

Chemical composition of grey and black shales from SOS zone (pulp rock analyses)

Table 9

Sample	SiO ₂ %	Al ₂ O ₃ %	Fe ₂ O ₃ %	FeO %	TOC %	MnO %	MgO %	CaO %	Na ₂ O %	K ₂ O %	TiO ₂ %	P ₂ O ₅ %	S %
L-PS/89	23.65	8.90	4.06	1.48	10.90	0.122	3.45	5.70	0.14	2.84	0.402	0.14	7.03
95/PG-1/4	30.88	11.10	0.89	1.65	11.00	0.191	2.82	14.17	0.15	3.12	0.505	0.13	2.43
95/PG-2/2S	37.01	13.85	0.37	1.16	1.82	0.174	4.90	9.89	0.26	4.14	0.675	0.13	0.93
95/PG-2/2C	61.80	2.19	1.53	0.17	0.03	0.173	3.28	14.31	0.17	1.03	0.069	0.06	0.07
PR 4-2527/ 113	50.47	19.59	0.86	1.51	1.41	0.107	2.63	4.48	0.58	5.56	0.949	0.16	0.11
95/PW-1/2	26.40	10.09	0.19	0.97	7.00	0.231	4.87	8.43	0.02	2.98	0.525	0.14	3.70
PZ-ISZ/2	22.50	7.31	-0.01	1.34	0.45	0.405	10.15	23.09	0.20	2.20	0.394	0.13	0.16
PZ-ISZ/3	35.03	11.72	-0.01	1.65	0.76	0.282	7.20	15.41	0.28	3.56	0.649	0.16	0.16
PZ-17/2S	29.08	10.18	0.05	1.60	1.11	0.380	7.52	19.42	0.30	3.10	0.517	0.21	0.17
PZ-18/2S	20.27	6.70	0.69	0.71	0.38	0.368	12.16	22.14	0.34	2.07	0.342	0.13	0.16
PZ-31/3S	41.46	15.87	0.64	1.24	1.20	0.192	5.71	10.56	0.30	4.78	0.871	0.25	0.09
RG-1	29.27	10.22	0.92	1.32	9.40	0.179	7.37	13.72	0.36	2.84	0.494	0.10	1.71
RG-2	27.36	10.97	-0.01	0.98	10.70	0.066	1.94	1.87	1.24	3.24	0.519	0.14	4.04
95/S-8/2	46.63	17.05	1.03	0.97	5.90	0.117	2.34	5.81	0.73	4.90	0.726	0.12	1.03
SR-23/518/115	40.31	15.55	0.28	2.83	5.40	0.222	2.68	10.73	0.43	4.70	0.728	0.18	0.57
SZ6-1086/116	48.94	20.59	0.77	1.34	2.00	0.114	1.85	6.32	0.12	5.79	0.957	0.14	0.27
SZ12-238/115	41.56	17.87	0.35	1.14	4.20	0.223	2.62	10.70	0.17	5.19	0.764	0.12	0.31
Average	36.04	12.34	0.74	1.30	4.33	0.21	4.91	11.57	0.34	3.65	0.59	0.14	1.35
Standard deviation	11.47	4.93	0.96	0.54	4.09	0.10	3.04	6.10	0.29	1.34	0.23	0.04	1.93
Coefficient of variability [%]	31.83	39.93	129.67	41.99	94.28	47.80	61.96	52.66	85.15	36.74	39.05	29.35	143.26
Variance	131.57	24.28	0.92	0.30	16.69	0.01	9.26	37.15	0.08	1.80	0.05	0.00	3.74
Median	35.03	11.10	0.64	1.32	2.00	0.19	3.45	10.70	0.28	3.24	0.53	0.14	0.31

SOS – secondary oxidized system

Sample	Rb ppm	Sb ppm	Sc ppm	Se ppm	Ta ppm	Th ppm	U ppm	La ppm	Ce ppm	Nd ppm	Sm ppm
L-PS/89	152	7.5	9.6	47	-1	5.3	16.90	22	39	19	5.9
95/PG-1/4	158	2.3	10.0	25	-1	6.3	15.60	18	35	13	3.1
95/PG-2/2S	203	1.4	12.7	71	-1	8.9	55.50	36	68	27	8.0
95/PG-2/2C	38	1.0	3.3	3	-1	1.2	5.90	20	57	53	11.9
PR 4-2527/113	322	2.1	17.2	12	-1	14.0	28.50	40	74	38	9.3
95/PW-1/2	139	4.8	10.5	31	-1	7.4	37.50	29	54	22	5.2
PZ-ISZ/2	96	0.5	7.7	-3	-1	5.9	10.20	30	69	63	14.5
PZ-ISZ/3	185	0.9	11.1	10	1	9.1	10.50	35	75	58	12.7
PZ-17/2S	135	0.7	11.2	11	-1	7.9	16.20	37	83	63	16.2
PZ-18/2S	117	0.5	6.6	-3	-1	4.2	7.60	25	52	34	9.3
PZ-31/3S	243	1.4	15.9	6	-1	12.1	15.50	42	85	61	16.4
RG-1	179	1.8	10.0	28	-1	6.5	11.40	27	46	20	4.2
RG-2	152	1.3	11.0	32	-1	8.0	51.30	27	48	27	5.8
95/S-8/2	239	2.8	14.7	1660	-1	12.5	1630.00	88	-227	-227	33.3
SR-23/518/115	238	1.0	15.7	51	-1	10.1	16.60	38	75	45	13.4
SZ6-1086/116	332	2.1	19.8	-3	1	15.8	23.70	34	57	25	6.1
SZ12-238/115	278	10.7	18.7	38	1	12.0	114.00	41	72	31	9.6
Average	188.59	2.52	12.10	118.59	-0.65	8.66	121.58	34.55	44.82	21.88	10.88
Standard deviation	79.03	2.75	4.41	397.78	0.79	3.77	389.62	15.62	71.62	66.29	7.12
Coefficient of variability [%]	41.91	109.06	36.44	335.43	-121.46	43.49	320.46	45.20	159.78	302.93	65.46
Variance	6245.88	7.54	19.44	158228.26	0.62	14.18	151802.10	243.87	5129.15	4393.99	50.69
Median	179.00	1.40	11.10	25.00	-1.00	8.00	16.60	33.70	57.00	31.00	9.30
Maximum	332.00	10.70	19.80	1660.00	1.00	15.80	1630.00	88.20	85.00	63.00	33.30
Minimum	38.00	0.50	3.30	-3.00	-1.00	1.20	5.90	18.40	-227.00	-227.00	3.10

Sample	Au ppb	As ppm	Br ppm	Co ppm	Cr ppm	Cs ppm	Hf ppm	Ir ppm	Mo ppm
L-PS/89	-5	105	2	400	190	31.0	2.20	-5	370.00
95/PG-1/4	31	68	-1	36	160	38.3	2.10	-5	280.00
95/PG-2/2S	588	129	-1	47	270	41.8	3.20	-5	39.00
95/PG-2/2C	-5	97	-1	22	19	2.5	0.80	-5	9.00
PR 4-2527/113	1470	5	-1	9	420	100.0	5.10	-5	-5.00
95/PW-1/2	63	510	4	220	210	25.2	2.60	-5	270.00
PZ-ISZ/2	760	3	3	4	140	19.2	2.40	-5	6.00
PZ-ISZ/3	121	4	2	6	210	33.8	4.00	-5	-5.00
PZ-17/2S	1840	3	3	5	210	26.8	3.20	-5	-5.00
PZ-18/2S	435	2	19	5	120	17.5	1.90	-5	7.00
PZ-31/3S	1470	3	-1	8	290	48.3	5.20	-5	-5.00
RG-1	10	32	3	160	240	36.5	2.30	-5	210.00
RG-2	-5	9	24	130	180	59.5	2.60	-5	91.00
95/S-8/2	10600	174	-1	14	210	67.8	5.10	-227	-5.00
SR-23/518/115	1650	16	3	9	290	48.6	3.30	-5	-5.00
SZ6-1086/116	14600	15	-1	10	320	82.2	4.80	-5	-5.00
SZ12-238/115	372	220	-1	17	260	51.1	3.50	-5	-5.00
Average	1999.71	82.06	3.24	64.82	219.94	42.95	3.19	-18.06	73.06
Standard deviation	4102.14	129.34	7.19	107.34	89.30	24.40	1.28	53.84	125.43
Coefficient of variability [%]	205.14	157.62	222.23	165.60	40.60	56.82	40.18	-298.15	171.69
Variance	16827537.35	16728.81	51.69	11522.90	7975.06	595.54	1.65	2899.06	15733.06
Median	435.00	16.00	2.00	14.00	210.00	38.30	3.20	-5.00	6.00
Maximum	14600.00	510.00	24.00	400.00	420.00	100.00	5.20	-5.00	370.00
Minimum	-5.00	2.00	-1.00	4.00	19.00	2.50	0.80	-227.00	-5.00

Sample	Eu ppm	Tb ppm	Yb ppm	Lu ppm	Ba ppm	Sr ppm	Y ppm	Zr ppm	Ag ppm	Cd ppm	Cu ppm
L-PS/89	1	1.0	1.7	0.27	156	69	21	70	320	-0.3	99999
95/PG-1/4	1	-0.5	1.4	0.25	189	210	15	82	69	47.0	15349
95/PG-2/2S	1	-0.5	2.7	0.41	225	123	30	127	15	0.5	24942
95/PG-2/2C	3	1.1	1.3	0.22	498	120	37	30	0	0.6	288
PR 4-2527/113	2	1.0	2.8	0.42	309	112	35	204	0	-0.3	1191
95/PW-1/2	1	0.7	1.6	0.25	172	111	20	119	196	-0.3	99999
PZ-ISZ/2	4	1.3	2.0	0.31	131	209	54	88	0	0.9	109
PZ-ISZ/3	4	1.6	2.3	0.37	209	155	51	156	0	-0.3	96
PZ-17/2S	4	1.7	2.6	0.38	165	184	58	119	0	0.4	148
PZ-18/2S	2	1.0	1.6	0.27	121	190	35	82	0	0.6	283
PZ-31/3S	4	1.4	3.0	0.48	273	135	50	200	1	-0.3	184
RG-1	1	-0.5	1.4	0.21	193	141	19	96	103	-0.3	2673
RG-2	1	-0.5	1.3	0.20	171	101	18	99	115	0.8	99999
95/S-8/2	4	1.5	3.1	-227.00	272	95	37	156	13	-0.3	2164
SR-23/518/115	3	1.4	3.4	0.52	254	142	47	134	3	-0.3	5892
SZ6-1086/116	1	-0.5	2.5	0.38	287	111	27	180	2	-0.3	383
SZ12-238/115	2	1.0	2.5	0.38	250	170	30	131	15	0.7	4626
Average	2.33	0.72	2.19	-13.04	227.94	139.88	34.35	121.94	50.20	2.88	23638.91
Standard deviation	1.31	0.85	0.70	55.14	89.29	41.07	13.68	47.09	89.14	11.43	37581.85
Coefficient of variability [%]	56.07	118.16	31.82	-422.82	39.17	29.36	39.83	38.62	178.21	397.08	1412395727.74
Variance	1.71	0.72	0.48	3040.01	7973.43	1687.11	187.24	2217.56	7946.35	130.71	1412399836.65
Median	2.20	1.00	2.30	0.31	209.00	135.00	35.00	119.00	2.98	-0.30	4626.00
Maximum	4.40	1.70	3.40	0.52	498.00	210.00	58.00	204.00	1319.60	47.20	99999.00
Minimum	0.50	-0.50	1.30	-227.00	121.00	69.00	15.00	30.00	-0.30	-0.30	96.10

Sample	Ni ppm	Pb ppm	Zn ppm	Bi ppm
L-PS/89	343	17663	90.0	-2
95/PG-1/4	215	22901	14238.0	-2
95/PG-2/2S	91	103	115.0	-2
95/PG-2/2C	15	29	39.0	-2
PR 4-2527/113	64	50	82.0	-2
95/PW-1/2	236	14	105.0	25
PZ-ISZ/2	21	15	17.0	6
PZ-ISZ/3	44	53	36.0	6
PZ-17/2S	31	62	31.0	-2
PZ-18/2S	30	29	20.0	10
PZ-31/3S	61	56	55.0	-2
RG-1	326	912	62.0	8
RG-2	288	42	73.0	-2
95/S-8/2	107	2014	74.0	-2
SR-23/518/115	57	35	64.0	-2
SZ6-1086/116	57	57	59.0	-2
SZ12-238/115	77	87	166.0	-2
Average	121.28	2595.38	901.50	