Annex I Instruments and fishing gear

The Simrad EK-500, 38 kHz echo scientific sounder was used during the survey for fish abundance estimation. The Bergen Echo Integrator system (BEI) logging the echogram raw data from the echo sounder, was used to scrutinize the acoustic records, and to allocate integrator data to fish species. All raw data was stored to tape, and a backup of the database of scrutinized data, stored. The EK-500, 18 kHz and 120 kHz was often run simultaneously with the 38 kHz echo sounder to analyze frequency-different scattering, in particular in areas with myctophids or jellyfish. Only the echograms were however stored from these frequencies. The details of the settings of the 38 kHz were as follows:

Transceiver-1 menu	Transducer depth	0.0m
	Absorbtion coeff.	10 dB/km
	Pulse length	medium
	Bandwidth	wide
	Max Power	2000 W
	2-way beam angle	-21.0 dB
	SV transducer gain	28.1 dB
	TS transducer gain	28.1 dB
	Angle sensitivity	21.9
	3 dB beamwidth	6.8 deg
	Alongship offset	0.00 deg
	Athwardship offset	0.04 deg
Display menu	Echogram	1, 1&2
	Bottom range	15 m
	Bottom start	10 m
	TVG	20logR
	SV Colour minimum	-75 dB
	TS Colour minimum	-65 dB
Printer menu	Slave	
Bottom detection menu	Varying, -30 to -55 dB depending on school density, and bottom conditions.	

Settings of the other echo sounders is given in detail in Instrument report, Nansen 1994404.

Hydrography

Conductivity, temperature density and dissolved oxygen were sampled regularly at CTD stations with a Seabird 911+ CTD sonde. The salinity is computed from the data on conductivity by the software retrieving data from the sensors.

Fishing gear

Two pelagic trawl were used to sample pelagic fish during the survey. The small pelagic trawl, a 320 m circumference, 198 meshes opening Åkrehamn trawl were mainly used in medium to shallow water on high density registrations. In deeper water, in mixed, low density recordings, a larger pelagic trawl, a Åkrehamn 486 m, 152 meshes opening trawl was used for identification and sampling. In very shallow water, where the small pelagic trawl could be destroyed by accidental bottom contact, a bottom trawl, the "Gisund super", was occasionally used to identify and sample schools. The bottom trawl was then rigged as for normal bottom trawl operation, but supplied with large surface floats on the wings. At depths of 20 meters or less, the opening then covered most of the water column. For all trawls, the Tyborøn, 7.8 m^2 (1670 kg) trawl doors were used. Complete drawings of the trawls used are included.

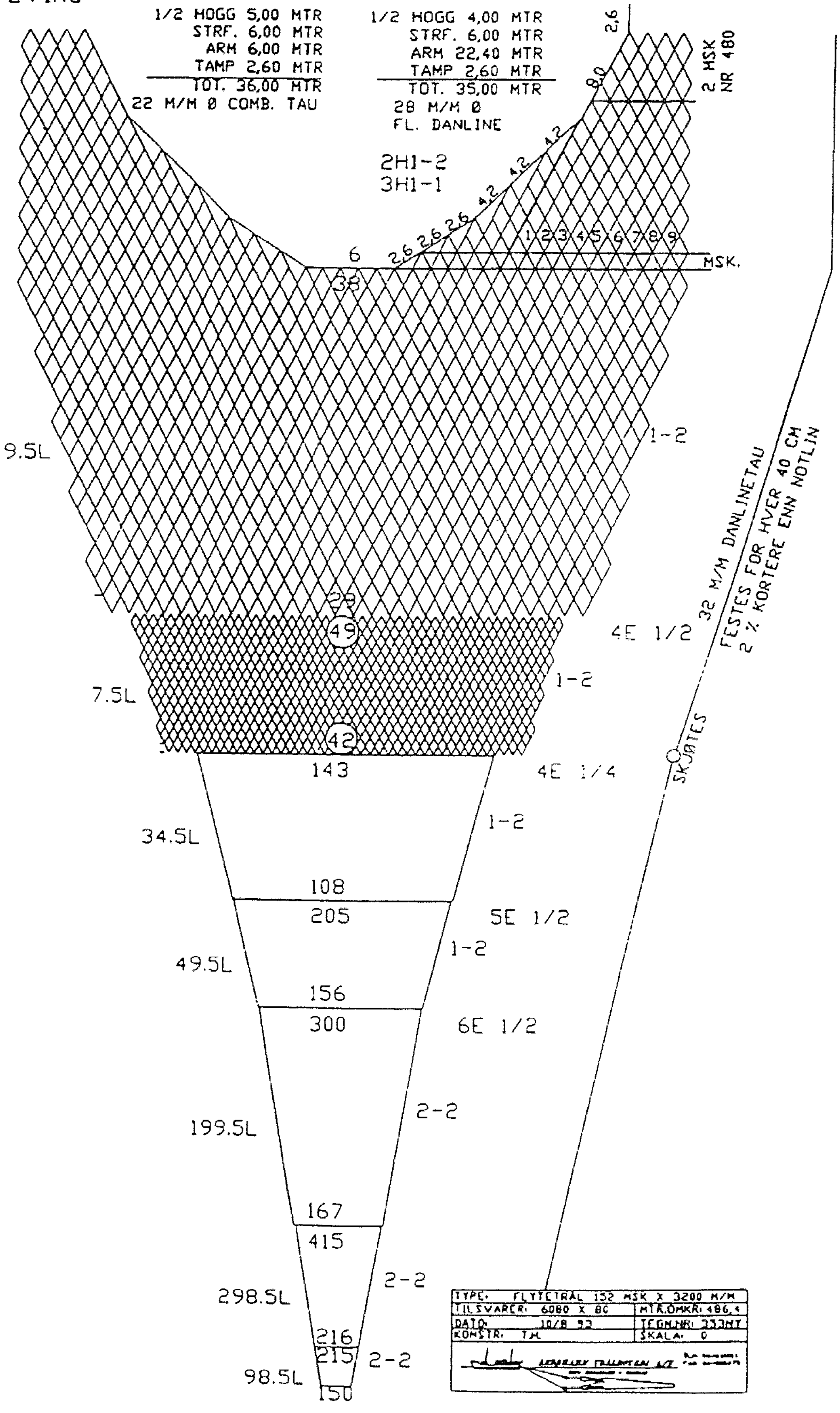
F/F Dr. Fridtjof Nansen

OVER/UNDER/SIDER

OVERDEL:
50 STK 11' PLASTKULER

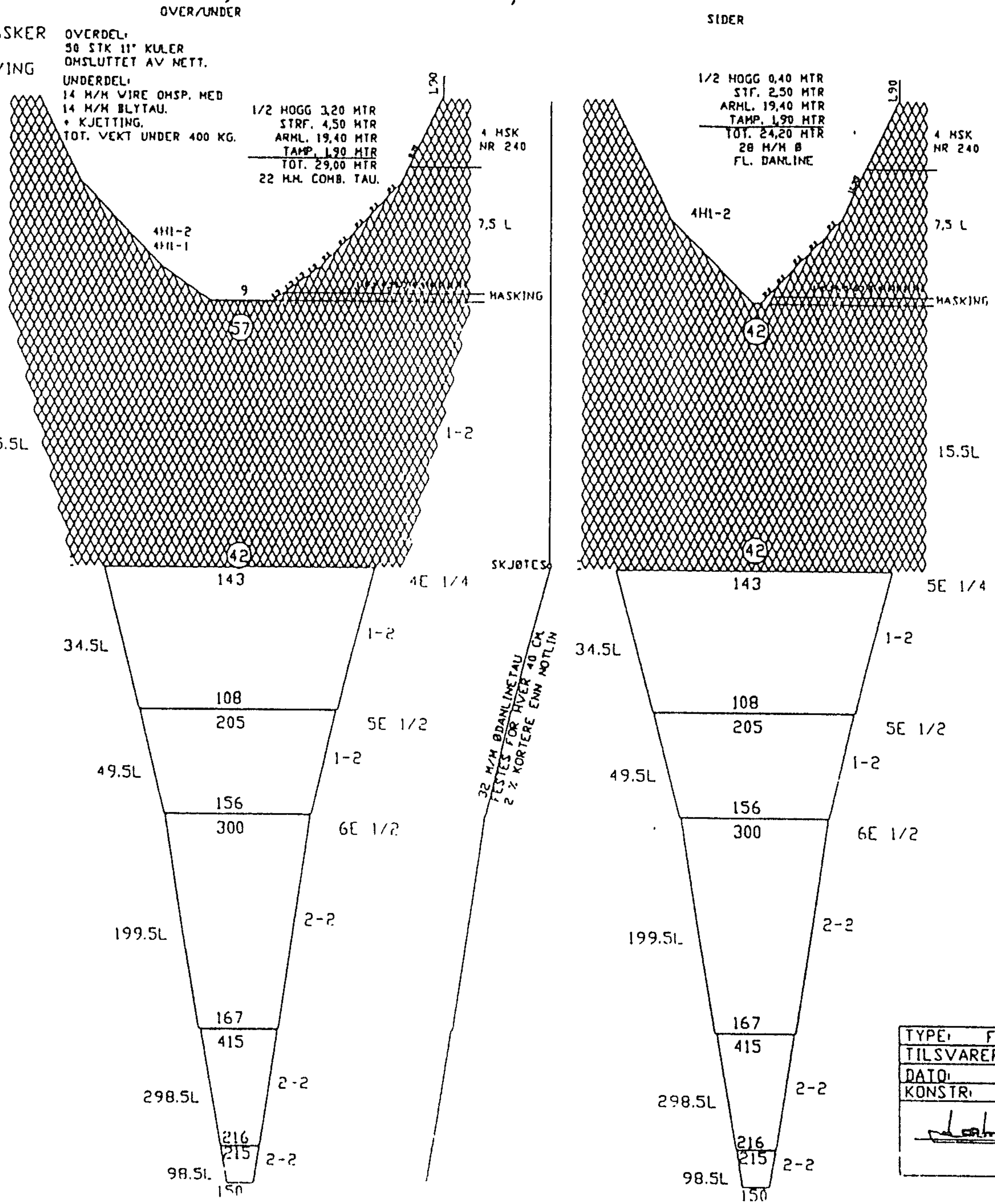
UNDERDEL
14 M/M VIRE OMSP. MED
14 M/M BLYTAU
+ KJETTING.
TOTAL VEKT UNDER 400 KG.

MASKER M/M	TRAAD NR.	LENGDE I MTR.	MASKER I EVING
3200.0	240	22.4	4
3200.0	240	32.0	4
1620.0	160	13.0	4
400.0	48	14.0	4
200.0	32	10.00	4
100.0	24	20.0	4
38.0	12	11.4	4
38.0	18	3.76	4



F/F Dr. Fridtjof Nansen

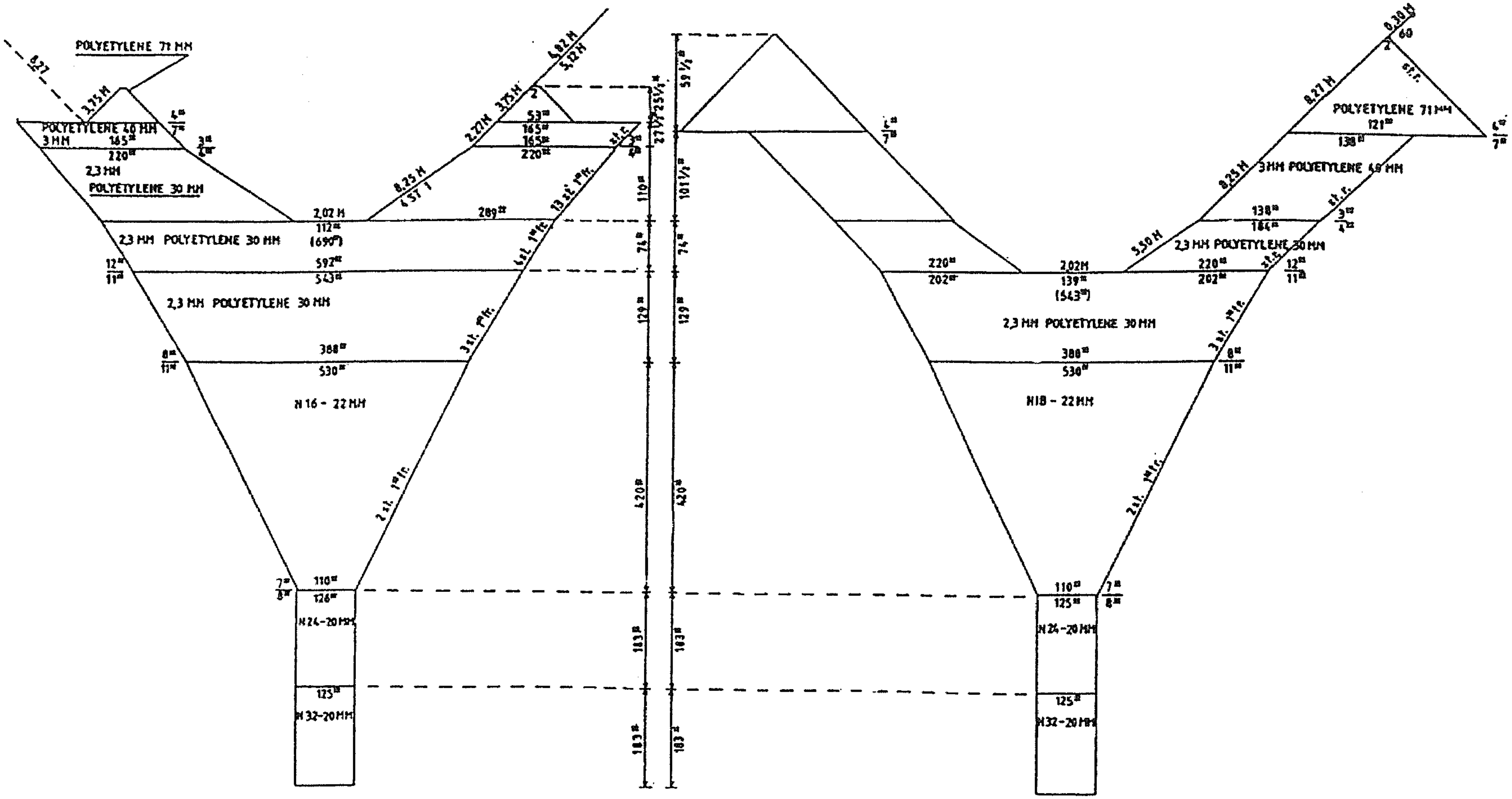
MASKER M/M	TRAAD NR.	LENGDE I MTR.	MASKER I EVING
1620.0	160	19.4	4
1620.0	160	25.9	4
400.0	48	14.0	4
200.0	32	10.00	4
100.0	24	20.0	4
38.0	12	11.4	4
36.0	18	3.76	4



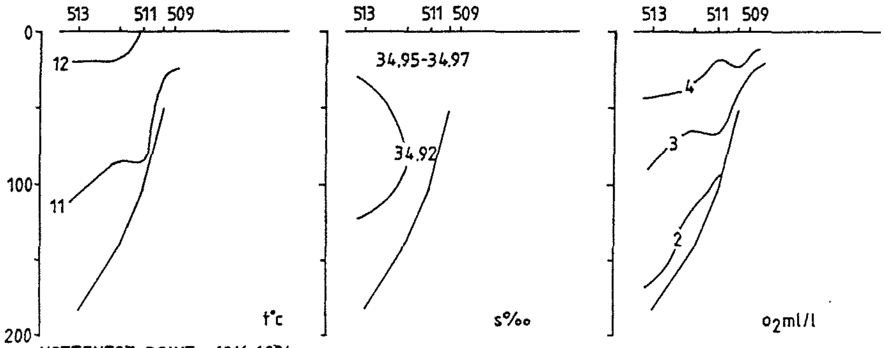
TYPE:	FLYTETRÅL 198 MSK X 1620 M/M
TILSVARER: 4010 X 80	MTR.OMKR: 320
DATO: 23/6 93	TEGN.NR: 510
KONSTR: T-H	SKALA: 0

AKRERHAVN TRÅLBØTERI A/S

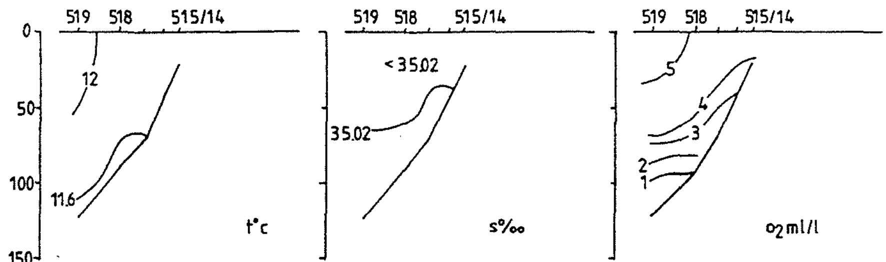
Bottom trawl: High opening shrimp and fish trawl with net headline 31m (floatline), foot-rope 47m, gear with 12 cm diameter roller disks, 40 m sweeps, estimated headline hight 6m and distance between wings during towing 18-20m.



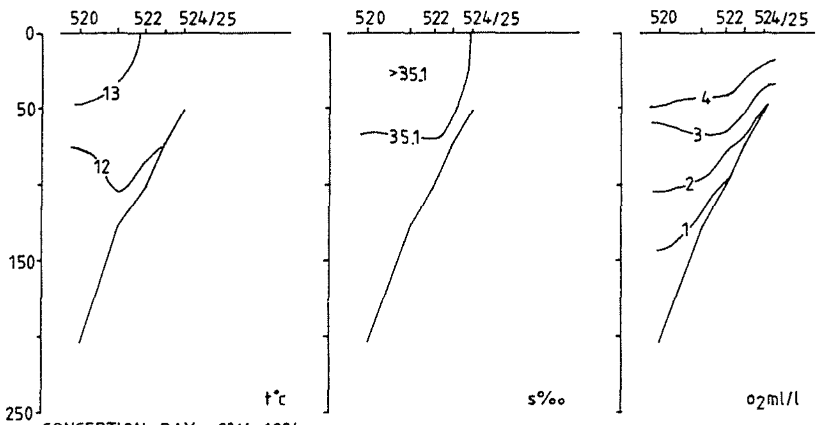
Annex II Hydrographic profiles



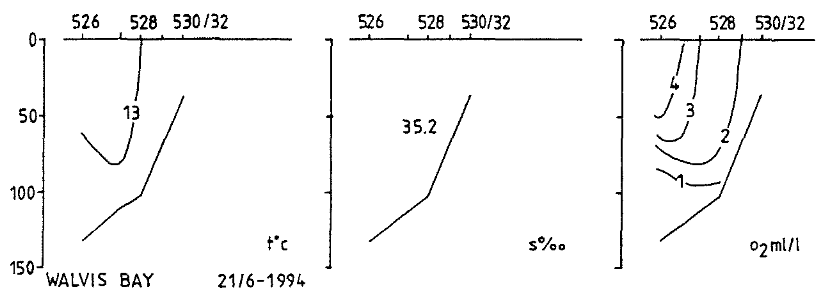
HOTTENTOT POINT 18/6-1994



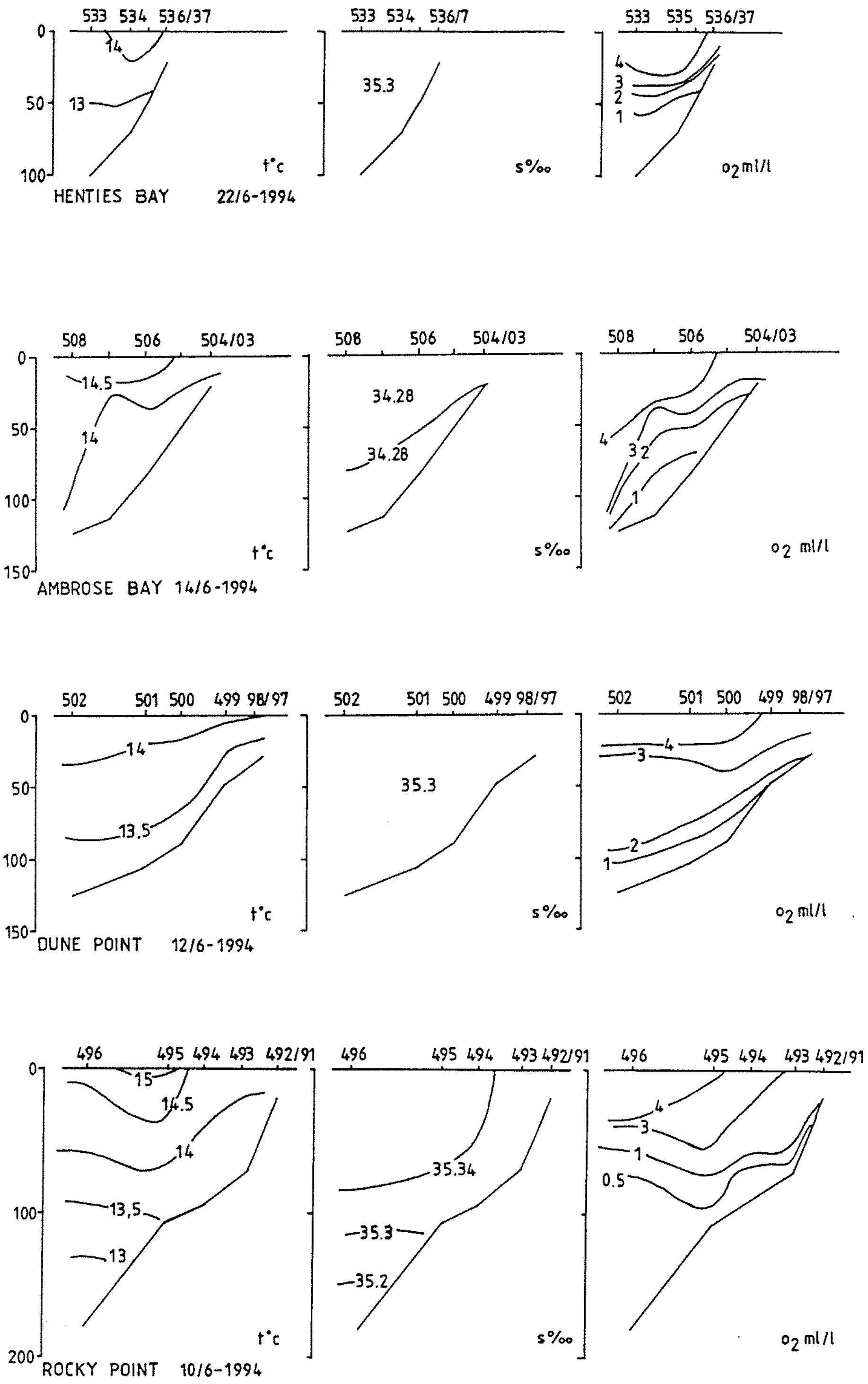
NORTH OF ESTER POINT 19/6-1994

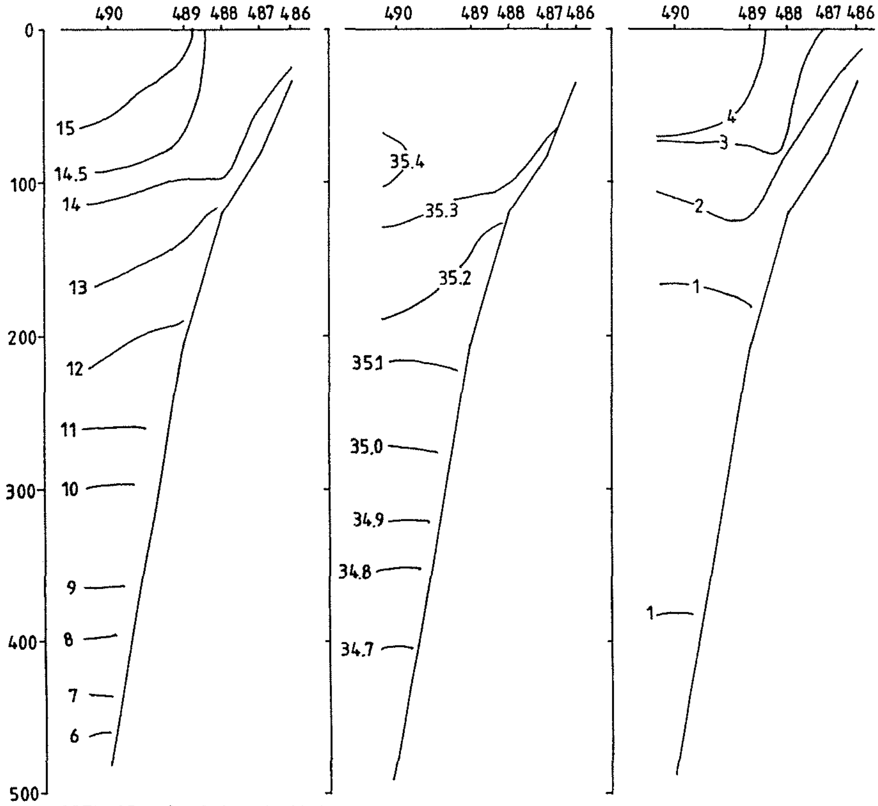


CONCEPTION BAY 20/6-1994

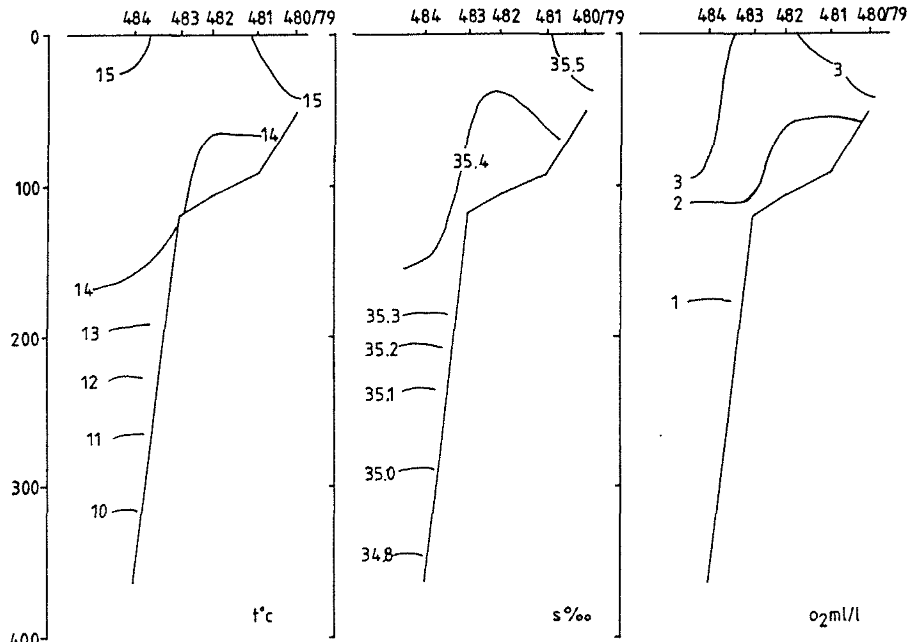


WALVIS BAY 21/6-1994


533 534 536/37
533 534 536/7
533 535 536/37
0
50
100
14
13
35.3
4
3
2
1
t°c
s‰
o2 ml/l
HENTIES BAY 22/6-1994
508 506 504/03
0
50
100
150
14.5
14
34.28
34.28
4
3 2
1
t°c
s‰
o2 ml/l
AMBROSE BAY 14/6-1994
502 501 500 499 98/97
0
50
100
150
14
13.5
35.3
4
3
2
1
t°c
s‰
o2 ml/l
DUNE POINT 12/6-1994
496 495 494 493 492/91
0
100
200
15
14.5
14
13,5
13
35.34
35.3
35.2
4
3
1
0.5
t°c
s‰
o2 ml/l
ROCKY POINT 10/6-1994



NORTH OF CAPEFRIO 9/6-1994



CUNENE 7/6-1994

Annex III Summary of trawl stations

FRIDTJOF-NANSEN TRAWL INFORMATION (JUNE 1994)

Trawl Number	Latitude (°S)	Bottom Depth (m)	Headrope Depth (m)	Catch by Species (% of total catch) *Trachurus*	*Sardinops*	*Engraulis*	*Etrumeus*	***Total Catch (kg)***
375	15,57	18	18	0	0	0	0	269
374	16,01	600	100	0	0	0	0	165
373	16,26	55	55	0	0	0	4	4500
376	16,37	14	10	0	0	0	2	187
371	16,38	50	30	0	1	99	0	3027
372	16,40	18	5	0	60	0	13	15
377	16,41	80	35	0	0	0	0	1
381	16,42	20	10	0	8	0	91	77
380	16,52	5	13	0	98	1	0	10000
384	17,00	900	200	0	0	0	0	3
383	17,00	130	130	100	0	0	0	3000
379	17,00	15	15	3	77	6	2	1005
382	17,02	20	20	18	0	49	17	417
385	17,11	23	10	3	43	50	3	708
370	17,21	65	8	0	0	0	100	1
387	17,34	40	15	18	14	27	26	413
386	17,41	85	85	97	0	0	0	7000
389	18,00	180	50	100	0	0	0	4
388	18,13	40	5	0	15	69	8	26
390	18,28	313	150	0	0	0	0	17
369	18,35	117	117	96	0	0	0	2888
391	18,38	70	22	100	0	0	0	1001
368	18,43	33	10	5	3	53	0	28
378	18,49	30	20	0	0	0	0	1
392	18,57	60	25	100	0	0	0	210
397	19,03	50	50	99	0	0	0	107
367	19,03	136	45	100	0	0	0	15
396	19,05	30	15	1	4	80	2	178
398	19,13	80	30	100	0	0	0	600
395	19,19	48	12	54	0	42	0	24
393	19,25	300	53	98	0	0	0	122
394	19,27	180	30	96	0	0	0	624
399	19,39	50	20	49	0	40	3	90
366	19,45	93	29	83	0	0	0	36
400	19,46	80	37	100	0	0	0	10003
401	19,57	25	10	73	1	21	3	243
402	20,01	285	92	(NET BURST)				
408	20,04	90	90	98	0	0	0	145
365	20,06	142	35	0	4	0	96	339
407	20,06	64	40	38	1	0	61	46
364	20,13	127	100	0	1	0	97	77
409	20,14	20	0	15	10	45	8	424
406	20,16	44	28	1	2	1	95	21
405	20,18	18	10	0	23	68	8	365
410	20,20	95	55	94	0	0	2	83
403	20,28	327	327	0	0	0	0	238
404	20,28	170	70	94	0	1	1	149

Trawl Number	Latitude (°S)	Bottom Depth (m)	Headrope Depth (m)	Catch by Species (% of total catch)				***Total Catch (kg)***
				Trachurus	*Sardinops*	*Engraulis*	*Etrumeus*	
415	20,30	317	311	38	0	0	0	151
411	20,38	70	15	1	1	1	97	146
363	20,42	30	15	26	0	0	68	1430
412	20,58	45	18	1	8	6	85	945
413	20,59	34	34	41	3	39	1	2000
414	20,59	171	164	89	0	0	0	2464
416	20,59	256	249	38	0	0	0	146
417	21,02	270	165	8	0	0	0	1
423	21,04	25	10	0	0	2	43	1
422	21,10	35	5	31	26	5	29	41
420	21,12	299	292	5	0	0	0	32
424	21,12	47	40					0
419	21,13	297	195	11	0	0	0	9
418	21,17	300	183	0	0	0	0	0
425	21,29	44	13	0	2	0	97	172
421	21,30	97	0	32	1	66	0	8
444	21,43	114	5	43	0	0	0	0
443	21,44	114	10	0	0	0	0	0
442	22,00	78	70	0	0	0	0	0
426	22,06	36	10	17	1	4	3	11
441	22,12	283	276	36	0	0	0	1
445	22,13	98	10	7	1	37	55	119
427	22,42	34	27	33	0	0	0	3
438	22,48	314	307	3	0	0	0	446
440	22,53	111	70	12	0	0	0	1
437	22,58	296	289	26	0	0	0	231
439	23,06	27	10	50	3	10	36	153
428	23,09	22	5	70	4	14	11	70
430	23,19	49	42	30	0	0	9	55
429	23,27	33	26	8	0	0	0	19
431	23,39	24	5	38	11	44	4	2
436	24,00	323	316	0	0	0	0	611
435	24,23	324	150	0	0	0	0	2
435	24,23	325	150	0	0	0	0	2
432	24,55	26	0	25	0	1	74	6
434	25,01	120	113	0	0	0	0	31
434	25,01	120	113	0	0	0	0	31
433	25,07	17	10	10	0	2	7	254