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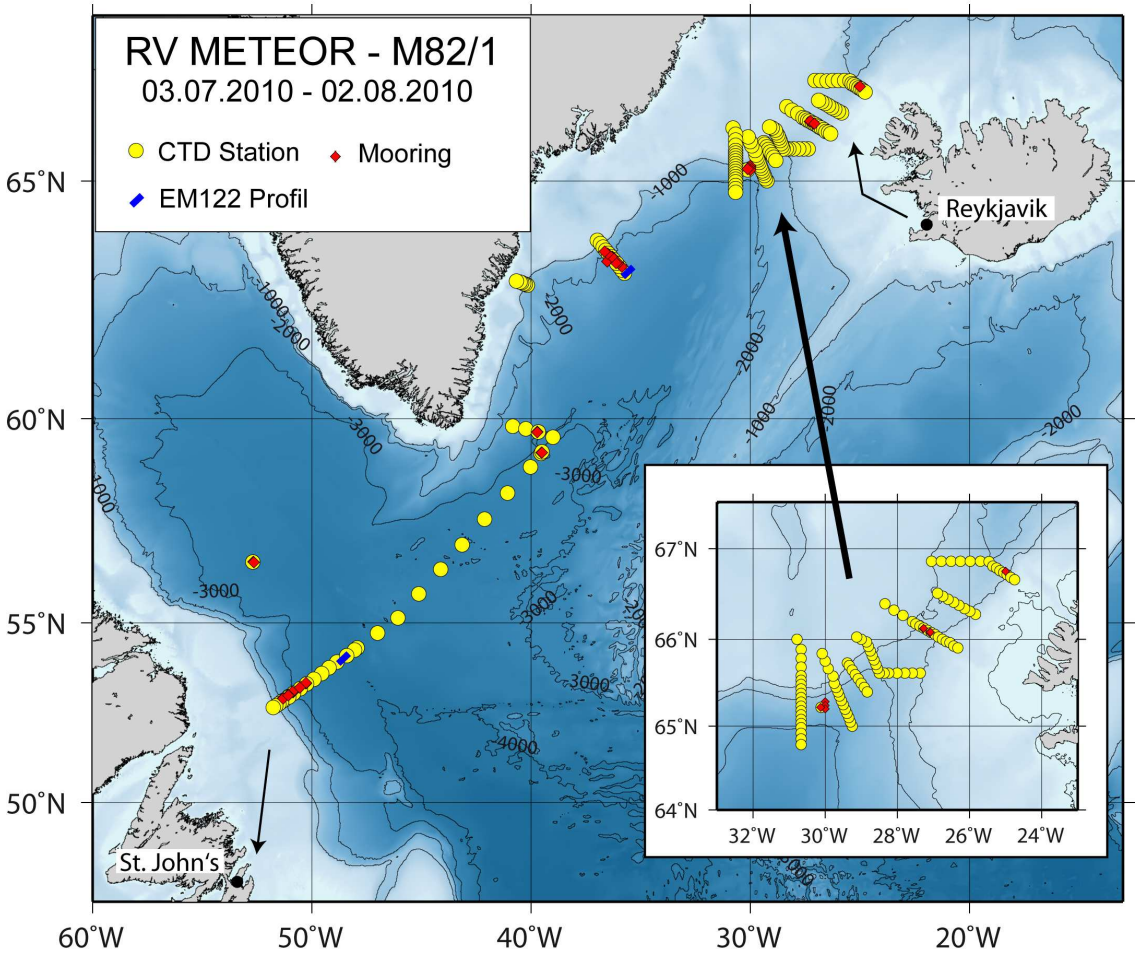
Summary Cruise Report
RV METEOR Cruise M82-1

Reykjavik – St. John's
3. July – 2. August 2010
Chief Scientist: Detlef Quadfasel
Captain: Thomas Wunderlich



Track of RV Meteor cruise M82-1 in the Labrador Sea, Irminger Sea and Greenland Sound with locations of moorings (red dots), CTD/lADCP casts (yellow dots) and acoustic surveys (blue dots).

Objectives

In the present state of our climate the northern North Atlantic is one of the major sources for the deep waters of the World Oceans and thus influences or even determines the global deep ocean circulation. Dense waters from the Nordic Seas and the Labrador Sea move southward at depth. Near the surface this is replenished by a northward flow of warm water that provides heat to the atmosphere thereby creating the pleasant European climate. During RV Meteor cruise M82-1 we studied the three major sources of North Atlantic Deep Water: the overflow through the Greenland Sound, the entrainment of ambient water into the overflow plume and the production in and export of deep waters from the Irminger Sea and Labrador Sea.

These three studies make use of data collected with long-term moored instrumentation, current profile measurements with a lowered Acoustic Doppler Profiler (LADCP) and with an ADCP (Ocean Surveyor) mounted in the ship's hull. CTD-O_2 profiles were taken along several sections to determine the characteristics and distribution and the mixing of water masses.

RV Meteor cruise M82-1 was carried out jointly by the Institut für Meereskunde at the KlimaCampus of the University of Hamburg and IFM-GEOMAR at the University of Kiel. Scientists and technicians from the U.K. Lowestoft Laboratory of CEFAS, the Royal Netherlands Institute for Sea Research and the Finnish Meteorological Institute also participated in the cruise. Six students from the Universities of Hamburg, Kiel and Helsinki got their first *in-situ* training.

Narrative

Greenland Sound work, 4.-13. July 2010

RV Meteor sailed from the port of Reykjavik at 10 a.m on July, 4th, setting course for the sill of Greenland Sound. The departure was delayed by a day, as a severe storm, passing the day before, would have made work in the region impossible. Wind speeds were up to 11 Bft. and mean wave heights reached 5 m. During the short transit to the working area instruments were set up and moorings were prepared. We also discussed and defined projects to be tackled by the students during the cruise.

During the early morning of July 5th the two monitoring moorings on the sill were recovered without any problems. Both instruments delivered excellent data for the currents in the overflow over the past year, extending our time series that started in 1997. Both moorings were re-deployed on July 7th. Other mooring work during this first part of the cruise included an – unsuccessful - attempt to recover an Inverted Echo Sounder (PIES) north of the sill and the deployment of three closely spaced ADCP moorings some 90 nautical miles south of the sill on July 11th, in the path of the dense overflow plume. Most of the time was spent running CTD-O2/lADCP sections across the overflow plume, with two sections north of the sill, one on the sill and four sections south of the sill. Altogether 98 hydrographic and current profiling stations were occupied during this first part of the cruise, which ended during the early morning of July 13th.

Irminger Sea work, 13. – 20. July 2010

The Angmassalik section about 500 km south of the sill in Greenland Sound was reached just before midnight on July 13th and we started with CTD stations at the southern end of this section. During the next day all four current meter moorings that had been deployed the year before were successfully recovered and one of the moorings could already be re-deployed. The night was again spent with CTD work and during the following day, while the technicians prepared for the next mooring deployments, we attempted to dredge for a mooring deployed in 2007, which was not recovered in 2009. Unfortunately this attempt failed. Starting at 6 p.m. on July 15th we ran a bathymetric

survey for the calibration of the new EM122 Multibeam Echo Sounder that had been installed on the vessel during the previous docking in the shipyard in Bremerhaven. The survey lasted through the night and the data collected were sent ashore via the new internet link of Meteor. The three remaining moorings were then deployed during the morning of July 16th. At 2 p.m. Meteor set course for the shelf moorings near 63° N. These moorings, a bottom ADCP lander and two hydrographic tube moorings could, however, not be reached, as severe ice conditions prevented the vessel getting onto the East Greenland Shelf. We instead ran a short CTD section and after breakfast departed for the location of the German CIS and the Dutch LOCO moorings in the central Irminger Sea east of Kap Farvel.

We reached CIS at 8 a.m. on July 18th and immediately spotted the surface element of that mooring. The attempt to release the mooring did, however, fail; there was no acoustic response from the releasers and the mooring did not come up. We therefore proceeded towards the LOCO mooring that was recovered without problems and was safely on deck at the late afternoon. During the night three CTD stations were run and when we approached the CIS mooring again the next morning, the surface float was gone. It turned out later that the mooring had released several hours after our first try and had drifted by some 3 miles during the night. Once spotted again, the mooring was recovered without any problems. During the afternoon LOCO was re-deployed and after the usual nightly CTD work, CIS was back in the water just after lunch on July 20th.

Labrador Sea work, 20. – 31. July 2010

During the transit to the third working area in the central and southern Labrador Sea we occupied nine CTD stations across the exit of the Labrador Sea. The Kiel 53° N section was reached late on July 22nd and the spacing of the CTD station was reduced to about 10 miles. In the evening of the next day we ran another EM122 calibration at water depths of nearly 4000 m, on the request of the bathymetry experts at home.

The work along the 53° N section lasted until 5 p.m. on July 26th. During this time five current meter moorings were recovered and redeployed and nine CTD/lADCP stations occupied. Immediately after the last mooring deployment the wind picked up and got above 20 m/s within just a few hours. Here we were really lucky to have finished the mooring work before the storm. As even CTD work was not possible under these weather conditions the ship went north to the central Labrador Sea, for the last mooring to be attended during this cruise. K1 was recovered early on July 28th and redeployed after just a few hours. Since the weather had improved by then, Meteor sailed back to the 53° N section to run a complete CTD/lADCP section along the mooring line, this time not interrupted by mooring work and harsh weather conditions.

The last CTD station on the Canadian Shelf was finished at 12:30 a.m. and Meteor set course for the port of St. John's. At 10:15 a.m. on August 2nd the vessel was alongside at the cruise liners pier and cruise M82/1 ended.

Acknowledgements

We like to thank Captain Thomas Wunderlich, his officers and the crew of RV Meteor for their support of our measurement programme. The ship time of RV Meteor was provided by the Deutsche Forschungsgemeinschaft within the core program METEOR/MERIAN. Financial support for the different projects carried out during the cruise was provided though the EU-Projects EuroSITES and THOR and the German Ministry of Education and Research (Nordatlantik Programm). We also benefited from financial contributions by the research institutes involved.

Cruise participants

Quadfasel, Detlef	Chief Scientist	IfM-ZMAW
Bakker, Marcel	moorings	NIOZ
Benneke, Swaantje	student, chemistry	IUPHB
De Jong, Femke	moorings, CTD	NIOZ
Drübbisch, Ulrich	moorings	IfM-ZMAW
Jochumsen, Kerstin	CTD, lADCP	IfM-ZMAW
Köllner, Manuela	student, CTD	IfM-ZMAW
Kopke, Robert	student, CTD	IFM-GEOMAR
Korhonen, Meri	student, CTD	FMI
Latarius, Katrin	CTD	IfM-ZMAW
Needham, Neil	moorings	CEFAS
Niehus, Gerd	moorings	IFM-GEOMAR
Nummelin, Aleksi	student, CTD	FMI
Nunes, Nuno	ADCP	IFM-GEOMAR
Papenburg, Uwe	moorings	IFM-GEOMAR
Schmitt, Jennifer	student, chemistry	IUPHB
Stöven, Tim	student, chemistry	IFM-GEOMAR
Raeke, Andreas	meteorology	DWD
Rother, Kristian	moorings	IFM-GEOMAR
Wasilewski, Thomas	data management	IfM-ZMAW
Zantopp, Rainer	moorings, CTD	IFM-GEOMAR

CEFAS:	Centre for Environment, Fishery and Aquaculture Sciences Lowestoft Laboratory, U.K.
DWD:	Deutscher Wetterdienst, Hamburg, Germany
FMI:	Finnish Meteorological Institute, Helsinki, Finland
IFM-GEOMAR:	Leibniz Institut für Meereswissenschaften University of Kiel, Germany
IfM-ZMAW:	Institut für Meereskunde, KlimaCampus, University of Hamburg, Germany
IUPHB:	Institut für Umweltphysik, University of Bremen, Germany
NIOZ:	Royal Netherlands Institute for Sea Research Texel, The Netherlands

List of Stations

CTD	Conductivity-Temperature-Depth sonde
EM122	Multibeam bathymetric survey
ROS	Rosette water sampler
LADCP	lowered Acoustic Doppler Profiler
MOR	Mooring
PIES	Pressure-Inverted-Echo-Sounder

EXPO-CODE	Stat. No.	Cast No.	Cast Type	Date mmddyy	Date UTC	Position Latitude	Position Longitude	Position Code	Bottom depth	Meter Wheel	Max. Press	Bottom Dist.	Comments
M82/1	320	1	MOR	070510	0627	66 04.560 N	27 06.440 W	GPS	953				Recovery of mooring DS1-09
M82/1	321	1	MOR	070510	0821	66 07.080 N	27 16.690 W	GPS	799				Recovery of mooring DS2-09
M82/1	322	1	ROS/CTD/LADCP	070510	1937	66 51.967 N	27 03.094 W	GPS	404		400	6	
M82/1	323	1	ROS/CTD/LADCP	070510	2102	66 51.980 N	26 47.129 W	GPS	511		508	10	
M82/1	324	1	ROS/CTD/LADCP	070510	2224	66 51.929 N	26 30.653 W	GPS	581		581	8	
M82/1	325	1	ROS/CTD/LADCP	070510	2347	66 52.018 N	26 14.992 W	GPS	630	589	629	8	
M82/1	326	1	ROS/CTD/LADCP	070610	0127	66 52.024 N	25 59.014 W	GPS	705	651	695	10	
M82/1	327	1	ROS/CTD/LADCP	070610	0259	66 51.972 N	25 42.126 W	GPS	827	771	823	8	
M82/1	328	1	ROS/CTD/LADCP	070610	0443	66 51.809 N	25 27.660 W	GPS	976	916	978	10	
M82/1	329	1	ROS/CTD/LADCP	070610	0637	66 48.811 N	25 21.008 W	GPS	913	855	914	10	
M82/1	330	1	ROS/CTD/LADCP	070610	0819	66 47.510 N	25 15.118 W	GPS	865	805	863	9	
M82/1	331	1	ROS/CTD/LADCP	070610	0939	66 45.924 N	25 09.100 W	GPS	778		779	8	
M82/1	332	1	ROS/CTD	070610	1052	66 44.530 N	25 02.936 W	GPS	698	656	696	9	
M82/1	333	1	PIES	070610	1155	66 45.170 N	25 00.280 W	GPS					Recovery of PIES by Dredging failed
M82/1	334	1	ROS/CTD	070610	1845	66 43.047 N	24 57.278 W	GPS	579	545	578	10	
M82/1	335	1	ROS/CTD	070610	2027	66 41.532 N	24 51.106 W	GPS	371	388	384	4	
M82/1	336	1	ROS/CTD	070610	2122	66 39.990 N	24 45.060 W	GPS	176	177	179	7	
M82/1	337	1	ROS/CTD	070710	0111	66 16.871 N	25 49.785 W	GPS	369	365	367	12	
M82/1	338	1	ROS/CTD	070710	0230	66 18.901 N	25 59.071 W	GPS	545	532	532	12	
M82/1	339	1	ROS/CTD	070710	0403	66 20.777 N	26 08.172 W	GPS	608	660	606	15	
M82/1	340	1	ROS/CTD	070710	0600	66 22.910 N	26 17.316 W	GPS	633	624	629	14	
M82/1	341	1	ROS/CTD	070710	0737	66 24.912 N	26 26.183 W	GPS	608	600	601	8	
M82/1	342	1	ROS/CTD	070710	0930	66 27.059 N	26 35.716 W	GPS	541	534	538	8	
M82/1	343	1	ROS/CTD	070710	1039	66 29.041 N	26 44.296 W	GPS	501	492	495	9	
M82/1	344	1	ROS/CTD	070710	1146	66 31.015 N	26 53.205 W	GPS	511	503	501	12	
M82/1	345	1	MOR	070710	1503	66 07.230 N	27 16.150 W	GPS					Deploym. of mooring DS2-10
M82/1	346	1	MOR	070710	1618	66 04.610 N	27 04.880 W	GPS					Deploym. of mooring DS1-10
M82/1	347	1	ROS/CTD	070810	0102	66 23.897 N	28 20.484 W	GPS	327	300	321	13	
M82/1	348	1	ROS/CTD	070810	0231	66 19.798 N	28 05.554 W	GPS	338	311	330	11	
M82/1	349	1	ROS/CTD	070810	0350	66 16.144 N	27 50.369 W	GPS	454	424	445	14	
M82/1	350	1	ROS/CTD	070810	0538	66 11.969 N	27 35.206 W	GPS	480	454	479	9	
M82/1	351	1	ROS/CTD	070810	0704	66 10.466 N	27 29.129 W	GPS	478	445	477	11	
M82/1	352	1	ROS/CTD	070810	0827	66 08.980 N	27 22.727 W	GPS	484	460	483	9	
M82/1	353	1	ROS/CTD	070810	1145	66 07.492 N	27 16.464 W	GPS	564	-	-	11	
M82/1	354	1	ROS/CTD	070810	1307	66 05.976 N	27 10.145 W	GPS	621	621	618	15	
M82/1	355	1	ROS/CTD	070810	1432	66 04.659 N	27 03.670 W	GPS	658	643	647	12	
M82/1	356	1	ROS/CTD	070810	1543	66 03.191 N	26 57.370 W	GPS	597	637	612	11	
M82/1	357	1	ROS/CTD	070810	1723	66 01.548 N	26 51.740 W	GPS	511	512	515	11	
M82/1	358	1	ROS/CTD	070810	1855	66 00.072 N	26 45.280 W	GPS	365	357	357	14	
M82/1	359	1	ROS/CTD	070810	2007	65 58.482 N	26 38.778 W	GPS	277	274	277	9	
M82/1	360	1	ROS/CTD	070810	2105	65 56.996 N	26 32.368 W	GPS	278	278	280	8	
M82/1	361	1	ROS/CTD	070810	2158	65 55.446 N	26 25.990 W	GPS	278	275	277	9	
M82/1	362	1	ROS/CTD	070810	2246	65 54.018 N	26 19.649 W	GPS	279	278	279	8	
M82/1	363	1	ROS/CTD	070910	0218	65 37.015 N	27 21.834 W	GPS	569	570	574	11	

M82/1	364	1	ROS/CTD	070910	0337	65 36.960 N	27 34.916 W	GPS	636	649	653	9			
M82/1	365	1	ROS/CTD	070910	0522	65 36.880 N	27 47.725 W	GPS	708	715	719	12			
M82/1	366	1	ROS/CTD/LADCP	070910	0703	65 37.020 N	28 00.907 W	GPS	799	807	811	11			
M82/1	367	1	ROS/CTD/LADCP	070910	0844	65 37.028 N	28 14.197 W	GPS	854	863	871	9			
M82/1	368	1	ROS/CTD/LADCP	070910	1013	65 37.044 N	28 22.000 W	GPS	926	-	946	9			
M82/1	369	1	ROS/CTD/LADCP	070910	1126	65 37.024 N	28 30.002 W	GPS	1015	1024	1035	10			
M82/1	370	1	ROS/CTD/LADCP	070910	1256	65 39.999 N	28 32.918 W	GPS	1006	1021	1024	10			
M82/1	371	1	ROS/CTD/LADCP	070910	1428	65 42.948 N	28 35.920 W	GPS	928	985	931	12			
M82/1	372	1	ROS/CTD	070910	1558	65 45.992 N	28 39.011 W	GPS	822	845	798	26			
M82/1	373	1	ROS/CTD	070910	1741	65 48.964 N	28 42.052 W	GPS	624	630	630	11			
M82/1	374	1	ROS/CTD	070910	1902	65 52.002 N	28 44.968 W	GPS	503	500	498	15			
M82/1	375	1	ROS/CTD	070910	2010	65 55.153 N	28 47.864 W	GPS	438	439	436	7			
M82/1	376	1	ROS/CTD	070910	2102	65 58.170 N	28 51.152 W	GPS	386	388	388	5			
M82/1	377	1	ROS/CTD	070910	2154	65 59.990 N	29 00.240 W	GPS	342	337	338	6			
M82/1	378	1	ROS/CTD	070910	2240	66 01.454 N	29 07.373 W	GPS	301	304	303	7			
M82/1	379	1	ROS/CTD	071010	0038	65 43.887 N	29 23.163 W	GPS	398	416	394	10			
M82/1	380	1	ROS/CTD	071010	0132	65 42.033 N	29 20.098 W	GPS	503	530	497	12			
M82/1	381	1	ROS/CTD/LADCP	071010	0243	65 39.116 N	29 14.798 W	GPS	755	801	745	11			
M82/1	382	1	ROS/CTD/LADCP	071010	0410	65 35.924 N	29 09.929 W	GPS	920	971	922	20			
M82/1	383	1	ROS/CTD/LADCP	071010	0604	65 32.998 N	29 05.248 W	GPS	1070	1085	1087	13			
M82/1	384	1	ROS/CTD/LADCP	071010	0751	65 30.007 N	29 00.042 W	GPS	1195	1218	1221	6			
M82/1	385	1	ROS/CTD/LADCP	071010	0947	65 27.010 N	28 55.031 W	GPS	1254	1258	1282	6			
M82/1	386	1	ROS/CTD/LADCP	071010	1131	65 23.947 N	28 50.146 W	GPS	1282	1293	1306	9			
M82/1	387	1	ROS/CTD/LADCP	071010	1500	65 00.057 N	29 14.847 W	GPS	1469	1438	1455	11			
M82/1	388	1	ROS/CTD/LADCP	071010	1725	65 03.029 N	29 17.905 W	GPS	1574	1600	1616	12			
M82/1	389	1	ROS/CTD/LADCP	071010	1933	65 06.086 N	29 20.783 W	GPS	1707	1730	1748	10			
M82/1	390	1	ROS/CTD/LADCP	071010	2137	65 09.106 N	29 23.886 W	GPS	1527	1532	1539	7			
M82/1	391	1	ROS/CTD/LADCP	071010	2314	65 12.008 N	29 26.990 W	GPS	1564	1587	1601	6			
M82/1	392	1	ROS/CTD/LADCP	071110	0104	65 14.986 N	29 30.056 W	GPS	1496	1523	1526	11			
M82/1	393	1	ROS/CTD/LADCP	071110	0307	65 18.001 N	29 33.009 W	GPS	1400	1444	1421	11			
M82/1	394	1	ROS/CTD/LADCP	071110	0504	65 21.072 N	29 35.963 W	GPS	1248	1310	1252	20			
M82/1	395	1	ROS/CTD/LADCP	071110	0650	65 24.038 N	29 38.936 W	GPS	1078	1104	1092	11			
M82/1	396	1	MOR	071110	0910	65 16.930 N	30 00.120 W	GPS					Deployment of mooring DS7-10		
M82/1	397	1	MOR	071110	0957	65 14.510 N	30 00.010 W	GPS					Deployment of mooring DS6-10		
M82/1	398	1	MOR	071110	1043	65 11.970 N	30 00.100 W	GPS					Deployment of mooring DS5-10		
M82/1	399	1	ROS/CTD/LADCP	071110	1142	65 13.108 N	30 07.171 W	GPS	1405	1474	1422	13			
M82/1	400	1	MOR	071110	1300	65 13.190 N	30 07.490 W	GPS	1400				Deployment of mooring DS4-10 failed		
M82/1	401	1	ROS/CTD/LADCP	071110	1518	65 27.001 N	29 41.999 W	GPS	884	890	898	11			
M82/1	402	1	ROS/CTD/LADCP	071110	1650	65 29.879 N	29 44.934 W	GPS	660	667	668	14			
M82/1	403	1	ROS/CTD	071110	1823	65 34.832 N	29 46.750 W	GPS	355	353	352	10			
M82/1	404	1	ROS/CTD	071110	1910	65 40.066 N	29 55.196 W	GPS	313	308	308	9			
M82/1	405	1	ROS/CTD	071110	2055	65 45.126 N	30 00.233 W	GPS	359	357	357	9			
M82/1	406	1	ROS/CTD	071110	2200	65 50.224 N	30 05.215 W	GPS	375	371	372	10			
M82/1	407	1	ROS/CTD	071210	0008	65 59.992 N	30.40.065 W	GPS	479	469	473	9			
M82/1	408	1	ROS/CTD	071210	0129	65 53.020 N	30 40.004 W	GPS	444	438	442	10			
M82/1	409	1	ROS/CTD	071210	0246	65 47.036 N	30 39.953 W	GPS	419	412	415	10			

M82/1	410	1	ROS/CTD	071210	0403	65 41.024 N	30 40.060 W	GPS	402	404	402	12		
M82/1	411	1	ROS/CTD	071210	0524	65 35.010 N	30 39.703 W	GPS	403	400	402	10		
M82/1	412	1	ROS/CTD	071210	0628	65 32.076 N	30 39.964 W	GPS	386	388	390	9		
M82/1	413	1	ROS/CTD	071210	0734	65 29.063 N	30 40.118 W	GPS	384	382	384	10		
M82/1	414	1	ROS/CTD/LADCP	071210	0834	65 26.034 N	30 40.109 W	GPS	499	498	501	8		
M82/1	415	1	ROS/CTD/LADCP	071210	0933	65 23.011 N	30 40.069 W	GPS	722	731	730	9		
M82/1	416	1	ROS/CTD/LADCP	071210	1035	65 20.010 N	30 40.048 W	GPS	925	950	936	10		
M82/1	417	1	ROS/CTD/LADCP	071210	1150	65 17.027 N	30 40.019 W	GPS	1091	1110	1106	11		
M82/1	418	1	ROS/CTD/LADCP	071210	1318	65 14.065 N	30 40.078 W	GPS	1259	1280	1285	10		
M82/1	419	1	ROS/CTD/LADCP	071210	1455	65 10.986 N	30 39.828 W	GPS	1407	1424	1434	10		
M82/1	420	1	ROS/CTD/LADCP	071210	1646	65 07.968 N	30 39.715 W	GPS	1570	1587	1602	11		
M82/1	421	1	ROS/CTD/LADCP	071210	1843	65 04.950 N	30 40.130 W	GPS	1686	1704	1724	12		
M82/1	422	1	ROS/CTD/LADCP	071210	2048	65 02.004 N	30 39.998 W	GPS	1777		1832	8		
M82/1	423	1	ROS/CTD/LADCP	071210	2252	64 59.012 N	30 40.231 W	GPS	1874	1911	1927	8		
M82/1	424	1	ROS/CTD/LADCP	071310	0048	64 54.989 N	30 40.056 W	GPS	1988	2010	2036	10		
M82/1	425	1	ROS/CTD/LADCP	071310	0302	64 50.988 N	30 40.057 W	GPS	2086	2109	2138	9		
M82/1	426	1	ROS/CTD/LADCP	071310	0523	64 46.999 N	30 40.073 W	GPS	2175	2202	2232	6		
M82/1	427	1	ROS/CTD/LADCP	071310	2040	63 15.958 N	35 25.162 W	GPS	2430	220	221	~2000		Teststation
M82/1	428	1	ROS/CTD/LADCP	071310	2215	63 09.956 N	35 43.986 W	GPS	2462	2464	2509	6		
M82/1	429	1	ROS/CTD/LADCP	071410	0045	63 13.892 N	35 51.620 W	GPS	2353	2370	2405	10		
M82/1	430	1	ROS/CTD/LADCP	071410	0319	63 17.981 N	35 59.058 W	GPS	2253	2276	2301	8		
M82/1	431	1	MOR	071410	0540	63 17.030 N	35 51.400 W	GPS	2311					Recovery of mooring UK2-09
M82/1	432	1	MOR	071410	0819	63 16.940 N	35 51.880 W	GPS	-					Deployment of mooring UK2-10
M82/1	433	1	MOR	071410	1017	63 21.560 N	36 60.840 W	GPS	-					Recovery of mooring G1-09
M82/1	434	1	MOR	071410	1151	63 23.330 N	36 30.810 W	GPS	-					Recovery of mooring G1-07 failed
M82/1	435	1	MOR	071410	1340	63 29.240 N	36 17.670 W	GPS	-					Recovery of mooring UK1-09
M82/1	436	1	MOR	071410	1525	63 33.200 N	36 29.740 W	GPS	-					Recovery of mooring F2-09
M82/1	437	1	ROS/CTD/LADCP	071410	1904	63 49.976 N	36 57.968 W	GPS	347	342	344	11		
M82/1	438	1	ROS/CTD/LADCP	071410	2017	63 45.845 N	36 50.566 W	GPS	679	-	725	11		
M82/1	439	1	ROS/CTD/LADCP	071410	2144	63 41.791 N	36 43.108 W	GPS	1603	1672	1668	10		
M82/1	440	1	ROS/CTD/LADCP	071410	2334	63 38.071 N	36 35.606 W	GPS	1614	1636	1651	10		
M82/1	441	1	ROS/CTD/LADCP	071510	0127	63 33.974 N	36 28.010 W	GPS	1748	1771	1787	9		
M82/1	442	1	ROS/CTD/LADCP	071510	0336	63 30.008 N	36 21.407 W	GPS	1877	1948	1933	12		
M82/1	443	1	ROS/CTD/LADCP	071510	0607	63 26.124 N	36 14.124 W	GPS	2032	2080	2080	10		
M82/1	444	1	ROS/CTD/LADCP	071510	0835	63 21.922 N	36 06.152 W	GPS	2151	2187	2209	9		
M82/1	445	1	MOR	071510	1100	63 23.070 N	36 04.050 W	GPS						Recovery of G1-07 by Dredging failed
M82/1	446	1	EM122 Profile	071510	1811	63 18.580 N	35 56.810 W	GPS						
M82/1	447	1	MOR	071610	0806	63 21.530 N	36 06.930 W	GPS						Deployment of mooring G1-10
M82/1	448	1	MOR	071610	1021	63 29.010 N	36 17.950 W	GPS						Deployment of mooring UK1-10
M82/1	449	1	MOR	071610	1215	63 33.010 N	36 29.970 W	GPS						Deployment of mooring F2-10
M82/1	450	1	MOR	071610	1330	63 35.520 N	36 38.900 W	GPS						Recovery of F1/2 - 07 failed
M82/1	451	1	ROS/CTD/LADCP	071710	0022	62 54.994 N	40 09.984 W	GPS	1507	1490	1485	9		
M82/1	452	1	ROS/CTD/LADCP	071710	0215	62 56.014 N	40 15.072 W	GPS	1311	1250	1254	9		
M82/1	453	1	ROS/CTD	071710	0400	62 57.030 N	40 19.919 W	GPS	393	383	382	10		
M82/1	454	1	ROS/CTD	071710	0514	62 58.040 N	40 25.150 W	GPS	203	198	199	11		
M82/1	455	1	ROS/CTD	071710	0613	62 59.033 N	40 30.131 W	GPS	259	253	255	9		

M82/1	456	1	ROS/CTD	071710	0753	63 00.131 N	40 40.621 W	GPS	451	458	450	11		
M82/1	457	1	MOR	071810	0800	59 41.530 N	39 43.410 W	GPS						Recovery of V434-CIS_09 failed
M82/1	458	1	MOR	071810	1240	59 12.170 N	39 30.950 W	GPS	3028					Recovery of LOCO2-7
M82/1	459	1	ROS/CTD/LADCP	071810	1513	59 12.054 N	39 32.646 W	GPS	3029	3020	3070	8		
M82/1	460	1	ROS/CTD/LADCP	071810	2340	59 49.996 N	40 50.003 W	GPS	2354	2386	2372	9		
M82/1	461	1	ROS/CTD/LADCP	071910	0329	59 46.004 N	40 15.002 W	GPS	2609	2610	2635	9		
M82/1	462	1	MOR	071910	0800	59 41.250 N	39 42.990 W	GPS	2770					Recovery of V434-CIS_09
M82/1	463	1	MOR	071910	1544	59 12.650 N	39 30.380 W	GPS	3001					Deployment of mooring LOCO2-8
M82/1	464	1	ROS/CTD/LADCP	071910	1940	59 14.034 N	39 29.876 W	GPS	3005	2994	3041	11		
M82/1	465	1	ROS/CTD/LADCP	072010	0052	59 34.996 N	38 59.903 W	GPS	2932	2931	2964	11		
M82/1	466	1	ROS/CTD/LADCP	072010	0544	59 41.892 N	39 39.853 W	GPS	2771	2763	2805	8		
M82/1	467	1	MOR	072010	0838	59 41.000 N	39 43.500 W	GPS	2738					Deployment of mooring CIS-10
M82/1	468	1	ROS/CTD/LADCP	072010	2223	58 53.057 N	40 01.788 W	GPS	3049	3042	3090	7		
M82/1	469	1	ROS/CTD/LADCP	072110	0537	58 16.040 N	41 04.934 W	GPS	3169	3166	3212	9		
M82/1	470	1	ROS/CTD/LADCP	072110	1307	57 38.034 N	42 07.026 W	GPS	3313	3304	3359	10		
M82/1	471	1	ROS/CTD/LADCP	072110	2236	56 59.899 N	43 08.051 W	GPS	3473	3486	3520	9		
M82/1	472	1	ROS/CTD/LADCP	072210	0815	56 22.999 N	44 07.848 W	GPS	3352	3359	3414	9		
M82/1	473	1	ROS/CTD/LADCP	072210	1530	55 44.963 N	45 06.944 W	GPS	3271	3250	3313	12		
M82/1	474	1	ROS/CTD/LADCP	072210	2328	55 07.969 N	46 04.070 W	GPS	3403	3392	3449	10		
M82/1	475	1	ROS/CTD/LADCP	072310	0547	54 44.026 N	46 59.857 W	GPS	3454	3451	3507	8		
M82/1	476	1	ROS/CTD/LADCP	072310	1210	54 20.064 N	47 55.026 W	GPS	3823	3817	3883	9		
M82/1	477	1	EM122 Profile	072310	1700	54 16.560 N	48 03.570 W	GPS	3861					
M82/1	478	1	ROS/CTD/LADCP	072410	0126	53 57.005 N	48 51.952 W	GPS	3776	3762	3827	10		
M82/1	479	1	MOR	072410	1102	53 22.540 N	50 15.390 W	GPS						Recovery of K 10
M82/1	480	1	ROS/CTD/LADCP	072410	1337	53 21.584 N	50 14.278 W	GPS	3433	3405	3472	9		
M82/1	481	1	MOR	072410	1700	53 22.800 N	50 15.200 W	GPS						Deployment of mooring K 10
M82/1	482	1	ROS/CTD/LADCP	072410	2159	53 29.792 N	49 53.686 W	GPS	3561	3537	3608	10		
M82/1	483	1	ROS/CTD/LADCP	072510	0313	53 13.893 N	50 31.812 W	GPS	3235	3221	3281	10		
M82/1	484	1	MOR	072510	0615	53 15.260 N	50 33.220 W	GPS						Recovery of DSOW 2
M82/1	485	1	MOR	072510	0855	53 15.400 N	50 33.270 W	GPS						Deployment of mooring DSOW 2
M82/1	486	1	MOR	072510	1104	53 07.780 N	50 51.860 W	GPS						Recovery of K 9
M82/1	487	1	MOR	072510	1408	53 08.260 N	50 52.270 W	GPS						Deployment of mooring K 9
M82/1	488	1	MOR	072510	1751	53 02.980 N	51 04.500 W	GPS						Recovery of DSOW 1
M82/1	489	1	ROS/CTD/LADCP	072510	1931	53 00.772 N	51 02.682 W	GPS	2586	2585	2620	9		
M82/1	490	1	ROS/CTD/LADCP	072510	2228	53 06.242 N	50 50.081 W	GPS	2959		2993	10		
M82/1	491	1	ROS/CTD/LADCP	072610	0351	52 55.406 N	51 15.880 W	GPS	2280	2283	2312	9		
M82/1	492	1	MOR	072610	0721	52 57.900 N	51 17.870 W	GPS						Recovery of K 8
M82/1	493	1	MOR	072610	1019	52 57.310 N	51 18,590 W	GPS						Deployment of mooring K 8
M82/1	494	1	MOR	072610	1402	53 02.800 N	51 04.800 W	GPS						Deployment of mooring DSOW1
M82/1	495	1	ROS/CTD/LADCP	072610	1723	52 42.731 N	51 45.251 W	GPS	388	380	382	9		
M82/1	496	1	ROS/CTD/LADCP	072610	1907	52 45.929 N	51 38.026 W	GPS	798	784	793	10		
M82/1	497	1	MOR	072810	0732	56 33.230 N	52 39.690 W	GPS	3486					Recovery of K 1
M82/1	498	1	ROS/CTD/LADCP	072810	0959	56 33.640 N	52 41.010 W	GPS	3483	3473	3528	12		
M82/1	499	1	MOR	072810	1340	56 33.130 N	52 38.930 W	GPS						Deployment of mooring K 1
M82/1	500	1	ROS/CTD/LADCP	072910	1054	54 25.268 N	48 24.949 W	GPS	3577		3400			MicroCat Calibration

M82/1	501	1	ROS/CTD/LADCP	072910	2331	53 47.839 N	49 12.164 W	GPS	3740	3740	3805	8			
M82/1	502	1	ROS/CTD/LADCP	073010	0415	53 38.842 N	49 32.839 W	GPS	3660	3637	3711	9			
M82/1	503	1	ROS/CTD/LADCP	073010	0927	53 29.564 N	49 53.886 W	GPS	3574		3617	11			
M82/1	504	1	ROS/CTD/LADCP	073010	1335	53 21.564 N	50 14.054 W	GPS	3427	3406	3471	10			
M82/1	505	1	ROS/CTD/LADCP	073010	1735	53 13.813 N	50 31.746 W	GPS	3247	3239	3299	7			
M82/1	506	1	ROS/CTD/LADCP	073010	2136	53 06.200 N	50 50.340 W	GPS	2940	2924	2980	6			
M82/1	507	1	ROS/CTD/LADCP	073110	0048	53 00.671 N	51 02.588 W	GPS	2590	2588	2625	10			
M82/1	508	1	POSIDONIA	073110	0340	52 57.300 N	51 18.500 W	GPS	2226						
M82/1	509	1	ROS/CTD/LADCP	073110	0710	52 52.301 N	51 22.657 W	GPS	1974	1969	1994	8			MicroCat Calibration
M82/1	510	1	ROS/CTD/LADCP	073110	0949	52 49.393 N	51 29.828 W	GPS	1411	1383	1418	10			
M82/1	511	1	ROS/CTD/LADCP	073110	1309	52 45.900 N	51 37.910 W	GPS	804			7			
M82/1	512	1	ROS/CTD/LADCP	073110	1432	52 42.661 N	51 45.257 W	GPS	386			9			