solid bitumen (B) and granular matrix bitumenite (mB) were also observed. There are also a minor amount of chitinous (ch, mostly derived from chitinozoans), rare siliceous (S) and calcareous microfossils. Trace amount of hydrocarbon fluid inclusions (hcfi) annealed within quartz minerals were also observed. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.63	0.03	9	
				4	0.47	0.04	23	
				4	0.30		1	
8983	100/07-29-038-19W4/00	Duvernay	186/09	2	0.68	0.06	23	Organic-rich, dark brown, fine-grained silty shale comprising mostly an interconnected network of framboidal pyrite (Py)–rich amorphous kerogen. Major amount of dark grey, fluorescing and non-fluorescing alginite lenses, and thinly dispersed vitrinite (V) maceral. Minor amount of small yellow-orange–fluorescing Prasinophyte (P) with both reddish orange–fluorescing to non-fluorescing isotropic solid bitumen (B) and granular matrix bitumenite (mB), siliceous (S, mostly derived from radiolaria) and calcareous microfossils (ca). There are also a trace amount of chitinous microfossils (ch, most likely derived from chitinozoans), hydrocarbon fluid inclusions (hcfi) annealed within quartz minerals and sporinite (Sp) showing zoning and partial degradation. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). I = Inertinite.
				4	0.50	0.04	29	
8989	100/13-20-085-16W5/00	Duvernay	187/09	2	0.71	0.04	9	Organically lean, silty shale with a minor to rare amount of mostly non-fluorescing alginite lenses and some yellow-orange–fluorescing Prasinophyte (P) and *Tasmanites* (T) alginite. Rare to trace amount of non-fluorescing isotropic and granular bitumen (B) and chitinous microfossils are also observed. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.55	0.06	19	
				2.2	1.39		1	
8993	100/13-20-085-16W5/00	Duvernay	188/09	2	0.70	0.04	12	Organically lean, silty shale with a minor to rare amount of mostly non-fluorescing alginite forming discontinuous amorphous kerogen lenses. Rare yellow-orange–fluorescing Prasinophyte (P) alginite. Rare to trace amount of non-fluorescing isotropic and granular bitumen (B), *Tasmanites* (T), chitinous microfossils (ch), microforams (forams) and hydrocarbon fluid inclusions (hcfi). Very rare sporinite (Sp) showing zonation and partial degradation. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; ac = acanthomorphic acritarch (ac).
				4	0.55	0.06	14	
				2	0.91	0.01		
8485	100/10-04-051-27W4/00	Duvernay	287/09	2	0.74	0.05	5	Organic- and framboidal pyrite–rich (Py) black shale with some orange-yellow–fluorescing alginite lenses (Prasinophyte (P), *Tasmanites sp* . (T), and coccoidal (Cc)). Minor amount of mostly small, thin lenses of alginite-derived vitrinite (V) and fluorescing and non-fluorescing bitumen (B). Rare mineral-filled radiolaria (R), hydrocarbon fluid inclusions (hcfi) and phosphatice nodules (Ph) were also observed within the shale matrix. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.59	0.05	29	
				4	0.43	0.05	6	
				2	0.97		1	
8997	100/10-04-051-27W4/00	Muskwa	315/09	2	0.80	0.06	13	Sieve-like network of weak brown–fluorescing fluoramorphinite matrix with high amount of pyrite and thin golden yellow–fluorescing Prasinophyte (P), Leiosphaeridia (L), orange-fluorescing sporinite (S), filamentous alginite (Fl) and other alginite (A). Minor to rare amount of measurable small vitrinite (V), bitumen (B) and brown-fluorescing bitumenite (Bt) lenses, bright yellow– fluorescing soluble hydrocarbon (oil, see arrow) within pores, and bitumen-filled acanthomorphic marine acritarch (ac). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). R = Radiolaria. T = Tasminites. Some measured %Ro are suppressed due to soluble hydrocarbon present.
				2?	0.66	0.02	7	
				4	0.56	0.04	36	
				4	0.42	0.02	4	
				2.2	0.94		1	
9000	100/02-08-044-27W4/00	Duvernay	316/09	2	0.80	0.04	5	Alginite-rich (A), greenish silty shale with major amount of golden yellow– fluorescing, mainly small coccoid (Cc) alginite. Rare, thick-walled *Tasmanites sp.* (T), thin golden yellow–fluorescing Prasinophyte (P), and other alginite (A) of unknown species. Minor to rare amount of measurable small vitrinite (V), bitumen (B), acanthomorphic marine acritarch (ac) and calcite-filled radiolaria (R) microfossils. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.69	0.05	5	
				4	0.51	0.03	3	
9202	100/09-06-052-11W5/00	Duvernay	317/09	2	1.08	0.07	31	Amorphous kerogen–rich (am) black shale with a major amount of yellow-orange–fluorescing alginite, Prasinophyte (P) and other alginite (A) inclusions. Rare amounts of measurable, small, alginite-derived vitrinite (V) lenses, asphaltine and calcite-filled, siliceous acanthomorphic marine acritarch (ac). Some indication of terrestrial deposition, as indicated by the presence of high-reflecting inertinite (I) maceral. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	1.33	0.05	8	
				4	0.89	0.06	7	
				4	0.34		1	
				2.2	1.64	0.11	3	
9222	100/12-01-057-03W5/00	Duvernay	318/09	2	0.64	0.04	12	Liptinite-rich perhydrous, black shale with a major amount of weak brown fluorescing continuous long lenses of lamalginite-derived hebamorphinite (H) and bitumenite with yellow fluorescing alginite (Prasinophyte (P)), bitumen (B) and pyrite inclusion. Minor to rare amount of measureable alginite-derived vitrinite (V) and bitumen lenses. Bright, yellow fluorescing soluble hydrocarbon (oil) within pores, and rare chitinous (ch) microfossil (possibly conodonts) and calcite-filled siliceous acanthomorphic marine acritarch (ac). Some indication terrestrial deposition as indicated by the presence of fusinite (F) submaceral. %Ro may be suppressed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.49	0.03	33	
				4	0.36	0.04	14	
				2?	0.77		1	

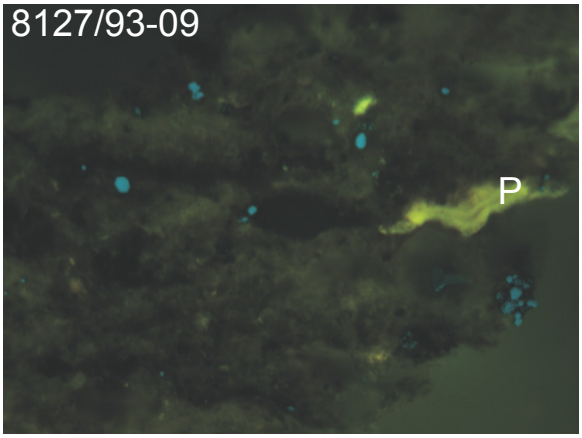
AGS Sample Number	Well Location - UWI	Formation	GSC Photo No.	ORG_TYPE	%Ro_R	SD	N	COMMENTS
9228	100/10-05-065-15W5/00	Duvernay	319/09	2	0.99	0.05	11	Alginite and chitinous microfossil rich black shale with minor amount of orange- to red-fluorescing Prasinophyte alginite (P), *Leiosphaeridia sp.* (L), granular bitumen (B), phosphatic nodules (ph) and vitrinite (V) lenses. Major amount of chitinous microfossil (ch), and a minor amount of calcite-filled siliceous microfossil (possibly radiolaria (R)). Hydrocarbon fluid inclusions (hcfi) are observed annealed within calcite filling minerals associated with the chitinous microfossil.
				4	0.82	0.04	23	
				4	0.65	0.05	16	
				2	0.46	0.08	2	
9232	100/10-21-061-01W5/00	Duvernay	320/09	2	0.73	0.03	7	Liptinite-rich, perhydrous black shale with major amount of brown-fluorescing, continuous long lenses of lamalginite-derived (Lg) hebamorphinite (H) with yellow-fluorescing alginite (A) inclusion. Minor amount of yellow-fluorescing, calcite-filled siliceous (S) microfossil (possibly derived from radiolaria) with a rare amount orange- to red-fluorescing Prasinophyte alginite (P), non- to weak-fluorescing Leiosphaeridia (L), granular bitumen (B), phosphatic nodules (Ph) and Leiosphraeridia-derived vitrinite (V) lenses. Trace amount of chitinous (ch) microfossil. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). am = amorphous kerogen. %Ro may be suppressed.
				4	0.62	0.04	17	
				4	0.45	0.04	18	
				4	0.33	0.04	10	
9233	100/09-09-061-18W4/00	Duvernay	321/09	2	0.62	0.03	4	Organically-lean siltstone matrix with rare amount of yellow fluorescing alginite (A) (spiny acritarch (ac) and Prasinophyte (P)) and calcareous microfossil; also, weak brown fluorescing bitumenite (Bt) maceral with pyrite (Py) inclusion. Very rare measureable vitrinite (V) or bitumen (B) lenses. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.52	0.02	4	
				4	0.41		1	
				4	0.29	0.05	2	Fluorescing
9237	100/06-14-037-07W5/00	Duvernay	322/09	2	1.40	0.08	26	Organic-rich black shale of mostly reddish brown–fluorescing, diffuse to concentrated, fluoramorphinite with reddish-orange–fluorescing alginite (mainly Prasinophyte (P)), bitumen (B) and framboidal pyrite (Py) inclusions. Minor amount of small, thin non-fluorescing to weak-fluorescing bitumen (B) lenses. Minor to rare amount of weak-fluorescing, calcite-filled siliceous (S) microfossil (possibly derived from radiolaria) with trace amount of phosphatic nodules (Ph). Trace amount of chitinous (ch) microfossil. Colour enhanced to differentiate organics from the host matrix. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	1.61	0.03	3	
				4	1.05	0.11	4	
				4	0.65	0.07	12	
				4	0.43	0.07	4	
9240	100/11-18-072-17W5/00	Duvernay	323/09	2	0.64	0.06	40	Liptinite-rich black shale of mostly reddish brown–fluorescing, diffuse, granular to concentrated fluoramorphinite (F)/hebamorphinite (H) and thin long lamalginite- and alginite-derived vitrinite (V) lenses. Major amount of non-fluorescing and minor amount of fluorescing alginite (mainly Prasinophyte (P)), and framboidal pyrite (Py) inclusion. Rare amount of granular bitumen (B), yellow-orange–fluorescing *Hystricosphaeridium cf.* (arrow) acritarch (ac) and phosphatic nodules (ph). (In oil, polished surface, fluorescence and reflected white light, 50X magnification). %Ro may be suppressed.
				4	0.50	0.04	10	
9244	100/09-06-052-11W5/00	Duvernay	324/09	2	1.09	0.06	17	Organic-rich, brown silty shale with a minor amount of orange-brown– fluorescing alginite (A, Prasinophyte (P)), pyrite (Py) inclusion and rare amount of phosphatic nodules (Ph) within an amorphous kerogen (am) matrix. Rare amount of yellow-fluorescing, calcite-filled, siliceous (S) acanthomorphic marine acritarch (radiolaria (R)) microfossils were also observed within the shale matrix. Small lenses of non-granular vitrinite (V) and bitumen (B) were measured for %Ro. Possible terrestrial deposition as indicated by the presence of fusinite (F) submaceral. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.87	0.08	13	
				4	1.42	0.05	4	
				4	0.65	0.02	4	
9246	100/10-24-072-23W5/00	Duvernay	325/09	2	0.88	0.10	15	Organically lean siltstone with a rare amount of non-fluorescing to yellow-orange–fluorescing alginite (A), and pyrite inclusion. Vitrinite (V) maceral derived mainly from unicellular algae Prasinophyte (P).
				4	0.67	0.05	6	
				2.2	1.28	0.03	3	
9253	100/10-16-074-26W5/00	Duvernay	326/09	4	0.68	0.04	12	Siltstone with a minor amount of stylocumulate/alginite (stylo)–derived vitrinite (V) and bitumen (B) lenses between carbonate grains. Rare yellow-fluorescing hydrocarbon fluid inclusions (hcfi) are observed mainly within quartz minerals, alginite and ashphaltine-like submacerals. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.55	0.04	21	
9351	100/16-04-074-26W5/00	Duvernay	327/09	2	0.67	0.04	23	Organic- and pyrite-rich black shale, mostly comprising a thin interconnected network of amorphous kerogen (am) with a minor amount of small lenses of alginite (A) and alginite-derived vitrinite (V) maceral and a rare amount of bitumen (B) inclusions. Rare yellow-orange–fluorescing alginite, mainly Prasinophyte (P). Calcite-filled siliceous (S) acanthomorphic marine acritarch (ac) microfossils were also observed within the shale matrix. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.55	0.03	21	
				4	0.424	0.02	2	
				2.2	0.80	0.03	8	
9362	100/02-06-047-04W5/00	Duvernay	328/09	2	1.42	0.06	21	Organic- and pyrite-rich black shale, mostly comprising a thin interconnected network of amorphous kerogen (am) with a minor amount of small lenses of vitrinite (V) and bitumen (B) maceral, and phosphatic nodules (Ph). A major amount of non-fluorescing alginite (A) and chitinous (ch) microfossil (possibly from fish bones) and a rare amount of calcite-filled, siliceous (S), acanthomorphic marine acritarch microfossils were also observed within the shale matrix, including a trace of isotropic pyrobitumen (Pb) showing devolatilization vacuoles. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	1.22	0.04	14	
				4	1.59	0.05	11	
				4	1.08	0.04	3	
9368	100/02-04-126-11W6/00	Muskwa	329/09	2	1.16	0.08	20	Organic rich and pyrite (framboidal) rich brown, silty shale with mainly an interconnected network of amorphous kerogen (am) and diffuse or concentrated hebamorphinite (H) lenses with orange fluorescing and non-fluorescing alginite maceral (i.e. Leiosphaeridia (L)) inclusions. Small lenses of non-granular and granular vitrinite (V) and bitumen (B) macerals are also observed within the shale matrix, together with rare, brown-fluorescing bitumenite and phosphatic nodules (ph). Rare chitinous conodont or fish bones. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	1.39	0.07	7	
				4	0.92	0.07	10	

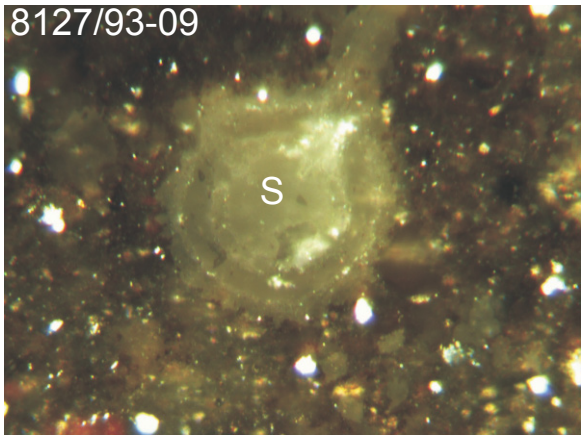
AGS Sample Number	Well Location - UWI	Formation	GSC Photo No.	ORG_TYPE	%Ro_R	SD	N	COMMENTS
					0.75		1	
9377	100/02-08-044-27W4/00	Duvernay	330/09					Organic- and pyrite-rich ((Py), framboidal), brown silty shale, mainly comprising an interconnected network of amorphous kerogen (am) and diffuse or concentrated hebamorphinite (H) lenses with orange-fluorescing and non-fluorescing alginite maceral (i.e. Leiosphaeridia (L)) inclusions. Small lenses of non-granular and granular vitrinite (V) and bitumen (B) maceral are also observed within the shale matrix, along with rare brown-fluorescing bitumenite and phosphatic nodules (Ph). Rare chitinous conodont or fish bones are observed. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	0.76	0.03	7	
				2,4	0.60	0.05	48	Bitumen and some suppressed vitrinite %Ro.
9378	100/02-08-044-27W4/00	Cooking Lake	331/09					Organically-lean siltstone with mainly migrated bitumen (B) and a rare amount of non-fluorescing to yellow-orange–fluorescing alginite (A) and non-fluorescing calcite-filled chitinozoans (ch). Traces of yellow-fluorescing hydrocarbon fluid inclusion (hcfi) observed within the calcite mineral matrix. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				4	0.68	0.03	15	
				4	0.50	0.05	14	
9382 Page 1 & 2	100/10-08-046-22W4/00	Duvernay	332/09					(Pages 1 & 2) Organic- and pyrite-rich ((Py), framboidal), brown silty shale, comprising mainly an interconnected network of amorphous kerogen (am) and diffuse or concentrated fluoramorphinite (F, weak brown-fluorescing) and non-fluorescing hebamorphinite (H) lenses. Major amount of yellow-fluorescing to non-fluorescing alginite (A), Prasinophyte (P), Coccoidal (Cc), *Tasmanites sp.* (T), siliceous (S) and spiny acanthomorphic marine acritarch (ac), and Leiosphaeridia (L)) inclusions. Rare amount of small vitrinite (V) and bitumen (B) macerals, and soluble hydrocarbon (oil) are observed and measured within the shale matrix, together with a trace amount of brown-fluorescing bitumenite (Bt) and phosphatic nodules (Ph). Highly suppressed %Ro. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	0.56	0.03	8	
9382 Page 3 & 4	100/10-08-046-22W4/00	Duvernay	332/09					(Page 3) Large fluorescing lenses are all coccoidal (Cc) alginite surrounded by mixture of individual to clusters of unicellular coccoids (Cc) and Prasinophytes (P) alginite-rich matrix. (Pg 4) Large fluorescing lenses are all Prasinophytes (P) alginite surrounded by mixture of individual to clusters of unicellular coccoids and Prasinophytes (P) alginite-rich matrix. Highly suppressed %Ro. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	0.56	0.03	8	
				4	0.46	0.03	19	Highly suppressed %Ro.
					0.35	0.03	8	
9399	100/04-11-063-25W5/00	Duvernay	333/09					Organic- and pyrite-rich ((Py), framboidal), black silty shale, comprising mainly an interconnected network of amorphous kerogen (am) and diffuse with rare non-fluorescing and fluorescing alginite (A), brown-fluorescing and non-fluorescing bitumen (B), and phosphatic nodules Ph). Small lenses of non-granular and granular vitrinite (V) and bitumen (B) maceral were also observed within the shale matrix, together with a major amount of siliceous (S) microfossil, possibly from marine acritarch and radiolaria. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).
				2	1.18	0.06	11	
				4	1.34	0.08	4	
				4	1.02	0.01	2	
				4	0.77		1	

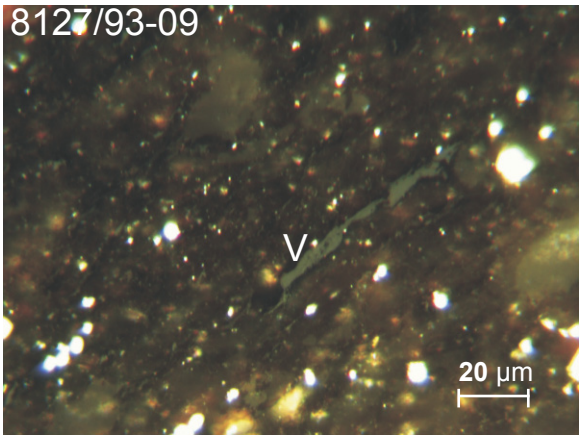




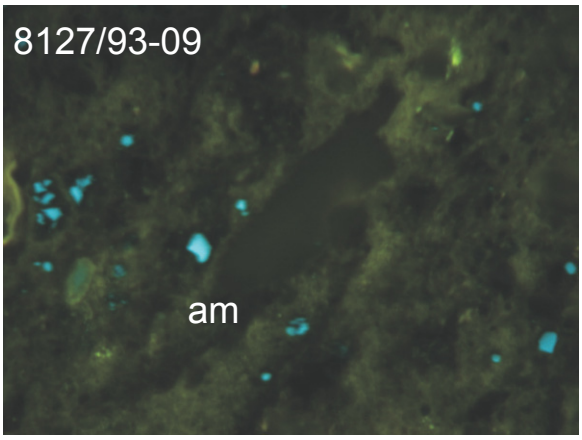


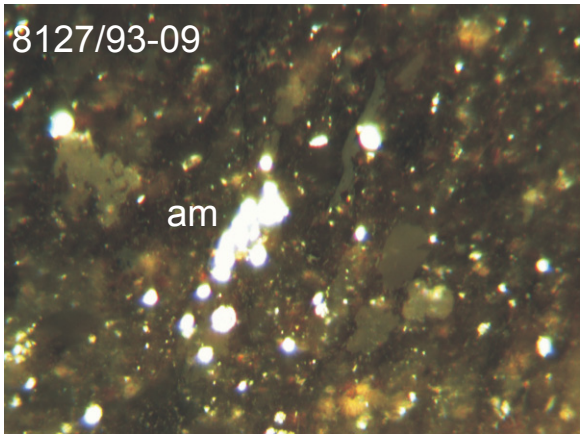


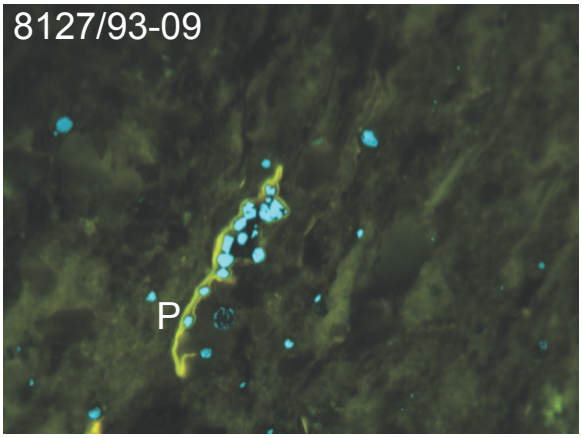


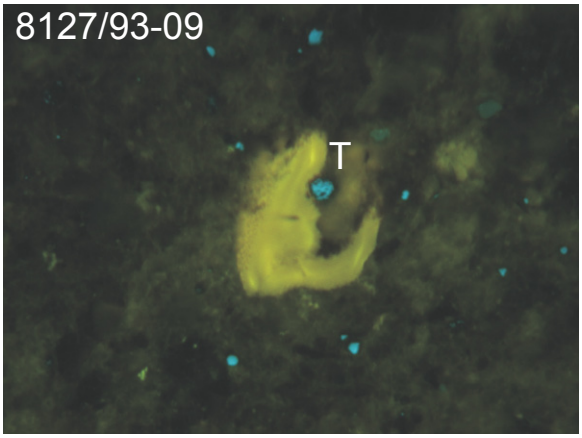


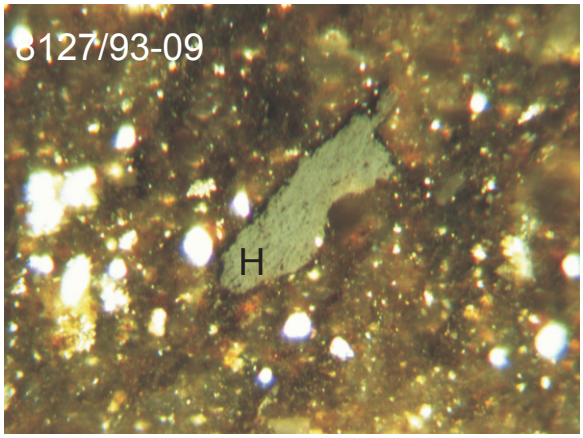
AGS 8127/GSC 93-09 (Muskwa; 100/11-17-088-03W6/00, 2317.5 m core depth). Shale with major pyrite (bright whitish yellow mineral) and micrinite-rich amorphous kerogen (am). Minor amount of siliceous microfossil (S, mainly derived from Radiolaria) and Prasinophyte (P) alginite. Long lenses of granular solid bitumen (B), vitrinite (V) and hemorphinite lenses (H) are observed. Rare amount of yellow fluorescing hydrocarbon fluid inclusion (hcfi). Trace amount of allochtonous inertinite (I) macerals. Scale bar applies to all images. T = Tasminites, Sp = Sporinite. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ac = acanthomorphic acritarchs.

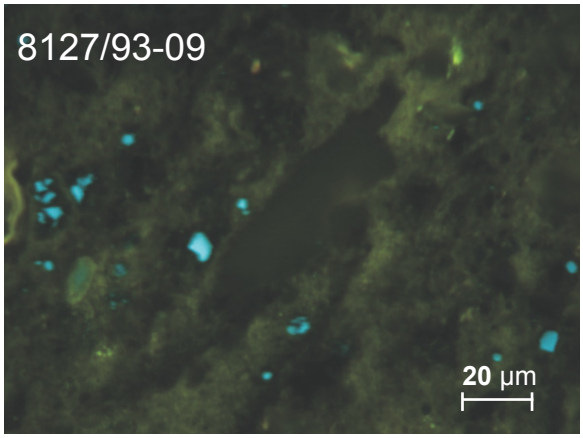

8127/93-09
am

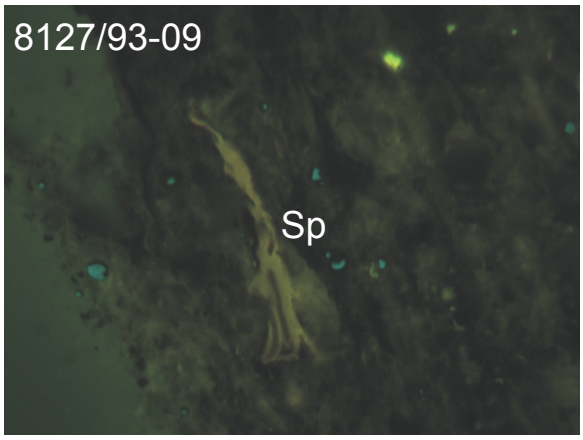

8127/93-09
am


8127/93-09
P


8127/93-09
T


8127/93-09
H


8127/93-09
20 µm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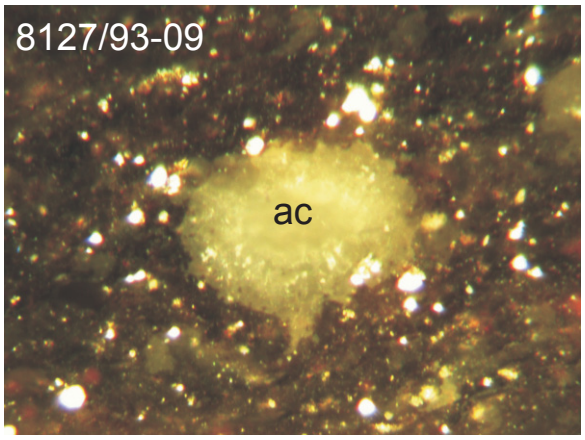
Sp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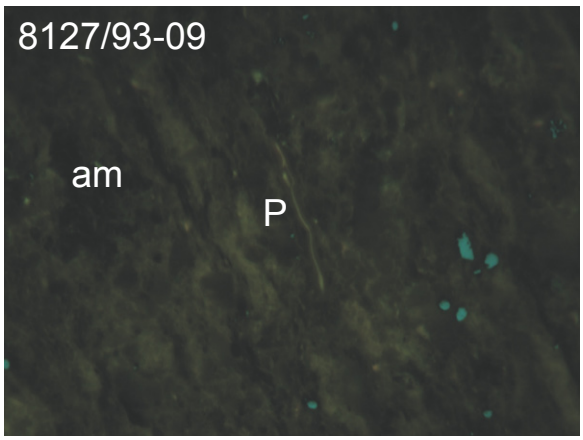
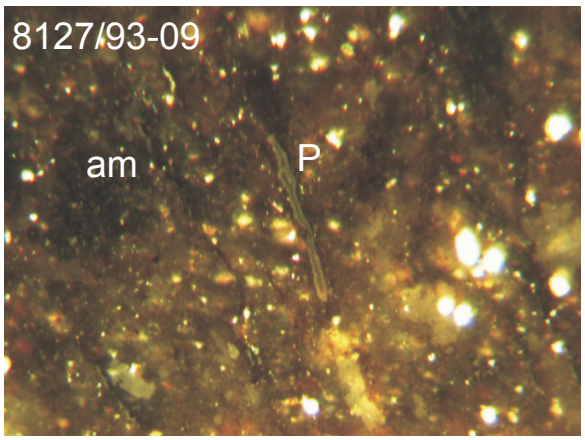
ac


8127/93-09
am
P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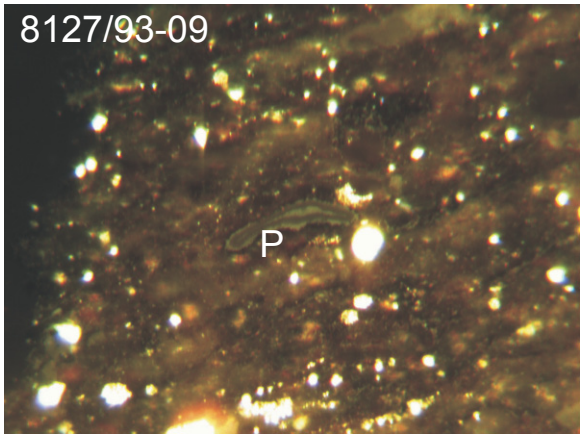
P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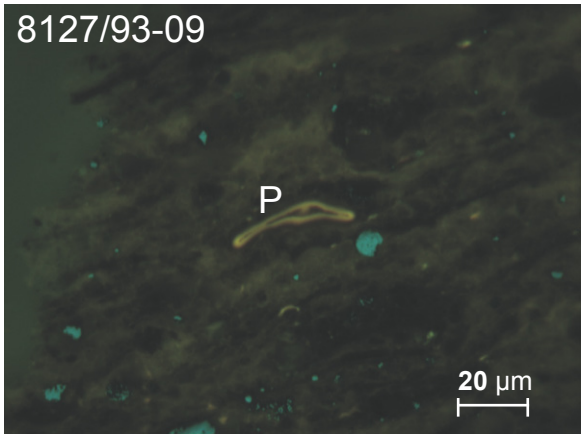
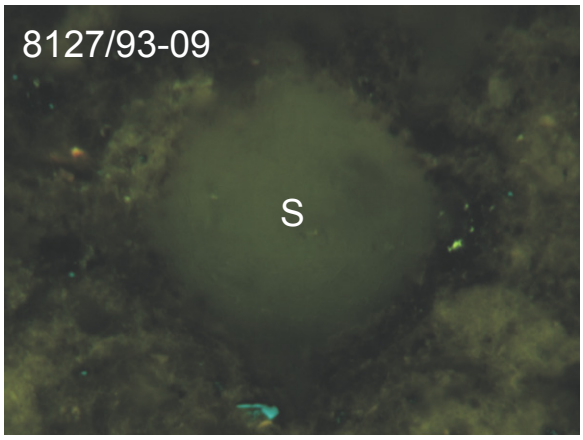
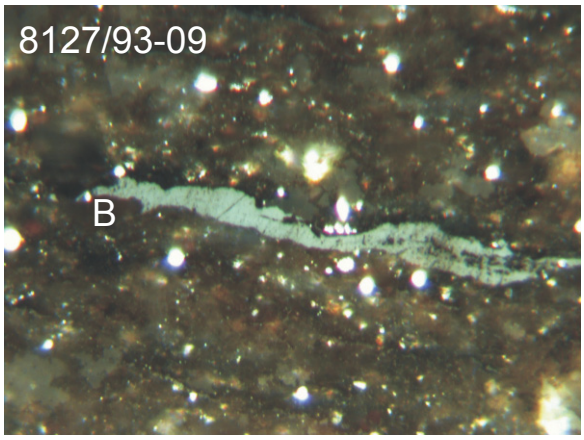
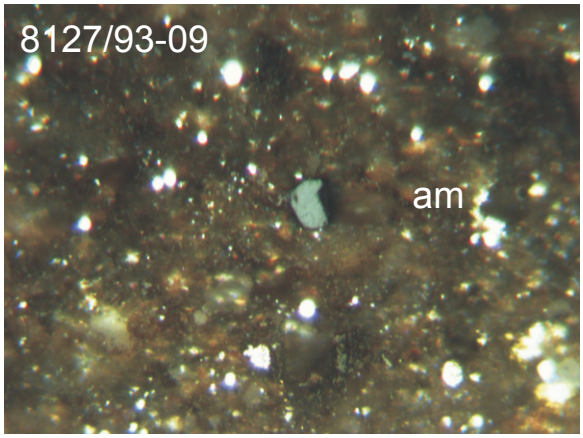
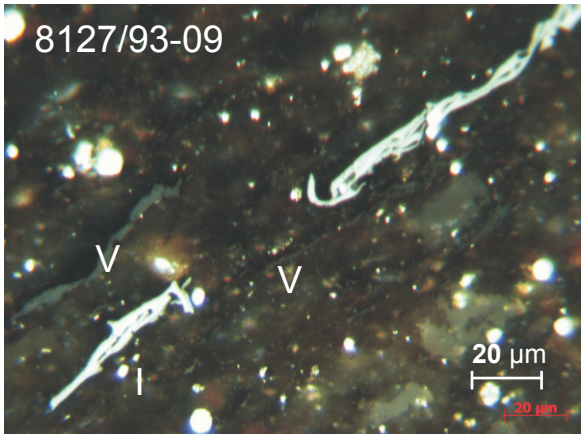
P

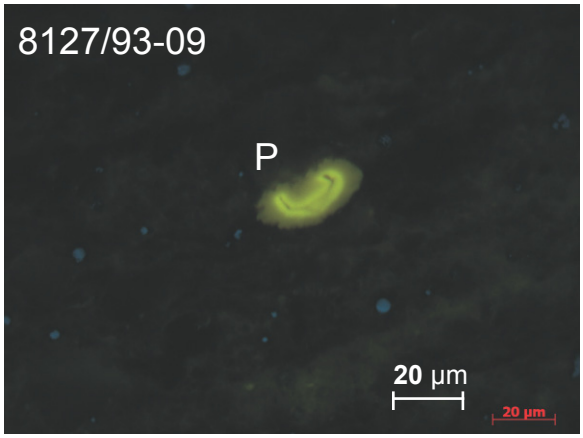

8127/93-09
P
20 µm

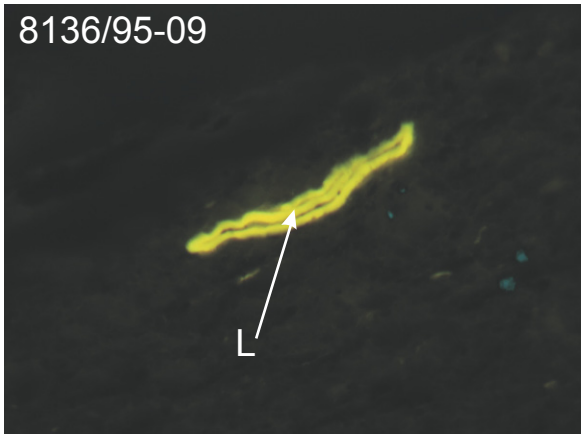

8127/93-09
S

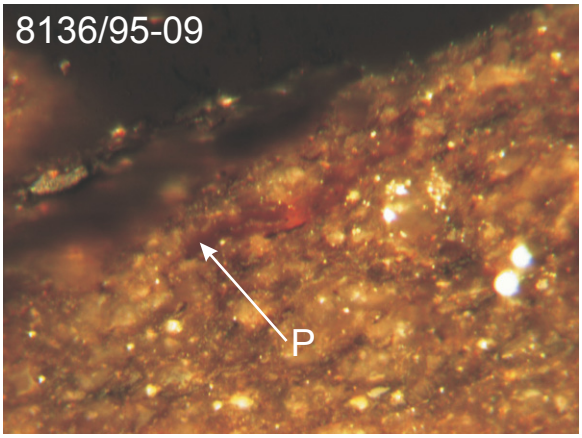

8127/93-09
B

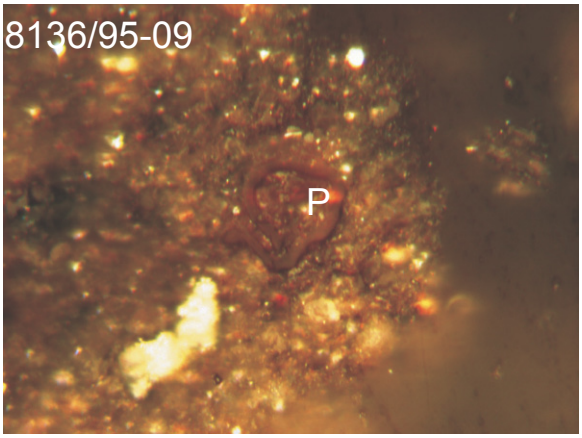

8127/93-09
am

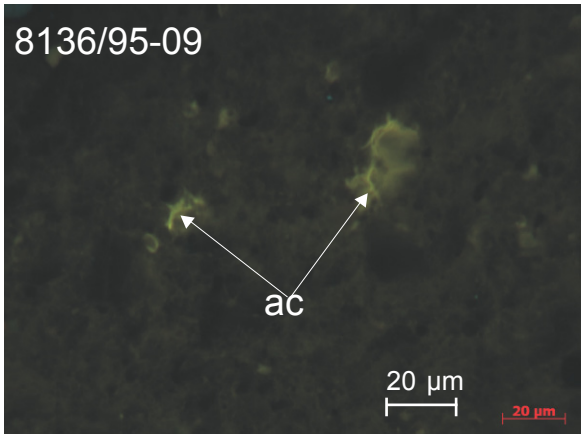

8127/93-09
V
V
I
20 µm

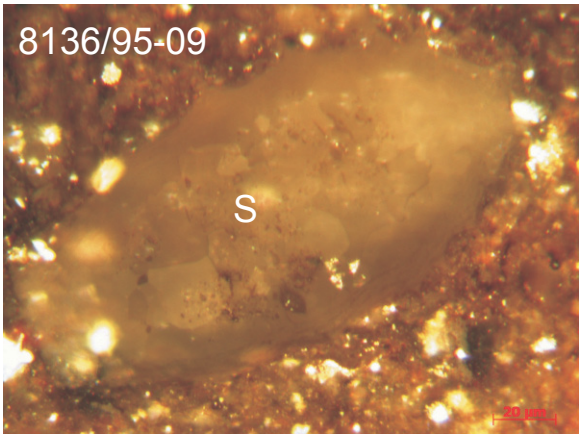

8127/93-09
P
20 µm



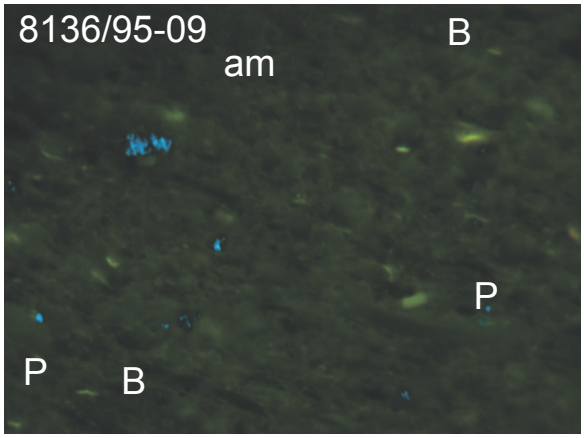


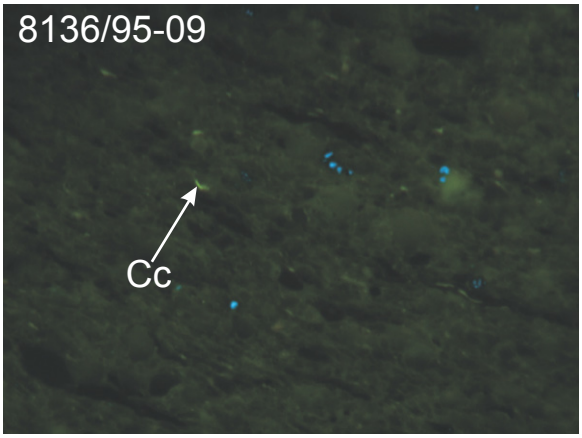


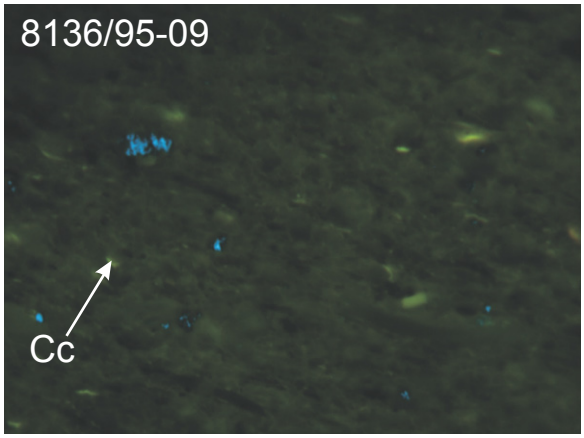


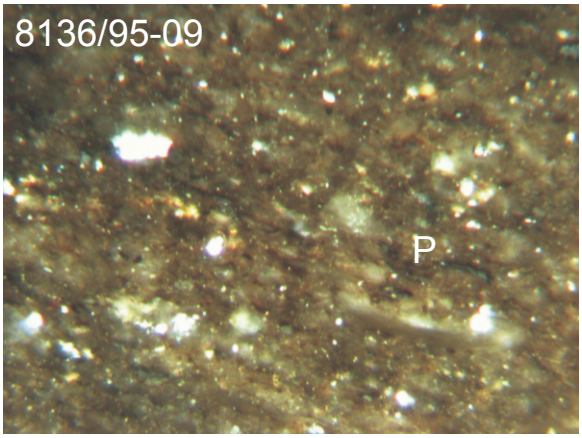


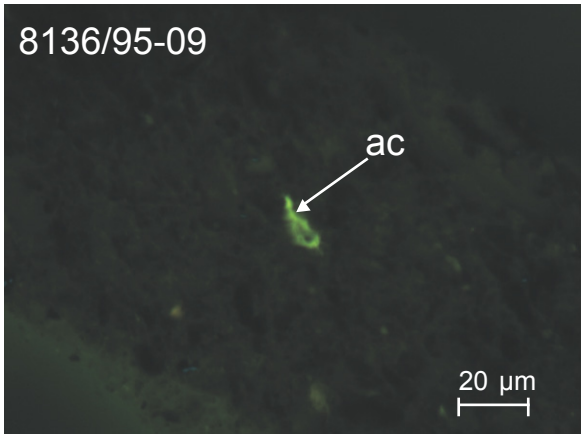
AGS 8136/GSC 95-09. (Duvernay; 100/11-11-050-17W4/00, 1190.2 m core depth). Amorphous kerogen-rich (am) shale with a major amount of both non-fluorescing and fluorescing Prasinophyte (P) alginite. Very minor to trace amount of yellow fluorescing spiny Micrhystiridium cf. acanthomorphic acritarhs (ac) and non-fluorescing to weak fluorescing, low reflecting, solid bitumen (B). Rare amount of Leiosphaeridia (L) alginite, siliceous microfossils (S, derived from Radiolaria) and chitinous microfossils (ch, fish remain?). Scale bar applies to all images. V = Vitrinite. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). Cc = cocoidal alginite.

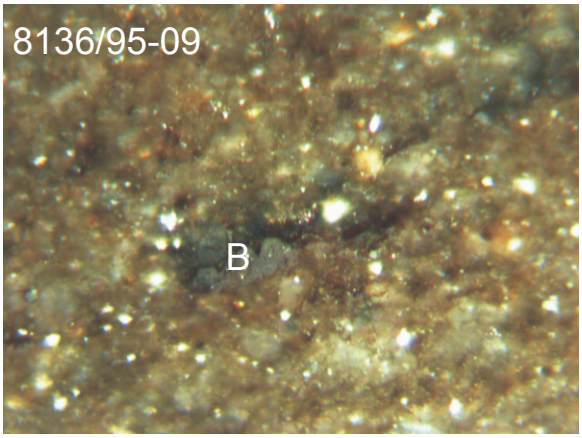

8136/95-09
B
am
P
P
B

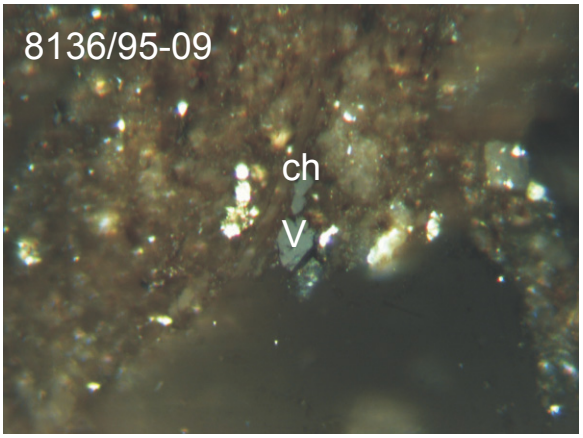

8136/95-09
Cc

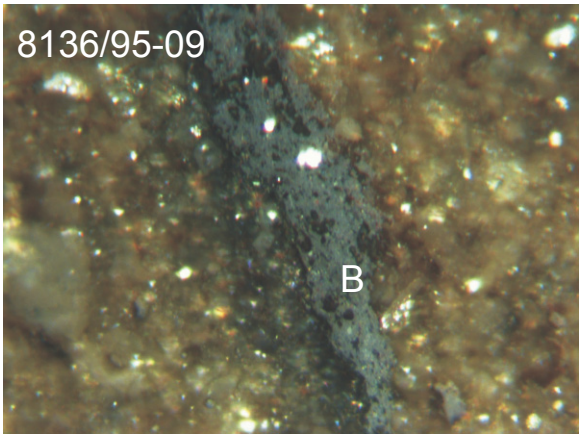

8136/95-09
Cc

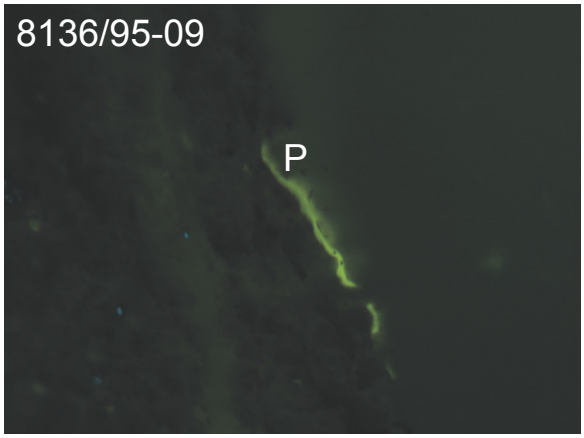

8136/95-09
P

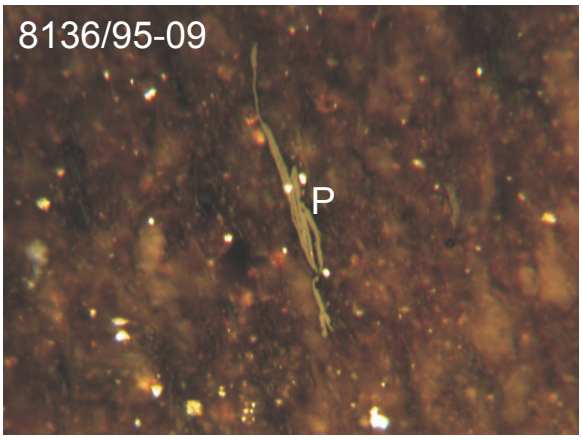

8136/95-09
ac
20 µm

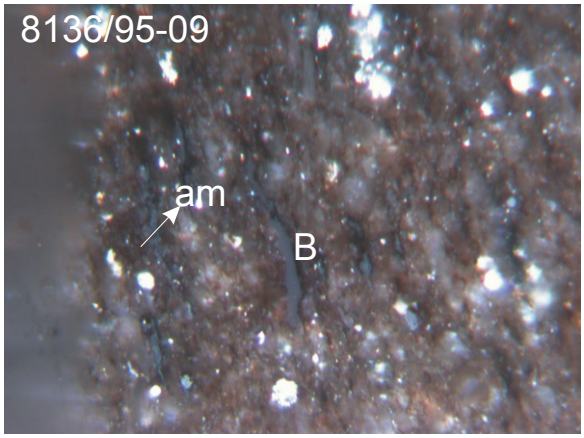

8136/95-09
B

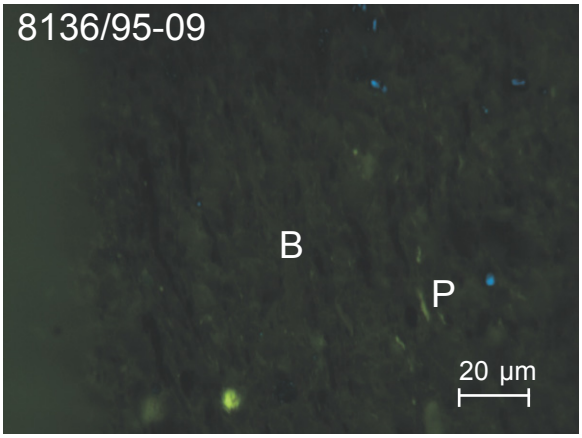

8136/95-09
ch
V

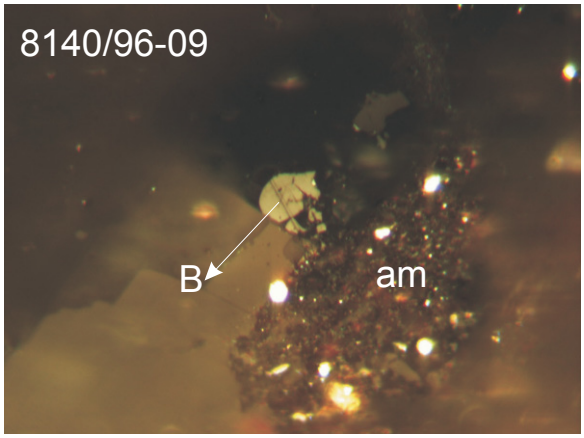

8136/95-09
B

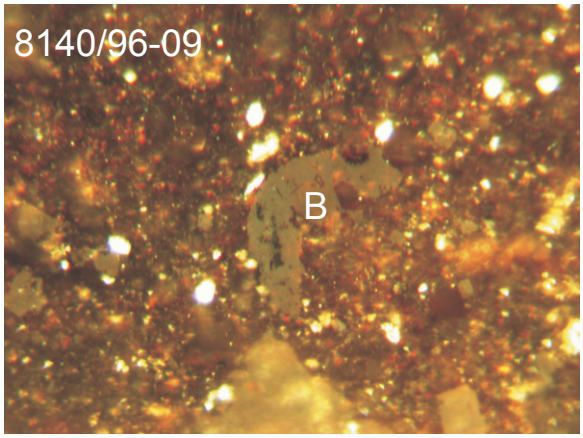

8136/95-09
P

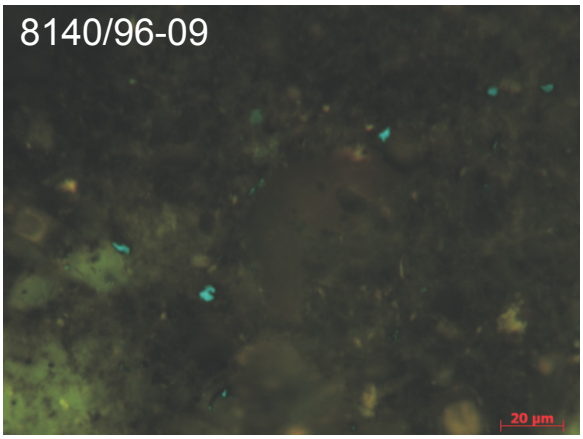

8136/95-09
P

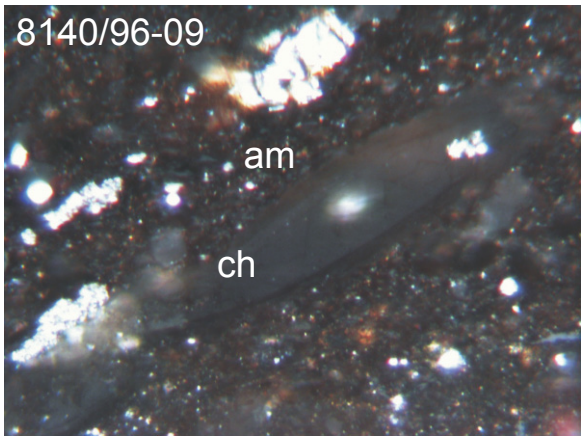

8136/95-09
am
B

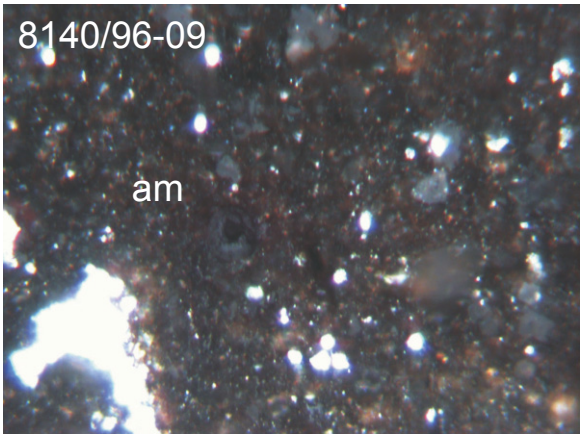

8136/95-09
B
P
20 µm

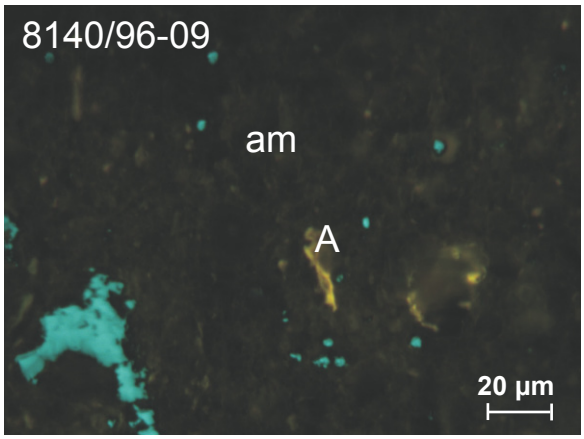




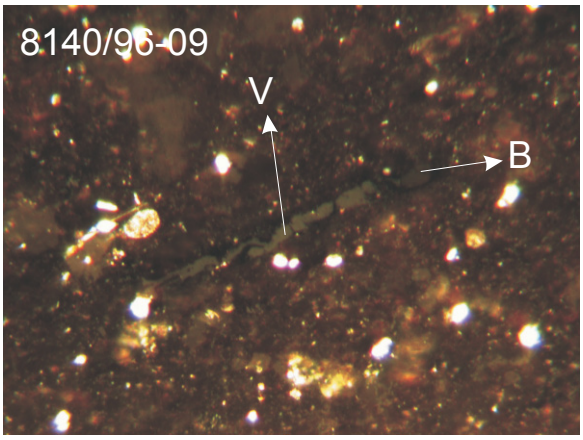


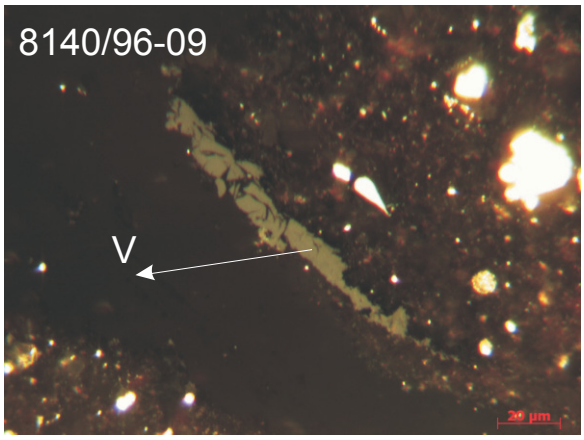


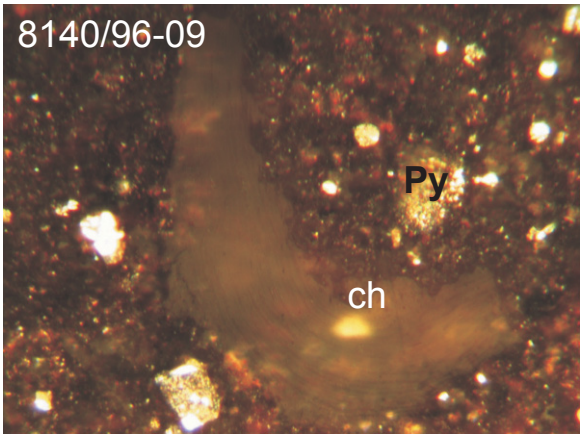


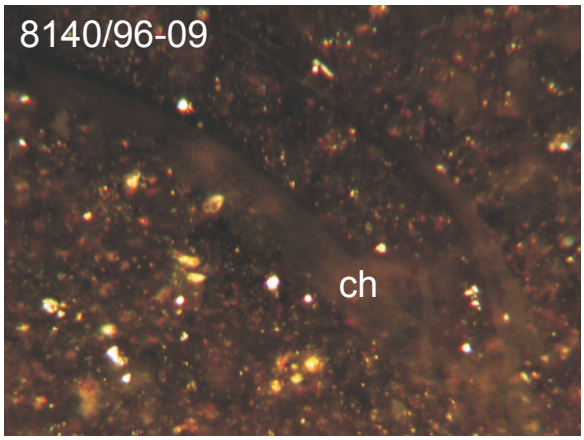


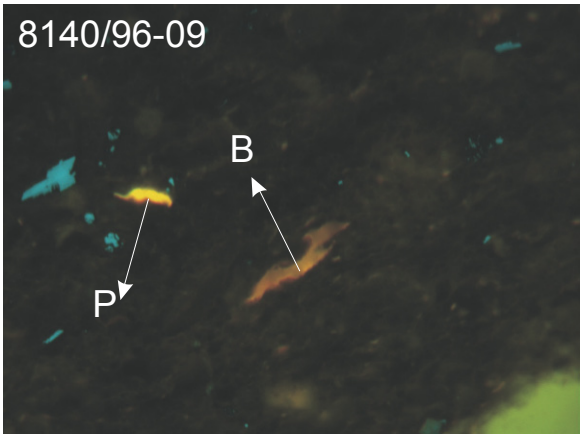
AGS 8140/GSC 96-09 (Duvernay; 100/10-24-072-23W5/00, 2821.2 m core depth). Oil stained shale with major amount of dark brown, amorphous kerogen (am) with some pyrite (Py) and micrinite inclusions. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite and asphaltine. Very minor to trace amount of chitinous microfossils (ch, possibly from fish remain or bone? (opaque) and chitinozoans? (long thin grey lenses)). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; B = Bitumin; I = Inertinite; V = Vitrinite

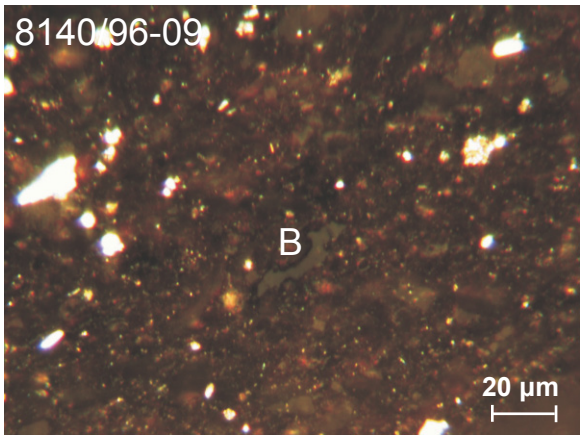

8140/96-09
V
B

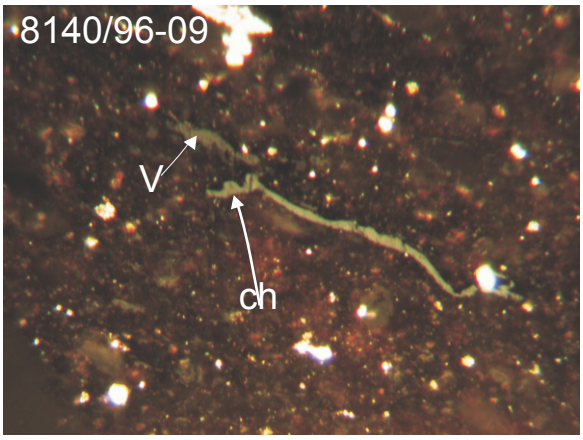

8140/96-09
V

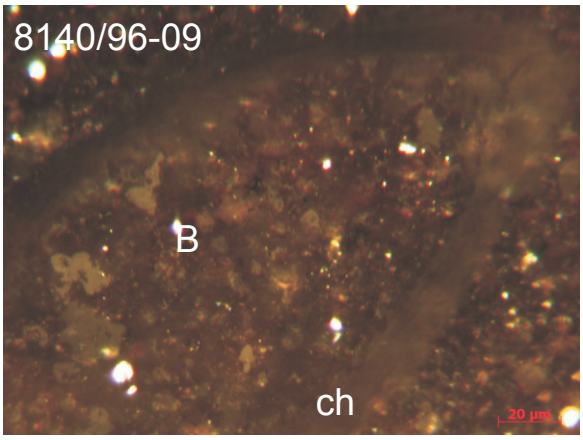

8140/96-09
Py
ch

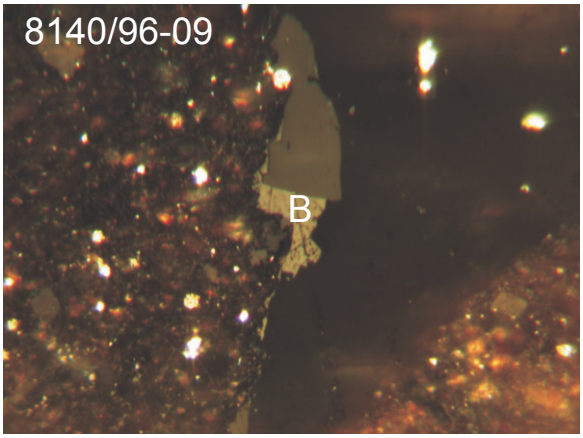

8140/96-09
ch

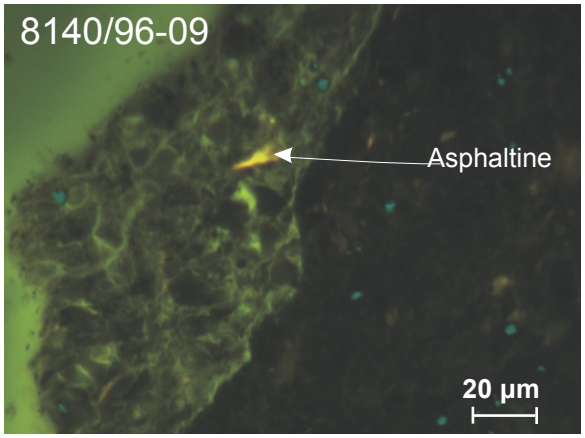

8140/96-09
B
P

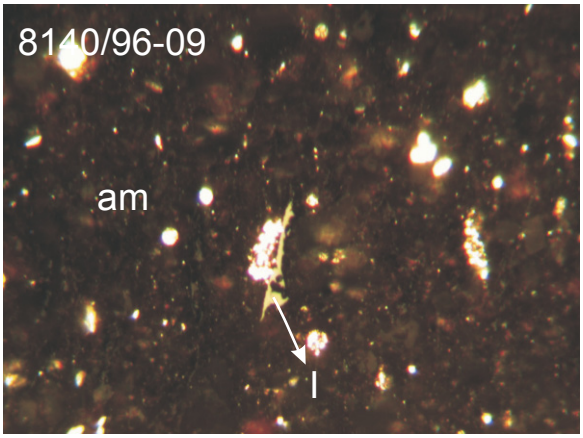

8140/96-09
B
20 µm

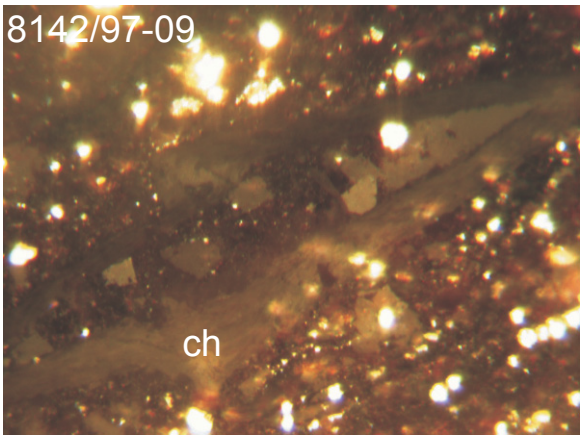

8140/96-09
V
ch

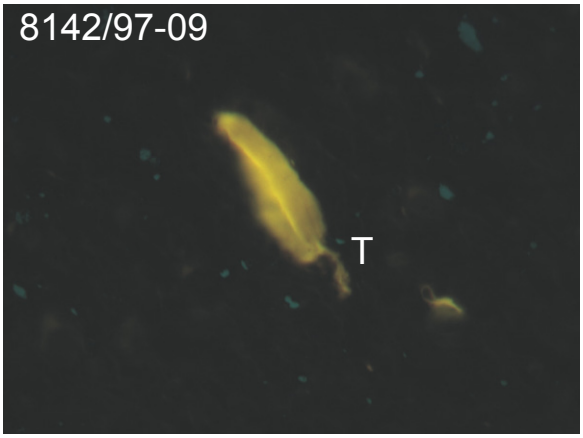

8140/96-09
B
ch
20 µm

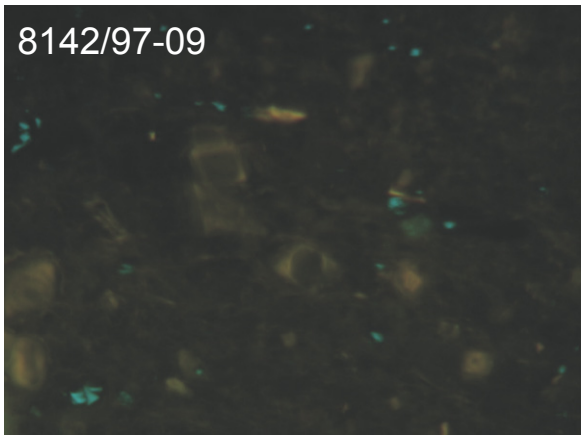

8140/96-09
B

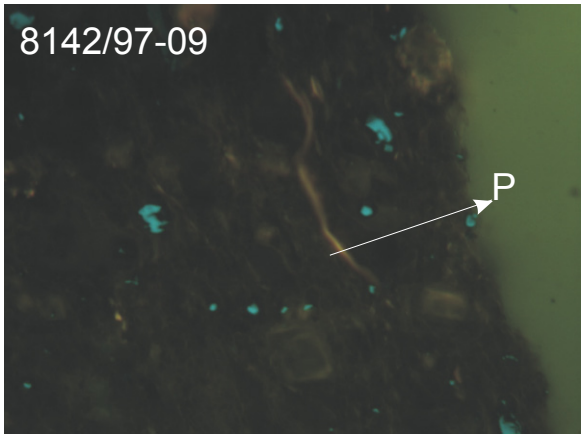

8140/96-09
Asphaltine
20 µm

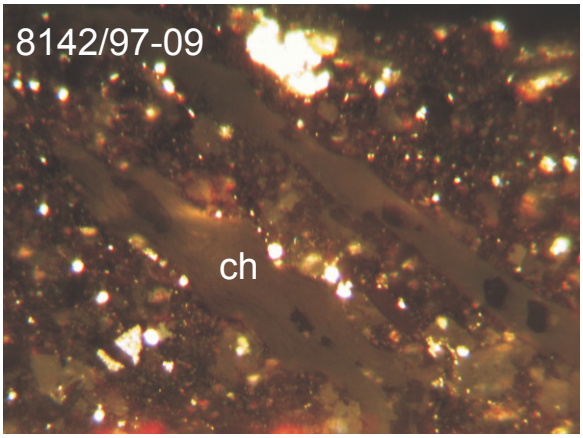

8140/96-09
am
I

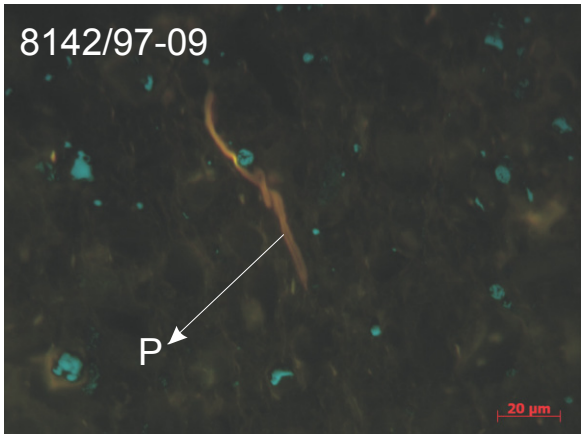




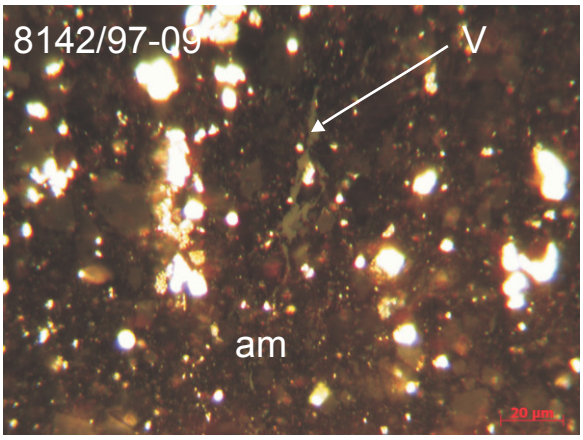


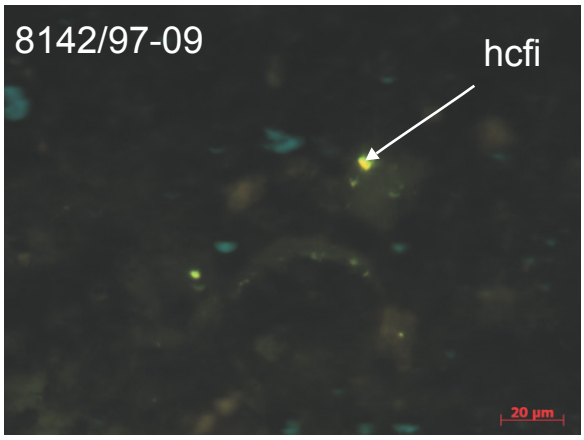


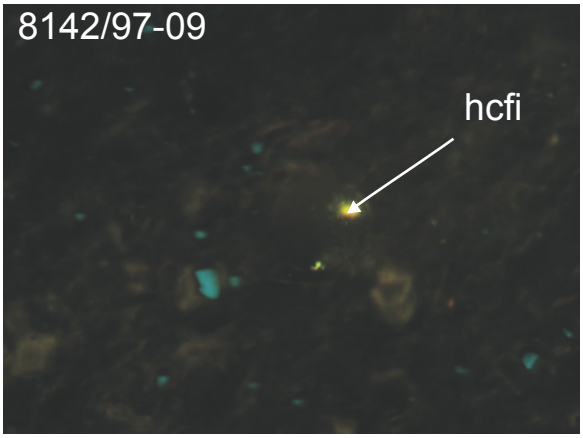


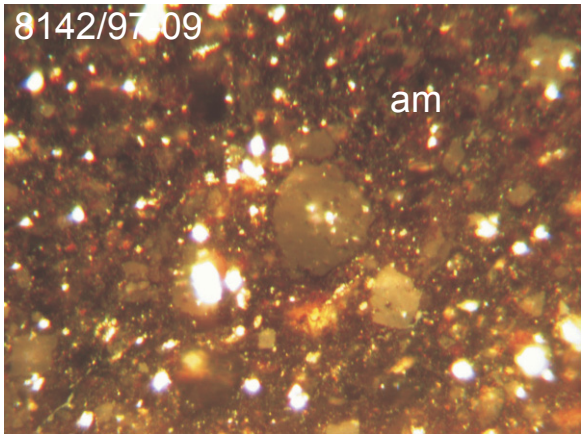


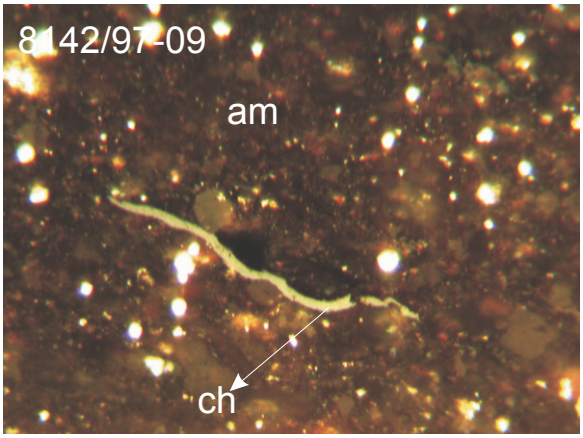
AGS 8142/GSC 8142/97-09 (Duvernay; 100/10-24-072-23W5/00, 2821.2 m core depth). Oil-stained shale rich in dark brown amorphous kerogen (am) with some pyrite and micrinite inclusions. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite and asphaltine. Minor amount of chitinous microfossils (ch) (possibly from fish remains or bone? (opaque), and chitinozoans?, long thin grey lenses) Rare amount of acanthomorphic acritarchs (ac), thick-walled Tasmanites (T) alginite and hydrocarbon fluid inclusion (hcfi). Scale bar applies to all images.(In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; B = Bitumin; V = Vitrinite; S = Siliceous microfossil.

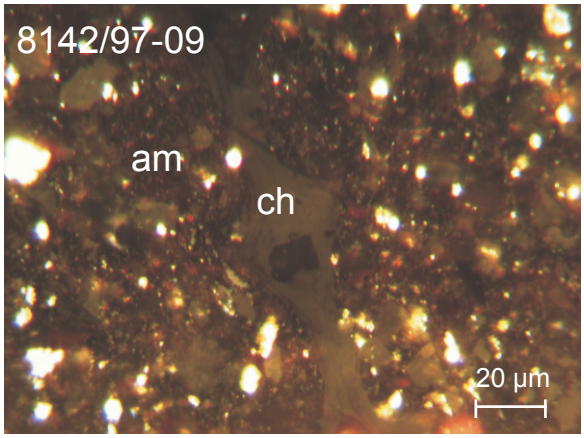

8142/97-09
V
am
20 µm

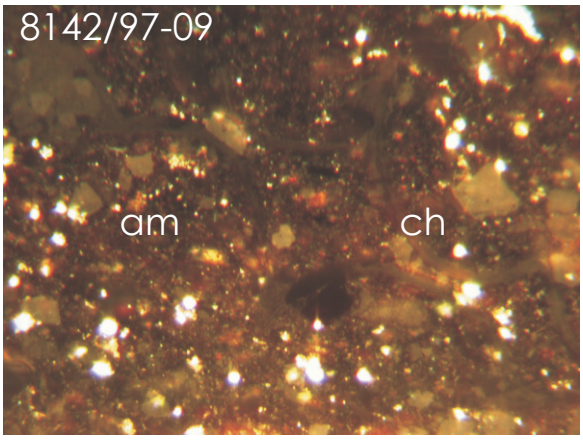

8142/97-09
hcfi
20 µm

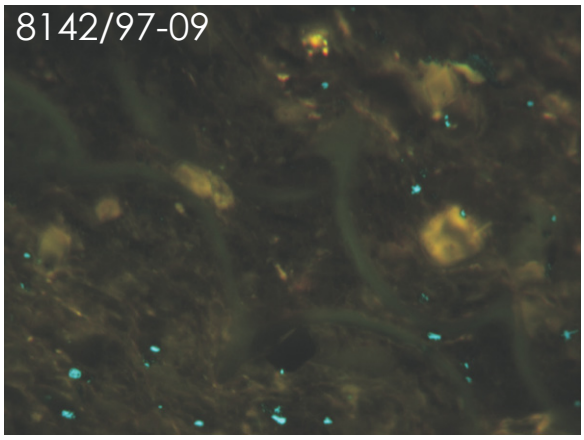

8142/97-09
hcfi

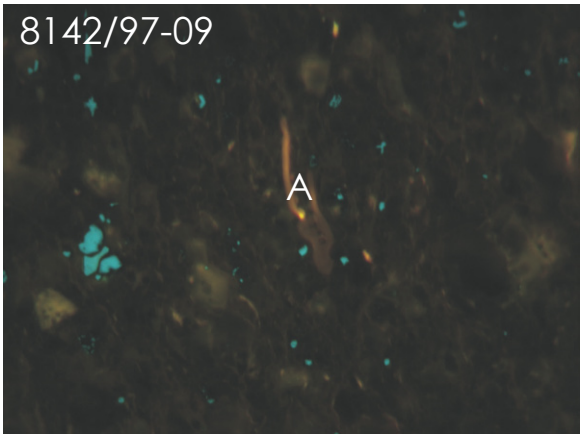

8142/97-09
am

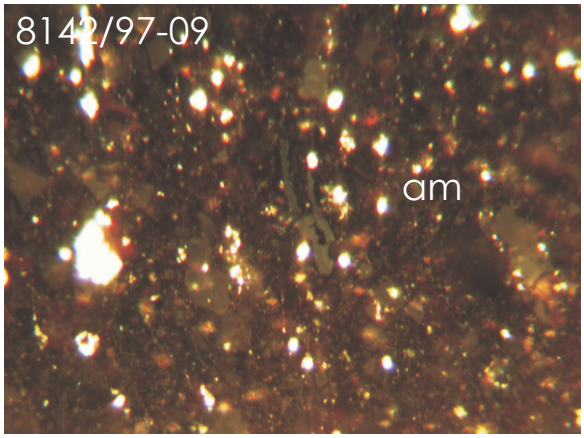

8142/97-09
am
ch

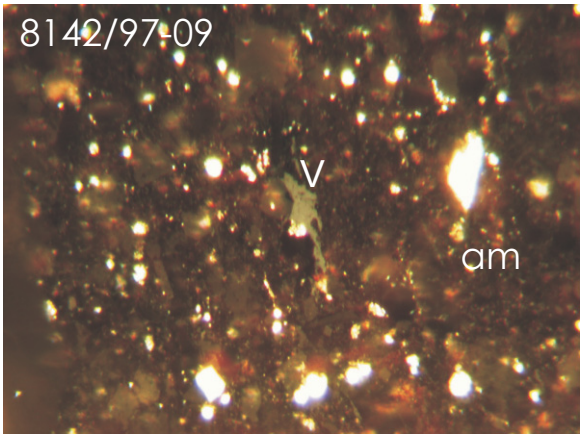

8142/97-09
am
ch
20 µm

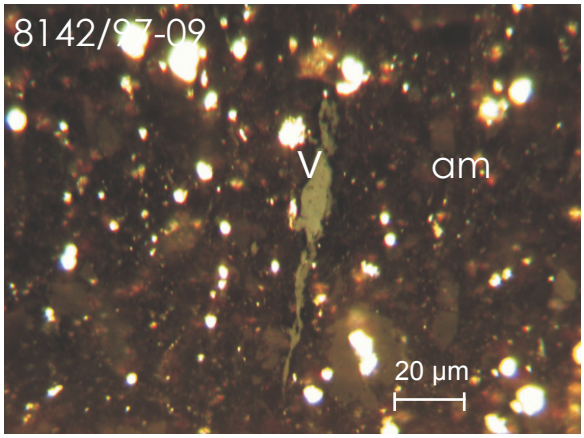

8142/97-09
am
ch

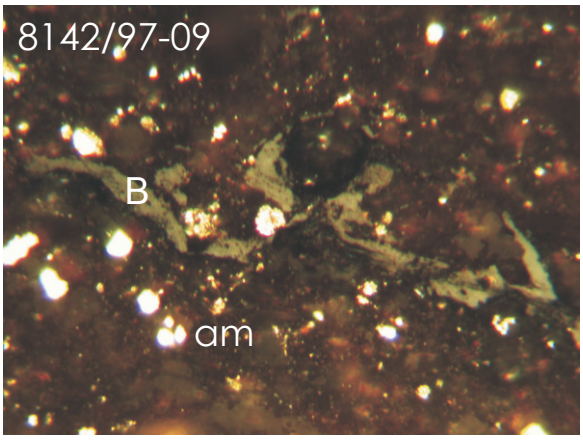

8142/97-09

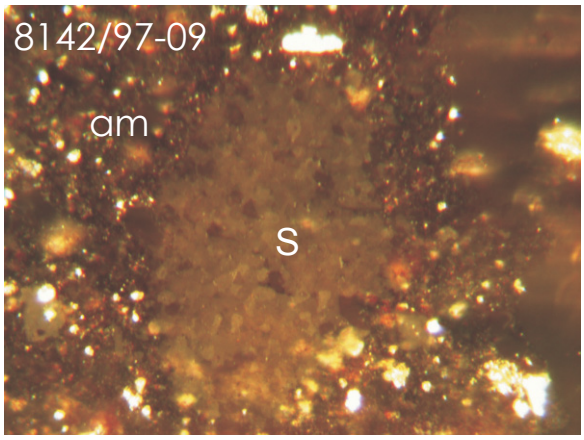

8142/97-09
A

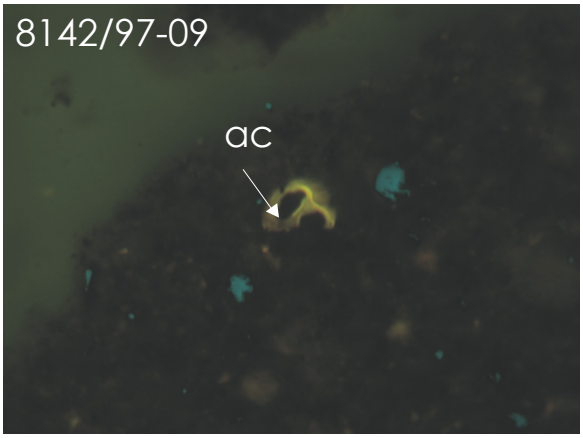

8142/97-09
am

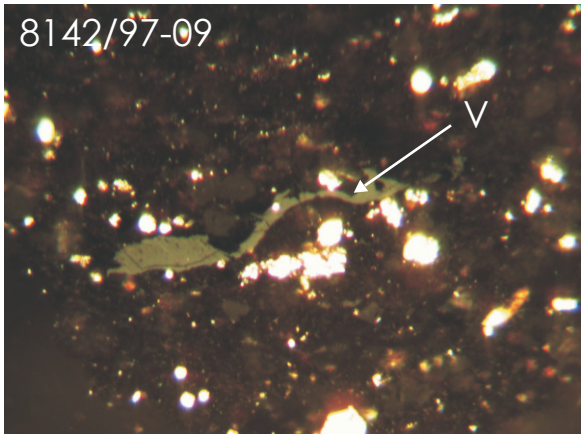

8142/97-09
V
am

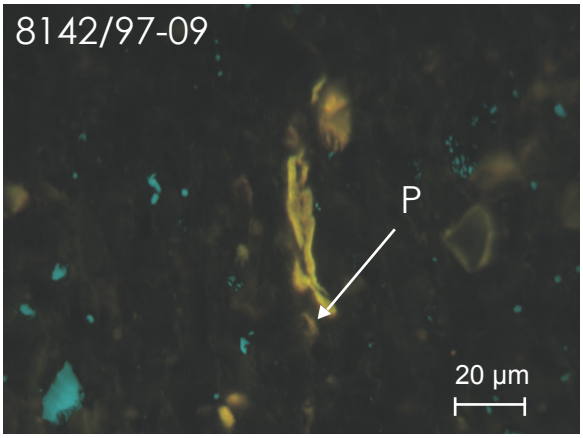

8142/97-09
V
am
20 µm

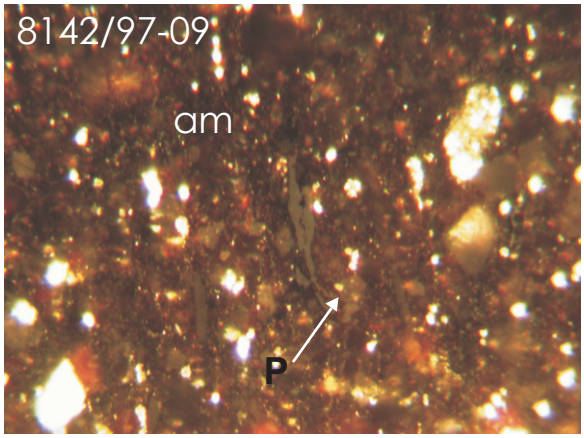

8142/97-09
B
am

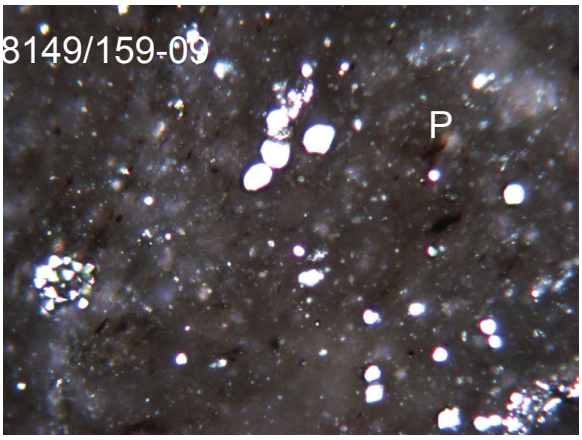

8142/97-09
am
S

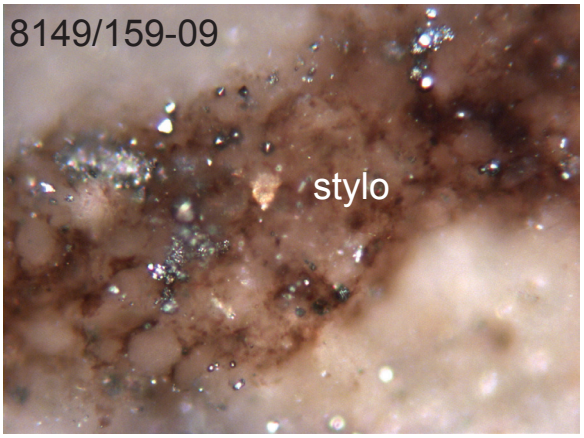

8142/97-09
ac

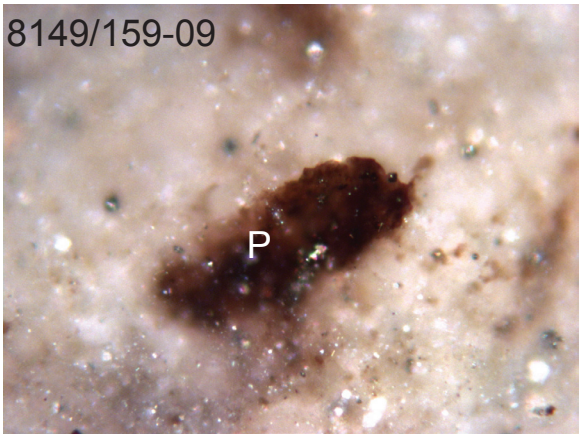

8142/97-09
V

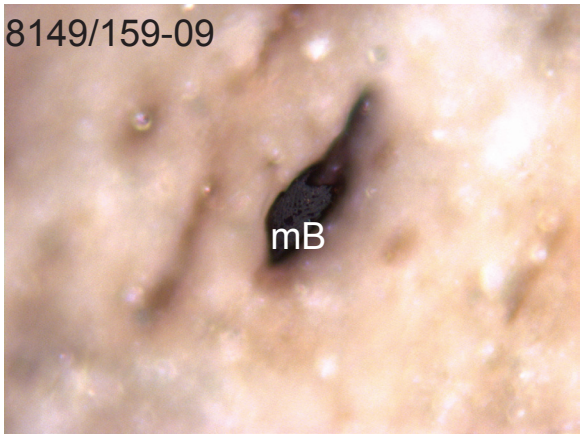

8142/97-09
P
20 µm

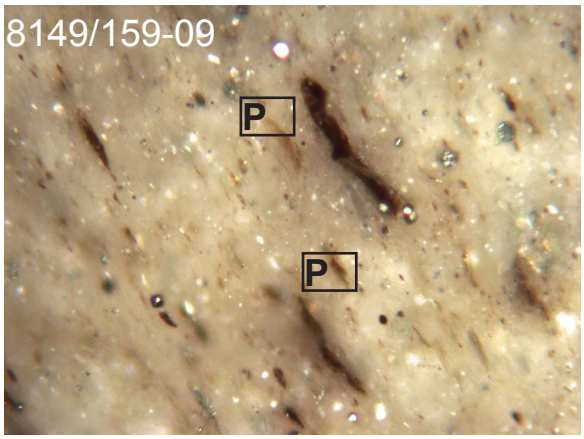

8142/97-09
am
P

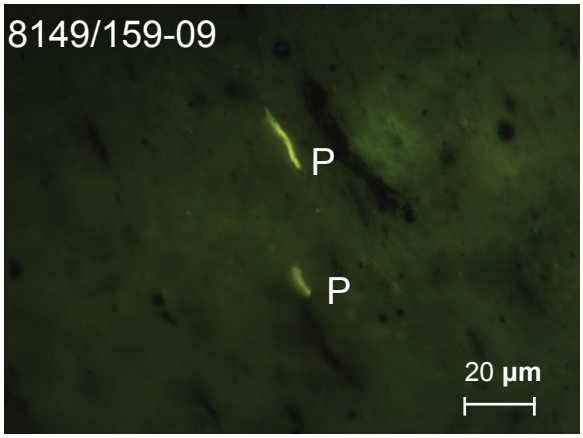




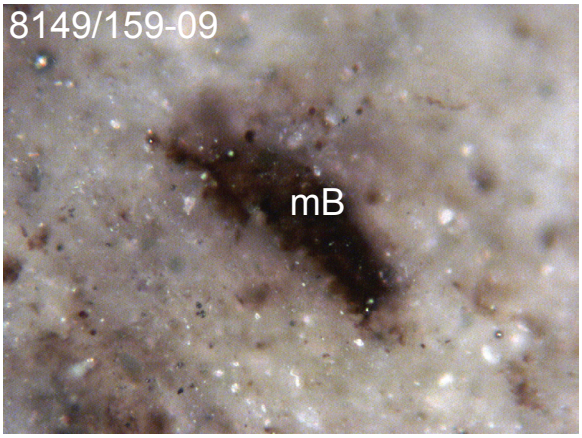


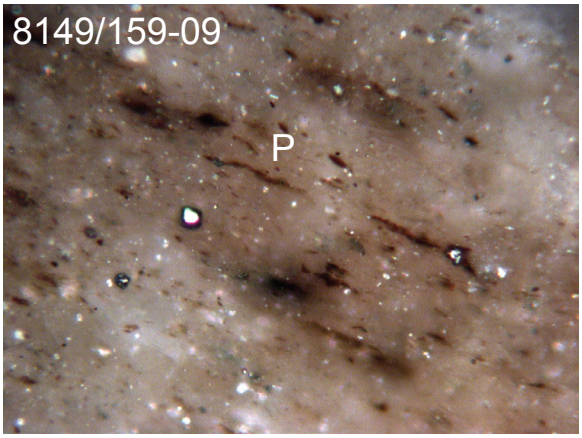


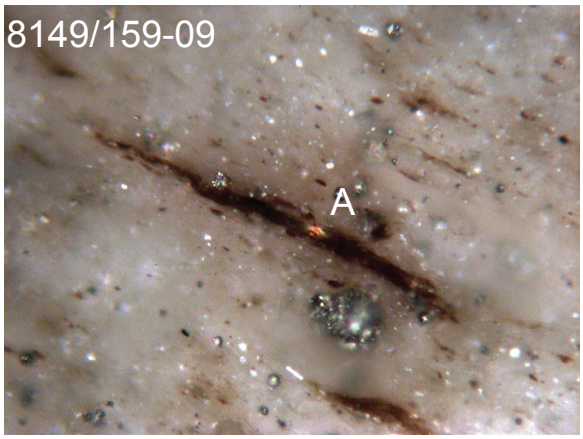


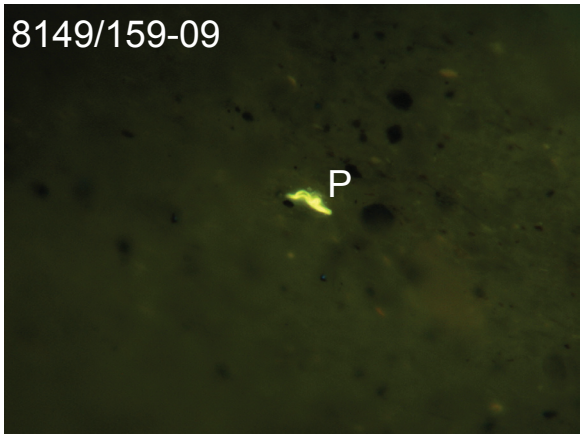


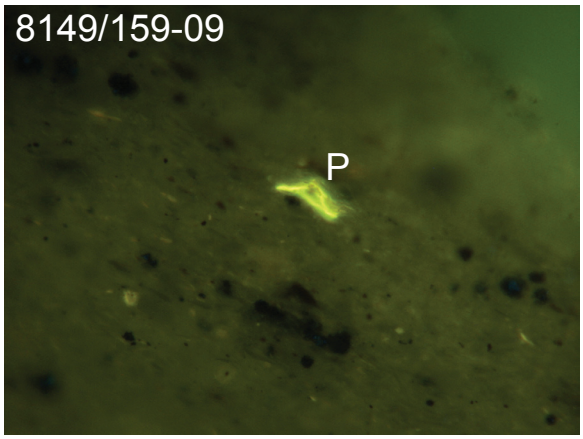
AGS 8149/GSC 159-09 (Ireton/Ft. Simpson; 100/14-19-109-03W5/00; 503 m core depth). Organically lean silty shale with a minor amount of both fluorescing and non-fluorescing Prasinophyte (P) alginite. Minor to trace amount of brown-coloured matrix bitumenite (mB), stylocomulate (stylo) lenses and concentrated alginite lenses (A). Very rare siliceous (S) microfossils are also observed. Scale bar appliees to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

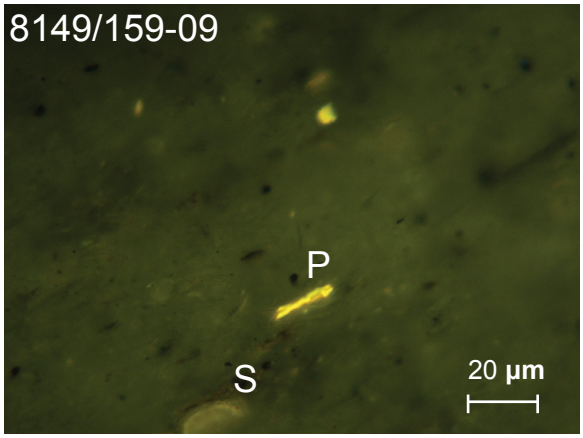

8149/159-09
mB

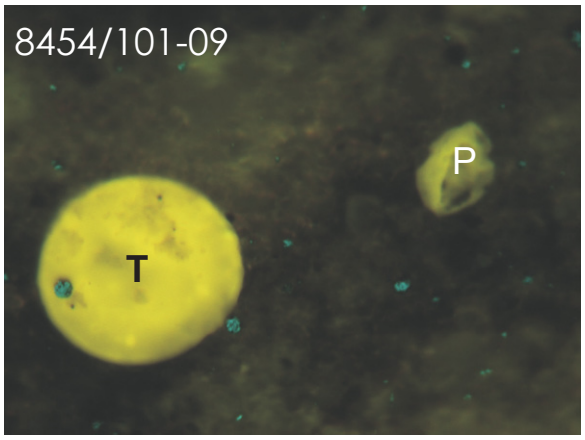

8149/159-09
P

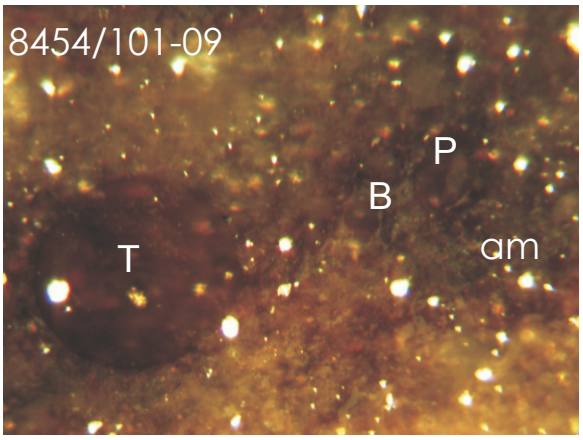

8149/159-09
A

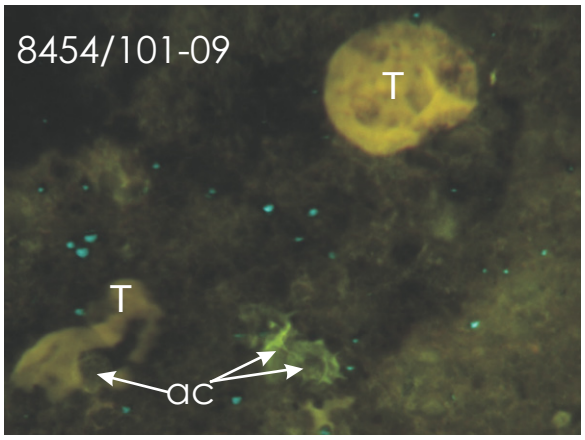

8149/159-09
P

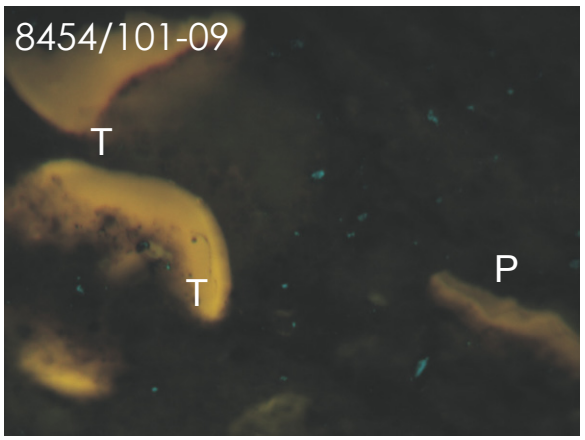

8149/159-09
P

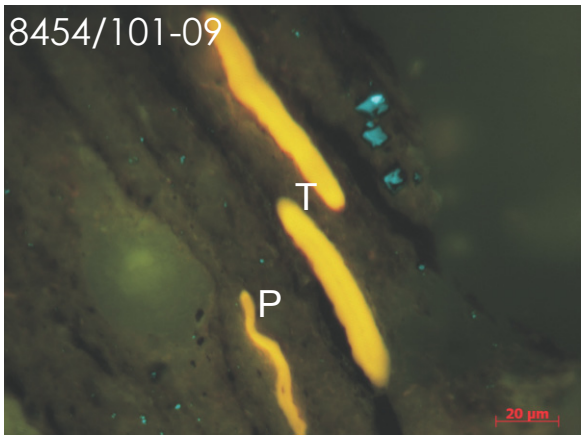

8149/159-09
P
S
20 µm

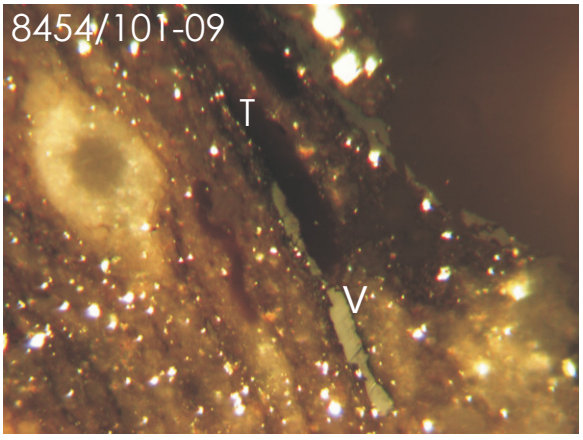




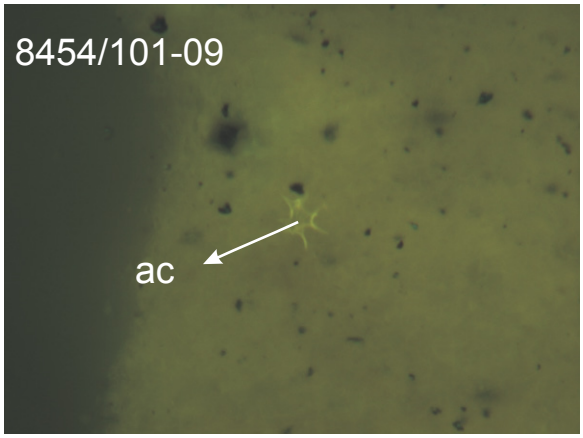


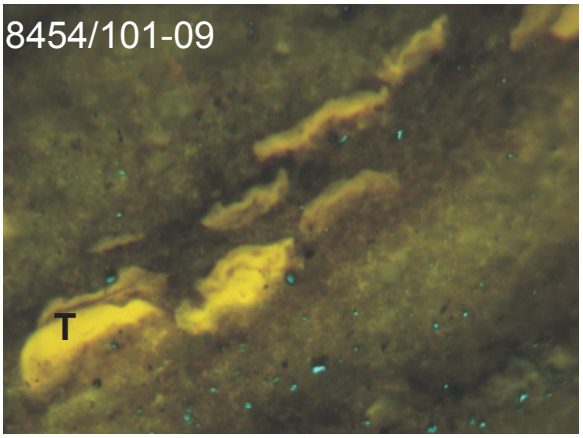


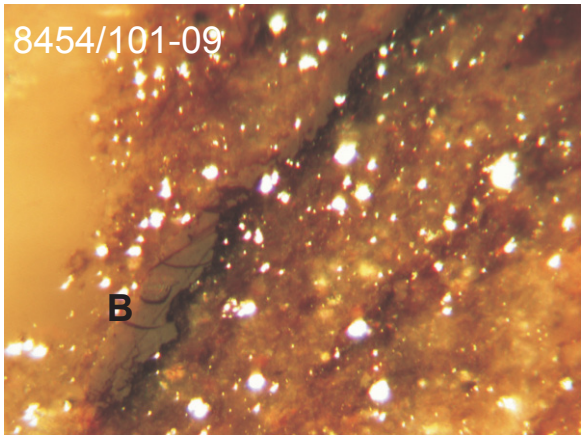


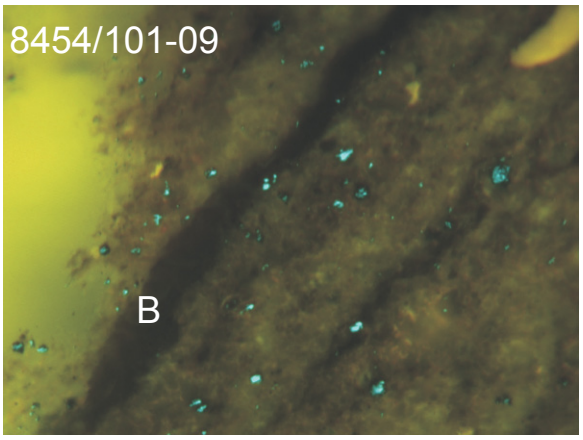


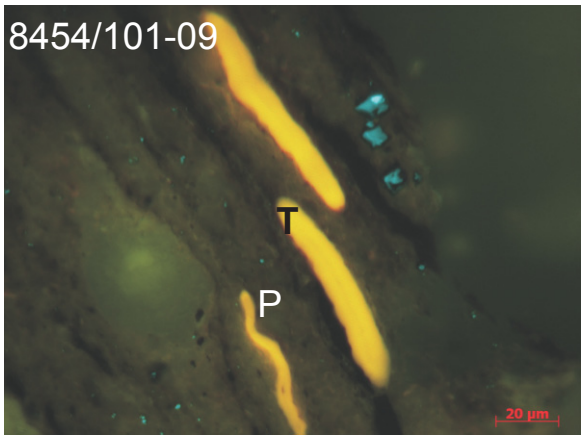
AGS 8454/GSC 101-09 (Duvernay; 100/04-33-068-22W4/00, 1054.6 m core depth). Organic-rich, carbonaceous shale with mostly long thin continuous lenses of dark brown amorphous and non-amorphous kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing bitumen (B) are also observed proximal to kerogen lenses. Major amount of yellow fluorescing, thick-walled *Tasmanites sp.* (T), Micrhystridium cf. acanthomorphic arcitarchs (ac), and Prasinophyte (P) alginite. V= Vitrinite. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

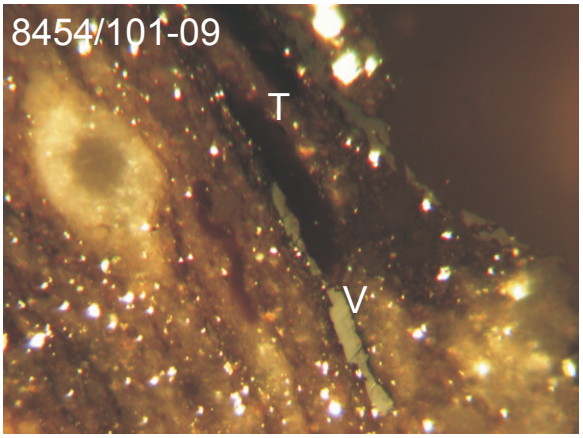

8454/101-09
ac

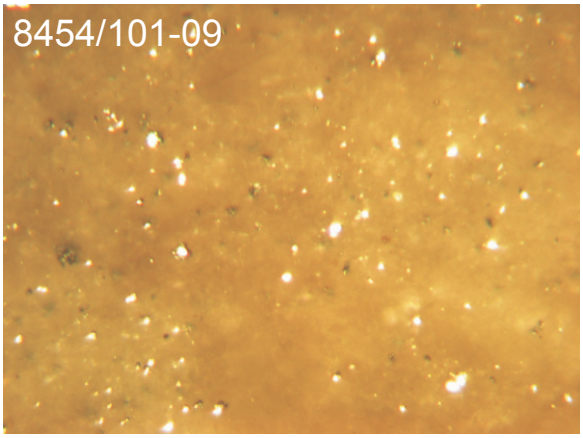

8454/101-09
T

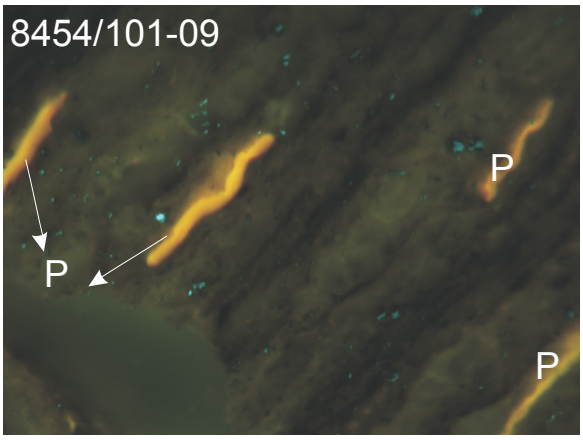

8454/101-09
B


8454/101-09
B


8454/101-09
T
P
20 µm


8454/101-09
T
V


8454/101-09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P
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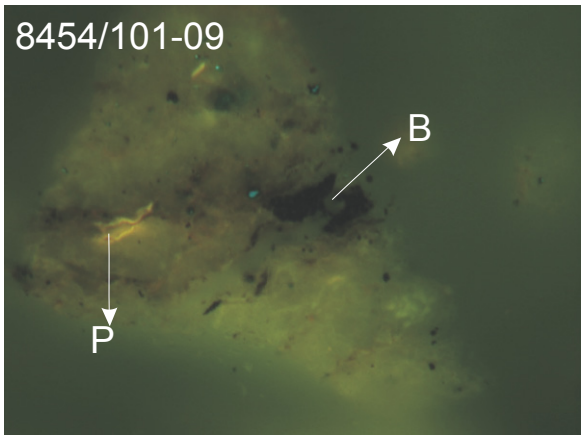
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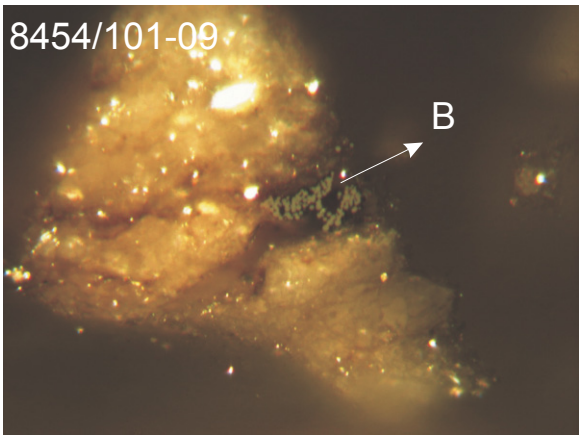
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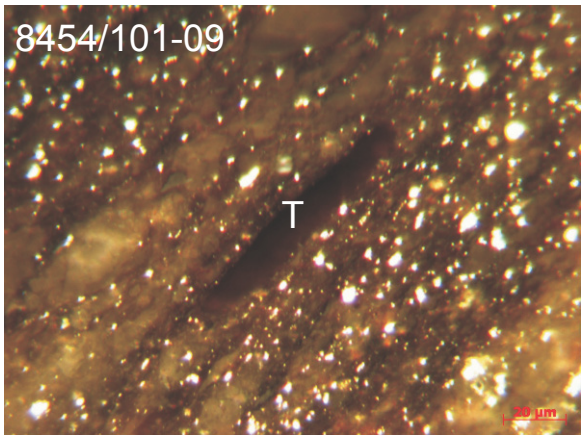
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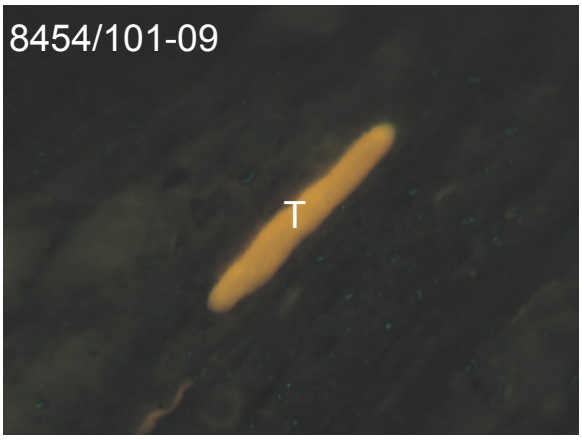
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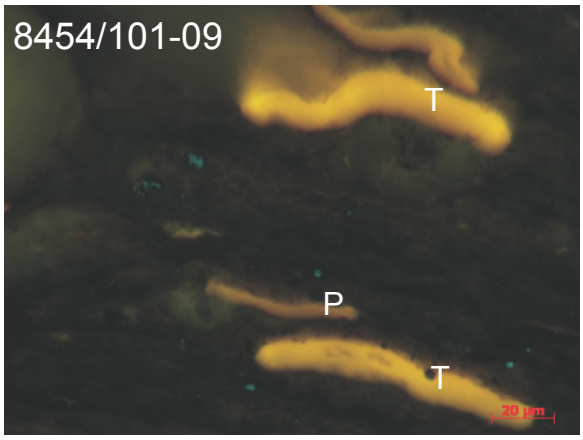
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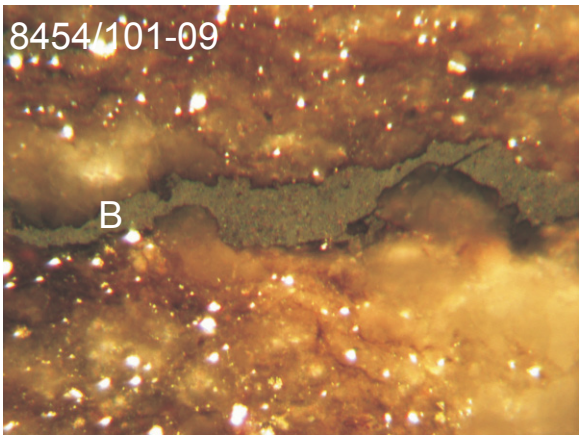
20 µm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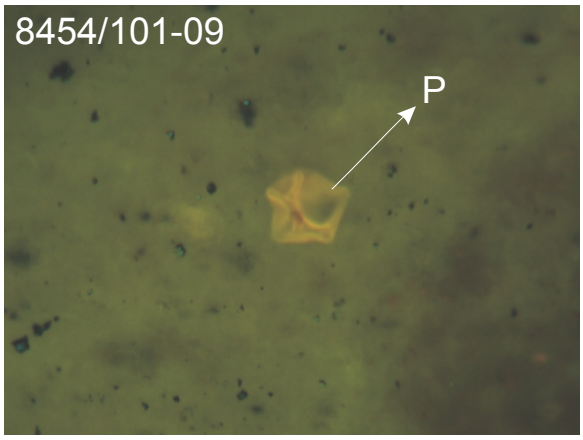
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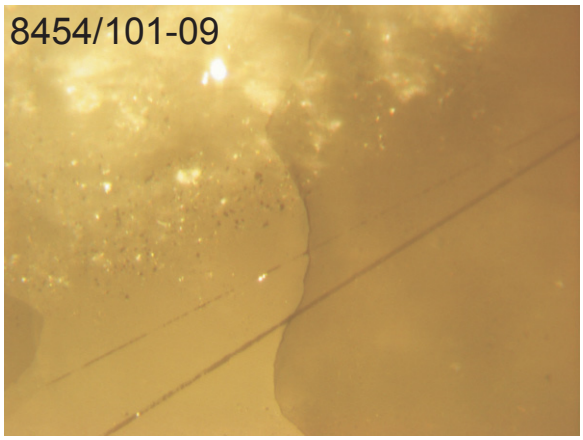
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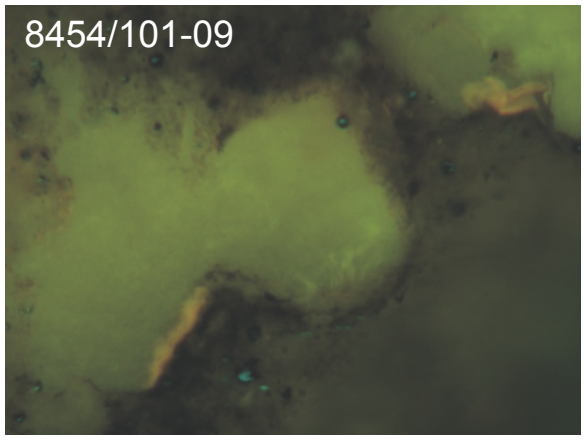
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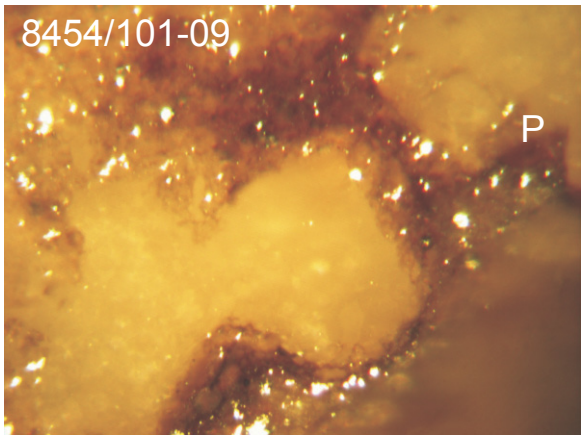
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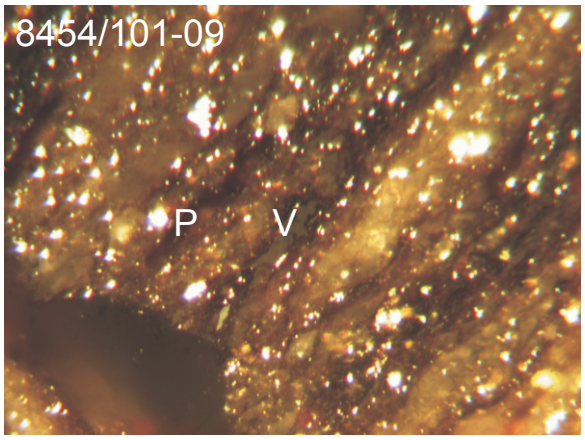
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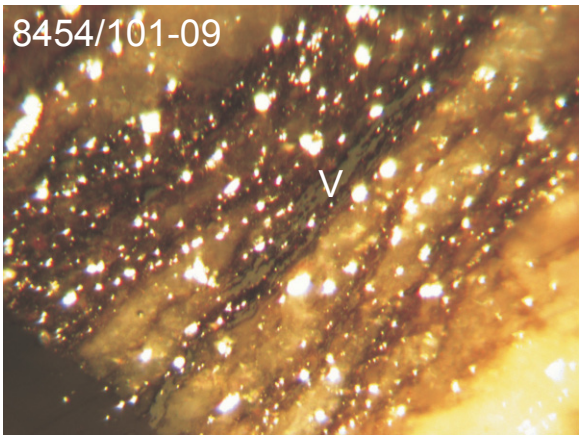
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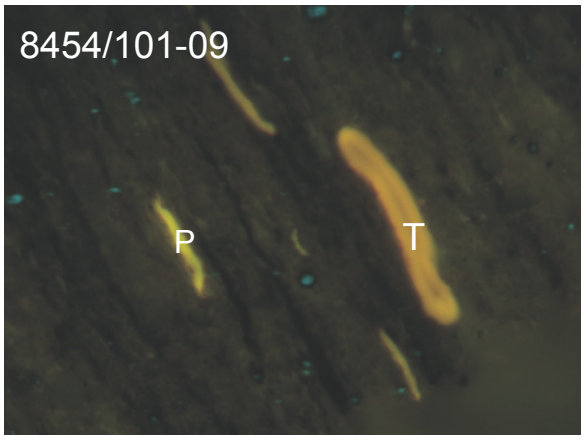
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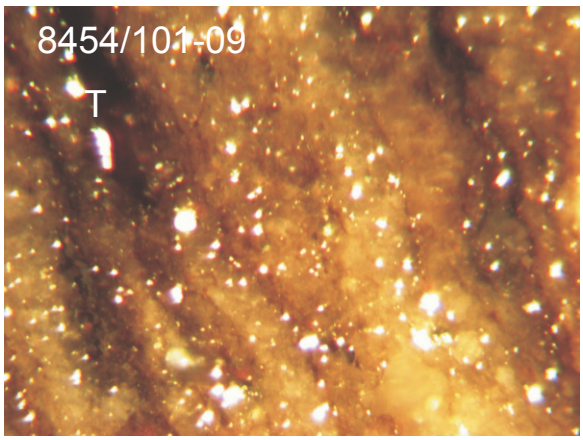
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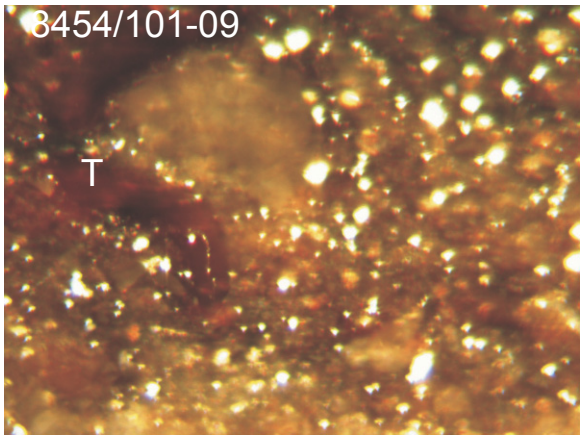
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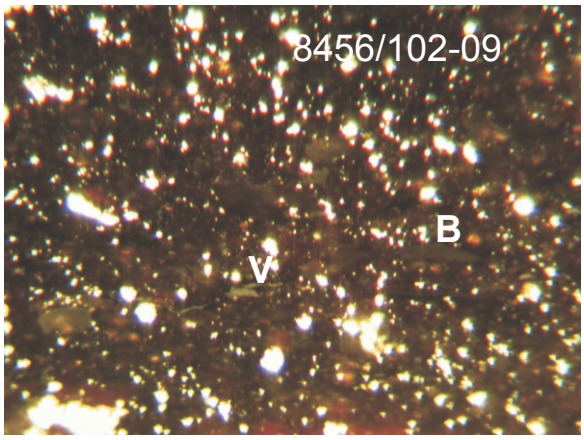
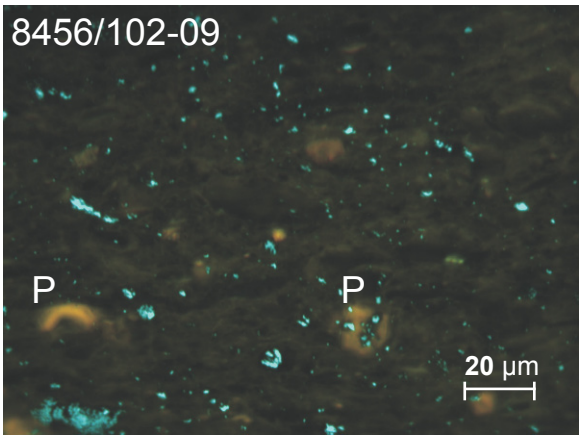
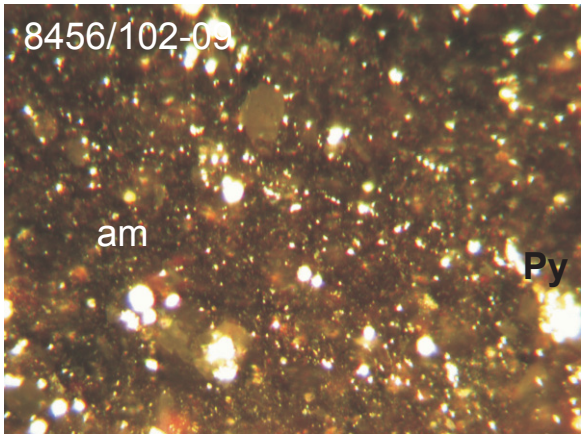
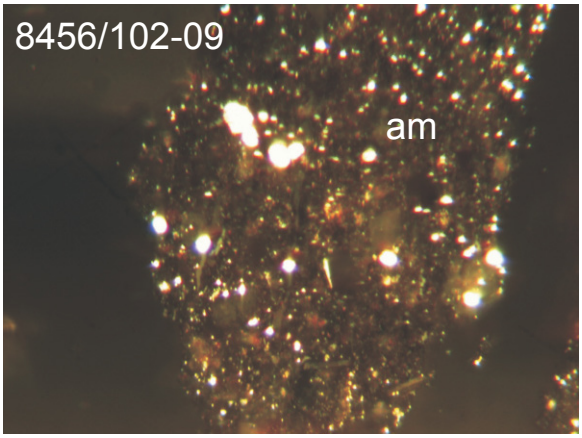
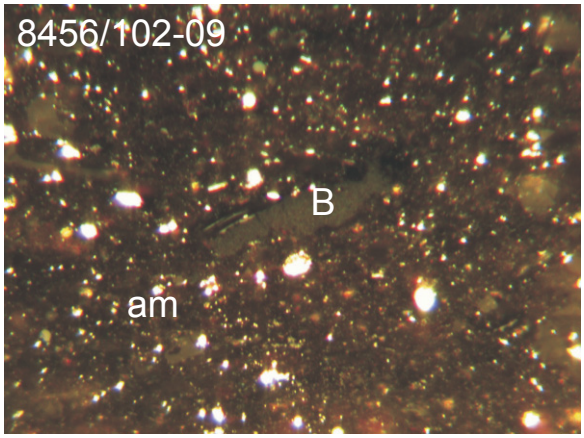
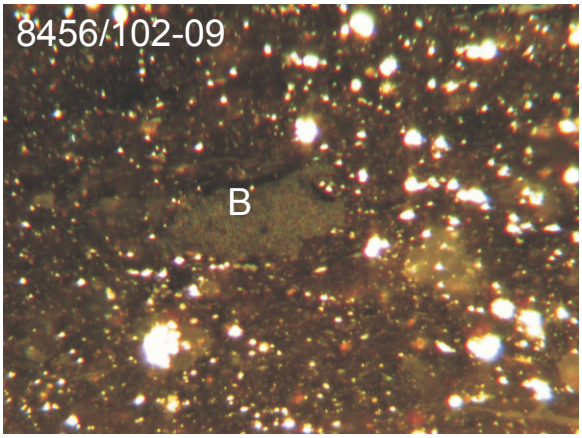




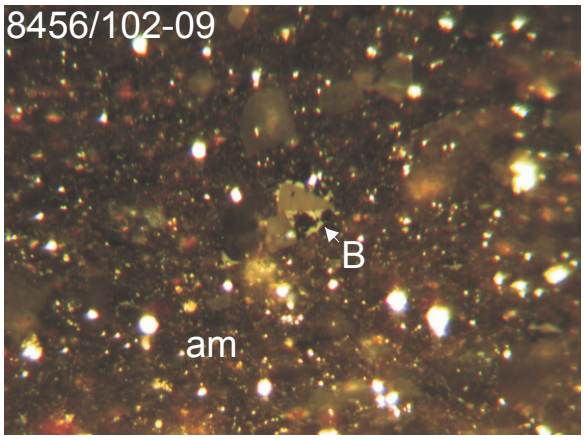


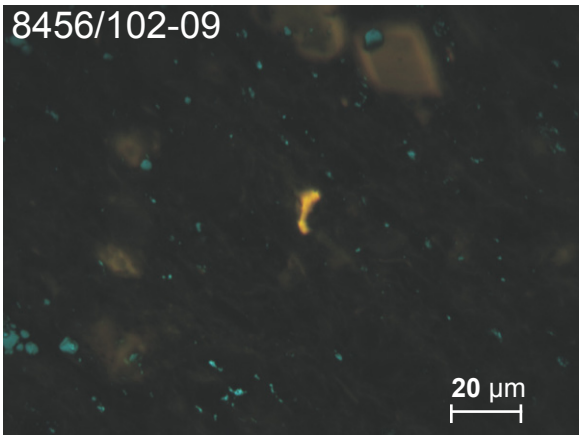


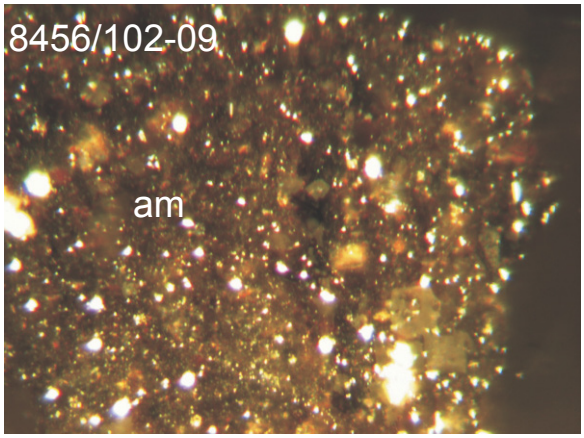


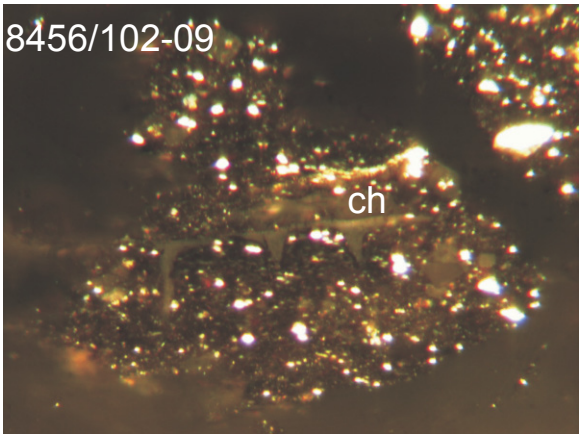


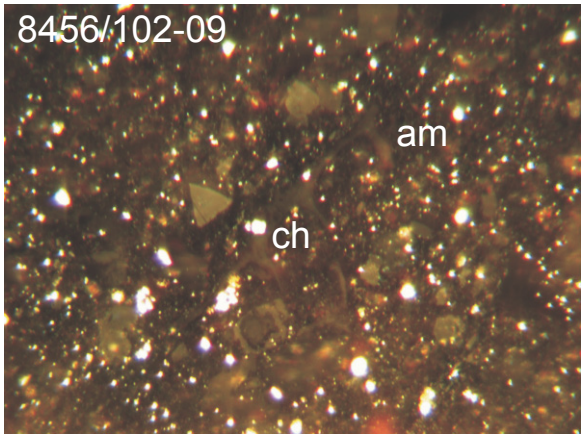
AGS 8456/GSC 102-09 (Duvernay; 100/05-17-056-08W5/00, 2358.8 m core depth). Shale rich in dark brown amorphous kerogen (am) with pyrite and micrinite inclusions in a marl matrix. Minor amount of both yellow fluorescing to non-fluorescing Prasinophyte (P) alginite, and chitinous microfossils (ch, possibly from fish remains or bone). Some granular bitumen (B) with a rare amount of allochtonous vitrinite (V) and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

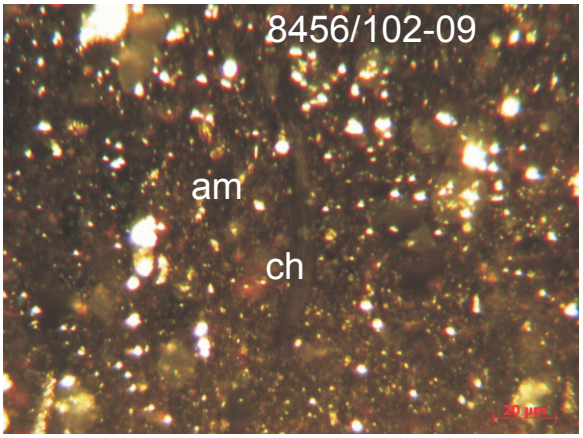

8456/102-09
B
am


8456/102-09
20 µm


8456/102-09
am


8456/102-09
ch


8456/102-09
am
ch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am
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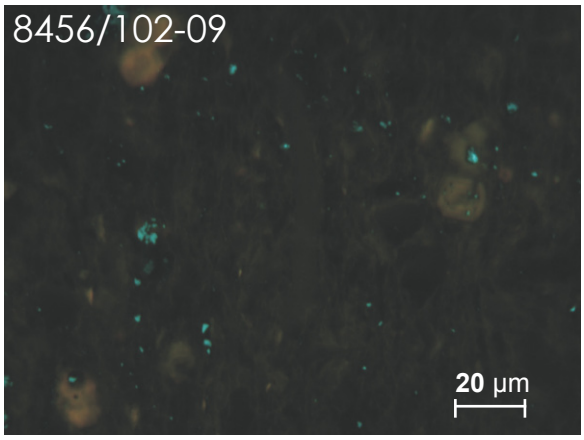
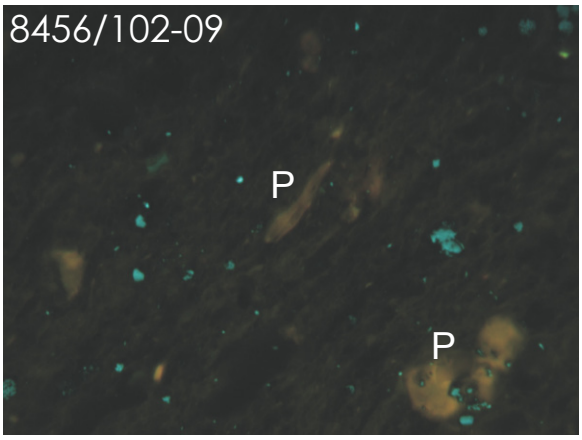
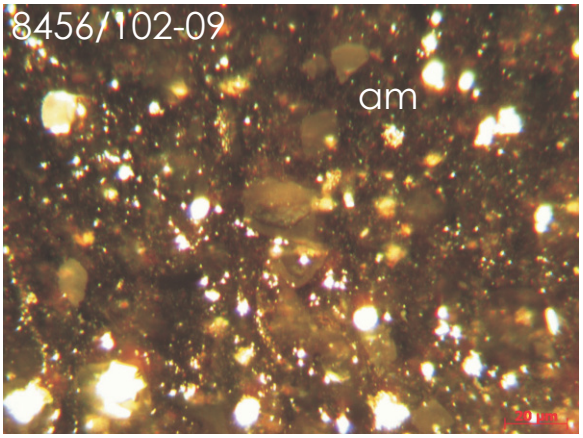
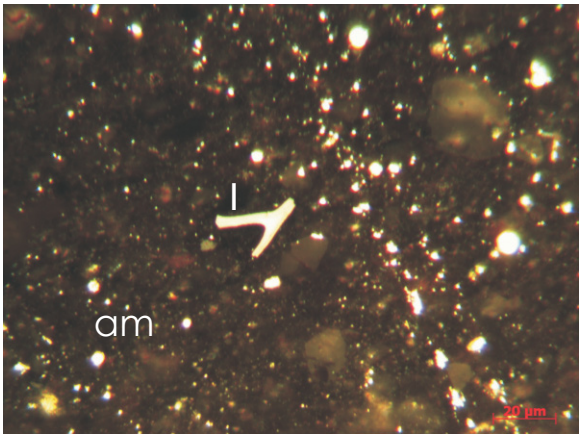
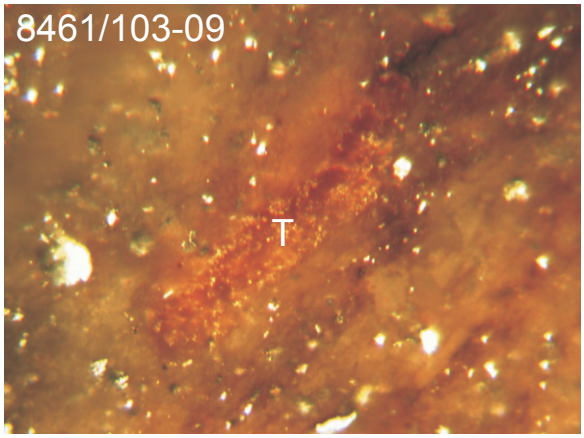
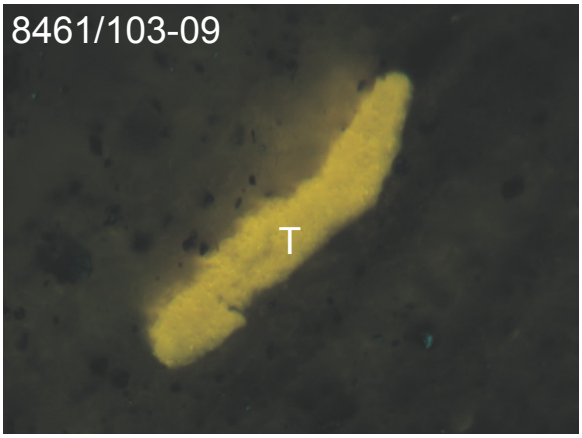

8456/102-09
20 µm

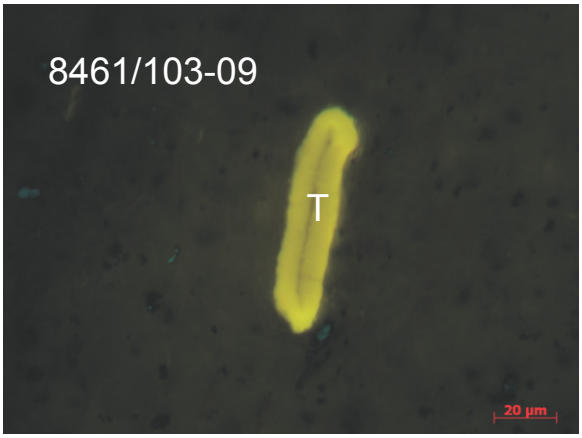

8456/102-09
P
P

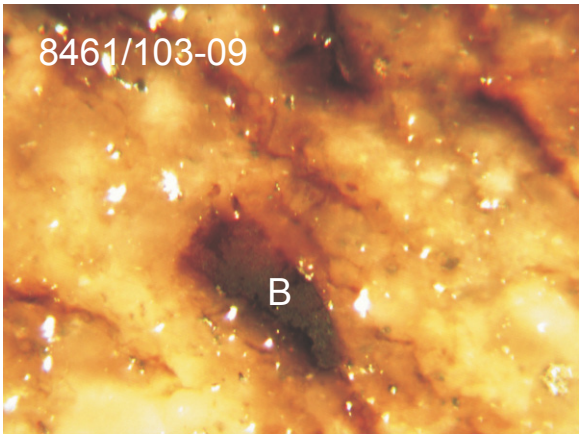

8456/102-09
am

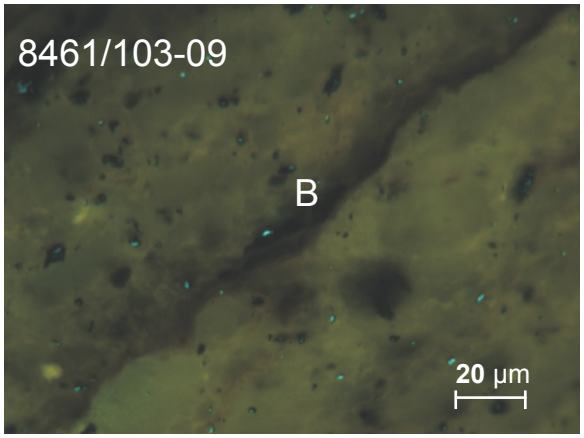

I
am

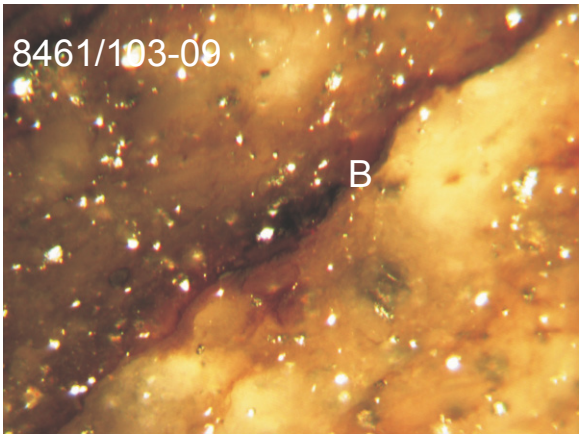




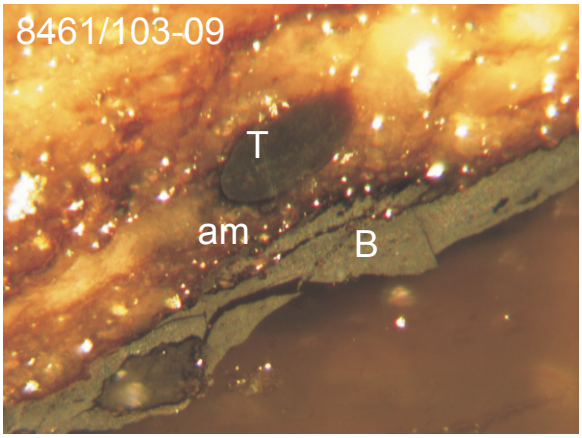


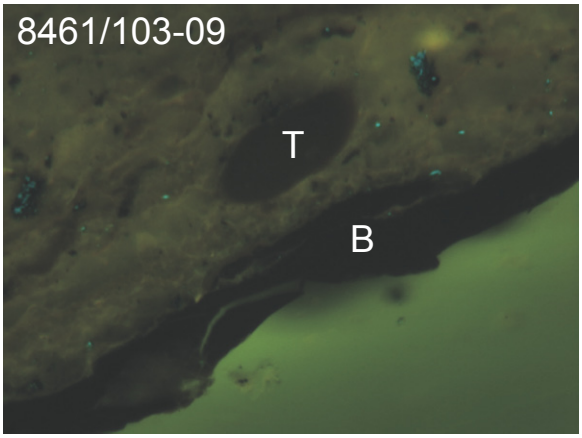


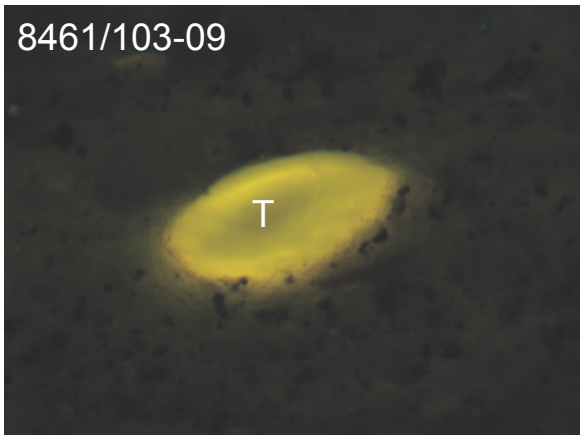




AGS 8461/GSC 103-09 (Duvernay; 100/10-09-059-11W4/00, 797.6 m core depth). Organic-rich mudstone with mostly long, thin lenses of dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing bitumen (B) are also observed proximal to amorphous kerogen lenses. Major to minor amount of yellow fluorescing thick-walled Tasmanites (T), Micrhystridium cf. acanthomorphic acritarchs, and rare Prasinophyte (P) and Leiosphaeridia (L) alginite. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).


8461/103-09
T
am
B


8461/103-09
T
B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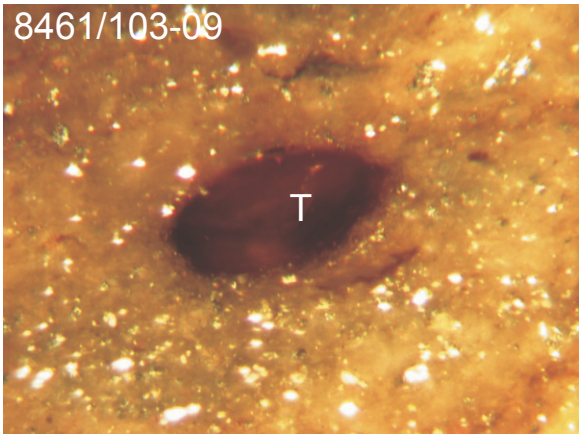
8461/103-09
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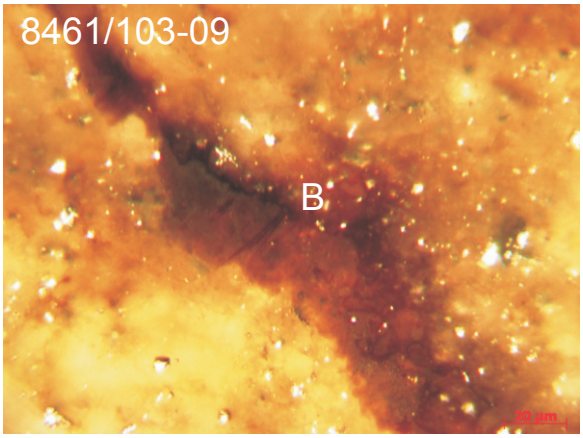
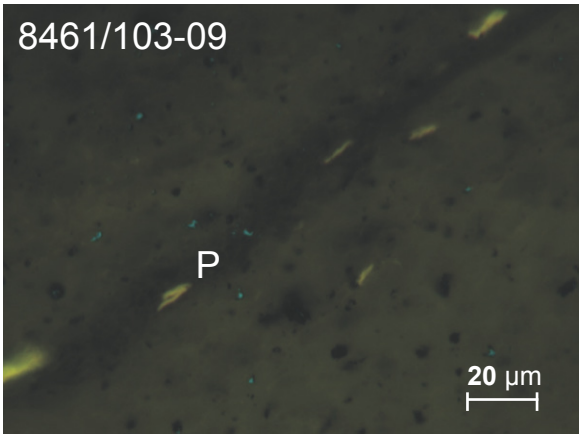
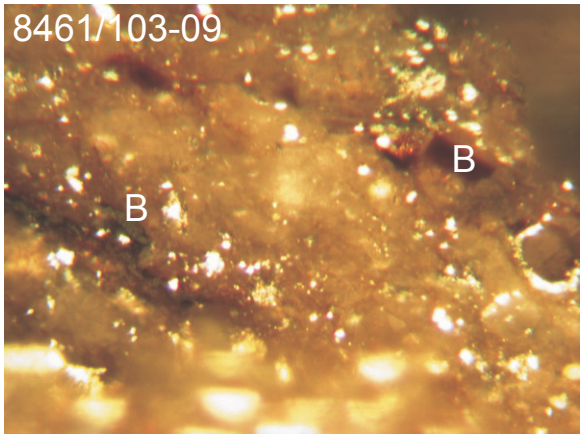
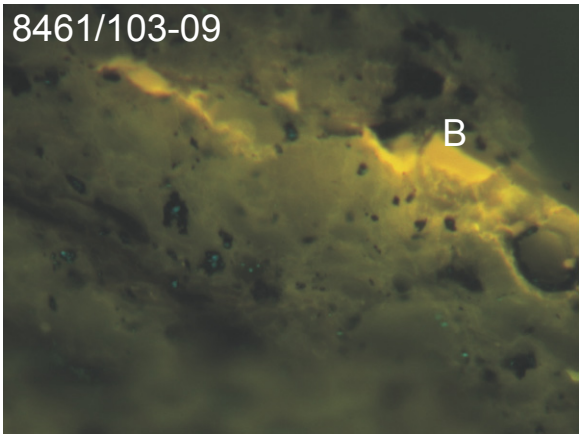
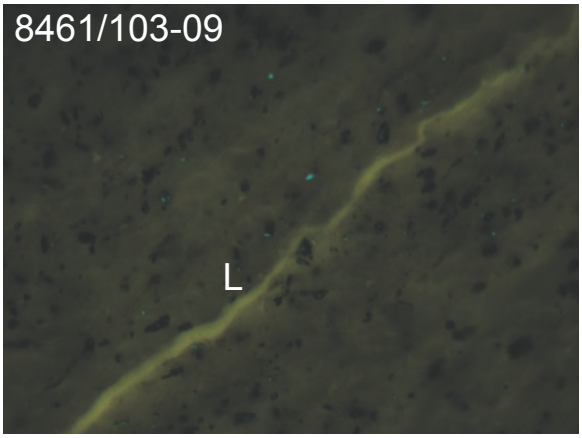

8461/103-09
B

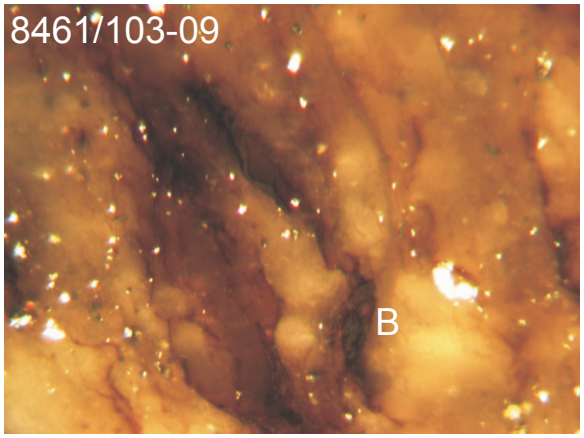

8461/103-09
P
20 µm

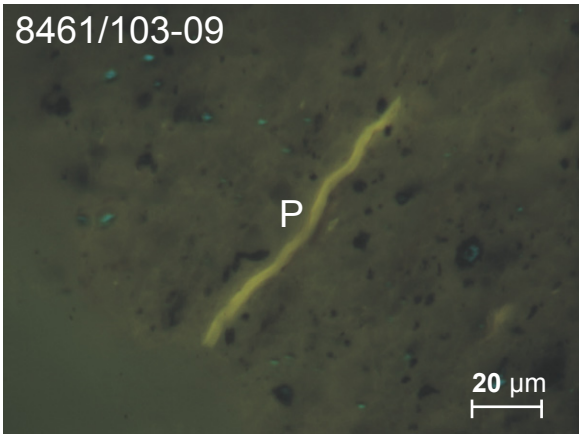

8461/103-09
B
B

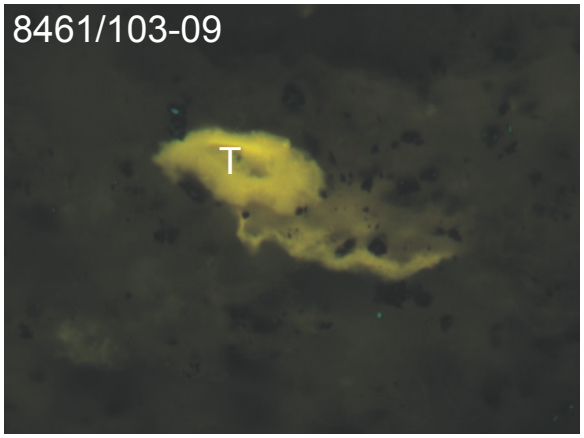

8461/103-09
B

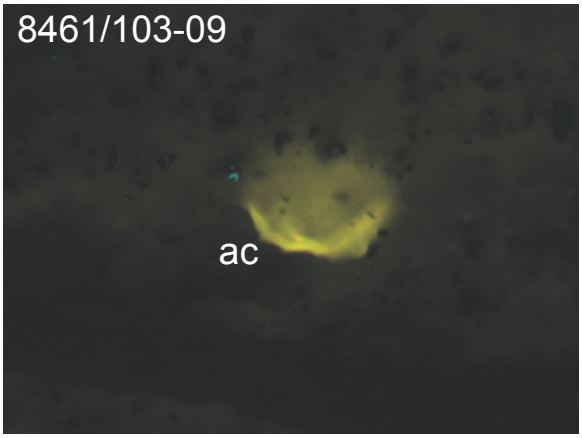

8461/103-09
ac


8461/103-09
L


8461/103-09
B


8461/103-09
P
20 µm


8461/103-09
T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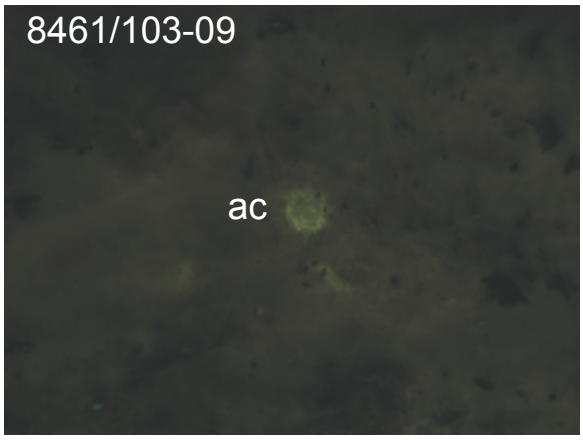
8461/103-09
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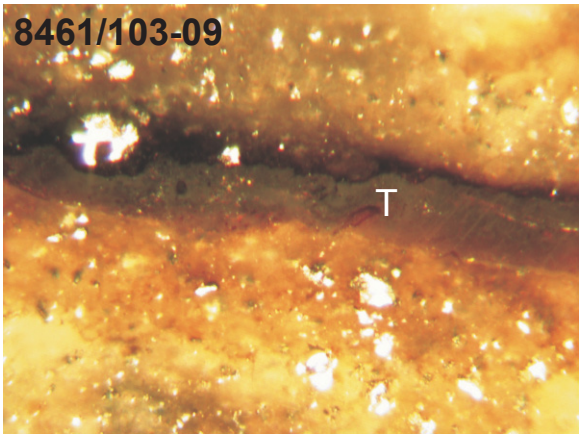
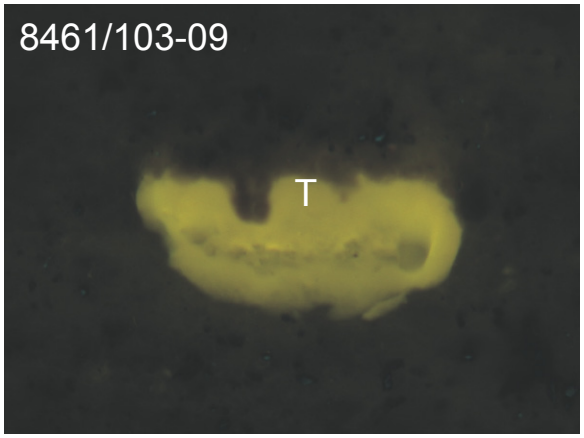
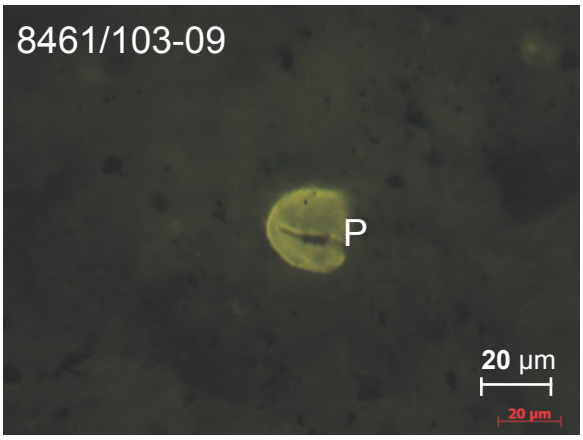
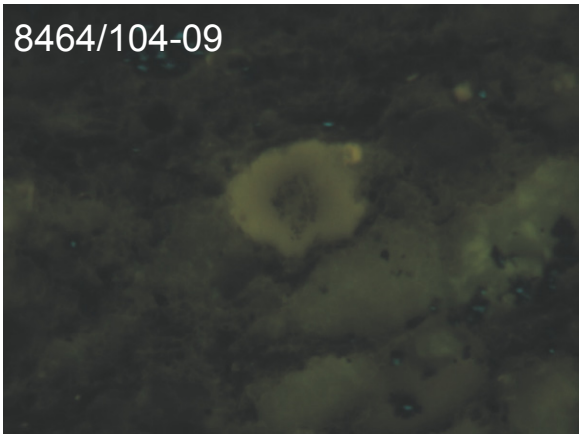
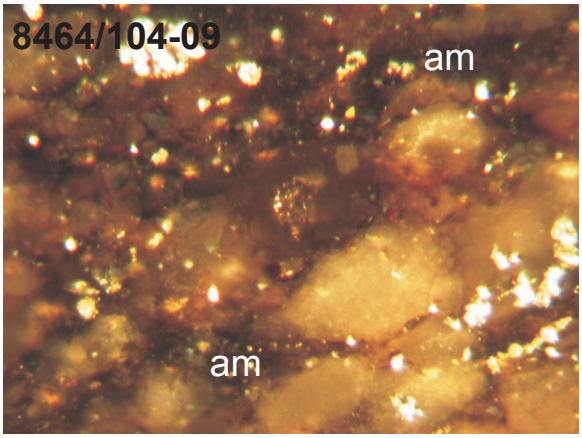
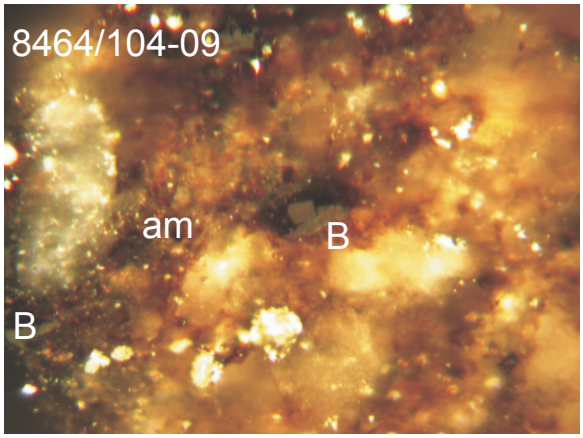

8461/103-09
T

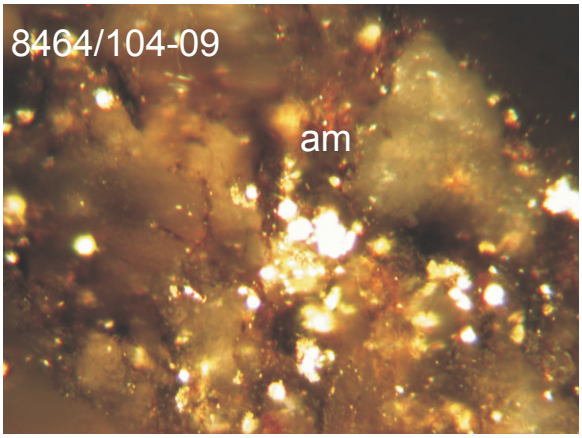

8461/103-09
T

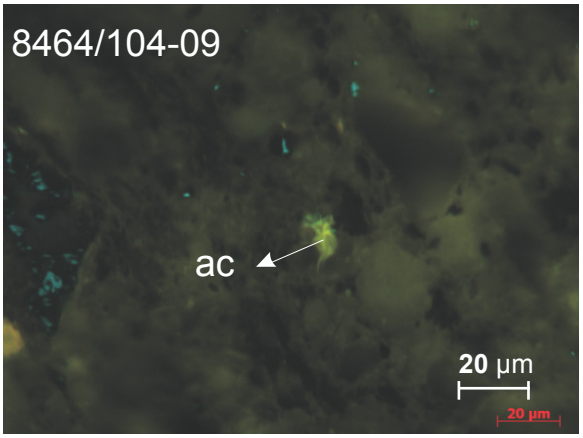

8461/103-09
P
20 µm
20 µm

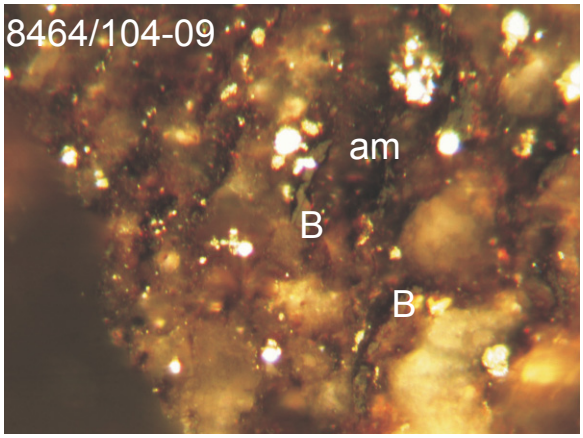




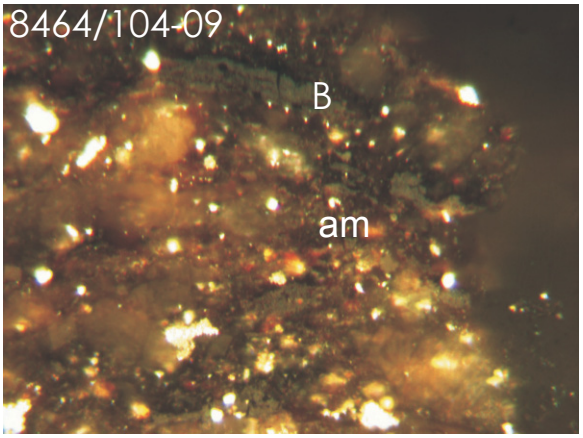


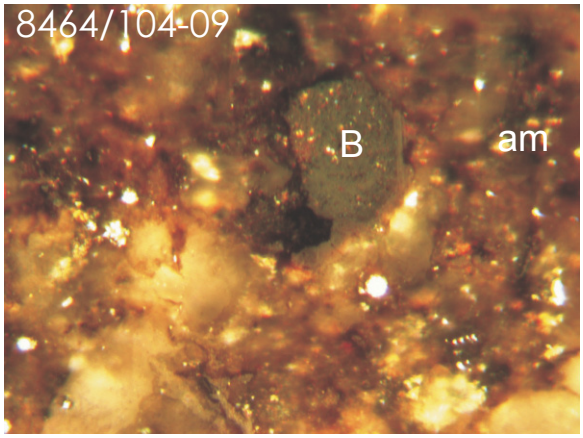


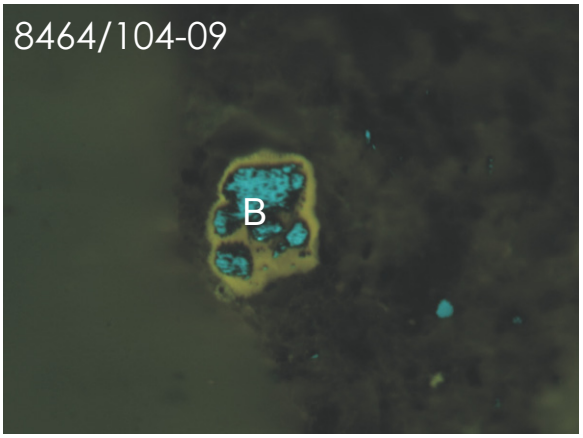


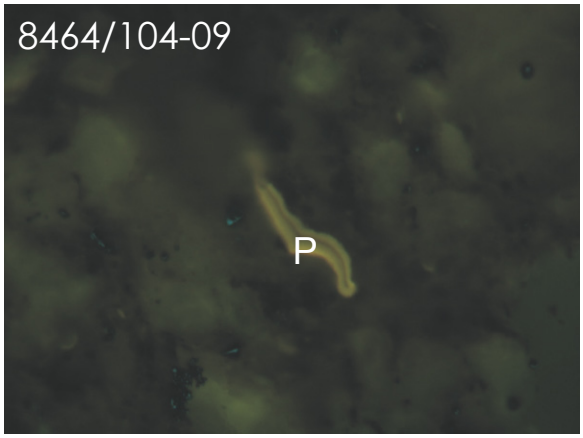


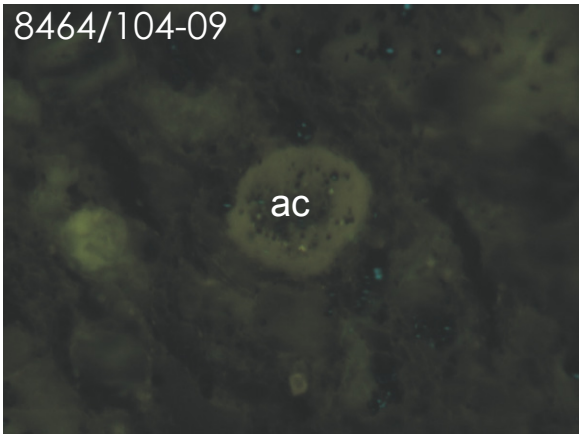
AGS 8464/GSC 104-09 (Duvernay; 102/10-27-057-21W4/00, 1136.8 m core depth). Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing to non fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor amount of yellow fluorescing Micrhystridium cf. acantho-morphic acritarchs (ac), and rare Prasinophyte (P), and Leiosphaeridia (L) alginite. Rare amount of allochtonous vitrinite and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). S = Siliceous microfossil; T = *Tasmintes*.

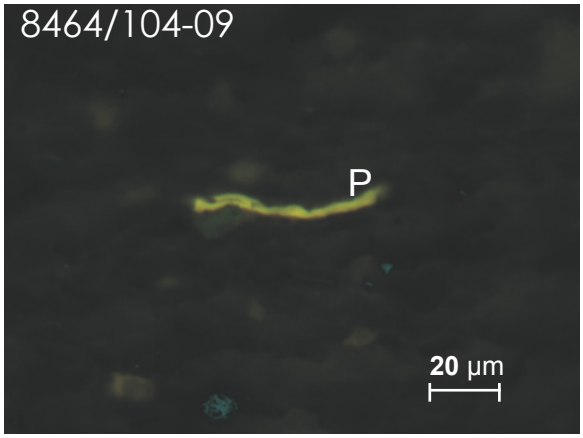

8464/104-09
B
am

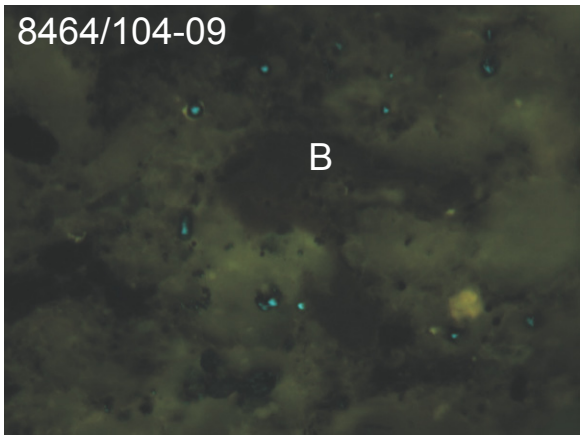

8464/104-09
B
am

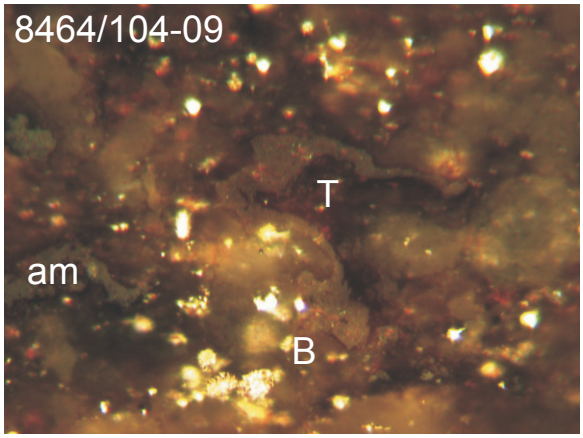

8464/104-09
B

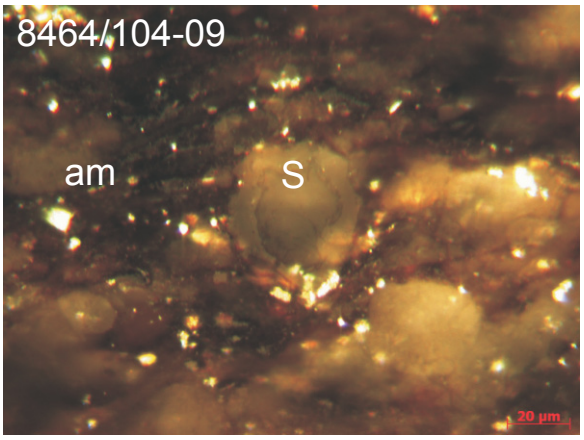

8464/104-09
P

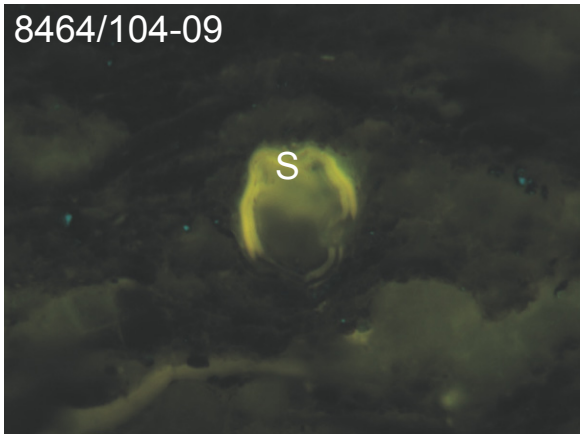

8464/104-09
ac

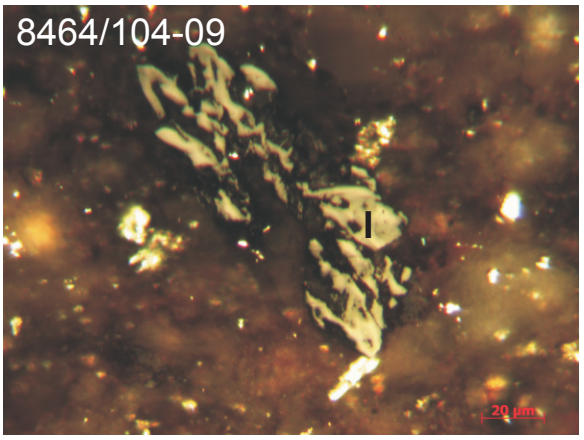

8464/104-09
P
20 µm

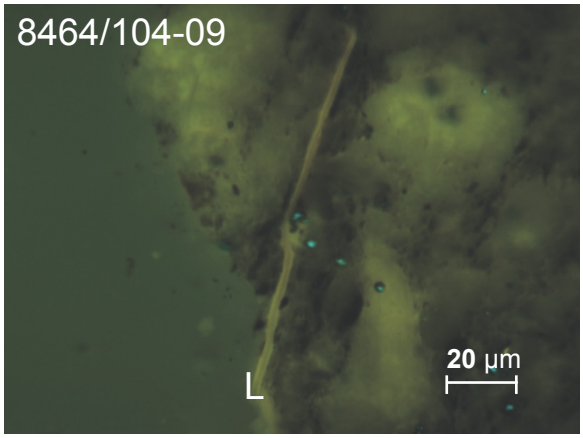

8464/104-09
B

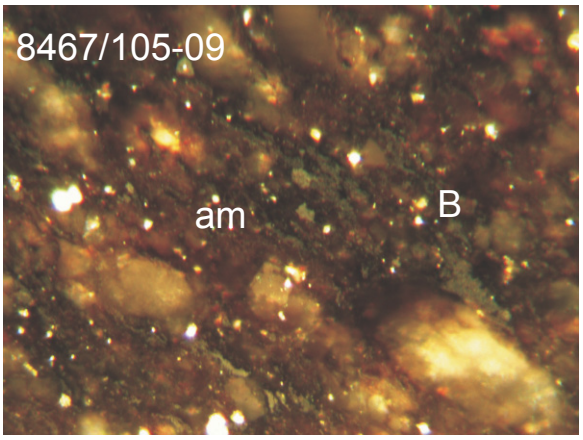

8464/104-09
T
am
B

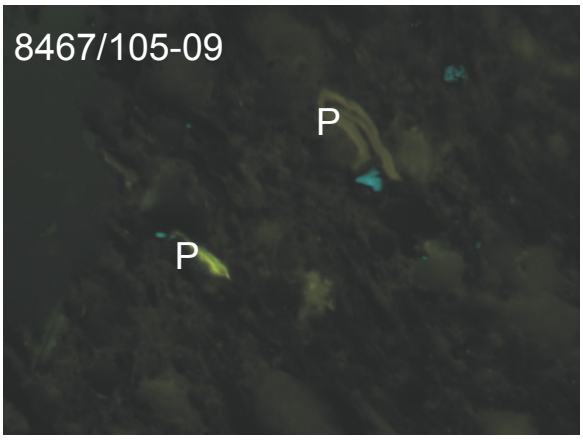

8464/104-09
am
S
20 µm

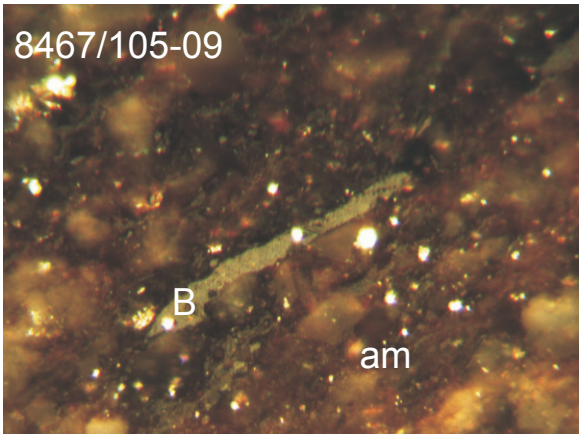

8464/104-09
S

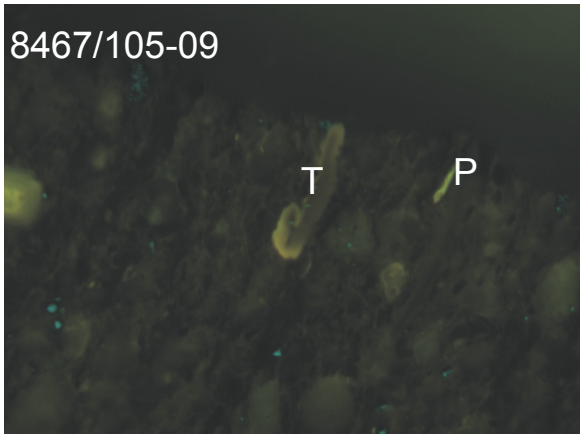

8464/104-09
I
20 µm

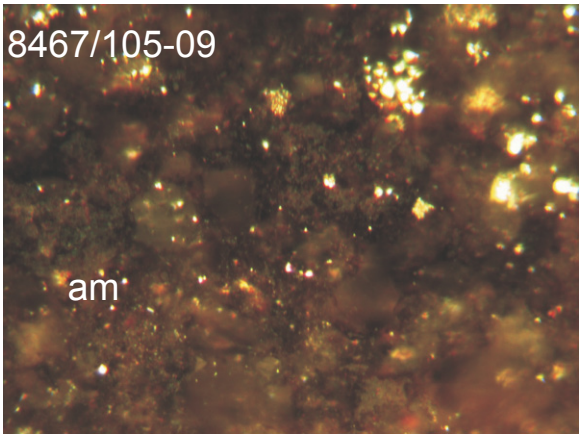

8464/104-09
L
20 µm

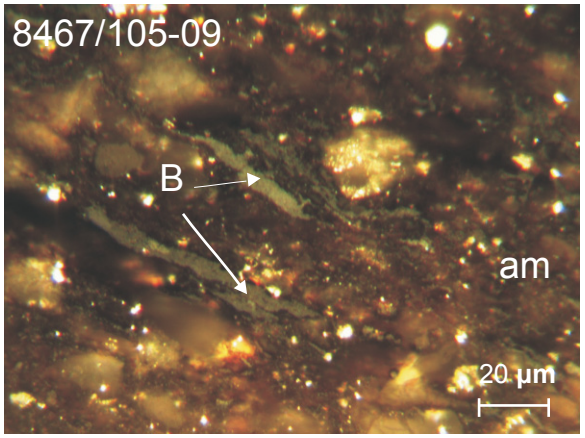




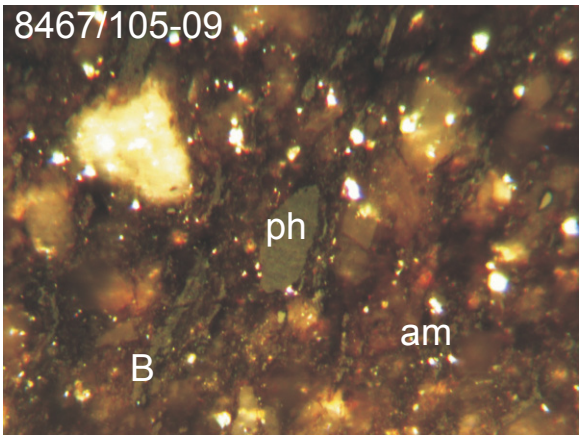


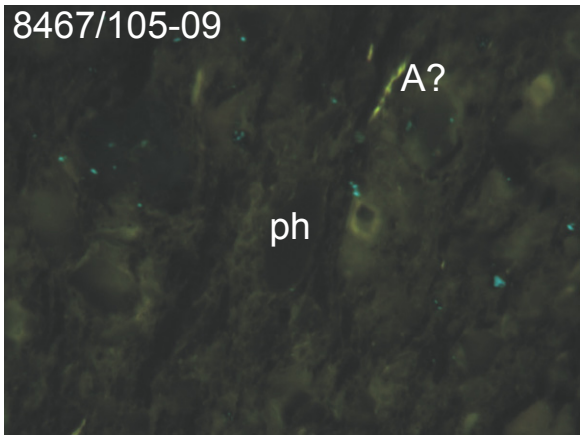


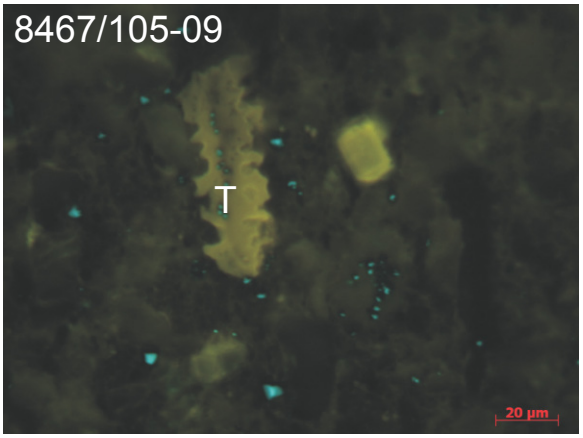


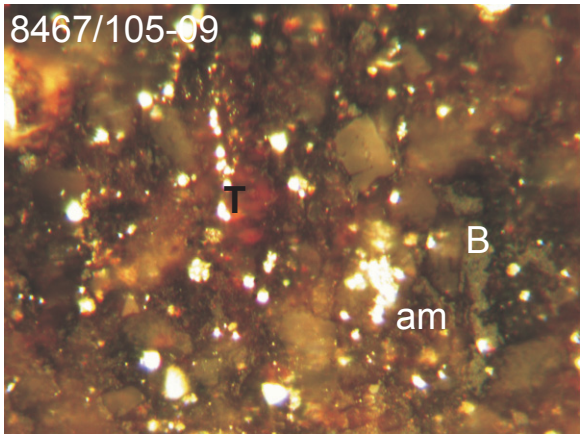


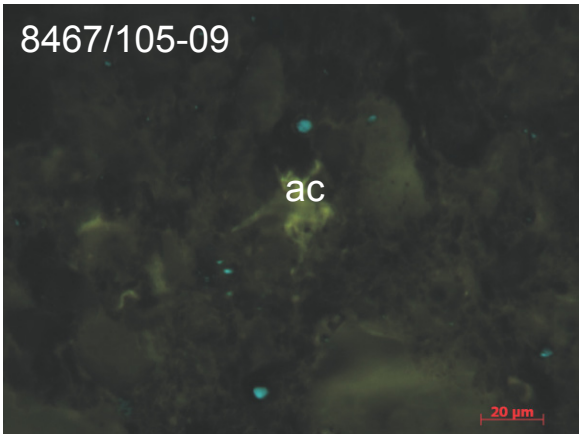
AGS 8467/GSC 105-09 (Duvernay; 102/10-27-057-21W4/00, 1149.4 m core depth). Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Orange fluorescing to non fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor to trace amount of yellow fluorescing thick-walled Tasmanites (T), Micrhystridium cf. acanthomorphic acritarchs (ac) and Prasinophyte (P) alginite. Rare amount of weak fluorescing sporinite (Sp), allochtonous vitrinite (V) and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; ph = Phosphatic nodule.

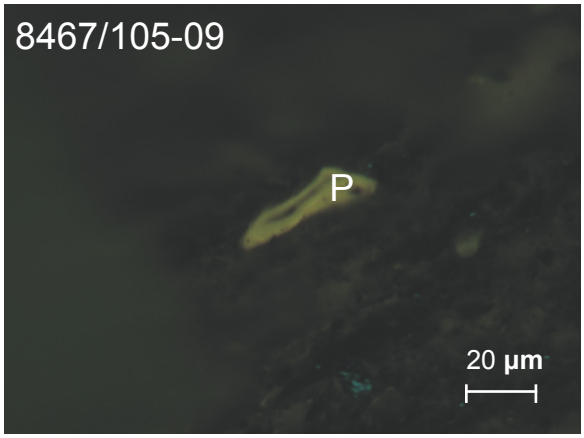

8467/105-09
ph
am
B

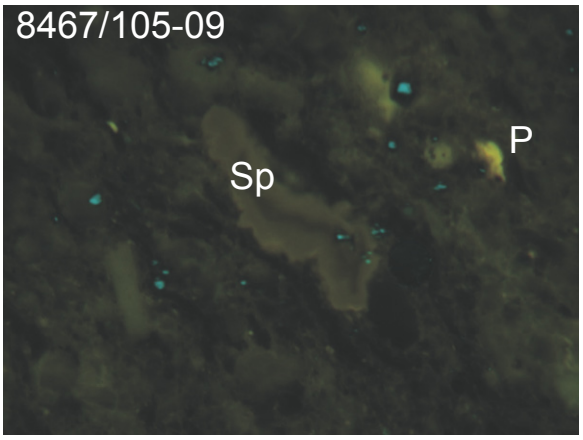

8467/105-09
A?
ph

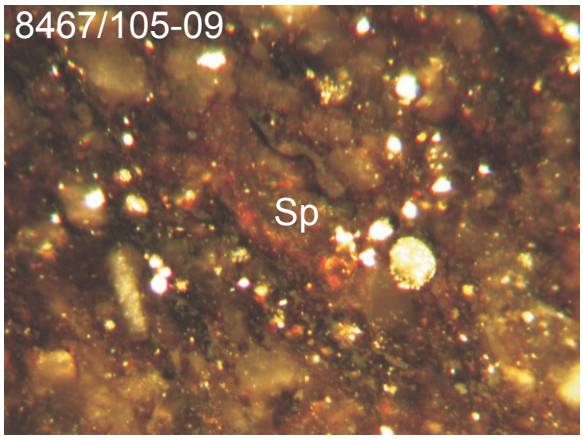

8467/105-09
T
20 µm

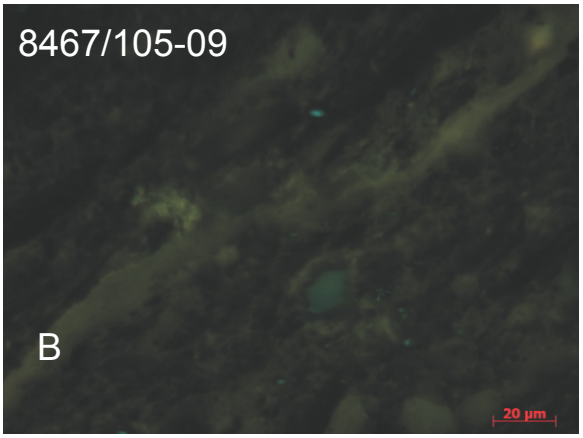

8467/105-09
T
B
am

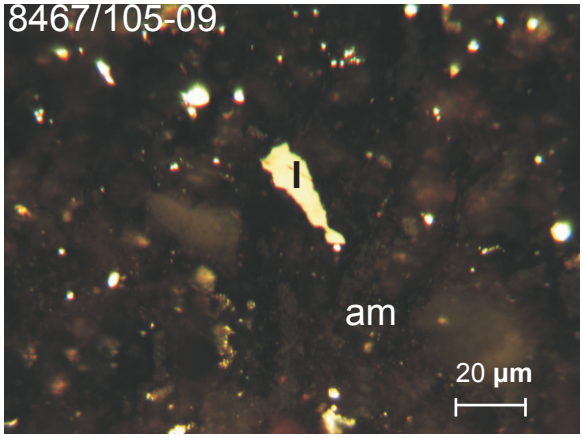

8467/105-09
ac
20 µm

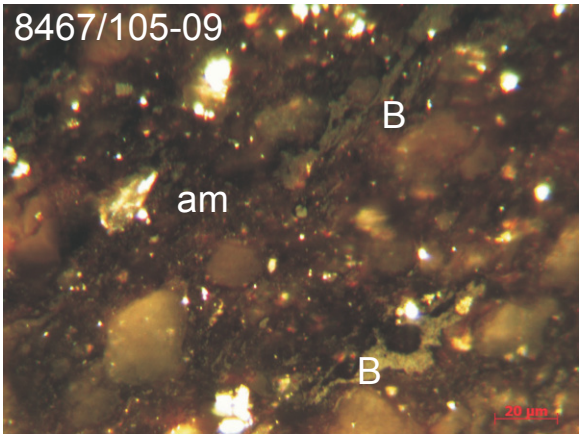

8467/105-09
P
20 µm

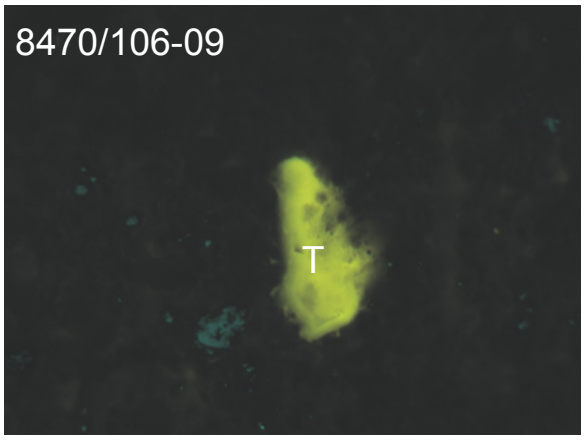

8467/105-09
P
Sp

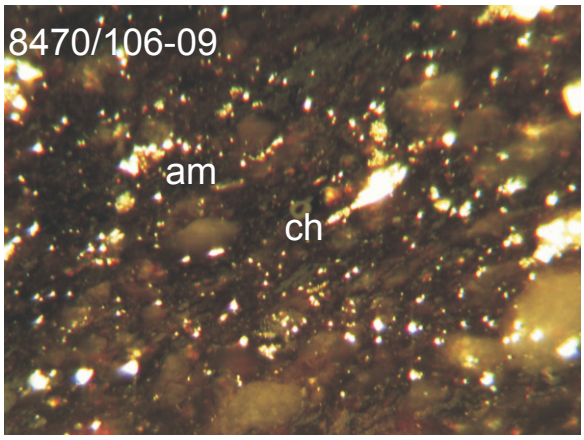

8467/105-09
Sp

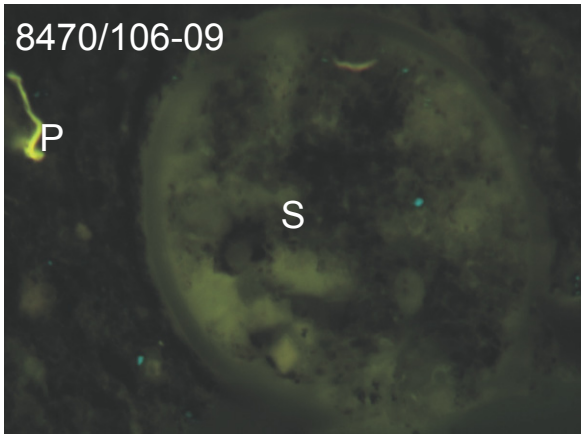

8467/105-09
B
20 µm

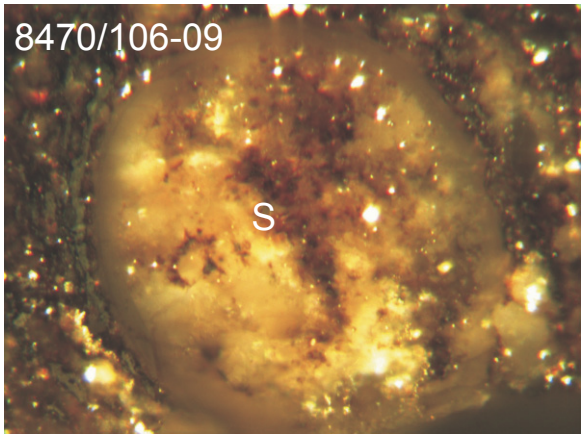

8467/105-09
I
am
20 µm

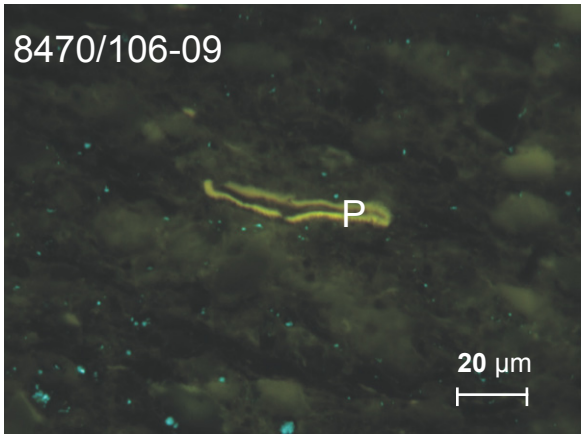

8467/105-09
B
am
B
20 µm

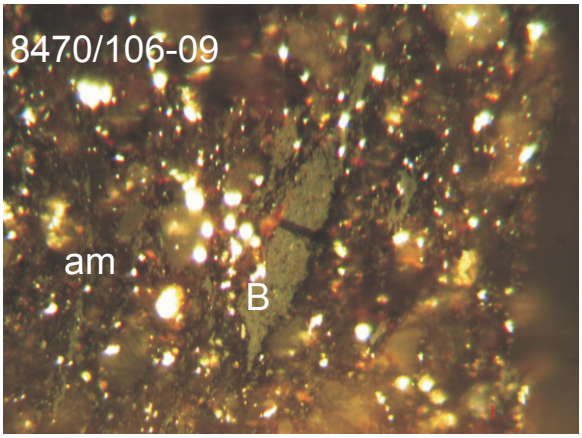




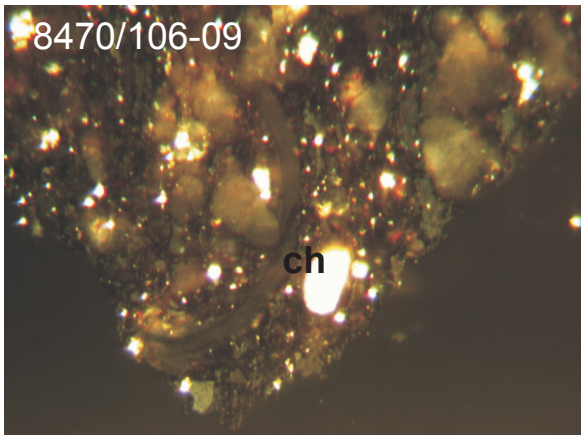


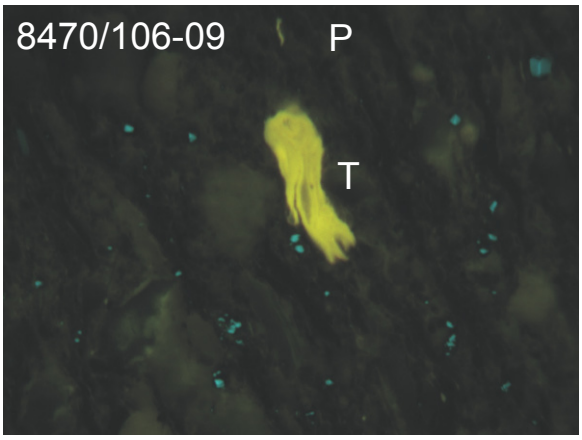


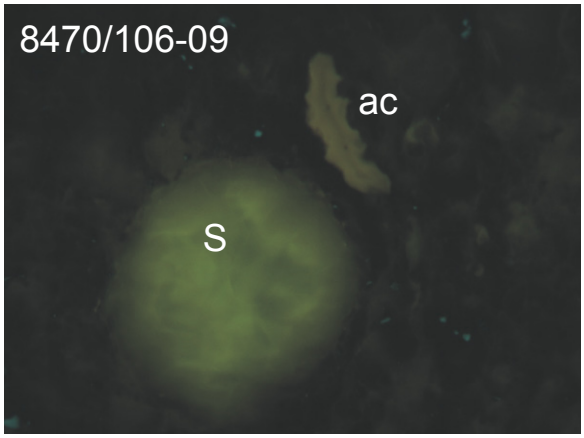


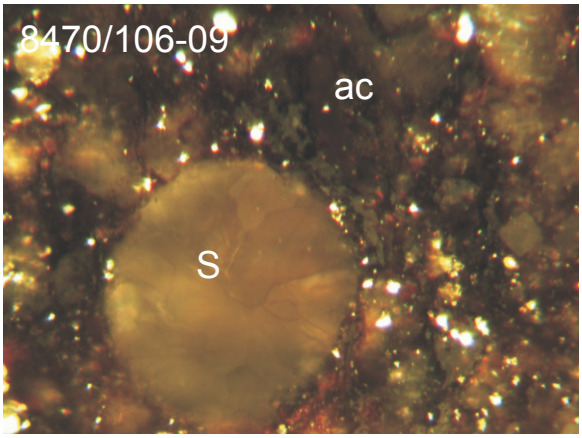


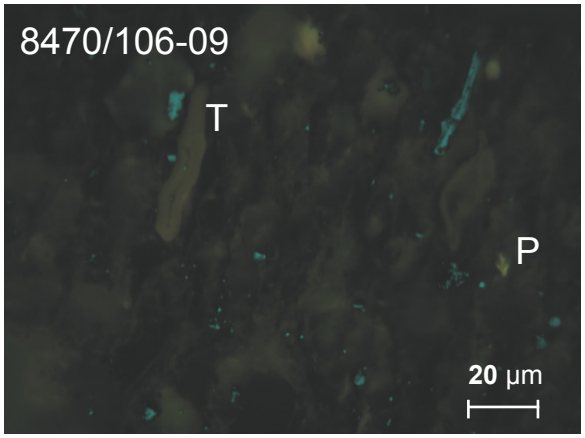
AGS 8470/GSC 106-09 (Duvernay; 102/10-27-057-21W4/00, 1153.7 m core depth). Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Brownish, red fluorescing solid to non-fluorescing granular bitumen (B) are also observed proximal to amorphous kerogen lenses. Minor to trace amount of siliceous microfossils (S), yellow fluorescing thick-walled Tasmanites (T), Prasinophyte (P) alginite, and chitinous microfossils (ch, possibly from translucent mineralized fish remains or thin, long grey chitinozoans). Very rare amount of allochtonous vitrinite and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ac = acanthomorphic acritarchs.

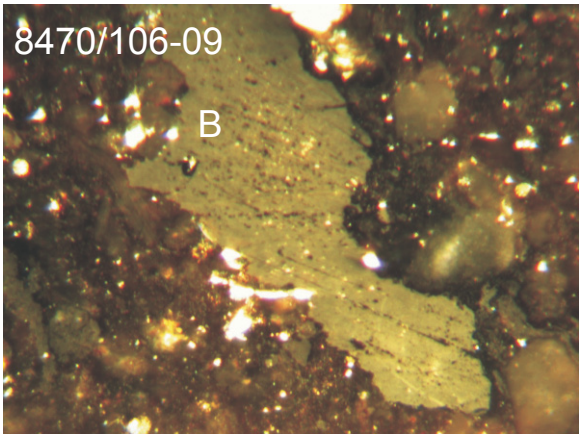

8470/106-09
ch

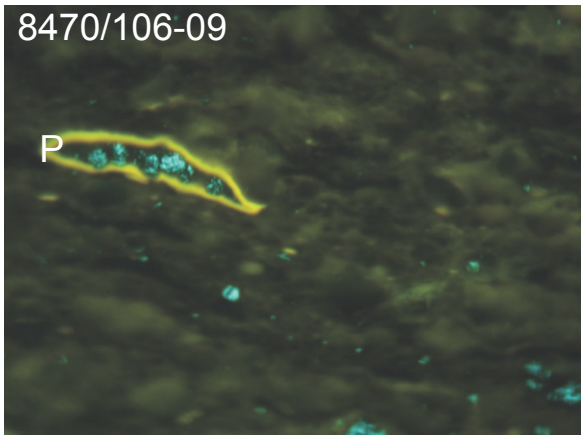

8470/106-09
P
T

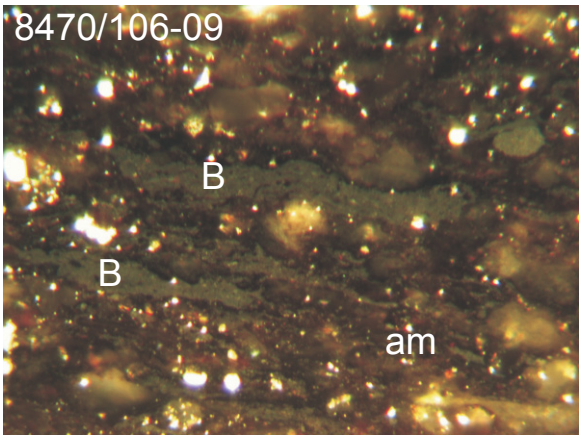

8470/106-09
ac
S

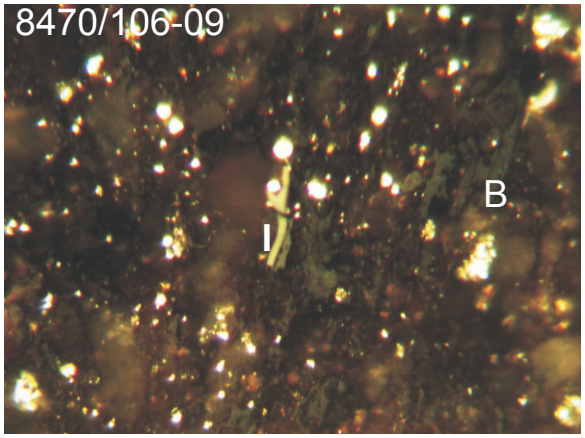

8470/106-09
ac
S

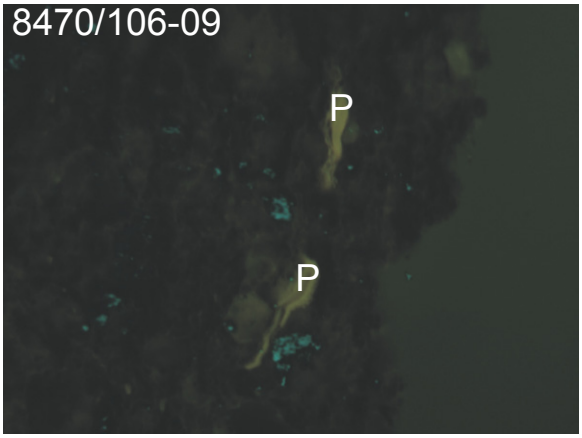

8470/106-09
T
P
20 µm

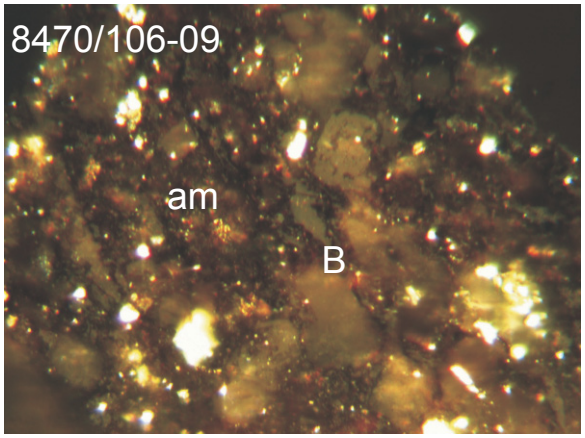

8470/106-09
B

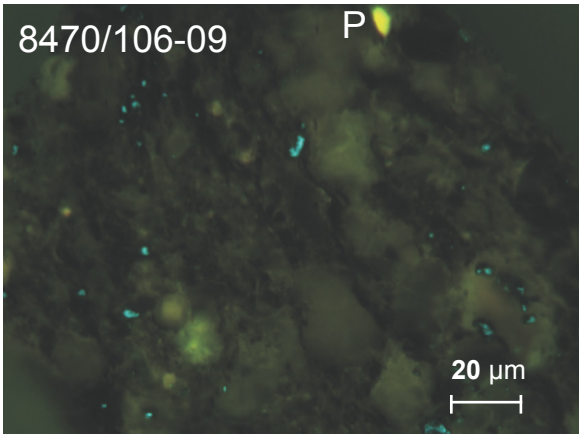

8470/106-09
P

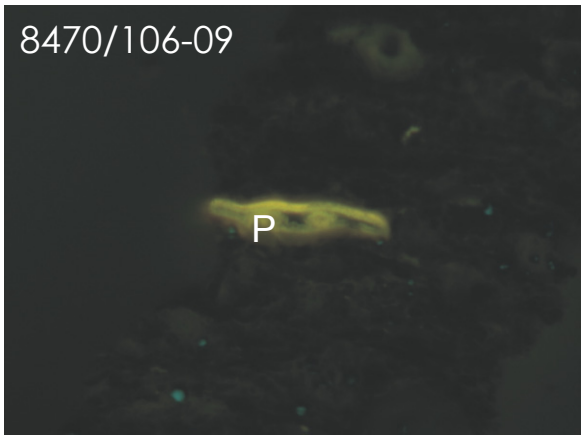

8470/106-09
B
B
am

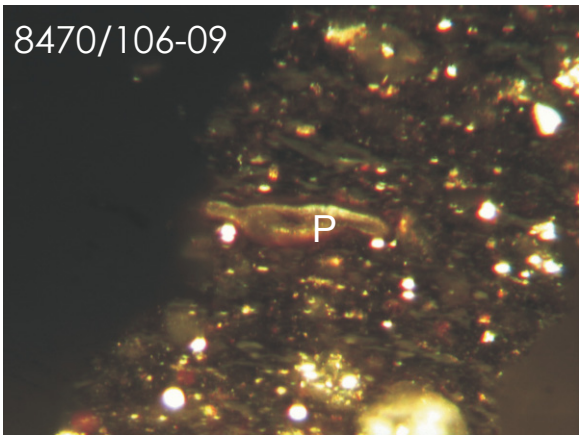

8470/106-09
B
I

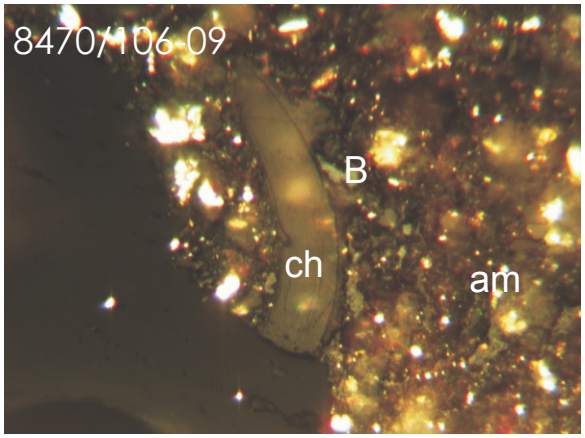

8470/106-09
P
P

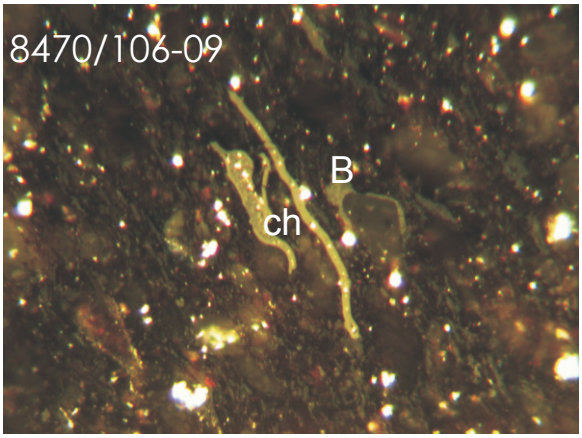

8470/106-09
am
B

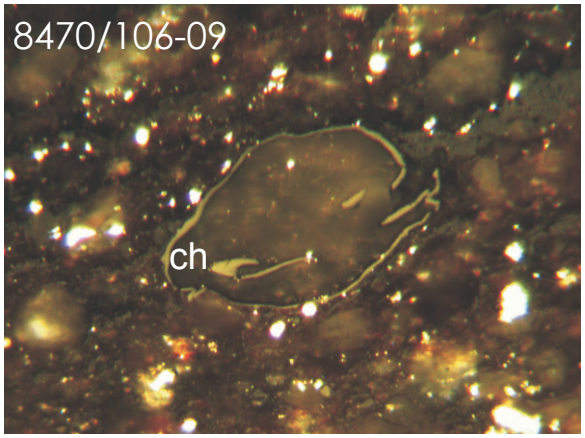

8470/106-09
P
20 µm


8470/106-09
P


8470/106-09
P


8470/106-09
B
ch
am


8470/106-09
B
ch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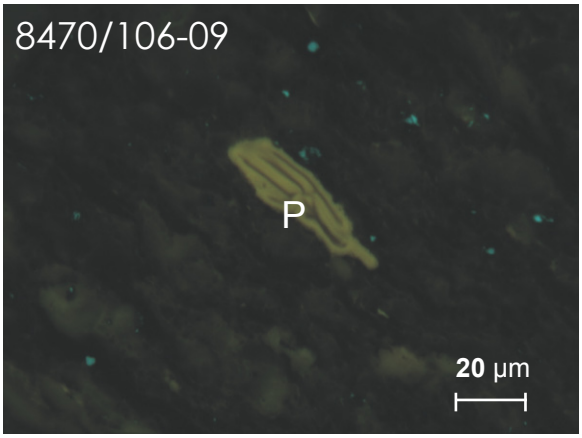
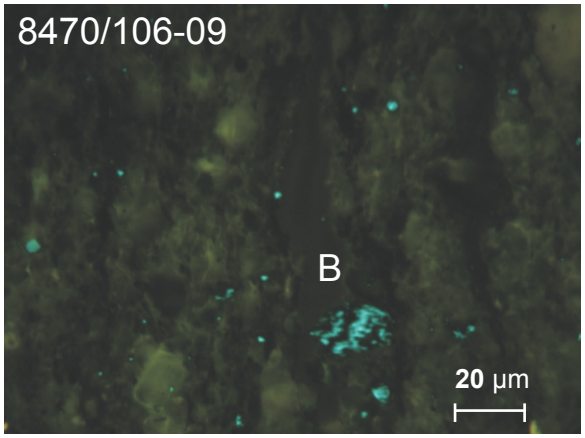
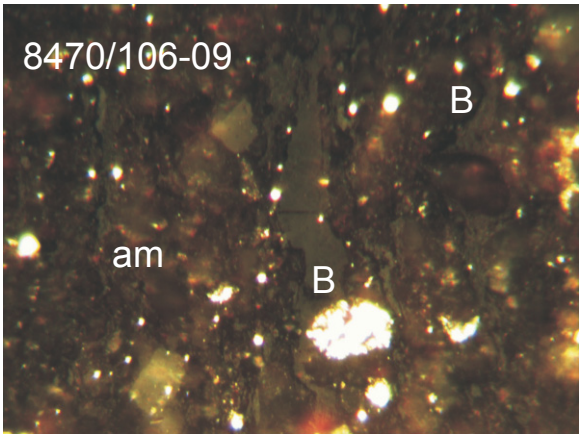
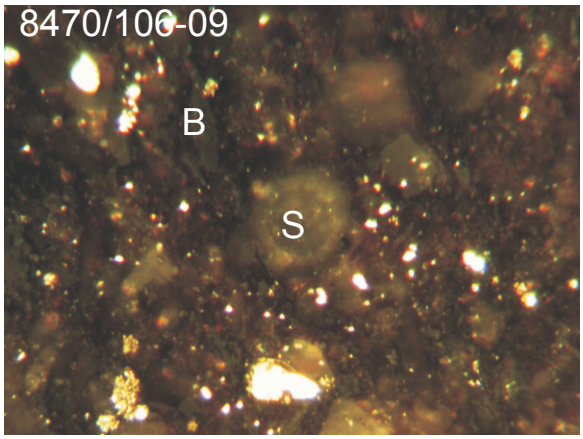
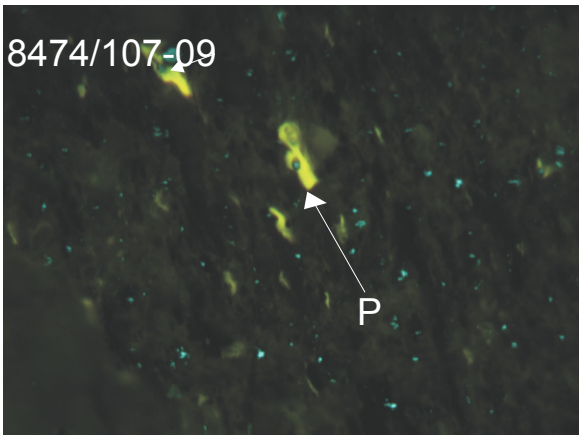
ch

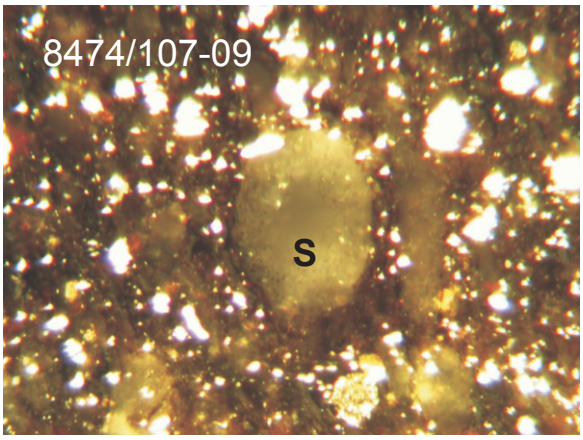

8470/106-09
P
20 µm

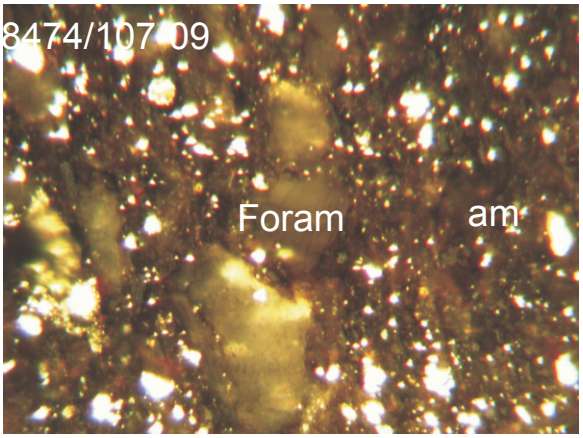

8470/106-09
B
20 µm

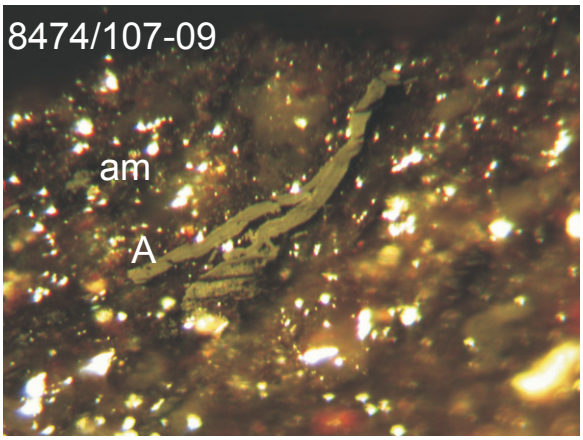

8470/106-09
B
am
B

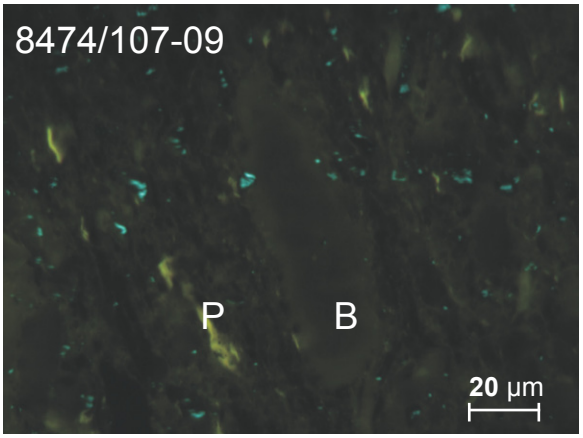

8470/106-09
B
S

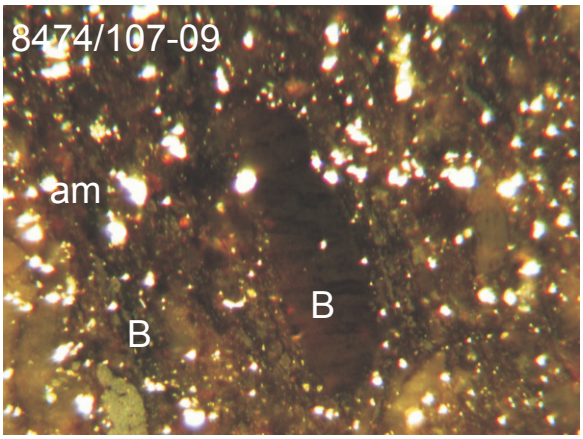




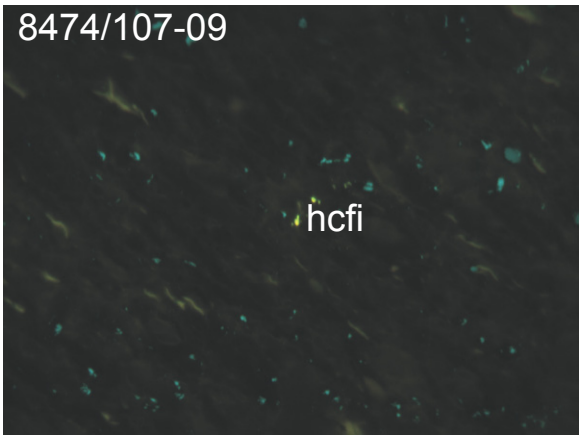


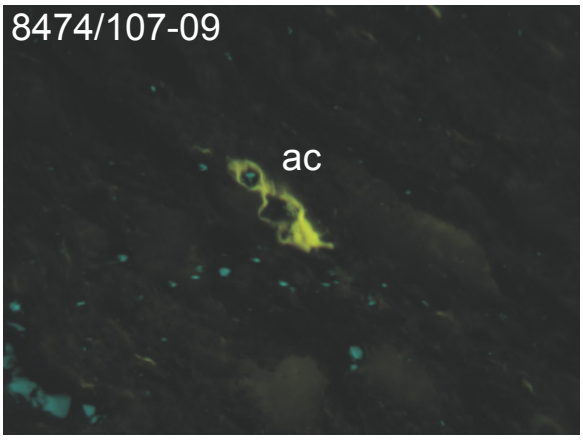


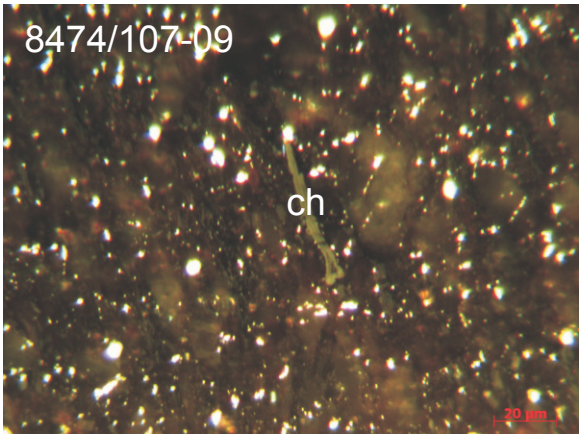


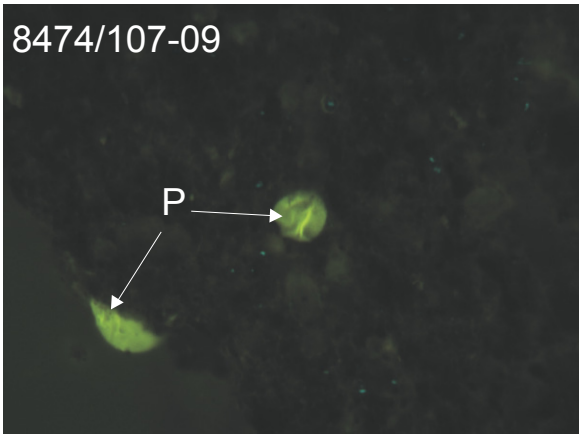


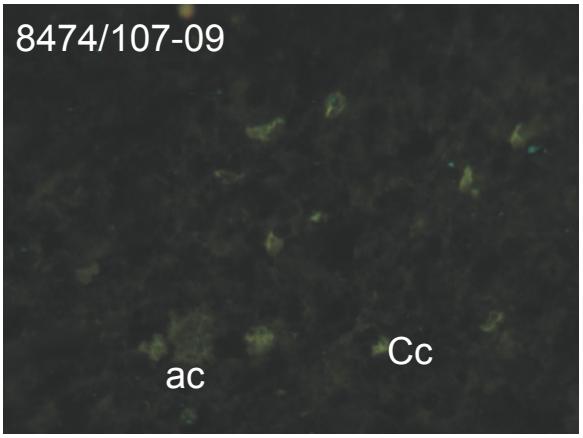
AGS 8474/GSC 107-09 (Duvernay; 102/10-27-057-21W4/00, 1162.6 m core depth). Organic-rich mudstone with mostly dark brown kerogen (am) with some pyrite and micrinite inclusions. Brownish red fluorescing solid to non-fluorescing granular bitumen (B) are also observed near amorphous kerogen lenses. Minor to trace amount of siliceous microfossils (S), yellow fluorescing Prasinophyte (P) alginite, spiny acanthomorphic acritarchs (ac) and chitinous microfossils (ch, possibly chitinozoans). Very rare amount of weak fluorescing sporinite (Sp), foraminifera (foram) with well-preserved chamber and allochtonous inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; hcfi = hydrocarbon fluid inclusion; Cc = cocoidal alginite.

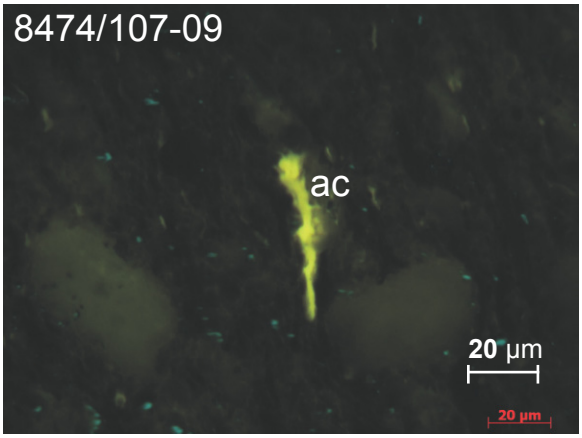

8474/107-09
hcfi

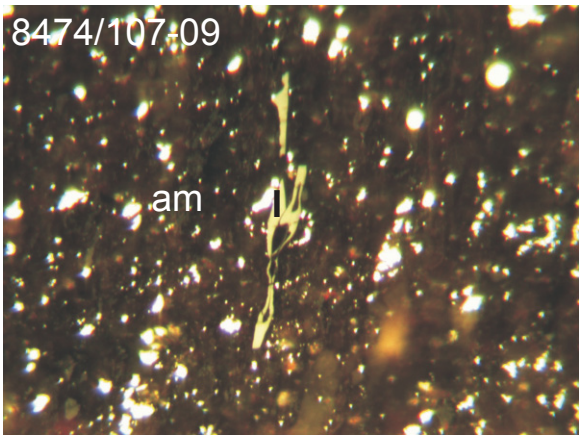

8474/107-09
ac

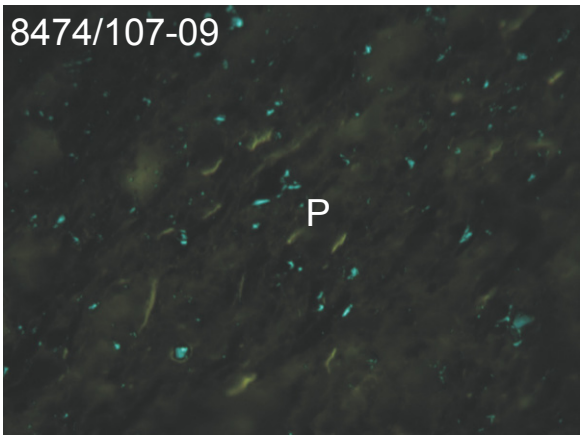

8474/107-09
ch
20 µm


8474/107-09
P


8474/107-09
ac
Cc


8474/107-09
ac
20 µm
20 µm


8474/107-09
am
I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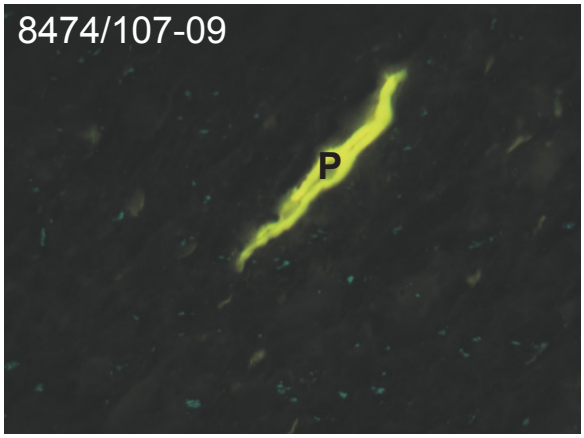
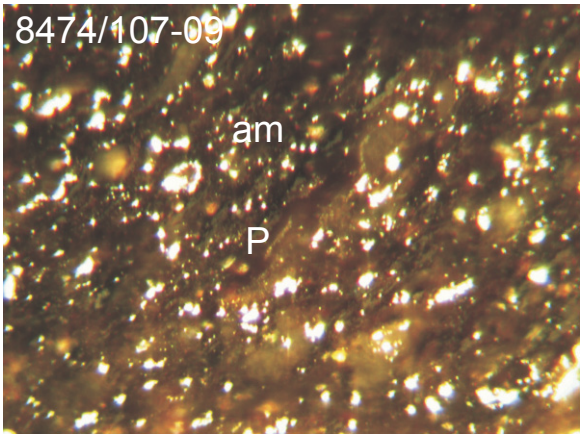
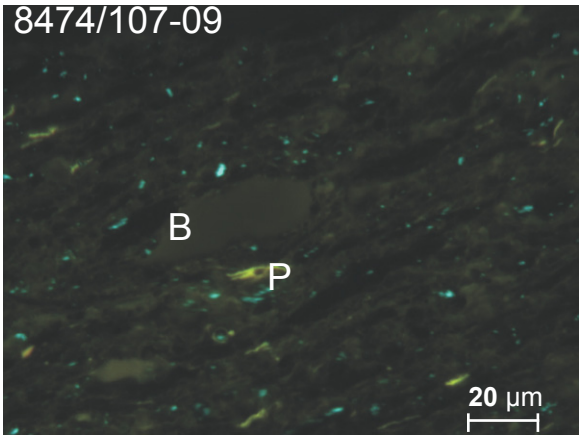
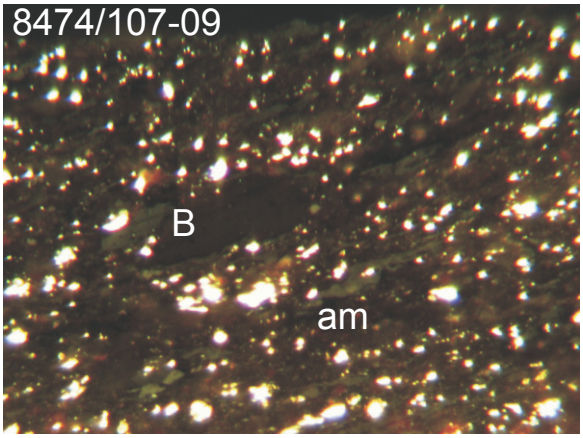
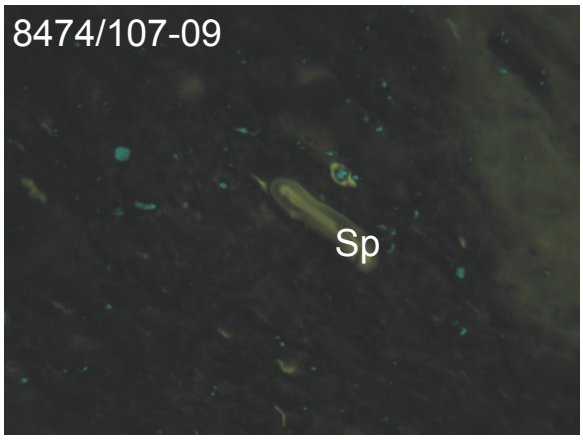
P

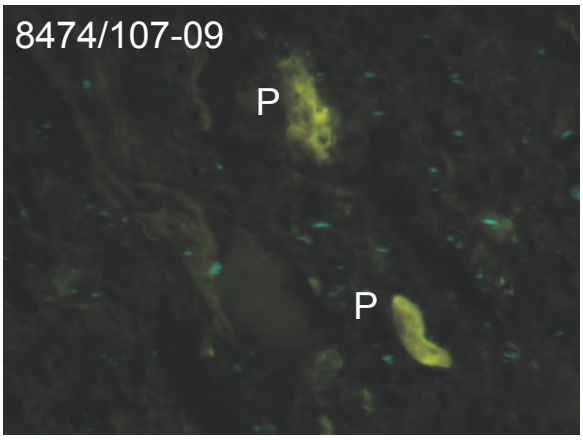

8474/107-09
P

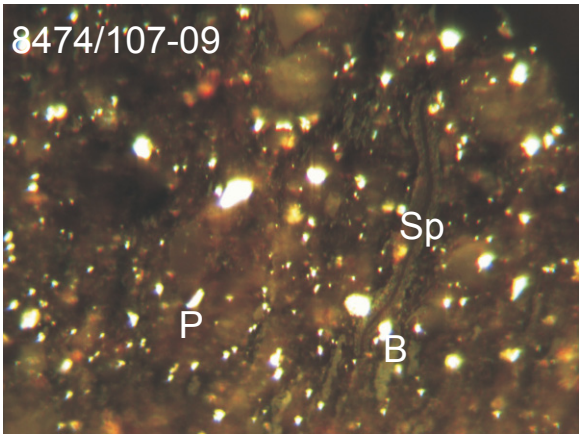

8474/107-09
am
P

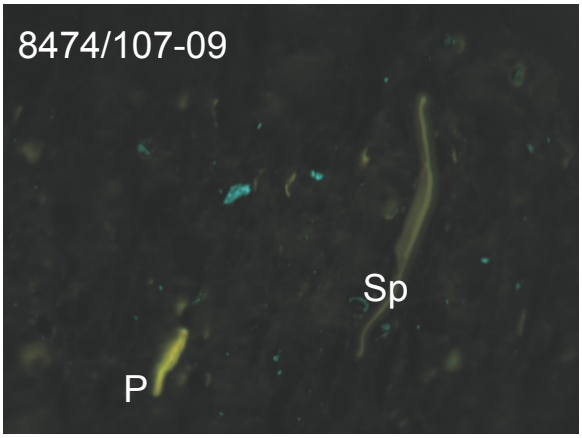

8474/107-09
B
P
20 µm

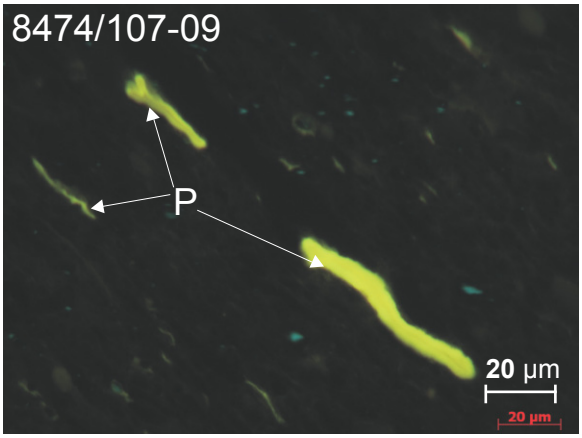

8474/107-09
B
am

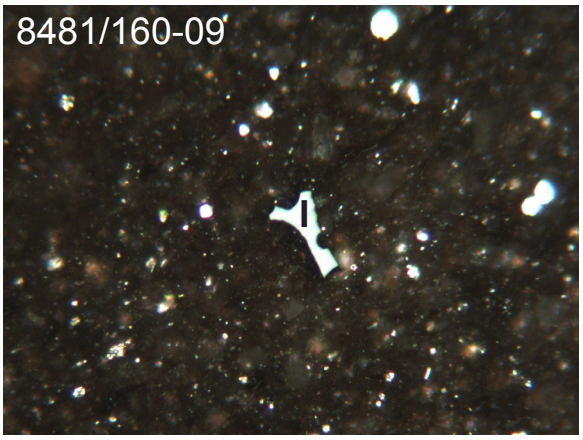

8474/107-09
Sp

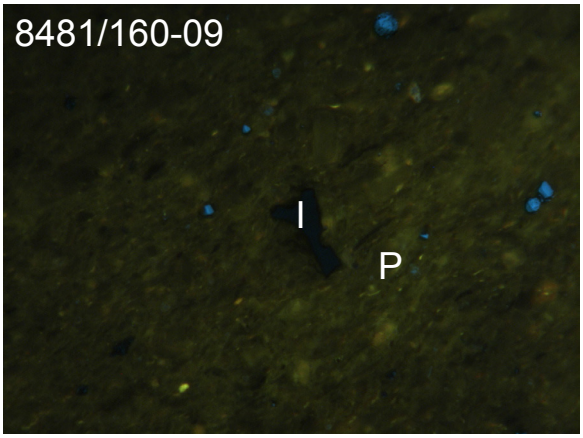

8474/107-09
P
P

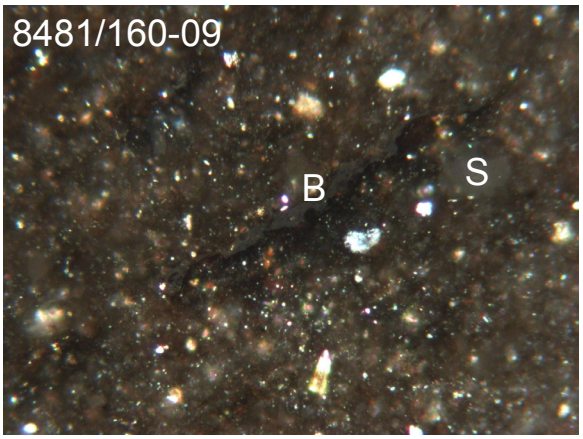

8474/107-09
Sp
P
B

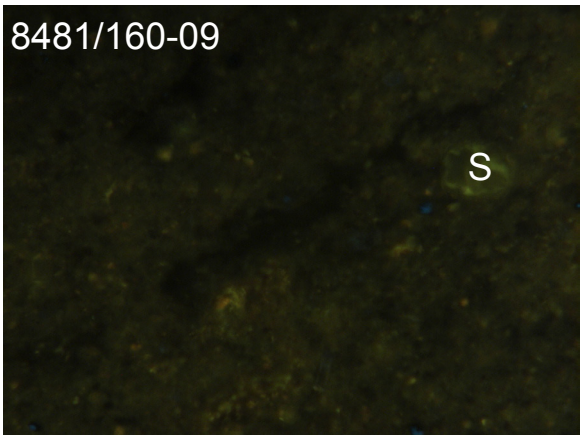

8474/107-09
Sp
P

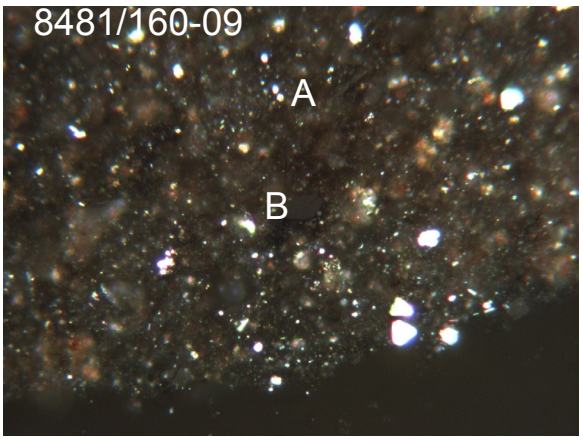

8474/107-09
P
20 µm
20 µm

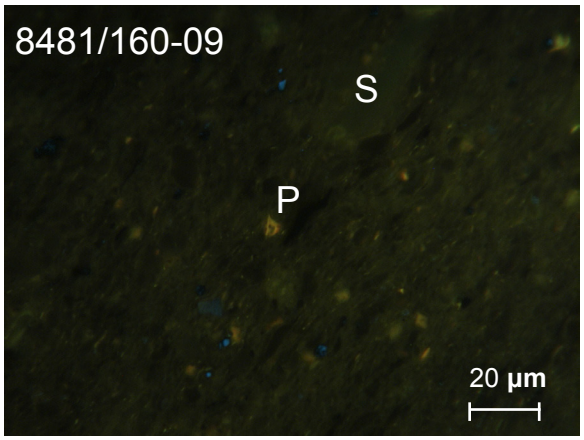




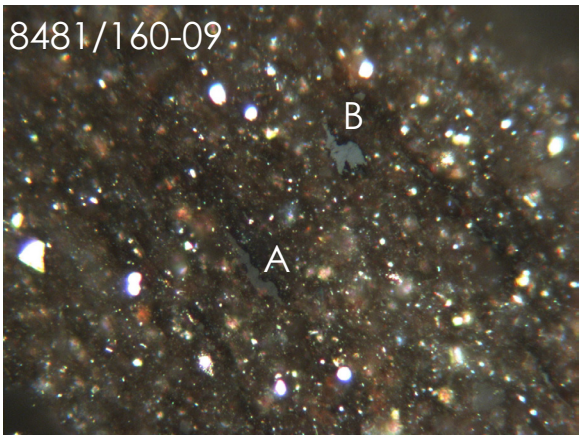


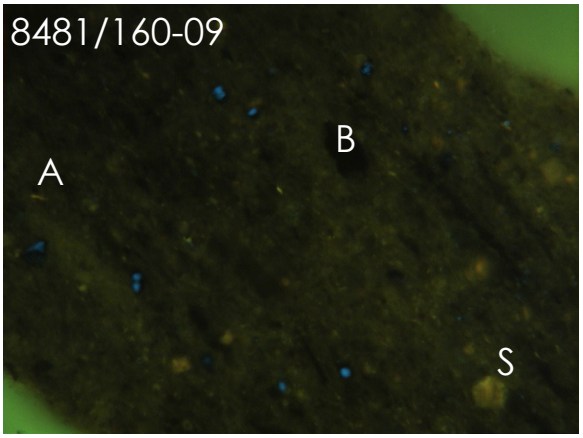


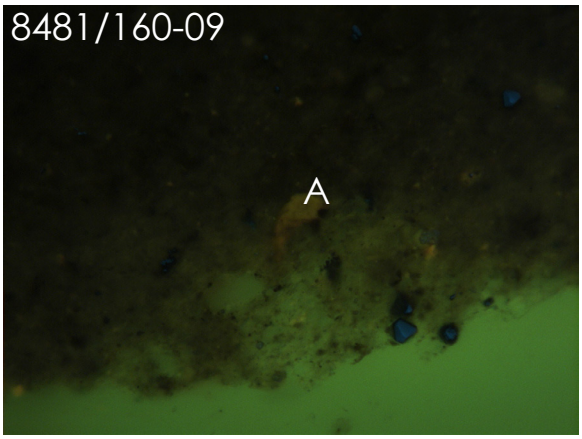


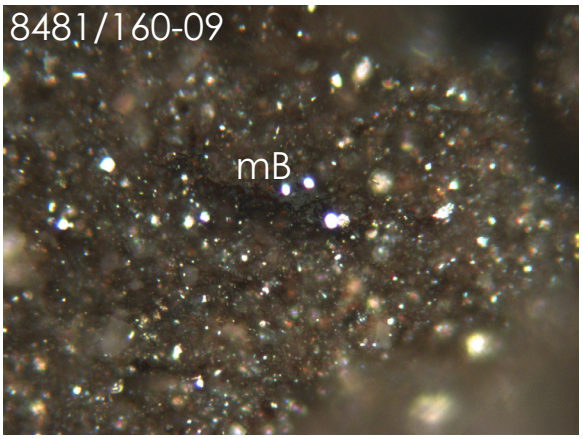


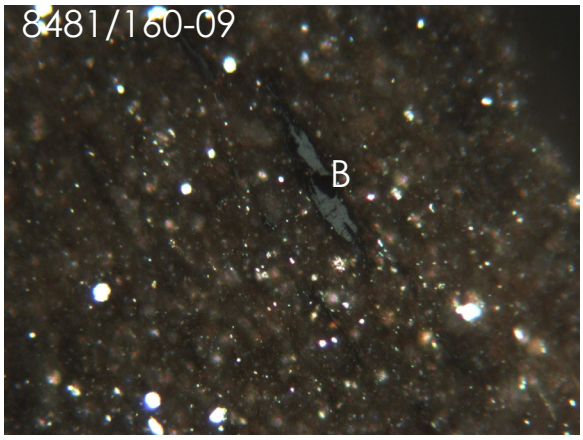
AGS 8481/GSC 160-09 (Majeau Lake; 100/10-13-063-12W5/00, 2625.5 m core depth). Organically rich brown shale, mostly composed of an interconnected network of amorphous kerogen with some framboidal pyrite and micrinite inclusions. Minor amount of both fluorescing and non-fluorescing Prasinophyte (P) and an unknown species of alginite (A). Minor to rare amount of brown-coloured matrix bitumenite (mB), bituminite (B) and siliceous (S) microfossils. Very rare allochthonous inertinite maceral (I). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

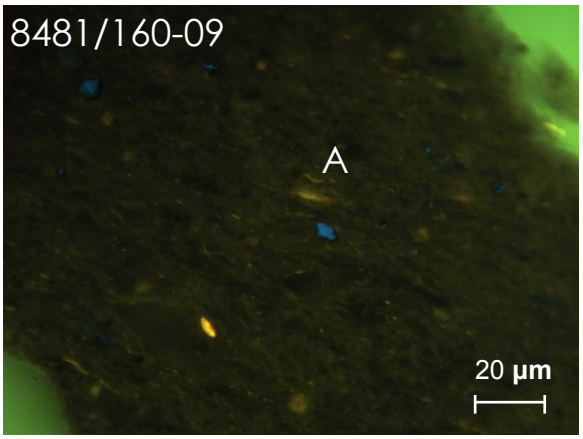

8481/160-09
B
A

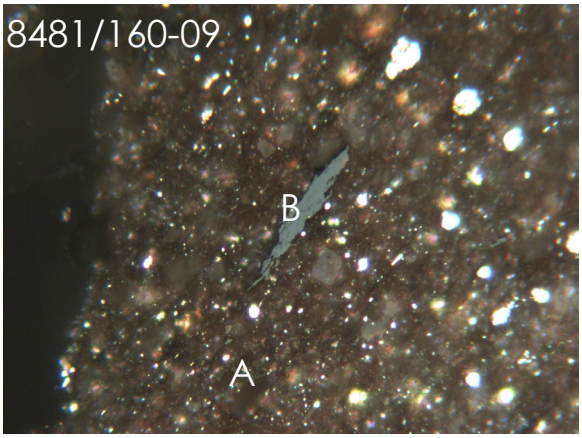

8481/160-09
B
A
S

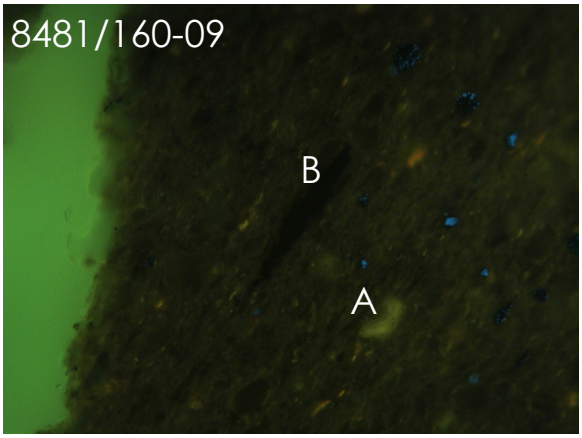

8481/160-09
A

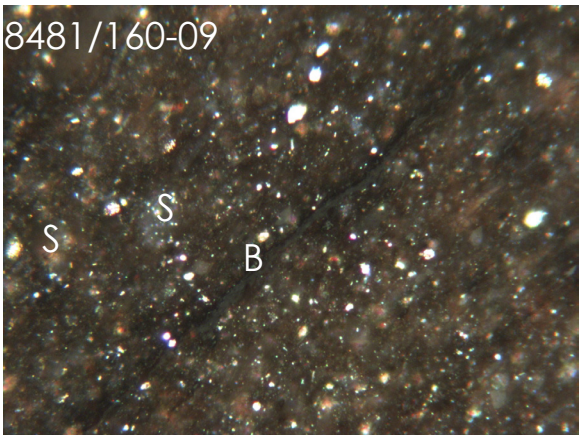

8481/160-09
mB

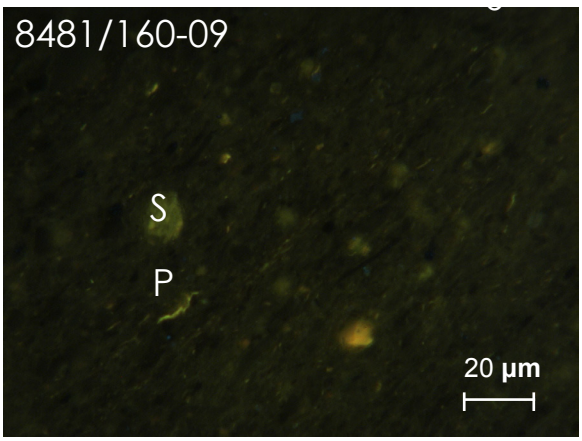

8481/160-09
B

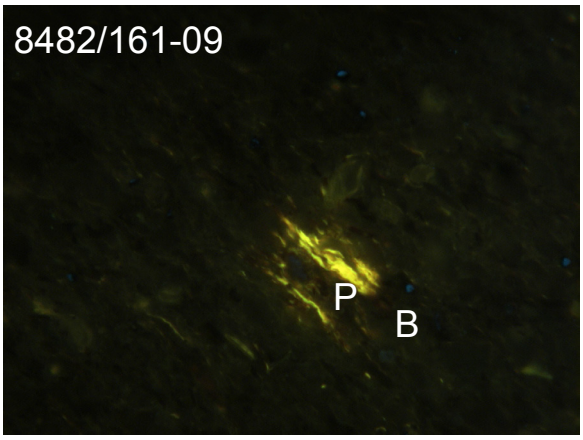

8481/160-09
A
20 µm

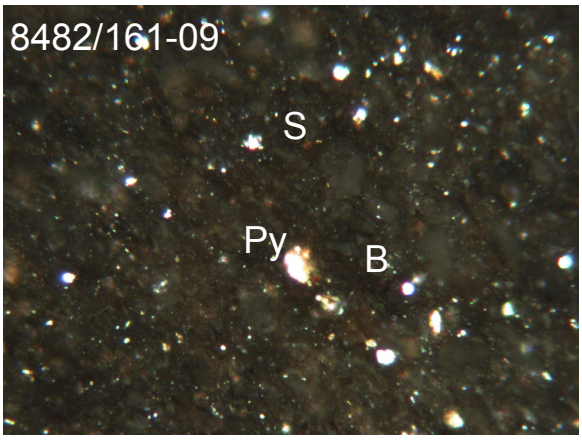

8481/160-09
B
A

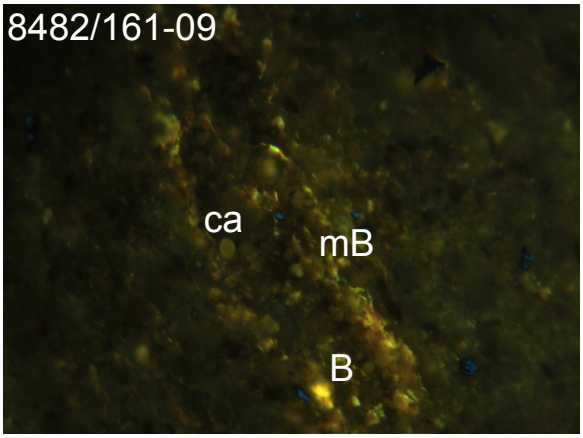

8481/160-09
B
A

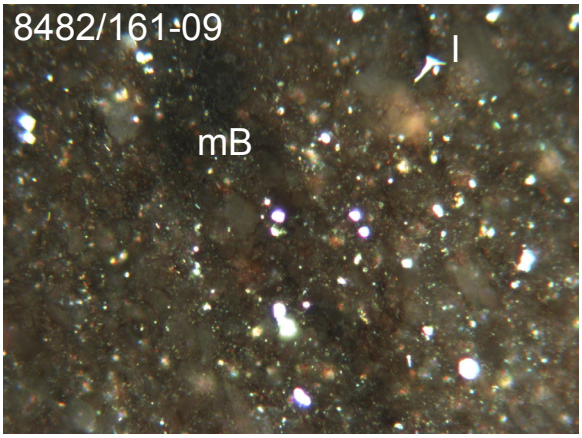

8481/160-09
S
S
B

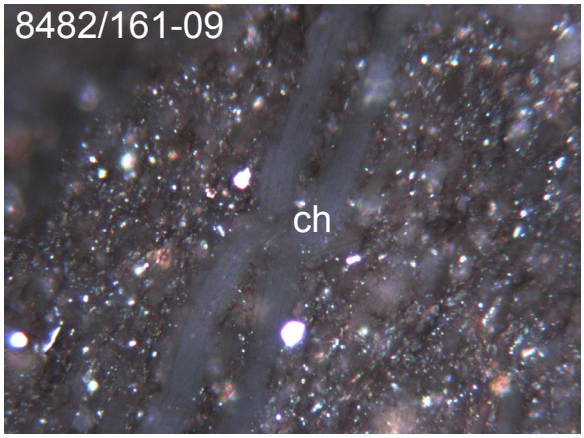

8481/160-09
S
P
20 µm

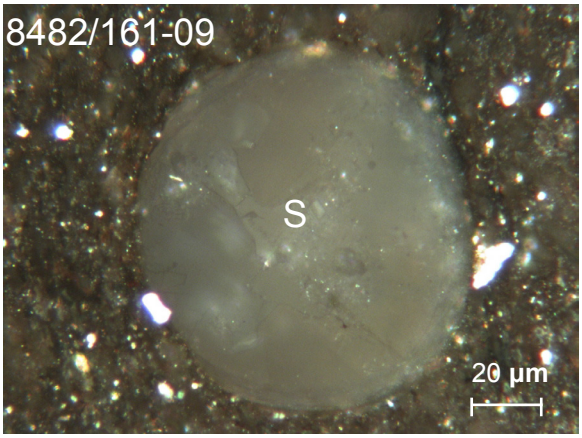




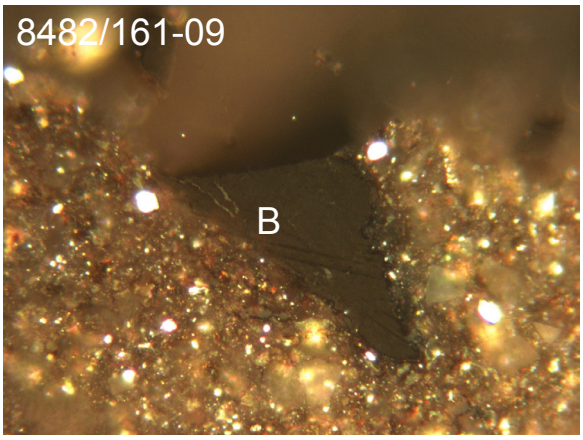


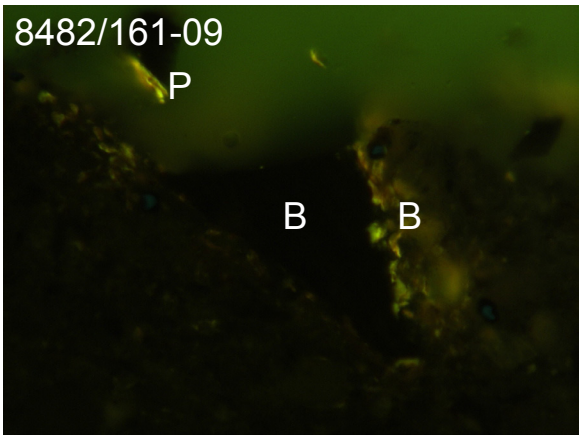


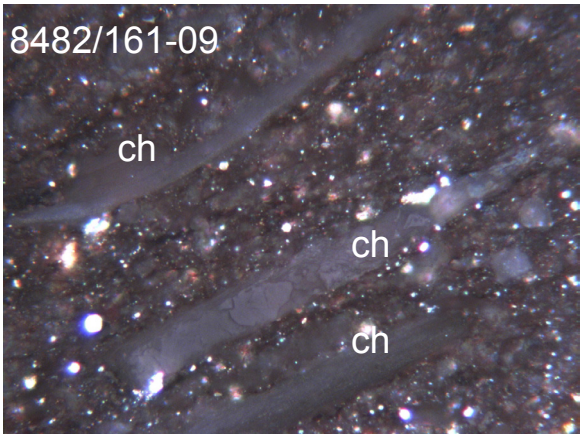


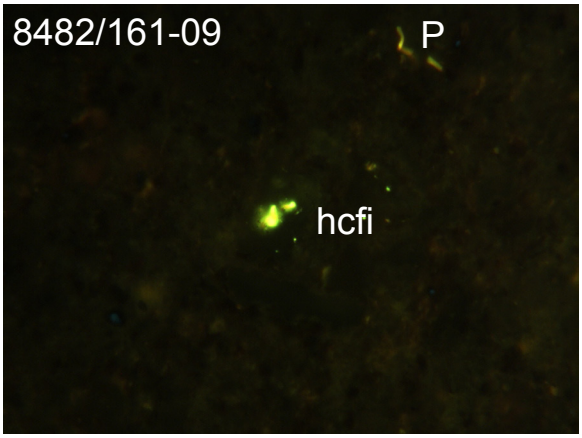


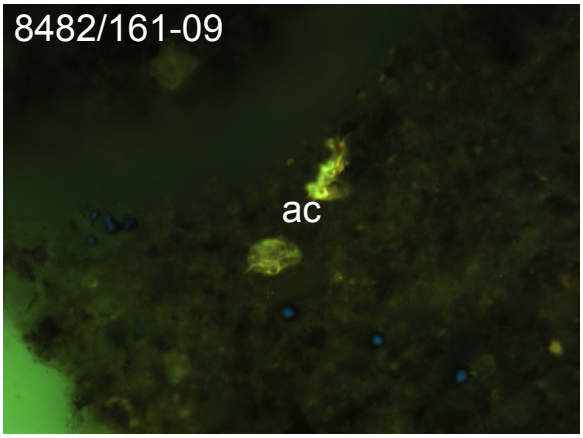
AGS 8482/GSC 161-09 (Beaverhill Lake; 100/10-13-063-12W5/00, 2632.5 m core depth). Organically rich brown shale composed mostly of an interconnected network of amorphous kerogen with some pyrite (Py) inclusions. Minor to rare amount of brown-coloured matrix bitumenite (mB) and fluorescing to non-fluorescing bituminite (B). Major to minor amount of both golden to dull yellow fluorescing and non-fluorescing Prasinophyte (P). Minor to rare amount of spiny Veryachium cf. and spiny acanthomorphic acritarch (ac), chitinous (ch), calcareous (ca) and siliceous (S) microfossils. Very rare allochthonous inertinite maceral (I). Some yellow fluorescing oil stains are also observed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). hcfi = hydrocarbon fluid inclusions.

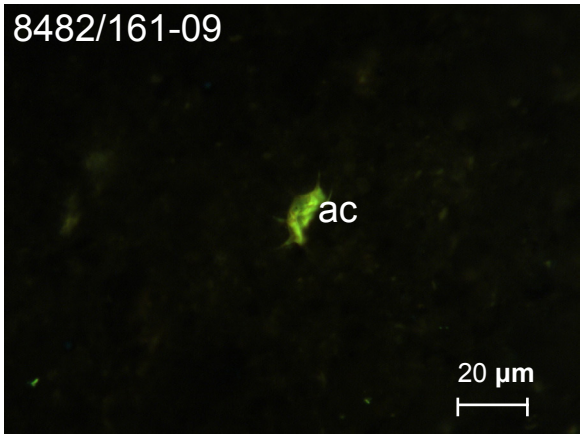

8482/161-09
B

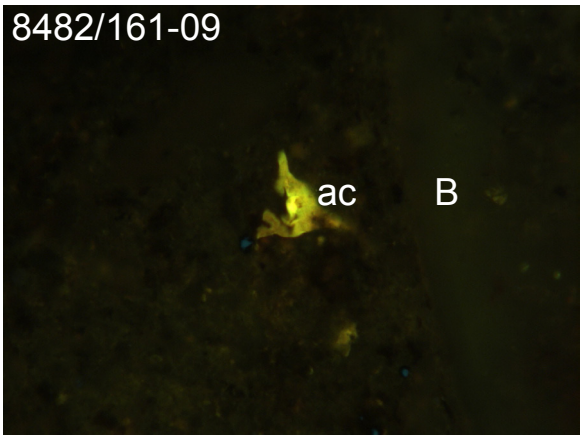

8482/161-09
P
B
B

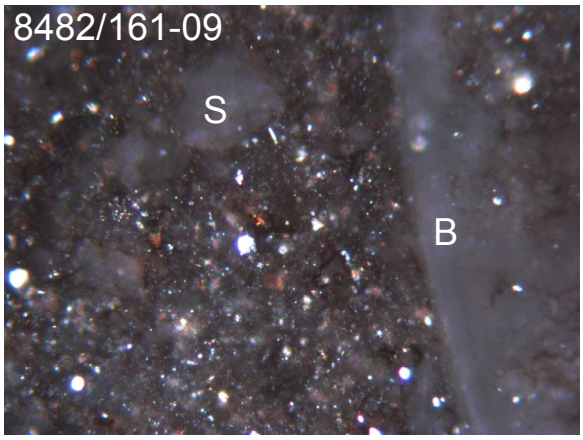

8482/161-09
ch
ch
ch

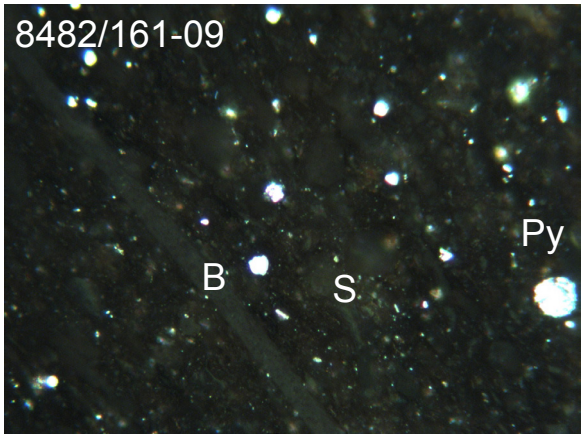

8482/161-09
P
hcfi

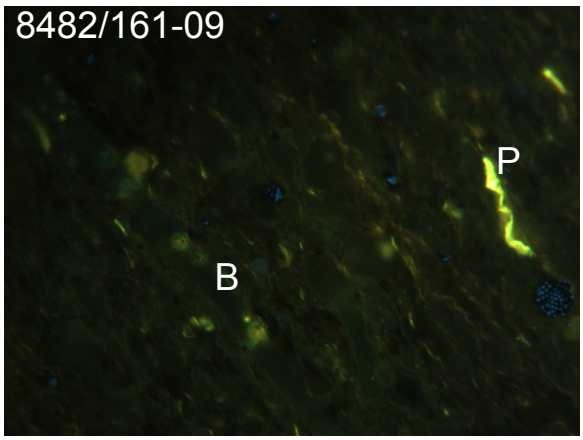

8482/161-09
ac

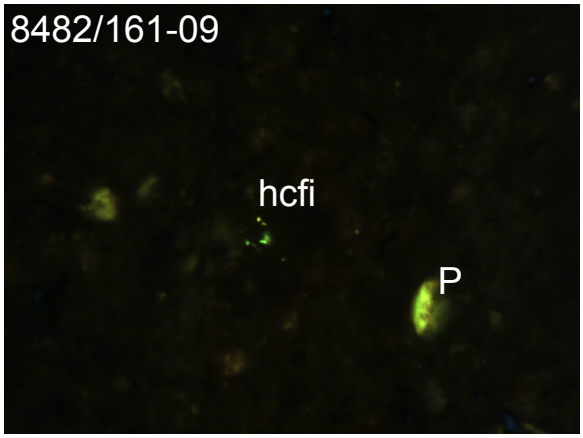

8482/161-09
ac
20 µm

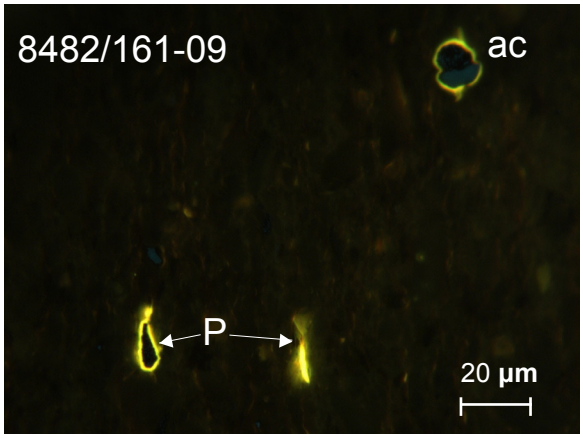

8482/161-09
ac
B

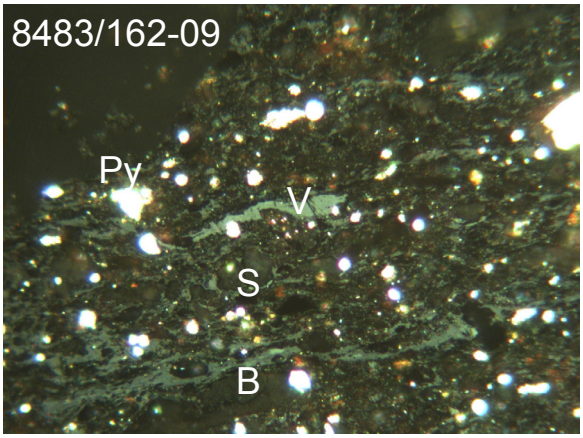

8482/161-09
S
B

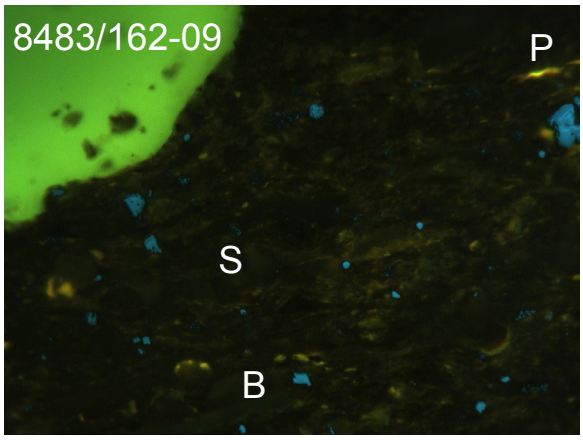

8482/161-09
Py
B
S

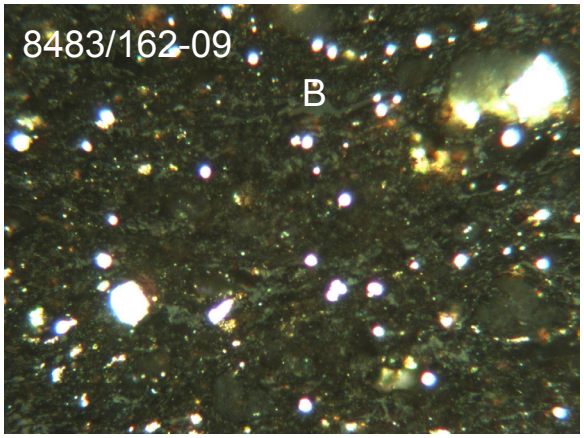

8482/161-09
P
B

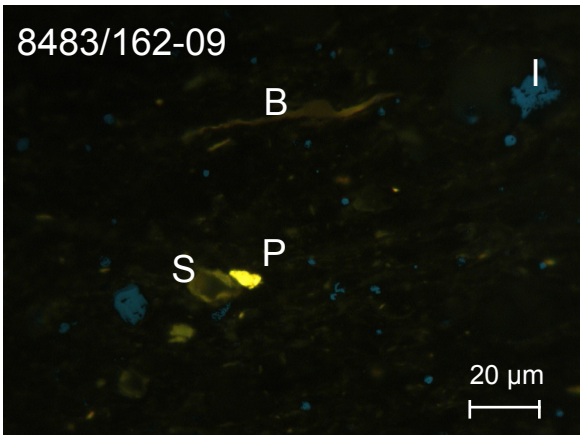

8482/161-09
hcfi
P

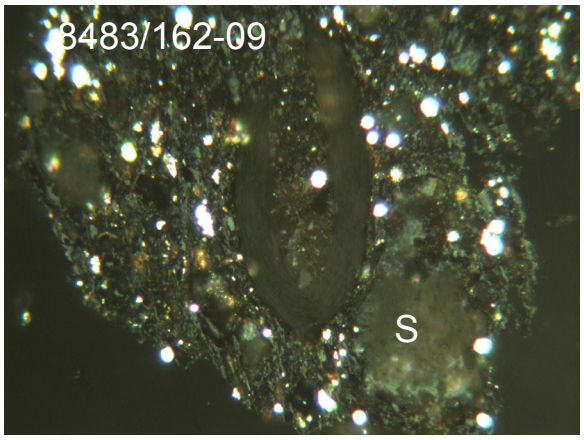

8482/161-09
ac
P
20 µm

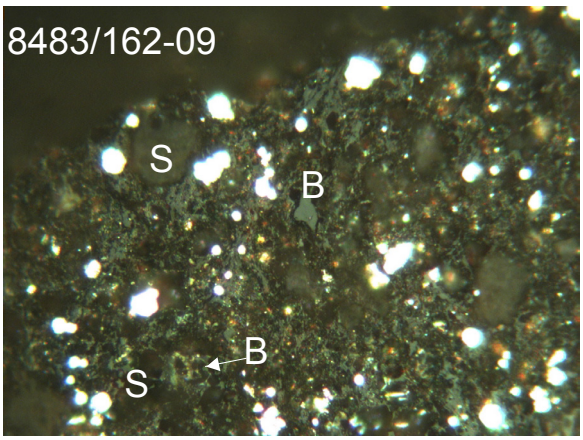




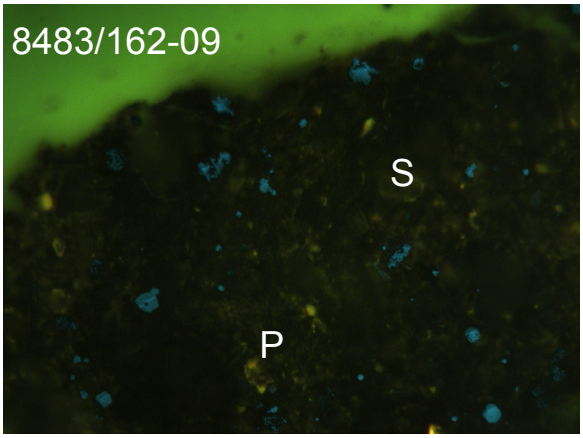


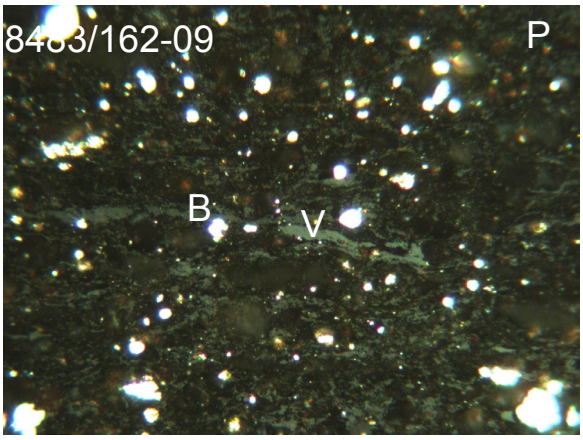


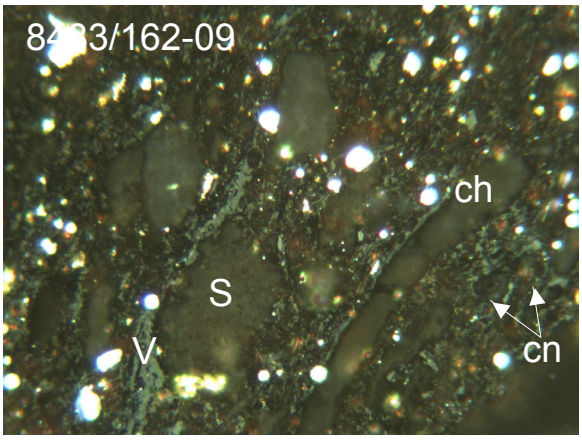


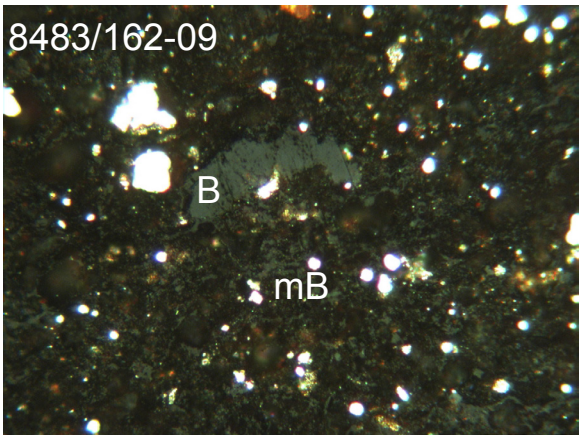


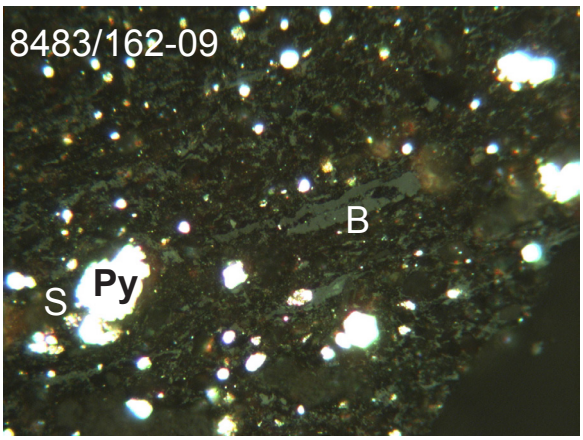
AGS 8483/GSC 162-09 (Duvernay; 100/10-04-051-27W4/00, 1934.8 m core depth). Organically rich brown shale composed mostly of an interconnected network of spent amorphous kergen with a high percentage of framboidal pyrite (Py) and micrinite inclusions. Also some micrinite-rich amorphinite/matrix bituminite (mB) with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous (S, derived from chrysophyte alginite, radiolaria, some are scolecodont and microforam remains) microfossils and calcareous nannoplankton (cn). Rare amount of both fluorescing and non-fluorescing Prasinophyte (P). Rare amount of vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ch = chitinous microfossil.

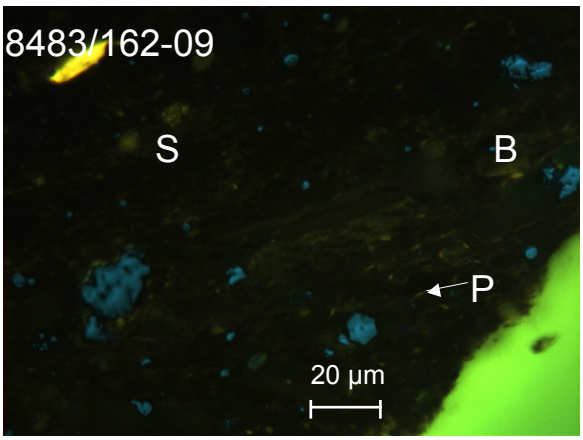

8483/162-09
S
P

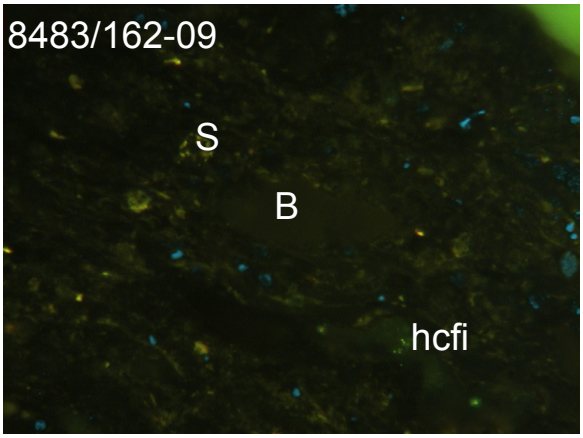

8483/162-09
P
B
V

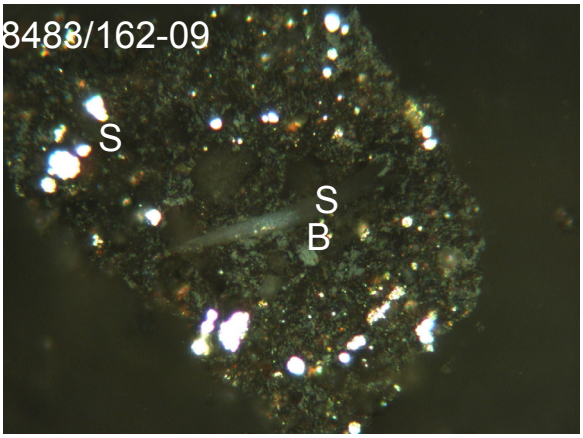

8483/162-09
ch
S
V
cn

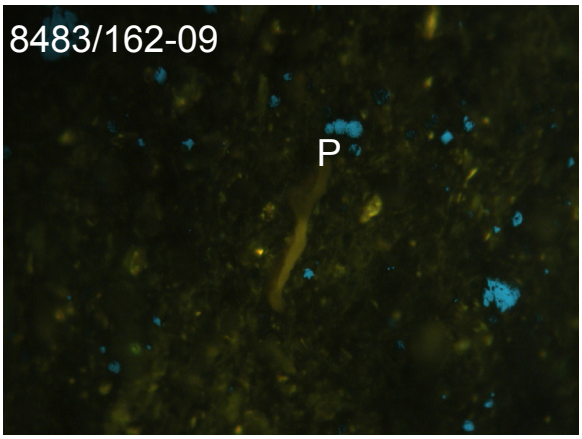

8483/162-09
B
mB

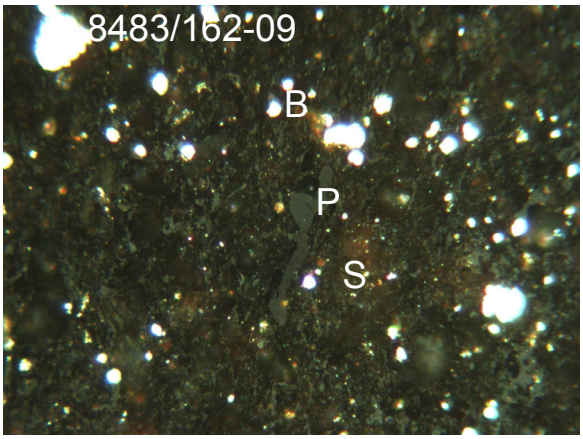

8483/162-09
B
Py
S

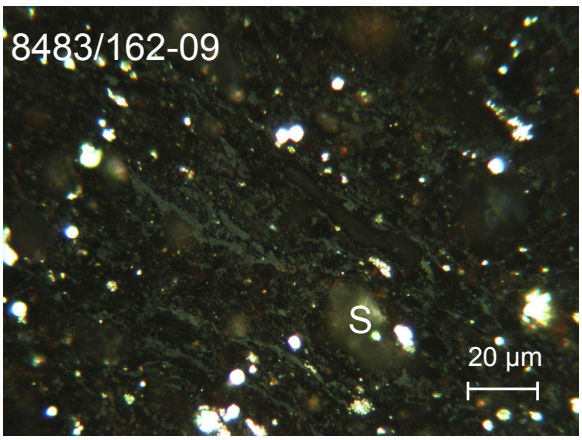

8483/162-09
S
B
P
20 µm

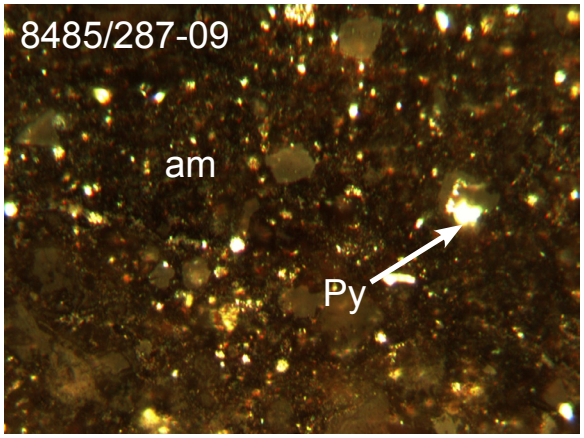

8483/162-09
S
B
hcfi

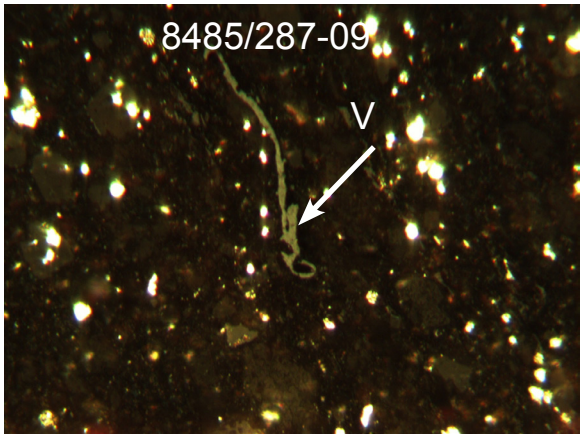

8483/162-09
S
S
B

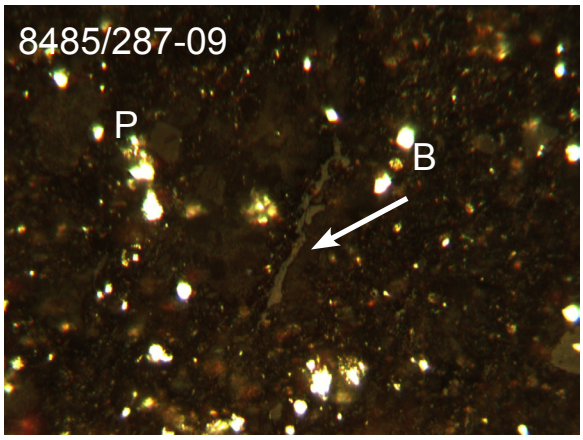

8483/162-09
P

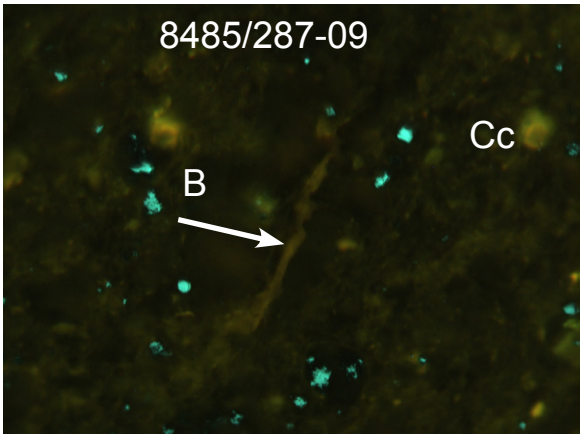

8483/162-09
B
P
S

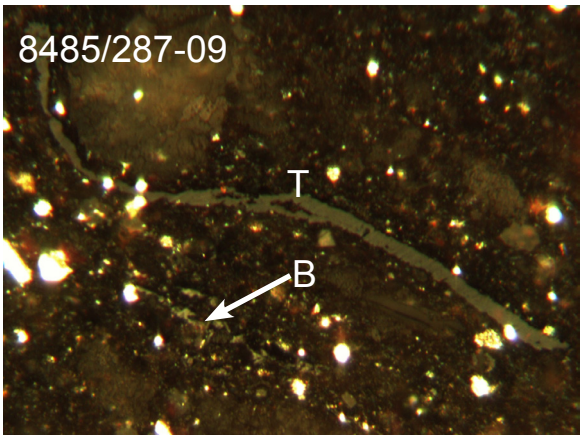

8483/162-09
S
20 µm

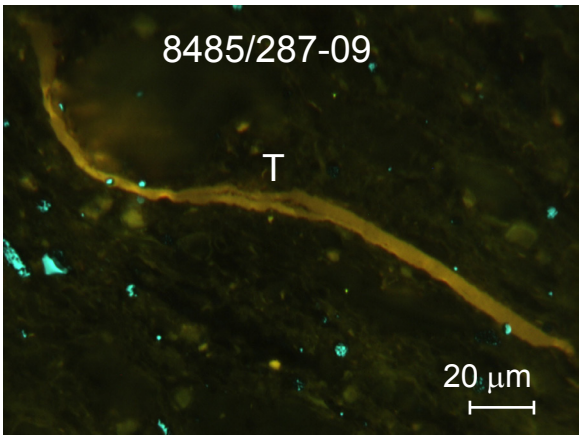




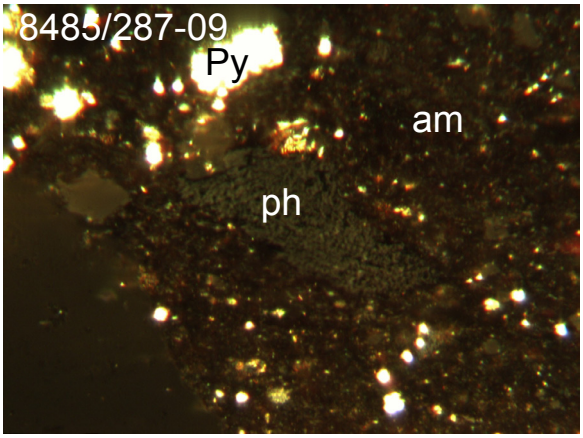


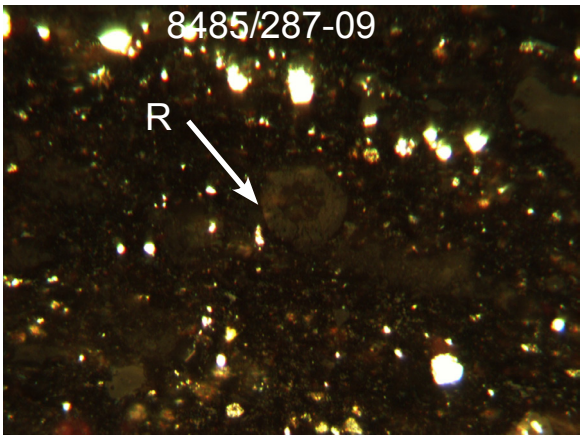


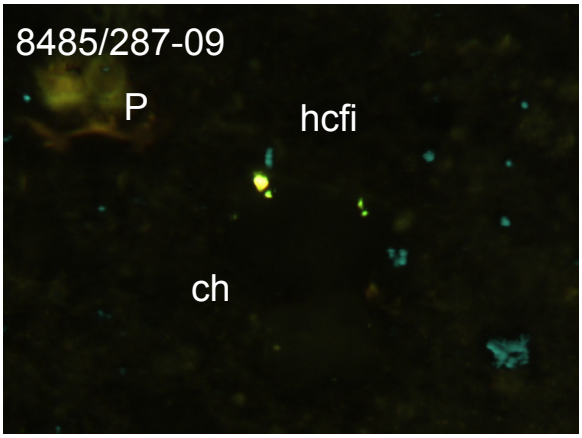


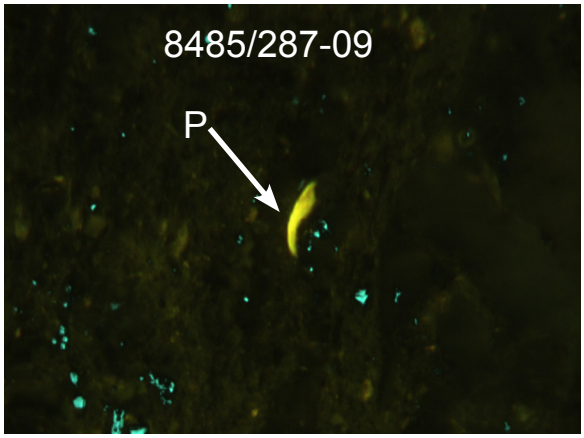


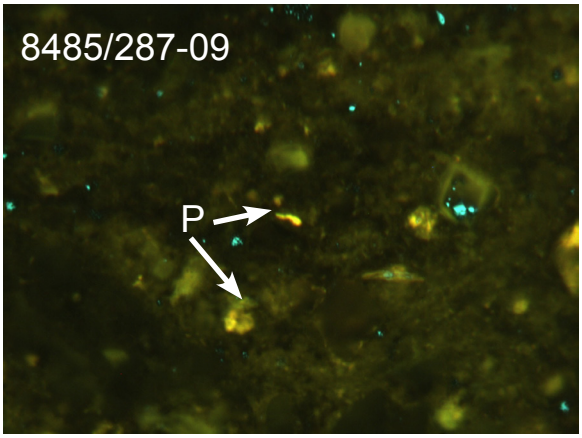
AGS 8485/GSC 287-09 (Duvernay; 100/10-04-051-27W4/00; 1941.3 m core depth). Organic and framboidal pyrite (Py) rich black shale with some orange-yellow fluorescing alginite lenses (Prasinophyte (P), Tasmanites sp. (T), and Coccoidal (Cc)). Minor amount of mostly small, thin lenses of alginite-derived vitrinite (V) and fluorescing and non- fluorescing bitumen (B). Rare mineral-filled radiolarian (R), hydrocarbon fluid inclusion (hcfi) and phosphatic nodules (ph) were also observed within the shale matrix. Scale applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). ch = chitin

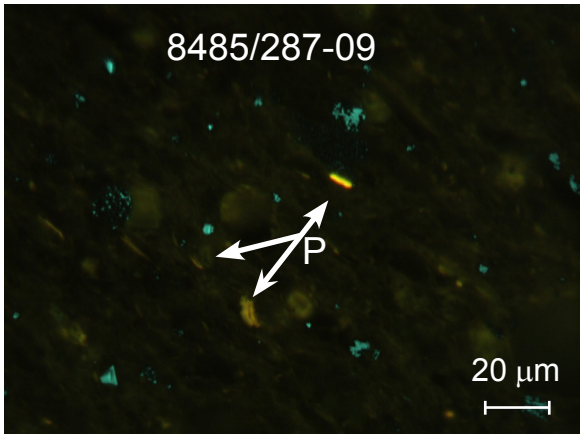

8485/287-09
Py
am
ph

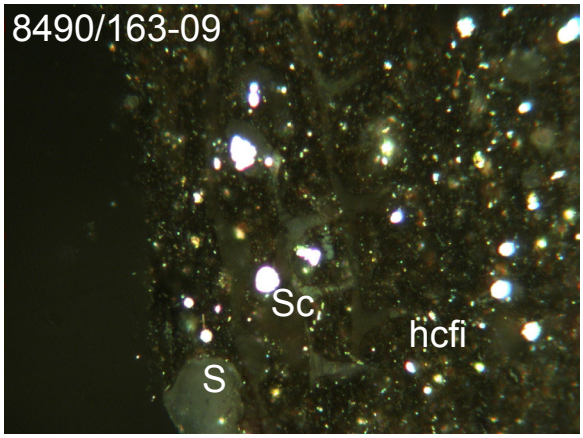

8485/287-09
R

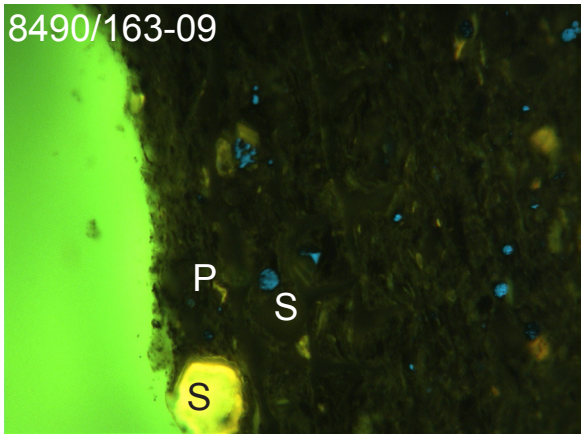

8485/287-09
P
hcfi
ch

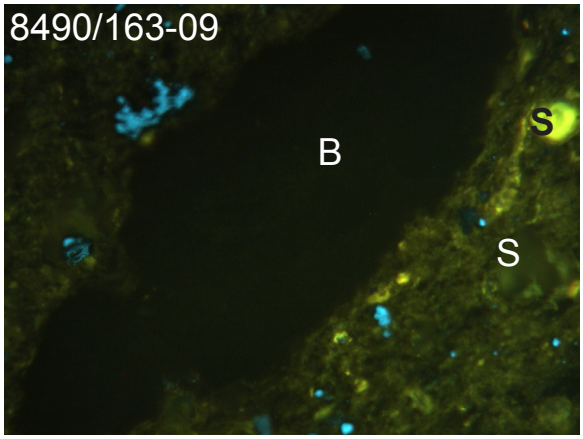

8485/287-09
P

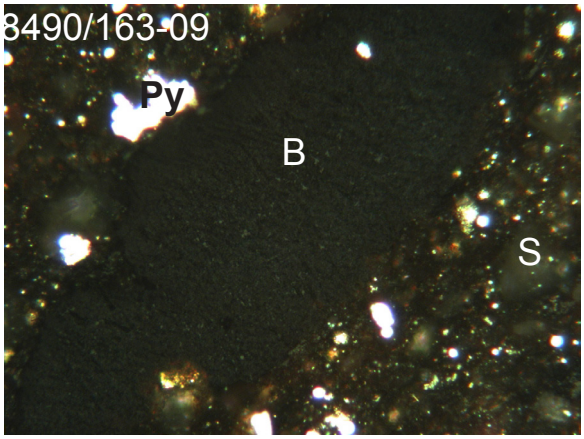

8485/287-09
P

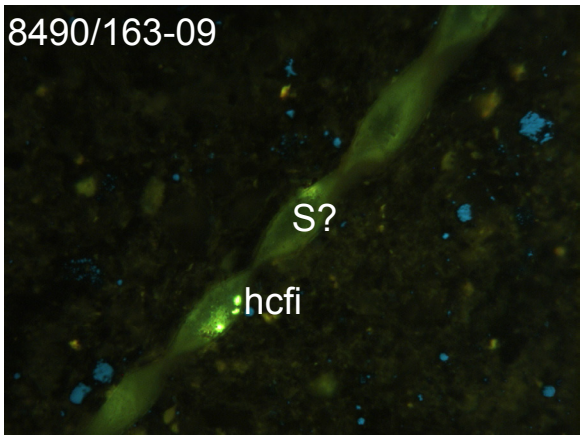

8485/287-09
P
20 µm

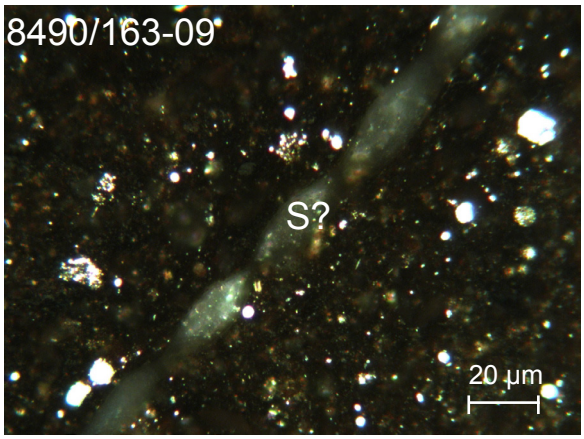




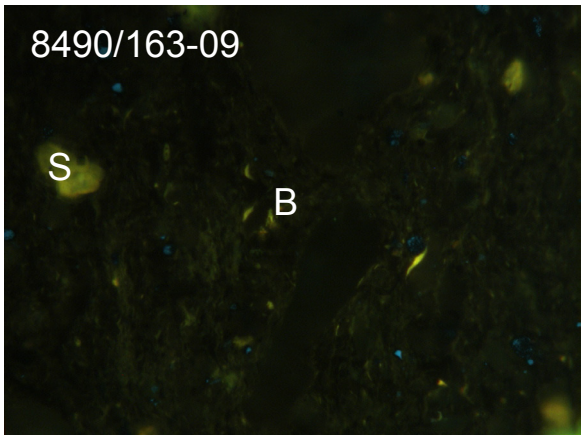


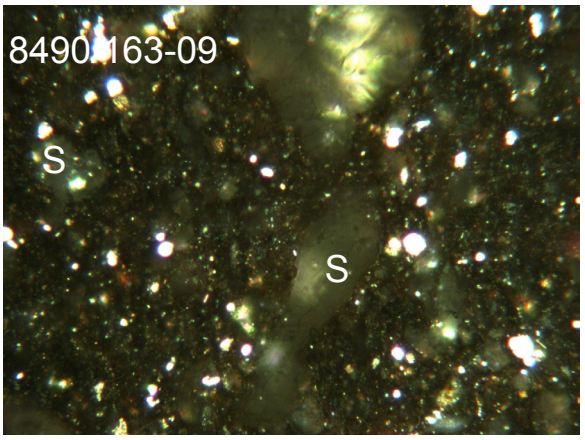


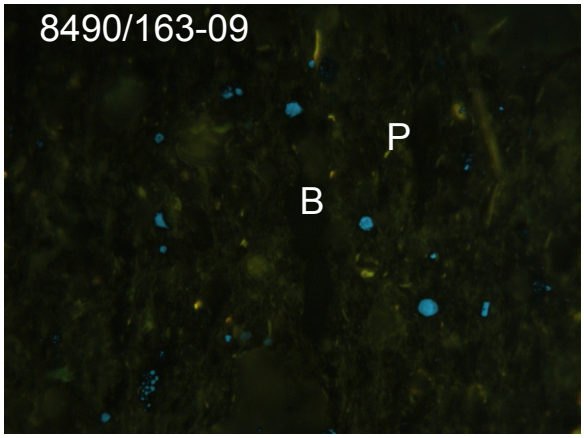


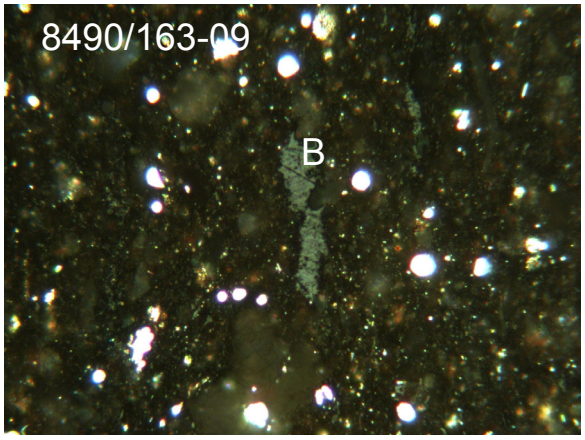


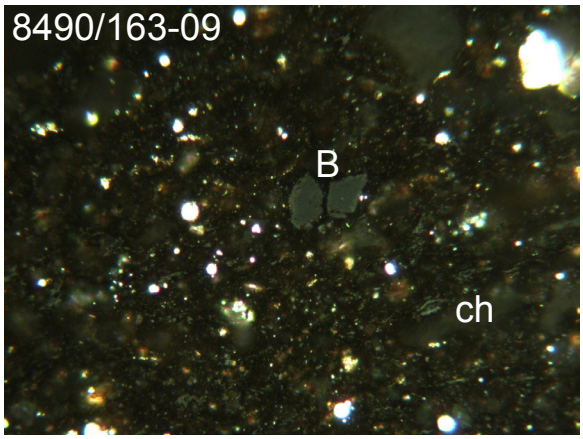
AGS 8490/GSC 163-09 (Duvernay; 100/14-29-048-06W5/00, 2648.7 m core depth). Similar to sample AGS 8483/GSC 162-09. Organically rich dark brown shale composed mostly of an interconnected network of spent amorphous kerogen with mostly framboidal pyrite (Py) and micrinite rich amorphinite/matrix bituminite with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous microfossils (S, derived from chrysophyte alginite, radiolaria, some are scolecodont (Sc) and possibly microforam remains) and calcareous nannoplankton. Rare amount of chitinous microfossils (ch) and fluorescing and non-fluorescing Prasinophyte (P). Rare vitrinite macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi) annealed within the siliceous microfossils, the latter of which are derived from foraminifera. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

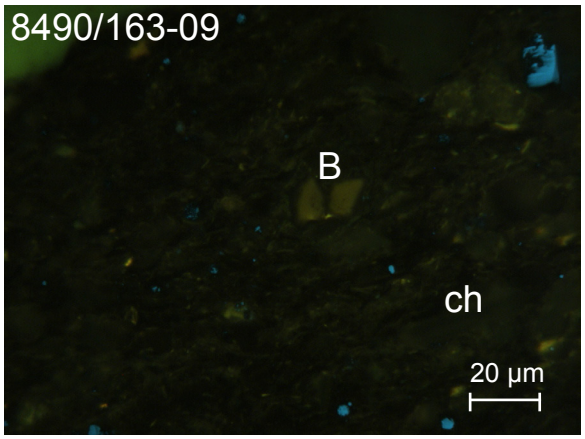

8490/163-09
S
B

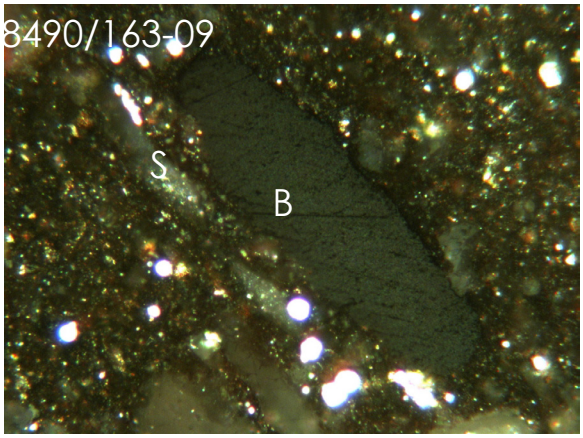

8490/163-09
S
S

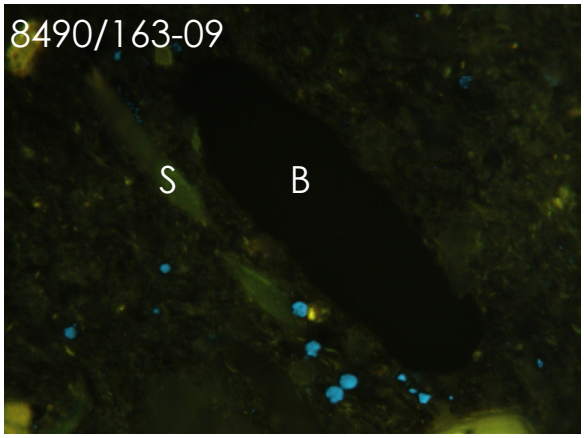

8490/163-09
P
B

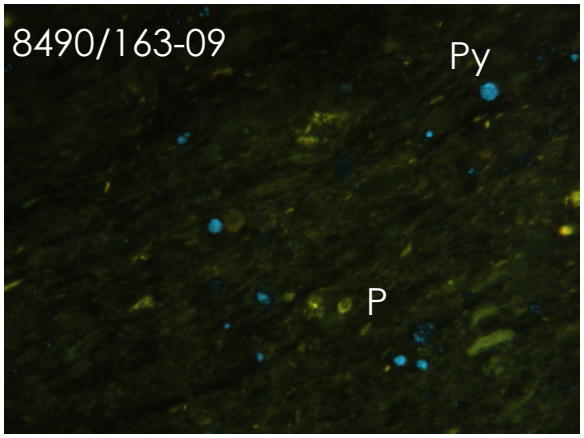

8490/163-09
B

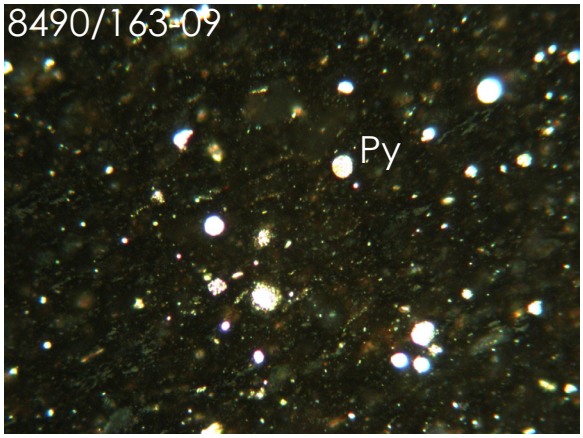

8490/163-09
B
ch

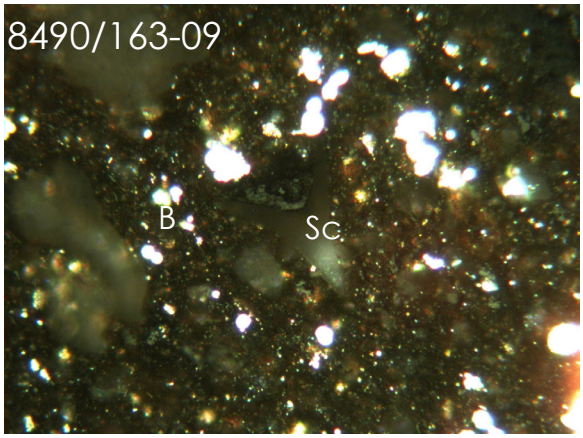

8490/163-09
B
ch
20 µm

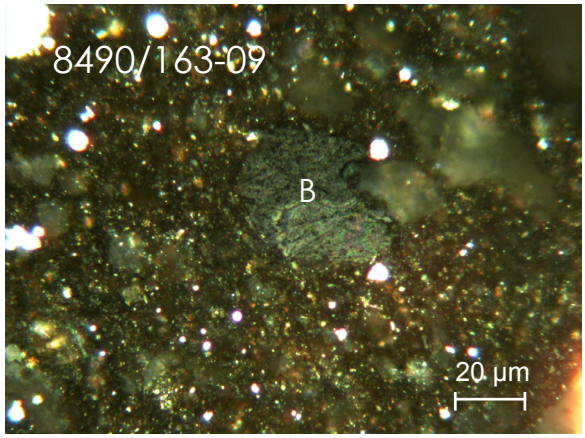

8490/163-09
S
B

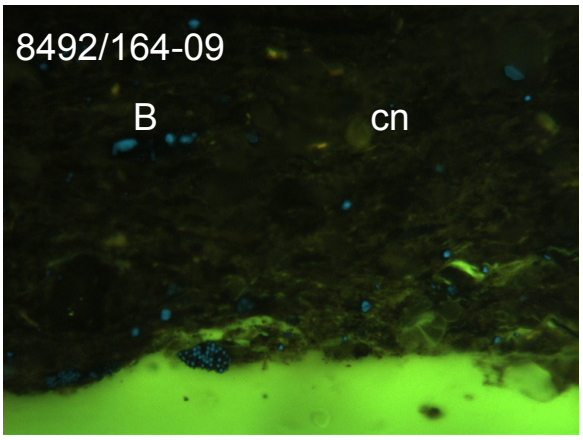

8490/163-09
S
B

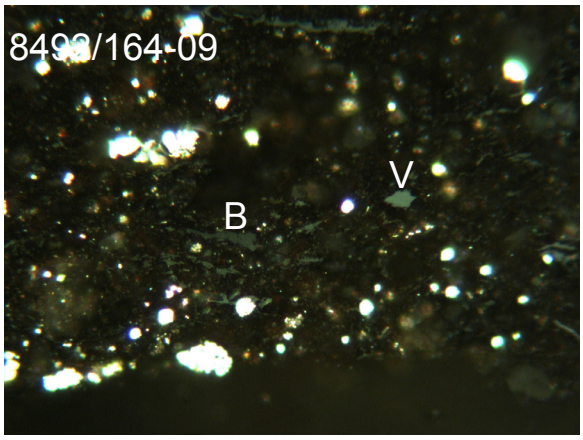

8490/163-09
Py
P

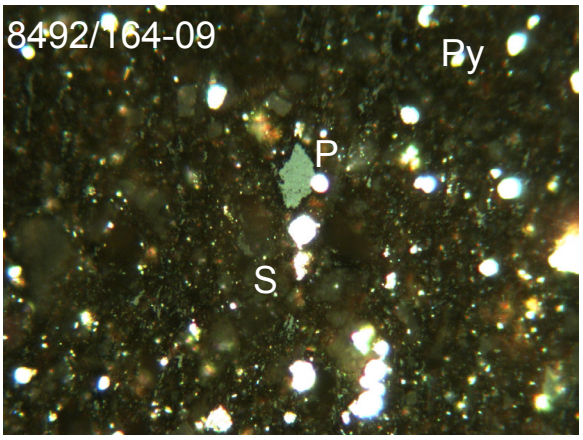

8490/163-09
Py

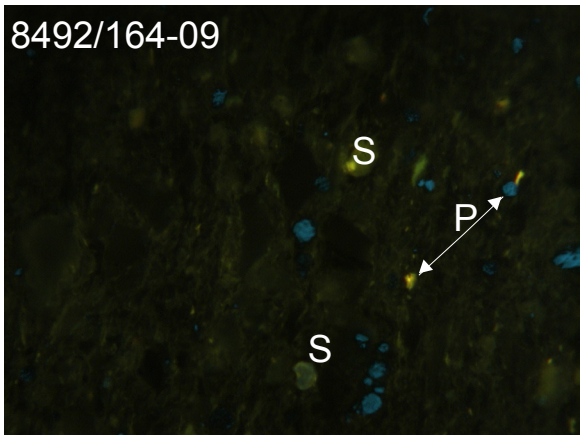

8490/163-09
B
Sc

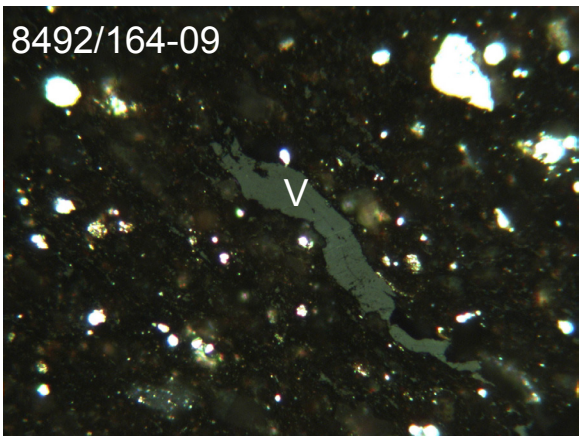

8490/163-09
B
20 µm

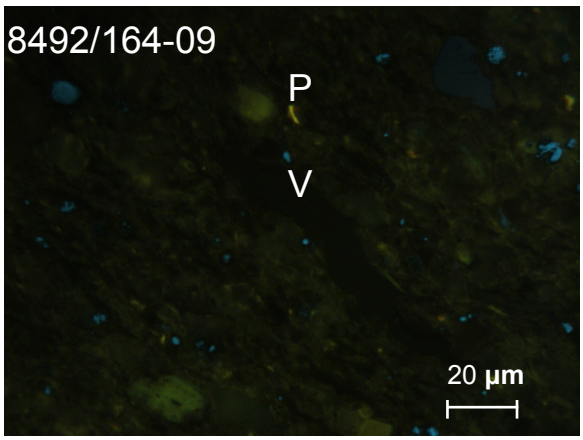




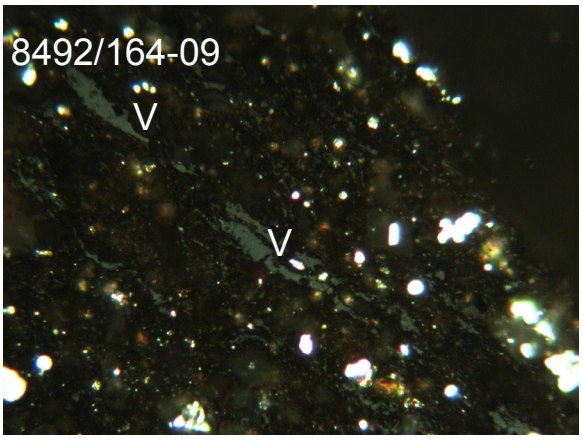


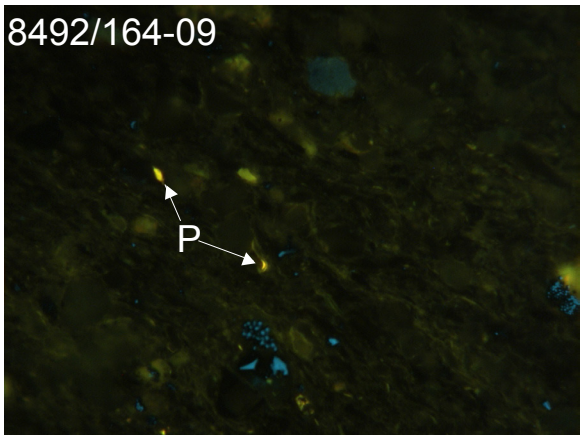


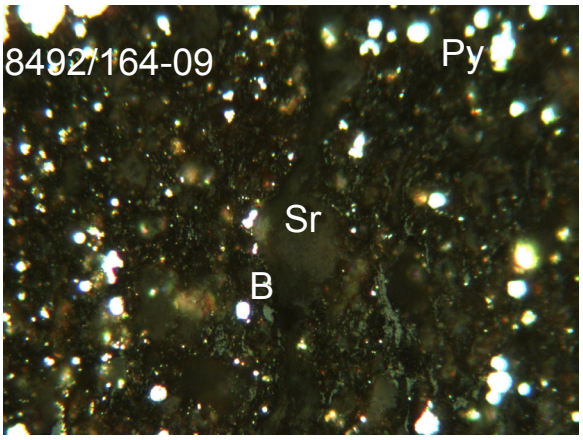


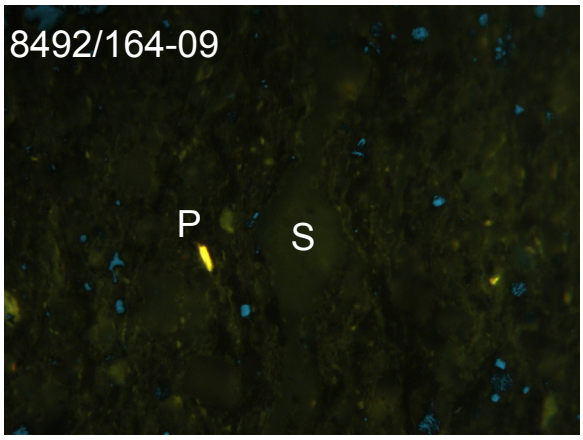


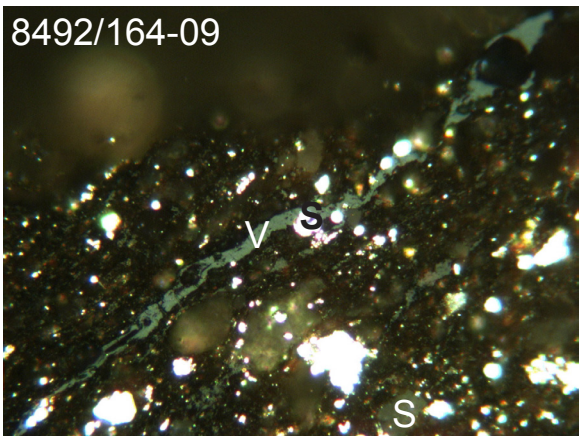
AGS 8492/GSC 164-09 (Duvernay; 100/14-29-048-06W5/00, 2655.7 m core depth). Organically rich dark brown shale composed mostly of an interconnected network of pyrite (Py) and micrinite rich amorphinite/matrix bituminite with fluorescing to non-fluorescing bitumen (B) lenses. Major to minor amount of siliceous (S, derived from chrysophyte alginite, radiolaria (Sr), some are scolecodont and possibly microforams remains and calcareous nannoplankton (cn)) microfossils. Rare amount of chitinous microfossils, and fluorescing and non-fluorescing Prasinophyte (P). Rare vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

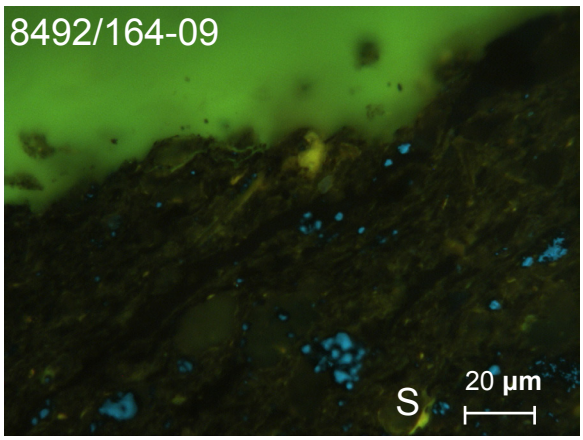

8492/164-09
V
V

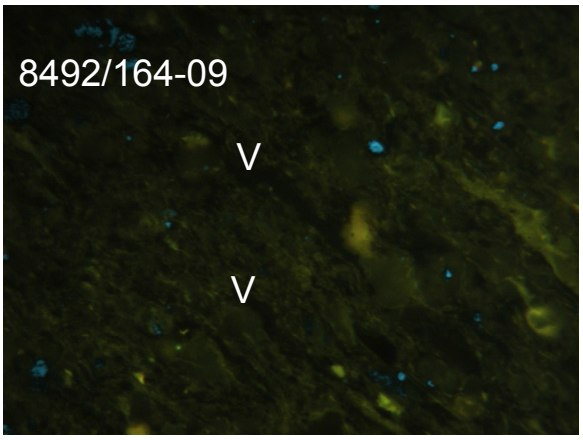

8492/164-09
P

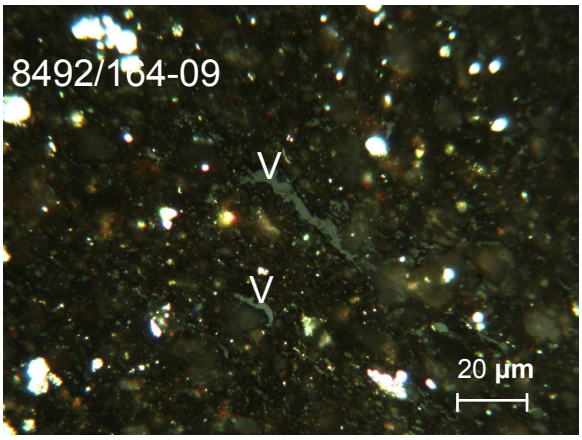

8492/164-09
Py
Sr
B

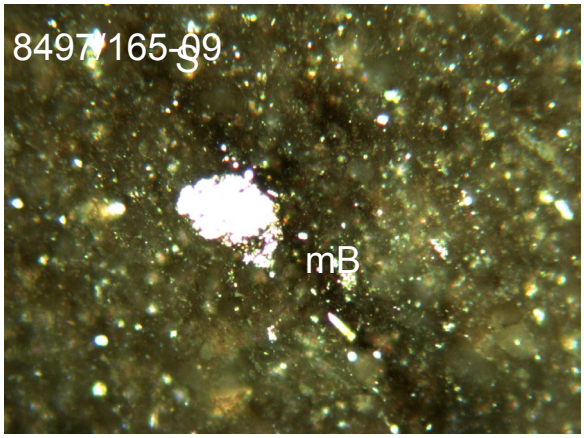

8492/164-09
P
S

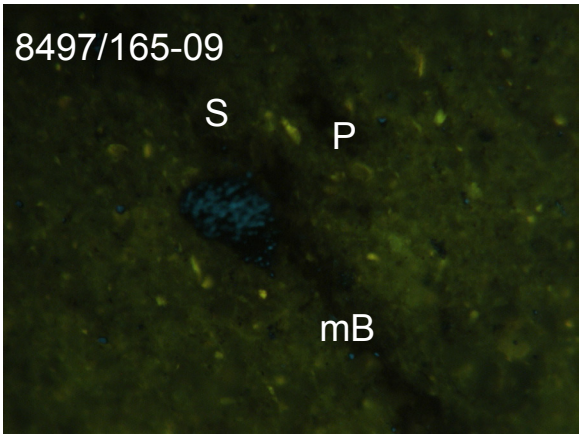

8492/164-09
V
S
S

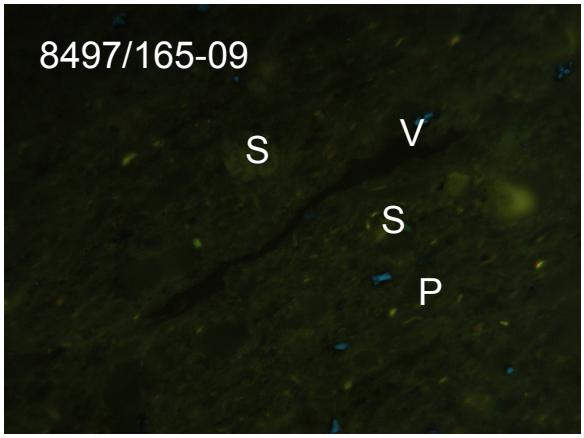

8492/164-09
S
20 µm

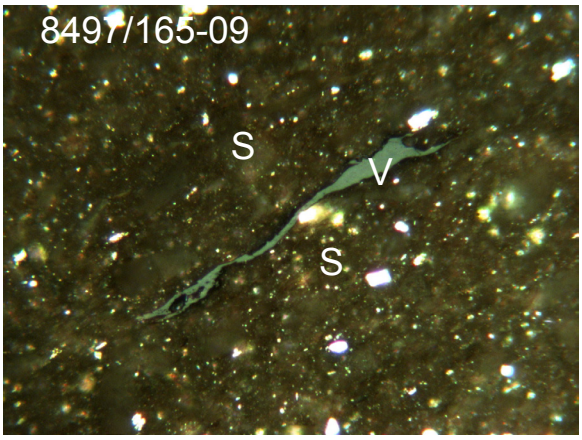

8492/164-09
V
V

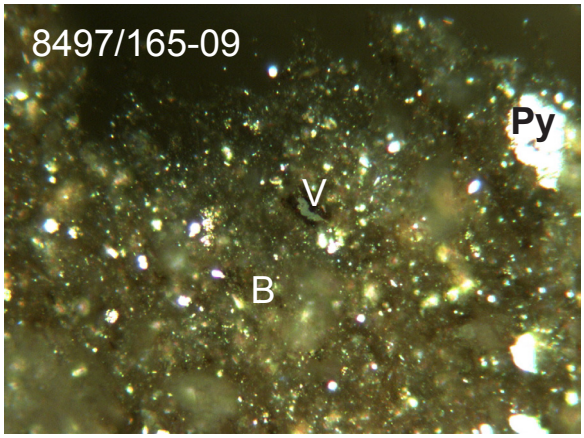

8492/164-09
V
V
20 µm

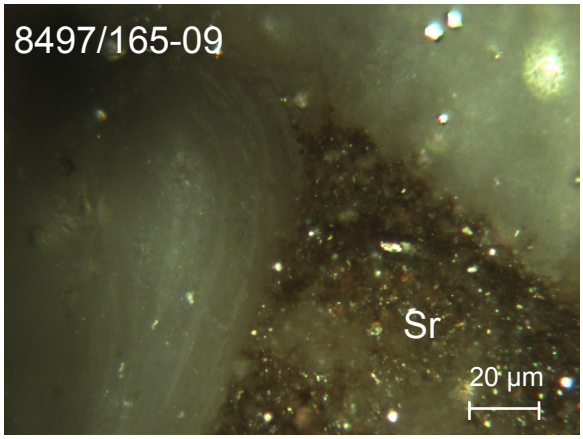




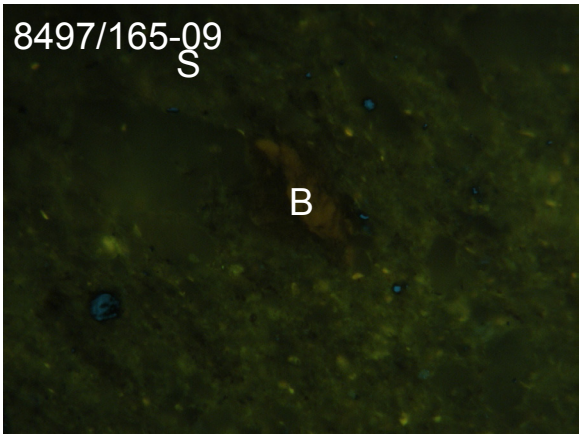


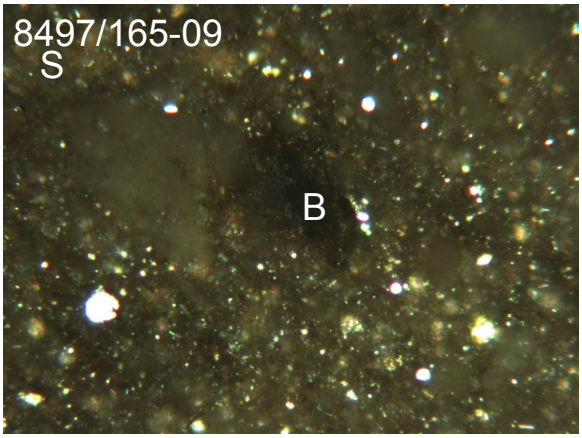


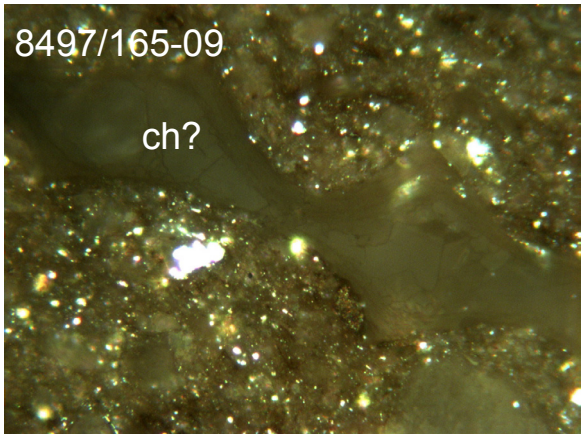


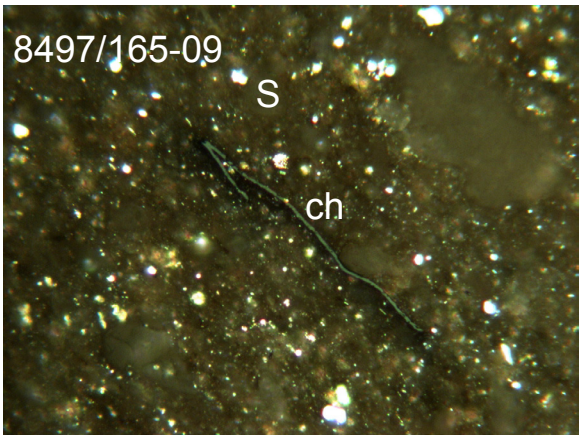


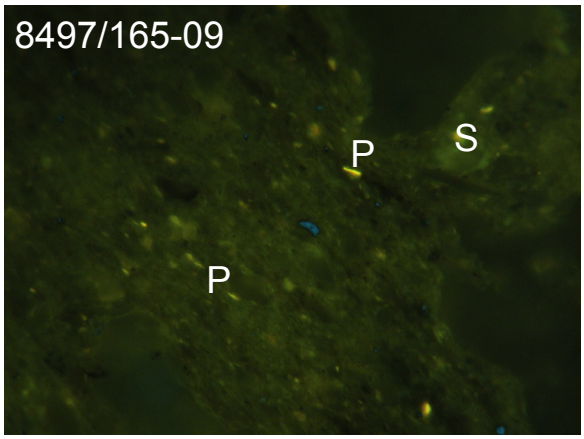
AGS 8497/GSC 165-09 (Majeau Lake; 100/15-11-061-13W5/00, 2549.7 m core depth). Organically rich dark brown shale composed mostly of an interconnected network of pyrite and micrinite-rich amorphinite/matrix bituminite (mB) with fluorescing to non-fluorescing bitumen (B) lenses. Minor amount of siliceous (S, derived from chrysophyte alginite, radiolaria (Sr), some are possibly microforam/microfossils remains and calcareous microfossils. Minor to rare amount fluorescing and non-fluorescing Prasinophyte (P) and chitinous (ch) microfossils. Rare vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi) annealed within carbonate minerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

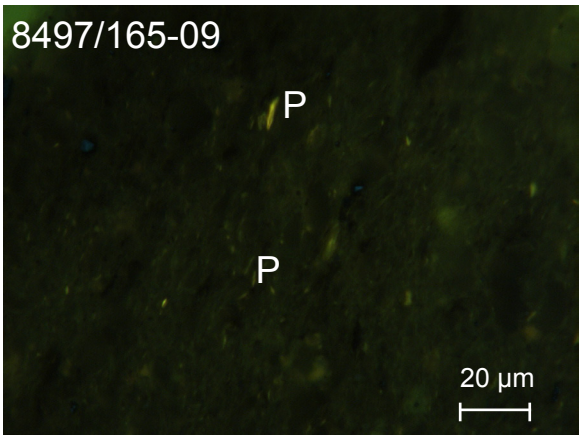

8497/165-09
S
B

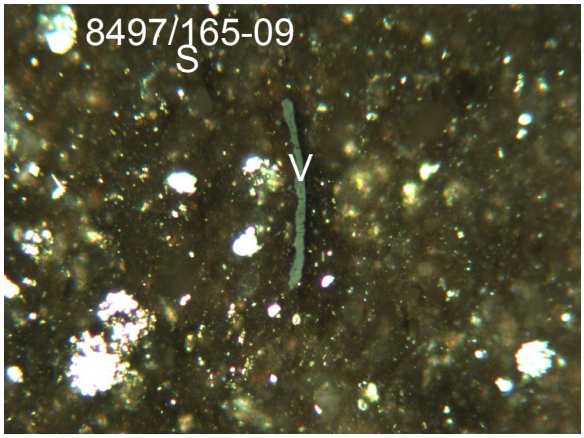

8497/165-09
S
B

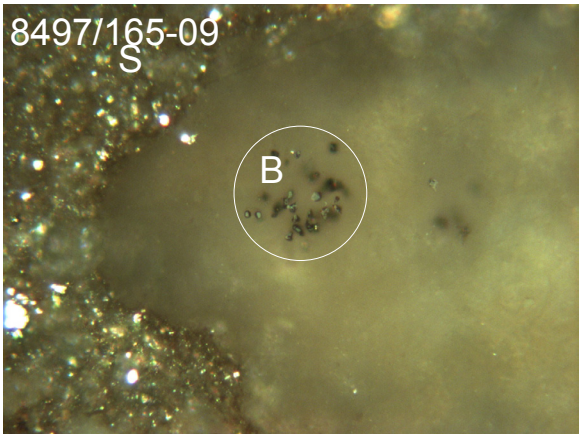

8497/165-09
ch?

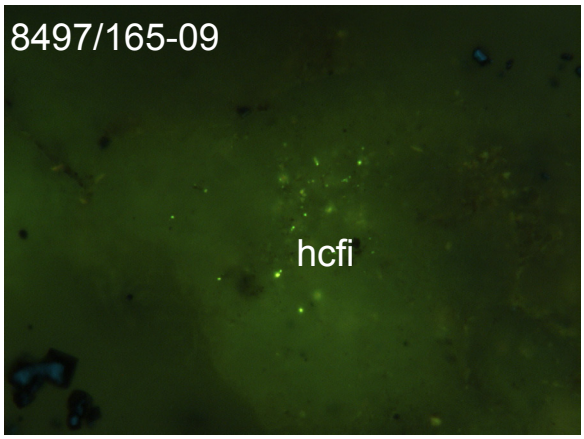

8497/165-09
S
ch

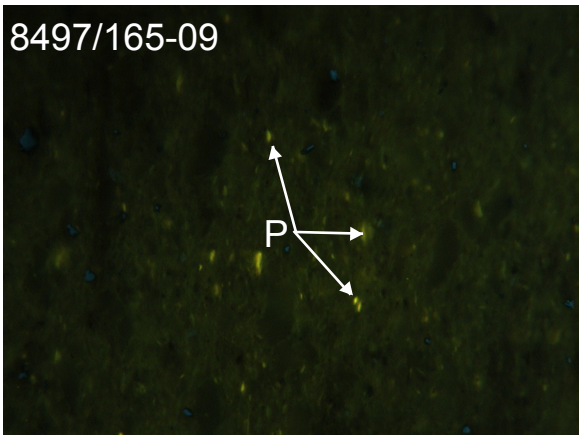

8497/165-09
P
S
P

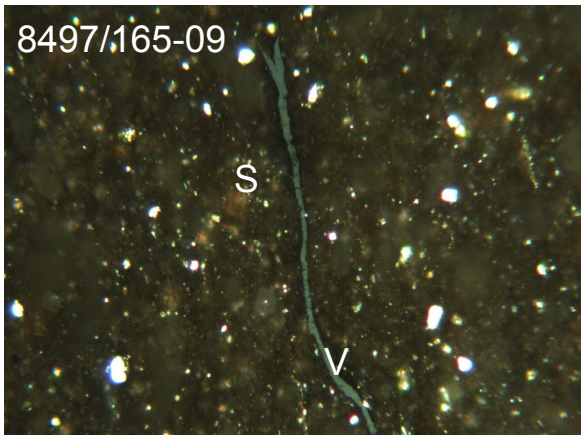

8497/165-09
P
P
20 µm

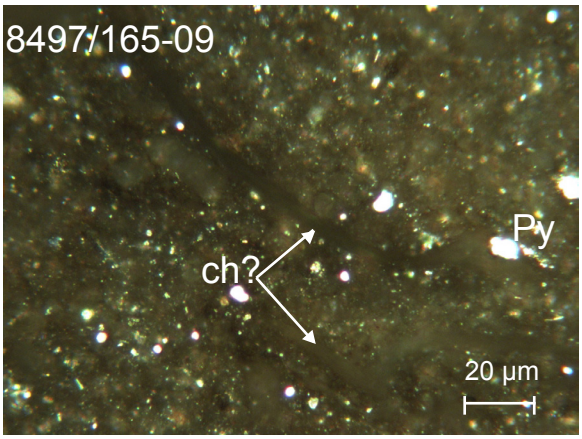

8497/165-09
S
V

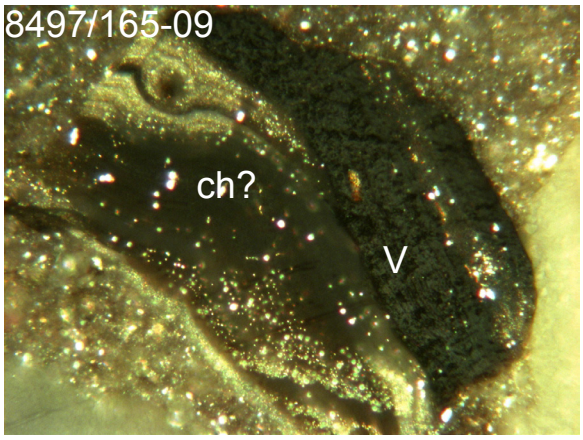

8497/165-09
S
B

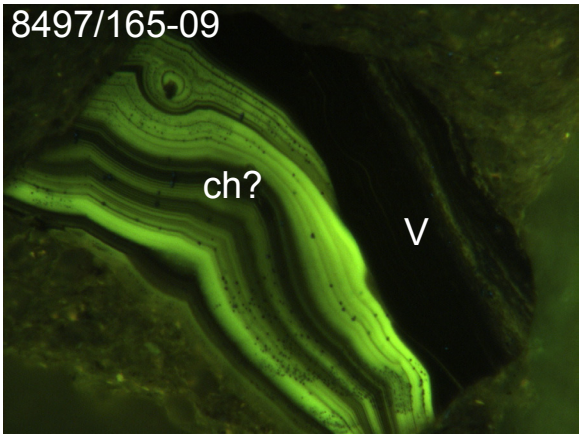

8497/165-09
hcfi

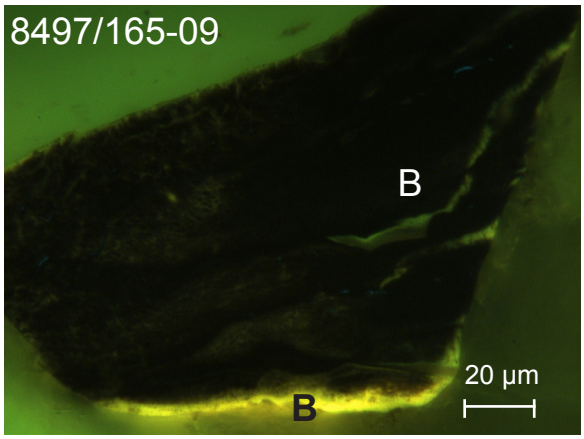

8497/165-09
P

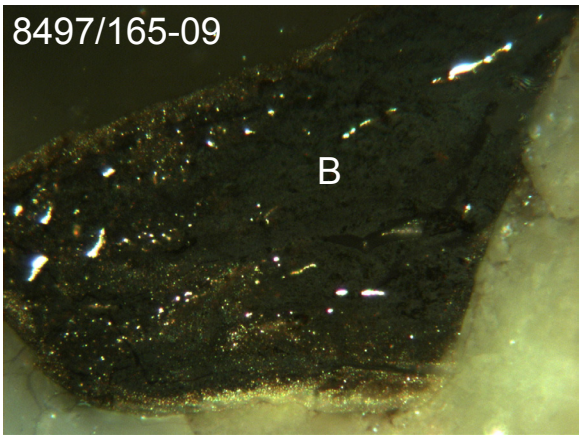

8497/165-09
S
V

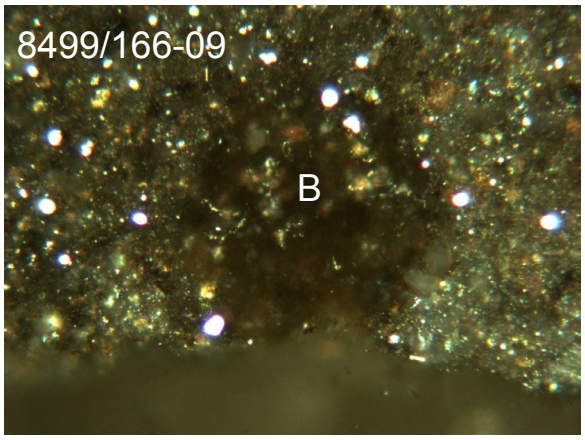

8497/165-09
Py
ch?
20 µm

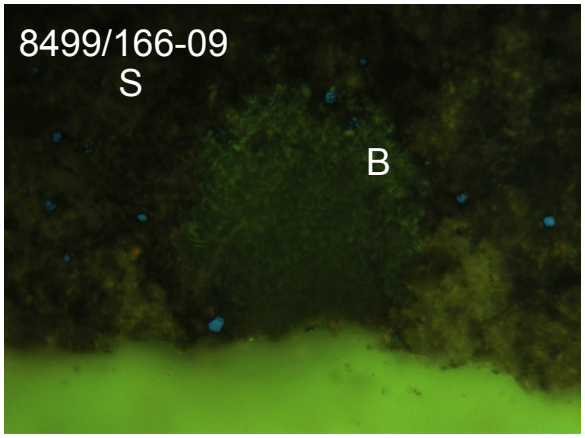

8497/165-09
ch?
V

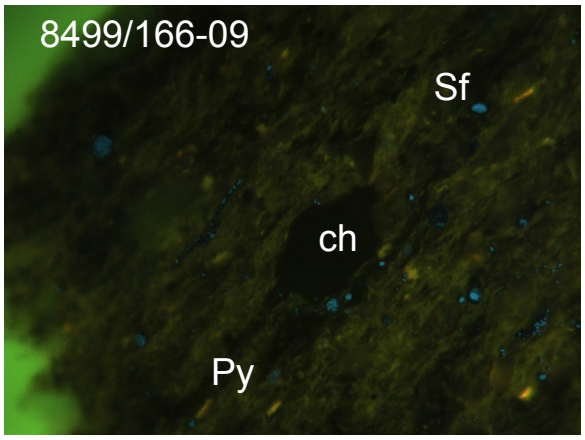

8497/165-09
ch?
V

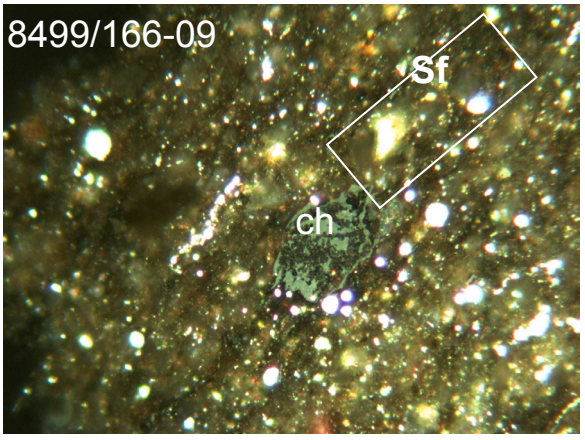

8497/165-09
B
20 µm
B

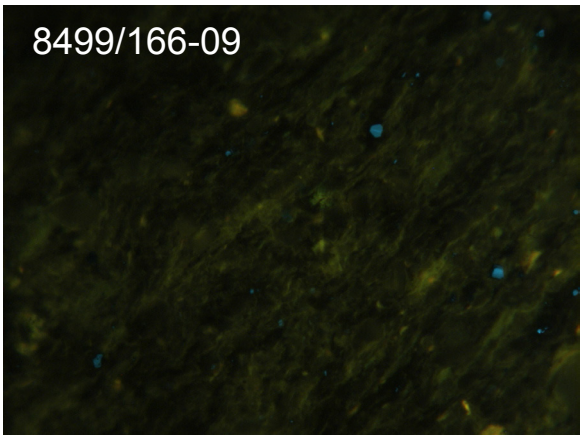

8497/165-09
B

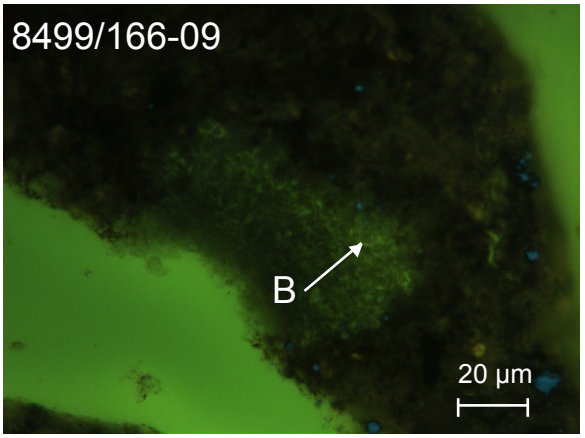




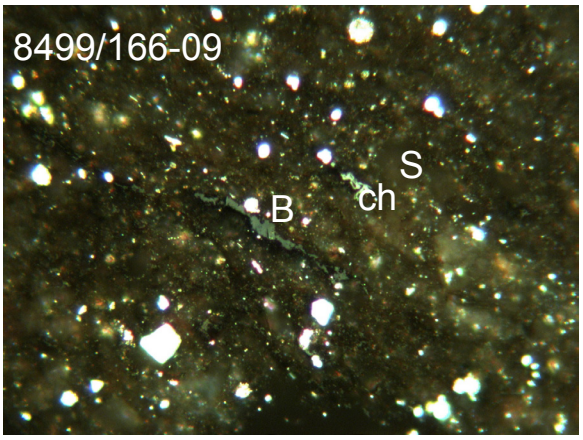


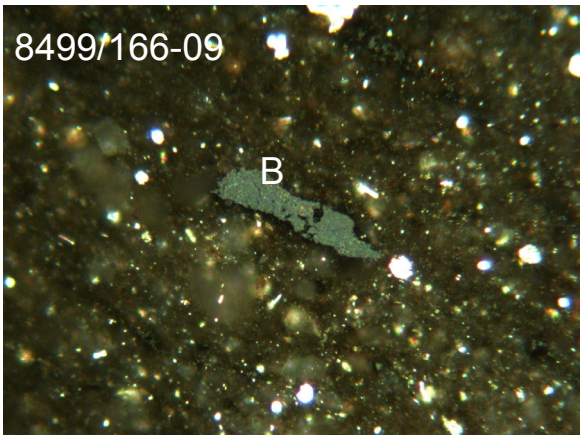


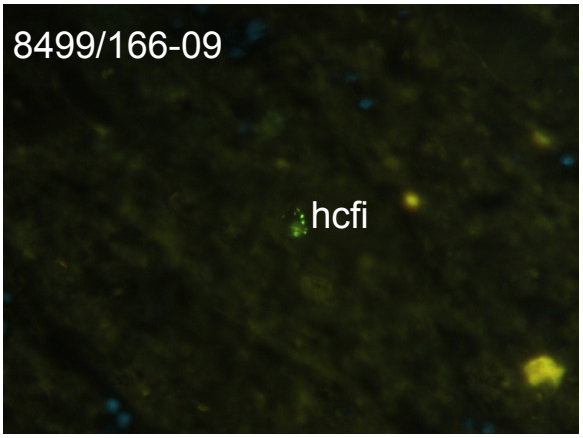


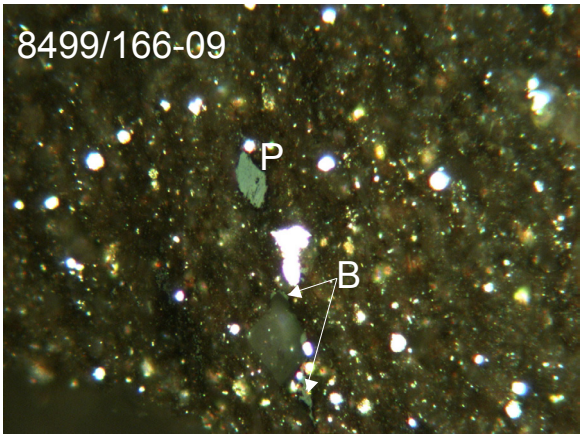


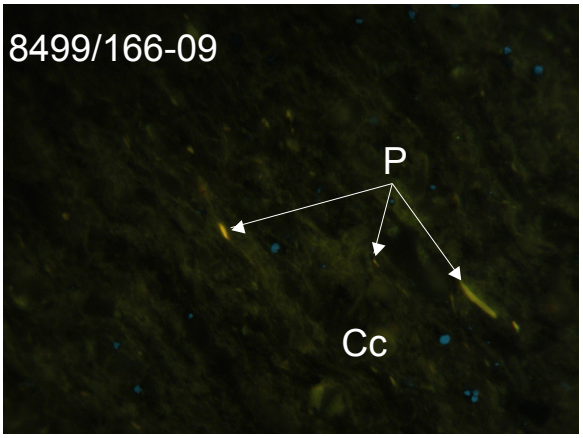
AGS 8499/GSC 166-09 (Muskwa; 100/06-11-101-04W6/00, 1651.4 m core depth). Organically rich dark brown shale composed mostly of an interconnected network of framboidal pyrite (Py) and micrinite-rich amorphous kerogen with some fluorescing to non-fluorescing primary bitumen (B) lenses. Minor amount of siliceous microfossils (S, derived from chrysophyte alginite), radiolaria, some are possibly derived from microforam (Sf) remains and calcareous nannoplankton). Minor to rare amount of fluorescing and non-fluorescing Prasinophyte (P) and chitinous (ch) microfossils. Very rare vitrinite (V) macerals and traces of yellow fluorescing hydrocarbon fluid inclusions (hcfi) annealed within carbonate minerals and inertinite (I) macerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). Cc = cocoidal alginite

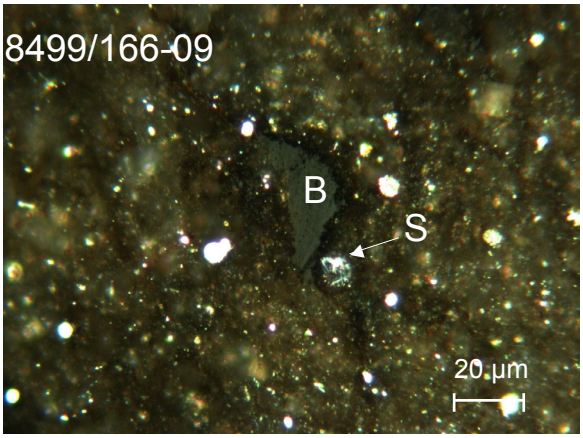

8499/166-09
S
ch
B

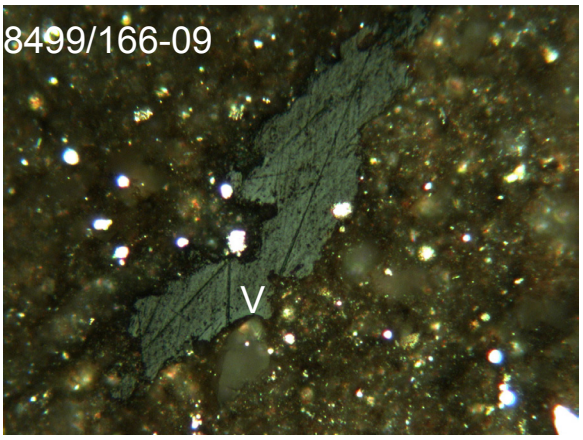

8499/166-09
B

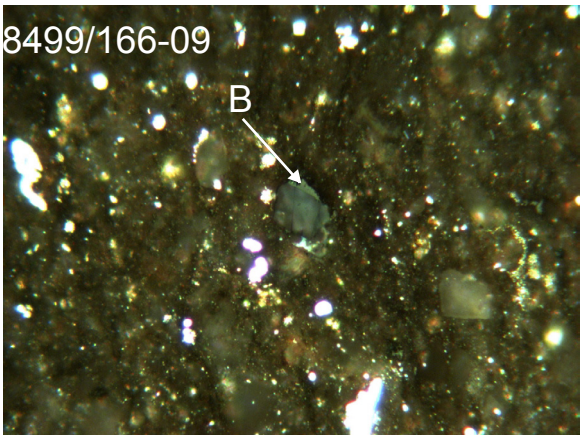

8499/166-09
hcfi

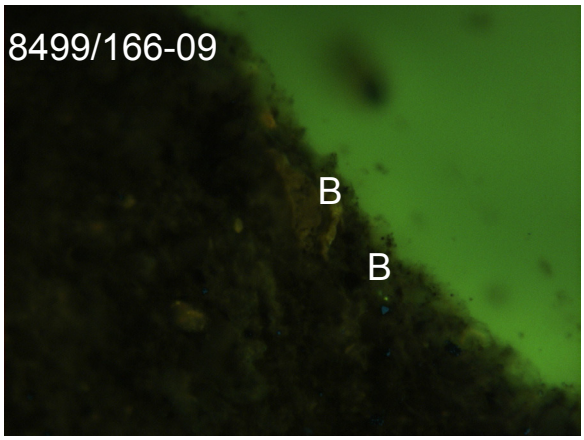

8499/166-09
P
B

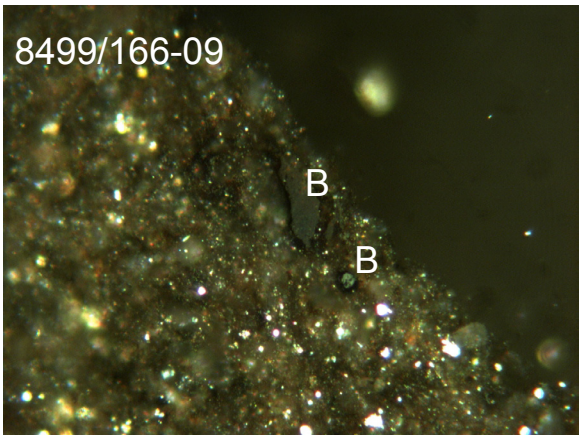

8499/166-09
P
Cc

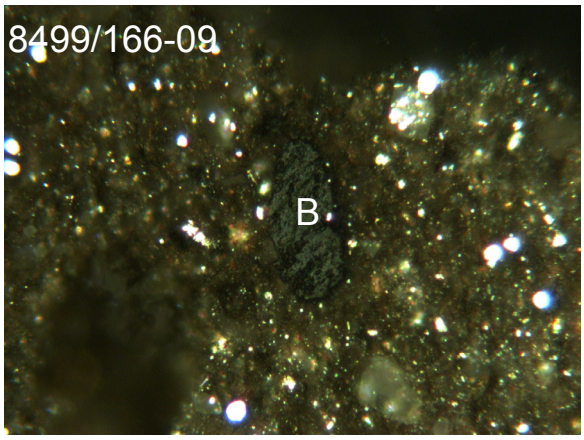

8499/166-09
B
S
20 µm

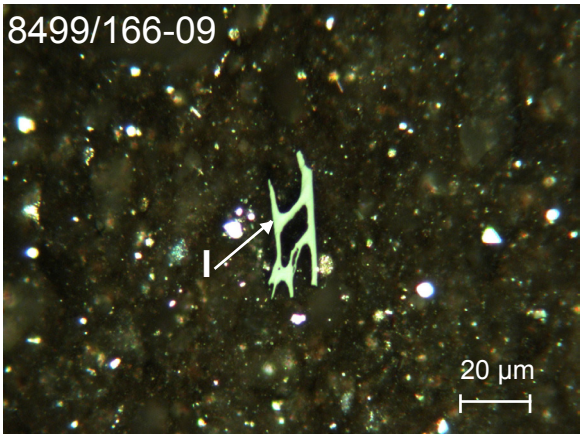

8499/166-09
V

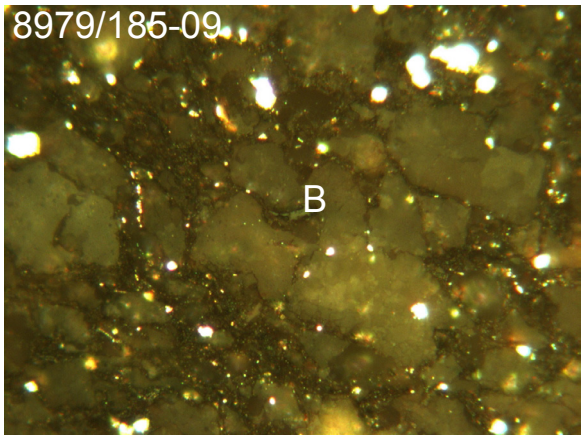

8499/166-09
B

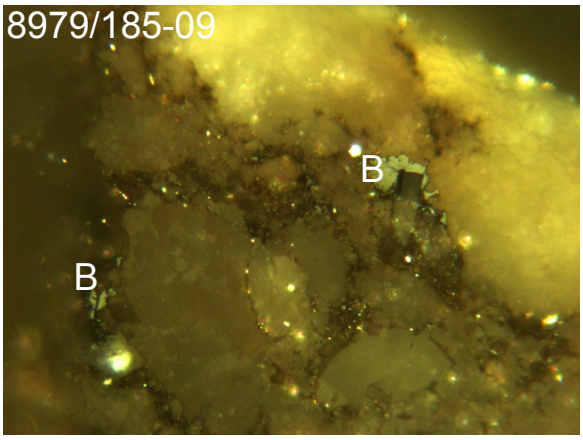

8499/166-09
B
B

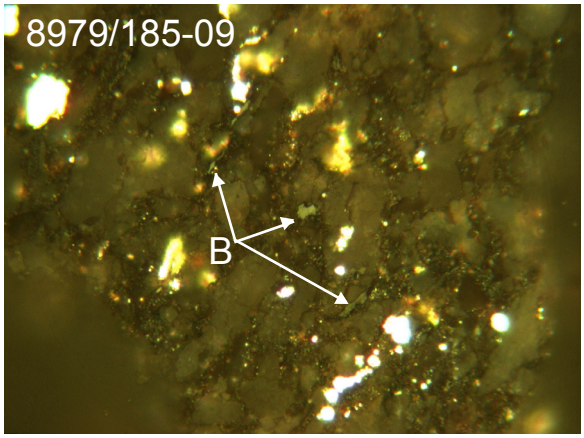

8499/166-09
B
B

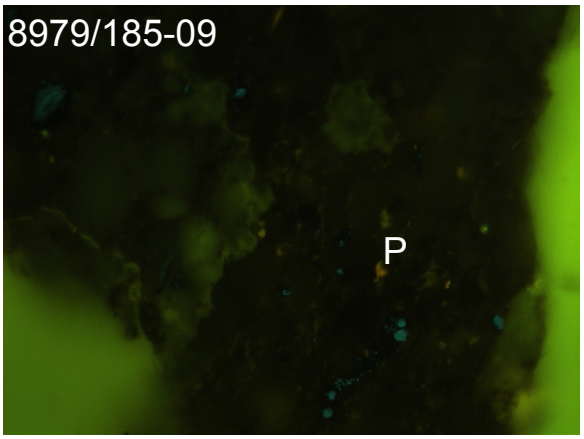

8499/166-09
B

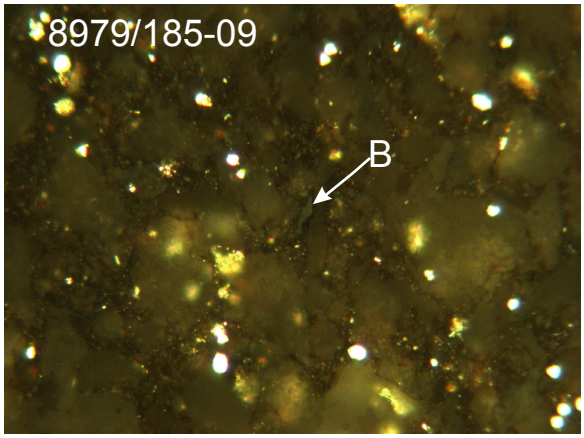

8499/166-09
I
20 µm

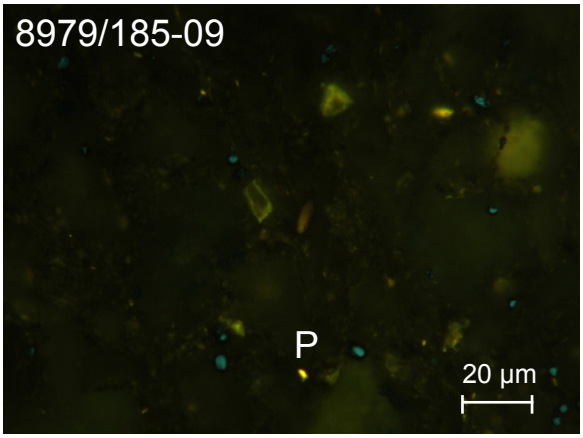




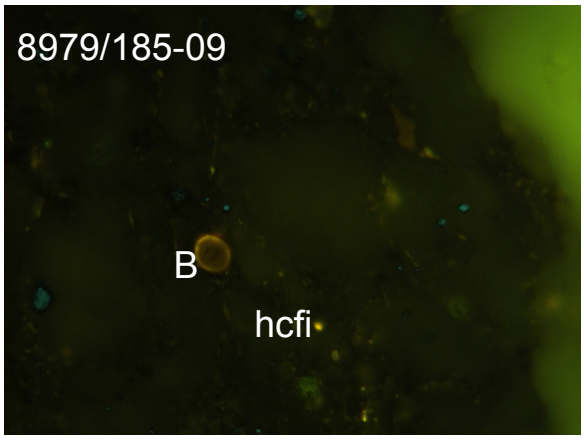


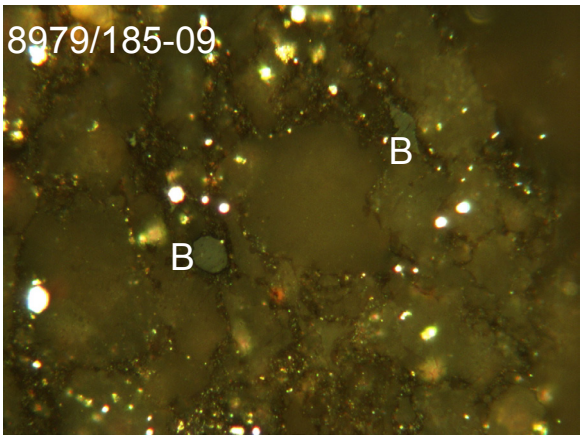


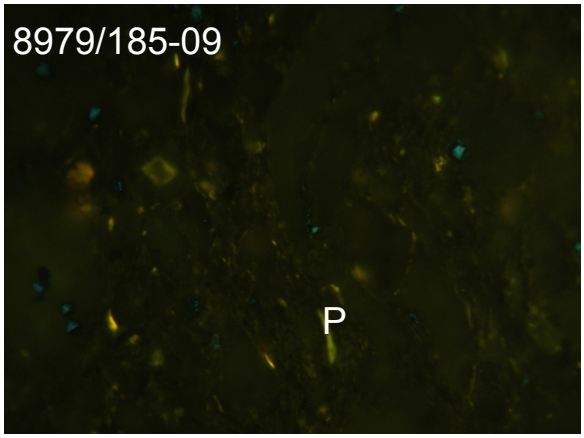


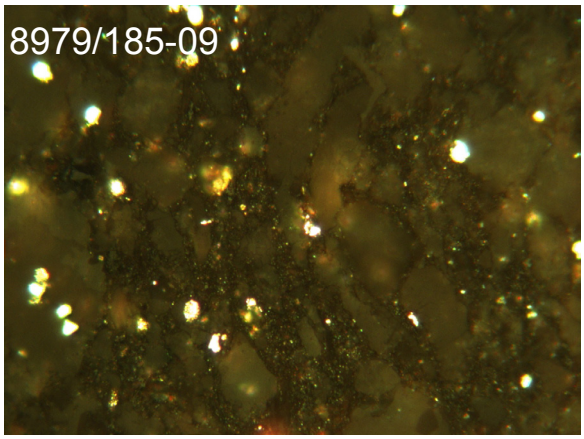


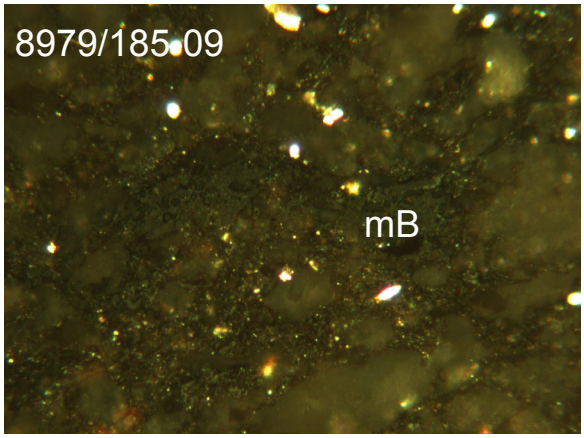
AGS 8979/GSC 185-09 (Duvernay; 100/02-19-039-26W4/00, 2280.4 m core depth). Organically rich, dark brown, coarse-grained, silty shale composed mostly of an interconnected network of framboidal pyrite (Py) rich amorphous kerogen brecciated between carbonate grains. Minor to rare amount of yellow-orange fluorescing Prasinophyte (P) with a trace amount of non-fluorescing *Tasmanites* (T). Minor amount of both reddish-orange fluorescing to non-fluorescing isotropic solid bitumen (B) and granular matrix bitumenite (mB) are also observed. There are also a minor amount of chitinous (ch, mostly derived from chitinozoans), rare siliceous (S) and calcareous microfossils. A trace amount of hydrocarbon fluid inclusions (hcfi) annealed within quartz minerals are also observed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

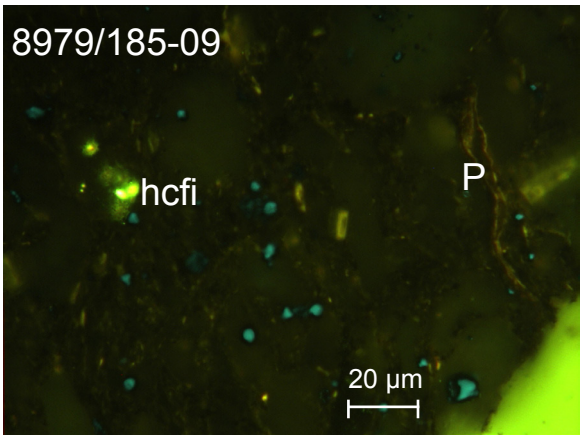

8979/185-09
B
hcfi

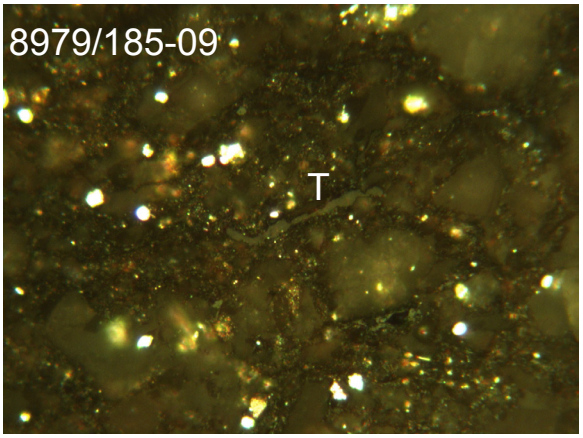

8979/185-09
B
B

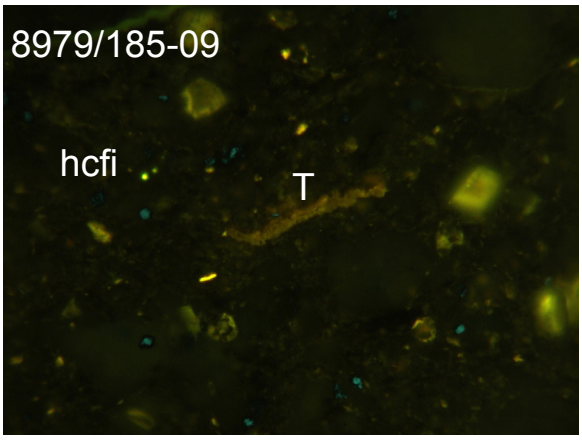

8979/185-09
P

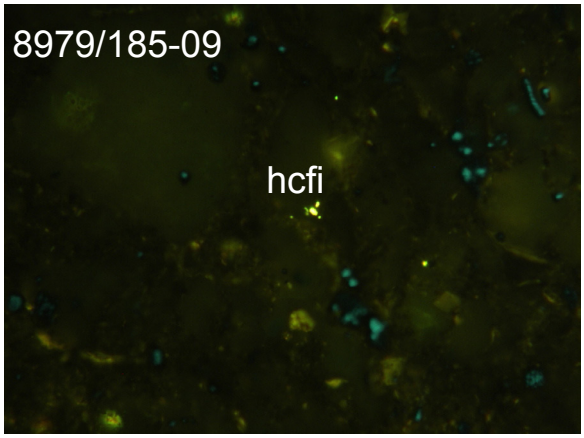

8979/185-09

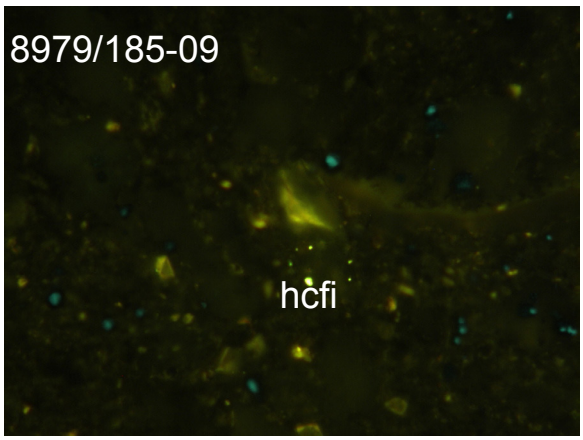

8979/185-09
mB

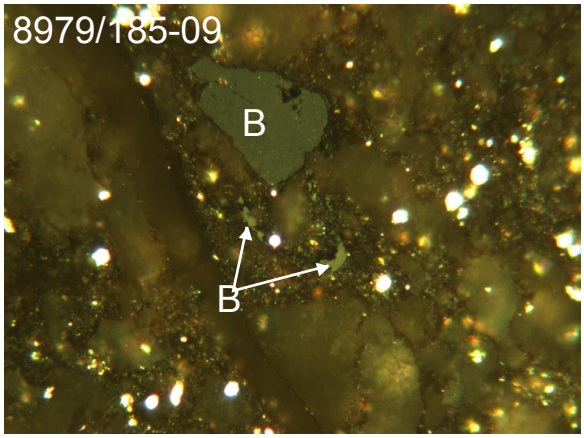

8979/185-09
hcfi
P
20 µm

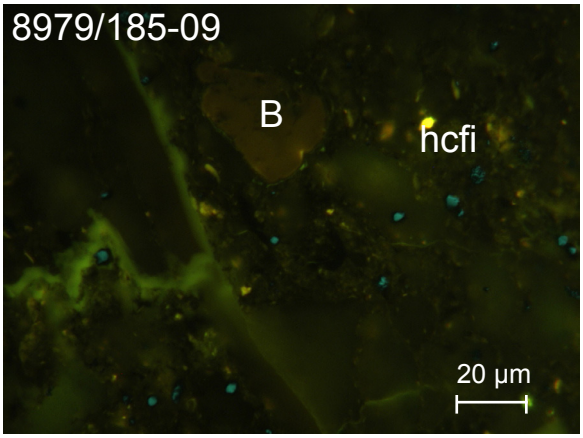

8979/185-09
T

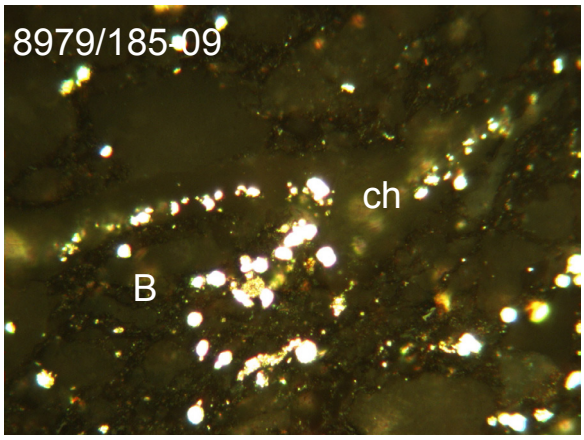

8979/185-09
hcfi
T

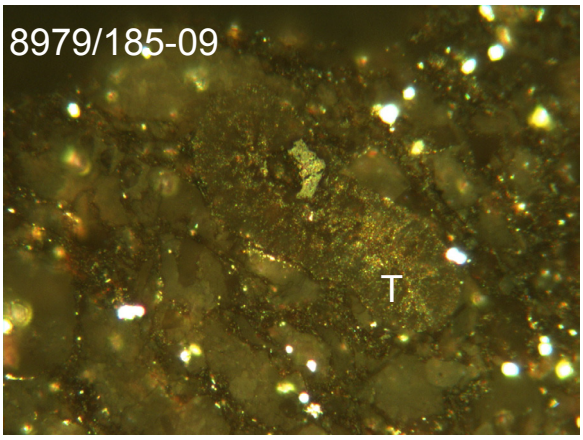

8979/185-09
hcfi

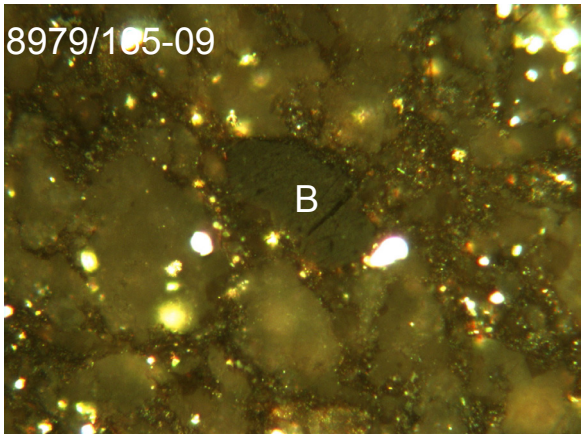

8979/185-09
hcfi

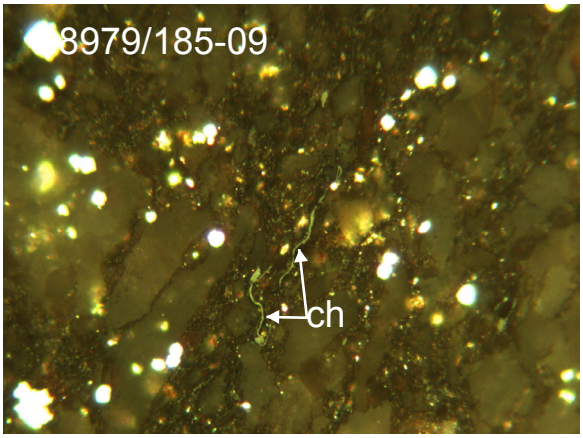

8979/185-09
B
B

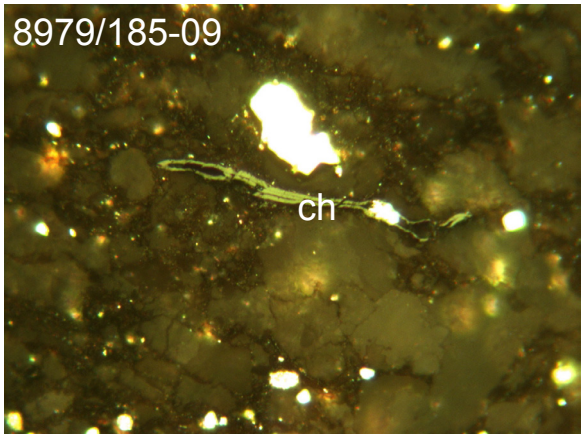

8979/185-09
B
hcfi
20 µm

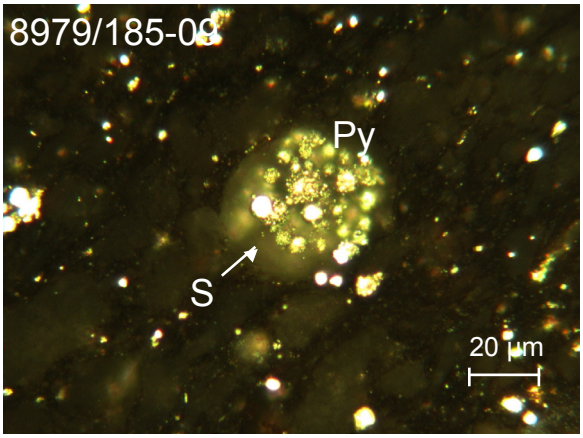

8979/185-09
ch
B

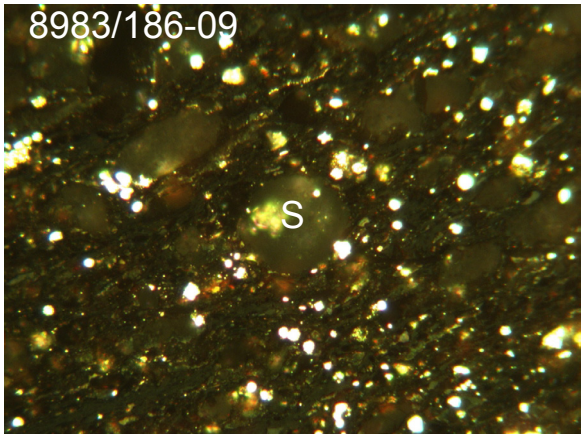

8979/185-09
T

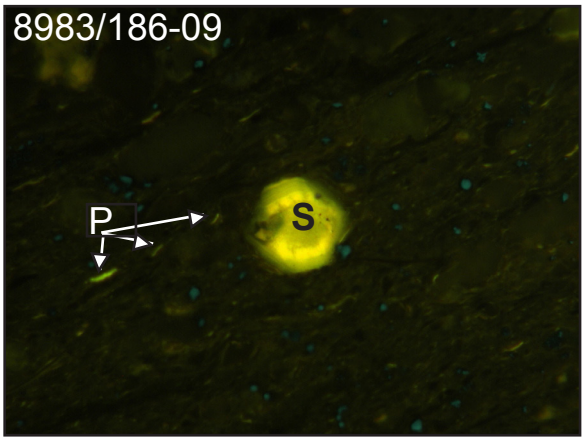

8979/185-09
B

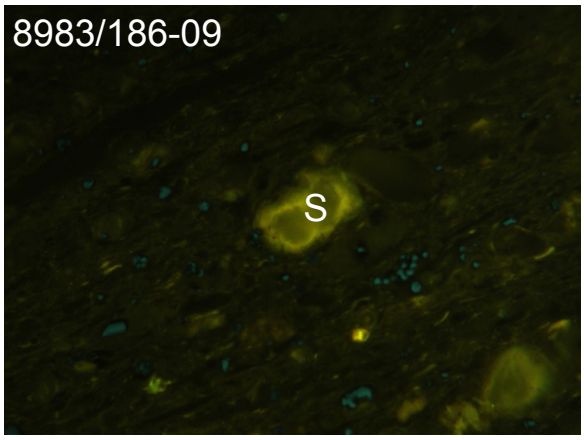

8979/185-09
ch

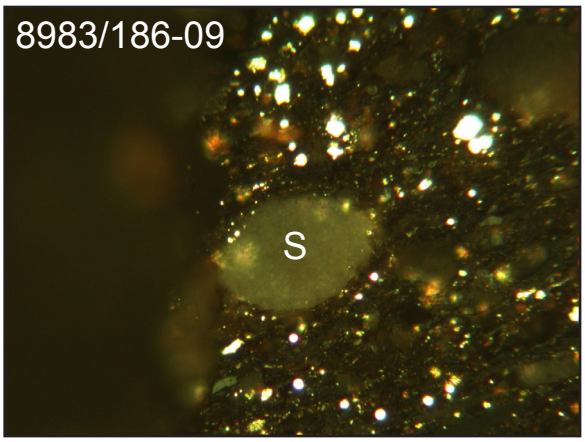

8979/185-09
ch

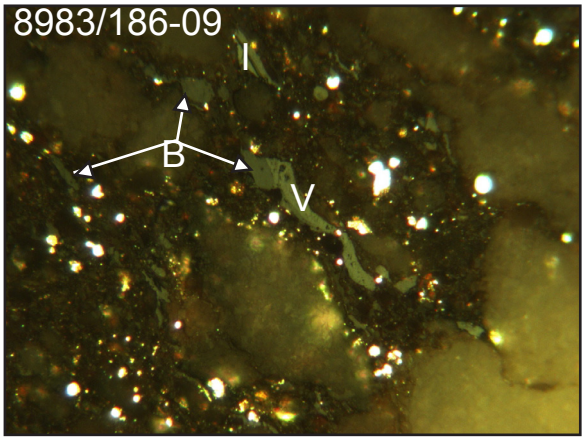

8979/185-09
Py
S
20 µm

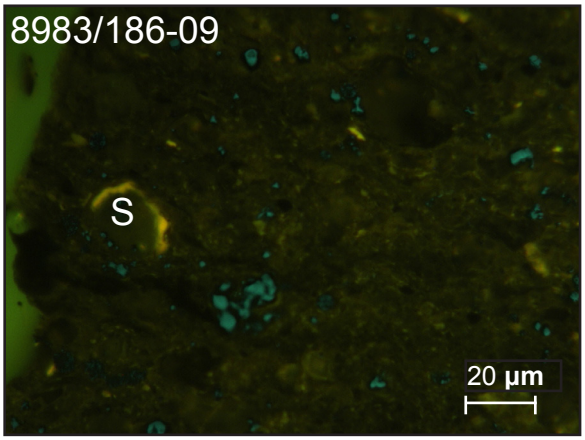




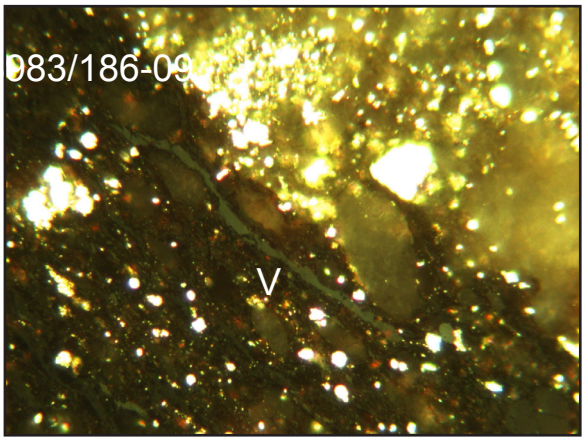


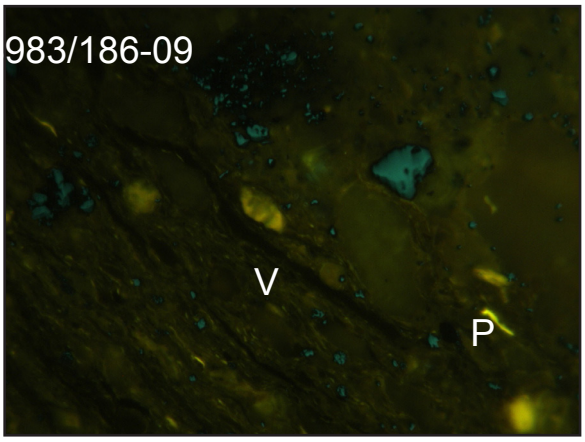


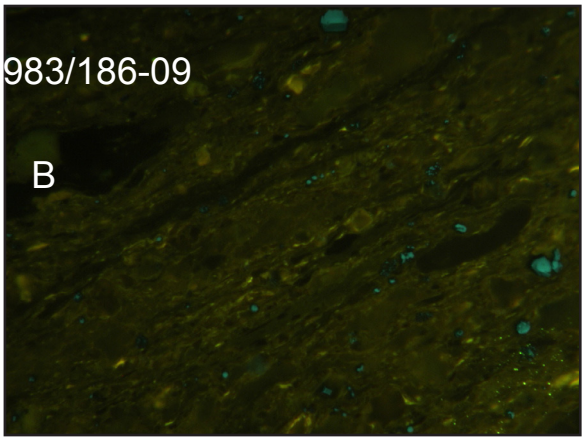


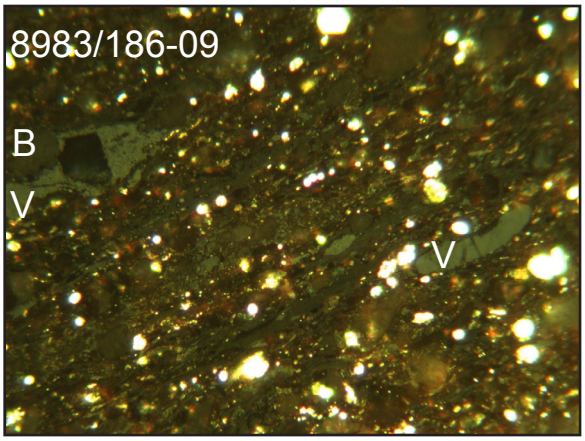


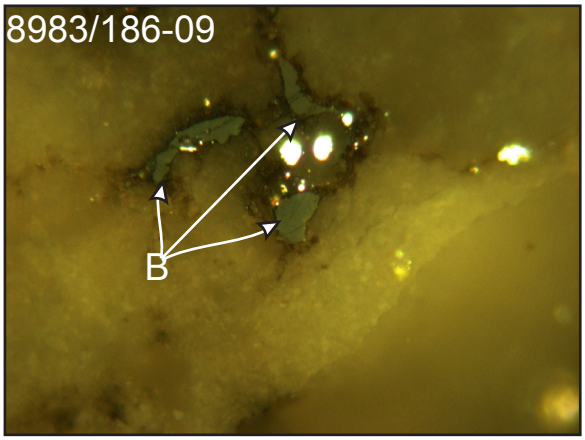
AGS 8983/GSC 186-09 (Duvernay; 100/07-29-038-19W4/00, 1775.9 m core depth). Organically rich, dark brown, fine-grained, silty shale composed mostly of an interconnected network of framboidal pyrite rich amorphous kerogen. Major amount of dark grey, fluorescing and non-fluorescing alginite lenses, and thinly dispersed vitrinite (V) maceral. Minor amount of small yellow-orange fluorescing Prasinophyte (P) with both reddish-orange fluorescing to non-fluorescing isotropic solid bitumen (B) and granular matrix bitumenite, siliceous (S, mostly derived from radiolaria) and calcareous microfossils (ca). There are also a trace amount of chitinous microfossils (ch, most likely derived from chitinozoans), hydrocarbon fluid inclusions annealed within quartz minerals and sporinite (Sp) showing zoning and partial degredation. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). I = Inertinite.

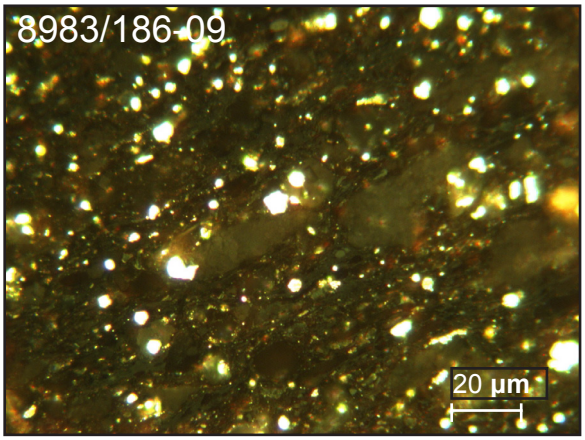

983/186-09
V

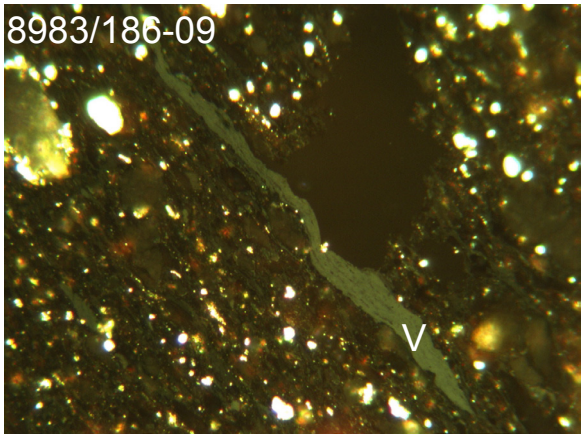

983/186-09
V
P

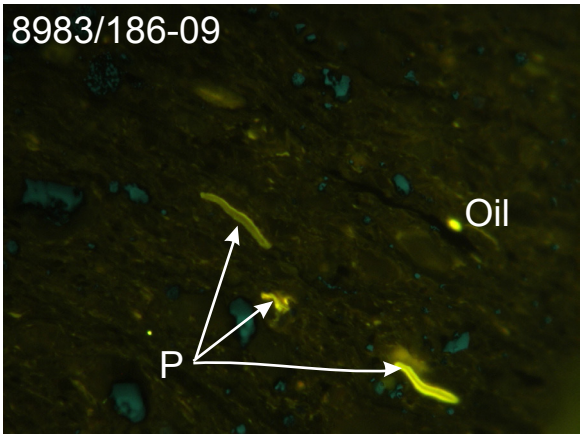

983/186-09
B

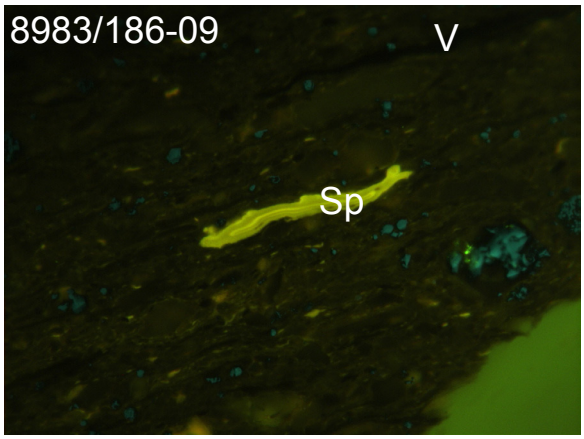

8983/186-09
B
V
V

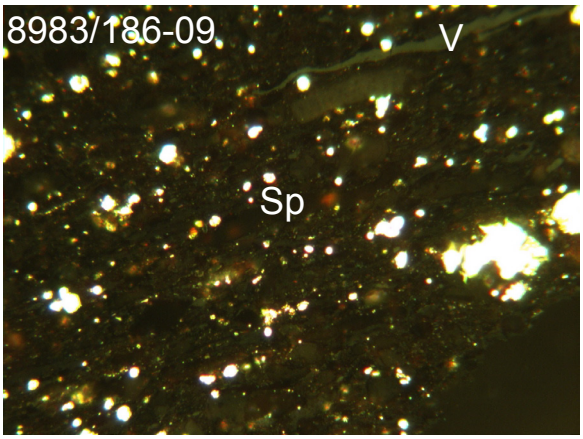

8983/186-09
B

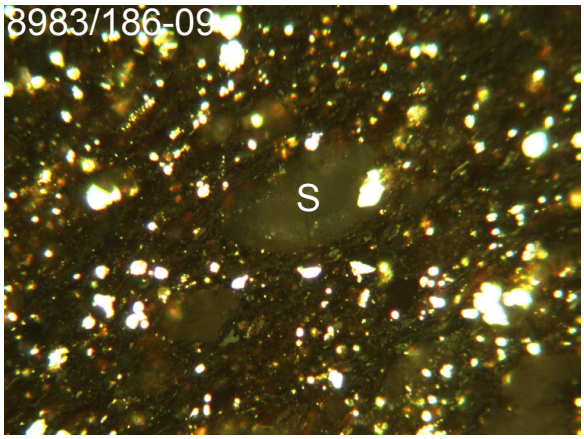

8983/186-09
20 µm

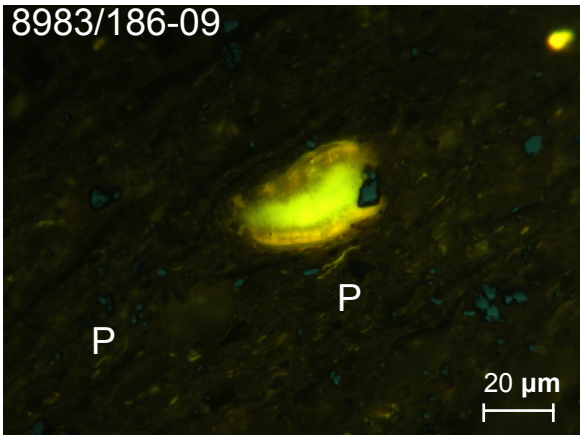

8983/186-09
V

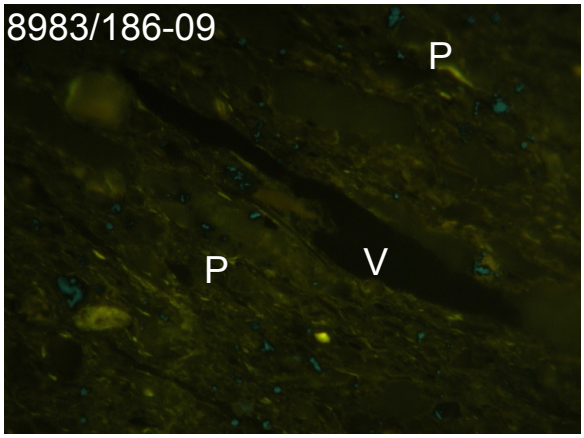

8983/186-09
Oil
P

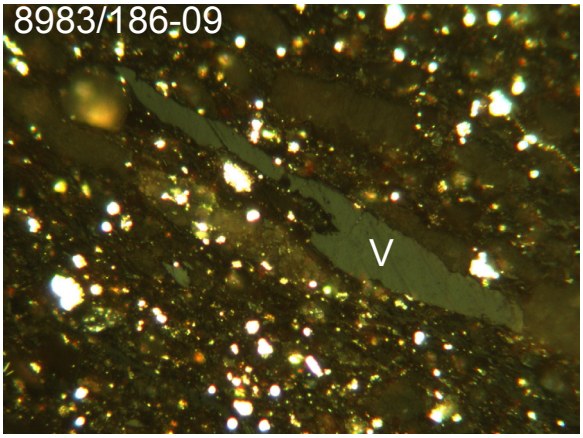

8983/186-09
V
Sp

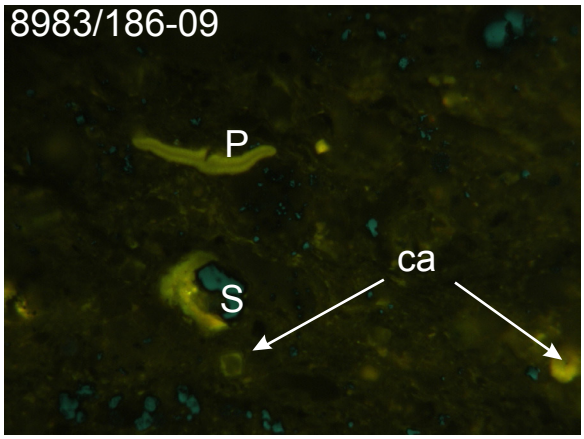

8983/186-09
V
Sp

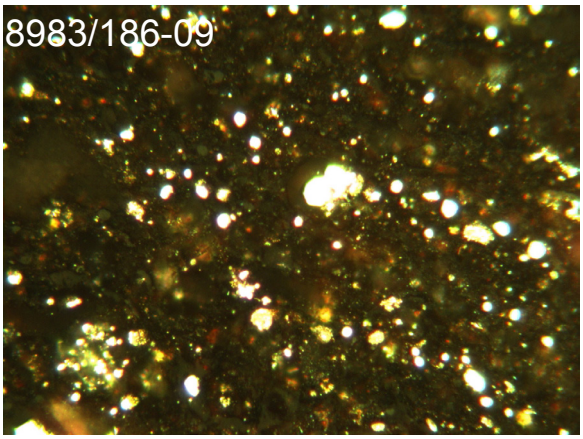

8983/186-09
S

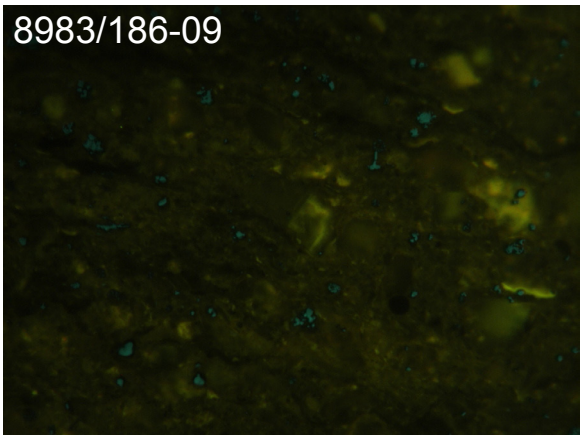

8983/186-09
P
P
20 µm

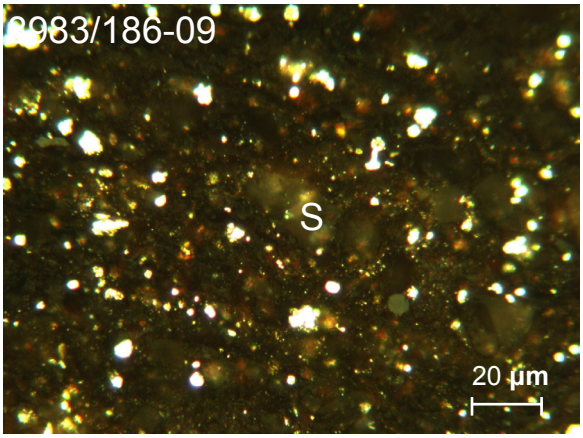

8983/186-09
P
P
V

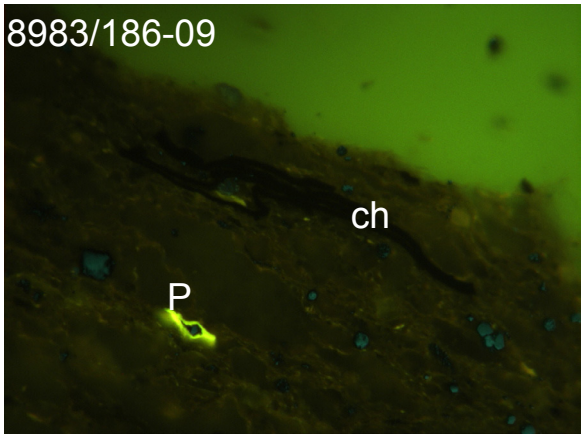

8983/186-09
V

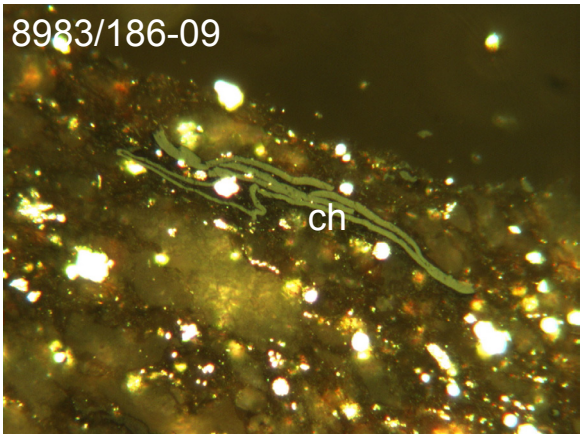

8983/186-09
P
ca
S


8983/186-09


8983/186-09


8983/186-09
S
20 µm


8983/186-09
ch
P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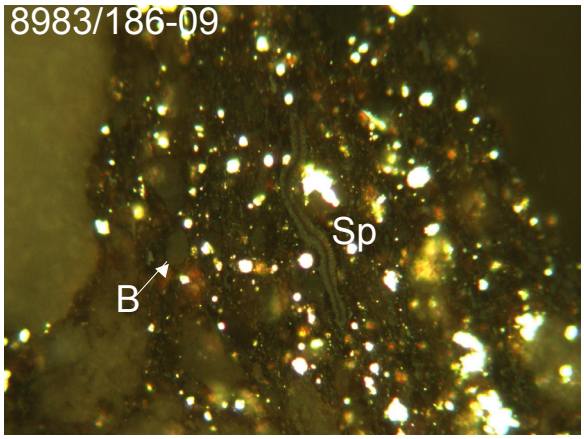
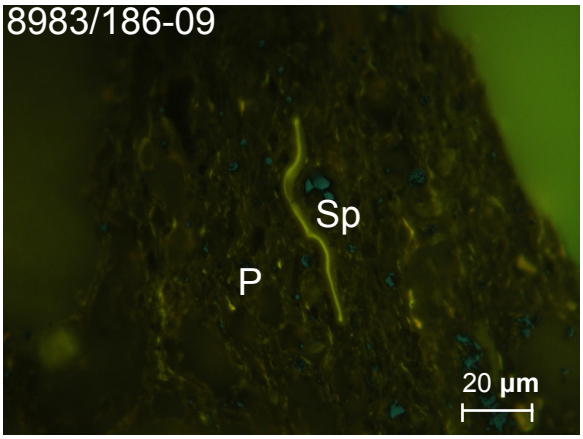
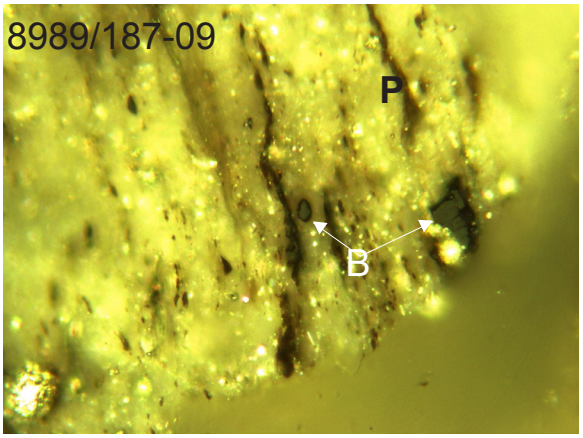
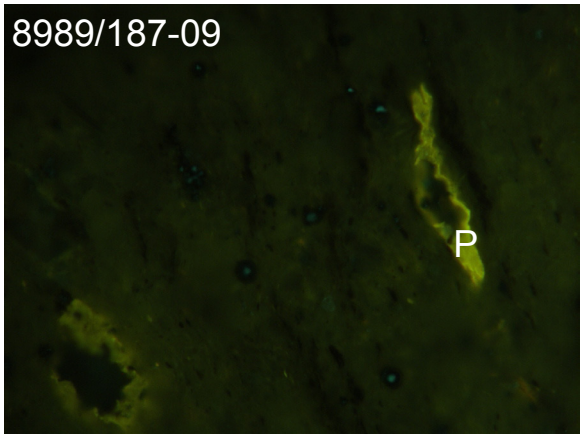
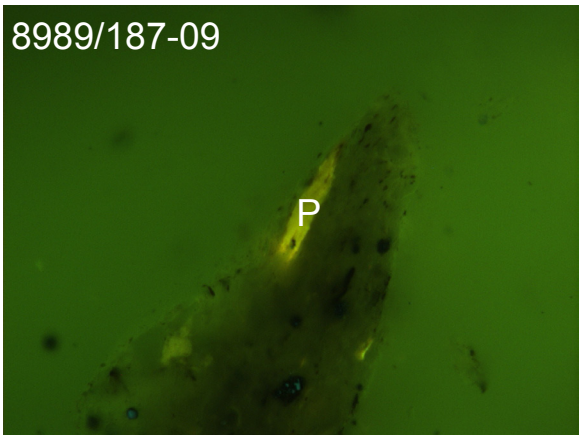
ch

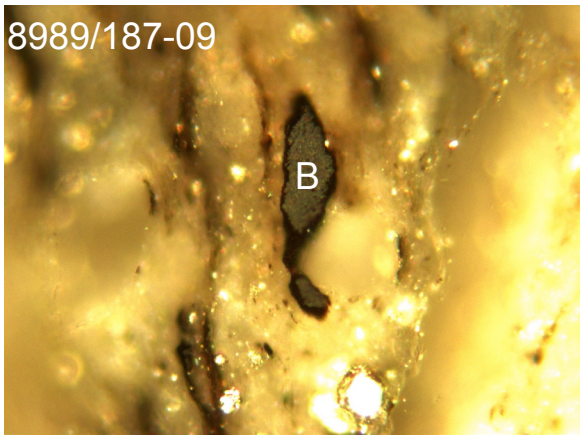

8983/186-09
Sp
B

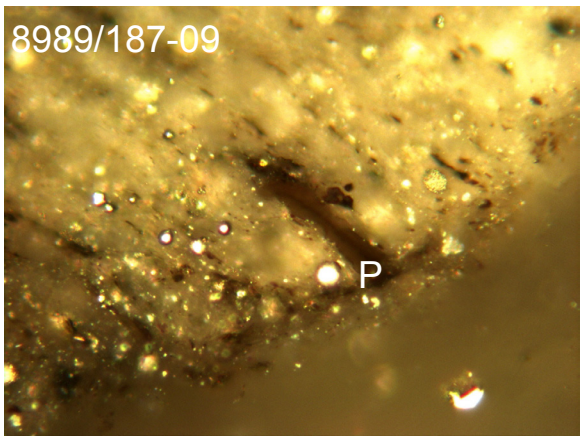

8983/186-09
Sp
P
20 µm

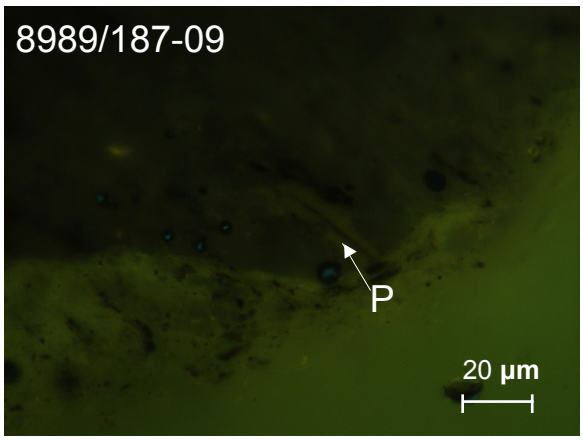




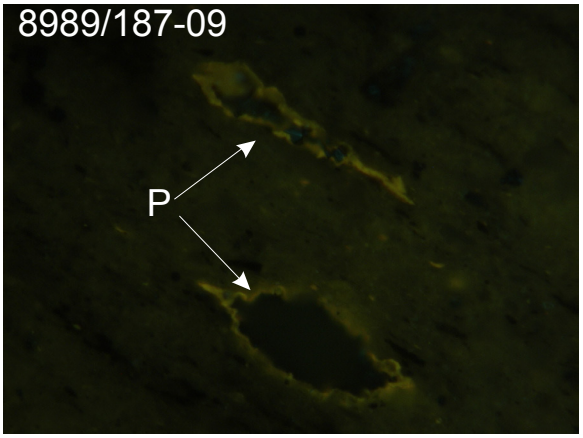


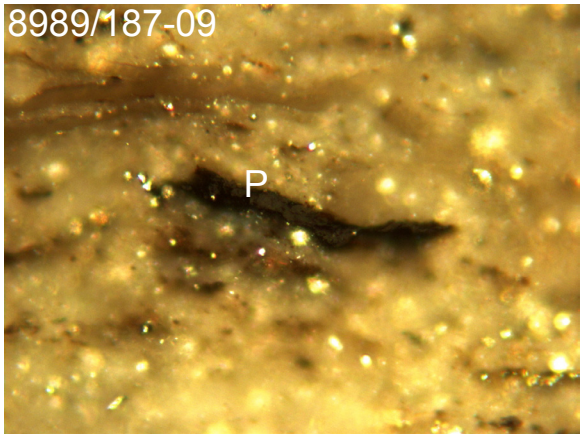


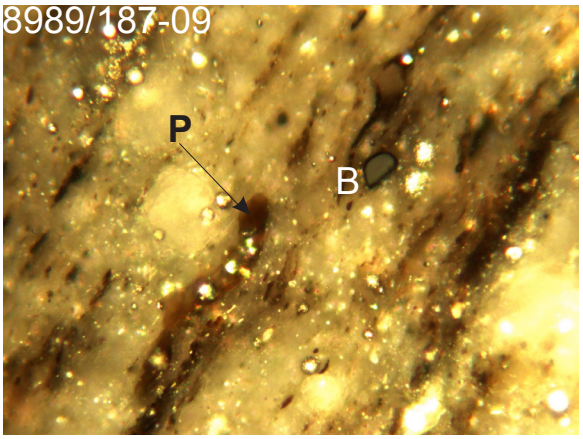


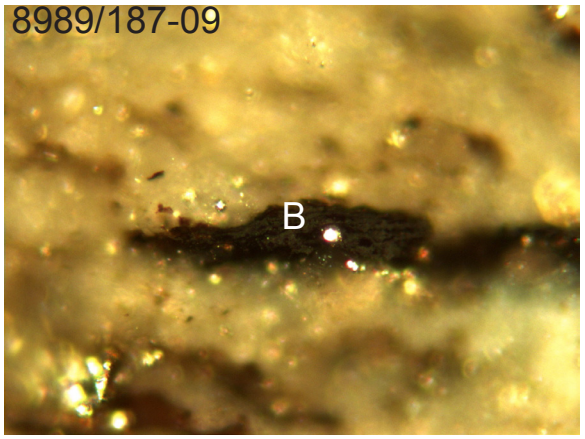


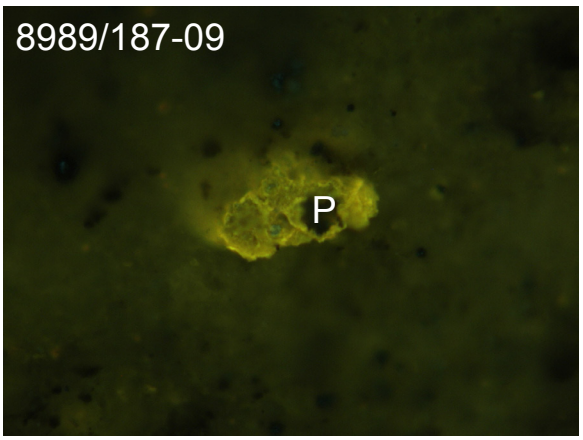
AGS 8989/GSC 187-09 (Duvernay; 100/13-20-085-16W5/00, 1704.1 m core depth). Organically lean, silty shale with a minor to rare amount of mostly non-fluorescing alginite lenses and some yellow-orange fluorescing Prasinophyte (P) and Tasmanites (T) alginite. Rare to trace amount of non-fluorescing isotropic and granular bitumen (B) and chitinous microfossils are also observed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

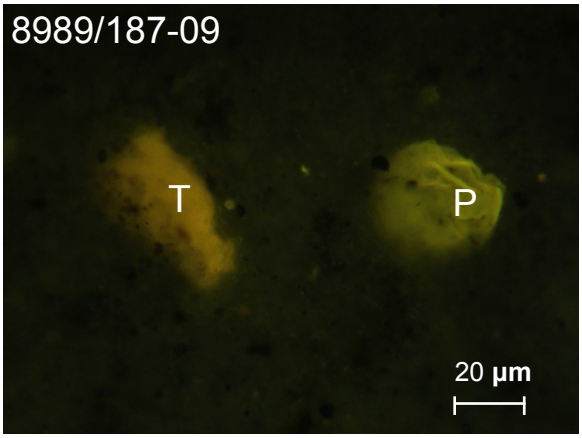

8989/187-09
P

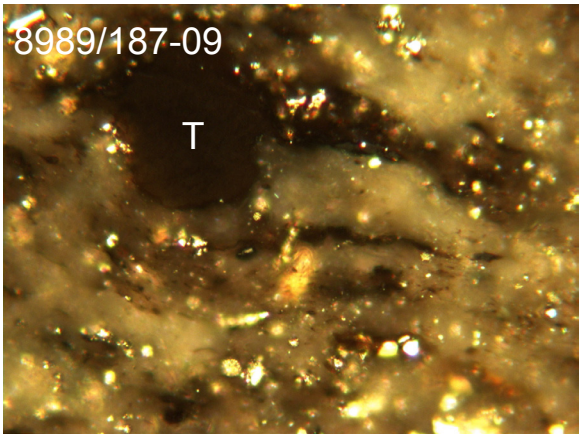

8989/187-09
P

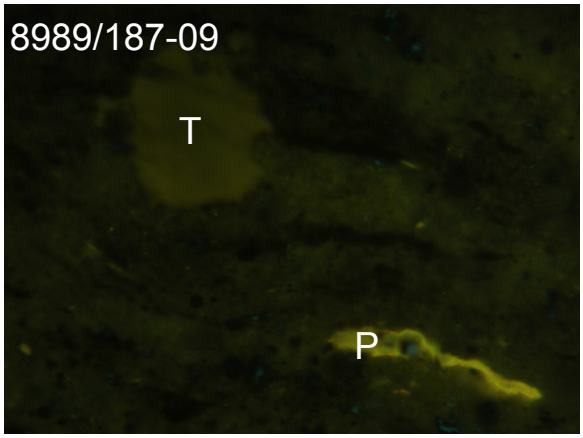

8989/187-09
P
B

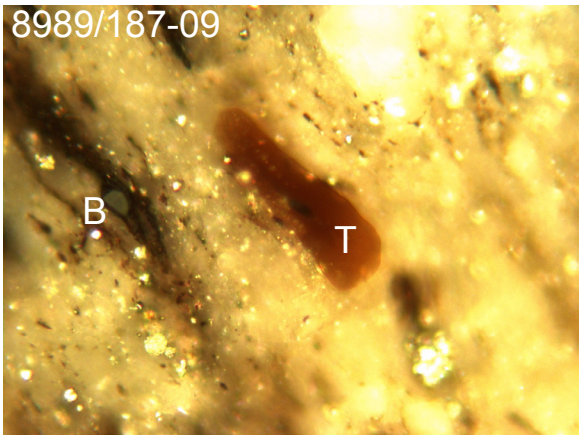

8989/187-09
B


8989/187-09
P

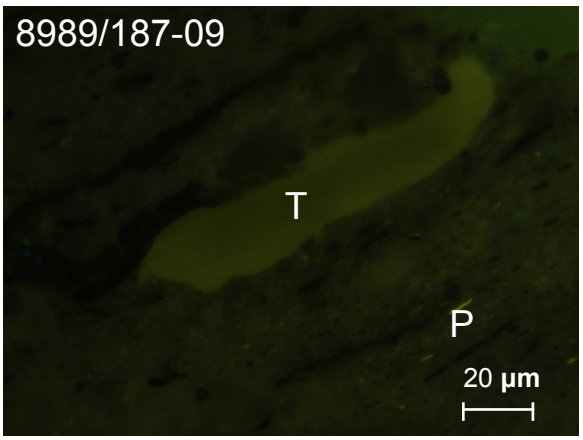

8989/187-09
T
P
20 µm

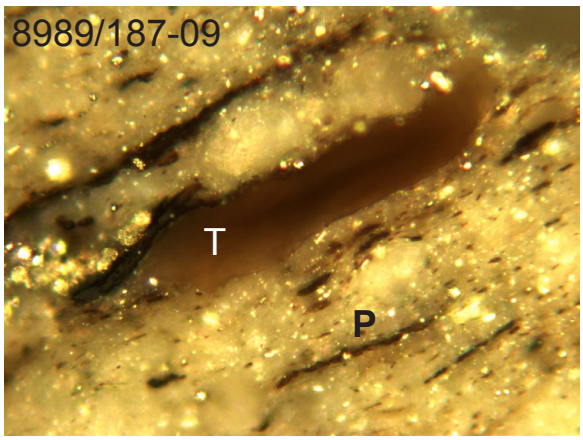

8989/187-09
T

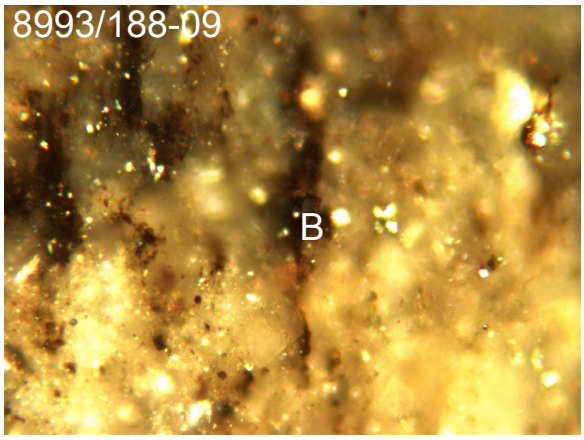

8989/187-09
T
P

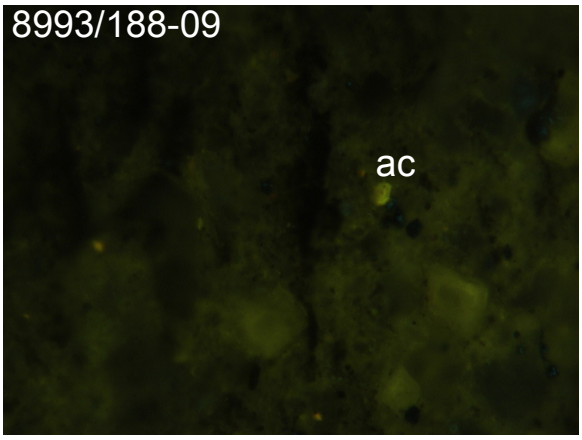

8989/187-09
B
T

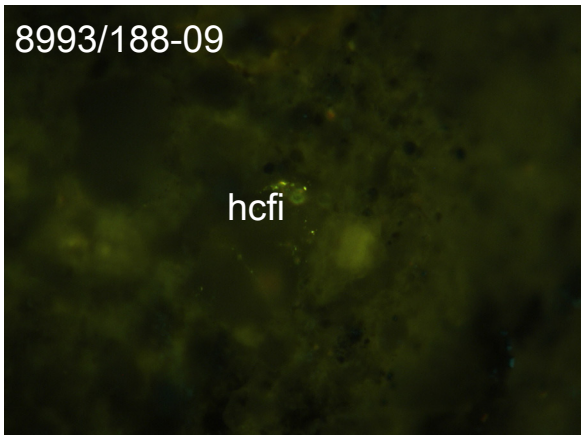

8989/187-09
T

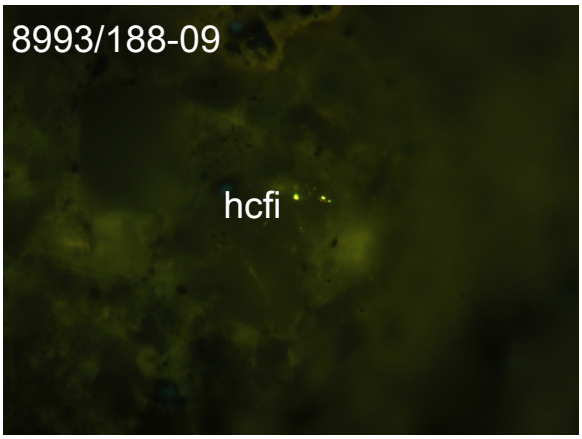

8989/187-09
T
P
20 µm

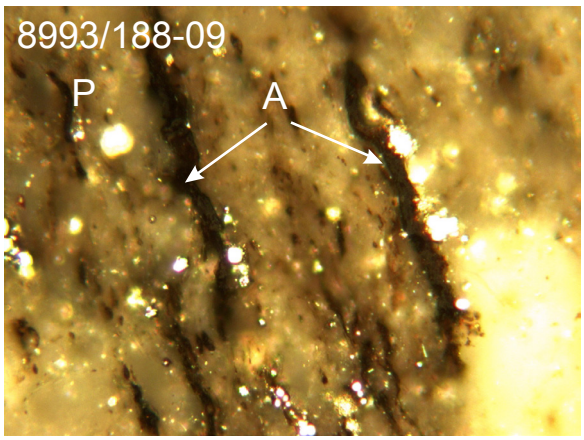

8989/187-09
T
P

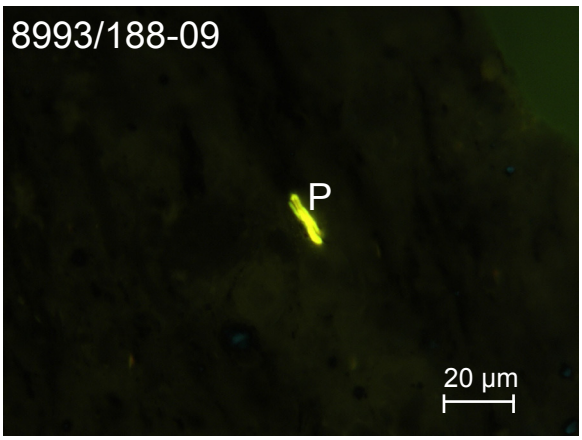




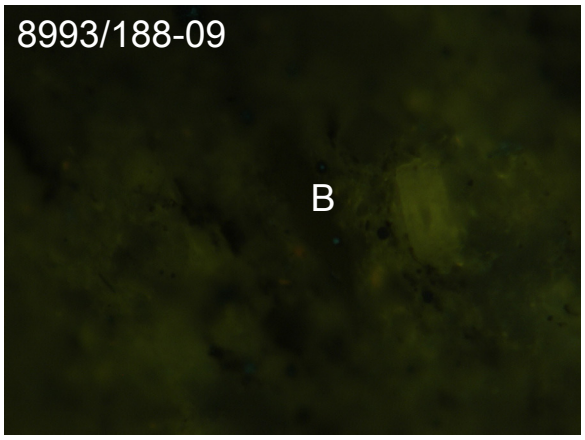


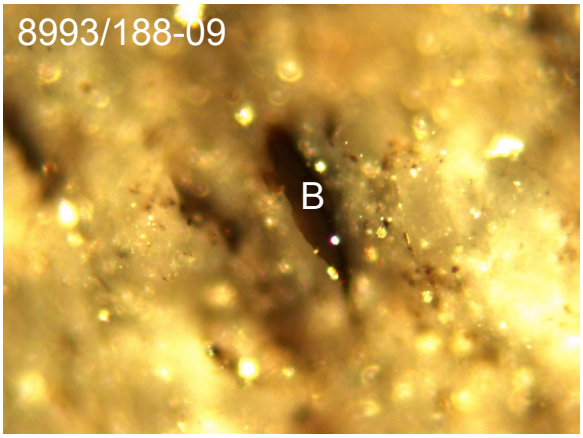


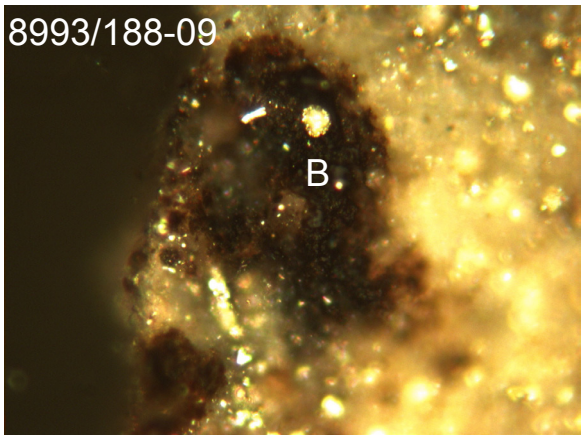


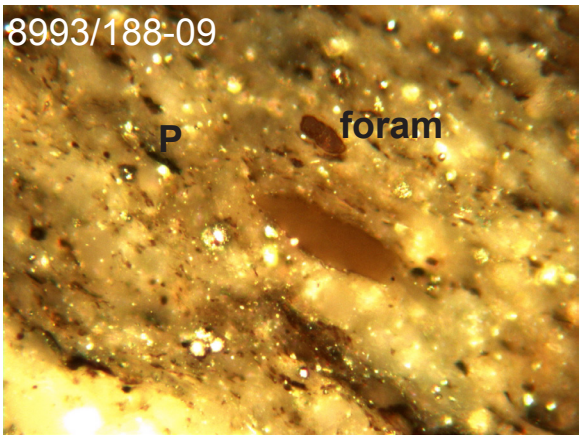


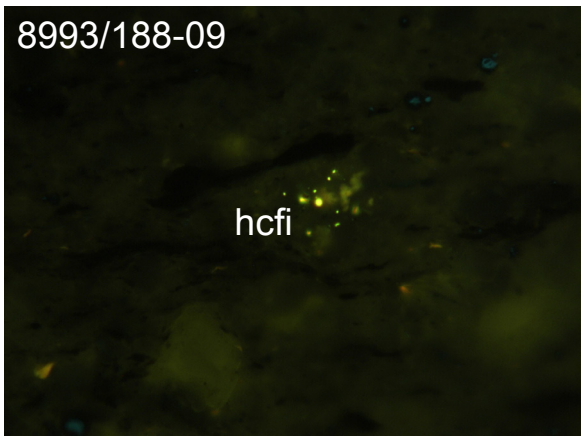
AGS 8993/GSC 188-09 (Duvernay; 100/13-20-085-16W5/00, 1704.7 m core depth). Organically lean, silty shale with a minor to rare amount of mostly non-fluorescing alginite forming discontinuous amorphous kerogen lenses. Rare yellow-orange fluorescing Prasinophyte (P) alginite. Rare to trace amount of non-fluorescing isotropic and granular bitumen (B), Tasmanites (T), chitinous microfossils (ch), microforams (foram) and hydrocarbon fluid inclusions (hcfi). Very rare sporinite (Sp) showing zonation and partial degradation. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). A = Alginite; ac = acanthomorphic acritarch.

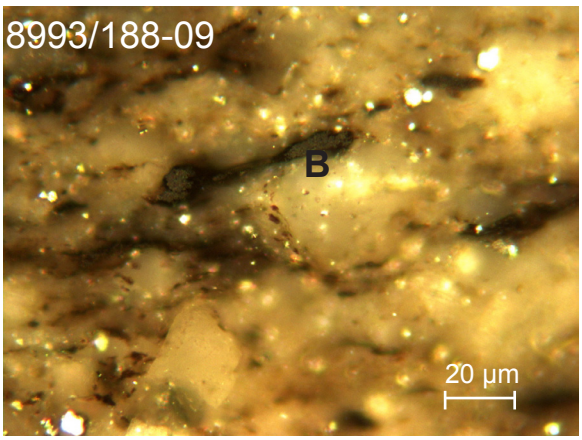

8993/188-09
B

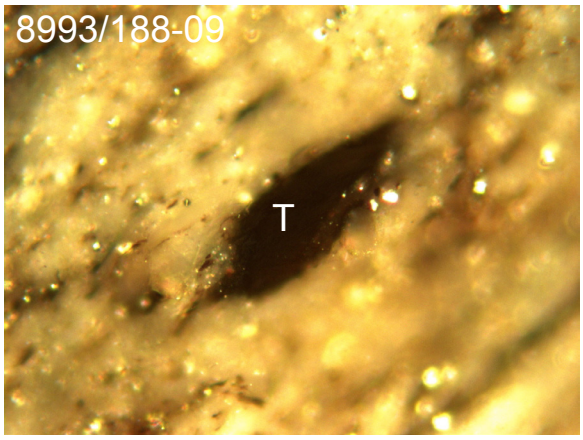

8993/188-09
B

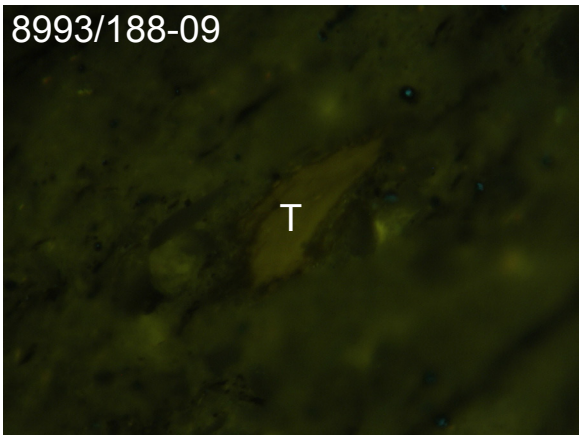

8993/188-09
B

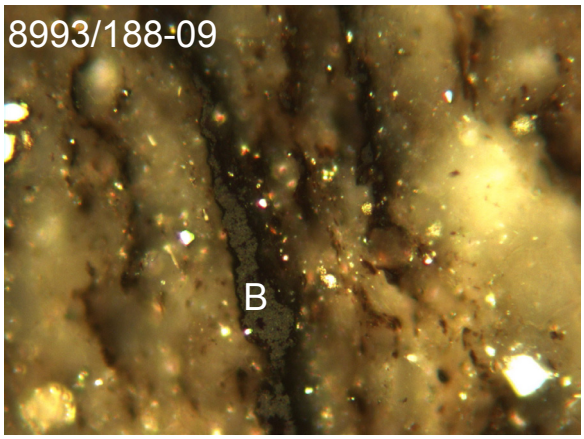

8993/188-09
P
foram

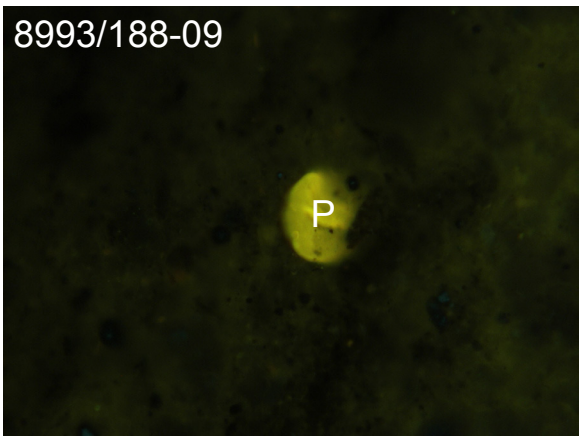

8993/188-09
hcfi

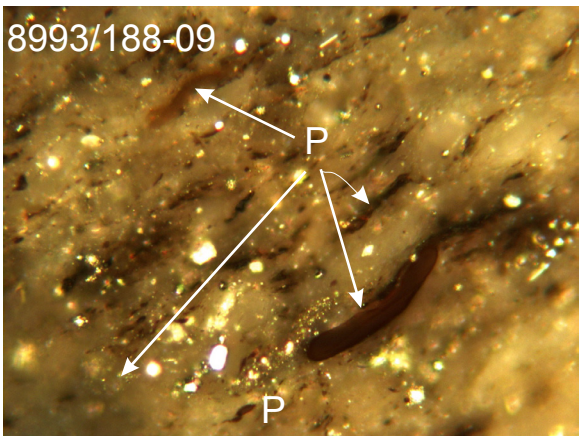

8993/188-09
B
20 µm

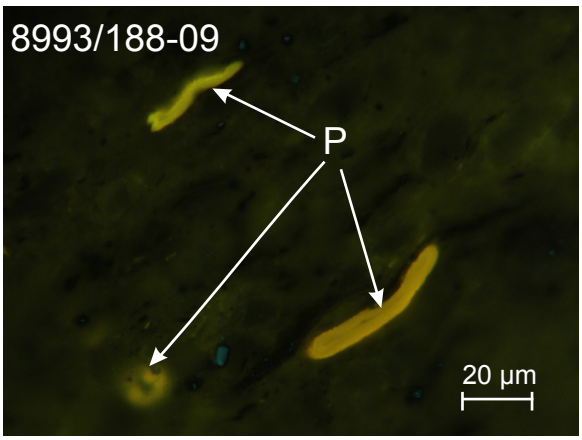

8993/188-09
T

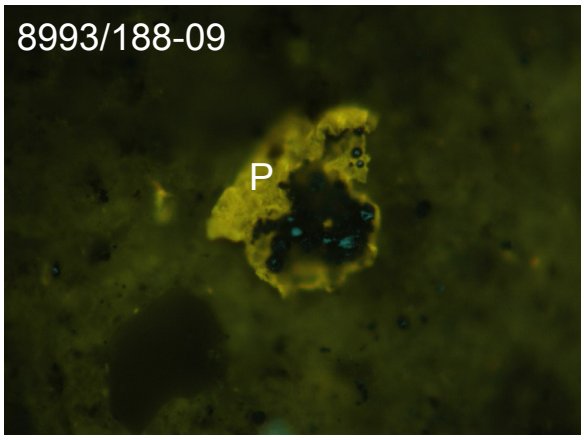

8993/188-09
T

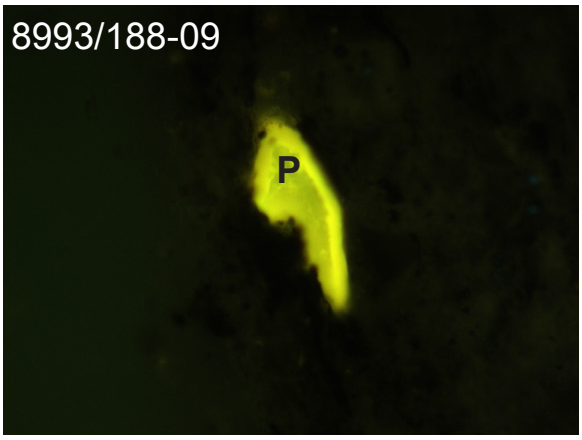

8993/188-09
B

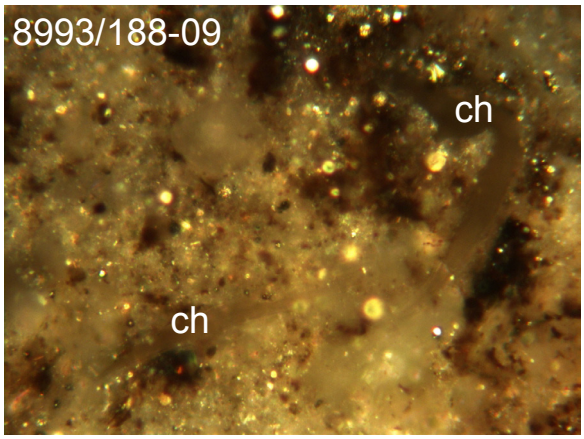

8993/188-09
P

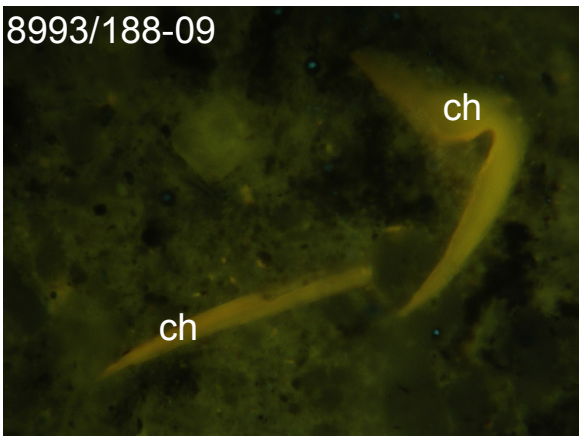

8993/188-09
P
P

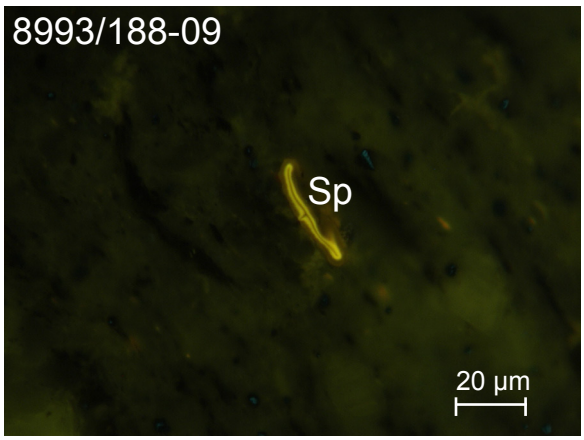

8993/188-09
P
20 µm

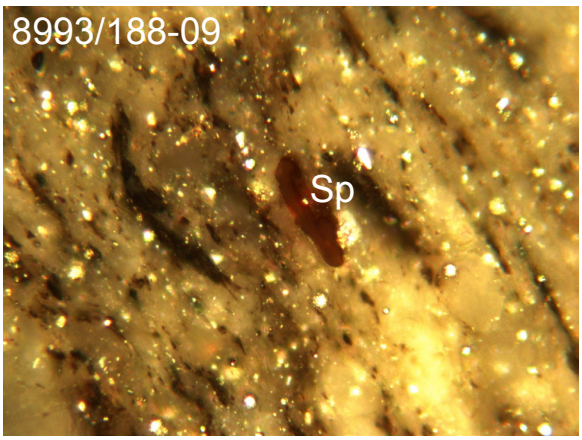

8993/188-09
P

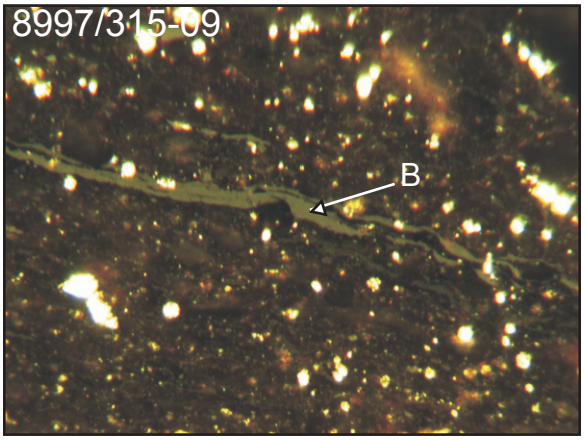

8993/188-09
P

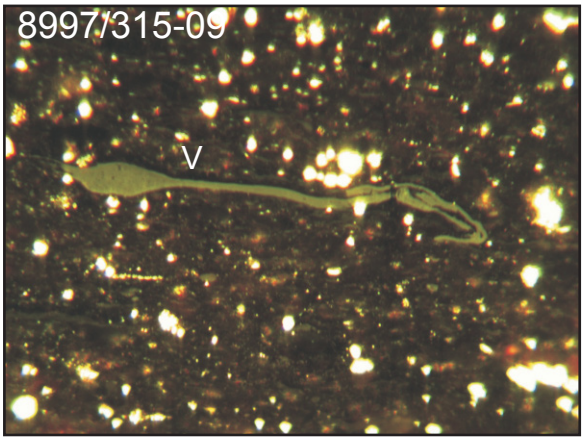

8993/188-09
ch
ch

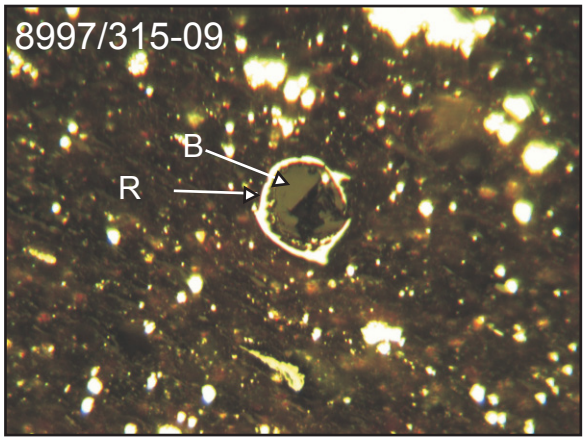

8993/188-09
ch
ch

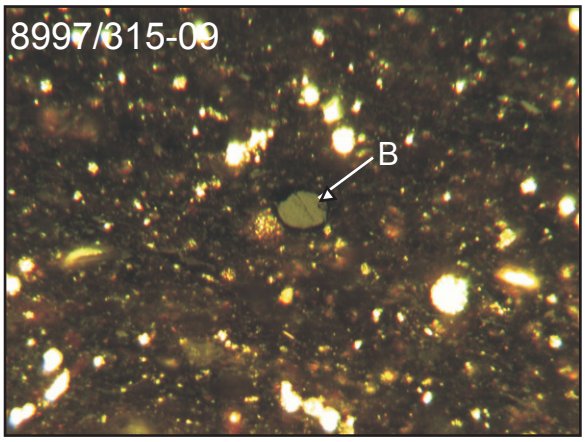

8993/188-09
Sp
20 µm

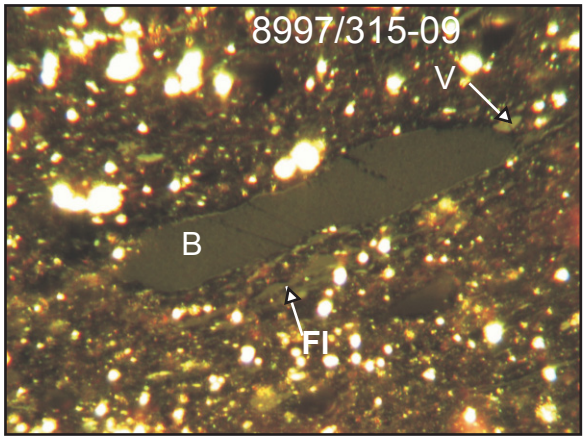

8993/188-09
Sp

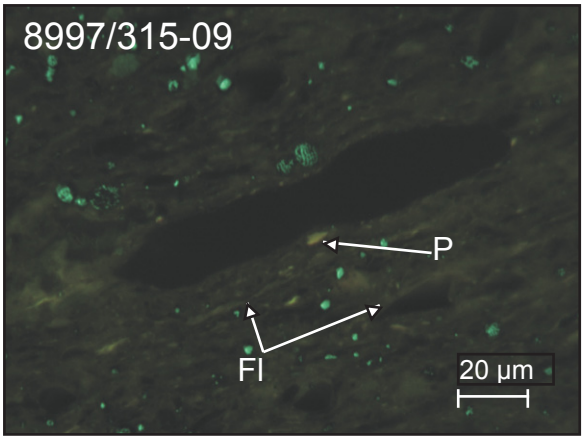




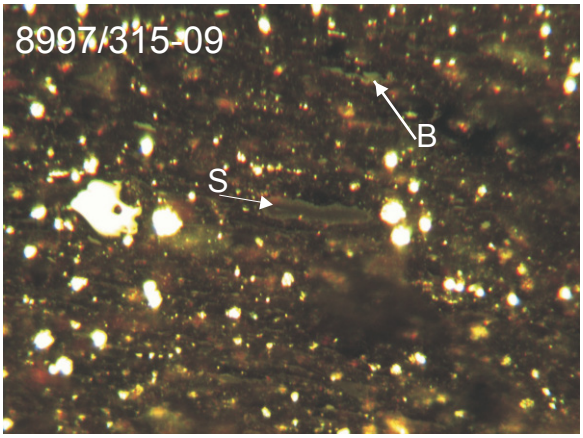


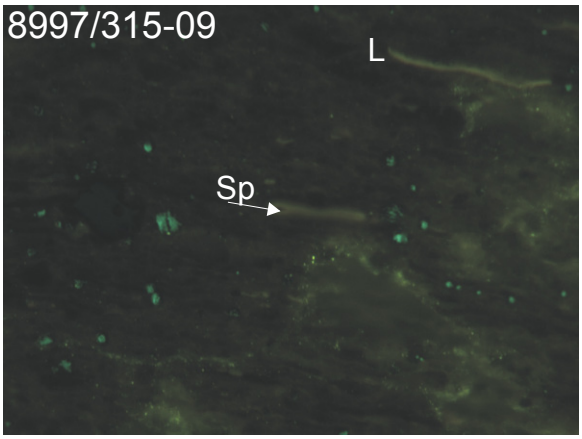


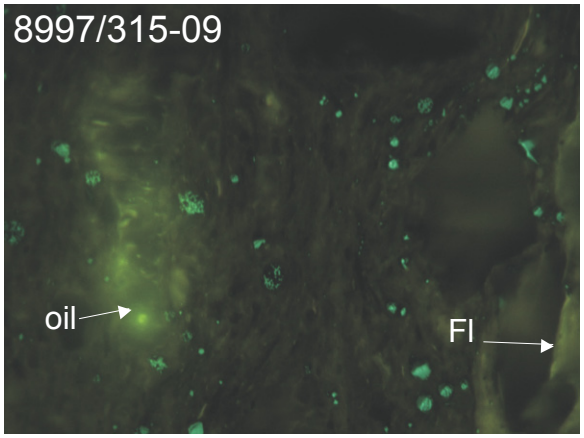


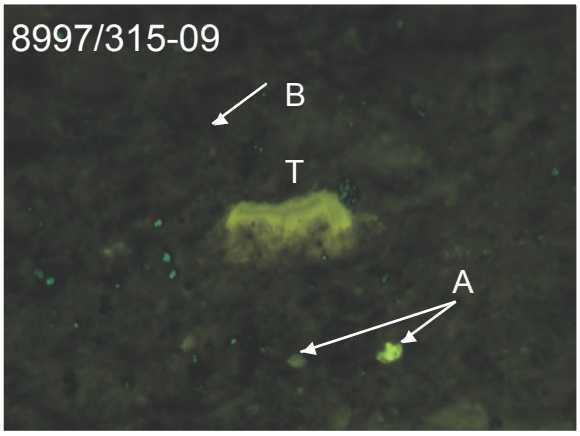


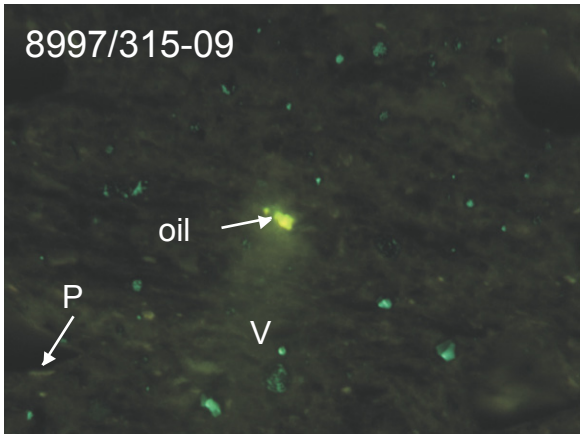
AGS 8997/GSC 315-09 (Muskwa; 100/02-30-088-04W6/0, 2413.4 m core depth). Sieve-like network of weak brown fluorescing fluoramorphinite matrix with high amount of pyrite and thin, golden-yellow fluorescing Prasinophyte (P), Leiosphaeridia (L), orange-fluorescing sporinite (Sp), filamentous alginite (Fl) and other alginite (A). Minor to rare amount of measureable small vitrinite (V), bitumen (B) and brown fluorescing bituminite (Bt) lenses, bright yellow-fluorescing soluble hydrocarbon (oil, see arrow) within pores, and bitumen-filled acanthomorphic marine acritarch. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). R = Radiolaria. T = *Tasminites*, I = Inertinite. Some measured %Ro are suppressed due to soluble hydrocarbon present.

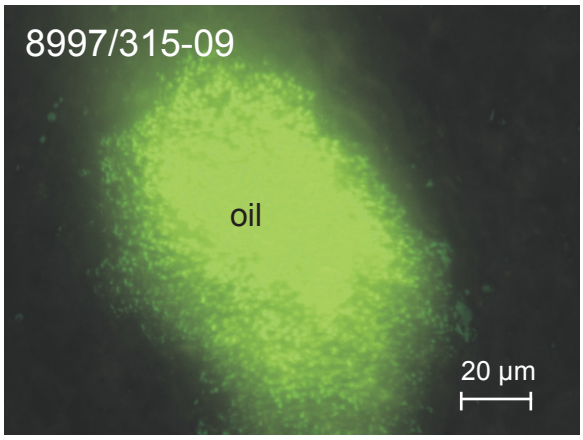

8997/315-09
B
S

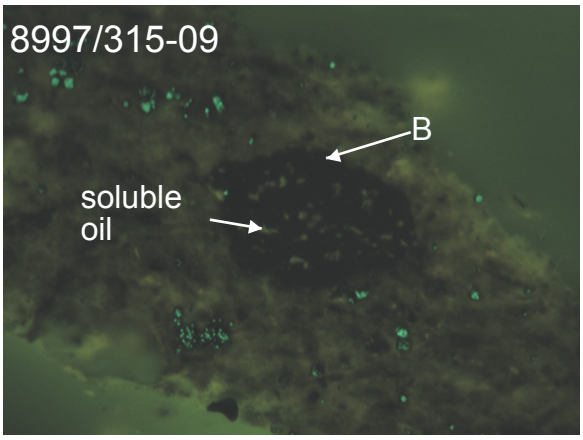

8997/315-09
L
Sp

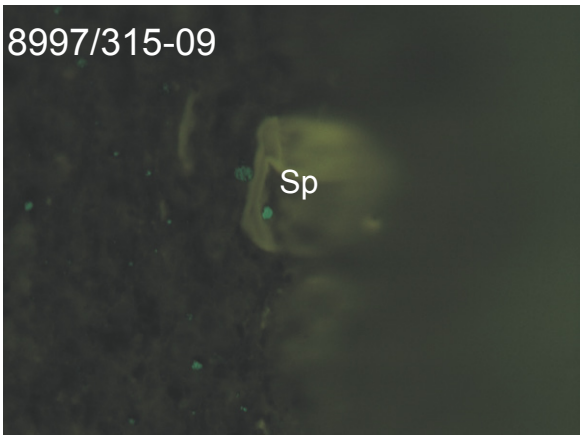

8997/315-09
oil
Fl

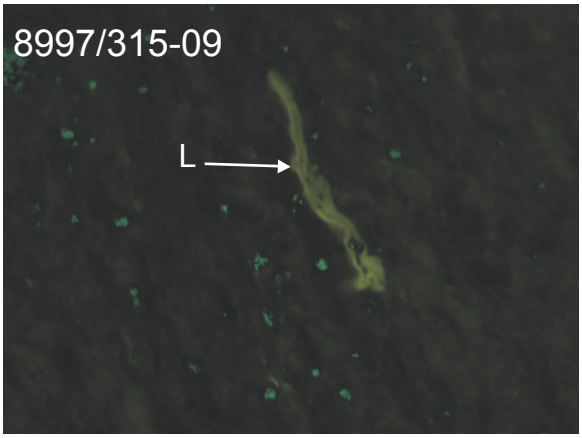

8997/315-09
B
T
A

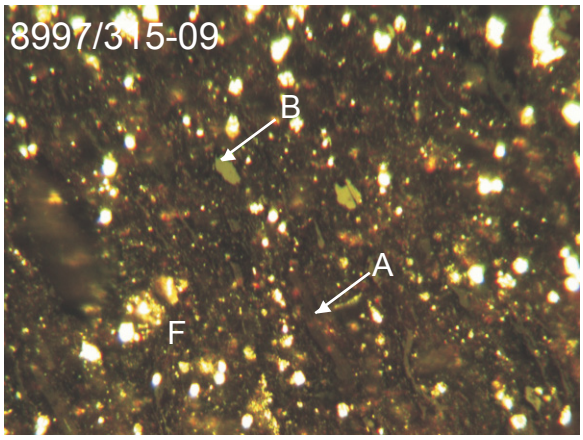

8997/315-09
oil
P
V

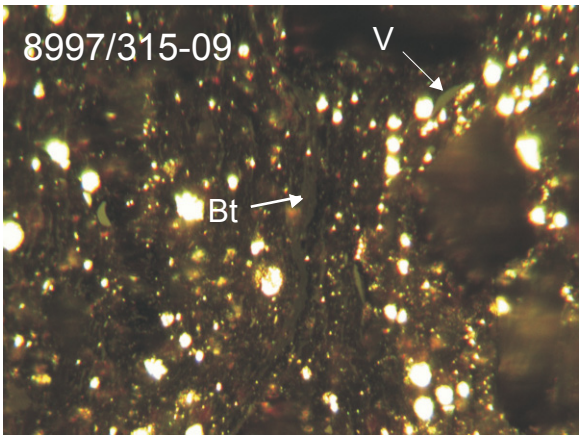

8997/315-09
oil
20 µm

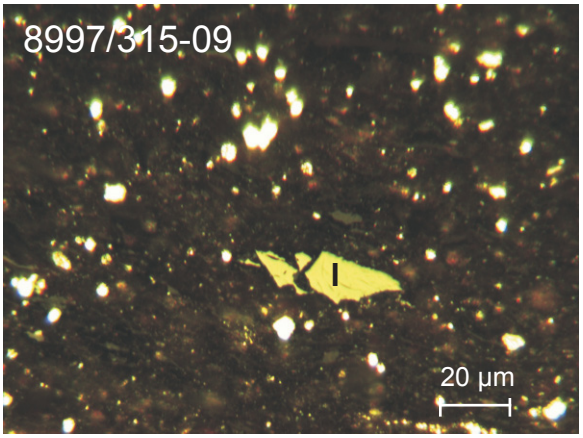

8997/315-09
B
soluble
oil

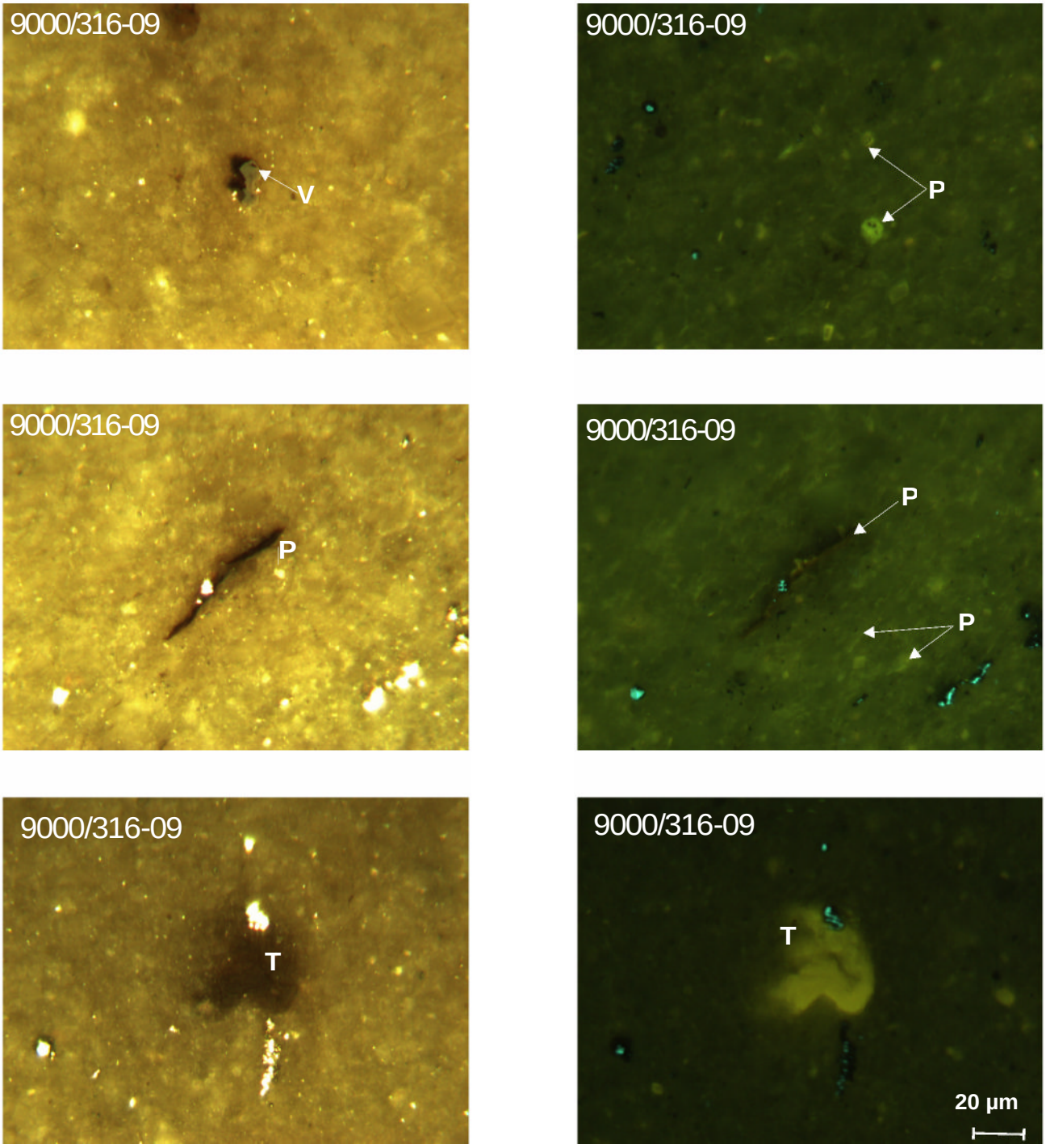

8997/315-09
Sp


8997/315-09
L

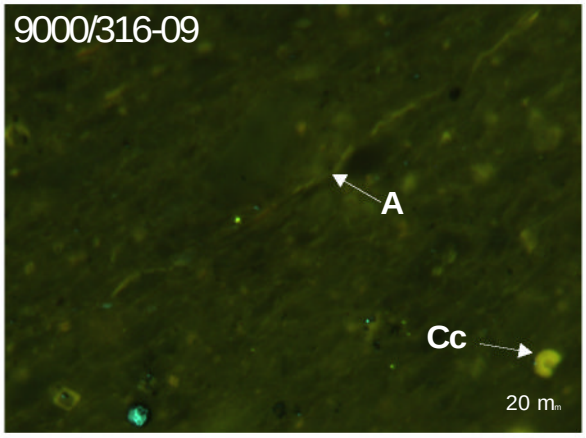

8997/315-09
B
A
F

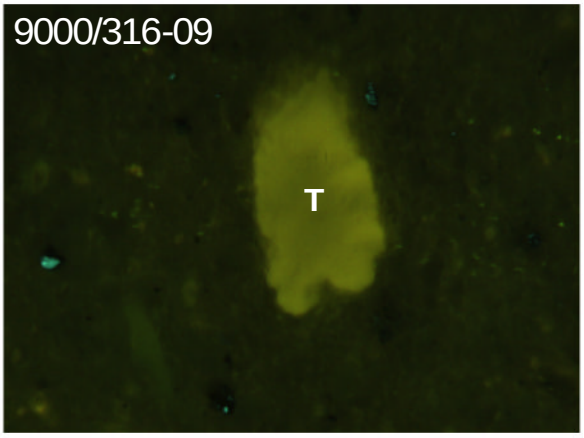

8997/315-09
V
Bt

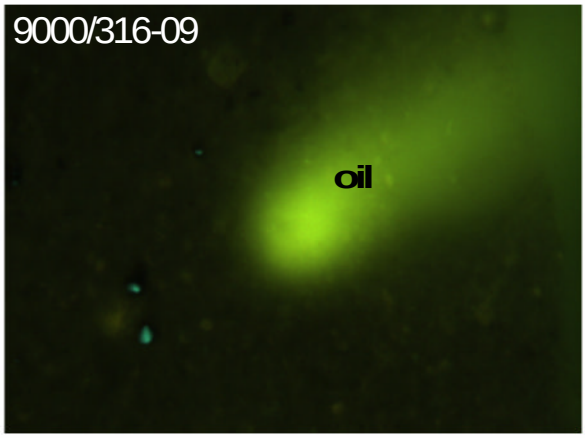

8997/315-09
I
20 µm

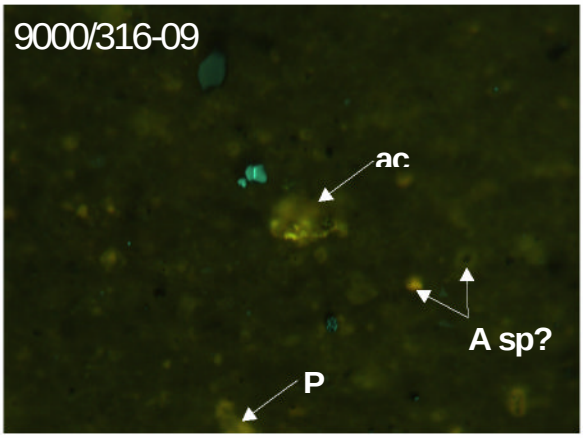


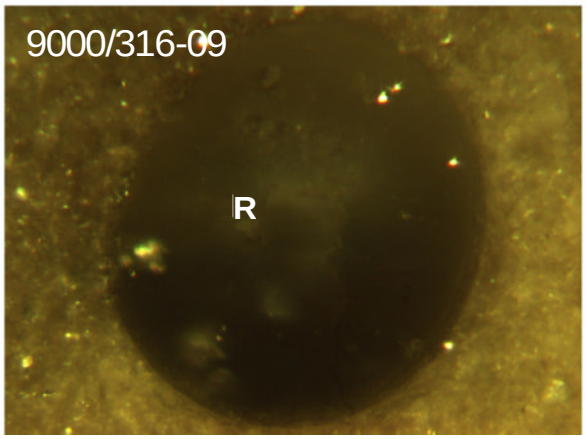
AGS 9000/GSC 316-09 (Duvernay; 100/02-08-044-27W4/00, 2235.2 m core depth). Alginite-rich (A) greenish, silty shale with major amount of golden yellow fluorescing mainly small cocoidal-like (Cc) alginite. Rare, thick-walled *Tasmanites sp.* (T), thin golden yellow fluorescing Prasinophyte (P), and other alginite (A) of unknown species. Minor to rare amount of measureable small vitrinite (V), bitumen (B), acanthomorphic marine acritarch (ac) and calcite-filled radiolaria (R) microfossil. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

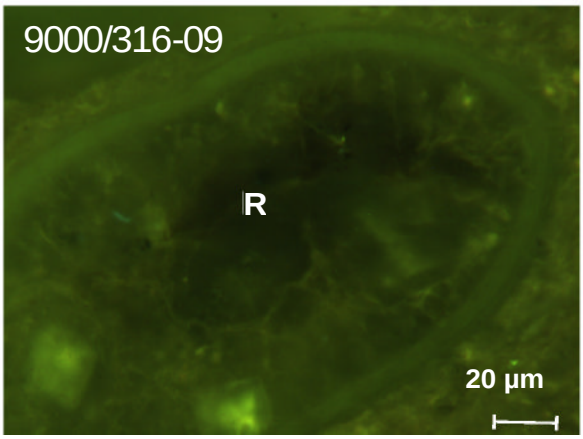

9000/316-09
A
Cc
20 µm

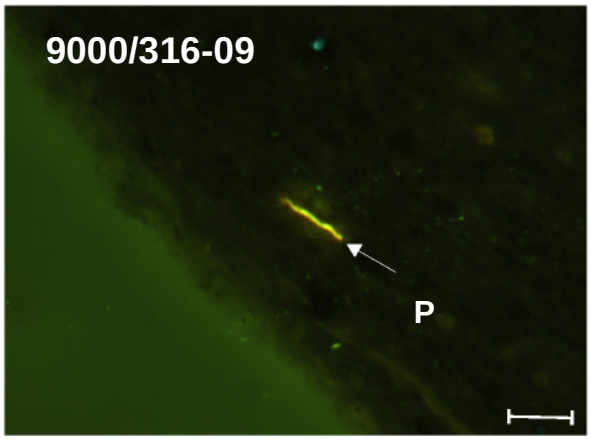

9000/316-09
T

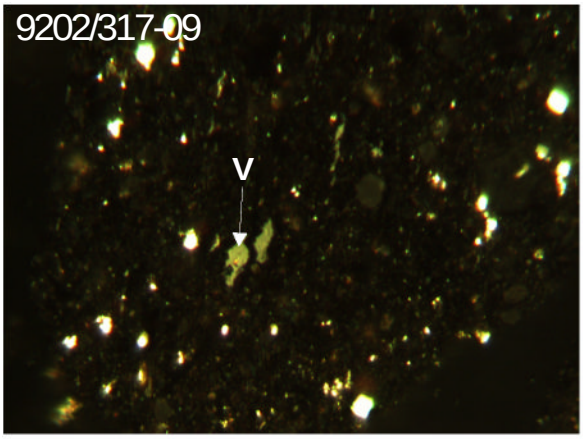

9000/316-09
oil

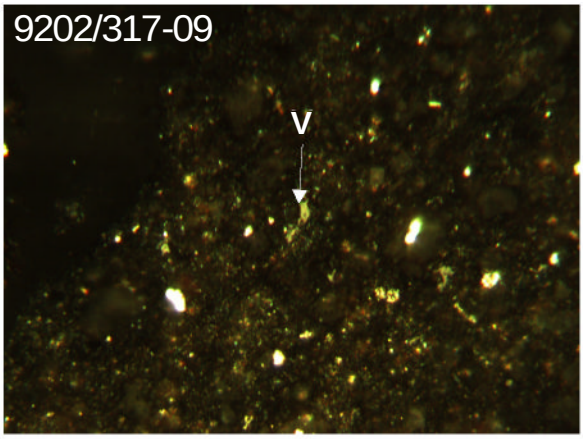

9000/316-09
ac
A sp?
P

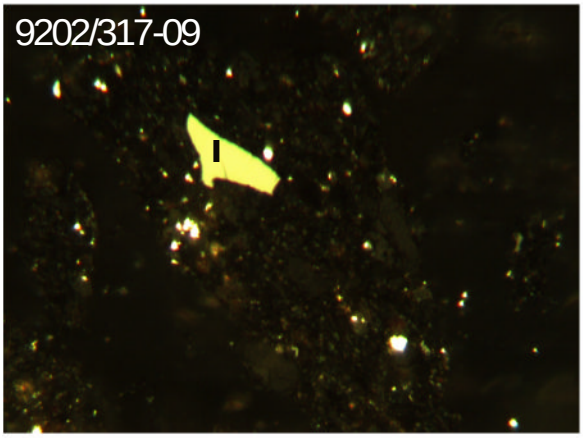

9000/316-09
R

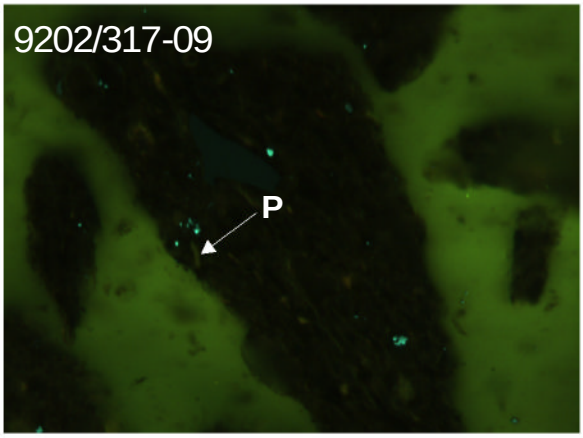

9000/316-09
R
20 µm

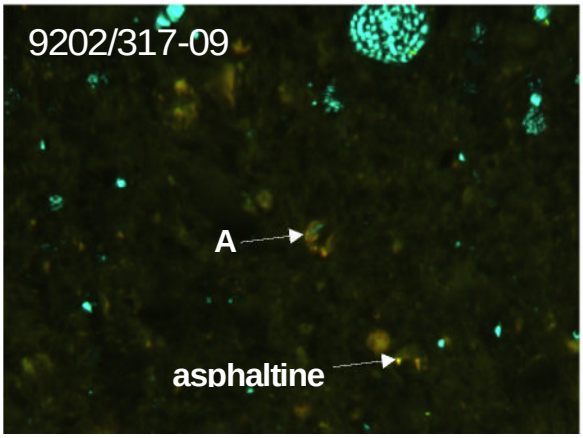

9000/316-09
P

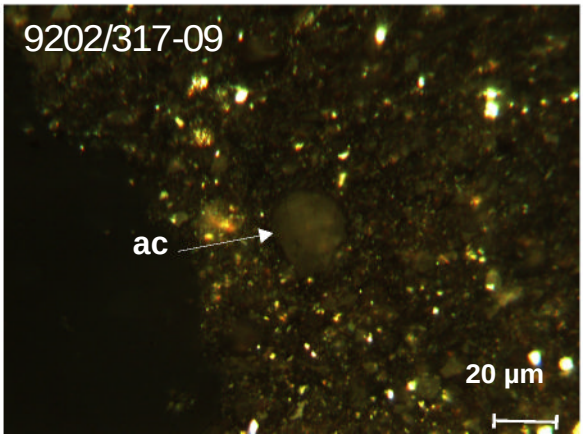




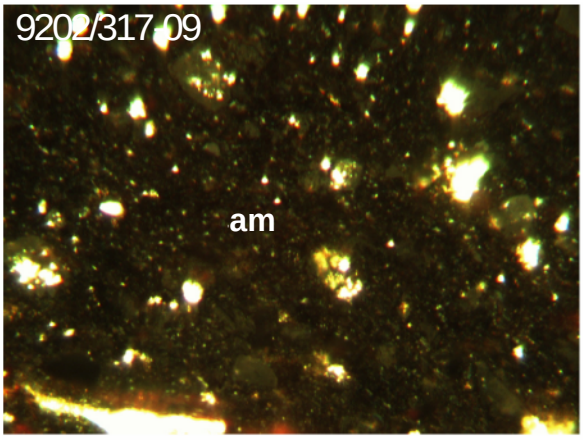


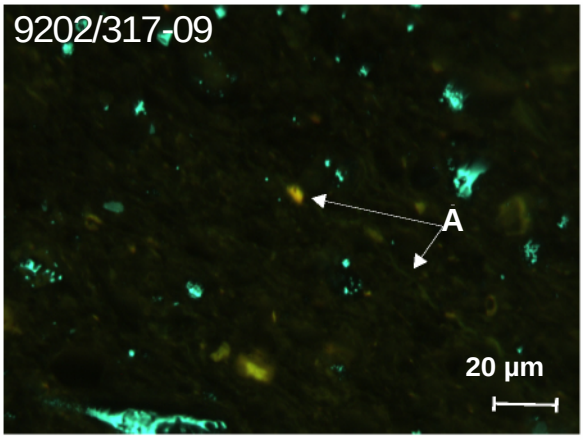


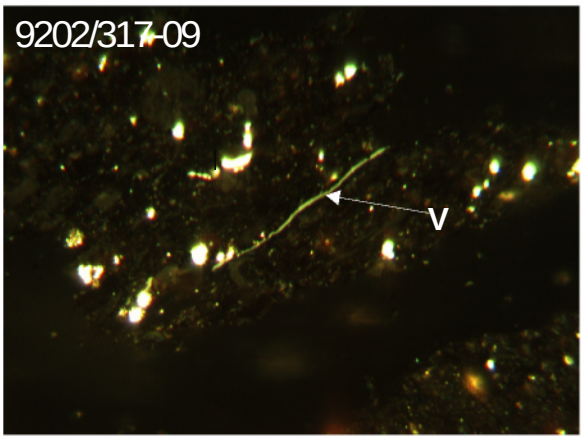


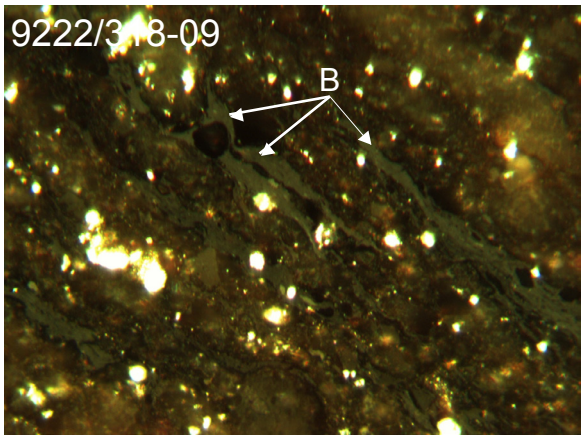


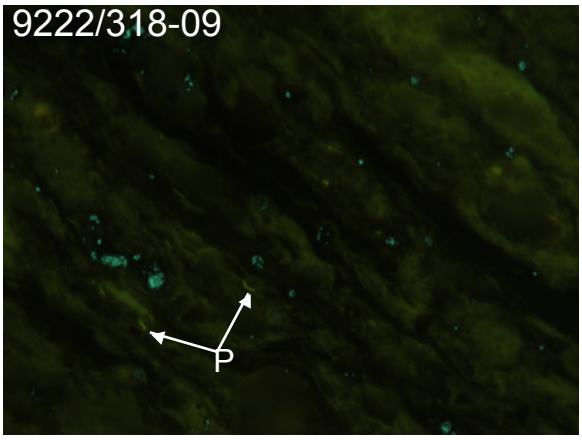
AGS 9202/GSC 317-09 (Duvernay; 100/09-06-052-11W5/00, 3021.8 m core depth). Amorphous kerogen-rich (am), black shale with a major amount of yellow-orange fluorescing alginite, Prasinophyte (P) and other alginite (A) inclusion s. Rare amount of measureable, small alginite-derived vitrinite (V) lenses, asphaltine, and calcite-filled, siliceous acanthomorphic marine acritarch (ac). Some indication of terrestrial deposition, as indicated by the presence of high reflecting inertinite (I) maceral. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

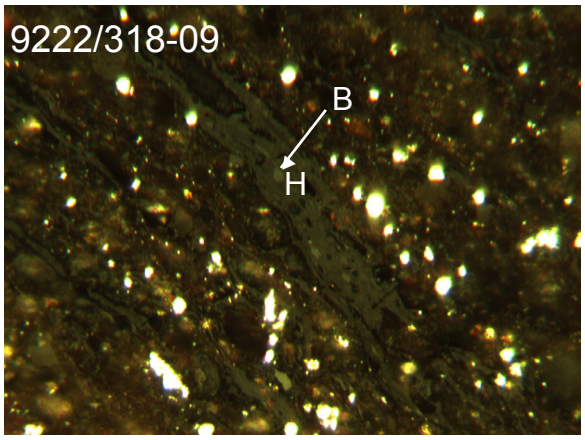

9202/317-09
am

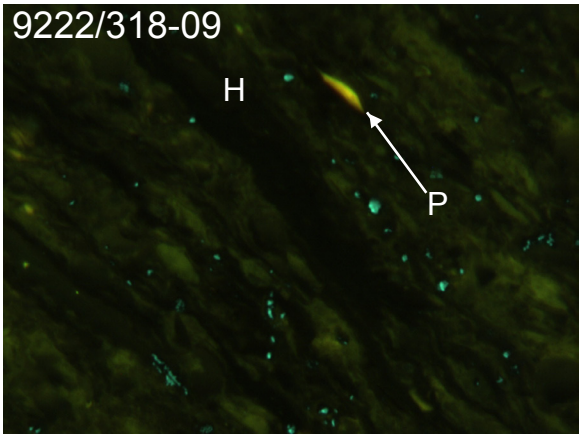

9202/317-09
A
20 µm

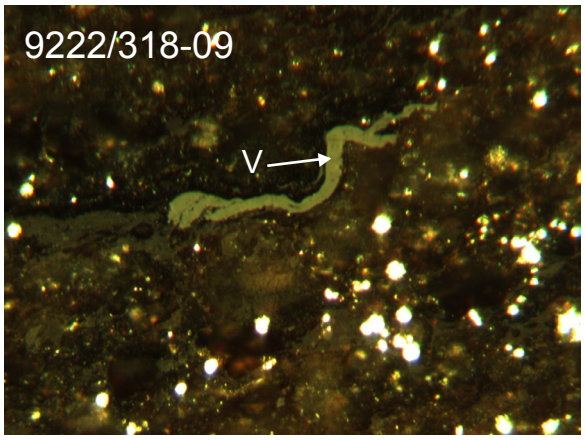

9202/317-09
V

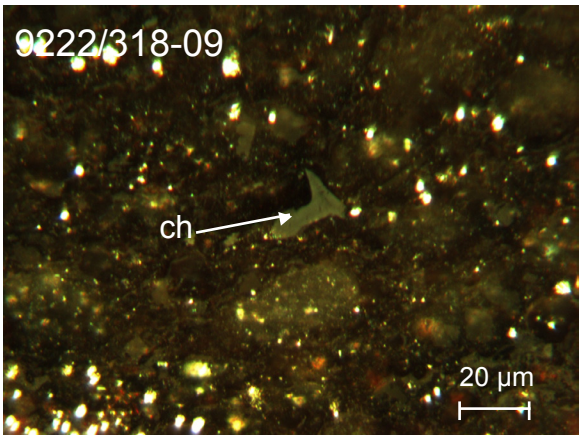




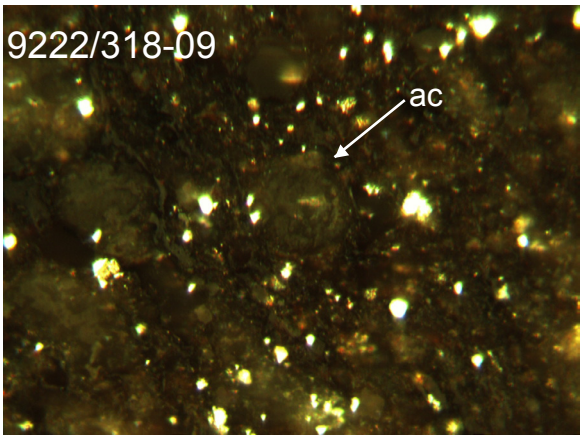


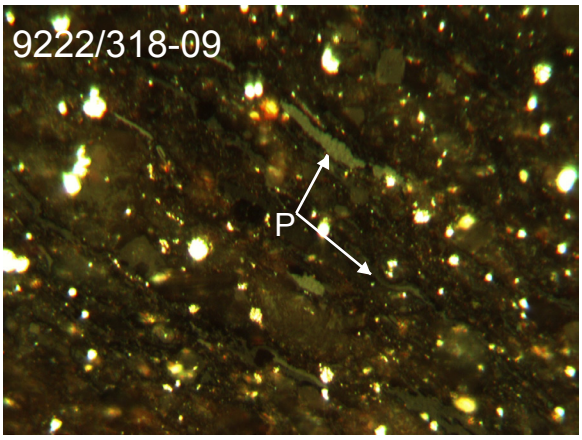


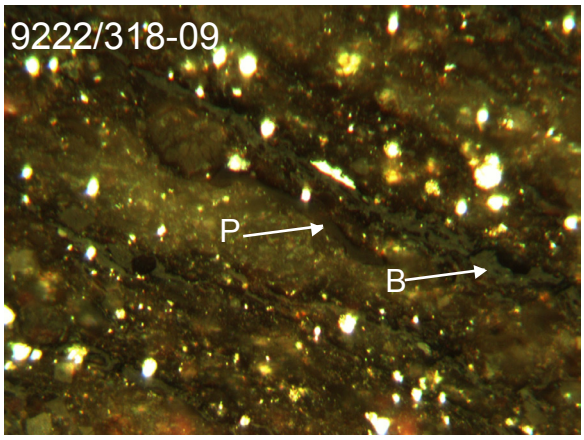


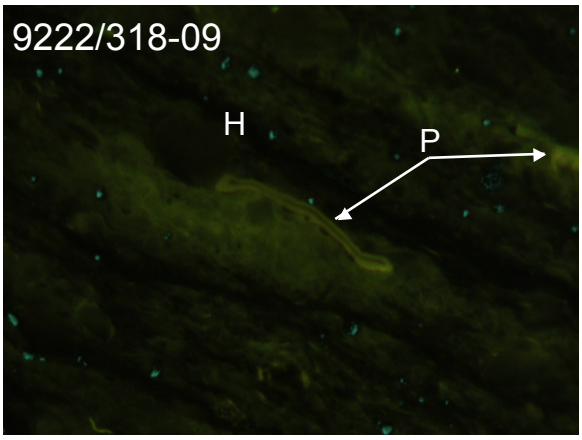


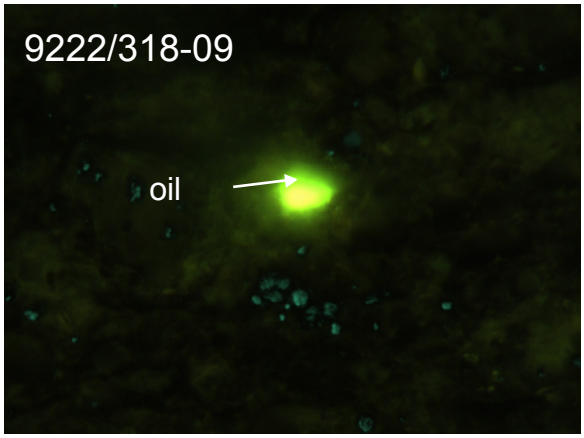
AGS 9222/GSC 318-09 (Duvernay; 100/12-01-057-03W5/00; 1825.4 m core depth). Liptinite-rich, perhydrous, black shale with a major amount of weak brown fluorescing continuous long lenses of lamalginite-derived hebamorphinite (H) and bitumenite with yellow-fluorescing alginite (Prasinophyte (P)), bitumen (B) and pyrite inclusion. Minor to rare amount of measureable alginite-derived vitrinite (V) and bitumen lenses. Bright, yellow-fluorescing soluble hydrocarbon (oil) within pores, and rare chitinous (ch) microfossil (possibly conodonts) and calcite-filled siliceous acanthomorphic marine acritarch (ac). Some indication of terrestrial deposition as indicated by the presence of fusinite (F) submaceral. %Ro may be suppressed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

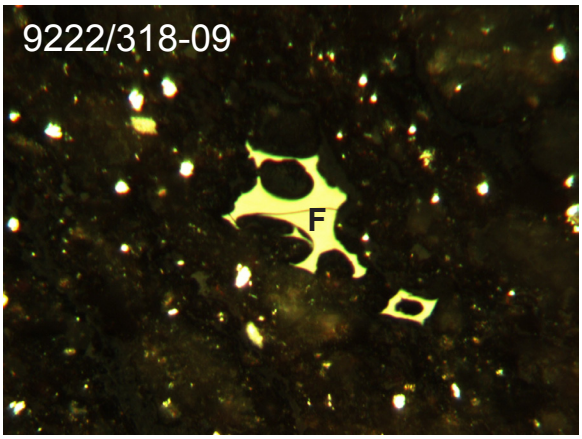

9222/318-09
ac

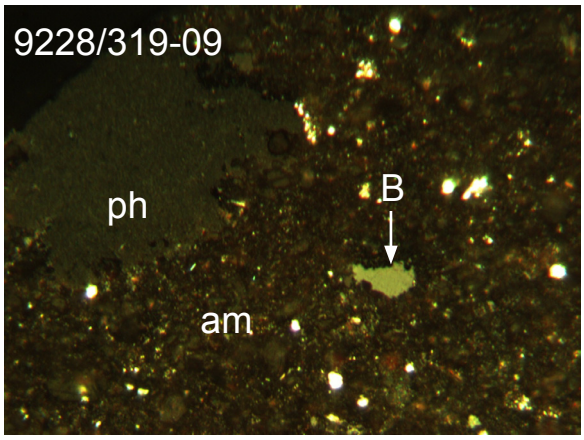

9222/318-09
P

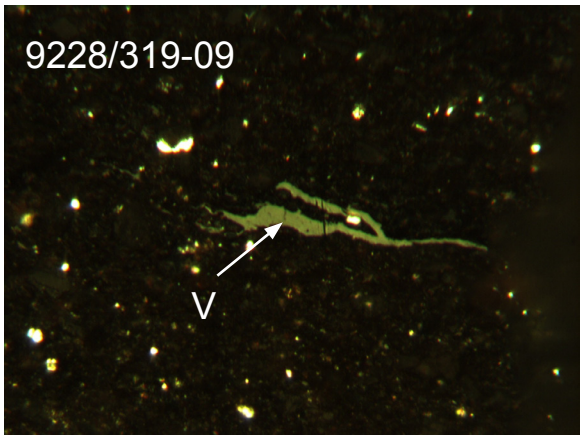

9222/318-09
P
B

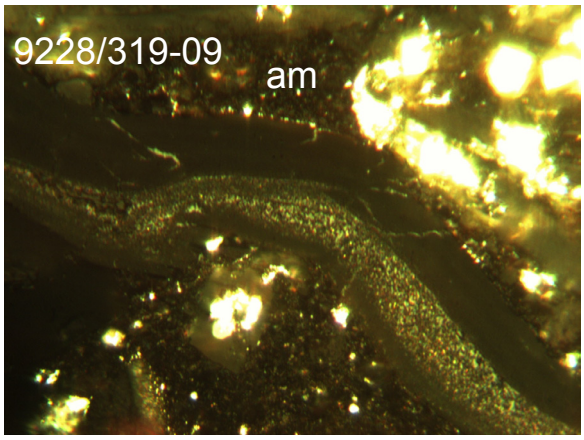

9222/318-09
H
P

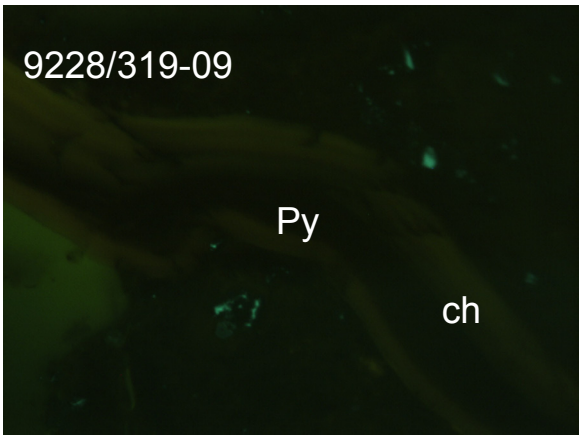

9222/318-09
oil

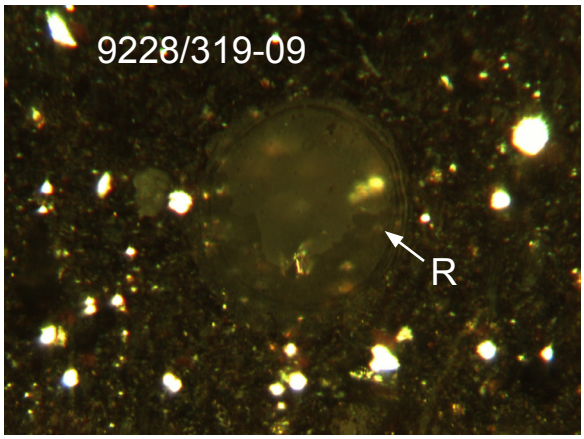

9222/318-09
F

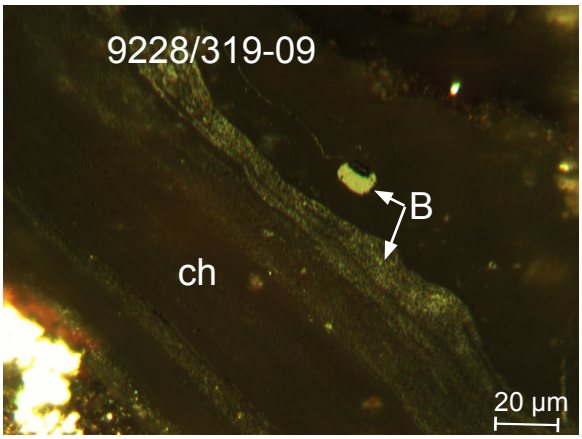




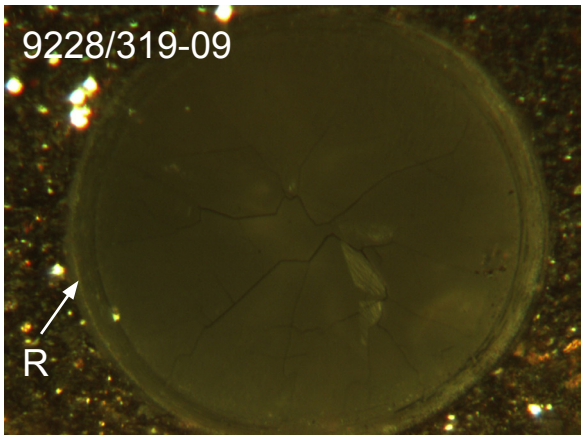


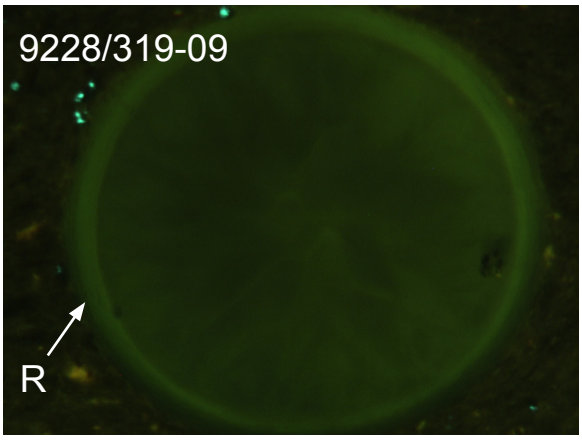


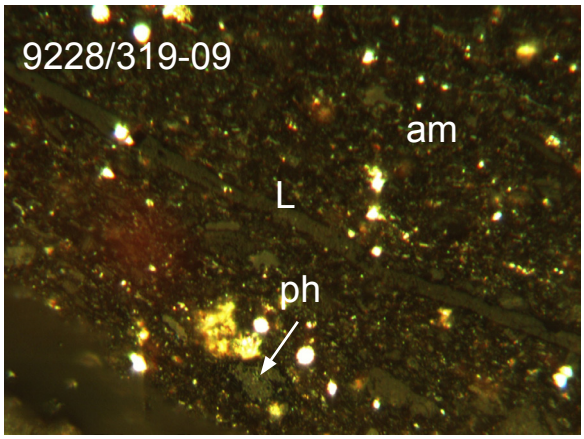


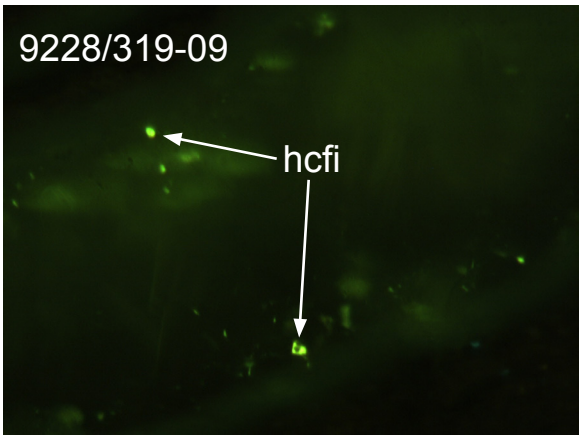


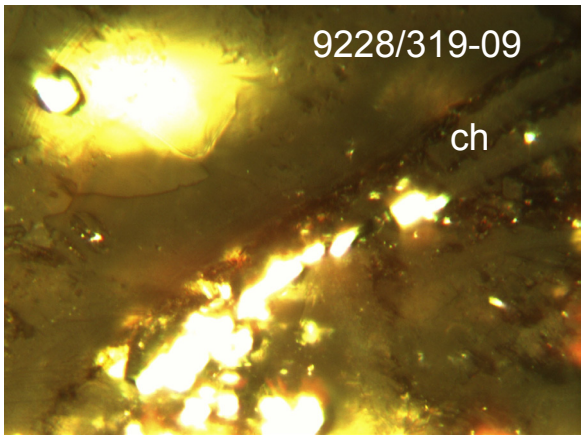
AGS 9228/GSC 319-09 (Duvernay; 100/10-05-065-15W5/00, 9058 ft. core depth). Alginite and chitinous microfossil rich, black shale with minor amount of orange to red fluorescing Prasinophyte alginite (P), Leiosphaeridia (L), granular bitumen (B), phosphatic nodules (ph) and vitrinite (V) lenses. Major amount of chitinous microfossil (ch), and a minor amount of calcite-filled siliceous microfossil, possibly radiolaria (R). Hydrocarbon fluid inclusions (hcfi) are observed annealed within calcite-filling minerals associated with the chitinous microfossil. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light). Py = pyrite, am = amorphous kerogen.

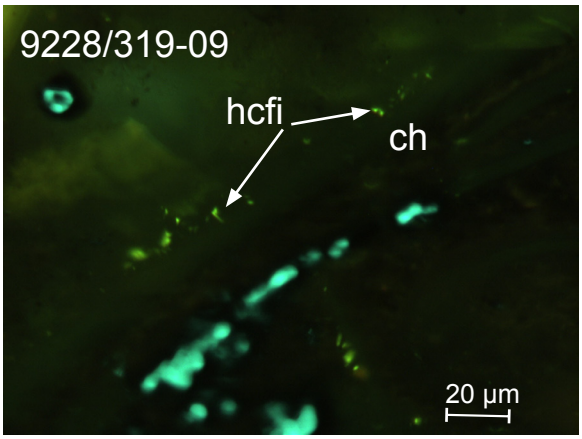

9228/319-09
R

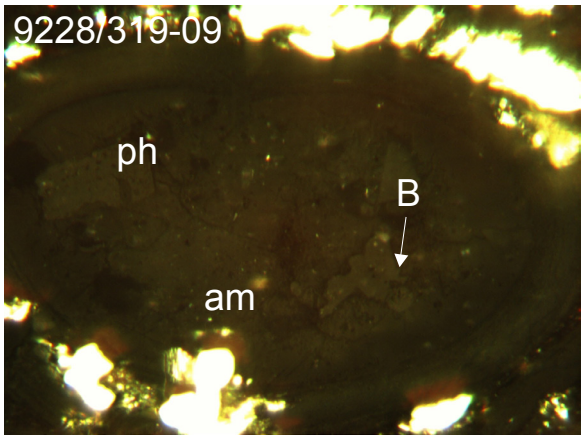

9228/319-09
R

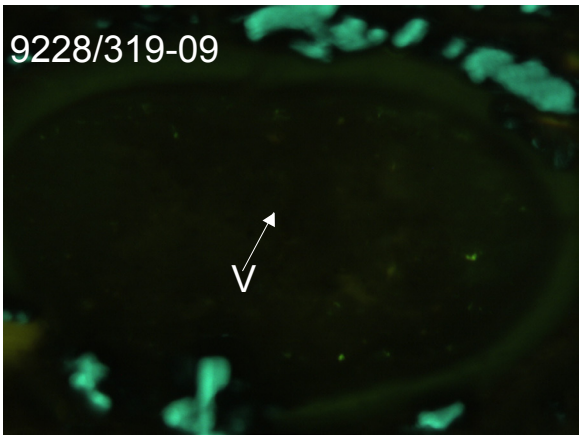

9228/319-09
am
L
ph

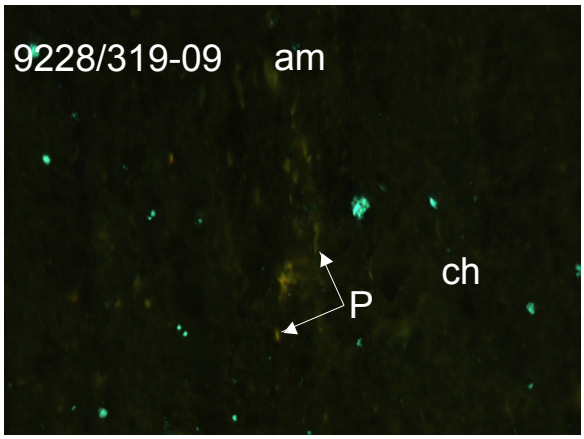

9228/319-09
hcfi

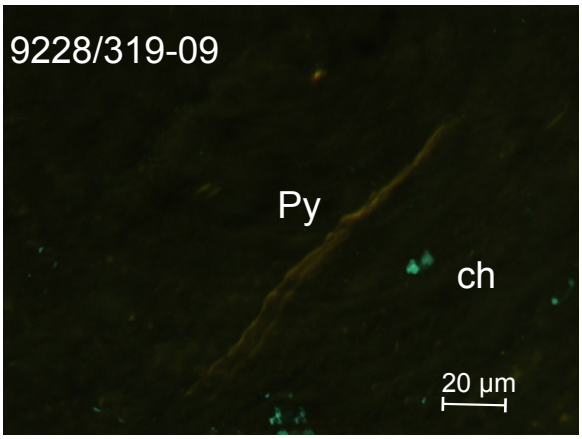

9228/319-09
ch

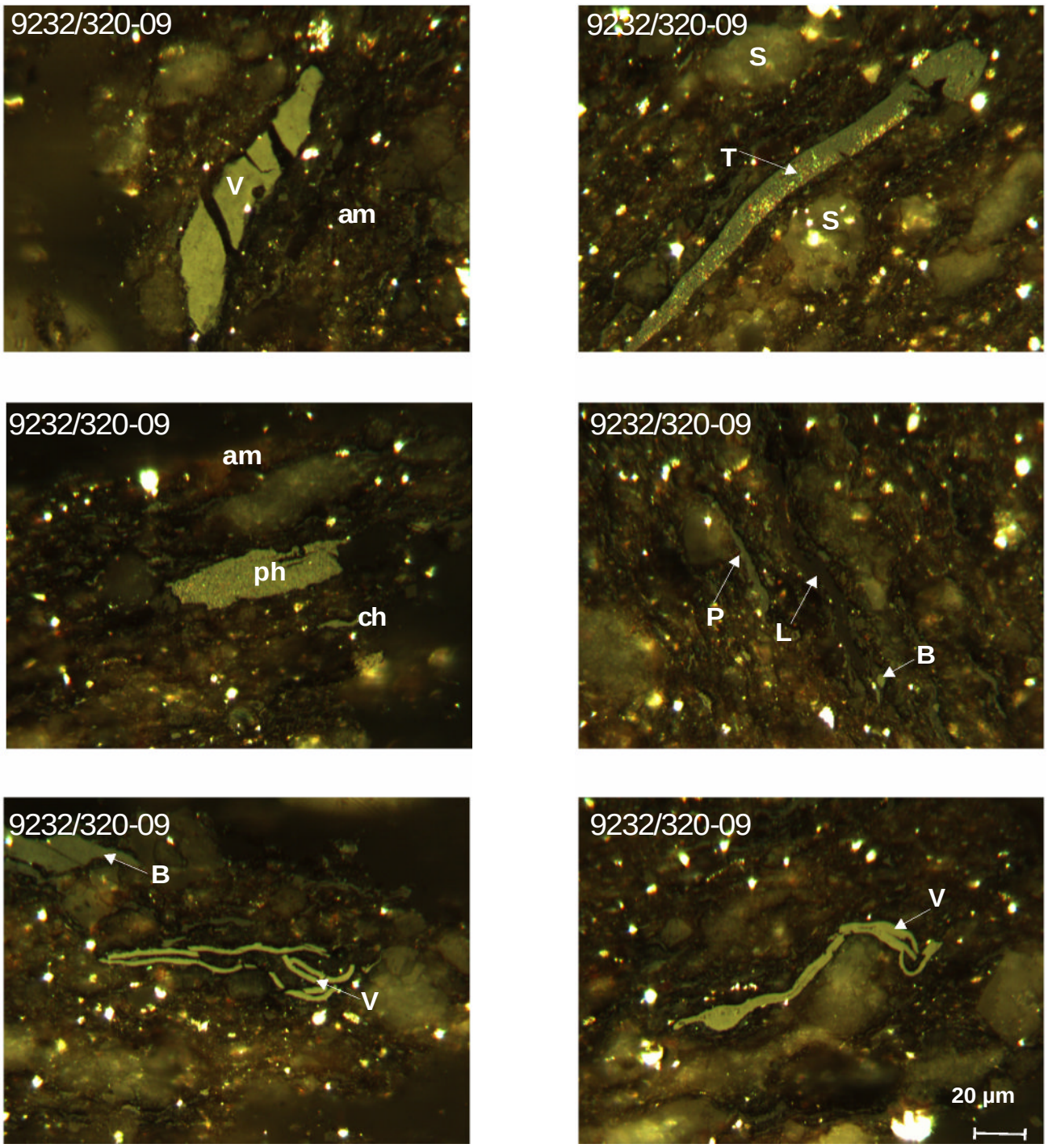

9228/319-09
hcfi
ch
20 µm


9228/319-09
ph
B
am

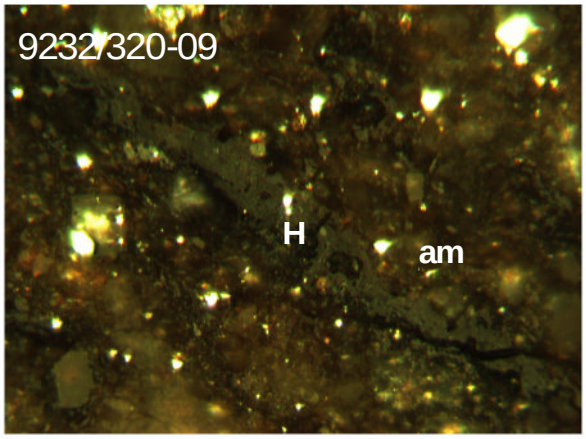

9228/319-09
V

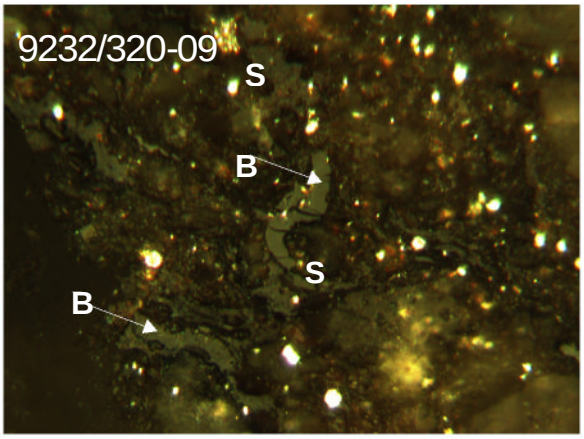

9228/319-09
am
ch
P

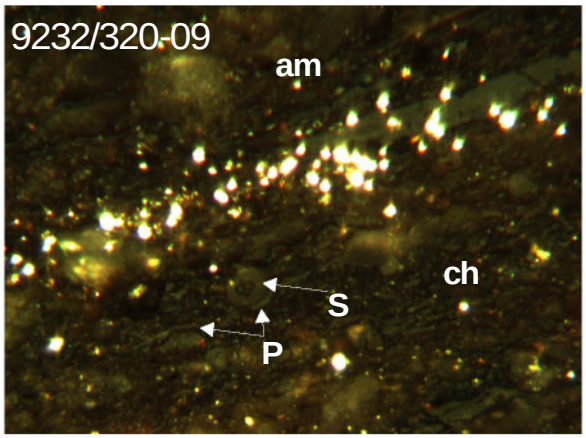

9228/319-09
Py
ch
20 µm

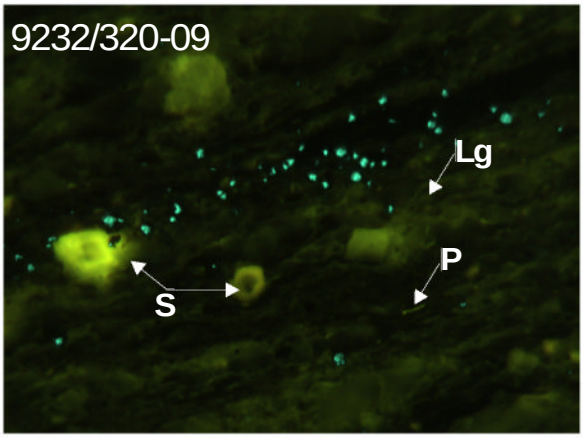


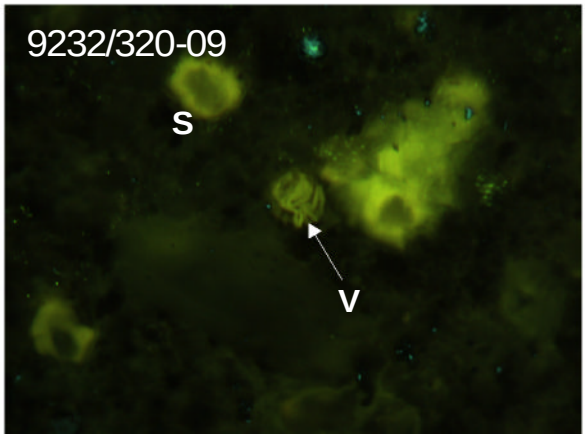
AGS 9232/GSC 320-09 (Duvernay; 100/10-21-061-01W5/00, 1473.1 m core depth). Liptinite-rich, perhydrous black shale with major amount of brown fluorescing continuous long lenses of lamalginite-derived (Lg) hebamorphinite (H) with yellow fluorescing alginite (A) inclusion. Minor amount of yellow fluorescing calcite-filled, siliceous (S) microfossil (possibly derived from radiolaria) with a rare amount orange to red fluorescing Prasinophyte alginite (P), non to weak fluorescing *Leiosphaeridia* (L), granular bitumen (B), phosphatic nodules (ph) and *Leiosphraeridia*-derived vitrinite (V) lenses. Trace amount of chitinous (ch) microfossil. %Ro may be suppressed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification). am = amorphous kerogen.

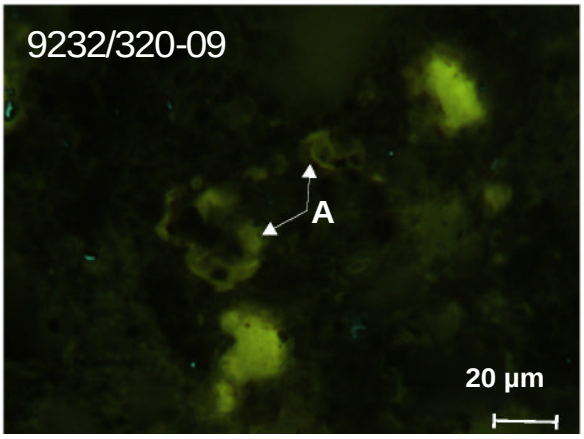

9232/320-09
H
am

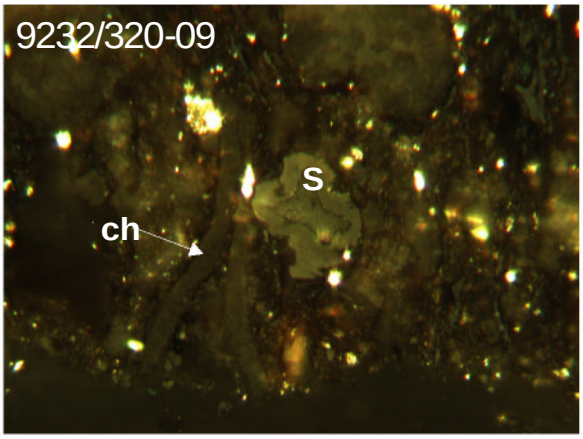

9232/320-09
S
B
S
B

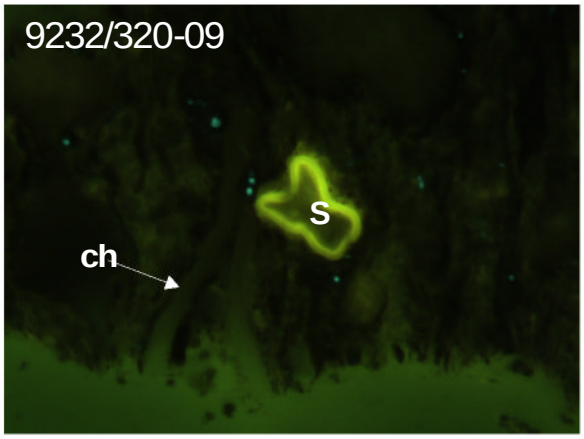

9232/320-09
am
ch
S
P

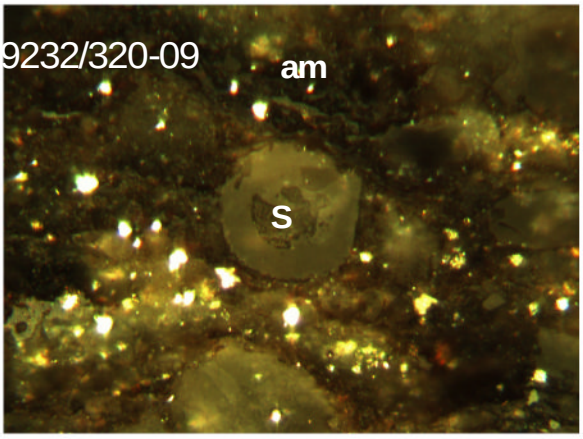

9232/320-09
Lg
P
S

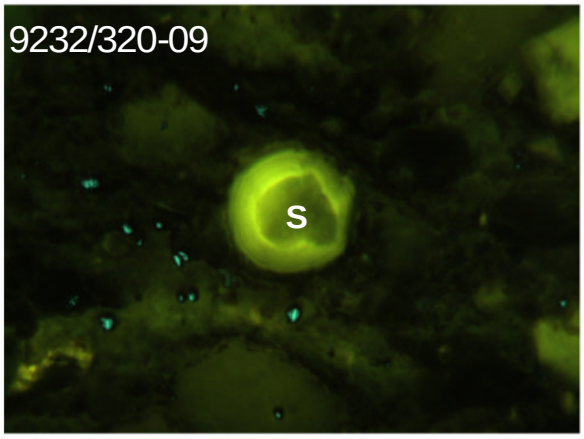

9232/320-09
S
V

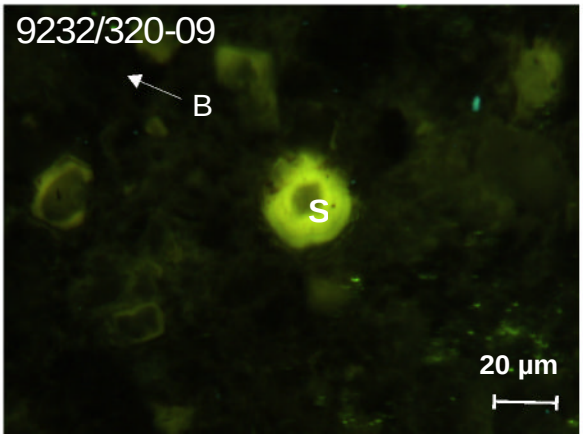

9232/320-09
A
20 µm

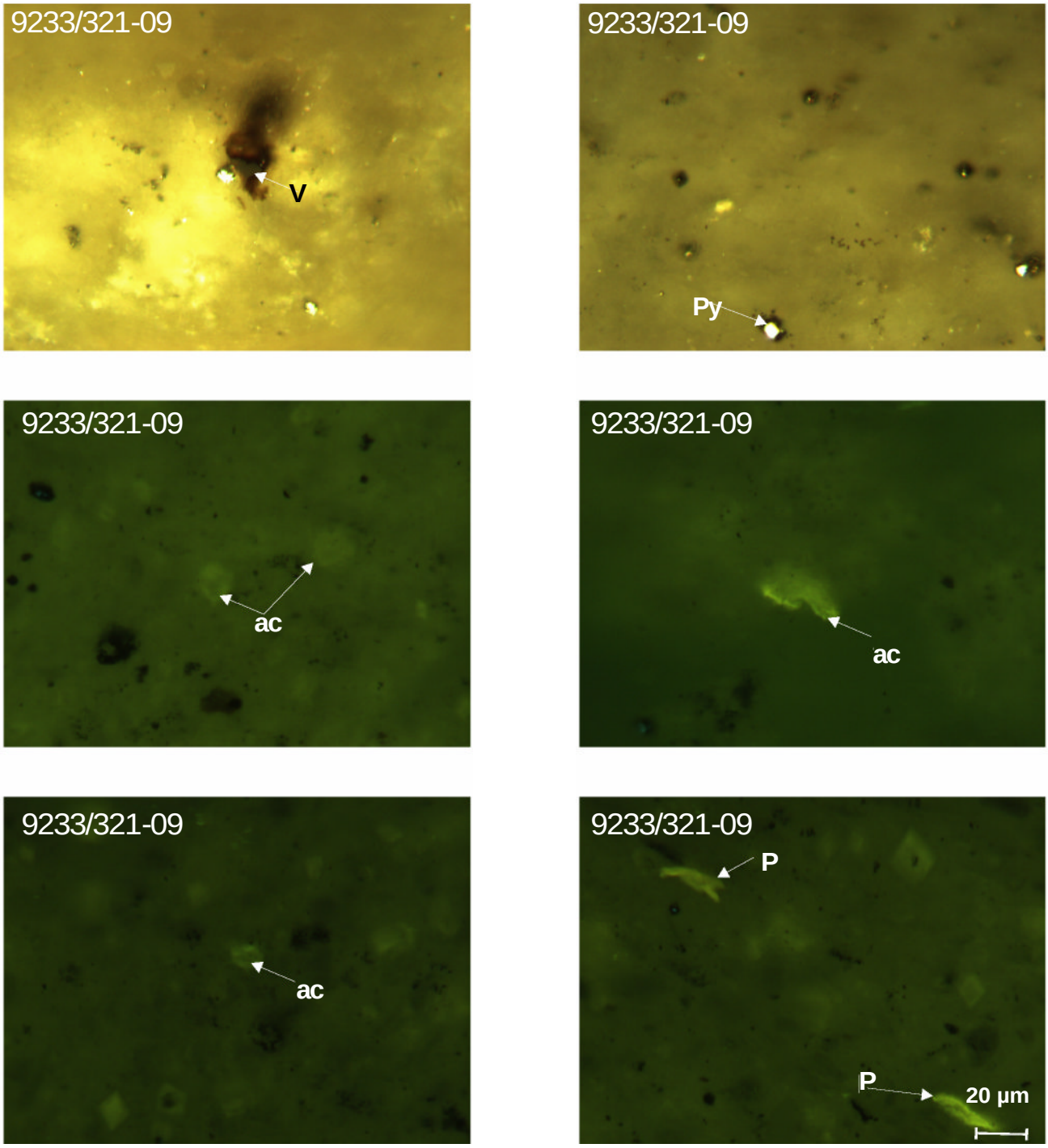

9232/320-09
S
ch


9232/320-09
S
ch

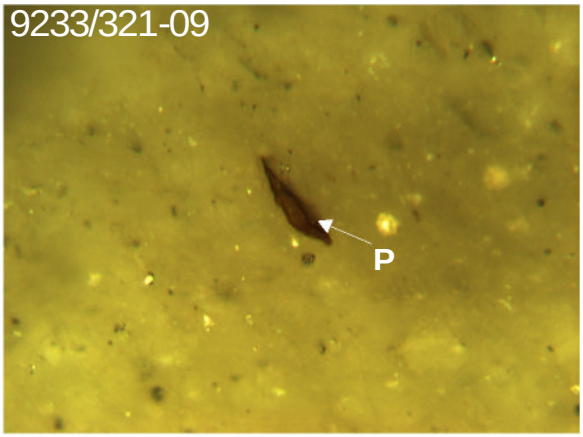

9232/320-09
am
S

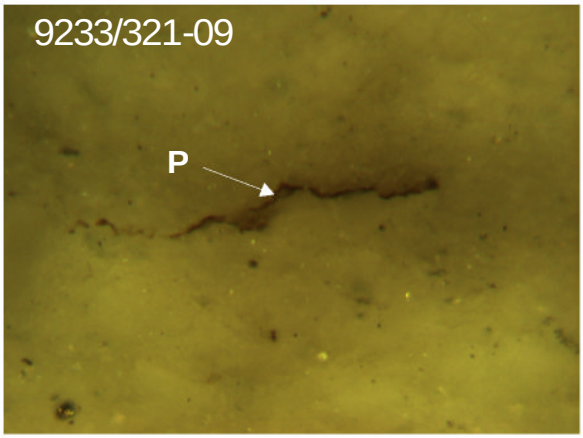

9232/320-09
S

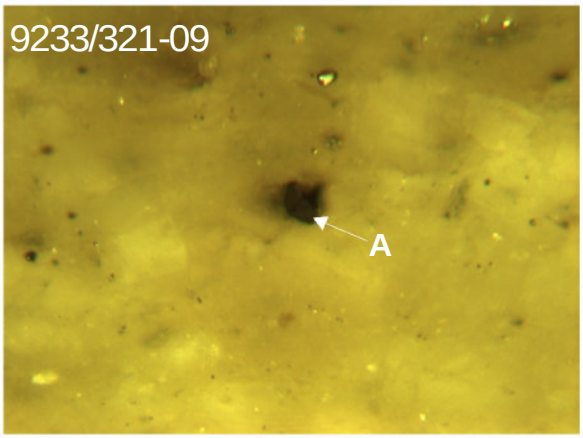

9232/320-09
B
S
20 µm

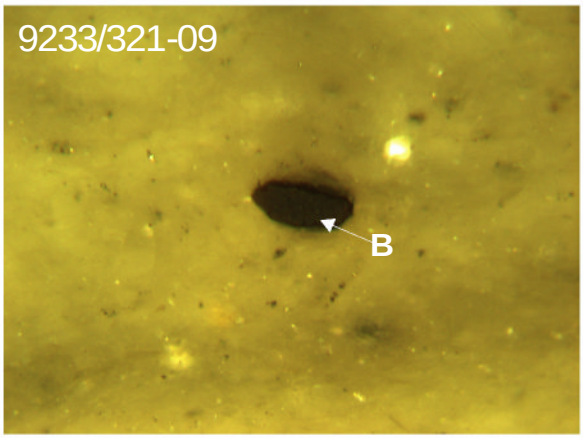


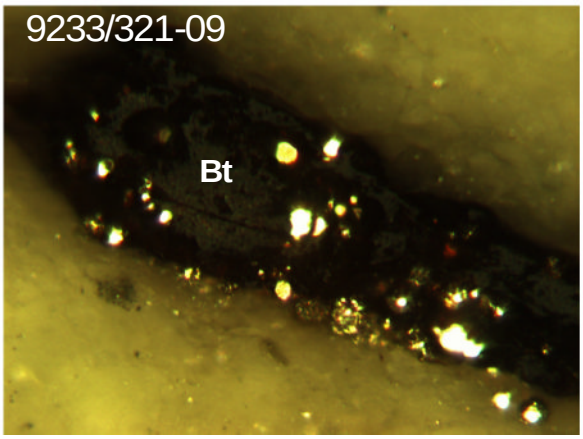
AGS 9233/GSC 321-09 (Duvernay; 100/09-09-061-18W4/00, 897.3 m core depth). Organically lean siltstone matrix with rare amount of yellow fluorescing alginite (A) (spiny acritarch (ac) and Prasinophyte (P)) and calcareous microfossil; also, weak brown fluorescing bitumenite (Bt) maceral with pyrite (Py) inclusion. Very rare measureable vitrinite (V) or bitumen (B) lenses. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

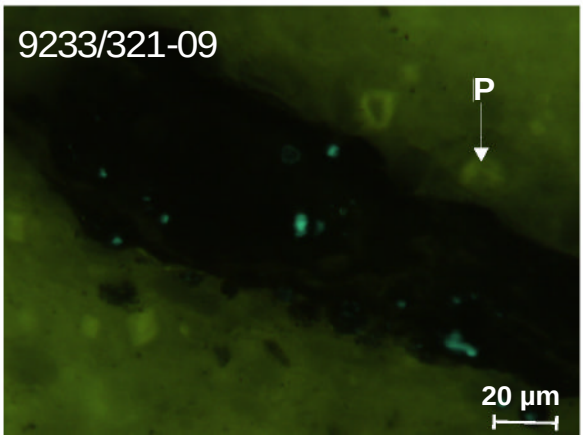

9233/321-09
P

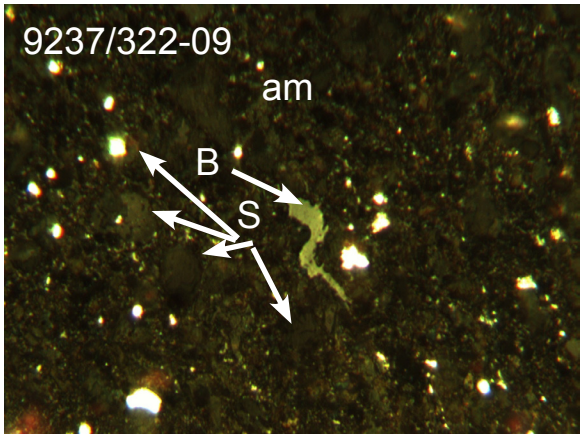

9233/321-09
P

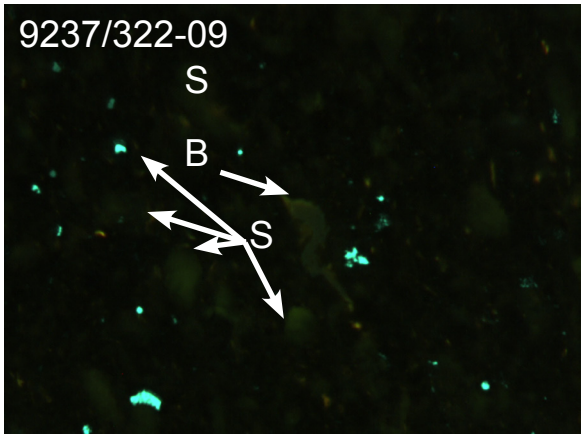

9233/321-09
A

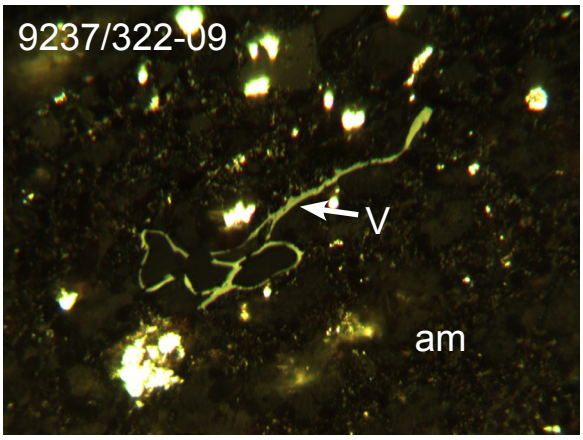

9233/321-09
B

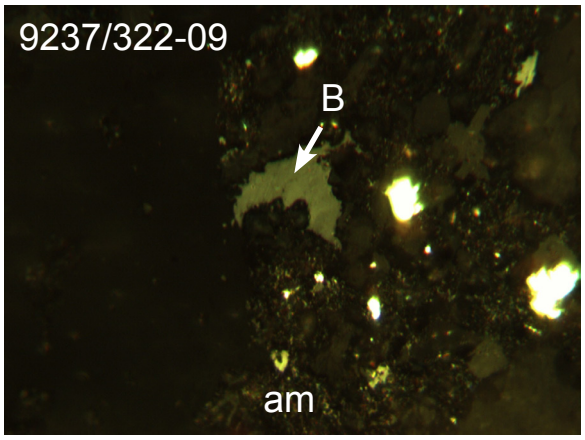

9233/321-09
Bt

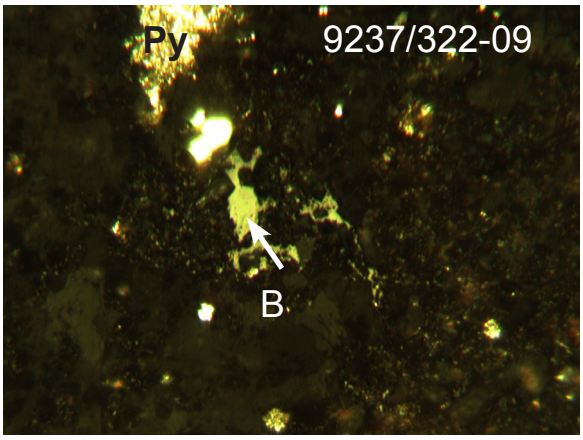

9233/321-09
P
20 µm

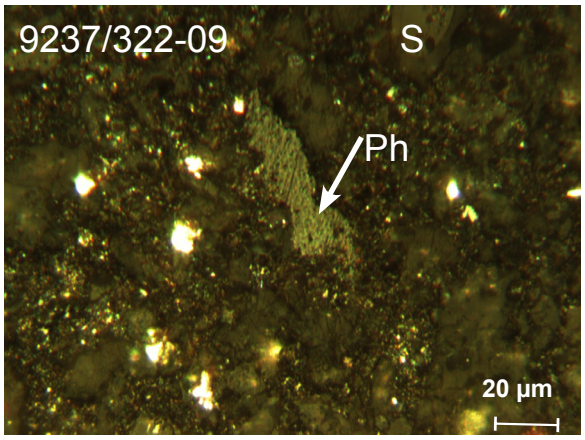




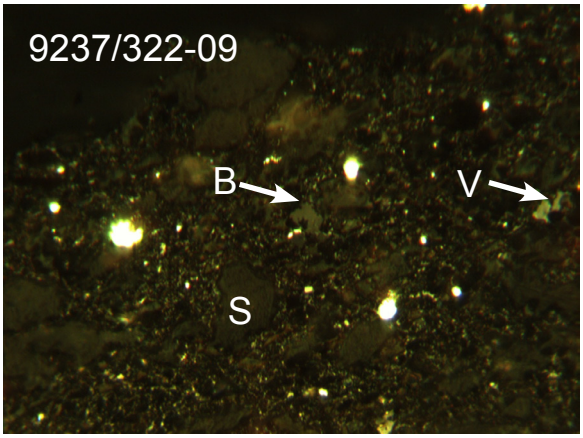


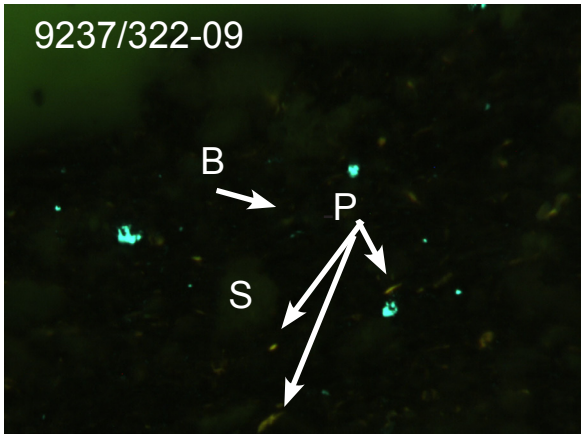


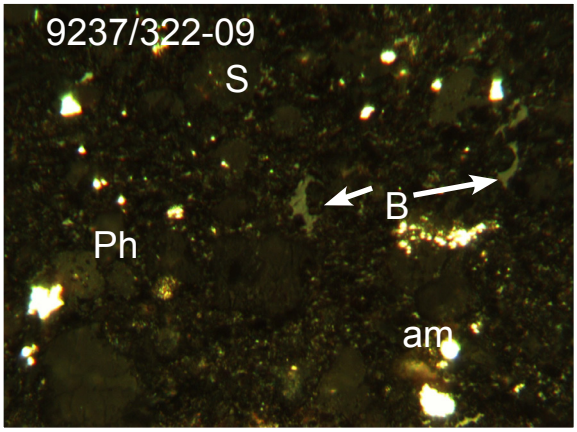


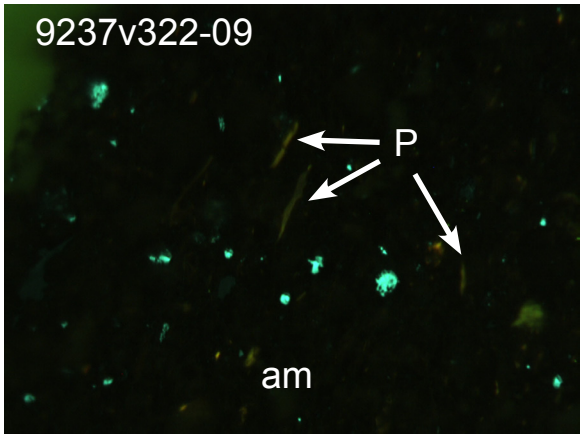


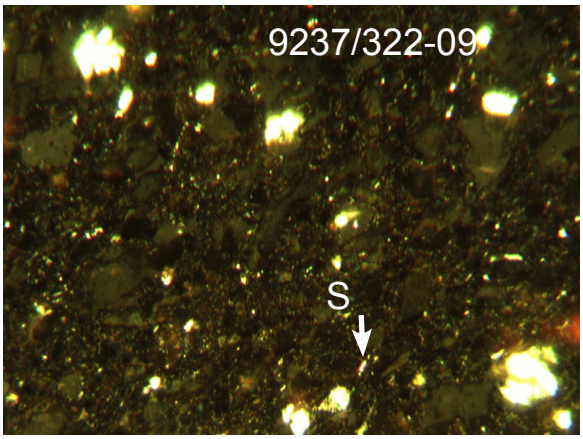
AGS 9237/GSC 322-09 (Duvernay; 100/06-14-037-07W5/00, 3649.1 m core depth). Organic-rich, black shale of mostly reddish-brown fluorescing, diffuse to concentrated, fluoramorphinite with reddish-orange fluorescing alginite (mainly Prasinophyte (P)), bitumen (B) and framboidal pyrite (Py) inclusions. Minor amount of small, thin non -fluorescing to weak fluorescing bitumen (B)lenses. Minorto rare amount of weakfluorescing calcite-filled siliceous (S) microfossil (possibly derived from radiolaria) with a trace amount of phosphatic nodules (Ph). Trace amount of chitinous (ch) microfossil. Colours enhanced to differentiate organics from the host matrix. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

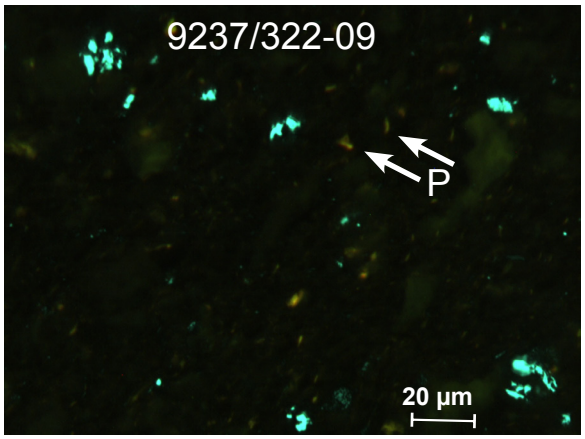

9237/322-09
B
V
S

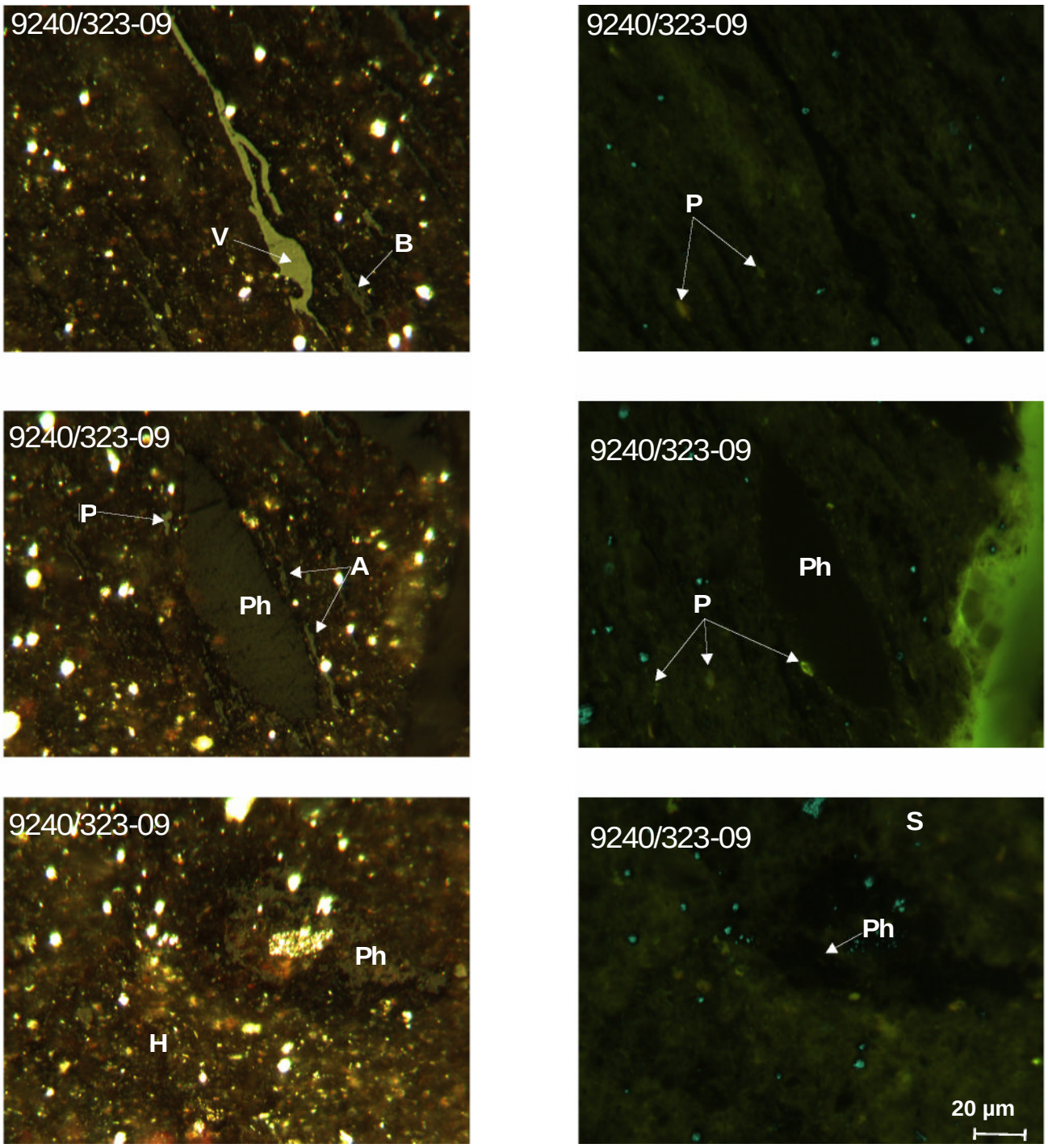

9237/322-09
B
P
S


9237/322-09
S
B
Ph
am

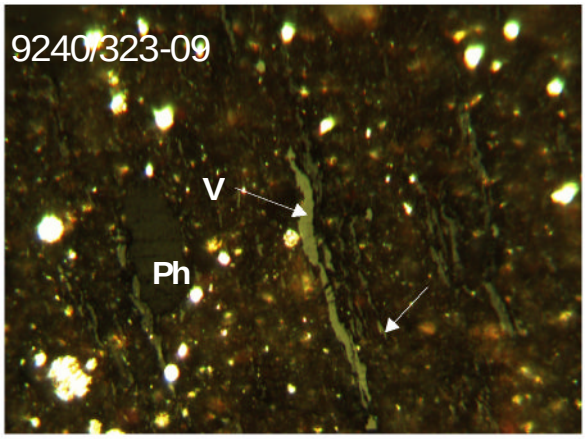

9237v322-09
P
am

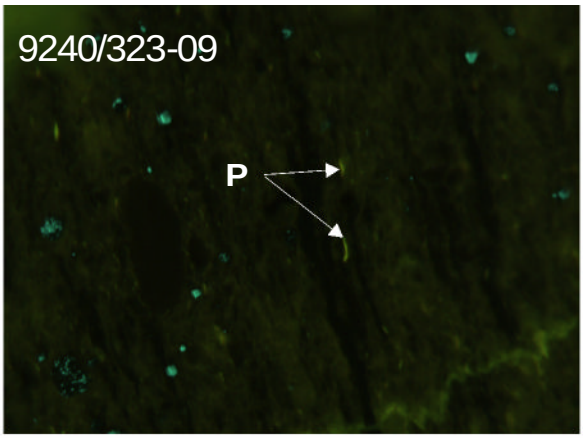

9237/322-09
S

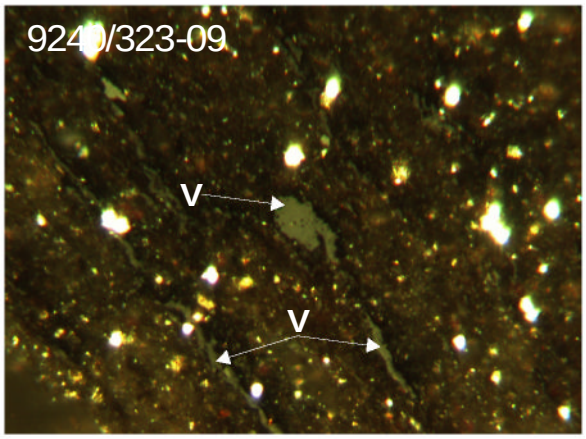

9237/322-09
P
20 µm

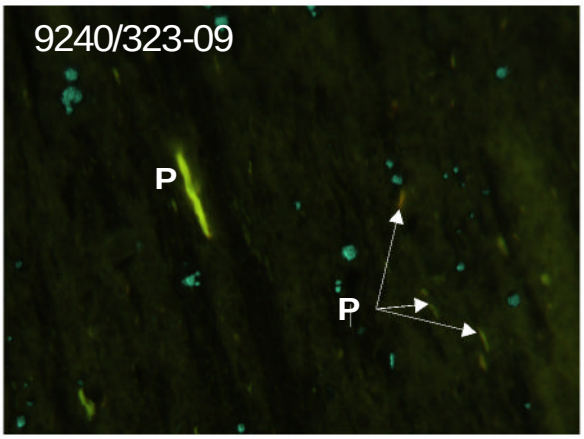


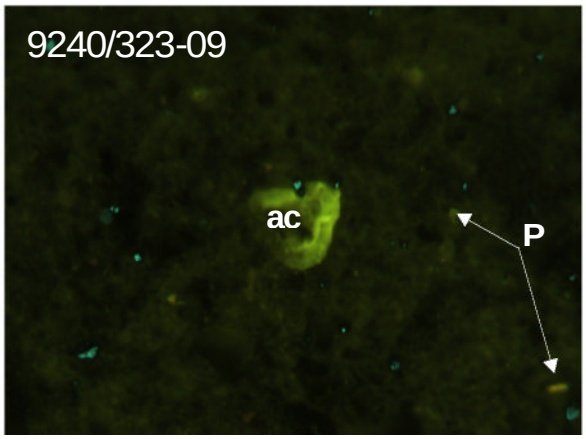
AGS 9240/GSC 323-09 (Duvernay; 100/11-18-072-17W5/00, 2362.8 m core depth). Liptinite-rich black shale of mostly reddish brown fluorescing diffuse granular to concentrated fluoramorphinite(F)/hebamorphinite (H) and thin long lamalginite and alginite derived vitrinite (V) lenses. Major amount of nonfluorescing and minor amount fluorescing alginite (mainly Prasinophyte (P)), and framboidal pyrite (Py) inclusion. Rare amount of granular bitumen (B), yellow-orange fluorescing *Hystricosphaeridium cf.* acritarch (ac) and phosphatic nodules (Ph). Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

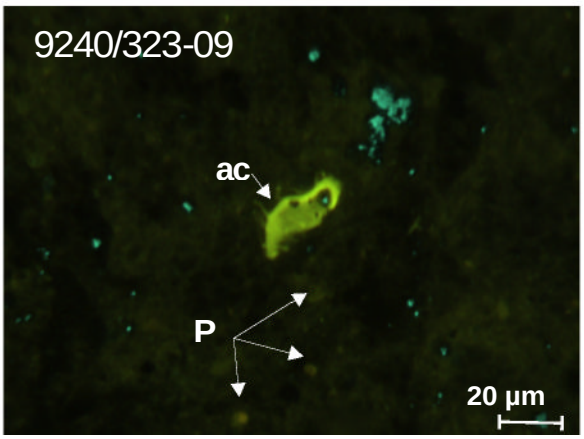

9240/323-09
V
Ph

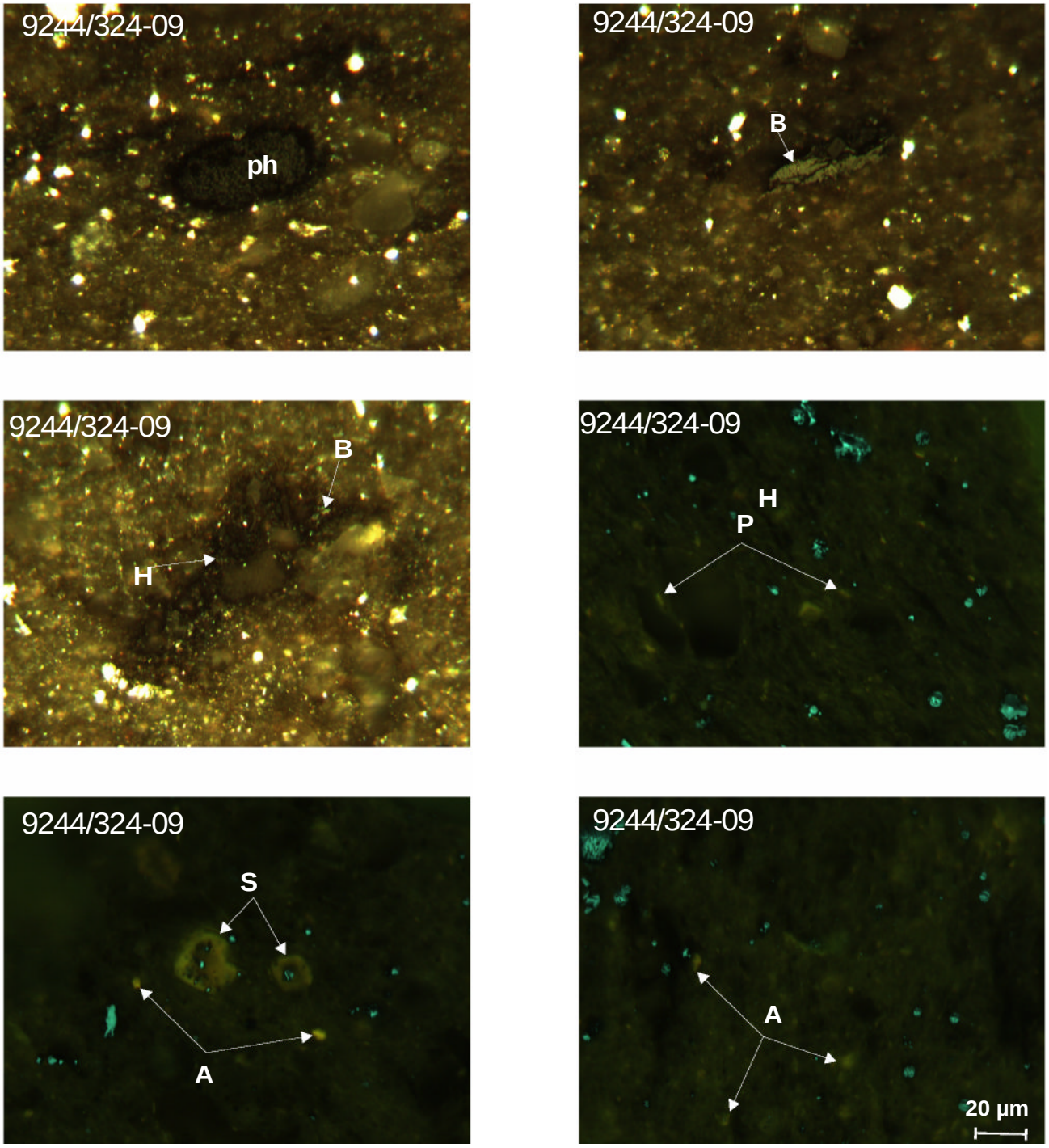

9240/323-09
P


9240/323-09
V
V

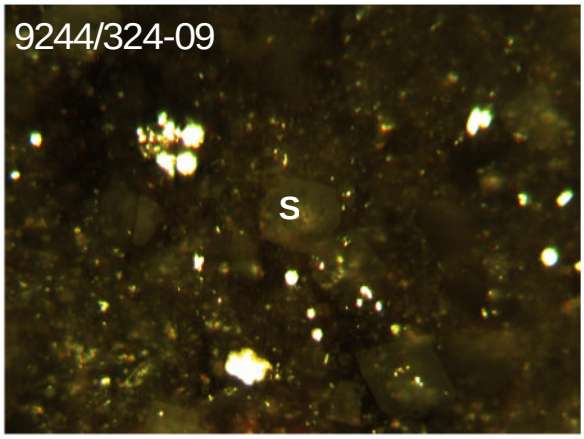

9240/323-09
P
P

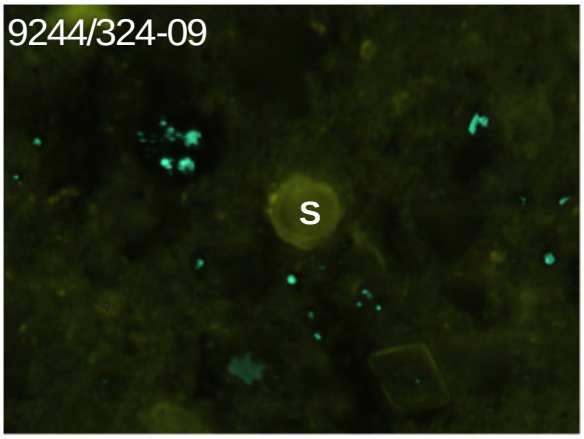

9240/323-09
ac
P

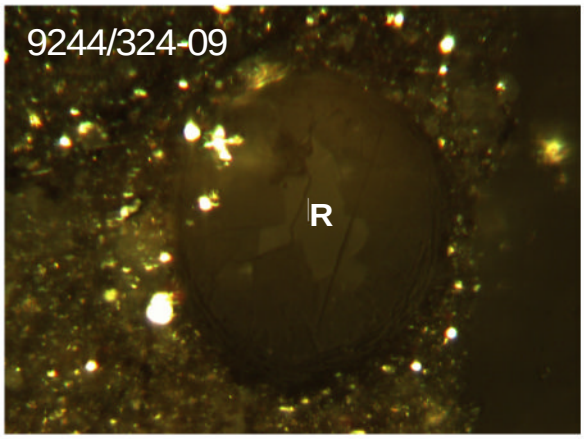

9240/323-09
ac
P
20 µm

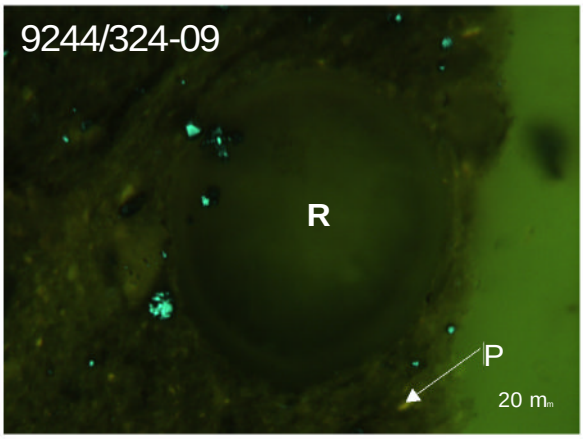


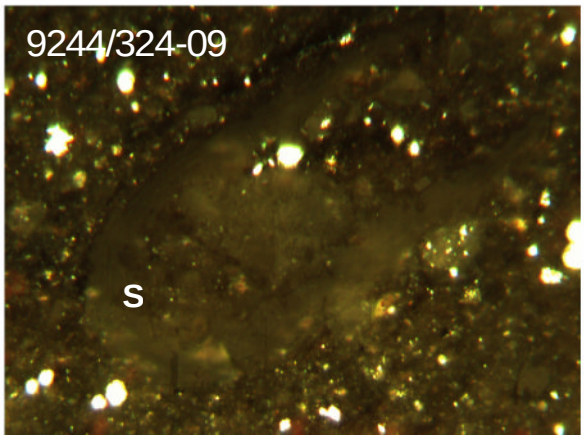
AGS 9244/GSC 324-09 (Duvernay; 100/09-06-052-11W5/00, 3015.7 m core depth). Organic-rich, brown, silty shale with a minor amount of orange-brown fluorescing alginite (A), Prasinophyte (P), and pyrite (Py) inclusions, and a rare amount of phosphatic nodules (ph) within an amorphous kerogen (am) matrix. A rare amount of yellow fluorescing calcite-filled siliceous (S) acanthomorphic marine acritarch microfossils (radiolaria, R) were also observed within the shale matrix. Small lenses of non-granular vitrinite (V) and bitumen (B) were measured for %Ro. Possible terrestrial deposition as indicated by the presence of fusinite (F) submacerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

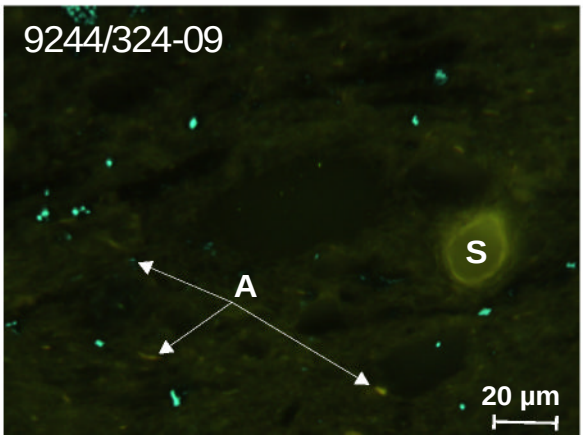

9244/324-09
S

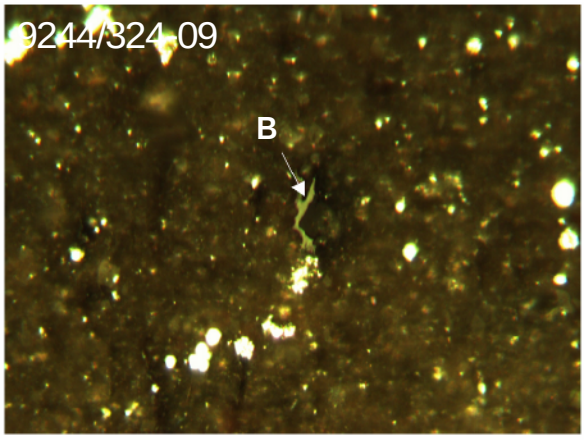

9244/324-09
S

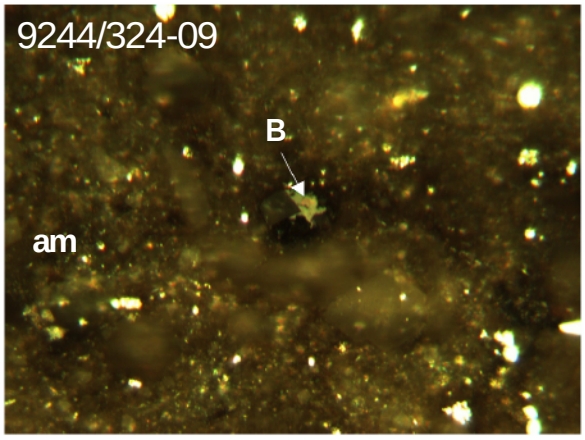

9244/324-09
R

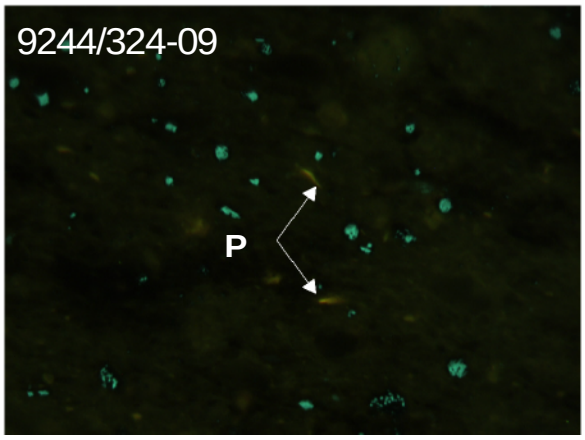

9244/324-09
R
P
20 mm

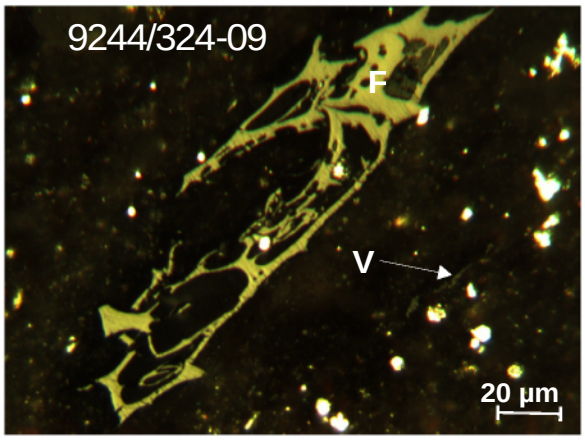

9244/324-09
S

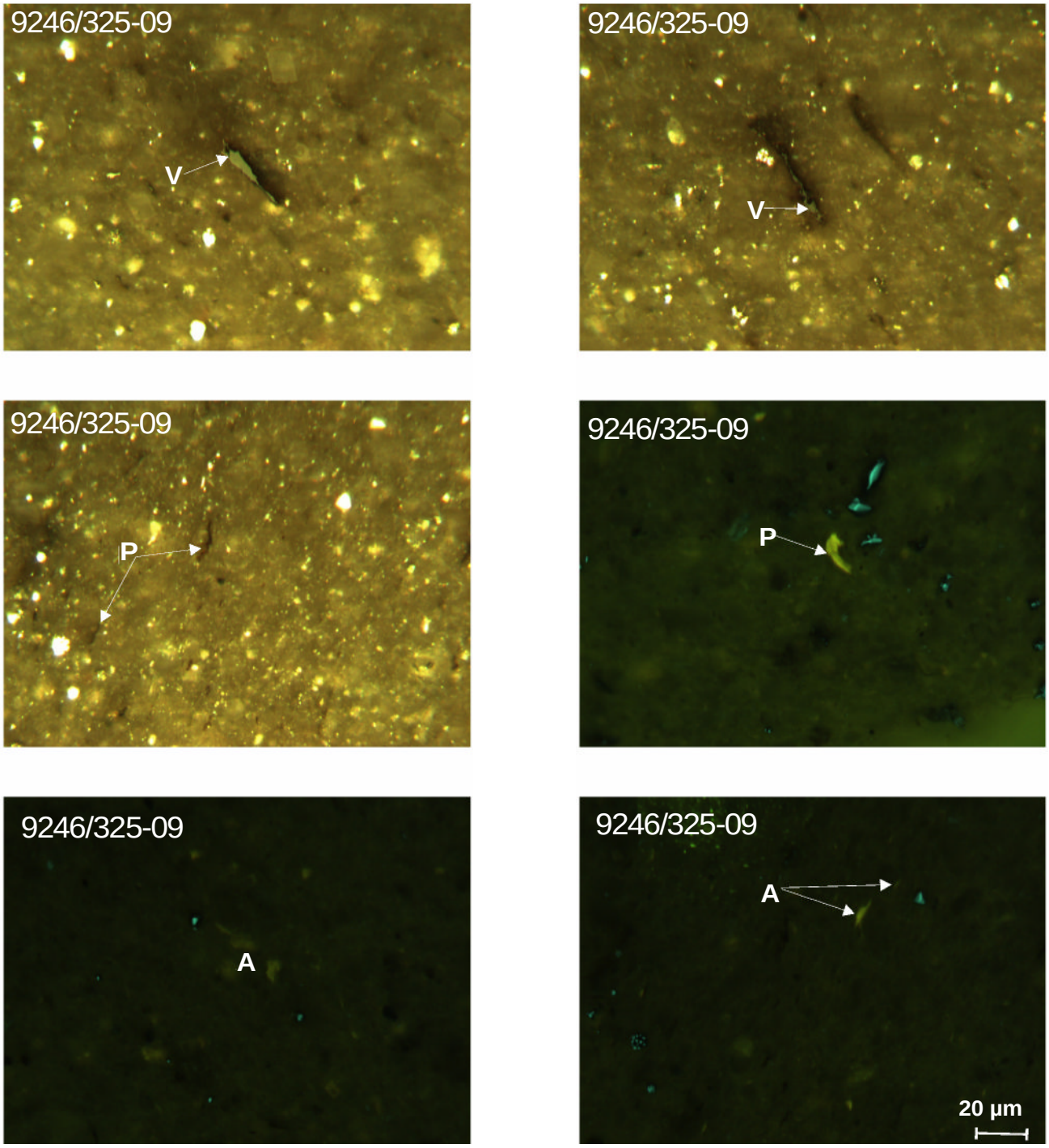

9244/324-09
S
A
20 µm


9244/324-09
B

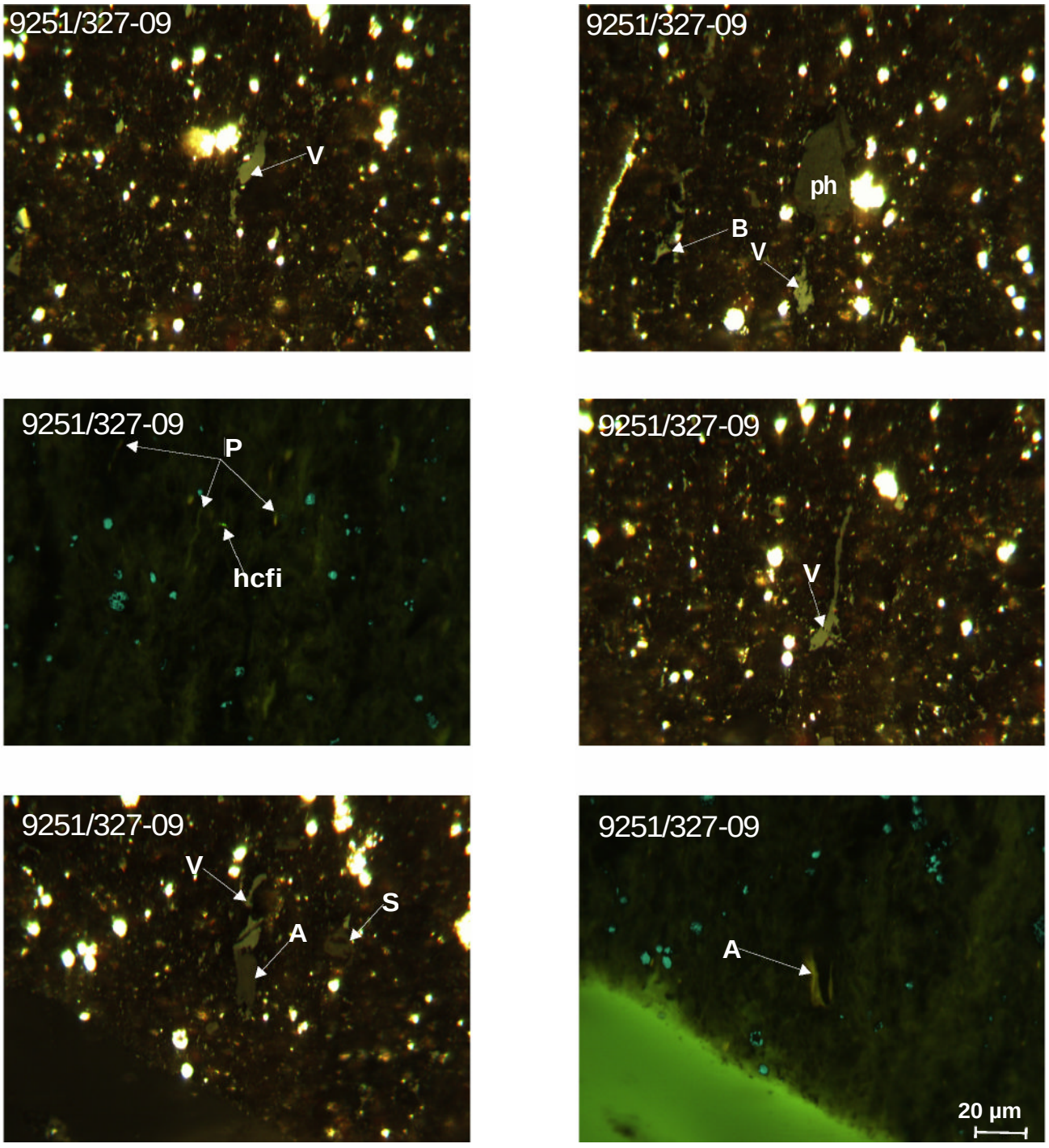

9244/324-09
B
am


9244/324-09
P

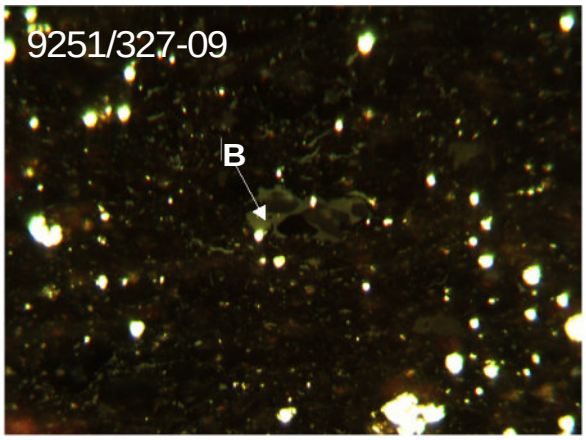

9244/324-09
F
V
20 µm

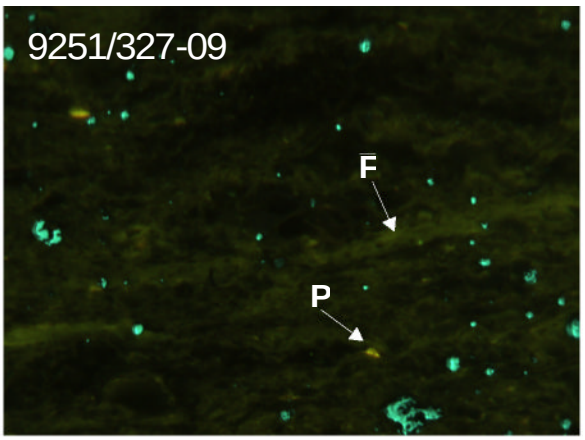


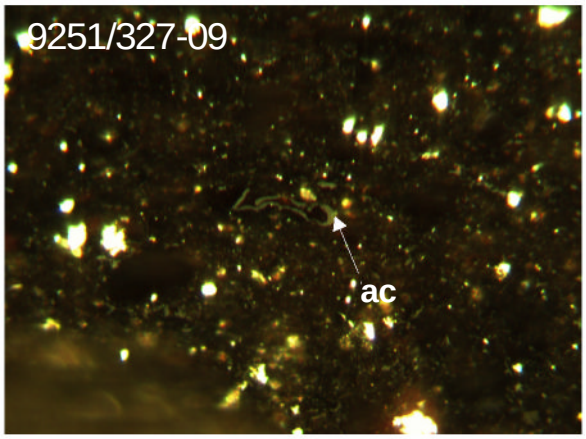
AGS 9246/GSC 325-09 (Duvernay, 100/10-24-072-23W5/00, 2757.7 m core depth). Organically lean siltstone with a rare amount of non-fluorescing to yellow-orange fluorescing alginite (A), and pyrite inclusions. Vitrinite (V) maceral derived mainly from unicellular Prasinophyte (P) alginite. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

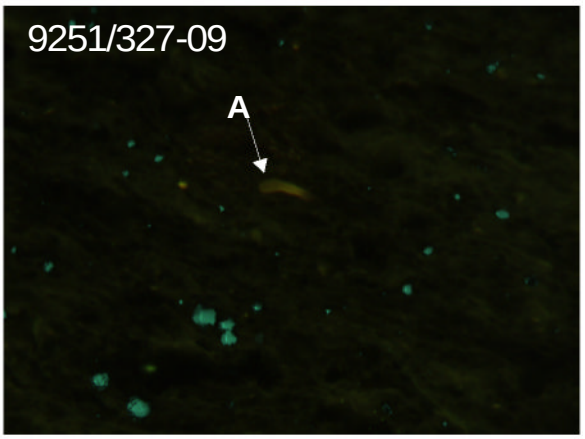


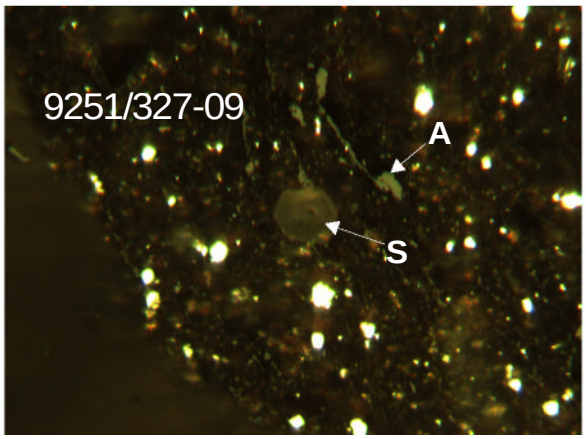
AGS 9251/GSC 327-09 (Duvernay; 100/16-04-074-26W5/00, 2940 m core depth). Organic-rich and pyrite-rich black shale, mostly composed of a thin, interconnected network of amorphous kerogen (am) with a minor amount of small lenses of alginite (A) and alginite-derived vitrinite (V) macerals and a rare amount of bitumen (B) inclusions. Rare, yellow-orange fluorescing alginite, mainly Prasinophyte (P), is observed. Calcite-filled siliceous (S) acanthomorphic marine acritarch (ac) microfossils are also observed within the shale matrix. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

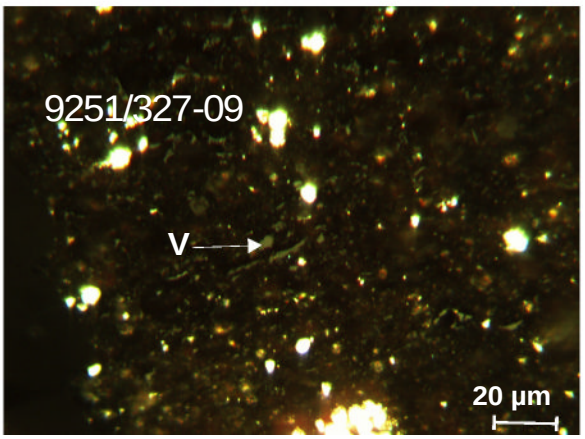

9251/327-09
B

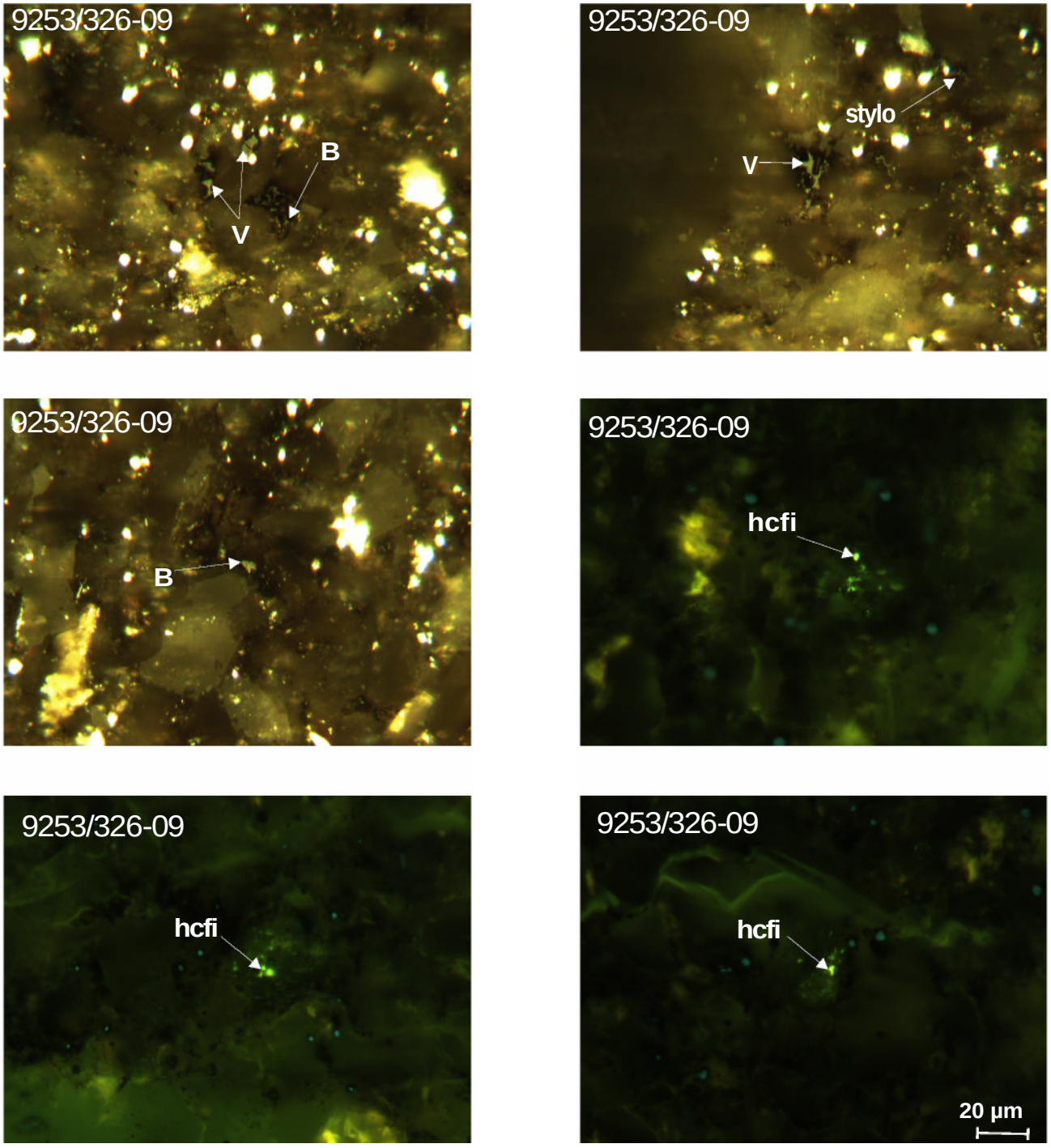

9251/327-09
F
P


9251/327-09
ac

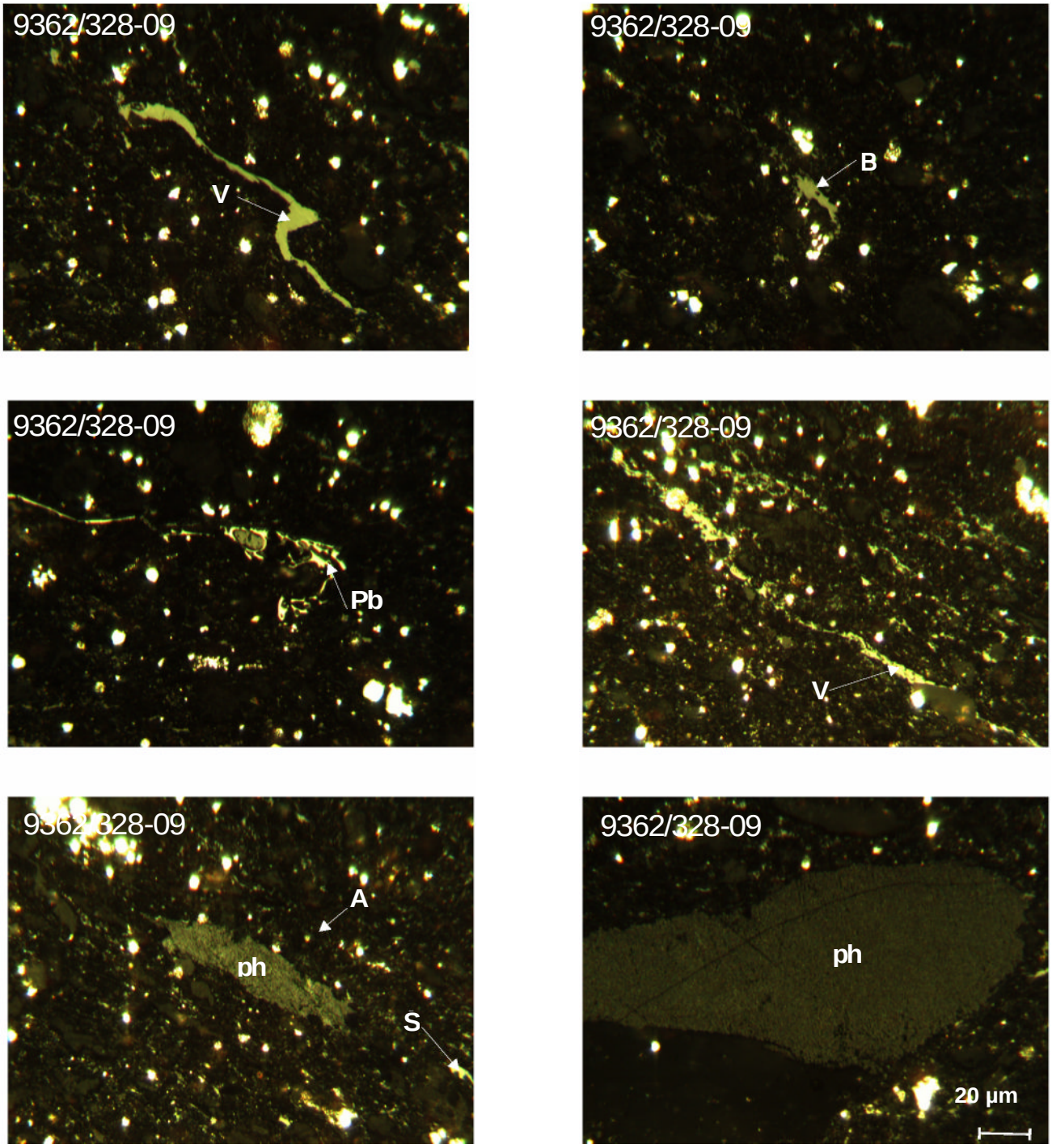

9251/327-09
A


9251/327-09
A
S

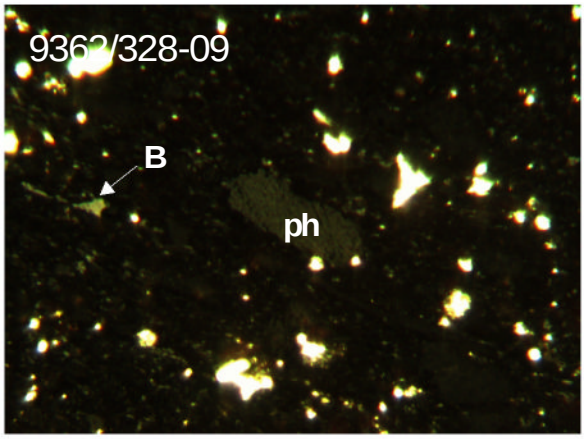

9251/327-09
V
20 µm

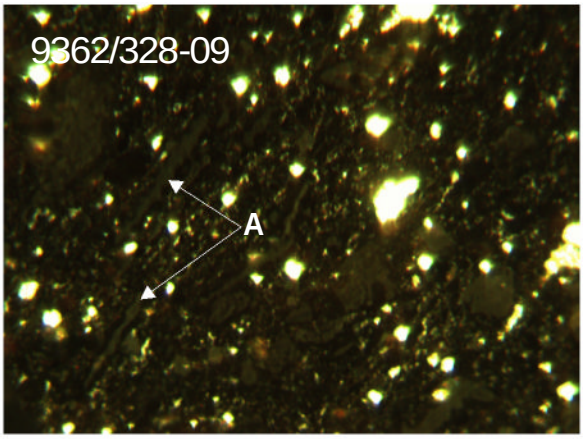


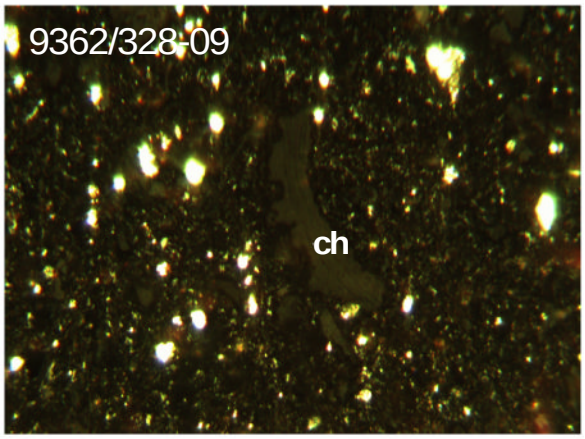
AGS 9253/GSC 326-09 (Duvernay; 100/16-04-074-26W5/00, 2942.6 m core depth). Siltstone with a minor amount of stylocumulate/alginite (stylo) derived vitrinite (V) and bitumen (B) lenses brecciated between carbonate grains. Rare, yellow fluorescing hydrocarbon fluid inclusions (hcfi) are observed mainly within quartz minerals, alginite and ashphaltine-like submacerals. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

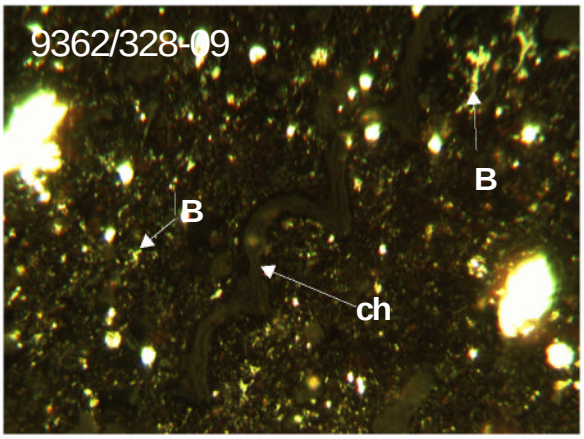


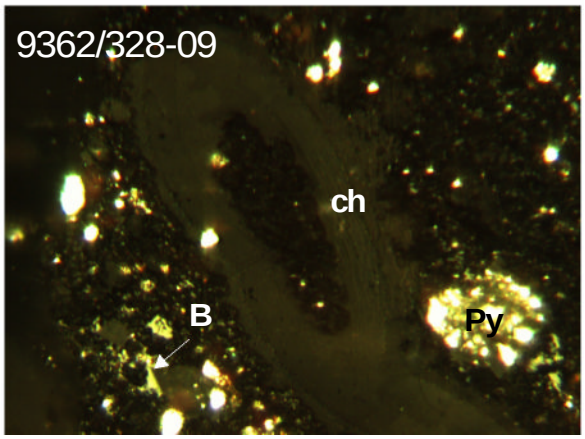
AGS 9362/GSC 328-09 (Duvernay; 100/02-06-047-04W5/00, 2639.6 m core depth). Organic-rich and pyrite-rich black shale, mostly composed of a thin, interconnected network of amorphous kerogen (am) with a minor amount of small lenses of vitrinite (V) and bitumen (B) macerals, and phosphatic nodules (ph). A major amount non-fluorescing alginite (A) and chitinous (ch) microfossils (possibly from fish bones) and a rare amount of calcite-filled siliceous (S) acanthomorphic marine acritarch microfossils are also observed within the shale matrix, including a trace amount of isotropic pyrobitumen (Pb) showing devolatilization vacuoles. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

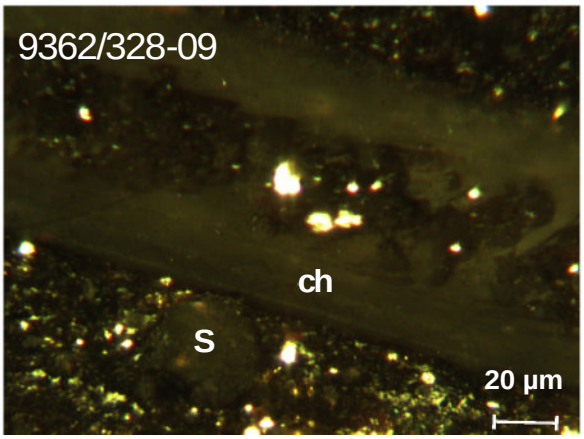

9362/328-09
B
ph

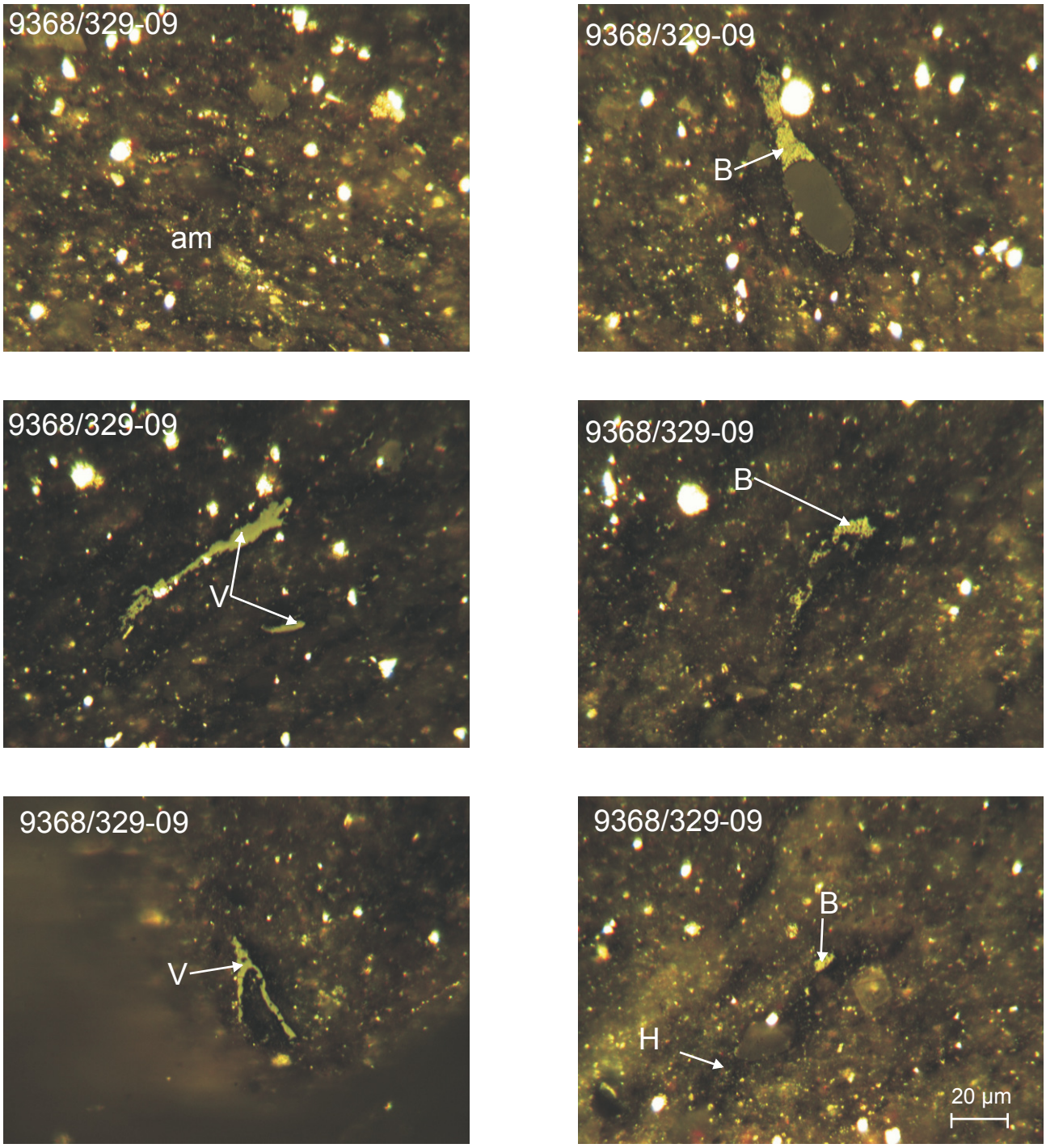

9362/328-09
A


9362/328-09
ch

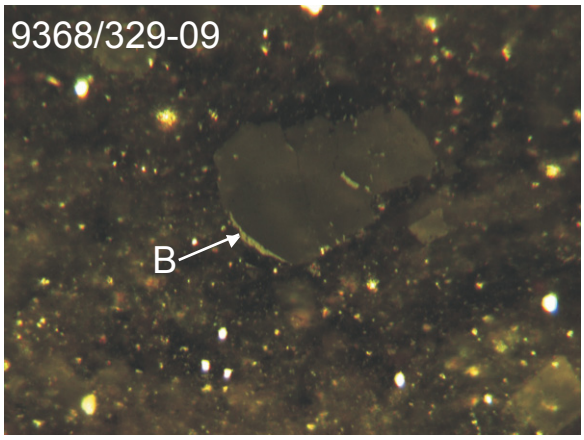

9362/328-09
B
B
ch

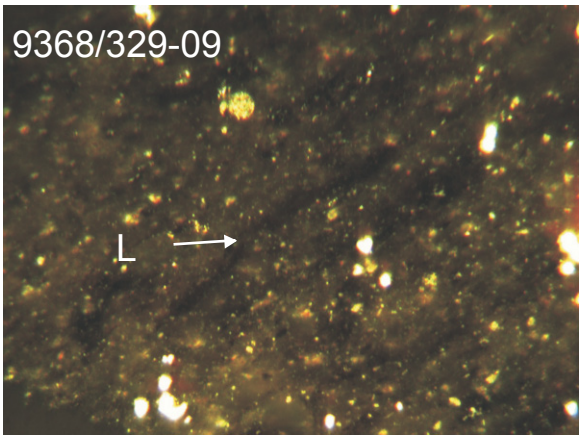

9362/328-09
ch
B
Py

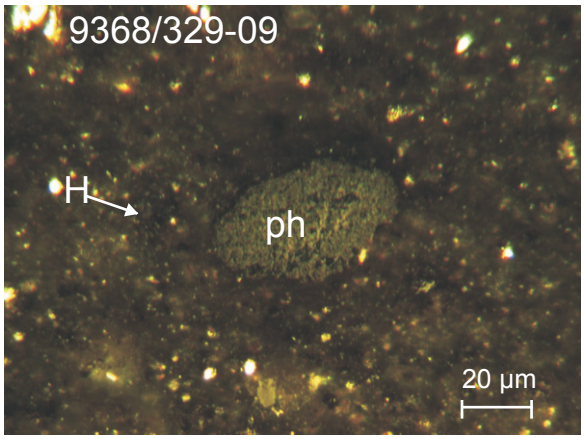

9362/328-09
ch
S
20 µm

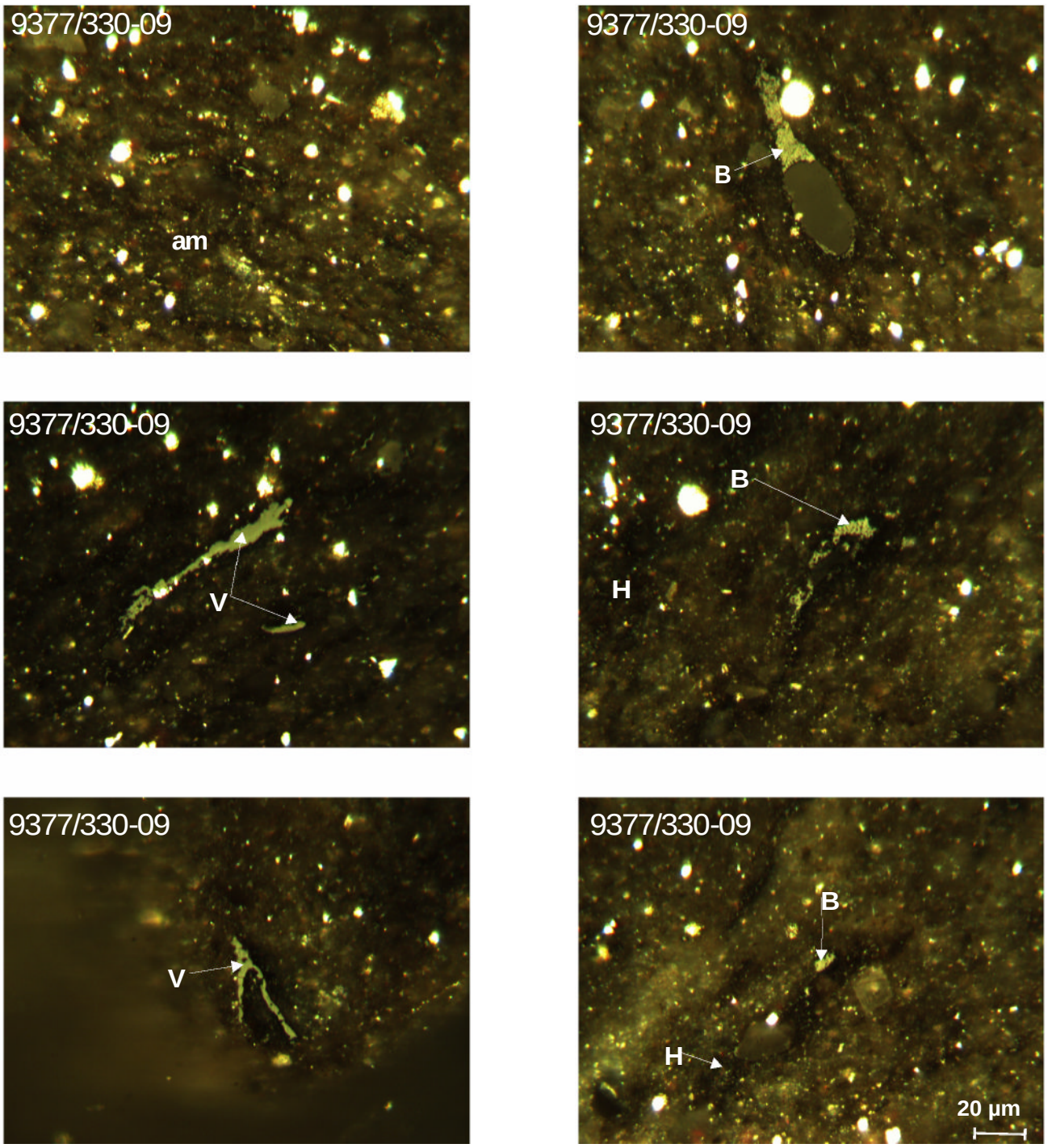


AGS 9368/GSC 329-09 (Duvernay; 100/02-04-126-11W6/00, 1519.8 m core depth). Organic rich and pyrite (framboidal) rich brown, silty shale with mainly an interconnected network of amorphous kerogen (am) and diffuse or concentrated hebamorphinite (H) lenses with orange fluorescing and non-fluorescing alginite maceral (i.e. Leiosphaeridia (L)) inclusions. Small lenses of non-granular and granular vitrinite (V) and bitumen (B) macerals are also observed within the shale matrix, together with rare, brown-fluorescing bitumenite and phosphatic nodules (ph). Rare chitinous conodont or fish bones. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

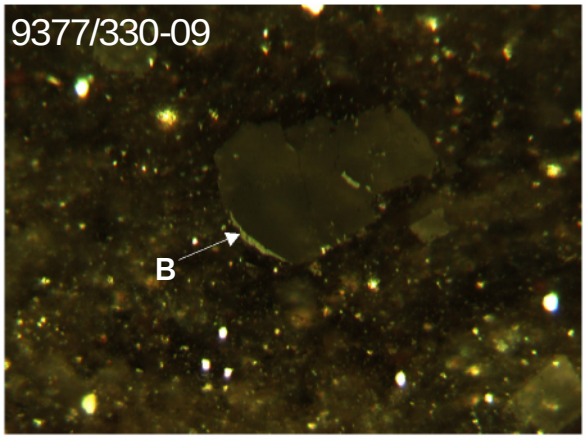

9368/329-09
B

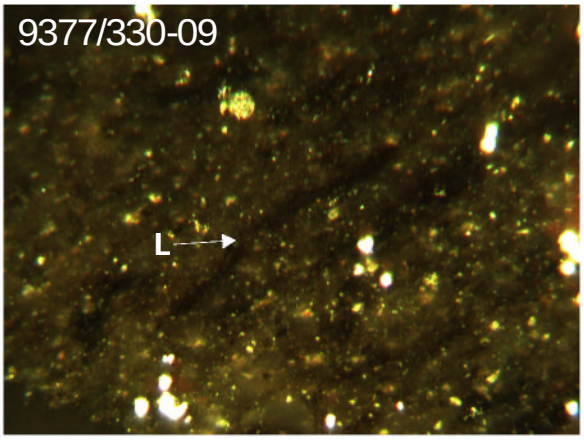

9368/329-09
L

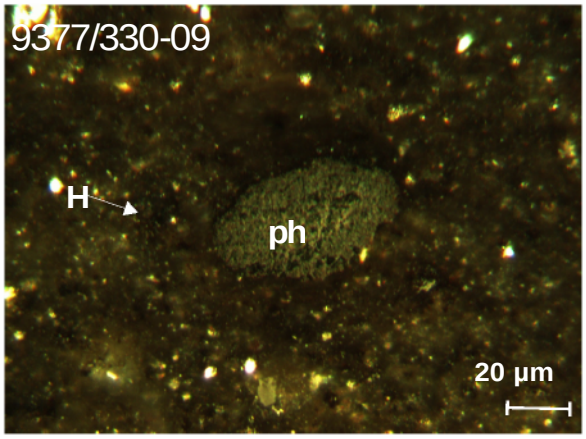

9368/329-09
H
ph
20 µm

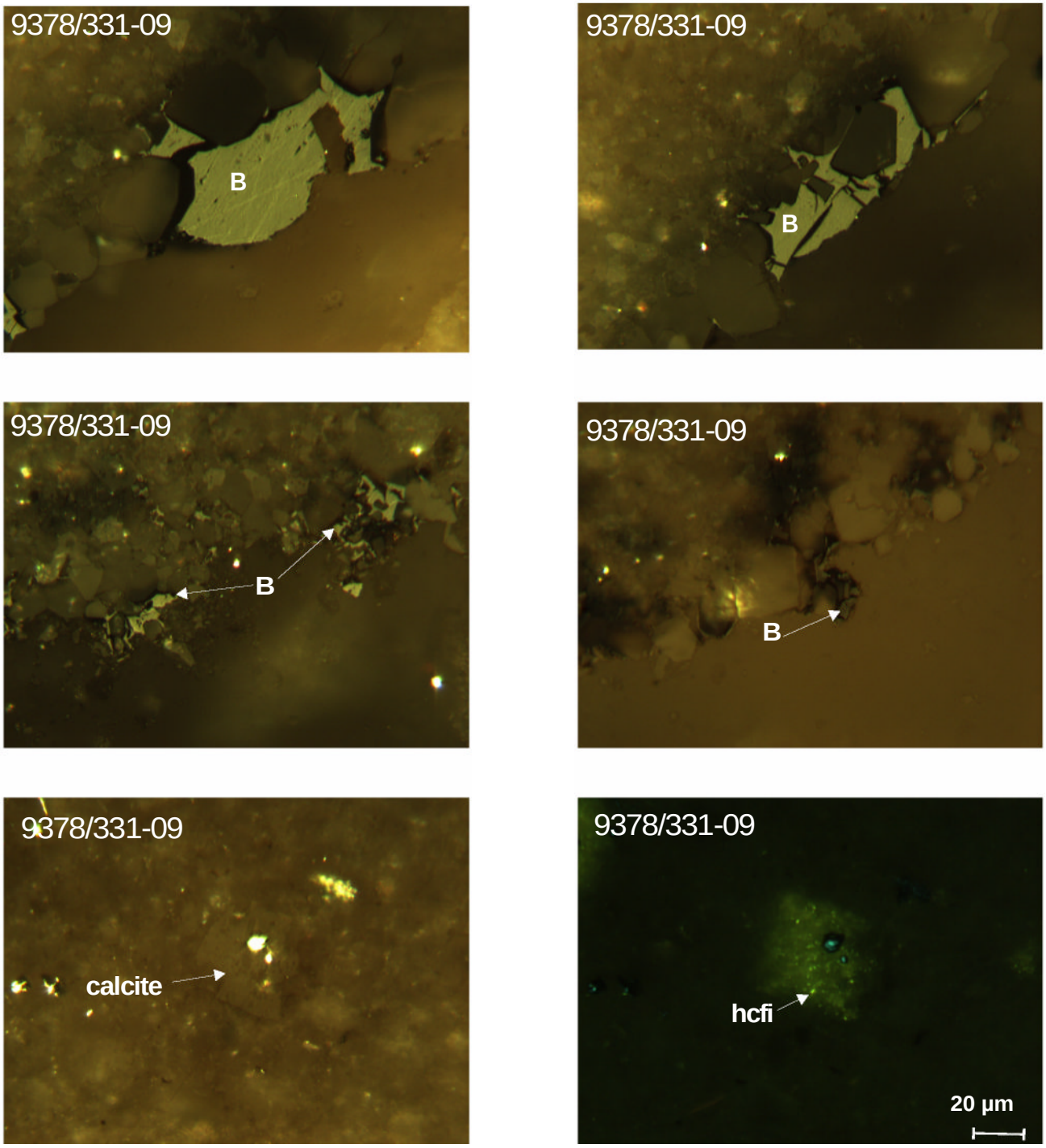


AGS 9377/GSC 330-09 (Duvernay; 100/02-08-044-27W4/00, 2256.4 m core depth). Organic-rich and pyrite-rich (Py, framboidal), brown silty shale, mainly composed of an interconnected network of amorphous kerogen (am) and diffuse or concentrated hebamorphi nite (H) lenses with orange-fluorescing and non-fluorescing alginite macerals (i.e. *Leiosphaeridia*, L) inclusions. Small lenses of non-granular and granular vitrinite (V) and bitumen (B) maceral are also observed within the shale matrix along with rare, brown-fluorescing bitumenite and phosphatic nodules (ph). Rare, chitinous conodont or fish bones are observed. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

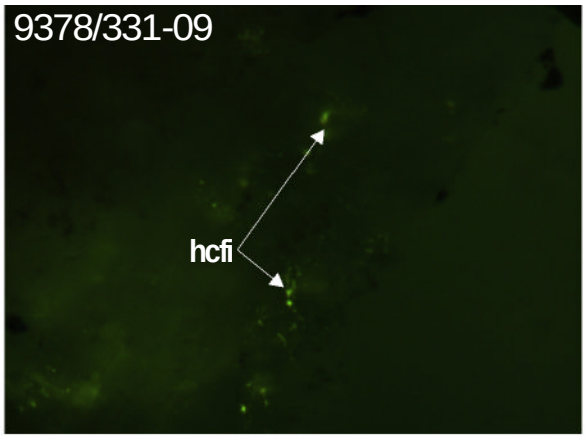

9377/330-09
B

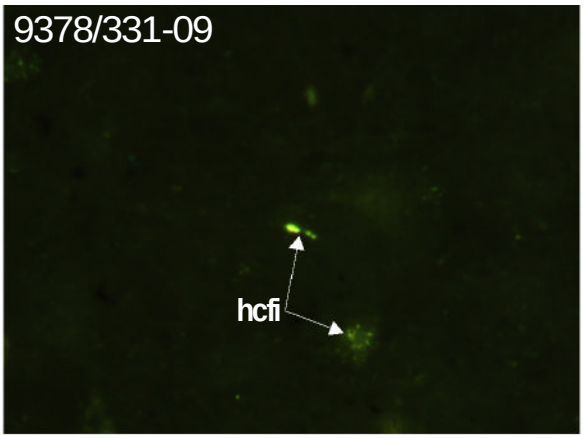

9377/330-09
L

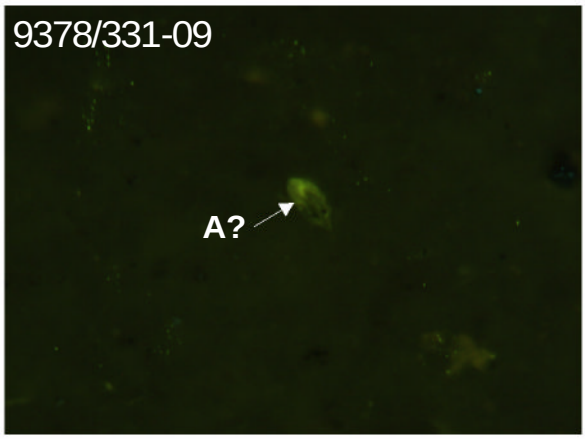

9377/330-09
H
ph
20 µm

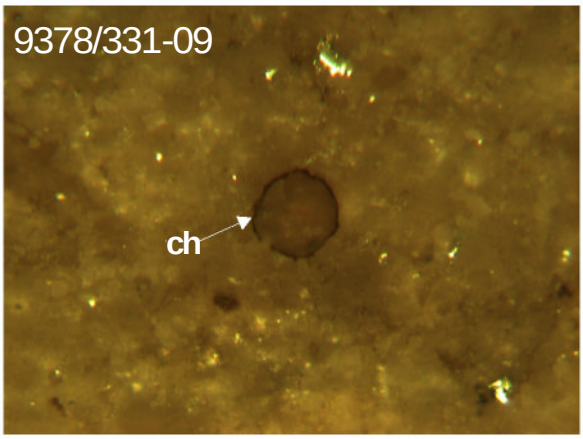


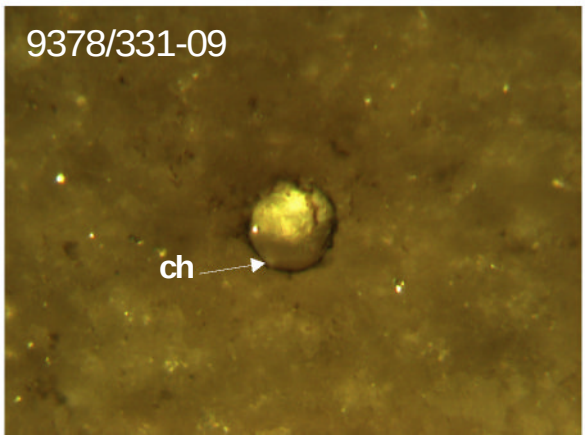
AGS 9378/GSC 331-09 (Cooking Lake; 100/02-08-044-27W4/00, 2274.7 m core depth). Organically lean siltstone with mainly migrated bitumen (B) and a rare amount of non-fluorescing to yellow-orange fluorescing alginite (A?) and non-fluorescing calcite-filled chitinozoans (ch). Traces of yellow fluorescing, hydrocarbon fluid inclusion (hcfi) are observed within the calcite matrix. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

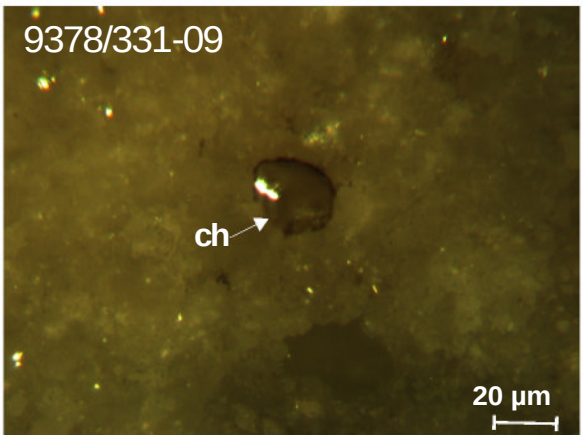

9378/331-09
hcfi

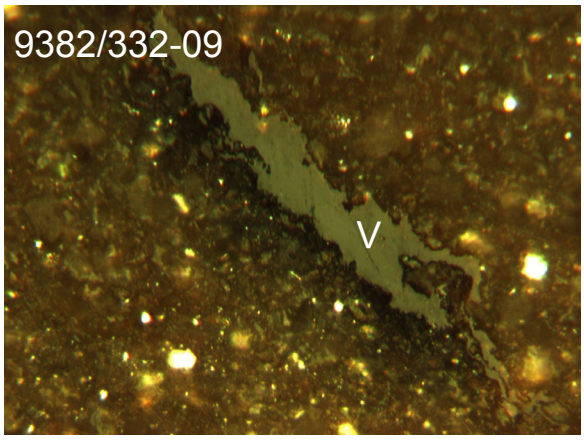

9378/331-09
hcfi

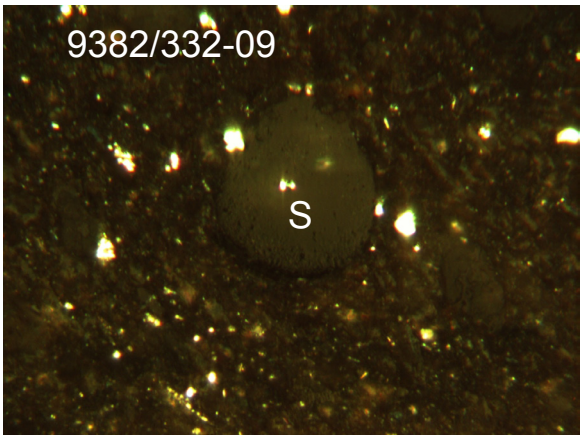

9378/331-09
A?

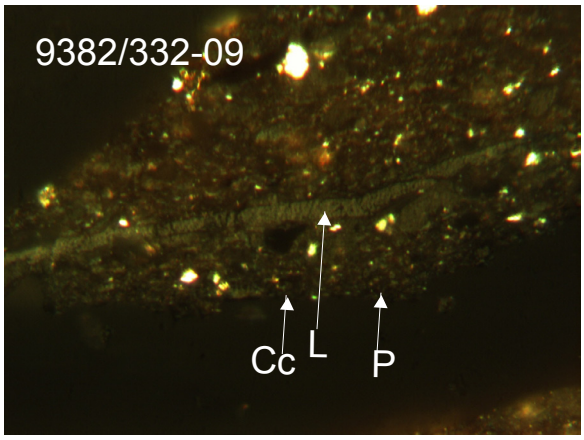

9378/331-09
ch

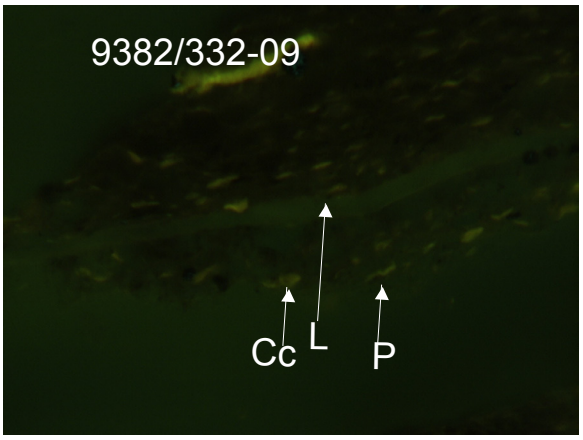

9378/331-09
ch

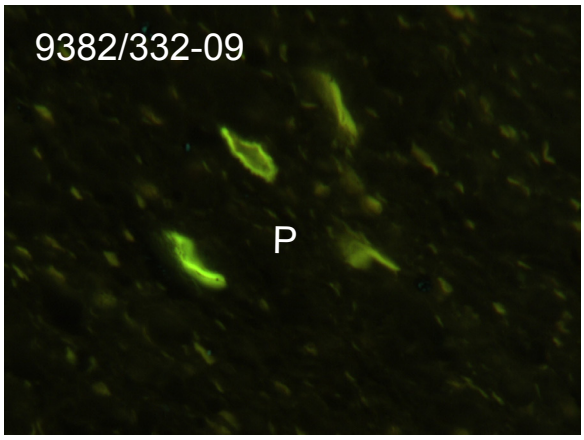

9378/331-09
ch
20 µm

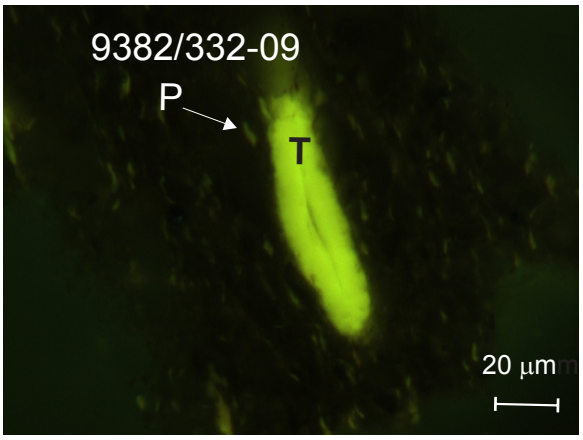




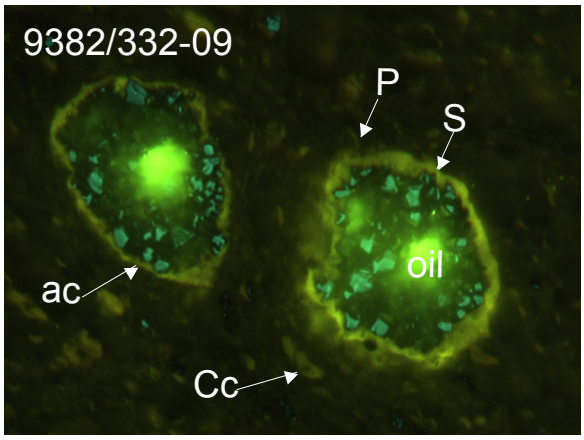


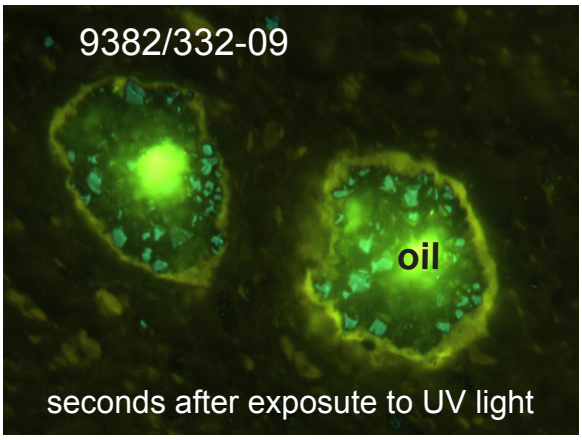


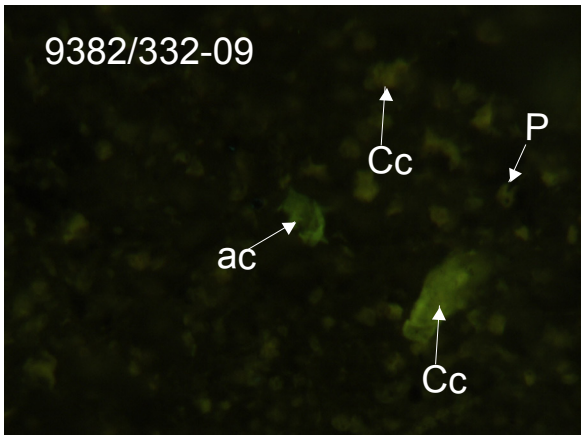


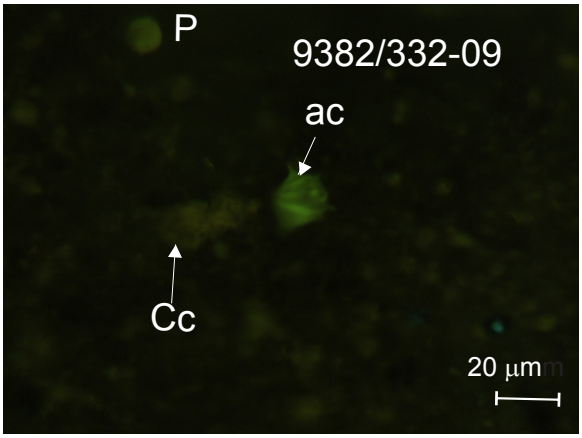


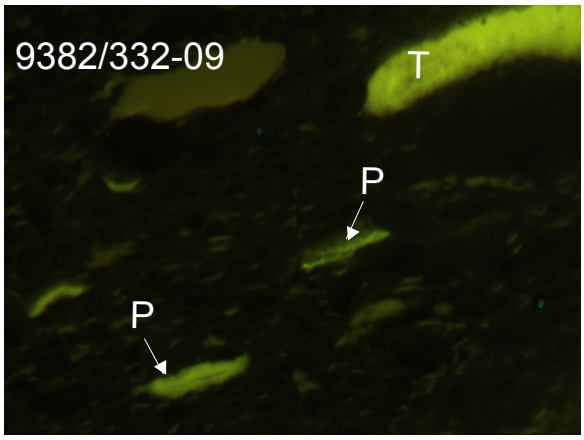
AGS9382/GSC332-09(Duvernay;100/10-08-046-22W4/00,1722.1 mcoredepth).Organic-rich and pyrite-rich (Py,framboidal),brown silty shale,mainly composed of an interconnected network of amorphouskerogen(am) and diffuse or concentrated fluoramorphinite (F,weak brown fluorescing) and non-fluorescing hebamorphinite(H) lenses. Major amount of yellow fluorescing to non-fluorescing alginite(A),Prasinoph yte(P),Coccoidal(Cc), Tasmanitessp.(T),siliceous(S)and spin-yacanthomorphic marine acritarch(ac),and Leiosphaeridia(L)) inclusions. Rare amount of small vitrinite(V) and bitumen(B) macerals, and soluble hydrocarbon(oil)are observed and measured within the shale matrix. Rare amount of small vitrinite(V) and bitumen(B)macerals, and soluble hydrocarbon(oil)are observed and measured within the shale matrix together with a trace amount of brown fluorescing bitumenite(Bt) and phosphaticnodules. Highly suppressed %Ro. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).

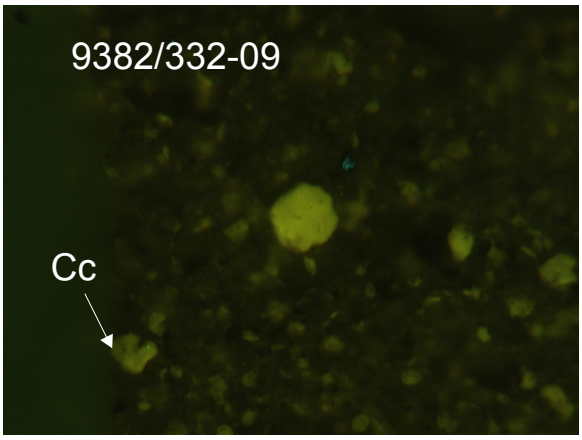

9382/332-09
P
S
oil
ac
Cc

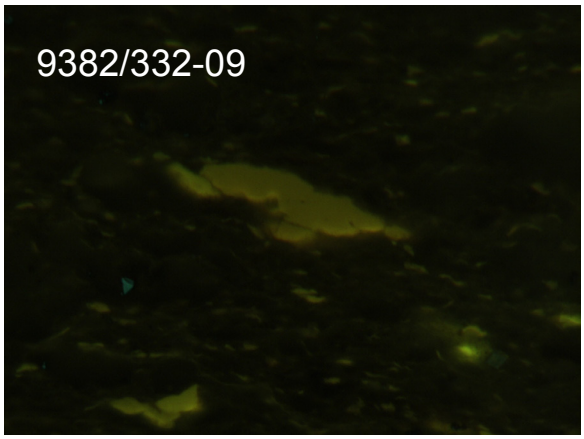

9382/332-09
oil
seconds after exposute to UV light

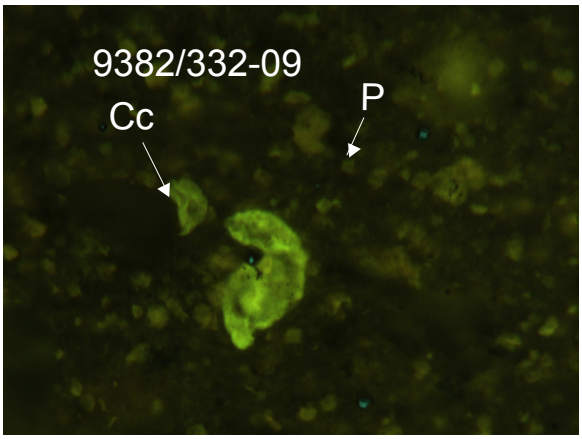

9382/332-09
Cc
P
ac
Cc

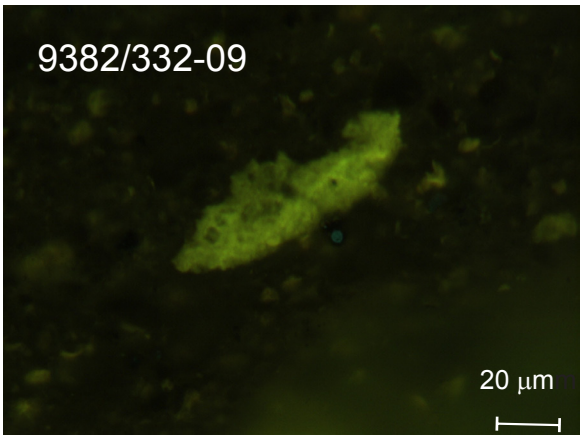

P
9382/332-09
ac
Cc
20 μm

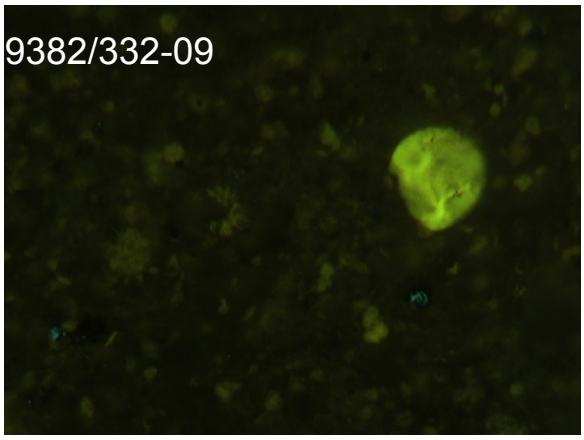

9382/332-09
T
P
P

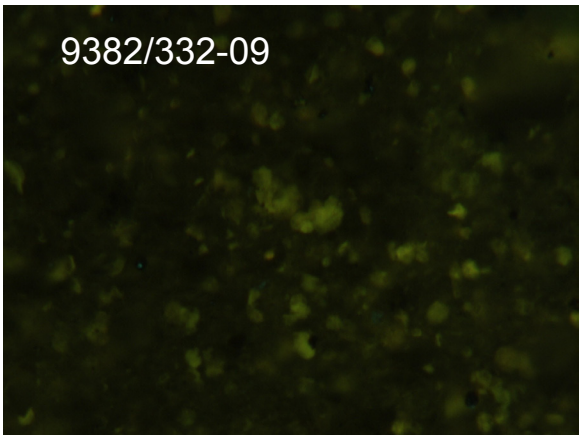

9382/332-09
Cc

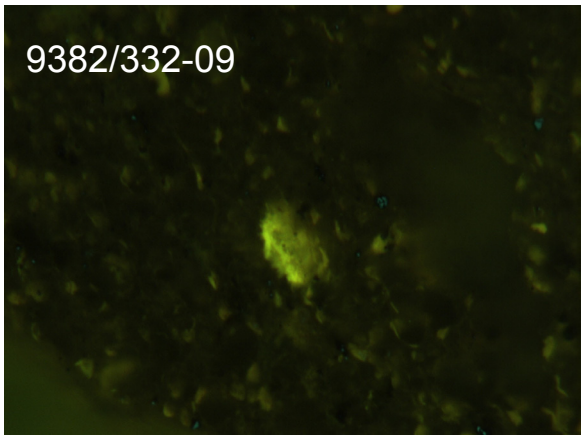

9382/332-09

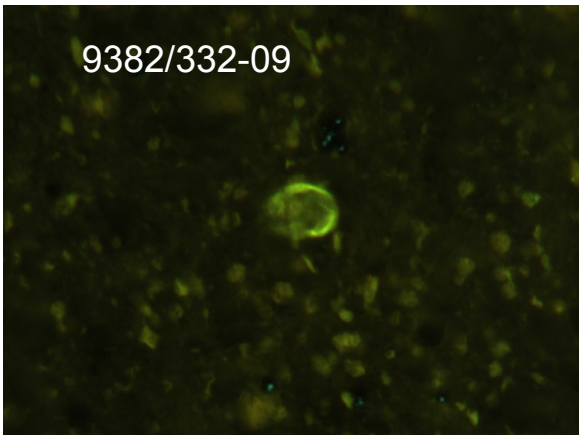

9382/332-09
Cc
P

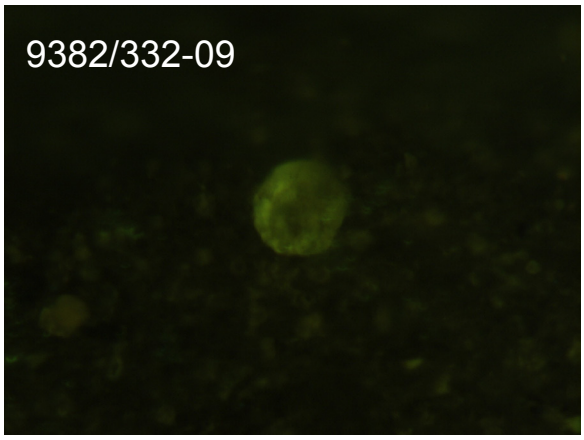

9382/332-09
20 μm

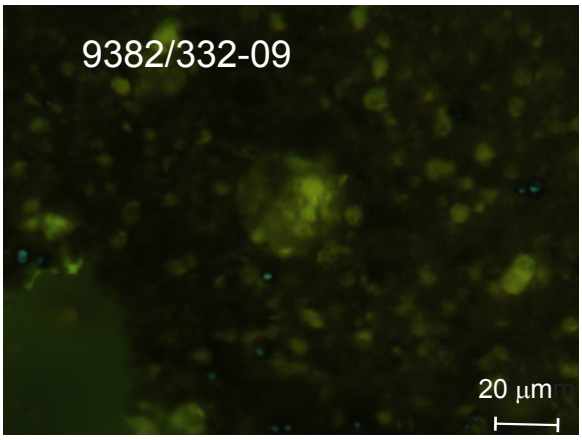

9382/332-09

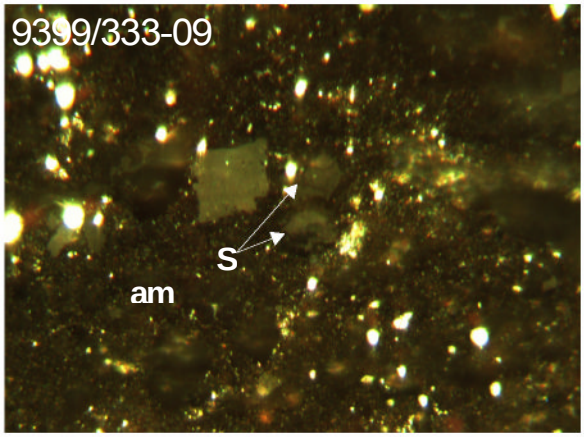

9382/332-09

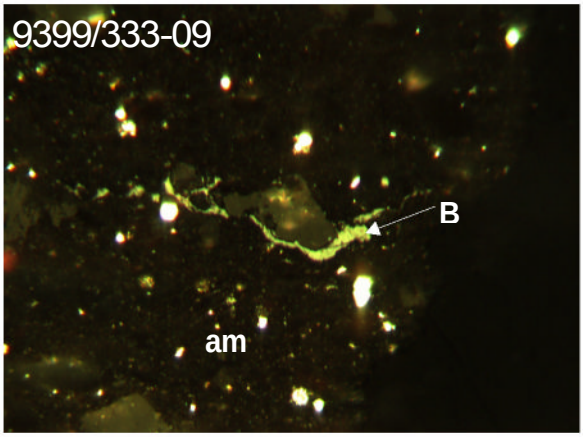

9382/332-09

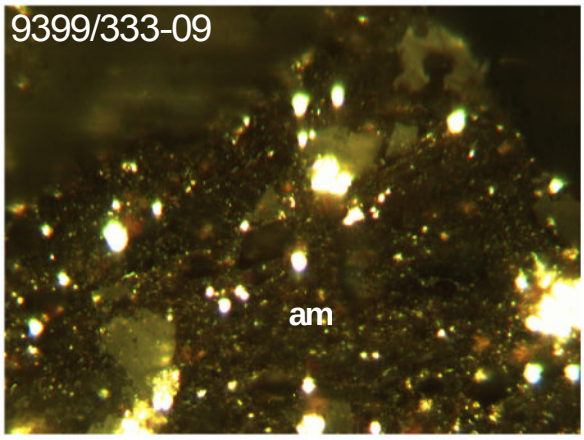

9382/332-09

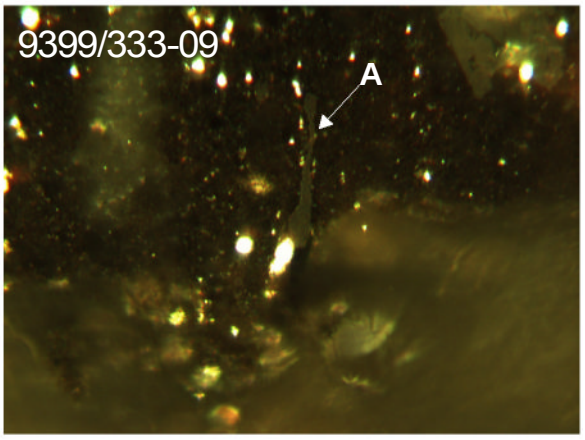

9382/332-09

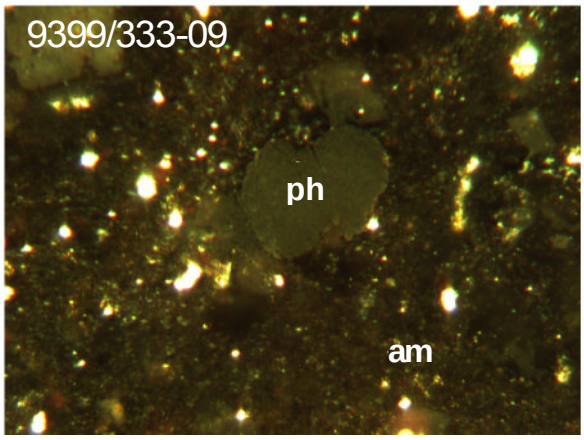

9382/332-09
20 µm

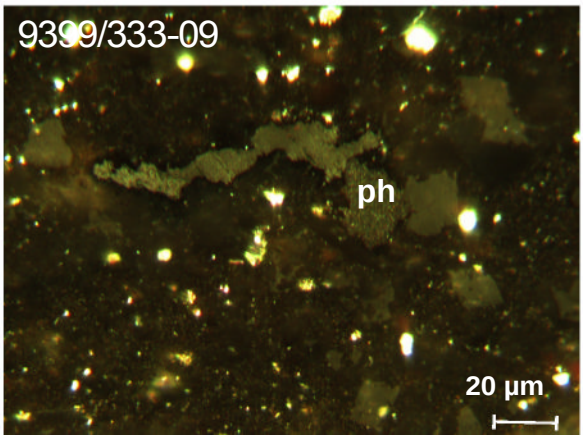




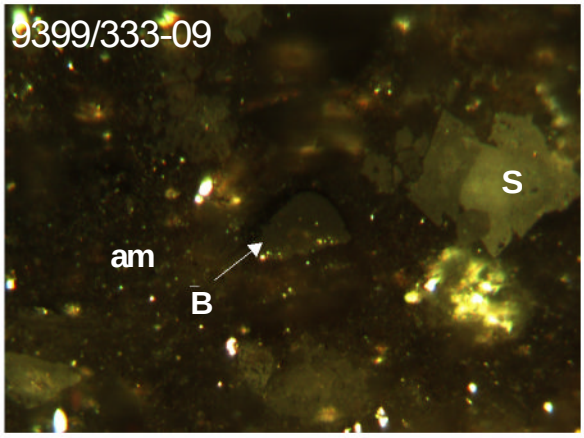


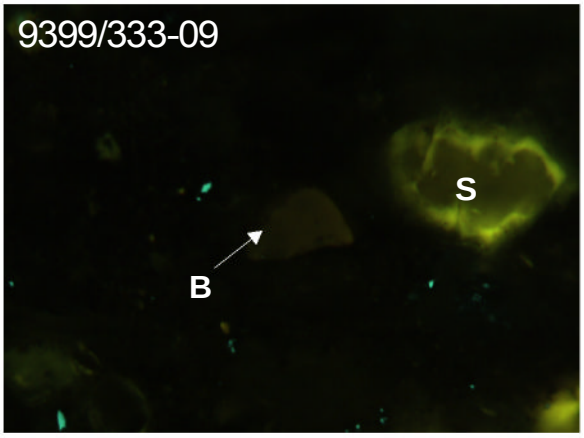






AGS 9399/GSC 333-09 (Duvernay; 100/04-11-063-25W5/00, 3576.3 m core depth). Organic-rich and pyrite-rich (Py, framboidal), black, silty shale, mainly composed of an interconnected network of amorphous kerogen (am) and diffuse, rare, non-fluorescing and fluorescing alginite (A), brown fluorescing and non-fluorescing bitumen (B), and phosphatic nodules (ph). Small lenses of non-granular and granular vitrinite (V) and bitumen (B) macerals are also observed within the shale matrix, together with a major amount of siliceous (S) microfossils possibly from marine acritarch and radiolaria. Scale bar applies to all images. (In oil, polished surface, fluorescence and reflected white light, 50X magnification).


9399/333-09
S
am
B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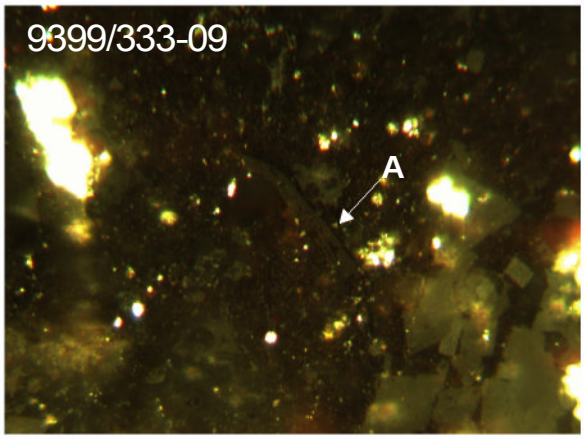
S
B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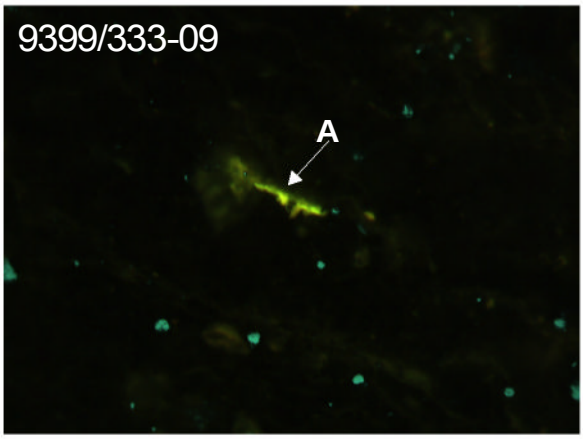
A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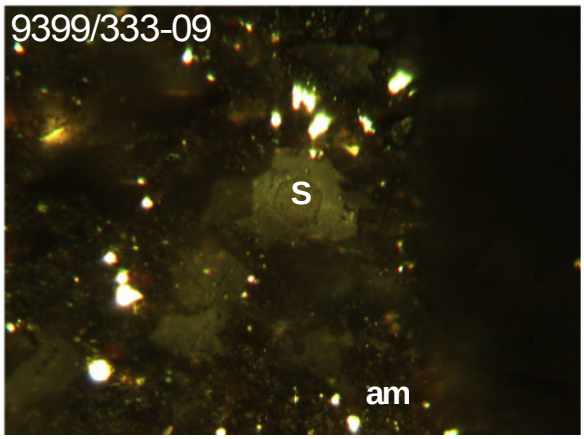
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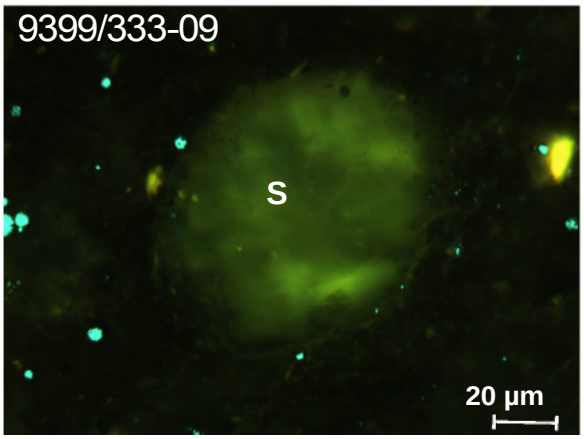
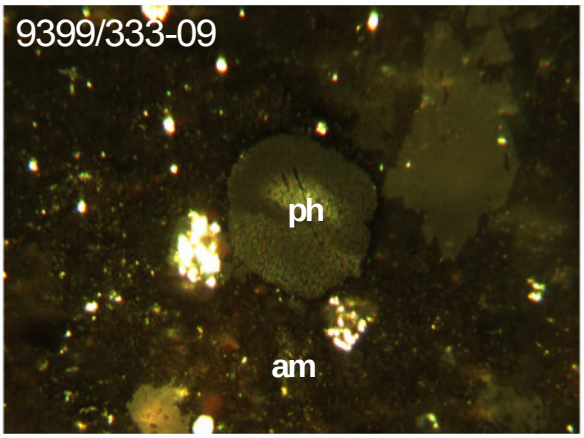
S
am


9399/333-09
S
20 µm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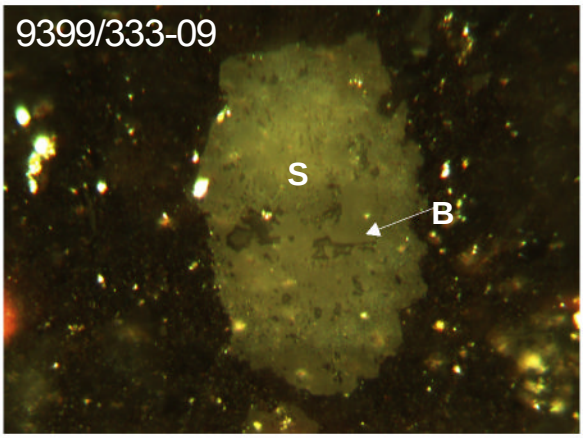
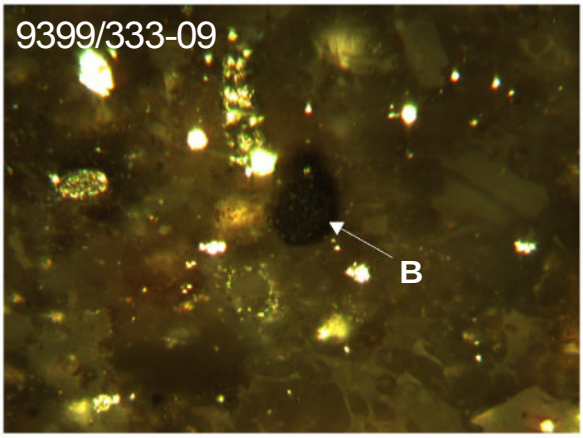
ph
am


9399/333-09
S
B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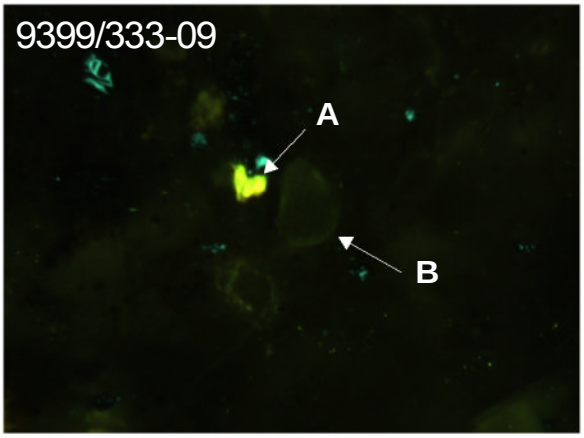
B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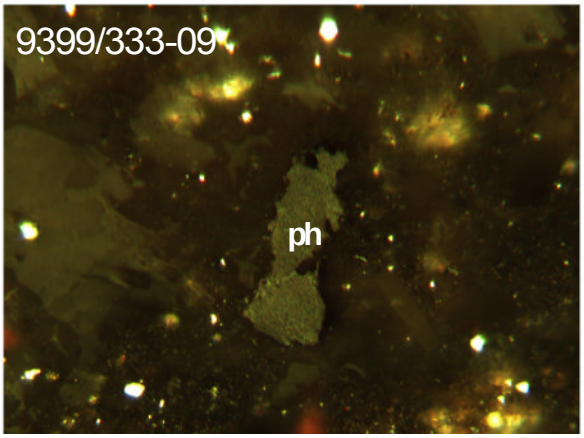
A
B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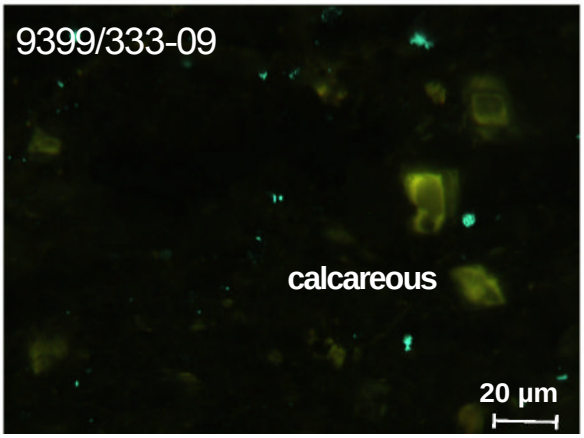
ph


9399/333-09
calcareous
20 µm