第一部 海鷹丸航海調査報告 平成12年度 第3次航海報告

5.5.2　太平洋西経漁場におけるマグロ延縄操業報告

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Report of tuna long-line fishing and oceanographic environment at the western fishing ground in Pacific Ocean.

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1. はじめに

海鷹丸Ⅳによる初の遠洋航海となった第 3 次航海にて行ったマグロ延縄操業の結果を報告する。今回行った西経漁場（Fig.1）は、メバチマグロの漁場として商売船が操業を行う海域でもあり、この海域で漁獲されたマグロは身質も良く、ベンガル湾等で漁獲されたマグロより市場でも高値で取り引きされている。

2. 方法

操業鉢数と使用した深度計の数はTable 1のとおりである。初回は6本付け（Fig. 3）の 100 鉢で 3 回目以降は同じく 6 本付け 150 鉢で操業をおこなった。投縄終了後に、ＣＴＤ観測を行った。漁獲物は、全長、体重、体高、体幅、生殖腺重量を測定した（Table 2）。

3. 結果

一般にマグロ類は水温躍層付近を遊泳していると考えられている。そのためマグロ類をねらう場合には、この水温躍層をいかにして見つけ、また仕掛けを投入するかが釣果の分かれ目となる。はじめに今回操業を行った海域の海洋構造をCTD の結果より見ていく（Fig. 4)。図より南から北上して従って、少しづつではあるが水温躍層が深くなっていることがわかる。深度計のデータより、回を重ねるごとに漁具が深く入っていることがわかる。漁獲物の量から漁具の深度を海洋構造の違いについて見ていくと、比較的マグロが漁獲された 2 日目と 6 日目は深度計の示した水温が 17～18℃付近であった。これに対して、カジキ類がかかったときの深度計の示していた水温は、20℃付近前後であった。また、漁獲がなかった 7 日目の深度計の示している水温は、13℃前後と他の時に比べて低く、漁具全体も安定してほぼ同じ層に入っていた。これに対して、7 日目以外の操業でも、水温の低い層に漁具が入っていることもあったが、すべての漁具がその層に入ることがなくある程度ばらけていた。今回の結果より、適切な層に漁具を入れることでより、釣果があがることが期待された。

Reference Photo

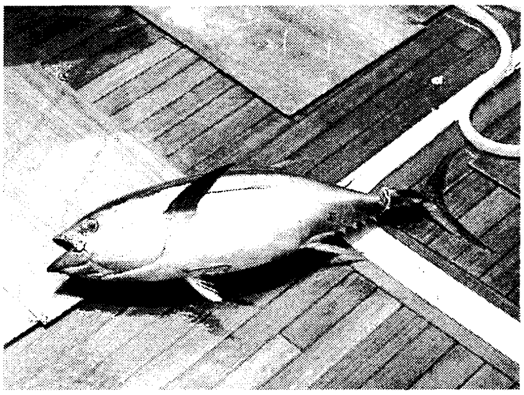


Photo 1. Big-eye tuna.

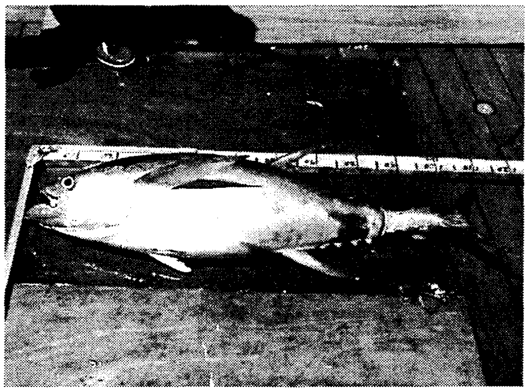


Photo 2. Yellow-fin tuna.

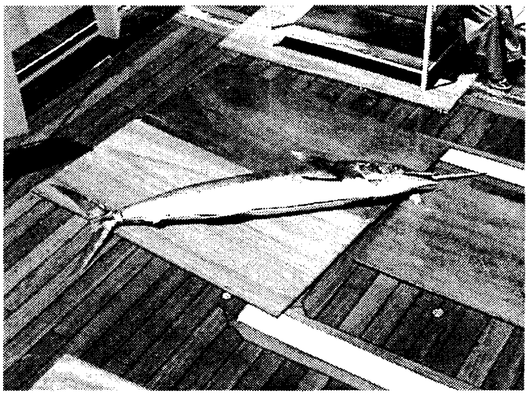


Photo 3. Blue-marlin.

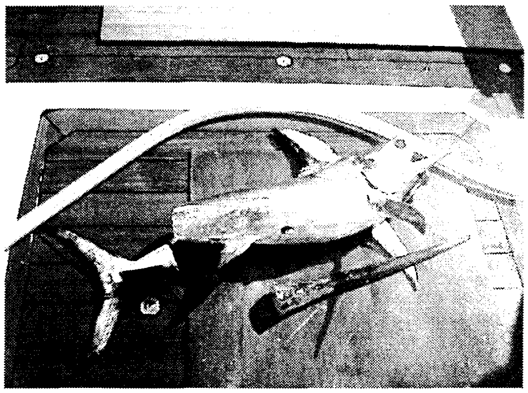


Photo 4. Swordfish.

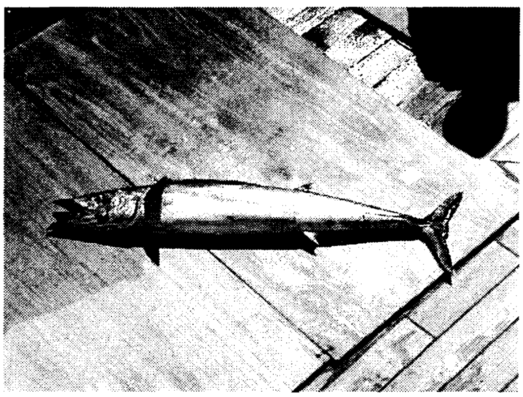


Photo 5. Spanish mackral

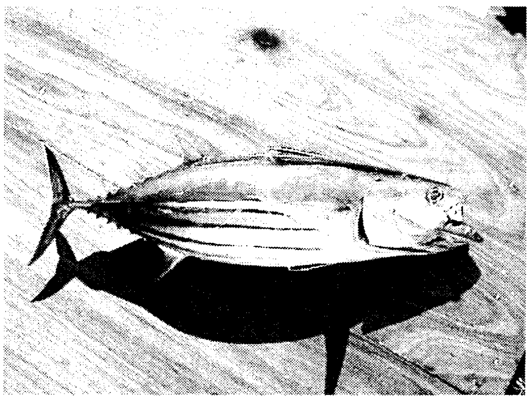


Photo 6. Bonito.

Reference

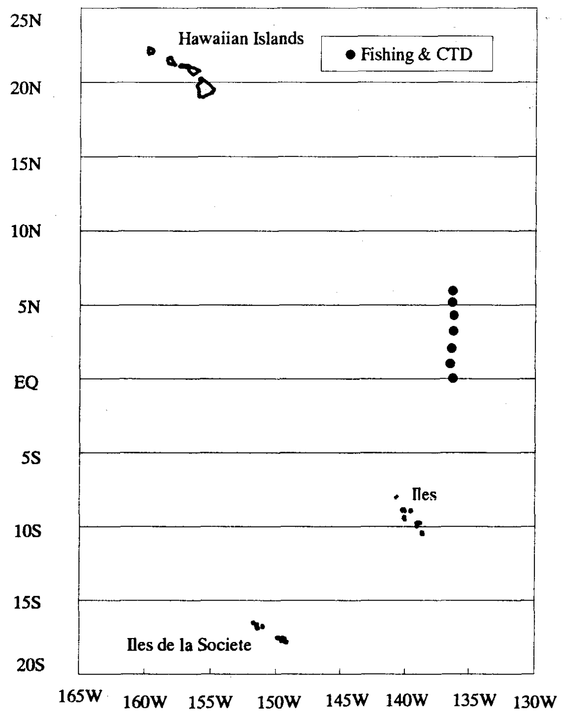


Fig.1. Location of tuna long-line fishing point in the Western South Pacific Ocean in 2000.

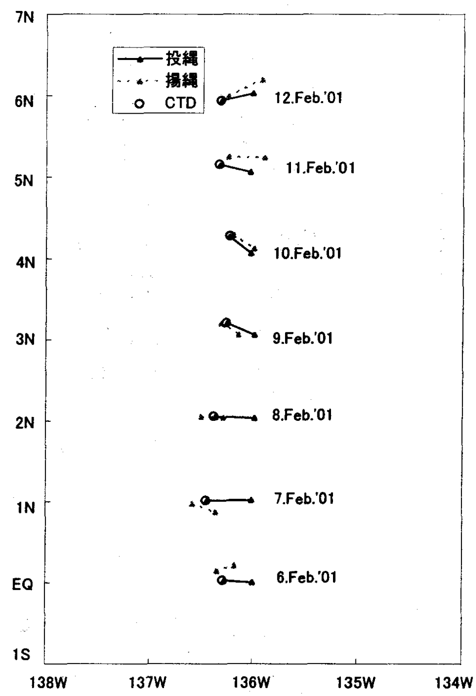
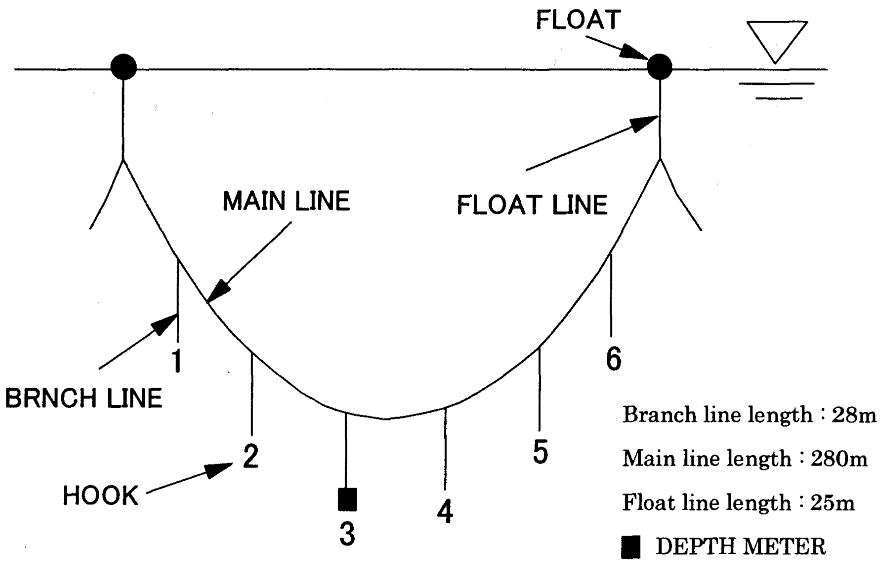


Fig.2. Location of tuna long-line fishing point in the Western South Pacific Ocean in 2000.



Structure of the long line

Fig.3. Typical feature of the tuna long-line setting.

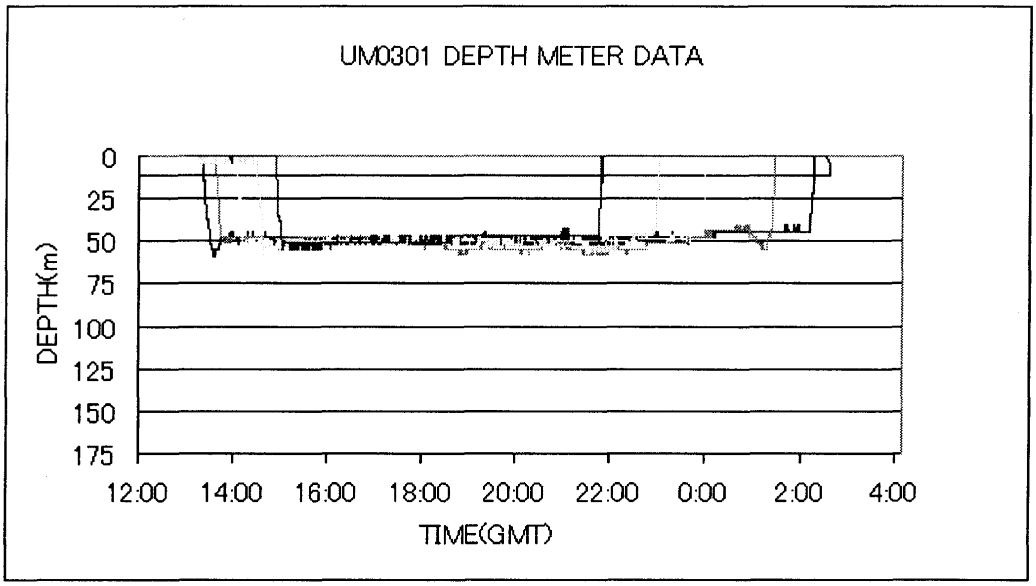
Table 1. Hooked rate of tuna long-line in the Western Pacific Ocean in 2001

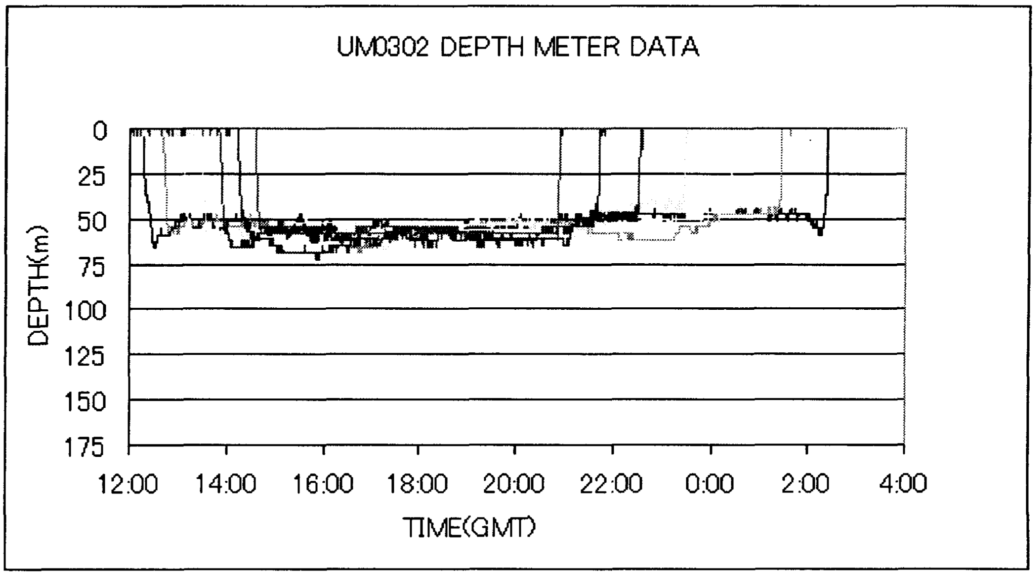
St.	DATE 2001	Minimum Depth (m)	Maximum Depth (m)	Thunnus	Marlins	Total
1	Feb.6	52.98	69.63	0.17	0.34	0.51
2	Feb.7	59.16	71.83	0.34	0.00	0.34
3	Feb.8	72.06	114.26	0.00	0.22	0.22
4	Feb.9	73.39	146.68	0.00	0.22	0.22
5	Feb.10	77.93	163.86	0.00	0.11	0.11
6	Feb.11	81.84	127.68	0.56	0.11	0.67
7	Feb.12	84.15	133.76	0.00	0.00	0.00
	Average	71.64	118.24	0.15	0.14	0.29

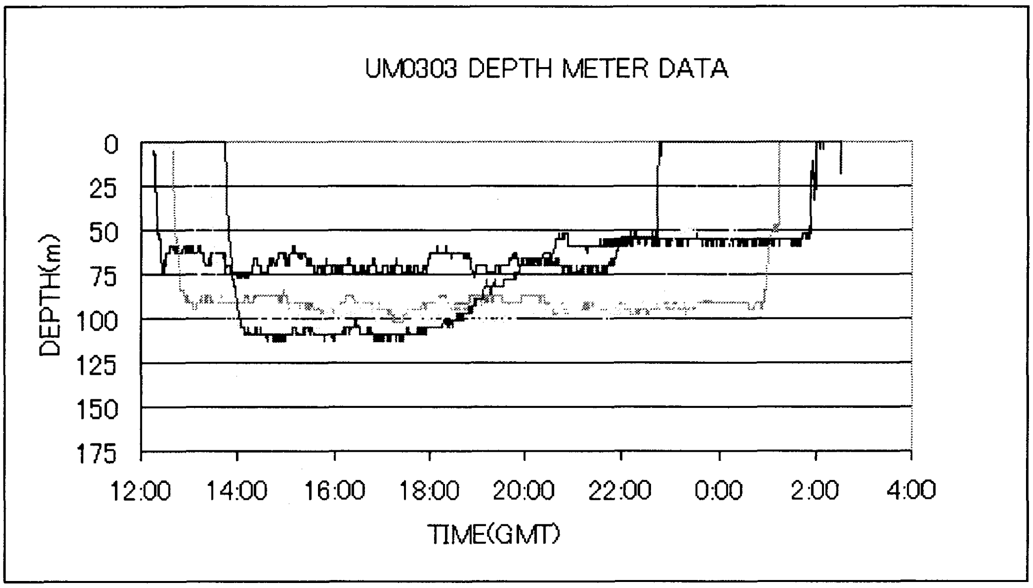
Table 2. Reference table about fish caught by tuna long-line

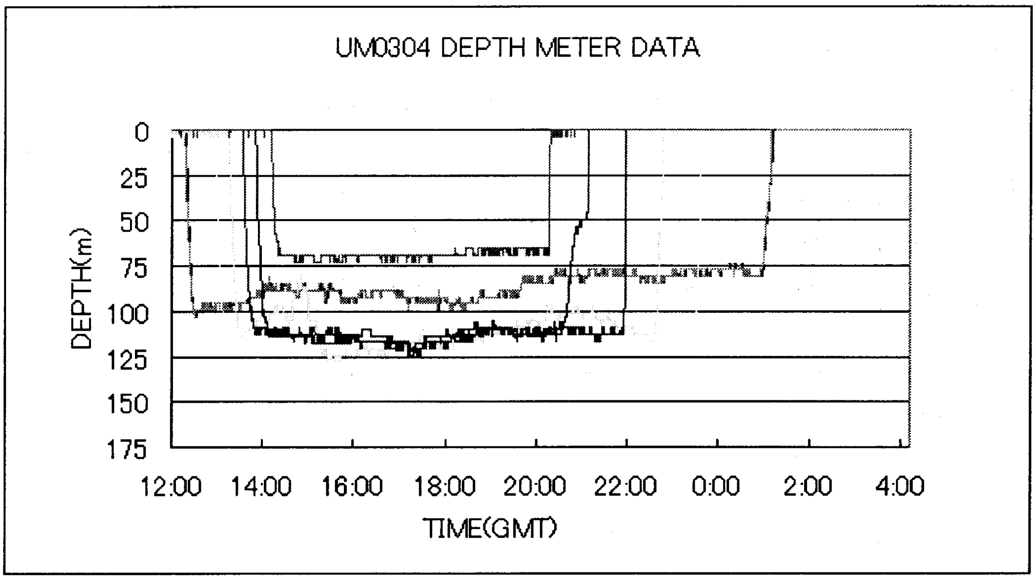
St.No.	Date	Potision (Lat. Long.) Spieces	Fork Length(cm)	Body Weight(Kg)	Body Depth(cm)	Body Width(cm)	Sex	Gonad Weight(g)	Stomach Contents
1	6.Feb '01	00-00.451S 135-59.927W							
		Yellow-fin		36	33	26	M	200	Nil
		Black-marlin	215	82	40	19	M	380	Nil
		Swordfish	95	19	22	22	M		Small fish
2	7.feb '01	00-01.573N 136-00.789W							
		Yellow-fin	135	44	33	25	M		Nil
		Yellow-fin	125	37	35	24	F		Bait
		Big-eye tuna	145	63	37	28	F		Bait
		Swordfish	180	108	42	27.5	M	180	Squid
3	8.Feb '01	02-02.304N 135-59.187W							
		Swordfish	140	55.2	33.5	24.5	F	250	Squid
		Swordfish	160	81	40.5	28.5	M	330	Squid
		Black-marlin	180	61	35	21	F	310	Squid
4	9.Feb '01	03-03.796N 135-59.292W							
		Swordfish	191	170	60	37	M	230	Bait
5	10.Feb '01	04-04.098N 136-01.501W							
		Blue-marlin	212	157.1	54	33	M		Nil
		Yellow-fin	104	23	25	20	M	78	Small Squid
6	11.Feb '01	05-04.041N 136-01.919W							
		Yellow-fin	105	21	27	28	M	120	Small Squid
		Big-eye tuna	160	79	43	32.5	M	600	Krill
		Big-eye tuna	164	87	45	32	M	800	Bait
		Black-marlin	204	107	43	31	M	900	Squid,Balistidae.sp
		Yellow-fin	138	51.2	36	27	M	930	Squid
7	12.Feb '01	06-02.025N 136-00.576W							
		Nil							

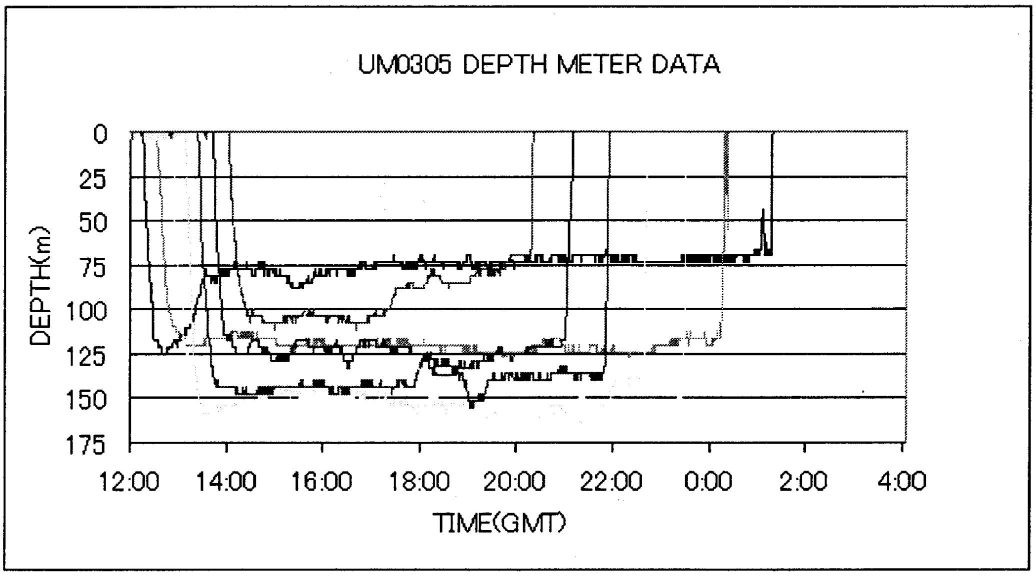
Reference of material for depth data








UM0304 DEPTH METER DATA
DEPTH(m)
0
25
50
75
100
125
150
175
12:00
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
TIME(GMT)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DEPTH(m)
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50
75
100
125
150
175
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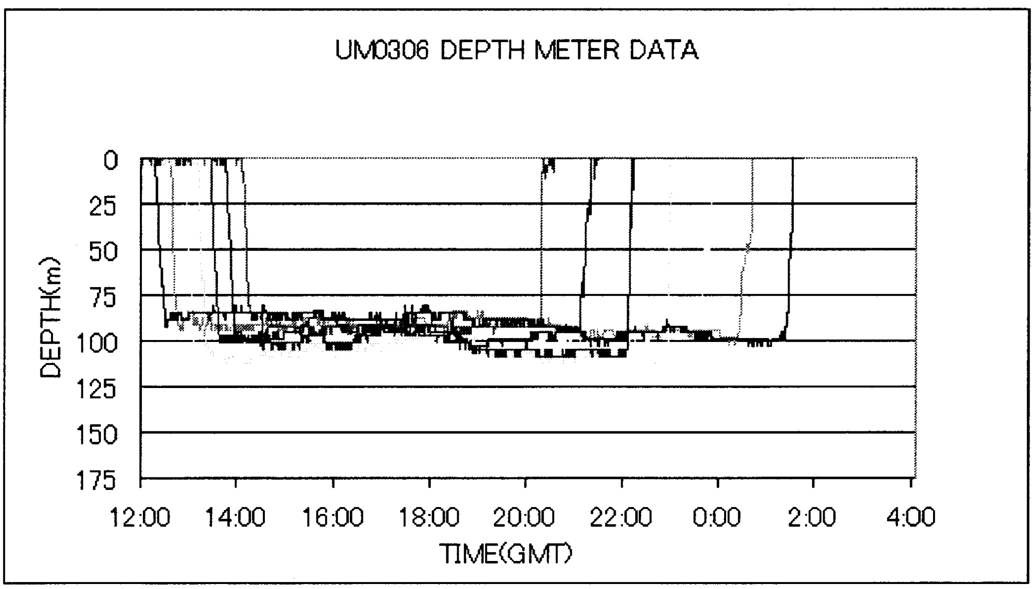
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
TIME(GMT)


UM0306 DEPTH METER DATA
DEPTH(m)
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50
75
100
125
150
175
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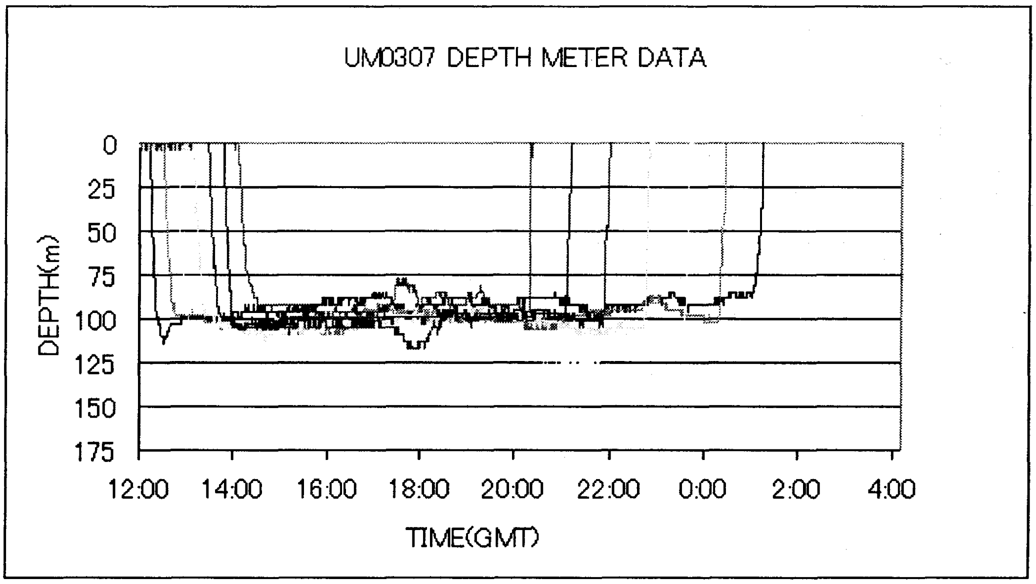
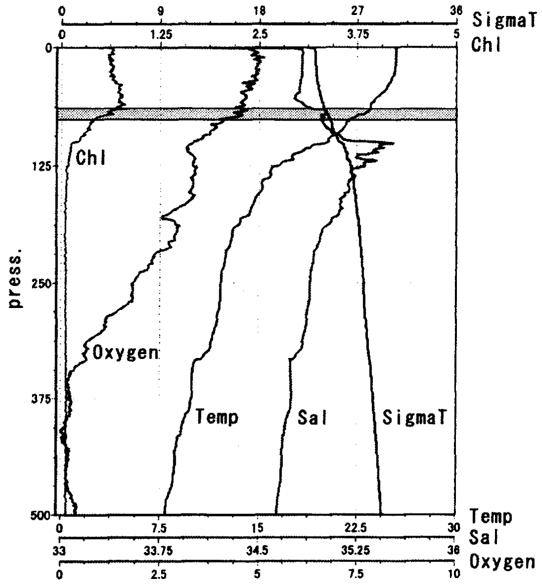
14:00
16:00
18:00
20:00
22:00
0:00
2:00
4:00
TIME(GMT)



Date	6th/Feb/'01		Zone Time	-09h-00m	Total Basket No.	100	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	Remark
1	8060	1	3	4:49:15	17:46:40	ASC8060.000	delayできずにstartさせる
2	8061	22	3	4:38:35	16:29:51	ASC8061.000	delayできずにstartさせる
3	8062	50	3	5:09:47	15:06:45	ASC8062.000	delayできずにstartさせる
4	8063	75	3	5:36:08	14:07:35	ASC8063.000	delayできずにstartさせる
5	8064	100	4	6:01:25	12:57:20	ASC8064.000	delayできずにstartさせる
Date	7th/Feb/'01		Zone Time	-08h-00m	Total Basket No.	149	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	Remark
1	8060	1	3	4:16:00	18:23:33		
2	8061	25	3	4:41:11	17:25:30		
3	8062	50	3	5:04:51	16:24:30		
4	8063	75	3	5:27:08	15:28:36		
5	8064	100	3	5:50:24	14:31:10		
6	8599	125	3	6:13:01	13:41:40		
7	8600	149	4	6:35:52	12:53:24		NO.1 branch let go
Date	8th/Feb/'01		Zone Time	08h-00m	Total Basket No.	150	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	
1	8060	1	3	4:15:38	18:00:57	ASC8060.002	
2	8061	25	3	4:38:17	17:17:33	ASC8061.002	
3	8062	50	3	5:01:56	15:35:57	ASC8062.002	
4	8063	75	3	5:24:10	14:48:04	ASC8063.002	
5	8064	100	3	5:44:40	13:48:50	ASC8061.002	
6	8599	125	3	6:05:01		回収不能	

Date	9th/Feb/'01		Zone Time	-08h-00m	Total Basket No.	150	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	Remark
1	8060	1	6	4:16:59	17:08:28	ASC8060.003	
2	8061	25	3	4:36:53	16:24:29	ASC8061.003	
3	8062	50	3	4:56:46	15:34:06	ASC8062.003	
4	8063	75	2	5:15:10	14:44:35	ASC8063.003	
5	8064	100	3	5:33:45	13:57:01	ASC8064.003	
6	7582	125	3	5:51:02	13:06:45	ASC7582.000	
7	8600	150	6	6:11:47	12:15:51	ASC8600.002	
Date	10th/Feb/'01		Zone Time	-08h-00m	Total Basket No.	149	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	Remark
1	8060	1	3	4:15:11	17:16:11	ASC8060.004	
2	8061	25	3	4:33:07	16:18:18	ASC8061.004	
3	8062	50	3	4:52:03	15:29:30	ASC8062.004	
4	8063	75	3	5:08:16	14:40:56	ASC8063.004	
5	8064	100	3	5:24:44	13:53:50	ASC8064.004	
6	8599	125	3	5:42:40	13:07:47	ASC7582.001	からみ
7	8600	150	3	6:02:00	12:18:38	ASC8600.003	
Date	11th/Feb/'01		Zone Time	-08h-00m	Total Basket No.	150	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	
1	8060	1	3	4:17:22	17:31:53	ASC8060.005	
2	8061	25	3	4:36:26	16:40:51	ASC8061.005	再プリントアウト
3	8062	50	4	4:55:18	15:52:30	ASC8062.005	
4	8063	76	3	5:11:51	14:59:19	ASC8063.005	
5	8064	100	3	5:27:54	14:09:36	ASC8064.005	
6	8599	125	3	5:46:43	13:09:02	ASC7582.002	
7	8600	150	3	6:05:25	12:18:39	ASC8600.004	
Date	12th/Feb/'01		Zone Time	-08h-00m	Total Basket No.	150	6 Branch/Basket
No.	Serial No.	Basket No.	Branch No.	Set on time(SMT)	Set off time(SMT)	Name of Ascii File	Remark
1	8060	1	3	4:12:50	17:15:43	ASC8060.006	
2	8061	25	3	4:31:12	16:26:05	ASC8061.006	
3	8062	50	3	4:49:17	15:37:30	ASC8062.006	
4	8063	75	3	5:08:50	14:48:10	ASC8063.006	
5	8064	100	3	5:28:33	13:58:31	ASC8064.006	
6	7582	125	3	5:47:19	13:09:41	ASC7582.003	
7	8600	150	3	6:06:04	12:18:20	ASC8600.005	

um0301



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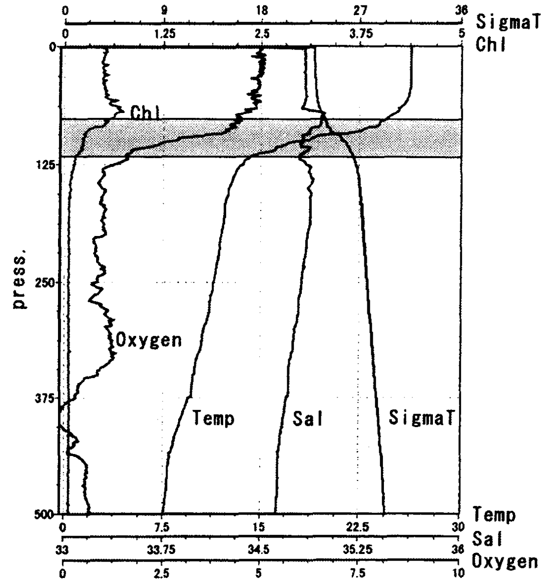

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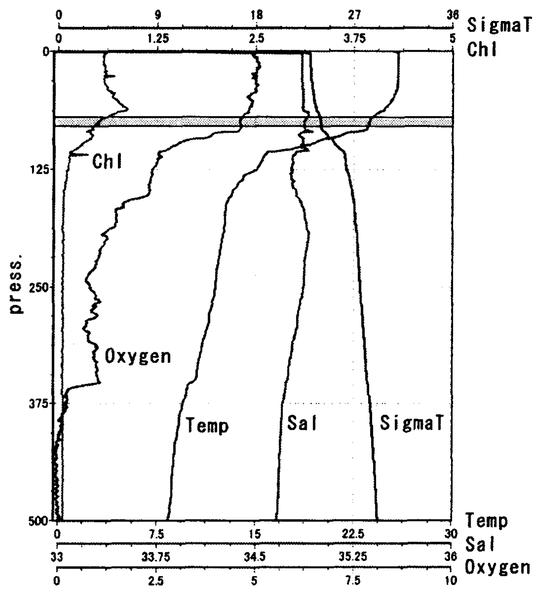

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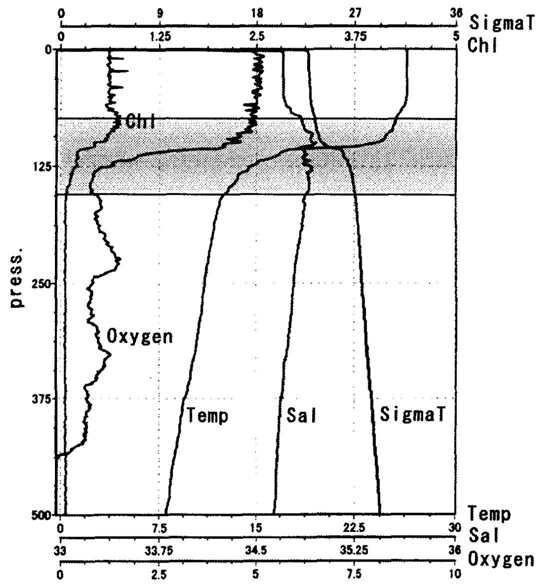
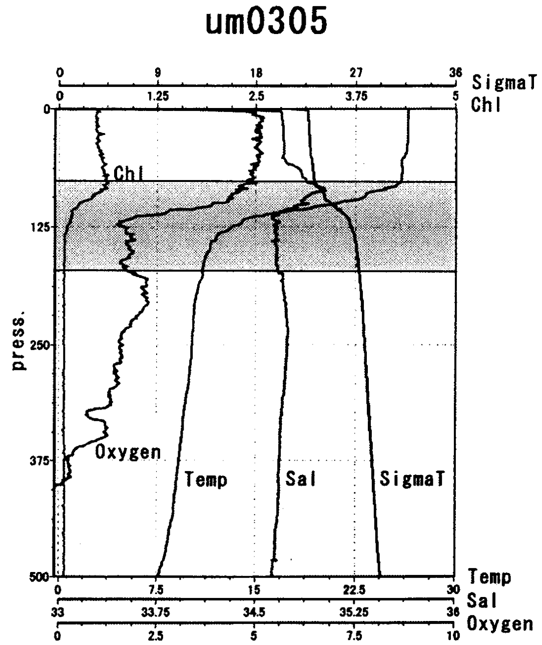
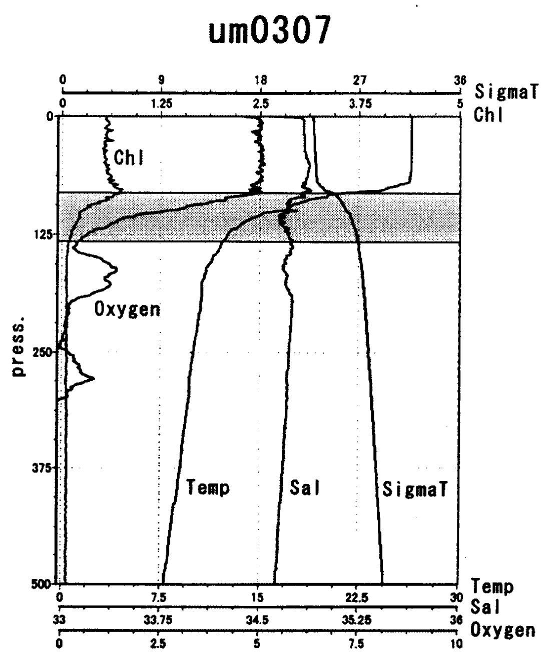


Fig.4. CTD profiles and vertical section at tuna-long line station and sat hook range





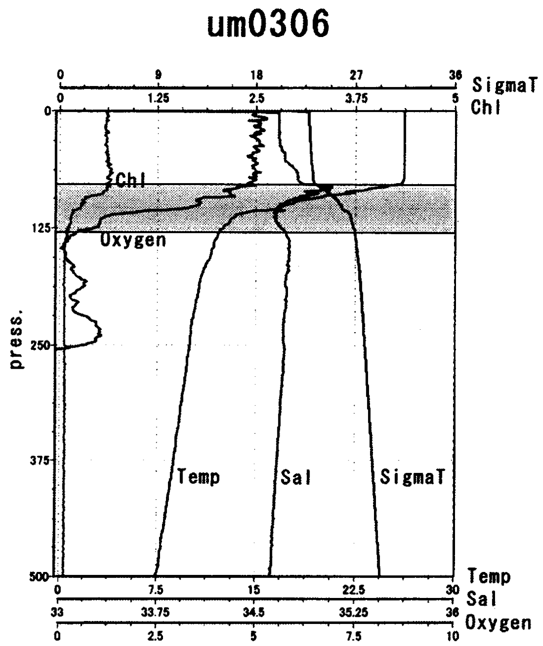


Fig.4. (Continued)+ CTD profiles and vertical section at tuna-long line station and sat hook range

Reference of Material for CTD data

観測地点名	um01Feb6
観測開始時間	2001/2/7 0:27
観測終了時間	2001/2/7 0:39
観測開始位置	0-01.4825S , 136-17.5923W
観測終了位置	0-01.5655S , 136-17.6155W

Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	25.332	33.469	22.086	3.887
1	25.381	34.765	23.054	4.72
2	25.382	34.829	23.106	4.768
3	25.383	34.83	23.11	4.829
4	25.382	34.83	23.115	4.841
5	25.382	34.831	23.12	4.924
10	25.375	34.83	23.143	5.073
15	25.367	34.83	23.167	5.053
20	25.353	34.83	23.193	4.959
25	25.323	34.828	23.222	4.966
30	25.25	34.828	23.266	4.804
40	24.835	34.817	23.427	4.859
50	24.244	34.782	23.622	4.689
75	22.218	34.997	24.481	4.193
100	20.411	35.301	25.319	3.36
125	16.516	35.307	26.416	3.339
150	15.258	35.191	26.727	3.304
200	13.005	34.975	27.265	2.868
250	12.145	34.893	27.597	1.834
300	11.666	34.857	27.886	1.116
400	9.27	34.711	28.657	0.113
500	7.921	34.641	29.277	0.389

観測地点名	um01Feb7
観測開始時間	2001/2/7 23:54
観測終了時間	2001/2/8 0:10
観測開始位置	1-01.5342N , 136-27.5876W
観測終了位置	1-01.4957N , 136-27.8593W

Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	25.327	11.28	5.423	5.701
1	25.827	33.963	22.314	4.939
2	25.848	34.851	22.979	4.933
3	25.849	34.852	22.984	4.912
4	25.851	34.854	22.988	4.931
5	25.854	34.853	22.991	4.947
10	25.857	34.854	23.013	5.017
15	25.856	34.854	23.035	5.066
20	25.855	34.853	23.056	5.048
25	25.843	34.855	23.082	4.913
30	25.856	34.854	23.099	4.992
40	25.769	34.854	23.169	4.967
50	25.414	34.866	23.33	4.835
75	23.663	34.875	23.972	4.604
100	18.828	34.864	25.4	2.964
125	15.115	34.773	26.326	2.388
150	13.252	34.81	26.865	2.3
200	12.448	34.902	27.321	1.209
250	11.989	34.868	27.609	0.808
300	11.209	34.805	27.933	0.785
400	9.191	34.698	28.661	0.118
500	8.394	34.664	29.217	0.074

観測地点名	um01Feb8
観測開始時間	2001/2/8 23:48
観測終了時間	2001/2/9 0:09
観測開始位置	2-03.8393N , 136-23.1218W
観測終了位置	2-04.0164N , 136-23.3441W

Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	26.207	29.85	19.091	5.325
1	26.288	34.549	22.609	5.061
2	26.294	34.836	22.828	4.964
3	26.293	34.837	22.834	4.958
4	26.3	34.838	22.836	5.027
5	26.301	34.836	22.839	4.969
10	26.299	34.837	22.862	4.958
15	26.303	34.836	22.882	5.046
20	26.304	34.837	22.903	4.966
25	26.306	34.837	22.924	5.055
30	26.307	34.837	22.945	4.907
40	26.279	34.839	22.999	4.931
50	26.18	34.844	23.076	4.663
75	24.592	34.958	23.758	4.494
100	18.29	34.81	25.494	2.84
125	13.655	34.847	26.698	1.276
150	12.586	34.862	27.039	0.934
200	12.005	34.862	27.377	1.029
250	11.396	34.811	27.678	0.837
300	10.617	34.763	28.01	1.093
400	8.807	34.672	28.705	-0.199
500	7.581	34.623	29.315	0.715
600	6.557	34.583	29.892	1.054
700	6.013	34.573	30.417	1.079
800	5.29	34.572	30.973	1.177
900	4.861	34.576	31.49	0.956
1000	4.411	34.584	32.011	1.068

観測地点名	um01Feb9
観測開始時間	2001/2/9 23:28
観測終了時間	2001/2/9 23:47
観測開始位置	3-13.0031N , 136-16.0026W
観測終了位置	3-13.1050N , 136-15.9478W

Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	26.27	29.236	18.611	2.109
1	26.312	34.276	22.397	3.737
2	26.316	34.689	22.711	4.851
3	26.322	34.703	22.724	4.915
4	26.324	34.703	22.727	4.926
5	26.326	34.705	22.732	4.977
10	26.326	34.705	22.754	4.937
15	26.328	34.705	22.775	5.075
20	26.326	34.706	22.797	5.167
25	26.329	34.706	22.818	5.143
30	26.322	34.707	22.843	4.924
40	26.322	34.707	22.885	5.105
50	26.315	34.705	22.929	4.995
75	25.56	34.848	23.38	4.806
100	24.093	34.929	23.993	4.533
125	14.608	34.914	26.546	1.306
150	12.89	34.905	27.012	0.792
200	11.61	34.841	27.438	1.124
250	11.039	34.795	27.733	0.823
300	10.536	34.759	28.022	0.942
400	9.15	34.679	28.653	0.628
500	8.062	34.644	29.256	-0.432
600	6.64	34.593	29.888	0.106
700	5.84	34.577	30.445	0.613
800	5.282	34.572	30.974	0.989
900	4.794	34.575	31.498	1.041
1000	4.425	34.583	32.009	1.047

観測地点名 um01Feb10
観測開始時間 2001/2/10 23:25
観測終了時間 2001/2/10 23:47
観測開始位置 4-17.2341N , 136-14.2657W
観測終了位置 4-17.4310N , 136-14.1871W

Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	26.261	32.507	21.075	2.115
1	26.389	34.454	22.506	3.787
2	26.405	34.671	22.669	4.72
3	26.411	34.69	22.685	4.861
4	26.417	34.692	22.69	4.978
5	26.417	34.692	22.694	4.982
10	26.417	34.693	22.717	5.158
15	26.416	34.701	22.744	5.057
20	26.413	34.703	22.768	5.151
25	26.406	34.707	22.795	4.985
30	26.404	34.707	22.817	5.148
40	26.349	34.713	22.882	5.033
50	26.16	34.702	22.976	5.115
75	25.937	34.877	23.285	4.809
100	21.27	34.855	24.746	3.939
125	13.163	34.656	26.653	1.635
150	11.495	34.658	27.093	1.822
200	10.433	34.722	27.562	2.256
250	10.168	34.738	27.847	1.595
300	9.825	34.714	28.113	1.31
400	8.987	34.679	28.68	0.088
500	7.645	34.625	29.308	-0.396
600	6.473	34.587	29.908	0.256
700	5.773	34.574	30.452	0.553
800	5.278	34.574	30.976	0.523
900	4.813	34.578	31.497	0.764
1000	4.355	34.586	32.02	0.671

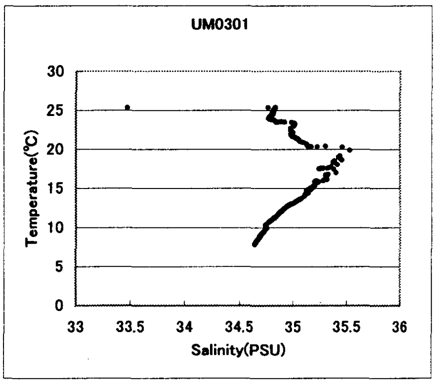
観測地点名 um01Feb12
観測開始時間 2001/2/12 23:22
観測終了時間 2001/2/12 23:44
観測開始位置 5-56.7556N , 136-19.6314W
観測終了位置 5-57.0393N , 136-19.4535W

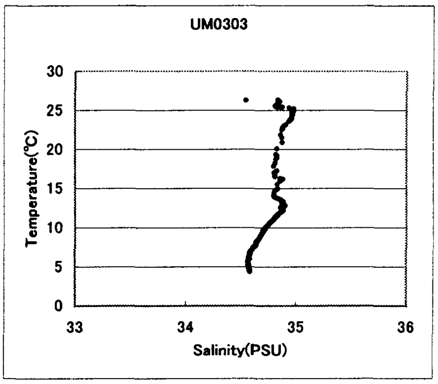
Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	26.35	34.592	22.618	4.509
1	26.35	34.811	22.787	4.906
2	26.35	34.816	22.796	4.925
3	26.35	34.826	22.807	4.985
4	26.351	34.826	22.811	5.003
5	26.352	34.826	22.815	5.012
10	26.353	34.826	22.837	4.988
15	26.358	34.828	22.858	4.925
20	26.363	34.831	22.88	5.002
25	26.363	34.831	22.902	4.953
30	26.363	34.831	22.924	4.967
40	26.369	34.843	22.973	5.046
50	26.351	34.87	23.042	5.099
75	24.743	34.821	23.609	4.904
100	16.58	34.775	25.883	2.691
125	12.597	34.706	26.805	0.66
150	11.485	34.698	27.125	0.92
200	10.581	34.743	27.552	0.197
250	10.031	34.719	27.856	0.141
300	9.711	34.71	28.13	0.056
400	8.861	34.67	28.694	-0.402
500	7.865	34.628	29.275	-0.452
600	6.744	34.591	29.871	-0.498
700	5.868	34.578	30.442	-0.228
800	5.249	34.576	30.982	0.152
900	4.767	34.581	31.507	0.321
1000	4.405	34.589	32.016	0.409

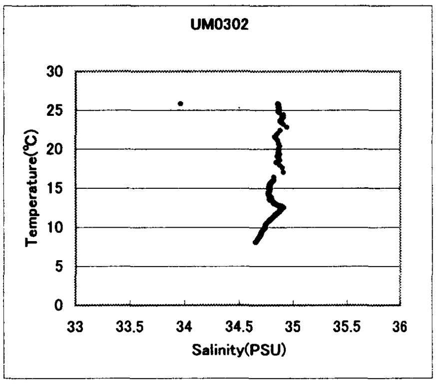
観測地点名 um01Feb11
観測開始時間 2001/2/11 23:24
観測終了時間 2001/2/11 23:47
観測開始位置 5-09.9165N , 136-20.5477W
観測終了位置 5-10.3671N , 136-20.4391W

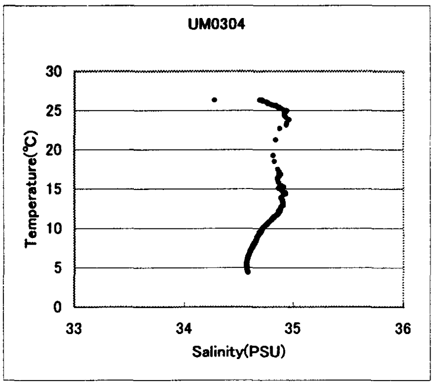
Press	Temp	Sal	SigmaT	Oxygen
dB	Cel		kg/m3	ml/l
0	26.111	32.587	21.181	5.123
1	26.148	34.48	22.601	5.006
2	26.15	34.672	22.75	4.955
3	26.149	34.67	22.753	4.983
4	26.149	34.671	22.758	4.971
5	26.149	34.671	22.763	4.895
10	26.151	34.671	22.783	4.954
15	26.15	34.672	22.805	5.103
20	26.151	34.673	22.827	5.155
25	26.155	34.677	22.85	5.131
30	26.157	34.677	22.872	5.008
40	26.16	34.693	22.926	4.971
50	26.154	34.717	22.989	4.937
75	26.085	34.823	23.198	4.933
100	17.649	34.681	25.555	3.578
125	12.528	34.687	26.804	0.888
150	11.611	34.75	27.142	0.13
200	10.528	34.73	27.551	0.271
250	9.974	34.718	27.866	0.699
300	9.508	34.699	28.157	-0.403
400	8.547	34.658	28.737	-0.373
500	7.44	34.615	29.331	-0.443
600	6.445	34.586	29.911	-0.184
700	5.624	34.575	30.474	0.445
800	5.161	34.577	30.995	0.437
900	4.738	34.583	31.511	0.455
1000	4.333	34.591	32.027	0.455

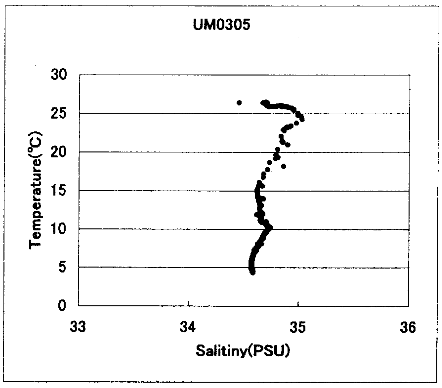
St.No.	Time (SMT)	Time (GMT)	Lat.	Long.	Air Temp.	Weter Temp.	Depth	Wind Dir.	Wind Sp'd
UM0301	2/6 06:23	2/6 15:23	00-01.8537S	136-17.3469W	25.3 ℃	25.8 ℃	4,337 m	113	8.3 m/s
	2/6 06:56	2/6 15:56	00-02.1914S	136-17.5217W	25.3 ℃	25.6 ℃	4,337 m	103	9.1 m/s
UM0302	2/7 06:51	2/7 14:51	01-01.1590N	136-27.3551W	25.2 ℃	26.2 ℃	4,337 m	72	7.3 m/s
	2/7 07:20	2/7 15:20	01-01.2078N	136-27.6113W	25.0 ℃	26.1 ℃	4,337 m	93	7.3 m/s
UM0303	2/8 06:44	2/8 14:44	02-03.4634N	136-22.8767W	25.8 ℃	26.6 ℃	4,200 m	88	9.1 m/s
	2/8 07:44	2/8 15:44	02-03.9511N	136-23.2432W	25.8 ℃	26.6 ℃	4,200 m	92	10.1 m/s
UM0304	2/9 06:25	2/9 14:25	03-12.6241N	136-15.7622W	25.9 ℃	26.6 ℃	4,100 m	104	10.0 m/s
	2/9 07:02	2/9 15:02	03-12.8886N	136-15.8156W	25.9 ℃	26.7 ℃	4,100 m	95	10.4 m/s
UM0305	2/10 06:22	2/10 14:22	04-16.5819N	136-14.0134W	23.9 ℃	26.8 ℃	4,337 m	122	1.6 m/s
	2/10 07:03	2/10 15:07	04-17.1972N	136-13.8475W	24.0 ℃	26.8 ℃	4,337 m	79	5.7 m/s
UM0306	2/11 06:20	2/10 14:20	05-09.5378N	136-20.2940W	25.8 ℃	26.5 ℃	4,244 m	104	6.9 m/s
	2/11 07:21	2/10 15:21	05-10.7251N	136-20.0187W	25.8 ℃	26.5 ℃	3,950 m	118	5.8 m/s
UM0307	2/12 06:18	2/12 14:18	05-56.3687N	136-19.3772W	25.8 ℃	26.7 ℃	3,105 m	66	9.9 m/s
	2/12 07:03	2/12 15:03	05-56.8167N	136-19.1163W	26.3 ℃	26.7 ℃	3,154 m	66	13.4 m/s







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15
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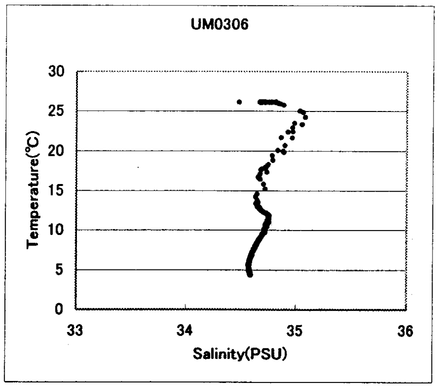
Salitiny(PSU)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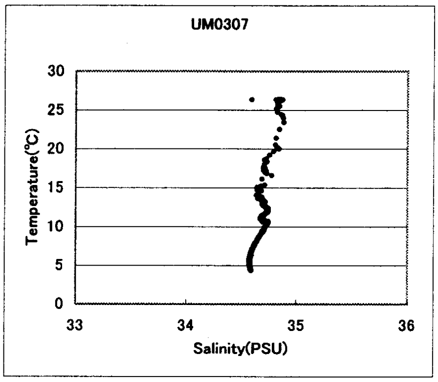
Salinity(PSU)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Temperature(℃)
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15
10
5
0
33
34
35
36
Salinity(PSU)