Cruise Report PD04/04

Part 1

Rv Prince Madog, 6-19th February 2004

Turbulence Control of the Properties and Flux of Suspended Matter in Tide-Stirred Shelf Seas - Spring Cruise.

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BACKGROUND:

It is suspected that turbulence controls the properties of suspended particulate matter (SPM) in tide-stirred shelf seas and so controls the vertical flux of SPM and organic carbon to the seabed, but there are very few observational data to support theoretical and laboratory evidence. These uncertainties constitute major prediction-limiting factors in water quality and ecosystem models. We have preliminary data which support turbulence control of particle disaggregation in the boundary layer and provide evidence for aggregation at the base of the thermocline. The aim of the project is to make *in situ* observations of turbulence and SPM under a range of dynamic conditions to develop functional relationships between turbulence and SPM, and to explore temporal/spatial evolution of SPM properties, particularly with respect to aggregation, resuspension, and advection of lateral differential size and concentration gradients.

PROJECT OBJECTIVES:

- To obtain high quality observational data sets of tidal flow, *in situ* SPM and turbulence properties in contrasting energy regimes.
- To investigate generic relationships between SPM and turbulence properties.
- To investigate and model the time history of aggregate development and vertical/lateral exchanges.

Specific Cruise Objectives:

- Deploy an ADCP mooring to determine tidal flow, stress, and TKE production estimates.
- Obtain full CTD profiles to determine water column structure.
- Obtain surface and deep-water samples & filter for suspended sediments.
- Carry out hourly series of FLY measurements to determine profiles of TKE dissipation.
- Carry out LISST 100B & C profiles, for data inter-comparison.
- Deploy settling velocity tubes in bottom, surface and thermocline regions.

PERSONNEL:

The following scientists from School of Ocean Sciences took part in leg 1. of the cruise:

Neil Fisher (Principle Scientist)	Matthew Palmer (PhD Student)
Sarah Jones	Peter Sykes (PhD Student)
Ray Wilton (Technician)	Barbara Berx (MSc Student)
Ben Powell (Technician)	Martin Goff (MSc Student)
Philip Wiles (PhD Student)	Jonathan Tinker (MSc Student)

For the second leg of the cruise Matthew Palmer and Philip Wiles were replaced with Katherine Ellis (PhD Student) and Maria Inmaculada Ferrer Sanz (MSc Student).

CRUISE SUMMARY:

Mooring Positions:

Station Name	Latitude	Longitude
Clyde Sea, C2	55 ^{o} 21.02'N	5^{o} 04.07'W
Irish Sea, Station Ethel	53 ^{o} 27.64'N	4^{o} 32.91'W
LiverpoolBay, Station T5	53^{o} 28.66'N	3^{o} 37.89'W

CTD Transect Positions:

Station No.	Latitude	Longitude
HH1	53 ^{o} 27.645'N	4^{o} 20.016'W
HH2	53 ^{o} 27.653'N	4^{o} 21.876'W
HH3	53 ^{o} 27.688'N	4^{o} 21.985'W
HH4	53 ^{o} 27.551'N	4^{o} 23.883'W
HH5	53 ^{o} 27.642'N	4^{o} 25.833'W
HH6	53 ^{o} 27.635'N	4^{o} 25.444'W
HH7	53 ^{o} 27.694'N	4^{o} 27.243'W
HH8	53 ^{o} 27.6663'N	4^{o} 31.272'W
HH9	53 ^{o} 27.611'N	4^{o} 37.665'W

T10	53 ^{o} 31.539'N	4^{o} 02.317'W
T9	53 ^{o} 31.065'N	3^{o} 57.601'W
T8	53 ^{o} 30.459'N	3^{o} 53.218'W
T7	53 ^{o} 30.009'N	3^{o} 48.429'W
T6	53 ^{o} 29.453'N	3^{o} 43.958'W
T5	53 ^{o} 29.061'N	3^{o} 39.476'W
T4	53 ^{o} 28.183'N	3^{o} 35.119'W
T3	53 ^{o} 27.591'N	3^{o} 30.928'W

T2 and T1- Aborted. No CTD at T8, LISST only.

The CTD and mooring station positions along with the ships track are shown as Figure 1.

Narrative:

06/02. - Mobilisation of equipment.

07/02. - Due to poor weather conditions the ship remained in port. This additional time allowed for last minute repairs to be made to FLY#4 and the pyramid mooring to be set for deployment.

Leg1, 8/02 – 15/02.

08/02.- Due to strong winds and rough weather, passage to the Clyde sea was slow and heavy going with some seasickness amongst the scientists and crew.

09/02.- Arrived on station at C2 to deploy 300 kHz ADCP pyramid bed frame and start the 50 hr time series of FLY, CTD, LISST and settling velocity measurements. Two small gaps occur in the FLY data due to instrument/cable problems.

11/02.- After completing the station measurements the mooring was recovered with the minimum of fuss and we put into Bangor (N.I.) for an

overnight port call to allow for the servicing of the pyramid frame for redeployment.

12/02.- Departed for the Irish sea station, Ethel, and performed a CTD transect survey along the north coast of Anglesey to establish the spatial variability of the SPM properties in the area (HH - transect).

13/02.- Having completed the CTD survey the 600 kHz ADCP (set up for turbulence measurements) was deployed at Ethel, and we began a 25 hr time series of CTD, LISST and settling velocity measurements followed by 25 hrs of FLY and CTD measurements.

15/02.- Finished station measurements and attempted to recover the ADCP mooring. During the mooring recovery the Captain spotted an unidentified floating object on the horizon and abandoned operations to investigate the sighting. After identifying the object as a set of party balloons we returned to the mooring, which was eventually recovered after several failed attempts in the strong tidal currents which were now present.

16/02.- This day was lost due to a ships crew change and a Mid-cruise break.

Leg2, 17/02 – 18/02.

Due to the good weather of the first leg we had two days of ship time originally allocated as contingency days on the original cruise plan. After a brief discussion it was decided that the best use of the remaining ship time was to conduct a sampling programme along the lines of a previous cruise to Liverpool Bay in 1999.

17/02.- Departed Menai Bridge and conducted a CTD transect across Liverpool bay to establish the East-west spatial gradients of temperature, salinity and suspended sediment (T - transect). Having completed the CTD survey the 600 kHz ADCP (set up for turbulence measurements) was deployed at T5, and we began a 25 hr time series of FLY, CTD, and LISST

measurements. The mooring position of T5 was chosen due to the presence of large sand waves at the original station LB2.

18/02.- After completing the station measurements the mooring was recovered with the minimum of fuss and we returned to Menai Bridge.

19/02.- Demobilisation of equipment and cleaning of the ship.

A full copy of the ships station log is shown in the appendix.

ASSESSMENT

Overall this was a highly successful cruise. In spite of losing the first day to adverse weather conditions, the calm weather for the remainder of the cruise enabled us to regain the lost time, and even add additional sampling to the originally proposed cruise plan. Work by Phil Wiles to the CTD processing and plotting software on board the Prince Madog has dramatically improved access to the data from the CTD, so that up to date plots can now be redrawn within minutes of each new profile being made. A selection of preliminary data plots from the CTD transects and station work are shown in Part 2 of the Cruise report. It should be noted that these plots have not be checked or screened for data quality or spiking, and the results should be used with caution.

ACKNOWLEDGEMENTS

I would like to thank the Captain and crew of the RV Prince Madog for their hard work and enthusiasm during the cruise, enabling all the cruise objectives to be met. I would also like to thank Ray Wilton and Ben Powel for their hard work operating and maintaining the FLY system, and all participating scientists for their efforts.

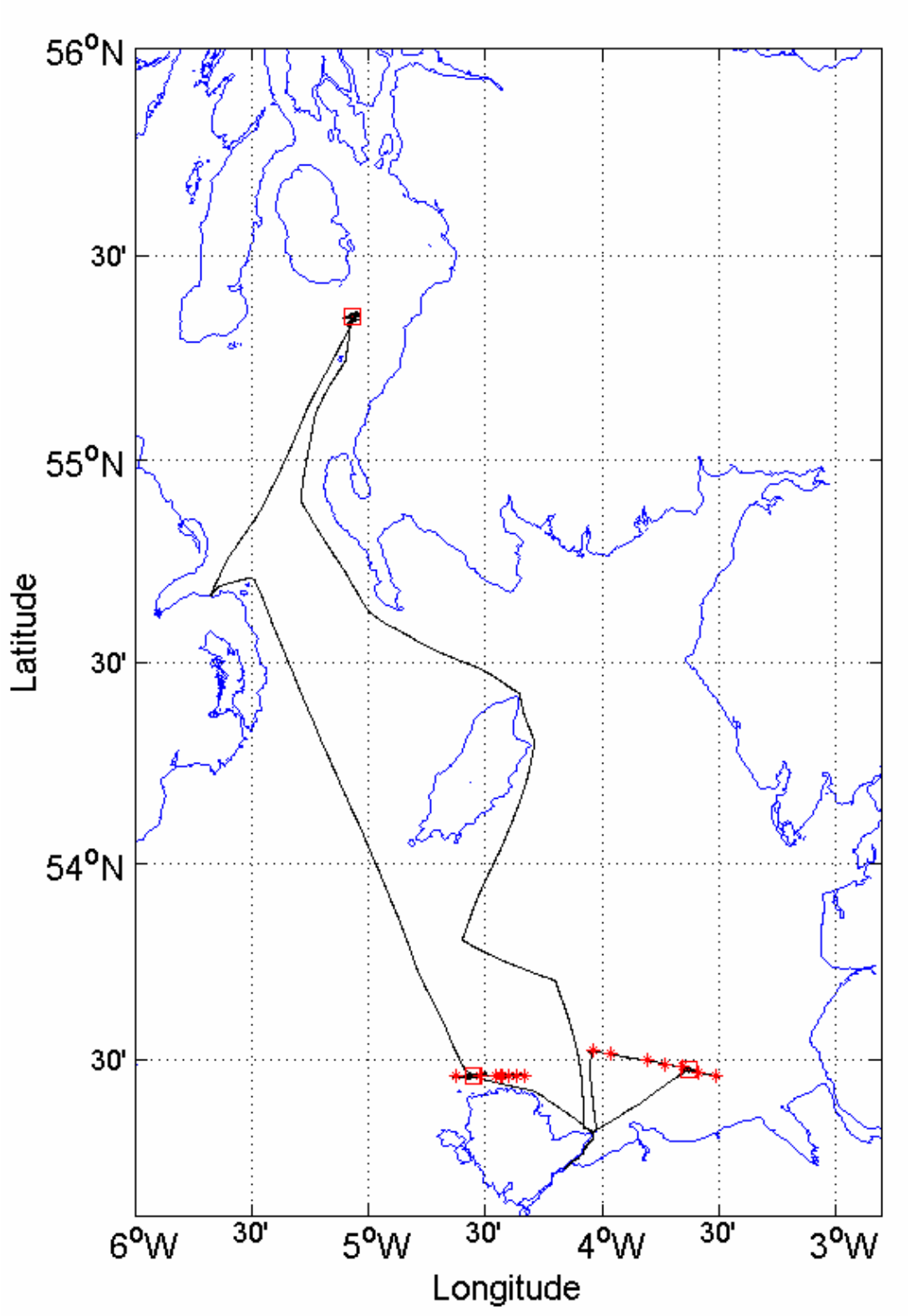

Figure 1. Location map for the cruise showing the three mooring stations marked by the red boxes and the two CTD transects marked with red stars. The ships track is also shown by the black line.

APPENDIX:

Station C2, 300kHz ADCP setup commands:

```
CR1
CF11101
EA00000
EB0
ED600
ES35
EX00000
EZ1111111
TE00:00:01.00
TP00:01.00
WB0
WD111100000
WF176
WN35
WP1
WS200
WV150
WA50
CK
CS
;
;Instrument         = Workhorse Monitor
;Frequency          = 307200
;Water Profile      = YES
;Bottom Track       = NO
;High Res. Modes    = NO
;High Rate Pinging  = NO
;Shallow Bottom Mode= NO
;Wave Gauge         = NO
;Lowered ADCP       = NO
;Beam angle         = 20
;Temperature        = 8.00
;Deployment hours   = 96.00
;Battery packs      = 0
;Automatic TP       = NO
;Memory size [MB]   = 512
;Saved Screen       = 3
;
;Consequences generated by PlanADCP version 2.02:
;First cell range   = 4.15 m
;Last cell range    = 72.15 m
;Max range          = 98.10 m
;Standard deviation = 6.14 cm/s
;Ensemble size      = 848 bytes
;Storage required   = 279.49 MB (293068800 bytes)
;Power usage        = 120.42 Wh
;
; WARNINGS AND CAUTIONS:
; The number of pings is too low for reasonable sampling of the currents.
; Advanced settings has been changed.
; Expert settings has been changed.
```

Station Ethel, 600kHz ADCP setup commands:

```
CR1
CF11101
EA0
EB0
ED0
ES35
EX00000
EZ1111111
WB0
WD111100000
WF88
WN45
WP1
WS106
WV200
TE00:00:01.00
TP00:01.00
WM12
WO6,6
CK
CS
;
;Instrument       = Workhorse Sentinel
;Frequency        = 614400
;Beam angle       = 20
;Temperature      = 5.00
;Deployment hours = 96.00
;Battery packs    = 1
;Automatic TP     = YES
;Memory size [MB] = 1000
;
;Consequences generated by PlanADCP version 2.01:
;First cell range = 2.11 m
;Last cell range = 48.75 m
;Max range = 42.81 m
;Standard deviation = 2.45 cm/s
;Ensemble size = 1048 bytes
;Storage required = 362.19 MB
;Power usage = 243.46 Wh
;Battery usage 0.5
```

Ships Station Log, Pages 1-13:

STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA - FLY

SHEET NUMBER 0128 (1) N. FISHER

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING		WIND		SEA	SWELL	REMARKS
							~~EMS~~	LOG.	DIR.	FORCE			
9.2.04	0809	C2	1	55 21.016	05 04.068	Stop	57.3		WNW	1/2	RPLD	SLT	DEPLOY ADCP - ON BOTTOM
	0830	✓	2	55 20.938	05 04.005	✓	57.3						CTD
	0853	✓	3	55 20.964	05 04.033	✓	57.3						SVT
	0921	✓	4	55 20.968	05 04.019	340	57.6	0.8	W	2	RPLD	SLT	DEPLOY FLY
	0944	✓	5	55 21.343	05 04.186	351	60.0	0.4					RECOVER FLY
	0949	✓	6	55 21.392	05 04.210	Stop	59.8						CTD
	1003	✓	7	55 21.446	05 04.110	✓	60.6						SVT
	1016	✓	8	55 21.408	05 04.001	162	59.6	0.5	SW	3	SLT	SLT	DEPLOY FLY
	1038	✓	9	55 21.116	05 03.779	160	58.8	0.4					RECOVER FLY
	1042	✓	10	55 21.087	05 03.734	Stop	58.8						CTD
	1114	✓	11	55 21.041	05 03.719	220	59.1	0.4	SW	3	SLT	SLT	DEPLOY FLY
	1137	✓	12	55 20.892	05 04.135	227	58.8	0.7					RECOVER FLY
	1142	✓	13	55 20.883	05 04.188	Stop							CTD
	1218	"	14	55 21 108	05 03 768	235	59		SW	3	SLT		DEPLOY FLY
	1246	"	15	55 20 927	05 04 457	225	59.1						RECOVER FLY
	1249	"	16	55 20 993	05 04 485	STOP	58.2						CTD
	1310	"	17	55 21 237	05 04 215	"	58.3						ST
	1316	"	18	55 21 240	05 03 995	235	58.3		SW	3/4	SLT	SLT	DEPLOY FLY
	1344	"	19	55 21 039	05 03 015								RECOVER FLY
	1346	"	20	55 21 035	05 02 962	STOP	60.1						CTD
	1401	"	21	55 21 189	05 02 844	STOP	60.5						ST
	1416	"	22	55 21 004	05 03 912	240	60.3						DEPLOY FLY
	1440	"	23	55 21 165	05 04 813	240	62.0						RECOVER FLY
	1449	"	24	55 21 213	05 04 902	STOP	62.1		SW	4	SLT	SLT	CTD
	1516	"	25	55 21 395	05 04 797	140	63.1						DEPLOY FLY
	1542	"	26	55 21 187	05 03 646	STOP	63.1						RECOVER FLY
	1544	"	27	55 21 191	05 03 642	STOPPED	63.2						CTD
	1600	"	28	55 21 303	05 03 694	STOPPED	62.0						ST
	1612	"	29	55 21 343	05 03 672	120	59.8						DEPLOY FLY
	1644		30	55 21 078	05 02 803	320	59.8						RECOVER FLY
	1643		31	55 21 057	05 02 777	STOP	58.3						CTD
	1658		32	55 21 103	05 02 837	STOP							ST

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CHIEF SCIENTIST

MASTER

STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA FLY N FISHER

SHEET NUMBER (2) 0129

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS. M	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
9.2.04	1708	C2	33	55 21 014	05 02 986	240	58.7		SW	4	SLT	LOW	DEPLOY FLY
	1734	✓	34	55 20 775	05 04 189	240	57.9						RECOVER FLY
	1739	✓	35	55 20 761	05 04 295	STOP	57.2						CTD
	1811	✓	36	55 20.895	05 04.427	103	57.3	0.8	SSW	5	MOD	LOW	DEPLOY FLY - BREAKDOWN - RECOVER
	1851	✓	37	55 20.998	05 04.249	STOP	57.5		SSW	5	MOD	LOW	CTD
	1913	✓	38	55 21.120	05 03.962	096	57.2	0.9	SSW	6	MOD	MOD	DEPLOY FLY
	1935	✓	39	55 21.121	05 03.055	090	57.4	0.7					RECOVER FLY
	1941	✓	40	55 21.158	05 02.922	STOP	57.7		SSW	6	MOD	MOD	CTD
	1958	✓	41	55 21.351	05 02.655	STOP	58.2						SVT
	2013	✓	42	55 21.376	05 02.745	284	58.2	0.7	SSW	6	MOD	MOD	DEPLOY FLY
	2037	✓	43	55 21.458	05 03.421	285	58.1	0.9					RECOVER FLY
	2043	✓	44	55 21.483	05 03.416	STOP	57.7		SSW	5	MOD	MOD	CTD
	2057	✓	45	55 21.675	05 03.138	STOP	58.7						SVT
	2111	✓	46	55 21.570	05 03.108	215	59.8	0.5	SSW	5/6	MOD	MOD	DEPLOY FLY
	2135	✓	47	55 21.337	05 03.563	215	58.3	0.8					RECOVER FLY
	2141	✓	48	55 21.326	05 03.567	STOP	58.6		SSW	6	MOD	MOD	CTD
	2215	✓	49	55 21.438	05 03.424	223	59.2	0.9	SSW	5/6	MOD	MOD	DEPLOY FLY
	2237	✓	50	55 21.216	05 03.878	207	57.4	0.7					RECOVER FLY
	2242	✓	51	55 21.233	05 03.840	STOP	58.3		SSW	5/6	MOD	MOD	CTD
	2305	✓	52	55 21.574	05 03.358	STOP	59.6		SSW	5	MOD	LOW	SVT
	2318	✓	53	55 21.603	05 03.208	208	59.0	0.8	SSW	5	MOD	LOW	DEPLOY FLY
	2340	✓	54	55 21.284	05 03.567	202	59.7	0.8					RECOVER FLY
	2346	✓	55	55 21.279	05 03.524	STOP	59.6		SW	5	MOD	LOW	CTD
10.2.04	0000	✓	56	55 21 444	05 03 189	STOP	59.7						ST
	0012	✓	57	55 21 510	05 02 931	216	60.0		SW	5	MOD	LOW	DEPLOY FLY
	0036	✓	58	55 21 176	05 03 718	210	60.2						RECOVER FLY
	0038	✓	59	55 21 138	05 02 651	STOP	60.2						CTD
	0110	✓	60	55 21 482	05 02 396	250	60.3		SW	6	MOD	MOD	DEPLOY FLY
	0136	✓	61	55 21 405	05 03 078	250	60.49						RECOVER FLY
	0138	✓	62	55 21 43	05 03 068	STOP	60		SW	5	MOD	MOD	CTD
	0210	✓	63	55 21 316	05 02 926	230	60.4						DEPLOY FLY
	0235	✓	64	55 20 955	05 03 207	230	69.78		SW	6	RGH	MOD	RECOVER FLY

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CHIEF SCIENTIST

MASTER

STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME FLY CLYDE N. FISHER

SHEET NUMBER (3) 0130

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS. M	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
10·2·04	0238	C2	65	55 20 977	05 03 181	STOPPED	59.1		SW	6/7	MOD/RG	MOD	CTD
	0254	″	66	55 21 194	05 02 911	STOP	59.9						ST
	0311	″	67	55 21 232	05 02 693	220	60.0		SW	7	RAH	MOD	DEPLOY FLY
	0337	″	68	55 21 039	05 03 041	220	60						RECOVER FLY
	0341	″	69	55 21 057	05 03 009	STOPPED	60.1						CTD
	0357	″	70	55 21 244	05 02 743		60.1						ST
	0408	″	71	55 21 251	05 02 614	220	60.3						DEPLOY FLY
	0435	″	72	55 20 918	05 03 254	220	60.1		SW	6/7	MOD	MOD	RECOVER FLY
	0436	″	73	35 20 919	05 03 261	STOPPED	58.3						CTD
	0508	″	74	55 20 914	05 03 213	220	58.3		SW	6	MOD	MOD	DEPLOY FLY
	0533	✓	75	55 20 550	05 03 923	220	58.3						RECOVERED FLY
	0535	✓	76	55 20 509	05 03 965	STOPPED	57.1						CTD
	0612	✓	77	55 20.715	05 03.811	300	57.8	0.8	SW	5/6	MOD	MOD	DEPLOY FLY
	0642	✓	78	55 21.040	05 04.687	296	58.1	0.8					RECOVER FLY
	0651	✓	79	55 21.096	05 04.850	STOP	58.2		SW	6	MOD	MOD	CTD
	0704	✓	80	55 21.140	05 04.744	STOP	59.0						SVT
	0715	✓	81	55 21.122	05 04.544	120	57.7	1.1	SW	6	MOD	MOD	DEPLOY FLY
	0740	✓	82	55 20.910	05 03.716	114	56.6	0.7					RECOVER FLY
	0745	✓	83	55 20.892	05 03.633	STOP	57.2		SW	5/6	MOD	MOD	CTD
	0759	✓	84	55 20.948	05 03.450	STOP	57.6						SVT
	0814	✓	85	55 20.928	05 03.325	188	57.3	0.4	SW	5/6	MOD	MOD	DEPLOY FLY
	0835	✓	86	55 20.545	05 03.839	201	55.2	0.7					RECOVER FLY
	0840	✓	87	55 20.555	05 03.834	STOP	55.6		SW	5/6	MOD	MOD	CTD
	0909	✓	88	55 20.745	05 03.634	310	57.0	1.0	SW	5	MOD	MOD	DEPLOY FLY 〈PTI MODE〉
	0934	✓	89	55 21.132	05 04.081	329	56.0	0.8					RECOVER FLY
	0943	✓	90	55 21.267	05 04.143	STOP	56.8		SW	5	MOD	MOD	CTD
	1013	✓	91	55 21.494	05 03.358	188	58.1	0.7	SW	5/6	MOD	MOD	DEPLOY FLY
	1036	✓	92	55 21.062	05 03.431	190	58.1	0.7					RECOVER FLY
	1041	✓	93	55 21.044	05 03.361	STOP	58.1		WSW	5/6	MOD	MOD	CTD
	1106	✓	94	55 21.165	05 03.010	249	58.7	0.7	WSW	5/6	MOD	MOD	DEPLOY FLY
	1134	✓	95	55 20.914	05 03.894	238	58.5	0.9					RECOVER FLY
	1138	✓	96	55 20.893	05 03.896	STOP	58.5		WSW	5	MOD	MOD	CTD

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CHIEF SCIENTIST

MASTER

STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA - FLY

SHEET NUMBER 0131 (4) N. FISHER

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING ~~FMS~~ M	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
10.02.04	1209	C2	97	55 21 016	5 03 183	220	59.7		SW	5	MOD	MOD	DEPLOYED FLY
	1234	✓	98	55 20 635	5 03 024	220	59.7						RECOVERED FLY
	1246	✓	99	55 20 676	5 02 617	STOP	58.3						CTD
	1315	✓	100	55 20 694	5 02 569	270	58.7		W	7	RGH	MOD	DEPLOY FLY
	1338	✓	101	55 20 657	5 03 361	270	58.7						RECOVER FLY
	1340	✓	102	55 20 648	5 03 352	STOP			W	7	RGH	MOD	CTD
	1441	✓	103	55 20 603	5 03 296	270	57.9						DEPLOY FLY
	1440	✓	104	55 20 421	5 04 403	270	58.6						RECOVER FLY
	1443	✓	105	55 20 401	5 04 446	STOP							CTD
	1511	✓	106	55 20 874	5 03 865	270	59.1		W	6	MOD/RGH	MOD	DEPLOY FLY
	1539	✓	107	55 20 812	5 04 783	270	60.4						RECOVER FLY
	1543	✓	108	55 20 767	5 04 755	STOP	60.1						CTD
	1606	✓	109	55 20 973	5 04 436	250	59.3						DEPLOY FLY
	1636	✓	116	55 19 973	5 05 436	250	59.3		W	6	MOD	RGH	RECOVER FLY
	1638	✓	111	55 19 901	5 05 454	STOP	56.1						CTD
	1709	✓	112	55 20 444	5 04 209	030	58.0		WNW	6	MOD	MOD	DEPLOY FLY
	1744	✓	113	55 20 652	5 03 503	030	57.1						RECOVER FLY
	1749	✓	114	55 20 645	5 03 496	STOP	57.0		WNW	6	MOD	MOD	CTD
	1814	✓	115	55 20 · 366	5 03 · 609	273	56.3	0.6	WNW	5	MOD	MOD	DEPLOY FLY
	1838	✓	116	55 20 · 416	5 04 · 468	275	55.6	0.7					RECOVER FLY
	1847	✓	117	55 20 · 362	5 04 · 548	STOP	56.8		WNW	5	MOD	MOD	CTD
	1912	✓	118	55 20 · 135	5 04 · 351	348	55.4	1.1	WNW	5/6	MOD	MOD	DEPLOY FLY
	1935	✓	119	55 20 · 539	5 04 · 455	356	56.2	1.0					RECOVER FLY
	1947	✓	120	55 20 · 597	5 04 · 217	STOP	56.4		WNW	6	MOD	MOD	CTD
	2012	✓	121	55 20 · 465	5 03 · 946	330	54.5	1.0	WNW	5	MOD	MOD	DEPLOY FLY
	2035	✓	122	55 20 · 881	5 04 · 375	335	56.5	0.8					RECOVER FLY
	2042	✓	123	55 20 · 944	5 04 · 356	STOP	57.1		WNW	4/5	MOD	MOD	CTD
	2111	✓	124	55 20 · 999	5 04 · 234	322	57.0	0.7	WNW	4/5	MOD	MOD	DEPLOY FLY
	2134	✓	125	55 21 · 352	5 04 · 820	329	60.5	0.9					RECOVER FLY
	2141	✓	126	55 21 · 379	5 04 · 774	STOP	60.4		WXW	5	MOD	MOD	CTD
	2209	✓	127	55 21 · 378	5 04 · 080	169	57.3	0.7	WXW	5	MOD	MOD	DEPLOY FLY
	2234	✓	128	55 20 · 985	5 03 · 894	160	58.2	0.7					RECOVER FLY

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STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA - FLY

SHEET NUMBER 0132 (5) N. FISHER

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING ~~FMS.~~ m	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
10.2.04	2240	C2	129	55 20.929	05 03.807	STOP	57.3		WNW	5	MOD	MOD	CTD
	2310	✓	130	55 20.988	05 03.326	293	58.2	0.7	WxN	4/5	MOD	MOD	DEPLOY FLY
	2332	✓	131	55 21.154	05 04.022	288	57.1	1.0					RECOVER FLY
	2338	✓	132	55 21.151	05 03.996	STOP	58.1		WNW	4/5	MOD	MOD	CTD
	0012	✓	133	55 21 151	05 03 540	260	58.2						DEPLOY FLY
	0032	✓	134	55 21 069	05 04 049	260	58.2						RECOVER FLY
	0034	✓	135	55 21 057	05 04 069	STOP							CTD
	0114	✓	136	55 21 075	05 03 487	270	58.94		WNW	4	MOD	LOW	DEPLOY FLY
	0132	✓	137	55 21 025	05 04 194	270	58.7						RECOVER FLY
	0134	✓	138	55 21 009	05 04 230	STOP	59.0						CTD
	0211	✓	139	55 21 087	05 03 732	270	59		WNW	3	SLT	LOW	DEPLOY FLY
	0229	✓	140	55 21 135	05 04 667	270	60.1						RECOVER FLY
	0236	✓	141	55 21 130	05 04 721	STOP	60						CTD
	0314	✓	142	55 21 216	05 04 433	260	60.7						DEPLOY FLY
	0335	✓	143	55 21 180	05 05 169	260	60.6						RECOVER FLY
	0339	✓	144	55 21 166	05 05 226	STOP	60.6						CTD
	0411	✓	145	55 21 175	05 05 205	260	61.1		WNW	3	SLT	LOW	DEPLOY FLY
	0439	✓	146	55 20 919	05 06 344	260	61.0						RECOVER FLY
	0442	✓	147	55 20 880	05 06 408	STOP	60.8						CTD
	0513	✓	148	55 20 952	05 04 690	270	59.3		WNW	3	SLT	LOW	DEPLOY FLY
	0540	✓	149	55 20 981	05 05 910	270	59.6						RECOVER FLY
	0543	✓	150	55 20 973	05 06 004	STOP	60.6						CTD
	0610	✓	151	55 20.913	05 05.822	066	58.5	1.3	WNW	2/3	SLT	LOW	DEPLOY FLY
	0637	✓	152	55 21.089	05 04.932	078	59.7	1.1					RECOVER FLY
	0645	✓	153	55 21.053	05 04.812	STOP	58.1		WNW	2/3	SLT	LOW	CTD
	0710	✓	154	55 20.913	05 04.656	090	57.6	1.0	WNW	2/3	SLT	LOW	DEPLOY FLY
	0730	✓	155	55 20.970	05 03.956	086	57.4	1.1					RECOVER FLY
	0739	✓	156	55 20.970	05 03.759	STOP	57.4		WxN	2/3	SLT	SLT	CTD
	0810	✓	157	55 20.858	05 03.792	325	56.9	0.7	W	3	SLT	SLT	DEPLOY FLY
	0832	✓	158	55 21.187	05 04.078	340	57.8	0.9					RECOVER FLY
	0843	✓	159	55 21.338	05 04.143	STOP	58.2		WxS	3	SLT	SLT	CTD
	0909	✓	160	55 21.384	05 03.862	214	57.6	0.9	WNW	3	SLT	LOW	DEPLOY FLY

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STATION LOG. R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA - FLY
SHEET NUMBER 0133 (6) N. FISHER

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING		WIND		SEA	SWELL	REMARKS
							~~METRES~~ m	LOG.	DIR.	FORCE			
11.02.04	0918	C2	161	55 21.267	05 03.968	210	55.4	0.7					RECOVER FLY - CABLE CONNECTION PROBLEM
	0920	✓	162	55 21.240	05 03.987	203	55.8	0.7	WNW	3	SLT	LOW	REDEPLOY FLY
	0930	✓	163	55 21.109	05 04.082	204	57.1	0.7					RECOVER FLY - BREAKDOWN
	0940	✓	164	55 21.043	05 03.944	STOP	57.2		WNW	3	SLT	SLT	CTD
	1003	✓	165	55 21.020	05 03.955	✓	57.4		WNW	3	SLT	SLT	ADCP "popped" & on surface
	1015	✓	166	55 21.058	05 03.976	✓	57.4						ADCP hoobed
	1023	✓	167	55 21.084	05 03.877	✓	57.8						ADCP & FRAME on deck recovered.
	1037	✓	168	55 20.922	05 03.783	STOP	57.4		WNW	3	SLT	SLT	CTD
12.02.04	1929	ETHEL	169	53 27.643	04 32.908	STOP	43.0		SSW	4	SLT	LOW	ADCP DEPLOYED ON BOTTOM
	2037	HH1	170	53 27.645	04 20.106	STOP	40		SW	3	SLT	SLT	CTD
	2132	HH2	171	53 27.653	04 21.876	STOP	40		SW	3/4	SLT	LOW	CTD
	2237	HH3	172	53 27.688	04 21.985	STOP	40.6		SW	4	SLT	LOW	CTD
	2330	HH4	173	53 27.551	04 23.883	STOP	41.5		SW	4	SLT	LOW	CTD
13.2.04	0032	HH5	174	53 27 642	04 25 833	STOP	43.5		SW	4	SLT	LOW	CTD
	0430	HH6	175	53 27 635	04 25 444	STOP	42.1		SW	3	SLT	LOW	CTD
	0230	HH 7	176	53 27 694	04 27 243	STOP	38.7		SW	3	SLT	LOW	CTD
	0328	HH 8	177	53 27 663	04 31 272	STOP	46.6		SW	3	SLT	LOW	CTD
	0430	HH 9	178	53 27 611	04 37 665	STOP	42.10		SW	3	SLT	LOW	CTD
	0530	'ADCP'	179	53 27 557	04 33 027	STOP	43.5		SW	3	SLT	LOW	CTD
	0598	ETHEL	120	53 27 474	04 34 092	STOP	44.6		SW	3	SLT	LOW	ST.
	0630	ETHEL	121	53 27 591	04 33 202	STOP	42.4						CTD
	0642	✓	122	53 27 515	04 34 135	STOP	43.1		SW	4	SLT	SLT	MSST
	0732	✓	123	53 27.630	04 32.993	STOP	42.7		SW	3/4	SLT	LOW	CTD
	0742	✓	124	53 27.619	04 33.372	STOP	44.0						SVT
	0829	✓	125	53 27.663	04 32 969	STOP	43.4		SW	3/4	SLT	LOW	CTD
	0840	✓	126	53 27.675	04 33.200	STOP	44.5						MSST
	0929	✓	127	53 27.677	04 33.048	STOP	43.7						CTD
	0942	✓	128	53 27.764	04 32.865	STOP	40.6		SW	3	SLT	LOW	SVT
	1030	✓	129	53 27.624	04 32.852	STOP	41.4		SW	3	SLT	LOW	CTD
	1043	✓	130	53 27.780	04 32.236	STOP	43.9						MSST
	1130	✓	131	53 27.613	04 32.662	STOP	42.1		WSW	2/3	SLT	SLT	CTD

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STATION LOG. R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME CLYDE SEA / SKERRIES – FLY
SHEET NUMBER 0134 (7) N. FISHER

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING ~~ENG~~ M	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
13.2.04	1144	ETHEL	132	53 27.733	04 31.592	STOP	43		WSW	2/3	SLT	SLT	SVT
	1228	✓	133	53 27 709	04 32 906	STOP	46.6		WSW	2	RPD	LOW	CTD
	1240	–	133	53 27 850	04 31 592	STOP	46.6		WSW	2	RPD	LOW	SVT LISST
	1332	✓	134	53 27 743	04 32 338	STOP	46.5		WSW	2	RPD	LOW	SVT
	1341	✓	135	53 27 790	04 31 803	STOP	47.9						CTD
	1429	–	136	53 27 715	04 32 803	STOP	49.33		SSW	2	RPD	LOW	CTD
	1446	✓	137	53 27 738	04 32 485	STOP	47.1						LISST
	1526	✓	138	53 27 594	04 33 081	STOP	44.0		SSW	2	RPD	LOW	CTD
	1538	✓	139	53 27 471	04 33 229	STOP	44.0						SVT
	1629	✓	140	53 27 699	04 32 839	STOP	47.0		WSW	2	RPD	LOW	CTD
	1640	✓	141	53 27 555	04 33 660	STOP	47.1						LISST
	1728	✓	142	53 27 595	04 33 077	STOP	43.7		SSW	2	RPD	LOW	CTD
	1739	✓	143	53 27 480	04 33 961	STOP	41.7						SVT
	1829	✓	144	53 27.562	04 32.928	STOP	42.6		VAR	1/2	RPLD	SLT	CTD
	1840	✓	145	53 27.363	04 33.720	STOP	40.4						LISST
	1930	✓	146	53 27.635	04 32.671	STOP	42.0		NW	2	RPLD	SLT	CTD
	1941	✓	147	53 27.600	04 33.209	STOP	42.0						SVT
	2030	✓	148	53 27.656	04 32.928	STOP	43.5		NW	2	RPLD	SLT	CTD
	2044	✓	149	53 27.603	04 33.499	STOP	42.5						LISST
	2130	✓	150	53 27.664	04 32.896	STOP	42.9		NW	2	RPLD	SLT	CTD
	2143	✓	151	53 27.673	04 33.051	STOP	43.4						SVT
	2240	✓	152	53 27.738	04 32.709	STOP	45.0		N	2/3	SLT	SLT	CTD
	2254	✓	153	53 27.766	04 32.351	STOP	43.7						LISST
	2329	✓	154	53 27.640	04 32.775	STOP	43.0		NNE	2	SLT	SLT	CTD
	2342	✓	155	53 27.710	04 32.139	STOP	42.6						SVT
14.2.04	0028	–	156	53 27 704	04 32 705	STOP	45.3		NE	2	SLT	SLT	CTD
	0039	–	157	53 27 745	04 31 647	STOP	44.1						LISST
	0130	–	158	53 27 671	04 32 824	STOP	44.9		NE	2	SLT	LOW	CTD
	0142	✓	159	53 27 727	04 31 923	STOP	44.8						SVT
	0230	✓	160	53 27 660	04 32 873	STOP	46.11						CTD
	0244	✓	161	53 27 689	04 32 266	STOP	46.7						LISST
	0329	✓	162	53 27 695	04 33 057	STOP	47.3		NE	2	RPD	LOW	CTD

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STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 4/04

SHEET NUMBER (8) 0135

PROGRAMME NEIL FISHER
SKERRIES CTD, SVT LISST

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS.	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
14.2.04	0340	ETHEL	163	53 27 885	04 32 971	STOPPED	46.8		N	2	RPD	LOW	SVT
	0432	"	164	53 27 613	04 32 916	"	45.9		N	2	RPD	LOW	CTD
	0445	"	165	53 27 581	04 33 414	"	43.5						LISST
	0529	"	166	53 27 656	04 32 945	"	45.9		N	2	RPD	LOW	CTD
	0548	✓	167	53 27 394	04 33 729	"	42.4						SVT
	0629	✓	168	53 27.659	04 32.959	✓	45.9		NNW	2/3	SLT	SLT	CTD
	0640	✓	169	53 27.524	04 33.694	✓	43.9						LISST
	0711	✓	170	53 27.590	04 33.430	083	44.0	2.7/0.5	NNE	3	SLT	SLT	DEPLOY FLY
	0740	✓	171	53 27.586	04 33.504	239	44.1	1.7/0.1					RECOVER FLY
	0745	✓	172	53 27.570	04 33.594	STOP	52.8		NE	2/3	SLT	SLT	CTD
	0818	✓	173	53 27.487	04 32.112	272	40.9	1.1	NE	2	SLT	SLT	DEPLOY FLY
	0837	✓	174	53 27.423	04 33.648	263	40.4	0.7					RECOVER FLY
	0841	✓	175	53 27.413	04 33.946	STOP	40.3		NE	2	SLT	SLT	CTD
	0911	✓	176	53 27.642	04 31.848	262	41.1	1.3	NE	2	SLT	SLT	DEPLOY FLY
	0932	✓	177	53 27.497	04 33.273	263	40.6	0.8					RECOVER FLY
	0936	✓	178	53 27.473	04 33.445	STOP	40.6						CTD
	1009	✓	179	53 27.497	04 33.649	085	41.6	0.8	NE	2	RPLD	SLT	DEPLOY FLY
	1028	✓	180	53 27.537	04 33.174	085	40.8	0.7					RECOVER FLY
	1033	✓	181	53 27.560	04 33.078	STOP	41.0						CTD
	1104	✓	182	53 27.602	04 32.996	270	41.6	0.9	N	1/2	RPLD	SLT	DEPLOY FLY
	1126	✓	183	53 27.647	04 33.138	340	42.6	0.7					RECOVER FLY
	1131	✓	184	53 27.683	04 33.080	STOP	44.1		VAR	1	RPLD	SLT	CTD
	1207	"	185	53 27 791	04 32 761	260	46.4	0.5	V	1	RPD	SLT	DEPLOY FLY
	1231	"	186	53 27 862	04 32 245	260	48.1						RECOVER FLY
	1233	"	187	53 27 867	04 32 154	STOP	48.9						CTD
	1313	"	188	53 27 775	04 32 487	270	49.1		VAR	1	RPD	SLT	DEPLOY FLY
	1334	"	189	53 27 983	04 29 900	276	49.1						RECOVER FLY
	1356	"	190	53 27 595	04 32 693	STOP	43.4		VAR	2	RPD	SLT	CTD
	1417	"	191	53 27 769	04 32 576	080	46.5						DEPLOY FLY
	1443	"	192	53 28 121	04 29 714	080	46.5						RECOVER FLY
	1505	"	193	53 27 644	04 32 874	STOP	46.5						CTD
	1518	"	194	53 27 799	04 32 564	270	48.7		NE	2	RPD	LOW	DEPLOY FLY

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STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 4/04

SHEET NUMBER (9) 0136

PROGRAMME NIGEL FISHER
SIERRIES FLY

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS.	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
14.2.04	1546	ETHEL	195	53 27 862	4 39 439	270	48.8		NG	2	SLT	LOW	RECOVER FLY
	1545	✓	196	53 27 851	4 33 431	STOD	51.1						CTD
	1609	✓	197	53 27 861	4 33 067	260	52.1						DEPLOY FLY
	1636	✓	198	53 27 783	4 34 350	260	51.9						RECOVER FLY
	1639	✓	199	53 27 728	4 34 424	STOP	49.1						CTD
	1707	✓	200	53 27 744	4 32 730	090	48.8		LT	AIRS	-	LOW	DEPLOY FLY
	1726	✓	201	53 27 618	4 32 762	090	44.4						RECOVER FLY
	1730	✓	202	53 27 590	4 32 885	STOD	44.5						CTD
	1816	✓	203	53 27.625	4 32.059	254	44.1	0.7	E	2	RPLD	SLT	DEPLOY FLY
	1835	✓	204	53 27.370	4 33.854	251	41.9	0.7					RECOVER FLY
	1841	✓	205	53 27.355	4 34 .263	STOP	41.8						CTD
	1915	✓	206	53 27.608	4 32.763	249	42.9	1.0	LT AIRS		SMTH	SLT	DEPLOY FLY
	1934	✓	207	53 27.465	4 33 '373	251	42.1	0.8					RECOVER FLY
	1939	✓	208	53 27.418	4 33.598	STOP	41.8						CTD
	2013	✓	209	53 27.548	4 32.173	230	41.9	1.0	E	1/2	RPLD	SLT	DEPLOY FLY
	2030	✓	210	53 27.417	4 32.583	237	40.4	0.6					RECOVER FLY
	2034	✓	211	53 27.408	4 32.765	STOP	40.8						CTD
	2110	✓	212	53 27.560	4 31.596	252	41.2	0.7	ENE	2	RPLD	SLT	DEPLOY FLY
	2128	✓	213	53 27.533	4 31.732	261	41.4	0.7					RECOVER FLY
	2131	✓	214	53 27.524	4 31.771	STOP	41.0						CTD
	2209	✓	215	53 27.489	4 32.454	041	40.1	0.7	E	2	RPLD	SLT	DEPLOY FLY
	2227	✓	216	53 27.568	4 32.339	055	41.2	0.7					RECOVER FLY
	2231	✓	217	53 27.588	4 32.360	STOP	41.3						CTD
	2305	✓	218	53 27.628	4 32.630	085	41.2	0.6	E	3	SLT	SLT	DEPLOY FLY
	2323	✓	219	53 27.625	4 32.174	089	41.2	0.5					RECOVER FLY
	2328	✓	220	53 27.623	4 32.031	STOP	41.3						CTD
15.2.04	0008	—	221	53 27 559	4 32 708	260	41.1						DEPLOY FLY
	0025	—	222	53 27 570	4 32 841	260	41.1		NNE	1	RPD	LOW	RECOVER FLY
	0110	—	223	53 27 722	4 33 787	260	46.4						DEPLOY FLY
	0131		224	53 27 813	4 32 313	260	47.6						RECOVER FLY
	0136		225	53 27 819	4 32 055	STOP	48.1						CTD
	0218		226	53 27 673	4 32 863	260	46.2						DEPLOY FLY

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STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 4/04 PROGRAMME NEIL FISHER STEERIES FLY

SHEET NUMBER (10) 0137

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS.	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
15.2.04	0243	ETHEL	227	53 27 925	4 32 256	260	53.8		NE	1	RPD	LOW	RECOVERED FLY
	0245	"	228	53 27 935	4 32 208	STOP ~~260~~	53.8						CTD
	0314	"	229	53 27 674	4 32 783	260	45.6						DEPLOY FLY
	0335	✓	230	53 27 741	4 32 650	260	48.0						RECOVER FLY
	0336	✓	231	53 27 735	4 32 605	STOP	48.0						CTD
	0416	✓	232	53 27 671	4 33 054	260 ~~STOP~~	47.2						DEPLOY FLY
	0436	✓	233	53 27 692	4 33 611	260	44.5		NE	2	RPD	LOW	RECOVERED FLY
	0437	✓	234	53 27 695	4 33 639	STOP	44.5						CTD
	0507	✓	235	53 27 698	4 32 607	090	47.7						DEPLOY FLY
	0529	✓	236	53 27 725	4 32 014	090	46						RECOVERED FLY
	0533	✓	237	53 27 719	4 31 998	STOP	44.5		E	1	RPD	LOW	CTD
	0612	✓	238	53 27.491	4 33.437	242	43.4	1.1	LT AIRS		RPLD	SLT	DEPLOY FLY
	0632	✓	239	53 27.441	4 33.666	255	42.9	0.9					RECOVER FLY
	0635	✓	240	53 27.422	4 33.757	STOP	42.9						CTD
	0710	✓	241	53 27.609	4 32.149	231	43.7	1.0	CALM		SMOOTH		DEPLOY FLY
	0730	✓	242	53 27.485	4 32.506	240	42.4	0.9					RECOVER FLY
	0733	✓	243	53 27.459	4 32.628	STOP	42.4						CTD
	0809	✓	244	53 27.630	4 32.059	252	43.2	1.1	LT	AIRS			DEPLOY FLY
	0835	✓	245	53 27.491	4 32.694	248	41.5	0.8					RECOVER FLY
	0840	✓	246	53 27.470	4 32.830	STOP	41.6						CTD
	0912	✓	247	53 27.525	4 33.161	233	42.0	1.0	CALM		SMOOTH		DEPLOY FLY
	0930	✓	248	53 27.465	4 33.491	244	41.2	0.8					RECOVER FLY
	0934	✓	249	53 27.462	4 33.615	STOP	41.1						CTD
	1006	✓	250	53 27.724	4 33.037	STOP	46.5		CALM		SMOOTH		ADCP 'popped' ✗ on surface
	1032	✓	251	53 27.637	4 33.047	✓	42.1						ADCP hooked. boat hook lost
	1040	✓	252	53 27.640	4 32.997	✓							ADCP re-hooked, secured on stern
	1053	✓	253	53 27.619	4 33.001	✓							Frame ✗ instrument recovered on deck
	1100	✓	254	53 27.556	4 33.182	✓	40.9		E	1/2	RPLD	SMTH.	CTD
17.2.04	1058	T10	255	53 31 539	4 02 317	"	43.0		N	4	SLT	SLT	CTD USST
	1133	T9	256	53 31 065	~~3~~ 57 601		56.4		NNE	4	SLT	LOW	CTD
	1209	T8	257	53 30.459	3 53.218	"	42.3		NNE	4	SLT	LOW	USST
	1240	T7	258	53 30.009	3 46.429	"	37.9		NNE	3	SLT	LOW	CTD + USST

N.B. - TOP SHEET TO BE TORN OUT - LABORATORY COPY
BOTTOM SHEET TO BE LEFT ON BOARD

CHIEF SCIENTIST

MASTER

STATION LOG. R.V. PRINCE MADOG

CRUISE NUMBER 04/04 PROGRAMME NEIL FISHER

SHEET NUMBER 0138 (1)

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING		WIND		SEA	SWELL	REMARKS
							~~FMS.~~ M	LOG.	DIR.	FORCE			
17/2/04	1317	T16	259	53 - 29.453	3 43.958	STOPPED	35.5		NNE	3	SLT	LOW	CTD
	1347	T5	260	53 29.061	3 39.476	"	30.8		NNE	3	SLT	LOW	CTD
	1417	T4	261	53 28.183	3 35.119	"	21.1		NNE	3	SLT	LOW	CTD
	1442	T3	262	53 27.591	3 30.928	"	18.1		NNE	3	SLT	LOW	CTD
	1519	T6	263	53 28.659	3 37.892	"	27.7		NNE	2	SLT	LOW	ADCP FRAME
	1524	T6	264	53 28.644	3 37.868	"	27.1		NNE	2	SLT	LOW	CTD
	1542	"	265	53 28.42	3 37.806	280	27.0	0.5	"	"	"	"	DEPLOY FLY
	1559	"	266	53 28.640	3 38.190	280	27.9	0.5	"	"	"	"	RECOVER FLY CTD ~~RECOV~~
	1616	"	267	53 28.544	3 37.975	STOPPED	27.4	STOPPED	"	"	"	"	LISST
	1640	"	268	53 28.513	3 37.678	330	27.6	0.5	"	"	"	"	DEPLOY FLY
	1704	"	269	53 28.691	3 37.747	340	28.4	0.5	"	"	"	"	RECOVER FLY
	1707	"	270	53 28.632	3 37.658	STOPPED	28.0	STOPPED	"	"	"	"	CTD
	1724	"	271	53 28.668	3 37.905	"	29.0		"	"	"	"	LISST
	1744	"	272	53 28.645	3 37.696	320	29.0	0.8	"	"	"	"	DEPLOY FLY
	1804	"	273	53 28 702	3 37 874		27.4						RECOVER FLY
	1809	"	274	53 28 664	3 37 775	STOP	27.4						CTD
	1819	"	275	53 28 584	3 37 270								LISST
	1840		276	53 28 644	3 37 844	280	27.8						DEPLOY FLY
	1900		277	53 28 646	3 37 832	280							RECOVER FLY
	1903		278	53 28 632	3 37 787	STOP	28						CTD
	AIS		279	53 28 474	3 37 277	STOP	26.5						LISST
	1946		280	53 28 677	3 37 922	296	29.7		NNE	2	RPD	LOW	DEPLOY FLY
	2008		281	53 28 698	3 37 936	296	29.5						RECOVER FLY
	2005		282	53 28 665	3 37 826	STOP	29.2						CTD
	2016		283	53 26 597	3 37 655								LISST
	2038		284	53 28 696	3 37 978	280	30.2						DEPLOY FLY
	2056		285	53 28 801	3 38 371								RECOVER FLY
	2105		286	53 28 794	3 38 383	STOP	36.7						CTD
	2110		287	53 28 695	3 38 408								LISST
	2139		288	53 28 611	3 37 729	100	31.3						DEPLOY FLY
	2155		289	53 28 429	3 37 364	100	30.6						RECOVER FLY
	2157		290	53 28 424	3 37 367	STOP	30.6						CTD

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CHIEF SCIENTIST

MASTER

STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 4/04 PROGRAMME NEIL FISHER LPL BFX

SHEET NUMBER 12 0139

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS. M	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
17.2.04	2200	ADCP	291	53 28 300	03 37 602	STOP			NE	2/3	SLT	LOW	LISST
	2239		292	53 28 643	03 38 042	100	32.8						DEPLOY FLY
	2300		293	53 28 487	03 38 032	100							RECOVER FLY, CTD
	2315		294	53 28 392	03 38 454	STOP							LISST
	2335		295	53 28 602	03 38 178	080	31.2						DEPLOY FLY
	2358		296	53 28 641	03 38 107								RECOVER FLY, CTD
	0011		297	53 28.551	03 38.664								LISST
	0045		298	53 28.696	03 38.198	330	30.4	0.8	NE	2	SLT	LOW	DEPLOY FLY
	0058		299	53 28.779	03 38.184	010	31.2	0.4	"	"	"	"	RECOVER FLY CTD
	0110		300	53 28.832	03 38.108		31.7		"	"	"	"	LISST
	0141		301	53 28.689	03 38.076	110	30.1	0.1	"	"	"	"	DEPLOY FLY
	0155		302	53 28.671	03 38.099	110	28.7	0.2	"	"	"	"	RECOVER FLY. CTD
	0204		303	53 28.672	03 38.107	STOPPED							CTD
	0212		304	53 28.767	03 38.418	STOPPED	28.7		"	"	"	"	LISST.
	0240		305	53 28.693	03 37.988	110	281	0.7	"	"	"	"	DEPLOY FLY
	0251		306	53 28.723	03 37.987	110	27.6	0.7	"	"	"	"	RECOVER FLY CTD
	0303		307	53 28.819	03 38.149	STOPPED	30.6		"	"	"	"	LISST
	0340		308	53 28.742	03 37.855	120	27.9	0.5	"	"	"	"	DEPLOY FLY
	0353		309	53 28.698	03 37.583	120	27.4	0.5	"	"	"	"	RECOVER FLY CTD
	0408		310	53 28.755	03 37.496	STOPPED	27.3		"	"	"	"	LISST.
	0440		311	53 28.653	03 37.965	250	27.9	0.5	"	"	"	"	DEPLOY FLY
	0459		312	53 28.589	03 38.141	260	28.6	0.5	"	"	"	"	RECOVER FLY. CTD
	0514		313	53 28.583	03 37.969	STOPPED	25.7		"	"	"	"	LISST
	0540		314	53 28.620	03 37.503	285	27.6	0.8	NNE	2	SLT	LOW	DEPLOY FLY
	0601		315	53 28 640	03 37 301	285	27.9						RECOVER FLY CTD
	0614		316	53 28 554	03 36 794	STOP	27.1						LISST
	0637		317	53 28 675	03 37 969	280	30.9						DEPLOY FLY
	0704		318	53 28 616	03 38 007	280	31.3						RECOVER FLY
	0716		319	53 28 452	03 37 357	STOP	30.4						LISST
	0939		320	53 28 687	03 37 999	280	32.4						DEPLOY FLY
	0800		321	53 28 827	03 38 108								RECOVER FLY CTD
	0815		322	53 28 802	03 37 810	STOP	33.6						LISST

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STATION LOG.

R.V. PRINCE MADOG

CRUISE NUMBER 4/04 PROGRAMME NIG. FISHER LPL BAY

SHEET NUMBER 13 0140

DATE	B.S.T.	STATION	Consecutive Number	LAT. N	LONG W.	TRUE COURSE	SOUNDING FMS.	SOUNDING LOG.	WIND DIR.	WIND FORCE	SEA	SWELL	REMARKS
18.2.04	0335	ADCP	323	53 28 588	03 37 983	280	32.7		NE	2	RPD	LOW	DEPLOY FLY
	0358		324	53 28 605	03 38 254								RECOVER FLY CTD
	0907		325	53 28 637	03 38 085	STOP	33.4						LISST
	0939		326	53 37 861	03 37 863	290	32.7						~~DEPLOY RECOVER~~ FLY CTD
	0957		327	53 28 862	03 38 380	290	37.3						RECOVER FLY CTD
	1013		328	53 28 916	03 38 564	STOP	37.4						LISST
	1040		329	53 28 675	03 37 944	090	32.6						DEPLOY FLY
	1059		330	53 28 648	03 37 596								RECOVER FLY, CTD
	1108		331	53 28 533	03 37 717	STOPPED	32.6						LISST
	1140		332	53 28 627	03 37 995	070	31.0						DEPLOY FLY
	1153		333	53 28 706	03 37 615	070	31.1						RECOVERED FLY CTD
	1206		334	53 28.699	03 37.879	STOPPED	30.6		NE	2	RPD	LOW	LISST
	1240		335	53 28.703	03 37.897	087	29.4	0.6	"	"	"	"	DEPLOY FLY
	1251		336	53 28.692	03 37.946	087	29.7	0.6	"	"	"	"	RECOVER FLY. CTD
	1305		337	53 28.690	03 38.378	STOPPED	30.7		"	"	"	"	LISST
	1340		338	53 28.709	03 37.791	110	29.0	0.6	"	"	"	"	DEPLOY FLY
	1353		339	53 28.713	03 37.924	110	28.3	0.6	NNE	2	RPD	LOW	RECOVER FLY CTD
	1406		340	53 28.793	03 38.305	STOPPED	31.6						LISST
	1440		341	53 28.591	03 37.649	115	26.7	0.8	NNE	2	RPD	LOW	DEPLOY FLY
	1452		342	53 28.611	03 37.629	115	26.4	0.6	"	"	"	"	RECOVER FLY CTD
	1504		343	53 28.714	03 37.419	STOPPED	27.0		"	"	"	"	LISST
	1540		344	53 28.722	03 37.452	120	27.3	0.6	"	"	"	"	DEPLOY FLY
	1555		345	53 28.662	03 37.677	140	25.9	0.4	"	"	"	"	RECOVER FLY
	1604		346	53 28.695	03 37.649	STOPPED	25.3		"	"	"	"	LISST
	1621												RECOVERED ADCP

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