DEEP SEA DRILLING PROJECT
MINOR AND TRACE-ELEMENT CHEMICAL ANALYSES
IGNEOUS AND METAMORPHIC ROCKS DATA FILE

I. INTRODUCTION

A. BACKGROUND

The file contains minor and trace-element analyses of igneous and metamorphic rocks and of a few sedimentary rocks composed of volcanic material. Data were encoded primarily from the "Initial Reports", although authors' manuscripts or the shipboard "Hole Summary Book" also were sources. The file contains both shipboard analyses and analyses from onshore laboratories. Shipboard analyses, using x-ray fluorescence methods, were made during DSDP Legs 37, 45, 46, 51-55, 61, 65, 68, 69, 82 and 83. The shipboard minor-element determinations were for Ni, Sr, Zr, and Cr only.

B. METHODS

Concentrations and other information about fifty-five elements are stored in a fixed-field format. The element concentrations are given in parts per million (ppm). Minor-element concentrations given in the source in oxide weight percent were converted to parts per million by the DSDP encoders for this file.

All records are in the same format. Each record is 590 characters long and represents a single chemical analysis of a sample. The analyses are not necessarily complete for each sample.

Each record includes an identifying code for the analyst's or the first author's name. See Table 1 for the index to analysts' codes. Each record has a code indicating whether the rock is igneous, sedimentary or metamorphic. Up to three analytical methods used in the determinations may be identified, e. g., x-ray fluorescence (XF), atomic absorption (AA). Lithological information about the rock sample, including the rock name and a visual estimate of the degree of alteration, is taken from the Visual Core Descriptions for Igneous Rocks forms, which are completed by the shipboard scientists soon after core recovery. The sample number assigned to the rock is included when available.

This file does not specify whether the analysis was performed onboard ship or at a shore facility. However, the sample number and the analyst's code can be used to find additional information either in the data source or the DSDP Major-Element Chemical Analyses file.

Blank fields mean not determined. 0.00 means not detected. A "-" preceding a concentration means "less than".

C. LEGS IN DATA SET

The data set contains data from Legs 12-19, 22-26, 28-30, 32-34, 36-39, 41-43, 45-46, 49, 51-55, 58-70, 72-76, 78-84, 86, 89, 91-92.

D. BIBLIOGRAPHY

References to analytical methods for shipboard analyses

Bougault, H., 1977. Major Elements: Analytical Chemistry Onboard and Preliminary Results, DSDP Leg 37. In Aumento, F., Melson, W. G. et al., Initial Reports of the Deep Sea Drilling Project, Volume 37: Washington (U.S. Government Printing Office), pp. 643-652.

Natland, J. et al., 1978. Chemical data for Sites 395 and 396: Analytical Procedures and Comparison of Interlaboratory Standards. In Melson, W. G., Rabinowitz, P. D., et al., Initial Reports of the Deep Sea Drilling Project, Volume 45: Washington (U.S. Government Printing Office), pp. 681-705.

Shipboard Scientific Party, 1978. Holes 396A and 396B. In Dmitriev, L., Heirtzler, J., et al., Initial Reports of the Deep Sea Drilling Project, Volume 46: Washington (U.S. Government Printing Office), pp. 15-85.

For analytical methods used in a shore-based study, consult the paper in the Initial Reports. The results and analytical information of shipboard analyses similarly are published in the Initial Reports. See Table 1 for the index to analysts' codes.

II. FORMAT, FIELD DESCRIPTIONS, AND CODES

A. DATA FORMAT

Record length = 590 characters

DSDP LABEL	1- 11	A11
TOP INTERVAL	12- 15	F4.1 (IMPLICIT DECIMAL)
BOTTOM INTERVAL	16- 19	F4.1 (IMPLICIT DECIMAL)
TOP OF CORE DEPTH	20- 27	F8.2
SAMPLE MIDPOINT DEPTH	28- 35	F8.2
ANALYST CODE	36- 39	A4
PIECE NUMBER	40- 43	A4
ANALYTICAL METHODS	44- 49	A6
ALTERATION	50- 50	A1
ROCK TYPE	51- 51	A1
ROCK NAME	52 -96	A45
ELEMENTS (b=BLANK,TRace)		F7.0 or bbbbbTR
LI	97-103	
BE	104-110	
B	111-117	
F	118-124	
CL	125-131	
SC	132-138	
V	139-145	
CR	146-152	
CO	153-159	
NI	160-166	
CU	167-173	
ZN	174-180	
GA	181-187	
GE	188-194	
AS	195-201	
SE	202-208	
BR	209-215	
RB	216-222	
SR	223-229	
Y	230-236	
ZR	237-243	
NB	244-250	
MO	251-257	
PD	258-264	
AG	265-271	
CD	272-278	
SN	279-285	
SB	286-292	

CS	293-299	

BA	300-306	
LA	307-313	
CE	314-320	
PR	321-327	
ND	328-334	
SM	335-341	
EU	342-348	
GD	349-355	
TB	356-362	
DY	363-369	
HO	370-376	
ER	377-383	
TM	384-390	
YB	391-397	
LU	398-404	
HF	405-411	
TA	412-418	
W	419-425	
IR	426-432	
PT	433-439	
AU	440-446	
TL	447-453	
PB	454-460	
BI	461-467	
TH	468-474	
U	475-481	
COMMENTS	482-590	A109

B. FIELD DESCRIPTIONS AND CODES

The definition of leg, site, hole, core and section may be found in the explanatory notes. In addition, the special core designations, as well as the methods of sample labeling and calculating absolute sample depths are discussed.

INTERVAL DEPTH:
Refers to the depth in centimeters within the section at which the the rock was sampled. Values are encoded with an implicit decimal point.

TOP OF CORE DEPTH:
The subbottom depth in meters to the top of the core.

SAMPLE MIDPOINT DEPTH:
The subbottom depth in meters to the level at which the core was sampled.

ANALYST CODE:

TABLE 1 - ANALYSTS'/AUTHORS' CODES

This table is common to both the major and the minor-elements files. "VOL" refers to the "Initial Reports of the Deep Sea Drilling Project".

LEG	CODE	ANALYST/AUTHOR	VOL	CHAPTERS	COMMENTS
12	AU	Aumento, F.	12	4, 6, 8, 9	
12	MURP	Murphy, J.	12	8	
13	HON	Honnorez, J.	13	26	
13	WEIB	Weibel, M.	13	28	
13	CA	Cann, J.	13	28	
14	EJ	Jarosewich, E. J.	14	23	
14	HJR	Rose, H. J., Jr.	14	23	
14	HT	Hart, S.	14	23	
15	DN	Donnelly, T.	15	30	
15	KAY	Kay, R.	15	30	

16	SCHD	Scheidegger, K.	16	22
16	YEAT	Yeats, R. S.	16	22
16	DYM	Dymond, J.	16	25
17	RHD	Rhodes, M.	17	14
17	SHIH	Shih, Chi-Yu	17	14
18	MACL	MacLeod, N. S.	18	31
19	ELMR	Elmore, P.	19	14

19	NAT	Natland, J.	55	29
19	SCHK	Schlocker, L.	55	29
19	MAYS	May, R. E.	19	14
22	CAB	Cambon, P.	22	17
22	TOM	Thompson, G.	22	19
22	BOG	Bougault, H.	22	18
23	BOTT	Botts, S.	23	16
23	COLE	Cole, D.	23	16
23	MAYS	Mays, R. E.	23	16
24	LEB	Lebedkova, A.	24	13
24	BING	Bingham, E.	24	14
25	ERLK	Erlank, A. J.	25	22
26	KEMP	Kempe, D.	26	14
26	KLEE	Kleeman, J. D.	26	14
26	FREY	Frey, F. A.	26	23
27	RB	Robinson, P. T.	27	26
28	FORD	Ford, A.	28	29, 30
29	KIR	Kirshenbaum, H.	29	37
29	SCH	Schilling, J.-G.	29	38
29	HERO	Heropoulos, C.	29	37
30	STOS	Stoeser, D.	30	8
30	BAT	Batiza, R.	61	26
31	MEIJ	Meijer, A.	31	26
32	MAR	Marshall, M.	32	31
33	FAB	Fabbi, B. P.	33	20
33	HERO	Heropoulos, C	33	20
33	SWTZ	Schwartz, L. J.	33	20
34	COR	Corliss, J.	34	18
34	TOM	Thompson, G.	34	10
34	HT	Hart, S.	34	16
34	LAB	LaBorde, R.	34	14
34	RI	Ridley, W.	34	15
34	DIN	Din, V.	34	9
34	CA	Cann, J.	34	17
34	RHD	Rhodes, M.	34	12
34	SCOT	Scott, R.	34	25
34	SEY	Seyfried, W.	34	27
35	NOR	Norberg, J.	35	15
36	TARN	Tarney, J.	36	23
37	AU	Aumento, F.	37	2, 3, 4, 5
37	GUNN	Gunn, B.	37	2, 3, 4, 5
37	BOG	Bougault, H.	37	2, 3, 4, 5
37	STG	Strong, D. F.	37	2, 3, 4, 5
37	RB	Robinson, P. T.	37	2, 5

37	LEB	Lebedkova, A.	37	2, 4
37	SHEV	Shevalevsky, I.	37	2, 4
37	SG	Sigurdsson, H.	37	2, 5
37	LAM	Lambert, R.	37	2, 3, 4, 5
37	ML	Melson, W.	37	2, 3, 4, 5
37	BAR	Baragar, W. R. A.	37	2, 5
37	TOM	Thompson, G.	37	2, 3, 4, 5
37	DT	Dmitriev, L.	37	2, 4
37	SCH	Schilling, J.-G.	37	2, 4, 5
37	WG	Wright, T.	37	2

37	SCAR	Scarfe, C. M.	37	2, 5
37	BCE	Bence, A. E.	37	2
37	FLOW	Flower, M.	37	2, 3, 4
37	SAV	Savinova, E.	37	2, 4
37	PONO	Ponomarev, A. I.	37	2
37	SCOT	Scott, R.	37	2
37	ZAK	Zakariadze, G.	37	3, 5
37	BAN	Bannich, L.	37	2, 4
37	DUR	Durasova, H.	37	2
37	POP	Popolitov, E.	37	2
37	CHE	Chernogorova, S.	37	2, 4
37	PUC	Puchelt, H.	37	2, 5
37	MUY	Muysson, J.	37	2, 3, 4
37	AN	Anoshin, G.	37	2, 4
37	CK	Crocket, J.	37	2
37	ON	O'nions, R.	37	2, 5
37	DOS	Dostal, J.	37	4
38	KH	Kharin, G.	38	10
38	ECK	Eckhardt, F.-J.	38	2-5, 8-9
38	RI	Ridley, W.	38	13
38	SCH	Schilling, J.-G.	38	14
39	KH	Kharin, J.	39	23
39	KZP	Kazpe, G.	39	18
39	BT	Bonatti, E.	39	18
39	FD	Fodor, R.	39	19
41	ER	Eremeev, V.	41	44
41	NAT	Natland, J.	41	45
42A	BARB	Barberi, F.	42A	18
42A	DIET	Dietrich, V.	42A	19
42A	KRZR	Kreuzer, H.	42A	20.1
43	HOUG	Houghton, R.	43	33
45	BOG	Bougault, H.	45	Appendix I
45	RHD	Rhodes, M.	45	Appendix I
45	ZOL	Zolotarev, B.	45	Appendix I
45	PRP	Propach, G.	45	Appendix I
45	ML	Melson, W.	45	Appendix I
45	GH	Graham, A.	45	Appendix I
45	HRN	Hoernes, S.	45	Appendix I
45	FJ	Fujii, T.	45	Appendix I
46	HON	Honnorez, J.	46	20
46	FLOW	Flower, M.	46	8

46	CAB	Cambon, P.	46	2, 13
46	DUG	Dungan, M.	46	3
46	AOKI	Aoki, K.	46	4
46	SO	Sato, H.	46	4
46	MEV	Mevel, C.	46	6
46	HOG	Hodges, F.	46	10
46	EMRN	Emmermann, R.	46	12
46	OKA	Okamoto, K.	46	4
49	VARE	Varet, J.	49	Appendix II
49	ZOL	Zolotarev, B.	49	27
49	FLOY	Floyd, P.	49	23
49	TARN	Tarney, J.	49	22
49	BOG	Bougault, H.	49	Appendices II, IV

49	WOOD	Wood, D.	49	21, II, IV
49	PRIT	Pritchard, R. G.	49	24
49	TEMP	Templeman, J. H.	49	28
51	HUM	Humphris, S.	51	47
51	QFT	Quisefit, J.	51	32
51	UI	Ui, Tadahide	51	26
51	DN	Donnelly, T.	51	54
51	RICE	Rice, S.	51	33
51	PV	Pertsev, N.	51	48
51	ARA	Arakeljanz, M.	51	40
51	FLOW	Flower, M.	51	21
51	BY	Byerly, G.	51	22
51	MEV	Mevel, C.	51	53
51	STAU	Staudigel, H.	51	24
51	EMRN	Emmermann, R.	51	25
51	BLG	Bollinger, C.	51	32
51	JOR	Joron, J. L.	51	32
51	SHIM	Shimizu, H.	51	34
52	BLG	Bollinger, C.	51	32
52	EMRN	Emmermann, R.	51	25
52	FLOW	Flower, M.	51	21
52	STAU	Staudigel, H.	51	24, 38
52	DN	Donnelly, T.	51	54
52	RICE	Rice, S.	51	33
52	BY	Byerly, G.	51	22
52	MTZ	Mathez, E.	51	31
52	MEV	Mevel, C.	51	53
52	UI	Ui, Tadahide	51	26
52	HUM	Humphris, S.	51	47
52	ARA	Arakeljanz, M.	51	40
52	THOM	Thompson, R. N.	51	23
52	JOR	Joron, J. L.	51	32
53	BY	Byerly, G.	51	22
53	FLOW	Flower, M.	51	21
53	EMRN	Emmermann, R.	51	25
53	THOM	Thompson, R. N.	51	23
53	PUC	Puchelt, H.	51	3
53	MTZ	Mathez, E.	51	31

53	STAU	Staudigel, H.	51	24
53	HUM	Humphris, S.	51	47
53	ARA	Arakeljanz, M.	51	40
53	PRIT	Pritchard, R. G.	51	27
54	SRI	Srivastava, R. K.	54	27
54	HUM	Humphris, S.	54	34
54	JOR	Joron, J. L.	54	30
54	ML	Melson, W.	54	29
54	DMI	Dmitriev, Y.	54	28
54	FD	Fodor, R.	54	31
54	SDR	Schrader, E. L.	70	23
54	SCON	Scoon, J.	54	33
54	MTY	Mattey, D.	54	33
55	CAB	Cambon, P.	55	23
55	KK	Kirkpatrick, J.	55	20
55	KLOK	Klock, P. R.	55	28

55	TAY	Taylor, S. R.	55	24
55	BCE	Bence, A. E.	55	24
55	AVD	Avdieko, G.	55	22
55	MORS	Morris, J.	55	31
55	CLAG	Clague, D.	55	25
57	FUJ	Fujioka, K.	57	42
58	TARN	Tarney, J.	58	33
58	WOOD	Wood, D.	58	35
58	NIST	Nisterenko, G.	58	32
58	DI	Dick, H.	58	34
59	TARN	Tarney, J.	59	37
59	ZAK	Zakariadze, G.	59	29
59	MRSH	Marsh, N.	59	37
59	ISH	Ishi, T.	59	31
59	ARM	Armstrong, R. L.	59	32
59	HARA	Haramura, H.	59	31
59	HAJ	Hajash, A.	59	34
59	SCOT	Scott, R.	59	30
59	SUT	Sutter, J. F.	59	33
60	TARN	Tarney, J.	60	33
60	SNR	Sharaskin, A.	60	34
60	BOG	Bougault, H.	60	35
60	HK	Hekinian, R.	60	40
60	MEIJ	Meijer, A.	60	38
60	HARA	Haramura, H.	60	39
60	ARM	Armstrong, R. L.	60	32
61	BIJN	Bijon, J.	61	2
61	BAT	Batiza, R.	61	26
61	HARA	Haramura, H.	61	25
61	SHKA	Shcheka, S. A.	61	22
61	SAUN	Saunders, A.	89	18
61	FJN	Fujii, N.	61	27
61	SEIF	Seifert, K.	61	29
62	MORG	Morgan, S.	62	49
62	SCOT	Scott, R.	62	50

63	GRCH	Grechin, V.	63	27
63	MIN	Minami, H.	63	25, 26
63	SUR	Pal Verma, S.	63	28
64	SAUN	Saunders, A.	64	12
64	SUR	Pal Verma, S.	64	15
64	FOR	Fornari, D.	64	13
64	JOR	Joron, J. L.	64	12
65	CAB	Cambon, P.	65	2, 3, 5, 29
65	SAUN	Saunders, A.	65	28
65	FLOW	Flower, M.	65	26
65	OHN	O'Hearn, T.	65	25
65	GRIF	Griffin, B. J.	65	24
65	ZOL	Zolotarev, B.	65	27
65	KUDO	Kudo, A.	65	30
66	DMI	Dmitriev, Y.	66	33
66	ARAI	Arai, S.	66	34
66	JOR	Joron, J. L.	66	36
66	HARA	Haramura, H.	66	34
66	BELL	Bellon, H.	66	35

67	BOG	Bougault, H.	67	23
67	DMI	Dmitriev, Y.	67	24
68	OHN	O'Hearn, T.	69	54
68	ETOU	Etoubleau, J.	69	50
68	RHD	Rhodes, M.	69	48
68	NAT	Natland, J.	69	54
68	NO	Noack, Y.	69	25
69	OHN	O'Hearn, T.	69	54
69	RHD	Rhodes, M.	69	48
69	HUB	Hubberten, H.-W.	69	36, 52
69	ETOU	Etoubleau, J.	69	50
69	MRSH	Marsh, N.	69	49
69	EMRN	Emmermann, R.	69	25
69	NO	Noack, Y.	69	25
69	TUAL	Tual, C.	83	7
69	BART	Barrett, T.	69	38
70	OHN	O'Hearn, T.	69	54
70	RHD	Rhodes, M.	69	48
70	HUB	Hubberten, H.-W.	69	36, 52
70	MRSH	Marsh, N.	69	49
70	CRRE	Corre', O.	69	50
70	LAV	Laverne, C.	69	26
70	LAV	Laverne, C.	70	22
70	SRN	Sharaskin, A.	69	51
70	TUAL	Tual,C.	83	7
70	SDR	Schrader, E. L.	70	23
70	EMRN	Emmermann, R.	70	24
70	BART	Barrett, T.	69	38
72	WEAV	Weaver, B.	72	14
72	TOM	Thompson, G.	72	15
73	DIET	Dietrich, V.	73	21
74	TOM	Thompson, G.	74	26

74	RICH	Richardson, S. H.	74	25
75	HUM	Humphris, S.	75	40
76	LOG	Logothetis, J.	76	34
78	MRSH	Marsh, N.	78	18
78	BOG	Bougault, H.	78	19
78	OHN	O'Hearn, T.	78	18
79	SHM	Schmincke, H.	79	19
80	MAUR	Maury, R. C.	80	42
81	JOR	Joron, J. L.	81	31
81	RICD	Richardson, C.	81	32
81	HUT	Hutchison, D.	81	29
81	DES	Desprairies, A.	81	28
81	HOLM	Holmes, K. A.	81	29
81	PARY	Parry, S.	81	29
81	EVAN	Evans, J.	81	29
82	DRA	Drake, N.	82	Appendix VI
82	WEAV	Weaver, B.	82	Appendix VI
82	BOG	Bougault, H.	82	Appendix VI
82	SHM	Schmincke, H.		Author's ms.
82	DT	Dmitriev, L.	82	Appendix VI
82	BT	Bonatti, E.	82	Appendix VI
82	PUC	Puchelt, H.	82	Appendix VI

82	JCB	Brannon, J. C.	82	Appendix VI
83	EMRN	Emmermann, R.	83	6
83	KNS	Kinoshita, H.	83	16
83	KEM	Kempton, P.	83	4
83	ALT	Alt, J. C.	83	9
83	TUAL	Tual, C.	83	7
84	HELM	Helm, R.	84	15, 16
84	BOU	Bourgois, J.	84	20
84	BELL	Bellon, H.	84	22
86	FOUN	Fountain, J. C.	86	32
89	FLOY	Floyd, P.	89	15, 16, 17
89	SAUN	Saunders, A.	89	18
89	TAK	Takigami, Y.	89	19
89	NOT	Notsu, K.	89	20
89	VIER	Viereck, L. G.	89	21
91	SAUN	Saunders, A.	91	15
92	PEA	Pearce, J. A.	92	26
92	ERZ	Erzinger, J.	92	28
92	STAU	Staudigel, H.	92	31

PIECE NUMBER:
The sample number assigned to the rock is included when available.

ANALYTICAL METHODS:

TABLE 2 - ANALYTICAL METHODS CODES

a.	Wet (classical wet chemical techniques)	WT
b.	XRF (X-Ray fluorescence)	XF
c.	Electron microprobe	PR
d.	Flame photometry	FP
e.	Energy dispersion	ED
f.	Instrumental neutron activation analyses	NA
g.	Fission track	FT
h.	Atomic absorption	AA
i.	Isotope dilution	ID
j.	Spectrometry, UV and IR (also spectrophotometry)	SP
k.	Emission spectrometry	ES
	1. Spark spectrometry	
	2. Arc spectrometry	
	3. Plasma spectrometry	
l.	CHN analyser	CH
m.	Other	OT

In the 6 columns provided there is room for 3 analytical methods codes.

ALTERATION:

TABLE 3 - ALTERATION CODES

F = Fresh
S = Slightly altered
M = Moderately altered
E = Extensively altered
T = Almost totally altered

This information is obtained from the alteration column on the Visual Core Description - Igneous Rocks form. If alteration information is not given in the alteration column, the text of the Visual Core Description is scanned for information on alteration. Frequently there is no reliable alteration information.

ROCK TYPE:

TABLE 4 - ROCK TYPE CODES

I = Igneous
S = Sedimentary
M = Metamorphic

ROCK NAME:

Lithological information about the rock sample, including the rock name and a visual estimate of the degree of alteration is taken from the Visual Core Description for Igneous Rocks forms, which are completed by the shipboard scientists soon after core recovery. The rock names are based on the mineralogy of the visible minerals in hand specimens and on texture. Occasionally the rock was described as grading from one type rock to another. In this case, the rock name is a range, for example, "aphyric to plag sparsely phyric basalt".

NGDC NOTES: (list of deviations from field descriptions)

Description of deviations	Record Number(s)
Bottom interval depth is 0, top is not	occurs throughout the file
Analyst code JOR not found in list	sporadically from record 3236-3701
Analyst code SRN not found in list	sporadically from record 5537-5832

DSDP Minor-Element Chemical Analysis 12/86