

## **Abstract:**

**M61-1** was a multidisciplinary cruise addressing biological, geological and hydrographical scientific objectives in the carbonate mound province west of Ireland. The cruise started in Lisbon (Portugal) and ended in Cork (Ireland). M61/1 was embedded within the ESF-DFG “Moundforce” project of the EUROMARGINS Programme. Together with the succeeding M61/3 cruise, these Meteor activities document Germanys strong scientific and logistic support for the success of this challenging programme. Investigations are also designed as a preparatory cruise for the currently proposed EU-project HERMES (Hotspot Ecosystem Research on the Margins of European Seas; estimated start Nov. 04). All institutions participating in M61-1 are partners in HERMES Work package 2 “Coral Reef and Carbonate Mound Systems”.

## **Operations:**

**Sunday 18. 4.:** The vanguard of the scientific party boarded METEOR at 9.00h and started with the unloading of three containers. The main scientific party arrived in the course of the afternoon. The rest of day was spent with the distribution of equipment to the laboratories.

**Monday 19.4.:** METEOR left Lisbon harbour at 10.30h with a group of 28 scientists. From the mouth of the Tejo River we took a northern course along the west coast of the Iberian Peninsula. We encountered a heavy swell of appr. 8m from the north west. The day was spent with the equipment of the laboratories, the construction of sampling gear and a plenary scientific meeting. Weather conditions were unchanged.

**Tuesday 20.4.:** In the evening we reached the Cap Finistere region and started our crossing of the Bay of Biscay. Gear preparations especially the installation of the lander systems continued.

**Wednesday 21.4.:** We continued our crossing of the Bay of Biscay. The swell changed the direction to west and caused a unpleasant rolling of the ship. Gear preparation on deck continued.

**Thursday 22.4.:** We arrived at our first station at  $51^{\circ} 10'N$ ,  $11^{\circ} 40'W$  in the southern Belgica Mound province in the afternoon. Station work started with the deployment of the ROBIO Lander (Stat 202). After the test drive of a few winches we left the locality and steamed 17nm to the north to survey two mounds west and southeast of Therese Mound with the OFOS system (Stat 203-204). Both Mounds have so far not been investigated. We named them Castor and Pollux Mound. Both contained rich thickets of corals. We started the night with a highly resolved longitudinal CTD/Ro transect across Galway and Little Galway Mound (Stat205-214).

**Friday 23.4.:** We finished the longitudinal CTD/Ro transect in the morning. Next was a series of VanVeen Grab casts (Stat. 215-218) in the vicinity of the Therese Mound including the Castor and Pollux Mounds. The early afternoon was spent with the deployment of the BCL-Lander on Galway Mound (Stat 220). Afterwards METEOR headed south to the ROBIO-deployment site Station. The lander was successfully recovered and had worked well. We then steamed back to the area south of Galway Mound to sample sediments with a box corer (6 deployments, Stat.221-226).

**Saturday 24. 4.:** Box corer sampling ended in the morning and was followed by a highly resolved latitudinal CTD/Ro transect across Galway Mound (Stat 227-233). The first MOCNESS net was towed across Galway Mound in the afternoon (Stat. 234). In the late afternoon we retrieved the BC-Lander (Stat. 235), The rest of the day and part of the following night was again dedicated to two MOCNESS transects (Stat.236-237).

**Sunday 25.4.:** Another series of 6 Van Veen grabs was driven to the north and east of Galway Mound (Stat. 238-243) . Followed by another MOCNESS haul (Stat 244). In the afternoon we deployed the DOS-lander (Stat. 245) instrumented with a wide range of equipment and experimental trays on the top plateau of Galway Mound. This lander will be moored for 110 days and will be retrieved with FS POSEIDON round 10<sup>th</sup> August 04. Next came another deployment of the ROBIO Lander (Stat. 246) west of Galway Mound. The rest of the day was spent with two OFOS transects across an hitherto unexplored mound at  $51^{\circ}29'N$ ,  $11^{\circ} 42,30'W'$  which was named Erik Mound and at escarpment of the 660m contour further to the south (Stat. 247-248).

**Monday 26. 4.:** The night until mid morning was dedicated to another CTD/Ro survey (Stat. 249-256). Next we deployed the BC-Lander (Stat. 257) and retrieved the ROBIO lander (Stat. 258). A CTD in the afternoon had to be cancelled for technical reasons and was replaced by a Van Veen grab reference sample at the DOS deployment site (Stat. 259). The TV-grab was employed on the escarpment surveyed the day before to retrieve exposed carbonates (Stat 260). Although the gear fell over during sampling we were able to retrieve sufficient material. Two MOCNESS transects were driven during the late evening and the first half of the night (Stat. 262-262).

**Tuesday 27.4.:** The second half of the night and the early morning were spent with Van Veen grab sampling (Stat. 263-266) followed by two MOCNESS hauls until early afternoon (Stat. 267-268) . In the course of the afternoon and early evening we retrieved the BC-Lander (Stat 269) and succeeded to sample a 2,70 m and 4,05 m long core with the gravity corer on Pollux Mound (Stat 270-271). The night was spent with an extensive box corer sampling survey with 6 successful deployments (272-277).

**Wednesday 28.04.:** The early morning was spent with another CTD/Ro survey (278-280). We then switched over to gravity coring which gained a successful core of 5,12 m (Stat 281-282). After a successful multiple corer haul and a final CTD/Ro cast (Stat 283) we finished our station work at the Belgica Mound Province in the afternoon and headed in north-west direction towards the second working area at the south-western flank of Rockall Bank.

**Thursday 29. 04.:** We continued our steaming to the Rockall area. Strong head winds reduced our speed significantly to about 7-8 kn.

**Friday 30.04.:** We arrived at our second working area in the morning at 56° 40'N, 17° 34'W. First target was a volcanic structure that pierced through the gently dipping north-western margin of Rockall Bank. After a survey with Hydrosweep (Stat. 284) and the deployment of the BC-Lander and ROBIO-lander ("85-286) we selected two transects for the OFOS across the newly chartered mount (Stat. 287-288). The rough summit of the volcanic structure, that we denominated "Kiel Mount", was covered by mostly fossil coral thickets. We documented a number of lithified carbonate sediments or hardgrounds. Larger drop stones colonised by huge sea fans or black corals. The mid-slope of Kiel Mount is patchily plastered with carbonate crusts. They show prominent dissolution features and are often eroded beneath the crust. Sediment filled dissolution cracks were abundantly inhabited by sea pens.

**Saturday. 01. 05.:** We spent the night with two highly resolved CTD/Ro transect across the Kiel Mount (Stat 289-297). The BC-Lander and the ROBIO-lander were retrieved in the morning (Stat 298-299). The recovery was followed by TV-grab sampling of carbonate crusts on top of Kiel Mount (Stat. 300-301). The afternoon was dedicated to another multibeam survey further upslope southeast of Kiel Mount (Stat 302). The survey revealed a multitude of interesting features. Because of the limited time we could only survey one area with the OFOS (Stat 303) until mid night. This site was dominated by an elongated carbonate mound, which was partly covered with dense *Lophelia* thickets which were hitherto not reported for the western part of Rockall Bank. The new mound was named "Franken Mound".

**Sunday 02.05.:** The rest of the night was dedicated to bottom sampling in the newly surveyed sites. A series of Van Veen grabs were deployed on Kiel mount (Stat 304-309). This was followed by box grab sampling and a gravity corer cast (Stat 310-313) A CTD/Ro followed at the Franken Mound (Stat. 314). The rest of the day was spent with Van Veen grab sampling on Franken Mound which was only of moderate success since the weather conditions quickly deteriorated. We left the station shortly before mid night and steamed back to the Porcupine Seabight area.

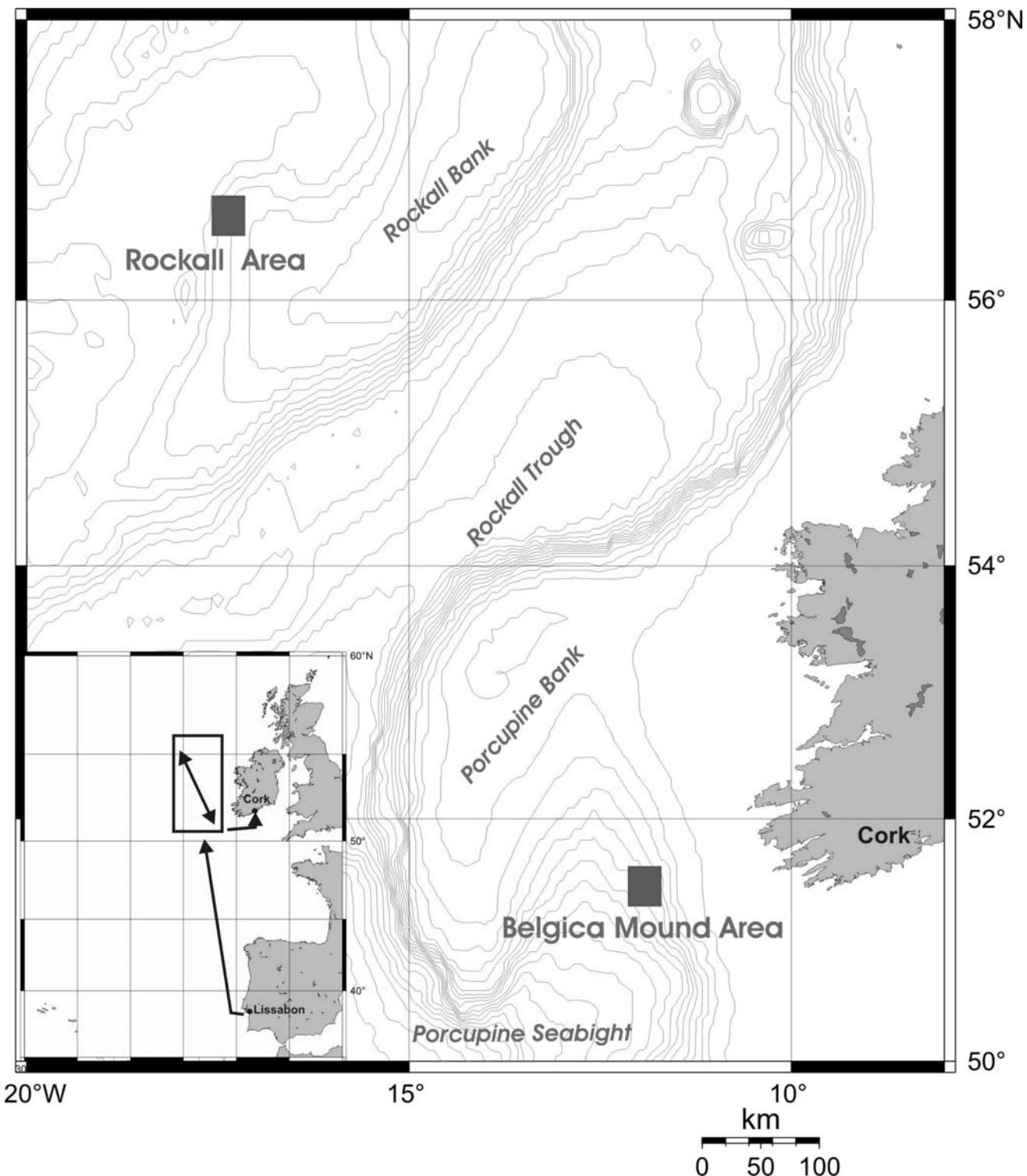
**Monday 03.05.:** We continued our transit with strong gale (Beaufort 8-9) from northwest. A further station on Porcupine Bank had to be cancelled because of the rough sea which prevented gear deployments. We therefore continued our passage to Cork.

**Tuesday 04.05.:** We continued our transit. In the meantime winds had increased to 10 Beaufort with gusts of 12.

### **Gears employed:**

Dredging operation, Lander Deployments, OFOS, MOCNESS Net, Parasound, CTD/Rosette, Box Corer, Multiple Corer, Van Veen Grab, Gravity Corer, TV Grab

## **Cruise track and working areas of leg M61-1:**



Stationlist Cruise METEOR 61/1 (Lisbon-Cork, 19. April - 05. May 2004)

Station No.	Date	Time (UTC)	Coordinates		Depth (m)	Gear
			Lat. °N	Long. °W		
202	22.04.2004	12:42			919	ROBIO-L
203	22.04.2004	17:25	51°26,56	11°47,07	1034-1067	OFOS
204	22.04.2004	19.52	51°25,44	11°45,34	989-999	OFOS
205	22.04.2004	22:46	51°27,87	11°45,05	923-925	CTD/Ro
206	22.04.2004	23:45	51°27,63	11°45,27	916-920	CTD/Ro
207	23.04.2004	00:41	51°27,45	11°45,28	864-871	CTD/Ro
208	23.04.2004	01:36	51°27,28	11°45,17	800-808	CTD/Ro
209	23.04.2004	02:29	51°27,10	11°45,14	797-813	CTD/Ro
210	23.04.2004	03:20	51°26,92	11°45,14	865-870	CTD/Ro
211	23.04.2004	04:11	51°26,79	11°45,19	886-890	CTD/Ro
212	23.04.2004	05:00	51°26,67	11°45,15	893-895	CTD/Ro
213	23.04.2004	05:54	51°26,52	11°45,43	873-884	CTD/Ro
214	23.04.2004	06:45	51°26,39	11°45,51	917-927	CTD/Ro
215	23.04.2004	07:55	51°26,26	11°47,28	986-1003	BG
216	23.04.2004	09:18	51°25,72	11°46,26	892-904	BG
217	23.04.2004	10:34	51°26,03	11°45,88	886-902	BG
218	23.04.2004	11:38	51°26,51	11°45,43	871-881	BG
219	23.04.2004	16:17	51°09,90	11°39,73	919-918	ROBIO
220	23.04.2004	12:50	51°27,37	11°45,13	860	BCL
221	23.04.2004	19:26	51°26,47	11°47,22	1057-1059	GKG
222	23.04.2004	20:52	51°26,16	11°47,29	958-975	GKG
223	23.04.2004	22:05	51°25,87	11°47,39	1029	GKG
224	23.04.2004	23:56	51°25,26	11°45,60	981	GKG
225	24.04.2004	01:17	51°24,99	11°45,71	912-914	GKG
226	24.04.2004	02:23	51°24,82	11°45,61	949-950	GKG
227	24.04.2004	03:54	51°27,18	11°44,47	924	CTD/Ro
228	24.04.2004	04:55	51°27,14	11°44,88	886-888	CTD/Ro
229	24.04.2004	05:45	51°27,09	11°45,13	804-817	CTD/Ro
230	24.04.2004	06:32	51°27,07	11°45,32	839-900	CTD/Ro
231	24.04.2004	07:41	51°27,07	11°45,61	956-960	CTD/Ro
232	24.04.2004	08:54	51°27,10	11°45,36	984-985	CTD/Ro
233	24.04.2004	11:21	51°26,72	11°48,54	1040-1070	CTD/Ro
234	24.04.2004	13:55	51°29,83	11°42,10	845-1016	MOC
235	24.04.2004	18:10	51°27,78	11°44,81	926	BCL
236	24.04.2004	19:35	51°29,67	11°45,08	935-1037	MOC
237	25.04.2004	00:22	51°30,35	11°45,05	972	MOC
238	25.04.2004	03:40	51°29,47	11°43,21	912	BG
239	25.04.2004	04:39	51°29,11	11°43,32	814-847	BG
240	25.04.2004	05:40	51°28,27	11°44,94	898-901	BG
241	25.04.2004	06:48	51°27,31	11°44,06	863-899	BG
242	25.04.2004	07:56	51°26,93	11°42,99	881	BG
243	25.04.2004	08:56	51°26,69	11°42,66	778	BG
244	25.04.2004	11:01	51°29,47	11°45,06	942-966	MOC
245	25.04.2004	15:50	51°27,34	11°45,15	806-848	DOS
246	25.04.2004	17:30	51°25,07	11°45,52	963	ROBIO-L
247	25.04.2004	18:24	51°29,39	11°42,97	845-904	OFOS
248	25.04.2004	21:57	51°24,73	11°41,27	675-764	OFOS
249	26.04.2004	00:18	51°25,14	11°46,32	10061009	CTD/Ro
250	26.04.2004	01:20	51°25,37	11°46,35	978-979	CTD/Ro
251	26.04.2004	02:23	51°25,53	11°46,38	943-947	CTD/Ro
252	26.04.2004	03:21	51°25,70	11°46,27	878-930	CTD/Ro
253	26.04.2004	04:18	51°25,82	11°46,24	891-906	CTD/Ro
254	26.04.2004	05:14	51°25,94	11°46,25	914-916	CTD/Ro
255	26.04.2004	06:12	51°26,14	11°46,20	990-997	CTD/Ro
256	26.04.2004	07:12	51°26,46	11°46,16	992	CTD/Ro
257	26.04.2004	09:55	51°27,07	11°46,36	986	BCL
258	26.04.2004	12:40	51°24,60	11°45,29	948-977	ROBIO
259	26.04.2004	13:12	51°27,30	11°45,26	850-867	BG
260	26.04.2004	14:36	51°24,28	11°41,21	636-673	TVG
261	26.04.2004	18:38	51°24,93	11°45,68	857-971	MOC
262	26.04.2004	23:11	51°25,18	11°45,08	854-972	MOC
263	27.04.2004	02:56	51°26,48	11°42,67	777-808	BG
264	27.04.2004	04:03	51°26,08	11°42,06	678-721	BG
265	27.04.2004	05:03	51°25,85	11°41,86	705-733	BG
266	27.04.2004	05:58	51°25,56	11°42,21	763-795	BG
267	27.04.2004	07:17	51°25,05	11°45,03	947-970	MOC

Station No.	Date	Time (UTC)	Coordinates		Depth (m)	Gear
			Lat. °N	Long. °W		
268	27.04.2004	11:36	51°25,23	11°45,09	974-859	MOC
269	27.04.2004	15:39	51°26,54	11°46,45	1012	BCL
270	27.04.2004	16:35	51°25,00	11°45,74	933-962	SL
271	27.04.2004	17:49	51°24,99	11°45,67	927-934	SL
272	27.04.2004	19:59	51°20,20	11°14,18	812-813	GKG
273	27.04.2004	21:09	51°20,22	11°41,59	761-763	GKG
274	27.04.2004	22:40	51°24,23	11°41,39	646-655	GKG
275	27.04.2004	23:38	51°24,74	11°41,65	785	GKG
276	28.04.2004	00:54	51°27,15	11°43,61	905	GKG
277	28.04.2004	02:07	51°28,34	11°44,80	900-902	GKG
278	28.04.2004	03:44	51°26,46	11°47,24	1062-1066	CTD/Ro
279	28.04.2004	05:22	51°24,97	11°45,70	924-932	CTD/Ro
280/1	28.04.2004	06:37	51°24,93	11°41,33	681-710	CTD/Ro
280/2	28.04.2004	07:42	51°24,35	11°41,37	692-711	CTD/Ro
281	28.04.2004	08:39	51°24,18	11°41,21	658-662	SL
282	28.04.2004	11:08	51°28,26	11°45,03	906-908	SL
283	28.04.2004	13:08	51°23,87	11°48,59	1160	MUC
283/1	28.04.2004	14:22	51°23,88	11°48,61	1160	CTD/Ro
283/2	28.04.2004	15:29	51°23,86	11°48,56	1163-1167	CTD/Ro
284	30.04.2004	07:34	56°40,40	17°33,55	837-1102	MB/PS
284	30.04.2004	08:21	51°41,090	17°24,520	843-1118	MB/PS
284	30.04.2004	09:15	56°41,91	17°33,55	855-1112	MB/PS
284	30.04.2004	10:12	56°42,770	17°24,331	892-1140	MB/PS
284	30.04.2004	10:58	56°43,64	17°35,49	894-1177	MB/PS
285	30.04.2004	12:12	56°39,82	17°29,86	975	BCL
286	30.04.2004	13:50	56°40,03	17°27,94	934	ROBIO
287	30.04.2004	14:39	56°41,47	17°30,57	902-1067	OFOS
288	30.04.2004	17:58	56°40,38	17°32,36	927,5-1060	OFOS
289/1	30.04.2004	22:00	56°40,29	17°31,47	1021-1025	CTD/Ro
289/2	30.04.2004	22:30	56°40,29	17°31,43	1021-1022	CTD/Ro
290	30.04.2004	23:33	56°41,18	17°31,26	912-916	CTD/Ro
291	01.05.2004	00:25	56°41,85	17°31,26	840-842	CTD/Ro
292	01.05.2004	01:20	56°42,66	17°31,06	954-956	CTD/Ro
293	01.05.2004	02:16	56°43,41	17°30,95	1090-1092	CTD/Ro
294/1	01.05.2004	03:29	56°42,45	17°34,53	1160-1161	CTD/Ro
294/2	01.05.2004	04:03	56°42,40	17°34,53	1161	CTD/Ro
295	01.05.2004	05:16	56°42,05	17°32,19	959-961	CTD/Ro
296	01.05.2004	06:20	56°41,61	17°30,05	904-905	CTD/Ro
297	01.05.2004	07:27	56°40,96	17°27,73	942	CTD/Ro
298	01.05.2004	08:27	56°39,60	17°29,02	951	BCL
299	01.05.2004	09:16	56°39,71	17°27,35	909-917	ROBIO
300	01.05.2004	10:45	56°41,74	17°30,77	847-864	TVG
301	01.05.2004	12:23	56°41,75	17°31,18	853-904	TVG
302	01.05.2004	15:04	56°30,57	17°28,52	968-608	MB/PS
302	01.05.2004	16:40	56°29,75	17°09,17	610-963	MB/PS
302	01.05.2004	18:28	56°28,96	17°28,70	607,2-979	MB/PS
303	01.05.2004	20:52	56°29,22	17°17,84	678-683	OFOS
304	02.05.2004	02:15	56°41,22	17°31,32	912-917	BG
305	02.05.2004	03:19	56°41,85	17°31,38	837-854	BG
306	02.05.2004	04:08	56°41,83	17°31,27	834-838	BG
307	02.05.2004	05:03	56°42,07	17°30,69	833-839	BG
308	02.05.2004	05:52	56°42,11	17°30,48	829-840	BG
309	02.05.2004	06:34	56°42,15	17°30,57	838-842	BG
310	02.05.2004	08:26	56°40,50	17°31,71	1026-1029	GKG
311	02.05.2004	10:05	56°39,80	17°29,82	968-975	GKG
312	02.05.2004	11:30	56°39,82	17°29,82	970-972	SL
313	02.05.2004	13:15	56°42,36	17°29,99	883-904	GKG
314	02.05.2004	16:01	56°29,86	17°18,25	670-683	CTD/Ro
315	02.05.2004	17:00	56°29,64	17°18,00	663-669	BG
316	02.05.2004	17:39				