

NGU Report 99.129

Rutile deposits in Norway. Vol. 3: Appendix.

REPORT

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Report no.: 99.129		ISSN 0800-3416	Grading: Åpen	
Title: Rutile deposits in Norway. Vol. 3: Appendix.				
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County: Norway			Commune:	
Map-sheet name (M=1:250.000)			Map-sheet no. and -name (M=1:50.000)	
Deposit name and grid-reference:			Number of pages: Price (NOK): Map enclosures:	
Fieldwork carried out: 1989-94, 1999	Date of report: 14 Dec. 1999	Project no.: 284700	Person responsible: <i>Nigel A.</i>	
Summary: See the text in report 99.129 Vol. 1.				
Keywords: Mineral resources		Rutile	Eclogite	
Metamorphism		Metasomatism	Albitite	
fagrapport				

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**Compilation of
analyses from rutile
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in Norway**

Printout from the rutile database

Bamble region

Kragerø area (E Bamble region)

Farsjø

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	granitic gneiss	KB32A.91	1991	XRF	75.68	12.36	1.39	0.14	0.24	1.08	3.39	4.11	0.02	0.03	0.24	98.67	0.02
chip	basic dyke	KB32B.91	1991	XRF	46.28	14.17	14.56	2.15	7.45	8.59	2.78	1.45	0.20	0.47	0.86	98.97	0.68
chip	amphibolite	KB34.91	1991	XRF	36.80	12.13	21.35	10.69	6.06	7.75	1.80	0.69	0.17	0.22	-0.17	97.48	-0.30

Gjerstadvatnet

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	metasedim.	KB43A.91	1991	XRF	46.19	17.49	10.05	3.59	13.81	3.05	0.43	2.15	0.04	0.72	1.78	99.29	3.08
chip	metasedim.	KB43B.91	1991	XRF	51.10	15.64	7.98	2.66	13.58	1.89	0.68	2.42	0.02	0.57	2.40	98.93	2.13
chip	metasedim.	KB43C.91	1991	XRF	49.24	15.34	9.32	3.29	13.42	2.34	0.47	2.38	0.03	0.53	2.24	98.61	2.78

Haukåsen

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	pegm	KB9A.91	1991	XRF	55.19	14.49	5.19	1.03	8.68	6.14	4.87	1.05	0.04	1.16	1.49	99.33	0.71
chip	pegm	KB9B.91	1991	XRF	60.20	18.49	1.55	3.22	2.09	4.21	6.97	1.08	0.01	0.72	0.85	99.38	2.91
chip	pegm	KB9C.91	1991	XRF	55.93	16.67	0.88	12.36	1.26	2.34	5.95	1.90	0.01	0.03	1.55	98.86	12.20

Krefjell

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	metas. gab.	KB8B.91	1991	XRF	53.23	14.49	2.99	7.87	4.85	7.45	6.43	0.33	0.02	0.09	0.59	98.34	7.58
chip	granitic gneiss	KB8C.91	1991	XRF	67.01	13.70	4.55	0.70	1.13	2.43	3.57	5.06	0.08	0.30	0.29	98.82	0.06
chip	gabbro	KB8.91	1991	XRF	48.70	13.36	5.79	7.69	6.85	9.00	5.48	0.28	0.03	0.14	0.47	97.79	5.86
chip	gabbro	KB8A.91	1991	XRF	50.76	15.79	6.20	3.42	5.32	9.88	6.05	0.39	0.03	0.20	0.32	98.37	0.07

Laget

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	pegmatite	KB10C.91	1991	XRF	55.67	10.75	3.52	1.84	5.94	9.32	5.85	0.16	0.08	0.33	5.69	99.13	1.14
chip	granite	KB10A.91	1991	XRF	73.69	14.52	0.73	0.62	0.31	0.91	7.77	0.78	0.01	0.04	0.25	99.62	0.36
chip	albitite	KB10B.91	1991	XRF	75.29	12.60	0.86	0.20	0.42	0.96	5.53	2.76	0.01	0.03	0.59	99.25	0.03

Lindvikkollen

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	pegm	KB11F.91	1991	XRF	69.14	19.26	0.17	0.02	0.01	0.98	10.16	0.97	0.01	0.01	0.33	01.00	0.01
chip	albitite	KB11A.91	1991	XRF	62.99	18.82	0.24	2.98	0.08	1.08	7.13	5.26	0.01	0.16	0.39	99.12	2.88
chip	albitite	KB11B.91	1991	XRF	65.76	18.53	0.28	2.97	0.07	1.26	9.83	0.88	0.01	0.23	0.21	00.04	2.72
chip	albitite	KB11C.91	1991	XRF	63.70	18.24	0.40	4.15	0.25	1.28	9.73	0.90	0.01	0.21	0.21	99.09	3.87
chip	albitite	KB11D.91	1991	XRF	64.93	20.13	0.53	1.20	0.44	1.18	10.23	0.69	0.01	0.06	0.57	99.97	1.17
chip	albitite	KB11E.91	1991	XRF	62.78	20.03	0.90	3.22	0.81	1.15	10.18	0.24	0.01	0.15	0.48	99.96	3.17

Løfthaug

Sample type	Rock	Sample no	Year	Anal	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	MgO	CaO	Na ₂ O	K ₂ O	MnO	P ₂ O ₅	LOI	SUM	Rutile
chip	albitite	KB1.91	1991	XRF	62.36	18.14	1.26	2.63	0.17	0.98	9.64	0.27	0.01	0.12	4.69	00.28	2.57
chip	albitite	KB1A.91	1991	XRF	57.56	16.91	4.24	8.28	0.45	1.87	9.13	0.12	0.02	0.83	0.28	99.70	5.53

Niksja

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	quartzite	KB30A.91	1991	XRF	93.08	3.27	0.78	0.11	0.86	0.04	0.10	1.02	0.01	0.01	0.61	99.79	0.05
chip	metasedim.	KB30B.91	1991	XRF	72.40	13.10	3.59	0.48	1.69	0.81	1.80	3.46	0.02	0.07	1.56	98.98	0.17
chip	metasedim.	KB30C.91	1991	XRF	56.24	15.73	8.55	1.57	9.66	2.50	0.55	1.88	0.08	0.31	2.43	99.50	0.82

Ringsjø

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	pegm	KB3D.91	1991	XRF	74.75	14.97	0.20	0.02	0.10	0.91	5.76	2.88	0.01	0.01	0.42	00.02	0.01
chip	gabbro	KB3A.91	1991	XRF	45.80	15.46	14.20	2.10	6.87	8.63	3.69	0.78	0.15	0.28	0.84	98.80	1.38
chip	amphibolite	KB3B.91	1991	XRF	45.78	15.14	14.33	2.20	6.91	8.33	3.87	0.80	0.14	0.28	1.28	99.06	1.48
chip	albitite	KB2.91	1991	XRF	70.51	15.33	1.00	0.45	0.54	4.30	6.16	0.42	0.01	0.08	0.99	99.79	0.00
chip	albitite	KB3C.91	1991	XRF	70.45	14.90	1.04	0.40	0.98	4.90	5.32	0.45	0.01	0.08	1.12	99.66	-0.02

Sannidal

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	metasedim.	KB42A1.9	1991	XRF	88.96	3.27	0.36	0.34	3.01	0.22	0.10	0.38	0.01	0.05	1.22	97.86	0.25
chip	metasedim.	KB42A2.9	1991	XRF	92.11	2.90	0.28	0.26	2.15	0.23	0.10	0.16	0.01	0.04	0.59	98.80	0.22
chip	metasedim.	KB42A3.9	1991	XRF	92.56	2.65	0.21	0.23	1.85	0.21	0.10	0.11	0.01	0.04	0.65	98.59	0.21
chip	metasedim.	KB42B1.9	1991	XRF	89.39	3.02	0.71	0.25	3.12	0.06	0.10	0.78	0.01	0.02	0.99	98.36	0.13
chip	metasedim.	KB42B2.9	1991	XRF	76.28	7.59	2.52	0.58	6.65	0.15	0.15	2.42	0.01	0.04	1.79	98.18	0.24
chip	metasedim.	KB42B3.9	1991	XRF	83.84	5.72	1.17	0.32	4.40	0.09	0.10	0.95	0.01	0.04	1.69	98.20	0.17
chip	metasedim.	KB42C1.9	1991	XRF	68.08	11.06	3.12	0.65	9.49	0.77	0.48	2.86	0.01	0.18	2.18	98.88	0.11
chip	metasedim.	KB42C2.9	1991	XRF	74.32	8.85	2.01	0.60	7.18	0.97	0.54	2.21	0.01	0.12	1.38	98.18	0.13
chip	metasedim.	KB42C3.9	1991	XRF	67.72	10.89	2.63	0.63	9.87	1.09	0.51	2.94	0.01	0.19	1.87	98.36	0.08
chip	amphibolite	KB39.91	1991	XRF	46.17	14.72	11.11	1.62	10.83	8.17	2.70	2.03	0.08	0.27	1.44	99.15	0.94

Tranbæråsen

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	gabbro	KB7.91	1991	XRF	46.45	14.91	9.78	4.20	7.00	8.29	5.76	0.43	0.06	0.20	0.64	97.72	1.00

Søndeled area (SW Bamble region)

Størdalsvatnet

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	granite	KB45.91	1991	XRF	70.52	13.30	2.30	0.41	1.29	0.97	2.00	6.54	0.01	0.08	1.38	98.78	0.20

Vegårdshei area (W Bamble region)

Fone

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
chip	rutile amph.	KB5G.91	1991	XRF	53.48	5.50	4.85	4.82	10.55	14.68	3.71	0.11	0.03	0.09	0.66	98.48	4.60
chip	pegm	KB5H.91	1991	XRF	64.17	18.68	0.31	3.04	0.27	1.41	10.65	0.25	0.01	0.14	0.35	99.29	2.94
chip	metas. amph.	KB5B.91	1991	XRF	50.55	5.58	4.15	9.05	10.00	13.99	3.52	0.14	0.03	0.08	0.68	97.78	8.83
chip	granitic gneiss	KB5I.91	1991	XRF	73.68	13.62	1.94	0.24	0.43	1.42	3.64	4.66	0.04	0.06	0.28	00.01	0.00
chip	amphibolite	KB5A.91	1991	XRF	45.43	15.61	12.27	1.78	8.07	7.52	6.01	0.69	0.03	0.24	0.86	98.50	0.80
chip	albitite	KB5C.91	1991	XRF	62.96	19.92	0.45	2.32	0.32	3.06	9.33	1.05	0.01	0.04	0.92	00.38	2.14
chip	albitite	KB5D.91	1991	XRF	71.93	13.96	2.67	0.39	0.53	1.32	6.21	2.68	0.05	0.09	0.42	00.26	0.04

drill-dust	metagabbro	1402.02	1990	XRF	44.08	14.01	12.61	1.83	5.88	8.96	3.70	0.79	0.11	0.46	93.70	0.48
drill-dust	metagabbro	1402.02	1990	XRF	48.86	15.91	3.71	3.20	6.32	9.28	7.03	0.42	0.01	0.61	97.70	2.94
drill-dust	metagabbro	1402.02	1990	XRF	48.14	14.24	4.85	2.81	6.82	9.28	5.33	1.05	0.03	0.66	94.97	2.41
drill-dust	metagabbro	1402.03	1990	XRF	48.88	11.26	15.78	2.30	1.90	6.97	3.55	1.37	0.27	1.00	94.16	0.09
drill-dust	metagabbro	1402.03	1990	XRF	49.50	13.94	13.57	2.38	2.65	7.09	6.07	0.48	0.15	1.21	97.41	-0.01
drill-dust	metagabbro	1402.03	1990	XRF	51.50	13.61	9.73	2.35	3.47	8.49	6.53	0.18	0.06	1.21	97.32	0.08
drill-dust	metagabbro	1402.03	1990	XRF	47.42	13.97	6.53	2.73	7.30	8.69	5.58	0.77	0.03	0.58	95.72	1.68
drill-dust	metagabbro	1402.03	1990	XRF	48.89	11.94	13.83	2.28	2.26	9.58	3.73	1.15	0.11	1.16	95.99	0.32
drill-dust	metagabbro	1402.03	1990	XRF	49.35	10.80	15.21	2.20	1.97	6.79	3.56	1.37	0.17	0.98	93.59	-0.10
drill-dust	metagabbro	1402.03	1990	XRF	46.93	14.89	6.85	2.71	6.06	9.50	6.10	0.44	0.05	0.46	96.36	1.44
drill-dust	metagabbro	1402.03	1990	XRF	45.03	13.49	10.65	2.69	5.16	9.20	5.04	0.55	0.11	0.44	94.56	0.34
drill-dust	metagabbro	1402.03	1990	XRF	51.57	13.39	9.56	2.26	2.29	10.01	4.90	0.76	0.11	1.18	96.67	0.27
drill-dust	metagabbro	1402.03	1990	XRF	44.01	10.79	16.57	3.43	5.41	8.30	3.34	0.87	0.11	0.45	94.50	-0.04
drill-dust	metagabbro	1402.04	1990	XRF	47.24	13.62	8.31	2.75	5.90	7.76	5.34	0.46	0.06	0.56	93.38	1.23
drill-dust	metagabbro	1402.04	1990	XRF	53.27	15.33	2.90	2.05	3.97	7.25	7.85	0.76	0.02	1.14	96.07	1.63
drill-dust	metagabbro	1402.04	1990	XRF	49.48	15.90	3.53	2.32	7.08	7.89	6.46	1.13	0.02	0.52	96.28	1.93
drill-dust	metagabbro	1402.04	1990	XRF	48.24	15.23	4.66	2.42	7.21	9.31	6.42	0.50	0.02	0.51	96.76	1.89
drill-dust	metagabbro	1402.04	1990	XRF	45.93	13.75	13.17	2.61	4.79	8.18	3.76	0.94	0.15	0.66	94.90	0.07
drill-dust	metagabbro	1402.04	1990	XRF	50.21	16.50	3.12	3.06	5.98	8.97	8.09	0.38	0.02	0.61	99.58	2.72
drill-dust	metagabbro	1402.04	1990	XRF	47.32	15.00	6.16	2.80	5.69	9.07	6.59	0.47	0.05	0.41	96.01	1.64
drill-dust	metagabbro	1402.04	1990	XRF	46.23	14.39	9.31	2.48	5.69	8.87	5.58	0.62	0.05	0.43	95.88	0.68
drill-dust	metagabbro	1402.04	1990	XRF	48.06	14.34	4.18	3.28	6.86	9.40	6.06	0.66	0.02	0.57	95.53	2.83
drill-dust	metagabbro	1402.04	1990	XRF	45.16	14.11	8.89	2.42	6.67	8.52	4.04	1.41	0.06	0.41	93.20	1.37
drill-dust	metagabbro	1402.05	1990	XRF	47.19	15.09	6.26	3.02	6.27	8.94	6.55	0.47	0.03	0.45	96.56	1.83
drill-dust	metagabbro	1402.05	1990	XRF	47.42	16.20	4.05	2.54	5.84	9.80	6.62	0.46	0.01	0.55	95.90	2.16
drill-dust	metagabbro	1402.05	1990	XRF	47.17	16.27	5.40	2.51	6.18	8.57	6.45	0.61	0.02	0.55	95.99	1.54
drill-dust	metagabbro	1402.05	1990	XRF	49.43	15.75	3.53	3.05	6.56	8.94	7.35	0.42	0.01	0.58	98.12	2.68
drill-dust	metagabbro	1402.05	1990	XRF	46.20	14.91	14.61	2.82	4.07	8.24	3.51	1.35	0.19	0.48	97.04	0.03
drill-dust	metagabbro	1402.05	1990	XRF	53.75	15.88	2.70	2.79	2.98	8.62	9.10	0.31	0.01	1.00	98.62	2.55
drill-dust	metagabbro	1402.05	1990	XRF	45.75	12.82	9.31	2.74	6.68	8.88	5.07	0.72	0.08	0.43	94.61	1.13
drill-dust	metagabbro	1402.05	1990	XRF	45.61	14.00	10.05	2.61	4.96	9.12	5.26	0.45	0.12	0.35	94.96	0.33
drill-dust	metagabbro	1402.05	1990	XRF	48.45	16.25	3.04	2.79	5.55	9.41	7.20	0.34	0.01	0.53	96.07	2.46
drill-dust	metagabbro	1402.05	1990	XRF	49.16	16.96	3.19	2.99	6.15	8.53	7.53	0.48	0.02	0.40	97.84	2.49
drill-dust	metagabbro	1402.06	1990	XRF	46.10	14.47	10.09	2.82	4.85	9.36	6.05	0.43	0.06	0.46	97.16	0.83
drill-dust	metagabbro	1402.06	1990	XRF	47.24	14.95	4.92	2.97	6.49	9.38	6.41	0.46	0.03	0.54	95.78	2.22
drill-dust	metagabbro	1402.06	1990	XRF	46.37	13.23	6.89	2.36	7.97	9.68	5.54	0.39	0.03	0.34	94.77	1.53
drill-dust	metagabbro	1402.06	1990	XRF	49.13	14.93	4.41	2.60	8.17	8.68	6.24	0.50	0.02	0.42	96.54	1.92
drill-dust	metagabbro	1402.06	1990	XRF	49.00	16.40	3.47	2.95	6.36	8.99	7.49	0.45	0.01	0.54	98.21	2.58

Bergen region

Holsnøy area (N Bergen region)

Husebø

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
drill-dust	eclogite	363.001	1990	XRF	49.89	13.56	14.06	2.97	4.28	7.01	4.13	1.52	0.16	0.06		97.64	1.82
drill-dust	eclogite	363.002	1990	XRF	48.84	12.21	13.04	2.84	4.93	7.27	3.74	1.88	0.15	0.07		94.97	2.25
drill-dust	eclogite	363.003	1990	XRF	51.91	14.36	10.02	2.61	3.68	6.49	4.29	1.89	0.10	0.08		95.43	1.72
drill-dust	eclogite	363.004	1990	XRF	51.44	15.21	8.27	1.63	3.51	5.76	3.63	3.13	0.10	0.06		92.74	0.49
drill-dust	eclogite	363.005	1990	XRF	51.04	14.76	9.54	2.53	3.57	6.86	4.06	2.20	0.11	0.06		94.73	0.16
drill-dust	eclogite	363.006	1990	XRF	51.57	15.19	7.62	1.62	3.25	6.99	4.03	2.32	0.10	0.07		92.76	0.01
drill-dust	eclogite	363.007	1990	XRF	53.17	15.87	8.09	1.52	3.27	6.90	4.58	2.37	0.11	0.07		95.95	0.56
drill-dust	eclogite	363.008	1990	XRF	51.73	12.89	9.22	1.19	4.91	8.24	3.92	1.88	0.13	0.07		94.18	0.63
drill-dust	eclogite	363.009	1990	XRF	47.34	9.65	15.48	2.61	6.92	9.14	2.39	1.03	0.24	0.06		94.86	1.72
drill-dust	eclogite	363.01	1990	XRF	51.49	14.05	11.48	2.98	3.92	6.59	3.79	2.06	0.12	0.06		96.54	1.44

drill-dust	eclogite	1040.05	1995	X-M	15.27	2.16
drill-dust	eclogite	1040.06	1995	X-M	16.56	2.63
drill-dust	eclogite	1040.07	1995	X-M	19.30	3.41
drill-dust	eclogite	1040.08	1995	X-M	9.26	0.61
drill-dust	eclogite	1041.01	1995	X-M	14.50	2.45
drill-dust	eclogite	1041.02	1995	X-M	14.52	1.84
drill-dust	eclogite	1041.03	1995	X-M	12.99	1.01
drill-dust	eclogite	1041.04	1995	X-M	8.53	0.96
drill-dust	eclogite	1041.05	1995	X-M	13.53	0.56
drill-dust	eclogite	1041.06	1995	X-M	12.95	0.88
drill-dust	eclogite	1041.07	1995	X-M	12.32	0.06
drill-dust	eclogite	1042.01	1995	X-M	12.22	0.29
drill-dust	eclogite	1042.02	1995	X-M	10.09	0.27
drill-dust	eclogite	1042.03	1995	X-M	11.55	0.80
drill-dust	eclogite	1042.04	1995	X-M	12.32	1.15
drill-dust	eclogite	1042.05	1995	X-M	9.23	0.30
drill-dust	eclogite	1042.06	1995	X-M	13.52	0.64
drill-dust	eclogite	1042.07	1995	X-M	12.04	0.29
drill-dust	eclogite	1042.08	1995	X-M	11.41	0.33
drill-dust 199	eclogite	146.501	1993	X-M	20.38	3.58
drill-dust 199	eclogite	146.502	1993	X-M	19.93	3.57
drill-dust 199	eclogite	146.503	1993	X-M	14.65	2.31
drill-dust 199	eclogite	146.504	1993	X-M	10.08	0.49
drill-dust 199	eclogite	146.505	1993	X-M	19.34	4.30
drill-dust 199	eclogite	146.506	1993	X-M	19.42	3.99
drill-dust 199	eclogite	146.507	1993	X-M	8.64	0.08
drill-dust 199	eclogite	146.508	1993	X-M	14.09	0.08
drill-dust 199	eclogite	146.509	1993	X-M	11.02	0.51
drill-dust 199	eclogite	146.51	1993	X-M	7.94	0.03
drill-dust 199	eclogite	146.511	1993	X-M	17.12	3.23
drill-dust 199	eclogite	146.512	1993	X-M	21.18	3.99
drill-dust 199	eclogite	146.513	1993	X-M	12.67	0.58
drill-dust 199	eclogite	146.514	1993	X-M	27.46	4.01
drill-dust 199	eclogite	146.515	1993	X-M	23.39	3.99
drill-dust 199	eclogite	146.516	1993	X-M	9.31	0.64
drill-dust 199	eclogite	146.517	1993	X-M	18.12	3.44
drill-dust 199	eclogite	146.518	1993	X-M	12.47	1.07
drill-dust 199	eclogite	146.519	1993	X-M	11.66	0.98
drill-dust 199	eclogite	146.52	1993	X-M	14.59	1.56
drill-dust 199	eclogite	146.521	1993	X-M	16.47	2.84
drill-dust 199	eclogite	146.522	1993	X-M	17.46	2.78
drill-dust 199	eclogite	146.523	1993	X-M	15.54	2.17
drill-dust 199	eclogite	146.524	1993	X-M	16.16	2.19
drill-dust 199	eclogite	146.525	1993	X-M	15.80	2.47
drill-dust 199	eclogite	146.526	1993	X-M	15.48	2.13
drill-dust 199	eclogite	146.527	1993	X-M	14.74	3.22
drill-dust 199	eclogite	146.528	1993	X-M	13.15	1.36
drill-dust 199	eclogite	146.529	1993	X-M	9.14	1.41
drill-dust 199	eclogite	146.53	1993	X-M	11.31	0.39
drill-dust 199	eclogite	146.531	1993	X-M	9.22	0.32
drill-dust 199	eclogite	146.532	1993	X-M	11.80	0.72
drill-dust 199	eclogite	146.533	1993	X-M	12.07	0.43
drill-dust 199	eclogite	146.534	1993	X-M	18.19	4.67
drill-dust 199	eclogite	146.535	1993	X-M	11.25	0.31
drill-dust 199	eclogite	146.536	1993	X-M	18.75	2.68
drill-dust 199	eclogite	146.537	1993	X-M	11.59	0.91
drill-dust 199	eclogite	146.538	1993	X-M	17.35	1.10
drill-dust 199	eclogite	146.539	1993	X-M	17.91	2.56
drill-dust 199	eclogite	146.54	1993	X-M	10.13	1.41
drill-dust 199	eclogite	146.541	1993	X-M	18.77	3.75
drill-dust 199	eclogite	146.542	1993	X-M	15.59	3.09
drill-dust 199	eclogite	146.543	1993	X-M	15.43	2.81
drill-dust 199	eclogite	146.544	1993	X-M	10.50	0.68
drill-dust 199	eclogite	146.545	1993	X-M	16.00	2.88
drill-dust 199	eclogite	146.546	1993	X-M	12.23	1.25

drill-dust 199	eclogite	146.547	1993	X-M	15.96	1.94
drill-dust 199	eclogite	146.548	1993	X-M	16.05	2.03
drill-dust 199	eclogite	146.549	1993	X-M	11.13	1.16
drill-dust 199	eclogite	146.55	1993	X-M	9.17	0.63
drill-dust 199	eclogite	146.551	1993	X-M	13.45	0.63
drill-dust 199	eclogite	146.552	1993	X-M	13.80	1.86
drill-dust 199	eclogite	146.553	1993	X-M	12.13	0.97
drill-dust 199	eclogite	146.554	1993	X-M	20.32	2.73
drill-dust 199	eclogite	146.555	1993	X-M	19.31	3.18
drill-dust 199	eclogite	146.556	1993	X-M	19.39	3.39
drill-dust 199	eclogite	146.557	1993	X-M	17.37	4.04
drill-dust 199	eclogite	146.558	1993	X-M	20.30	4.36
drill-dust 199	eclogite	146.559	1993	X-M	6.62	0.29
drill-dust 199	eclogite	146.56	1993	X-M	15.27	0.34
drill-dust 199	eclogite	146.561	1993	X-M	12.82	1.42
drill-dust 199	eclogite	146.562	1993	X-M	17.81	1.63
drill-dust 199	eclogite	146.563	1993	X-M	11.77	1.30
drill-dust 199	eclogite	146.564	1993	X-M	11.80	1.15
drill-dust 199	eclogite	146.565	1993	X-M	17.68	2.48
drill-dust 199	eclogite	146.566	1993	X-M	8.21	0.65
drill-dust 199	eclogite	146.567	1993	X-M	12.24	0.23
drill-dust 199	eclogite	146.568	1993	X-M	14.34	0.54
drill-dust 199	eclogite	146.569	1993	X-M	16.65	2.41
drill-dust 199	eclogite	146.57	1993	X-M	18.77	3.90
drill-dust 199	eclogite	146.571	1993	X-M	19.06	2.33
drill-dust 199	eclogite	146.572	1993	X-M	15.52	5.67
drill-dust 199	eclogite	146.573	1993	X-M	9.21	1.03
drill-dust 199	eclogite	146.574	1993	X-M	11.19	1.15
drill-dust 199	eclogite	146.575	1993	X-M	9.66	0.40
drill-dust 199	eclogite	146.576	1993	X-M	8.97	0.66
drill-dust 199	eclogite	146.577	1993	X-M	19.43	2.38
drill-dust 199	eclogite	146.578	1993	X-M	10.30	0.13
drill-dust 199	eclogite	146.579	1993	X-M	19.95	3.16
drill-dust 199	eclogite	146.58	1993	X-M	5.29	0.32
drill-dust 199	eclogite	146.581	1993	X-M	18.29	3.63
drill-dust 199	eclogite	146.582	1993	X-M	18.16	4.06
drill-dust 199	eclogite	146.583	1993	X-M	8.26	0.13
drill-dust 199	eclogite	146.584	1993	X-M	15.33	18.78
drill-dust 199	eclogite	146.585	1993	X-M	18.41	3.78
drill-dust 199	eclogite	146.586	1993	X-M	10.39	0.33
drill-dust 199	eclogite	146.587	1993	X-M	14.68	2.38
drill-dust 199	eclogite	146.588	1993	X-M	18.37	3.49
drill-dust 199	eclogite	146.589	1993	X-M	8.24	0.18
drill-dust 199	eclogite	146.59	1993	X-M	21.65	5.37
drill-dust 199	eclogite	146.591	1993	X-M	20.12	4.16
drill-dust 199	eclogite	146.592	1993	X-M	23.96	4.38
drill-dust 199	eclogite	146.593	1993	X-M	20.18	3.59
drill-dust 199	eclogite	146.594	1993	X-M	16.92	3.56
drill-dust 199	eclogite	146.595	1993	X-M	19.69	3.64
drill-dust 199	eclogite	146.596	1993	X-M	6.30	0.11
drill-dust 199	eclogite	146.597	1993	X-M	19.91	3.14
drill-dust 199	eclogite	146.598	1993	X-M	18.63	6.62
drill-dust 199	eclogite	146.599	1993	X-M	11.12	0.23
drill-dust 199	eclogite	146.6	1993	X-M	19.00	6.88
drill-dust 199	eclogite	146.601	1993	X-M	21.71	5.86
drill-dust 199	eclogite	146.602	1993	X-M	16.26	1.60
drill-dust 199	eclogite	146.603	1993	X-M	16.48	2.00
drill-dust 199	eclogite	146.604	1993	X-M	11.97	0.34
drill-dust 199	eclogite	146.605	1993	X-M	20.43	3.20
drill-dust 199	eclogite	146.606	1993	X-M	16.62	3.54
drill-dust 199	eclogite	146.607	1993	X-M	14.79	2.89
drill-dust 199	eclogite	146.608	1993	X-M	12.92	4.13
drill-dust 199	eclogite	146.609	1993	X-M	20.80	6.21
drill-dust 199	eclogite	146.61	1993	X-M	18.73	3.41
drill-dust 199	eclogite	146.611	1993	X-M	19.22	4.16

drill-dust	eclogite	1046.24	1995	X-M	19.45	5.47
drill-dust	eclogite	1046.25	1995	X-M	18.94	3.55
drill-dust	eclogite	1046.26	1995	X-M	7.65	0.81
drill-dust	eclogite	1046.27	1995	X-M	10.91	1.12
drill-dust	eclogite	1046.28	1995	X-M	15.86	2.69
drill-dust	eclogite	1046.29	1995	X-M	18.73	3.01
drill-dust	eclogite	1046.3	1995	X-M	16.16	2.72
drill-dust	eclogite	1046.31	1995	X-M	17.17	3.11
drill-dust	eclogite	1046.32	1995	X-M	18.34	3.30
drill-dust	eclogite	1046.33	1995	X-M	14.55	1.56
drill-dust	eclogite	1046.34	1995	X-M	13.65	1.99
drill-dust	eclogite	1046.35	1995	X-M	19.45	3.14
drill-dust	eclogite	1046.36	1995	X-M	6.85	1.61
drill-dust	eclogite	1046.37	1995	X-M	21.82	3.84
drill-dust	eclogite	1046.38	1995	X-M	17.31	2.64
drill-dust	eclogite	1046.39	1995	X-M	11.27	1.21
drill-dust	eclogite	1046.4	1995	X-M	8.81	1.07
drill-dust	eclogite	1046.41	1995	X-M	10.72	1.22
drill-dust	eclogite	1046.42	1995	X-M	12.54	1.54
drill-dust	eclogite	1046.43	1995	X-M	14.97	2.06
drill-dust	eclogite	1046.44	1995	X-M	14.81	2.20
drill-dust	eclogite	1046.45	1995	X-M	13.61	2.06
drill-dust	eclogite	1046.46	1995	X-M	19.59	3.40
drill-dust	eclogite	1046.47	1995	X-M	13.85	1.93
drill-dust	eclogite	1046.48	1995	X-M	10.21	1.08
drill-dust	eclogite	1046.49	1995	X-M	0.00	0.00
drill-dust	eclogite	1046.5	1995	X-M	8.31	0.50
drill-dust	eclogite	1046.51	1995	X-M	7.74	0.39
drill-dust	eclogite	1046.52	1995	X-M	7.02	0.46
drill-dust	eclogite	1046.53	1995	X-M	16.23	2.71
drill-dust	eclogite	1046.54	1995	X-M	9.65	0.54
drill-dust	eclogite	1046.55	1995	X-M	8.18	0.62
drill-dust	eclogite	1046.56	1995	X-M	8.12	0.59
drill-dust	eclogite	1046.57	1995	X-M	10.66	1.07
drill-dust	eclogite	1046.58	1995	X-M	3.83	0.36
drill-dust	eclogite	1046.59	1995	X-M	7.92	0.73
drill-dust	eclogite	1046.6	1995	X-M	18.06	3.77
drill-dust	eclogite	1047.01	1995	X-M	8.88	0.61
drill-dust	eclogite	1047.02	1995	X-M	5.78	0.45
drill-dust	eclogite	1047.03	1995	X-M	0.00	0.00
drill-dust	eclogite	1047.04	1995	X-M	11.76	1.24
drill-dust	eclogite	1047.05	1995	X-M	10.82	0.99
drill-dust	eclogite	1047.06	1995	X-M	9.05	0.74
drill-dust	eclogite	1047.07	1995	X-M	11.55	0.84
drill-dust	eclogite	1047.08	1995	X-M	8.00	0.49
drill-dust	eclogite	1047.09	1995	X-M	14.98	2.46
drill-dust	eclogite	1047.1	1995	X-M	5.71	1.26
drill-dust	eclogite	1047.11	1995	X-M	9.72	0.65
drill-dust	eclogite	1047.12	1995	X-M	8.66	0.64
drill-dust	eclogite	1047.13	1995	X-M	13.70	1.92
drill-dust	eclogite	1047.14	1995	X-M	15.65	2.19
drill-dust	eclogite	1047.15	1995	X-M	16.33	2.68
drill-dust	eclogite	1047.16	1995	X-M	17.96	2.84
drill-dust	eclogite	1047.17	1995	X-M	11.94	1.41
drill-dust	eclogite	1047.18	1995	X-M	8.25	0.99
drill-dust	eclogite	1047.19	1995	X-M	20.35	3.58
drill-dust	eclogite	1047.2	1995	X-M	9.35	1.31
drill-dust	eclogite	1047.21	1995	X-M	14.52	2.14
drill-dust	eclogite	1047.22	1995	X-M	8.83	1.05
drill-dust	eclogite	1047.23	1995	X-M	15.46	2.41
drill-dust	eclogite	1047.24	1995	X-M	18.94	3.34
drill-dust	eclogite	1047.25	1995	X-M	14.82	1.73
drill-dust	eclogite	1047.26	1995	X-M	16.59	2.91
drill-dust	eclogite	1047.27	1995	X-M	16.23	2.89
drill-dust	eclogite	1047.28	1995	X-M	12.65	0.82

drill-dust 199	eclogite	262.42	1994	XRF	45.37	10.65	16.99	4.07	5.06	9.77	2.80	0.38	0.18	0.11	95.35	2.52
drill-dust 199	eclogite	262.43	1994	XRF	50.22	13.05	10.62	1.04	5.13	7.68	3.50	1.09	0.14	0.17	92.63	0.90
drill-dust 199	eclogite	262.44	1994	XRF	44.00	8.60	19.24	4.48	5.09	10.16	1.99	0.21	0.20	0.15	94.09	4.27
drill-dust 199	eclogite	262.45	1994	XRF	54.99	11.96	11.01	1.54	2.04	6.70	3.48	0.86	0.14	0.59	93.28	0.74
drill-dust 199	eclogite	262.46	1994	XRF	44.01	7.89	18.32	4.78	4.56	10.66	1.28	0.47	0.20	0.16	92.31	4.58
drill-dust 199	eclogite	262.47	1994	XRF	45.51	8.99	18.04	4.74	4.37	9.80	2.60	0.05	0.19	0.19	94.46	4.58
drill-dust 199	eclogite	262.48	1994	XRF	44.92	9.50	17.94	4.39	4.41	10.27	2.46	0.29	0.20	0.20	94.56	4.06
drill-dust 199	eclogite	262.49	1994	XRF	45.04	7.31	17.43	3.57	3.88	10.28	2.34	0.52	0.21	2.31	92.86	3.25
drill-dust 199	eclogite	262.5	1994	XRF	48.66	8.83	18.25	3.96	4.01	8.30	2.16	0.33	0.21	0.34	95.03	3.58
drill-dust 199	eclogite	262.51	1994	XRF	46.16	9.14	16.94	3.71	3.67	9.49	2.26	0.62	0.19	0.28	92.44	3.55

Southern Førdefjord region

Fureviknipa

Sample type	Rock	Sample no	Year	Anal	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	LOI	SUM	Rutile
drill-dust	eclogite	1044.01	1995	X-M			11.14	0.88									
drill-dust	eclogite	1044.02	1995	X-M			10.77	0.89									
drill-dust	eclogite	1044.03	1995	X-M			8.91	0.65									
drill-dust	eclogite	1044.04	1995	X-M			12.87	2.27									
drill-dust	eclogite	1044.05	1995	X-M			12.25	1.87									
drill-dust	eclogite	1044.06	1995	X-M			12.35	1.45									
drill-dust	eclogite	1044.07	1995	X-M			12.79	1.45									
drill-dust	eclogite	1044.08	1995	X-M			11.92	1.45									
drill-dust	eclogite	1044.09	1995	X-M			16.58	1.60									
drill-dust	eclogite	1044.1	1995	X-M			12.32	1.30									
drill-dust	eclogite	1044.11	1995	X-M			9.37	0.74									
drill-dust	eclogite	1044.12	1995	X-M			14.74	2.05									
drill-dust	eclogite	1044.13	1995	X-M			15.79	1.71									
drill-dust	eclogite	1044.14	1995	X-M			15.74	1.64									
drill-dust	eclogite	1044.15	1995	X-M			16.07	1.48									
drill-dust	eclogite	1044.16	1995	X-M			17.17	1.79									
drill-dust	eclogite	1044.17	1995	X-M			15.23	1.80									
drill-dust	eclogite	1044.18	1995	X-M			18.53	2.11									
drill-dust	eclogite	1044.19	1995	X-M			17.30	2.08									
drill-dust	eclogite	1044.2	1995	X-M			13.63	1.93									
drill-dust	eclogite	1044.21	1995	X-M			15.11	2.23									
drill-dust	eclogite	1044.22	1995	X-M			15.48	1.23									
drill-dust	eclogite	1044.23	1995	X-M			7.17	0.61									
drill-dust	eclogite	1044.24	1995	X-M			8.68	0.51									
drill-dust	eclogite	1044.25	1995	X-M			24.18	4.13									
drill-dust	eclogite	1044.26	1995	X-M			22.96	2.63									
drill-dust	eclogite	1044.27	1995	X-M			21.86	2.83									
drill-dust	eclogite	1044.28	1995	X-M			20.23	2.46									
drill-dust	eclogite	1044.29	1995	X-M			23.67	4.34									
drill-dust	eclogite	1044.3	1995	X-M			20.74	2.81									
drill-dust	eclogite	1044.31	1995	X-M			18.93	2.81									
drill-dust	eclogite	1044.32	1995	X-M			24.44	4.71									
drill-dust	eclogite	1044.33	1995	X-M			23.45	4.94									
drill-dust	eclogite	1044.34	1995	X-M			22.41	3.64									
drill-dust	eclogite	1044.35	1995	X-M			21.01	3.37									
drill-dust	eclogite	1044.36	1995	X-M			20.31	2.67									
drill-dust	eclogite	1044.37	1995	X-M			19.70	2.67									
drill-dust 199	eclogite	504.001	1994	XRF	42.06	10.04	21.74	2.81	4.79	10.46	3.10	0.03	0.28	2.12	97.40	2.30	
drill-dust 199	eclogite	504.002	1994	XRF	32.40	5.83	24.02	4.60	5.64	13.32	2.08	0.07	0.30	4.27	92.51	0.59	
drill-dust 199	eclogite	504.003	1994	XRF	40.36	9.92	25.32	4.57	5.48	9.38	2.34	0.05	0.26	0.22	97.87	4.26	
drill-dust 199	eclogite	504.004	1994	XRF	34.54	4.72	34.08	4.84	9.11	7.50	0.32	0.01	0.35	2.32	97.79	-0.40	
drill-dust 199	eclogite	504.005	1994	XRF	43.34	12.40	21.84	2.51	5.81	8.64	3.29	0.14	0.24	0.77	98.97	2.20	
drill-dust 199	eclogite	504.006	1994	XRF	42.84	11.93	21.96	2.39	4.41	10.10	3.12	0.14	0.30	0.68	97.85	2.17	
drill-dust 199	eclogite	504.007	1994	XRF	42.11	9.99	21.91	3.27	5.41	10.61	3.12	0.04	0.28	2.38	99.09	1.79	
drill-dust 199	eclogite	504.008	1994	XRF	40.58	8.73	25.54	3.98	5.27	10.38	2.14	0.07	0.28	0.72	97.66	3.43	

Appendix 3:

**Rutile
PROVINCES
and LOCALITIES
in Norway**

Report generated from the PC-database "Rutile-99.mdb"
giving an overview of rutile localities vs. Area and

Bamble region

The Bamble-region (Fig. 17 in the 1999 rutile report; also "The Bamble-Arendal region" or "The Bamble Sector") of the Baltic Shield is a geologic province that is anomalously rich in mineral deposits of various types, and one where mining has traditionally been an important industry. The region's anomalous character with respect to mineral deposits may reflect unique, but poorly understood, circumstances in its geologic evolution.

The oldest rocks known in the region are supracrustals which are intruded by several generations of basic and acidic intrusions. De Haas (1992) reports Sm-Nd ages of 1770 and 1640 Ma for two gabbroic intrusions in the Arendal area. This early period, The Gotian Orogen, in the region's geologic evolution lasted for approximately 250 m. y. (1500-1750 Ma; see references in de Haas, 1992 and Starmer, 1991). The maximum metamorphism in this period was 700-800°C and 6-8 kb (granulite facies; see Touret, 1971 and Lamb et al., 1986).

The region then experienced a fairly quiet geologic period until The Sveconorwegian Orogen (990-1250 Ma), which was characterized by significant basic magmatic activity followed by a period of granulite facies metamorphism. In certain parts of the region, for example at Ødegården, significant hydrothermal activity caused extensive metasomatic alteration of the basic rocks. This geologic period was terminated by the intrusion of large, post-tectonic granites (990 Ma; Kullerud and Machado, 1991). According to Starmer (1991) the basic magmatism was associated with an anorogenic early phase in the Sveconorwegian orogeny, and was associated with extensional tectonics followed by an orogenic phase with nappe tectonics. De Haas (1992) also supports an extensional model; according to de Haas the mantle from which the Sveconorwegian gabbros were derived, domed up under a relatively thin crust. This mantle doming led to high temperature/-pressure-gradients and granulite facies metamorphism in the overlying crust.

Smalley and Field (1991) have another opinion: based on trace element characteristics for the Sveconorwegian gabbros they claim that the gabbros formed at an active continental margin.

Regardless of which of these two models are preferred, the significant hydrothermal activity that was active in the region altered the basic intrusions that are believed to have formed during the first part of the orogen, and must, therefore, be younger than the intrusions. The hydrothermal activity is most likely related to the last part of the orogenic activity.

Post-Sveconorwegian magmatism in the form of scattered carbonatitic dykes and alkaline basic dykes is associated with the Fen carbonatite complex (600 Ma.) and the Permian magmatism in the Oslo Graben (270 Ma).

Of the rutile-bearing rock-types, coordierite-bearing metasediments and scapolitized gabbros occur in large volumes and may have an economic potential with respect to rutile. No significant investigation has been done on the rutile-bearing metasediments, while NGU (1990-91) investigated the scapolitized gabbros at Ødegård (Fig. 19) for rutile, including core-drilled two holes. The Ødegården deposit covers an area of more than 100,000 m² with the rutile contents varying between 1% and 4%. The deposit is heavily covered by vegetation. See Korneliussen and Furuhaug (1993) for additional information.

The two drill-cores from the Ødegård deposit have been studied in order to investigate the details of the gabbro to scapolitized gabbro transition. Major / and trace element analyses from this study are given in Appendix 2 while Table 1 gives a compilation of average analytical values for the various rock/varieties that were distinguished in these cores. Based on these data the chemical variations with increasing metasomatism can be demonstrated. The variations in Fe₂O₃, TiO₂ and rutile contents with increasing metasomatism (scapolitisation) are shown in Fig. 20 (1). During the transformation of gabbro to the scapolite-hornblende rock (ødegårdite), the hydrothermal fluids involved leaches a series of elements from the gabbro, to be carried away in the hydrothermal system. The major silicate minerals in the remaining rock is scapolite (after plagioclase) and a hornblende with low iron content (after the mafic silicates in the gabbro/amphibolite). The rutile is formed from the titanium remaining when iron from ilmenite is carried away by the fluids.

The drawing in Fig. 20 (2) is a generalized cross-section of the crust illustrating the formation of rutile-bearing rocks at a deep level in the Earth's crust by metasomatic processes leaching elements such as Fe, Cu and Cu, leaving titanium as rutile. The leached elements are transported to higher levels in the crust, presumably along major shear-zones, to be concentrated into various types of hydrothermal ore deposits due to changes in the physical and chemical environment.

The bar-graphs (3), (4) and (5) in Fig. 20 illustrates the related variations in major- and trace elements in the main rock-types metagabbro, scapolitized gabbro (ødegårdite) and phlogopite-enstatite-apatite veins/dykes. In the scapolitization process elements such as Fe, Mn, Zn, Cu, Co, Zr, Sr, Ba and Eu are significantly depleted by the scapolitization process, while Mg, Na, K, V, Cr, Ni, U and Rb are enriched. The phlogopite-enstatite-apatite veins or dykes that intruded the scapolitized gabbroic rock along numerous fracture zones, are particularly enriched in Mg, K, P, V, Ni, As, Y, Th, Rb, La, Ce, Nd, Sm, Tb, Yb and Lu.

Kragerø area (E Bamble region)

"name xxx"

albitite

Field Photograph 1:

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1991

North coord:

Category: 3

Field Photograph 2:

Other locality information:

Confid.: open

Field Photograph 3:

Farsjø

syenite

Map (1:50000): 1712.4

East coord: 519019

North coord: 6534093

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Farsjø 2**

metasediment

Map (1:50000): 1712.4

East coord: 519219

North coord: 6533593

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Farsjø 3**

amphibolite

Map (1:50000):

East coord: 519919

North coord: 6533493

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gjerstadvatnet**

gneiss

Map (1:50000): 1612.1

East coord: 503419

North coord: 6524193

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

Phlogopite-coordierite bearing gneiss with some rutile

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Grøtvatnet**

granite/syenite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Haukåsen

pegmatite

Map (1:50000): 1612.2

East coord: 493919

North coord: 6504993

Other locality information:

Rutile and apatite in pegmatite.

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovdefjell**

quartzite

Map (1:50000): 1612.3

East coord: 482119

North coord: 6505993

Other locality information:

Quartz-rich metasediment

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***IS-3**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work:

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Krefjell**

metagabbro

Map (1:50000): 1612.2

East coord: 495419

North coord: 6507993

Other locality information:

Some rutile in light patches (scaplotitized ?) in the metagabbro

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Laget**

amphibolite

Map (1:50000): 1612.2

East coord: 504319

North coord: 6504393

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Lindvikkollen

albitite

Map (1:50000):

East coord: 521319

North coord: 6525193

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Lofthus**

albitite

Map (1:50000): 1712.4

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Løfthaug**

albitite

Map (1:50000): 1712.4

East coord: 516319

North coord: 6527593

Other locality information:

Rutile-bearing albitite

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Masterød**

metagabbro

Map (1:50000): 1712.4

East coord: 521419

North coord: 6534193

Other locality information:

Altered metagabbro

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Niksja**

quartzite

Map (1:50000): 1612.3

East coord: 488119

North coord: 6500193

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Ringsjø

albitite

Map (1:50000): UTM-zone: 32
 East coord: 530919 Field-work: 1991
 North coord: 6535293 Category: 3
 Other locality information: Confid.: open
 Albitite practically without rutile.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ringsjø 2**

albitite

Map (1:50000): UTM-zone: 32
 East coord: 530519 Field-work: 1991
 North coord: 6534993 Category: 3
 Other locality information: Confid.: open
 metagabbro/amphibolite with albitization

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ringsjø 3**

amphibolite

Map (1:50000): UTM-zone: 32
 East coord: 530619 Field-work: 1991
 North coord: 6535393 Category: 3
 Other locality information: Confid.: open
 Amphibolite with albitite bands

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sannidal**

quartzite

Map (1:50000): 1612.1 UTM-zone: 32
 East coord: 512519 Field-work: 1991
 North coord: 6526993 Category: 3
 Other locality information: Confid.: open
 Quartzite with phlogopite, coordierite and some rutile.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Tranbæråsen**

metagabbro

Map (1:50000): UTM-zone: 32
 East coord: 498819 Field-work: 1991
 North coord: 6513793 Category: 3
 Other locality information: Confid.: open
 Some rutile associated with small pegmatite (albititic) veins.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Tyvann

amphibolite

Map (1:50000): 1712.4

East coord: 518519

North coord: 6530993

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Åbu**

gneiss

Map (1:50000): 1612.1

East coord: 504719

North coord: 6521193

Other locality information:

Variable garnet-bearing gneiss, phlogopite-bearing

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Risør area (SW Bamble region)**

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone:

Field-work:

Category:

Confid.:

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Søndeled area (SW Bamble region)****Indre Søndeled**

garnet-amphibolite

Map (1:50000): 1612.1

East coord: 504919

North coord: 6514693

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

IS-1

mangerite (?)

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***IS-2**

granite

Map (1:50000):

East coord:

North coord:

Other locality information:

Grimstad-granite

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stordalsvatnet**

granite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vegårshei area (W Bamble region)****Fone**

amphibolite

Map (1:50000): 1612.1

East coord: 504119

North coord: 6522693

Other locality information:

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Gruvetjønn

amphibolite
Map (1:50000): 1612.1 UTM-zone: 32
East coord: 497719 Field-work: 1991
North coord: 6514593 Category: 3
Other locality information: Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ødegård area (E. Bamble region)**Loc KB53.91**

(unreg)
Map (1:50000): UTM-zone: 32
East coord: Field-work: 1991
North coord: Category:
Other locality information: Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ødegården 1a

metagabbro
Map (1:50000): 1712.4 UTM-zone: 32
East coord: 531919 Field-work: 1995
North coord: 6535793 Category:
Other locality information: Confid.: open
Steinbrudd, fortsettelse av lok. 1400.52. Alle måleområdene her kan representeres ved prøve 1400.525.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ødegården 1b

metagabbro
Map (1:50000): UTM-zone: 32
East coord: 531719 Field-work: 1991
North coord: 6535493 Category: 1
Other locality information: Confid.: open
Scaplotized metagabbro (ødegårdite)

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ødegården 1c

ødegårdite

Map (1:50000): 1712.4

East coord: 532019

North coord: 6535793

Other locality information:

UTM-zone: 32

Field-work: 1991

Category:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ødegården 2**

K-fsp. Pegmatite

Map (1:50000): 1712.4

East coord: 531119

North coord: 6534693

Other locality information:

Pegmatite in the ødegårdite zone

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ødegården 3**

Phlogopite-bearing rock

Map (1:50000): 1712.4

East coord: 531119

North coord: 6534693

Other locality information:

Sillimanite-phlogopite-quartz rock (from Brickwoods map)

UTM-zone: 32

Field-work: 1991

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ødegården 4**

gneiss

Map (1:50000): 1712.4

East coord: 531919

North coord: 6532793

Other locality information:

Sillimanite-bearing gneiss

UTM-zone: 32

Field-work: 1991

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Øydegårdsvatnet**

metagabbro

Map (1:50000): 1712.4

East coord: 532919

North coord: 6536693

Other locality information:

Metagabbro with scattered albitisation

UTM-zone: 32

Field-work:

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Bergen region

Ti-rich rocks associated with a large Proterozoic anorthosite complex (c. 1000 m.y.) in the Bergen region of W. Norway (Fig. 5 in the 1999 rutile report) have, in the northern parts of Holsnøy (Fig. 6), been metamorphosed to eclogites along Caledonian (c. 400 Ma) shear zones. Anorthositic rocks are dominant in the region. They vary from pure anorthosite through gabbroic anorthosite to leucogabbro. These rocks are normally very low in titanium, but may occasionally contain minor Ti-enriched layers or segregations and Ti-enriched dykes of garnet-pyroxenitic composition. Dykes and larger bodies of jotunite rocks frequently intrude the anorthosite. The jotunite rocks contain large amounts of low-grade ilmenite mineralization/dissemination. Other rocks in the area are gabbros, spinel-lherzolites, mangerites, garnet-pyroxenites and banded granulites. These rocks have crystallized at approximately 1000 Ma in the following order: anorthosite, gabbro, Ti-rich garnet-pyroxenite, jotunite, Fe-Ti-P-rich garnet-pyroxenite, and mangerite (Austrheim, 1990). They were metamorphosed under granulite facies conditions during or shortly after the time of crystallization and experienced high-pressure Caledonian metamorphism (c. 400 Ma) with eclogitization in shear zones (see Austrheim & Griffin, 1985; Austrheim, 1987 and 1990; Austrheim & Mørk, 1988; Jamtveit et al., 1990).

One fairly large deposit occurs at Husebø within eclogitized jotunite, covering an area of about 100.000 m². The average TiO₂-content based on surface samples is 3.6% TiO₂, but higher contents do occur within parts of the deposit. Approximately 60% of the titanium is in the form of rutile and 40% in ilmenite. Other mineralizations at Holsnøy may have higher rutile-contents than Husebø, but are too small to have economic interest. Holsnøy rutile mineralizations are the most coarse-grained of the rutile/eclogite deposits known in Norway, but tend to be intergrown with ilmenite. Ilmenite from Husebø and other deposits at Holsnøy have a low MgO-content (< 1% MgO). The region is close to Bergen and is fairly densely populated. The environmental conflict in case of mining is expected to be large.

The main focus on NGUs investigations in this area (1989-90) was the Husebø deposit, while other eclogites at Holsnøy and in neighbouring areas were only roughly investigated. Consequently, significant deposits, particularly in areas with much overburden, might not have been found. The rutile ore potential of this area has not been sufficiently investigated. In case of continued investigations a combination of gravity profiles and geological follow-up should be done.

Holsnøy area (N Bergen region)

Alverstraumen 2

Fe-Ti ore

Field Photograph 1:

Map (1:50000): 92700

UTM-zone: 32

East coord:

Field-work: 1990

North coord:

Category: 3

Field Photograph 2:

Other locality information:

Confid.: open

Massive ilmenite ore (insignificant).

Field Photograph 3:

Alverstrømmen

Fe-Ti ore

Field Photograph 1:

Map (1:50000): 1116.2

UTM-zone: 32

East coord: 292419

Field-work: 1989

North coord: 6722493

Category: 3

Field Photograph 2:

Other locality information:

Confid.: open

Massive Fe-Ti ore

Field Photograph 3:

Askeland

Fe-Ti ore

Map (1:50000): 1116.2

UTM-zone: 32

East coord: 288619

Field-work: 1989

North coord: 6729293

Category: 3

Other locality information:

Confid.: open

Irregular, mainly disseminated Fe-Ti ore in a partly garnet-bearing, heterogeneous mafic rock.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Buldevika 4**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 279800

Field-work:

North coord: 6724400

Category: 3

Other locality information:

Confid.: open

Irregular Fe-Ti oxide ineralization in garnet-amphibolite / eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Buldrevika**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 280100

Field-work: 1989

North coord: 6724200

Category: 3

Other locality information:

Confid.: open

Small exposure of Ti-rich eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Buldrevika 2**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 279900

Field-work: 1989

North coord: 6724300

Category: 3

Other locality information:

Confid.: open

0.5m thick zone (layer or dyke) of Ti-rich eclogite in eclogite-anorthosite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Buldrevika 3**

eclogite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1989

North coord:

Category: 3

Other locality information:

Confid.: open

Garnet-rich mafic rock (not eclogite) with a distinct but irregular content of Fe-Ti oxides.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Havrevåg

eclogite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work: 1989
 North coord: Category: 3
 Other locality information: Confid.: open
 100m wide zone with ilmenite-bearing, retrograded (?)
 eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Havrevåg 2**

eclogite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Husebø**

eclogite
 Map (1:50000): 1116.3 UTM-zone: 32
 East coord: 280500 Field-work: 1990
 North coord: 6725200 Category: 2
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kviste 1**

anorthosite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work: 1990
 North coord: Category: 4
 Other locality information: Confid.: open
 Garnet-rich metaanorthosite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kviste 2**

garnet-amphibolite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Kviste 3

garnet-amphibolite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1990

North coord:

Category: 4

Other locality information:

Confid.: open

Heterogeneous mineralization of Fe-Ti oxides in garnet-rich rocks.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kviste 4**

garnet-amphibolite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1990

North coord:

Category: 4

Other locality information:

Confid.: open

garnet-rich rocks, partly eclogitic, with some Fe-Ti oxides.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kårbo**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 282419

Field-work: 1989

North coord: 6725193

Category: 3

Other locality information:

Confid.: open

Eclogitized Ti-rich mafic rocks (roadcut)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K3.89**

eclogite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1989

North coord:

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K5.89**

eclogite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1989

North coord:

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Lyseknappen

Fe-Ti ore

Map (1:50000): UTM-zone: 32

East coord: 289719 Field-work: 1989

North coord: 6728293 Category: 3

Other locality information: Confid.: open

Fe-Ti oxides in fairly leucocratic mangerite. Irregular layers and disseminations over several tens of meters. Good exposures at the shore.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Lyseknappen 2**

Fe-Ti ore

Map (1:50000): UTM-zone: 32

East coord: 289669 Field-work: 1990

North coord: 6728393 Category: 3

Other locality information: Confid.: open

massive ilmenite ore in a 0.5m thick zone in ajotunitic rock.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Odland**

eclogite

Map (1:50000): 1116.2 UTM-zone: 32

East coord: 287219 Field-work: 1989

North coord: 6723593 Category: 3

Other locality information: Confid.: open

Eclogitized anorthosite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Odland 2**

eclogite

Map (1:50000): 1116.2 UTM-zone: 32

East coord: 287319 Field-work: 1989

North coord: 6723693 Category: 3

Other locality information: Confid.: open

Thin layers of garnet-rich eclogite with some rutile within eclogite-anorthosite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Odland 3**

eclogite

Map (1:50000): 1116.2 UTM-zone: 32

East coord: 287119 Field-work: 1989

North coord: 6723793 Category: 3

Other locality information: Confid.: open

Approx 10m thick zone of garnet-rich eclogite (distinct rutil content) within eclogite-anorthosite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Rimmo

Fe-Ti ore

Map (1:50000): 1116.2 UTM-zone: 32
 East coord: 292319 Field-work: 1989
 North coord: 6722993 Category: 3
 Other locality information: Confid.: open
 Massive Fe-Ti ore

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sætrevik Ø**

eclogite

Map (1:50000): 1116.3 UTM-zone: 32
 East coord: 281119 Field-work: 1989
 North coord: 6724193 Category: 3
 Other locality information: Confid.: open
 Ti-rich layers in eclogite-anorthosite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ådnefjell**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: 284900 Field-work: 1989
 North coord: 6724000 Category: 3
 Other locality information: Confid.: open
 fairly rutile-rich eclogite in an area dominated with low-Ti
 eclogite-anorthosite. The rutile-rich varieties occur as
 irregular bands and lenses in up to 0.5 m thickness.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ådnefjell 2**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: 284919 Field-work: 1989
 North coord: 6724393 Category: 3
 Other locality information: Confid.: open
 Eclogite-anorthosite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ådnefjell 3**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: 284500 Field-work: 1989
 North coord: 6724100 Category: 3
 Other locality information: Confid.: open
 10 m thick zone with rutile-bearing garnet amphibolite /
 eclogite-

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Ådnefjell 4

eclogite

Field Photograph 1:

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1989

North coord:

Category: 3

Field Photograph 2:

Other locality information:

Confid.: open

Ti-rich eclogite (1m thick zone) at the margin of the eclogite-anorthosite massive.

*Field Photograph 3:***Dalsfjord region**

This region contains a variety of gneisses, and basic, ultrabasic and Fe-Ti oxide-rich rocks; the basic rocks are frequently eclogitized. Massive bands and impregnations of magnetite-ilmenite occur within gabbroic, partly eclogitized rocks. Some of these were mined for magnetite at the beginning of this century. The largest of these deposits is at Saurdal where up to 0.5 m thick bands of massive magnetite-ilmenite occur along an E-W trending 800 m-long zone along the southern margin of an eclogitized gabbro. Investigations in 1993-94 by the DuPont/NGU project were concentrated on the Dalsfjord region, mainly focusing on rutile-bearing eclogites in the Gjørlanger-Saurdal area and westwards towards Drøsdal/Orkheia/Seljevoll.

Rutile-bearing eclogites in the Dalsfjord region were investigated by NGU in 1978-79 (Korneliussen 1980, 1981, 1985). The central part of this region, at Hellevik-Gjørlanger-Flekkje, was investigated by S.Cuthbert in a doctoral thesis (1985). This region contains a variety of gneisses, and basic, ultrabasic and Fe-Ti oxide-rich rocks; the basic rocks are frequently eclogitized. Many eclogites had demonstrably low-pressure igneous protoliths and/or show intrusive relationships with the gneisses, indicating a crustal, eclogite-facies metamorphism of all lithologies. Relics of early granulite-facies assemblages occur in most lithologies (Cuthbert 1985). Associated eclogites have been metasomatically altered but retain some tholeiitic characteristics. The Flekke unit rocks have affinities with some layered basic intrusions typical of mid-Proterozoic anorthosite suites. Mineral chemistry and parageneses of a variety of lithologies indicate an early (presumably Proterozoic) granulite-facies event at 7-13 kb, and 750-1000°C, followed by metamorphism to high-pressure eclogite-facies conditions at 597+/-30°C, and decompression during exhumation to below 6 kb. Such a P-T path is incorporated into a continental collision model for the Scandinavian Caledonides involving transient "subduction" of the Basal Gneiss Complex in a Himalayan-style collision zone (Cuthbert, 1985).

Ane Engvik (Univ. Oslo) is about to finalise a Ph.D. thesis on the gabbro – eclogite relationships in the Gjørlanger area.

Fig. 7 gives a geological overview of the western part of the Dalsfjord region, including various photographs with accompanying text to illustrate some of the characteristics of this area.

The DuPont-NGU project paid significant attention to this area during 1992-94. Some of the results from the investigations that were done are shown in the form of various graphs within Fig. 8. In general, rutile from eclogites in the Dalsfjord region is relatively coarse-grained, as shown in the grain distribution graphs in Fig. 8. However, good indications of large volumes of rutile/eclogite ores with 3-5 % rutile was not found, and in the autumn of 1995 the focus was taken away from the Dalsfjord region in favour of the Engebøfjellet eclogite deposit (Chapt. 4) on the northern side of Førdefjord.

However, the Dalsfjord eclogite province might very well contain significant rutile/eclogite deposits yet to be identified. Based on the experiences with using gravimetry in rutile/eclogite exploration in the Førdefjord region which resulted in the discovery of the Steinkorsen occurrence, continued investigations in the Dalsfjord region should be based on a combination of gravity profiles and geological follow-up investigations.

Eastern Dalsfjord region**Avkrokeheia**

tonalite

Field Photograph 1:

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 317319

Field-work: 1994

North coord: 6804293

Category: 4

Field Photograph 2:

Other locality information:

Confid.: open

Field Photograph 3:

Bergheia

tonalite

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 313819 Field-work: 1994
 North coord: 6799693 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Bjørvika**

eclogite

Map (1:50000): 1218.2 UTM-zone: 32
 East coord: 317919 Field-work: 1994
 North coord: 6808193 Category: 3
 Other locality information: Confid.: open
 Massive, very hard, fine-grained eclogitic rock (road-cut)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnatjørna**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 304169 Field-work: 1995
 North coord: 6801143 Category: 3
 Other locality information: Confid.: open
 Eclogite (road cut). Old locality K169.93

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnatjørna 1**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 303719 Field-work: 1993
 North coord: 6801093 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnatjørna-East**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 304119 Field-work: 1993
 North coord: 6801293 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:*

Garnet rich eclogite in a road-cut along the new road to Botnatjørna. Eclogites northwards from this exposure are investigated in more detail by Garson/Parr.

Field Photograph 3:

Djupevatnet

eclogite

Map (1:50000): 1217.4 UTM-zone: 32

East coord: 315419 Field-work: 1994

North coord: 6801293 Category: 2

Other locality information: Confid.: open

Steeply dipping eclogite lens/zone in gneiss (N20-50E/70-90). Mineralogically similar to the Bergheia eclogite. The TiO₂ content is in the range 1-4%.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***E of Håheia**

metabasite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 304019 Field-work: 1994

North coord: 6802793 Category: 3

Other locality information: Confid.: open

fine-grained metabasite (lava or intrusive ?)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fjellsenden**

eclogite

Map (1:50000): 1217.4 UTM-zone: 32

East coord: 314519 Field-work: 1994

North coord: 6800793 Category: 3

Other locality information: Confid.: open

eclogite from small lens

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flekk 1**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 304619 Field-work: 1993

North coord: 6898793 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flekk 2**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 305719 Field-work: 1993

North coord: 6900593 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Flekk 3

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 305419

Field-work: 1993

North coord: 6901193

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flekkestølen 1**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 307119

Field-work: 1993

North coord: 6801393

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flekkestølen 2**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 306919

Field-work: 1993

North coord: 6801693

Category: 3

Other locality information:

Confid.: open

5-8 m thick zone, probably a W-E trending shear-zone) of extensive chloritization of eclogite. See photographs no. 21 and 22.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flekkestølen 3**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 306719

Field-work: 1993

North coord: 6801893

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Florsheia**

amphibolite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 326119

Field-work: 1994

North coord: 6797993

Category: 3

Other locality information:

Confid.: open

Diabase lens (10 x 50 m) surrounded by a reddish granitoid gneiss.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Førde

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 307419

Field-work: 1994

North coord: 6808493

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Guddalsfjell**

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 313719

Field-work: 1994

North coord: 6799893

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hd344**

chloritic schist

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 299319

Field-work: 1993

North coord: 6799593

Category: 4

Other locality information:

Confid.: open

E/W-trending, a few meter thick, practically vertical zone of a magnetite-rich, chlorite schist (presumably a heavily retrograded basic rock) Eastwards between Samlestølen and Breiheia: Metabasite, locally eclogitized (low-Ti), frequently intruded by a felsic rock (equivalent to Simon Cuthbert's low-K gneiss). At Vardeknolten: Extensive area of eclogitized, partly coronitic basic rocks (low-Ti). Some felsic intrusions in up to a few meter thick veins and dykes that are slightly deformed, giving a gneissic impression.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Heimtunet**

amphibolite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 311919

Field-work: 1994

North coord: 6809193

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Heimtunet 2

amphibolite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Herstad**

gneiss
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 313219 Field-work: 1994
 North coord: 6802293 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holtane**

eclogite
 Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 307719 Field-work: 1993
 North coord: 6803293 Category: 3
 Other locality information: Confid.: open
 Intensely folded metabasite, partly eclogitized, with <1m thick layers and lenses of more mafic varieties of these rocks. These are usually eclogitic with some visible rutile

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holtane 1**

eclogite
 Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 307719 Field-work: 1993
 North coord: 6803293 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holten 1**

eclogite
 Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 303319 Field-work: 1993
 North coord: 6800393 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Hovlandsdal

amphibolite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 310919

Field-work: 1994

North coord: 6796593

Category: 3

Other locality information:

Confid.: open

fine-grained ultramafic amphibolite (restite from anatectic melting of gabbro - diorite complex ?)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovlandsvt. 1**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 302319

Field-work: 1993

North coord: 6796693

Category: 3

Other locality information:

Confid.: open

4-5 m thick, finegrained eclogite lens/zone in granitoid gneiss.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovlandsvt. 2**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 299619

Field-work: 1993

North coord: 6797993

Category: 3

Other locality information:

Confid.: open

Small, fine-grained eclogite lenses in gneiss

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovlandsvt. 3**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 300619

Field-work:

North coord: 6798693

Category: 3

Other locality information:

Confid.: open

Small eclogite lenses in gneisses.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovlandsvt. 3a**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 300619

Field-work: 1993

North coord: 6798693

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Hovlandsvt. 4

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 302719

Field-work: 1993

North coord: 6798293

Category: 3

Other locality information:

Confid.: open

Boulders of fine-grained eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Høgelia**

eclogite

Map (1:50000): 1217.1

UTM-zone: 32

East coord: 334419

Field-work: 1994

North coord: 6802393

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Høgeliheia**

eclogite

Map (1:50000): 1217.1

UTM-zone: 32

East coord: 322819

Field-work: 1994

North coord: 6800293

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Høgevar den**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 307819

Field-work: 1993

North coord: 6802593

Category: 3

Other locality information:

Confid.: open

Very good exposures of folded, partly eclogitized basic to intermediate rocks. Fe Ti rich layer (<0.5m thick) in metabasite with aggregates of Fe-Ti oxides (rutile + ilmenite). Sheared white mica rich eclogite zone in the metabasite complex

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Håheia 1**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 304119

Field-work: 1993

North coord: 6803593

Category: 3

Other locality information:

Confid.: open

More than 10m thick garnet and rutile rich eclogite (road-cut) in partly eclogitized metagabbro.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Håheia 2

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 304119 Field-work: 1993

North coord: 6853493 Category: 3

Other locality information: Confid.: open

10-20m wide zone in the "metabasite" with distinct eclogitization.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Håheia 3**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 304119 Field-work: 1993

North coord: 6803493 Category: 3

Other locality information: Confid.: open

0.5m wide layer (or dyke) of a garnet-rich eclogite in fine-grained, banded, relatively felsic (intermediate) "metabasite". Similar dm-m wide, relatively Fe-Ti rich eclogitic "dykes" are common in the area.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Håheia 4**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 304119 Field-work: 1993

North coord: 6803593 Category: 3

Other locality information: Confid.: open

Approx. 10m wide zone of Fe-Ti rich eclogite within fine-banded "metabasite".

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hålandsnipa**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 308519 Field-work: 1993

North coord: 6805293 Category: 3

Other locality information: Confid.: open

Chip samples of fairly garnet rich eclogite from boulders at the base of the outcropping eclogite. See photographs no. 6 and 7.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Kalstadelva

eclogite

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 315719 Field-work: 1994
 North coord: 6796493 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kibberdalsfjellet**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 309319 Field-work: 1994
 North coord: 6801493 Category: 3
 Other locality information: Confid.: open
 500m x 100m eclogite zone/lens (N20E, 80-90SE). Low-Ti eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kusælfjellet**

gneiss

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 302219 Field-work: 1995
 North coord: 6799743 Category: 4
 Other locality information: Confid.: open
 Strongly sheared biotite-banded felsic gneiss

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Løbrotet,Hovl.**

gneiss

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 311919 Field-work: 1994
 North coord: 6796893 Category: 4
 Other locality information: Confid.: open
 leucodiorite or dioritic gneiss from basement complex ?

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langeheia S**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 310719 Field-work: 1994
 North coord: 6800493 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Langeheia SE

eclogite

Map (1:50000): 1217.4

East coord: 310919

North coord: 6800893

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langevt. 1**

eclogite

Map (1:50000): 1117.1

East coord: 308719

North coord: 6800693

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langevt. 2**

eclogite

Map (1:50000): 1117.1

East coord: 308519

North coord: 6800693

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langevt. 3**

eclogite

Map (1:50000): 1117.1

East coord: 307119

North coord: 6800493

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langevt. 4**

eclogite

Map (1:50000): 1117.1

East coord: 307419

North coord: 6800693

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Lillekletten

eclogite

Map (1:50000): 1117.1

East coord: 308719

North coord: 6803493

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Lillekletten 1**

eclogite

Map (1:50000): 1117.1

East coord: 308619

North coord: 6803593

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc KN10.94**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc KN11.94**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc KN15.94**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Loc KNS5.94

eclogite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work: 1994
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc LPN53B.94**

eclogite
 Map (1:50000): UTM-zone: 32
 East coord: Field-work: 1994
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loneland**

eclogite
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 306019 Field-work: 1994
 North coord: 6797193 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***NE Fjellsende.**

eclogite
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 315019 Field-work: 1994
 North coord: 6801293 Category: 3
 Other locality information: Confid.: open
 eclogite from central part of lens

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nistad**

eclogite
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 317919 Field-work: 1994
 North coord: 6808193 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Nistadlia

amphibolite

Map (1:50000): 1217.4

East coord: 315419

North coord: 6808693

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***NNW Djupevatn**

eclogite

Map (1:50000): 1217.4

East coord: 315719

North coord: 6800493

Other locality information:

eclogite

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Norddalsheia**

eclogite

Map (1:50000): 1217.4

East coord: 314219

North coord: 6805293

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***NW of Håheia**

metadunite

Map (1:50000): 1117.1

East coord: 301719

North coord: 6803493

Other locality information:

long dunitic body, metadunite

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nåledalen**

eclogite

Map (1:50000): 1217.4

East coord: 317519

North coord: 6799393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Oevrebø, Sande

eclogite

Map (1:50000): 1217.4

East coord: 315719

North coord: 6800493

Other locality information:
eclogite

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rakneberg**

eclogite

Map (1:50000): 1117.1

East coord: 307419

North coord: 6804593

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rakneberg 1**

eclogite

Map (1:50000): 1117.1

East coord: 306919

North coord: 6805093

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rakneberg 2**

eclogite

Map (1:50000): 1117.1

East coord: 306719

North coord: 6804793

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rakneberg 3**

eclogite

Map (1:50000): 1117.1

East coord: 307319

North coord: 6804693

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Sagevika

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 316719

Field-work: 1994

North coord: 6808093

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sagevika 2**

amphibolite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work:

North coord:

Category: 3

Other locality information:

Confid.: open

Particularly hard rock.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sande**

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 324619

Field-work: 1993

North coord: 6805893

Category: 3

Other locality information:

Confid.: open

Several 5-10m thick zones of retrograded eclogite in gneisses

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sande 2**

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 324619

Field-work: 1993

North coord: 6805893

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Skilbreivatnet**

gneiss

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 328619

Field-work: 1994

North coord: 6808493

Category: 4

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Skjellevatn

gabbro

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 315319 Field-work: 1994
 North coord: 6803193 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Solåsen**

amphibolite

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 325019 Field-work: 1994
 North coord: 6802993 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stavskletten**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 306519 Field-work: 1993
 North coord: 6803993 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:*

Eclogite boulders. Most boulders are of a low-Ti type; a few are garnet-rich with distinctly visible rutile. This indicate that eclogite containing 3-4% rutile occurs in the hills above.

*Field Photograph 3:***Steiestøl 1**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Steiestøl 2**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Steiestøl 3

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work:

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Steiestøl 4**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work:

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Steiestølen**

gneiss

Map (1:50000): 1217.4

East coord: 311919

North coord: 6804393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stongatj. NW**

eclogite

Map (1:50000): 1117.1

East coord: 309419

North coord: 6801593

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Storhellarhøgda**

gneiss

Map (1:50000): 1117.1

East coord: 303119

North coord: 6800193

Other locality information:

UTM-zone: 32

Field-work: 1995

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Storurdfjellet

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 308519 Field-work: 1993
 North coord: 6800693 Category: 3
 Other locality information: Confid.: open
 10x50m(+?) massive rutile bearing eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Strandavatnet**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 309319 Field-work: 1993
 North coord: 6803493 Category: 3
 Other locality information: Confid.: open
 5 10m thick eclogite zone in gneiss. Some rutile.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Strandavatnet 1**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Strandavatnet 2**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Strandavatnet 3**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work:
 North coord: Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Styggeheia

eclogite

Map (1:50000): 1217.4

East coord: 317119

North coord: 6799193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Svidnova**

gabbro

Map (1:50000): 1117.1

East coord: 308519

North coord: 6802393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Såta**

eclogite

Map (1:50000): 1117.2

East coord: 301719

North coord: 6795193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Taket**

eclogite

Map (1:50000): 1217.4

East coord: 315319

North coord: 6800693

Other locality information:

very fine-grained eclogite in small lens

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Tyssedalsvatn**

metabasite

Map (1:50000): 1117.1

East coord: 300019

North coord: 6803593

Other locality information:

metabasite (tuff ?)

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Ulvdalsheia

eclogite

Map (1:50000): 1217.4

East coord: 312219

North coord: 6799693

Other locality information:
weakly eclogitised diabase

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vardevasskron**

tonalite

Map (1:50000): 1217.4

East coord: 314619

North coord: 6799393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vardevasstj.**

eclogite

Map (1:50000): 1217.4

East coord: 315419

North coord: 6797893

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vardevatnet**

granite

Map (1:50000): 1217.4

East coord: 314919

North coord: 6798493

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vassdalen**

granite

Map (1:50000): 1217.4

East coord: 312719

North coord: 6801693

Other locality information:
weakly deformed pink granite (location only, no sample)

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Western Dalsfjord region

Arekletten

eclogite

Map (1:50000): 1117.1

East coord: 296419

North coord: 6800993

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Botnatjønn 1

eclogite

Map (1:50000): 1117.1

East coord: 295219

North coord: 6799993

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Botnatjønn 2

eclogite

Map (1:50000): 1117.1

East coord: 295119

North coord: 6799793

Other locality information:

Coarse-grained gabbro, some eclogitization.

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Botnatjønn 3

amphibolite

Map (1:50000): 1117.1

East coord: 295219

North coord: 6800193

Other locality information:

Banded garnet-bearing amphibolite with traces of rutile.

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Botnatjønn 4

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 295219 Field-work: 1992
 North coord: 6800193 Category: 3
 Other locality information: Confid.: open
 Coarse-grained metagabbro rich in Fe-Ti oxides.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnatjønn 5**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 295219 Field-work: 1992
 North coord: 6800193 Category: 3
 Other locality information: Confid.: open
 Eclogitization of metagabbro in shear-zone. The Fe-Ti
 oxide aggregates are squeezed out to elongate rutile
 aggregates.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnen**

gneiss

Map (1:50000): 1117.2 UTM-zone: 32
 East coord: 305319 Field-work: 1994
 North coord: 6794093 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drivarfjellet**

gneiss

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 299669 Field-work: 1995
 North coord: 6799243 Category: 4
 Other locality information: Confid.: open
 Magnetic measurements of tonalitic gneiss varieties
 (muscovite and biotite bearing).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Drøsdal

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 295000

Field-work: 1992

North coord: 6796700

Category: 3

Other locality information:

Confid.: open

Eclogite sample from the north-eastern margin of the Drøsdal eclogite. Ti-enriched eclogite similar to localities KD68.92 and KD70.92 has not been found in the north-eastern, eastern and south-eastern parts of the Drøsdal eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1a**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 294919

Field-work: 1992

North coord: 6896993

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1b**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 294919

Field-work: 1992

North coord: 6896993

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1c**

eclogite

Map (1:50000): 1117.2

UTM-zone: 32

East coord: 295219

Field-work: 1992

North coord: 6895993

Category: 3

Other locality information:

Confid.: open

At the farmhouse

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1d**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 295619

Field-work: 1992

North coord: 6896893

Category: 3

Other locality information:

Confid.: open

Eclogite margin N of Svanetjønn.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Drøsdal 1e

eclogite

Map (1:50000): 1117.1

East coord: 296119

North coord: 6896693

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1f**

eclogite

Map (1:50000): 1117.1

East coord: 296419

North coord: 6896493

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1g**

eclogite

Map (1:50000): 1117.2

East coord: 296119

North coord: 6896593

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1h**

eclogite

Map (1:50000): 1117.2

East coord: 296019

North coord: 6895993

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Drøsdal 1i**

eclogite

Map (1:50000): 1117.2

East coord: 295419

North coord: 6896093

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Eidet

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 289918

Field-work: 1995

North coord: 6799792

Category: 3

Other locality information:

Confid.: open

Fairly garnet-rich, variably retrograded eclogite of unknown size.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gamlestølen, Drivarfjellet**

gneiss

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 299419

Field-work: 1995

North coord: 6799043

Category: 4

Other locality information:

Confid.: open

Follow-up of eclogites together with E.A. and F.L. in the Hornedalen-Drivarfjellet area. Further details (XMET-results) by Eric A. /Felicity L.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gjølanger 1**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 297819

Field-work: 1992

North coord: 6802393

Category: 3

Other locality information:

Confid.: open

Felsic low-K gneiss (see Cuthbert 1985) typical of this area. It varies from fairly massive to distinctly gneissic.

Presumably this rock is a tonalite that intruded the eclogite protolith. Scattered grains of sphene.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Grenstadiheia**

gneiss

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 298319

Field-work: 1994

North coord: 6800593

Category: 4

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Grønstadliheia

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 297969 Field-work: 1995
 North coord: 6801043 Category: 3

Other locality information: Confid.: open

XMET analyses, fairly massive, garnet-rich eclogite approx. 100m N of 393,01. The general impression from this area is that the rutile-rich eclogite is eclogitized Fe-Ti rich gabbro similar to gabbro-anorthosites that have not been eclogitized elsewhere in the area. The rutile tend to occur in clusters within the eclogite (reflecting the occurrence of Fe-Ti oxide aggregates in the original gabbro) and the XMET-analyses are very variable. Drill-dust sampling is required to obtain good samples.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Grønstadliheia 1**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 297219 Field-work: 1992
 North coord: 6801193 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gyttavatnet 1a**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 302619 Field-work: 1992
 North coord: 6801493 Category: 3

Other locality information: Confid.: open

Ti-poor eclogite along a 200-300 thick zone from Gyttavatnet in the west to Botnafjørna in the east.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gyttavatnet 1b**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 303119 Field-work: 1992
 North coord: 6801493 Category: 3

Other locality information: Confid.: open

In the northeastern part of the Botnatjønn eclogite the eclogite tends to be more Fe-Ti rich. The eclogite is in places intensely mixed with a felsic gneis (tonalitic intrusion in the eclogite protolith ?). In some places the eclogite occurs as lenses and layers in this gneis (See the photographs in Appendix 3.34). The area is fairly vegetated and the extent of the Ti-rich eclogite is unknown. Fine-grained dissemination of ilmenite/rutile grains. SIZE: minor (?).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Hestegardsnova

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 297719

Field-work: 1995

North coord: 6798993

Category: 3

Other locality information:

Confid.: open

Chip samples from a 2x2m medium grained, garnet- and rutile-rich eclogite boulder. The area eastwards towards loc. Hd344 is poorly exposed. Some gneiss exposures. Some eclogite and metabasite boulders.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holtanova**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 295019

Field-work: 1994

North coord: 6799693

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holten**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 303319

Field-work: 1993

North coord: 6800393

Category: 3

Other locality information:

Confid.: open

30m+ thick eclogite lens within granitic gneisses.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hovlandsvatnet**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 304719

Field-work: 1994

North coord: 6798793

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Hydalen

gneiss

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 299119 Field-work: 1994

North coord: 6796493 Category: 4

Other locality information: Confid.: open

Banded, finegrained quartz-feldspatic gneiss approx 200m south of the Ramsgrønoca eclogite. This gneiss belong to an the old gneiss complex in the area and is intruded by a reddish granite (also gneissic). Some of the hills S of the Hydalsvatnet contains this younger granitic gneiss.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hyllestad**

eclogite

Map (1:50000): 1117.2 UTM-zone: 32

East coord: 301119 Field-work: 1994

North coord: 6787493 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Instetjøna**

amfibolitt

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 299019 Field-work: 1995

North coord: 6799893 Category: 3

Other locality information: Confid.: open

Amphibolite with leucocratic bands (mafic/felsic volcanic rocks ?) .

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Klibberen, Drivarfjellet**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 299869 Field-work: 1995

North coord: 6799993 Category: 3

Other locality information: Confid.: open

Eclogite/amphibolite (partly eclogitized metabasite) intermixed by a felsic (tonalitic?) gneissic rock. Photographs.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Kvia

gneiss

Map (1:50000): 1117.1

East coord: 298019

North coord: 6801493

Other locality information:

Low-K (tonalitic?) gneiss

UTM-zone: 32

Field-work: 1995

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kvia 1**

eclogite

Map (1:50000): 1117.1

East coord: 297919

North coord: 6801393

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kvia 2**

eclogite

Map (1:50000): 1117.1

East coord: 297519

North coord: 6801293

Other locality information:

banded mafic gneiss

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Lia**

metagabbro

Map (1:50000): 1117.1

East coord:

North coord:

Other locality information:

Very coarse-metagabbro with relics of dm-sized primary orthopyroxenes. Scattered Mt-ilmenite aggregates. Variably chloritized. Magnetic.

UTM-zone: 32

Field-work: 1995

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K274A.94**

eclogite

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Lonedalsfjell

amphibolite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 297819

Field-work: 1995

North coord: 6799693

Category: 3

Other locality information:

Confid.: open

2m chick zone of chloritic schist within amphibolite (metabasite).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Mjåsundet**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 310019

Field-work: 1995

North coord: 6802993

Category: 3

Other locality information:

Confid.: open

Miscellaneous eclogite boulders in a river.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nontuva**

gneiss

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 301019

Field-work: 1994

North coord: 6800393

Category: 4

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Orkheia**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 293489

Field-work: 1995

North coord: 6798453

Category: 3

Other locality information:

Confid.: open

Drill-dust 1995

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Orkheia 1**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 293619

Field-work: 1993

North coord: 6797993

Category: 2

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Orkheia 2

eclogite

Map (1:50000): 1117.1

East coord: 293319

North coord: 6798293

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Orkheia 3**

eclogite

Map (1:50000): 1117.1

East coord: 293419

North coord: 6798293

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ramsgrønova**

eclogite

Map (1:50000): 1117.1

East coord: 298519

North coord: 6797393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ramsgrøvatnet**

gneiss

Map (1:50000): 1117.1

East coord: 297519

North coord: 6795993

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rutle**

gneiss

Map (1:50000): 1117.1

East coord: 292319

North coord: 6796133

Other locality information:

Reddish granitic gneiss.

UTM-zone: 32

Field-work: 1995

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Rutlevatn

gneiss

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 291899 Field-work: 1995
 North coord: 6795343 Category: 4
 Other locality information: Confid.: open
 Finegrained banded qv-feldspatic gneiss (biotite-rich bands)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Saurdal 1a**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 297319 Field-work: 1992
 North coord: 6801393 Category: 2
 Other locality information: Confid.: open
 Samples from the old Fe-Ti mine (from tailings).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Saurdal 1b**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 297119 Field-work: 1992
 North coord: 6801493 Category: 2
 Other locality information: Confid.: open
 Eclogite samples from the eclogite dimensionstone quarry.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Saurdal 4**

Metabasite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 297539 Field-work: 1995
 North coord: 6800428 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Metabasite. After passing the 90 degree bend on the road ca. 225 m north of sub-loc 65, eclogite boulders start to show up along the road. The first boulder noticed was a very coarse-grained, deformed variety with rutile enriched in stringers up to 1 cm wide and 10 cm long. Compact rutile further occurs in small stringers up to 1-2 mm wide and 3-4 mm long. Farther up-hill along the road, i.e. towards the WSW to sub-loc 66 eclogite boulders are met with frequently.

Saurdal-93a

eclogite

Map (1:50000):

East coord: 297100

North coord: 6801500

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Saurdal-93b**

eclogite

Map (1:50000): 1117.1

East coord: 298019

North coord: 6802293

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Saurdal-93c**

eclogite

Map (1:50000): 1117.1

East coord: 297419

North coord: 6802393

Other locality information:

UTM-zone: 32

Field-work: 1993

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Seljevoll area**

eclogite

Map (1:50000): 1117.1

East coord: 290619

North coord: 6798293

Other locality information:

UTM-zone: 32

Field-work: 1979

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Svarttjerna**

eclogite

Map (1:50000): 1117.1

East coord: 300019

North coord: 6809793

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Vardeheia

metabasite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 298919 Field-work: 1993
 North coord: 6803293 Category: 3
 Other locality information: Confid.: open
 Fine grained metabasite in road-cuts.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vardeknolten**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32
 East coord: 299919 Field-work: 1993
 North coord: 6800593 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Very good eclogite exposure under tilted pine root (Photograph no. 10). Ti rich zones in eclogitized gabbro. Irregular layers of massive, garnet-rich eclogite (in the right part of the exposure) within a coronitic eclogite (to the left) The garnet-rich eclogite is distinctly rutile-rich (highest X-MET analysis is 23% TiO₂ in rutile-rich aggregates). Such rutile-rich eclogites are frequent in the area with thicknesses up to a few meters. They are believed to represent iron- (and titanium) rich layers in an original layered gabbroic intrusion. In some cases such Fe-Ti rich eclogites have cross-cutting relationships to the layering in the surrounding metagabbro/eclogite indicating an originally intrusive origin. West of Vardeknolten: Well-preserved relict after a coarse gabbroic rock that has experienced various stages of deformation and eclogitization. General impression: The area is dominated by a fine-grained, deformed basic rock (called metabasite by Simon Cuthberth, 1985) that variably show remnants of a coarser texture indicating gabbroic origin. These basic rocks are variably eclogitized. Up to a few meter thick bands and lenses that are enriched in Fe and Ti are fairly frequent. In the non-eclogitic variety of these rocks the Fe-Ti oxides are magnetite/ilmenite; in the eclogitized version magnetite is absent and ilmenite is partly or totally transformed into rutile.

Ønamarka

eclogite

Map (1:50000): 1117.2 UTM-zone: 32
 East coord: 297819 Field-work: 1994
 North coord: 6795293 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Åsen

diorite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 300419

Field-work: 1995

North coord: 6802593

Category: 4

Other locality information:

Confid.: open

Fairly massive dioritic rock showing gradational transitions to eclogite. Deformed, uneclogitized varieties are similar to the Håheia metabasite. The original diorite is relatively magnetic and is probably the source of the Åsen magnetic anomaly. Both the deformed varieties and the eclogitized varieties are low-magnetic.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Førdefjord region

The Førdefjord area is a part of the Proterozoic Western Gneiss Region of Norway. This area and adjacent areas to the south and north, are folded into regional east-west trending folds, interpreted to be the result of late-Palaeozoic N-S compression. Two major units are present in the area: the Hegreneset complex and the Helle complex.

The Hegreneset complex (Figs. 10 and 11) consists of a variety of mafic, mainly eclogitic rocks, and crosscutting, homogeneous grey to grey-green tonalitic, dioritic and granodioritic intrusives. The mafic and felsic rocks are in many places intimately mingled, in several places with a broad intrusive contact zone where the grey intrusives have abundant basic xenoliths. The Hegreneset complex crops out continuously on the southern side of Førdefjord from Hegreneset in the west to near Førde in the east. It seems to be situated in a major late-Caledonian east-west elongated dome structure. On the northern side of the Førdefjord, it crops out in the Engebø area, and from Engebø it can be followed discontinuously eastwards, surrounded by rocks of the Helle complex.

At Mt. Fureviknipa (Fig. 11) on the southern side of the fjord, banded eclogite represents eclogitized layered gabbro. Westwards from Fureviknipa, anorthosite and leucogabbro constitute part of the same basic complex; the anorthosite contains lenses of retrograded eclogites. The large basic complex south of Førdefjord, including Mt. Fureviknipa, therefore consists mostly of plutonic layered cumulate rocks. Southwest of Mt. Fureviknipa, a fine-grained, banded to laminated, basic rock of either intrusive or extrusive origin occurs. This rock shows extensive mesoscopic, ductile, disharmonic folding under eclogite facies conditions; and resembles the Engebøfjellet eclogite. In some places, such as the country-rocks to the Engebøfjell eclogite body, mafic and felsic rocks occur in a characteristic deformed cm-dm scale banded succession as well as in larger units.

The Helle complex consists mainly of granitic to granodioritic gneisses, in many places migmatitic and/or banded. The granitic gneisses are red to grey. A number of younger red granites altered to gneiss, and minor basic intrusives are also included in the complex. Due to the complex, polyphase, and generally strong deformation in the area, rocks with varied structures and textures occur.

RUTILE-BEARING ECLOGITES

Eclogites in the Førdefjord region frequently occur as several kilometer-long folded and boudinaged layers with thicknesses in the range of 10 meter to a few hundred meters. Some of the larger boudins are fairly massive eclogite bodies covering areas of more than 100,000 m² (e.g. Engebøfjellet). The TiO₂-content is generally 1-3%, but contents of 4-5% TiO₂ or more are not uncommon. The high Ti-contents are often, but not always, associated with fairly massive parts of the eclogites.

Rutile in eclogites in the Førdefjord region was first mentioned by Eskola (1921) from the Naustdal village eclogite, and then by Binns (1967) who presents a TiO₂-analysis of 6.44%. H.P. Geis from Elkem A/S recognised an economic potential related to the Førdefjord rutile-bearing eclogites in the middle 1970s. In collaboration with Elkem A/S, NGU did reconnaissance mapping of eclogites in the Førdefjord (and Dalsfjord) region in 1978-80 (See Korneliussen, 1980 and 1981; Foslie, 1980, Korneliussen & Foslie 1985). These investigations resulted in the discovery of several large eclogite bodies with rutile contents of 1-3%. Locally the rutile content reaches 3-4% or more.

In 1979 Frank Barkve and his companion Tore Birkeland recognized the Engebøfjellet eclogite body as potentially suitable material for breakwater purposes. They did not succeed in putting the deposit into production and Birkeland withdrew from the project after a few years. Barkve's Engebø-project has now been taken over by the company Fjord Blokk.

Rutile-investigations were continued by Norsk Hydro in 1984-85, including beneficiation tests on the Engebøfjellet eclogite (by Warren Spring Lab., England) and Fureviknipa (by prof. K. Sandvik, Technical Univ. of Norway, Trondheim), without success. NGU did new sampling of the Engebøfjellet and Fureviknipa eclogites in 1990 in order to obtain additional information about rutile-contents and rutile/ilmenite-proportions (Korneliussen & Furuhaug, 1991).

Continued investigations in the Førdefjord area were then carried out by DuPont/Stokke/NGU in 1992 to obtain additional information on TiO₂ contents in a number of previously known eclogites and to discover new rutile-bearing eclogites. In 1993 an attempt was made to find new eclogites eastwards from Naustdal. Several localities of low-TiO₂ eclogites similar to the so-called "volcanic eclogites" near Førdefjord were found more-or-less directly eastwards from Naustdal. Ti-rich eclogite varieties frequently occur as thin bands and lenses within the low-TiO₂ eclogite. The situation is comparable to the areas between Naustdal and Vevring/Engebø. This type of eclogite continues eastwards from Naustdal at least as far as Kleppstølen 15 km E of Naustdal, and probably much further.

In a river at Svorstølen (near Fimlandsgrend) approx. 30 km NE of Naustdal an anomalous number of Ti-rich eclogites that resemble the Naustdal and Engebøfjellet eclogites in grain-size and TiO₂ content were identified. These boulders indicate, even though their source was not found, that eclogite-bearing terrains of the Førdefjord region can be extended far eastwards and northeastwards from Naustdal. So far this large area has been only superficially investigated for rutile-bearing eclogites.

Based on the present knowledge, the largest rutile ore potential in Norway is on the northern side of the Førdefjord between Engebøfjellet (Chapter 4) in the west and Naustdal in the east, including the Steinkorsen area (Chapter 5) in between.

Northern Førdefjord region

Andalen

eclogite

Map (1:50000): 1217.4

East coord: 318519

North coord: 6819793

Other locality information:

UTM-zone: 32

Field-work: 1979

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Bjørndalen 1**

eclogite

Map (1:50000): 1118.2

East coord: 306819

North coord: 6823493

Other locality information:

Same as Kletten (no 60)

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Bjørndalen 2**

eclogite

Map (1:50000): 1118.2

East coord: 308919

North coord: 6823993

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Botnarusta**

eclogite

Map (1:50000): 1117.1

East coord: 306119

North coord: 6823093

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Byrkjelandstølane**

eclogite

Map (1:50000): 1218.2

East coord: 334119

North coord: 6829493

Other locality information:

5-10 m³ eclogite boulder. Retrograded. Ti-rich.

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Byrkjelia

eclogite

Map (1:50000): 1218.3

UTM-zone: 32

East coord: 330419

Field-work: 1993

North coord: 6824993

Category: 3

Other locality information:

Confid.: open

10m (+?) eclogite zone in gneiss

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Engebøfjellet**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 310200

Field-work:

North coord: 6822750

Category: 1

Other locality information:

Confid.: confid

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Espelandstølane**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 336319

Field-work: 1994

North coord: 6830043

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Espenipa**

granite

Map (1:50000): 1218.3

UTM-zone: 32

East coord: 331219

Field-work: 1994

North coord: 6823993

Category: 4

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fimlandsgrend**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 339919

Field-work: 1993

North coord: 6832693

Category: 3

Other locality information:

Confid.: open

Eclogite boulders in till

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Furefjellet

eclogite

Map (1:50000): 1117.1

East coord: 306219

North coord: 6823193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Furefjellet 1a**

eclogite

Map (1:50000): 1117.1

East coord: 306819

North coord: 6823493

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Furefjellet 1b**

eclogite

Map (1:50000): 1117.1

East coord: 306719

North coord: 6823293

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Furefjellet 1c**

eclogite

Map (1:50000): 1117.1

East coord: 306719

North coord: 6823093

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Furefjellet 1d**

eclogite

Map (1:50000): 1117.1

East coord: 306819

North coord: 6822893

Other locality information:

UTM-zone: 32

Field-work: 1992

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Fureneset

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 328619

Field-work: 1979

North coord: 6822593

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Grimsetelia (Kleppestølen)**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 332919

Field-work: 1994

North coord: 6826093

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Heia**

eclogite

Map (1:50000): 1118.2

UTM-zone: 32

East coord: 307519

Field-work: 1992

North coord: 6823393

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Heianova**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 332919

Field-work: 1994

North coord: 6829593

Category: 3

Other locality information:

Confid.: open

20m+ thick eclogite horizon. Infiltrated by felsic material.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Helgås (Naustdal)**

eclogite

Map (1:50000): 1218.3

UTM-zone: 32

East coord: 327919

Field-work: 1994

North coord: 6824293

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Helleneset

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 312719

Field-work: 1994

North coord: 6818593

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hukset**

eclogite

Map (1:50000): 1218.3

UTM-zone: 32

East coord: 327619

Field-work: 1993

North coord: 6826293

Category: 3

Other locality information:

Confid.: open

10m (+?) thick eclogite zone in gneiss

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kleppestølen**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 333319

Field-work: 1994

North coord: 6826193

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kleppestølen 1**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 333019

Field-work: 1993

North coord: 6826093

Category: 3

Other locality information:

Confid.: open

Approx. 50m wide zone of an eclogite with low Ti-content (1-2 % TiO₂). Garnet-rich, dm-thick bands are enriched in titanium (3-5% TiO₂).*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Kletten

eclogite

Map (1:50000): 1118.2 UTM-zone: 32

East coord: 307319 Field-work: 1992

North coord: 6824593 Category: 3

Other locality information: Confid.: open

E-W zone of banded and boudinaged eclogite of the volcanic (?) type. Some parts that are fairly massive may represent protoliths of intrusive origin (?). The banded eclogites are distinctly retrogressed, especially at the margin towards gneis.; while the more massive parts are practically non-retrogressed. The banded eclogites are occasionally mixed with acidic gneissic rocks that could represent intrusives or mobilized sediments. The TiO₂-contents are generally 1-2.5%, less commonly 2.5-3.5% and occasionally 3.5-5%. Large bodies with >3% TiO₂ have not been found W of Engebøfjellet. SIZE: the higher TiO₂-contents at Kletten occur within a fairly small to intermediate (10.000 m² ?) eclogite lens or boudin that is a part of a several km long eclogite horizon.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Klubben**

eclogite

Map (1:50000): 1218.3 UTM-zone: 32

East coord: 333019 Field-work: 1994

North coord: 6825193 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kvammen**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 307819 Field-work: 1979

North coord: 6820693 Category: 3

Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kyrskora**

eclogite

Map (1:50000): 1117.1 UTM-zone: 32

East coord: 317119 Field-work: 1994

North coord: 6823993 Category: 3

Other locality information: Confid.: open

Samples from the Kyrskora eclogite taken in 1978-79 indicate that the TiO₂-contents are generally low but that some parts of the deposit could contain 3-4% rutile. New investigations in 1992 including field X-MET analyses, show that this deposit is of the banded "volcanic" type with generally low TiO₂-contents. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Langevatn

eclogite

Map (1:50000): 1218.3

UTM-zone: 32

East coord: 319319

Field-work: 1994

North coord: 6824993

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Langevatnet**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 317119

Field-work: 1994

North coord: 6823993

Category: 3

Other locality information:

Confid.: open

Samples from the Kyrskora eclogite taken in 1978-79 indicate that the TiO₂-contents are generally low but that some parts of the deposit could contain 3-4% rutile. New investigations in 1992 including field X-MET analyses, show that this deposit is of the banded "volcanic" type with generally low TiO₂-contents. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Lok K165**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 334119

Field-work: 1993

North coord: 6831193

Category: 3

Other locality information:

Confid.: open

10m thick zone of retrograded eclogite in a mica-rich gneiss.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Naustdal eclogite**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 326119

Field-work: 1994

North coord: 6824593

Category: 1

Other locality information:

Confid.: open

The Naustdal eclogite is described by Eskola (1921) and Binns (1967), and was first sampled for rutile in 1977 by H.P.Geis from the company Elkem A/S and then by NGU in 1978 (Korneliussen 1980). The main part of the deposit is covered by many domestic-houses. The TiO₂-grade varies from 1 to 6-7%. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Naustdal tunnel W

gneiss
 Map (1:50000): 1218.3 UTM-zone: 32
 East coord: Field-work: 1994
 North coord: Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Naustdal tunnell E**

gneiss
 Map (1:50000): 1218.3 UTM-zone: 32
 East coord: Field-work: 1994
 North coord: Category: 4
 Other locality information: Confid.: open
 Sulfide (py, cp) - bearing cracks/veins and irregular sulfide
 impregnations. Tailings at eastern opening of new Naustdal
 tunnel.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nonsholten**

eclogite
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 312719 Field-work: 1994
 North coord: 6819593 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Pikholten**

eclogite
 Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 319719 Field-work: 1979
 North coord: 6819993 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rabben**

eclogite
 Map (1:50000): 1218.2 UTM-zone: 32
 East coord: 340519 Field-work: 1994
 North coord: 6831093 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Ramelfjell

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 318119

Field-work: 1979

North coord: 6819593

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Roteneset**

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 329819

Field-work: 1979

North coord: 6821993

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Russenes**

eclogite

Map (1:50000): 1117.1

UTM-zone: 32

East coord: 310719

Field-work: 1992

North coord: 6820293

Category: 3

Other locality information:

Confid.: open

Massive, fairly fine-grained, rutile-rich eclogite surrounded by slightly schistose, rutile-poor eclogite. The mineralization resembles Engebøfjellet with only a small amount of ilmenite as compared to rutile.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Skaflestad**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 336019

Field-work: 1994

North coord: 6830393

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Steinkorsen**

eclogite

Map (1:50000):

UTM-zone: 32

East coord: 322000

Field-work:

North coord: 6824000

Category: 1

Other locality information:

Confid.: confid

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Svanevatnet N.

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 336219

Field-work: 1994

North coord: 6825593

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Svorstølen 2**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 340019

Field-work: 1993

North coord: 6831693

Category: 3

Other locality information:

Confid.: open

Various boulders of Fe-Ti rich eclogite (retrograded) in a river. TiO₂: 3-5 % (X-Met analyses).*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vassligrova**

amphibolite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 335619

Field-work: 1994

North coord: 6830493

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vatnevatnet/Helleneset**

eclogite

Map (1:50000): 1217.4

UTM-zone: 32

East coord: 313319

Field-work: 1979

North coord: 6818893

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Øybostølen**

eclogite

Map (1:50000): 1218.2

UTM-zone: 32

East coord: 333219

Field-work: 1994

North coord: 6825593

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Åsebotnen

eclogite

Map (1:50000): 1218.2

East coord: 334319

North coord: 6824193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Åsestøyl S.**

eclogite

Map (1:50000): 1218.2

East coord: 334019

North coord: 6824293

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Southern Førdefjord region

Frammarsvik

eclogite

Map (1:50000): 1217.4

East coord: 321019

North coord: 6821493

Other locality information:

UTM-zone: 32

Field-work: 1979

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fureviknipa**

eclogite

Map (1:50000): 1217.4

East coord: 326669

North coord: 6818268

Other locality information:

Drill-dust 1995

UTM-zone: 32

Field-work: 1995

Category: 2

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Grova (Furevik)

eclogite

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 325219 Field-work: 1994
 North coord: 6819193 Category: 3
 Other locality information: Confid.: open
 Eclogite road-cut near Fureviknipa.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Holmeset**

eclogite

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 321519 Field-work: 1979
 North coord: 6821693 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ulltang**

gneiss

Map (1:50000): 1217.4 UTM-zone: 32
 East coord: 328719 Field-work: 1994
 North coord: 6818793 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kristiansund region**

At Averøy (Figs. 14 & 15) large volumes of low-TiO₂ (1-2%) basic rocks of volcanic origin are metamorphosed into garnet-amphibolites and eclogites. At Helset (Fig. 14) the dominant low-TiO₂ eclogite is intruded by dm-thick dykes (eclogitized) with 3-9% TiO₂. Thin-sections show that ilmenite is more abundant than rutile. Further northeast on the islands Frei and Tustna (Fig. 15) the eclogites tend to occur as fairly small, boudinaged, low-TiO₂ bodies within gneisses.

In the Gjemnes and Halså districts further east, the eclogitization has been less complete; a number of gabbroic intrusions show gradual transition into eclogite. TiO₂-contents are generally 1-2%, though contents of 3-4% occur occasionally. The TiO₂-content in eclogites in the Kristiansund region varies between 1% and 4% TiO₂, with a highly variably rutile/ilmenite ratio.

The eastern parts of the Kristiansund region that contain Fe-Ti-rich amphibolites and metagabbros should be investigated in order to find eclogitized portions of these rocks. Eclogites in these areas have experienced significant retrogression in general, but there are probably large local variations. Fairly high ilmenite/rutile ratios and the fact that titanite is a common mineral cast doubt on the potential of these areas even if high-Ti eclogites do occur.

Aure area (NE Kristiansund region)

Fuglevåg

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 466319

Field-work: 1992

North coord: 7006793

Category: 3

Other locality information:

Confid.: open

50 m thick eclogite body surrounded by gneisses. The eclogite body has a gabbroic, partly eclogitized core. It is intruded by a 2-3dm thick basic dyke.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***KB31.92-locality**

eclogite

Map (1:50000):

UTM-zone: 32

East coord:

Field-work: 1992

North coord:

Category: 3

Other locality information:

Confid.: open

Eclogite roadcut 1 km S of "bomstasjon"

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Mjosund**

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 475019

Field-work: 1992

North coord: 7011093

Category: 3

Other locality information:

Confid.: open

Representative sample of eclogite / garnet-amphibolite from an area with numerous small (10m +/-) eclogite bodies. The rutile is fairly dark and cannot be distinguished from ilmenite in the photograph. The rutile/ilmenite grains in the photographs are mainly ilmenite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Averøy area (SW Kristiansund region)**

Helset

eclogite

Map (1:50000): 1320.4 UTM-zone: 32
 East coord: 425919 Field-work: 1992
 North coord: 6981293 Category: 3

Other locality information: Confid.: open

A,B & C: finegrained, fairly light eclogite with some visible rutile. D,E & F: Biotite-bearing, slightly darker eclogite with some visible rutile. G,H & I: Darker, distinctly rutile-bearing eclogite. J: No sample. K: Eclogite with stripes of rutile/ilmenite. L: pegmatite in eclogite. Two thin-sections (KE30S1.92 and KE30S2.92) show that the oxides are mainly ilmenite with some intergrown rutile. In the dominant low-Ti eclogite rutile occurs as scattered individual grains with subordinate ilmenite intergrowths. In the Ti-rich eclogite ilmenite is the dominant oxide mineral. The rutile is very dark in thin-sections from the Ti-rich eclogite and is not easily distinguished from ilmenite. The dominant low-Ti eclogite contains layers or dykes of a Ti-enriched, more coarse-grained eclogite. SIZE: Large deposit for the low-Ti and probably minor for the high-Ti eclogite variety.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***KE30.92-locality**

eclogite

Map (1:50000): UTM-zone: 32
 East coord: Field-work: 1992
 North coord: Category: 3

Other locality information: Confid.: open

Eclogite quarry (mined for road aggregate). Distinct oxide (rutile and ilmenite) in coarse-grained eclogite varieties that tend to occur as bands (dykes ?) in the surrounding eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Tevikåsen**

eclogite

Map (1:50000): 1320.4 UTM-zone: 32
 East coord: 417219 Field-work: 1992
 North coord: 6984193 Category: 3

Other locality information: Confid.: open

Eclogite / garnet-amphibolite. A few rutile grains are up to 10 mm large. The rutile is fairly dark and cannot be distinguished from ilmenite on the photograph. SIZE: Large.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gjemnes area (NE Kristiansund region)**

Flemma

eclogite

Map (1:50000): 1320.1 UTM-zone: 32
 East coord: 453519 Field-work: 1992
 North coord: 6978193 Category: 3
 Other locality information: Confid.: open
 Metagabbro with some Fe-Ti oxides. SIZE: intermediate (?)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hoem**

eclogite

Map (1:50000): 1320.1 UTM-zone: 32
 East coord: 451119 Field-work: 1992
 North coord: 6981593 Category: 3
 Other locality information: Confid.: open
 Gabbro showing some eclogitization. Some rutile
 intergrown with ilmenite. SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Høgliebba**

eclogite

Map (1:50000): 1320.1 UTM-zone: 32
 East coord: 449919 Field-work: 1992
 North coord: 6981193 Category: 3
 Other locality information: Confid.: open
 500-600m long eclogite / garnet amphibolite body. SIZE:
 minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ranem**

eclogite

Map (1:50000): 1320.1 UTM-zone: 32
 East coord: 445019 Field-work: 1992
 North coord: 6981793 Category: 3
 Other locality information: Confid.: open
 5m thick eclogite lens in gneiss (roadcut). Some oxides
 (rutile?). SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Reinsfjellet**

eclogite

Map (1:50000): 1320.1 UTM-zone: 32
 East coord: 447319 Field-work: 1992
 North coord: 6976993 Category: 3
 Other locality information: Confid.: open
 Various samples from the southern parts of the same
 eclogite body as KE32.92. Rutile occurs as scattered grains
 occasionally intergrown with ilmenite. Some rutile grains
 are rimmed by sphene.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Reinsfjellet 2

eclogite

Map (1:50000): 1320.1

UTM-zone: 32

East coord: 447019

Field-work: 1992

North coord: 6976693

Category: 3

Other locality information:

Confid.: open

Chip-samples (KE33A-G.92) from the southeastern part of the Litl-Reinsfjellet eclogite body. The eclogite varies from garnet-rich eclogite to amphibolite and metagabbro.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Skardet**

eclogite

Map (1:50000): 1320.1

UTM-zone: 32

East coord: 448019

Field-work: 1992

North coord: 6982193

Category: 3

Other locality information:

Confid.: open

10-20m thick eclogite / garnet amphibolite lens in gneiss (roadcut). Ilmenite + rutile (minor) grains tend to occur as inclusions in biotite and amphibole. SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Torvik**

eclogite

Map (1:50000): 1320.1

UTM-zone: 32

East coord: 442419

Field-work: 1992

North coord: 6980193

Category: 3

Other locality information:

Confid.: open

Two 2-4m thick eclogite zones; one is dark and fine-grained (sample A and B), the other is slightly more coarse-grained (sample C). The eclogites in this area tend to occur as small lenses or boudins in a banded granitic gneiss, as shown in the photograph in Appendix 3.27. Such small lenses are often retrograded to amphibolite with just traces of garnet left; bigger lenses usually have a core of eclogite surrounded by garnet-amphibolite/amphibolite towards the gneiss-contact. SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Torvik 2**

eclogite

Map (1:50000): 1320.1

UTM-zone: 32

East coord: 442919

Field-work: 1992

North coord: 6981093

Category: 3

Other locality information:

Confid.: open

70-80 m long roadcut with eclogite/gnt.amph.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Halsa area (NE Kristiansund region)**

Hennset

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 472819

Field-work: 1992

North coord: 7000493

Category: 3

Other locality information:

Confid.: open

Gabbro showing beginning eclogitization (quarry). SIZE: minor (?).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Hesjingfjellet**

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 475519

Field-work: 1992

North coord: 6997993

Category: 3

Other locality information:

Confid.: open

Completely eclogitized gabbro from the same gabbro/eclogite body. Rutile/ilmenite grains (0.1-0.3+ mm) interstitial to large garnet crystals or aggregates. The rutile is fairly dark.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Høgset**

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 478019

Field-work: 1992

North coord: 7000593

Category: 3

Other locality information:

Confid.: open

Beginning eclogitization of a small (10m+ thick) gabbro body. The ilmenite/rutile (fairly dark) grains are dominated by ilmenite. SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Indre Vågland**

eclogite

Map (1:50000): 1421.3

UTM-zone: 32

East coord: 466019

Field-work: 1992

North coord: 6998293

Category: 3

Other locality information:

Confid.: open

2-3m thick eclogite lens in gneiss (roadcut). SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Kjøløy

eclogite

Map (1:50000): 1421.3 UTM-zone: 32
East coord: 476119 Field-work: 1992
North coord: 7000993 Category: 3
Other locality information: Confid.: open
20m eclogite roadcut. Small eclogite lenses are common in this area. SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rennhøgda**

eclogite

Map (1:50000): 1421.3 UTM-zone: 32
East coord: 479419 Field-work: 1992
North coord: 7003593 Category: 3
Other locality information: Confid.: open
Fairly big eclogite body showing various stages of retrogression. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Solli 1**

eclogite

Map (1:50000): 1421.3 UTM-zone: 32
East coord: 471719 Field-work: 1992
North coord: 6991693 Category: 3
Other locality information: Confid.: open
Gabbro showing beginning eclogitization. Some oxides. SIZE: minor (?).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Solli 2**

eclogite

Map (1:50000): 1421.3 UTM-zone: 32
East coord: 471419 Field-work: 1992
North coord: 6991293 Category: 3
Other locality information: Confid.: open
Fairly massive metagabbro with some eclogitisation. Some Fe-Ti oxides.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kristiansund area**

Flatset

eclogite

Map (1:50000): 1321.2

UTM-zone: 32

East coord: 437719

Field-work: 1992

North coord: 6989393

Category: 3

Other locality information:

Confid.: open

Approximately 50m thick gabbro body showing beginning eclogitization. The eclogitization is complete at the margin of the body. The rutile is fairly dark and cannot be distinguished from ilmenite on the photograph (Appendix 3.13.). SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kristiansund**

eclogite

Map (1:50000): 1321.2

UTM-zone: 32

East coord: 438519

Field-work: 1992

North coord: 6991993

Category: 3

Other locality information:

Confid.: open

Eclogite with 1-2 % TiO₂ (X-Met analyses)*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Prestmyra**

eclogite

Map (1:50000): 1321.2

UTM-zone: 32

East coord: 438519

Field-work: 1992

North coord: 6991993

Category: 3

Other locality information:

Confid.: open

Fairly fine-grained eclogite with predominantly 0.1-0.2 mm large rutile crystals. The rutile tend to be surrounded by quartz (+ albite) and not so much within garnet or amhibole as is common elsewhere. SIZE: minor (intermediate ?).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Tustna area (Central Kristiansund region)****Ramsvikbukta**

eclogite

Map (1:50000): 1321.2

UTM-zone: 32

East coord: 456319

Field-work: 1992

North coord: 7003193

Category: 3

Other locality information:

Confid.: open

10m thick, fairly fine-grained, massive eclogite in gneiss. Individual rutile/ilmenite grains (0.1-0.5mm). Approx. 1 % TiO₂ (X-Met).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Molde region

A large number of eclogites occur north and northeast of Molde in the Fræna and Eide districts (Fig. 14). Reksten (1985) describes eclogites in the Eide area. Most of these eclogites are small with TiO₂-contents of 1-3% (based on a few analysed localities). At Eide a large volume of garnet-amphibolite/eclogite is associated with indisputable metasedimentary rocks including carbonates. The protoliths for these eclogites are presumably of volcanic origin; they continue northeastwards on the island Averøy (Kristiansund region) where the same basic rock units are the host-rocks for stratabound massive sulfide deposits.

Analysed eclogites have 1-2% TiO₂ of which less than 50% occurs in rutile (Fig. 14). Certainly the eclogite protoliths have not been of Ti-rich types, and the eclogite metamorphism has partitioned only 40-60% of the titanium into rutile. The rutile/ilmenite is not intergrown with garnet and might, for that reason, be fairly easy to concentrate. Ti-rich dykes at Averøy indicate that Ti-rich eclogites occur in the region, and the possibility for major rutile/eclogite deposits cannot be excluded.

Aukra area (N Molde region)

Hollingen

eclogite			<i>Field Photograph 1:</i>
Map (1:50000):	1220.1	UTM-zone: 32	
East coord:	397319	Field-work: 1992	
North coord:	6961693	Category: 3	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open		
Eclogite with some visible rutile. Scattered ilmenite + rutile grains.			<i>Field Photograph 3:</i>

Eide area (NE Molde region)

Eide 6

eclogite			<i>Field Photograph 1:</i>
Map (1:50000):	1320.4	UTM-zone: 32	
East coord:	417319	Field-work: 1992	
North coord:	6982193	Category: 3	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open		
Garnet-rich eclogite, weakly banded, 1-2 % TiO ₂ (X-Met anal.).			<i>Field Photograph 3:</i>

Eide 7

Gnt-amph./ecl.			<i>Field Photograph 1:</i>
Map (1:50000):	1320.4	UTM-zone: 32	
East coord:	418119	Field-work: 1992	
North coord:	6981693	Category: 3	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open		
Garnet-amphibolite (eclogitic) from a 200m long roadcut.			<i>Field Photograph 3:</i>

Lyngstad

eclogite

Map (1:50000): 1320.4

UTM-zone: 32

East coord: 418119

Field-work: 1992

North coord: 6981693

Category: 3

Other locality information:

Confid.: open

Eclogite / garnet-amphibolite from a 200m long roadcut. Rutile/ilmenite with common grain-size 0.1-0.2 mm. The rutile is fairly dark in the thin-section and cannot be distinguished from ilmenite on the photograph (Appendix 3.9.). SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nystad (Nerland)**

eclogite

Map (1:50000): 1320.4

UTM-zone: 32

East coord: 417319

Field-work: 1992

North coord: 6982193

Category: 3

Other locality information:

Confid.: open

Garnet-rich eclogite / garnet-amphibolite, slightly banded. Rutile tends to occur as inclusions (0.1mm ±) in garnet and amphibole. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Storvasshaugen**

eclogite

Map (1:50000): 1320.4

UTM-zone: 32

East coord: 413119

Field-work: 1992

North coord: 6981493

Category: 3

Other locality information:

Confid.: open

Retrograded eclogite / garnet amphibolite with coarse-grained garnet. Scattered grains of rutile, ilmenite and rutile+ilmenite. The oxides are mainly ilmenite. A few separate sphene grains were observed.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Straumsholmen**

eclogite

Map (1:50000): 1321.3

UTM-zone: 32

East coord: 414419

Field-work: 1992

North coord: 6987893

Category: 3

Other locality information:

Confid.: open

50-100m long eclogite road-cut.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Visnes

eclogite

Map (1:50000): 1320.4

UTM-zone: 32

East coord: 417719

Field-work: 1992

North coord: 6981093

Category: 3

Other locality information:

Confid.: open

Boulder of a fairly fine-grained, light (unusual for this area) eclogite / garnet-amphibolite with 2-4 %TiO₂ (XMET-analyses). The titanium is mainly within ilmenite. Only traces of rutile occur. Appendix 3.26 shows the Visnes marble quarry as seen from Averøy. The rocks surrounding the quarry are mainly eclogite. The lower photograph shows a big rutile aggregate in an eclogite at the viewpoint of the upper photograph. SIZE: big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fræna area (NE Molde region)****Aureosen**

eclogite

Map (1:50000): 1220.1

UTM-zone: 32

East coord: 404919

Field-work: 1992

North coord: 6966393

Category: 3

Other locality information:

Confid.: open

50m eclogite in roadcut

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rambjøra**

eclogite

Map (1:50000): 1220.1

UTM-zone: 32

East coord: 392119

Field-work: 1992

North coord: 6977593

Category: 3

Other locality information:

Confid.: open

500m long eclogite hill. The eclogite show various stages of retrogression. SIZE: intermediate/big.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stavik 1**

eclogite

Map (1:50000): 1220.1

UTM-zone: 32

East coord: 396819

Field-work: 1992

North coord: 6974093

Category: 3

Other locality information:

Confid.: open

Several 10m +/- eclogite lenses in gneiss exposed in a quarry (road aggregate). Eclogites in this region are surrounded by intensely deformed gneisses. The eclogites have behaved fairly competently during this deformation. The photographs in Appendix 3.32 show a typical relation between small eclogite bodies and gneiss. Rutile and ilmenite occur in approx. equal amounts.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Stavik 2

eclogite

Map (1:50000): 1220.1 UTM-zone: 32
 East coord: 397019 Field-work: 1992
 North coord: 6973793 Category: 3
 Other locality information: Confid.: open
 Eclogies within a 100m long roadcut.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stavik 3**

eclogite

Map (1:50000): 1220.1 UTM-zone: 32
 East coord: 397319 Field-work: 1992
 North coord: 6973493 Category: 3
 Other locality information: Confid.: open
 50 m thick eclogite body.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stavik 4**

eclogite

Map (1:50000): 1220.1 UTM-zone: 32
 East coord: 397019 Field-work: 1992
 North coord: 6974393 Category: 3
 Other locality information: Confid.: open
 Several +10m eclogite bodies in gneiss.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Nordfjord region

Known eclogite localities in the Nordfjord region are shown in Fig. 12. In general, these eclogites are small bodies that are believed to represent eclogitized basic dykes. A characteristic feature of this region is an abundance of anorthosites, commonly forming concordant layers tens to hundreds of meters thick and many kilometers long. A regional association of ultramafic rocks, anorthosites and mangerites raises the possibility that these rocks could be part of a disrupted layered complex (Mørk and Krogh, 1987). Since Ti-rich rocks commonly are associated with anorthosites elsewhere, for example at Holsnøy, the anorthosites of Nordfjord might also be spatially associated with Ti-rich rocks that include eclogites.

Only three samples of Nordfjord eclogites have been analysed for rutile. The TiO₂-content is low. A dominant part of the titanium in the rock resides in rutile (Fig. 12). Microscopy shows that a significant portion of the rutile/imenite minerals occur as distinct grains.

However, no indications of eclogites of economic interest have been found in the Nordfjord region.

Eastern Nordfjord region

Bakkesetra

pyroxenite

Map (1:50000): 1218.1

East coord: 350619

North coord: 6872093

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Leivdal**

eclogite

Map (1:50000): 1218.1

East coord: 347819

North coord: 6869893

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sagesetra**

eclogite

Map (1:50000): 1218.1

East coord: 350769

North coord: 6872393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sigrusætra**

gneiss

Map (1:50000): 1218.4

East coord: 329919

North coord: 6872793

Other locality information:

banded gneiss (metasupracrustal gneiss)

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Tippadalen**

maic tuff

Map (1:50000): 1218.1

East coord: 340119

North coord: 6872393

Other locality information:

mafic metatuff (semi-ecl) in cm/dm bands

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Vasslivatn

gneiss

Map (1:50000): 1218.1

UTM-zone: 32

East coord: 344319

Field-work: 1994

North coord: 6875093

Category: 4

Other locality information:

Confid.: open

supracrustal qtz-fsp-bt/ms/ser/chl-schist/-gneiss

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Villevatnet**

dunite

Map (1:50000): 1218.1

UTM-zone: 32

East coord: 351819

Field-work: 1994

North coord: 6871093

Category: 4

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Western Nordfjord region****Aksla, Nordp.**

eclogite

Map (1:50000): 1118.1

UTM-zone: 32

East coord: 305219

Field-work: 1994

North coord: 6874693

Category: 3

Other locality information:

Confid.: open

grt-poor eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Allmenningen**

eclogite

Map (1:50000): 1118.1

UTM-zone: 32

East coord: 302919

Field-work: 1994

North coord: 6869993

Category: 3

Other locality information:

Confid.: open

dark, mica-bearing eclogite in boulder

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Almenningen

eclogite

Map (1:50000): 1118.1 UTM-zone: 32
 East coord: 303119 Field-work: 1992
 North coord: 6869893 Category: 3
 Other locality information: Confid.: open
 Minor, intensively folded eclogite lenses and bands.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Angelshaug**

eclogite

Map (1:50000): 1118.1 UTM-zone: 32
 East coord: 300319 Field-work: 1994
 North coord: 6868993 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Berstaddal**

eclogite

Map (1:50000): 1119.3 UTM-zone: 32
 East coord: 311919 Field-work: 1994
 North coord: 6880093 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Berstaddalen**

gneiss

Map (1:50000): 1119.3 UTM-zone: 32
 East coord: 311899 Field-work: 1994
 North coord: 6880093 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Buholmen, Sa.**

eclogite

Map (1:50000): 1119.3 UTM-zone: 32
 East coord: 313319 Field-work: 1994
 North coord: 6887993 Category: 3
 Other locality information: Confid.: open
 centr. parts of small, fresh ecl

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

E of Almenningen

eclogite

Map (1:50000): 1118.1 UTM-zone: 32
 East coord: 303519 Field-work: 1994
 North coord: 6869993 Category: 3
 Other locality information: Confid.: open
 nice, rel coarse-grained eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flåde**

eclogite

Map (1:50000): 1119.3 UTM-zone: 32
 East coord: 310599 Field-work: 1994
 North coord: 6889793 Category: 3
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Flatraket**

eclogite

Map (1:50000): 1118.1 UTM-zone: 32
 East coord: 303119 Field-work: 1994
 North coord: 6877393 Category: 3
 Other locality information: Confid.: open
 fine-grained eclogitised diabase

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fure**

psammite

Map (1:50000): 1019.2 UTM-zone: 32
 East coord: 298819 Field-work: 1994
 North coord: 6891493 Category: 4
 Other locality information: Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gangeskarneset**

eclogite

Map (1:50000): 1118.1 UTM-zone: 32
 East coord: 301019 Field-work: 1994
 North coord: 6877693 Category: 3
 Other locality information: Confid.: open
 clear-green metaperidotite - eclogite (grt-free) from eclogite lens

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Halsnes

eclogite

Map (1:50000): 1118.1

East coord: 294419

North coord: 6872293

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kapellneset**

eclogite

Map (1:50000): 1118.4

East coord: 297819

North coord: 6877093

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Klubbeholmen**

eclogite

Map (1:50000): 1119.3

East coord: 310299

North coord: 6881293

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kroken**

eclogite

Map (1:50000): 1118.1

East coord: 308219

North coord: 6870493

Other locality information:

Coars-grained eclogite (roadcut).

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Maurstad**

eclogite

Map (1:50000): 1118.1

East coord: 313719

North coord: 6872793

Other locality information:

ecl from northern roadcut

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

N of Selje

eclogite

Map (1:50000): 1119.3

UTM-zone: 32

East coord: 309019

Field-work: 1994

North coord: 6885593

Category: 3

Other locality information:

Confid.: open

ecl in small lenses, only descr,no sample

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nakkeneset**

eclogite

Map (1:50000): 1118.4

UTM-zone: 32

East coord: 293569

Field-work: 1994

North coord: 6872393

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nesholmane,S.**

eclogite

Map (1:50000): 1119.3

UTM-zone: 32

East coord: 313219

Field-work: 1994

North coord: 6888193

Category: 3

Other locality information:

Confid.: open

ecl in small lens,ca 3m long

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nordpollen**

psammite

Map (1:50000): 1118.1

UTM-zone: 32

East coord: 306119

Field-work: 1994

North coord: 6874893

Category: 4

Other locality information:

Confid.: open

metapsammite hosting ecl lens

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Nybø,Sørpollen**

eclogite

Map (1:50000): 1118.1

UTM-zone: 32

East coord: 301619

Field-work: 1994

North coord: 6872593

Category: 3

Other locality information:

Confid.: open

nice Opx-eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Oppedal

eclogite

Map (1:50000): 1118.4

East coord: 293919

North coord: 6877043

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Otnheimneset**

gneiss

Map (1:50000): 1119.3

East coord: 311399

North coord: 6889393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 4

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Rekvikneset**

eclogite

Map (1:50000): 1119.3

East coord: 311999

North coord: 6888593

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Salt**

eclogite

Map (1:50000): 1119.3

East coord: 308799

North coord: 6882393

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sandvikneset**

eclogite

Map (1:50000): 1119.3

East coord: 313219

North coord: 6887893

Other locality information:
ecl from small lens, central facies

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Skavøypollen

eclogite

Map (1:50000): 1118.1

East coord: 297119

North coord: 6870893

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stokkenes**

eclogite

Map (1:50000): 1119.3

East coord: 315799

North coord: 6885693

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Straumen,Sørp.**

eclogite

Map (1:50000): 1118.1

East coord: 301419

North coord: 6874493

Other locality information:

retrograded epidote-rich basite - semi-eclogite

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Totland**

eclogite

Map (1:50000): 1118.1

East coord: 309719

North coord: 6871193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vemmålsvik**

eclogite

Map (1:50000): 1118.1

East coord: 298719

North coord: 6869093

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Verpeneset

eclogite

Map (1:50000): 1118.1

East coord: 300619

North coord: 6869193

Other locality information:

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***ytre Stadland**

eclogite

Map (1:50000): 1019.2

East coord: 301319

North coord: 6891293

Other locality information:

lens, ca 2m diameter of ecl altered from gabbro in sst

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Årsheimneset**

eclogite

Map (1:50000): 1119.3

East coord: 314119

North coord: 6887393

Other locality information:

nice,hard,massive ecl

UTM-zone: 32

Field-work: 1994

Category: 3

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Other regions

In the Rausand district (Fig. 14) large volumes of vanadium-bearing magnetite-ilmenite ore are associated with amphibolites surrounded by a variety of gneisses (see Sanetra, 1985). A possibility that remains to be tested is that such magnetite-ilmenite ores have been the protoliths for Fe-Ti rich eclogites elsewhere in the region, perhaps resulting in large volumes of rutile-rich eclogites.

At Dalsfjell in the Gulen area between the Holsnøy and Dalsfjord regions a large gabbro has been incompletely eclogitized. The TiO₂-contents are in the range 1-4% with 50-80% of the titanium as rutile (Korneliussen, 1989). The largest eclogites in this area occur at Slengesol, Nordal and Kjølby (also called Kjellbu) where the eclogitized areas are up to 3-400 m long and 100 m wide.

Westwards from Dalsfjord a number of eclogite localities are known on the island of Byrknesøy. The main eclogite body at Byrknesøy is an approx. 1 km long eclogite body called Vetten, which was sampled by the DuPont-NGU project in 1995 (the information from this deposit is confidential out 2000).

No area defined

Rekvikdal

granite

Map (1:50000):

East coord: 859661

North coord: 7763919

Other locality information:

Bergarkiv no V 325

UTM-zone: 34

Field-work:

Category: 3

Confid.:

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vatnefjord 1**

granite

Map (1:50000): 1131.1

East coord: 724048

North coord: 7590497

Other locality information:

No information available

UTM-zone: 33

Field-work:

Category: 3

Confid.:

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Vatnefjord 2**

granite

Map (1:50000): 1131.1

East coord: 724347

North coord: 7590627

Other locality information:

No information available

UTM-zone: 33

Field-work:

Category: 3

Confid.:

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Permian Oslo Rift

Southern part of the Oslo Permian province

Loc K120.99

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 541200

North coord: 6550300

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Loc K121.99

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 541100

North coord: 6551000

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K122.99**

basalt

Map (1:50000): 1713.2

East coord: 541100

North coord: 6553400

Other locality information:

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K123.99**

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 541600

North coord: 6552700

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc K124.99**

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 542400

North coord: 6552400

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc. K125.99**

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 546000

North coord: 6550200

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Loc. K126.99

Larvikite (plag.rock)

Map (1:50000): 1713.2

East coord: 546000

North coord: 6550200

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Loc. K129.99**

Larvikite (plag.rock)

Map (1:50000): 1813.3

East coord: 559600

North coord: 6566800

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Stueåsen**

Larvikite (plag.rock)

Map (1:50000): 1813.3

East coord: 560200

North coord: 6557300

Other locality information:

Road-cut with white (altered) "anorthosite"

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Rogaland anorthosite province

The Rogaland anorthosite province (Fig. 21) is characterised by massif-type anorthosites and a large layered jotunitic intrusion (the Bjerkreim-Sokndal intrusion). It occurs in the Proterozoic Sveconorwegian Province, generally correlated with the Grenville Province in North America, where voluminous anorthosite massifs together with several of the largest ilmenite deposits in the World occur. In Rogaland, two major parental magmas are invoked to explain the whole anorthosite suite of rocks (Duchesne et al. 1987). These are a high-alumina basaltic magma that has given rise to the massive anorthosites, and a jotunitic magma that has differentiated into the Bjerkreim-Sokndal layered series of anorthosite/leuconorite – norite – gabbronorite – mangerite cumulates topped by quartz mangerites and charnockites (Wilson et al. 1996; Duchesne and Wilmart 1997). Ti-Fe oxide deposits are widespread in the province, and are primarily found as ilmenite rich, cumulate noritic rocks, or as a variety of ilmenite – magnetite rich dykes (Duchesne 1999). The major plutonism took place between 932 and 920 Ma (Schärer et al. 1996) 50-60 Ma after the last major regional deformation. The anorthosites have thus escaped tectonic reworking, in sharp contrast to most North American occurrences. Thus they are in their pristine state, providing an unique opportunity to study primary relations between anorthosites and ilmenite deposits, and more globally to address the geodynamics of anorthosite magmatism.

There is a long tradition for ilmenite mining in the Rogaland anorthosite province, starting in 1785 in the Egersund area where ilmenite ore was mined as iron ore. After pioneering research on utilising the Ti contents of the ilmenite, an industrial method of producing a white TiO₂ pigment today known as the sulphate process, was developed (Jonsson 1892), and the company Titania A/S started a titanium mining operation at the Storgangen deposit in 1917. In 1963 the production continued at the nearby Tellnes deposit. The present mining at Tellnes has an annual production of 500,000 – 600,000 t. ilmenite concentrate containing 44.7% TiO₂. This is 6-7% of the World's mine production of titanium minerals in contained TiO₂. The Tellnes ore body (> 300 Mt.) is one of the largest individual titanium deposit in the world, containing approximately 15 % of the Worlds reserves of titanium.

The Tellnes ilmenite norite orebody has a sickle-shaped outcrop (2700 m long and more than 400m wide in its central part) and is intruded into the Åna-Sira anorthosite. It is spatially associated with a series of slightly older jotunitic to mangeritic dykes. U-Pb ages on zircon and baddeleyite from the ilmenite ore-body are 920 Ma, thus distinctly younger than the surrounding anorthosite (932 Ma) and the jotunitic dyke (931 Ma) (Schärer et al 1996). It is suggested that the deposit was injected as a crystal mush lubricated by interstitial Fe-Ti-rich silicate liquid (Wilmart et al. 1989).

Other mineral deposits exploited in the province are jotunitic rocks mined for aggregate, white, hydrothermal alteration anorthosite, mined for aggregate, some varieties of anorthosite are mined for dimension stone.

Large volumes of anorthosite, particularly in the coastal parts of the province, consists of white, altered anorthosites. At Hellevik and Rekevik such anorthosites are being mined for aggregate. The white anorthosites have formed by the break-down of plagioclase to fine-grained aggregates of albite, quartz and white mica along fracture zones in various scales. In some areas several km² of white anorthosites have formed by this mechanism.

NGU is presently running a project on mapping and characterisation of white anorthosites in the Rogaland anorthosite province paid by the Rogaland county. Because several competing companies have an interest in this rocks for aggregate production, it has been decided to keep the information obtained so far within this project confidential until the realise of a report and map in the spring 2000.

The white anorthosites in the coastal areas have a low Ti-content (< 1 % TiO₂), in contrast to some anorthosite varieties further inland that might contain distinct dissemination of ilmenite. In some cases ilmenite has been replaced by rutile + titanite, as illustrated in Figs. 22 & 23. Rutile mineralisations that in size and quality might have a chance of becoming of economic interest have not been identified.

However, the mapping and understanding of the white (albiteised) anorthosites have just started, and there are still large areas that have not been investigated. The possibility of significant rutile deposits associated with hydrothermal alteration of anorthosites cannot be ruled out at present.

Eastern Rogaland anorthosite province

Garsaknatten

anorthosite

Map (1:50000): 1311.4

East coord: 354400

North coord: 6472900

Other locality information:

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Garsaknatten 2

anorthosite
 Map (1:50000): 1311.4 UTM-zone:
 East coord: 354300 Field-work: 1999
 North coord: 6473000 Category: 4
 Other locality information: Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Garsaknatten 3**

anorthosite
 Map (1:50000): 1311.4 UTM-zone:
 East coord: 353800 Field-work: 1999
 North coord: 6473200 Category: 4
 Other locality information: Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Håskog**

anorthosite
 Map (1:50000): 1311.4 UTM-zone:
 East coord: 351700 Field-work: 1999
 North coord: 6462700 Category: 4
 Other locality information: Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Igletjørna**

anorthosite
 Map (1:50000): 1311.4 UTM-zone:
 East coord: 337300 Field-work: 1999
 North coord: 6468800 Category: 4
 Other locality information: Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Mong**

Anorthosite
 Map (1:50000): 1311.4 UTM-zone:
 East coord: 339400 Field-work: 1999
 North coord: 6468800 Category: 4
 Other locality information: Confid.: open 2
 Road-cut with white (altered) "anorthosite"

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Rekefjord

anorthosite

Map (1:50000): 1311.4

East coord: 339400

North coord: 6468800

Other locality information:

Altered anorthosite

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ålgård**

anorthosite

Map (1:50000): 1311.4

East coord: 345200

North coord: 6874500

Other locality information:

Distinct alteration of anorthosite (road-cuts)

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Åna-Sira**

anorthosite

Map (1:50000): 1311.4

East coord: 349800

North coord: 6463800

Other locality information:

UTM-zone:

Field-work: 1999

Category: 4

Confid.: open 2

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Eastern Rogaland anorthosite province 2**

Map (1:50000):

East coord:

North coord:

Other locality information:

UTM-zone:

Field-work:

Category:

Confid.:

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Northern Rogaland anorthosite province**

Map (1:50000):	UTM-zone:	<i>Field Photograph 1:</i>
East coord:	Field-work:	
North coord:	Category:	<i>Field Photograph 2:</i>
Other locality information:	Confid.:	
		<i>Field Photograph 3:</i>

Western Rogaland anorthosite province

Hellevik

anorthosite		<i>Field Photograph 1:</i>
Map (1:50000): 1212.2	UTM-zone:	
East coord: 320500	Field-work: 1999	
North coord: 6488600	Category: 4	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open 2	
		<i>Field Photograph 3:</i>

Kydland

anorthosite		<i>Field Photograph 1:</i>
Map (1:50000): 1211.1	UTM-zone: 32	
East coord: 333300	Field-work: 1999	
North coord: 6478800	Category: 4	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open 2	
Hydrothermally altered, relatively Ti-rich anorthosite		<i>Field Photograph 3:</i>

Odden

anorthosite		<i>Field Photograph 1:</i>
Map (1:50000): 1211.1	UTM-zone:	
East coord: 328500	Field-work: 1999	
North coord: 6475400	Category: 4	<i>Field Photograph 2:</i>
Other locality information:	Confid.: open 2	
		<i>Field Photograph 3:</i>

Romsdal region

Eclogites in the Romsdal region (Fig. 16) are rather scarce, presumably due to lesser amounts of favorable basic protoliths. Eclogites in the Lesja district tend to be fairly titanium-rich (3-4% TiO₂). Many of the eclogite bodies are small, but some may be large (covering areas of more than 100,000 m²). However, the rutile portion of the titanium is low due to significant retrogression that causes rutile alteration to ilmenite and also to titanite.

Lesja area (E Romsdal region)

Brue

eclogite

Map (1:50000): 1319.1

UTM-zone: 32

East coord: 454919

Field-work: 1992

North coord: 6909793

Category: 3

Other locality information:

Confid.: open

70-80m roadcut. Eclogite/garnet amphibolite at various stages of retrogression. Rutile is intergrown with ilmenite. Sphene occurs along the rims of rutile+ilmenite grains and as individual grains. SIZE: unknown.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Gruvlisæter**

eclogite

Map (1:50000): 1419.3

UTM-zone: 32

East coord: 471319

Field-work: 1992

North coord: 6899393

Category: 3

Other locality information:

Confid.: open

Gruvlisæter area: Magnetite-ilmenite mineralizations associated with amphibolite layers and lenses in gneiss. Samples: A (banded host-rock gneiss), B (amphibolite), C (massive Fe-Ti ore), D (gneiss with bands rich in Fe-Ti oxides), E (garnet-rich gneiss). SIZE: minor.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kleiva**

eclogite

Map (1:50000): 1319.1

UTM-zone: 32

East coord: 454819

Field-work: 1992

North coord: 6906893

Category: 3

Other locality information:

Confid.: open

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Kleiva 2**

eclogite

Map (1:50000): 1319.1

UTM-zone: 32

East coord: 454919

Field-work: 1992

North coord: 6907093

Category: 3

Other locality information:

Confid.: open

30-40m roadcut⁹n eclogite at the road to Brue. Same eclogite zone as KL21.92

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Merratind

eclogite

Map (1:50000): 1419.4

UTM-zone: 32

East coord: 475419

Field-work: 1992

North coord: 6904593

Category: 3

Other locality information:

Confid.: open

Boulder of retrograded eclogite. A large eclogite is reported to occur in this area (not found).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Neset area (N Romsdal region)****Rausand**

Fe-Ti ore

Map (1:50000): 1320.1

UTM-zone: 32

East coord: 455419

Field-work: 1992

North coord: 6968293

Category: 3

Other locality information:

Confid.: open

Grey gneiss at the western side of the Rausand amphibolite horizon

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Sundalsfjord area (N Romsdal region)****Vika**

amphibolite

Map (1:50000): 1420.3

UTM-zone: 32

East coord: 474219

Field-work: 1992

North coord: 6953193

Category: 3

Other locality information:

Confid.: open

100m roadcut with amphibolite / garnet amphibolite (retrograded eclogite ?)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ålvund**

amphibolite

Map (1:50000): 1420.4

UTM-zone: 32

East coord: 474319

Field-work: 1992

North coord: 6967493

Category: 3

Other locality information:

Confid.: open

50-80m roadcut with amphibolite / garnet amphibolite (retrogressed eclogite ?)

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Sognefjord region

NW Sognefjord region

Veten (Lavik)

eclogite

Map (1:50000): 1117.2

UTM-zone: 32

East coord: 307119

Field-work: 1995

North coord: 6777593

Category: 3

Other locality information:

Confid.: open

Large eclogite lens (see map from Øyvind Skår). Chip-samples and XMET-analyses.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

SW Sognefjord region

Byrknesøy

eclogite

Map (1:50000): 1116.4

UTM-zone: 32

East coord: 277419

Field-work: 1995

North coord: 6757093

Category: 2

Other locality information:

Confid.: open

Large eclogite, fairly massive, variably retrograded. Surrounded by granitic gneisses. One major km-sized eclogite and several comparably minor eclogite localities (see map from Øyvind Skår). The overall impression is that this eclogite is fairly Ti-rich, but retrograded. The field-impression is that the surrounding granite has intruded (?) the eclogite protolith, followed by deformation and eclogitization, and then retrogression. The eclogitization have been complete showing no relics of gabbroic rocks.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Slengesol

eclogite

Map (1:50000): 1116.1

UTM-zone: 32

East coord: 292719

Field-work: 1994

North coord: 6761593

Category: 3

Other locality information:

Confid.: open

300-400m long and 50+m broad zone of eclogite surrounded by uncompletely eclogitized gabbro. TiO₂-contents are in the range 1-4%. 50-80% of the titanium in the rock is estimated to be as rutile. See Korneliussen (1989). SIZE: intermediate.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ålesund region

One large eclogite in the Ulsteinvik area (Fig. 13) forms a sheet of approximately 25 km², but is only about 300 m thick (Grønlie et al., 1972). The chemical composition is transitional alkali olivine basalt and olivine tholeiite (Mysen & Heier, 1972). The metamorphic peak has been estimated at ca 800°C, 18 kb by Griffin et al. (1982). The Ulsteinvik and other eclogites in the area tend to be fairly retrograded and low in TiO₂. An exception is an eclogite at Aurvåg that shows X-MET TiO₂-values varying between 2-3% and 15% (mainly ilmenite) over a 2-3m thick zone in a 200-300 m long eclogite body that contains approx. 2% TiO₂ in average.

In the Volda district south-east of Ulsteinvik, a number of relatively small eclogites are known, and some of these are believed to be eclogitized remnants of Proterozoic layered intrusions (cf. Erambert, 1985). Decimeter-thick layers within mafic and ultramafic eclogitized layered rocks have occasionally a few percent rutile (samples given to A. Korneliussen by M. Erambert in 1990).

At Vassbotn a few kilometers north of the town of Volda a fairly large and extremely garnet-rich eclogite outcrops on a mountain slope. The TiO₂-content is 2-3%, mainly in the form of rutile. The company Novemco has recently investigated this deposit for garnet. The mineralogical features of the Vassbotn eclogite are comparable to those of Ti-rich layers in layered, eclogitized mafic intrusions elsewhere in the Volda district (Muriel Erambert, pers. comm. 1994).

Good indications of eclogites of economic interest for rutile has not been found in the Ålesund region.

Nerlandsøy area (W Ålesund region)

Teigetuva

eclogite

Map (1:50000): 1119.4

UTM-zone: 32

East coord: 323619

Field-work: 1994

North coord: 6918593

Category: 3

Other locality information:

Confid.: open

A relatively small body of garnet-rich, retrograded eclogite that is investigated by Stokke Industri (Garnet A/S) for garnet production.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Nordøyane area (NW Ålesund region)

Fjørtoft

eclogite

Map (1:50000): 1220.3

UTM-zone: 32

East coord: 366919

Field-work: 1994

North coord: 6954793

Category: 3

Other locality information:

Confid.: open

Several small eclogite bodies on the island Fjørtoft.

Field Photograph 1:

Field Photograph 2:

Field Photograph 3:

Ulsteinvik area (W Ålesund region)

Aurvåg

eclogite

Map (1:50000): 1119.1

UTM-zone: 32

East coord: 332019

Field-work: 1993

North coord: 6909593

Category: 3

Other locality information:

Confid.: open

50m long roadcut in eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Dimnøy**

eclogite

Map (1:50000): 1119.1

UTM-zone: 32

East coord: 335919

Field-work: 1992

North coord: 6912993

Category: 3

Other locality information:

Confid.: open

The Ulsteinvik eclogite body forms a fairly flatlying sheet of approximately 6 x 4 km (Appendix 4.5) but only about 300 m thick, and is folded in a E-W synform running through Ulsteinvik (Grønlie et al. 1972). It is internally layered. The chemical composition is transitional alkali olivine basalt to olivine tholeiite, but may have been modified by alkali loss during dehydration/metamorphism (Mysen & Heier 1972). The metamorphic peak has been estimated at c.800°C, 18 kb by Griffin et al. 1982. At sample locality KU5.92 coarse-grained, significantly retrograded eclogite, slightly banded, from a roadcut near the margin of the Ulsteinvik eclogite body. The garnet rims show beginning alteration to amphibole (Appendix 3.7). Minor relicts of small rutile grains occur as inclusions in garnet. Outside the garnet crystals rutile is completely altered to ilmenite. Some very fine-grained black mineral (dust-like) is probably magnetite formed during the retrogression process.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fosnavåg 1**

eclogite

Map (1:50000): 1119.4

UTM-zone: 32

East coord: 326919

Field-work: 1993

North coord: 6915793

Category: 3

Other locality information:

Confid.: open

Coarse-grained, retrograded eclogite.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Fosnavåg 2**

eclogite

Map (1:50000): 1119.4

UTM-zone: 32

East coord: 325319

Field-work: 1993

North coord: 6915193

Category: 3

Other locality information:

Confid.: open

Coarse-grained eclogite

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Seljeset

eclogite

Map (1:50000): 1119.3 UTM-zone: 32
 East coord: 328819 Field-work: 1993
 North coord: 6903293 Category: 3
 Other locality information: Confid.: open
 Disseminated Fe-Ti oxides in 30-40 m thick amphibolite zone within migmatitic gneisses.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Ulsteinvik**

eclogite

Map (1:50000): 1119.1 UTM-zone: 32
 East coord: 335919 Field-work: 1992
 North coord: 6912993 Category: 3
 Other locality information: Confid.: open
 Coarse-grained, weakly banded, retrograded eclogite from a roadcut near the margin of the Ulsteinvik eclogite massive. Generally eclogites in the area are relatively coarse-grained, weakly banded and significantly retrograded. The TiO₂-content is 1-2 % in general based on X-MET field-analyses.

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:***Volda area (S. Ålesund region)****Vassbotn**

eclogite

Map (1:50000): 1119.2 UTM-zone: 32
 East coord: 351800 Field-work: 1994
 North coord: 6892000 Category: 2
 Other locality information: Confid.: open
 This is a fairly large deposit of a very coarse and garnet-rich eclogite in a mountain slope 300-400 m.a.s.l. only a few km NE of the town of Volda. The eclogite have experienced a variable degree of retrogression; the original omphacitic clinopyroxene is altered to symplectitic aggregates of diopside, hornblende and plagioclase, or completely altered to hornblende. Rutile is the dominant titanium mineral. The upper photograph in Appendix 3.19 (sample VP4) show a big rutile grain surrounded by big garnet crystals. In the lower photograph rutile can be seen mantled by a rim of sphene in a significantly retrogressed sample (VP6) from the Vassbotn eclogite. 7 samples have been analysed for rutile (NGUs rutile analytical procedure) giving values from 0.78 to 2.51% rutile (average 1.63% rutile with 63% of the TiO₂ as rutile). SIZE: big (approx. 100.000 m²).

*Field Photograph 1:**Field Photograph 2:**Field Photograph 3:*

Appendix 4:

Grain-Size Intervals

Standard printout from Rutile-99 (RTIT).mdb

- The grain-size parameters (DCIRCLE) are based on image processing of optical images. The metode give rough information of the grain-size distribution.
- "Dust" less than 3 pixels in the original images, equivalent to approximately 40 microns, have been removed. Numbers for the interval < 50 microns are therefore too small.
- This method does not distinguish between rutile, ilmenite and sulfides.

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM

Bamble region

Kragerø area (E Bamble region)

Gjerstadvatnet

KB43A.91	99	0.24	2.66	3.14	2.66	4.11	87.20	100.00	0.01	0.06	0.07	0.06	0.09	1.80	2.07
<i>Average Locality:</i>	99	0.24	2.66	3.14	2.66	4.11	87.20	100.00	0.01	0.06	0.07	0.06	0.09	1.80	2.07

Haukåsen

KB9.91		0.71	2.13	3.55	4.96	10.64	78.01	100.00	0.01	0.01	0.03	0.04	0.07	0.55	0.70
<i>Average Locality:</i>		0.71	2.13	3.55	4.96	10.64	78.01	100.00	0.01	0.01	0.03	0.04	0.07	0.55	0.70

Krefjell

KB8A.91	425	0.19	1.48	1.72	1.86	1.67	93.08	100.00	0.04	0.28	0.32	0.35	0.31	17.28	18.57
KB8B.91	40	0.00	0.56	1.12	0.28	0.84	97.19	100.00	0.00	0.02	0.04	0.01	0.03	3.46	3.56
<i>Average Locality:</i>	233	0.09	1.02	1.42	1.07	1.26	95.13	100.00	0.02	0.15	0.18	0.18	0.17	10.37	11.06

Laget

KB10A.91		1.84	6.13	3.07	6.13	0.00	82.82	100.00	0.01	0.05	0.03	0.05	0.00	0.68	0.82
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SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
<i>Average Locality:</i>		1.84	6.13	3.07	6.13	0.00	82.82	100.00	0.01	0.05	0.03	0.05	0.00	0.68	0.82

Lindvikkollen

KB11B.91	551	0.56	5.72	11.07	10.04	11.63	60.98	100.00	0.03	0.30	0.59	0.54	0.62	3.25	5.33
<i>Average Locality:</i>	551	0.56	5.72	11.07	10.04	11.63	60.98	100.00	0.03	0.30	0.59	0.54	0.62	3.25	5.33

Løfthaug

KB1A.91		0.73	8.41	14.39	11.95	10.98	53.54	100.00	0.03	0.35	0.59	0.49	0.45	2.19	4.10
<i>Average Locality:</i>		0.73	8.41	14.39	11.95	10.98	53.54	100.00	0.03	0.35	0.59	0.49	0.45	2.19	4.10
<i>Average Area:</i>	279	0.61	3.87	5.44	5.41	5.69	78.97	100.00	0.02	0.15	0.24	0.22	0.22	4.17	5.02

Vegårdshei area (W Bamble region)**Fone**

KB5E.91	76	0.58	4.68	5.26	15.79	11.70	61.99	100.00	0.01	0.04	0.04	0.14	0.10	0.53	0.85
<i>Average Locality:</i>	76	0.58	4.68	5.26	15.79	11.70	61.99	100.00	0.01	0.04	0.04	0.14	0.10	0.53	0.85
<i>Average Area:</i>	76	0.58	4.68	5.26	15.79	11.70	61.99	100.00	0.01	0.04	0.04	0.14	0.10	0.53	0.85

Ødegård area (E. Bamble region)**Ødegården 1a**

1Ø/26.15	11	0.00	2.74	1.37	0.00	0.00	95.89	100.00	0.00	0.01	0.01	0.00	0.00	0.35	0.36
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SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
1Ø/35.30	242	0.34	3.95	7.73	12.37	8.76	66.84	100.00	0.01	0.12	0.23	0.36	0.26	1.95	2.91
1Ø/5.40	258	1.04	7.45	7.04	6.83	6.83	70.81	100.00	0.03	0.18	0.17	0.17	0.17	1.71	2.42
1Ø/50.20	222	1.19	7.76	10.45	11.34	9.55	59.70	100.00	0.02	0.13	0.18	0.19	0.16	1.00	1.68
1Ø/67.25	260	1.37	12.33	16.10	11.99	14.04	44.18	100.00	0.02	0.18	0.24	0.18	0.21	0.65	1.46
1Ø/9.40	374	2.50	10.83	8.75	7.29	7.92	62.71	100.00	0.06	0.26	0.21	0.18	0.19	1.51	2.40
2Ø/26.60	396	3.77	13.62	15.36	15.94	10.43	40.87	100.00	0.07	0.24	0.27	0.28	0.18	0.70	1.73
2Ø/28.70	645	2.38	16.82	20.11	13.71	12.98	34.00	100.00	0.07	0.46	0.55	0.38	0.35	0.93	2.73
2Ø/29.30	840	3.76	24.44	21.80	16.92	14.85	18.23	100.00	0.10	0.65	0.58	0.45	0.40	0.48	2.66
2Ø/29.90	1 202	10.91	29.84	18.93	13.58	11.32	15.43	100.00	0.27	0.72	0.46	0.33	0.28	0.38	2.43
2Ø/30.15	492	2.21	13.28	15.90	14.49	11.67	42.45	100.00	0.06	0.33	0.40	0.36	0.29	1.05	2.48
2Ø/32.15	128	0.33	2.67	3.33	4.67	2.00	87.00	100.00	0.01	0.08	0.10	0.14	0.06	2.61	3.00
2Ø/32.25	148	0.78	3.13	1.56	2.82	1.25	90.45	100.00	0.03	0.10	0.05	0.09	0.04	2.89	3.20
2Ø/34.55	941	7.35	35.07	20.85	13.98	4.03	18.72	100.00	0.16	0.74	0.44	0.29	0.09	0.40	2.11
2Ø/48.10	155	7.14	51.79	23.21	7.14	10.71	0.00	100.00	0.02	0.14	0.07	0.02	0.03	0.00	0.28
2Ø/51.90	34	0.00	3.70	11.11	4.94	3.70	76.54	100.00	0.00	0.01	0.04	0.02	0.01	0.31	0.41
2Ø/58.45	91	0.48	3.85	13.46	8.65	6.25	67.31	100.00	0.01	0.04	0.14	0.09	0.07	0.70	1.04
2Ø/6.20	473	3.08	19.05	22.69	16.81	18.77	19.61	100.00	0.06	0.34	0.41	0.30	0.34	0.35	1.79
2Ø/61.65	46	9.09	27.27	13.64	22.73	27.27	0.00	100.00	0.01	0.03	0.01	0.03	0.03	0.00	0.11
2Ø/67.90	68	0.00	1.82	2.12	2.12	9.09	84.85	100.00	0.00	0.03	0.04	0.04	0.15	1.40	1.65
2Ø/68.30	13	0.00	100.00	0.00	0.00	0.00	0.00	100.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
2Ø/77.90	156	1.02	9.69	14.80	16.33	14.29	43.88	100.00	0.01	0.10	0.14	0.16	0.14	0.43	0.98
2Ø/81.41	365	2.47	18.96	10.71	5.49	1.65	60.71	100.00	0.04	0.35	0.20	0.10	0.03	1.11	1.82
2Ø/85.45	119	1.09	4.00	7.64	5.82	8.73	72.73	100.00	0.01	0.06	0.11	0.08	0.12	1.00	1.38
2Ø/91.45	116	2.19	10.95	9.49	8.76	10.22	58.39	100.00	0.01	0.07	0.07	0.06	0.07	0.40	0.69
<i>Average Locality:</i>	312	2.58	17.40	11.93	9.79	9.05	49.25	100.00	0.04	0.22	0.20	0.17	0.15	0.89	1.67

Ødegården 1b

KB12.91	294	0.57	5.89	11.03	15.21	13.12	54.18	100.00	0.01	0.16	0.29	0.40	0.35	1.43	2.63
KB12J.91	300	0.74	7.98	10.39	8.53	8.35	64.01	100.00	0.02	0.22	0.28	0.23	0.23	1.73	2.69
<i>Average Locality:</i>	297	0.66	6.94	10.71	11.87	10.73	59.09	100.00	0.02	0.19	0.29	0.32	0.29	1.58	2.66

Ødegården 3

KB37A.91		0.73	8.41	14.39	11.95	10.98	53.54	100.00	0.03	0.35	0.59	0.49	0.45	2.19	4.10
<i>Average Locality:</i>		0.73	8.41	14.39	11.95	10.98	53.54	100.00	0.03	0.35	0.59	0.49	0.45	2.19	4.10

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)							
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM	
Øydegårdsvatnet																
KB14C.91		0.77	4.62	4.44	5.21	5.66	79.29	100.00	0.09	0.51	0.49	0.58	0.63	8.75	11.04	
<i>Average Locality:</i>		0.77	4.62	4.44	5.21	5.66	79.29	100.00	0.09	0.51	0.49	0.58	0.63	8.75	11.04	
<i>Average Area:</i>	311	2.32	15.93	11.67	9.85	9.12	51.11	100.00	0.04	0.23	0.23	0.21	0.18	1.25	2.14	
<i>Average Region:</i>	299	1.95	13.34	10.32	9.17	8.54	56.68	100.00	0.04	0.21	0.23	0.21	0.19	1.79	2.65	

Bergen region

Holsnøy area (N Bergen region)

Alverstrømmen

KH50A.89	728	0.00	1.00	1.00	0.82	0.58	96.24	100.00	0.13	0.42	0.39	0.33	0.23	38.05	39.54
<i>Average Locality:</i>	728	0.00	1.00	1.00	0.82	0.58	96.24	100.00	0.13	0.42	0.39	0.33	0.23	38.05	39.54

Askeland

KH52B.89	835	4.00	21.00	20.00	11.27	9.36	34.66	100.00	0.13	0.59	0.57	0.33	0.27	1.00	2.89
<i>Average Locality:</i>	835	4.00	21.00	20.00	11.27	9.36	34.66	100.00	0.13	0.59	0.57	0.33	0.27	1.00	2.89

Buldrevika 3

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
KH59.89	224	5.00	16.00	9.00	10.27	11.35	48.65	100.00	0.04	0.14	0.09	0.10	0.11	0.45	0.93
KH60.89	613	5.00	25.00	13.00	13.28	9.76	33.06	100.00	0.10	0.47	0.25	0.25	0.18	0.61	1.85
<i>Average Locality:</i>	419	5.00	20.50	11.00	11.77	10.55	40.86	100.00	0.07	0.30	0.17	0.17	0.14	0.53	1.39

Havrevåg

KH14A.89	375	1.00	4.00	5.00	3.74	2.85	82.68	100.00	0.05	0.23	0.27	0.19	0.14	4.20	5.08
<i>Average Locality:</i>	375	1.00	4.00	5.00	3.74	2.85	82.68	100.00	0.05	0.23	0.27	0.19	0.14	4.20	5.08

Havrevåg 2

KH17.89	475	2.00	9.00	11.00	7.15	9.82	62.13	100.00	0.06	0.30	0.39	0.26	0.35	2.21	3.56
<i>Average Locality:</i>	475	2.00	9.00	11.00	7.15	9.82	62.13	100.00	0.06	0.30	0.39	0.26	0.35	2.21	3.56

Husebø

KH2A.89	555	3.00	16.00	16.00	9.39	12.01	43.45	100.00	0.08	0.37	0.35	0.22	0.28	1.00	2.29
KH2B.89	629	5.00	17.00	14.00	11.21	4.86	47.99	100.00	0.11	0.41	0.33	0.27	0.12	1.14	2.37
KH2C.89	435	3.00	17.00	16.00	7.37	8.16	48.16	100.00	0.06	0.33	0.31	0.14	0.16	0.92	1.90
<i>Average Locality:</i>	540	3.67	16.67	15.33	9.32	8.34	46.53	100.00	0.08	0.37	0.33	0.21	0.18	1.01	2.19

Kårbo

KH22.89	524	3.00	16.00	16.00	10.85	14.89	39.79	100.00	0.07	0.37	0.38	0.26	0.35	0.94	2.35
<i>Average Locality:</i>	524	3.00	16.00	16.00	10.85	14.89	39.79	100.00	0.07	0.37	0.38	0.26	0.35	0.94	2.35

Odland 2

KH62A.89	283	3.00	14.00	14.00	17.05	17.83	34.50	100.00	0.04	0.18	0.19	0.22	0.23	0.45	1.29
KH62C.89	782	8.00	35.00	26.00	15.25	6.74	9.38	100.00	0.13	0.59	0.45	0.26	0.12	0.16	1.71
<i>Average Locality:</i>	533	5.50	24.50	20.00	16.15	12.29	21.94	100.00	0.08	0.39	0.32	0.24	0.17	0.30	1.50

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)							
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM	
Odland 3																
KH62.89	808	3.00	9.00	7.00	4.72	5.51	71.06	100.00	0.08	0.22	0.17	0.12	0.14	1.80	2.54	
<i>Average Locality:</i>	808	3.00	9.00	7.00	4.72	5.51	71.06	100.00	0.08	0.22	0.17	0.12	0.14	1.80	2.54	
Sætrevik Ø																
KH63A.89	445	3.00	12.00	11.00	7.60	6.63	61.01	100.00	0.07	0.29	0.28	0.20	0.17	1.56	2.56	
KH63B.89	257	1.00	6.00	11.00	12.04	9.46	60.22	100.00	0.02	0.14	0.27	0.28	0.22	1.40	2.33	
KH63E.89	453	5.00	25.00	20.00	14.72	8.30	26.42	100.00	0.07	0.34	0.27	0.20	0.11	0.35	1.33	
<i>Average Locality:</i>	385	3.00	14.33	14.00	11.45	8.13	49.21	100.00	0.05	0.26	0.27	0.22	0.17	1.11	2.07	
Ådnefjell																
KH54B.89	462	6.00	24.00	22.00	10.29	6.62	30.51	100.00	0.08	0.33	0.30	0.14	0.09	0.42	1.36	
KH54C.89	765	1.00	9.00	9.00	8.65	6.98	65.17	100.00	0.09	0.53	0.55	0.52	0.42	3.92	6.02	
KH54D.89	724	1.00	8.00	9.00	7.55	5.66	68.71	100.00	0.08	0.50	0.57	0.48	0.36	4.37	6.36	
KH55.89	212	0.00	3.00	4.00	2.46	3.98	86.42	100.00	0.01	0.14	0.16	0.11	0.17	3.69	4.27	
<i>Average Locality:</i>	541	2.00	11.00	11.00	7.24	5.81	62.70	100.00	0.07	0.37	0.39	0.31	0.26	3.10	4.50	
Ådnefjell 4																
KH56A.89	325	1.00	7.00	9.00	5.98	6.73	70.70	100.00	0.04	0.23	0.29	0.20	0.23	2.37	3.35	
KH56B.89	1 043	1.00	10.00	9.00	7.87	4.45	67.68	100.00	0.11	0.80	0.73	0.65	0.36	5.55	8.20	
KH56C.89	753	2.00	11.00	10.00	6.22	6.88	64.18	100.00	0.09	0.56	0.56	0.33	0.36	3.41	5.30	
KH56D.89	515	1.00	5.00	6.00	5.25	5.72	77.27	100.00	0.06	0.34	0.36	0.34	0.36	4.93	6.38	
KH56E.89	575	1.00	7.00	6.00	6.00	6.34	73.35	100.00	0.07	0.41	0.35	0.35	0.37	4.28	5.84	
KH56F.89	647	1.00	5.00	5.00	6.55	3.84	77.72	100.00	0.10	0.38	0.36	0.46	0.27	5.46	7.03	
<i>Average Locality:</i>	643	1.17	7.50	7.50	6.31	5.66	71.82	100.00	0.08	0.45	0.44	0.39	0.33	4.33	6.02	
<i>Average Area:</i>	555	2.65	12.77	11.50	8.60	7.51	56.97	100.00	0.07	0.37	0.35	0.27	0.24	3.64	4.95	
<i>Average Region:</i>	555	2.65	12.77	11.50	8.60	7.51	56.97	100.00	0.07	0.37	0.35	0.27	0.24	3.64	4.95	

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM

Dalsfjord region

Eastern Dalsfjord region

Botnatjørna

K292.94	470	6.00	33.00	22.00	17.36	5.79	15.29	100.00	0.07	0.41	0.27	0.21	0.07	0.19	1.21
<i>Average Locality:</i>	470	6.00	33.00	22.00	17.36	5.79	15.29	100.00	0.07	0.41	0.27	0.21	0.07	0.19	1.21

Botnatjørna-East

K295C.94	733	6.00	33.00	27.00	10.92	5.04	17.93	100.00	0.11	0.58	0.48	0.20	0.09	0.32	1.79
<i>Average Locality:</i>	733	6.00	33.00	27.00	10.92	5.04	17.93	100.00	0.11	0.58	0.48	0.20	0.09	0.32	1.79

Djupevatnet

K227A.94	56	4.00	42.00	12.00	7.69	0.00	34.62	100.00	0.01	0.06	0.01	0.01	0.00	0.04	0.13
K227B.94	247	3.00	29.00	16.00	13.29	10.13	29.11	100.00	0.02	0.23	0.13	0.11	0.08	0.23	0.79
K227E.94	217	3.00	41.00	32.00	12.00	6.00	6.00	100.00	0.01	0.21	0.16	0.06	0.03	0.03	0.50
K227F.94	199	1.00	12.00	10.00	13.18	8.11	55.74	100.00	0.01	0.19	0.14	0.20	0.12	0.83	1.48
<i>Average Locality:</i>	180	2.75	31.00	17.50	11.54	6.06	31.37	100.00	0.01	0.17	0.11	0.09	0.06	0.28	0.72

Sagevika

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
K283.94	507	6.00	46.00	28.00	11.11	6.76	1.93	100.00	0.07	0.48	0.29	0.12	0.07	0.02	1.03
<i>Average Locality:</i>	507	6.00	46.00	28.00	11.11	6.76	1.93	100.00	0.07	0.48	0.29	0.12	0.07	0.02	1.03
<i>Average Area:</i>	347	4.14	33.71	21.00	12.22	5.98	22.95	100.00	0.04	0.31	0.21	0.13	0.07	0.24	0.99

Western Dalsfjord region

Hestegardsnova

K291.94	331	11.00	52.00	20.00	5.61	0.00	11.21	100.00	0.06	0.28	0.11	0.03	0.00	0.06	0.54
<i>Average Locality:</i>	331	11.00	52.00	20.00	5.61	0.00	11.21	100.00	0.06	0.28	0.11	0.03	0.00	0.06	0.54

Hovlandsvatnet

K301.94	312	3.00	15.00	11.00	11.78	10.10	48.82	100.00	0.04	0.23	0.17	0.18	0.15	0.72	1.49
<i>Average Locality:</i>	312	3.00	15.00	11.00	11.78	10.10	48.82	100.00	0.04	0.23	0.17	0.18	0.15	0.72	1.49

Ramsgrønova

K222A.94	301	1.00	11.00	8.00	8.95	11.35	59.61	100.00	0.01	0.26	0.19	0.21	0.26	1.37	2.29
K222C.94	271	2.00	20.00	14.00	7.59	6.33	50.21	100.00	0.03	0.24	0.17	0.09	0.07	0.59	1.19
K222D.94	380	1.00	9.00	7.00	4.12	4.92	74.87	100.00	0.03	0.32	0.26	0.16	0.19	2.81	3.76
K222D1.94	340	1.00	9.00	9.00	10.62	9.27	60.04	100.00	0.03	0.25	0.25	0.28	0.24	1.55	2.59
<i>Average Locality:</i>	323	1.25	12.25	9.50	7.82	7.97	61.18	100.00	0.03	0.26	0.21	0.18	0.19	1.58	2.46

Ramsgrøvatnet

K272.94	440	1.00	30.00	24.00	12.26	8.71	23.55	100.00	0.02	0.47	0.37	0.19	0.14	0.36	1.55
<i>Average Locality:</i>	440	1.00	30.00	24.00	12.26	8.71	23.55	100.00	0.02	0.47	0.37	0.19	0.14	0.36	1.55
<i>Average Area:</i>	339	2.86	20.86	13.29	8.71	7.24	46.90	100.00	0.03	0.29	0.21	0.16	0.15	1.07	1.91

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
<i>Average Region:</i>	343	3.50	27.29	17.14	10.46	6.61	34.92	100.00	0.04	0.30	0.21	0.14	0.11	0.65	1.45

Førdefjord region

Northern Førdefjord region

Botnarusta

K303.94	441	3.00	30.00	25.00	18.96	14.50	8.55	100.00	0.04	0.41	0.34	0.26	0.20	0.12	1.35
<i>Average Locality:</i>	441	3.00	30.00	25.00	18.96	14.50	8.55	100.00	0.04	0.41	0.34	0.26	0.20	0.12	1.35

Engøbøfjellet

1/126.5	665	5.00	40.00	31.00	11.07	7.72	4.36	100.00	0.08	0.60	0.47	0.17	0.12	0.07	1.49
13/140.0	1 497	10.00	49.00	24.00	12.73	3.08	0.82	100.00	0.25	1.19	0.59	0.31	0.07	0.02	2.44
13/156.0	1 118	8.00	48.00	25.00	10.68	5.58	2.18	100.00	0.17	1.00	0.52	0.22	0.12	0.04	2.06
2/169.0	800	4.00	29.00	24.00	20.90	10.34	11.46	100.00	0.10	0.64	0.54	0.47	0.23	0.26	2.23
4/129.9	1 048	4.00	12.00	9.00	13.99	9.50	51.28	100.00	0.18	0.59	0.47	0.69	0.47	2.51	4.90
5/61.9	610	7.00	34.00	21.00	20.59	13.60	3.31	100.00	0.05	0.23	0.14	0.14	0.09	0.02	0.68
<i>Average Locality:</i>	956	6.33	35.33	22.33	14.99	8.30	12.24	100.00	0.14	0.71	0.45	0.33	0.18	0.49	2.30

Fimlandsgrend

K253B.94	223	1.00	11.00	7.00	7.40	10.06	63.02	100.00	0.01	0.19	0.13	0.13	0.17	1.06	1.69
<i>Average Locality:</i>	223	1.00	11.00	7.00	7.40	10.06	63.02	100.00	0.01	0.19	0.13	0.13	0.17	1.06	1.69

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)							
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM	
Furefjellet																
K308.94	399	7.00	34.00	21.00	18.08	14.69	4.52	100.00	0.07	0.30	0.19	0.16	0.13	0.04	0.89	
<i>Average Locality:</i>	399	7.00	34.00	21.00	18.08	14.69	4.52	100.00	0.07	0.30	0.19	0.16	0.13	0.04	0.89	
Heianova																
K251.94	984	2.00	15.00	19.00	19.23	12.79	32.83	100.00	0.07	0.72	0.95	0.96	0.64	1.63	4.96	
<i>Average Locality:</i>	984	2.00	15.00	19.00	19.23	12.79	32.83	100.00	0.07	0.72	0.95	0.96	0.64	1.63	4.96	
Kleppestølen																
K246.94	458	3.00	57.00	29.00	7.18	4.42	0.00	100.00	0.03	0.52	0.26	0.07	0.04	0.00	0.91	
K252.94	338	3.00	57.00	30.00	5.93	3.70	0.00	100.00	0.02	0.39	0.21	0.04	0.03	0.00	0.68	
<i>Average Locality:</i>	398	3.00	57.00	29.50	6.55	4.06	0.00	100.00	0.02	0.45	0.23	0.05	0.03	0.00	0.79	
Naustdal eclogite																
K150.99	812	5.00	22.00	20.00	14.42	6.92	31.54	100.00	0.14	0.58	0.52	0.38	0.18	0.82	2.60	
K255-1.94	828	3.00	47.00	32.00	12.95	3.86	1.38	100.00	0.06	0.85	0.58	0.24	0.07	0.03	1.81	
K255.94	733	10.00	52.00	27.00	8.94	1.28	0.00	100.00	0.12	0.61	0.32	0.11	0.01	0.00	1.18	
<i>Average Locality:</i>	791	6.00	40.33	26.33	12.10	4.02	10.97	100.00	0.10	0.68	0.47	0.24	0.09	0.28	1.86	
Steinkorsen																
K143.99	1 158	21.00	74.00	5.00	0.00	0.00	0.00	100.00	0.25	0.89	0.06	0.00	0.00	0.00	1.20	
K145.99	735	7.00	36.00	30.00	15.15	6.97	4.85	100.00	0.11	0.60	0.50	0.25	0.12	0.08	1.65	
K146.99	681	7.00	42.00	30.00	16.06	1.82	2.92	100.00	0.10	0.58	0.41	0.22	0.03	0.04	1.37	
K147.99	1 167	5.00	32.00	26.00	15.75	6.30	14.93	100.00	0.15	0.96	0.79	0.48	0.19	0.45	3.02	
K148.99	657	2.00	14.00	19.00	12.50	11.35	40.79	100.00	0.07	0.43	0.57	0.38	0.35	1.24	3.04	
K149.99	810	3.00	33.00	30.00	20.22	8.54	4.49	100.00	0.07	0.75	0.68	0.45	0.19	0.10	2.23	
<i>Average Locality:</i>	868	7.50	38.50	23.33	13.28	5.83	11.33	100.00	0.12	0.70	0.50	0.30	0.14	0.32	2.08	
<i>Average Area:</i>	770	5.71	36.57	23.05	13.46	7.48	13.49	100.00	0.10	0.62	0.44	0.29	0.16	0.41	2.02	

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM
<i>Average Region:</i>	770	5.71	36.57	23.05	13.46	7.48	13.49	100.00	0.10	0.62	0.44	0.29	0.16	0.41	2.02

Rogaland anorthosite province

Western Rogaland anorthosite province

Kydland

MM99035	1.67	12.78	23.33	21.11	11.94	29.17	100.00	0.03	0.23	0.42	0.38	0.22	0.53	1.80
<i>Average Locality:</i>	1.67	12.78	23.33	21.11	11.94	29.17	100.00	0.03	0.23	0.42	0.38	0.22	0.53	1.80
<i>Average Area:</i>	1.67	12.78	23.33	21.11	11.94	29.17	100.00	0.03	0.23	0.42	0.38	0.22	0.53	1.80
<i>Average Region:</i>	1.67	12.78	23.33	21.11	11.94	29.17	100.00	0.03	0.23	0.42	0.38	0.22	0.53	1.80

Sognefjord region

SampleNo	Counts	Normalised values (intervals in microns)							Areal % (= volume %) (intervals in microns)						
		<50	50-100	100-150	150-200	200-250	>250	SUM	<50	50-100	100-150	150-200	200-250	>250	SUM

NW Sognefjord region

Veten (Lavik)

394.02	1 049	7.00	20.00	22.00	21.70	15.10	14.41	100.00	0.22	0.57	0.63	0.63	0.44	0.42	2.88
394.03	902	17.00	38.00	10.00	4.59	7.77	22.97	100.00	0.24	0.54	0.14	0.07	0.11	0.33	1.42
394.05	385	6.00	21.00	18.00	18.03	15.45	21.89	100.00	0.07	0.25	0.21	0.21	0.18	0.26	1.17
<i>Average Locality:</i>	779	10.00	26.33	16.67	14.77	12.78	19.76	100.00	0.17	0.45	0.33	0.30	0.24	0.33	1.82
<i>Average Area:</i>	779	10.00	26.33	16.67	14.77	12.78	19.76	100.00	0.17	0.45	0.33	0.30	0.24	0.33	1.82

SW Sognefjord region

Byrknesøy

395.03	261	2.00	9.00	9.00	6.42	11.23	62.83	100.00	0.03	0.17	0.17	0.12	0.21	1.18	1.87
395.04	404	3.00	12.00	12.00	16.74	16.28	40.14	100.00	0.06	0.26	0.27	0.36	0.35	0.88	2.18
395.05	281	7.00	26.00	21.00	26.67	9.63	8.89	100.00	0.05	0.18	0.14	0.18	0.07	0.06	0.68
395.06	191	1.00	7.00	6.00	7.02	9.36	70.18	100.00	0.02	0.12	0.10	0.12	0.16	1.20	1.71
395.07	371	2.00	14.00	16.00	14.17	17.06	36.75	100.00	0.04	0.26	0.31	0.27	0.33	0.70	1.91
395.08	118	2.00	14.00	14.00	2.26	7.52	59.40	100.00	0.01	0.10	0.10	0.01	0.05	0.40	0.67
395.09	376	3.00	13.00	12.00	11.61	11.33	48.44	100.00	0.06	0.23	0.22	0.21	0.20	0.85	1.77
395.10	407	2.00	9.00	6.00	7.83	5.04	70.61	100.00	0.07	0.25	0.16	0.23	0.14	2.03	2.88
395.11	502	5.00	22.00	19.00	21.36	11.46	21.36	100.00	0.08	0.35	0.31	0.35	0.19	0.35	1.62
<i>Average Locality:</i>	323	3.00	14.00	12.78	12.68	10.99	46.51	100.00	0.05	0.21	0.20	0.20	0.19	0.85	1.70
<i>Average Area:</i>	323	3.00	14.00	12.78	12.68	10.99	46.51	100.00	0.05	0.21	0.20	0.20	0.19	0.85	1.70
<i>Average Region:</i>	437	4.75	17.08	13.75	13.20	11.44	39.82	100.00	0.08	0.27	0.23	0.23	0.20	0.72	1.73

Appendix 5

Rutile grain-size distribution graphs

Appendix 5: Overview of rutile grain-size distribution graphs

Bamble region (excl. Ødegården)

Files in the Power Point file "Bamble region (excl Ødeg).ppt":

Gjerstadvatnet KB43A.91	Kragerø area "	Laget KB10A.91	Kragerø area "	Ødegården 2 KB12J.91	Ødegården area "
Haukåsen KB9.91	Kragerø area "	Lindvikkollen KB11B.91	Kragerø area "	Ødegården 5 KB37A.91	Ødegården area "
Krefjell KB8A.91	Kragerø area "	Løfthaug KB1A.91	Kragerø area "	Ødegården 6 KB37A.91	"
				Øydegårdsvatnet KB14C.91	Ødegården area "

Ødegården

Files in the Power Point file "Ødegården.ppt":

Ødegården 2Ø/85.45	Ødegården area "	Ødegården 2Ø/58.45	Ødegården area "	Ødegården 2Ø/48.10	Ødegården area "
2Ø/26.60	"	2Ø/34.55	"	1Ø/26.15	"
1Ø/67.25	"	1Ø/5.40	"	2Ø/32.25	"
2Ø/91.45	"	1Ø/50.20	"	2Ø/29.90	"
2Ø/29.30	"	2Ø/28.70	"	2Ø/77.90	"
2Ø/51.90	"	2Ø/68.30	"	2Ø/32.15	"
2Ø/6.20	"	1Ø/35.30	"	1Ø/9.40	"

Bergen region

Files in the Power Point file "Bergen region.ppt":

Havrevåg KH14A.89	Holsnøy area "	Husebø KH2A.89	Holsnøy area "
Havrevåg 2 KH17.89	Holsnøy area "	KH2B.89	"
		KH2C.89	Holsnøy area

Dalsfjord region

Files in the Power Point file "Dalsfjord region.ppt":

Botnatjørna K292.94	Flekkje area "	Hestegardsnova K291.94	Gjørlanger area "
Djupevatnet K227B.94	Vassdal area "	Hovlandsvatnet K301.94	Langsjøen area "
K227E.94	"	Ramsgrønova K222A.94	Langsjøen area "
K227A.94	"	K222C.94	"
K227F.94	"		
Sagevika K283.94	Dale area "		

Førdefjord region

Files in the Power Point file "Førdefjord region.ppt":

Botnarusta K303.94	Vevring area "	Fimlandsgrend K253B.94	Naustdal area "	Steinkorsen K147.99	Naustdal area "
Engøbøfjellet 2/169.0	Vevring area "	Furefjellet K308.94	Vevring area "	K146.99	"
13/156.0	"	Naustdal eclogite K150.99	Naustdal area "	K145.99	"
4/129.9	"			K143.99	"
1/126.5	"			K149.99	"
13/146.0	"			K148.99	"

Other deposits

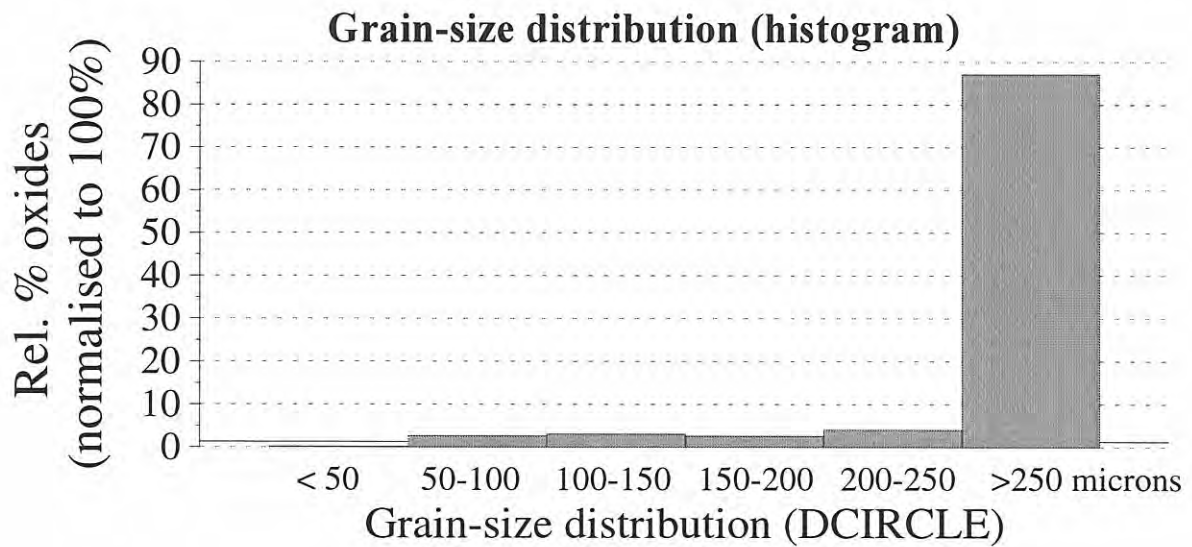
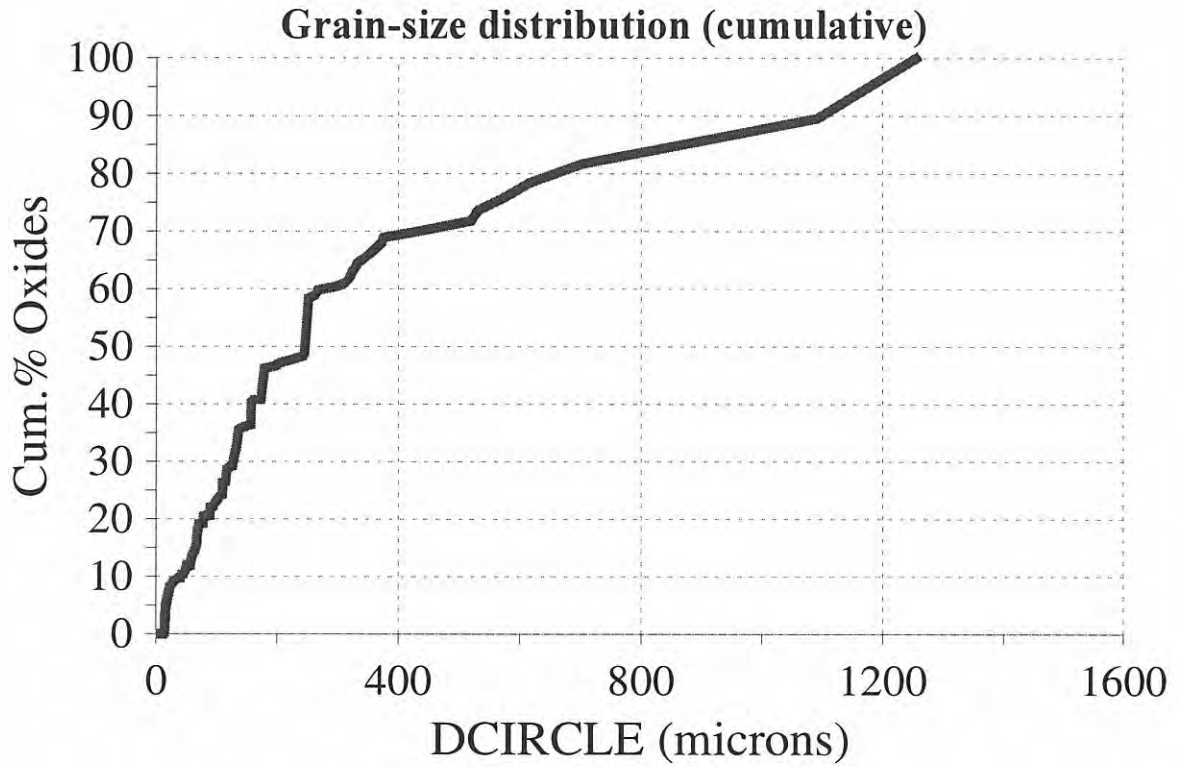
Files in the Power Point file "Other deposits.ppt":

Veten (Lavik) 394.02	NW Sognefjord area "	Kydland MM99035	Egersund area "
394.03	"	MM00035	"
Byrknesøy 395.09	SW Sognefjord region "	Byrknesøy 395.06	SW Sognefjord region "
395.05	"	395.08	"
395.04	"	395.03	"
395.07	"	395.11	"

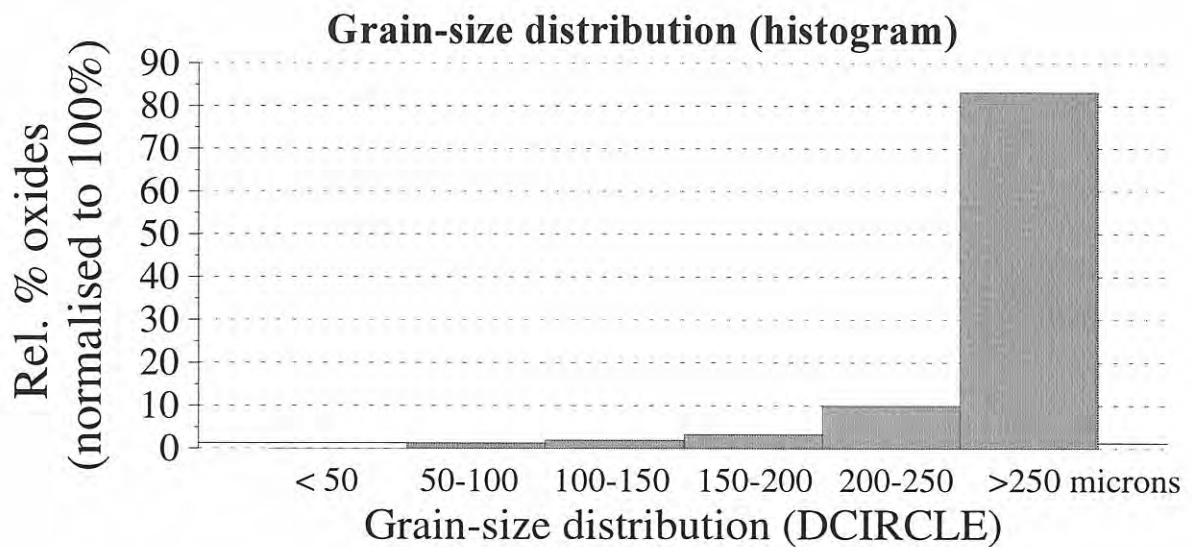
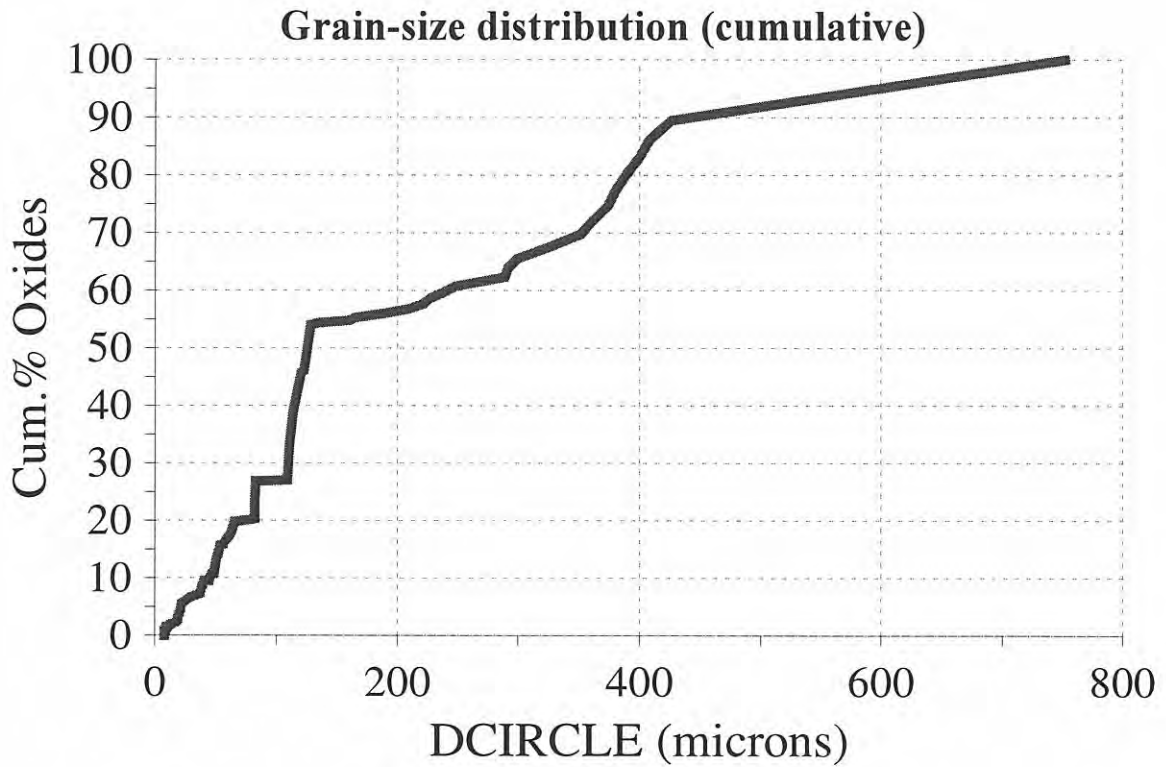
Rutile grain-size
distribution graphs

Bamble region
(excl. Ødegården)

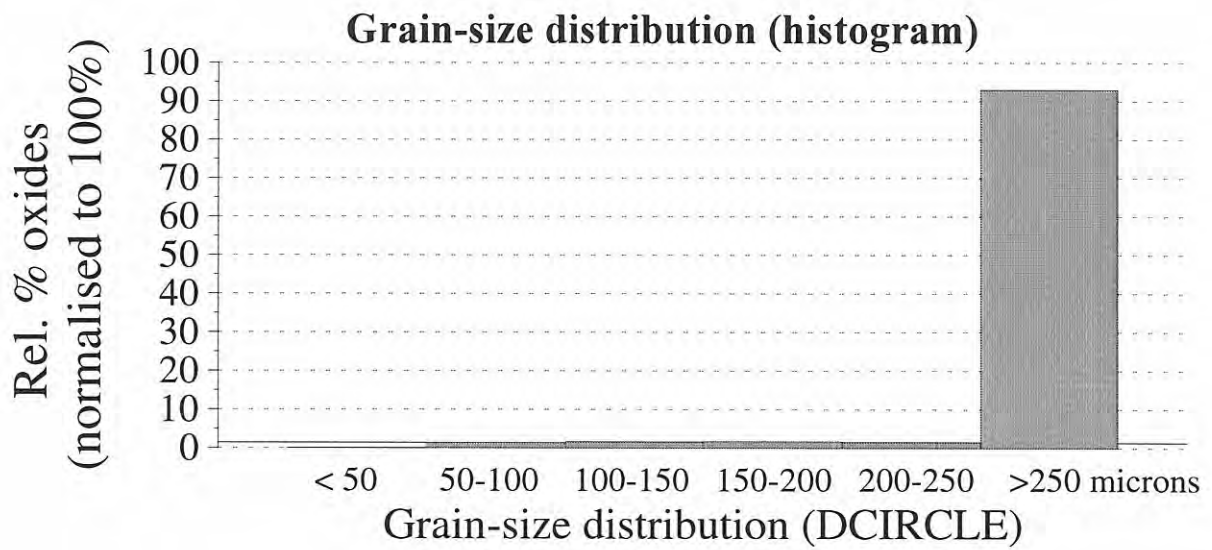
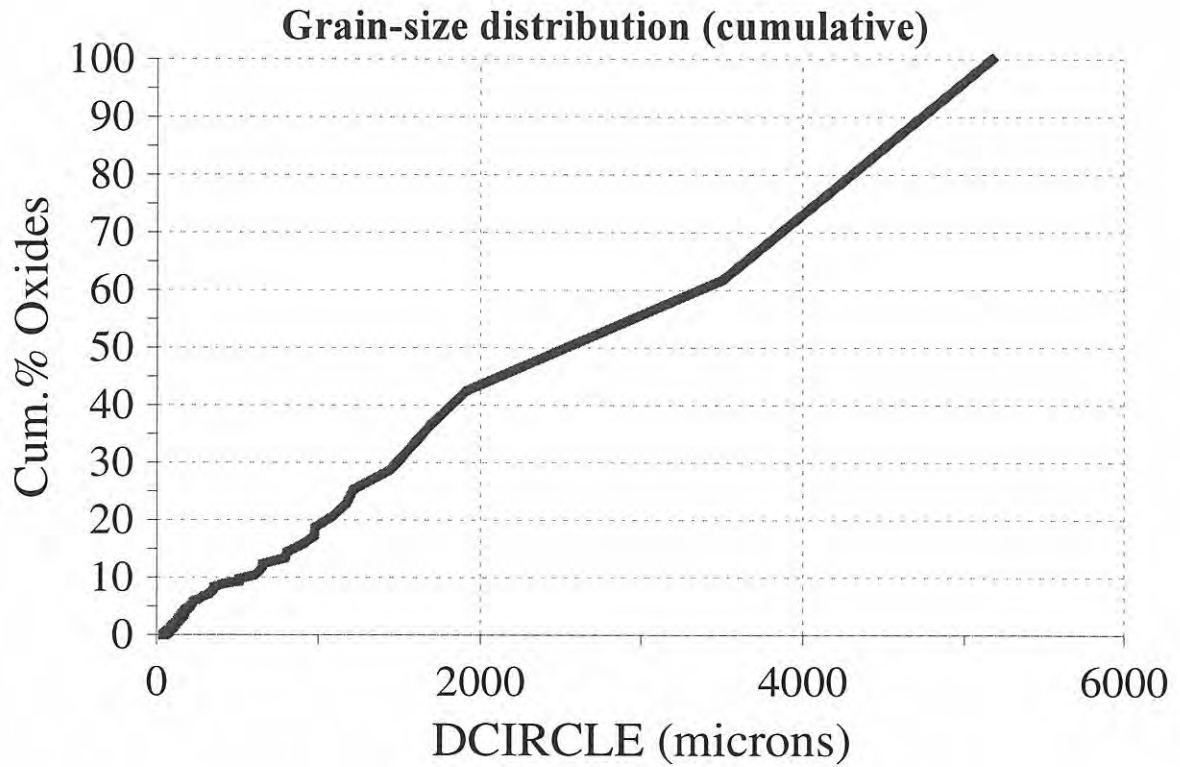
Sample KB43A.91



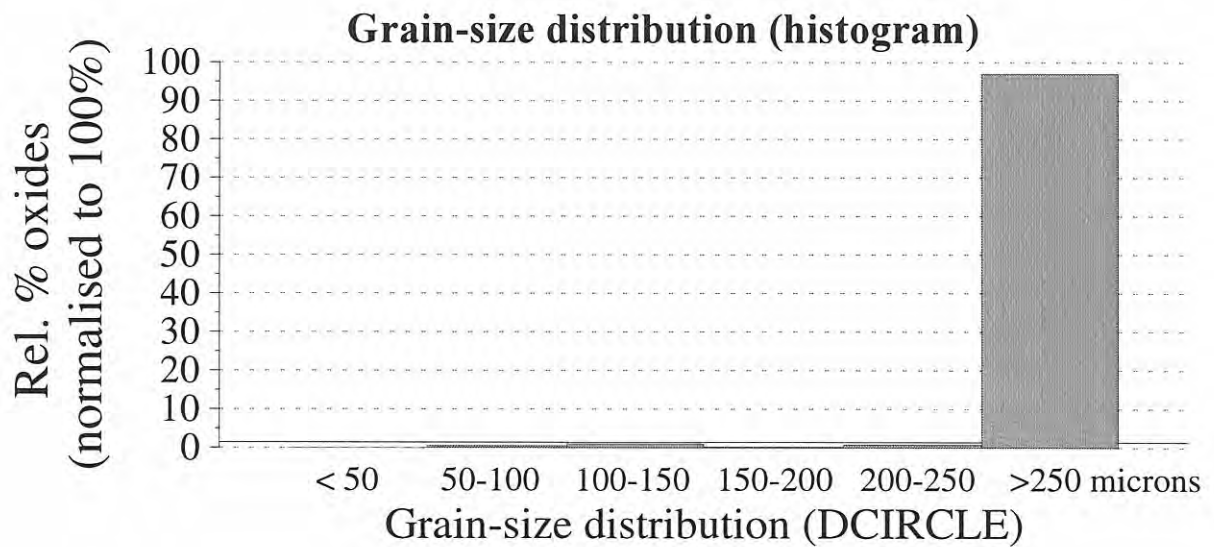
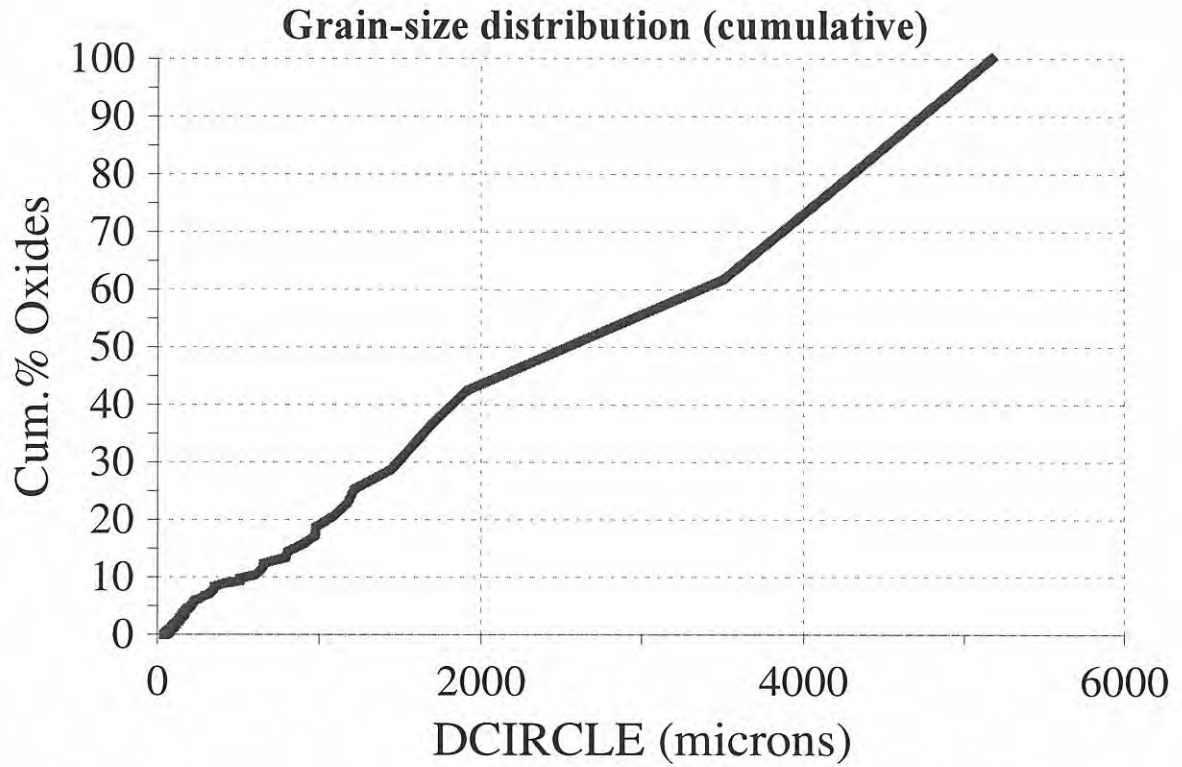
Sample KB9.91



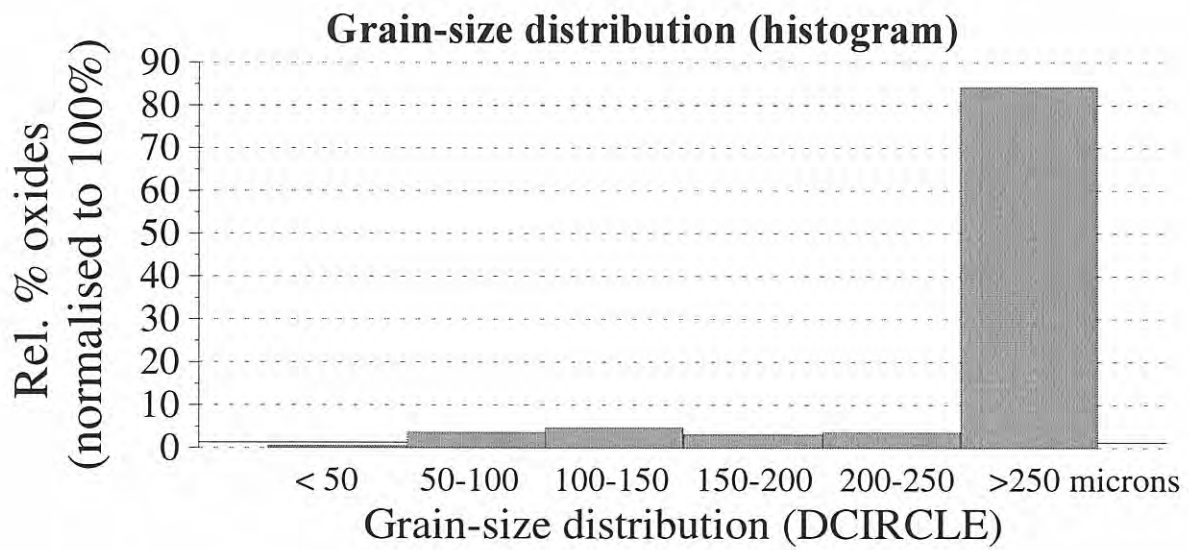
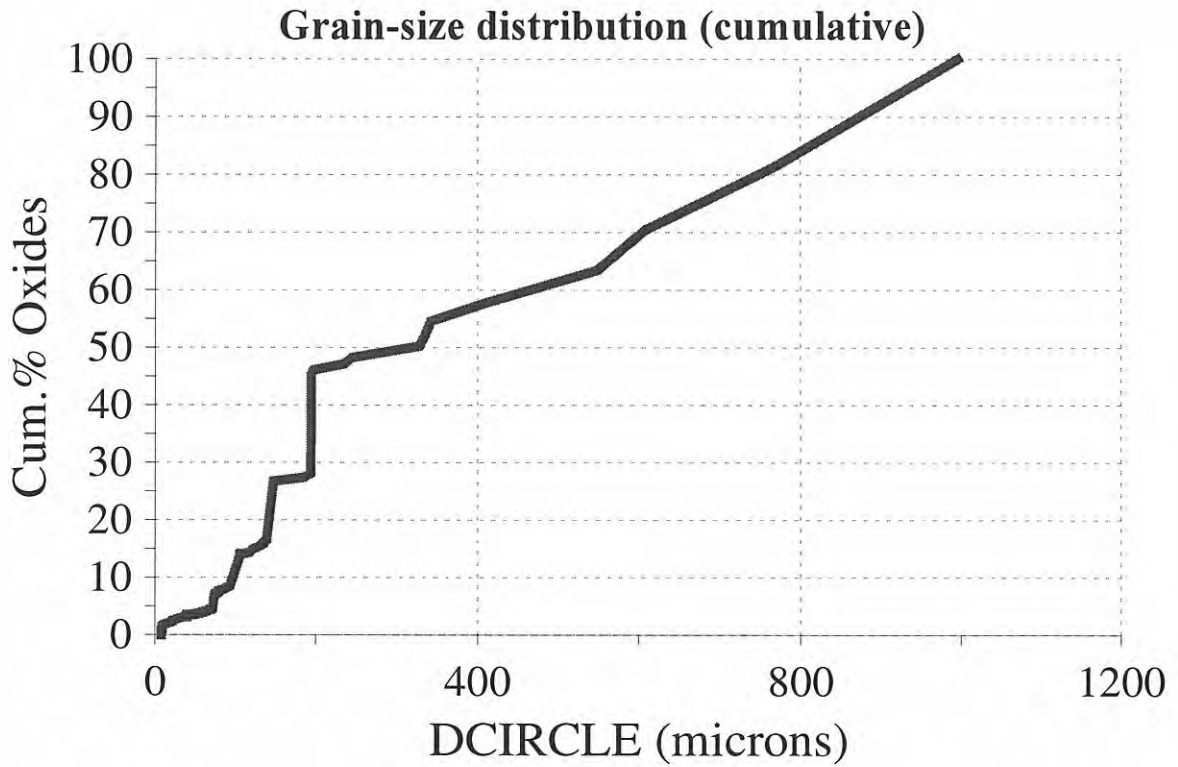
Sample KB8A.91



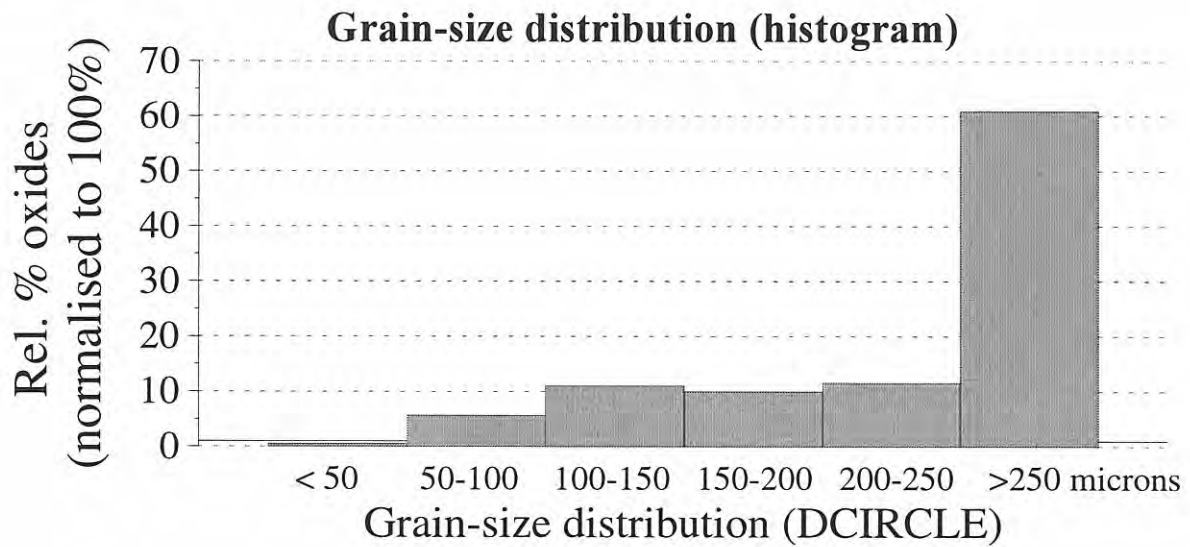
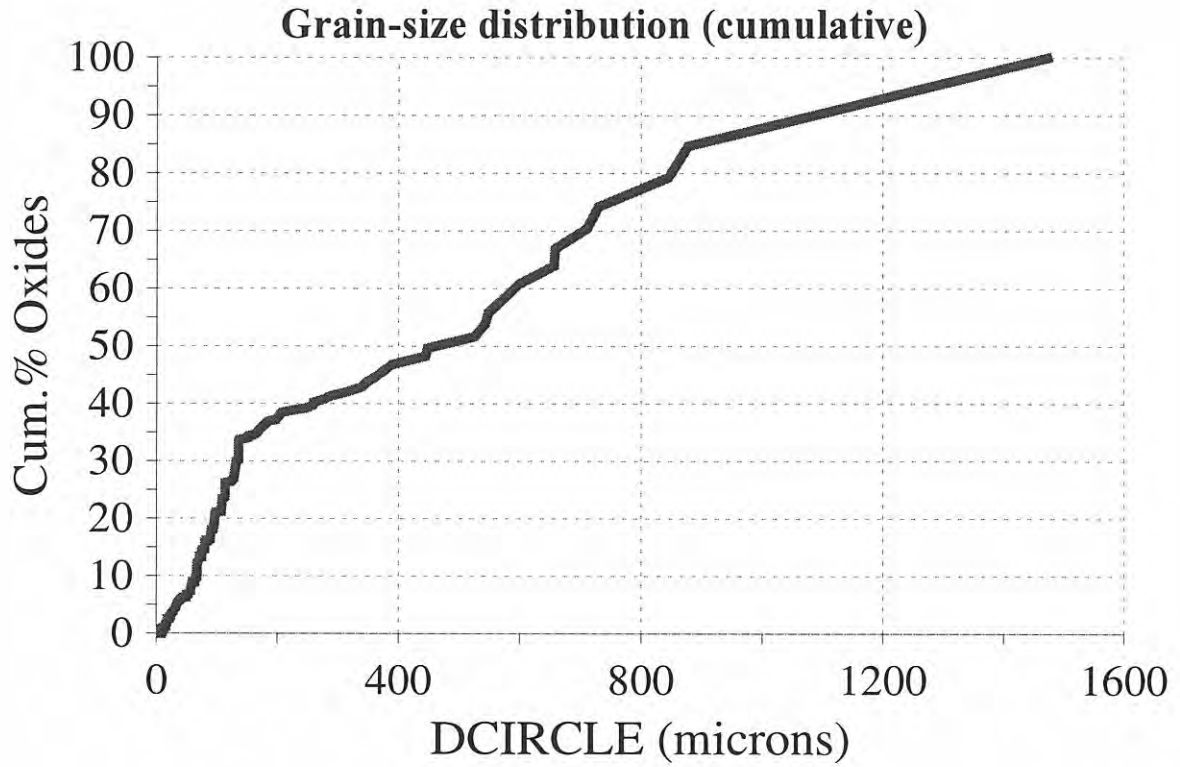
Sample KB8B.91



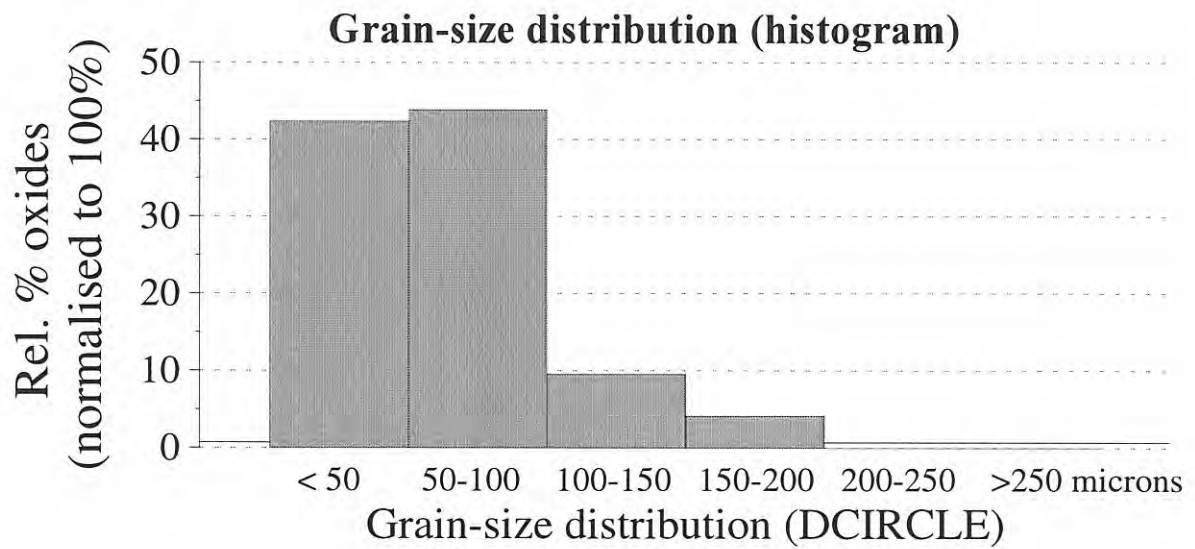
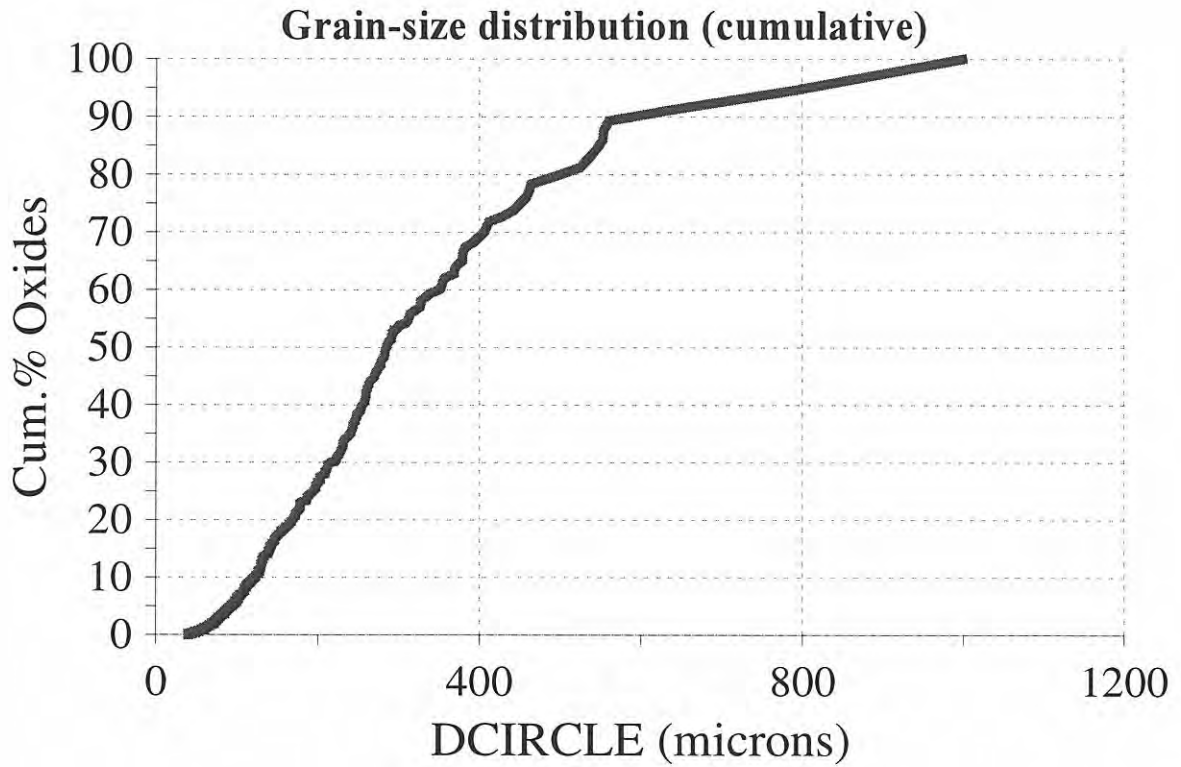
Sample KB10A.91



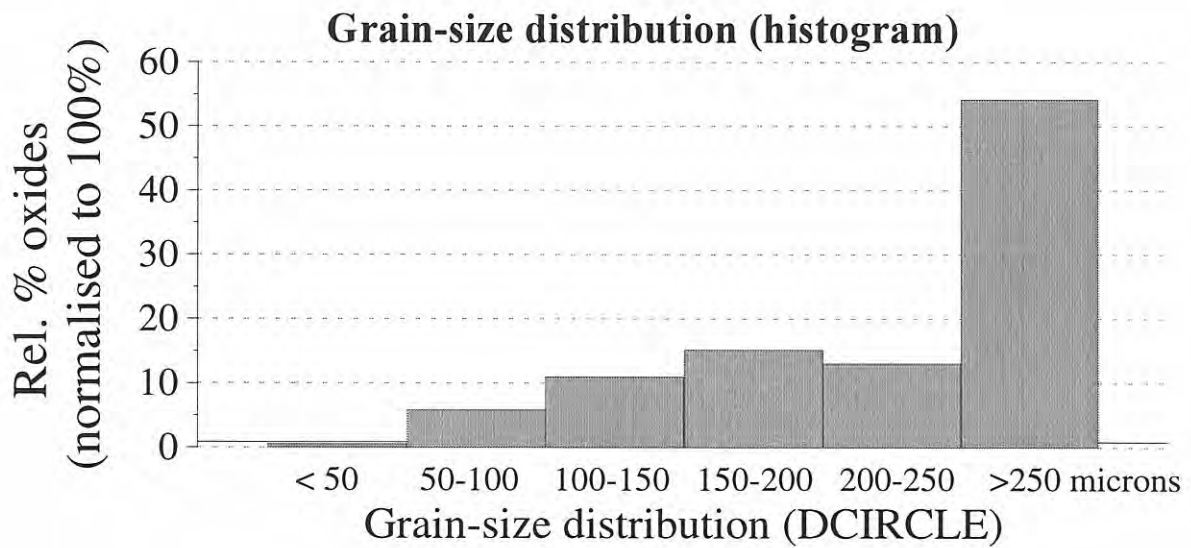
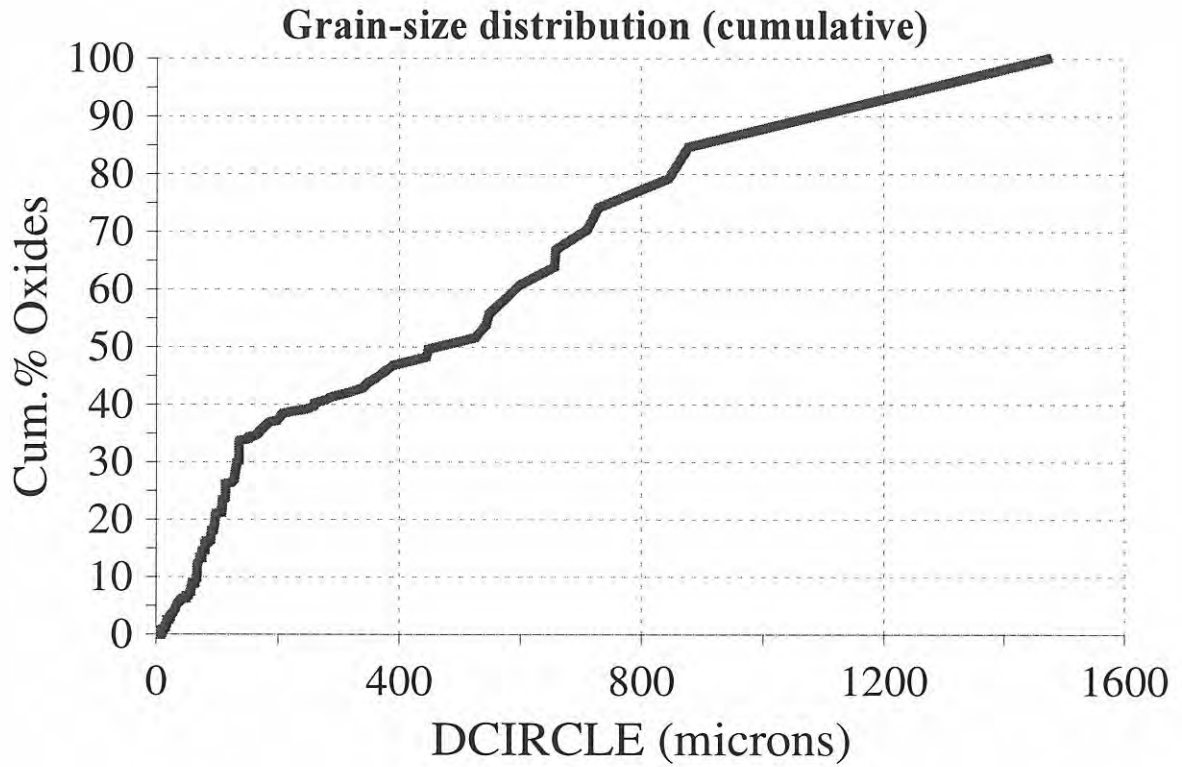
Sample KB11B.91



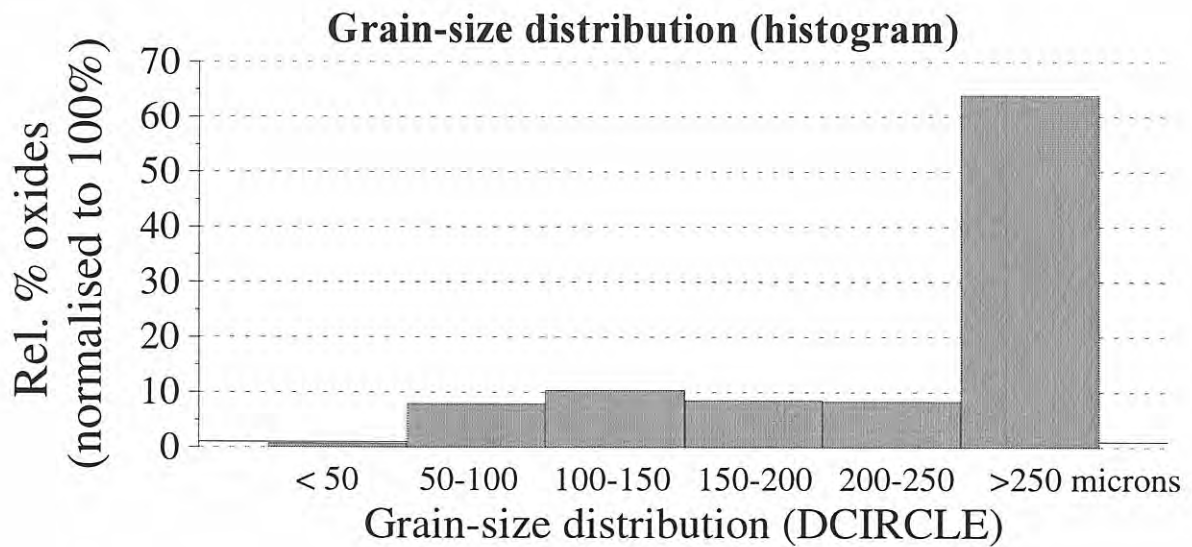
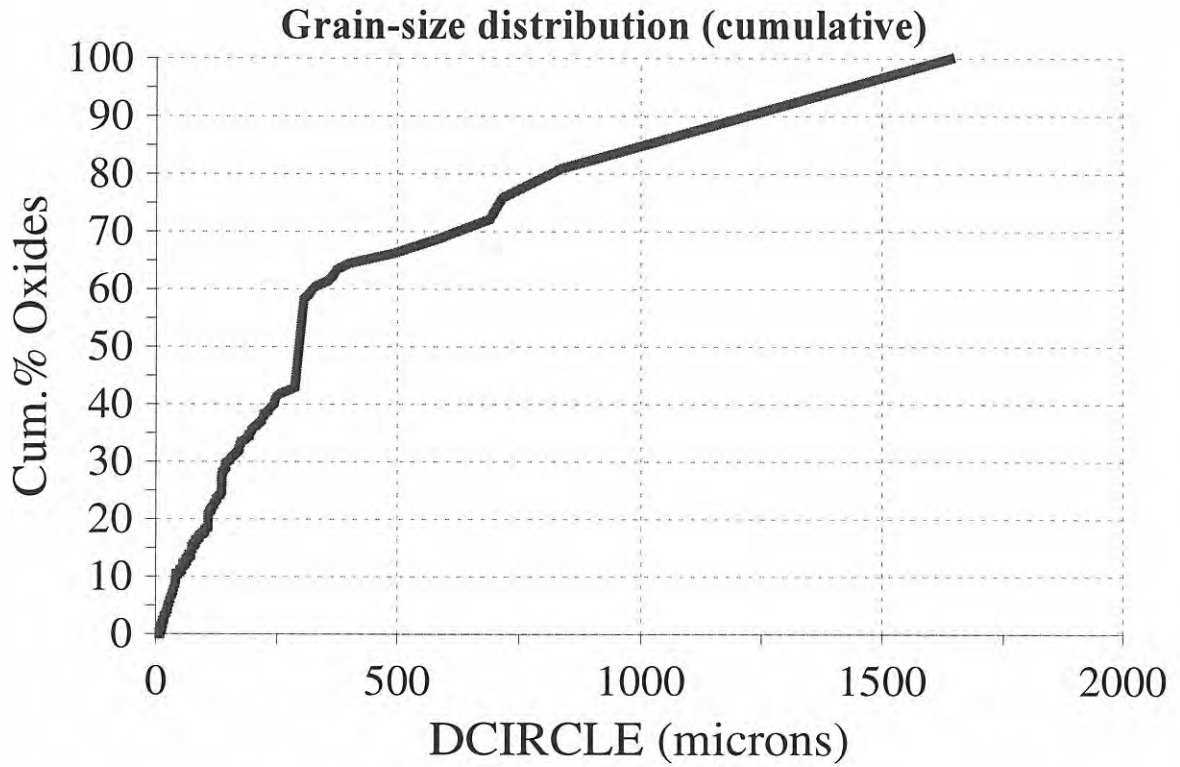
Sample KB1A.91



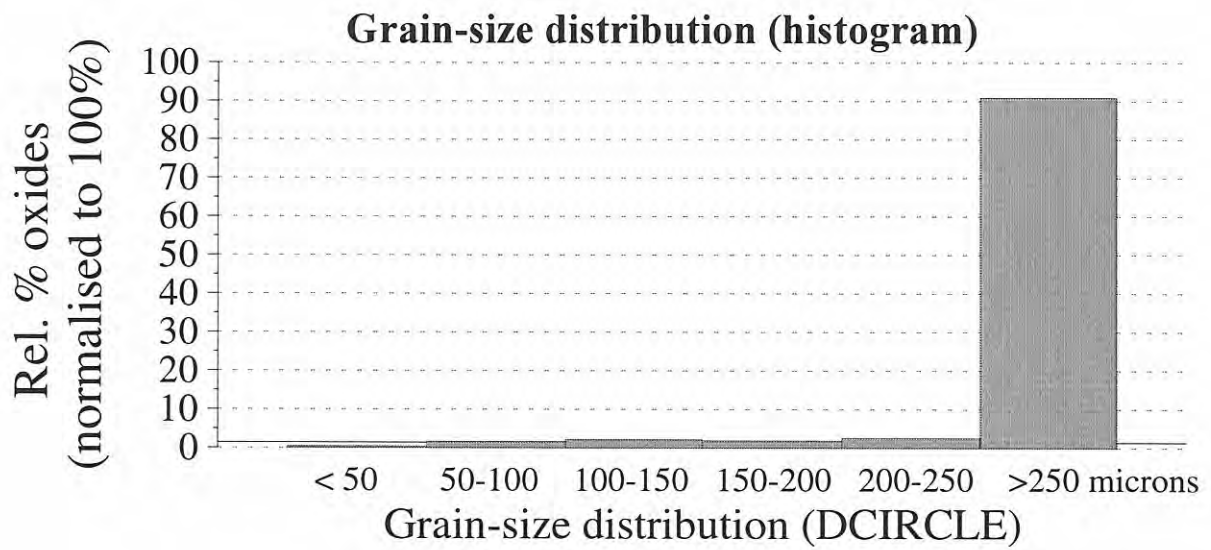
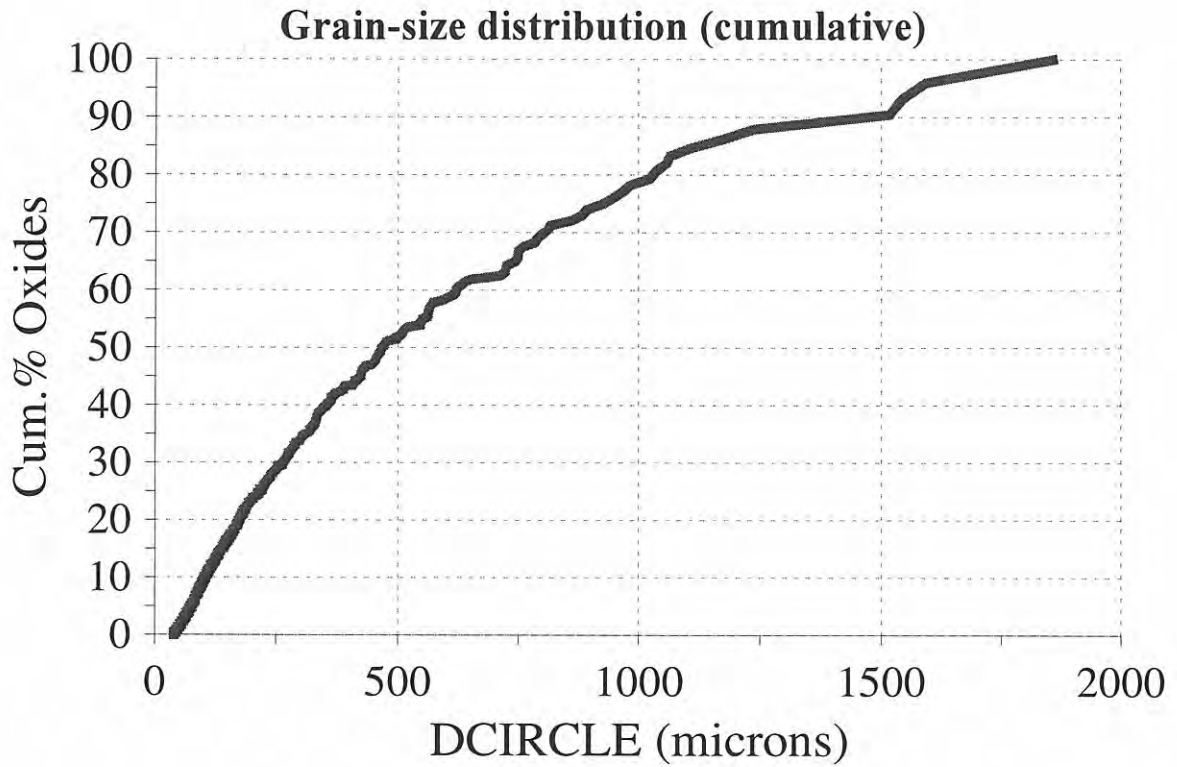
Sample KB12.91



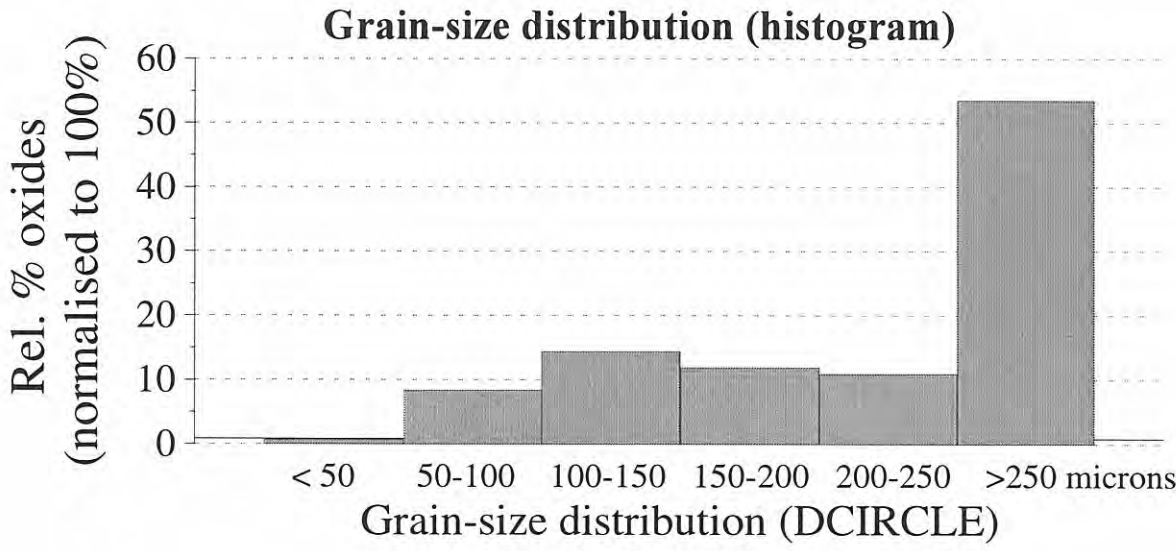
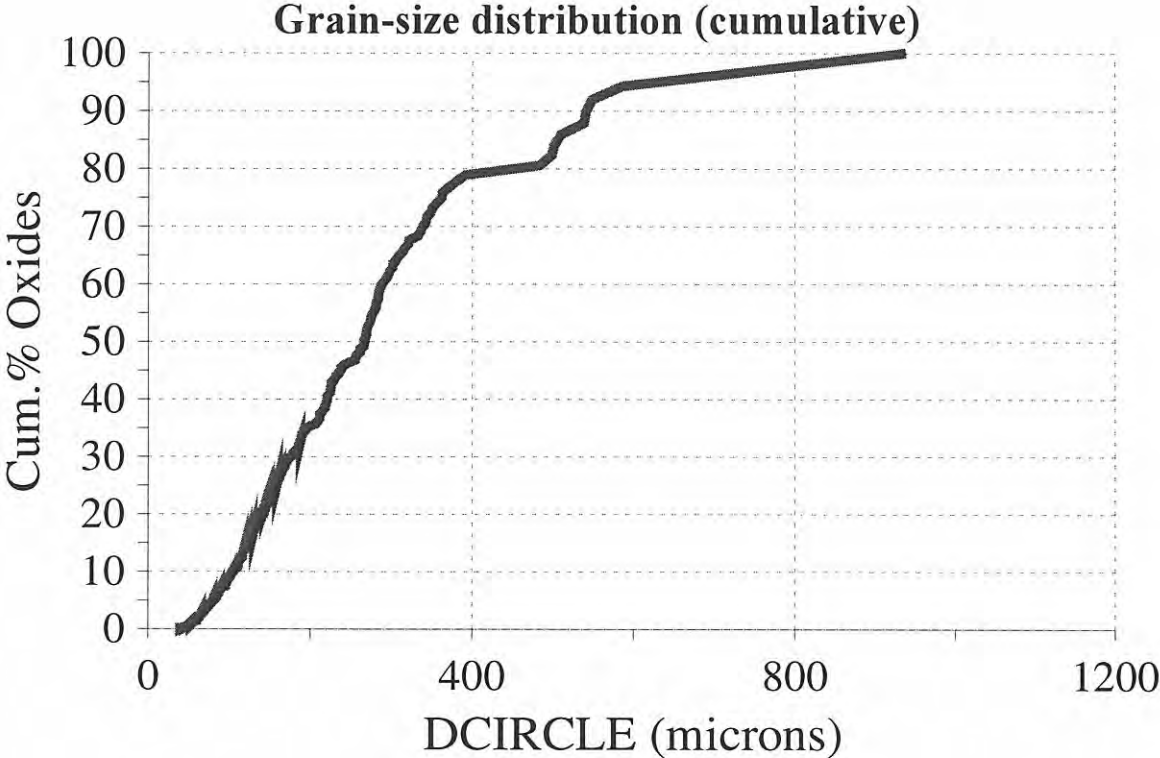
Sample KB12J.91



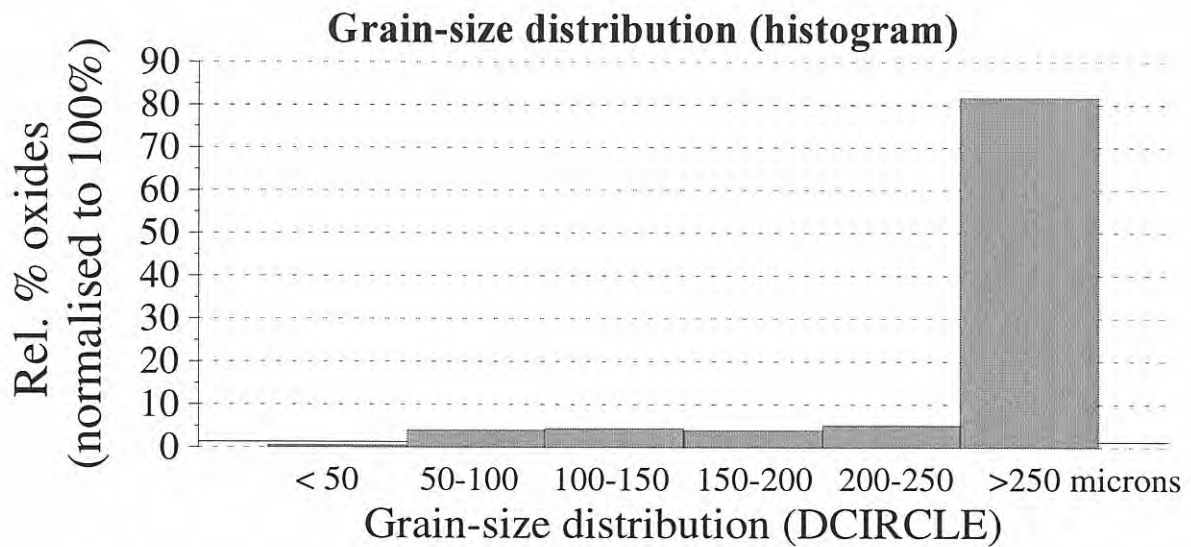
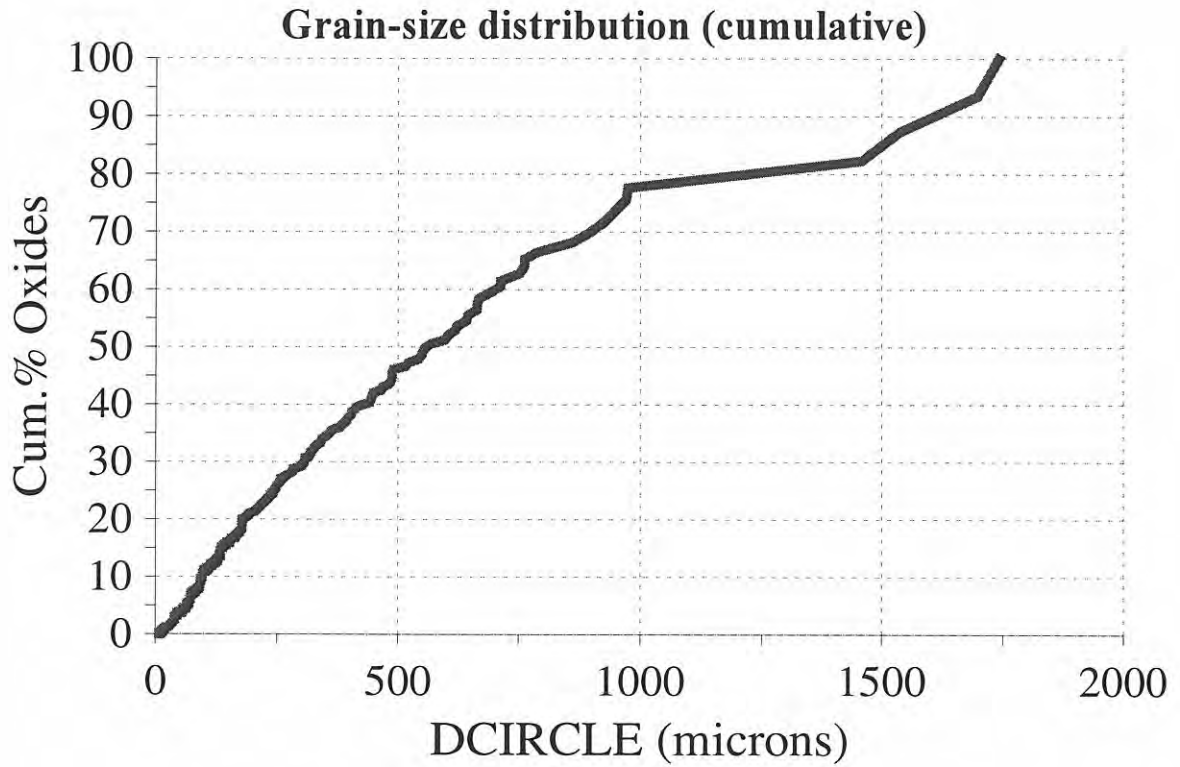
Sample KB37A.91



Sample KB37A.91



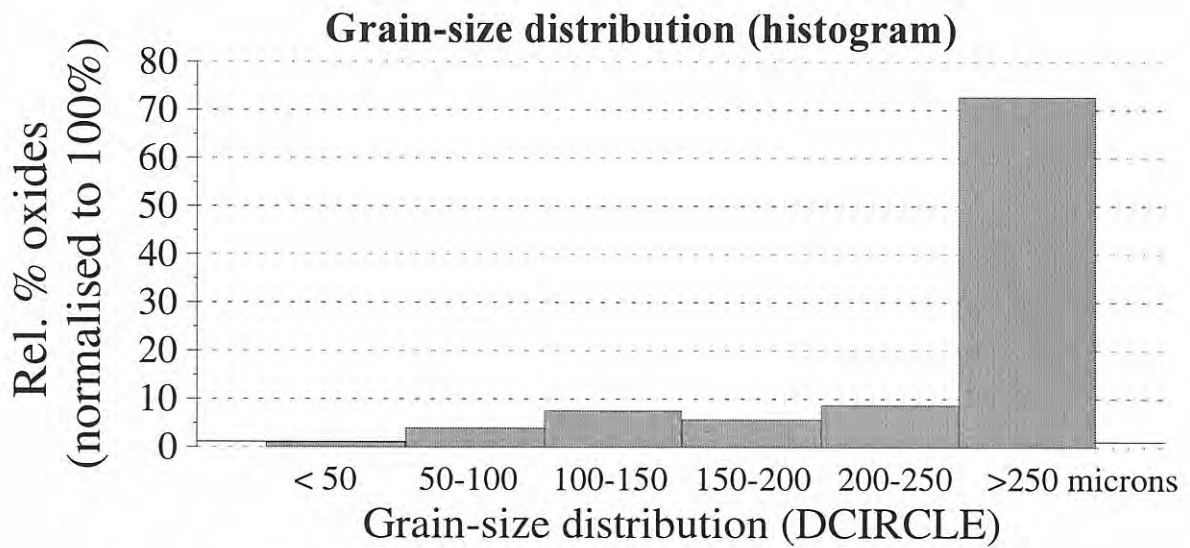
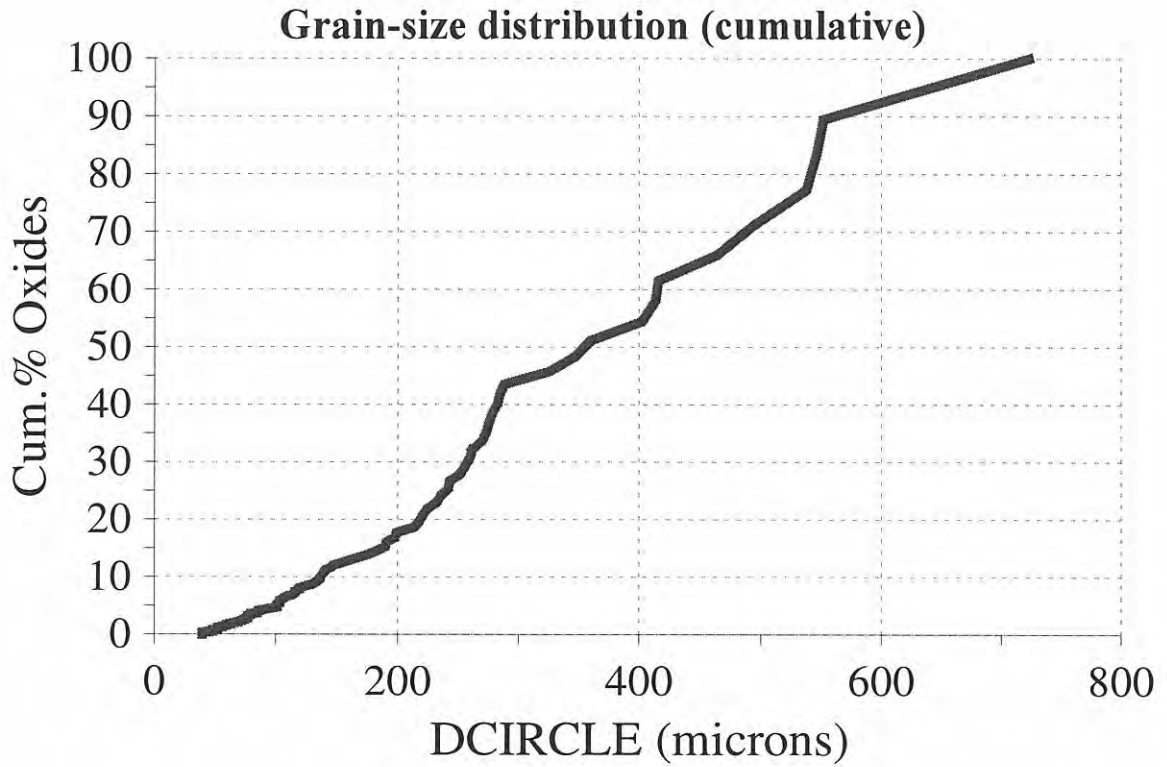
Sample KB14C.91



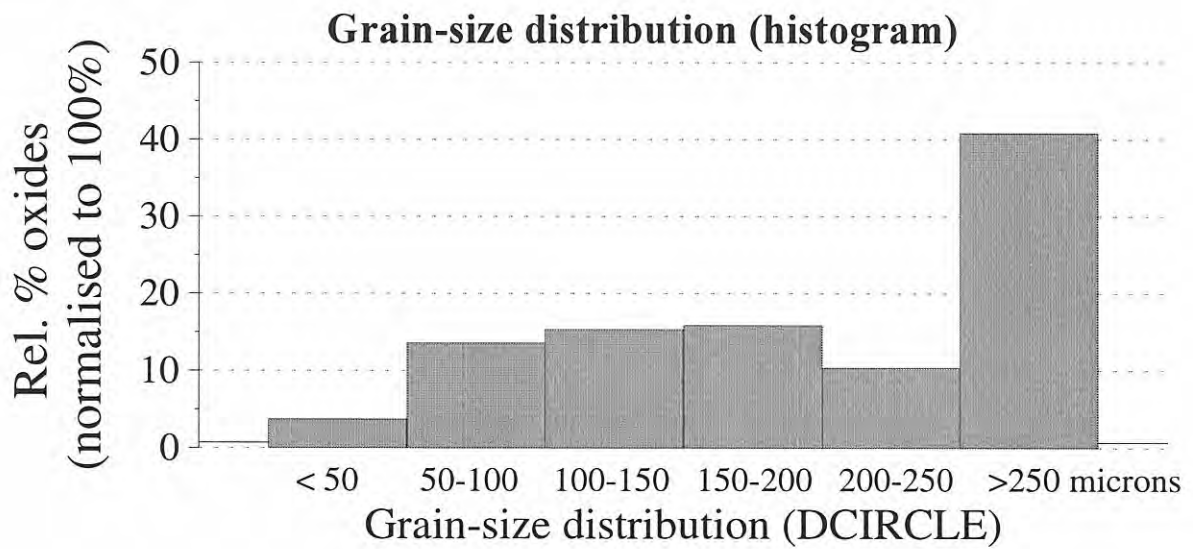
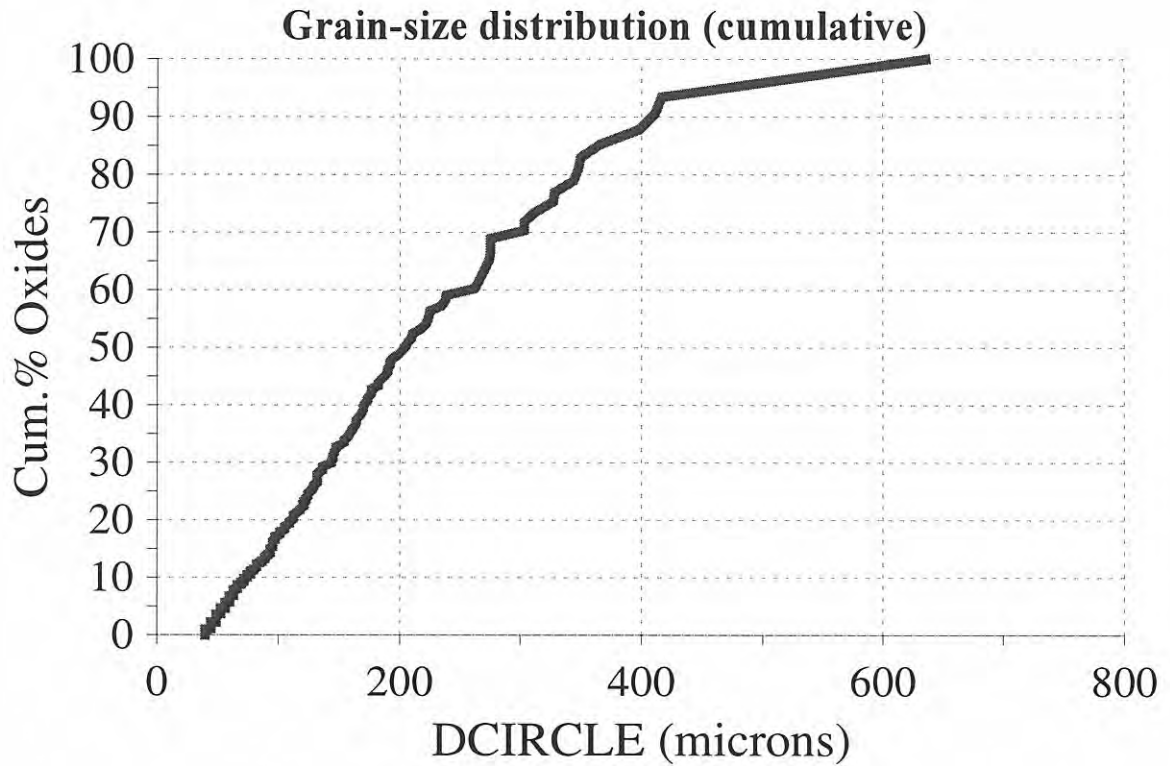
Rutile grain-size
distribution graphs

Ødegården

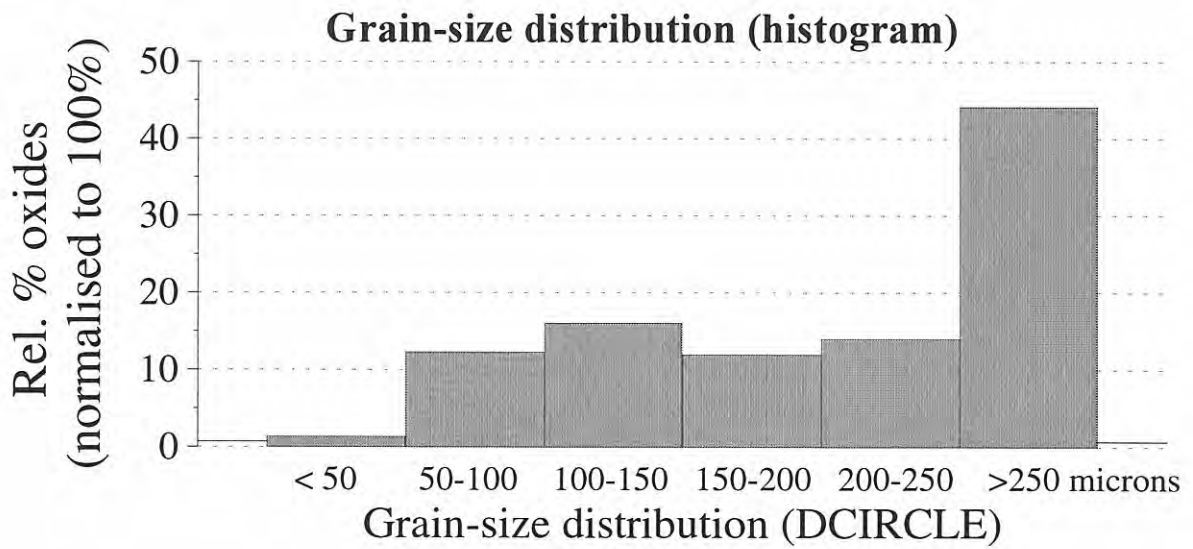
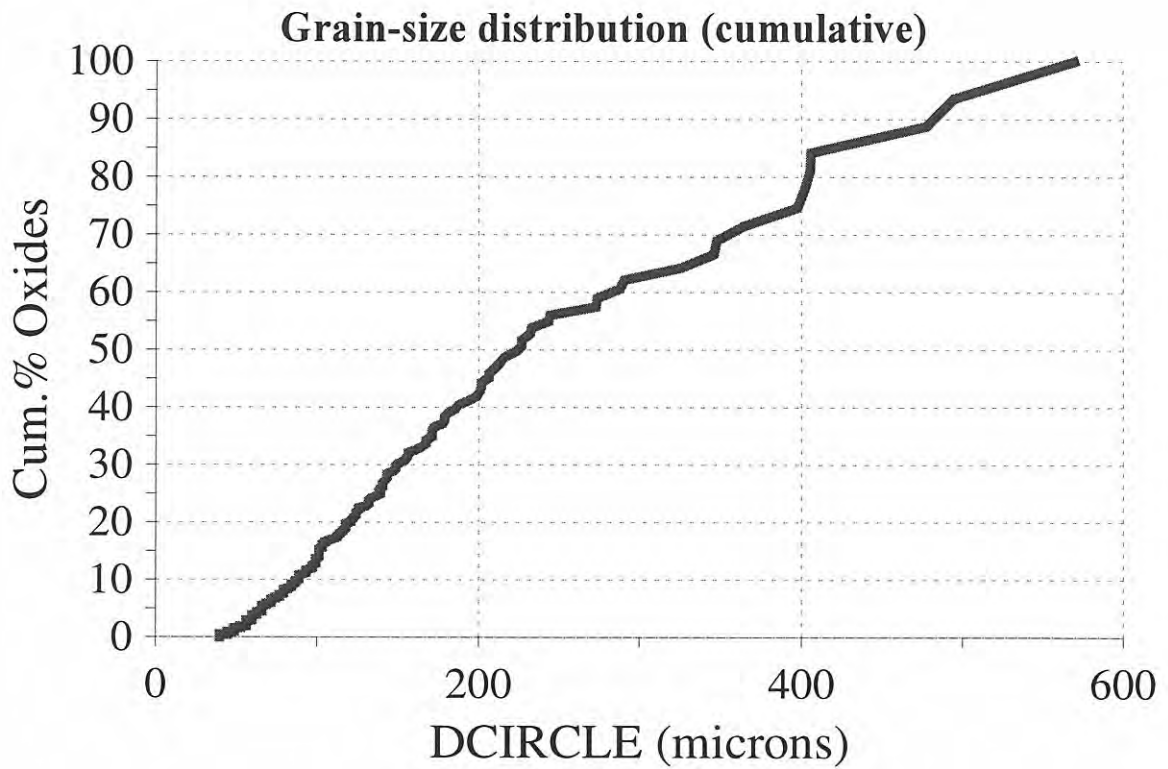
Sample 2Ø/85.45



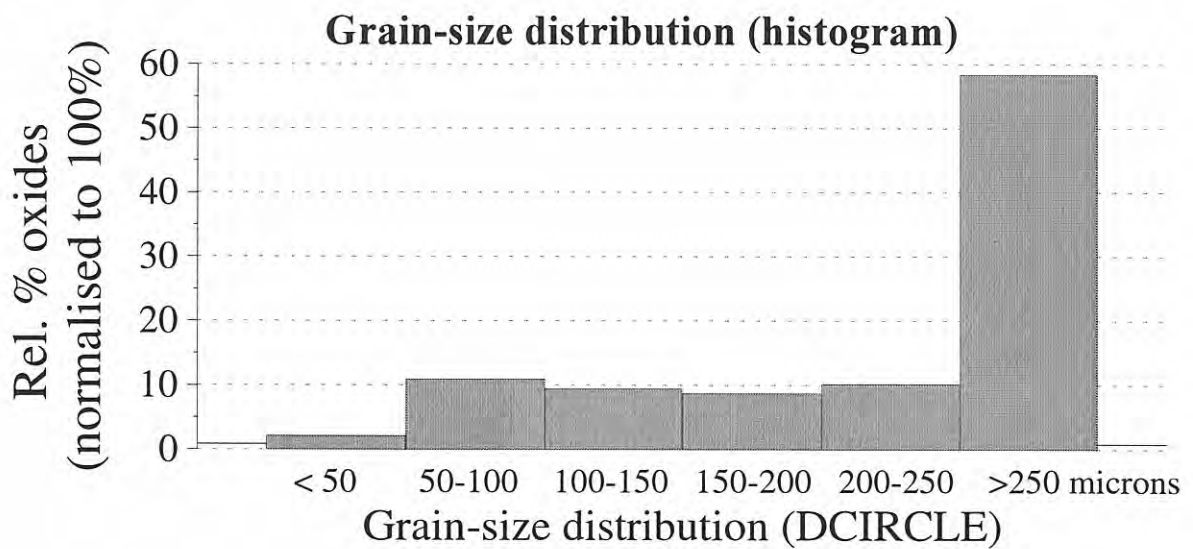
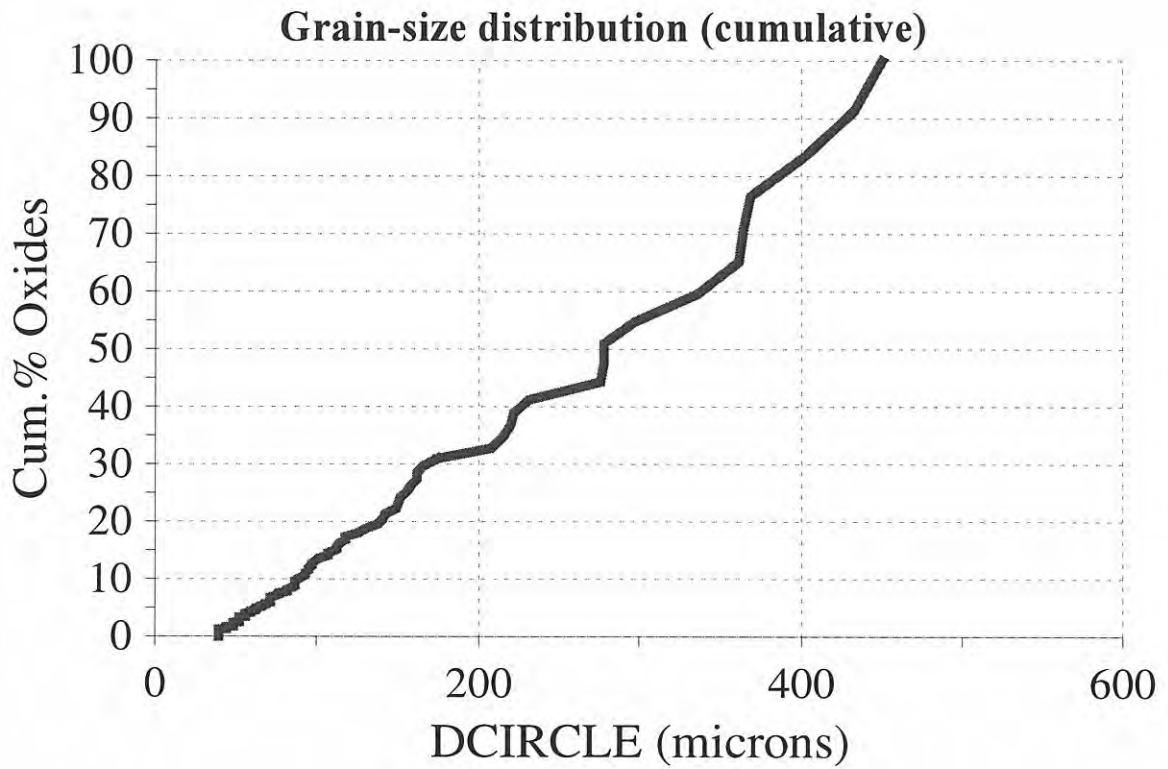
Sample 2Ø/26.60



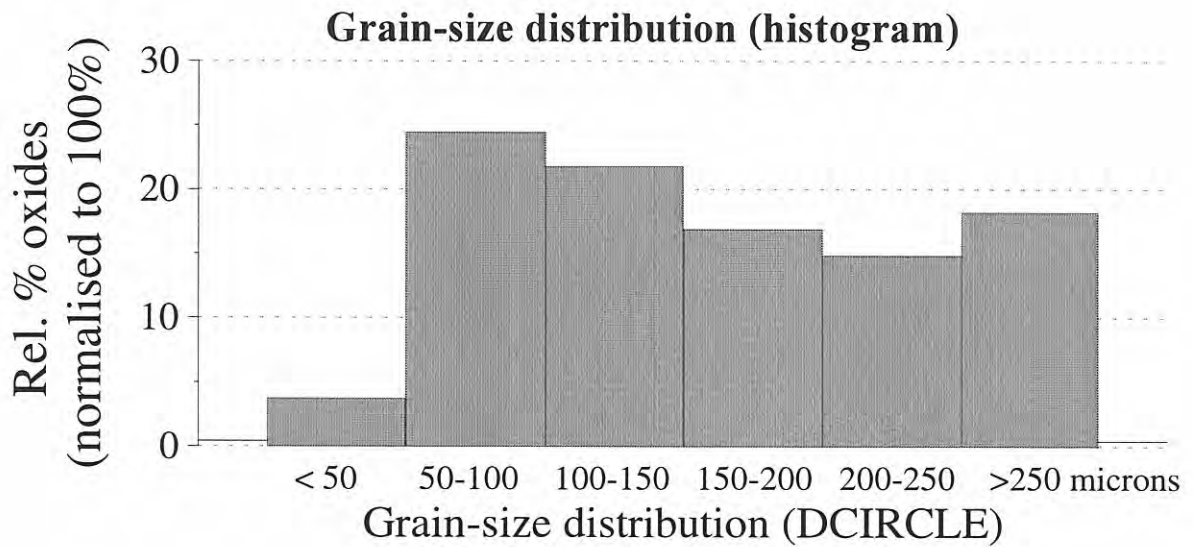
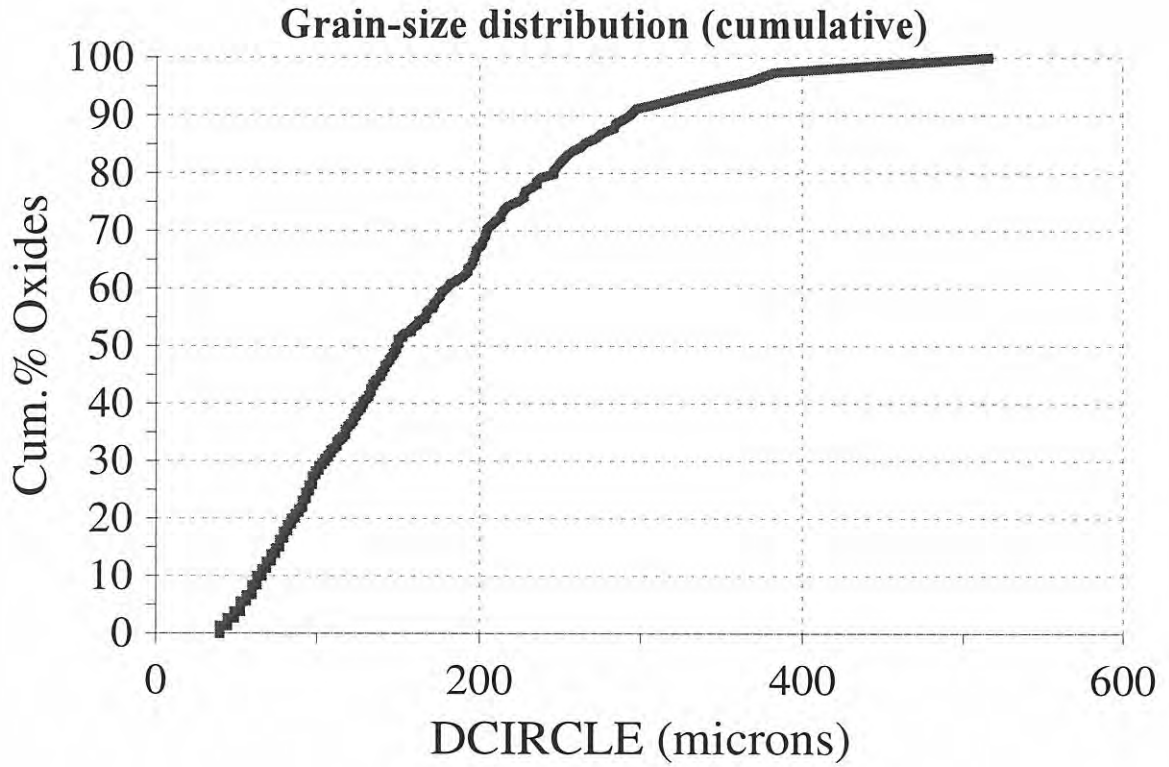
Sample 1Ø/67.25



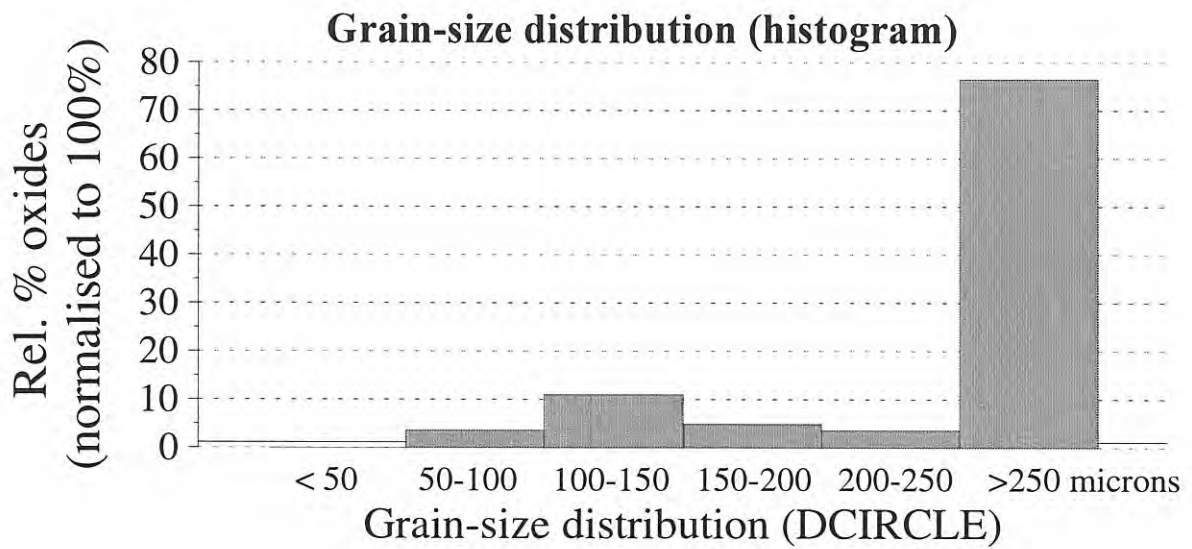
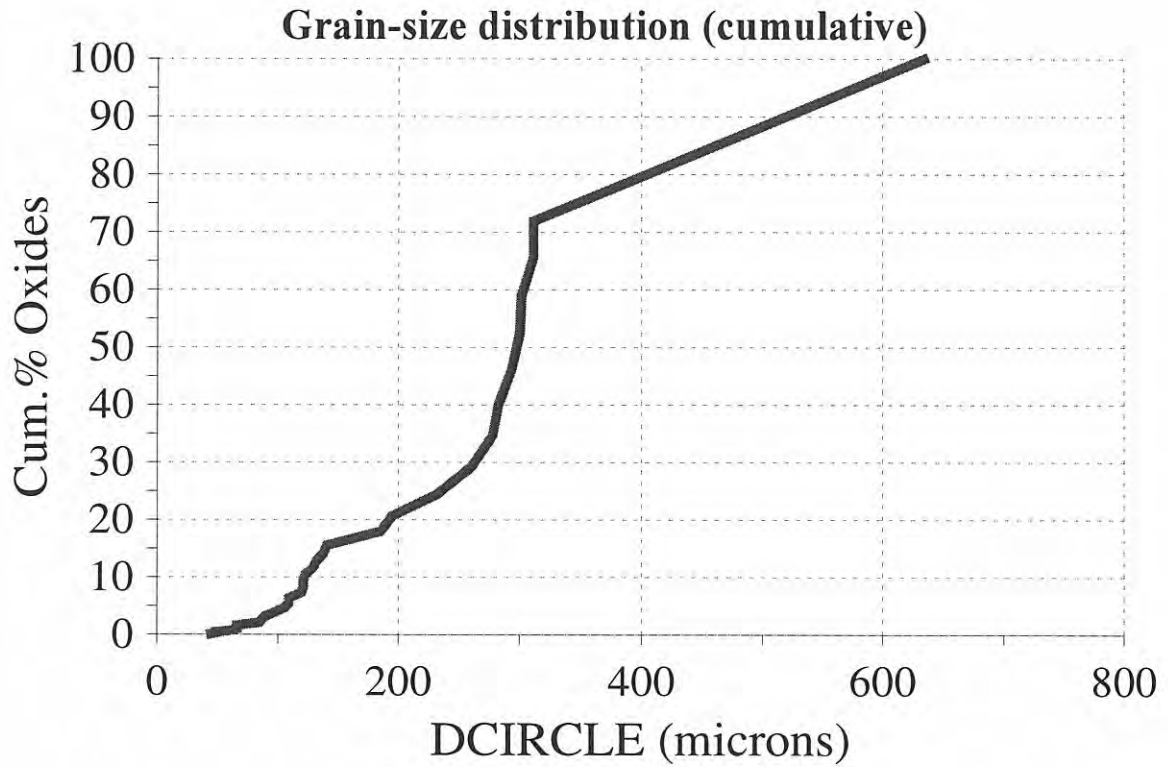
Sample 2Ø/91.45



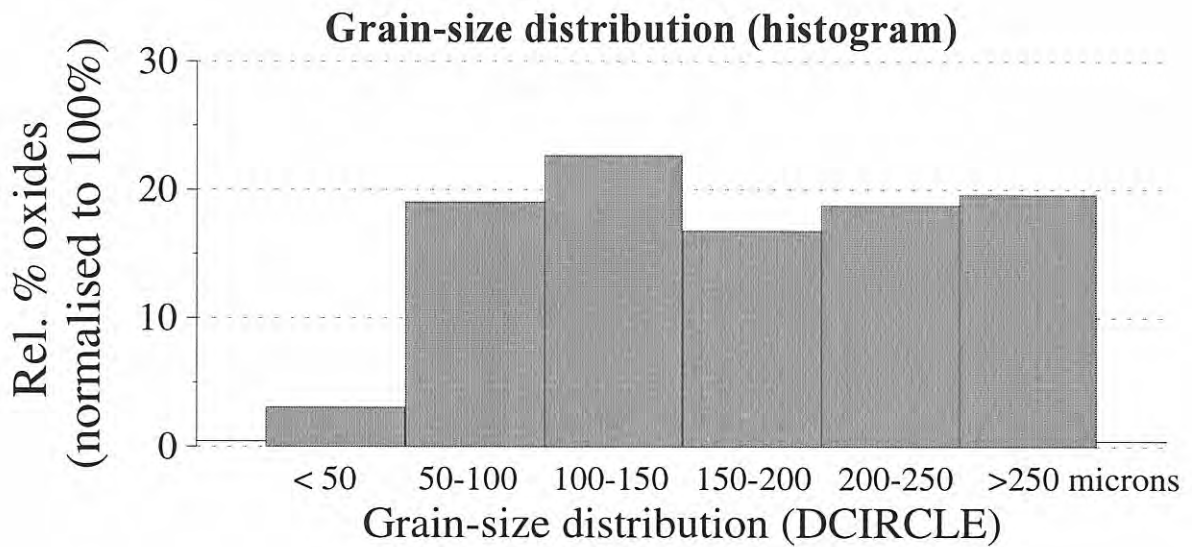
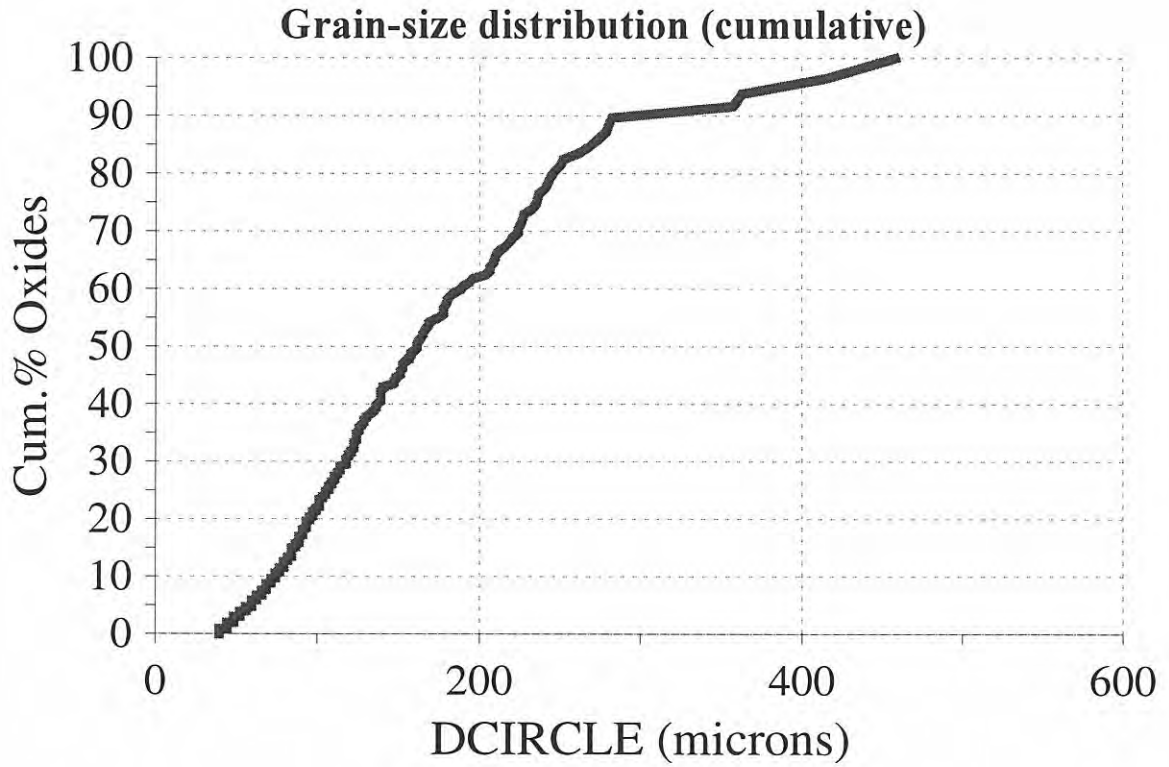
Sample 2Ø/29.30



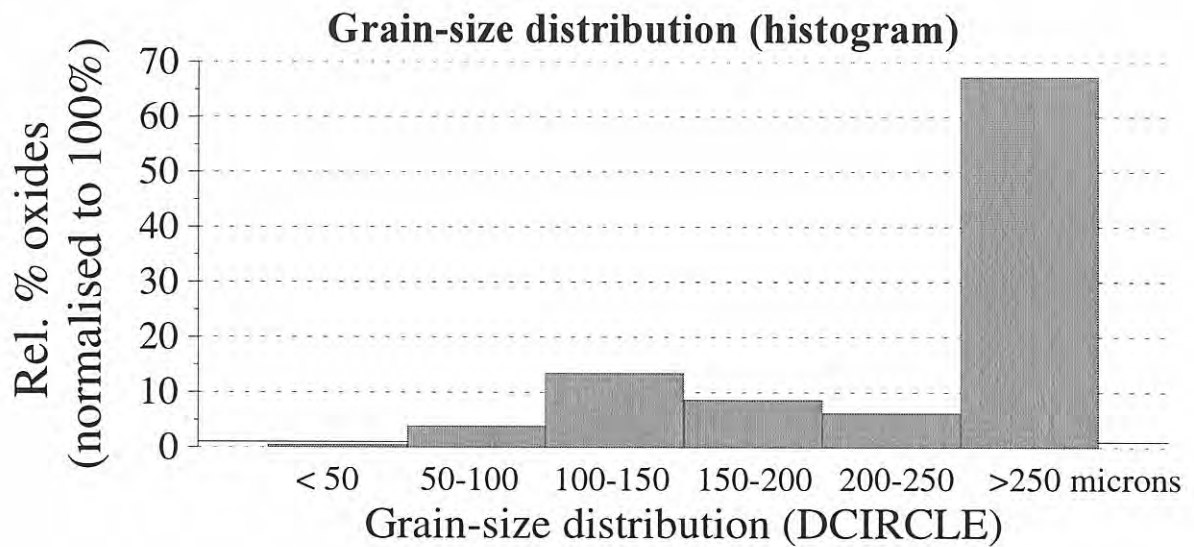
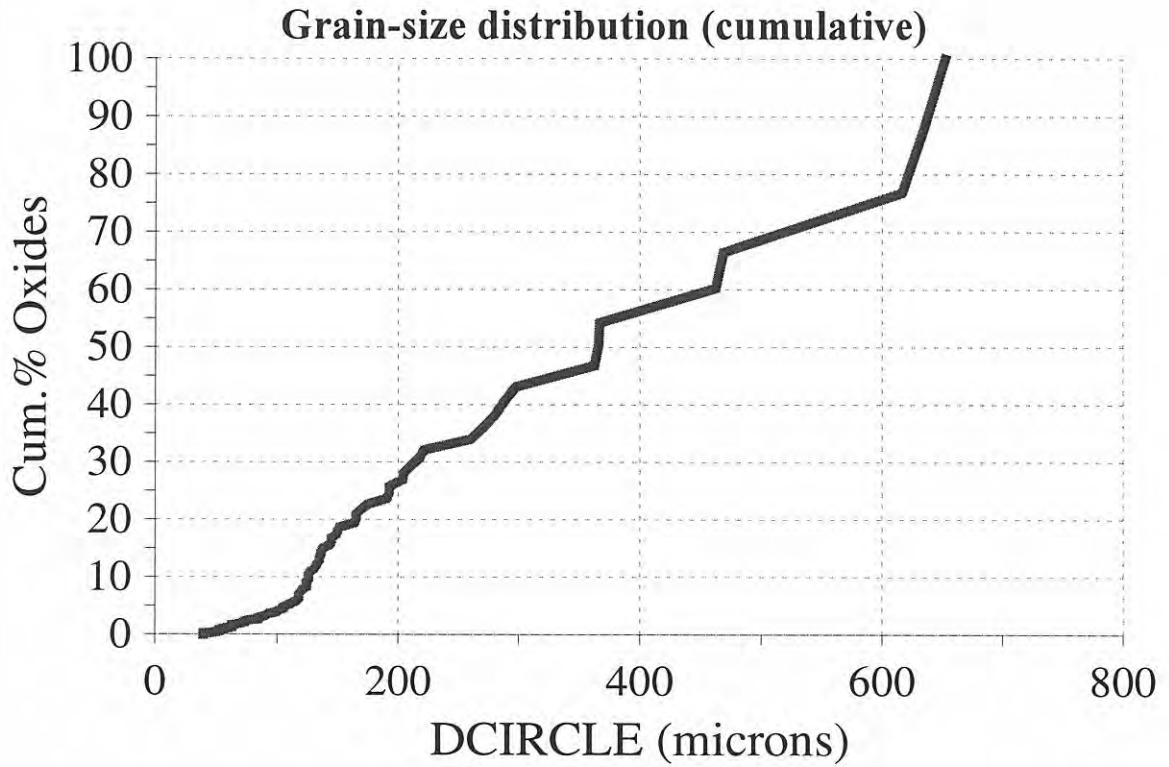
Sample 2Ø/51.90



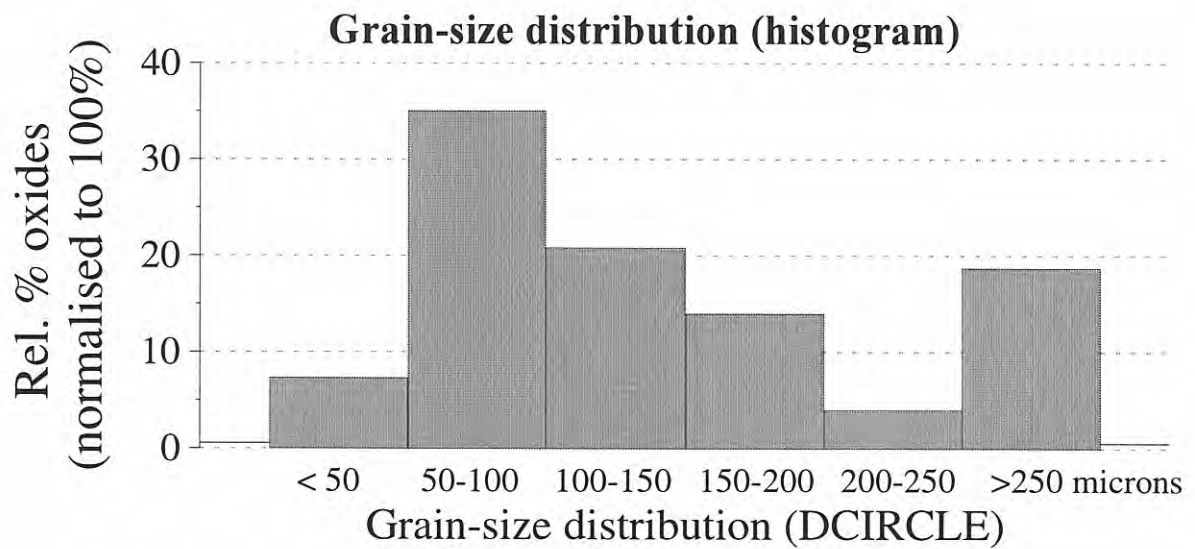
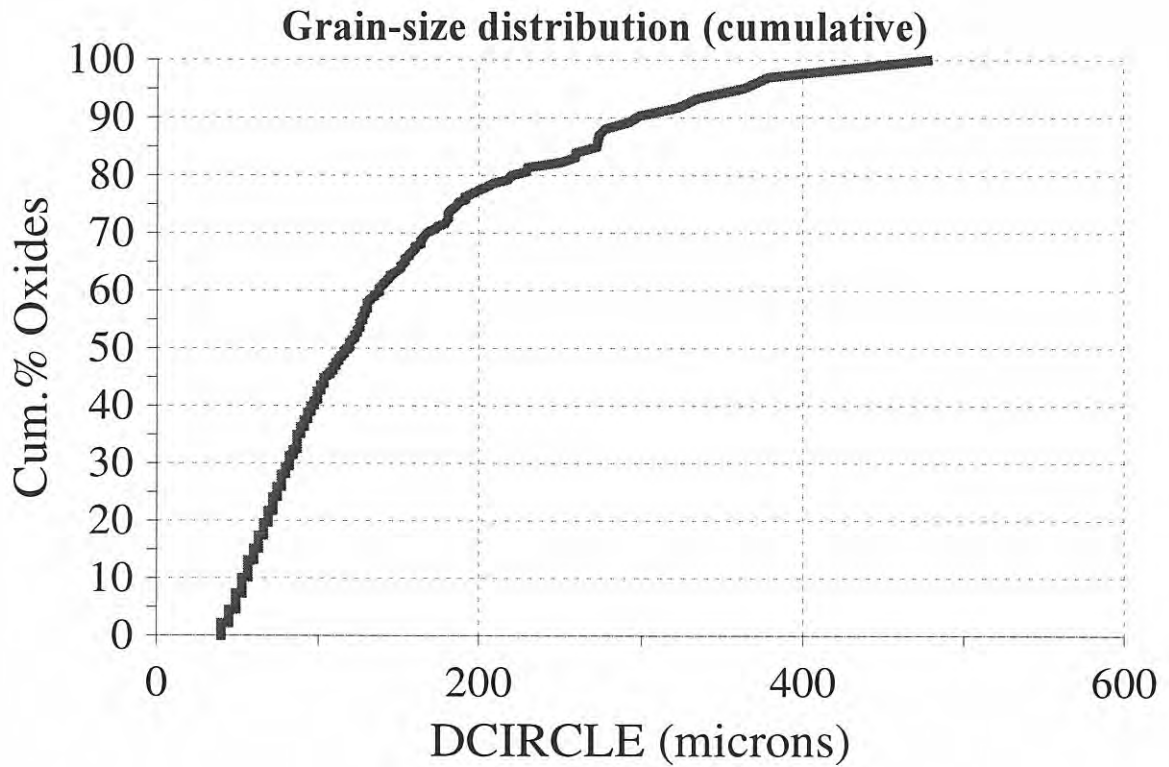
Sample 2Ø/6.20



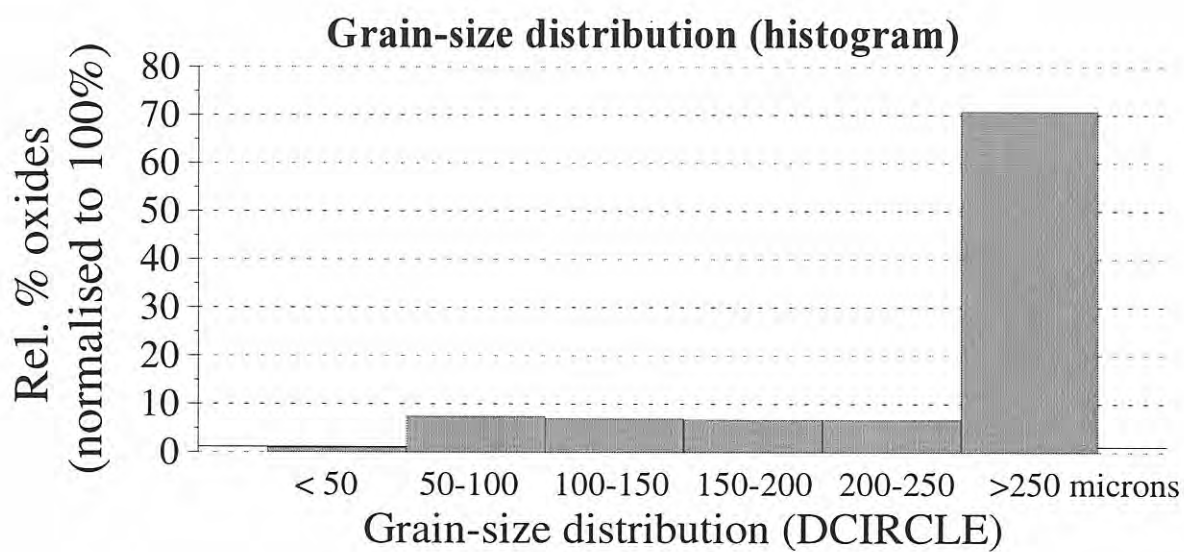
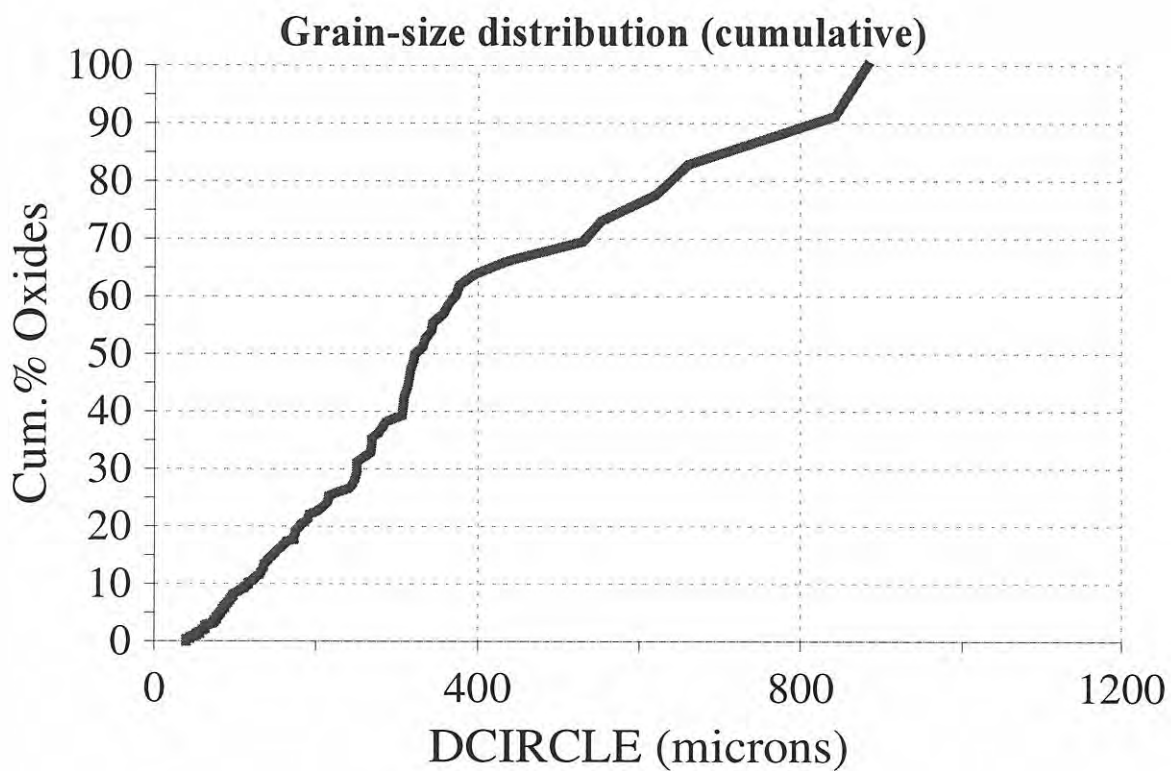
Sample 2Ø/58.45



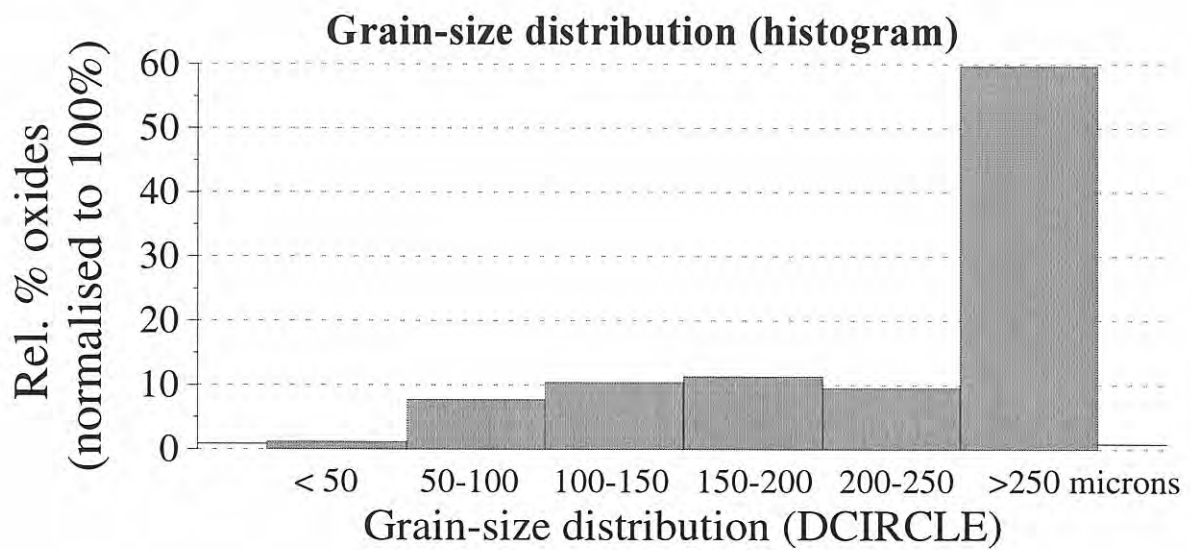
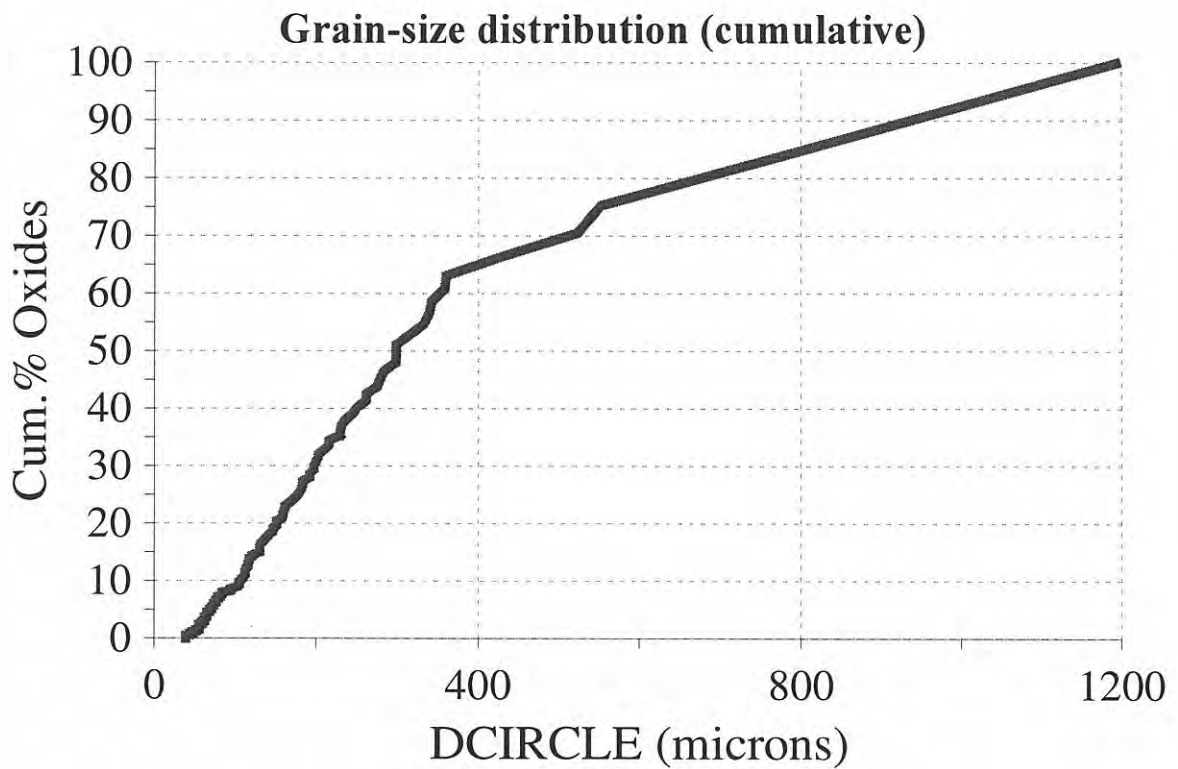
Sample 2Ø/34.55



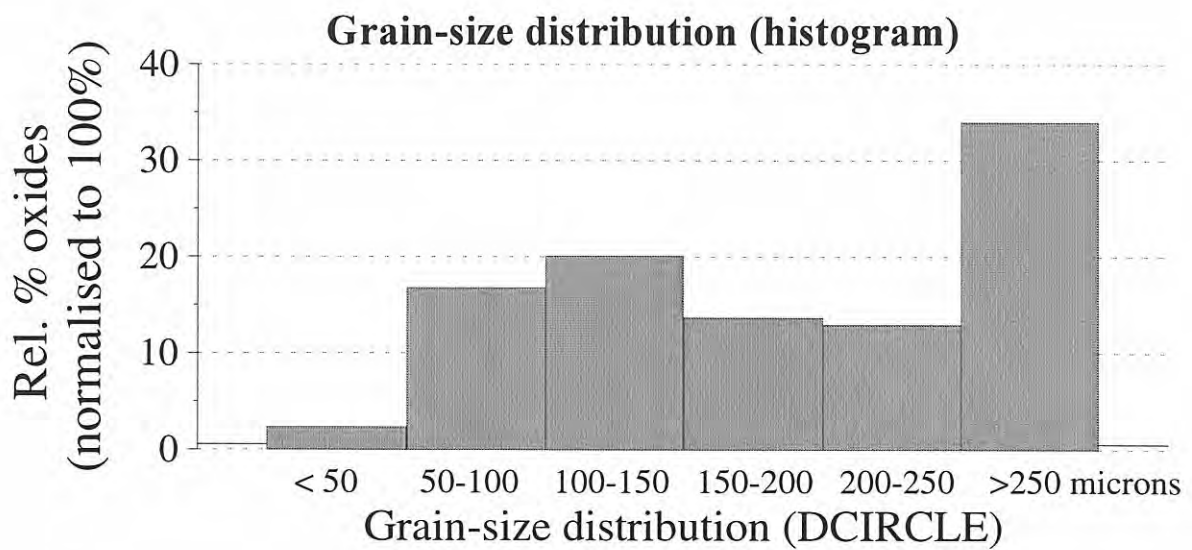
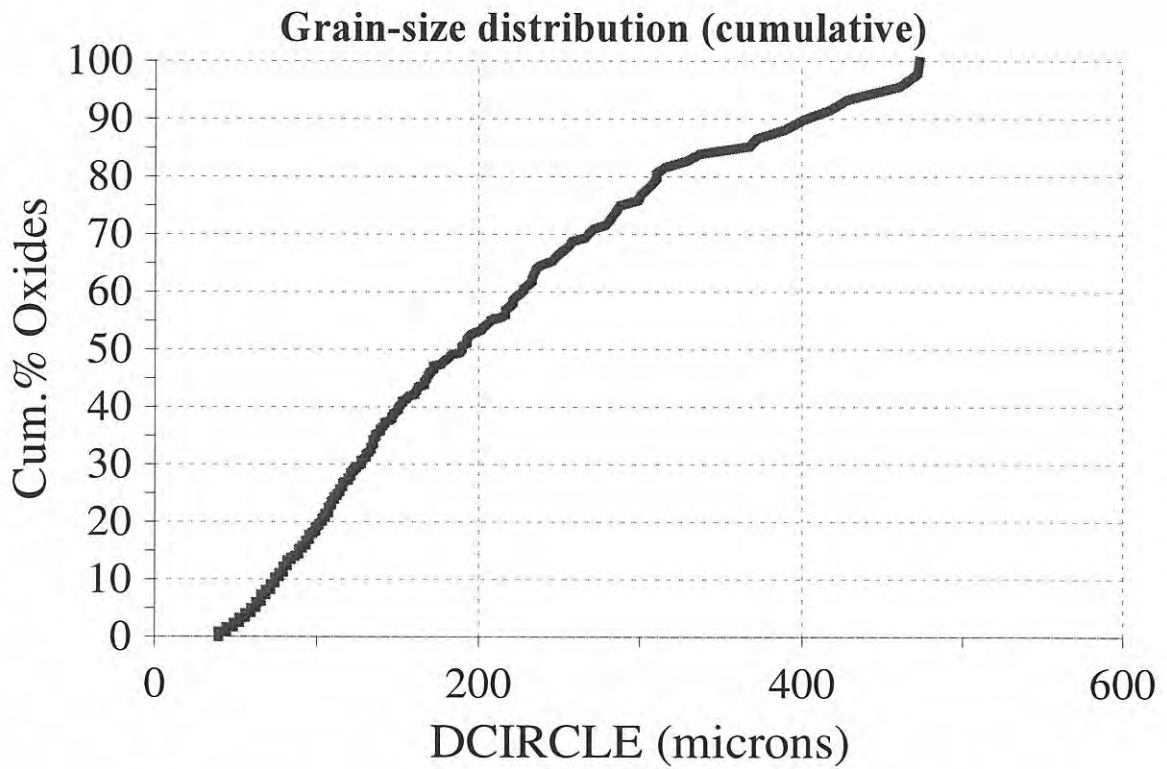
Sample 1Ø/5.40



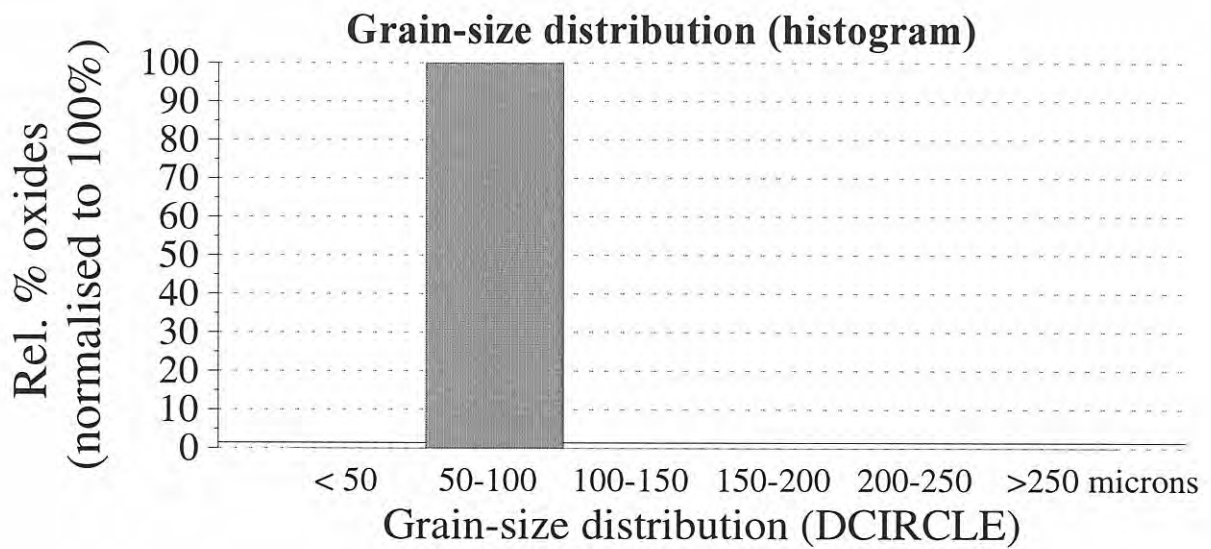
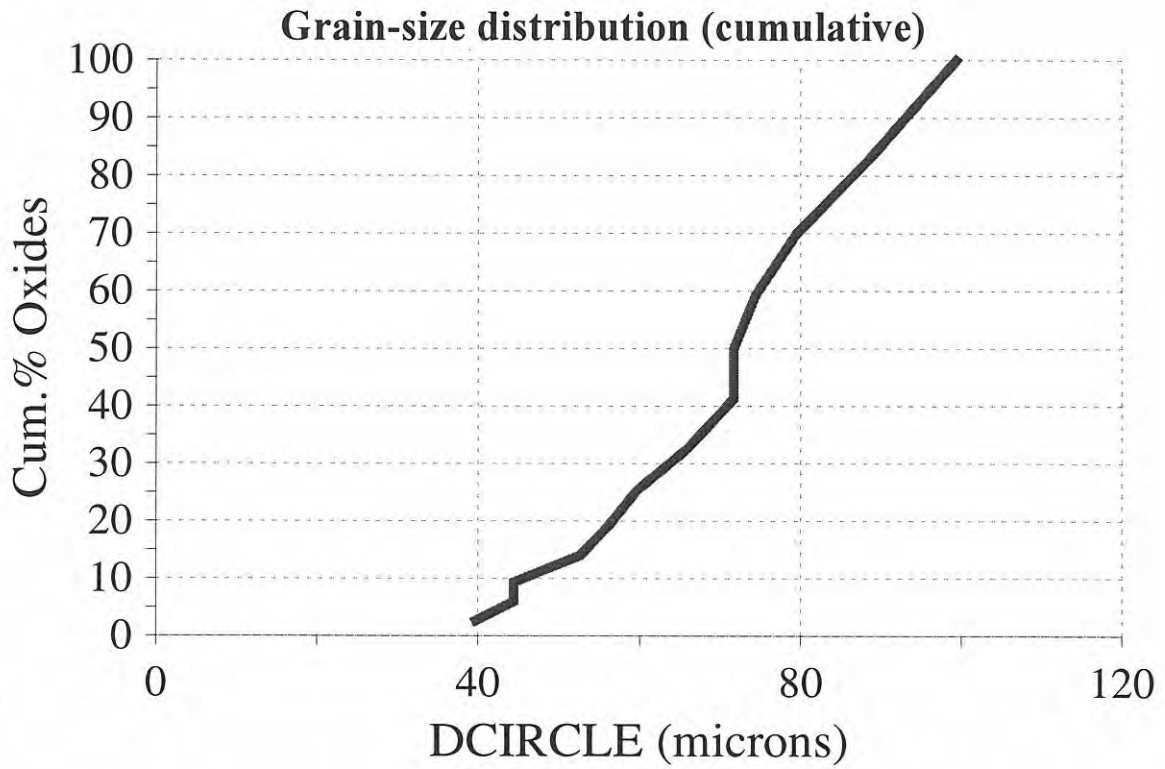
Sample 1Ø/50.20



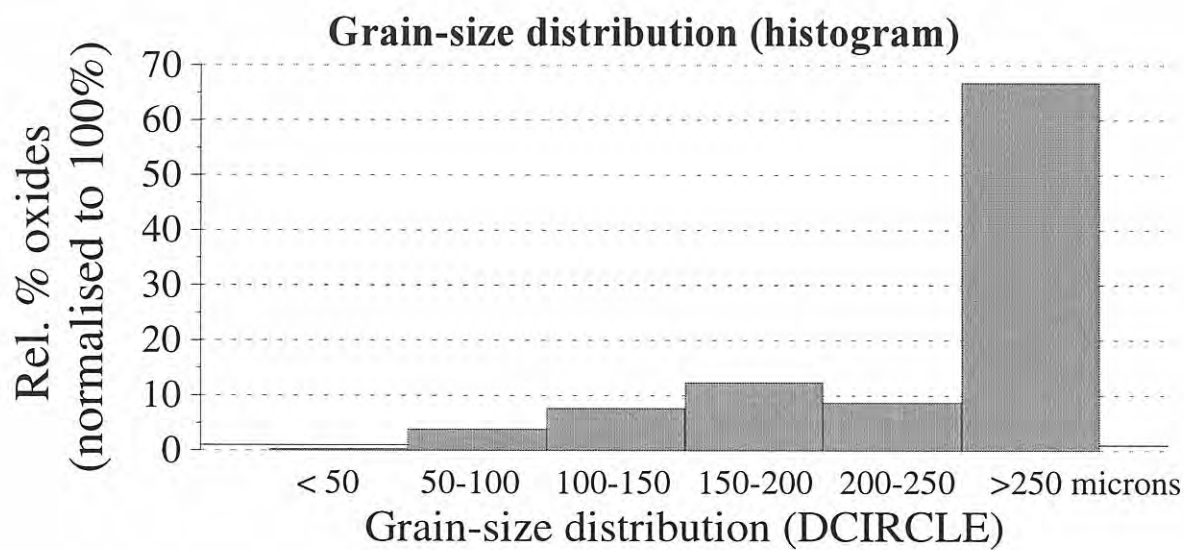
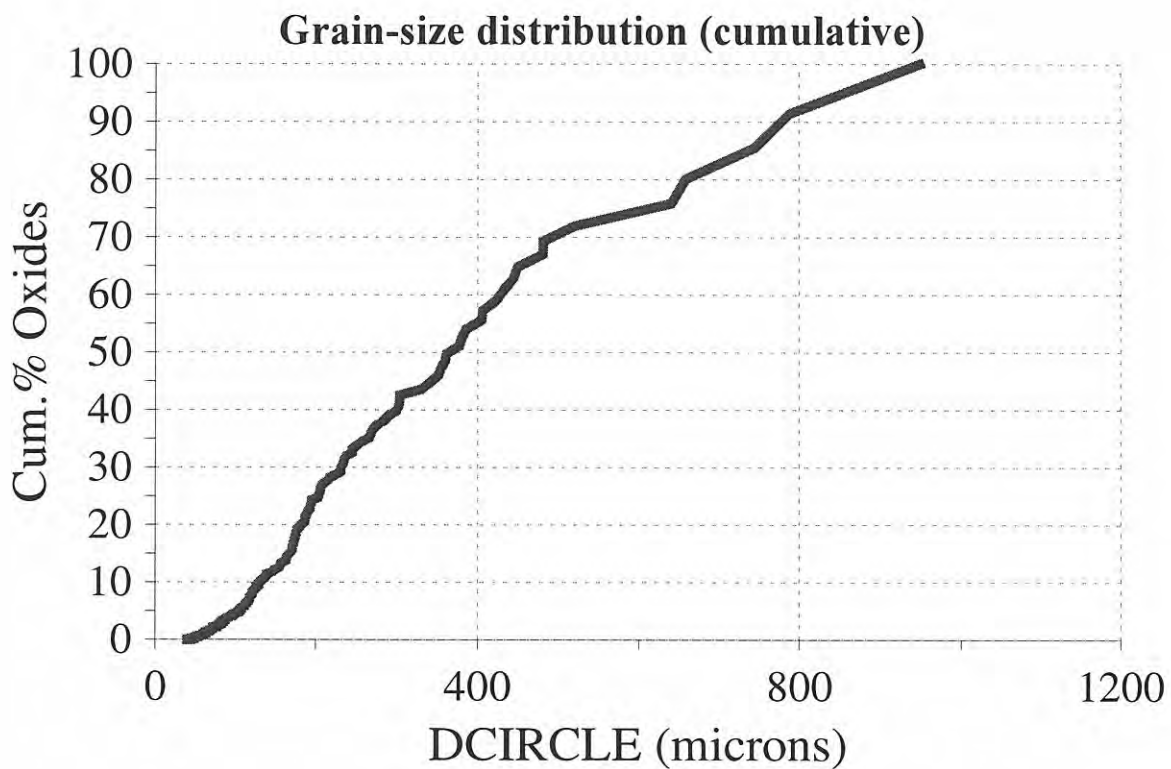
Sample 2Ø/28.70



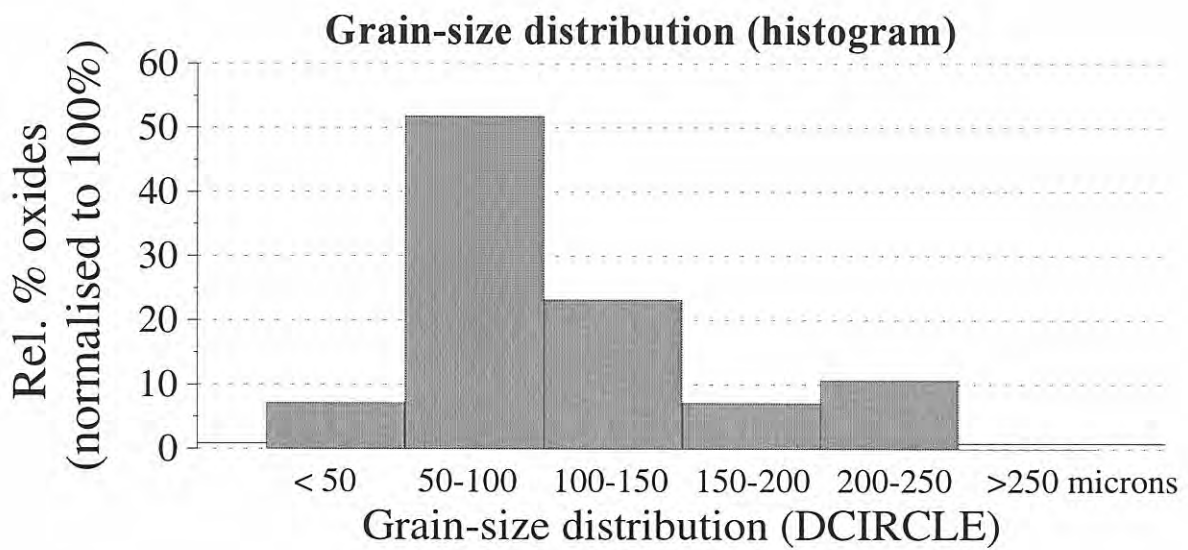
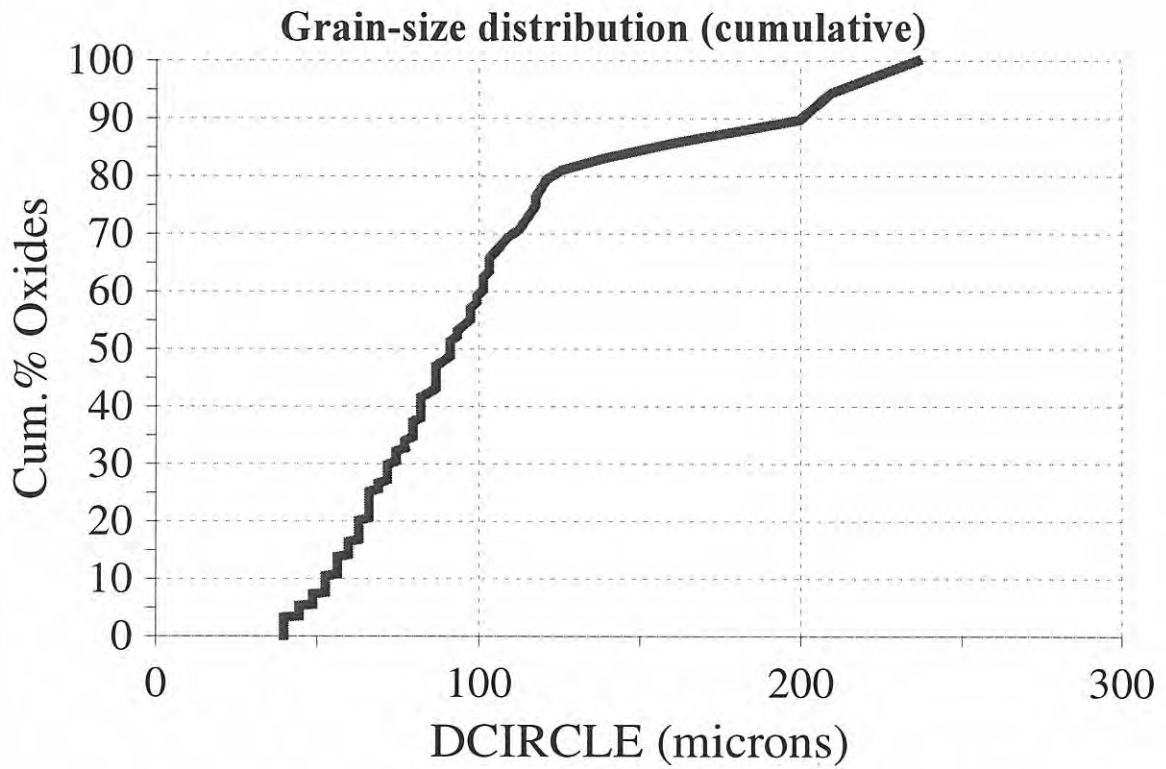
Sample 2Ø/68.30



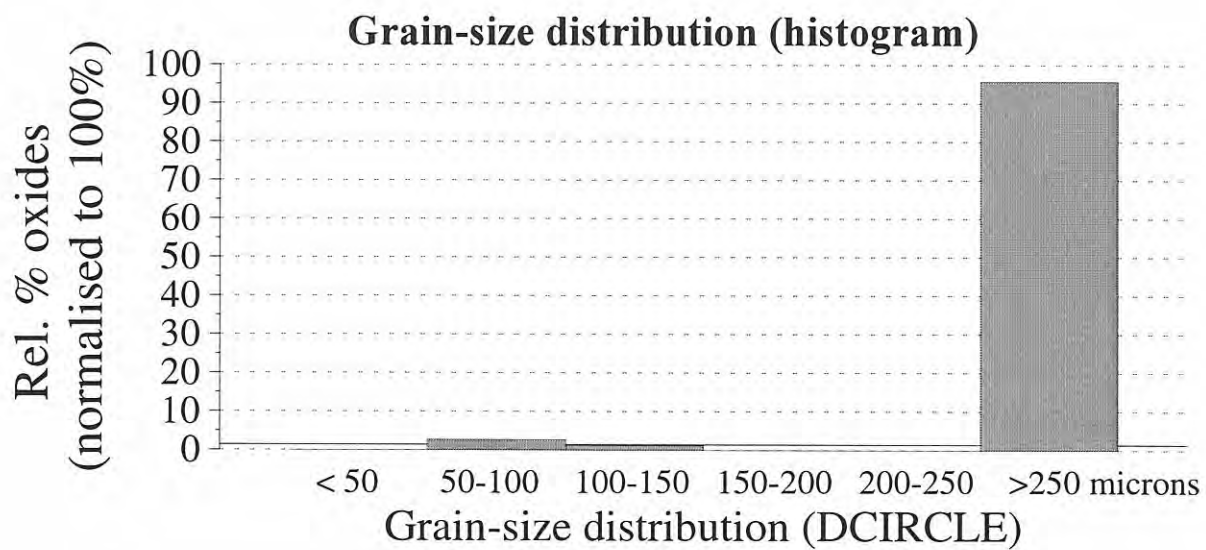
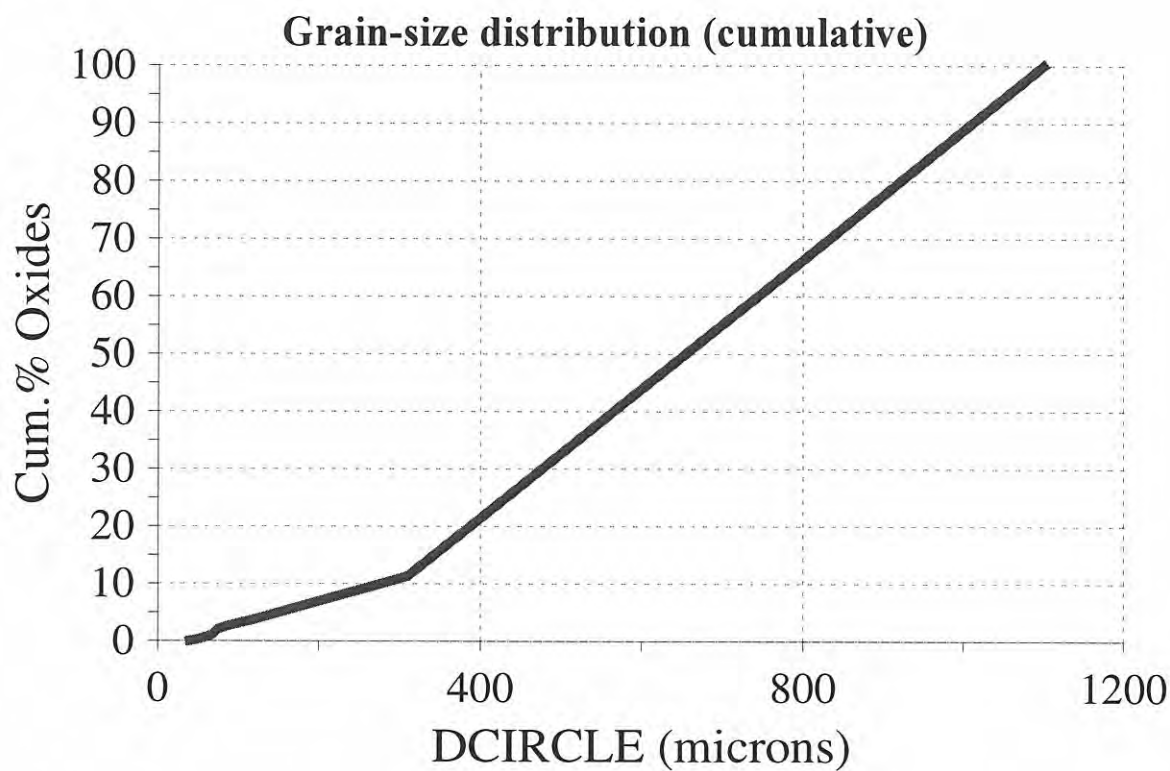
Sample 1Ø/35.30



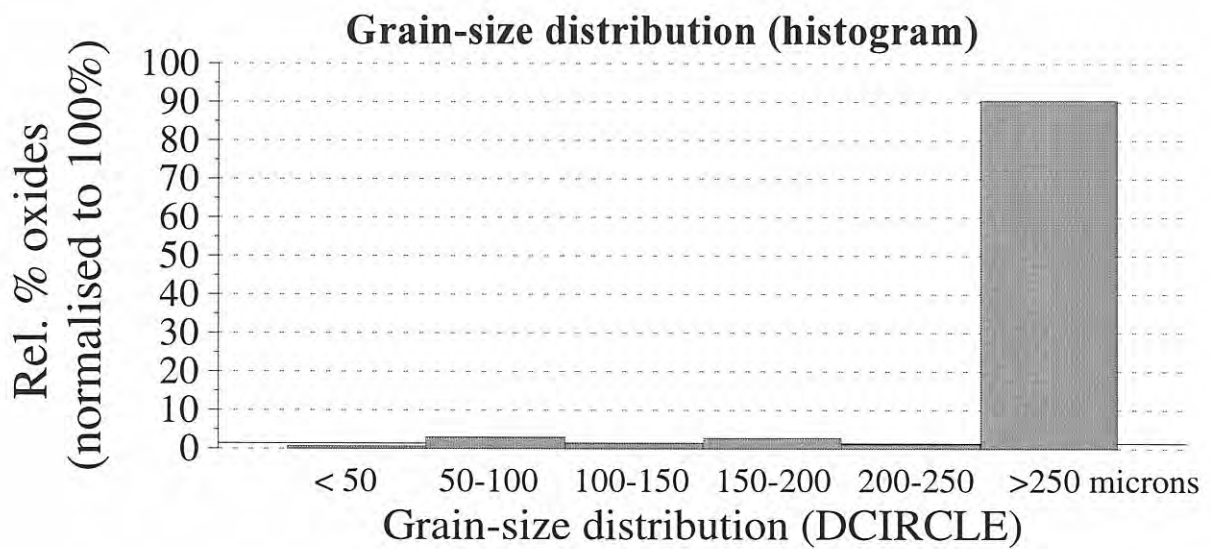
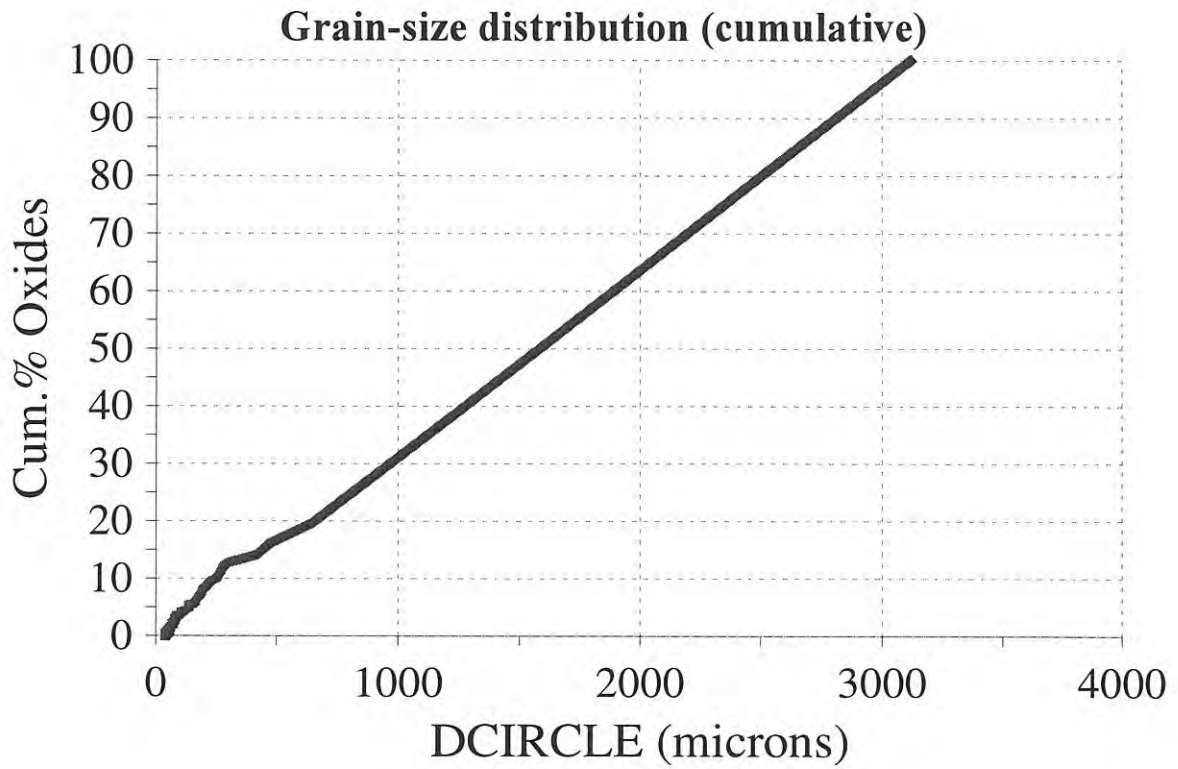
Sample 2Ø/48.10



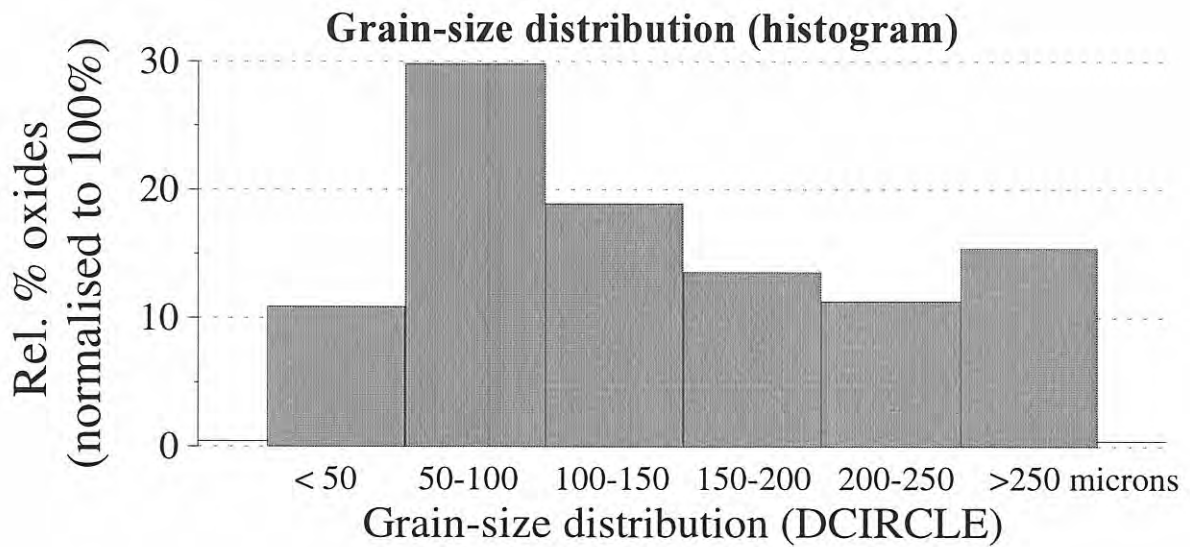
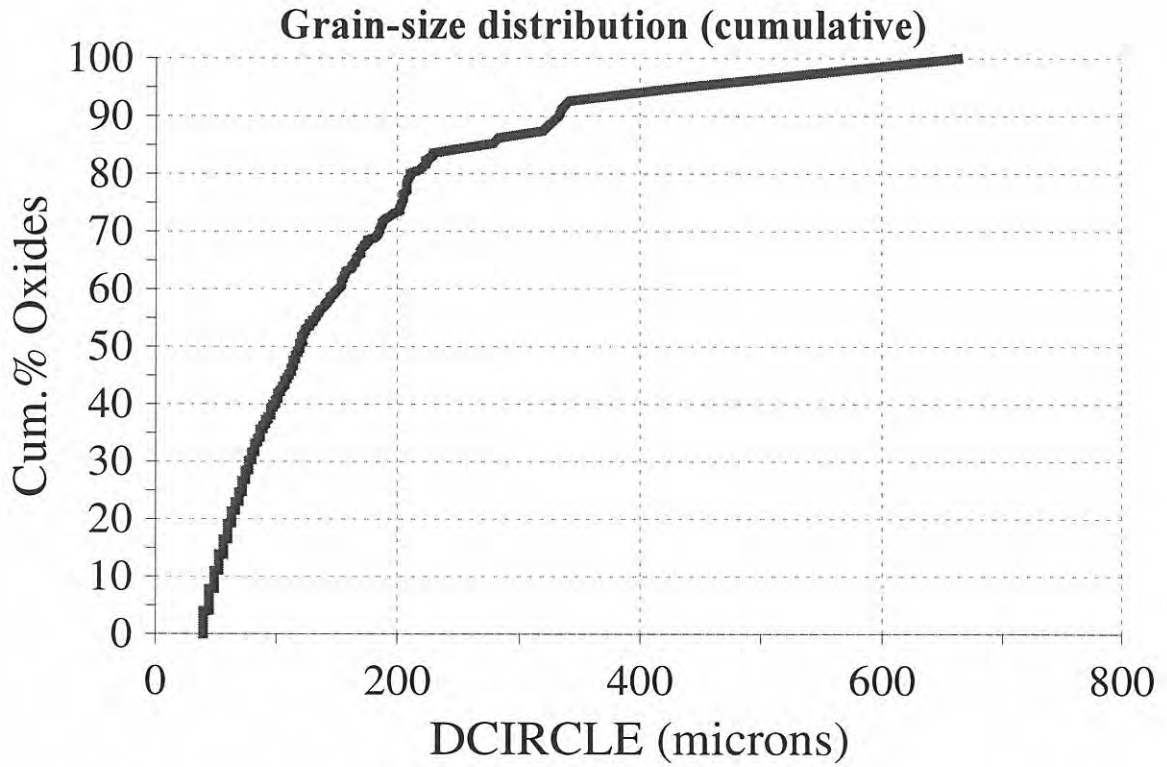
Sample 1Ø/26.15



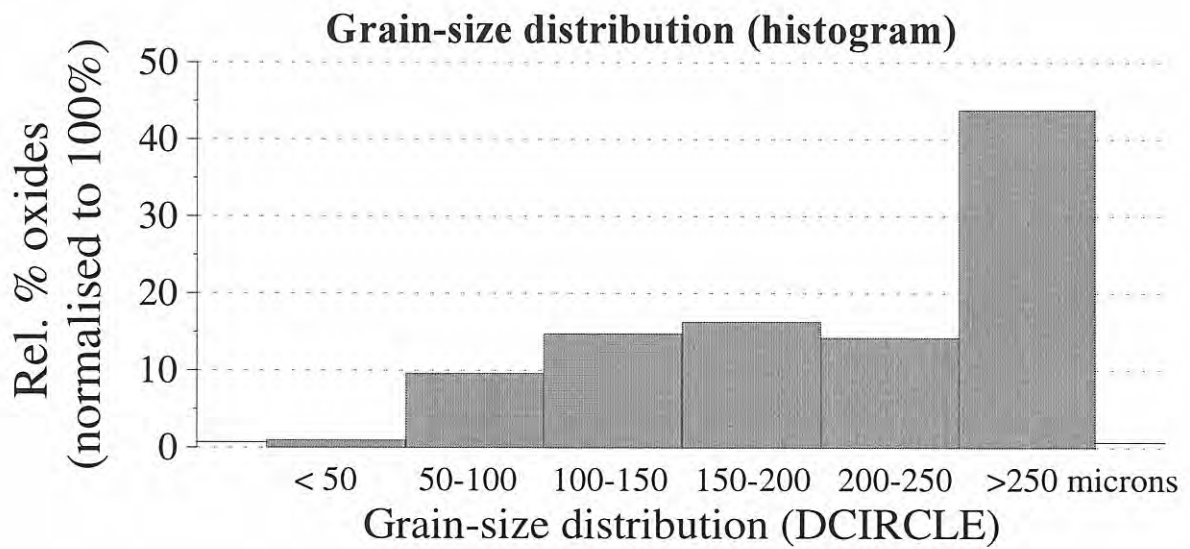
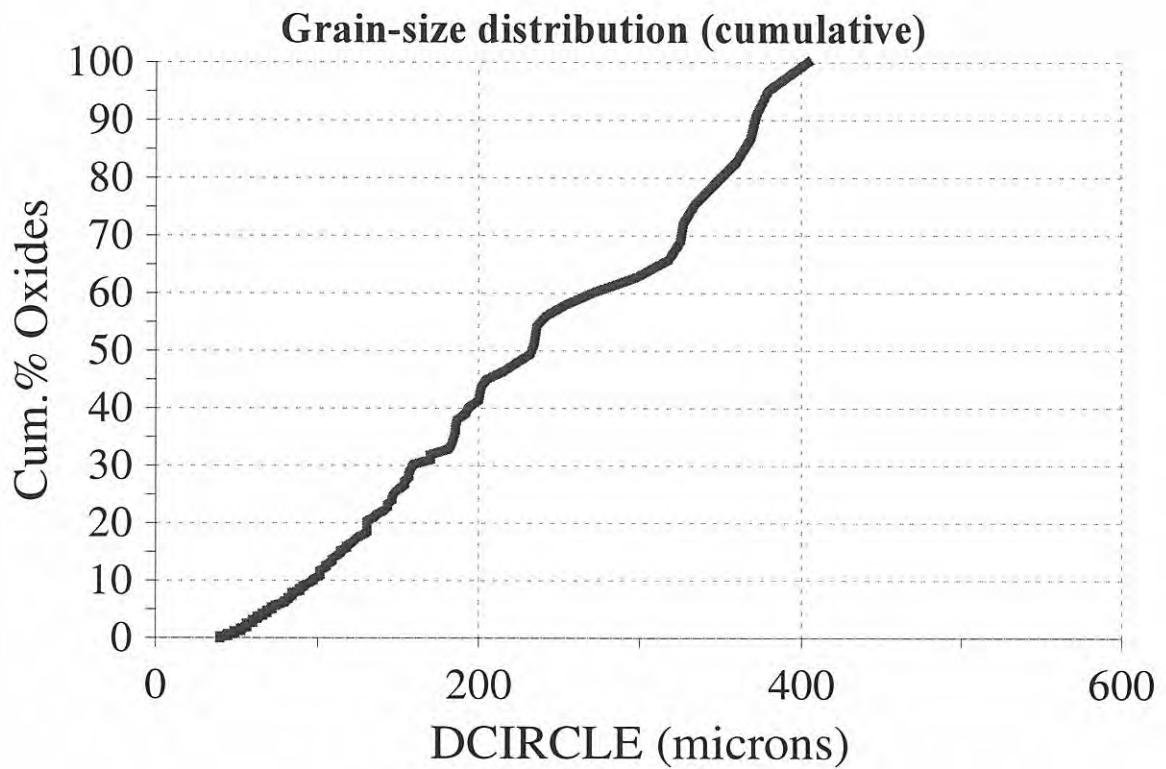
Sample 2Ø/32.25



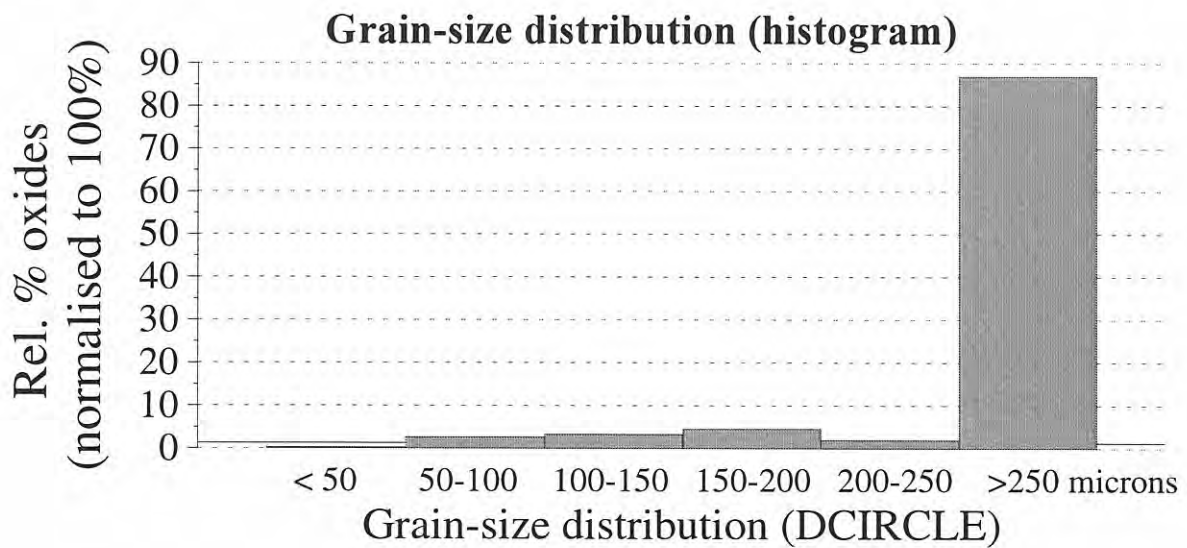
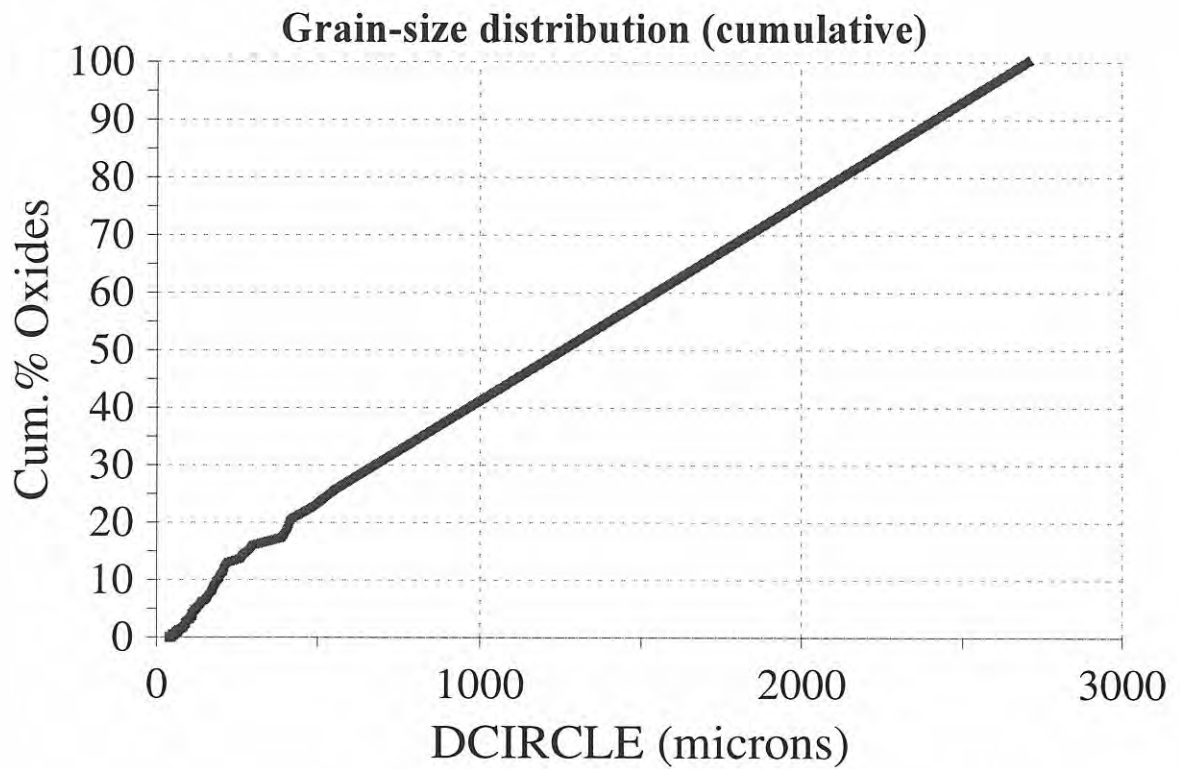
Sample 2Ø/29.90



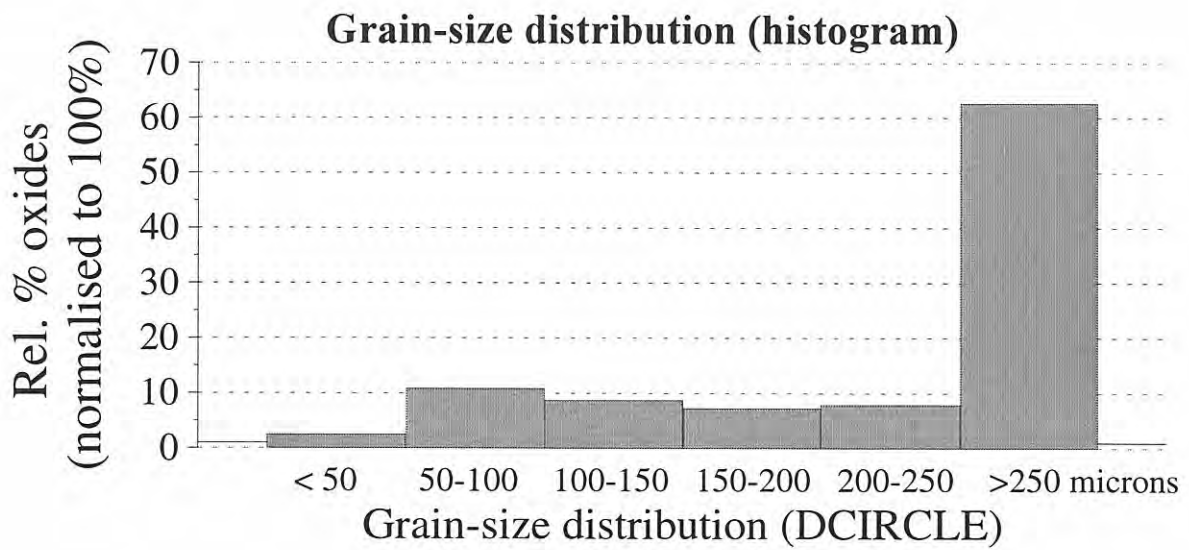
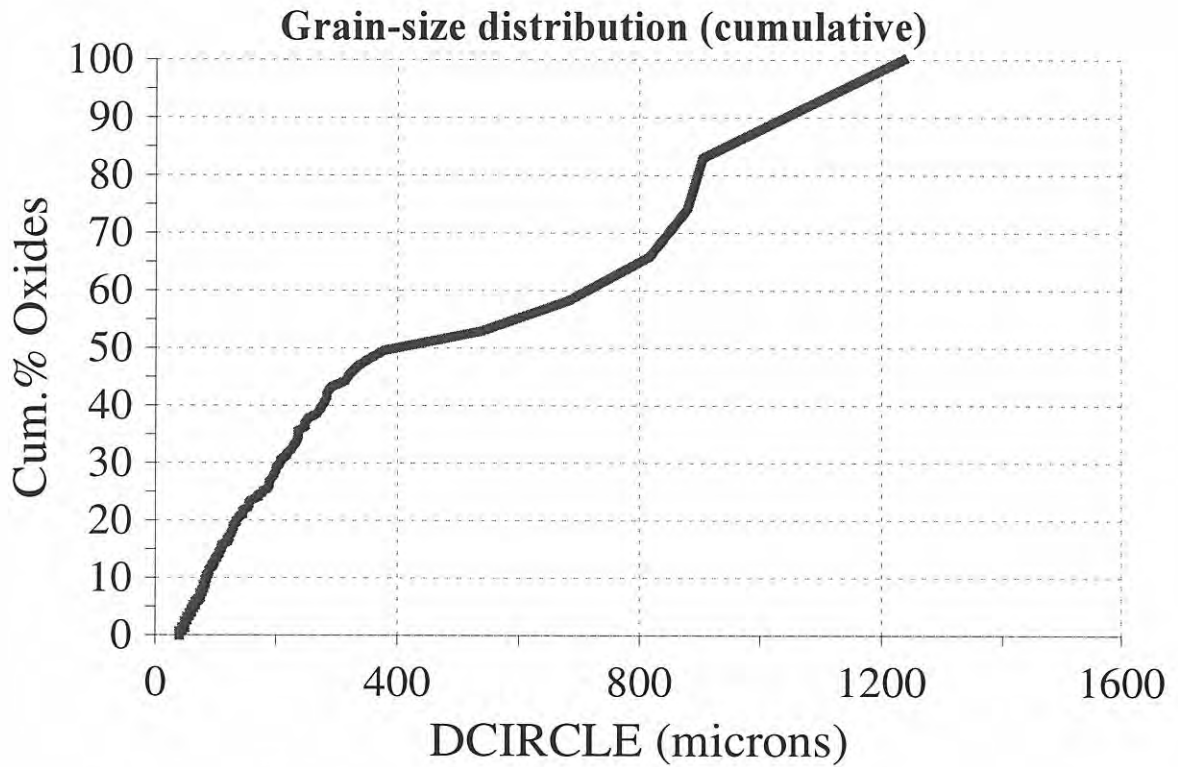
Sample 2Ø/77.90



Sample 2Ø/32.15



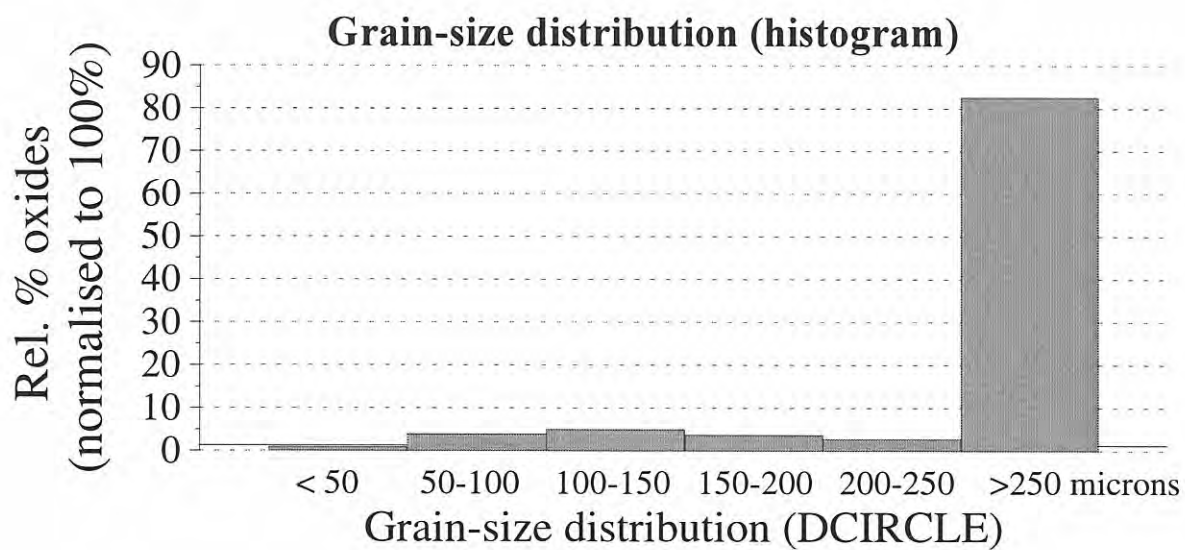
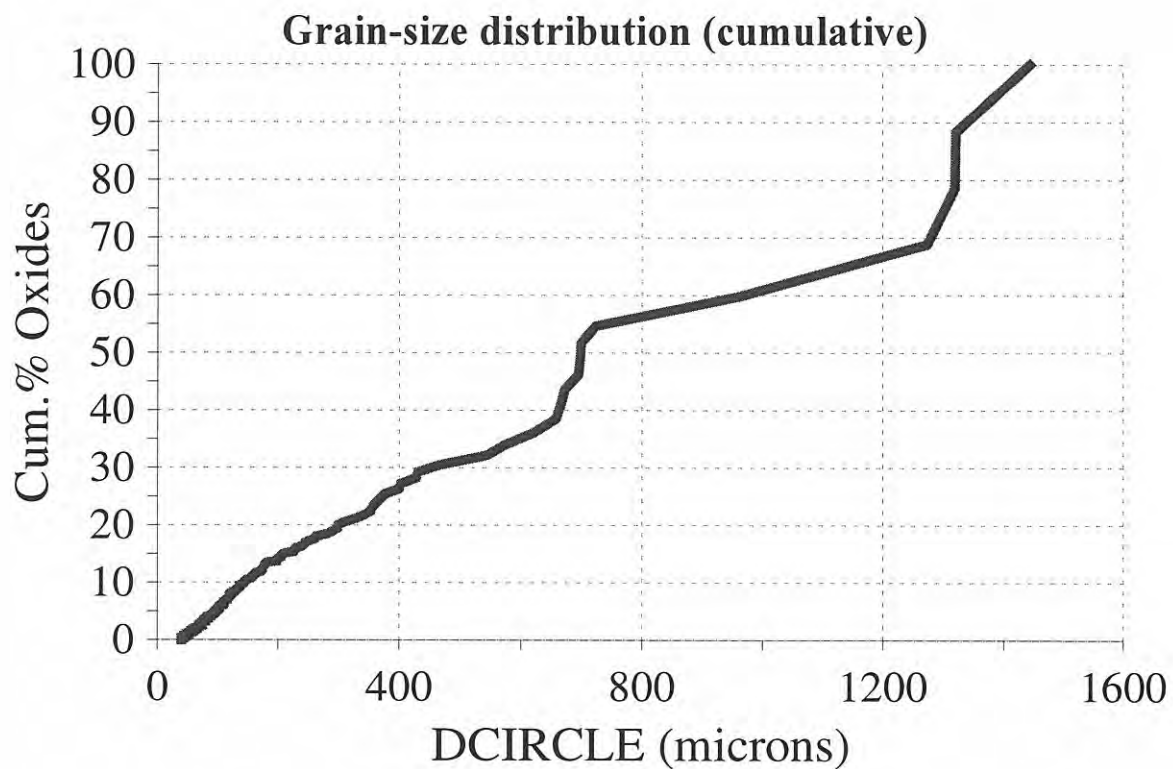
Sample 1Ø/9.40



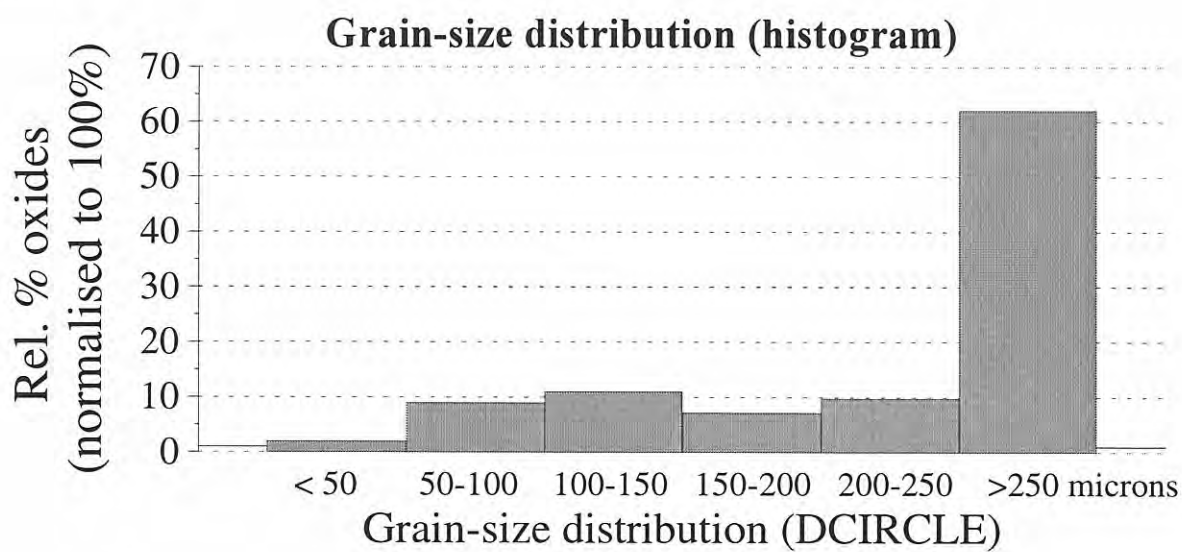
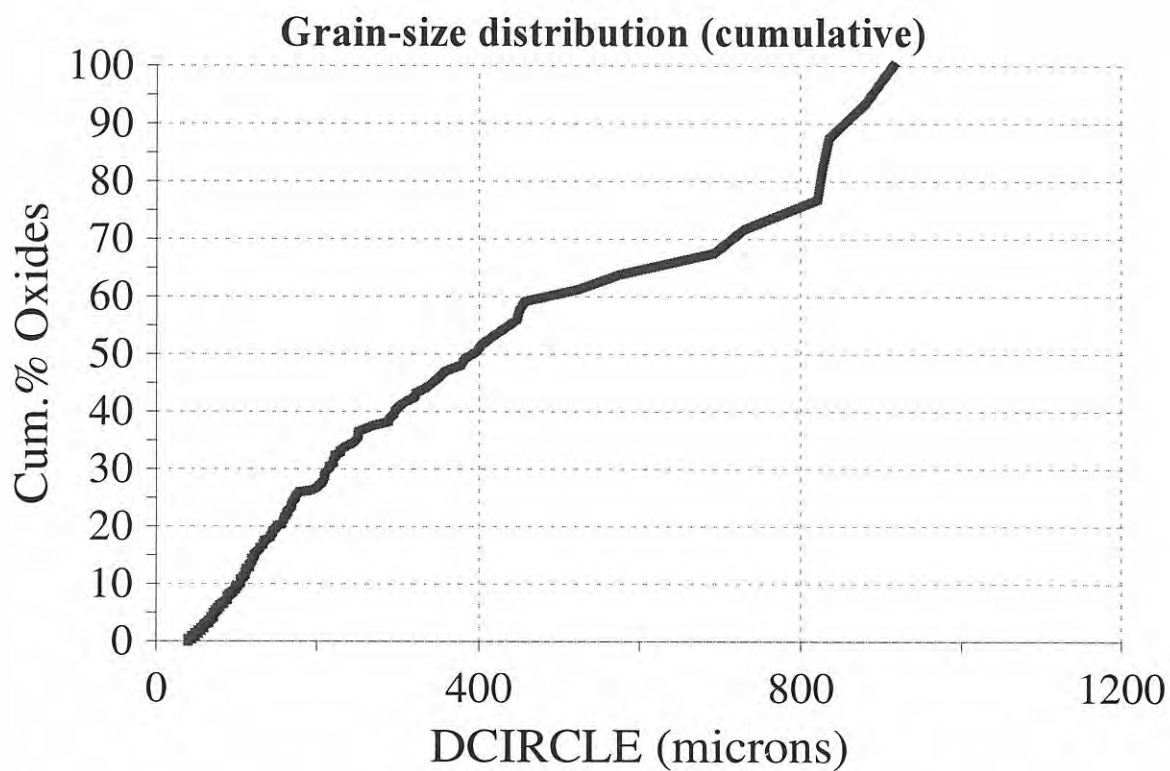
Rutile grain-size
distribution graphs

Bergen region

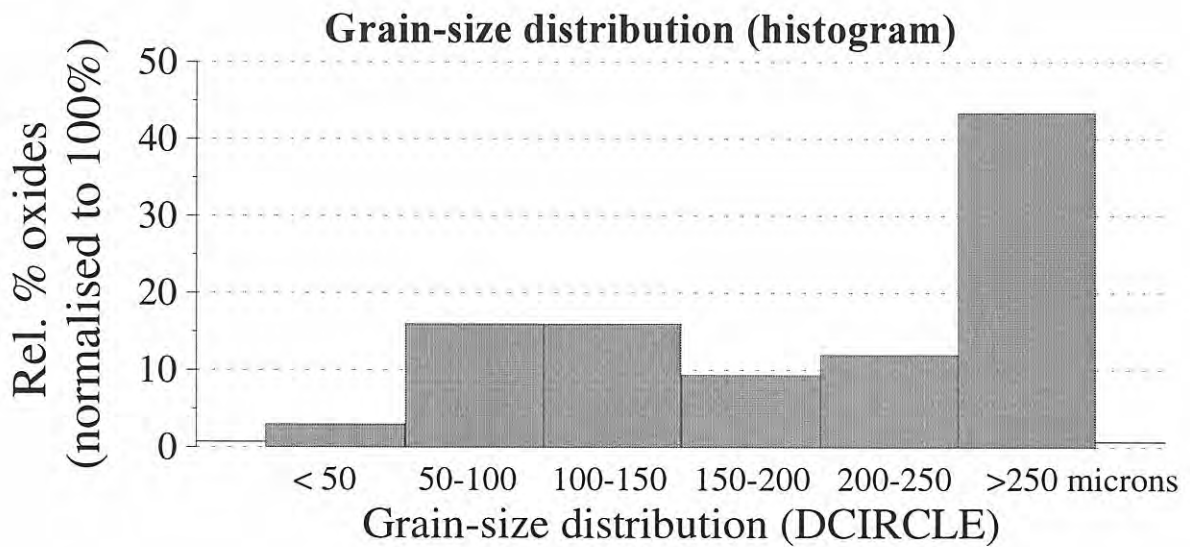
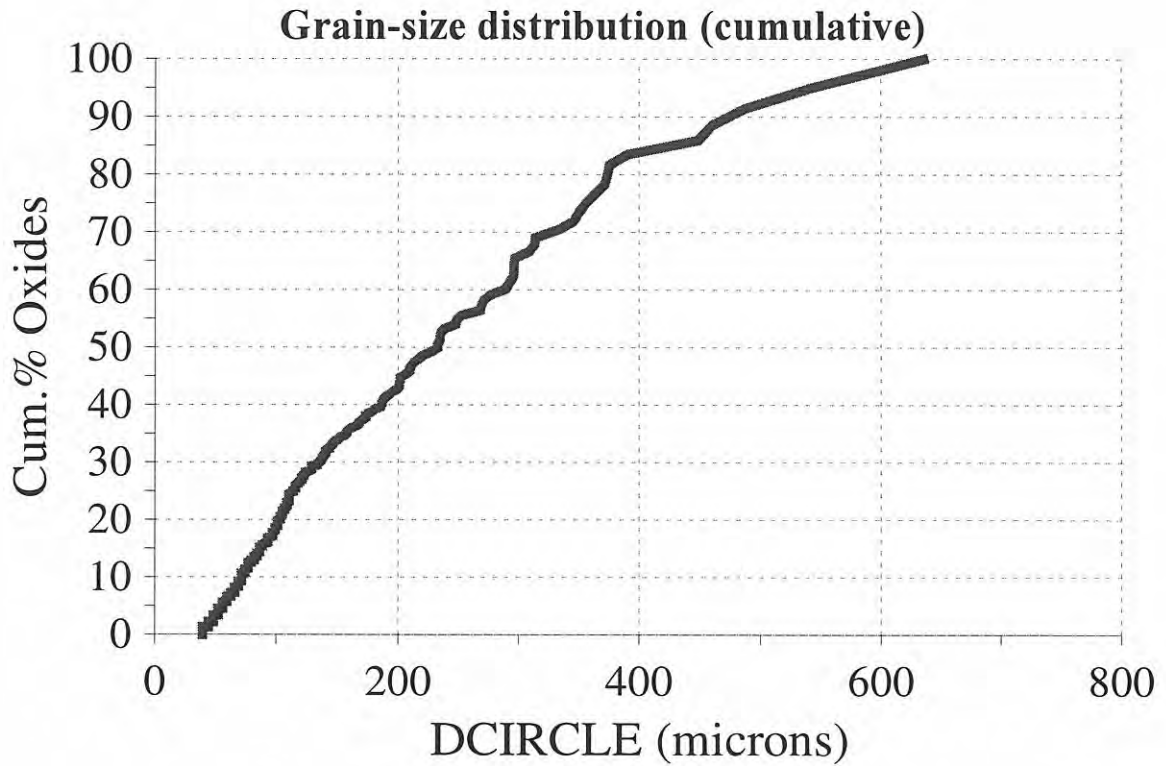
Sample KH14A.89



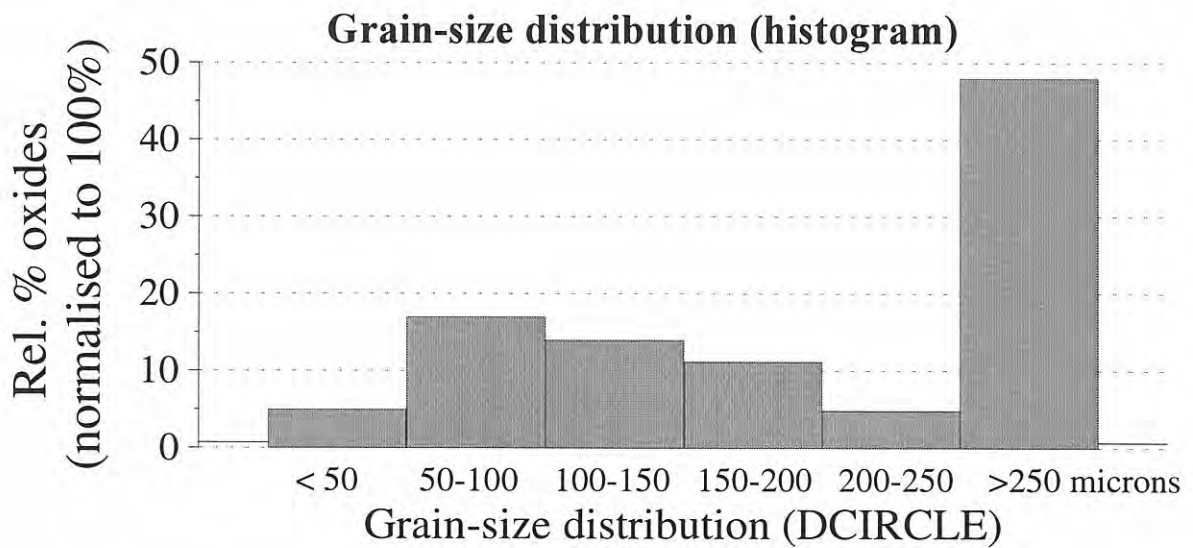
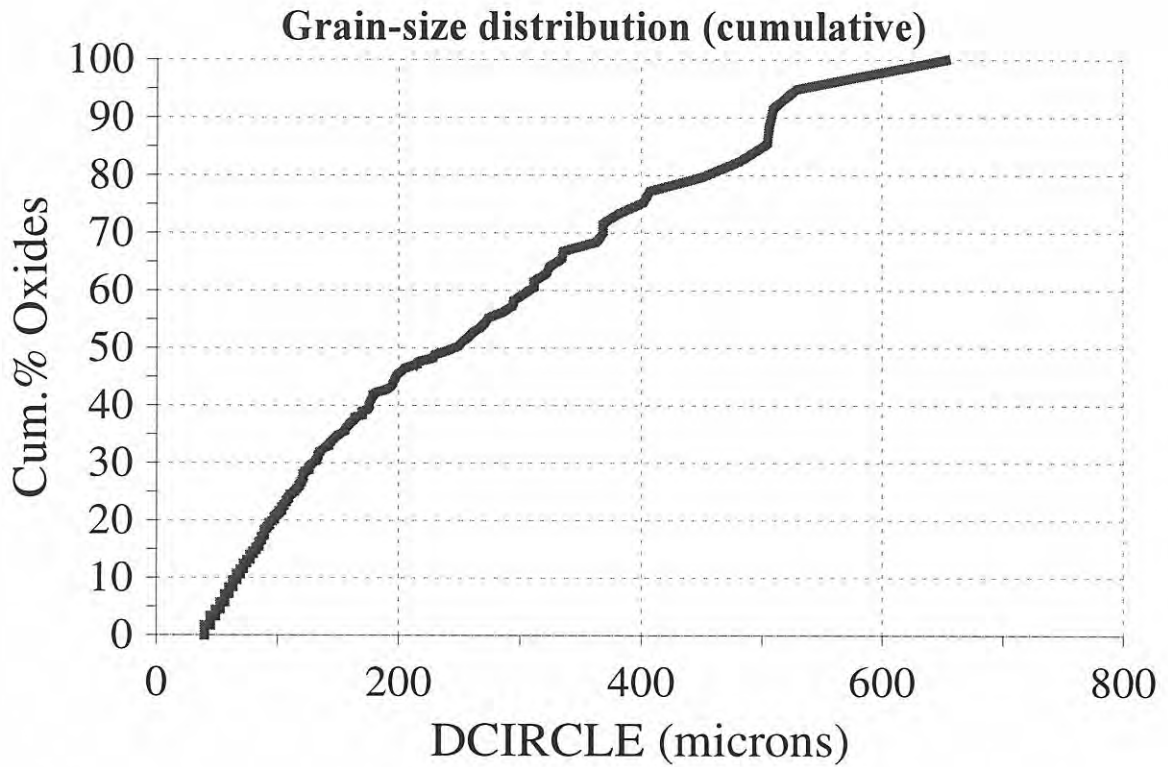
Sample KH17.89



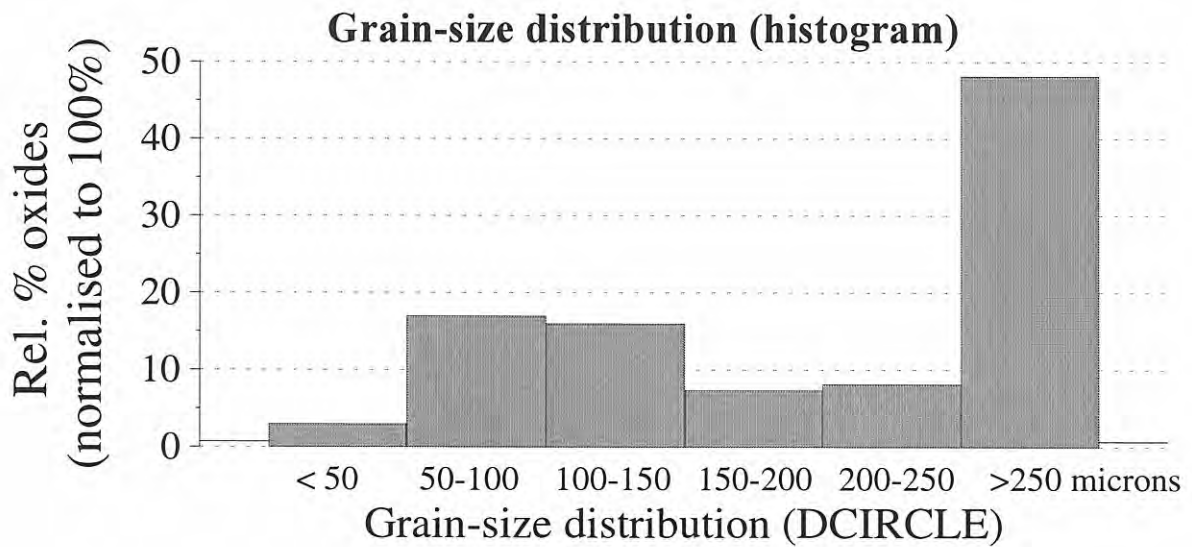
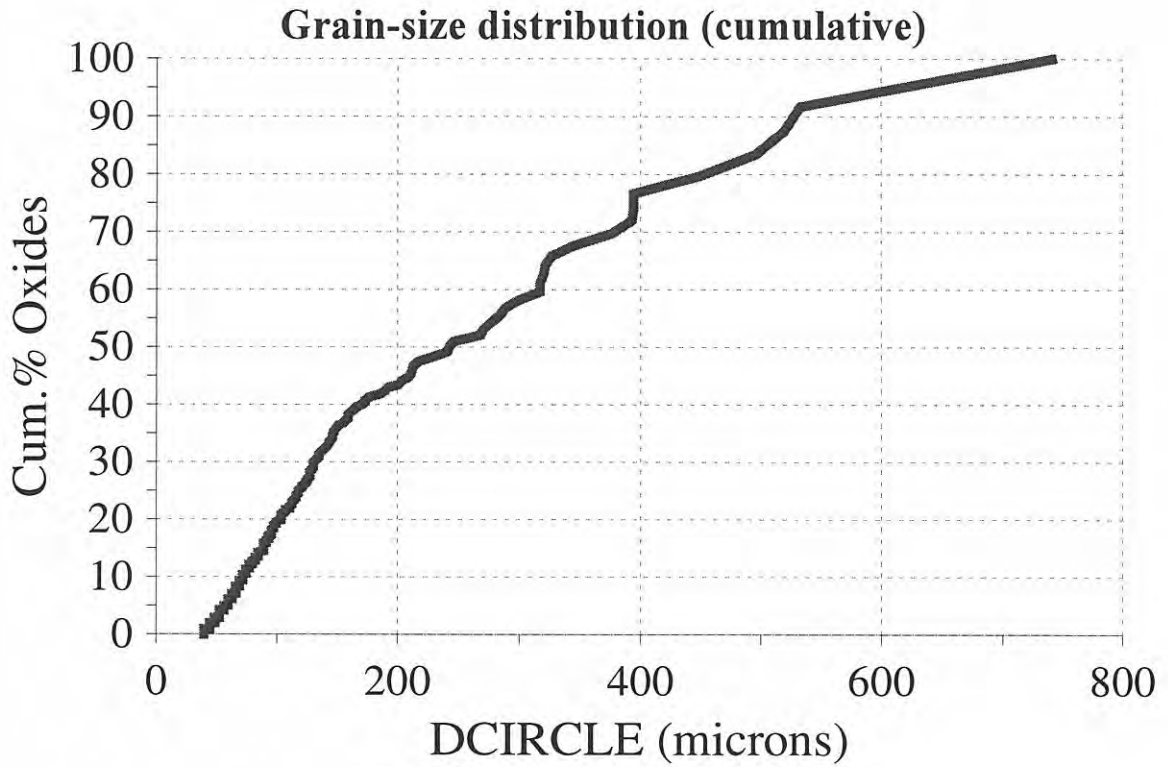
Sample KH2A.89



Sample KH2B.89



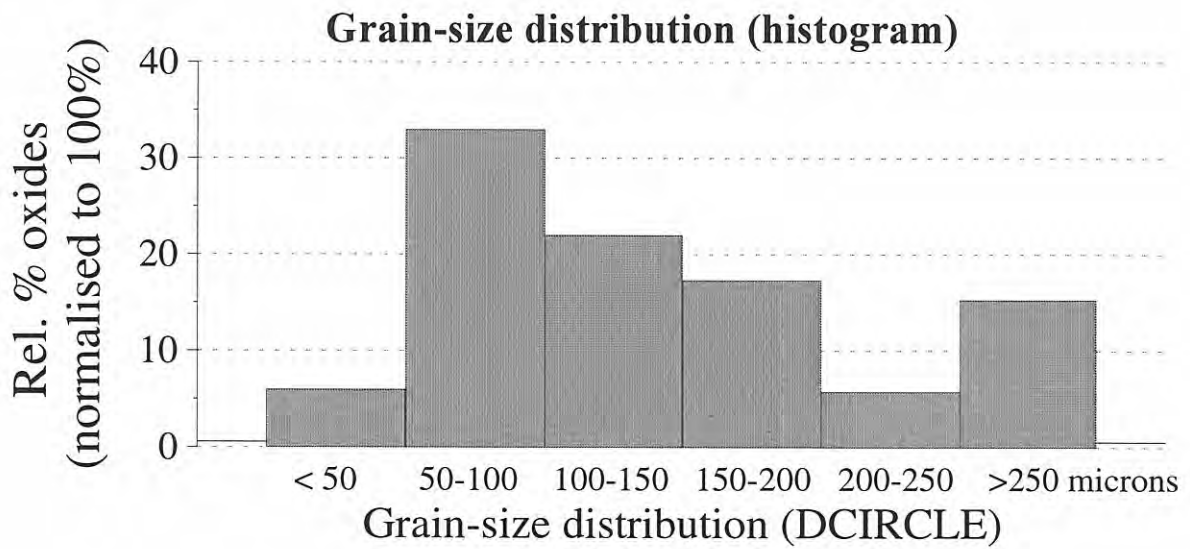
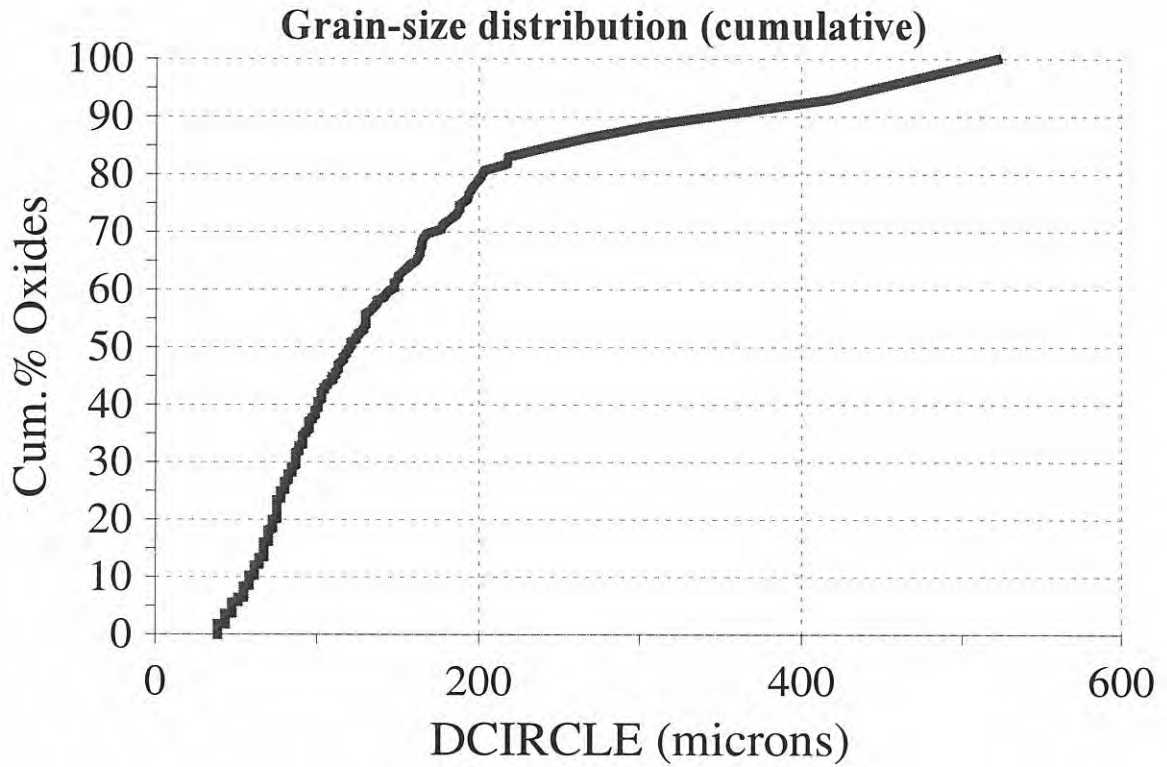
Sample KH2C.89



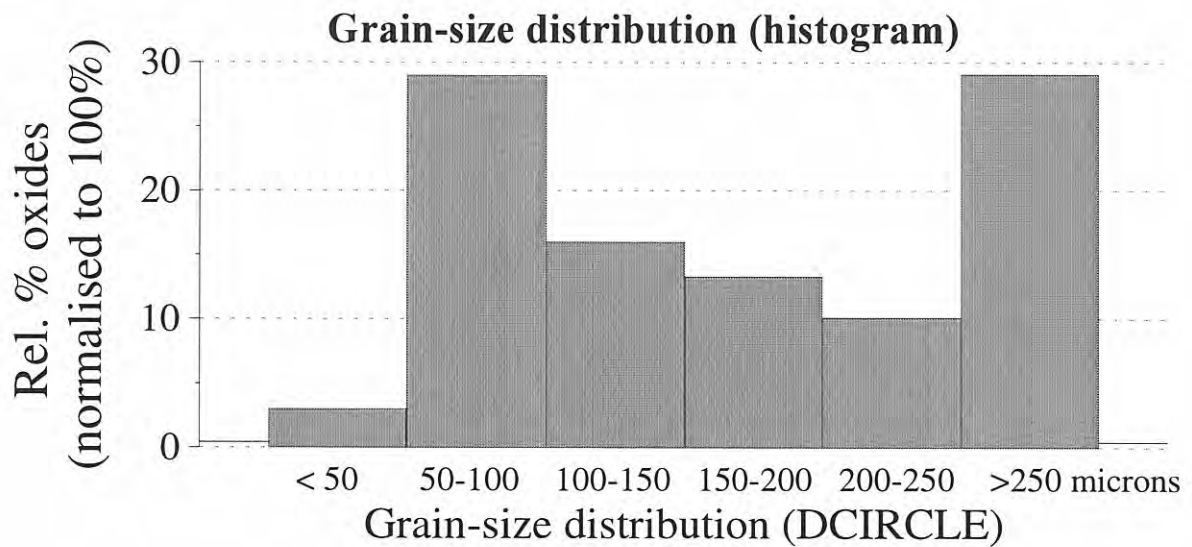
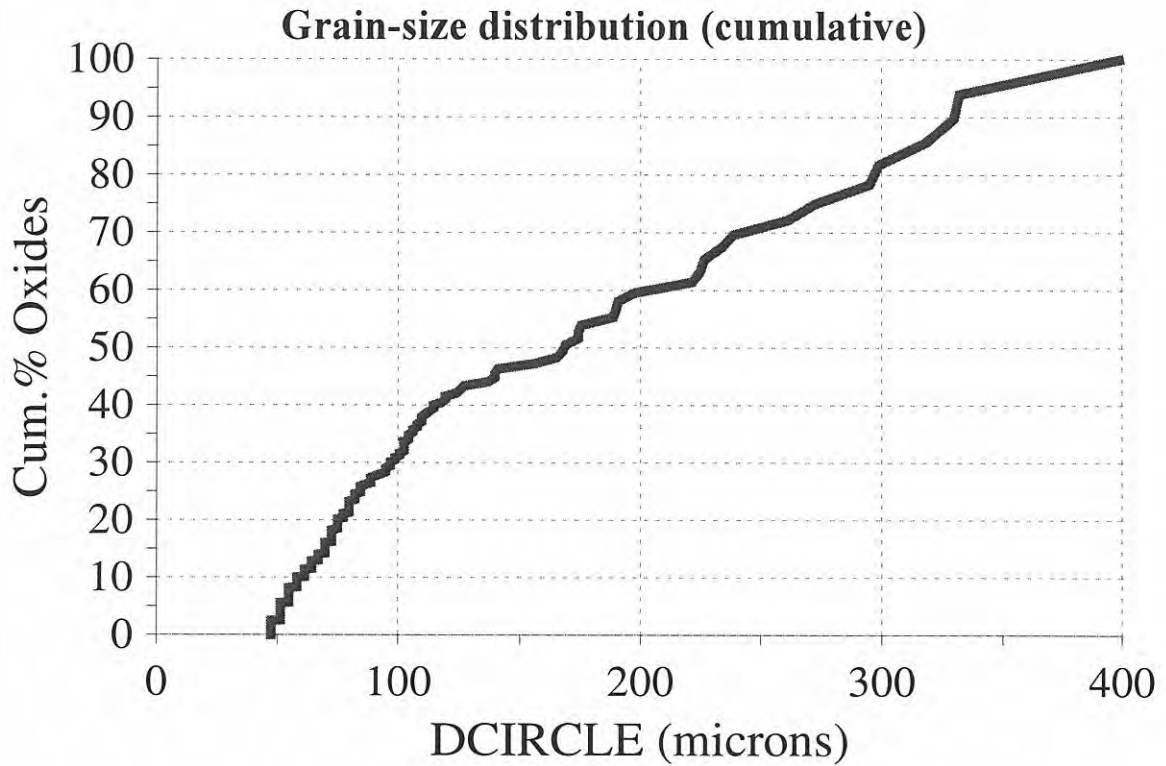
Rutile grain-size
distribution graphs

Dalsfjord region

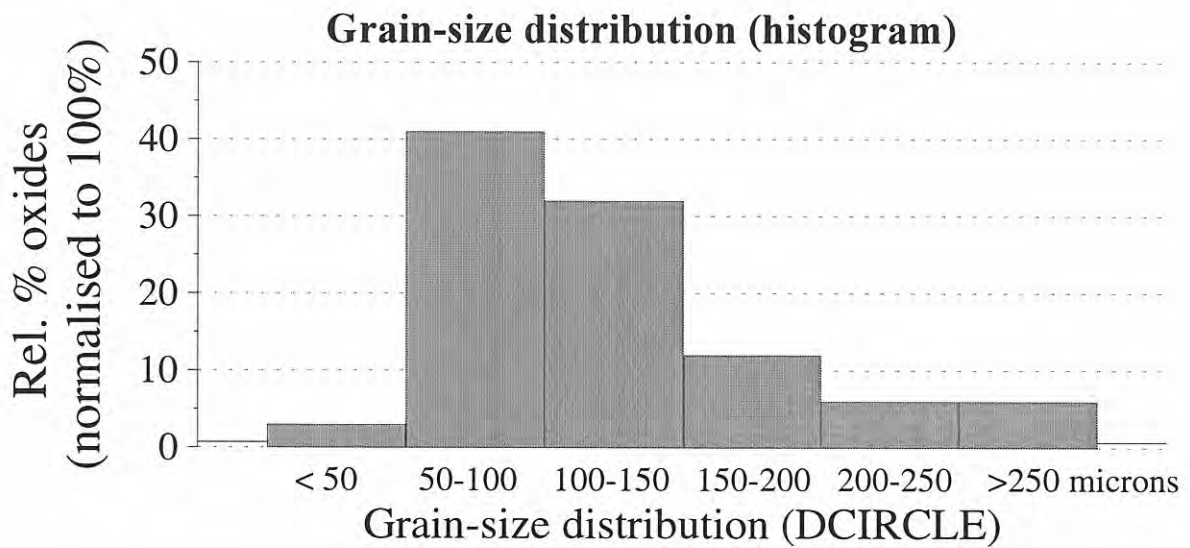
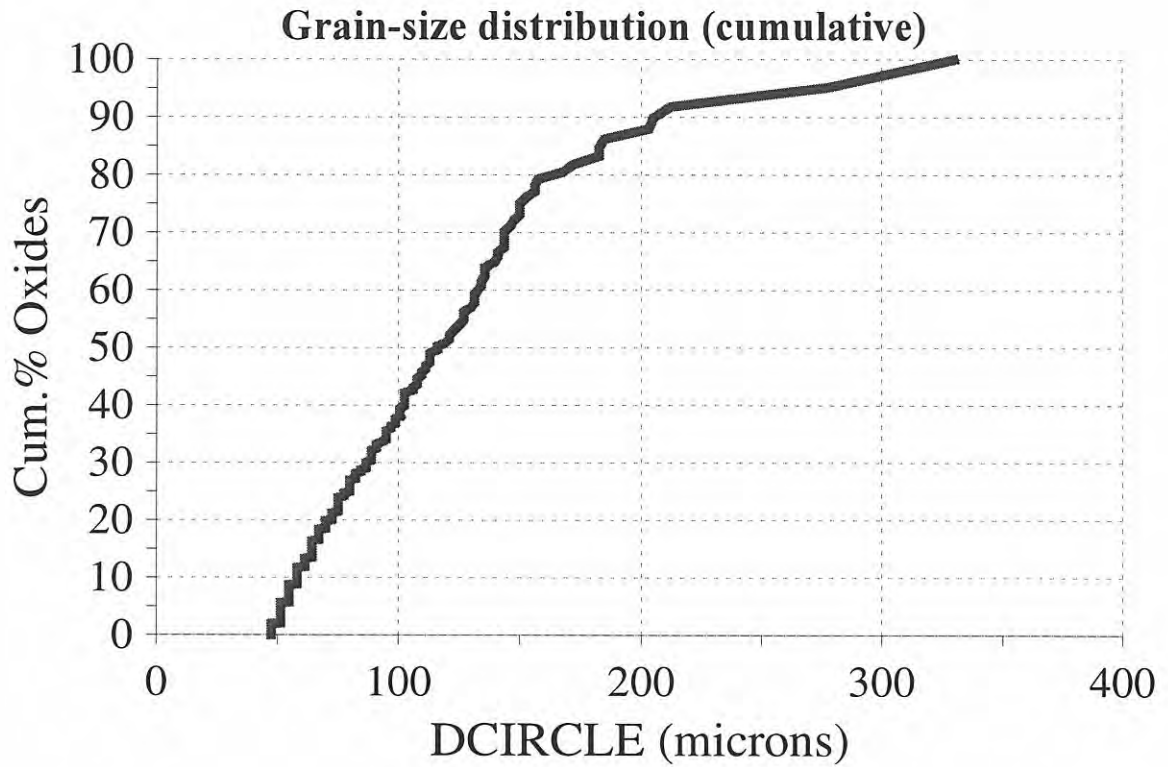
Sample K292.94



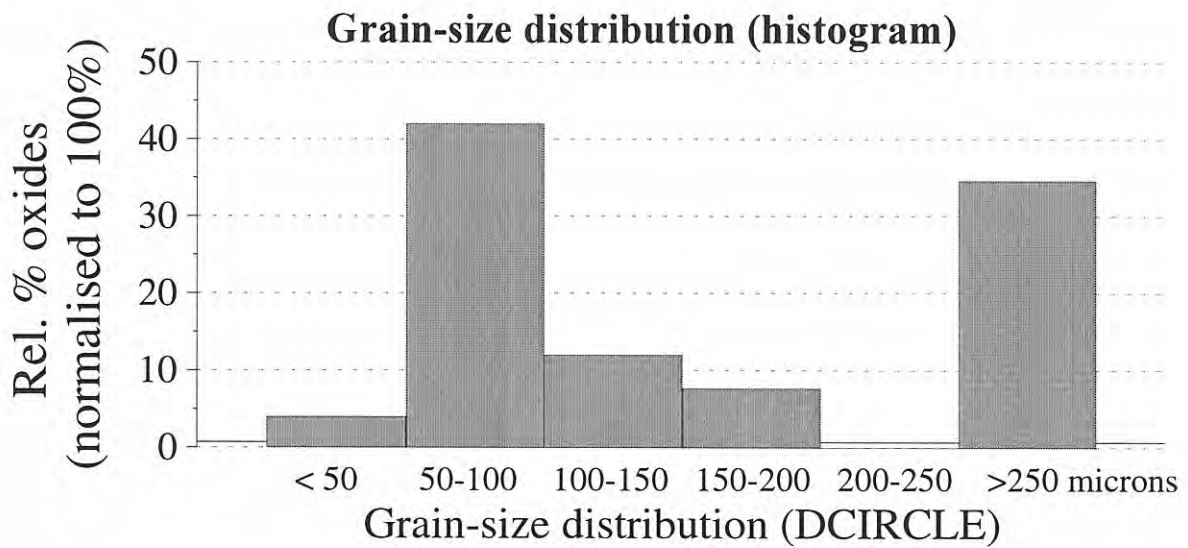
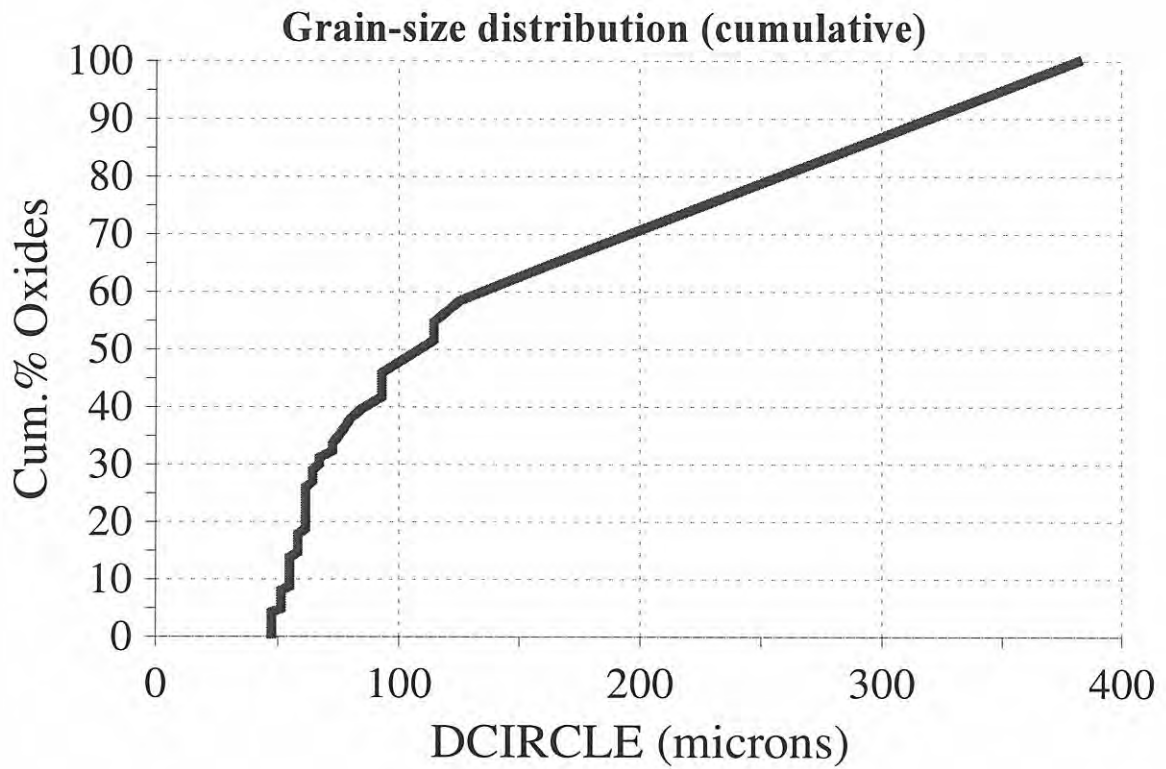
Sample K227B.94



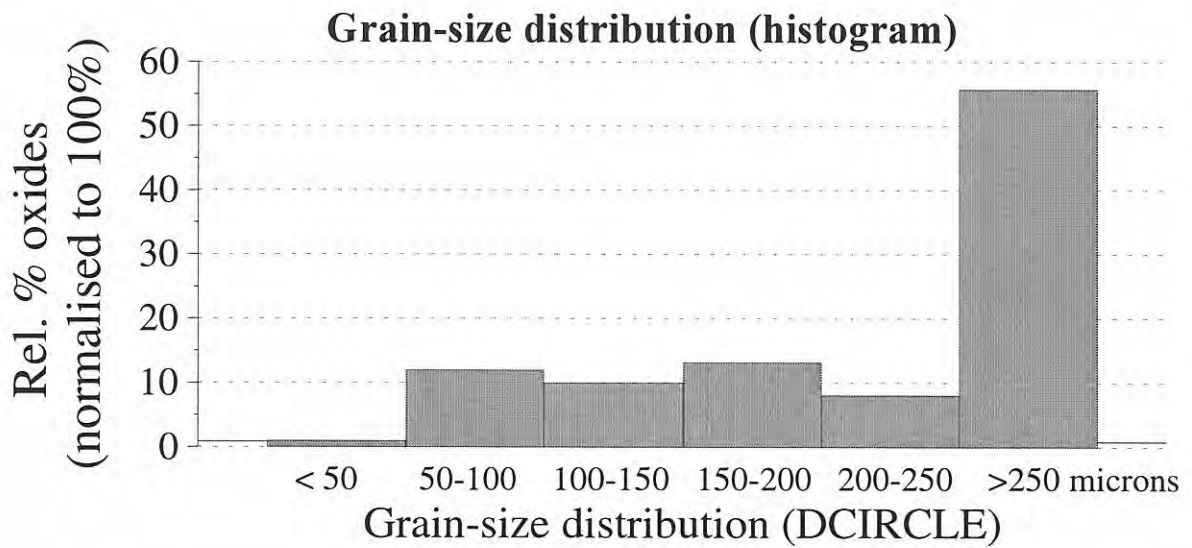
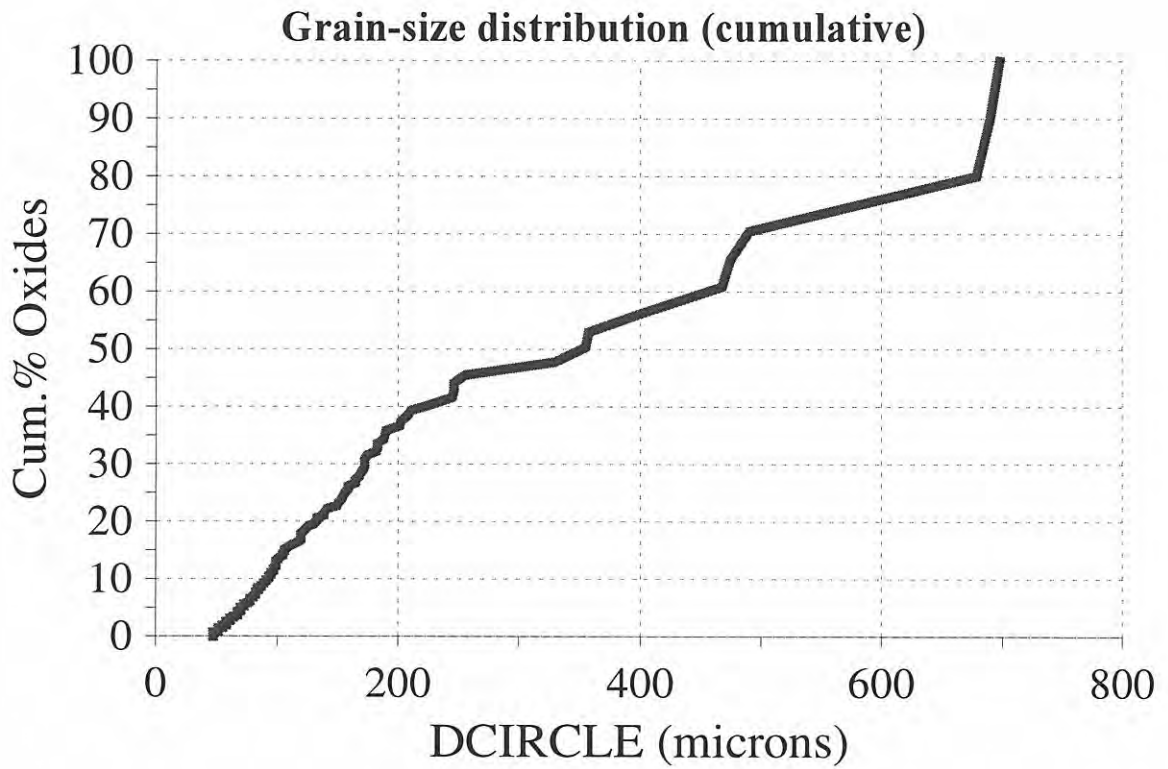
Sample K227E.94



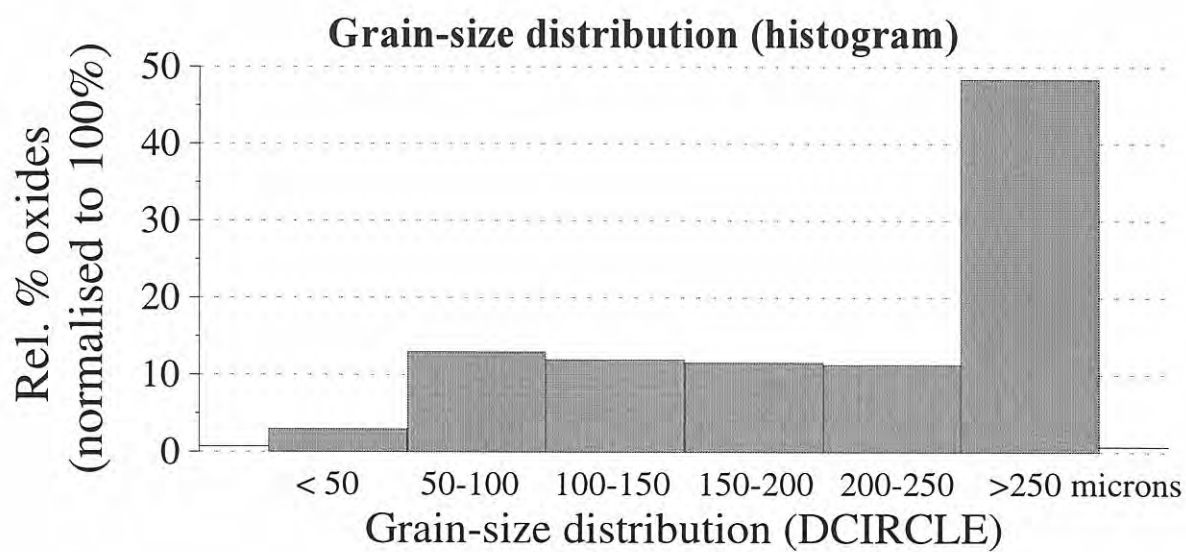
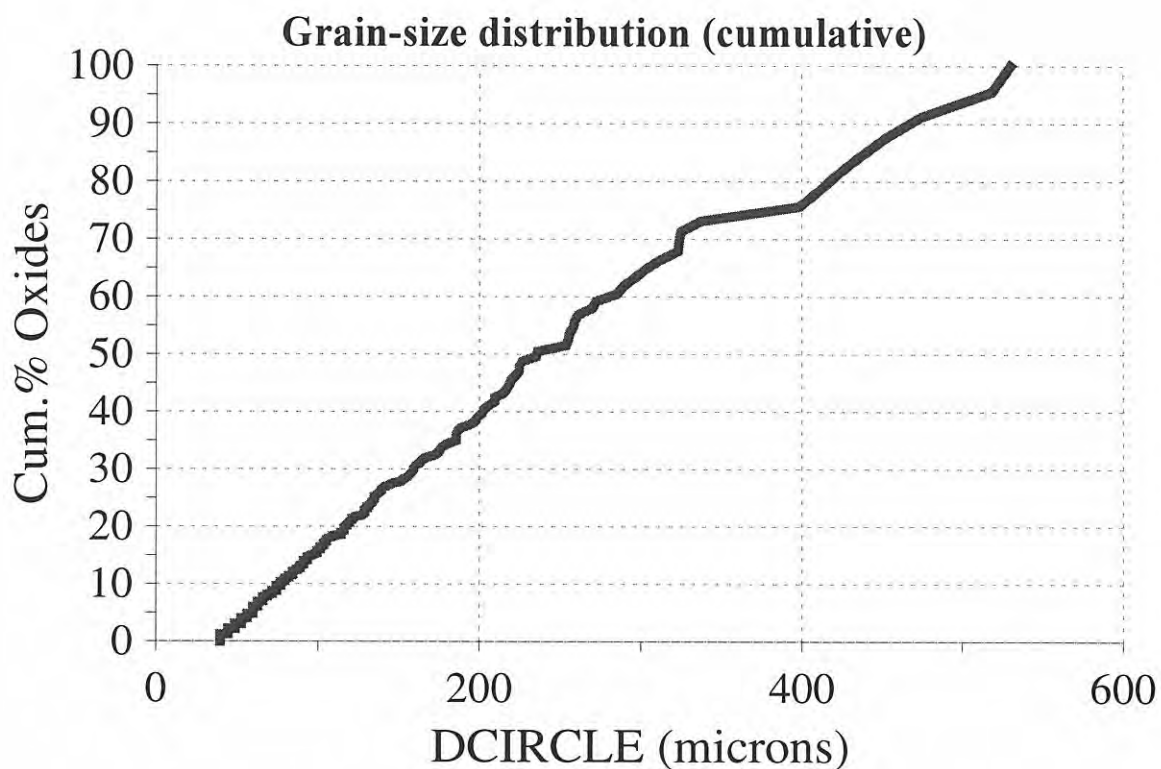
Sample K227A.94



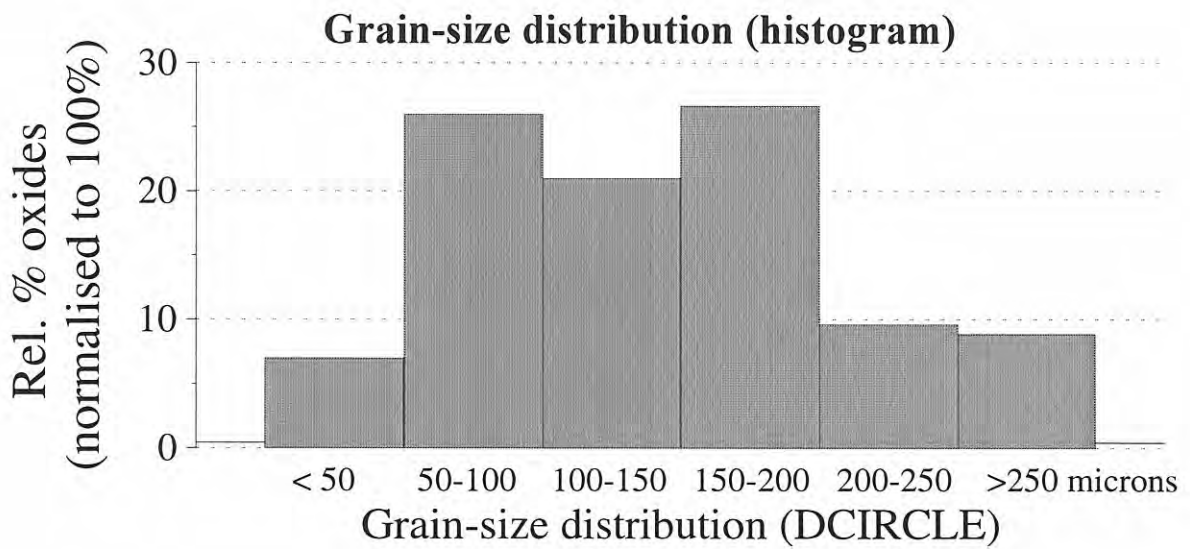
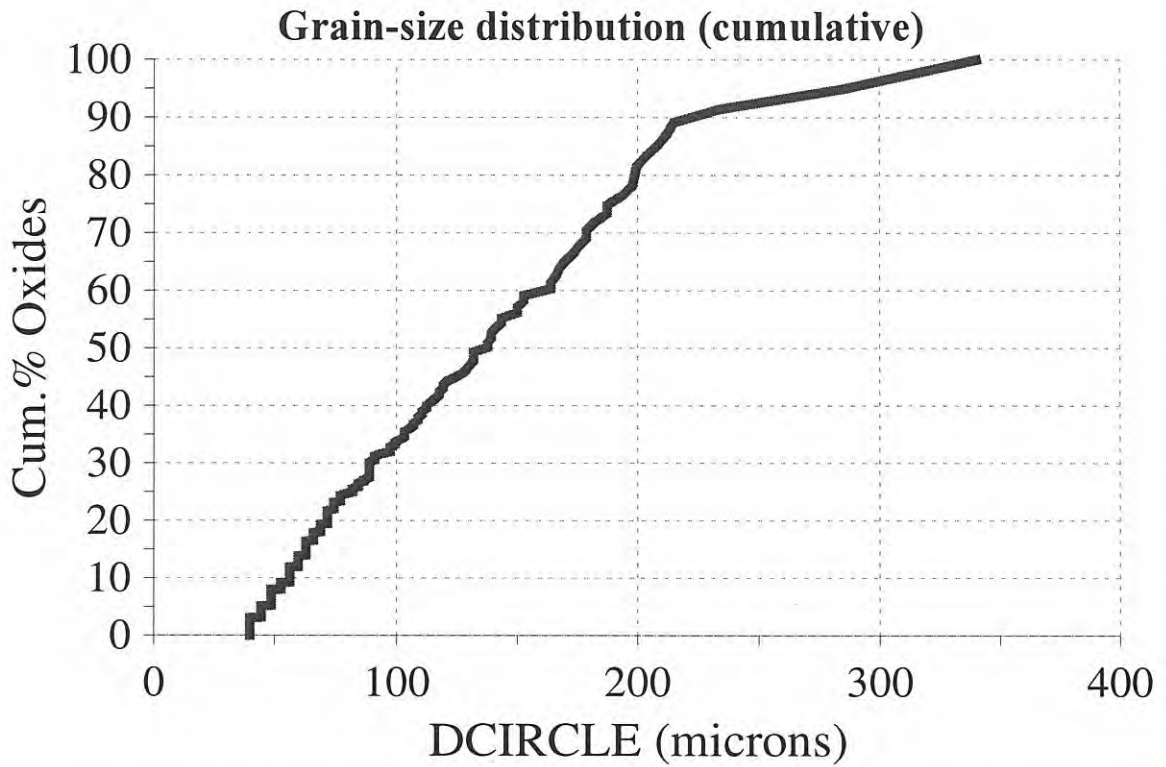
Sample K227F.94



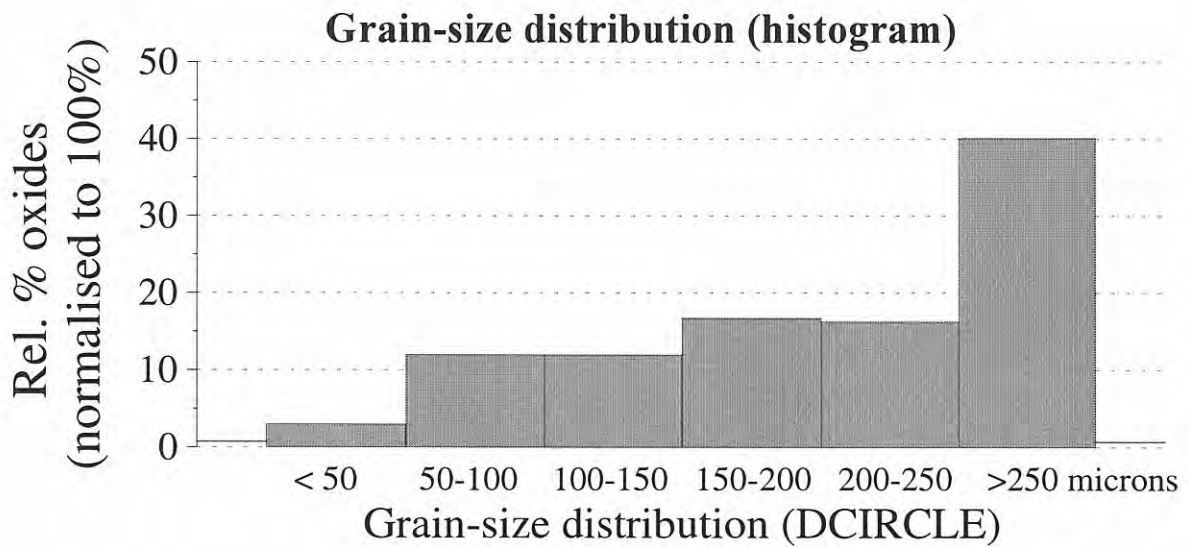
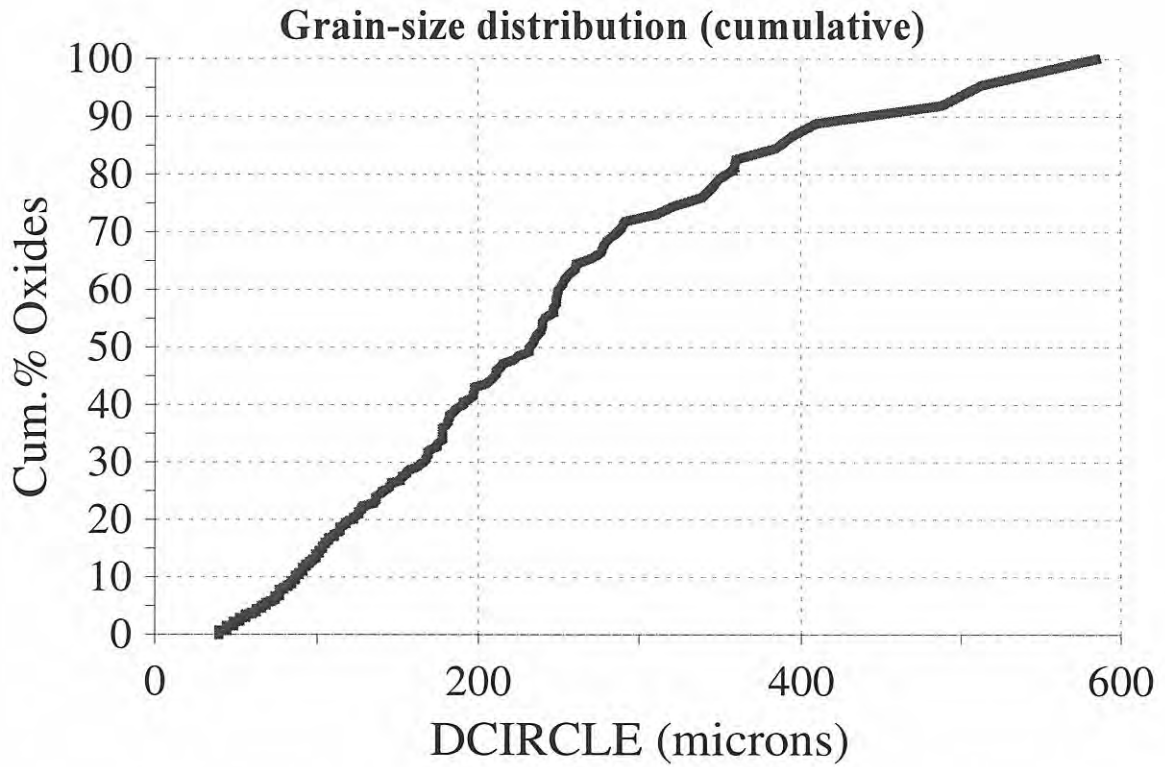
Sample 395.09



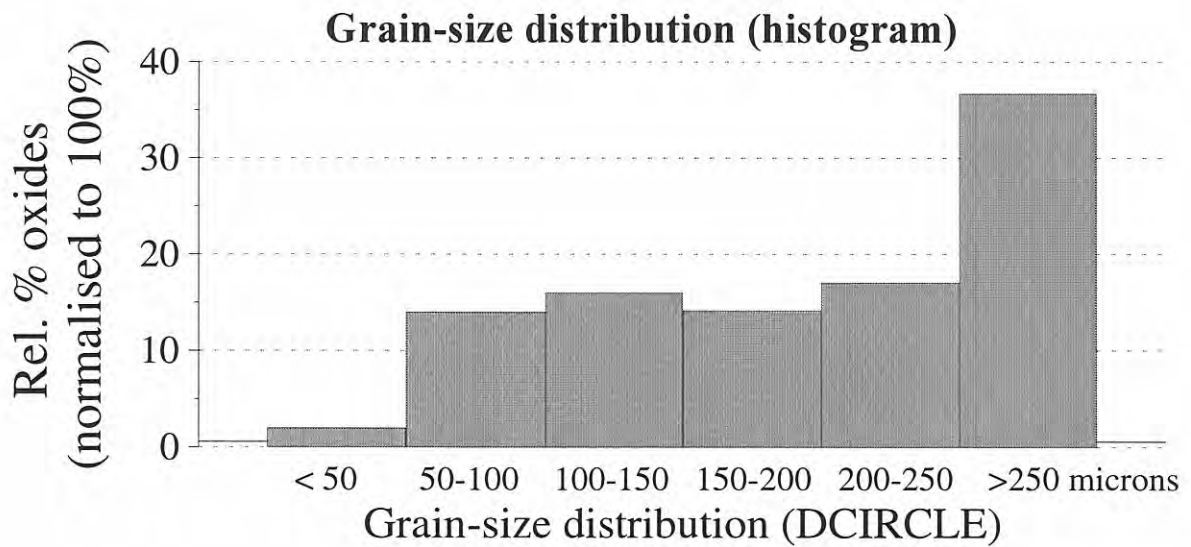
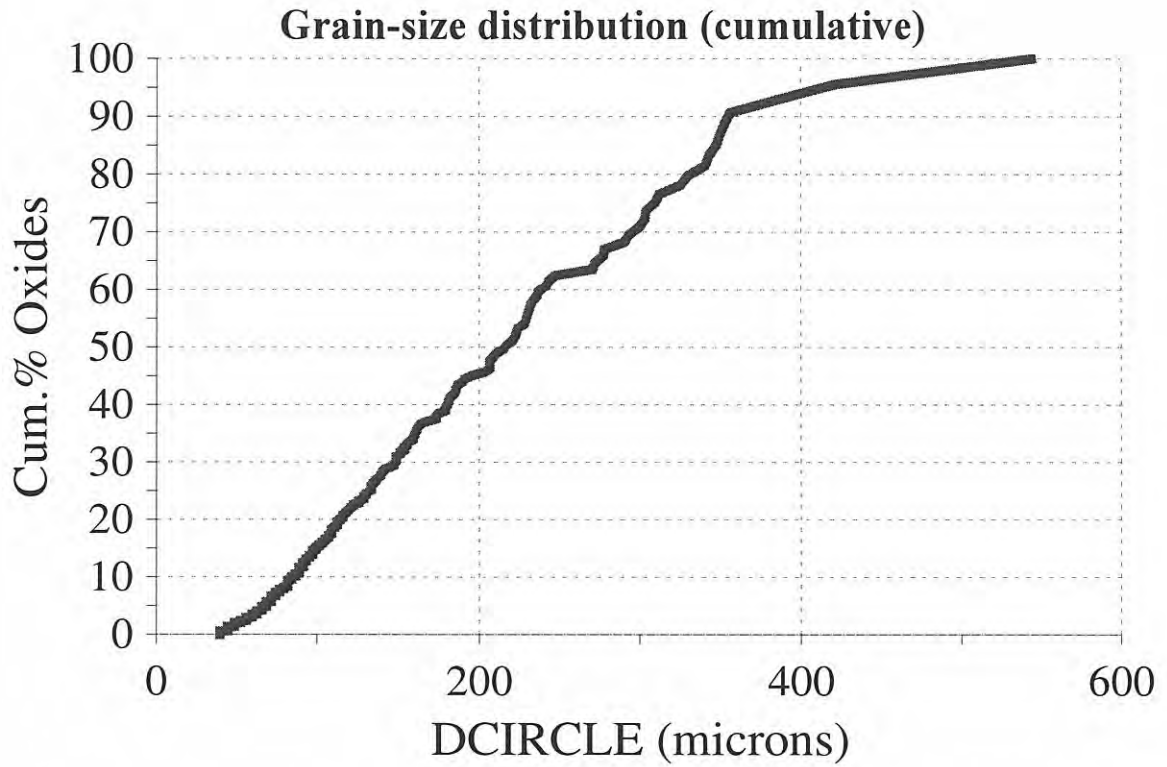
Sample 395.05



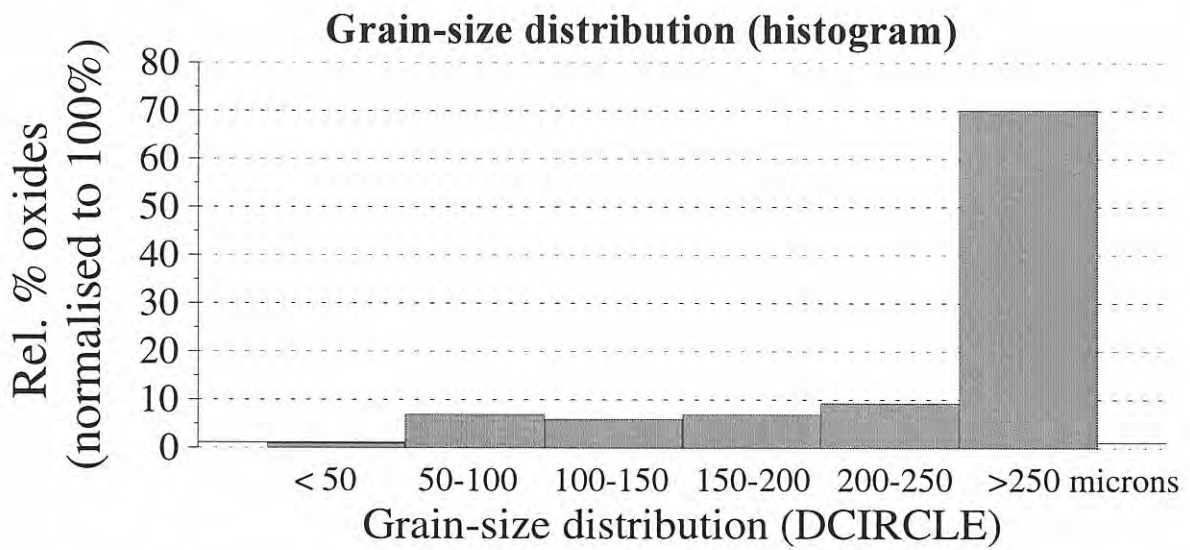
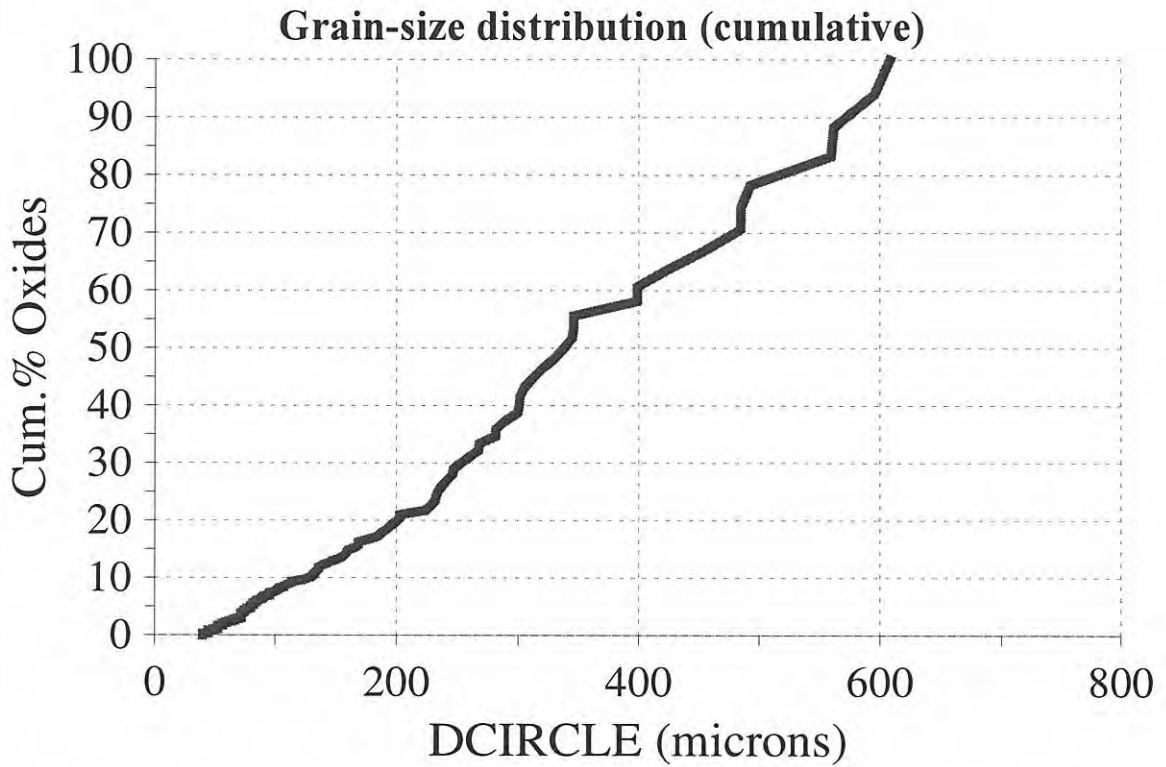
Sample 395.04



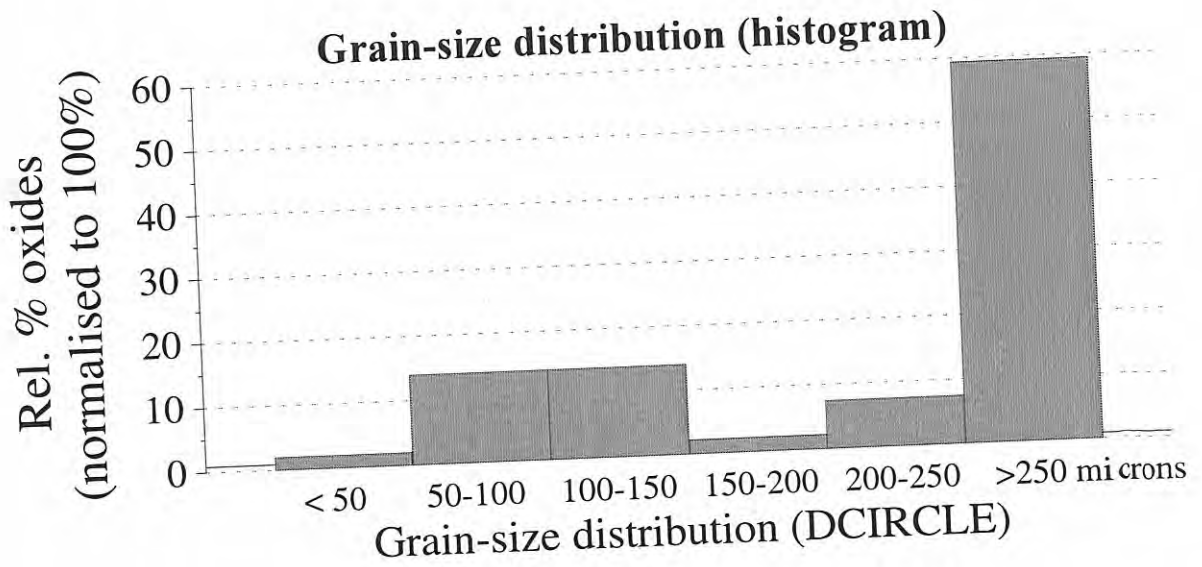
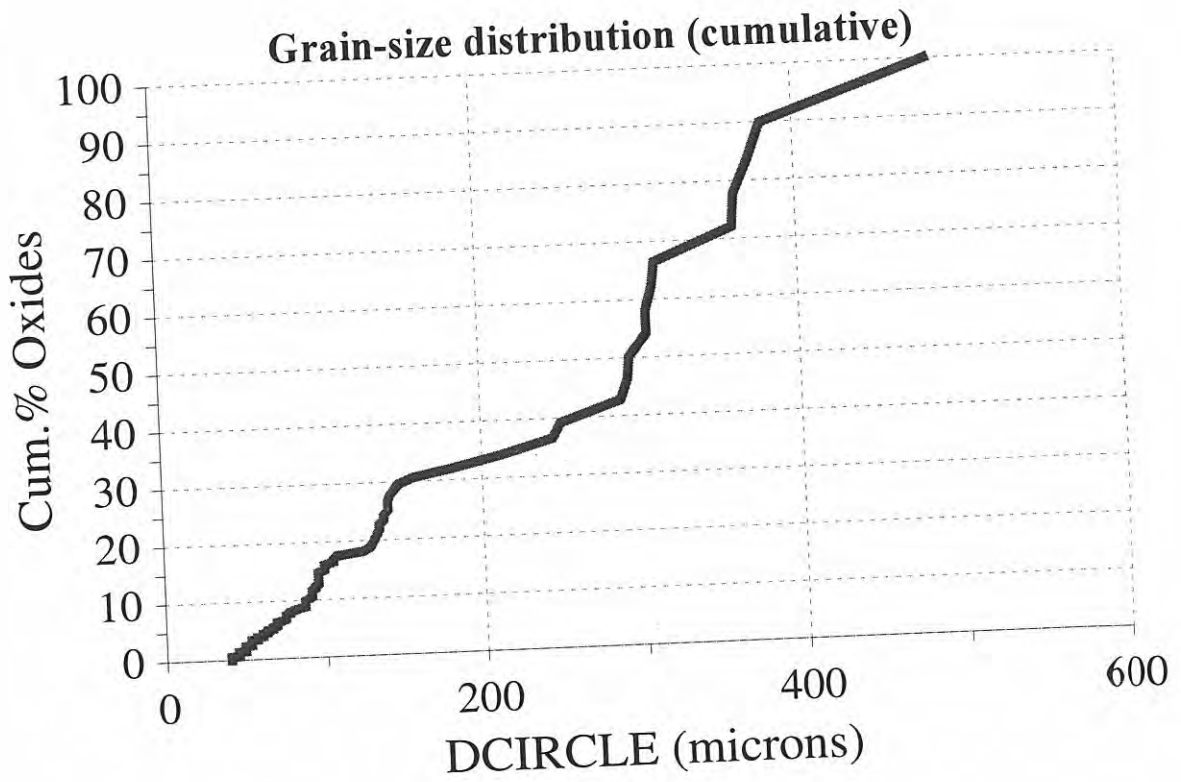
Sample 395.07



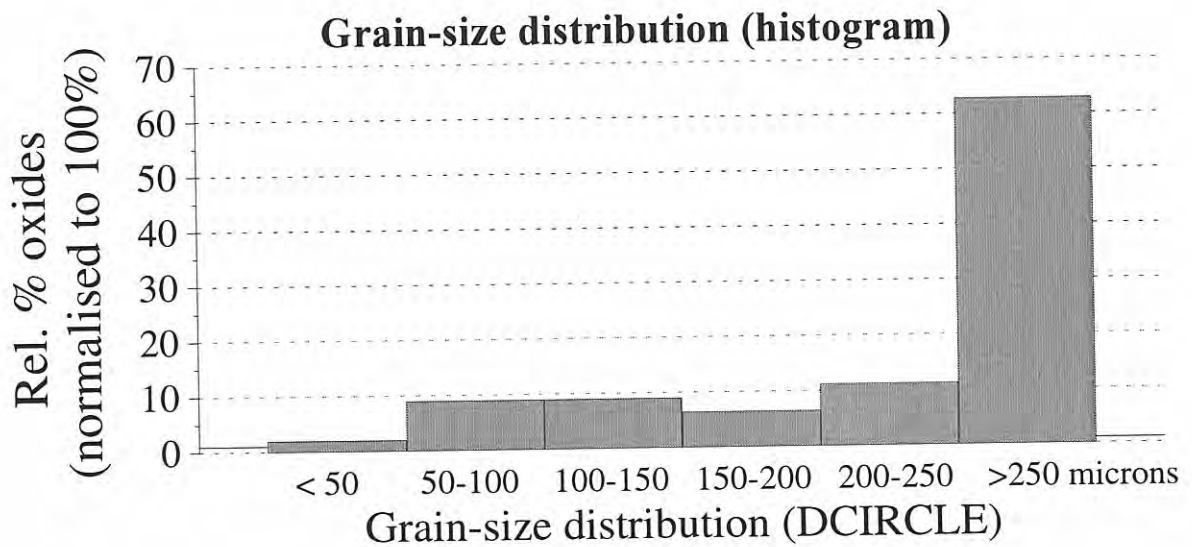
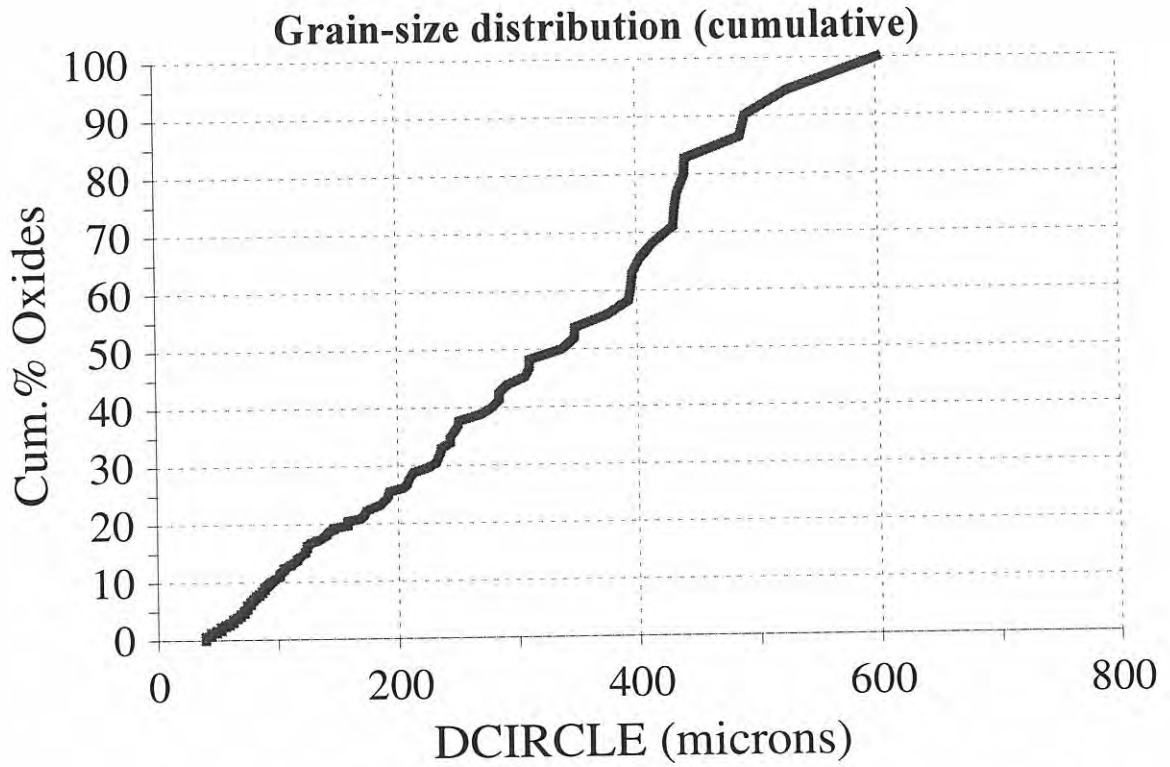
Sample 395.06



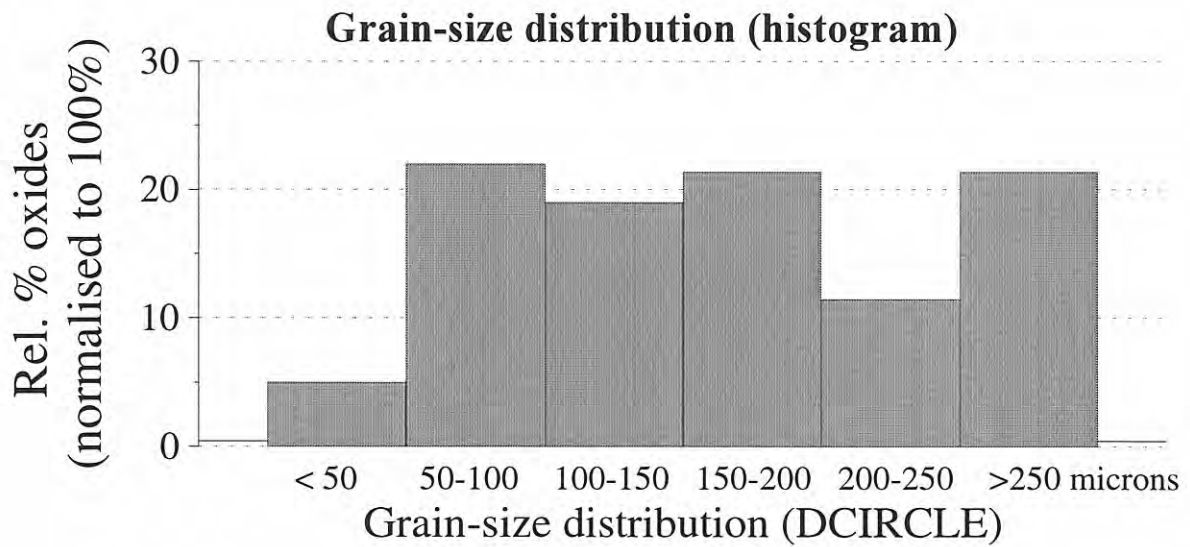
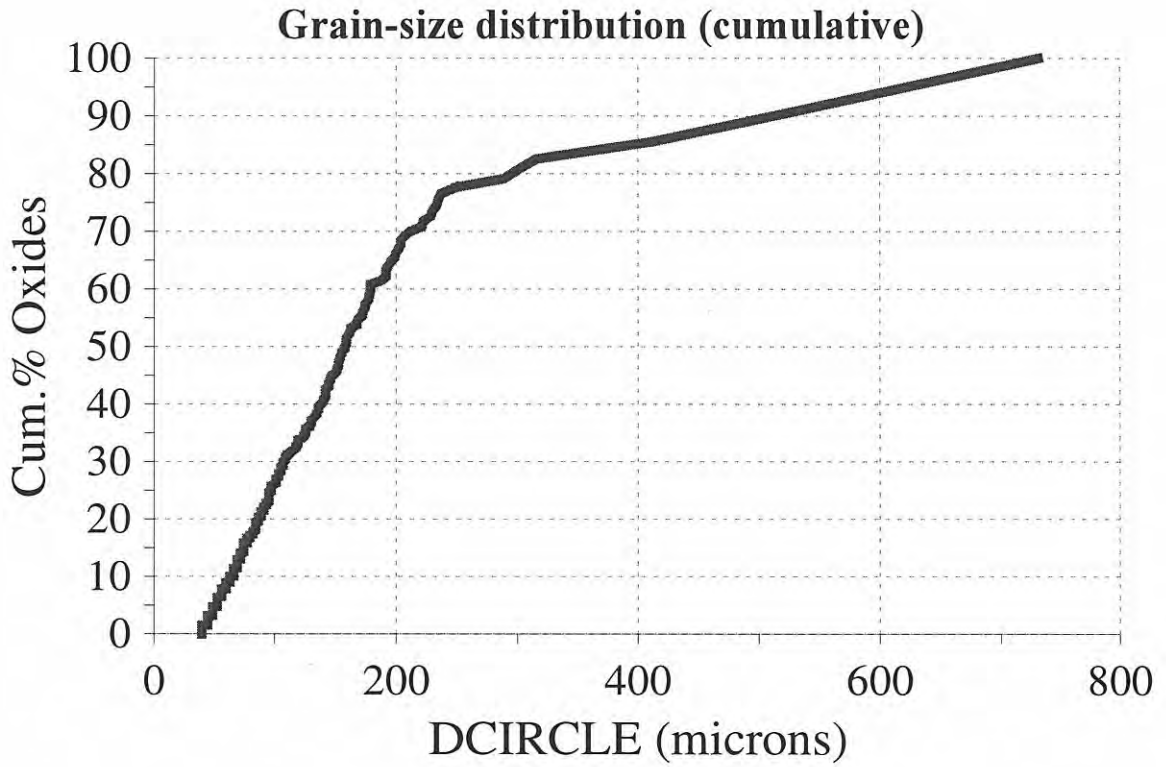
Sample 395.08



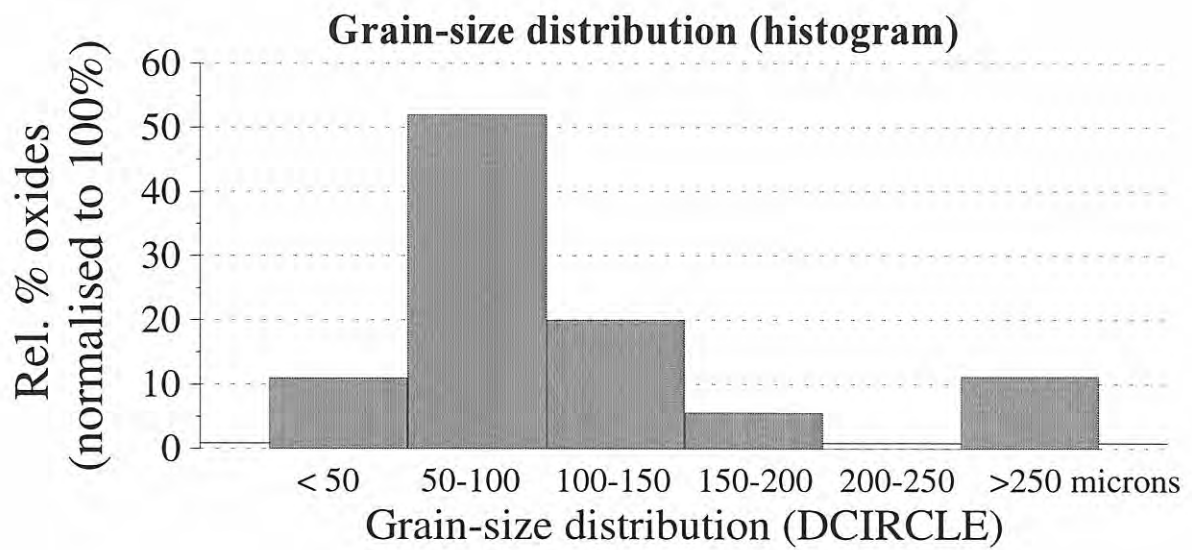
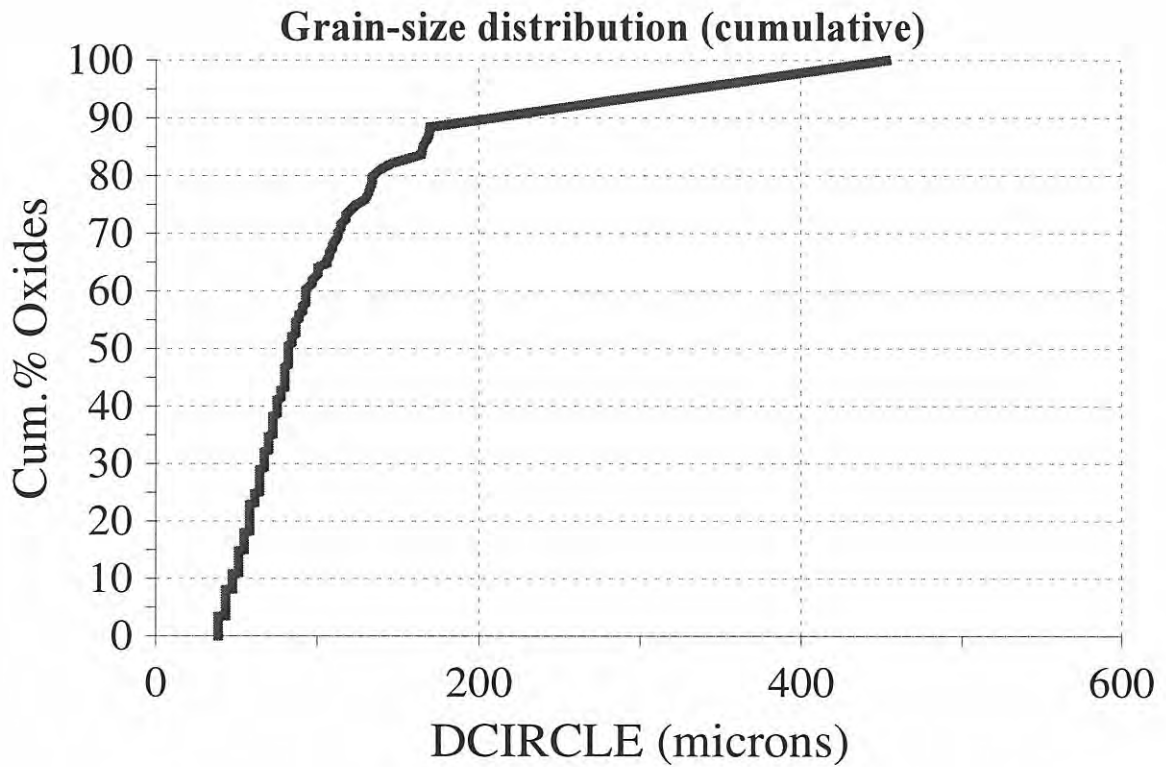
Sample 395.03



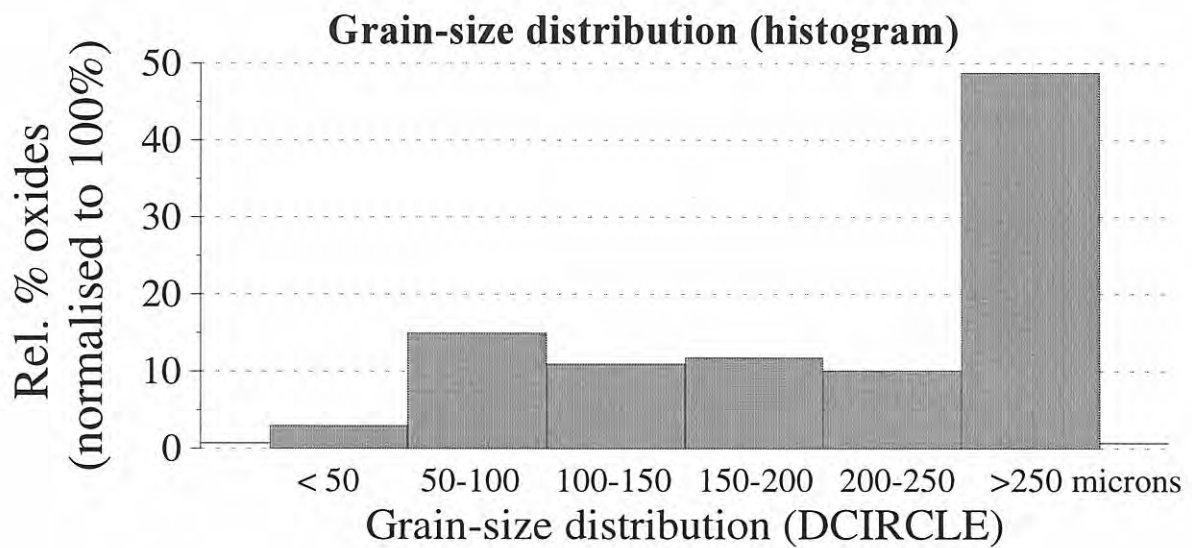
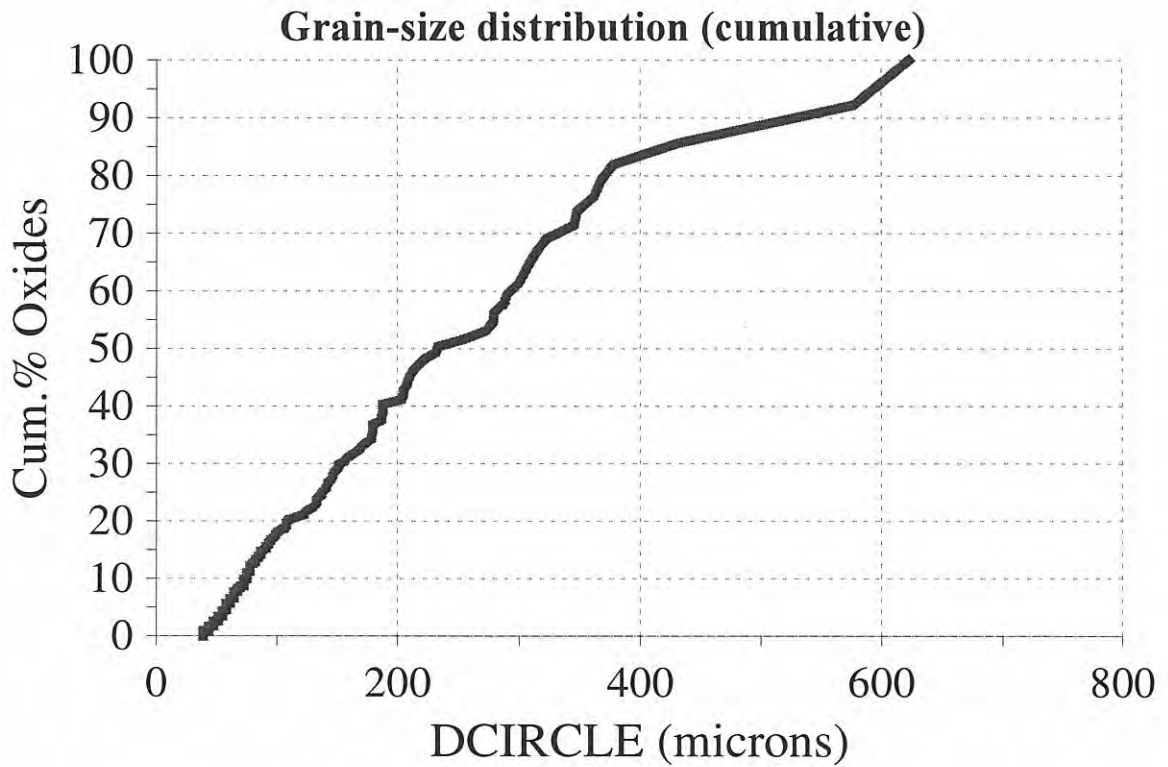
Sample 395.11



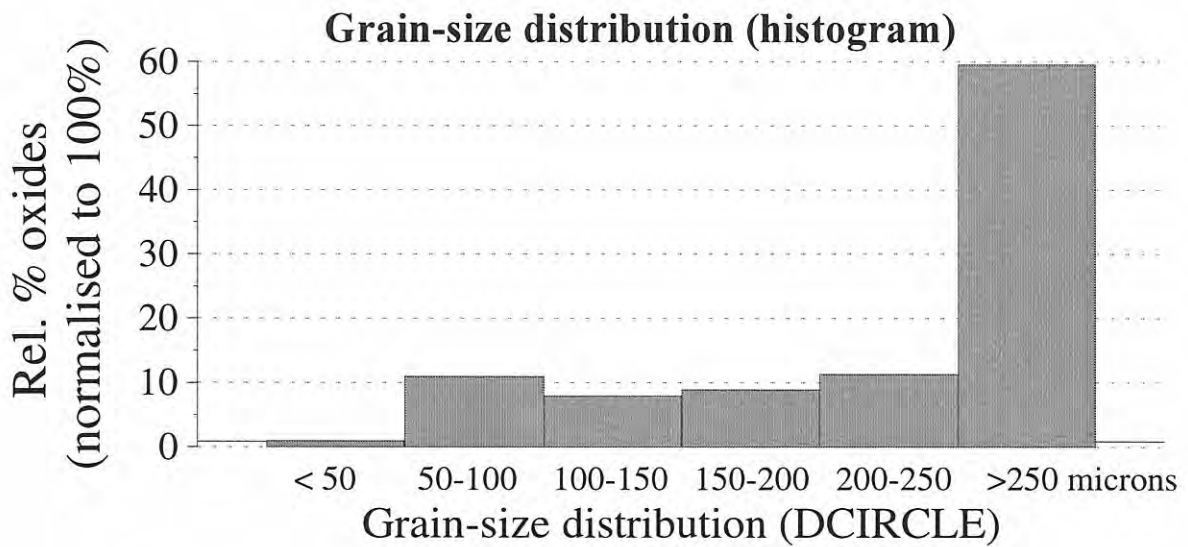
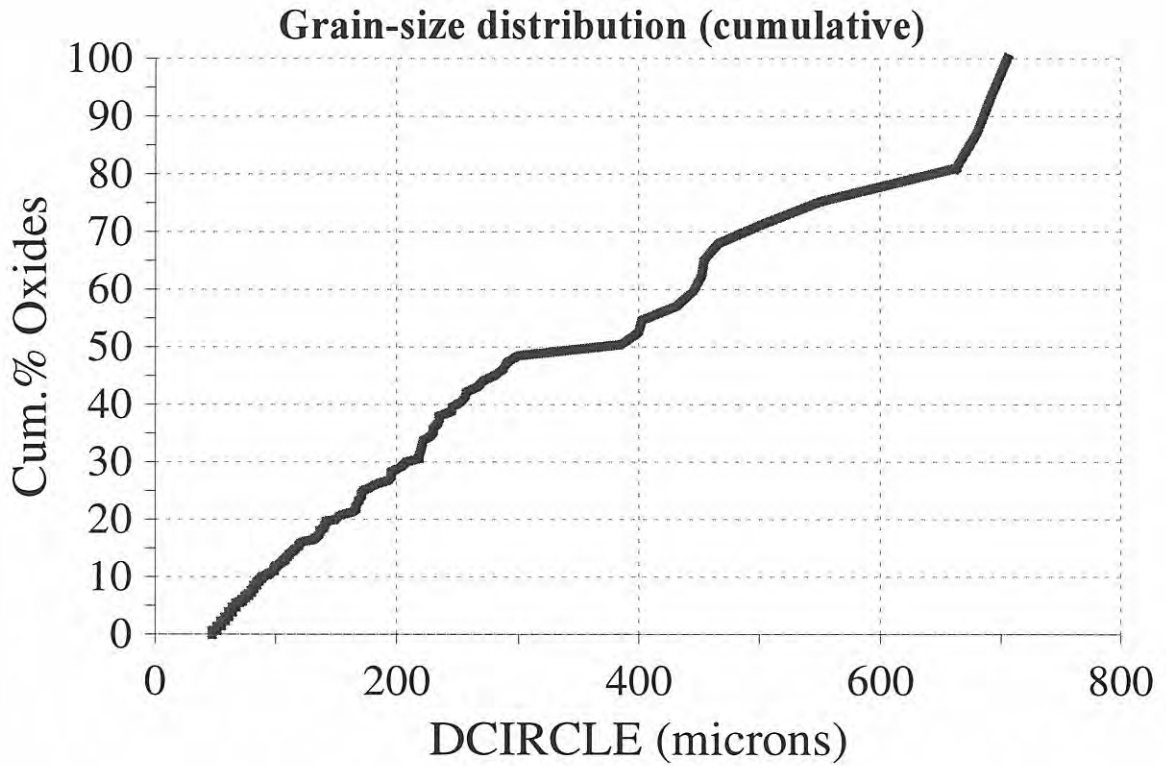
Sample K291.94



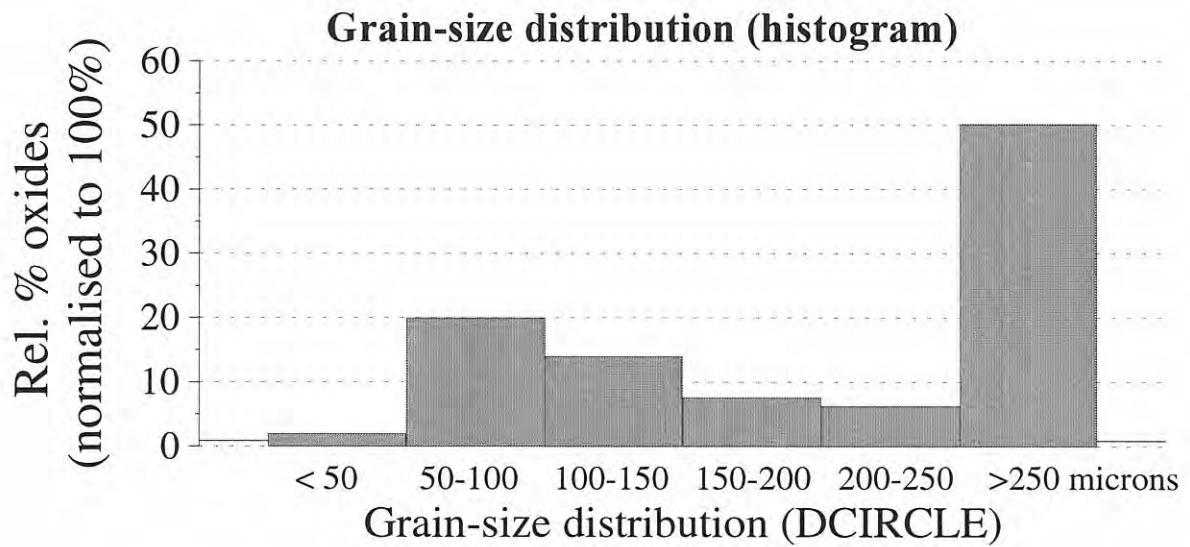
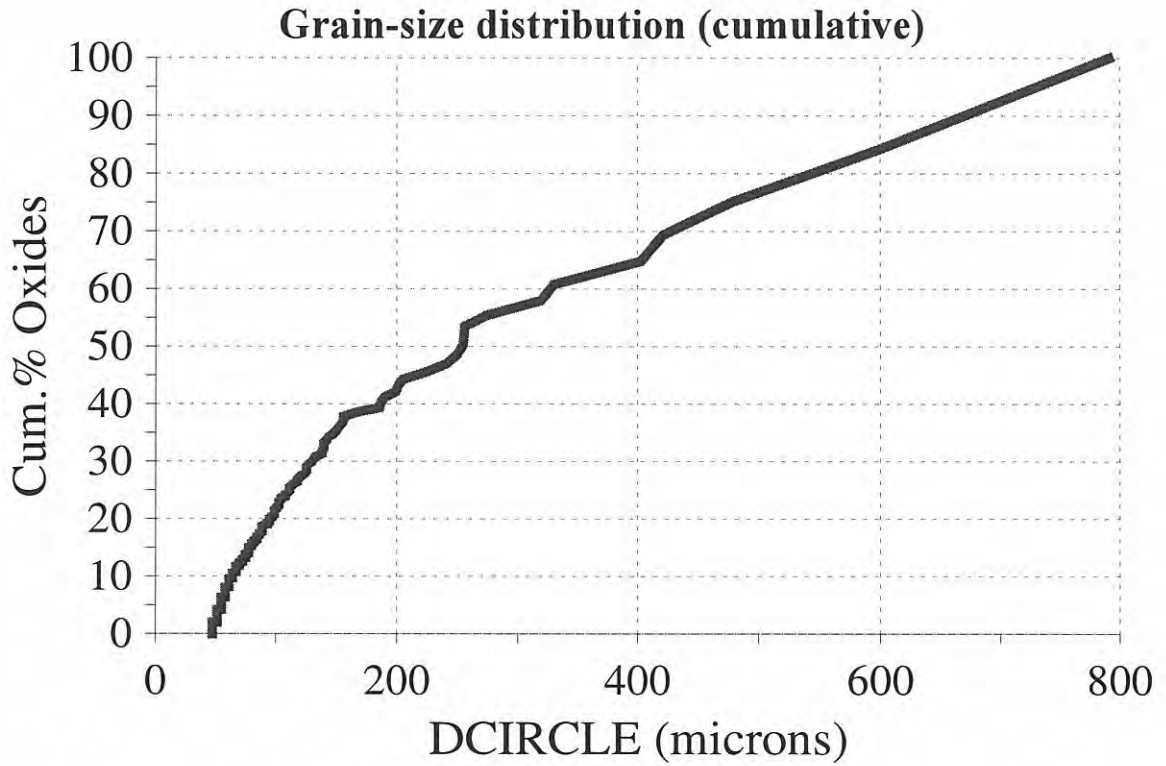
Sample K301.94



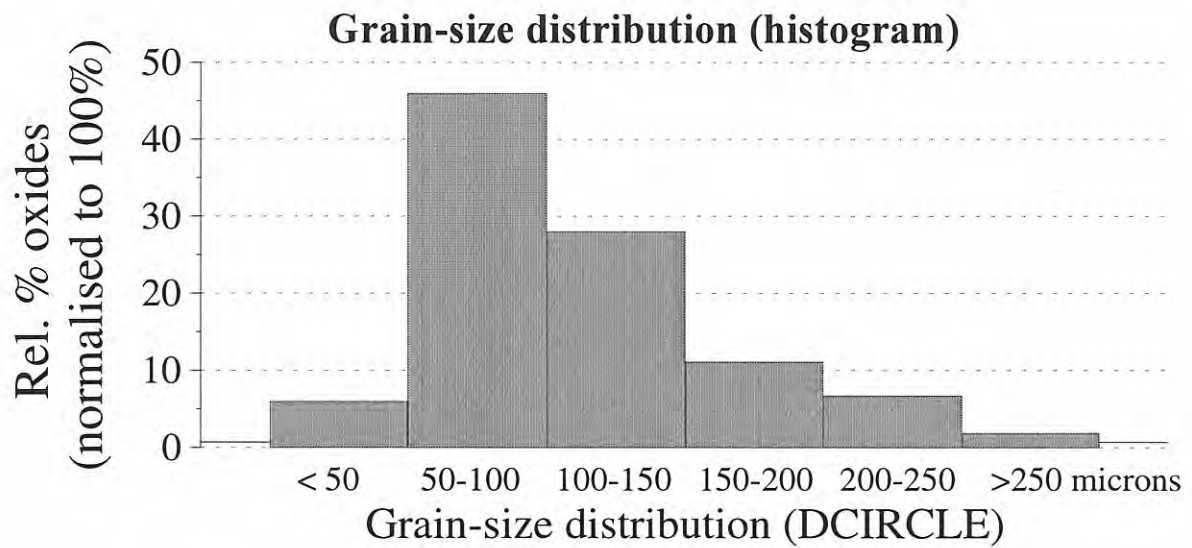
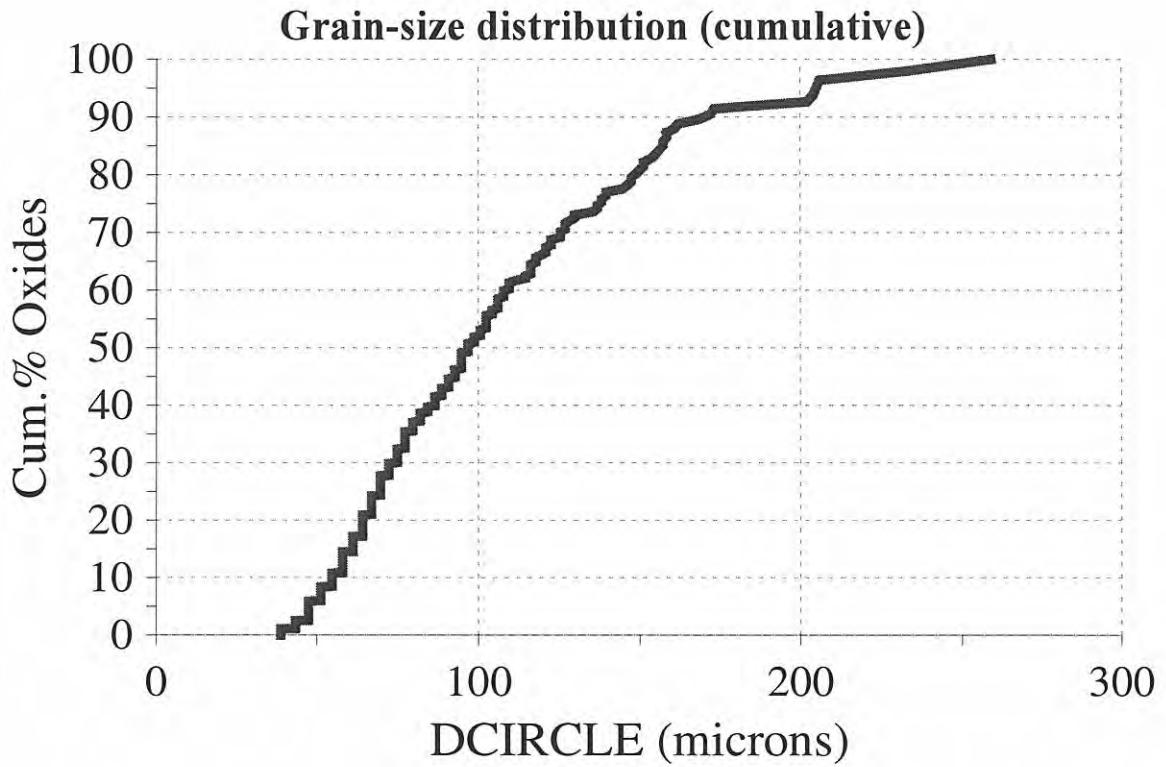
Sample K222A.94



Sample K222C.94



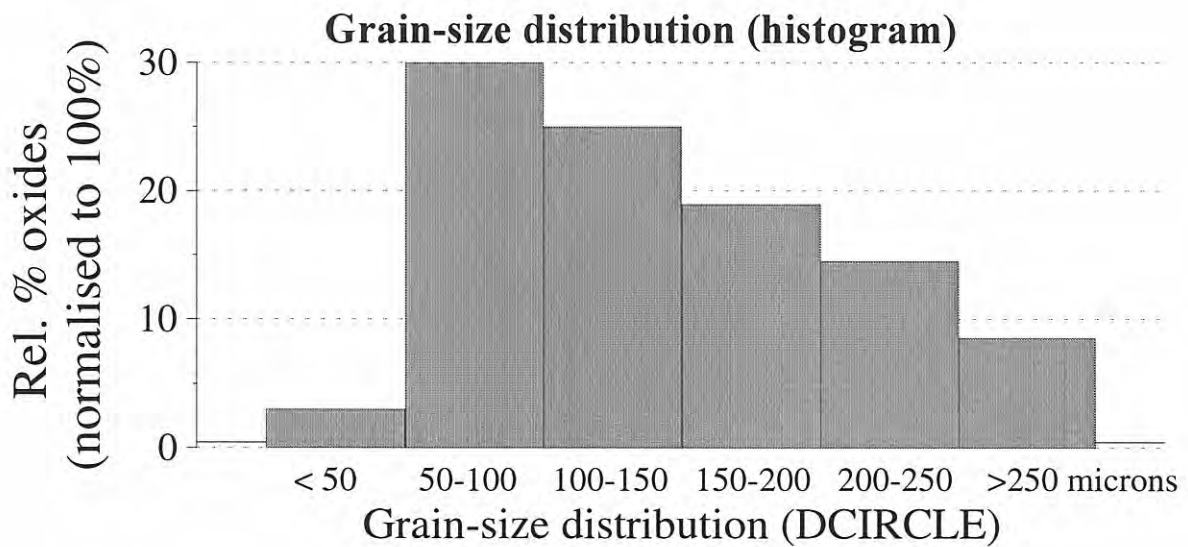
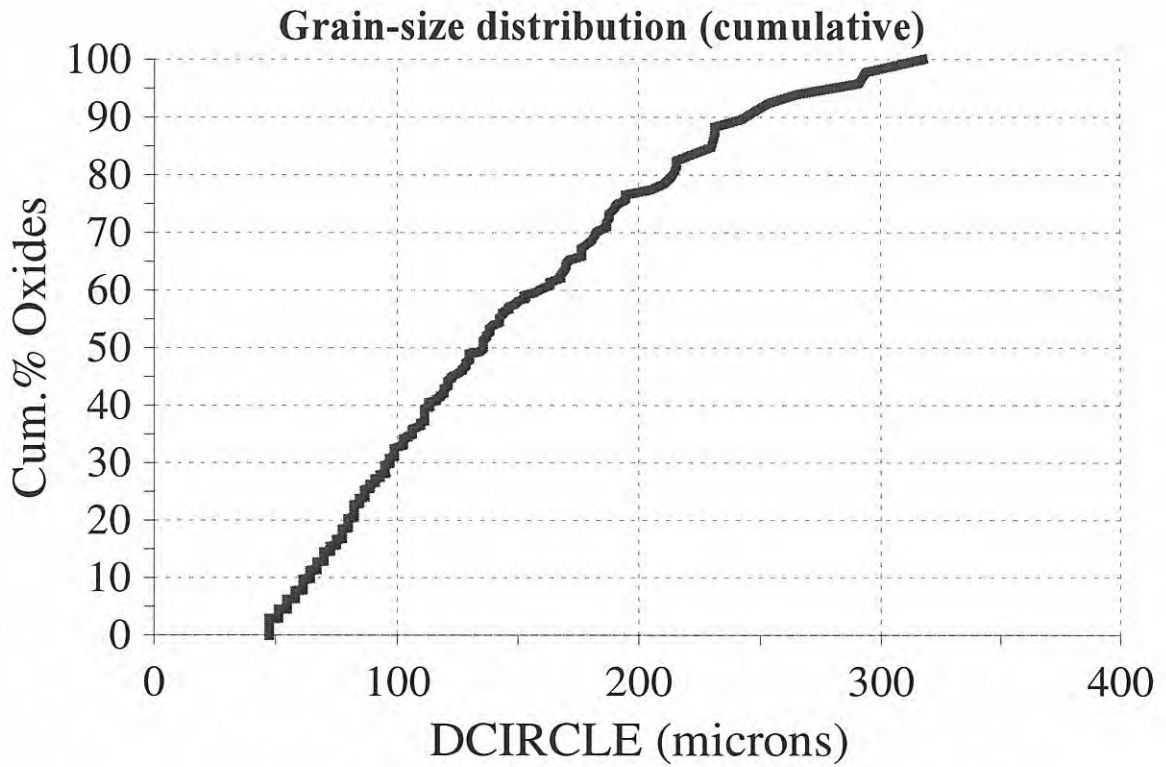
Sample K283.94



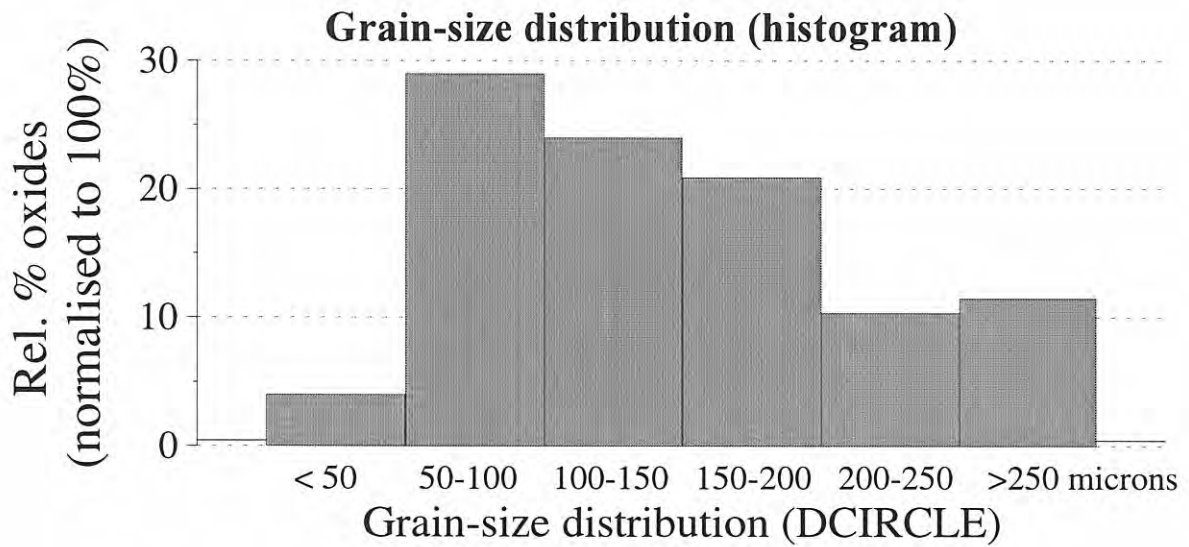
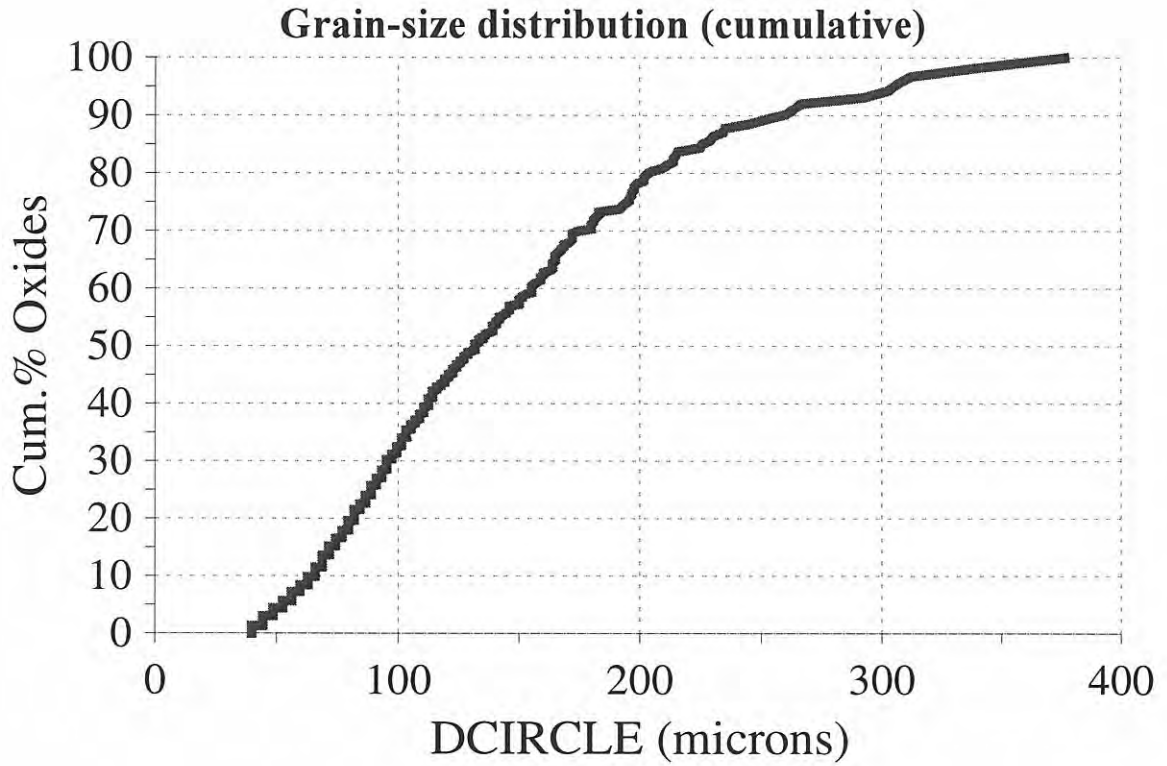
Rutile grain-size
distribution graphs

Førdefjord region

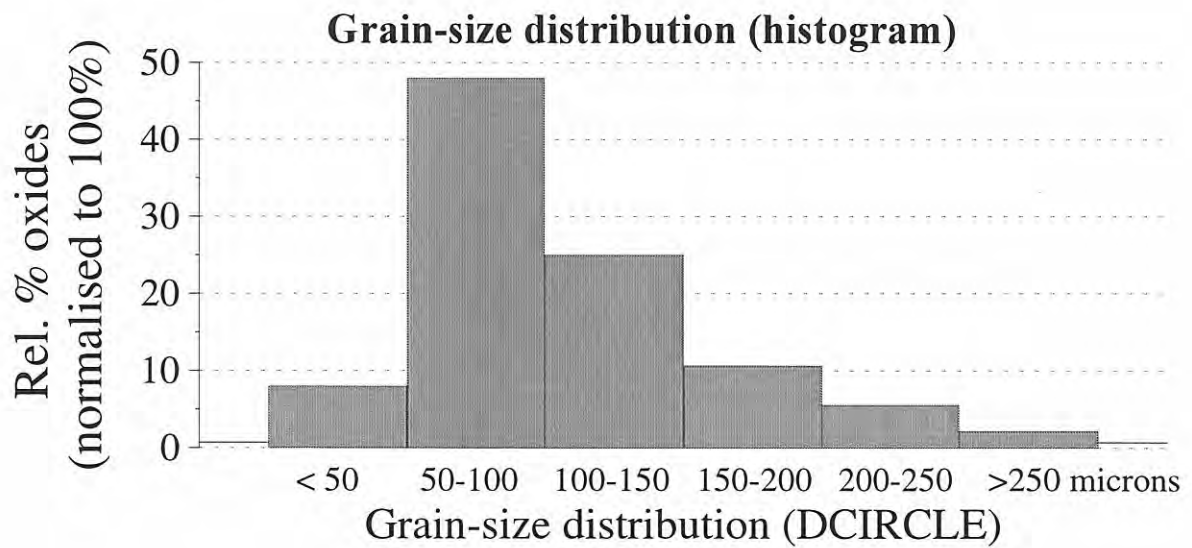
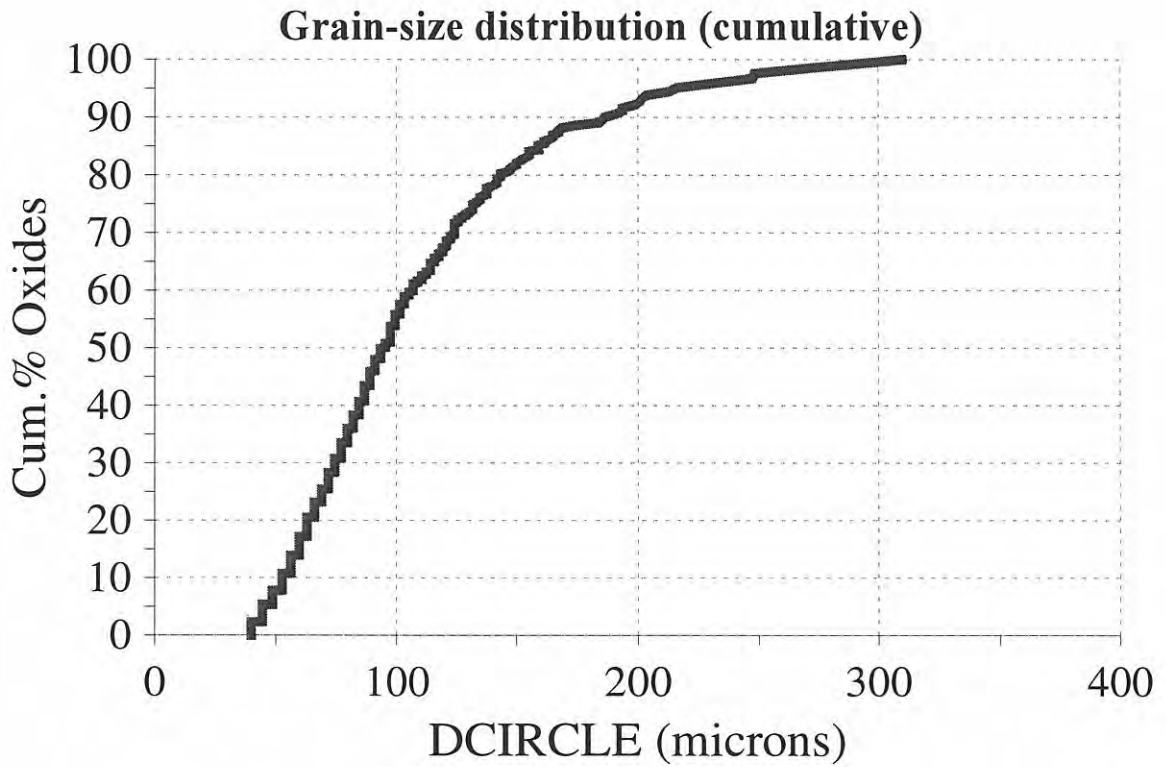
Sample K303.94



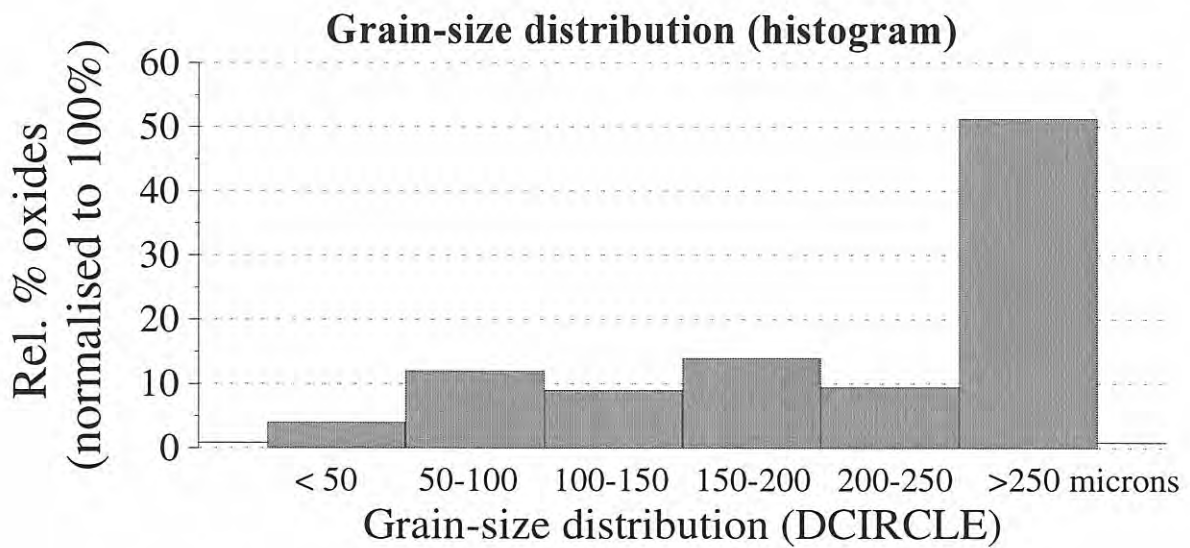
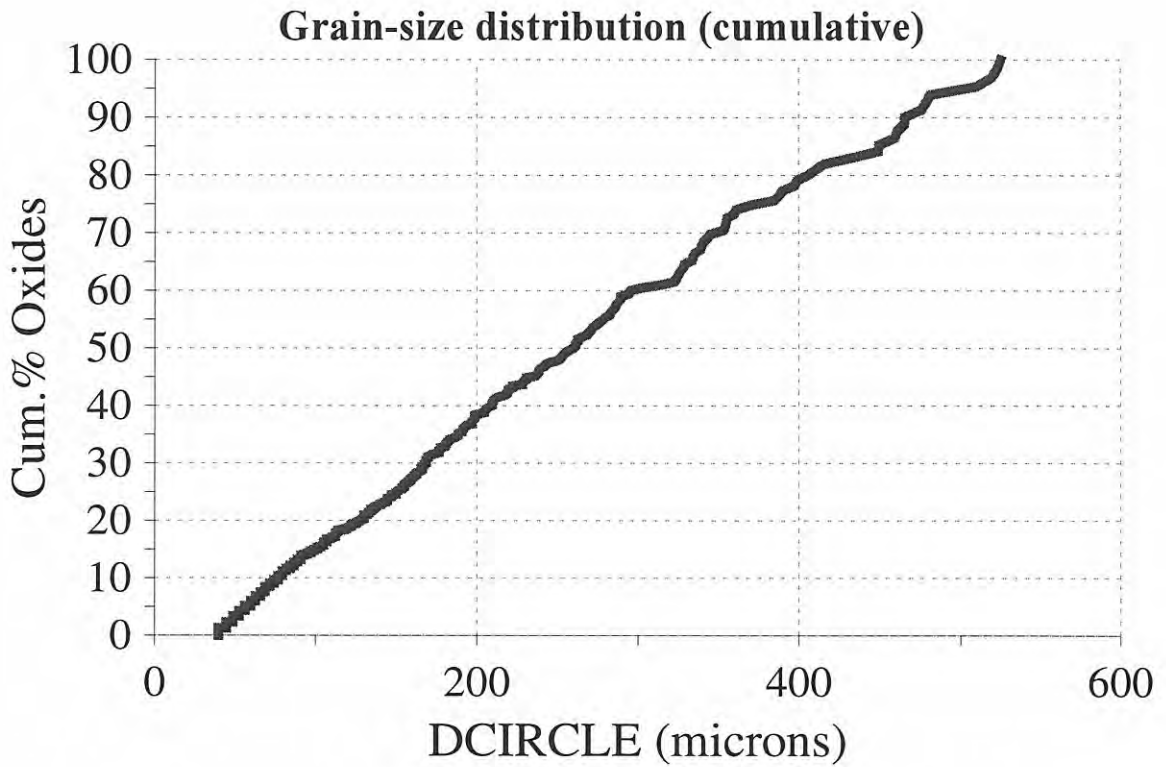
Sample 2/169.0



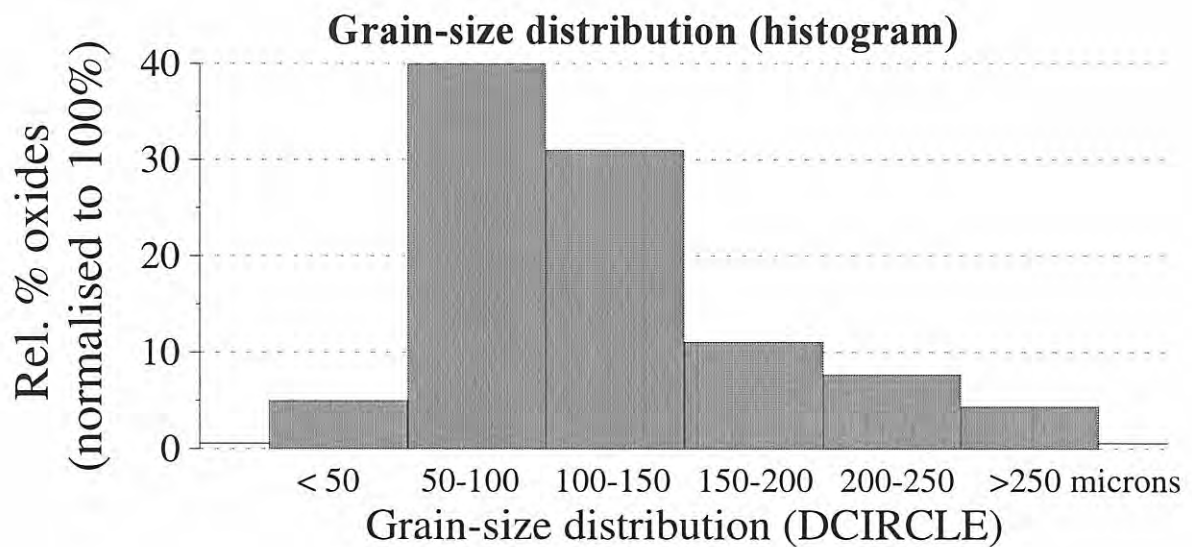
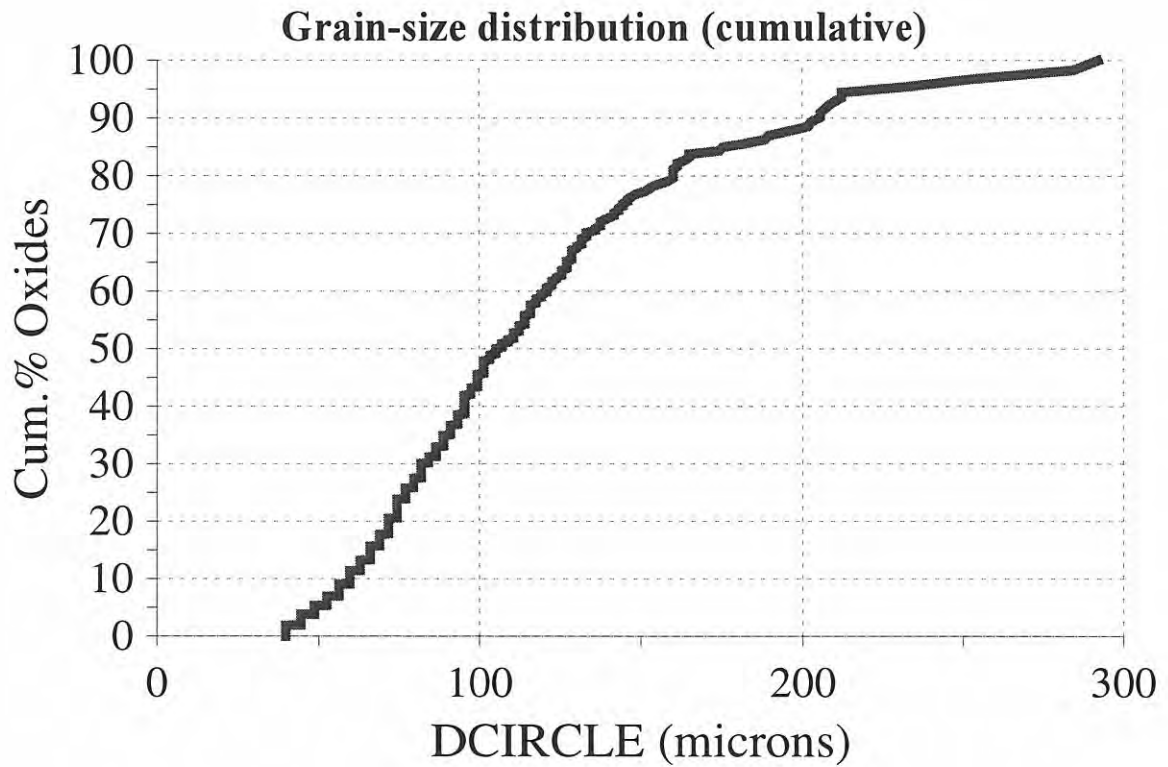
Sample 13/156.0



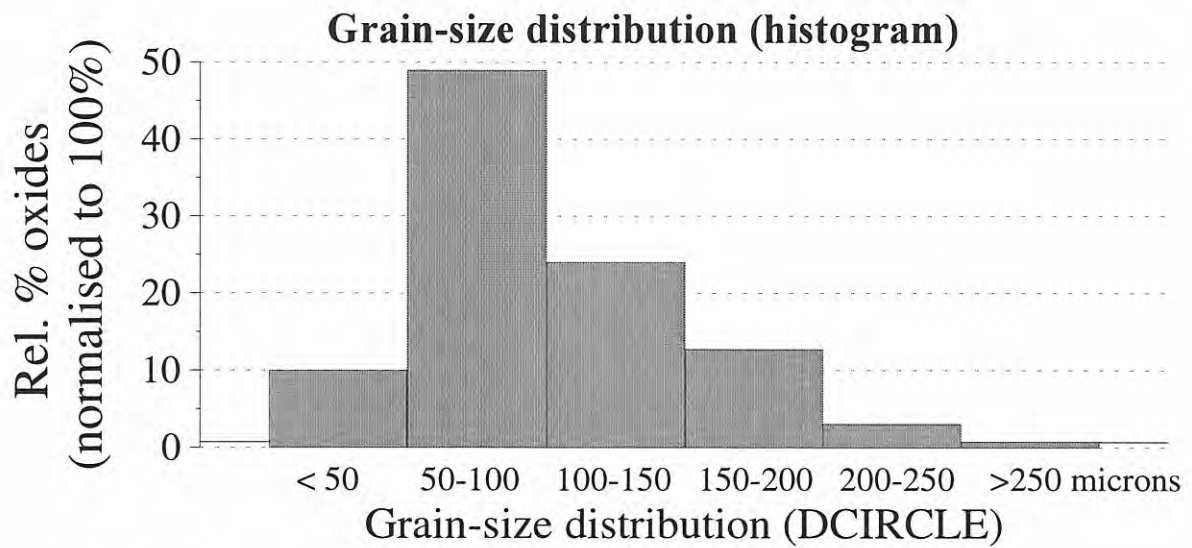
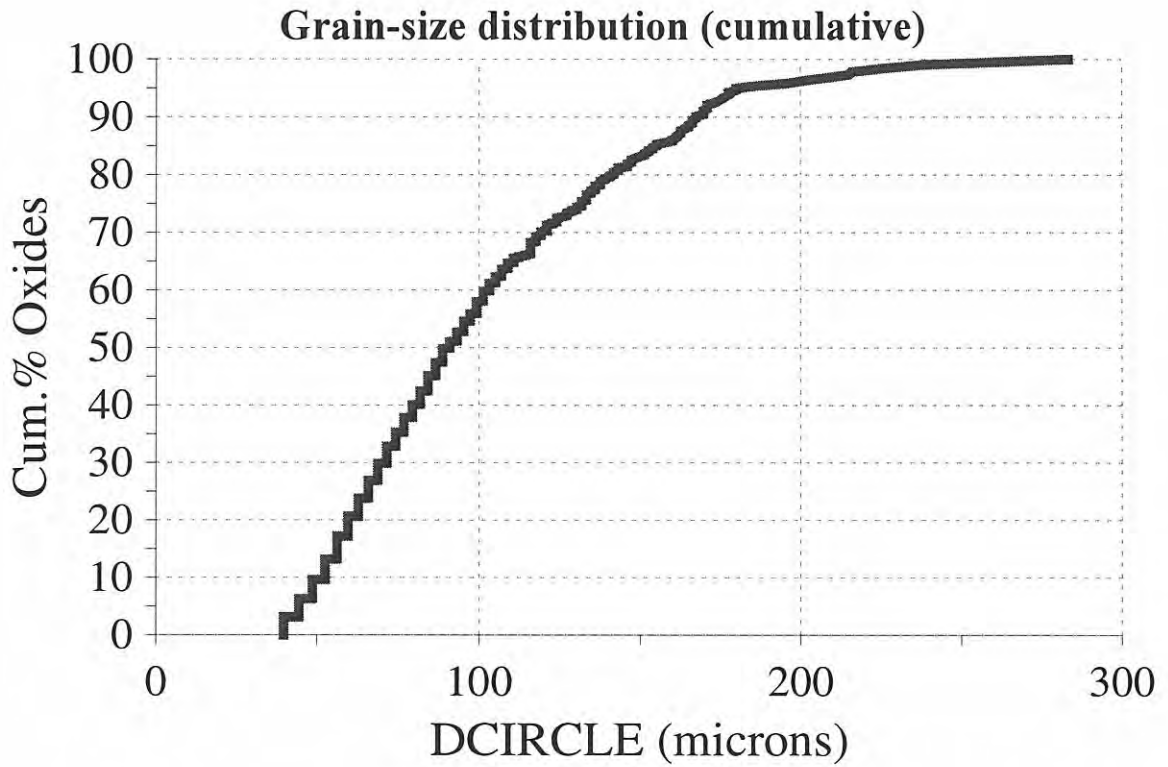
Sample 4/129.9



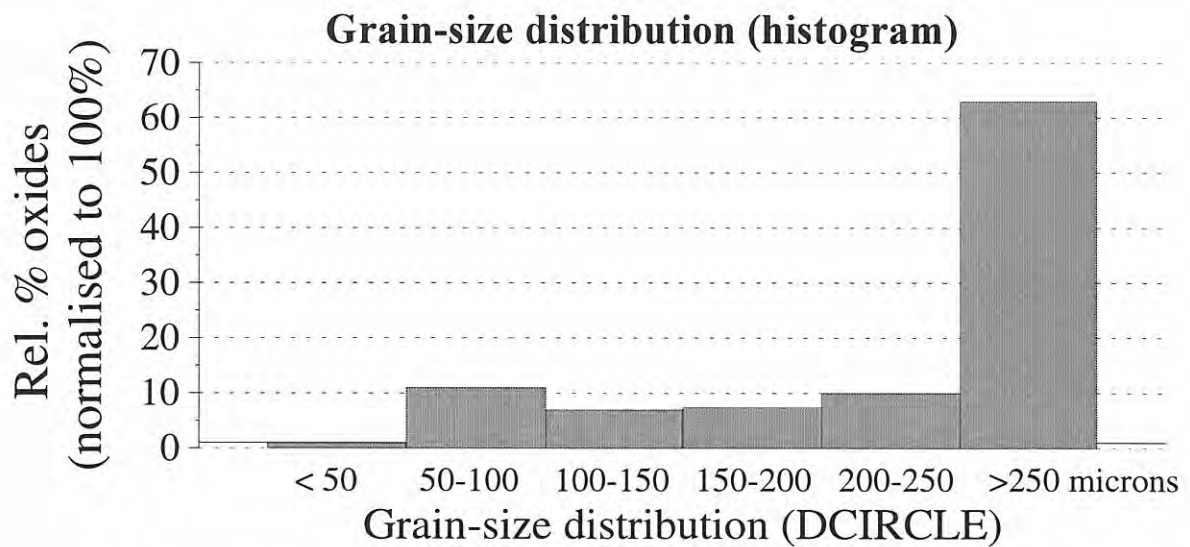
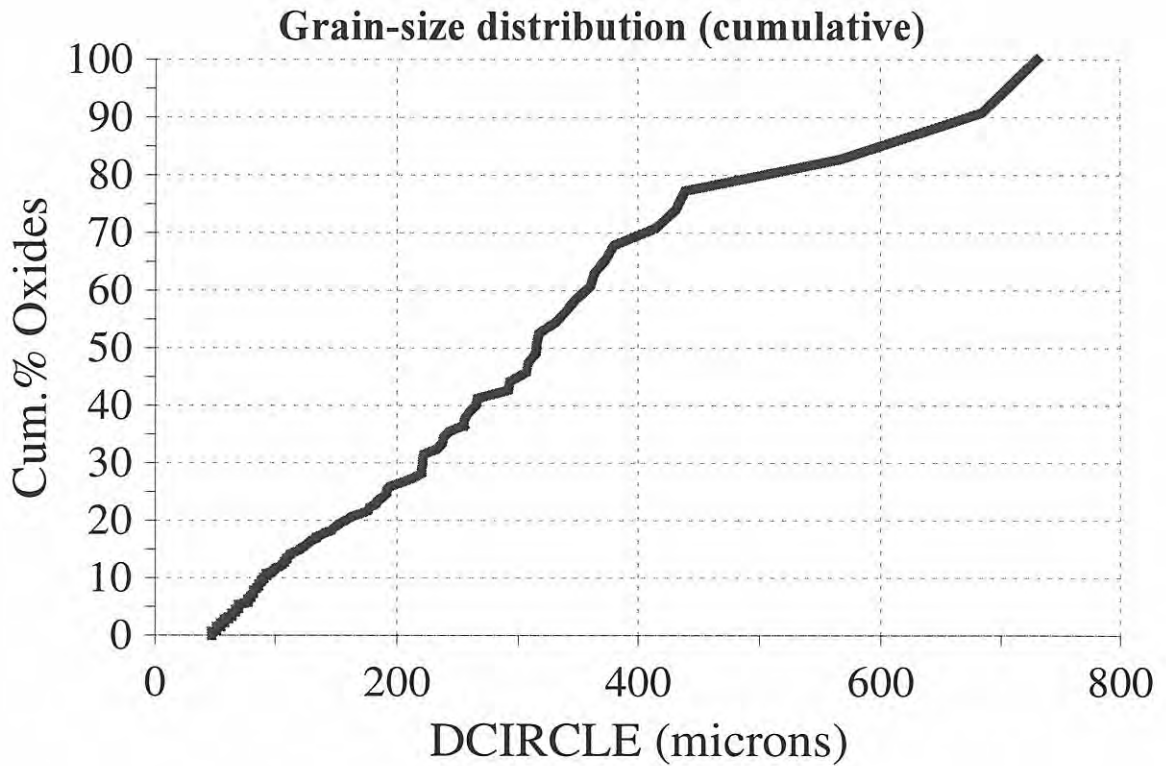
Sample 1/126.5



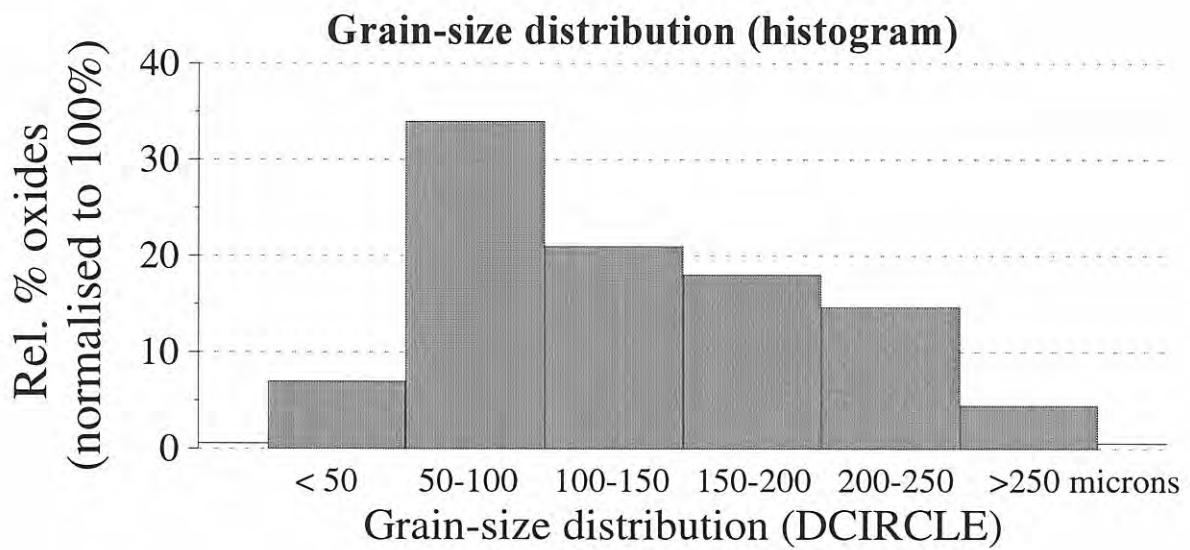
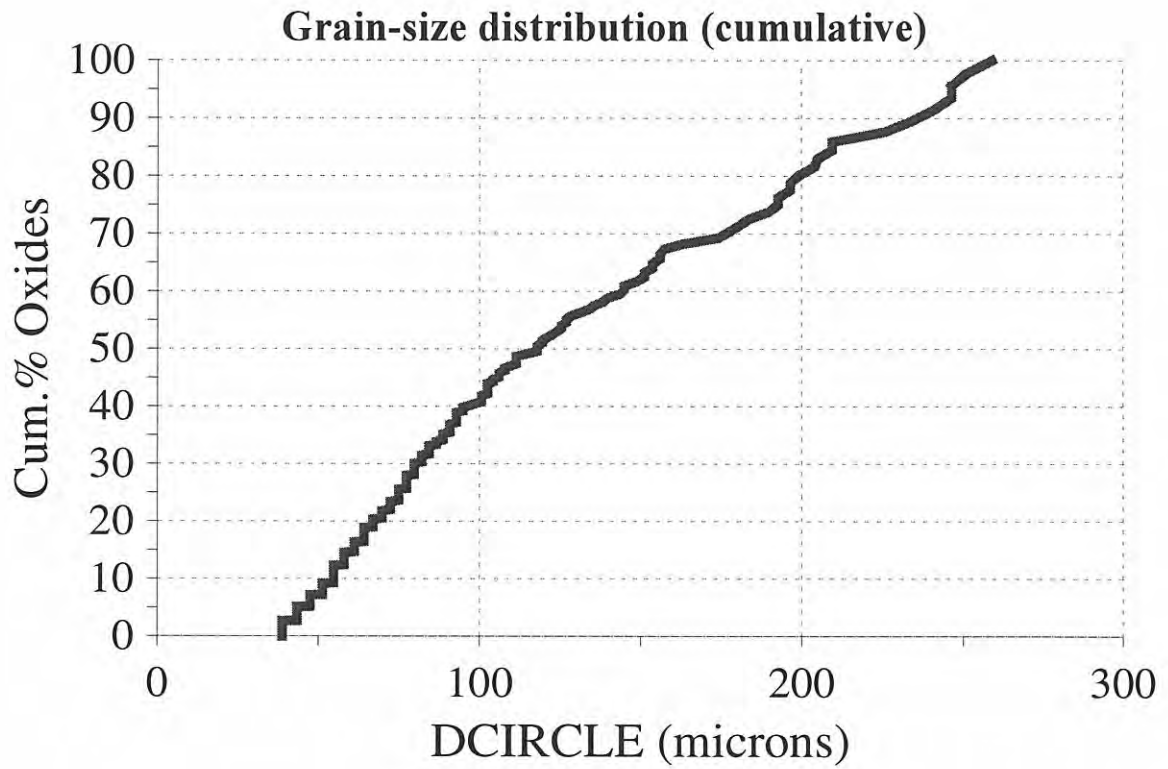
Sample 13/146.0



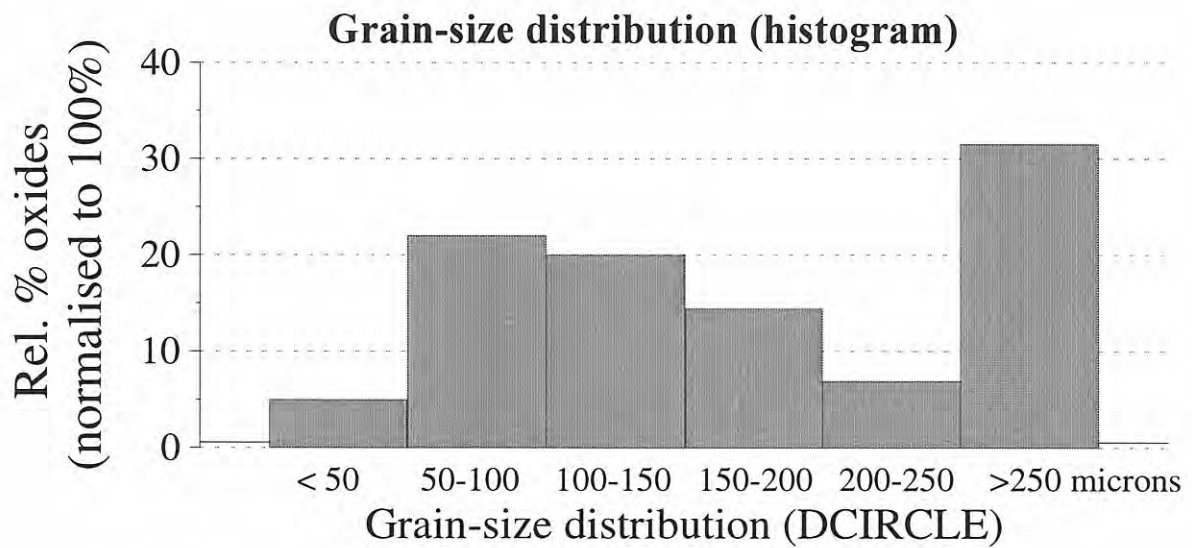
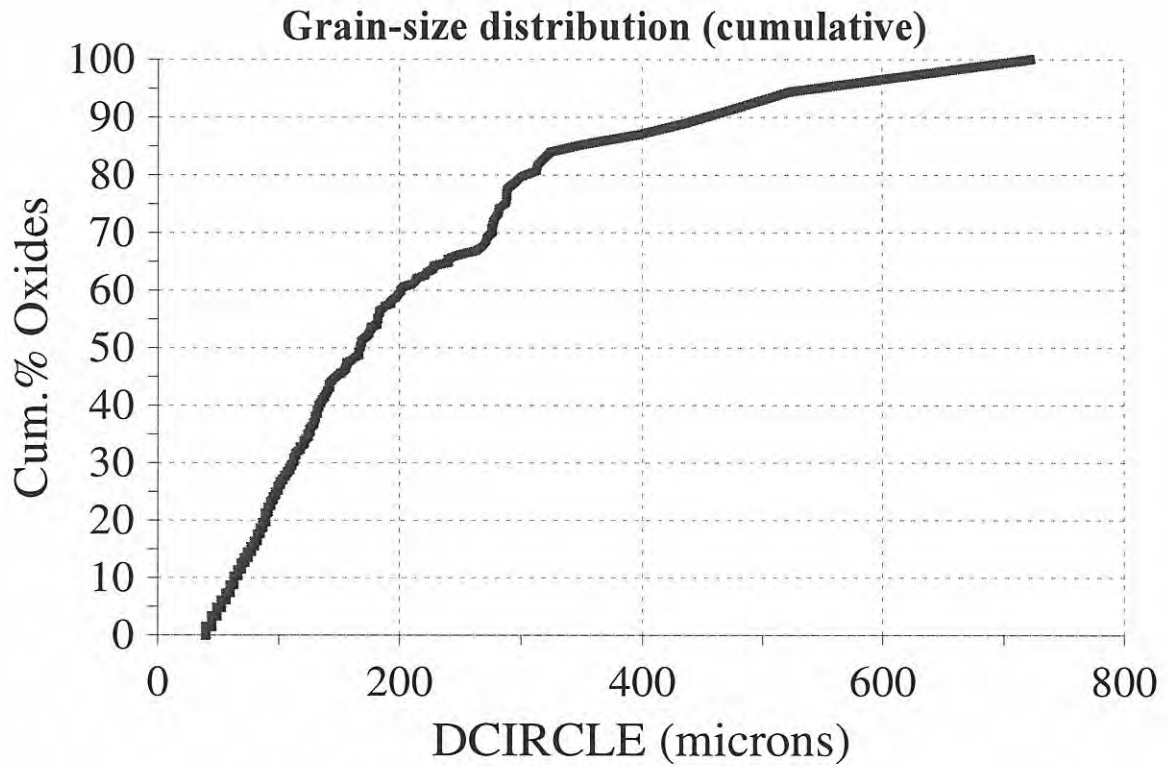
Sample K253B.94



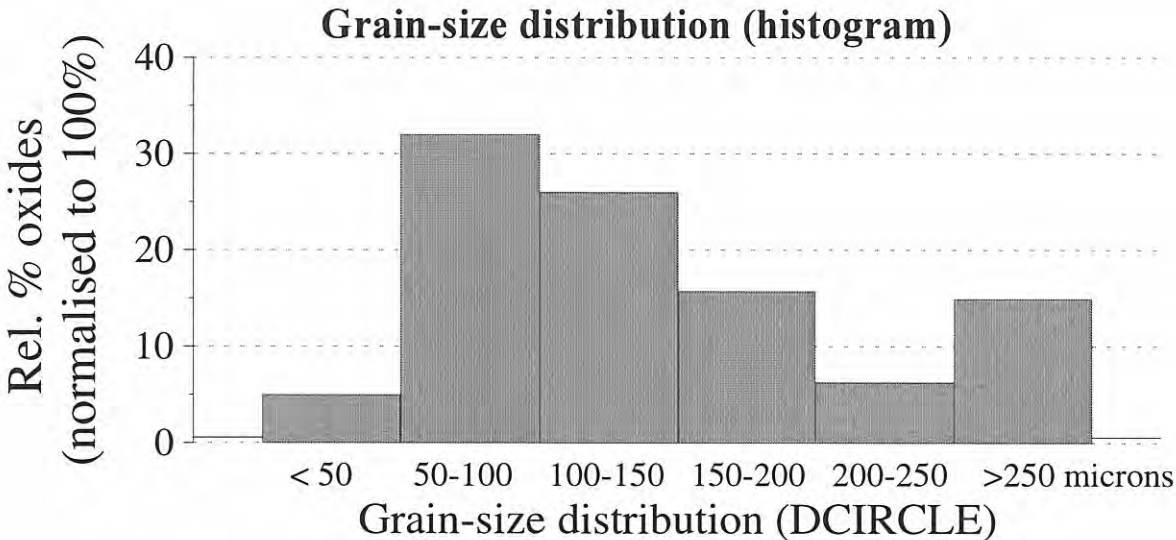
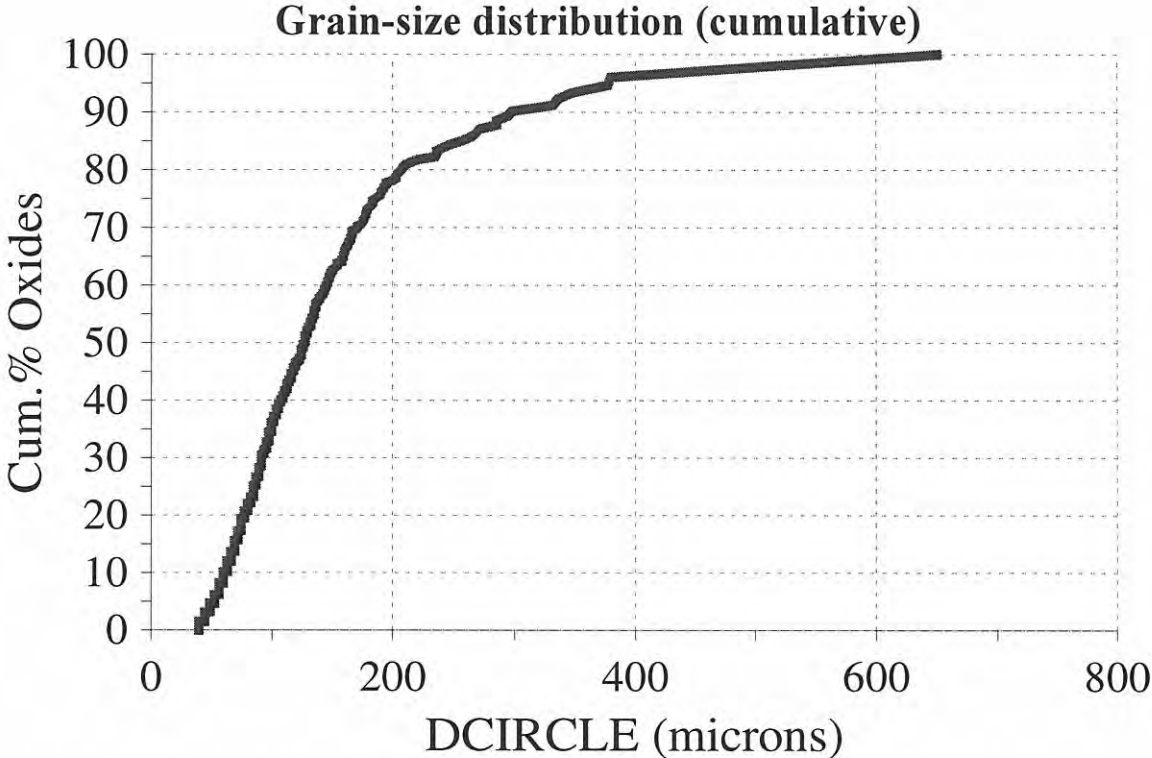
Sample K308.94



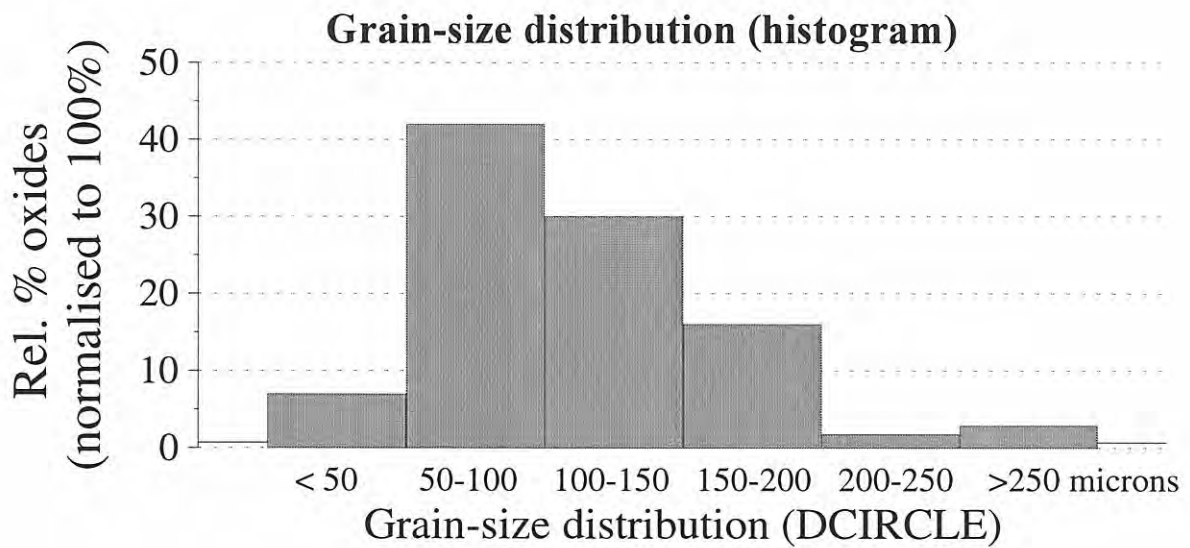
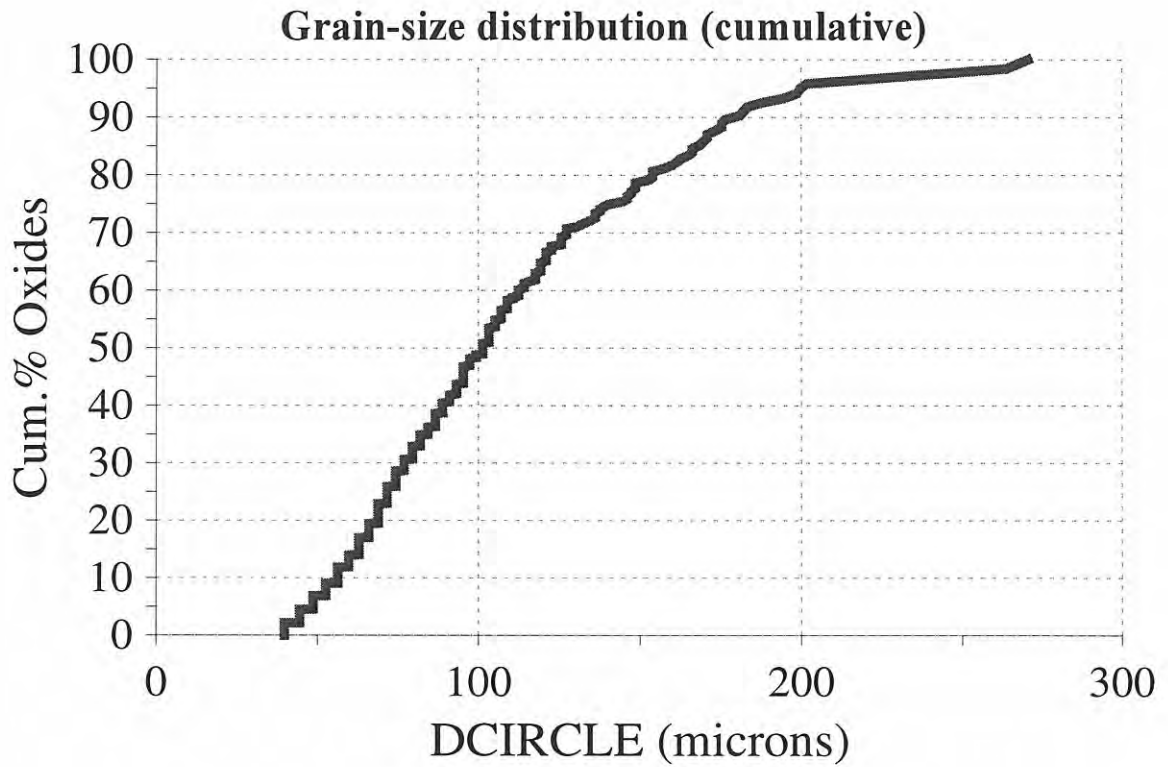
Sample K150.99



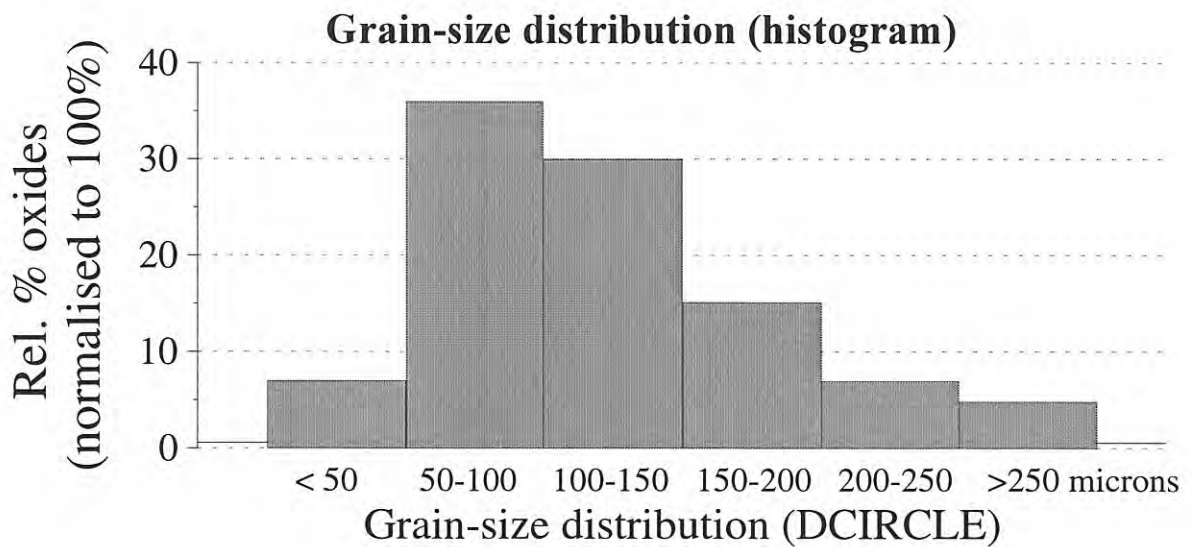
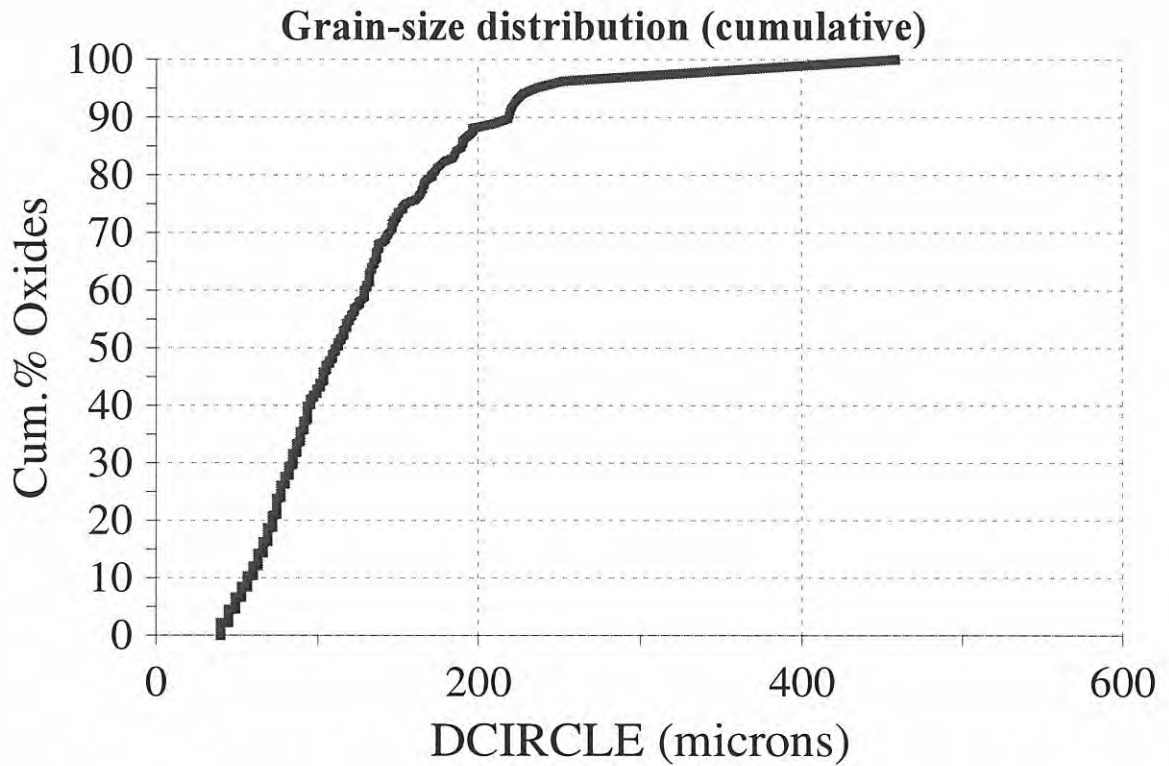
Sample K147.99



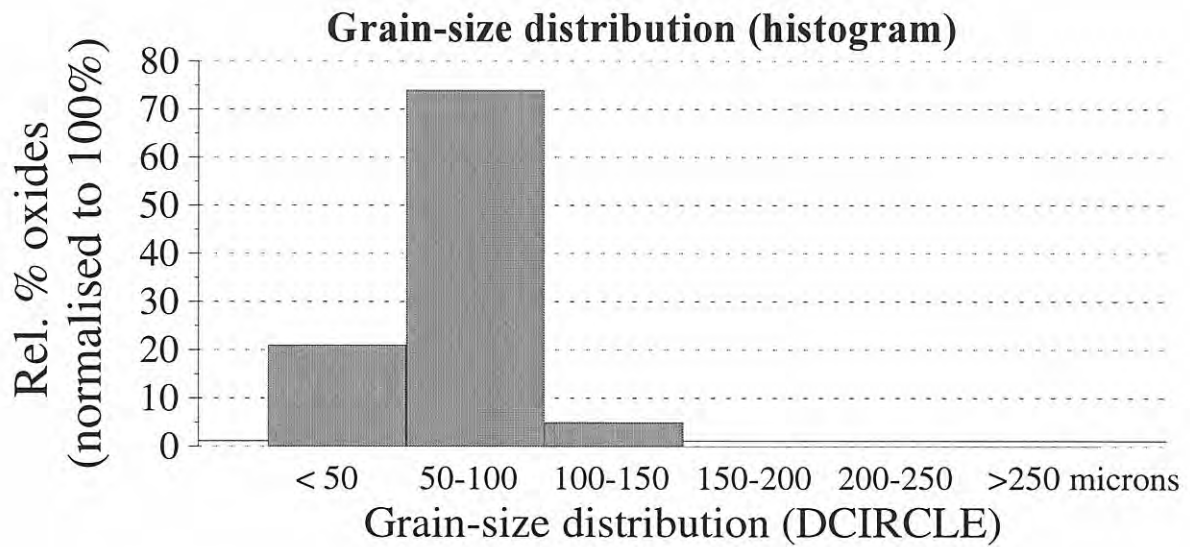
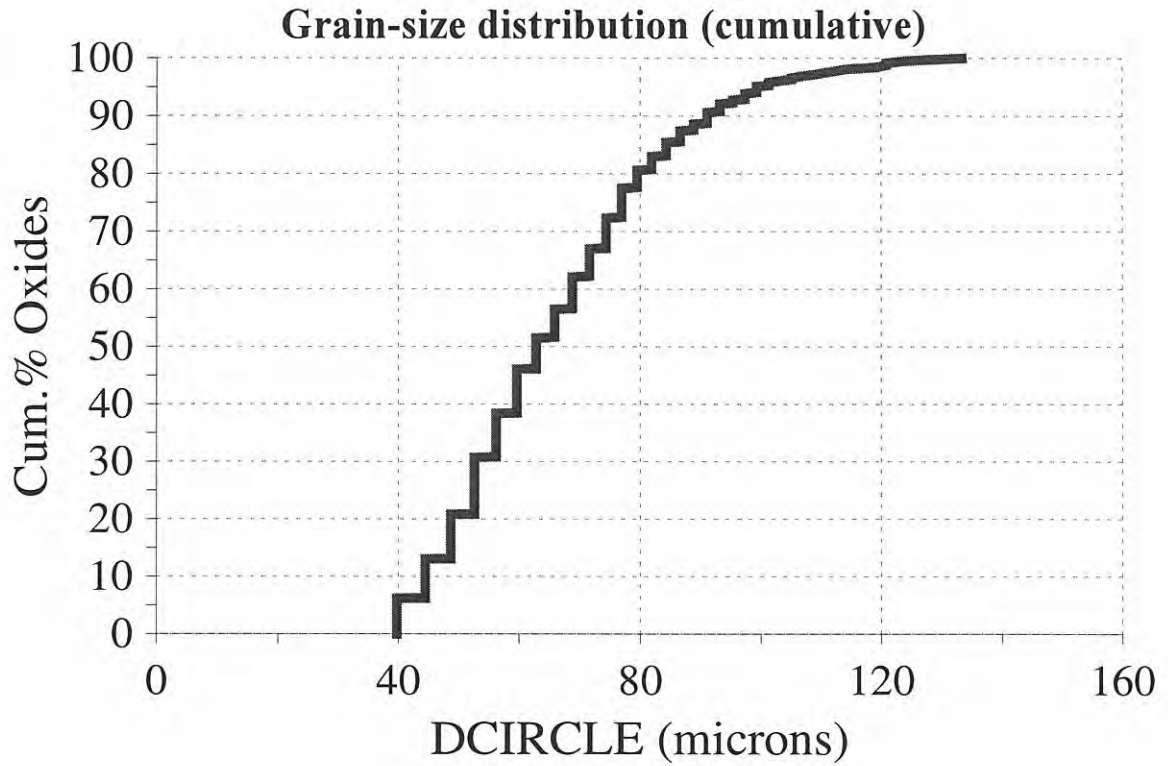
Sample K146.99



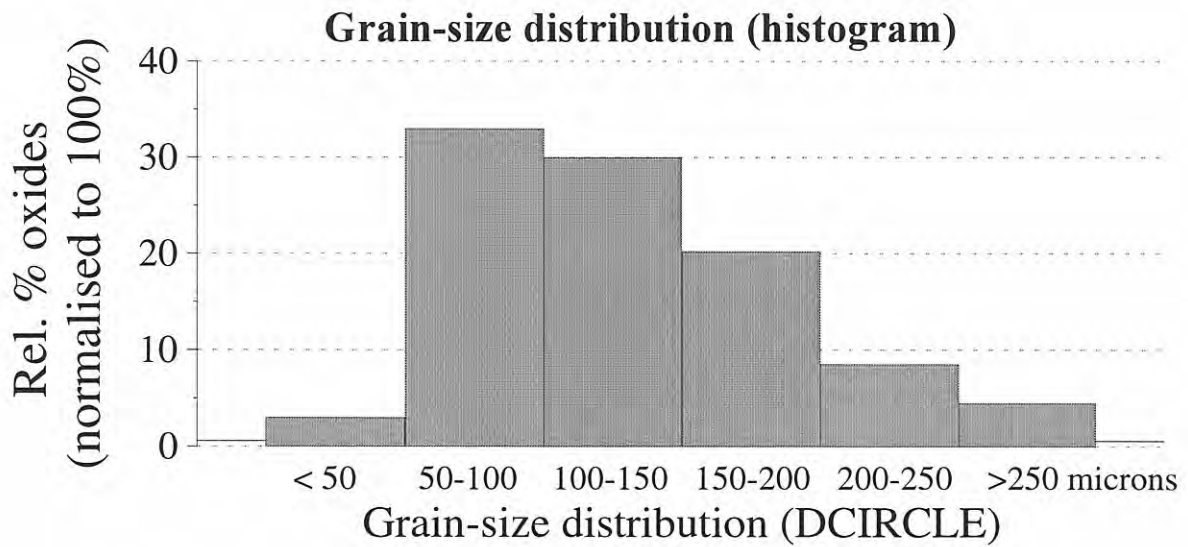
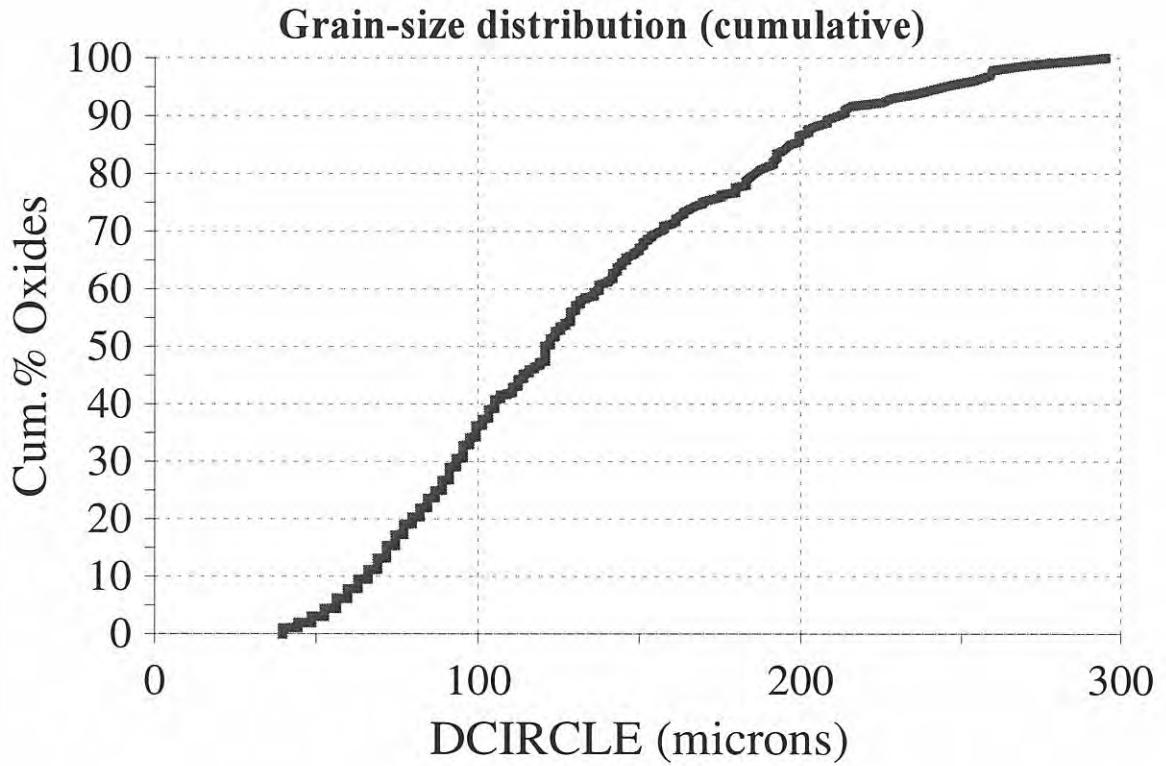
Sample K145.99



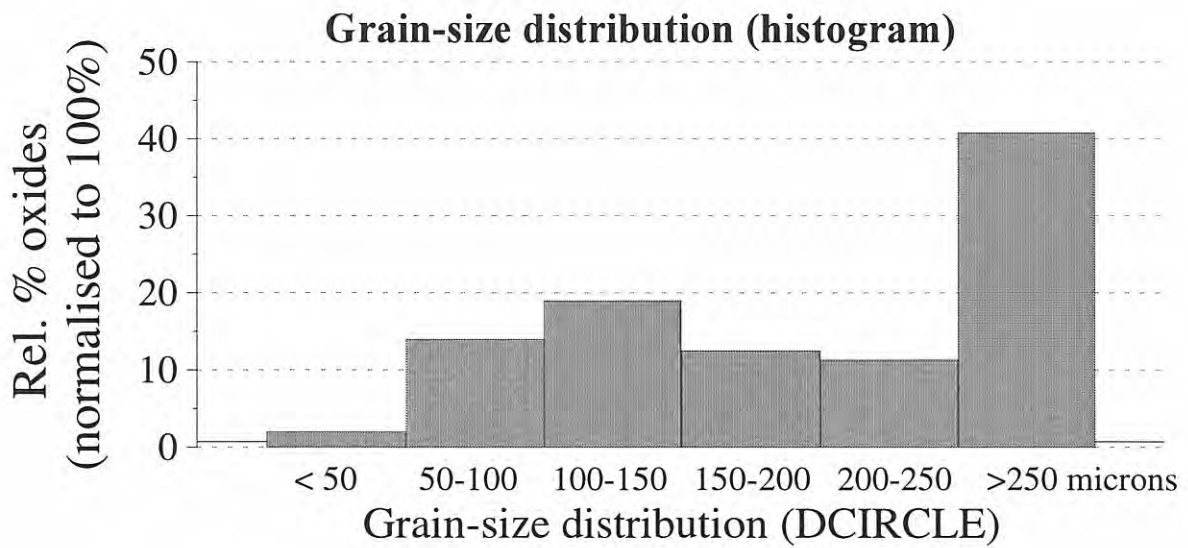
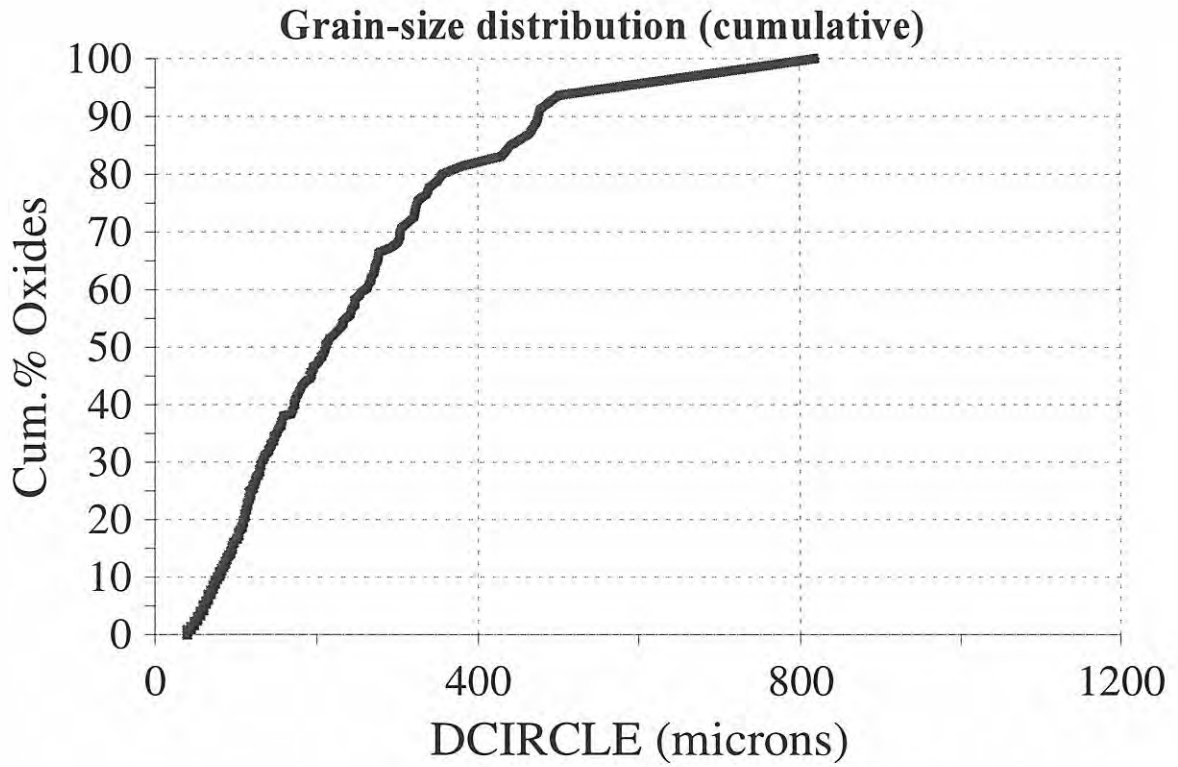
Sample K143.99



Sample K149.99



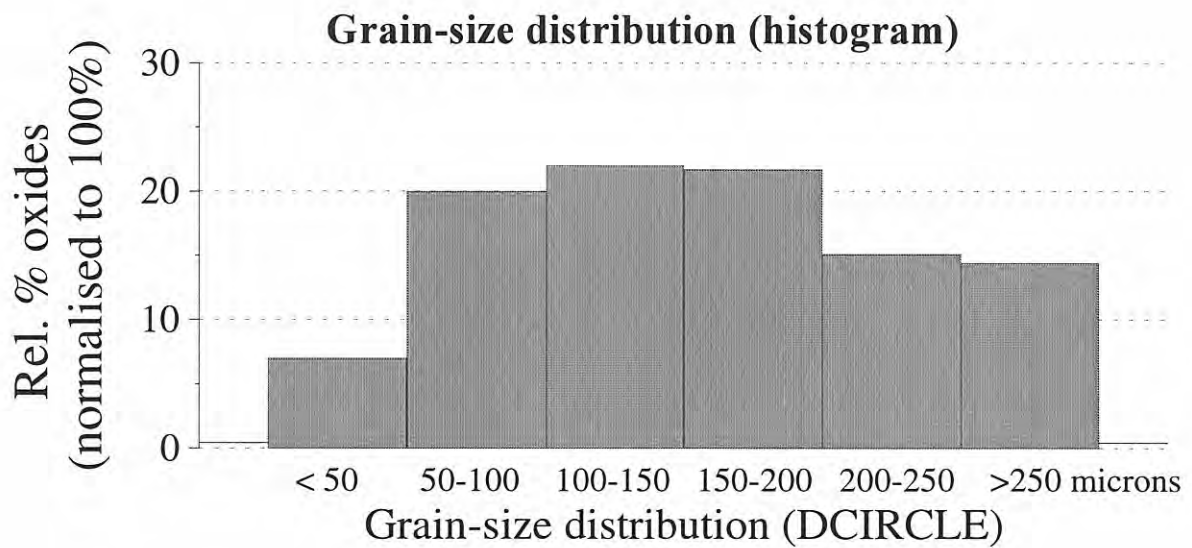
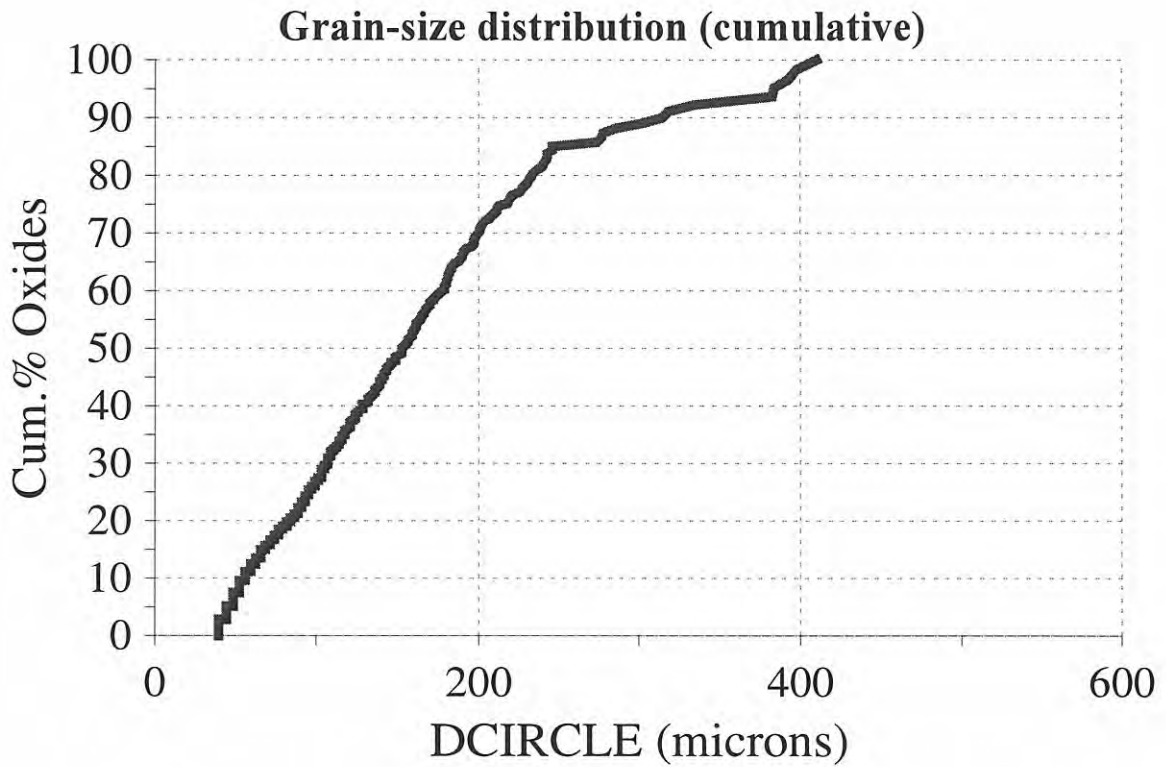
Sample K148.99



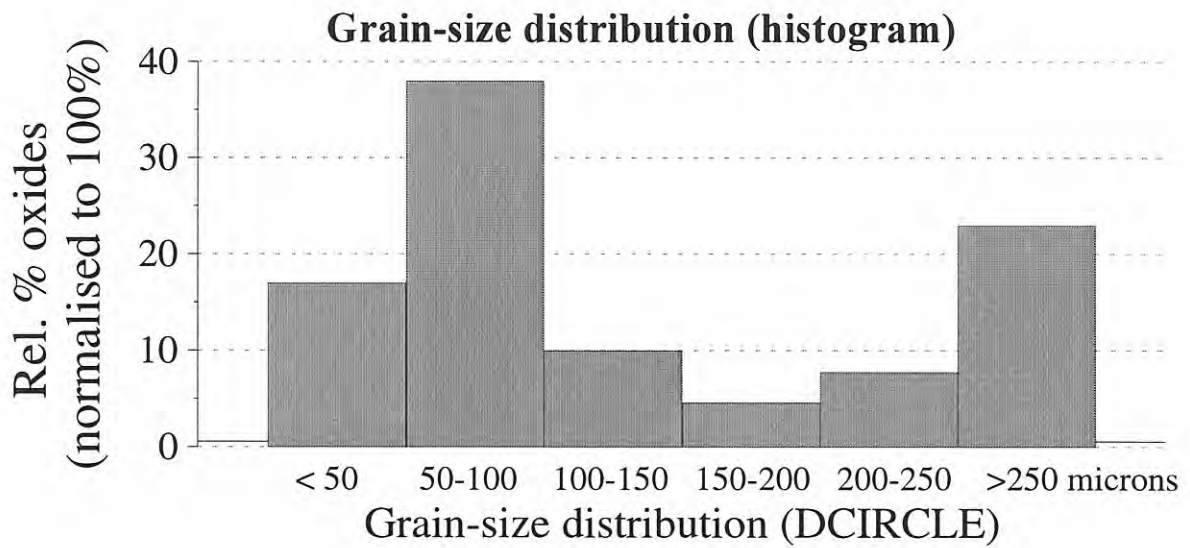
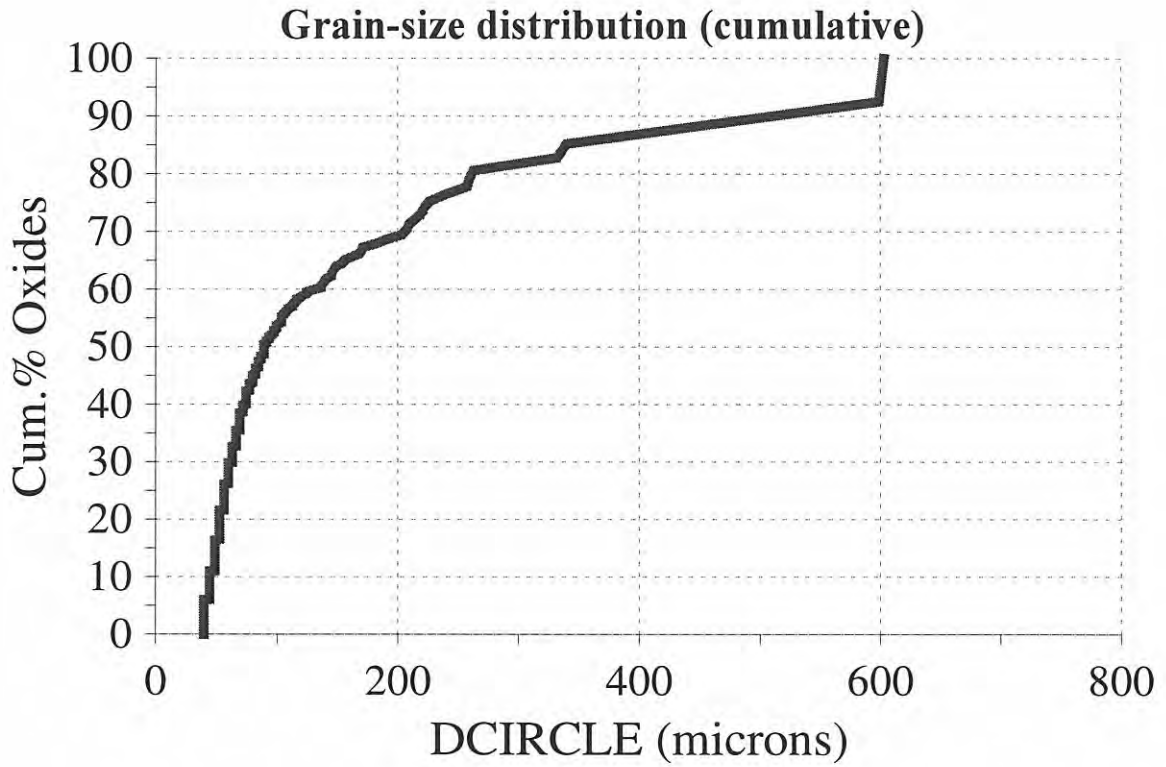
Rutile grain-size
distribution graphs

Other deposits

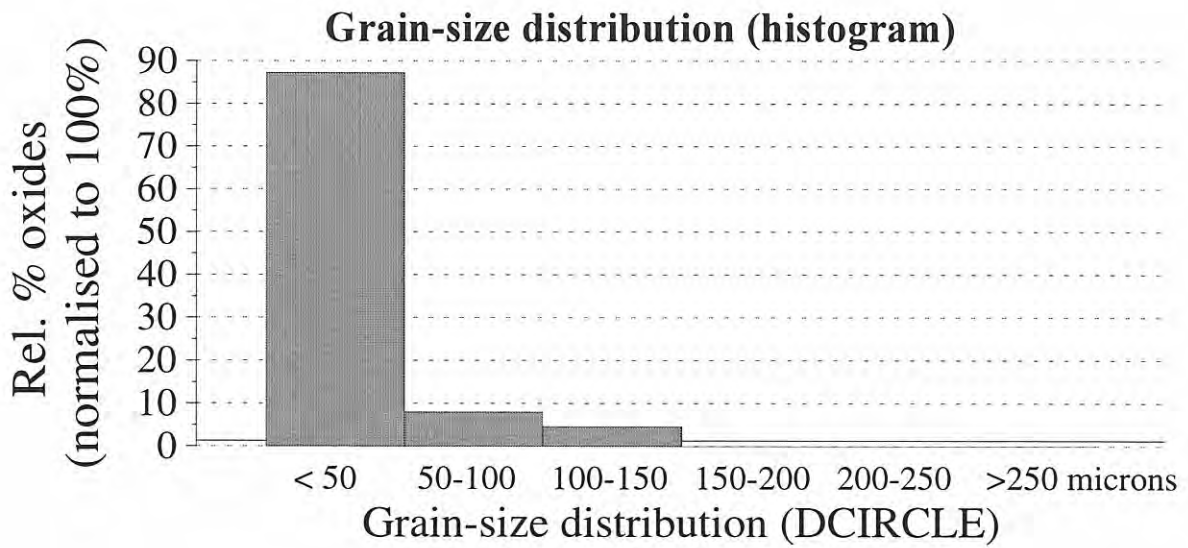
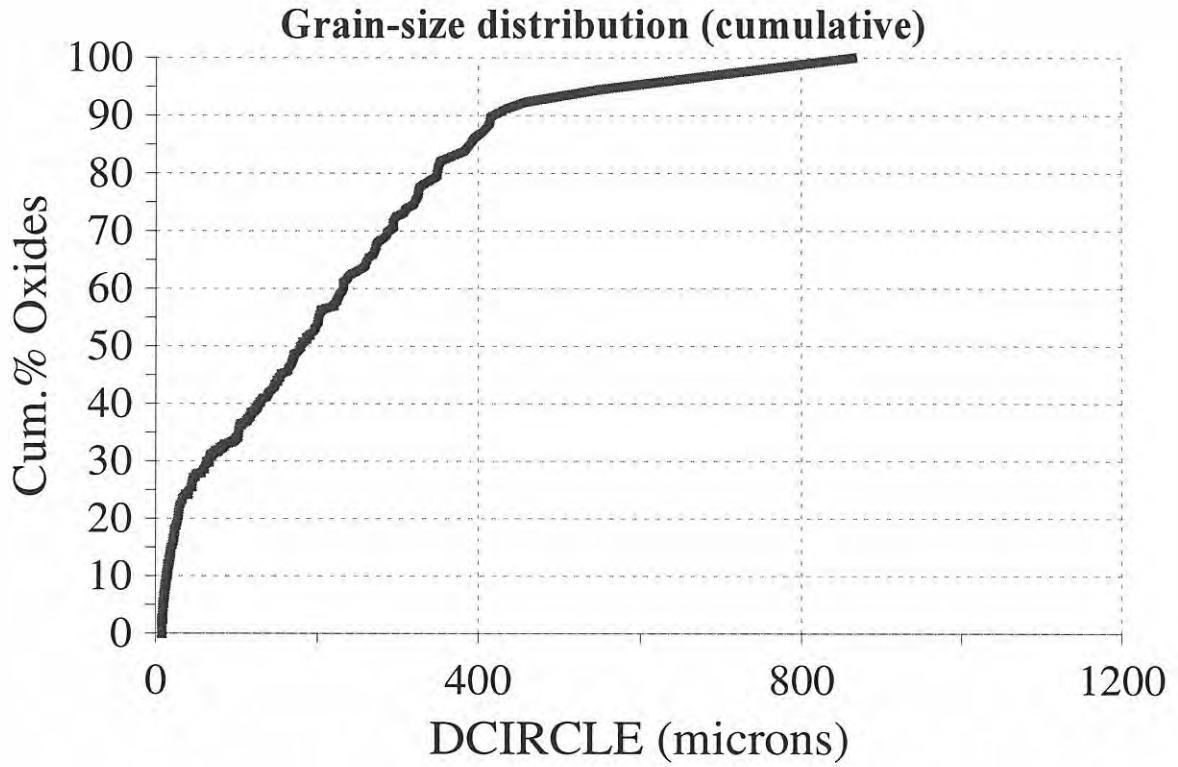
Sample 394.02



Sample 394.03



Sample MM00035



Appendix 6

A4-photocopies
of thin-sections

Appendix 6

Overview of available A4-photocopies made from thin-sections

Bergen region

Holsnøy area (N Bergen region)

<i>Odland 2</i>	KH62C.89
<i>Ådnefjell 4</i>	KH56D.89
<i>Sætrevik Ø</i>	KH63B.89
<i>Ådnefjell 4</i>	KH56A.89
<i>Buldrevika 3</i>	KH59.89
<i>Ådnefjell</i>	KH54C.89
<i>Buldrevika 3</i>	KH60.89
<i>Kårbo</i>	KH22.89
<i>Havrevåg</i>	KH14A.89
<i>Ådnefjell 4</i>	KH56B.89
<i>Odland 2</i>	KH61.89
<i>Odland 2</i>	KH62A.89
<i>Odland 2</i>	KH62B.89
<i>Sætrevik Ø</i>	KH63A.89
<i>Havrevåg 2</i>	KH17.89
<i>Sætrevik Ø</i>	KH63E.89
<i>Ådnefjell</i>	KH54B.89
<i>Husebø</i>	KH2C.89
<i>Ådnefjell 4</i>	KH56C.89
<i>Alverstrømmen</i>	KH50A.89
<i>Ådnefjell</i>	KH54D.89
<i>Ådnefjell</i>	KH55.89
<i>Husebø</i>	KH2A.89
<i>Ådnefjell 4</i>	KH56F.89
<i>Ådnefjell 4</i>	KH56E.89

Dalsfjord region

Eastern Dalsfjord region

<i>Botnatjørna</i>	K292.94
<i>Djupevatnet</i>	K227F.94
<i>Djupevatnet</i>	K227E.94
<i>Djupevatnet</i>	K227B1.94
<i>Djupevatnet</i>	K227B.94
<i>Botnatjørna-East</i>	K295B.94
<i>Rakneberg</i>	K117.93
<i>Botnatjørna-East</i>	K295C.94
<i>Sagevika</i>	K283.94
<i>Djupevatnet</i>	K227A.94
<i>Håheia 1</i>	K204.94

Western Dalsfjord region

<i>Ramsgrønova</i>	K222A.94
<i>Ramsgrønova</i>	K222D1.94
<i>Gyttavatnet 1a</i>	KD77.92
<i>Hestegardsnova</i>	K291.94
<i>Ramsgrønova</i>	K222D.94
<i>Botnatjønn 4</i>	KD88.92
<i>Hovlandsvatnet</i>	K301.94
<i>Orkheia 2</i>	K153C.93
<i>Orkheia 2</i>	K153A.93
<i>Orkheia 2</i>	K153H.93
<i>Orkheia 2</i>	K153I.93
<i>Orkheia 2</i>	K153G.93
<i>Ramsgrønova</i>	K222C.94

Førdefjord region

Northern Førdefjord region

<i>Kleppestølen</i>	K246.94
<i>Furefjellet</i>	K308.94
<i>Kleppestølen</i>	K252.94
<i>Botnarusta</i>	K303.94
<i>Botnarusta</i>	K304.94
<i>Russenes</i>	KF1B.92
<i>Russenes</i>	KF1A.92
<i>Heianova</i>	K251.94
<i>Naustdal eclogite</i>	K255.94

Kristiansund region

Aure area (NE Kristiansund region)

<i>Fuglevåg</i>	KF15B.92
<i>Mjosund</i>	KM14.92
<i>Fuglevåg</i>	KF15A.92

Averøy area (SW Kristiansund region)

<i>KE30.92-locality</i>	KE30G.92
<i>KE30.92-locality</i>	KE30F.92
<i>KE30.92-locality</i>	KE30A.92

Gjemnes area (NE Kristiansund region)

<i>Hoem</i>	KE42A.92
<i>Flemma</i>	KE43B.92
<i>Torvik 2</i>	KE38A.92
<i>Reinsfjellet</i>	KE32A.92
<i>Skardet</i>	KE40A.92

Halsa area (NE Kristiansund region)

<i>Solli 1</i>	KH50A.92
<i>Hesjingfjellet</i>	KV13B.92
<i>Hesjingfjellet</i>	KV13A.92
<i>Høgset</i>	KV12.92

Kristiansund area

<i>Flatset</i>	KK11.92
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Tustna area (Central Kristiansund region)

<i>Ramsvikbukta</i>	KF16.92
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Molde region

Aukra area (N Molde region)

Hollingen KE34A.92

Eide area (NE Molde region)

Storvasshaugen KE36A.92

Fræna area (NE Molde region)

Stavik 4 KE28A.92

Stavik 2 KE26A.92

Nordfjord region

Western Nordfjord region

Almenningen KN4.92

Kroken KN3B.92

Kroken KN3A.92

Romsdal region

Lesja area (E Romsdal region)

Kleiva KL21A.92

Brue KL22A.92

Sunnalsfjord area (N Romsdal region)

Ålvund KS49A.92

Sognefjord region

NW Sognefjord region

Veten (Lavik) 394.02

Veten (Lavik) 394.03

Veten (Lavik) 394.01

SW Sognefjord region

Byrknesøy 395.09

Byrknesøy 395.06

Byrknesøy 395.04

Byrknesøy 395.05

Byrknesøy 395.11

Byrknesøy 395.03

Byrknesøy 395.10

Byrknesøy 395.08

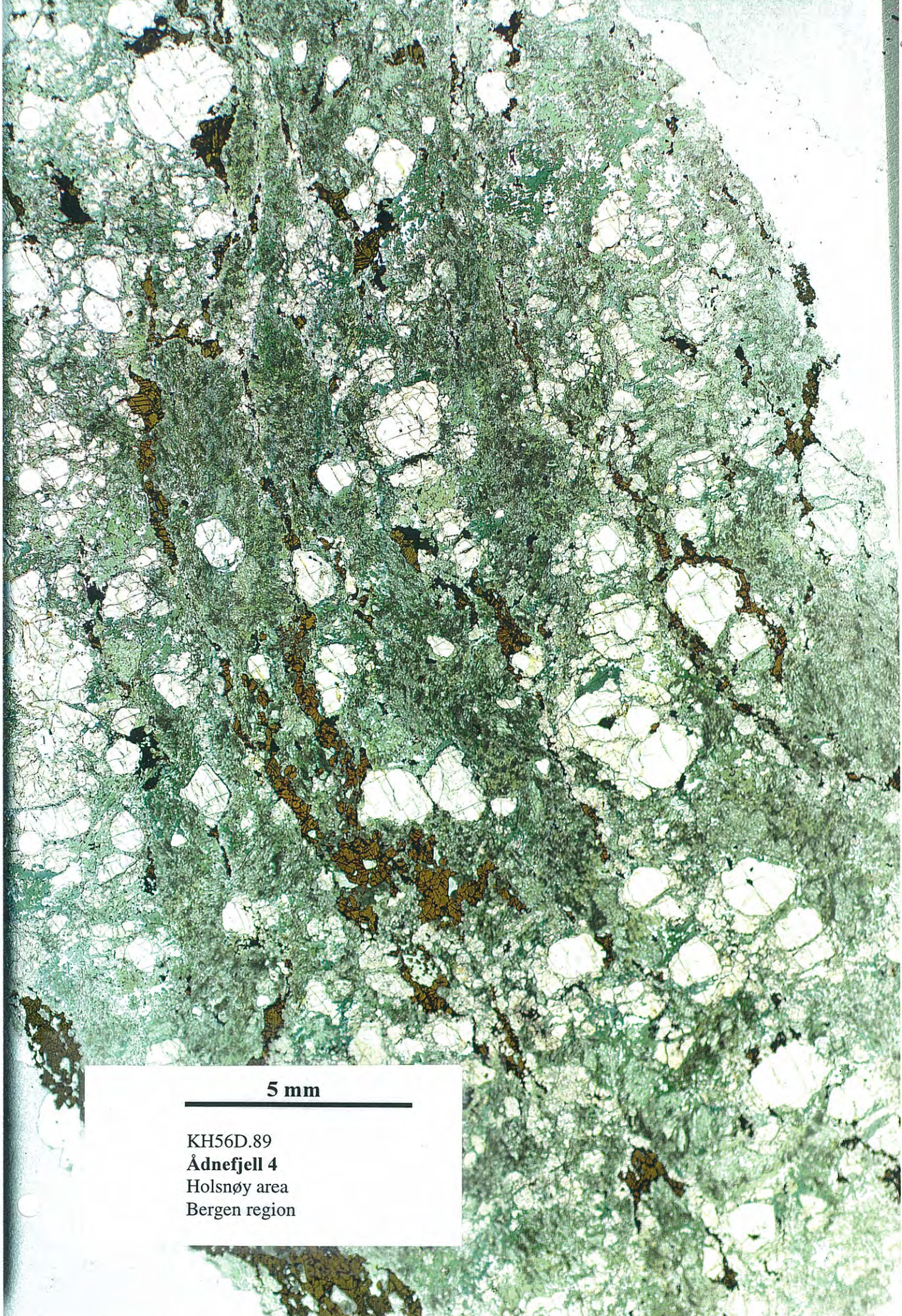
Byrknesøy 395.07

Bergen region

5 mm

KH62C.89
Odland 2
Holsnøy area
Bergen region

KH62C



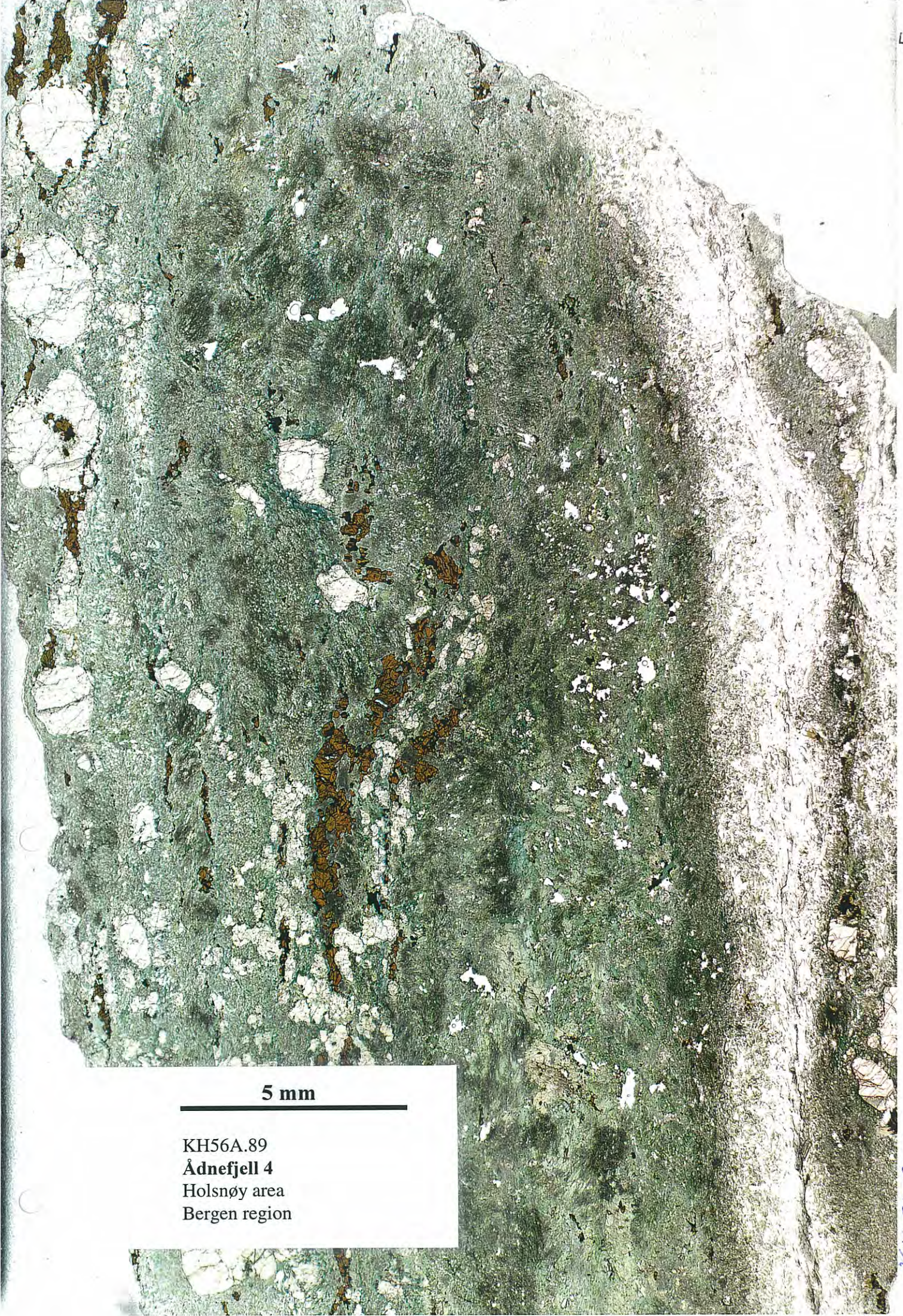
5 mm

KH56D.89
Ådnefjell 4
Holsnøy area
Bergen region

KH56D

5 mm
KH63B.89
Sætrevik Ø
Holsnøy area
Bergen region

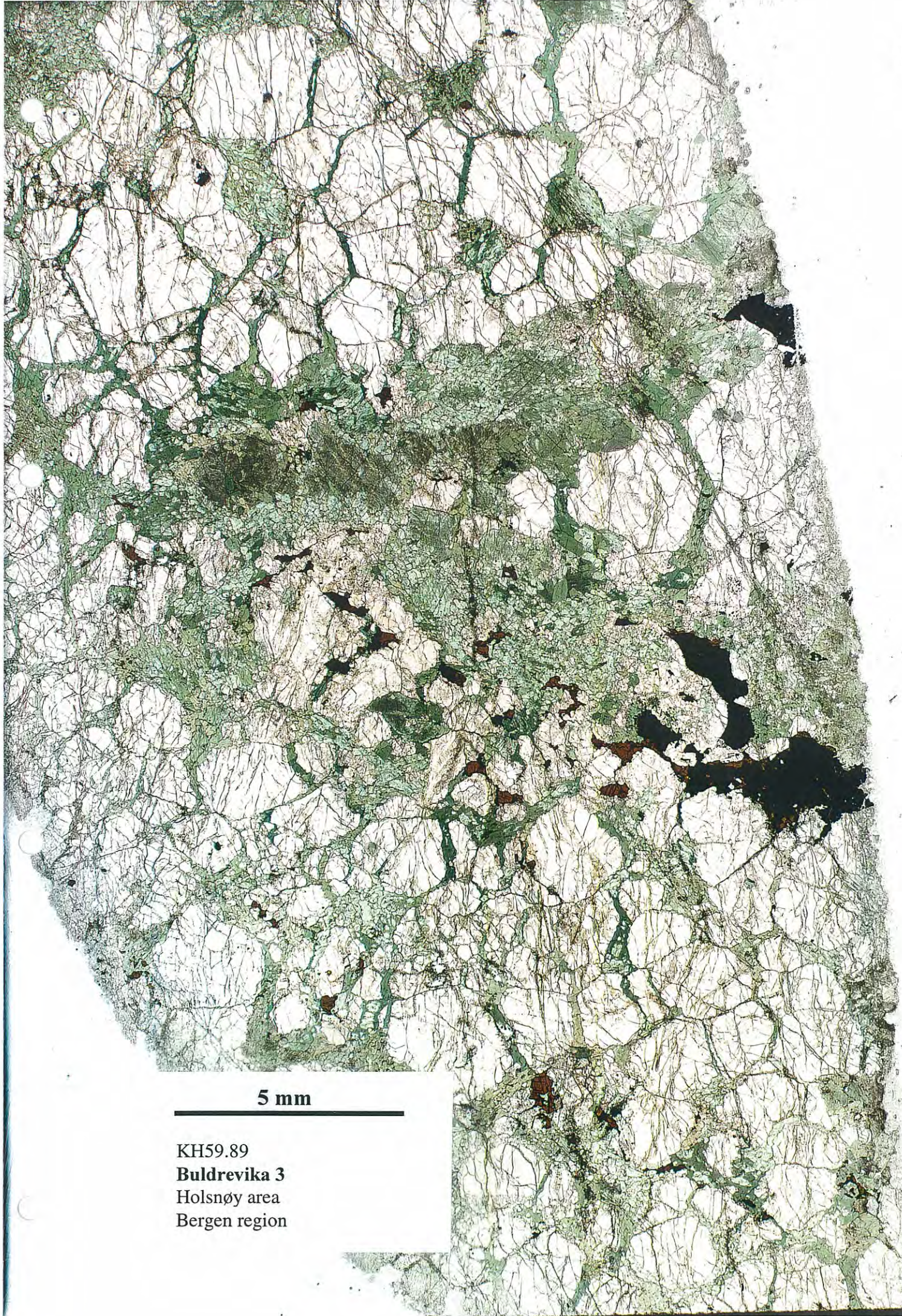
KH63B



5 mm

KH56A.89
Ådnefjell 4
Holsnøy area
Bergen region

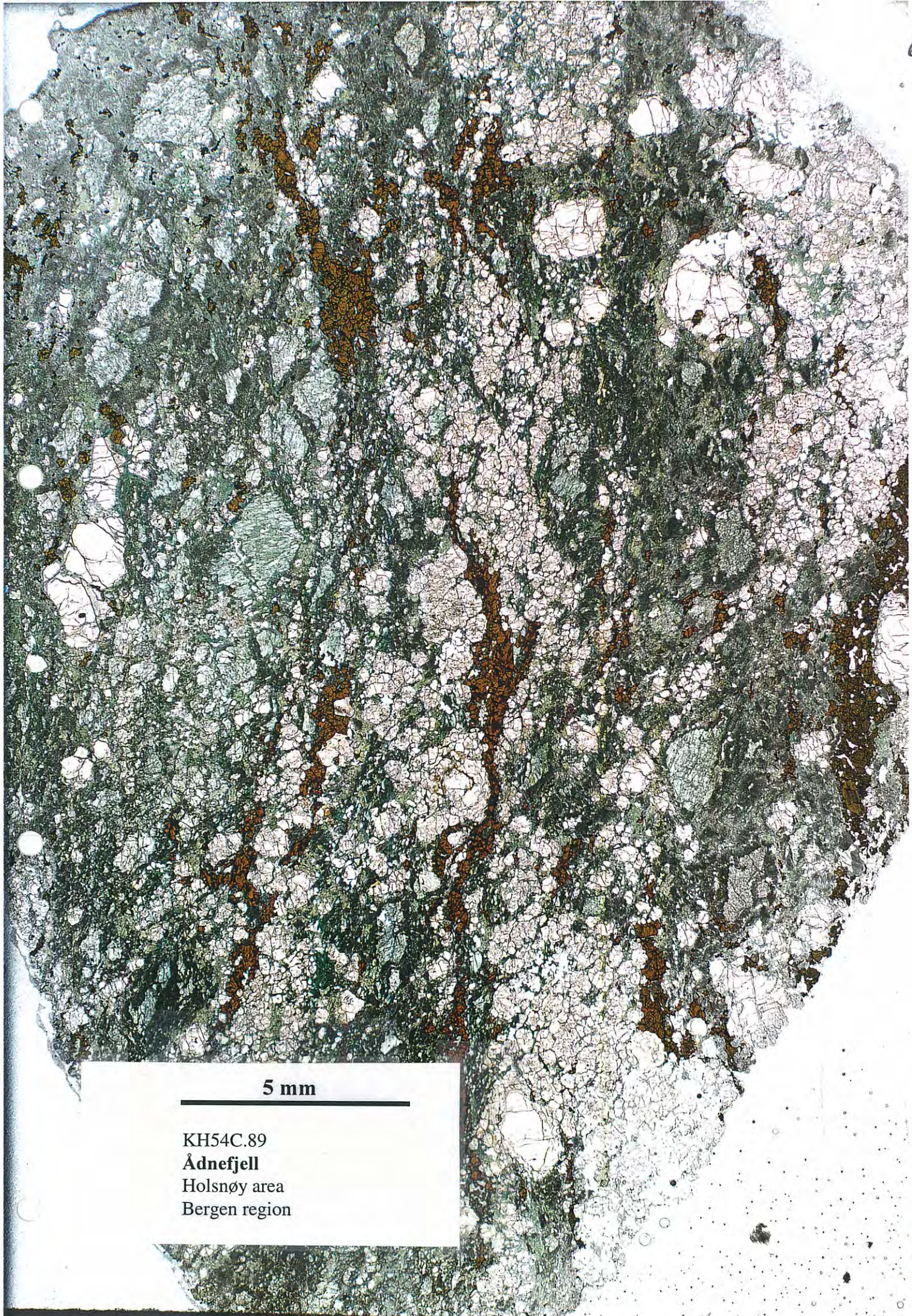
KH 56 A



5 mm

KH59.89
Buldrevika 3
Holsnøy area
Bergen region

KH59



5 mm

KH54C.89
Ådnefjell
Holsnøy area
Bergen region

KH54C



5 mm

KH60.89
Buldrevika 3
Holsnøy area
Bergen region

KH60

5 mm

KH22.89
Kårbø
Holsnøy area
Bergen region

KH22.89



5 mm

KH14A.89
Havrevåg
Holsnøy area
Bergen region

KH14A.89



5 mm

KH56B.89
Ådnefjell 4
Holsnøy area
Bergen region

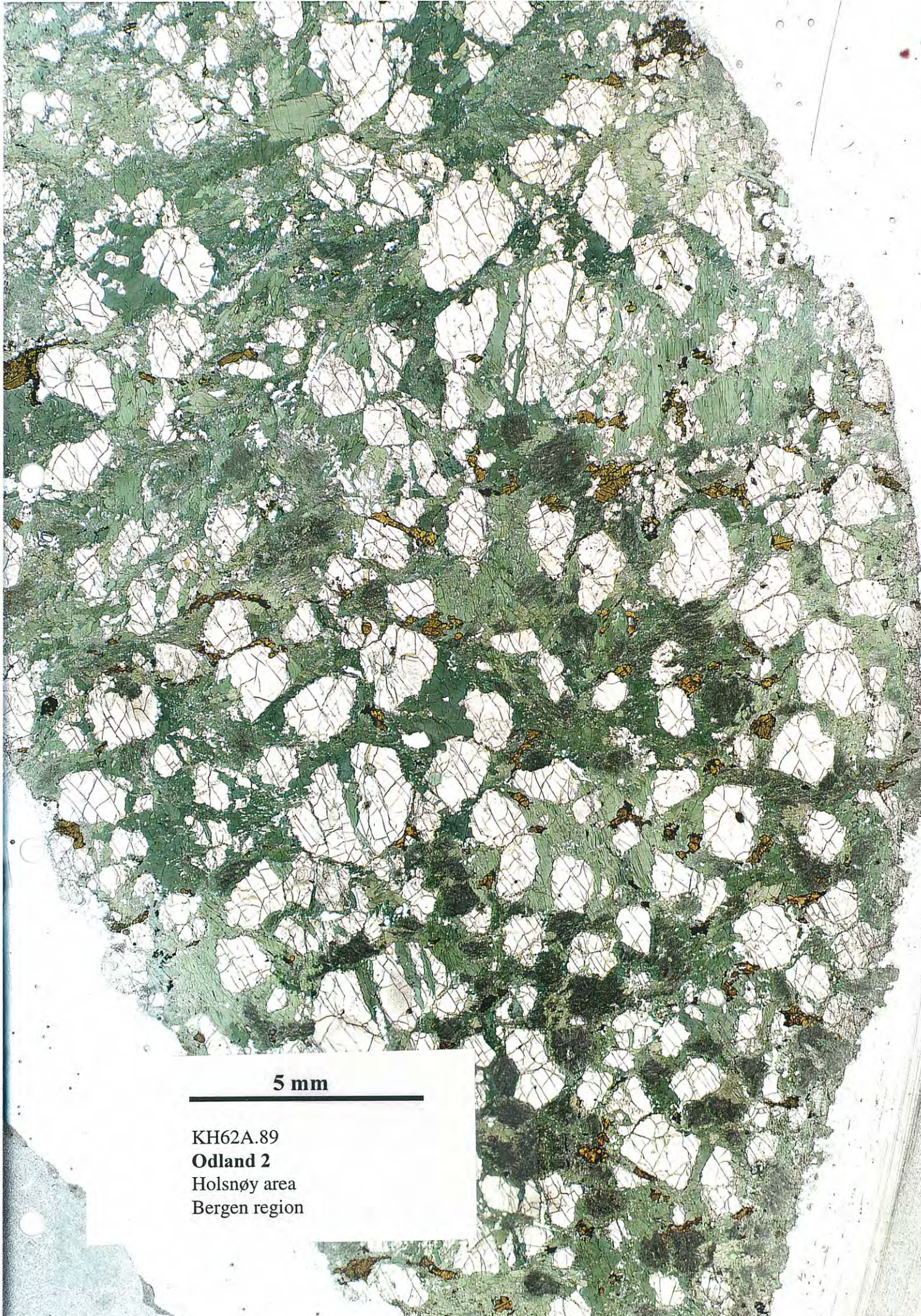
KH 56 B



5 mm

KH61.89
Odland 2
Holsnøy area
Bergen region

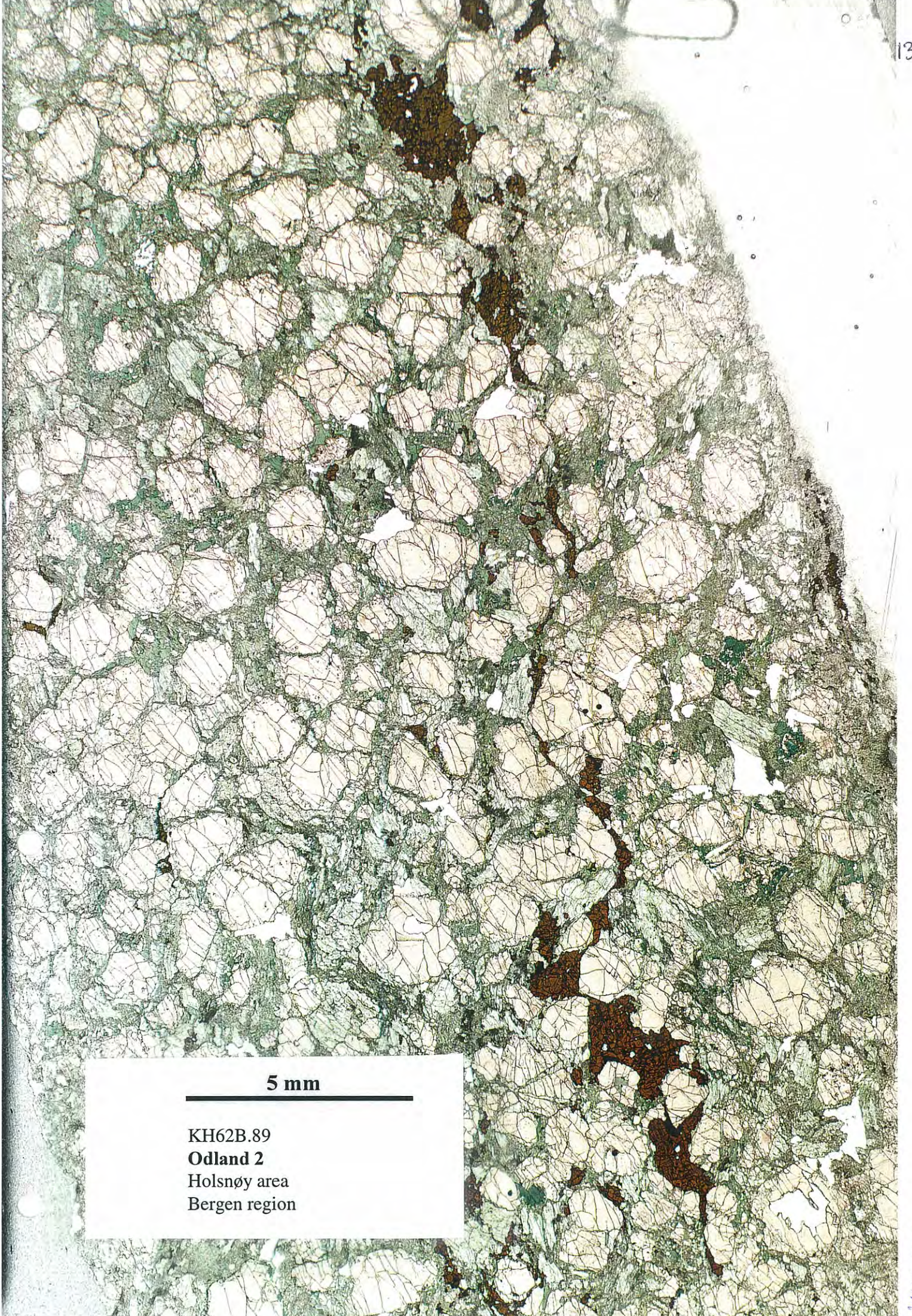
KH61



5 mm

KH62A.89
Odland 2
Holsnøy area
Bergen region

KH62 A

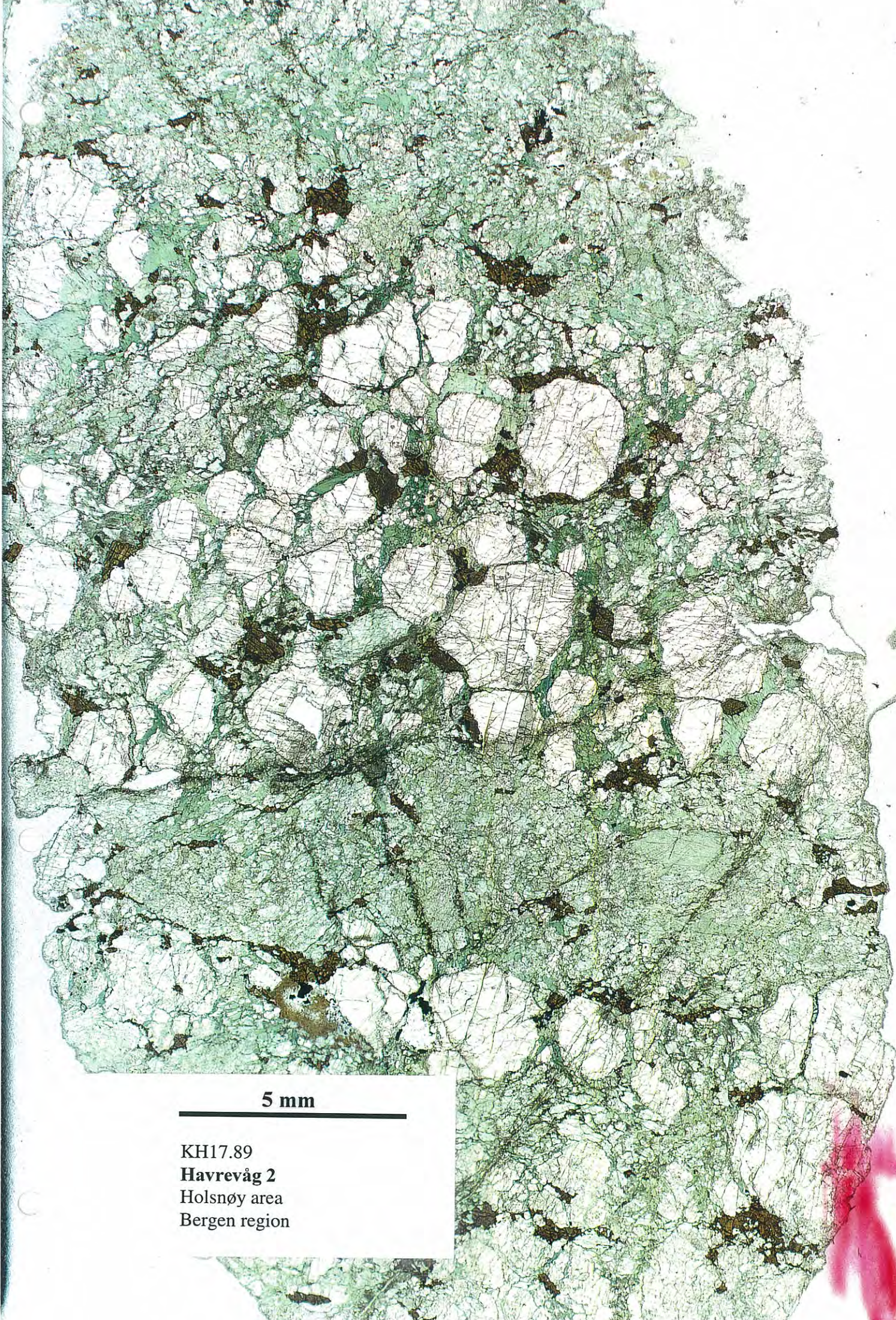


5 mm

KH62B.89
Odland 2
Holsnøy area
Bergen region

KH62B.89

5 mm
KH63A.89
Sætrevik Ø
Holsnøy area
Bergen region



5 mm

KH17.89
Havrevåg 2
Holsnøy area
Bergen region

KH17.89

5 mm

KH63E.89
Sætrevik Ø
Holsnøy area
Bergen region



5 mm

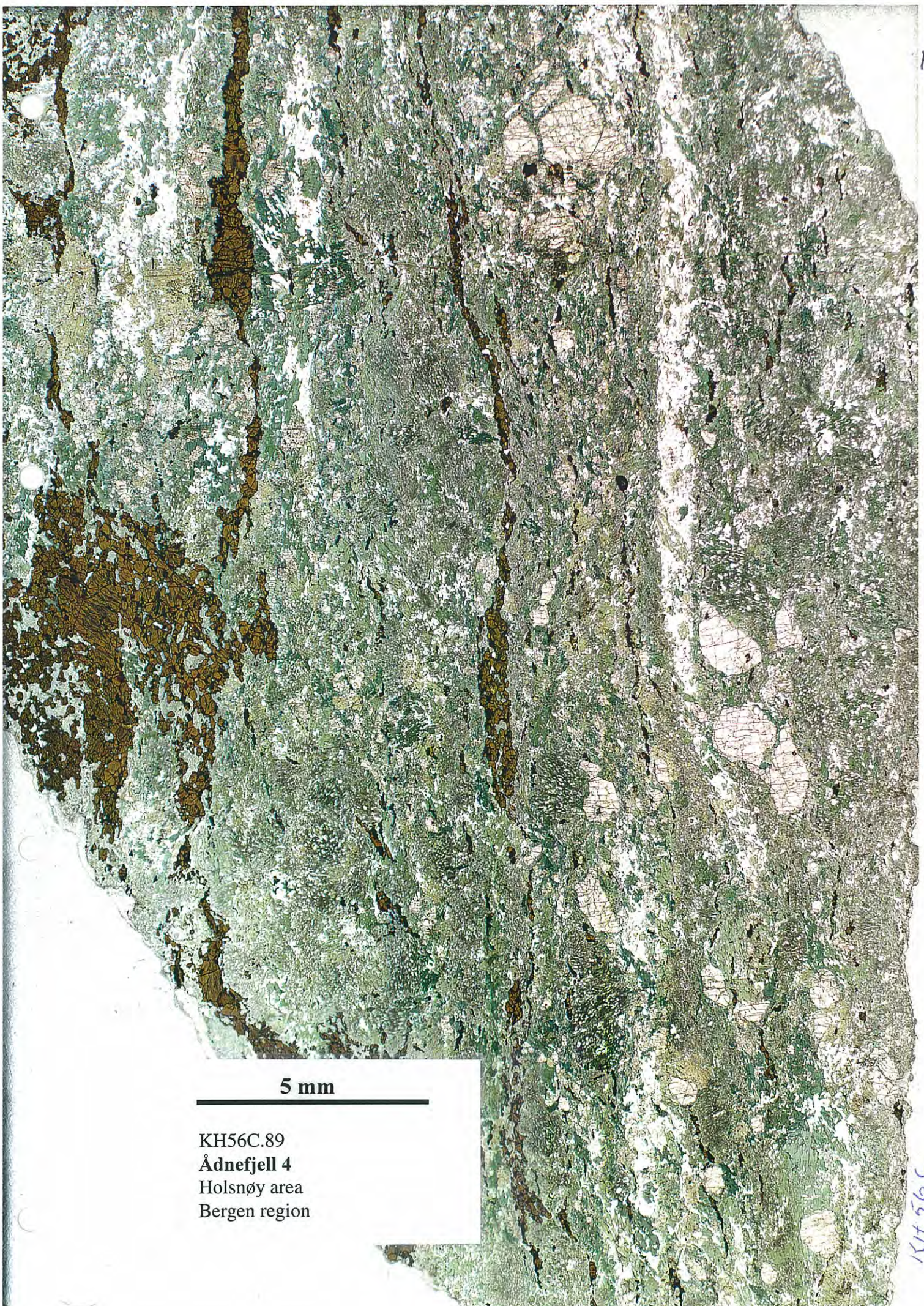
KH54B.89
Ådnefjell
Holsnøy area
Bergen region

5 mm

KH2C.89
Husebø
Holsnøy area
Bergen region

KH2C.89

19



5 mm

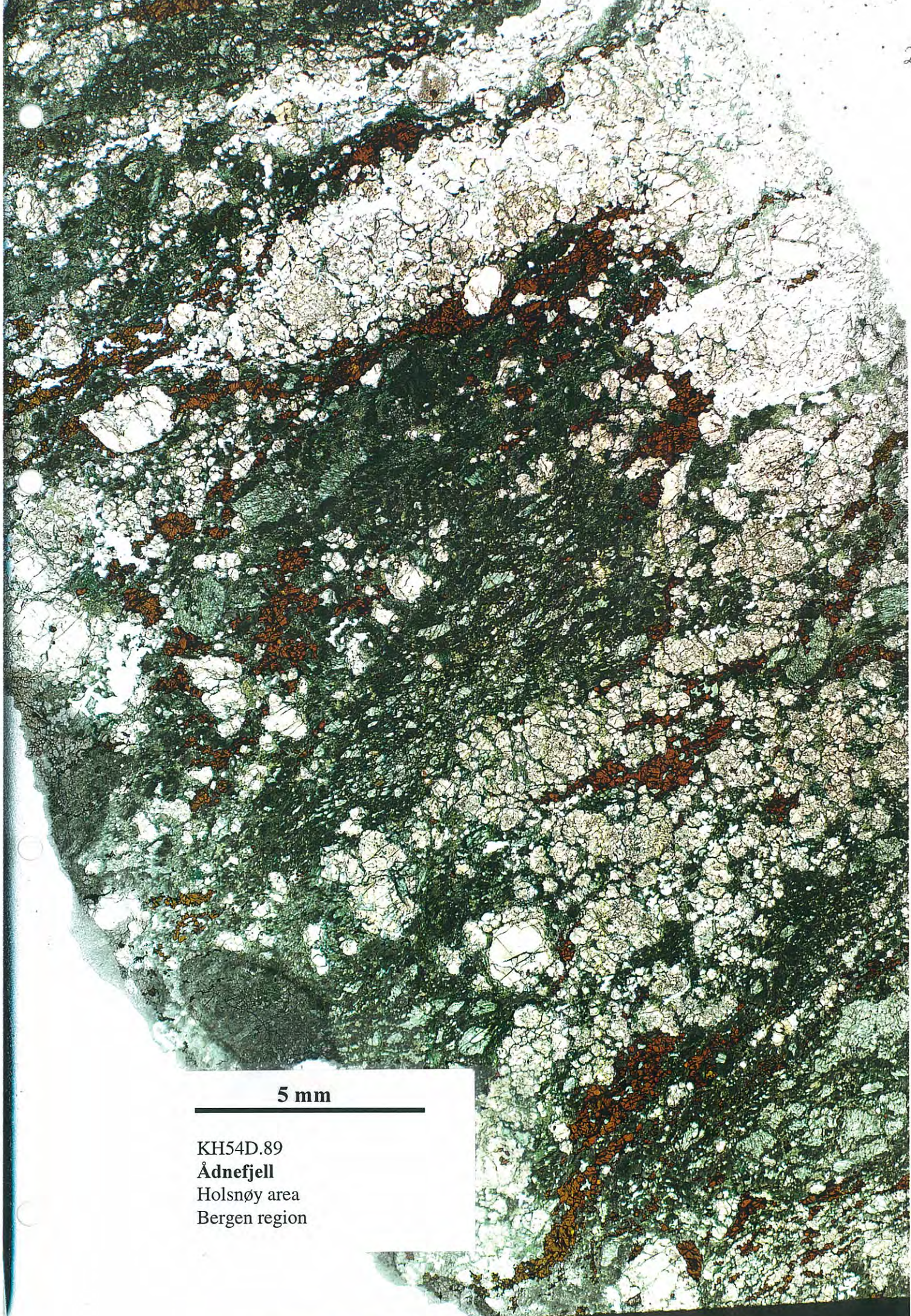
KH56C.89
Ådnefjell 4
Holsnøy area
Bergen region

KH 56C



5 mm

KH50A.89
Alverstrømmen
Holsnøy area
Bergen region



5 mm

KH54D.89
Ådnefjell
Holsnøy area
Bergen region

KH 54 D



5 mm

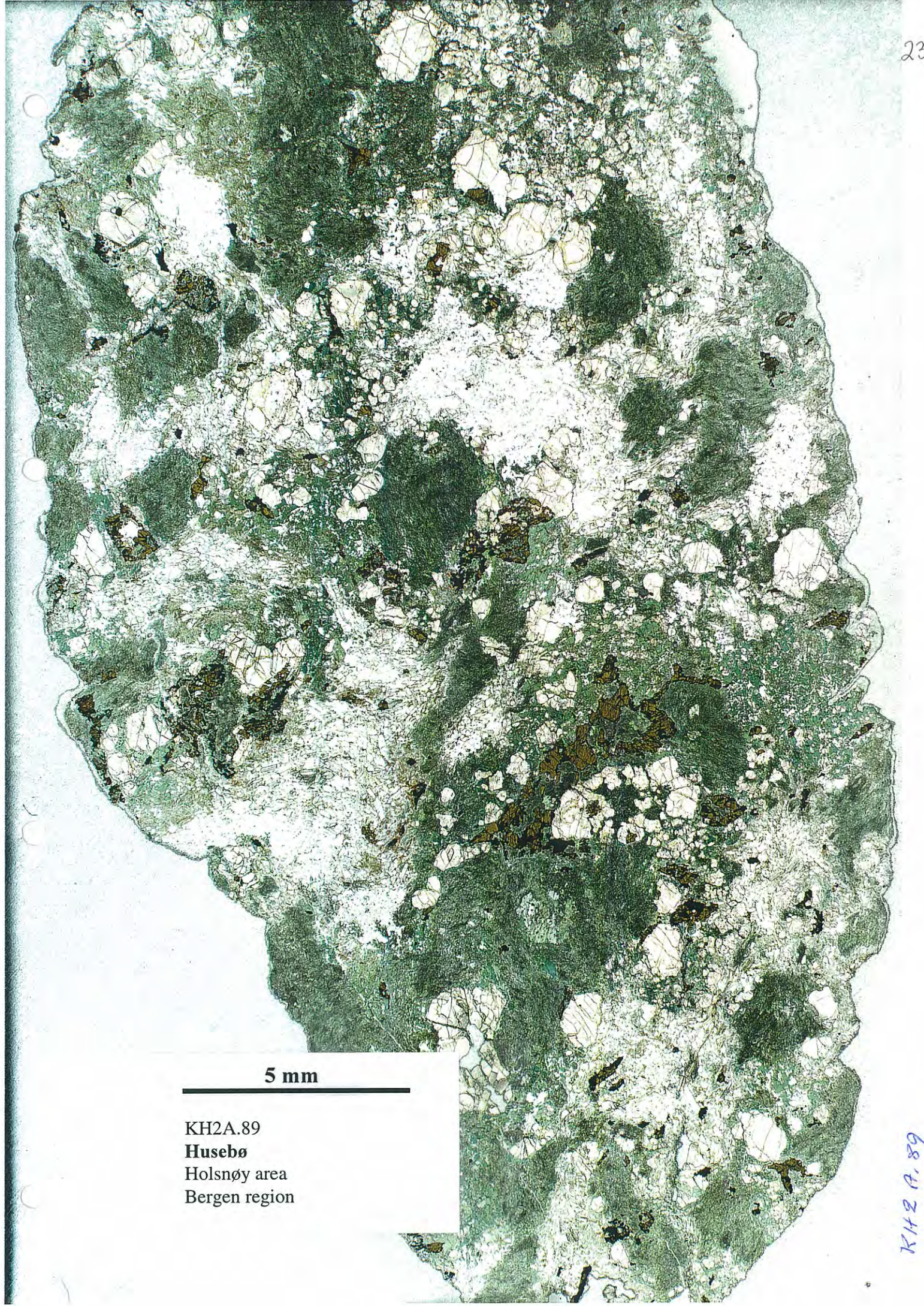
KH55.89
Ådnefjell
Holsnøy area
Bergen region

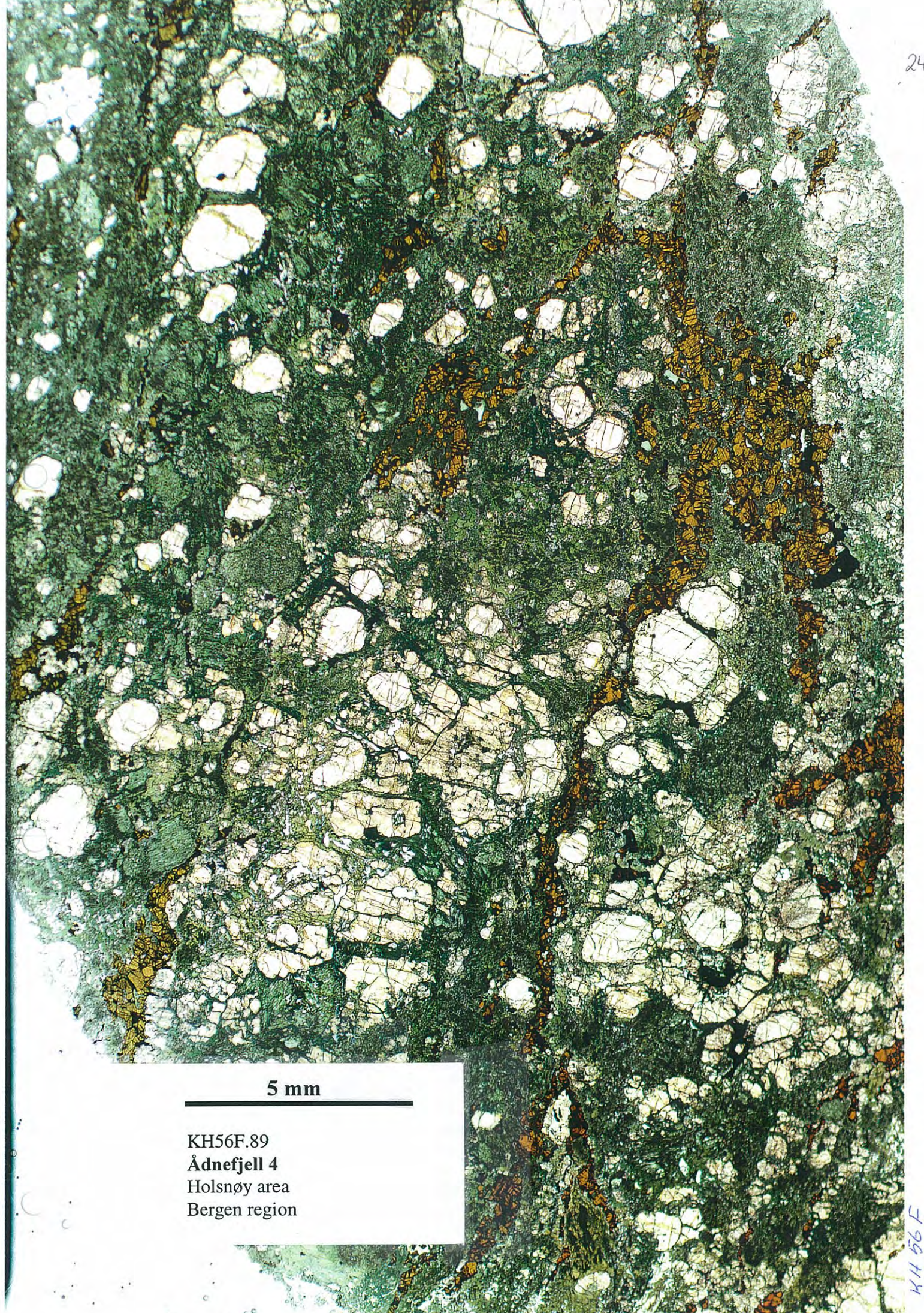
KH 55

5 mm

KH2A.89
Husebø
Holsnøy area
Bergen region

KH2 A. 89

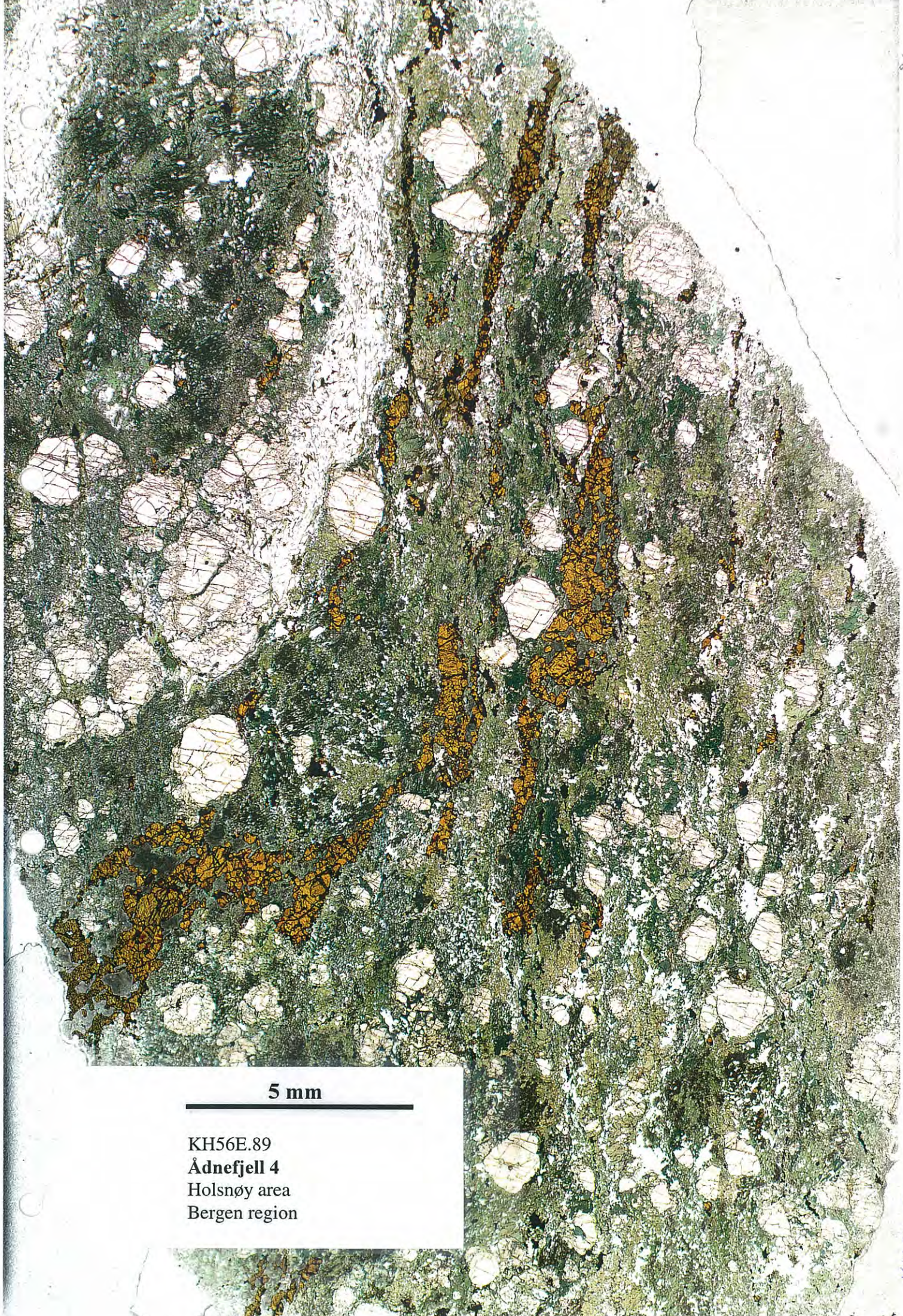




5 mm

KH56F.89
Ådnefjell 4
Holsnøy area
Bergen region

KH 56 F



5 mm

KH56E.89
Ådnefjell 4
Holsnøy area
Bergen region

KH56 E

Dalsfjord region



5 mm

K292.94
Botnatjørna
Flekke area
Dalsfjord region



5 mm

K227F.94
Djupevatnet
Vassdal area
Dalsfjord region



5 mm

K227E.94
Djupevatnet
Vassdal area
Dalsfjord region



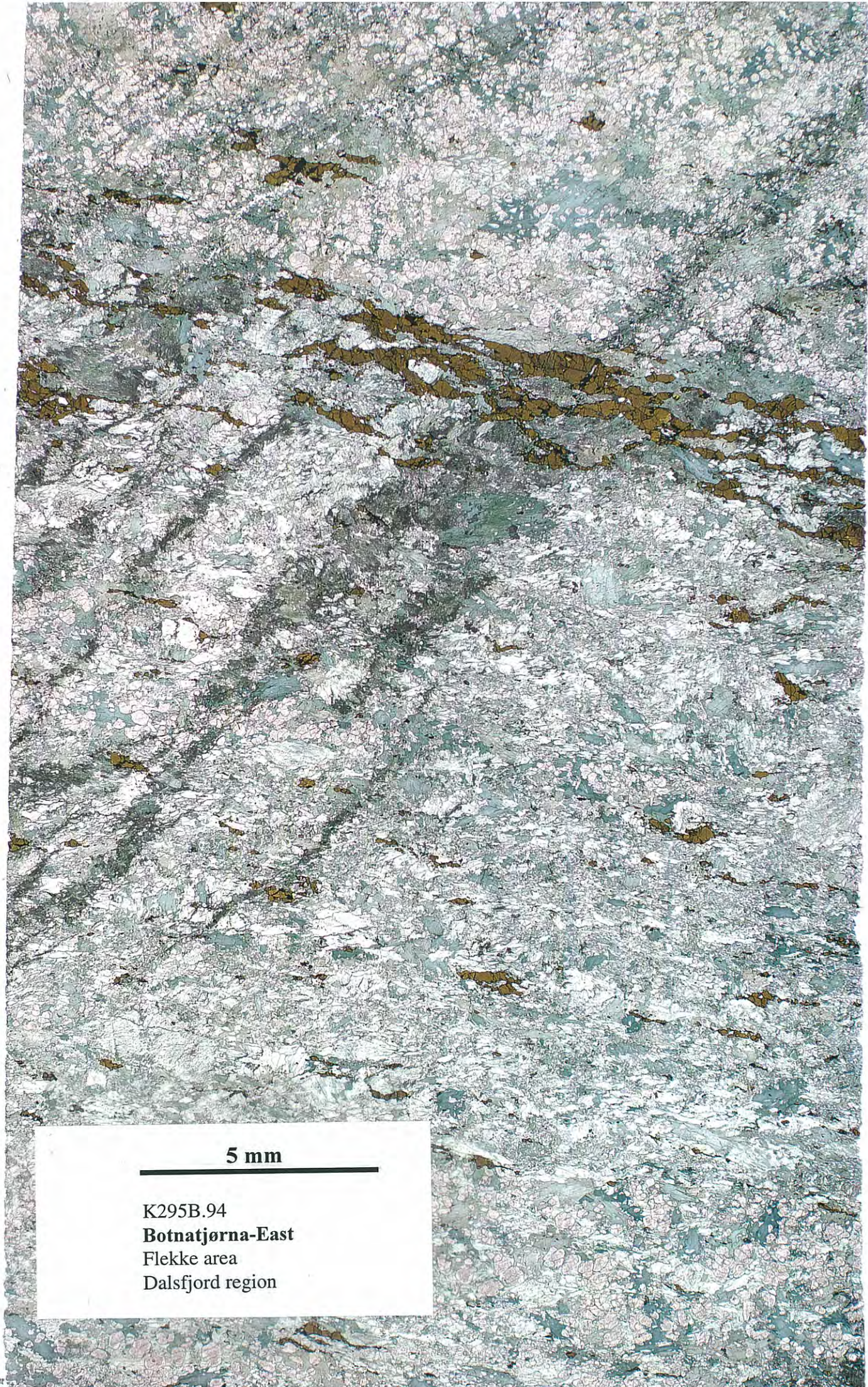
5 mm

K227B1.94
Djupevatnet
Vassdal area
Dalsfjord region



5 mm

K227B.94
Djupevatnet
Vassdal area
Dalsfjord region



5 mm

K295B.94
Botnatjørna-East
Flekke area
Dalsfjord region



5 mm

K117.93
Rakneberg
Vassdal area
Dalsfjord region

K117.93



5 mm

K295C.94
Botnatjørna-East
Flekke area
Dalsfjord region



5 mm

K283.94

Sagevika

Vassdal area

Dalsfjord region



5 mm

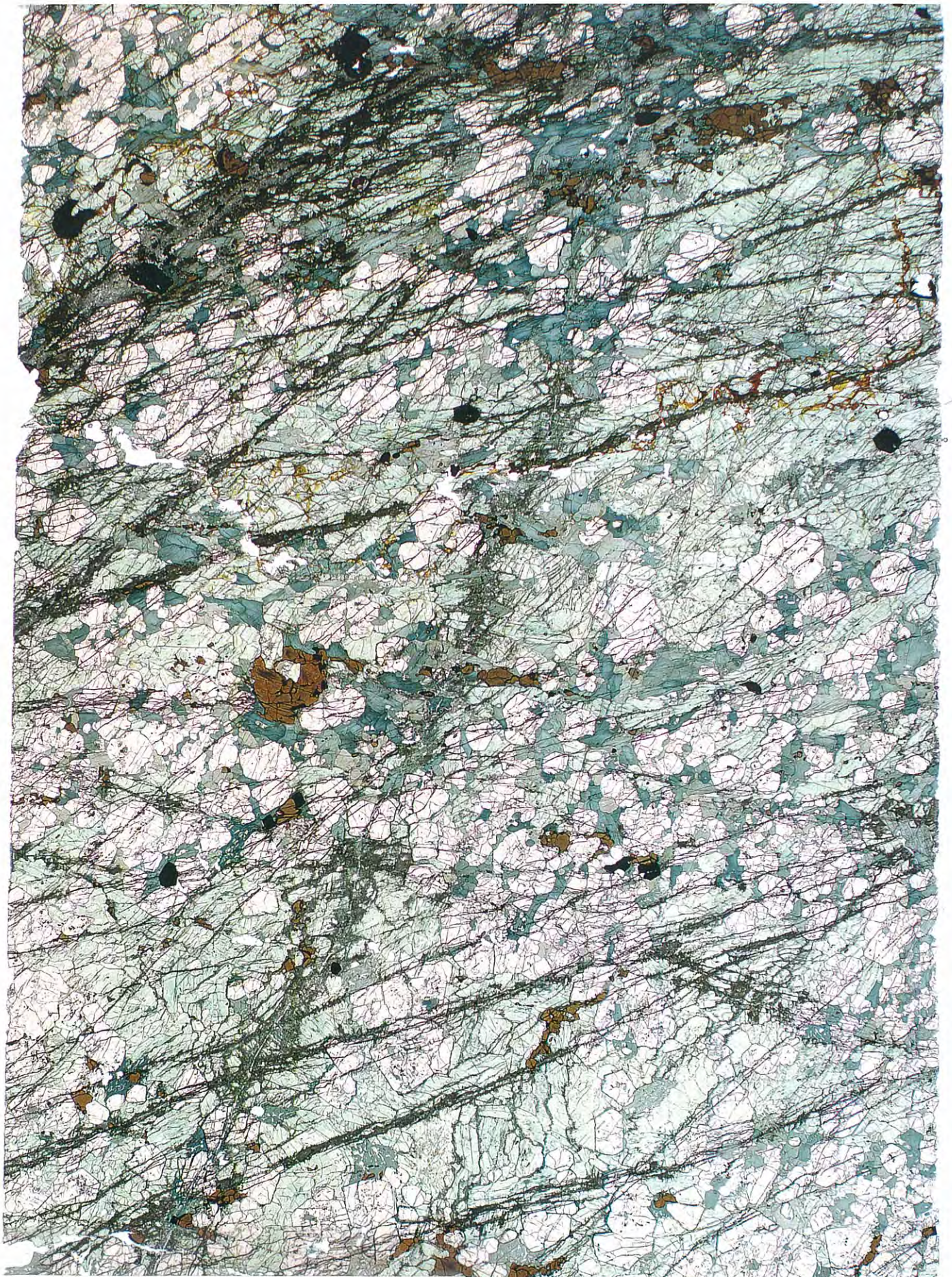
K227A.94
Djupevatnet
Vassdal area
Dalsfjord region



5 mm

K204.94
Håheia 1
Flekke area
Dalsfjord region





5 mm

K222A.94
Ramsgrønova
Langsjøen area
Dalsfjord region

An aerial photograph showing a dense forest with a complex, irregular pattern of green and brown patches, likely representing different tree species or forest types. A scale bar is located in the bottom left corner, and a white box contains text identifying the location and sample ID. The number '3' is visible in the top right corner.

5 mm

K222D1.94
Ramsgrønova
Langsjøen area
Dalsfjord region



5 mm

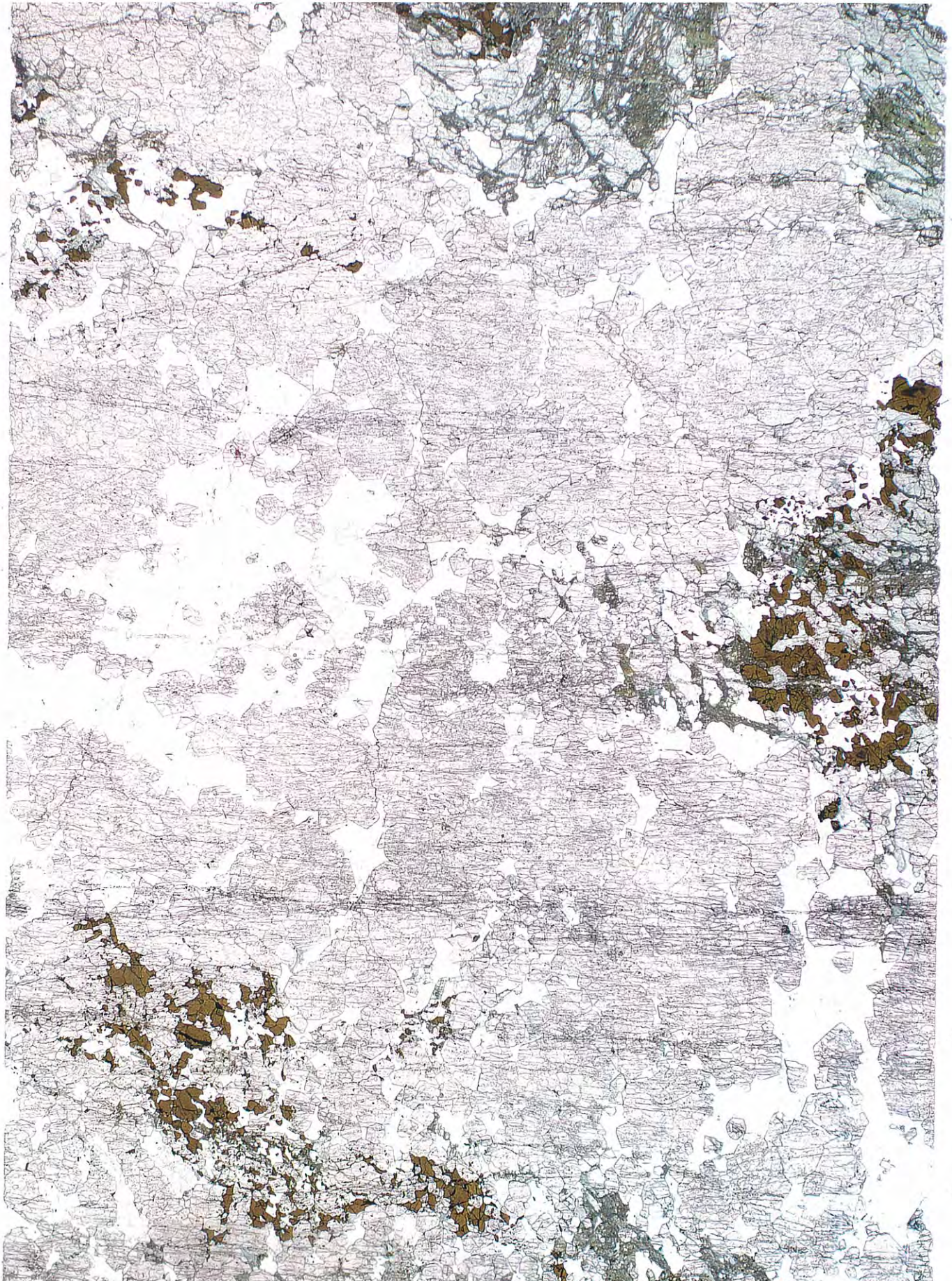
KD77.92
Gyttavatnet 1a
Langsjøen area
Dalsfjord region

KD77.92



5 mm

K291.94
Hestegardsnova
Gjørlanger area
Dalsfjord region



5 mm

K222D.94
Ramsgrønova
Langsjøen area
Dalsfjord region





5 mm

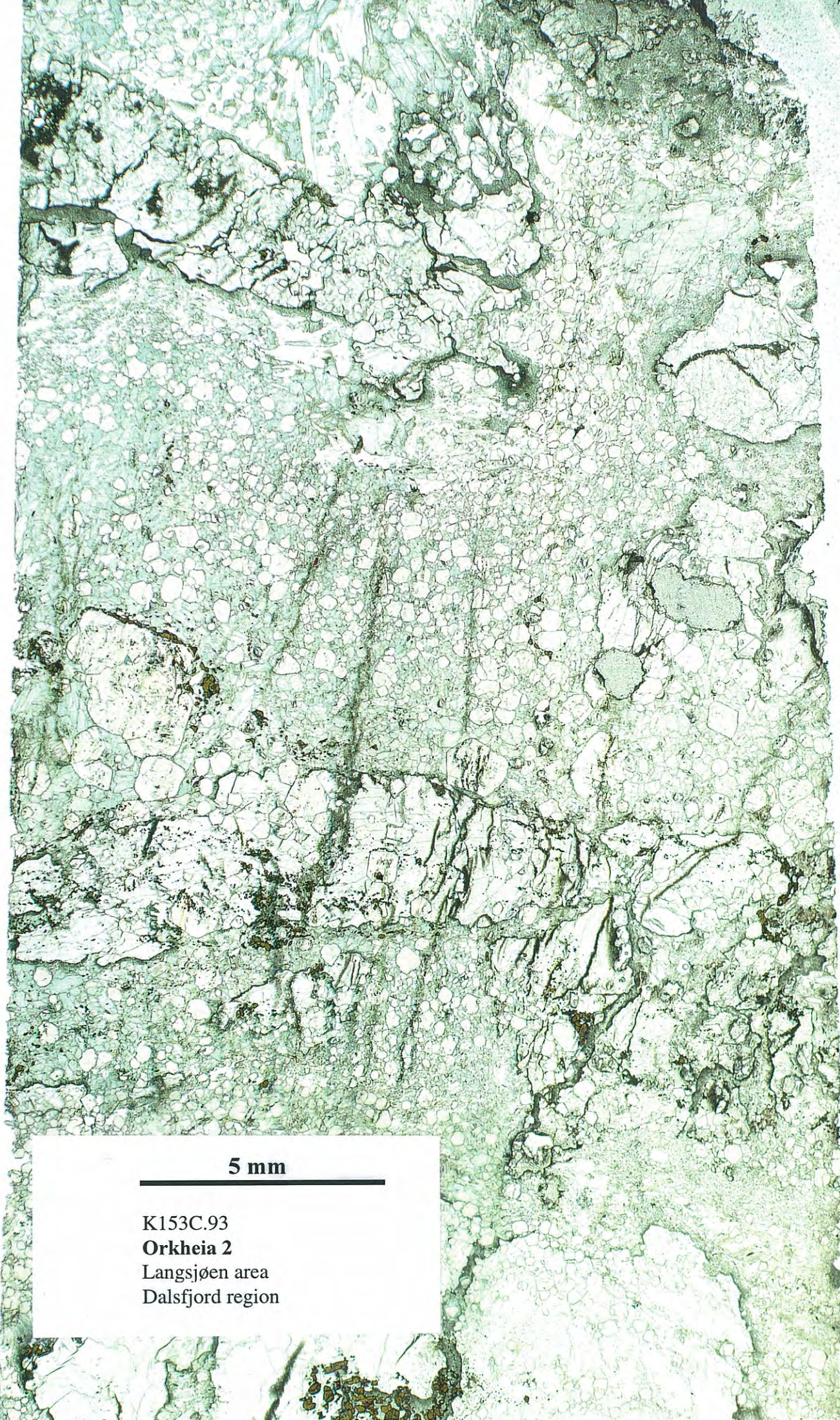
KD88.92
Botnatjønn 4
Langsjøen area
Dalsfjord region

11D 88, 92



5 mm

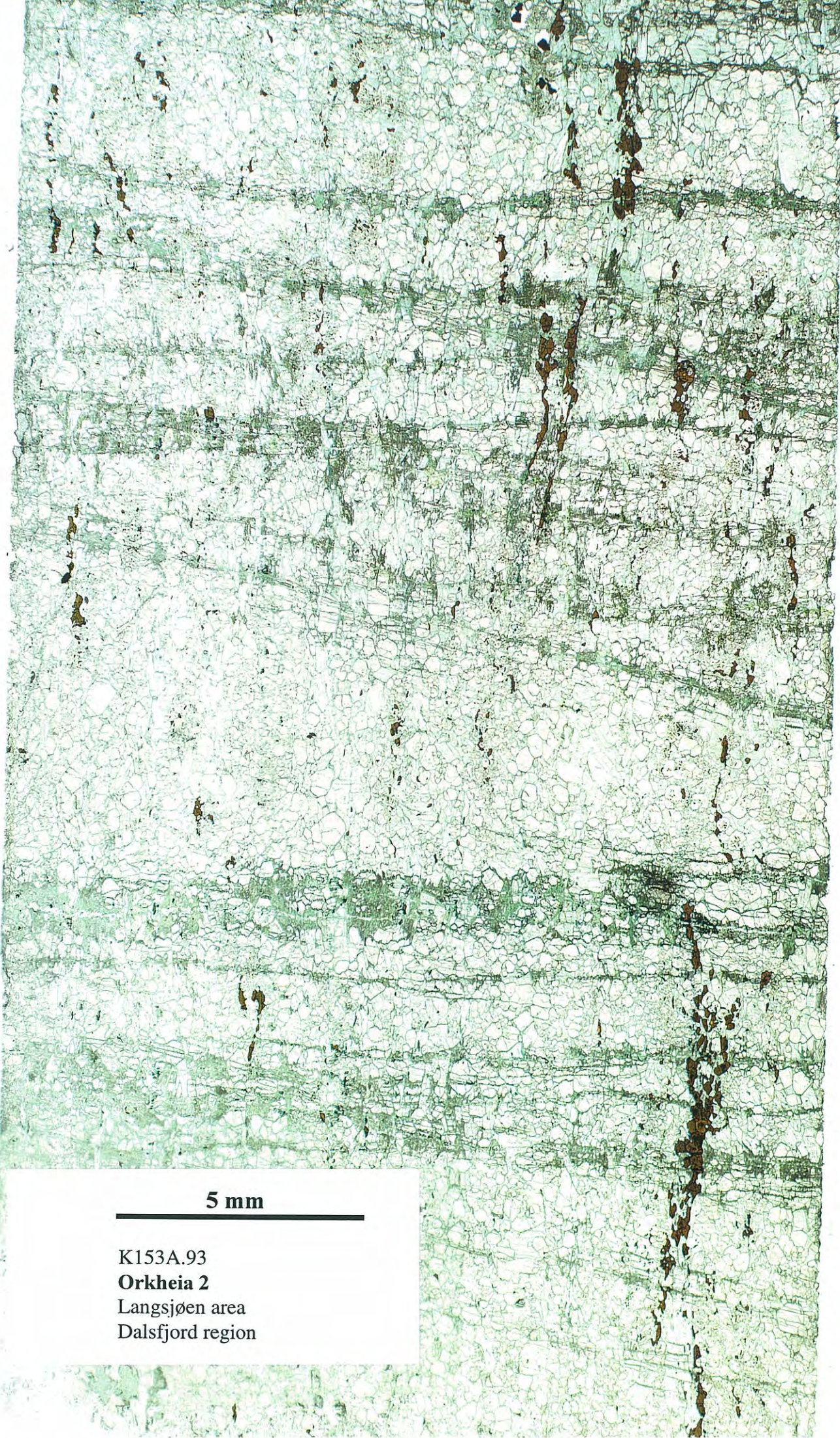
K301.94
Hovlandsvatnet
Langsjøen area
Dalsfjord region



5 mm

K153C.93
Orkheia 2
Langsjøen area
Dalsfjord region

K153C.93



5 mm

K153A.93
Orkheia 2
Langsjøen area
Dalsfjord region

K153A,93

5 mm

K153H.93
Orkheia 2
Langsjøen area
Dalsfjord region

K 153 H, 93

5 mm

K1531.93
Orkheia 2
Langsjøen area
Dalsfjord region

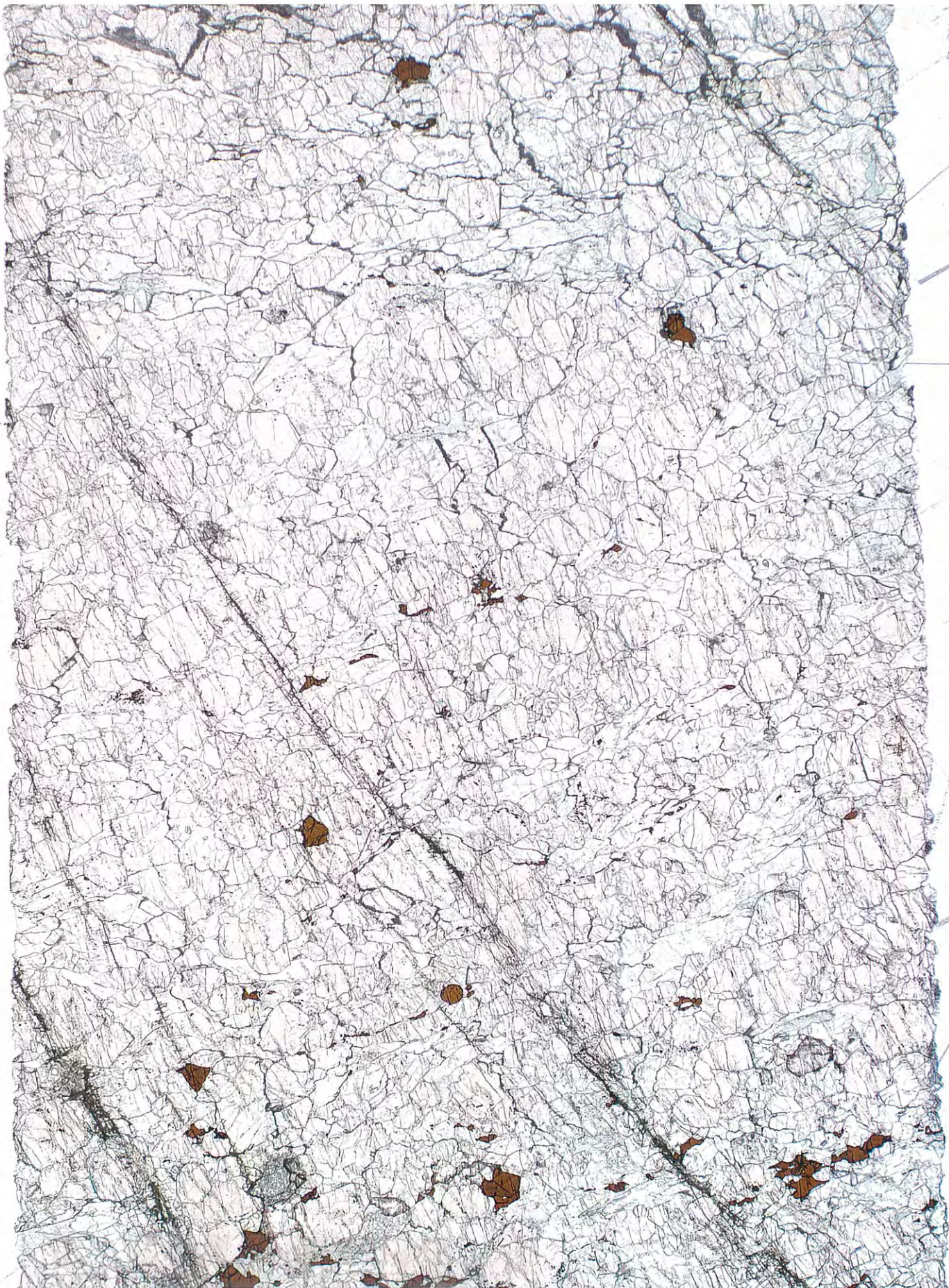
K1531.93



5 mm

K153G.93
Orkheia 2
Langsjøen area
Dalsfjord region

X 153G.93



5 mm

K222C.94
Ramsgrønova
Langsjøen area
Dalsfjord region

Førdefjord region



5 mm

K246.94

Klepestølen

Naustdal area

Førdefjord region



5 mm

K308.94
Furefjellet
Vevring area
Førdefjord region



5 mm

K252.94
Kleppestølen
Naustdal area
Førdefjord region



5 mm

K303.94
Botnarusta
Vevring area
Førdefjord region



5 mm

K304.94
Botnarusta
Vevring area
Førdefjord region

KF1B,92

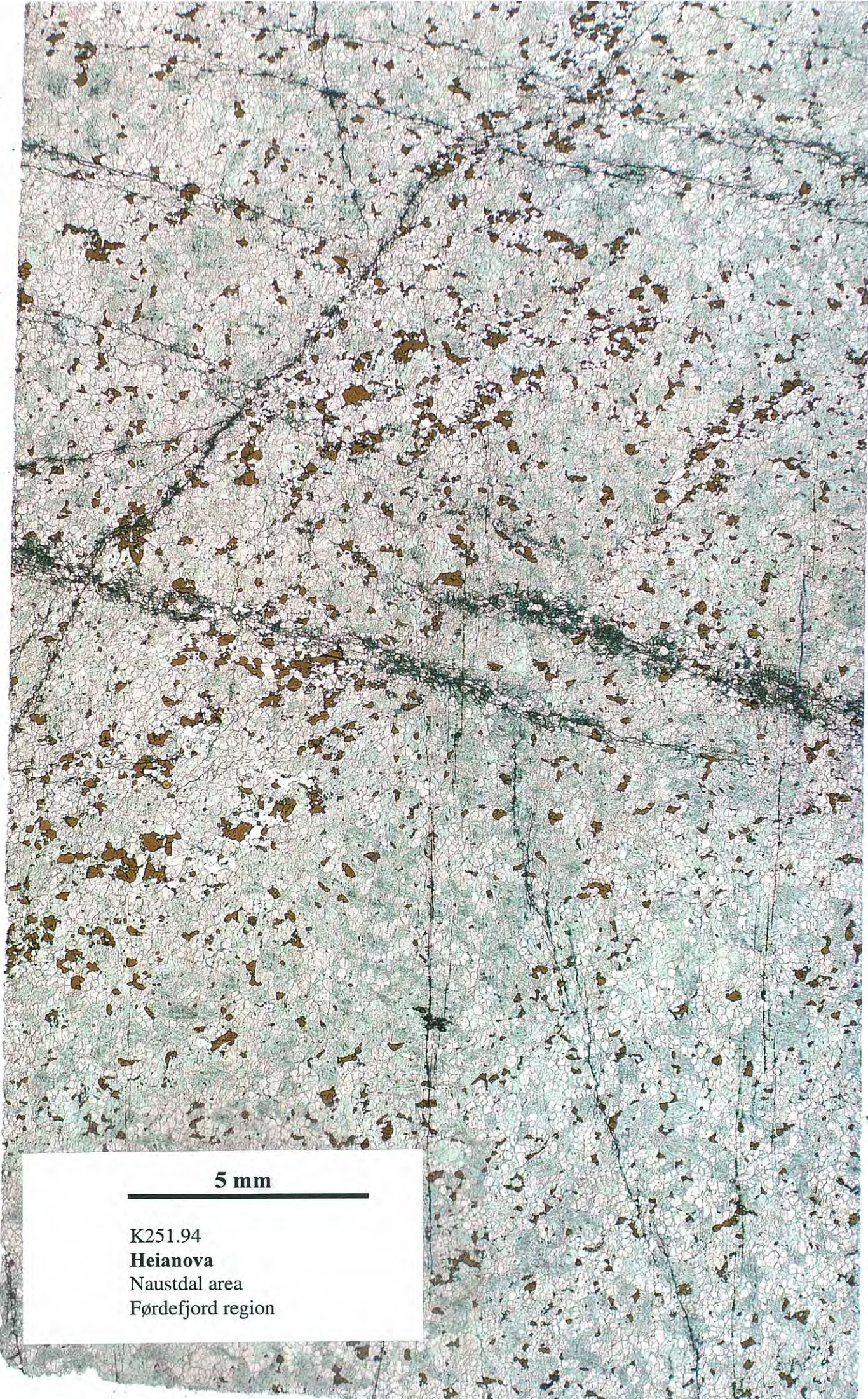
5 mm

KF1B.92
Russenes
Vevring area
Førdefjord region

5 mm

KF1A.92
Russenes
Vevring area
Førdefjord region

KF 1 A, 92



5 mm

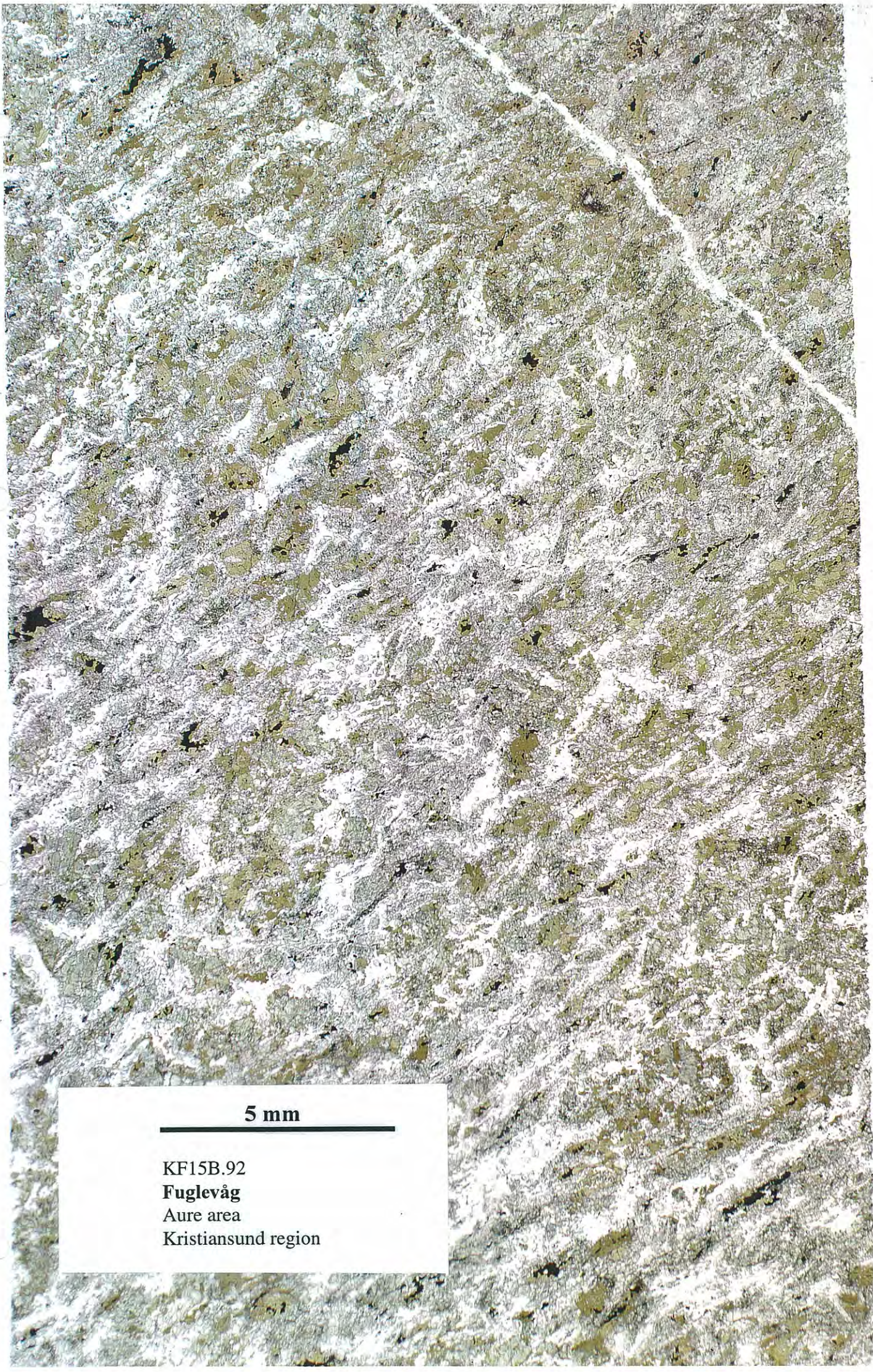
K251.94
Heianova
Naustdal area
Førdefjord region



5 mm

K255.94
Naustdal eclogite
Naustdal area
Førdefjord region

Kristiansund region



5 mm

KF15B.92
Fuglevåg
Aure area
Kristiansund region

KF15B,92



5 mm

KM14.92
Mjosund
Aure area
Kristiansund region

KM14.92



5 mm

KF15A.92
Fuglevåg
Aure area
Kristiansund region

KF15A.92

5 mm

KE30G.92
KE30.92-locality
Averøy area
Kristiansund region

KE 30 G. 92

5 mm

KE30A.92
KE30.92-locality
Averøy area
Kristiansund region

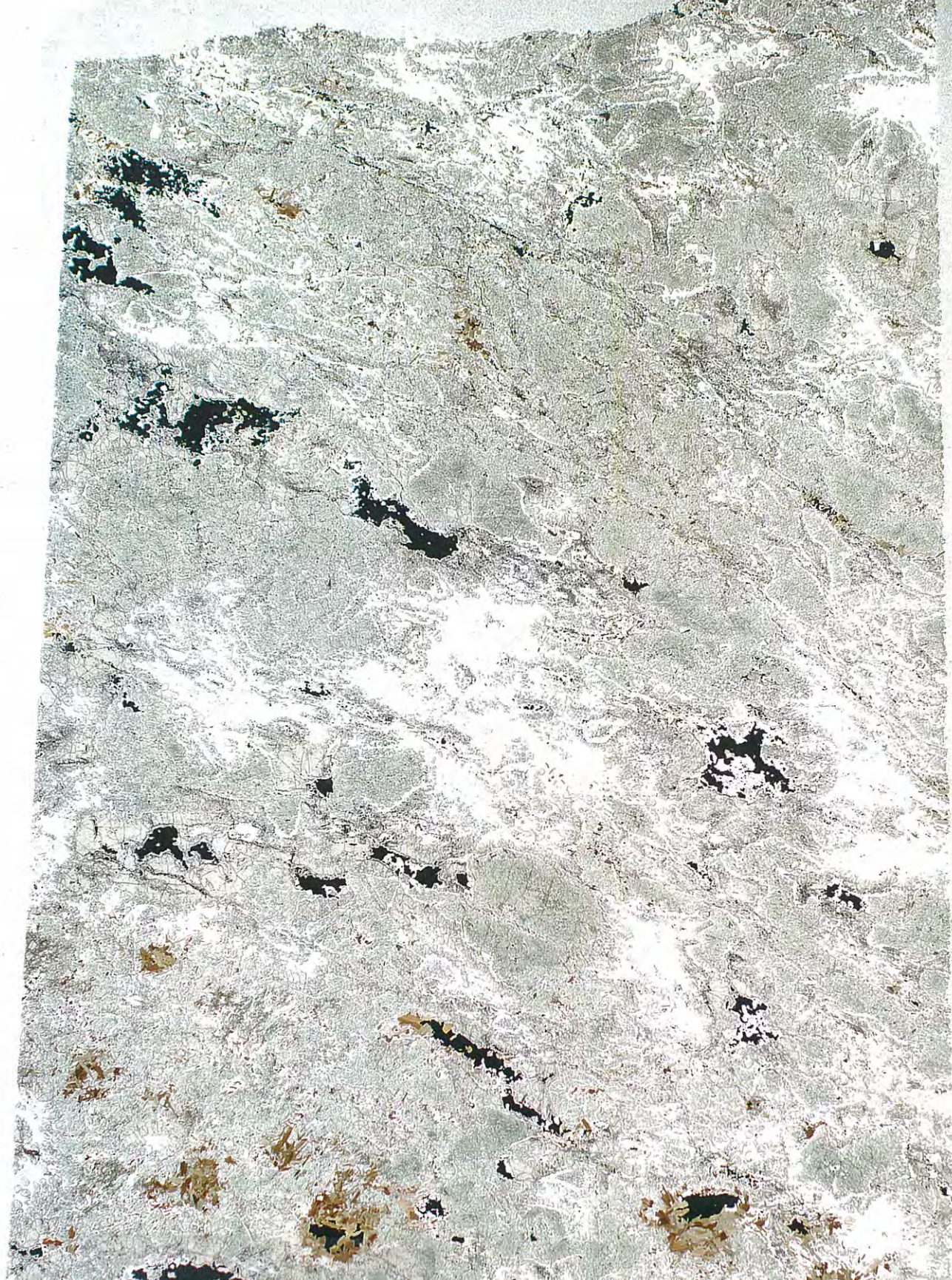
KE 30 A. 92



5 mm

KE30F.92
KE30.92-locality
Averøy area
Kristiansund region

KE30F,92



5 mm

KE42A.92
Hoem
Gjemnes area
Kristiansund region

KE42 A.92



5 mm

KE43B.92
Flemma
Gjemnes area
Kristiansund region

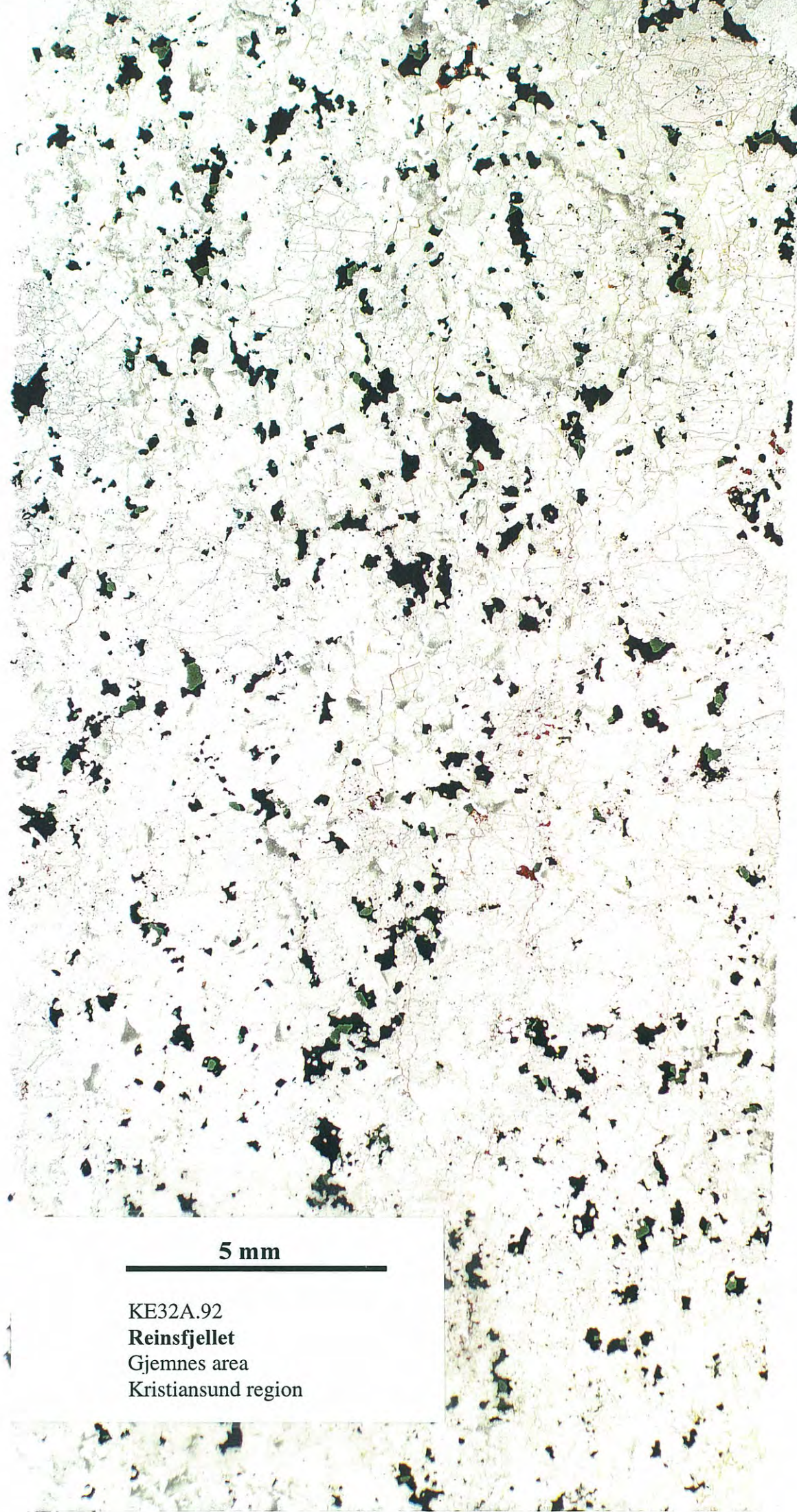
KE 43 B.92



5 mm

KE38A.92
Torvik 2
Gjemnes area
Kristiansund region

KE 38 A.92



5 mm

KE32A.92
Reinsfjellet
Gjemnes area
Kristiansund region

KE 32 A. 92

5 mm

KE40A.92
Skardet
Gjemnes area
Kristiansund region

KE40A.92



5 mm

KH50A.92
Solli 1
Halsa area
Kristiansund region

KH 50 A.92

5 mm

KV13B.92
Hesjingfjellet
Halsa area
Kristiansund region

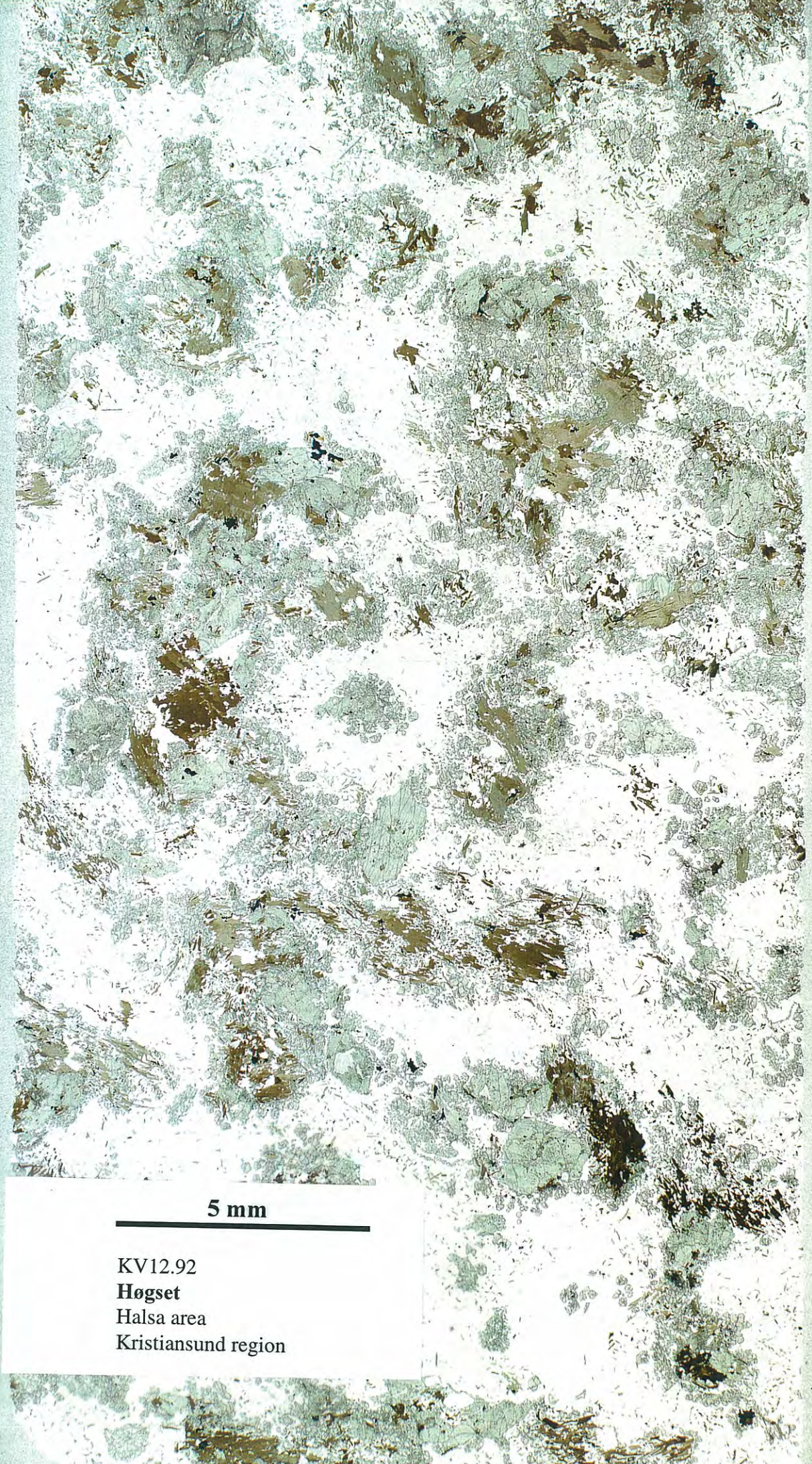
KV 13B, 92

5 mm

KV13A.92
Hesjingfjellet
Halsa area
Kristiansund region

KV13A.92





5 mm

KV12.92
Høgset
Halsa area
Kristiansund region

KV12.92

7

5 mm

KK11.92
Flatset
Kristiansund area
Kristiansund region

KK11.92

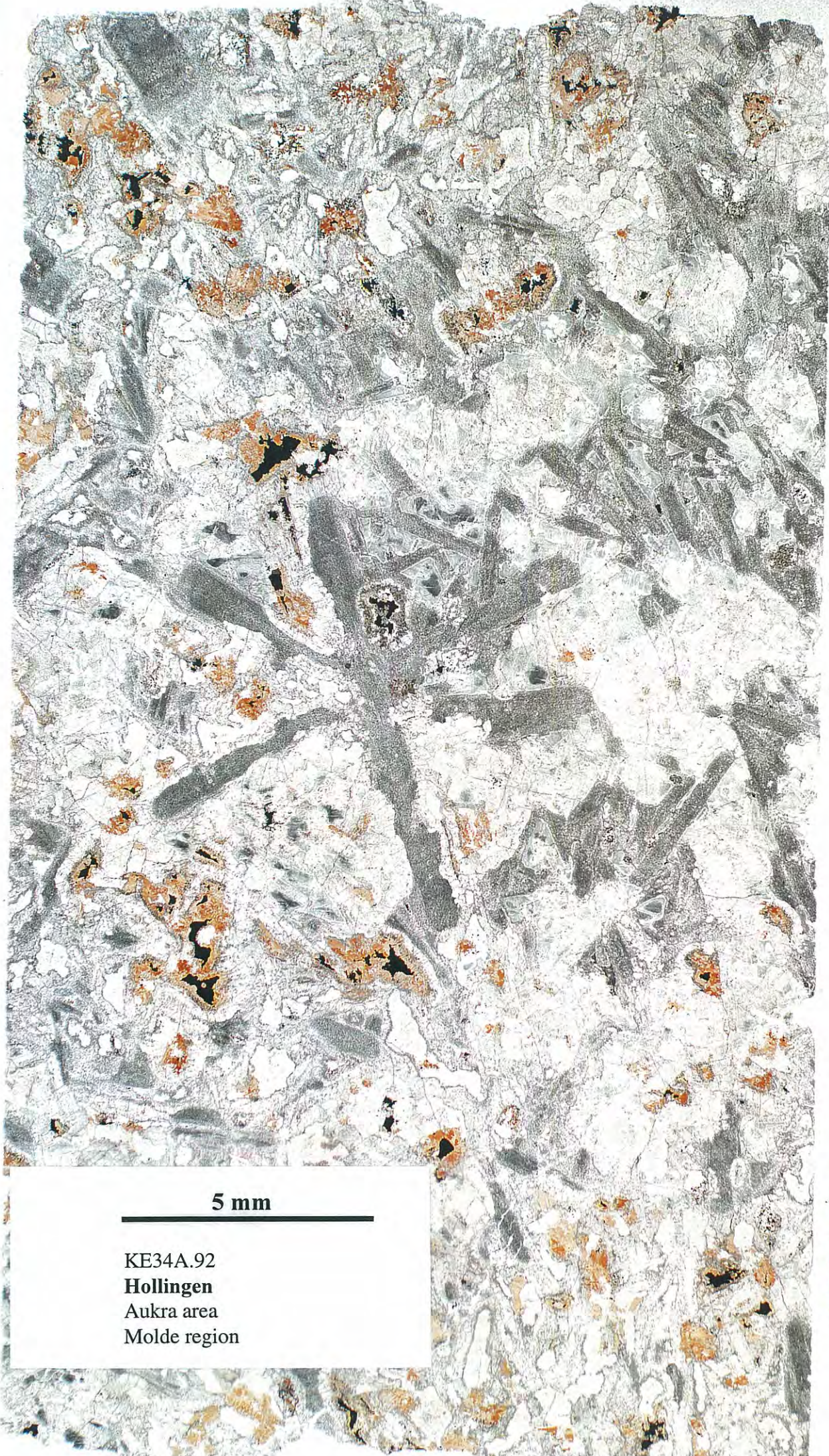


5 mm

KF16.92
Ramsvikbukta
Tustna area
Kristiansund region

KF16.92

Molde region



5 mm

KE34A.92
Hollingen
Aukra area
Molde region

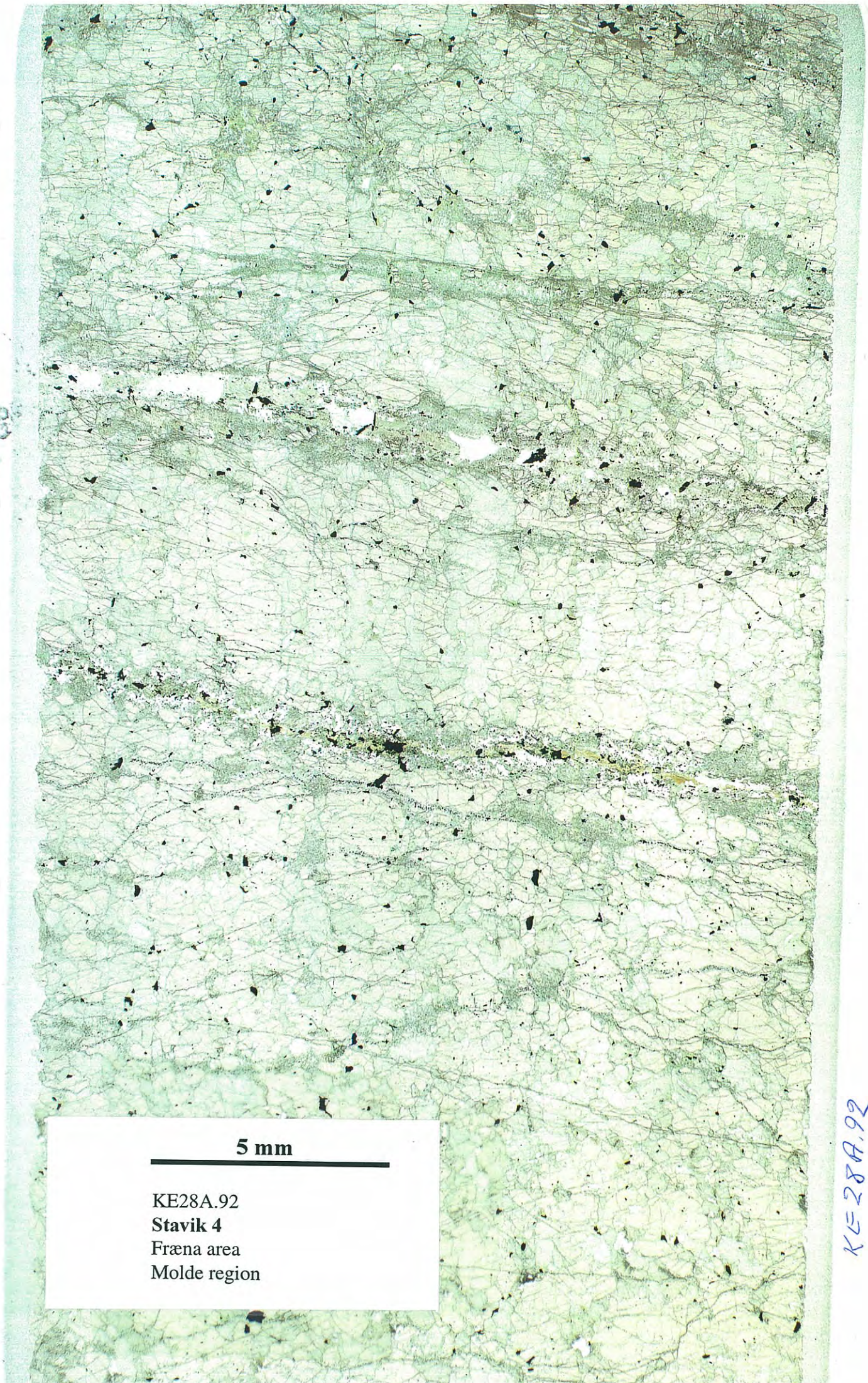
KE34A.92



5 mm

KE36A.92
Storvasshaugen
Eide area
Molde region

KE 36 A. 92



5 mm

KE28A.92
Stavik 4
Fræna area
Molde region

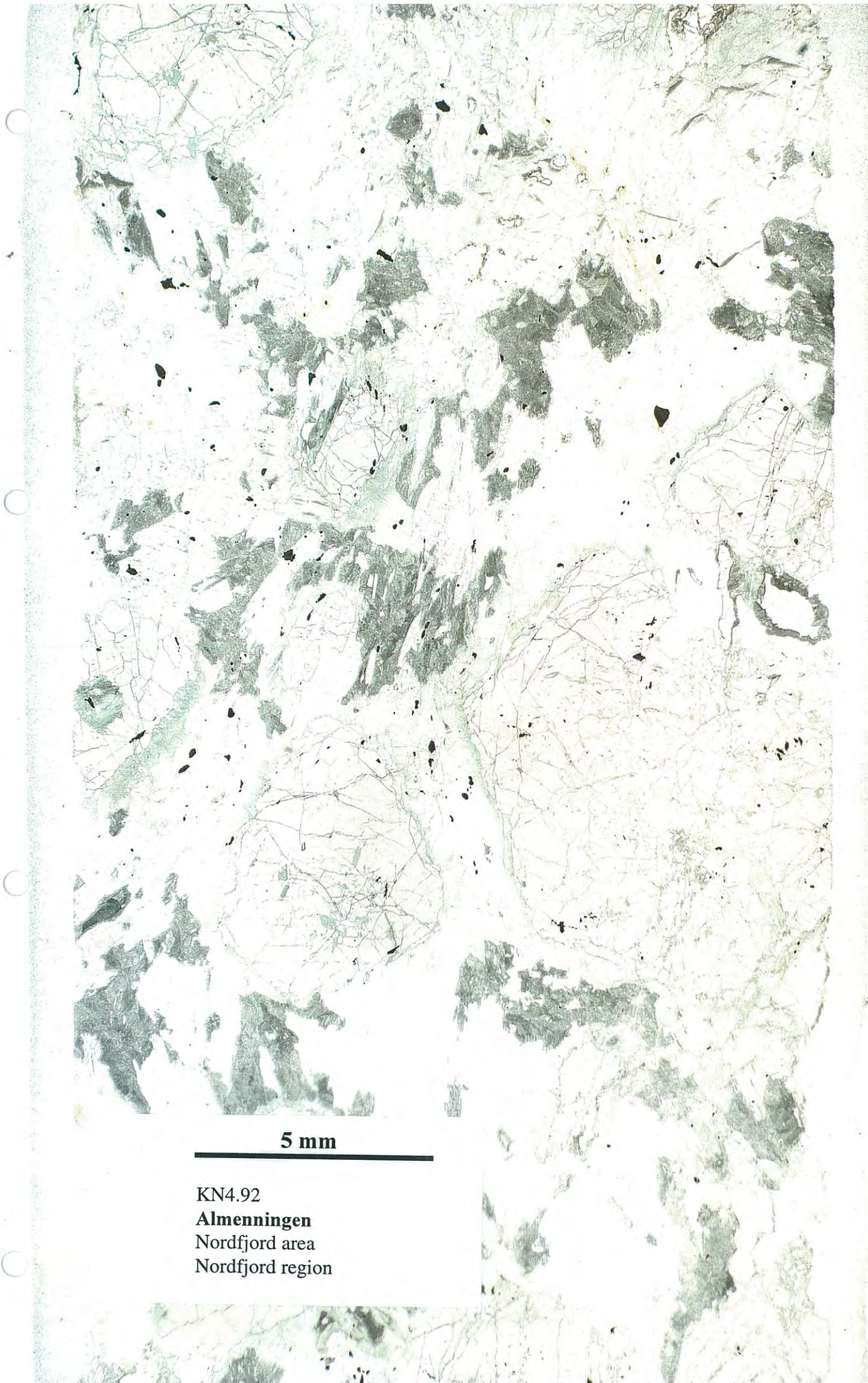
KE28A.92

5 mm

KE26A.92
Stavik 2
Fræna area
Molde region

KE26A.92

Nordfjord region



5 mm

KN4.92
Almenningen
Nordfjord area
Nordfjord region

KN4.92



5 mm

KN3B.92
Kroken
Måløy area
Nordfjord region

KN3B.92



5 mm

KN3A.92
Kroken
Måløy area
Nordfjord region

KN3A, 92

Romsdal region



5 mm

KL21A.92
Kleiva
Lesja area
Romsdal region

KL21A.92



5 mm

KL22A.92
Brue
Lesja area
Romsdal region

KL 22A.92

5 mm

KS49A.92
Ålvund
Sunnalsfjord
Romsdal region

KS 49A.92

Sognefjord region



5 mm

394.02

Veten (Lavik)

NW Sognefjord region

394.02



5 mm

394.03

Veten (Lavik)

NW Sognefjord region

394.03



5 mm

394.01
Veten (Lavik)
NW Sognefjord region

394.01



5 mm

395.09
Byrknesøy (Veten)
SW Sognefjord region

395.09





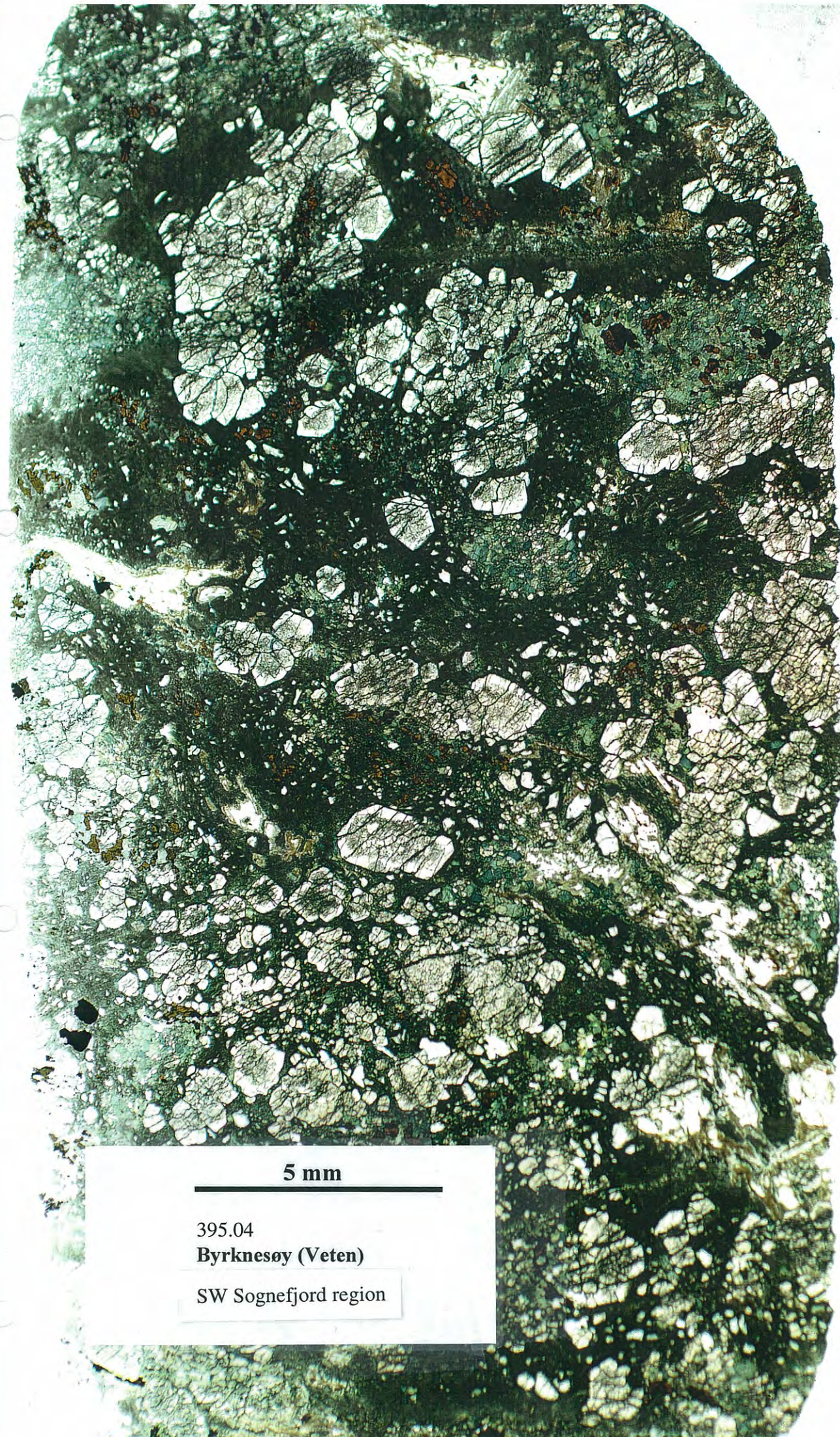
5 mm

395.06

Byrknesøy (Veten)

SW Sognefjord region

395.06



5 mm

395.04
Byrknesøy (Veten)
SW Sognefjord region

395.04



5 mm

395.05

Byrknesøy (Veten)

SW Sognefjord region

395,05

5 mm

395.11
Byrknesøy (Veten)
SW Sognefjord region

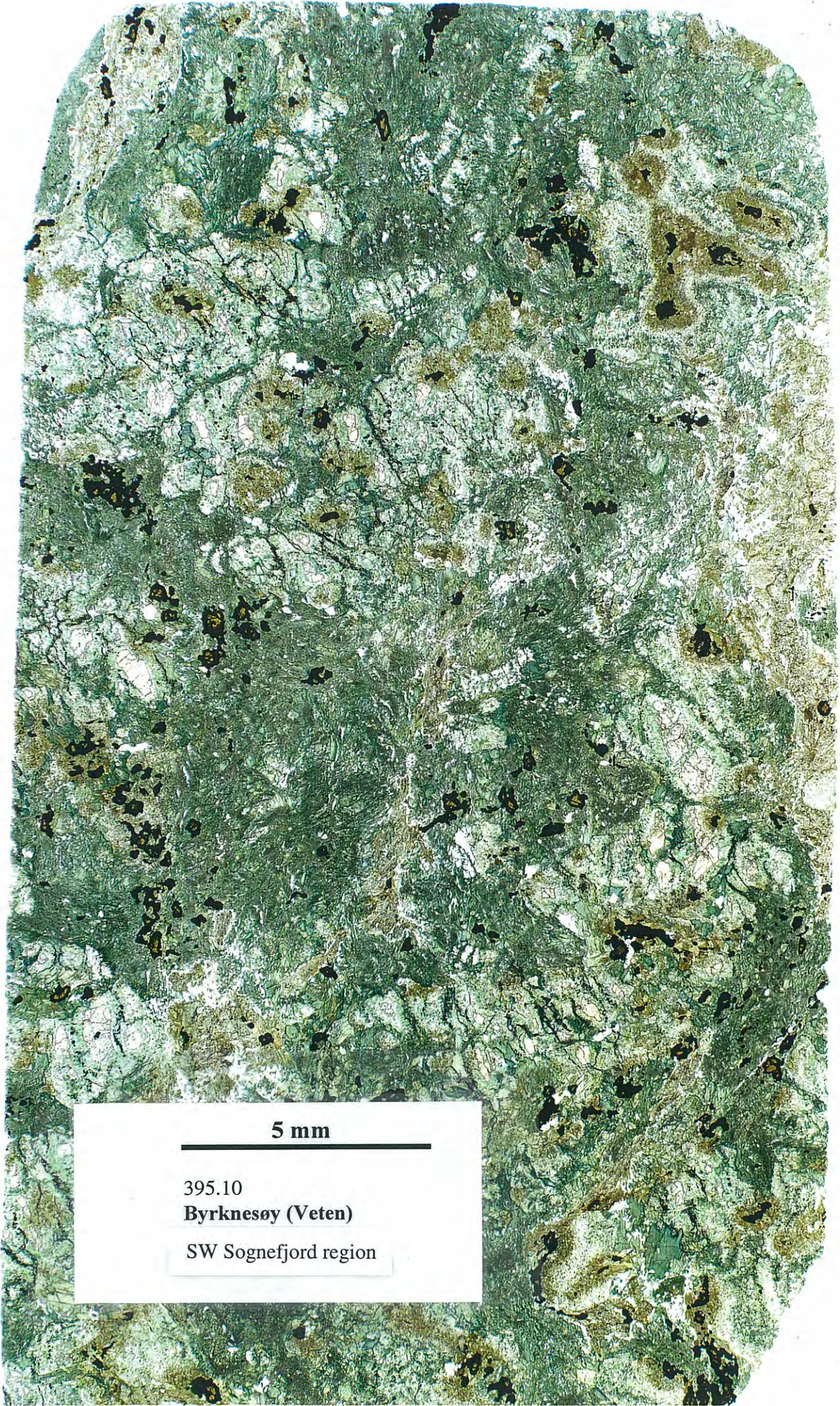
395.11



5 mm

395.03
Byrknesøy (Veten)
SW Sognefjord region

395,03



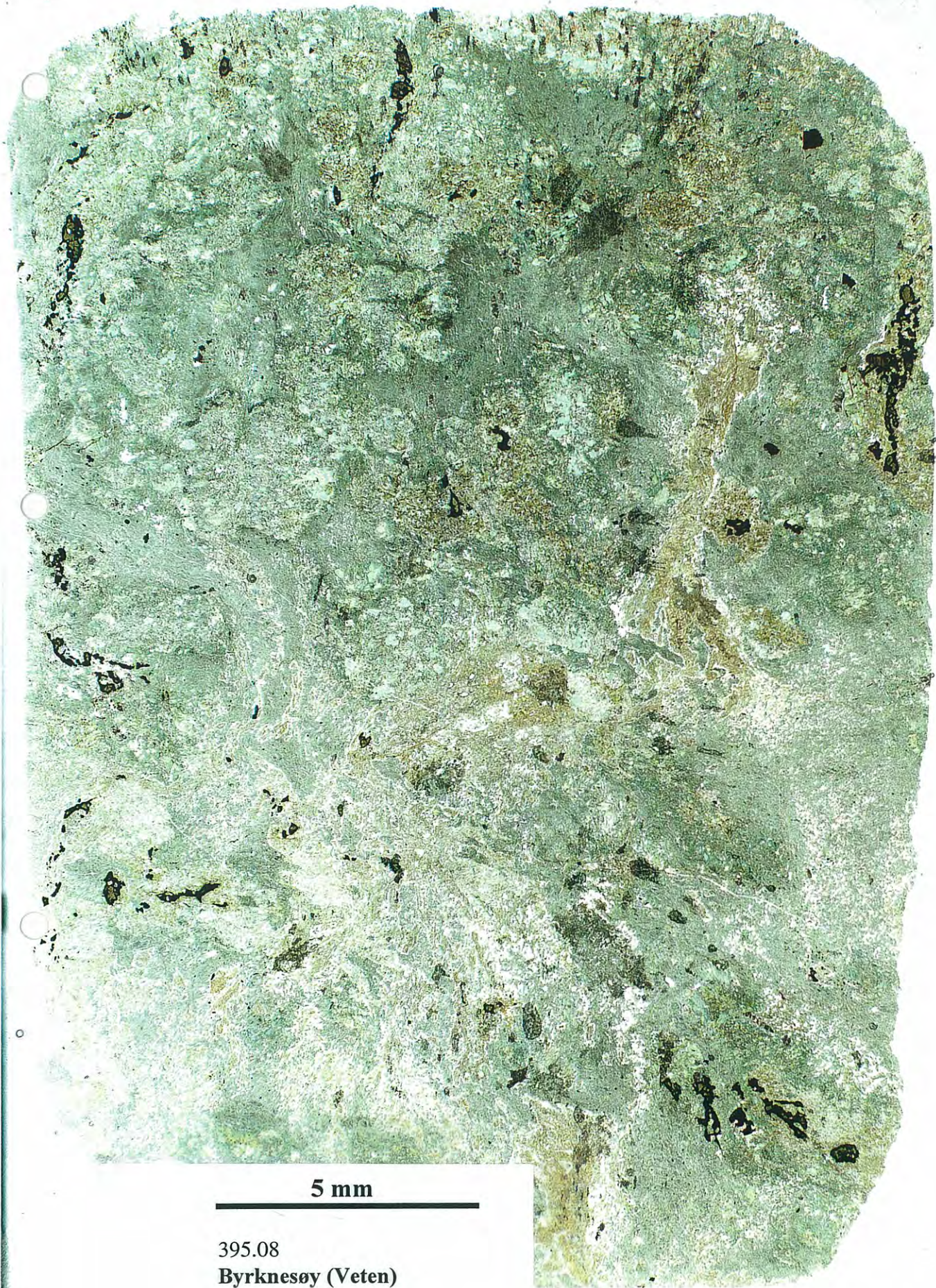
5 mm

395.10

Byrknesøy (Veten)

SW Sognefjord region

395.10



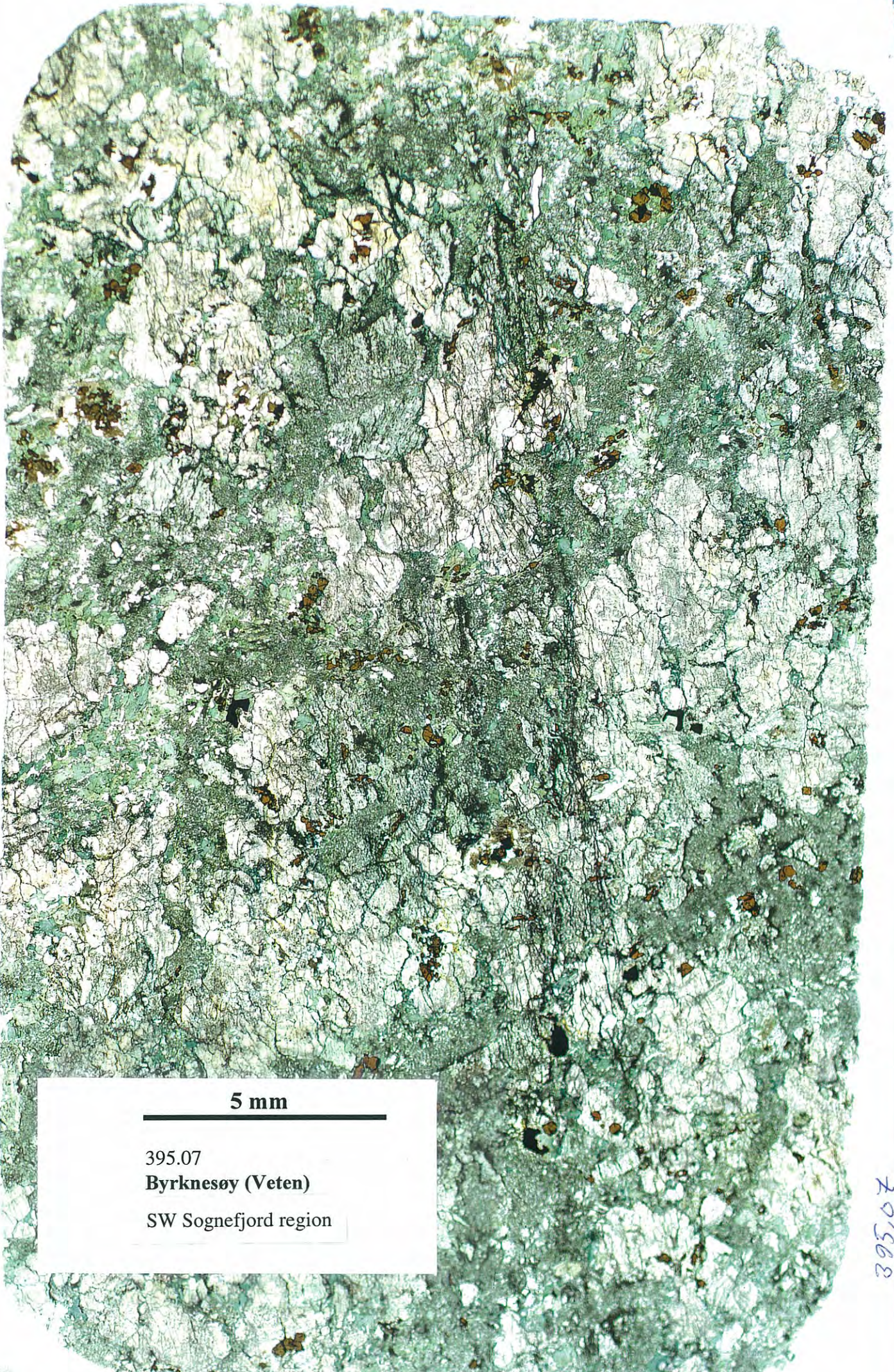
5 mm

395.08

Byrknesøy (Veten)

SW Sognefjord region

395.08



5 mm

395.07

Byrknesøy (Veten)

SW Sognefjord region

395,07

Appendix 7:

MICROPHOTOGRAPH OVERVIEW

The microphotographs are stored in the enclosed CD

Page 1 of 7

Label Microphoto-1

Label Microphoto-2

Label Microphoto-3

Label Microphoto-4

Bamble region

Kragerø area (E Bamble region)

"name xxx"

MF K116.99 10x R (2).jpg MF K116.99 2.5x R (2).jpg MF K116.99 50x R (2).jpg MF K116.99 2.5x T.jpg

Masterød

MF K238.94 10x T (2).jpg MF K238.94 10x T.jpg

Ødegård area (E. Bamble region)

Ødegården 1b

MF KB12H.91 2.5x T.jpg

Ødegården 3

MF KB37A.89 10x R.jpg MF KB37A.91 2.5x R.jpg MF KB37A.91 2.5x T.jpg

Bergen region

Holsnøy area (N Bergen region)

Havrevåg 2

MF KH17.89 2.5x T.jpg

Husebø

MF KH2A.89 2.5x T.jpg

Odland 2

MF KH62C.89 2.5x R.jpg MF KH62C.89 2.5x T.jpg

Ådnefjell

MF KH54D.89 10x R.jpg MF KH54D.89 2.5x R.jpg MF KH54D.89 2.5x T.jpg
MF KH54C.89 2.5x T.jpg

Label Microphoto-1	Label Microphoto-2	Label Microphoto-3	Label Microphoto-4
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Ådnefjell 4

MF KH56E.89 2.5x R.jpg	MF KH56E.89 2.5x T.jpg	MF KH56E.89 50x R.jpg	
MF KH56B.89 10x R.jpg	MF KH56B.89 2.5x R.jpg	MF KH56B.89 2.5x T.jpg	

Dalsfjord region**Eastern Dalsfjord region*****Botnatjørna***

MF K292.94 10x R.jpg	MF K292.94 2.5x R.jpg		
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Botnatjørna-East

MF K295C.94 10x R (2).jpg	MF K295C.94 2.5x R.jpg	MF K295C.94 2.5x T.jpg	MF K295C.94 50x R.jpg
MF K295B.94 10x R.jpg	MF K295B.94 2.5x R.jpg	MF K295B.94 2.5x T.jpg	MF K295B.94 50x R.jpg
MF K169.93 2.5x T.jpg	MF K169.93 2.5x R.jpg	MF K169.93 10x R.jpg	

Djupevatnet

MF K227F.94 10x R.jpg	MF K227F.94 2.5x R.jpg	MF K227F.94 2.5x T.jpg	
MF K227E.94 10x R.jpg	MF K227E.94 2.5 R(2).jpg	MF K227E.94 2.5 T (2).jpg	MF K227E.94 2.5 T.jpg
MF K227B.94 10 R.jpg	MF K227B.94 2.5 R.jpg	MF K227B.94 2.5 T.jpg	
MF K227A.94 2.5 T (2).jpg	MF K227A.94 2.5 T.jpg		

Håheia 1

MF K204.94 10x R.jpg	MF K204.94 2.5x R.jpg	MF K204.94 2.5x T.jpg	MF K204.94 50x R.jpg
MF K170.93 2.5x T.jpg	MF K170.93 2.5x R.jpg	MF K170.93 10x R.jpg	MF K170.93.jpg

Langevt. 3

MF K124.99 10x R.jpg	MF K124.99 2.5x R.jpg	MF K124.99 2.5x T.jpg	MF K124.99 2.5x T.jpg
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Rakneberg

MF K117.93 2.5x T.jpg	MF K117.93 2.5x R.jpg	MF K117.93 10x R.jpg	MF K117.93.jpg
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Rakneberg 2

MF K116.99 10x R (2).jpg	MF K116.99 2.5x R (2).jpg	MF K116.99 2.5x T.jpg	MF K116.99 50x R.jpg
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Sagevika

MF K283.94 10x R.jpg	MF K283.94 2.5x R.jpg	MF K283.94 2.5x T.jpg	MF K283.94 50x R.jpg
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Sagevika 2

MF K284.94 2.5x R.jpg	MF K284.94 2.5x T.jpg		
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Western Dalsfjord region***Gyttavatnet 1b***

MF KD78M.92 10x R.jpg	MF KD78M.92 2.5x R.jpg	MF KD78M.92 2.5x T.jpg	MF KD78M.92 50x R.jpg
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Hestegardsnova

MF K291.94 10x R.jpg	MF K291.94 2.5x R.jpg	MF K291.94 2.5x T.jpg	MF K291.94 50x R.jpg
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Hovlandsvatnet

MF K301.94 10x R.jpg	MF K301.94 2.5x R.jpg	MF K301.94 2.5x T (2).jpg	MF K301.94 2.5x T.jpg
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Orkheia 1

MF K146.99 10x R.jpg	MF K146.99 2.5x R.jpg	MF K146.99 50x R (2).jpg	MF K146.99 50x R.jpg
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Label Microphoto-1	Label Microphoto-2	Label Microphoto-3	Label Microphoto-4
<i>Orkheia 2</i>			
MF K153H.93 2.5x T.jpg	MF K153H.93 2.5x R.jpg	MF K153H.93 10x R.jpg	
MF K153G.93 2.5x T.jpg	MF K153G.93 2.5x R.jpg	MF K153G.93 10x R.jpg	
MF K153F.93 2.5x T.jpg	MF K153F.93 2.5x R.jpg		
MF K153C.93 2.5x T.jpg	MF K153C.93 2.5x R.jpg	MF K153C.93 10x R.jpg	
MF K153A.93 2.5x T.jpg	MF K153A.93 2.5x R.jpg	MF K153A.93 10x R.jpg	MF K153A.93.jpg
<i>Ramsgrønova</i>			
MF K222D1.94 2.5x T.jpg	MF K222D1.94 2.5x R.jpg	MF K222D1.94 2.5x T.jpg	
MF K222D.94 10x R.jpg	MF K222D.94 2.5x T.jpg	MF K222D.94 50x R.jpg	MF K222D.94 2.5x R.jpg
MF K222C.94 10x R.jpg	MF K222C.94 2.5x R.jpg	MF K222C.94 2.5x T.jpg	
MF K222A.94 1.25x R.jpg	MF K222A.94 2.5x T.jpg	MF K222A.94 10x R.jpg	MF K222A.94 50x R.jpg
<i>Saurdal-93a</i>			
MF K147.99 2.5x T.jpg	MF K147.99 2.5x R.jpg	MF K147.99 10x .jpg	
<i>Saurdal-93b</i>			
MF K148.99 10x R.jpg	MF K148.99 2.5x T (2).jpg	MF K148.99 2.5x T.jpg	MF K148.99 50x R.jpg

Førdefjord region

Northern Førdefjord region

Botnarusta

MF K304.94 2.5x R.jpg	MF K304.94 2.5x T.jpg	MF K304.94 50x R.jpg
MF K303.94 10x R.jpg	MF K303.94 2.5x R.jpg	MF K303.94 2.5x T.jpg

Engebøfjellet

MF 5-61.9 (1.25x R).jpg	MF 5-61.9 (10x R).jpg	MF 5-61.9 (2.5x T).jpg	MF 5-61.9 (50x R).jpg
MF 5-170.1 (1.25x R).jpg	MF 5-170.1 (10x R).jpg	MF 5-170.1 (2.5x R).jpg	MF 5-170.1 (2.5x T).jpg
MF 4-120.9 (1.25x R).jpg	MF 4-120.9 (10x R).jpg	MF 4-120.9 (2.5x T).jpg	MF 4-120.9 (50x R).jpg
MF 304-69.9 10x R (2).jpg	MF 304-69.9 2.5 T.jpg	MF 304-69.9 2.5x T (2).jpg	MF 304-69.9 2.5x T.jpg
MF 304-28.1 10x R.jpg	MF 304-28.1 2.5x R.jpg	MF 304-28.1 2.5x T.jpg	MF 304-28.1 50x R.jpg
MF 304-112.2 2.5x T (2).jp	MF 304-112.2 2.5x T.jpg		
MF 303-56.2 10x R.jpg	MF 303-56.2 10x T.jpg	MF 303-56.2 2.5x T.jpg	MF 303-56.2) 2.5 T.jpg
MF 303-126.2 10x R(2).jpg	MF 303-126.2 10x R.jpg	MF 303-126.2 2.5x T.jpg	MF 303-56.2) 2.5 T.jpg
MF 3-127.3 10x R (2).jpg	MF 3-127.3 10x R.jpg	MF 3-127.3 2.5x T.jpg	MF 3-127.3 50x R.jpg
MF 2-169.0 (1.25x R).jpg	MF 2-169.0 (10 R).jpg	MF 2-169.0 (2.5x T).jpg	MF 2-169.0 (50x R).jpg
MF 2-154.8 (1.25x R).jpg	MF 2-154.8 (10x R).jpg	MF 2-154.8 (2.5x R).jpg	MF 2-154.8 (2.5x T).jpg
MF 13-237.0 10x R (2).jpg	MF 13-237.0 10x R.jpg	MF 13-237.0 2.5x R.jpg	
MF 1-126.5 (1.25x R).jpg	MF 1-126.5 (1.25x R).jpg	MF 1-126.5 (10x R).jpg	MF 1-126.5 (2.5x T).jpg

Fimlandsgrend

MF K253B.94 10x R (2).jp	MF K253B.94 2.5x R.jpg	MF K253B.94 2.5x T.jpg	MF K253B.94 50x R.jpg
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Furefjellet

MF K308.94 10x R.jpg	MF K308.94 50x R.jpg
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Heianova

MF K251.94 10x R (2).jpg	MF K251.94 10x R.jpg	MF K251.94 2.5x R.jpg	MF K251.94 2.5x T.jpg
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Kleppestølen

MF K252.94 10x R.jpg	MF K252.94 2.5x T.jpg	MF K252.94 50x R.jpg
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Label Microphoto-1	Label Microphoto-2	Label Microphoto-3	Label Microphoto-4
MF K246.94 10x R.jpg	MF K246.94 2.5x R.jpg	MF K246.94 50x R.jpg	
<i>Naustdal eclogite</i>			
MF K255.94 10x R.jpg	MF K255.94 2.5x T (2).jpg	MF K255.94 2.5x T.jpg	MF K255.94 50x R.jpg
MF K255.94 10x R.jpg	MF K255.94 2.5x T (2).jpg	MF K255.94 2.5x T.jpg	MF K255.94 50x R.jpg
MF K150.99 2.5x T.jpg	MF K150.99 10x R (2).jpg	MF K150.99 2.5x R.jpg	MF K150.99 2.5x T (2).jpg
<i>Russenes</i>			
MF KF1B.92 2.5x T.jpg			
MF KF1A.92 2.5x T.jpg			
<i>Steinkorsen</i>			
MF K148.99 2.5x T.jpg	MF K148.99 2.5x R.jpg	MF K148.99 10x R .jpg	MF K148.99 50x R.jpg
MF K147.99 10x R.jpg	MF K147.99 2.5x R.jpg	MF K147.99 2.5x T.jpg	
MF K146.99 2.5x T.jpg	MF K146.99 2.5x R.jpg	MF K146.99 10x R.jpg	MF K146.99 50x R.jpg
MF K145.99 10x R (2).jpg	MF K145.99 2.5x R.jpg	MF K145.99 2.5x T.jpg	MF K145.99 50x R (2).jpg
MF K143.99 2.5x T.jpg	MF K143.99 2.5x R.jpg	MF K143.99 10xR.jpg	MF K143.99 50x R.jpg

Southern Førdefjord region

Grova (Furevik)

MF K243A.94 10x R.jpg MF K243A.94 2.5x R.jpg MF K243A.94 2.5x T.jpg

Kristiansund region

Aure area (NE Kristiansund region)

Mjosund

MF KM14.92 2.5x T.jpg

Averøy area (SW Kristiansund region)

KE30.92-locality

MF KE30K.92 10x T.jpg MF KE30K.92 2,5x T.jpg
 MF KE30G.92 10x T.jpg MF KE30G.92 2.5x T.jpg
 MF KE30F.92 10x T.jpg MF KE30F.92 2.5x T.jpg
 MF KE28A.92 2.5x T.jpg

Tevikåsen

MF KE9.92 10x T.jpg MF KE9.92 2.5x T.jpg
 MF KE8.92 10x T.jpg MF KE8.92 2.5x T.jpg

Gjemnes area (NE Kristiansund region)

Hoem

MF KE42A.92 10x (2).jpg MF KE42A.92 10x T.jpg MF KE42A.92 2.5x T.jpg

Reinsfjellet

MF KE32A.92 10x T.jpg MF KE32A.92 2.5x T.jpg

Reinsfjellet 2

MF KE33A.92 10x T.jpg MF KE33A.92 2.5x T.jpg

Skardet

Label Microphoto-1

Label Microphoto-2

Label Microphoto-3

Label Microphoto-4

MF KE40A.92 2.5x T.jpg

Torvik 2

MF KE38A.92 2.5x T.jpg

Halsa area (NE Kristiansund region)***Hesjingfjellet***

MF KV13B.92 10x T.jpg

MF KV13A.92 2.5x T.jpg

Høgset

MF KV12.92 2.5x T.jpg

Rennhøgda

MF KH55A.92 10x T.jpg

MF KH55A.92 2.5x T.jpg

Kristiansund area***Flatset***

MF KK11.92 2.5x T.jpg

Kristiansund

MF KK10.92 2.5x T.jpg

Tustna area (Central Kristiansund region)***Ramsvikbukta***

MF KF16.92 2.5x T.jpg

Molde region**Eide area (NE Molde region)*****Eide 6***

MF KE6.92 10x T.jpg

MF KE6.92 2.5x T.jpg

Eide 7

MF KE7.92 10x T.jpg

MF KE7.92 2.5x T.jpg

Storvasshaugen

MF KE36A.92 10x T.jpg

MF KE36A.92 2.5x T.jpg

Fræna area (NE Molde region)***Stavik 2***

ME KL26A.92 2.5x T.jpg

Stavik 4

MF KE28A.92 2.5x T.jpg

Nordfjord region

Label Microphoto-1

Label Microphoto-2

Label Microphoto-3

Label Microphoto-4

Western Nordfjord region

Kroken

MF KN3B.92 10x T (2).jpg

MF KN3B.92 10x T.jpg

MF KN3B.92 2.5x T.jpg

MF KN3A.92 2.5x T (2).jp

MF KN3A.92 2.5x T (3).jp

MF KN3A.92 2.5x T.jpg

Permian Oslo Rift

Southern part of the Oslo Permian province

Loc K124.99

MF K124.99 10x R.jpg

MF K124.99 2.5x R.jpg

MF K124.99 2.5x T.jpg

Rogaland anorthosite province

Eastern Rogaland anorthosite province

Håskog

MF K109A.99 10R.jpg

MF K109A.99 2.5 R.jpg

MF K109A.99 2.5 T.jpg

MF K109A.99 50R.jpg

Igletjorna

MF K105.99 10x R (2).jpg

MF K105.99 2.5x R.jpg

MF K105.99 2.5x T.jpg

MF K105.99 50x R (2).jpg

Mong

MF K106B.99 10x R (2).jp

MF K106B.99 2.5 R.jpg

MF K106B.99 2.5x T.jpg

MF K106B.99 50x R.jpg

MF K106B.99 10x R (2).jp

MF K106B.99 2.5 R.jpg

MF K106B.99 2.5x T.jpg

MF K106B.99 50x R.jpg

Rekefjord

MF K104A.99 10x R .jpg

MF K104A.99 10x T.jpg

MF K104A.99 2.5x T (2).jp

MF K104A.99 50x R.jpg

Åna-Sira

MF K110.99 10x R.jpg

MF K110.99 2.5x T.jpg

MF K110.99 50x R.jpg

Western Rogaland anorthosite province

Odden

MF K107B.99 10x R.jpg

MF K107B.99 2.5x T (2).jp

MF K107B.99 50x R (2).jp

MF K107B.99 50x R.jpg

Romsdal region

Lesja area (E Romsdal region)

Brue

MF KL22A.92 10x T.jpg

MF KL22A.92 2.5x T.jpg

Kleiva

MF KL21A.92 10x T.jpg

MF KL21A.92 2.5x T.jpg

Label Microphoto-1

Label Microphoto-2

Label Microphoto-3

Label Microphoto-4

Sognefjord region

NW Sognefjord region

Veten (Lavik)

MF 394.05 (2.5x R).jpg	MF 394.05 (2.5x T).jpg		
MF 394.03 (10x R).jpg	MF 394.03 (2.5x R).jpg	MF 394.03 (2.5x T).jpg	MF 394.03 (50x R).jpg
MF 394.02 (10x R).jpg	MF 394.02 (2.5x R).jpg	MF 394.02 (2.5x T).jpg	MF 394.02 (50x R).jpg
MF 394.01 (10x R).jpg	MF 394.01 (2.5x R).jpg	MF 394.01 (2.5x T).jpg	MF 394.01 (50x R).jpg

SW Sognefjord region

Byrknesøy

MF 395.09 (10x R).jpg	MF 395.09 (10x R)b.jpg	MF 395.09 (2.5x R).jpg	MF 395.09 (2.5x T).jpg
MF 395.08 (10x R).jpg	MF 395.08 (2.5x R).jpg	MF 395.08 (2.5x T).jpg	MF 395.08 (50x R).jpg
MF 395.06 (10x R).jpg	MF 395.06 (2.5x R).jpg	MF 395.06 (2.5x T).jpg	MF 395.06 (50x R).jpg
MF 395.05 (10x R).jpg	MF 395.05 (2.5x R).jpg	MF 395.05 (2.5x T).jpg	
MF 395.04 (10x R).jpg	MF 395.04 (2.5x T).jpg	MF 395.04 (2.5x R).jpg	
MF 395.03 (10x R).jpg	MF 395.03 (2.5x R).jpg	MF 395.03 (2.5x T).jpg	
MF 395-10 (2.5x).jpg	MF 395.04 (2.5x R).jpg		

Ålesund region

Ulsteinvik area (W Ålesund region)

Aurvåg

MF K104B.93 (10x R).jpg	MF K104B.93 (2.5x R).jpg	MF K104B.93 (2.5x T).jpg	
MF K104A.93 (10x R).jpg	MF K104A.93 (2.5x R).jpg	MF K104A.93 (2.5x T).jpg	MF K104A.93 (50x R).jpg

Ulsteinvik

MF KU5.92 2.5x T.jpg

Volda area (S. Ålesund region)

Vassbotn

MF VP3.91 2.5x T.jpg	
MF SP9.90 (U5) 2.5x T.jpg	
MF SP2.90 (N8) 2.5x T.jpg	
MF SP1.91 10x T.jpg	MF SP1.91 2.5x T.jpg