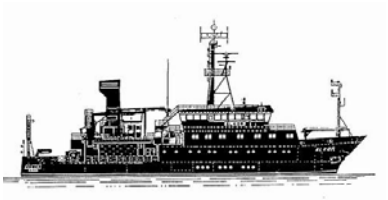


ALKOR 259
Kiel – Kiel, 10. – 22. 06. 2005

IFM-GEOMAR
Leibniz-Institut für Meereswissenschaften
an der Universität Kiel

Preliminary Report ALKOR 259

Principal scientist: Dr. Olaf Pfannkuche, Leibniz-Institute of Marine Sciences;
IFM - GEOMAR, Wischhofstr. 1-3, 24148 Kiel, Germany

Cruise ALKOR 259 was part of the investigations of the collaborative project COMET (Controls on methane fluxes and their climatic relevance in marine gas hydrate-bearing environments) sponsored by the German Ministry of Education and Research and co-ordinated by IFM-GEOMAR. Objective of this cruise was: How the benthic boundary layer methane turnover is regulated in shallow gassy sediments in comparison to gas hydrate bearing sediments at continental margins.
To address this question we surveyed the water column and seafloor in the vicinity of active pockmarks and gassy sediments with hydro-acoustic methods and TV-cameras mounted to a towed frame, respectively. Surface sediment samples were taken with video-guided multiple corer and van Veen grab in the vicinity of gas seeps. A gravity corer was used to sample sediments in meter scales. Water samples for physical and chemical water properties as well as for methane were obtained from Rosette water sampler profiles. Methane in surface water was measured with an equilibrator system connected to a continuous water pumping device. Gas flux from discrete gas flares was quantified with an oblique multi-beam system integrated into a bottom lander. Faunal activity and benthic boundary layer processes were monitored with another lander system. Landers were only deployed for the duration of our working activities in the respective area. All sea floor investigation were operated under video control (sediment coring, lander deployments)
Work permissions were requested for the EEZs of the UK and Norway. Station work focussed on the Tommeliten Gas Field (Norwegian EEZ, Fig. 1) already studied in previous years by the German RV HEINCKE (e.g. cruises No. 180, 191).
In the UK EEZ station works were carried out at two sites (Fig. 1): a gas blow out and the UK plot 15/25 in the Fladen Ground. The latter well known for abundant pockmarks.

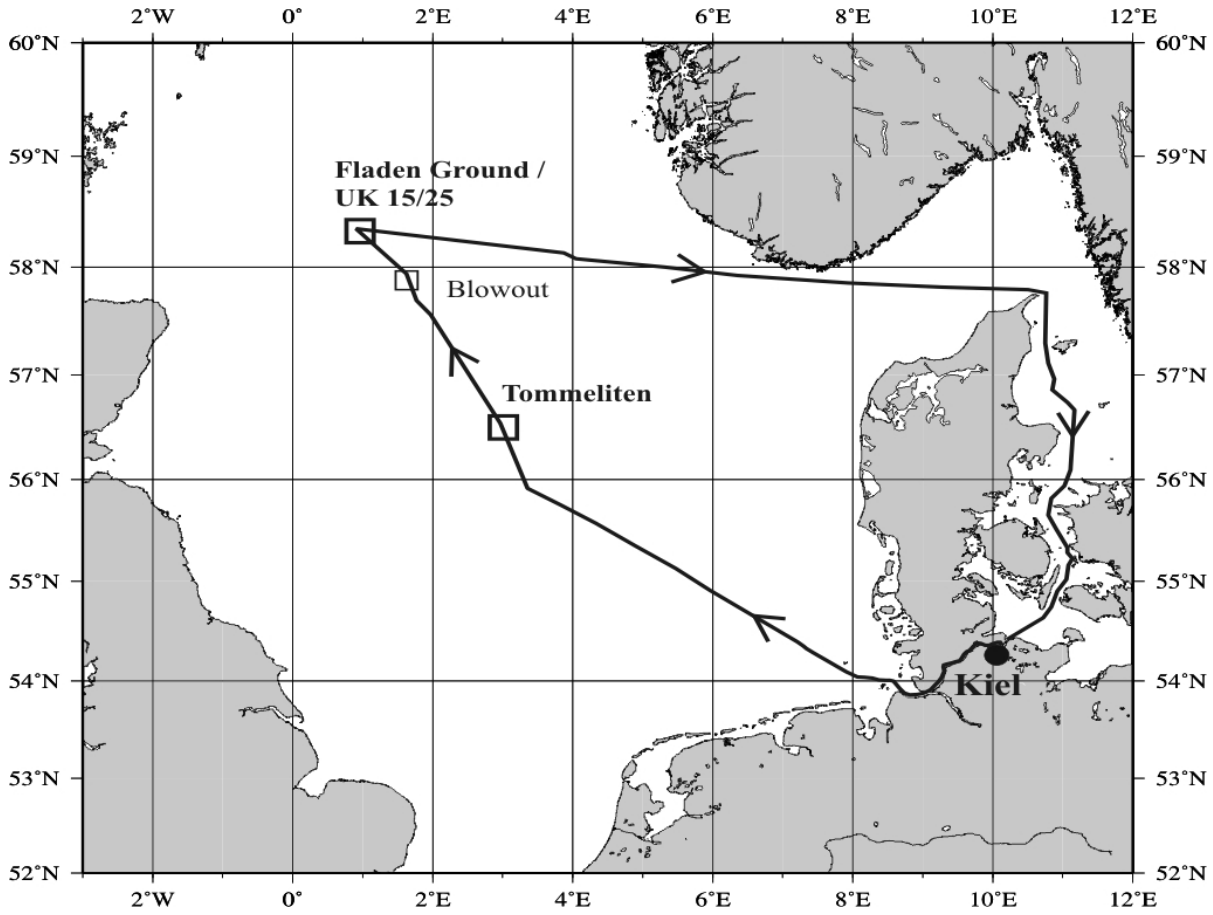


Fig. 1: Cruise track and stations of ALKOR Cruise 259

Narrative of the cruise

Friday, 10-06-2005

ALKOR left the IFM-GEOMAR west shore pier at 08:00h with 12 scientists and a group of guests for the Kiel Canal passage. At 16:00h we reached the canal locks at Brunsbüttel where the guests disembarked. The ship progressed down the River Elbe into the German Bight and headed to the first area of investigation Tommeliten in the Norwegian EEZ in the vicinity of Ekofisk. Our progress was retarded to about 7kn by strong headwinds.

Saturday, 11-06-2005
We continued our passage with an average speed of 7kn through the German EEZ towards Tommeliten

Sunday, 12-06-2005
We started with a calibration station (**Stat.754-55**) for the 75kHz multi-beam echo sounder at 01:00h in the German EEZ at 55°:49.84´N; 003°:33.64´E which comprised of a CTD cast for a sound velocity profile and three parallel multiyear profiles of 1nm length. At 03:06h we continued our journey. We reached our first working station in the Tommeliten area at 08:36h. Our first sample was a CTD/Ro cast (**Stat. 756-1**) which was followed by a van Veen grab sample for sediment ground truthing (**Stat 756-2**). Station work continued until early afternoon with several sounding profiles (**Stat. 757**) with 75kHz multi-beam (bottom topography) and 38kHz single beam echo sounder (flare imaging) in an area already known for abundant gas flares. This was followed by a survey with the ocean floor observation system (OFOS) to image bottom structure and megabenthos (**Stat. 758**). Of special interest

was the location of sulphide oxidizing bacteria mats as targets for the planned deployment of landers. The evening was spent with 3 CTD/Ro casts on a transect through a gas flare (**Stat. 759-761**).

Monday, 13-06-2005
During the night we undertook another multi-beam survey profiling a hole-like structure north of Tommeliten (**Stat. 762**). During the morning we prepared the GasQuant Lander for its first deployment which included a swimming test to balance the number of floats attached to the lander. GasQuant was deployed approximately 40m from a gas bubble site at 13:24h (**Stat. 763**). During the afternoon the preparation and deployment of the DOS-Lander followed. DOS was placed on a bacterial mat at 17:24h (**Stat. 764**). At 20:00h we started to deploy the BIGO-Lander (**Stat. 765**). After a number of search profiles to spot a bacterial mat as target site we released the lander from its video launcher at 21:16h. However, the lander was not disconnected from the launcher since the catching rope with a small float was accidentally released from its container and became entangled with the launcher. In consequence, we had to uplift the launcher and the entangled lander. During the salvage operation a part of the lander frame structure supporting a third of the floats broke off. After all we managed to retrieve the lander, the launcher and the lost float section. A first inspection revealed severe damage to the lander frame structure. In consequence, the BIGO-Lander was not usable for the rest of the cruise. The evening and part of the night was dedicated to continue our CTD/Ro surveys of the gas flare areas.

Tuesday 14-06-2005
In the morning we prepared the TV-Multiple Corer (TV-MUC) and started to sample sediments bearing *Beggiatoa* mats (**Stat 769-73**). After some unsuccessful samples we reduced the number of sampling cores to 4 and were able to sample sediments which were clearly documented by the on-line video control. Unfortunately, all samples were lost when the corer was lifted through the water surface, since the sandy sediments were washed out easily by the waves through small openings in the down core closing caps. In the course of the afternoon the weather conditions deteriorated rapidly and wind speeds reached Bft 7. The wave height and the movements of the ship prevented further sediment sampling with the TV-MUC from with the stern A-frame. A planned OFOS survey was also cancelled. The only gear system operable under these weather conditions was the CTD/Ro. Therefore, we continued our gas flare survey programme during the late afternoon and evening (**Stat. 774-780)**.

Wednesday 15-06-2005
Station work in the morning started with the successful retrieval of the DOS-Lander (**Stat. 781**) and the GasQuant Lander (**Stat. 782**). During mid day and early afternoon we deployed two bottom water samplers which were integrated into the DOS lander. The BWS-lander was deployed on the sea floor attached to the coaxial cable. The first bottom water sample (highly resolved into cm and dcm scale) was taken at a *Beggiatoa* mat an a near by bubble site (**Stat. 783**). The second BWS was driven at a reference site with normal background benthic conditions (**Stat. 784**). A CTD/Ro cast followed in the vicinity of the first BWS station (**Stat 785**). The afternoon was dedicated to TV-MUC sampling with the aim to sample sediments with **Beggiatoa** mats (Stat. **786-89**). From 4 TV-MUC casts two were successful in retrieving sediments. One core seemed to have sampled a *Beggiatoa* mat. All others were taken in close vicinity to mats. Sediment sampling ended with an unsuccessful gravity piston corer station (**Stat. 790**). The sandy sediments obviously prevented a sufficient penetration of the corer. With **Stat. 791** a CTD/Ro cast we finished our station work at Tommelien. We headed to our second working area, the UK Block 15/25 in the Fladen Ground.

Thursday 16-06-2005
At early morning we interrupted our transit to UK Block 15/25 at 57° 55,33'N; 01° 37, 948´E to take a CTD/Ro cast (**Stat. 792**) at a former drilling blow out site which was found still very active with a vigorous bubble stream reaching the surface. Around 09.00h we reached our

survey area in the UK Block 15/25. After a CTD cast (**Stat. 793**) to gain an actual sound velocity profile we started with a multi-beam survey of the area (**Stat. 794**). On the basis of the produced bathymetric map we started to survey the sea floor of three large pockmarks (Scanner, Scotia, and Challenger) with the OFOS (Stat. **795-97**). A relatively weak gas flare was detected in the Scanner pockmark with the 38kHz echo sounder, but no traces of *Beggiatoa* mats or outcropping carbonates were found. With some calibration profiles for the multi-beam echo sounder (**Stat. 798**) and a CTD/Ro cast in the Scanner pockmark (**Stat. 799**) station work ended for this day.

Friday 17-06-2005
During the night we continued the multi-beam survey from the previous day (**Stat. 800**) a took two CTD/Ro samples in the Scanner pockmark (**Stat. 801-02**). We then continued our OFOS surveys in different medium sized pockmarks (**Stat. 803-05**). Since all pockmarks surveyed did neither show gas flares nor chemosynthetic benthic communities we started again a multi-beam survey to enlarge the investigation box (**Stat. 806**). We mapped two larger pock marks which were both surveyed afterwards with the OFOS (**Stat. 807-08**). In one of the pockmarks we detected the largest gas flare of the investigated area and we decided to concentrate our further benthic investigations on this pockmark which we named "Alkor pockmark". We started benthic activities with two van Veen grab casts in the centre and at the rim of the Alkor pockmark to study sediment composition (**Stat. 811-12**). The sediment in the centre of the pockmark was extremely silty and soft whereas at the rim of the pockmark sediment texture became slightly more solid.

Saturday 18-06-2005
During the night we continued multi-beam mapping (**Stat. 813, Stat. 815**) and took two CTD/Ro casts in the Alkor pockmark at high respectively low tide (**Stat. 814, 816**). In the course of the morning until early afternoon we deployed the DOS-Lander (**Stat. 817**), made another CTD/RO cast (Stat. 818) and finally deployed the GasQuant Lander (**Stat. 819**) in the Alkor pockmark. A TV-MUC sample in the centre of the Alkor pockmark failed (**Stat. 820**) since the legs of the TV-MUC sank too deep into the mud which prevented to activate the trigger mechanism to release the core closure mechanism. However, the following TV-MUC cast at the rim of the Alkor pockmark rendered perfect sediment samples. In the late afternoon we left the pockmark area and headed back to the blow out site at 57° 55,33'N; 01° 37,948´E to perform a detailed multi-beam mapping (**Stat. 822, 825**) and to sample the centre of the gas flare and its vicinity with the CTD/Ro (**Stat. 823, 824, 826**). These activities lasted until early Sunday morning.

Sunday 19-06-2005
Upon our return to the Alkor pockmark in the morning we tried again to sample the centre of the pockmark with the TV-MUC. In the meantime we had attached two wooden planks to the MUC´s feet to prevent its sinking into the mud (**Stat. 827**) which finally resulted in a successful sample. After some additional multi-beam surveys (**Stat. 828**) we retrieved the DOS-Lander (**Stat. 829**) and in succession the GasQuant Lander **(Stat. 830**). A successful gravity corer sample on the position of the GasQuant Lander followed (**Stat. 831**). The night until Monday morning was again dedicated to multi-beam mapping to finish Stat. 828 transects and CTD/Ro sampling (**Stat. 833-34**).

Monday 20-06-2005
From early morning we started with water sampling in the benthic boundary layer with the DOS/BWS and the above lying water column with the CTD/Ro in the centre of the Alkor pockmark (Stat. 835-36) and at the rim station of the pockmark (**Stat. 837-38**). With Stat. 838 our sampling programme in the UK Block 15/25 ended. At 09:00h we started our home journey and headed towards the Skagerrak.

Tuesday 21-06-2005
We continued our journey through the Skagerrak and Kattegat.

Wednesday 22-06-2005
We reached IFM-GEOMAR east shore pier in mid morning. Expedition Alkor 259 ended in the early afternoon after unloading and disembarkation of the scientific party.

List of employed gear:

CTD/Ro: CTD / rosette water sampler
MB/PS: multi beam echosounder (75kHz)
Van Veen grab
TV-MUC: TV-controlled multiple corer
Gravity corer (3m)
OFOS: ocean floor observation system
GasQuant: gas quantification lander
DOS: deep sea observation lander
DOS/BWS: deep sea observatio lander with integrated bottom water sampler

List of Stations: (overleaf)

Station list ALKOR 259 (10.° 22. June 2005)

Station No.	Gear	No.	Area	Date	Start Time	Coordinates		Depth	at depth Time	Coordinates		Depth	end stat. Time	Coordinates		Depth
					(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)
754	CTD / Rosette	1	Entenschnabel	12.6.05	00:56	55°49,85	003°33,69	55,3								
755	MB/PS	2	Entenschnabel	12.6.05	01:30	55°50,10	003°32,85	55,1					03:06	55°50,10	003°28,85	55,1
756	CTD / Rosette	2	Tommeliten	12.6.05	08:36	56°29,89	002°59,79	73,8								
	Van Veen Grab	1	Tommeliten	12.6.05	08:56	56°29,88	002°59,79	73,6								
757	MB/PS	2	Tommeliten	12.6.05	09:25	56°28,49	003°00,34	72,8					14:42	56°30,83	002°59,15	71,8
758	OFOS	1	Tommeliten	12.6.05	15:35	56°30,10	003°00,22	70,9					18:10	56°30,18	003°00,26	72,3
	OFOS		Tommeliten	12.6.05	18:35	56°30,14	003°00,44	71,6					19:34	56°29,34	002°58,88	72,8
759	CTD / Rosette	3	Tommeliten	12.6.05	20:03	56°29,59	002°59,08	73								
760	CTD / Rosette	4	Tommeliten	12.6.05	21:40	56°29,68	002°59,32	71,6								
761	CTD / Rosette	5	Tommeliten	12.6.05	22:58	56°29,52	002°58,98	71,5								
762	MB/PS	3	Tommeliten	12.6.05	23:32	56°29,38	003°01,93	72,3					05:15	56°32,76	002°59,17	69,3
763	Test Lander		Tommeliten	13.6.05	08:18	56°30,25	003°00,13	72,1								
	Gas Quant Lander	1	Tommeliten	13.6.05	11:22	56°29,79	002°59,85	71,9					11:54	56°30,07	002°59,62	
	Gas Quant Lander		Tommeliten	13.6.05	13:17	56°29,80	002°59,85	72,1								
764	DOS Lander	1	Tommeliten	13.6.05	16:57	56°30,00	002°59,62	70,4								
765	BIGO Lander	1	Tommeliten	13.6.05	20:00	56°29,99	002°59,58	71								
766	CTD / Rosette	6	Tommeliten	13.6.05	22:23	56°29,60	002°59,13	71,6								
767	CTD / Rosette	7	Tommeliten	13.6.05	00:28	56°29,68	002°59,26	71,6								
768	CTD / Rosette	8	Tommeliten	14.6.05	02:51	56°29,53	002°58,97	72,5								
769	TV Multicorer	1	Tommeliten	14.6.05	10:18	56°30,00	002°59,65	71,6					10:45	56°29,84	002°59,88	72
770	TV Multicorer	2	Tommeliten	14.6.05	10:58	56°29,89	002°59,92	70,7	11:04	56°29,89	002°59,87	72	11:08	56°29,91	002°59,85	71,7
771	TV Multicorer	3	Tommeliten	14.6.05	12:05	56°29,91	002°59,91	71,7	12:17	56°29,89	002°59,87	72,2	12:23	56°29,92	002°59,87	72,2
772	TV Multicorer	4	Tommeliten	14.6.05	12:34	56°29,92	002°59,91	70,5	12:43	56°29,87	002°59,86	72	12:49	56°29,89	002°59,83	71,6
773	TV Multicorer	5	Tommeliten	14.6.05	13:01	56°29,90	002°59,87	72,4	13:15	56°29,90	002°59,84	72,3	13:20	56°29,90	002°59,82	72,2
774	CTD / Rosette	9	Tommeliten	14.6.05	17:14	56°29,68	002°59,07	70,8								
775	CTD / Rosette	10	Tommeliten	14.6.05	18:50	56°29,52	002°59,30	71,3								
776	CTD / Rosette	11	Tommeliten	14.6.05	20:00	56°29,61	002°58,79	71,5								
777	CTD / Rosette	12	Tommeliten	14.6.05	21:03	56°29,77	002°59,14	71,9								
778	CTD / Rosette	13	Tommeliten	14.6.05	22:23	56°29,59	002°59,43	72,8								
779	CTD / Rosette	14	Tommeliten	14.6.05	23:36	56°29,43	002°59,12	72,3								
780	CTD / Rosette	15	Tommeliten	14.6.05	01:18	56°28,77	003°00,19	72,4								
781	Recovery DOS Lander	1	Tommeliten	15.6.05	06:03	56°29,97	002°59,76	71,7					06:19	56°29,92	002°59,83	70,9
782	Recovery GQ Lander	1	Tommeliten	15.6.05	06:35	56°29,89	002°59,64	71,6					06:54	56°29,87	002°59,87	71,2
783	DOS/BWS	1	Tommeliten	15.6.05	12:04	56°29,90	002°59,76	71,5	12:22	56°29,97	002°59,55	72	12:38	56°29,99	002°59,56	71,4
784	DOS/BWS	2	Tommeliten	15.6.05	13:05	56°29,80	002°59,77	72,1	13:25	56°29,88	002°59,79	72,2	13:35	56°29,90	002°59,83	71,7
785	CTD / Rosette	16	Tommeliten	15.6.05	14:25	56°29,92	002°59,82	71,5								
786	TV Multicorer	6	Tommeliten	15.6.05	15:07	56°29,91	002°59,82	71,1	15:16	56°29,88	002°59,84	71,1	15:23	56°29,89	002°59,84	71,4
787	TV Multicorer	7	Tommeliten	15.6.05	15:30	56°29,92	002°59,87	71,3	15:43	56°29,89	002°59,86	71,7	15:46	56°29,89	002°59,85	71,3
788	TV Multicorer	8	Tommeliten	15.6.05	15:58	56°29,88	002°59,83	71,2	16:03	56°29,89	002°59,78	71,3	16:08	56°29,88	002°59,76	71,5
789	TV Multicorer	9	Tommeliten	15.6.05	16:19	56°29,90	002°59,81	71,5	16:25	56°29,89	002°59,76	71,2	16:30	56°29,88	002°59,76	71,2
790	Gravity corer(3m)	1	Tommeliten	15.6.05	17:13	56°29,91	002°59,82	71,9	17:16	56°29,90	002°59,83	71,8	17:23	56°29,87	002°59,86	71,6
	gravity corer (3m)		Tommeliten	15.6.05	17:29	56°29,88	002°59,86	71,1	17:31	56°29,90	002°59,84	71,8	17:45	56°29,88	002°59,90	71,5
	CTD / Rosette		Tommeliten	15.6.05	18:29	56°29,90	002°59,81	71,1								

Station No.	Gear	No.	Area	Date	Start Time	Coordinates		Depth	at depth Time	Coordinates		Depth	end stat. Time	Coordinates		Depth
					(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)
791	CTD / Rosette	17	Tommeliten	15.6.05	18:51	56°29,97	002°59,54	71,7								
792	CTD / Rosette	18	Blow out	16.6.05	05:40	57°55,53	001°37,92	94,2								
793	CTD / Rosette	19	Fladen Ground	16.6.05	09:40	58°16,51	000°59,01	146								
794	MB/PS	4	Fladen Ground	16.6.05	10:26	58°16,50	000°59,00	146					13:49	58°18,80	000°56,93	
795	OFOS	2	Fladen Ground	16.6.05	15:10	58°17,86	000°58,54	146,5	15:17	58°17,83	000°58,51	146,8	16:20	58°16,43	000°58,27	147
796	OFOS	3	Fladen Ground	16.6.05	18:23	58°18,85	000°57,49	146	18:30	58°18,82	000°57,48	148	19:30	58°18,22	000°57,50	147
797	OFOS	4	Fladen Ground	16.6.05	19:49	58°17,04	000°58,61	149	19:57	58°17,05	000°58,60	149	20:40	58°16,83	000°57,88	148
798	MB/PS	5	Fladen Ground	16.6.05	21:12	58°16,50	000°56,39	148					22:43	58°16,50	000°56,39	148
799	CTD / Rosette	20	Fladen Ground	16.6.05	23:09	58°16,97	000°58,49	155,8								
800	MB/PS	6	Fladen Ground	16.6.05	00:28	58°19,09	000°59,51	144,6					01:14	58°19,40	000°59,51	
801	CTD / Rosette	21	Fladen Ground	17.6.05	01:43	58°16,41	000°58,24	162,4								
	Forts. Profil # 800		Fladen Ground	17.6.05	02:28	58°19,71	00059°50	144,3					03:58	58°16,51	000°59,79	145,3
802	CTD / Rosette	22	Fladen Ground	17.6.05	04:23	58°16,71	000°57,03	148								
	CTD / Rosette		Fladen Ground	17.6.05	04:42	58°16,72	000°56,89	147								
803	OFOS	5	Fladen Ground	17.6.05	08:14	58°17,33	000°56,76	148	08:24	58°17,31	000°56,80	148	09:06	58°17,55	000°56,86	147,4
804	OFOS	6	Fladen Ground	17.6.05	09:23	58°18,04	000°57,34	147,7	09:32	58°18,03	000°57,35	147,7	09:56	58°18,09	000°56,94	147,2
805	OFOS	7	Fladen Ground	17.6.05	10:10	58°18,21	000°57,60	146,7	10:18	58°18,20	000°57,58	146,9	10:52	58°18,44	000°57,00	147,1
806	MB/PS	7	Fladen Ground	17.6.05	11:16	58°17,43	000°56,34	147,8					13:41	58°16,24	001°00,10	146,7
807	OFOS	8	Fladen Ground	17.6.05	14:13	58°19,12	000°55,95	147,1	14:23	58°19,24	000°56,02	147,1	15:25	58°19,01	000°56,03	145,3
808	OFOS	9	Fladen Ground	17.6.05	15:58	58°19,85	000°55,38	146	16:04	58°19,85	000°55,39	146	17:12	58°19,20	000°55,04	145
809	Van Veen Grab	2	Fladen Ground	17.6.05	17:32	58°19,55	000°55,40	155,1								
810	MB/PS	8	Fladen Ground	17.6.05	19:55	58°19,00	000°56,63	147					20:57	58°17,06	000°58,68	147,7
811	Van Veen Grab	3	Fladen Ground	17.6.05	21:18	58°16,90	000°58,25	162,7								
812	Van Veen Grab	4	Fladen Ground	17.6.05	21:42	58°16,94	000°58,22	156,6								
813	MB/PS	9	Fladen Ground	17.6.05	23:27	58°16,44	000°59,37	146,7					00:58	58°20,06	000°54,84	152,3
814	CTD / Rosette	23	Fladen Ground	18.6.05	01:22	58°19,56	000°55,42	159,4								
815	MB/PS	10	Fladen Ground	18.6.05	01:59	58°19,25	000°56,28	145,6					03:15	58°19,86	000°59,52	
816	CTD / Rosette	24	Fladen Ground	18.6.05	04:21	58°19,58	000°55,44	158								
	MB/PS		Fladen Ground	18.6.05	05:05	58°20,24	000°54,81	145					06:47	58°20,65	001°00,00	143
817	DOS	2	Fladen Ground	18.6.05	09:27	58°19,56	000°55,41	157	09:37	58°19,53	000°55,41	152				
818	CTD / Rosette	25	Fladen Ground	18.6.05	10:50	58°19,56	000°55,42	161								
819	Gas Quant	2	Fladen Ground	18.6.05	11:21	58°19,60	000°55,45	153,7	12:06	58°19,56	000°55,42	158,4				
820	TV Multicorer	10	Fladen Ground	18.6.05	13:12	58°19,58	000°55,47	154,4	13:19	58°19,57	000°55,45	156,7	13:42	58°19,51	000°55,46	148,7
	TV Multicorer		Fladen Ground	18.6.05	13:50	58°19,58	000°55,48	153,3	14:10	58°19,55	000°55,42	156,4	14:21	58°19,51	000°55,43	149,5
821	TV Multicorer	12	Fladen Ground	18.6.05	14:37	58°19,59	000°55,17	145,6					14:50	58°19,53	000°55,12	148,3
822	MB/PS	11	Fladen Ground	18.6.05	18:10	57°55,82	001°38,53	93					19:30	57°55,75	001°38,89	94
823	CTD / Rosette	26	Fladen Ground	18.6.05	20:08	57°55,31	001°37,89	93								
	Forts. Profil # 822		Blow out	18.6.05	20:22	57°55,36	001°37,94	93					21:50	57°55,30	001°37,90	93,3
824	CTD / Rosette	27	Blow out	18.6.05	21:56	57°55,33	001°37,95	93,3								
	CTD / Rosette		Blow out	18.6.05	22:48	57°55,29	001°37,86	109								
	Forts. Profil # 822		Blow out	18.6.05	23:00	57°55,34	001°37,88	93					23:29	57°56,83	001°41,32	91,1
825	MB/PS	12	Bow out	18.6.05	23:52	57°57,42	001°37,98						02:30	57°55,10	001°42,81	94,6
826	CTD / Rosette	28	Blow out	19.6.05	03:40	57°55,43	001°37,77	93					04:23	57°55,23	001°37,91	93
827	TV Multicorer	12	Fladen Ground	19.6.05	09:02	58°19,61	000°55,44	154	09:17	58°19,57	001°55,42	161	09:30	58°19,57	001°55,34	148
828	MB/PS	13	Fladen Ground	19.6.05	09:54	58°20,23	000°54,83	145,9					13:20	58°20,24	000°53,70	148,3

Station No.	Gear	No.	Area	Date	Start Time	Coordinates		Depth	at depth Time	Coordinates		Depth	end stat. Time	Coordinates		Depth
					(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)	(UTC)	Lat. °N	Long. °E	(m)
829	Recovery DOS Lander	2	Fladen Ground	19.6.05	13:45	58°19,65	000°55,44	149,2					14:00	58°19,62	000°55,38	148,7
830	Recovery GQ Lander	2	Fladen Ground	19.6.05	14:07	58°19,64	000°55,30	146,8					14:21	58°19,65	000°55,47	149,1
831	gravity corer (3m)	2	Fladen Ground	19.6.05	16:12	58°19,60	000°55,43	157								
	Forts. Profil # 828		Fladen Ground	19.6.05	17:57	58°20,25	000°53,32	144					20:15	58°20,27	000°52,97	145,2
832	CTD / Rosette	29	Fladen Ground	19.6.05	20:40	58°19,58	000°55,42	152,1								
	Forts. Profil # 828		Fladen Ground	19.6.05	21:15	58°20,34	000°53,67	145,8					22:42	58°21,04	000°54,11	143,2
833	geschl. CTD z.W.	30	Fladen Ground	19.6.05	23:06	58°19,73	000°55,33	146,6					00:05	58°19,37	000°55,59	146,8
	Forts. Profil # 828		Fladen Ground	20.6.05	00:26	58°21,04	000°54,11	143,1					03:29	58°20,37	001°00,24	146,3
834	CTD/Ro	31	Fladen Ground	20.6.05	03:59	58°19,74	000°55,33	146					04:40	58°19,35	000°55,57	146
	Forts. Profil # 828		Fladen Ground	20.6.05	05:31	58°21,04	000°53,99	143					06:12	58°20,60	000°52,42	143
835	CTD / Rosette	32	Fladen Ground	20.6.05	06:39	58°19,59	000°55,42	156								
836	DOS/BWS	3	Fladen Ground	20.6.05	07:05	58°19,57	000°55,42	160	07:12	58°19,57	000°55,41	161	07:31	58°19,58	000°55,30	146
837	DOS/BWS	4	Fladen Ground	20.6.05	08:10	58°19,50	000°55,21	146,2	08:19	58°19,50	000°55,21	146,2	08:39	58°19,47	000°55,28	146,7
838	CTD / Rosette	33	Fladen Ground	20.6.05	08:44	58°19,50	000°55,21	146,2								

CRUISE SUMMARY REPORT

FOR COLLATIMG CENTRE USE

Centre: DOD Ref. No.:

Is data exchange restricted ☐ Yes ☐ In part ☒ No

SHIP enter the full name and international radio call sign of the ship from which the data were collected, and indicate the type of ship, for example, research ship; ship of opportunity, naval survey vessel; etc.

Name: **ALKOR** Call Sign: **DBND**

Type of ship: **Research Vessel**

CRUISE NO. / NAME AL-259

enter the unique number, name or acronym assigned to the cruise (or cruise leg, if appropriate).

CRUISE PERIOD start (set sail) 10/06/2005 day/ month/ year to 22/06/2005 day/ month/ year end (return to port)

PORT OF DEPARTURE (enter name and country) **Kiel, Germany**

PORT OF RETURN (enter name and country) **Kiel, Germany**

RESPONSIBLE LABORATORY enter name and address of the laboratory responsible for coodinating the scientific planning of the cruise

Name: **Leibniz-Institute of Marine Science, IFM-GEOMAR**

Address: **Wischhofstr. 1-3, 24148 Kiel**

Country: **Germany**

CHIEF SCIENTIST(S) enter name and laboratory of the person(s) in charge of the scientific work (chief of mission) during the cruise.

Dr. Olaf Pfannkuche (IFM-GEOMAR, Germany)

OBJECTIVES AND BRIEF NARRATIVE OF CRUISE enter sufficient information about the purpose and nature of the cruise so as to provide the context in which the report data were collected.

Cruise ALKOR 259 was part of the investigations of the collaborative project COMET (Controls on methane fluxes and their climatic relevance in marine gas hydrate-bearing environments) sponsored by the German Ministry of Education and Research and co-ordinated by IFM-GEOMAR. Objective of this cruise was: how the benthic boundary layer methane turnover is regulated in shallow gassy sediments in comparison to gas hydrate bearing sediments at continental margins.
We surveyed the water column and seafloor in the vicinity of active pockmarks and gassy sediments with hydro-acoustic methods and TV-cameras mounted to a towed frame, respectively. Surface sediment samples were taken with video guided multiple corer and van Veen grab in the vicinity of gas seeps. A gravity corer was used to sample sediments in meter scales. Water samples for physical and chemical water properties as well as for methane were obtained from Rosette water sampler profiles. Methane in surface water was measured with an equilibrator system connected to a continuous water pumping device. Gas flux from discrete gas flares was quantified with an oblique multi-beam system integrated into a bottom lander. Faunal activity and benthic boundary layer processes were monitored with another lander system. Landers were only deployed for the duration of our working activities in the respective area.
Work permissions were granted for the EEZ of UK and Norway. Station work focussed on the Tommeliten Gas Field (Norwegian EEZ).In the UK EEZ station works were carried out at two sites: a gas blow out and at the UK plot 15/25 in the Fladen Ground. The latter well known for abundant pockmarks.

PROJECT (IF APPLICABLE) if the cruise is designated as part of a larger scale cooperative project (or expedition), then enter the name of the project, and of organisation responsible for co-ordinating the project.

Project name: COMET

Coordinating body: IFM- GEOMAR

PRINCIPAL INVESTIGATORS: Enter the name and address of the Principal Investigators responsible for the data collected on the cruise and who may be contacted for further information about.the data. (The letter assigned below against each Principal Investigator is used on pages 2 and 3, under the column heading 'PI', to identify the data sets for which he/she is responsible)

A. Dr. Olaf Pfannkuche, IFM-GEOMAR, opfannkuche@ifm-geomar.de

B.

C.

D.

E.

F.

MOORINGS, BOTTOM MOUNTED GEAR AND DRIFTING SYSTEMS

This section should be used for reporting moorings, bottom mounted gear and drifting systems (both surface and deep) deployed and/or recovered during the cruise. Separate entries should be made for each location (only deployment positions need be given for drifting systems). This section may also be used to report data collected at fixed locations which are returned to routinely in order to construct 'long time series'.

PI	APPROXIMATE POSITION						DATA TYPE	DESCRIPTION
	LATITUDE			LONGITUDE				
See top of page.	deg	min	N/S	deg	min	E/W	enter code(s) from list on cover page.	Identify, as appropriate, the nature of the instrumentation the parameters (to be) measured, the number of instruments and their depths, whether deployed and/or recovered, dates of deployments and/or recovery, and any identifiers given to the site.

Please continue on separate sheet if necessary

SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN

Except for the data already described on page 2 under 'Moorings, Bottom Mounted Gear and Drifting Systems', this section should include a summary of all data collected on the cruise, whether they be measurements (e.g. temperature, salinity values) or samples (e.g. cores, net hauls).

Separate entries should be made for each distinct and coherent set of measurements or samples. Different modes of data collection (e.g. vertical profiles as opposed to underway measurements) should be clearly distinguished, as should measurements/sampling techniques that imply distinctly different accuracy's or spatial/temporal resolutions. Thus, for example, separate entries would be created for i) BT drops, ii) water bottle stations, iii) CTD casts, iv) towed CTD, v) towed undulating CTD profiler, vi) surface water intake measurements, etc.

Each data set entry should start on a new line – it's description may extend over several lines if necessary.

NO, UNITS : for each data set, enter the estimated amount of data collected expressed in terms of the number of 'stations'; miles' of track; 'days' of recording; 'cores' taken; net 'hauls'; balloon 'ascents'; or whatever unit is most appropriate to the data. The amount should be entered under 'NO' and the counting unit should be identified in plain text under 'UNITS'.

PI see page 2	NO see above	UNITS see above	DATA TYPE Enter code(s) from list on cover page	DESCRIPTION Identify, as appropriate, the nature of the data and of the instrumentation/sampling gear and list the parameters measured. Include any supplementary information that may be appropriate, e. g. vertical or horizontal profiles, depth horizons, continuous recording or discrete samples, etc. For samples taken for later analysis on shore, an indication should be given of the type of analysis planned, i.e. the purpose for which the samples were taken.
A	**13**	**station**	**G74**	**several profiles per station**
A	**33**	**station**	**H10**	**vertical depth profiles**
A	**4**	**station**	**G02/B18**	**van Veen grab**
A	**2**	**station**	**G04**	**gravity corer (3m)**
A	**12**	**station**	**G90**	**nutrients, oxidants in sediment profiles (Multicorer samples)**
A	**9**	**station**	**G08/B18**	**Ocean Floor Observation System surveys, track lines (video films)**
A	**4**	**station**	**D90/ G90**	**Bottom Lander deployments, benthic boundary layer physics, activity, gas flux**

Please continue on separate sheet if necessary

TRACK CHART: You are strongly encouraged to submit, with the completed report, an annotated track chart illustrating the route followed and the points where measurements were taken.	**Insert a tick(✓) in this box if a track chart is supplied**	

GENERAL OCEAN AREA(S): Enter the names of the oceans and/or seas in which data were collected during the cruise – please use commonly recognised names (see, for example, International Hydrographic Bureau Special Publication No. 23, 'Limits of Oceans and Seas').

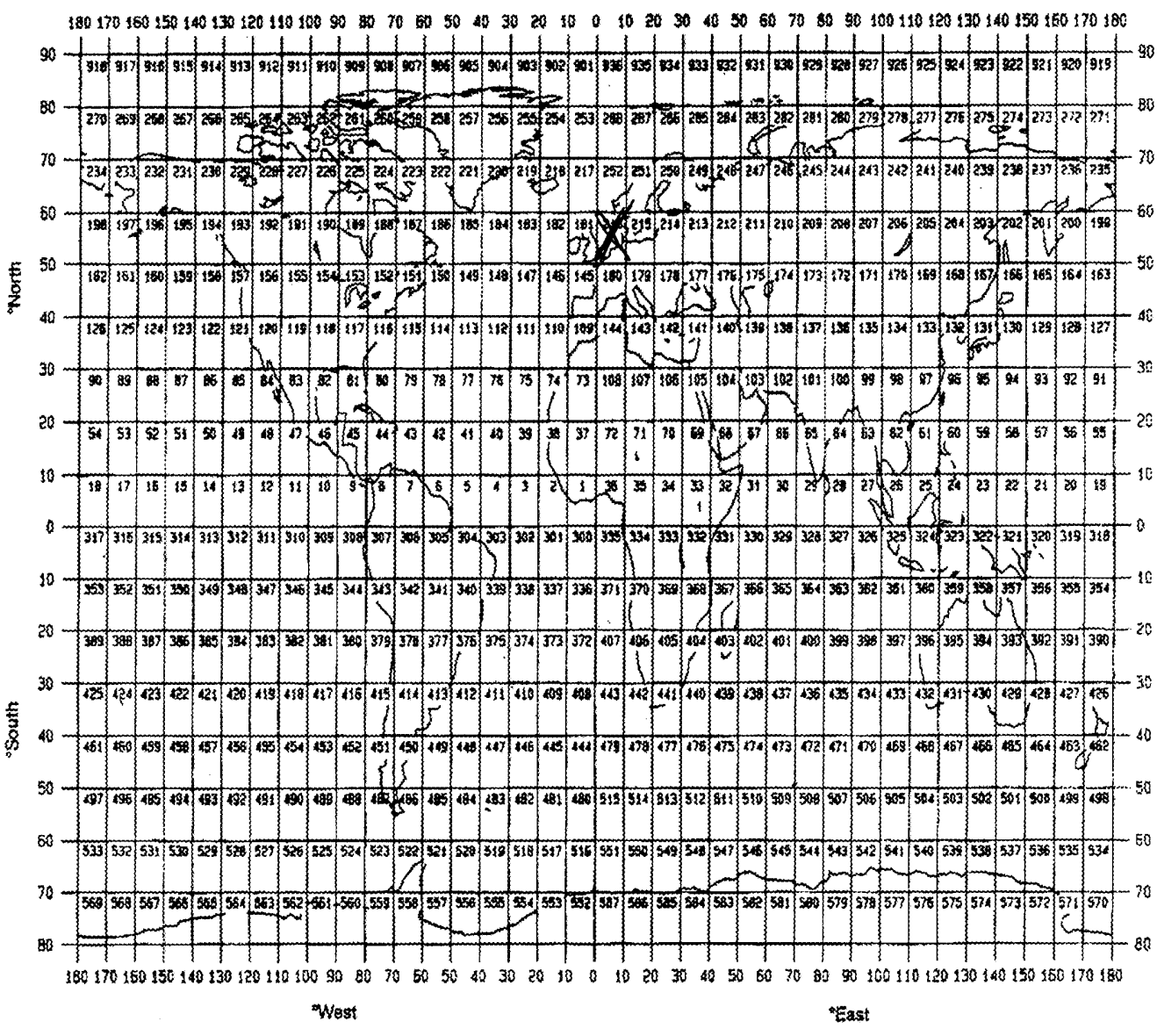
North Sea

SPECIFIC AREAS: If the cruise activities were concentrated in a specific area(s) of an ocean or sea, then enter a description of the area(s). Such descriptions may include references to local geographic areas, to sea floor features, or to geographic coordinates.
Please insert here the number of each square in which data were collected from the below given chart

216 (central North Sea, FladenGround)

GEOGRAPHIC COVERAGE - INSERT 'X' IN EACH SQUARE IN WHICH DATA WERE COLLECTED

see above



THANK YOU FOR YOUR COOPERATION