Appendix DR1: Analytical description of biomarker analysis, raw data and cross correlation between total organic carbon (TOC) and inorganic nitrogen (N_{inorg}) for the Buchanan Lake section, Sverdrup Basin.

Method Organic Geochemistry

About 2 g of sediment were extracted (methanol/dichlormethane 1:3) using a microwave system (mls 1200 mega). Extracts were run over a copper column to remove elemental sulfur. After saponification the neutral extract were desulphurized with Raney Nickel and subsequently hydrogenated (Sinninghe Damsté et al. 1988). Identification was done by GC-MS (Shimadzu QP-2010 Plus with an Optic3 (Atas GL) injector using EI and an lycopene standard (Philippe Schaeffer). A Restek Rxi 5 ms, 30 m, 025 mm ID, 0.25 µm film column was used. Oven program was 70°C (one minute) heating to 130°C with 20° m^{-1}, heating to 320 °C with 4°C m^{-1}, hold 20 min.
Quantification was done on a GC (Shimadzu GC-2010 Plus) with a GL Sciences Inert Cap 5 MS/NP (30m, 0.25mm ID, 0.25 µm film) using a 3 point calibration of a C_{35} n-alkane.

Sinninghe Damsté, J. S.; Irene, W.; Rijpstra, C.; de Leeuw, J. W.; Schenck, P. A., 1988. Origin of organic sulphur compounds and sulphur-containing high molecular weight substances in sediments and immature crude oils. Organic Geochemistry 13, p. 593-606.

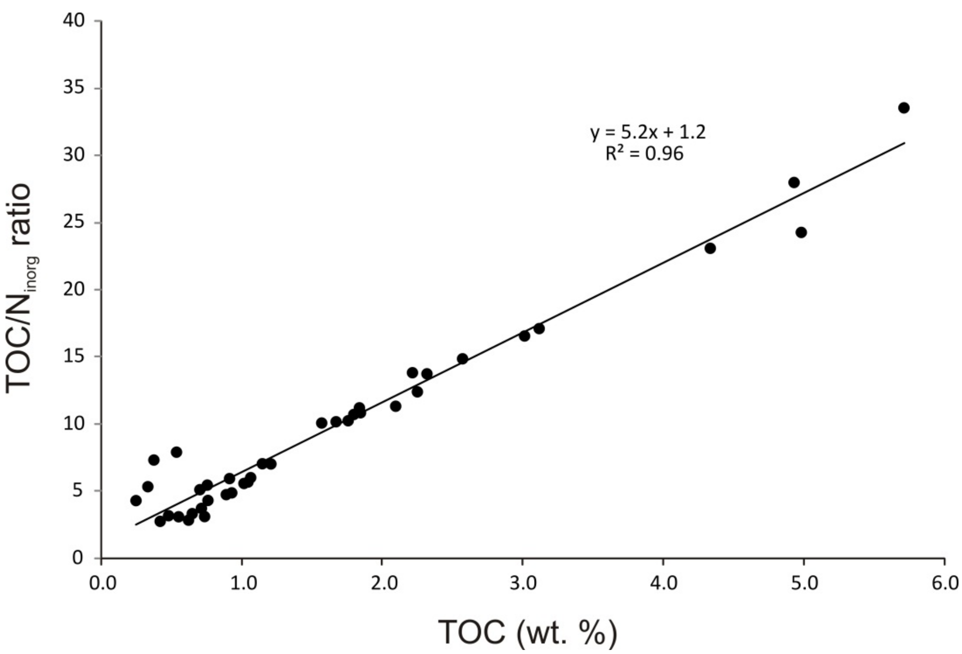

Figure DR1. Cross correlation between TOC and C/N_{inorg}. From the high regression coefficient (R^2 = 0.96), an organic source for the inorganic nitrogen is inferred.

Table DR1. Raw geochemical data for the Buchanan Lake section, Sverdrup Basin

Depth	TC% Leco	TOC% Leco	Sulphur% Leco	Ntot wt%	Ninorg wt%	δ^{15}Ntot	δ^{15}Ninorg	C/Ntot	C/Ninorg	C/S	Lycopane µg/gSed
33.75	2.29	0.33	0.27	0.07	0.06	7.86	8.06	4.6	5.3	1.24	0.70
25.25	1.08	0.54	1.27	0.08	0.07	8.06	7.93	6.5	7.9	0.42	
20.65	1.52	0.25	0.91	0.07	0.06	8.46	8.39	3.7	4.3	0.27	
17.4	0.91	0.38	9.75	0.05	0.05	8.90	8.45	6.9	7.3	0.04	
15.4	0.96	1.05	0.41	0.20	0.18	8.38	8.24	5.4	5.7	2.53	
13.4	0.84	0.70	0.48	0.16	0.14	8.78	8.24	4.5	5.1	1.47	
11.4	0.96	0.93	0.70	0.21	0.19	8.64	8.06	4.4	4.9	1.32	
9.4	1.16	1.15	0.52	0.19	0.16	8.49	8.26	6.1	7.0	2.23	1.23
6.9	0.60	0.55	0.29	0.19	0.18	8.38	8.31	2.9	3.1	1.90	
5.9	1.09	1.07	0.55	0.19	0.18	8.47	8.29	5.5	6.0	1.93	
4.9	1.20	1.21	0.40	0.19	0.17	8.44	8.41	6.3	7.0	3.06	
4.4	0.78	0.76	0.39	0.20	0.18	8.55	8.31	3.9	4.3	1.96	
4	0.94	0.89	0.38	0.20	0.19	8.47	8.24	4.4	4.7	2.33	
3	1.20	1.02	0.63	0.20	0.18	8.62	8.48	5.1	5.6	1.61	1.53
2.1	0.72	0.72	1.09	0.20	0.19	8.75	8.51	3.6	3.7	0.65	
1.3	0.64	0.65	1.51	0.20	0.20	8.87	8.46	3.2	3.3	0.43	
0.5	0.76	0.74	2.12	0.24	0.24	8.95	9.03	3.0	3.1	0.35	
0.2	0.67	0.62	1.51	0.23	0.22	9.01	8.73	2.7	2.8	0.41	
0	0.57	0.42	2.92	0.16	0.15	8.94	8.55	2.6	2.7	0.14	0.20
-0.2	0.51	0.48	5.86	0.16	0.15	8.97	8.90	3.0	3.2	0.08	
-0.6	5.17	4.98	1.08	0.24	0.21	8.38	8.46	20.5	24.3	4.63	
-1	2.14	2.10	0.89	0.20	0.19	8.86	8.47	10.3	11.3	2.35	
-1.8	5.16	4.93	0.43	0.21	0.18	8.85	8.65	23.0	28.0	11.51	
-2.6	3.46	3.01	0.73	0.21	0.18	9.05	8.87	14.3	16.5	4.10	
-3.4	4.36	4.33	0.58	0.22	0.19	9.13	9.13	20.0	23.1	7.47	0.94
-4	2.55	2.25	0.67	0.21	0.18	9.24	8.79	10.9	12.4	3.35	
-4.7	3.18	3.12	1.05	0.20	0.18	9.32	9.03	15.5	17.1	2.98	
-6.7	2.99	2.57	0.63	0.20	0.17	9.44	9.14	13.0	14.9	4.06	
-8.2	2.01	1.76	0.39	0.19	0.17	9.09	9.07	9.4	10.2	4.46	0.31
-11.2	2.07	1.84	0.44	0.18	0.16	8.98	8.96	10.1	11.2	4.15	
-19.6	n.d.	n.d.	n.d.	0.18	n.d.	8.97	n.d.	17.2	n.d.	n.d.	
-26	2.61	2.22	0.26	0.18	0.16	8.96	9.08	12.3	13.8	8.65	
-32	2.19	1.80	1.26	0.19	0.17	9.31	9.17	9.6	10.7	1.43	0.22
-38	2.27	1.85	1.17	0.19	0.17	9.42	9.41	10.0	10.8	1.58	
-44	2.57	2.32	1.00	0.18	0.17	9.07	9.22	12.9	13.7	2.31	
-50	5.36	5.71	0.98	0.20	0.17	9.16	9.00	29.0	33.5	5.80	
-56	1.95	1.67	0.58	0.18	0.16	9.44	9.30	9.5	10.2	2.86	1.23
-62	1.81	1.57	0.56	0.17	0.16	9.03	8.97	9.3	10.1	2.82	
-72	1.10	0.91	0.92	0.17	0.15	9.04	8.68	5.4	5.9	1.00	
-86	1.01	0.76	0.59	0.15	0.14	9.27	8.86	5.1	5.4	1.29	0.52