Sea ice conditions in the northern North Atlantic in 2003 and 2004

Observations during RV POLARSTERN cruises ARKTIS XIX/1a and b and ARKTIS XX/2

Compiled by
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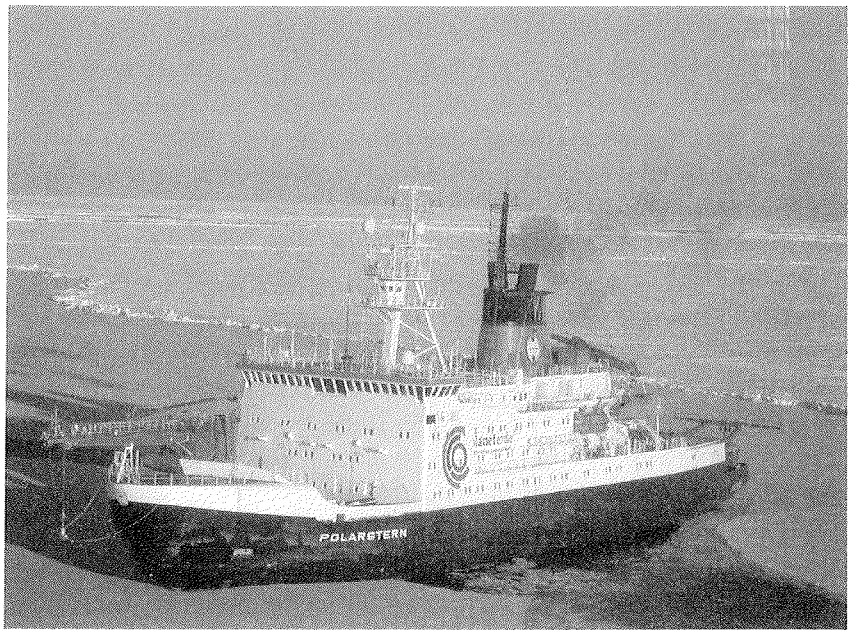
Sea ice conditions in the Svalbard Region in March/April 2003

Observations during RV POLARSTERN cruise ARKTIS XIX/1 a&b



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A detailed description of the sea ice measurements and sampling during the expedition ARKTIS XIX-1 a&b can be found in Schauer and Kattner (2004).

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

Abstract

This report presents visual shipboard sea ice observations carried out during leg ARKTIS XIX/1 a&b of RV POLARSTERN in March and April 2003 while the ship was operating in the Svalbard region. The cruise commenced in Bremerhaven, Germany, on 28 February 2003 and ended in Lonyearbyen, Spitzbergen, on 24 April 2003

Along with estimates of general sea ice conditions, the observer team took photographs from the ship's bridge to give a characteristic impression on the surrounding area. Due to different experience and background of the observers the estimates of ice conditions are subject of variation and uncertainties. However, this report can provide a general impression on the winterly ice situation in the Svalbard region and weather conditions. It is a continuation of observations made during previous cruises of RV POLARSTERN to the Arctic Ocean, for example in 2001 (Haas and Lieser, 2003).

General ice conditions

Hourly, standardised visual ice observations were performed in a joint effort by all 16 sea ice scientists during daylight hours when the ship was moving through ice. In total, 279 observations were performed. The cruisetrack is shown in Figure 1.

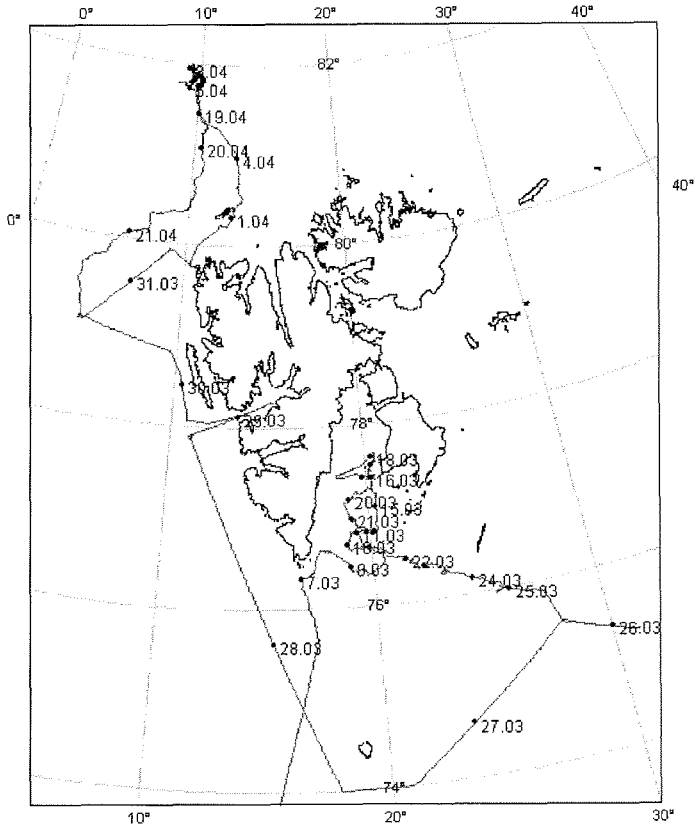

Figure 1: Cruise track of RV POLARSTERN leg ARK XIX/1 a&b. Dots mark noon positions.

Storfjord and Barents Sea (leg 1a)

A diffuse ice edge with bands of pancake brash was crossed at about 8:00 UTC on March 6 between Björnøya and Svalbard (see cruise track; Figure 1). From there, the ship passed in 70 to 90% ice concentration with small thin floes less than 20 m diameter to the southern tip of Svalbard. There, very heavy ice conditions were met requiring continuous ramming, lasting until March 21, when Storfjorden was left into the Barents Sea. Between March 7 and March 21, in outer Storfjorden Polarstern sailed in almost always 100% ice concentration, with 0.4 to 1.8 m thick small floes (typically less than 30 m diameter) covered with 20 to 30 cm of snow, embedded in heavily ridged and rubbled ice. As was interpreted from satellite radar imagery (see Figures 2 and 3) and ice core analyses, this ice was a mixture of second-year and multiyear floes from the Arctic Ocean, with deformed first-year ice in between.

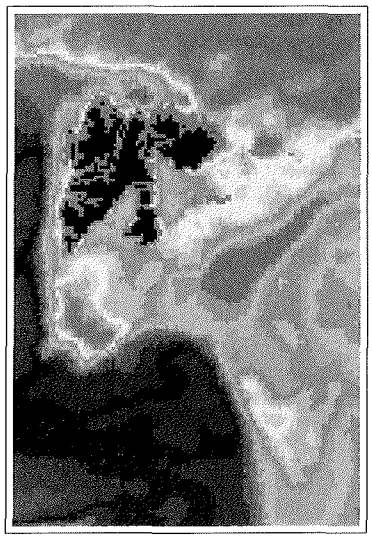

Figure 2: QuickScat HH backscatter image of Svalbard and the Barents Sea from March 06. 2003. Dark tones represent low backscatter, bright tones represent high backscatter. The image shows the flow lines of older ice form the Arctic Ocean and first year ice formed leeward of Franz Josef Land and in Storfjorden. Image courtesy of L. Toudal, DTU.

Only few cracks and narrow leads led to the inner Storfjord region, where grey ice with thin or no snow prevailed and where Polarstern made good progress. As can be seen on the satellite images, this region of young and first-year ice formed in Storfjorden extended all along the western margin of the fjord.

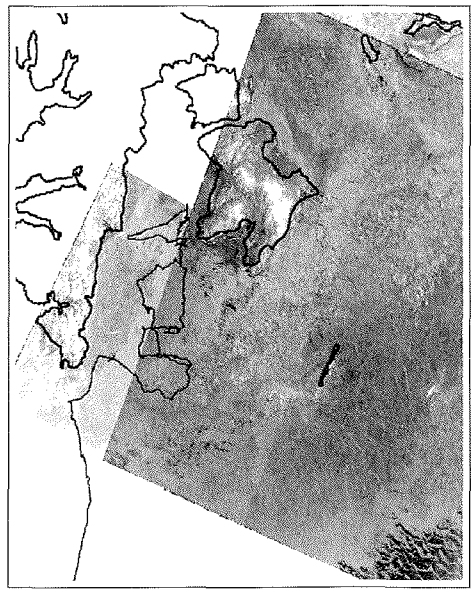

Figure 3: Mosaic of ERS and Envisat SAR images acquired between March 17 and 21. Superimposed are the coastline of Svalbard and the actual cruise track until March 21 as well as planned stations (red dots). Different textures of second/multiyear ice and first-year ice can be seen and compared to Figure 2. Image courtesy K. Kloster, NERSC.

No opening of a large polynja occurred during our study. As can be seen on the near infrared image in Figure 4, open water and thin ice were confined to a narrow zone along the northern and north eastern coasts. However, as outlined above, by the end of March ice formed in Storfjorden could be tracked southward to the southern tip of Svalbard. After March 21, in the Barents Sea with ice concentrations of 90 to 100% big floes (100-1000 m diameter) with less ridging but 20 to 30 cm snow were encountered. After March 24, fracturing due to

ocean swell was observed, and bigger polynjas inside the closed pack covered with new ice and extensive amounts of frost flowers. After this, the marginal ice zone with heavy swell was left through a very diffuse ice edge into the open Barents Sea on March 26 to sail to Longyearbyen, Spitzbergen. On March 28, close to Svalbard ice exported from the Storfjord was encountered in the West Spitzbergen Current. Ice concentration was as high as 90 %, with small but thick deformed and snow covered floes.

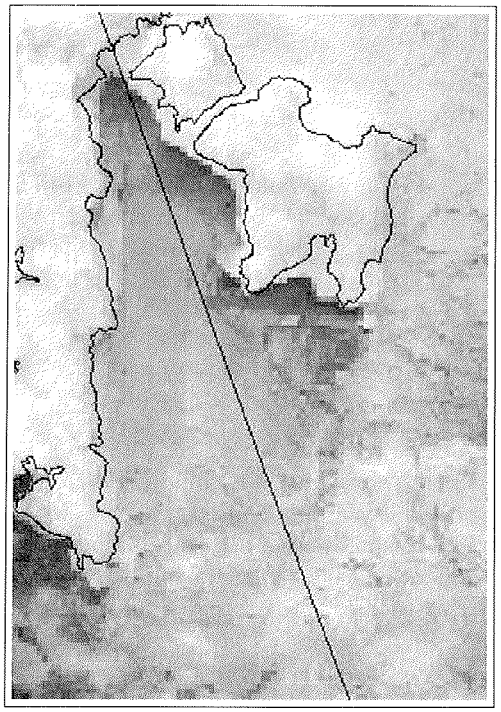

Figure 4: NOAA-AVHRR near infrared image of Storfjorden received on board on March 19, showing the distribution of polynjas and thin ice areas, as well as the first-year ice exported from Storfjord.

Northwest of Svalbard (leg 1b)

On March 29 the ship arrived in Isfjorden which was covered up to 90% with nilas and greyice and some smashed first-year ice. During and after leave of Isfjorden nilas and pancakes where encountered until March 30, 6 UTC, when last bands of almost completely melted brash ice were observed at 78°55'N, 7°35'E, while steaming westward. On March 31, steaming northeastward, the ship arrived at the ice edge at 80°05'N, 11°18'E. In between, isolated, almost completely melted second-year and multiyear ice floes were observed (e.g. at 79°04'E, 4°18'E); later, i.e. further north (around 79°50'N, 9°01'E and further east) bands of first-year ice floes and open water were observed. Typical ice (snow) thickness was 0.70 m (0.1-0.2 m) at the ice edge.
The ice coverage encountered during the next days until arrival at the drift station ice floe on April 6 at 81°54'N, 9°28'E, was between 90 and 100% comprising mostly first-year/secondyear and multiyear ice floes (on by leads which were between 50 and 500 m (2000 m) wide. The leads were typically covered with nilas, grey, and grey-white ice, often covered by dense frost flower mats. Through these leads which can be seen in Figure 5 quite clearly the ship was navigated to the drift station ice floe. Ice thickness in leads varied between 0.03 and 0.20 m whereas it was between 0.80 to 2.00 m otherwise. Observed snow depths ranged from 0.05 to

0.30 m on thick ice. Notable rubble fields (up to 30% of the total ice coverage) were observed on April 1 at around 80°26'N, 12°49'E. Typical ridge height and spacing was 1 m and 100 m, respectively. On the way to the drift station ice floe, the ship was stuck two times; the first time on April 3 at 80°42'N, 13°14'E for about six hours in a floe with a 3 m high ridge; the second time on April 4/5 for about 30 hours in a 0.8-1.2 m thick first-year ice floe which itself was stuck between two multiyear ice floes.

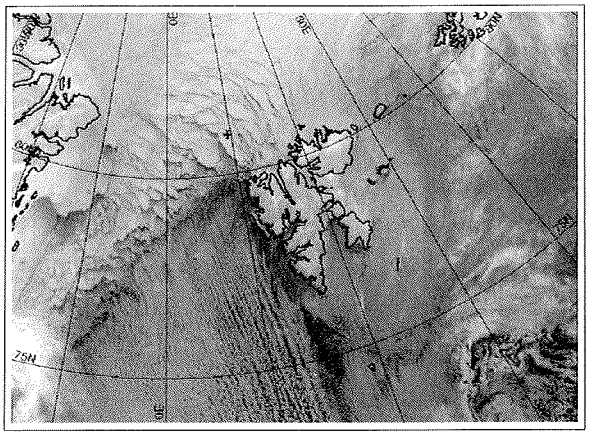

Figure 5: Image received on April 5th 2003 at 08:19 UTC from NOAA-15. The scene shows the area around Svalbard as seen from AVHRR channel 4.

After leaving the drift station ice floe on April 18, at 81°38'N, 9°59'E, still heavy ice conditions were encountered with 90 to 100% of first-year/second-year and multiyear icefloes with an average diameter of 200 m, a snow depth of 0.15 to 0.30 m and average ridge height and spacing of 1 m and 100 m, respectively. Between these floes dark and light nilas was observed - sometimes without frost flowers. Rubble fields amounted up to 20% of the total ice cover. Between April 19 and 20, i.e. 81°15'N, 10°33'E and 80°35'N, 10°20'E, ice concentrations decreased to between 80 and 95%. The ice coverage comprised 1 to 2 m thick first-year/second-year and multiyear ice. Typical floe sizes decreased to between 20 and 50 m and looked like as if broken by recent swell activity. Floes were separated by brash ice rather than nilas. The ice type changed to mainly first-year ice around 80°19'N, 7°38'E with a decrease of the typical ice (snow) thickness to 0.40 to 0.60 m (0.05 to 0.10 m). Further to the southwest (80°12'N, 7°31'E) a mixture of such first-year ice and up to 2 m thick secondyear/multiyear ice was observed together with some nilas and grey-ice as well as open water.
Ice concentrations dropped to 60 to 90%. On April 21 at about 12 UTC the ship arrived in open water at about 79°20'N, 3°54'E, after steaming through 20 to 60% ice coverage with melting first-year ice.

References

Haas, C. and J. L. Lieser , 2003: Sea ice conditions in the Transpolar Drift in August/September 2001: Observations during POLARSTERN cruise ARKTIS 17/2, Reports on Polar and Marine Research (**441**), Alfred Wegener Institute for Polar and Marine Research.

Schauer, U. and G. Kattner , 2004 : The Expedition ARKTIS XIX/1 a,b and XIX/2 of the Research Vessel "Polarstern" in 2003, Reports on Polar and Marine Research (**481**), Alfred Wegener Institute for Polar and Marine Research.

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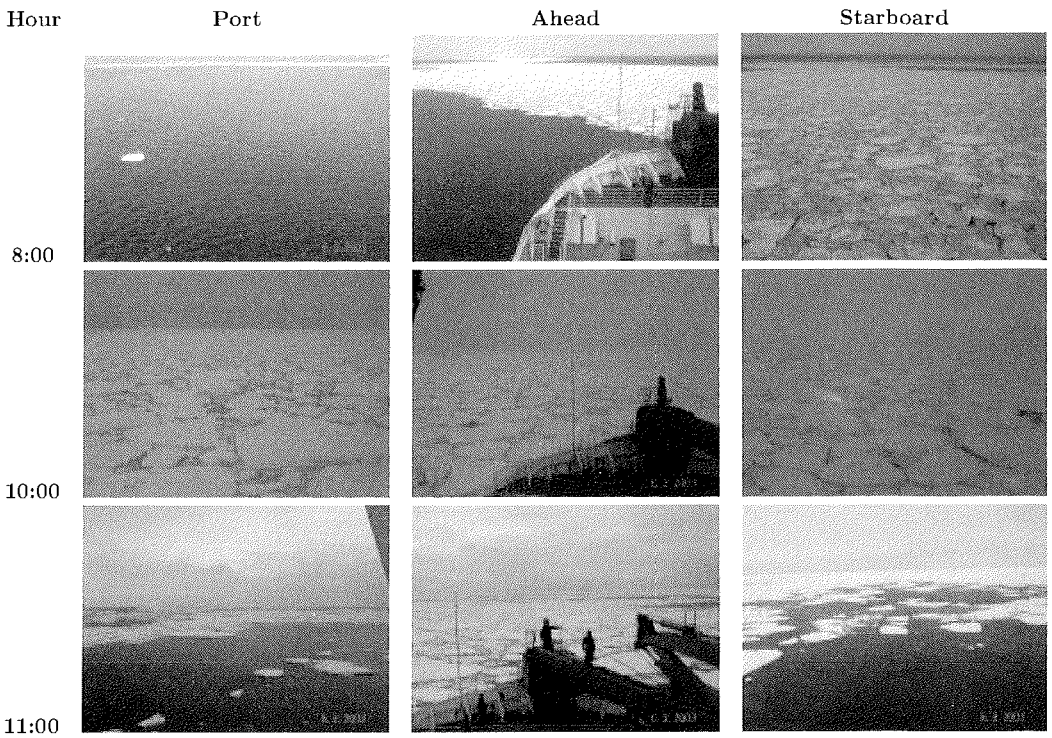
6.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs. Number of
08	75.20	16.59	8.4	61	-11.4	-1.12	34.49	9.4	2	5	5	2	5	0.2	0	3	5	0			1000							
10	75.33	17.13	8.2	48	-12.8	-0.91	34.17	9.8	2	75	10	7	60	0.8	10	10	20	5					0.5	1				
11	75.40	17.21	7.4	58	-13.3	-1.43	34.25	0.9	2	70	0	7	70	0.8	10	5	20	5					0.5	1.5		1		
12	75.41	17.18	8.1	48	-13.4	-1.58	34.19	7.8	2	70	0	7	70	0.8	10	10	10	0					0.5	1.5		1		
13	75.49	17.11	8	50	-14.7	-1.23	34.18	2.3	2	90	20	7	70	0.6	10	8	30	5					0.6	0.8		1		
14	75.50	17.08	8.4	51	-14.8	-1.39	34.04	8	2	95	10	7	75	0.8	5	7	20	5					0.5	0.8				
15	75.56	17.04	8.3	48	-14.77	-1.77	34.14	9.3	2	95	10	7	80	0.6	5	6	20	2					0.3	0.8				
16	75.58	17.01	7.7	50	-14.6	-1.69	34.22	0	2	95	10	7	80	0.6	5	6	20	2					0.2	0.5				
23	76.18	16.40	12.6	67	-12.3	-1.82	34.25	7.8	2	50	20	30		0.6	10	10	15				1000	10	0.5	1		1		



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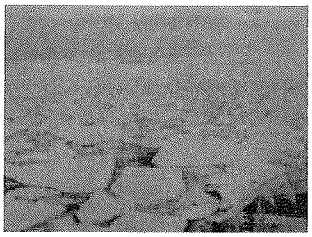
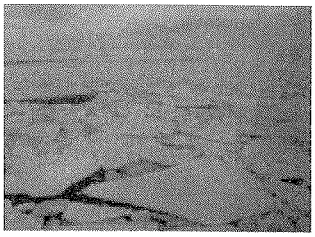
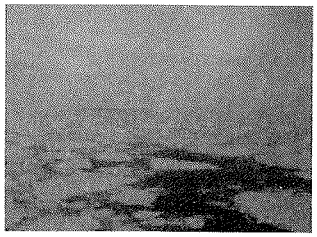
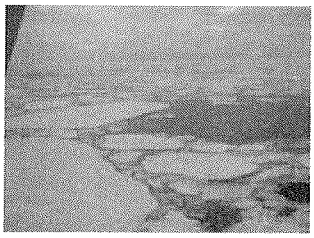
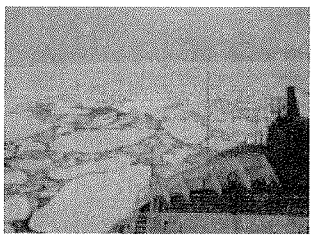
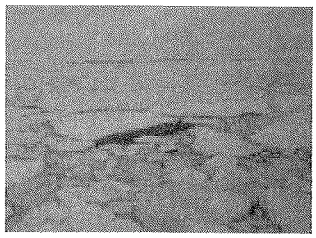
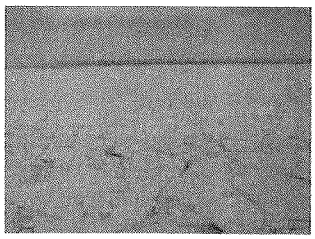
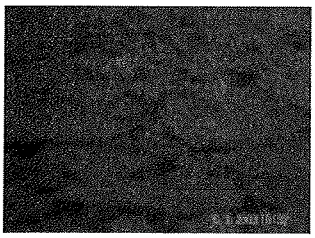
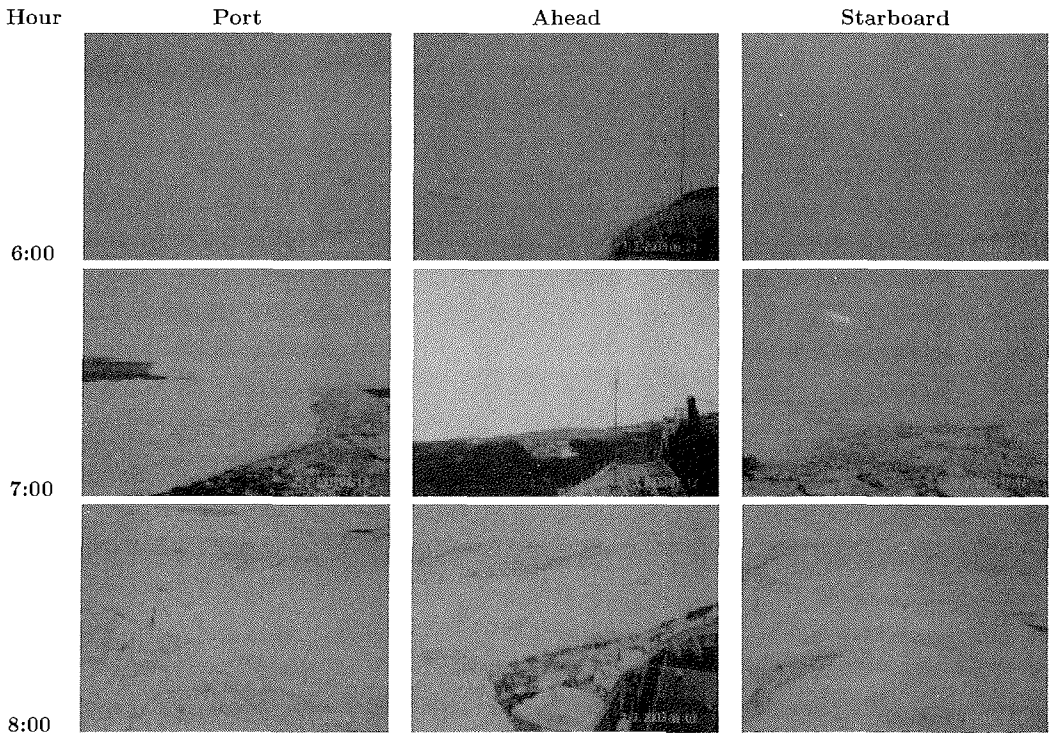
12:00			
13:00			
14:00			
15:00			
16:00			

7.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	*Total ice concentration* [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.37	17.32	12.5	47	-18.7	-1.87	34.23	1.1	3.5	100	15	7	85	0.5	10				1	1			0.5	1		1	50	
07	76.39	17.34	12.2	45	-18.7	-1.87	34.78	0	2	95	15	7	80	0.7	10	20		20	1	1			0.5	1		1	50	
08	76.38	17.47	14.7	35	-18.5	-1.41	16.03	0.9	3.5	100	10	7	95	0.7	10	20							0.5	1		1		
09	76.38	17.54	14.6	50	-19	-1.86	34.25	0.3	3.5	95	0	7	90	0.7	15								0.5	1.5		1	50	
10	76.37	17.58	16.2	43	-19	-1.86	34.24	3	3.5	100	0	7	100	0.7	10	20							0.5	1		1		
11	76.37	18.01	15.9	48	-19.1	-1.84	34.25	0.6	3	98	0	7	95	0.7	10								0.5	1		1	20	
12	76.37	17.57	16.6	40	-18.8			0	3	100	0	7	95	0.7	15								0.5	1		1	20	
14	76.36	17.55	16.7	45	-18.3	-1.85	34.2	1.1	4	100	5	7	95	0.8	10								0.5	2	20	1		
16	76.38	18.05	18.2	38	-18.2	-1.82	34.23	0.5	4	100	5	7	95	0.8	20								0.5	1		1		
17	76.38	18.05	16.6	43	-18	-1.8	34.24	0	4	100	2	7	98	0.8	20								0.5	1.5		1		
19	76.35	18.19	13.6	39	-18.1	-1.87	34.24	2	4	100	5	7	98	0.7	25	30	60						0.8	3		2	30	
21	76.31	18.40	11.1	38	-16.9	-1.78	34.22	3.6	3	100	5	6.5	95	0.7	20	20	100						0.5	2		2	20	
22	76.29	18.51	13.7	34	-16.6	-1.78	34.26	4	3.5	100	5	7	98	0.7	25	20	80						0.5	2.5		2	10	
23	76.27	18.57	12.2	35	-15.8	-1.79	34.25	1.5	3	100	5	7	95	1	10	20	50						0.5	2	20	1	5	



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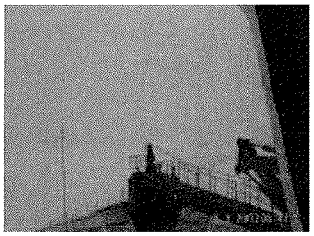
9:00			
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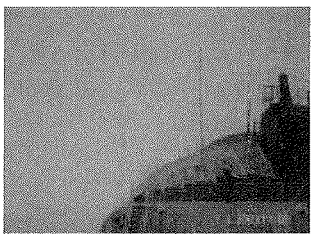
14:00			
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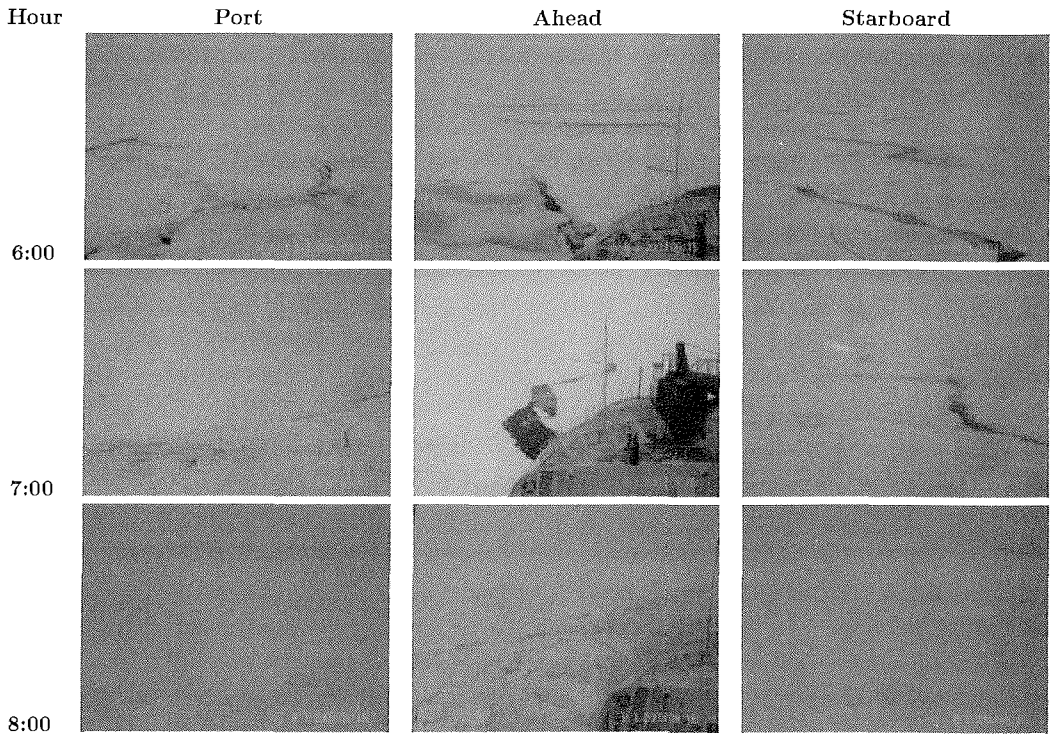
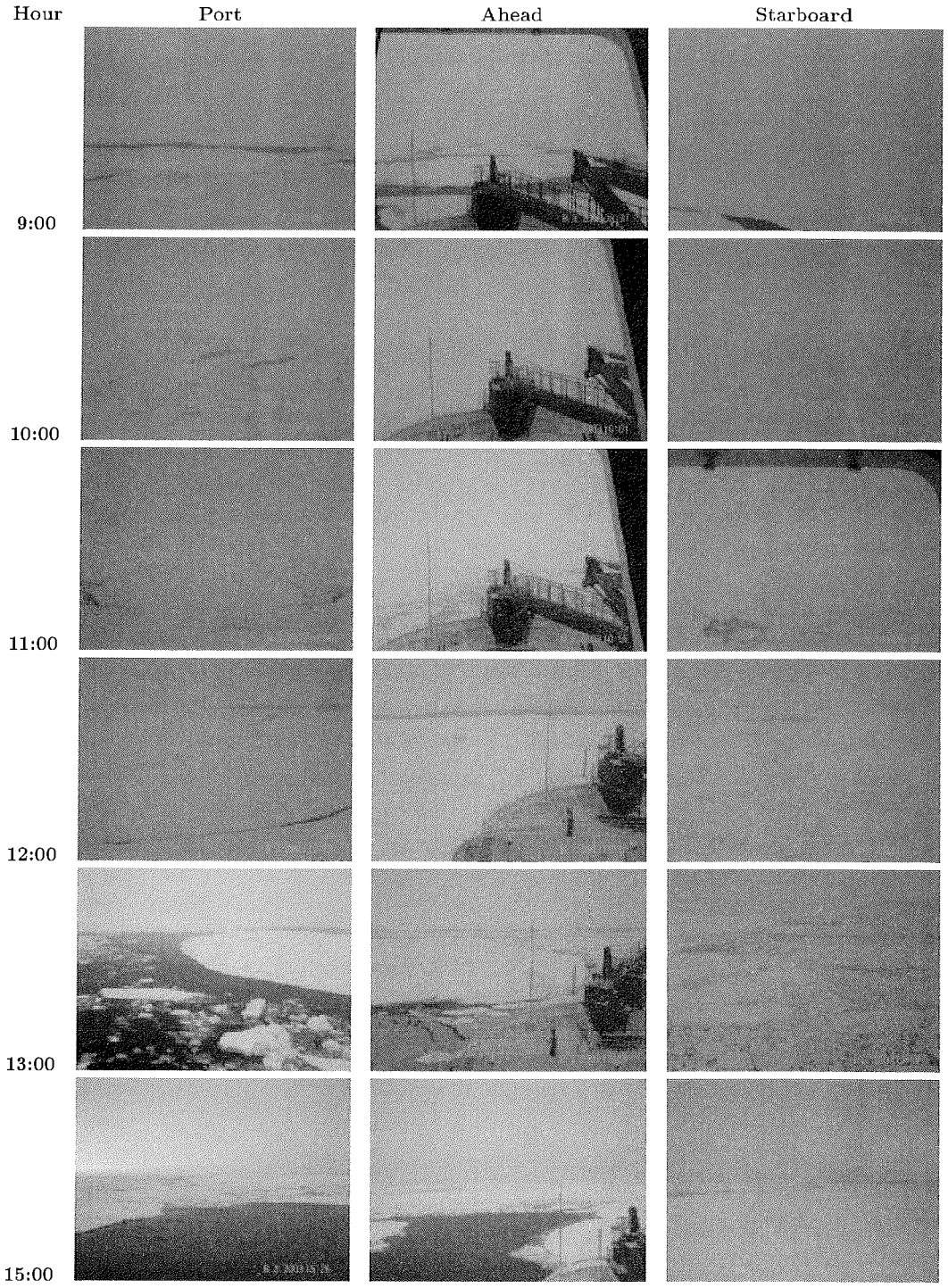
8.3.2003

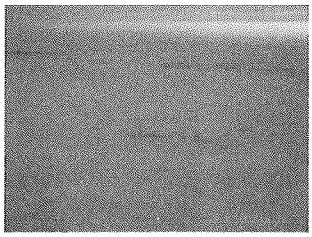
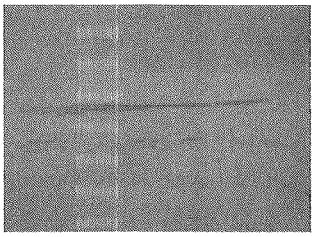
Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kt]	Operation mode: channel=0, lead=1, floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.21	19.56	5.5	345	-11	-1.78	34.23	4.7	3	95	20	7	80	0.5	10	15	50						0.3	1	20	1	5	
07	76.23	20.05	4.7	2	-10.4			6.4	3	99	5	7	94	0.6	20	20	50				2		0.5	1.5	20	1	10	
08	76.25	20.22	3.9	338	-11.4			0.3	3.5	100	5	7	95	0.6	20	20	50						0.5	1.5		1	5	
09	76.25	20.24	5.2	329	-10.1	-1.64	34.28	4.7	3.5	95	5	7	90	0.7	20	50	100	5					0.5	1.5		1	10	
10	76.30	20.33	3.1	311	-9.1	-1.77	34.31	4.6	3	100	5	7	95	0.6	20	30	60						0.5	1		1		
11	76.33	20.30	4.1	308	-9.3	-1.84	34.39	1.2	3.5	95	5	7	95	0.5	20	150	300						0.7	1.5	200			
12	76.35	20.38	4.3	270	-9.8	-1.84	34.31	7.7	3	95	5	7	95	0.4	20	100	300				30	20	0.5	2	40	2	1	
13	76.35	20.39	4.5	275	-10.3			0.6	3	90	15	7	75	0.5	20	150	400				30	10	0.5	2	30	2	10	
15	76.35	20.39																										
16	76.37	20.20	4.6	227	-13.7	-1.74	34.34	4.2	3	90	10	7	85	0.5	20	100	300				20		0.5	3	30	2	10	
17	76.38	20.90	5.2	209	-13.6	-1.76	34.32	7.7	2	80	15	7	75	0.4	20	80	200				40	10	0.5	2	40	2	10	
22	76.38	20.09	5.3	95	-12.8	-1.82	34.3	2.23	4	100	5	7	90			90	90						1	1.5	30	0	10	
23	76.39	19.58	3.96	95	-13.5	-1.79	34.32	4.8	3	100	1	7	99	100	50	100	500				0		0.8	2	30	2	5	



8.3.2003



8.3.2003

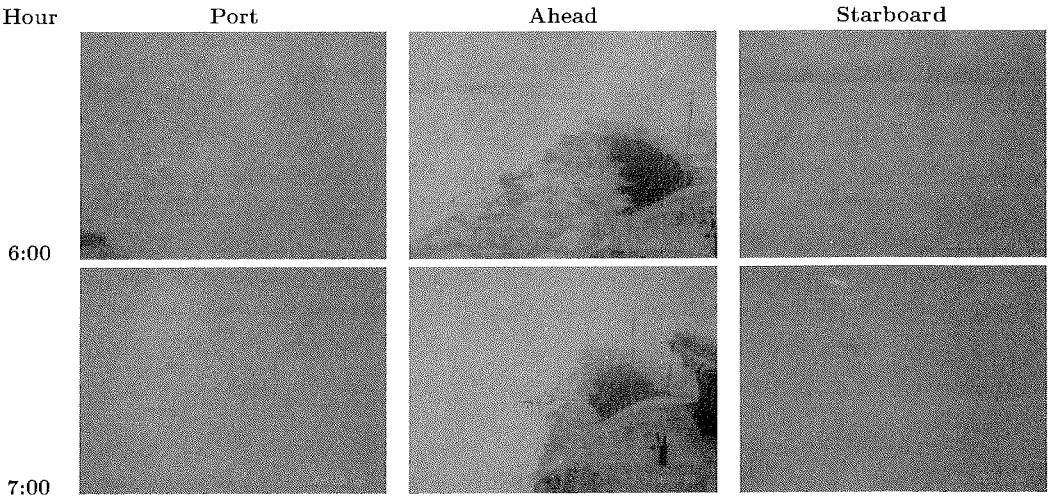
Hour	Port	Ahead	Starboard
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

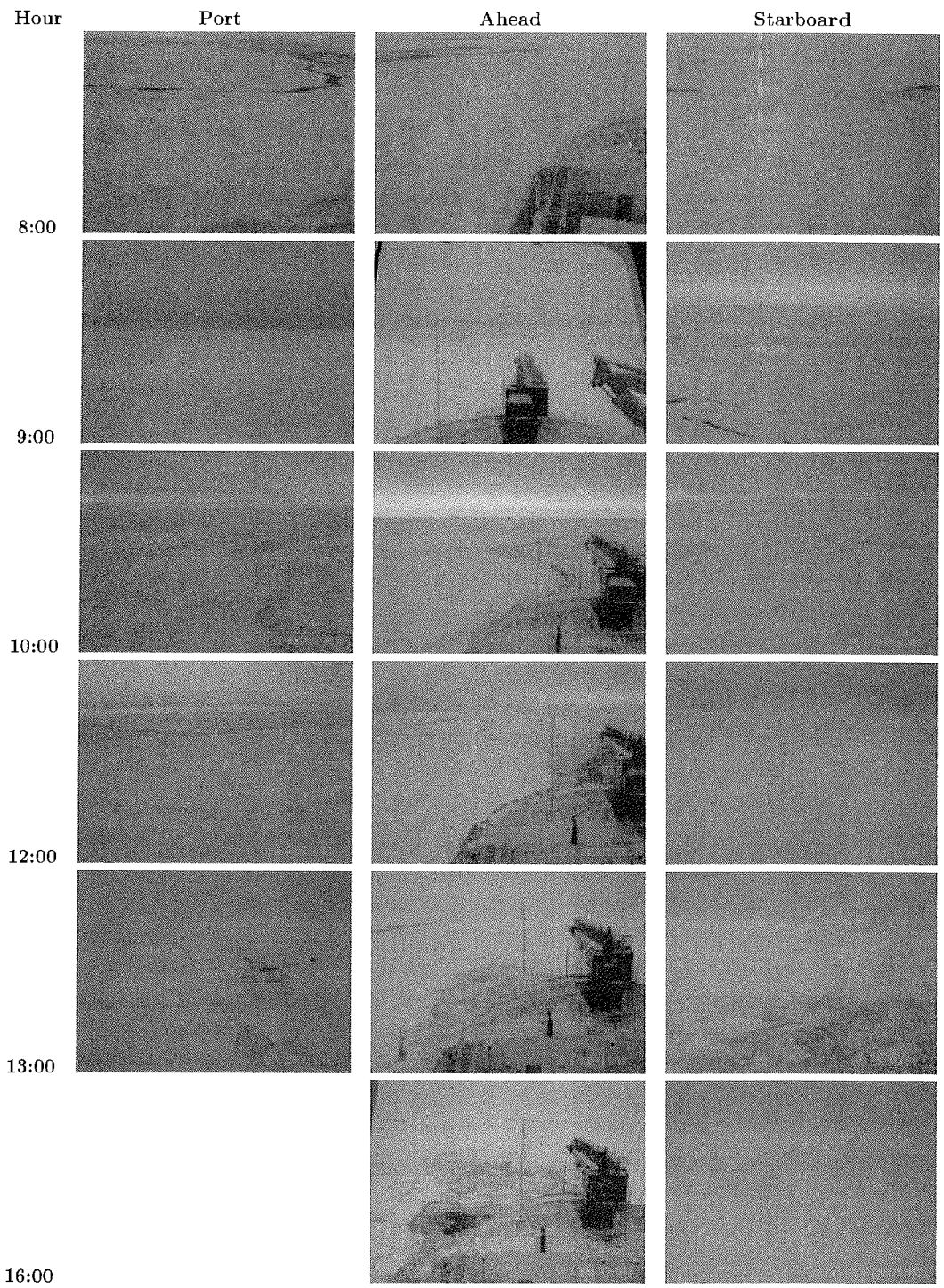
9.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.39	19.45	2.7	80	-11	-1.8	34.32	2	4	98	5	7	95	0.6	30	20	100						0.5	2	20	2	20	0
07	76.39	19.45	3.9	82	-10.1	-1.87	34.32	2	4	100	5	7	99	0.7	30								0.5	2	20	2	20	
08	76.37	19.37	2.6	56	-10.4			5.7	3.5	97	3	7	90	0.7	30	50	100						0.5	1.5	50	2	20	
09	76.38	19.30	4.6	73	-10.2	-1.83	34.29	2.3	3	98	5	7	90	0.7	30	70	150						0.7	1.5	50	1	15	
10	76.39	19.30	3.2	70	-10.3	-1.7	34.34	0		98	5	7	95	0.8	30	50	250						0.8	1.5	50	1		
11	76.38	19.29	4.9	66	-10.7	-1.73	34.34	0		95	5	7	90	0.8	30	50	150						1	1.5	50		20	
12	76.38	19.24	5.7	70	-11.3	-1.74	34.27	0.6	4	95	5	7	95	0.8	30	150	500							1.5	150	2	10	
13	76.39	19.22	6	52	-12.9	-1.73	34.29			99	1	7	99	0.8	25	100	300				10	10	1	2	30	2	5	
16	76.38	19.04	7.2	57	-13.2	-1.85	34.18	1.9	3	95	5	7	95	0.8	30	50	300				10	10	1.5	2	20	2		
17	76.38	19.03	7.6	60	-12.9	-1.85	34.23	1	3.5	98	2	7	98	0.8	60	50	200						1	2	20	2	5	
22	76.39	18.56	6.8	23	-150	-1.87	34.2	1.7	4	100	0	7	100										0.5	1		1	50	

10:00 ice station
11:00 several overlaid layers of ice, ~3m thickness, ice station
12:00 hard going
13:00 on station, bigger floes with plenty of compressed brash inbetween, some brown ice
22:00 impossible to distinguish any individual floes



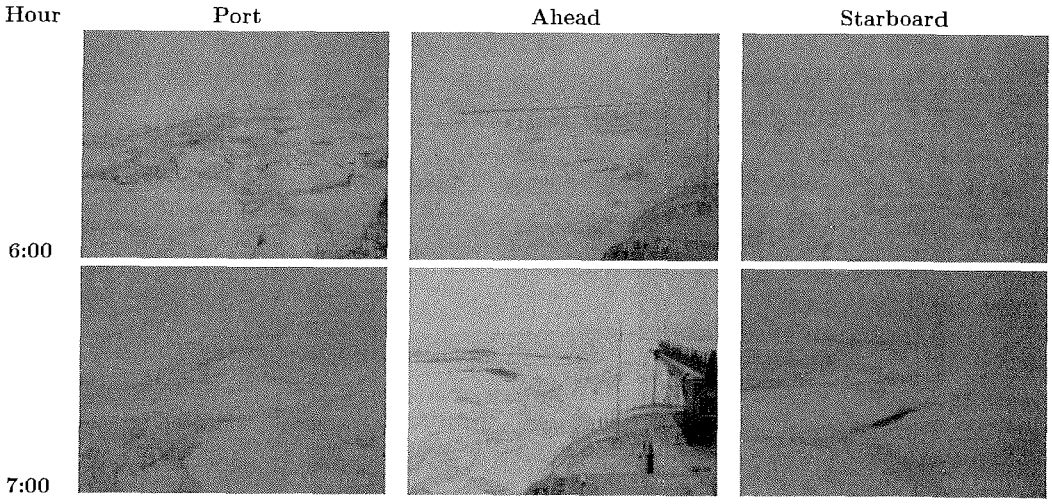
9.3.2003



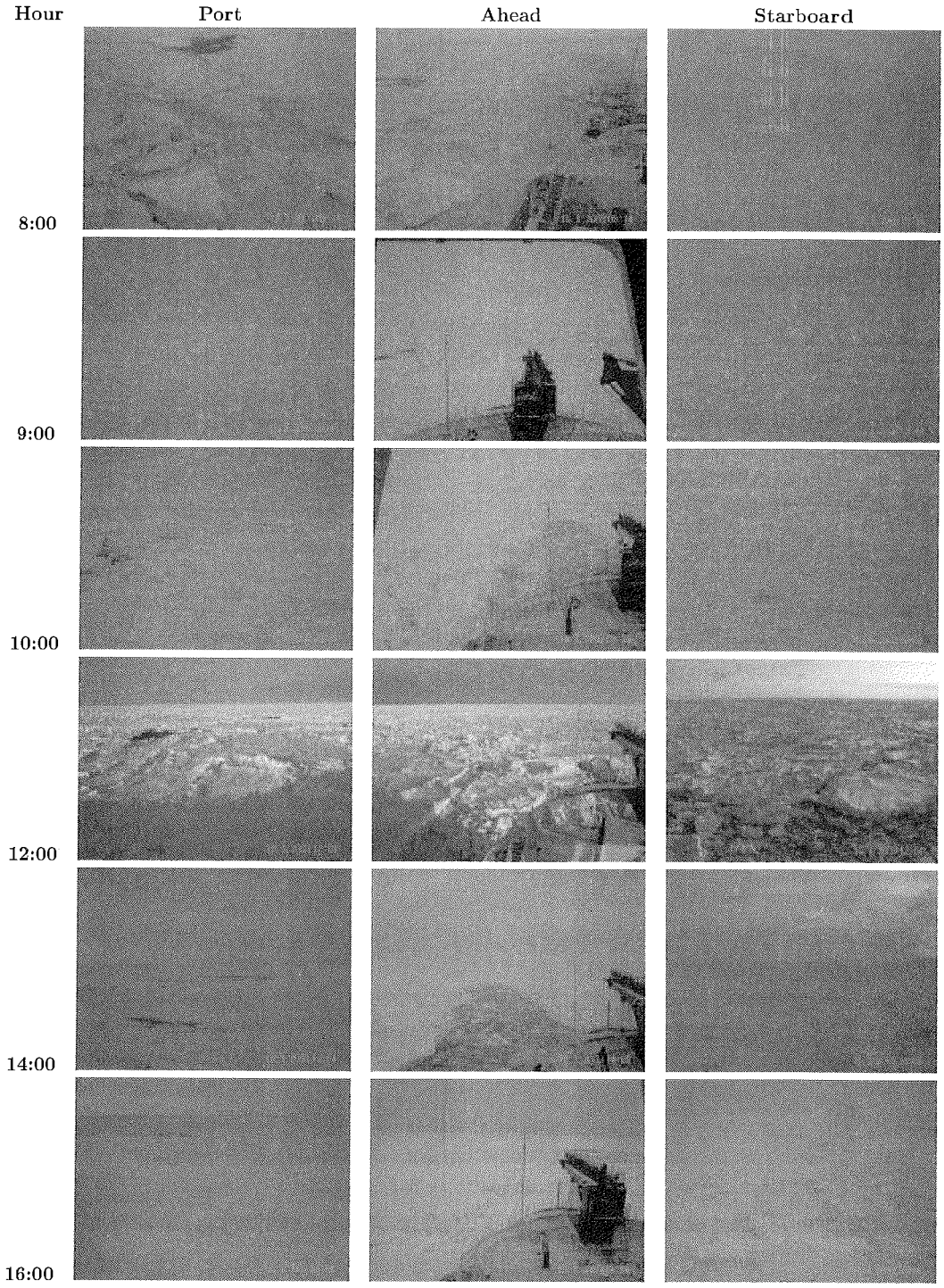
10.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.45	19.00	2.1	55	-16.2	-1.87	34.33	3	3.5	99	3	7	80	0.6	20	10	50						0.5	2	20	2	40	
07	76.46	19.01	2	11	-16.3	-1.87	34.25	0.2	4	98	5	7	93	0.8	20	20	50				5	1	0.5	2	20	2	30	
08	76.47	19.04	2.3	5	-16.3	1.96		3.1	4	99	1	7	98	1	30	50	100				5		0.8	2	20	2	40	
09	76.48	19.05	2.1	5	-16.3	-1.86	34.16	0.9		98	1	7	97	0.9	30	50	100				5		0.5	2	40	1	20	
10	76.48	19.45	1	23	-16.1	-1.86	34.22	1.1	4	100	4	7	96	0.8	30	50	250						0.8	2.5	50	1		
12	76.50	19.20	8.2	351	-16.3	4.2		0.8	4	98	5	7	93	0.8	30	50	250							2	50	2	40	
14	76.49	19.42	5.6	212	-11.4	-1.8	34.2	0	3	98	4	7	95	0.8	30	60	250							2	50		30	
16	76.50	19.60	4.6	9	-18	2.67	0	0	4	99	2	7	95	0.8	30			2	1	1	3		1.5	2	20	2	20	0
17	76.50	19.11	4.2	355	-18.9	-1.6	34.83	3.1	4	98	3	7	92	0.8	30	100	500	2	1	1	4	1	1	3	50	2	30	
19	76.50	19.17	2.5	72	-19.4			0.5	4	99	3	7	98										0.5	1	20	2		
22	76.50	19.20	3.6	79	-21.8	-1.84	34.1	3.6	4	100	0	7	100										0.5	1	20	2	40	0
23	76.49	19.21	3.3	100	-22.9	-1.86	34.11	0	4	100	0	7	100			100					0	0	1	2	20	2		

06:00 *ramming through compressed small floe fragments*
07:00 extremely brkoen but consolidated ice, heavy snow load
08:00 ridged ice with small openings partly covered by new ice
12:00 limited, small (20-30cm) open water patches near ship - otherwise 100%
14:00 many ridges



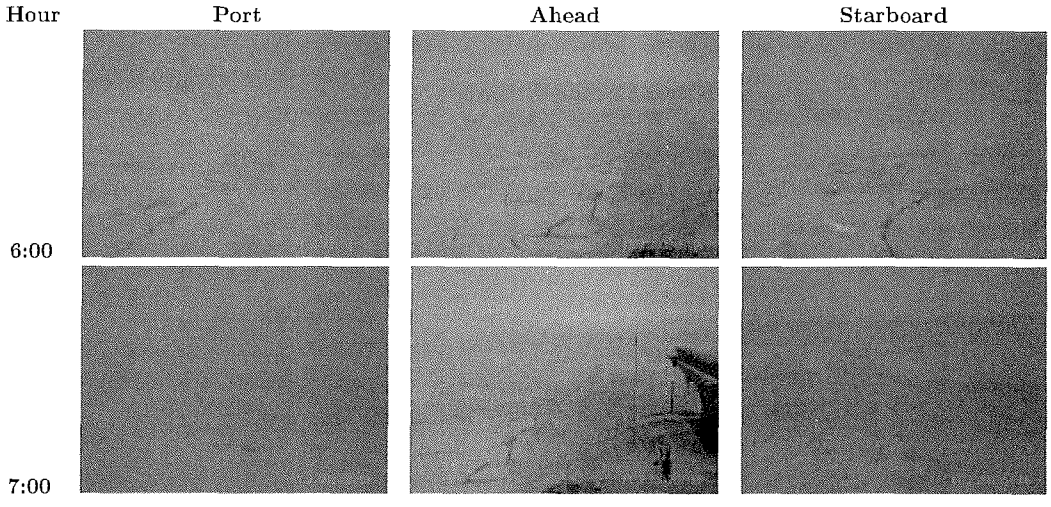
10.3.2003



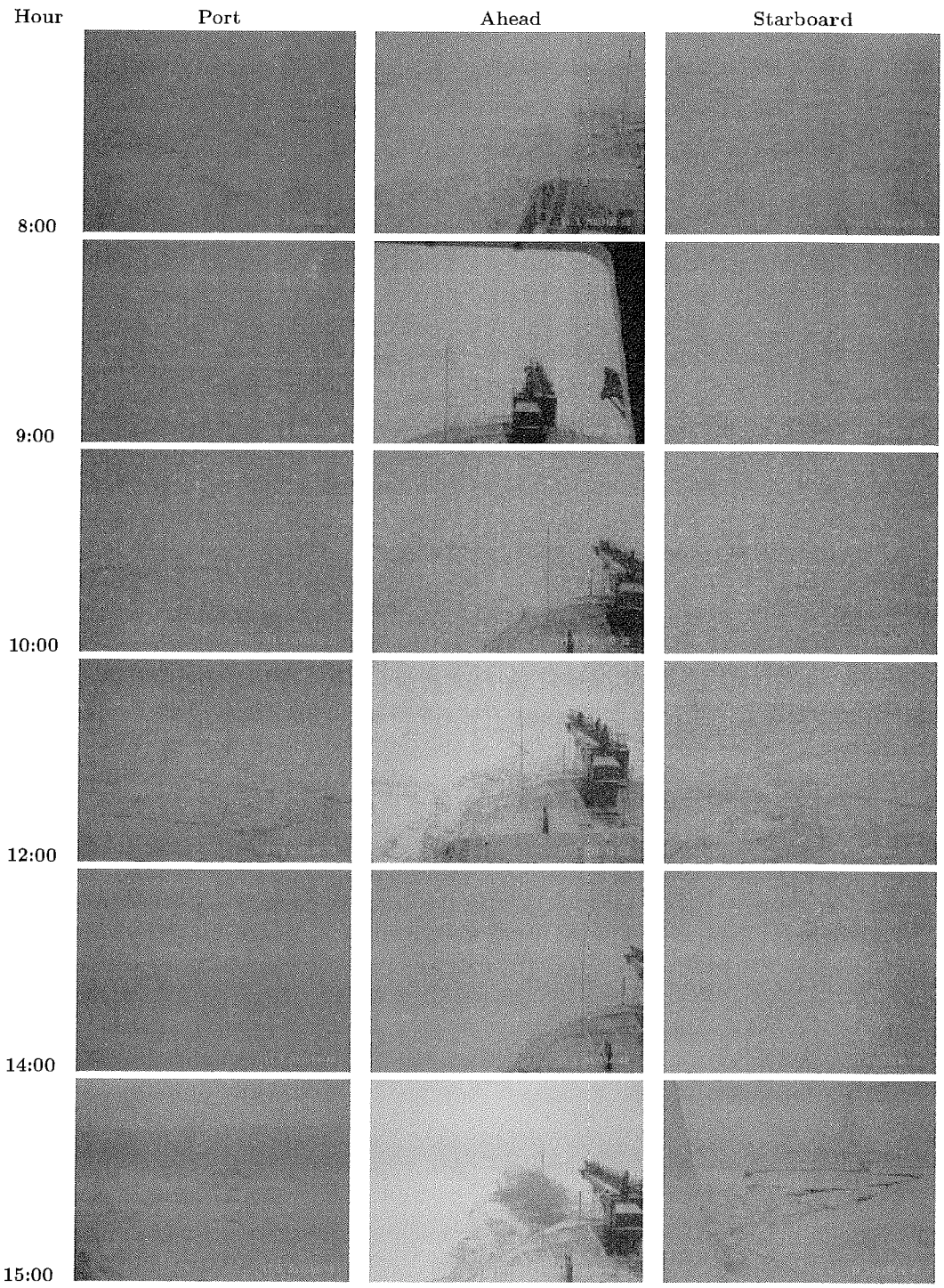
11.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kt]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≥30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes. diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs. Number of
06	76.50	19.25	4.8	93	-24.8	-1.84	34.32	0.3	4	100	1	7	99	0.8	20	40	80						0.5	2		2	20	
07	76.50	19.25	5.5	95	-25.4	-1.82	34.25	0		100	1	7	99	0.8	20	40	80						0.5	2		2	20	
08	76.50	19.26	4.43	90	-24.7	-1.17	34.25	1.2	4	100	1	7	99	0.8	30	20	80						0.8	2		2	50	
09	76.50	19.29	5.8	82	-25.1	-1.87	34.26	2.4	4	100	1	7	99	0.8	30	30	150	5					0.8	2		2	30	
10	76.50	19.29	6.1	93	-25.3	-1.87	34.22	3.2	4	100	1	7	99	1	30	30	200	3					0.8	2	30	2	30	
12	76.50	19.30	5.9	86	-26	-1.83	34.27	0	4	100	1	7	99	1	30	50	150							2	50	2	30	
13	76.50	19.30	5.5	74	-26	-1.82	34.25	0		100	1	7	99	0.9	20	50	200						1	2	30	2	20	
14	76.50	19.31	5.2	96	-26	-0.24		0.7	4	100	0	7	100	0.9	25				5	0	1			1	3		1	0
15	76.50	19.33	4.4	70	-26	-1.85	34.25	6	4	100	0	7	100	0.8	20	50		20	1	1			1	3	30	1	20	
16	76.50	19.36	3.5	70	-26.2	-0.81	34.36	0.2	4	100	0	7	100	0.8	30								1	2	40	2	10	0
17	76.50	19.38	3.5	77	-26.1	-1.24	34.26	0.5	4	100	2	7	100	0.8	30	30	200	2	1	1	10		1					
19	76.50	19.35	2.9	69	-26.1	-1.75	34.27	0		98	5	7	93										0.8	1.5	20	2		
23	76.50	19.50	3.1	96	-27.5	-1.82	34.22	0		100	0	7	100			50	300						1	2	20	2	30	

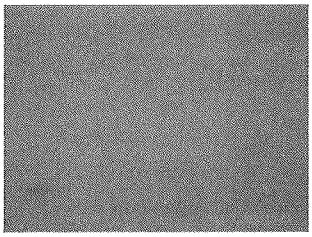
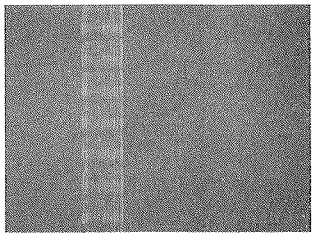
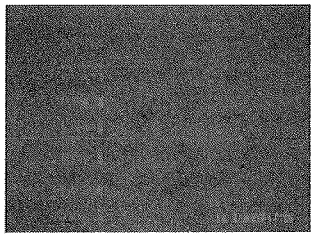
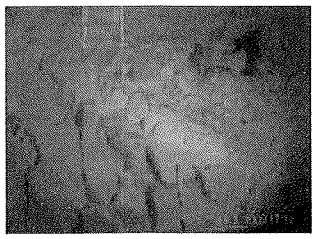
06:00 consolidated cover of small floes, and brash with snow load
07:00 mooring station since 06:00 UTC
12:00 white out conditions, on station
13:00 still on station
15:00 old ridges and hummocks, dirty ice visible when broken
23:00 stuck in compressed rubble, some bigger and level floes are around, clear sky



11.3.2003



11.3.2003

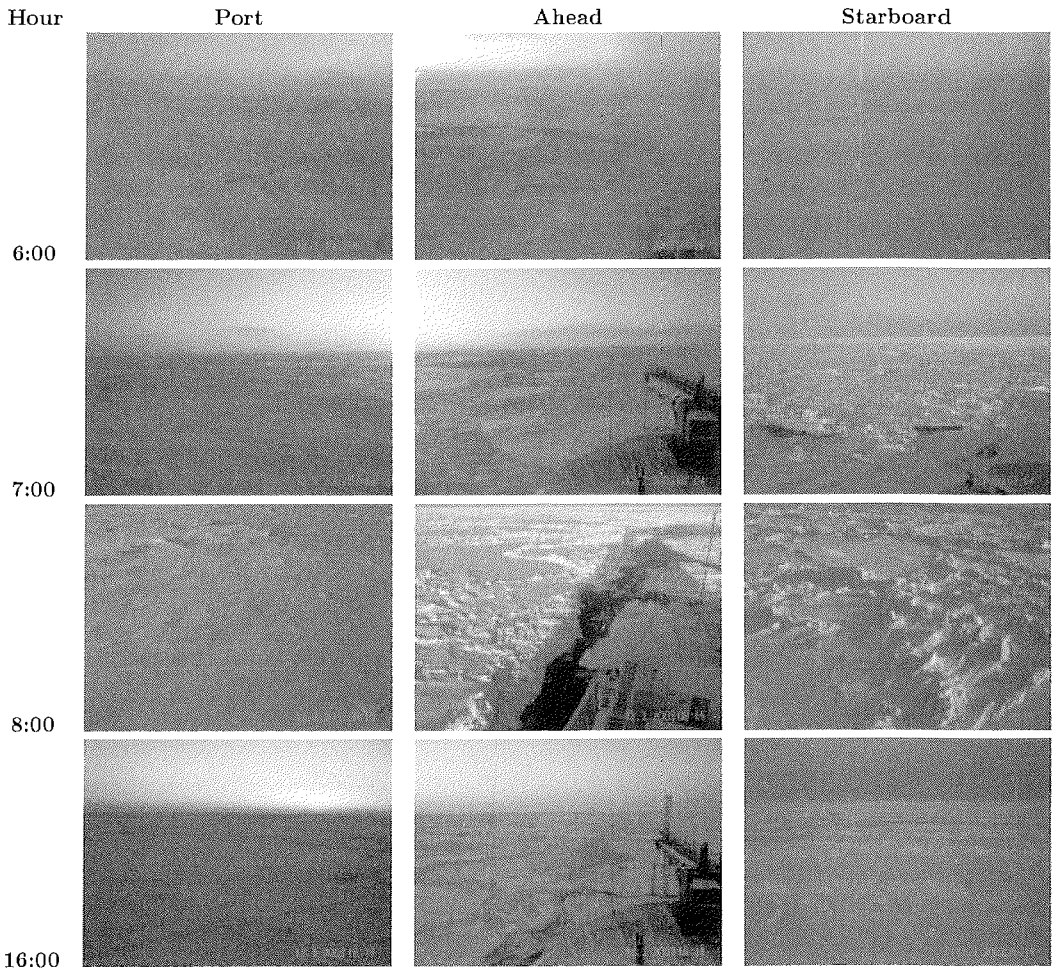
Hour	Port	Ahead	Starboard
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

12.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ¡30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
07	76.50	20.10	2.8	285	-26.6	-0.76	34.69	0	4	99	1	7	98	0.8	20	20	200				10		1	3		2	30	
08	76.48	20.12	4.9	263	-29.5	-1.77	34.32	0.1		100	1	7	99	0.7	20	50	300				10		0.5	2		2	20	

07:00 heading for an ice floe to have a 24hrs station



13.3.2003

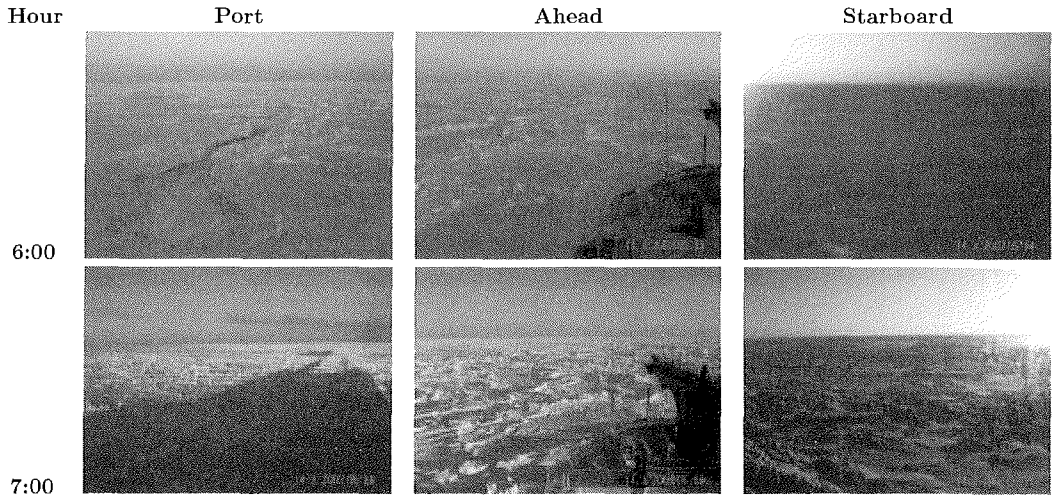
Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≥30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
19	76.48	19.58	6.2	334	-23.7	-1.83	34.04	3.1	4	99	0	7	99	0.8	20								1	1.5				
22																												
23	76.48	20.03	3.4	340	-23	-1.83	34.48	2	4	100	0	7	100	0.8	25	50	200				0		1	2	15	1	10	

22:00 bad visibility, white out conditions all day
23:00 compact ice pack of refrozen small floes with compressed and snow covered brash inbetween

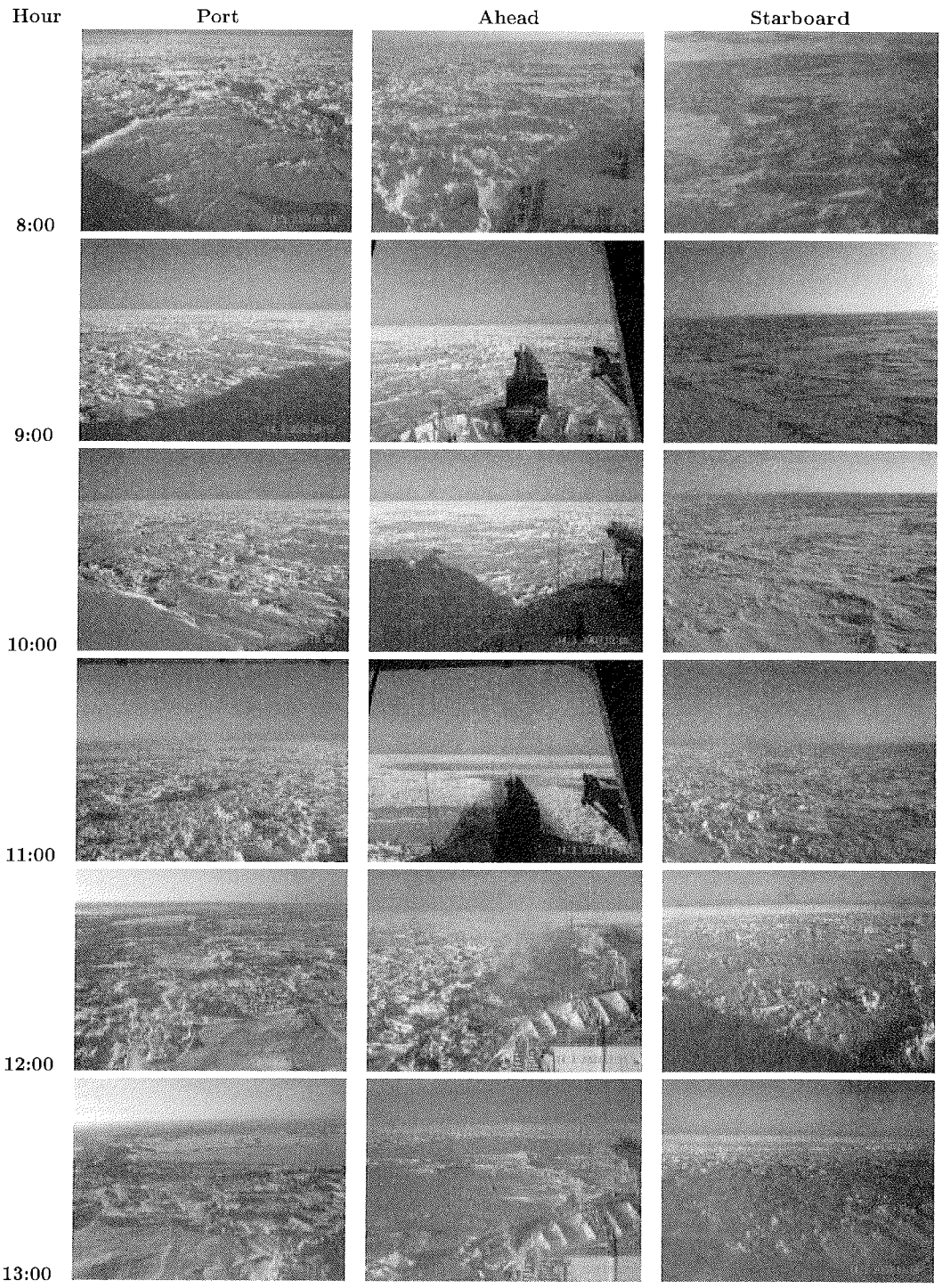
14.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ¡30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.54	20.17	2.9	296	-24.2		34.34	1.7	4	99	5	7	94	0.6	15	40	100						0.8	1.5	30	1	30	
07	76.54	20.17	3.3	315	-24.1	-1.26	34.81	0.1	4	100	5	7	95	0.8	20	50	100						1	2	8	1	50	
08	76.54	20.19	3.2	319	-24.6	-1.88	34.22	0.4	4	100	0	7	100	0.8	20	50	100						1	2	10	1	50	
09	76.55	20.21	1.3	305	-24	-1.83	34.33	0.2	4	100	5	7	95	0.8	20	30	100						1	2	10	1	50	
10	76.55	20.21	2.1	11	-23.6	-1.81	34.36	0.2		100	5	7	98	0.8	20	30	80						1.2	2	10	1	50	
11	76.55	20.22	2.7	38	-23.7	-1.81	34.36	1.1	4	100	5	7	95	0.7	20	30	300							2	20	1	50	
12	76.57	20.23	2.2	130	-26.4	-1.45	34.34	6.6	3	100	5	7	95	5	20	30	300							2	20		50	
13	76.59	20.23	1.7	160	-22.1	-1.45	34.41	0	4	100	1	7	99	0.8	25	20	200	2	2	1	0		1	2	20	1	30	
15	76.60	20.22	1.4	191	-22.8	-1.86	34.76	0.9	4	100	1	7	99	0.7	20	15	100	5	2	1	0		0.8	1.5	30	1	20	
22	77.45	20.21	4.1	262	-22.8	-1.88	34.38	1.7	4	100	1	7	100										0.5	0.6	20	1	0	0
23	77.05	20.22	2.9	265	-24.5	-1.85	34.12	0	4	100	1	7	99	1	20		500	1			0		0.8	1.5	30	2	20	0

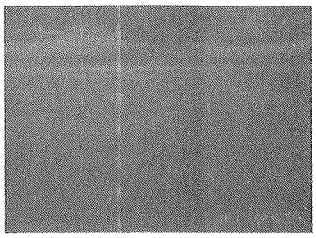
06:00 compact consolidated small FY floes with compressed brush, some fractures with GW ice/nilas, heavy snow load
07:00 heavily ridged ice, some areas of thinner ice
08:00 heavily ridged ice, fractures with thin ice, covered with ~ 5 cm snow
12:00 ridges now much less dramatic than this morning
13:00 compact floe fragments embedded in refrozen and compressed brash, no open water visible
22:00 generally undeformed ice cover, numerous small areas of deformation - well scattered
23:00 some narrow leads extending E-W



14.3.2003



14.3.2003

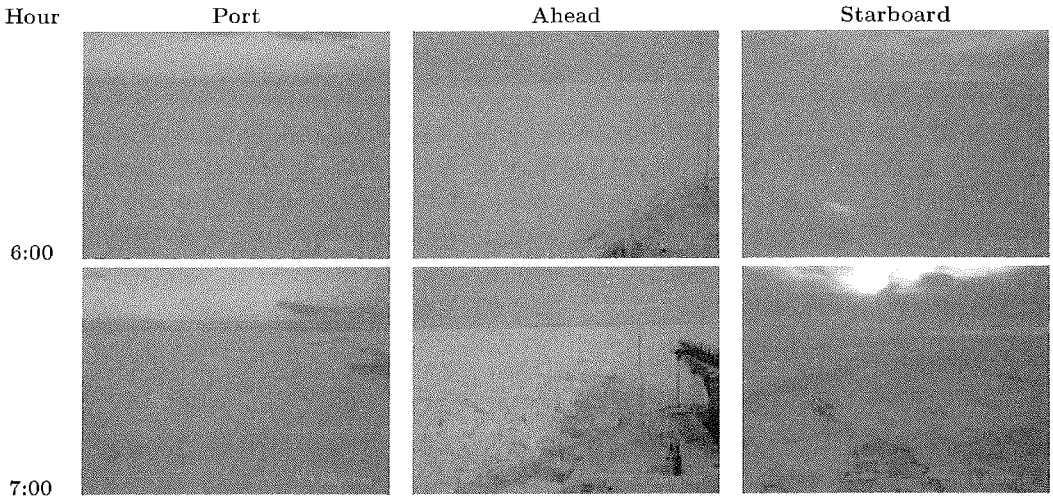
Hour	Port	Ahead	Starboard
15:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

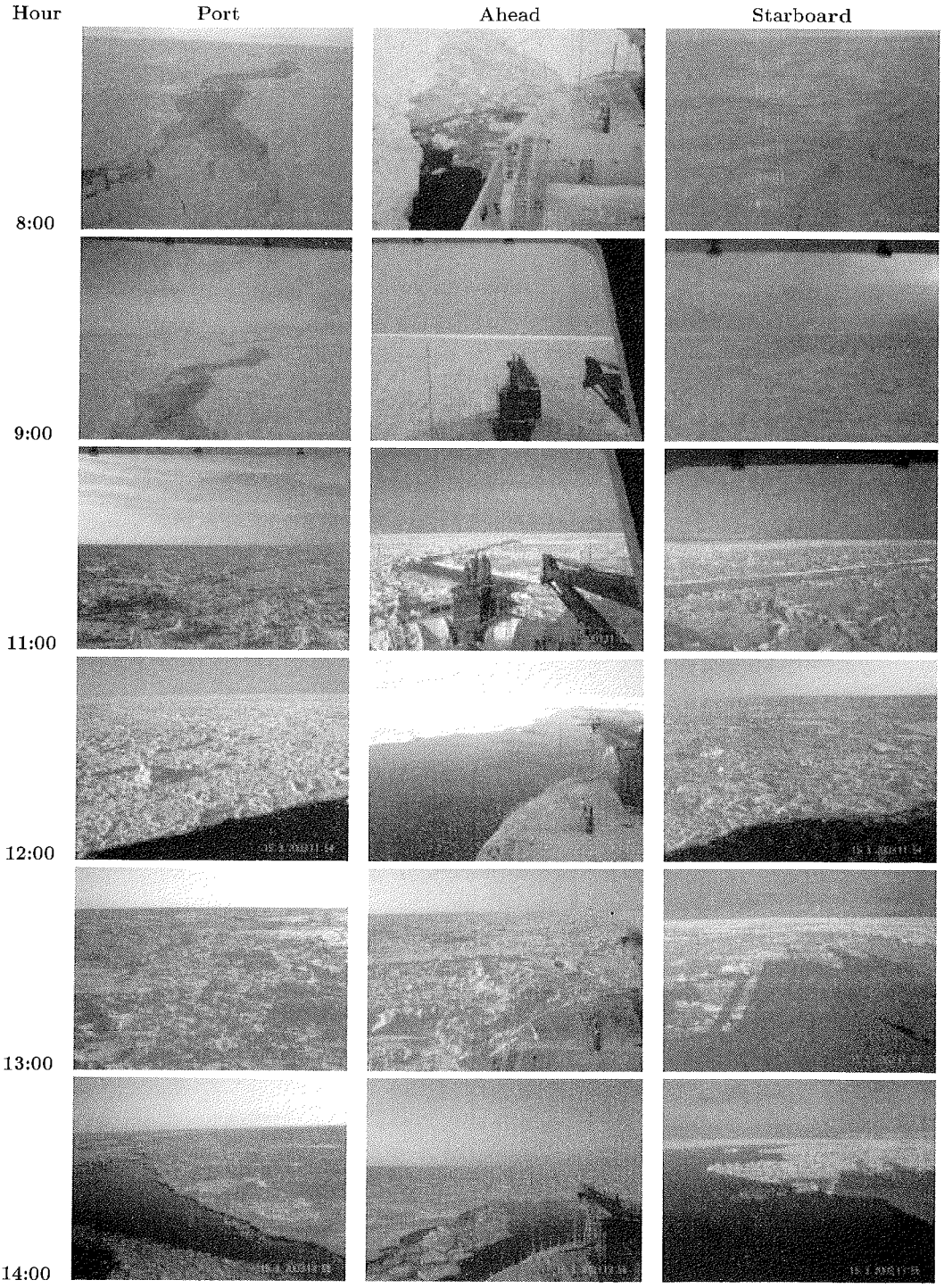
15.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≥30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	77.12	20.26	8.4	235	-16.4	-1.88	34.42	2.5	4	100	1	7	99	0.7	15		100						0.3	1		1	70	
07	77.13	20.27	7.3	239	-16.8	-1.88	34.42	1	4	100	1	7	99	0.8	20		100						0.5	1.5	20	2	60	
08	77.13	20.27	9.1	242	-16.8			0		100	1	7	99	0.8	20							10	0.5	1.5	20	2	50	
09	77.13	20.28	8.2	247	-16.1	-1.83	34.44	0.6		100	3	7	97	0.8	20						15		1	2		2	50	
11	77.15	20.17	5.5	300	-13.4	-1.88	34.37	6.3	3	95	5	7	89	0.7	20						10		1	2		1	50	
12	77.18	20.15	8.2	266	-14.1			5.2	1	70	5	7	65	0.5	10						30			2	30	1	30	
13	77.21	20.17	5.6	299	-13.9	-1.88	34.52	3.9	3	99	1	7	98	0.8	10	30	200				0		0.5	1.5	20	1	20	
14	77.23	20.17	5.2	350	-13.9			1.8	1	90	5	7	85	0.8	20	30	100				10		1	2	10	2	50	
15	77.23	20.24	4.6	310	-14	-1.88	34.2	6	3	90	2	7	95	0.8	15	100	1000				40		1	3	5	1	75	
17	77.23	20.26	5.5	301	-14	-1.85	34.49	2.1	3	90	3	7	92	0.8	20	50	500	1	2	1	20	1	1	2	5	2	70	
19	77.23	20.24	1.2	286	-15.7			0.1		95	5	7	90										0.5	10	5	1	60	
23	77.24	20.17	6.4	299	-14.5	-1.89	34.44	0.3	4	100	1	78	99	1	15	20	50				0		0.8	1.5	20	1	30	

06:00 consolidated ice cover, just a few level floes, rubble ice dominant, opne ice covered fracture ahead
07:00 one long lead (5m width) with nilas
08:00 on station
12:00 following lead in approach to polynia
13:00 prominent lead on radar, thick compacted brash with embedded floes
15:00 Polarstern left lead is now ramming, heavily deformed ice, 6.5nm off coast
19:00 on station
23:00 no leads visible on 3nm range radar, compressed brash and floe fragments



15.3.2003



15.3.2003

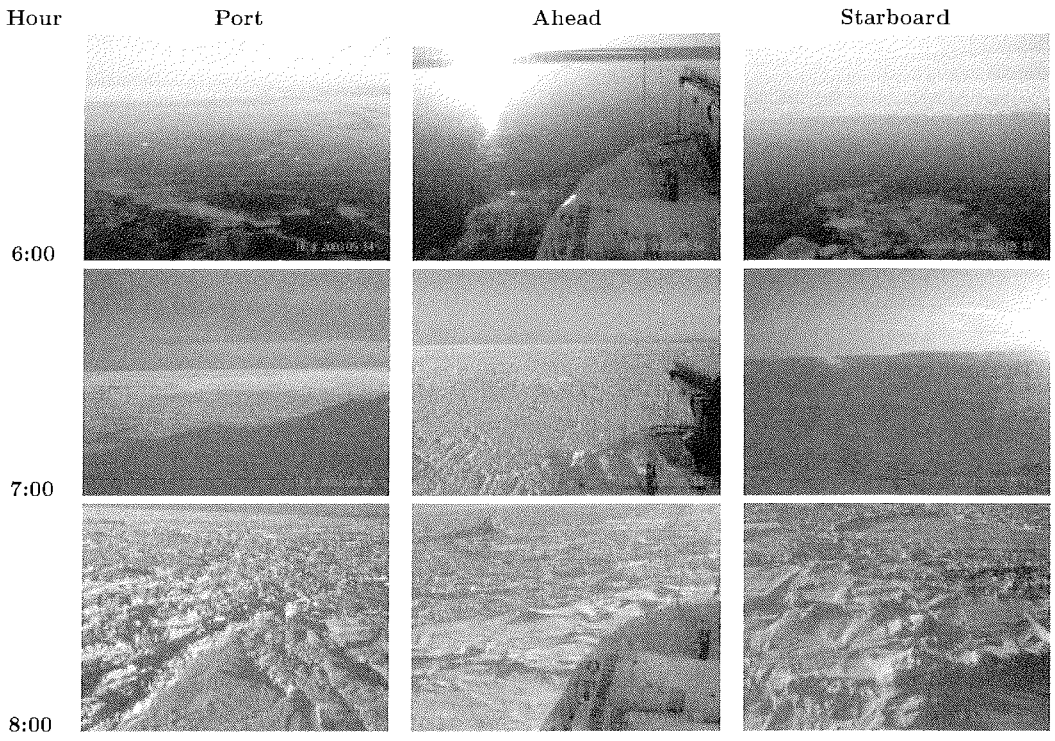
Hour	Port	Ahead	Starboard
15:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

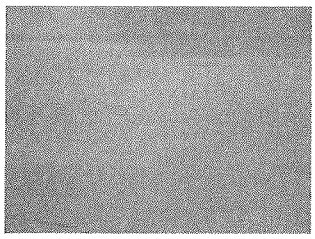
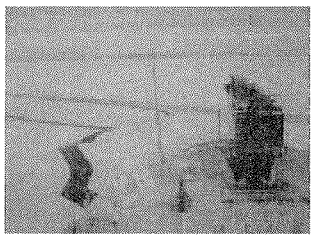
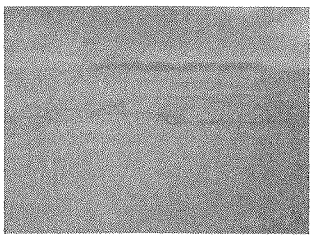
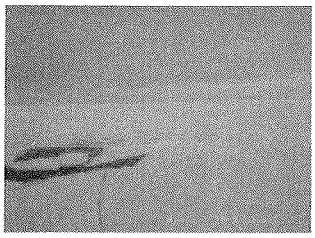
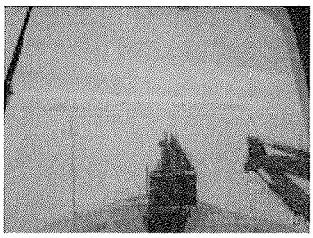
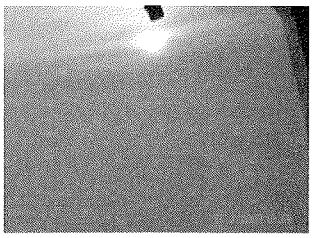
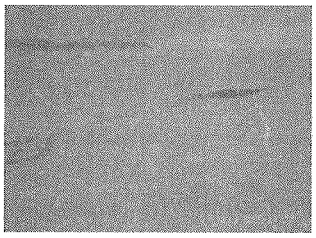
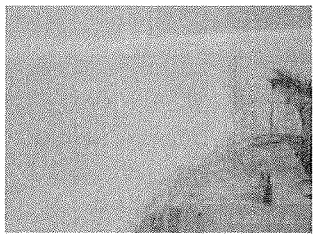
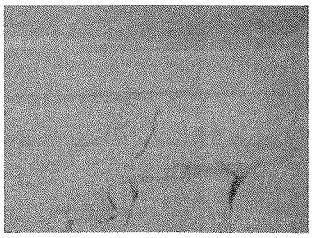
16.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=1	Total ice concentration [%]	C thin ice ¡30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	77.29	20.16	4.1	182	-13.9	-1.87	34.58	0.4	1	98	80	3	60	0.02	0													
07	77.30	20.13	4.6	195	-12.5	-1.88	34.55	7.5	1	95	80	3	80	0.3	5	8					10							1
08	77.32	20.18	4	208	-13.7			1.6	4	100	1	7	99	0.5	10	8	30				1						70	1
09	77.33	20.20	5.4	236	-13	-1.89	34.52	2.4	4	100	1	7	99	0.8	20	50	150	1	0	1	1	1	2	500	2	50	2
10	77.34	20.29	4.8	237	-12.4	-1.89	34.59	5.2	3	100	100	4	100	0.15	1							0.3				0	1
11	77.35	20.33	5.1	235	-11.8	-1.86	34.59	0	2	90	5	5.6	85	0.2	2												2
12	77.34	20.30	8	242	-10.6	-1.86	34.57	0	2	95	95	6	95	0.2	1						10					0	2

06:00 just enteredn polynia with almost closed nilas coverage, beautiful finger rafting
08:00 piece of iceberg to the left, 7m high and 20 m wide
10:00 just entering large refrozen polynia with slightly rafted light nilas/ grey ice, look at SIMS
11:00 both, rafting and ridging of sea ice take place
12:00 on station, in thin ice for CTDs etc.



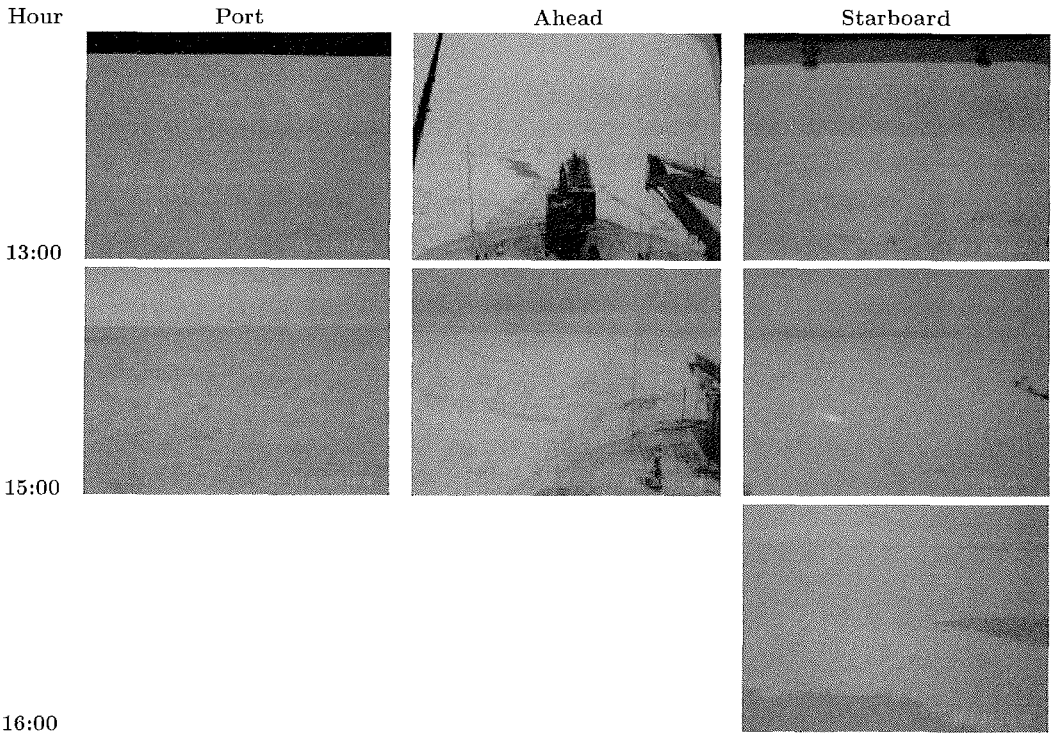
16.3.2003

Hour	Port	Ahead	Starboard
9:00			
10:00			
11:00			
12:00			

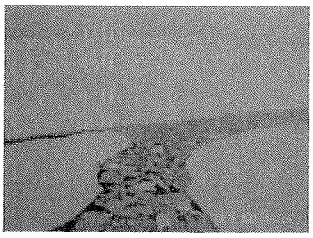
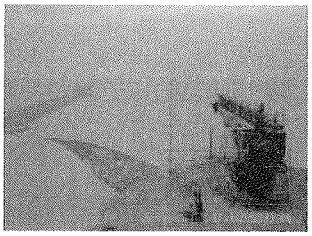
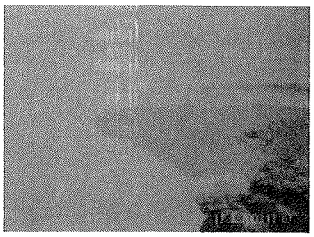
17.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≥30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
14	77.36	20.20	3.4	147			0																					
15	77.32	20.21	3.4	186	-16.1	-0.29	34.64	3.3	1	98	10	7	90	0.8	10	200	600	20	0	1	3		1	1.5	100	1		2
16	77.35	20.33	3.9	92	-13.2			0.4	2	90	90	6	90	0.2	5			0			5		0				0	0
17	77.34	20.33	4.3	101	-15.2	-1.86	34.58	0.8	3	95	90	6	95	0.25	10	500	200	0			10		0.2	0.3	500	0	0	
19	77.35	20.26	1.9	47	-13.8			1.1	3	98	75	6	95	0.2	3								0.2	0.5		2	0	
23	77.38	20.25	1.8	108	-11.9	-1.87	34.6	5	3	100	75	6	75	0.3	2								0.3	0.5			0	0

15:00 iceberg=bergy bits
16:00 steaming through young ice at polynia position
23:00 continuous sheet of grey/gw ice with many rafts. Floe crakes with dark nilas



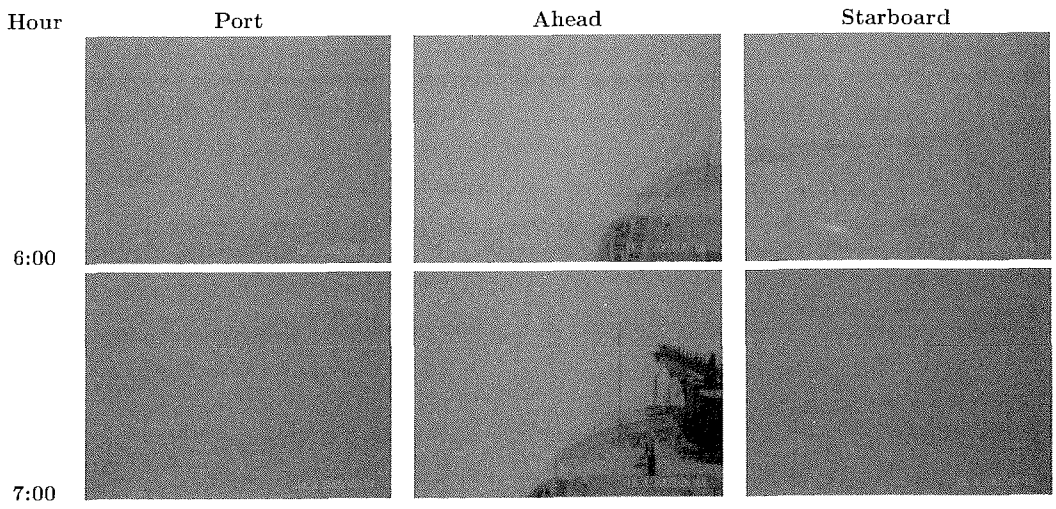
17.3.2003

Hour	Port	Ahead	Starboard
17:00			

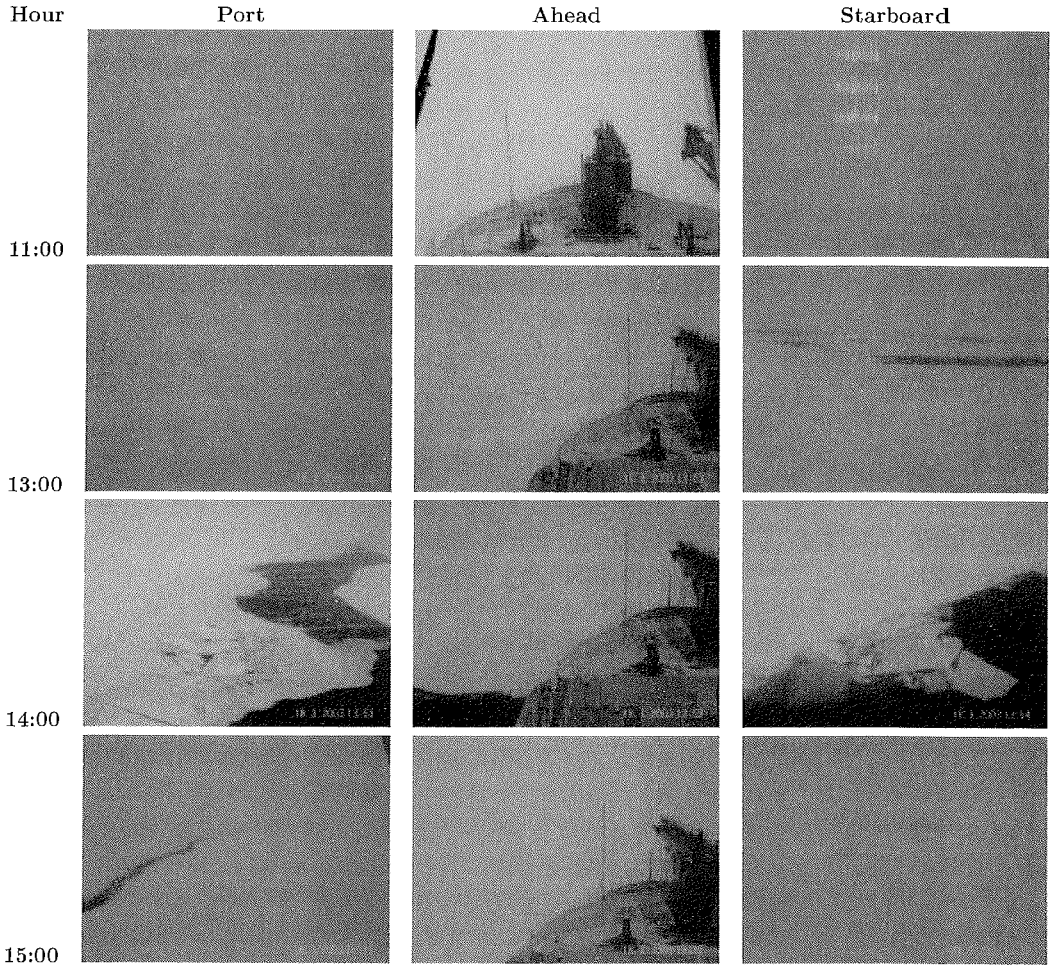
18.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≤30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	77.25	19.10	10	56	-14.4	-1.85	34.44			100	60	6	60	0.3	5								0.3	0.5			0	0	
07	77.30	19.88	11.5	43	-15.7	-1.82	34.44	0.3		100	70	6	70	0.3	0.5								0.3	1			0	0	
08	77.29	19.07	14.4	34	-18			0.4		100	1	6	99	0.7	5								0.3	1			0	0	
09	77.29	19.06	16.3	28	-18.8	-1.83	34.46			100	60	6	60	0.3	5								0.2	0.3					
11	77.28	18.54	19.8	27	-20.9	-1.88	34.2	1.1	3.4	100	80	6	80	0.25	0.5								0.2	0.5					
13	77.27	18.33	18.39	23	-22.6	-1.83	34.2	6	3	99	99	5	99	0.3	1						10		0.2	0.5	100	1	0	0	
14	77.27	18.31	21.5	18	-22.1			0		91	99	5	99	0.3	7						10								
15	77.26	18.37	19.6	10	-22.4			6.5	3	98	98	7	98	0.4	5			0			0		0.2	0.3	100	0			
19	77.27	19.31	14.7	31	-22.9			0.5	4	99	99	7	99	0.3	3														
23	77.25	19.50	12.1	20	-24.4			0	4	100	0	7	100	1.6	20	10	30				0		1	2	10	1	20		

06:00 snowfall+drift, visibility ~500m, floes probably larger ⇒ level white ice with only few ridges
07:00 ice station
08:00 ice station
11:00 strong ice compaction
13:00 contionuous grey ice cover with few rafts and shallow snow drifts, few narrow leads
14:00 continuous grey ice
15:00 white FY ice, no leads but steaming without ramming possible
19:00 on station, Henrike is the world's best ice observer
23:00 compacted thick floes with rubbles inbetween; Radar shows level grey ice 1.5nm to NE



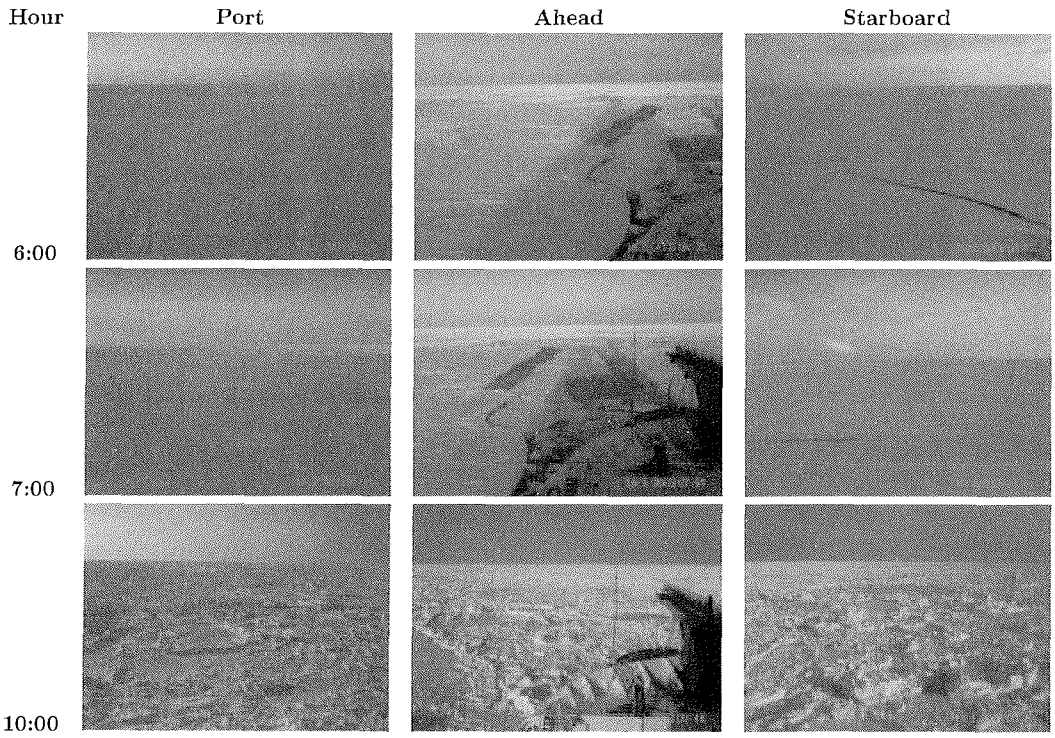
18.3.2003



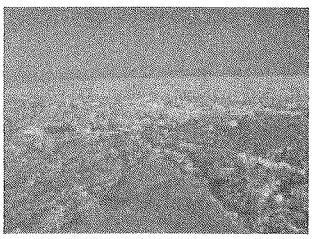
19.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ¡30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	77.16	20.18	6	336	-23					100	80	7	75	0.3	5		1000						0.1	1		1	20	
08	77.16	20.10	3.8	295	-22.6			1.7	4	100	5	6.5	95	0.5	10		200				8		1	2		1	80	
09	77.17	20.08	23	269	-22.8			3.2	4	99	4	7	95	0.5	15	20	150						1	3		1	80	
10	77.17	20.08	3.8	272	-22.6			4.9	3.5	100	5	7	96	0.5	10	10	60						1	2	10	1	90	
12	77.17	20.03	5.7	310	-22.2			5	3	99	10	7	90	0.5	10	20	100				2		1	3	30		70	
13	77.15	19.52	1.2	307	-21.8			2	3.5	100	5	7.5	95	0.4	10	20	50	1			0		0.8	2	20	2	50	
14	77.15	19.46	2.3	354	-20.9			0.4	3.5	100	5	7	95	0.8	10	20	100						1	3		1	80	
15	77.14	19.45	2.1	356	-20.2			2.6	4	100	10	7	90	0.9	5	50	100						1	2	5	1	80	
16	77.14	19.43	2.8	6	-19.9			5.9	3	95	10	7	90	0.7	10	50	100						1	2	3	1	80	
23	77.11	19.11	1	124	-18.3			3.4	3	98	5	6	93	0.5	5	50	100				2		0.4	0.5	50	2	0	

06:00 some nilas areas ahead, heavily ridged floes3
13:00 Mixture of FY/SY floes embedded in rubbled grey and white ice and nilas (light). Quite some brown ice
15:00 Ramming in rubbled ice with little to no snow cover, large deformed areas. only single floes detectable
23:00 level g/w ice with shallow ridges/rafts: after station in big lead: only 2 engines



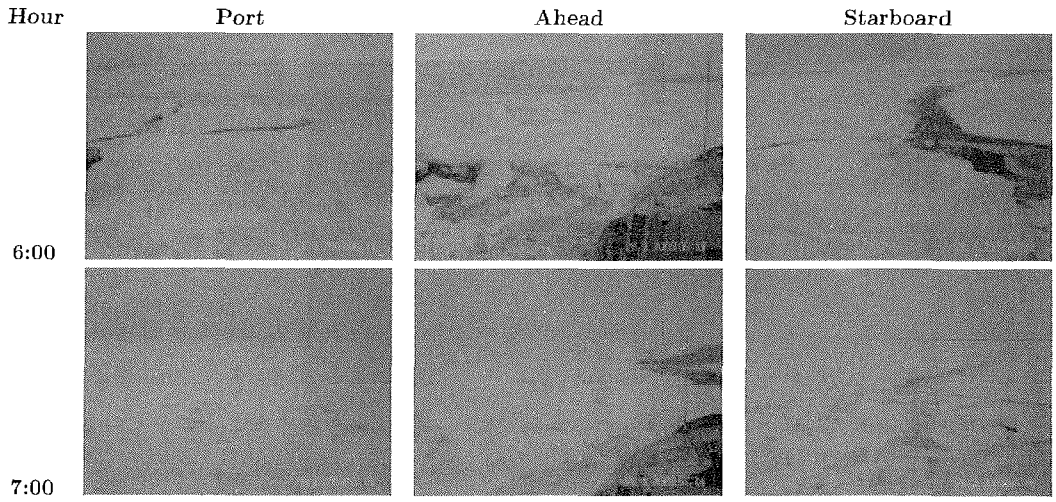
19.3.2003

Hour	Port	Ahead	Starboard
12:00			
13:00			
14:00			
15:00			
16:00			

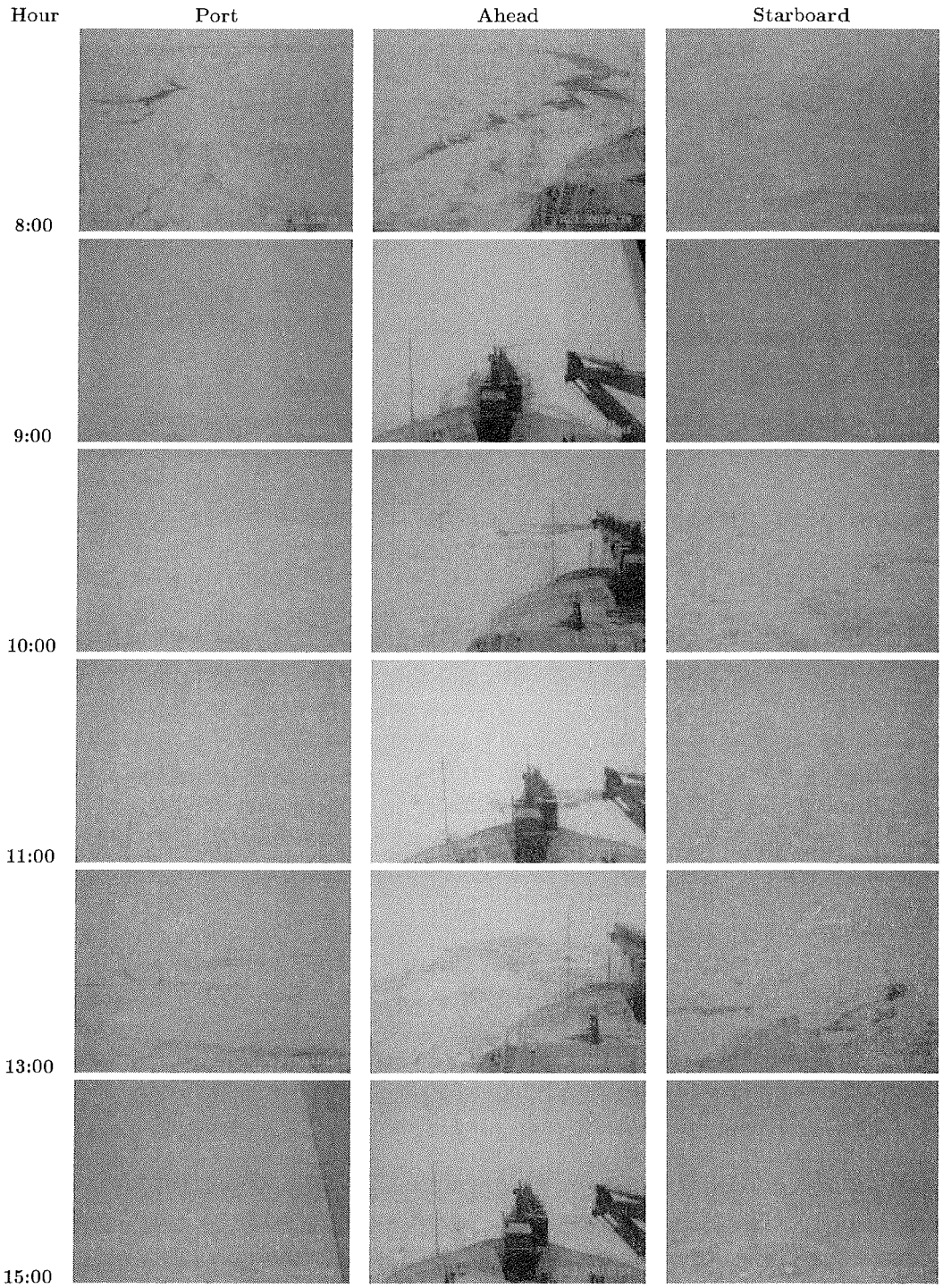
20.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice β30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	*Dirty ice concentration* [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	*Lead floes, diameter* [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	77.00	19.01	2.8	142	-19.1			8.2	3	95	20	6	60	0.3	5	100	200						0.8	0.8	30	2	10	
07	76.59	19.05	1.1	140	-18.2			0.5	4	97	5	7	92	1	20	50	200				10		0.5	1.5	20	2	40	
08	76.57	19.09	0.7	324	-16.8			0.7	4	95	5	7	90	0.8	20	20	200				10		0.5	1.5	20	2	70	
10	76.57	19.12	1.9	221	-14.2			0.4	4	99	3	7	96	10	30	30	150						0.8	2		1	60	
11	76.57	19.11	2.7	237	-13.5			1.7	4	98		7	96		20	20	300	20	0	1	10		1	2		1	40	
13	76.57	19.12	0.3	164	-12.6			0.4	4	100	0	8	100		25	30	50	20	2	1	0		1	2	20	1	30	
14	76.57	19.12	1.6	137	-12.6			0.4	4	100	0	7	100	0.8	15	50	100	20	0				0.7	1.5			20	
16	76.58	19.15	7.5	136	-11.4	-1.78	34.34	0.3		100	2	7	100	0.7	20			5	1	1	5		0.5	1	20	1	50	0
17	76.57	19.15	7.4	144	-9.7	-1.84	34.34	0.4	4	99	3	7	97	0.7	25	30	100	5	1	1	3		0.5	1.5	10	1	50	
19	76.57	19.16	9.8	155	-5.4			2.3	4	100	0	7	100	0.8	10								0.3		20	1		
23	76.58	19.13	6.3	207	-4.7			0	4	100	0	8	100	1.5	25	20	100				0		0.8	1.5	20	1	30	

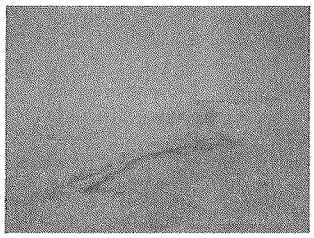
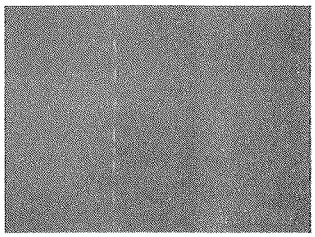
06:00 so far following thin icebetween floes(Dark/light nilas, grey ice, up to 5 % coverage with frost flowers and some brown ice
07:00 radar sigan disturbed, few patches of open water, nilas between thick floes, ramming
08:00 "Streuselkucheneis" (Lutz)
13:00 drift is more backwards than we get forward, fog and snowfall (s. image)
14:00 lots of dirty ice in shiptrack, more hummocks than ridges
23:00 small thick floes baked into brash and rubble



20.3.2003



20.3.2003

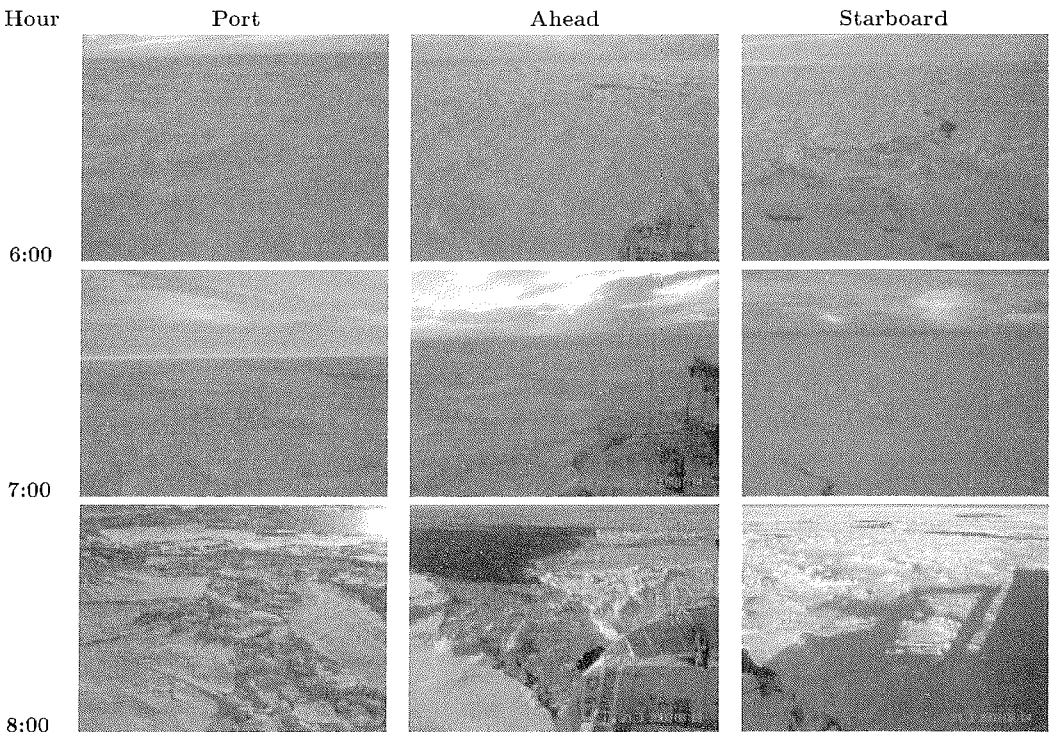
Hour	Port	Ahead	Starboard
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

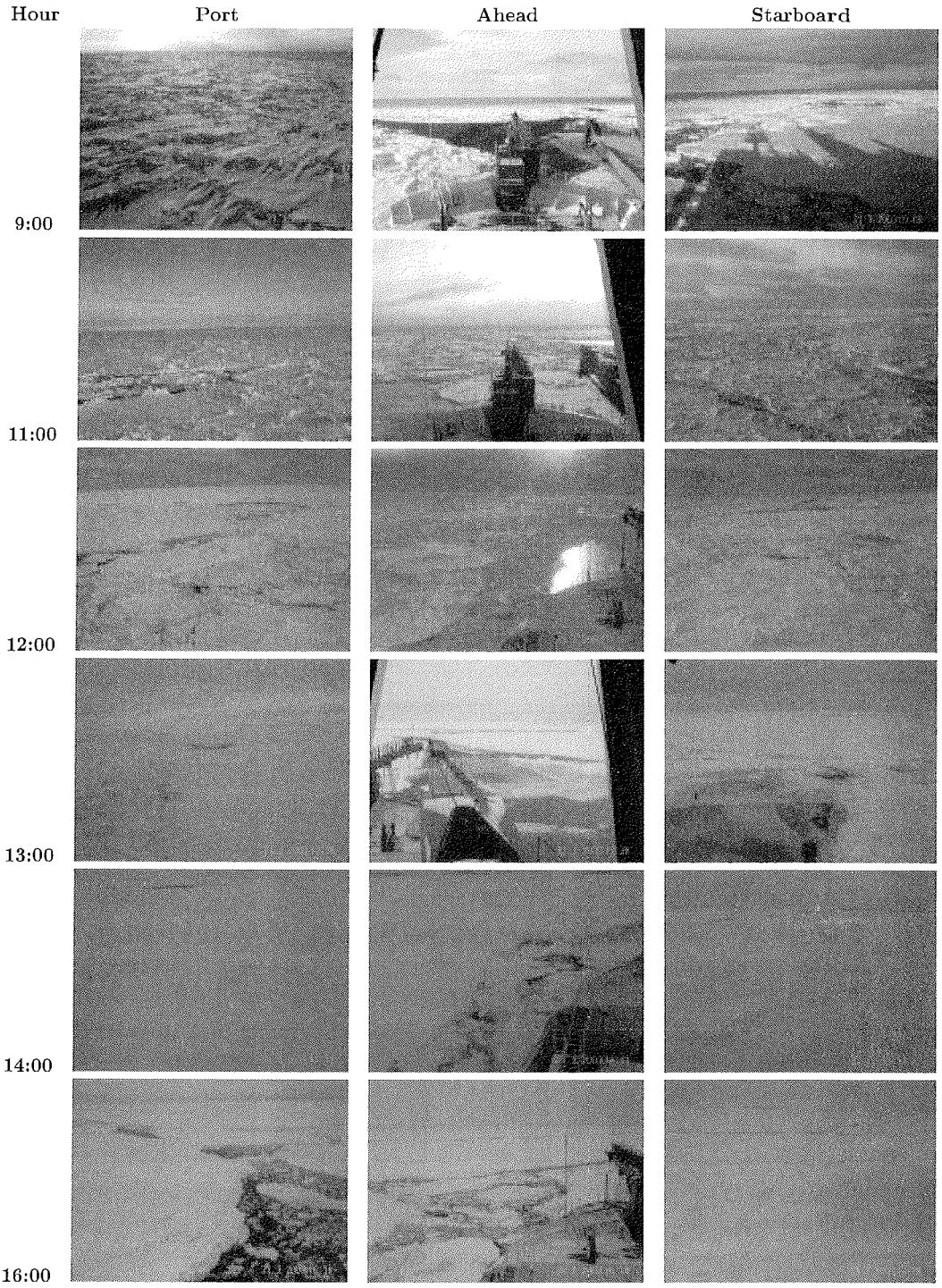
21.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, running=4	Total ice concentration [%]	C thin ice ≤30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy =2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.55	19.22	11.8	248	-3.5			6.6	3.5	98	3	7	95	1	20	20	100	10	2	1			0.5	1	20	1	50	
07	76.54	13.23	7.8	255	-3.9			1.6	4	99	3	7	96	0.8	20	20	100						0.5	1	20	1	50	
08	76.50	19.17	9.8	248	-4.2			0.7	3	90	3	7	87	0.7	20	50	100				25	5	1	2	50	1	50	
09	76.49	19.24	13.9	260	-4.1			5.4	3	95	5	7	90	0.8	0.2	20	30	150			10	10	0.8	0.7	1.5	2	1	50
11	76.43	19.33	8.7	249	-4.7			5.3	3	95	5	7	90	1	15	80	1000				10		0.8	1.5		2	30	
12	76.39	19.32	5.2	259	-4.3			4.7	3	95	10	7	85	0.8	20	50	100				10		1	3	50	2	15	
13	76.39	19.37	9.1	260	-4.3			6.1	3	80	10	7	70		10	40	100	25	1	2	5		1	2	20	1	10	
14	76.37	19.55	7.6	259	-4.4			7.4	2	90	5	7.5	95		20	100	200				15	15	0.8	2	40	1	0	
16	76.35	20.33	2.5	256	-4.7			4.5	1	95	2	7	90	0.3	10	200	500	5	1	1	30		1	2	20	2	0	0
19	76.30	21.20	2.4	66	-4.7			7.3	2	89		7	95	0.8	10	50	150											
23	76.28	21.38	6.5	36	-9.7			0	4	100	0	8	100	0.8	25	1000	1000				0		1	2	50	1	30	

06:00 following fractures with slush and cake ice through consolidated thick ice of small floes, heay snow load . only few level floes
12:00 regular patches of nilas and grey ice ~20m in diameter
13:00 frost flowers on nilas, contrasts bad
23:00 stopped/stuck in a big floe with much ridges and and rubbles. no floe edge visible in the dark



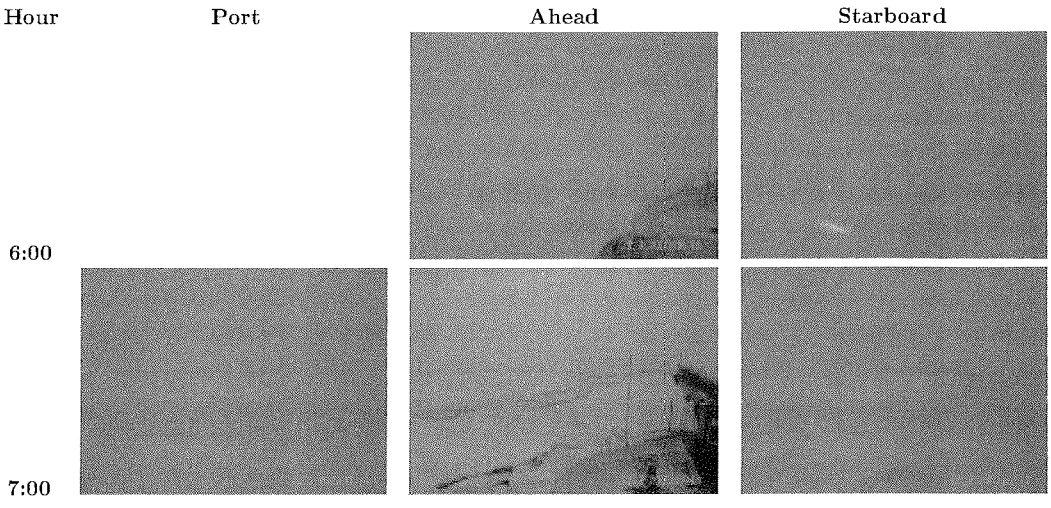
21.3.2003



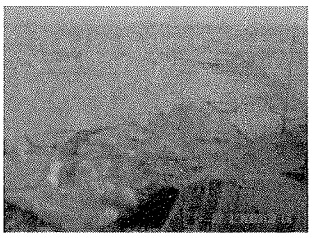
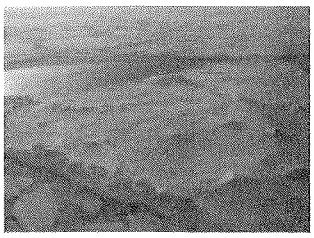
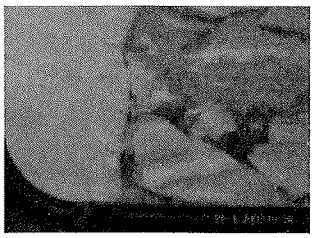
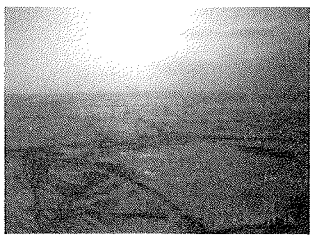
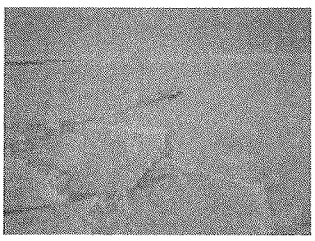
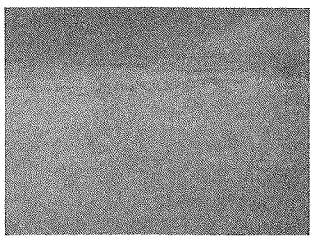
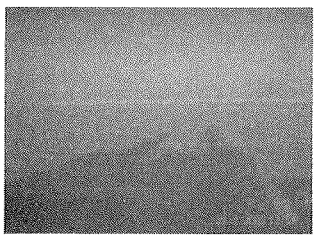
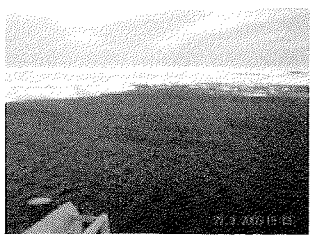
22.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice ≤30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.28	21.38	6.5	36	-9.7		0	4	100	0	8	100	0.8	25	1000	1000				0		1	2	50	1	30	
07	76.29	21.35	7.4	347	-12.7		39	3.5	99	2	7.5	97	0.8	20								0.5	2	2		10	
08	76.27	21.53	6.6	346	-13.9		1.2	3.5	97	2	7.5	95	0.8	20	200							1	2	20	0	20	
10	76.26	21.48	7.96	356	-14.4		1.1		95	3	7.58	92	1	20	200	1000						1	2	50	2		
11	76.26	21.45	9.1	354	-13.8		1.2		99	4	7	95	1	10	100	500						0.5	2	50	2	10	
13	76.25	21.46	6.6	347	-14.9		8.1	1	85	10	7	75	0.4	20	300	1000				20		0.5	1	200	1	10	
14	76.24	21.24	10.1	15	-16		0.6	2	95	25	7	95	0.35	15	150	2000				80		1	2	100	1	30	
15	76.22	22.03	8.4	10	-16.3		3	1	80	5	7	95	1	10	120	500				200			2	50		10	
16	76.23	22.03	9.9	358	-15.8		0.3	1	70	5	7	95	0.6	20	100	800				300		0.5	1.5	50	1	10	0
17	76.23	22.04	8.2	17	-15.6		0.5	1	70	5	7	95	0.5	15	150	500				300	1	0.5	1.5	50	1	10	
19	76.22	22.60	5.4	6	-16.1		0.5	1	70	5	7	95			150					300		0.5	1.5		1		
23	76.23	22.25	8.6	36	-20.2		1.4	1	90		7	90			100	500				200	50	0.5	1.5		2		

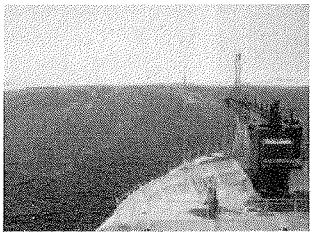
06:00 ramming through large level floe, some dark patches ahead, poor visibility due to snowfall/drift
07:00 white out. large floes surrounded by little cracks woth open water
10:00 on station
13:00 vast level floes and open watwer patches with grease ice forming on surface
14:00 vast floe on cast side
15:00 stopped for Meteorology station in lead,thin ice pancakes in in grease matrix
23:00 on station, drift speed: 1.4 kn, parking in 200 * 200 m open water patch



22.3.2003

Hour	Port	Ahead	Starboard
8:00			
10:00			
11:00			
13:00			
14:00			
15:00			

22.3.2003

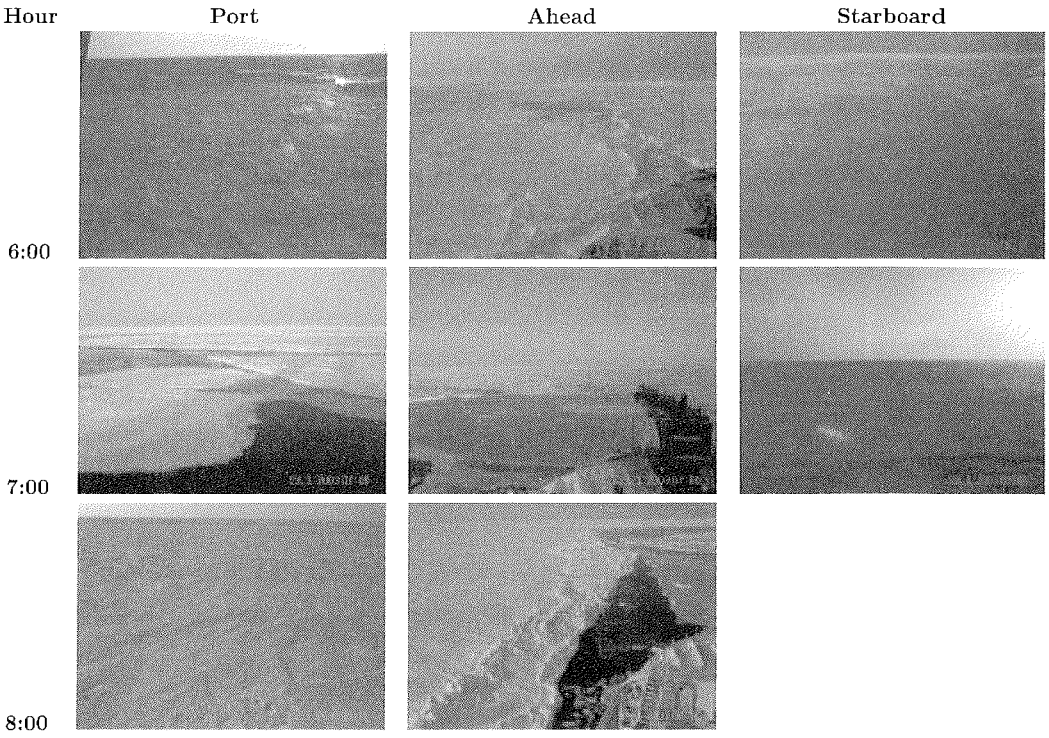
Hour	Port	Ahead	Starboard
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

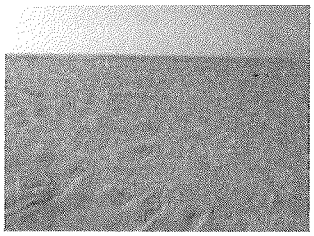
23.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.19	23.19	4.8	36	-21.6			4.9	3	99		6.5	90	0.4	15	40	1000						0.5	1.5	30	1	10	
07	76.19	23.18	4.6	47	-21.6			1.2	3	99	3	6.5	96			50	500						0.5	2	50	2	20	
08	76.17	23.21	3.7	49	-21			0.9	3																			
10	76.16	23.21	5.7	50	-20.8																							
19	76.14	23.50	3.2	335	-21.6			8.2	2	99	5	7	95	0.4		100	500				70	10	10	15	20	1		
23	76.10	24.32	2.3	329	-21.3			2.7	2	99	5	7	95	0.5	20	50	1000				10	5	0.5	1.5	100	1		

06:00 breaking through consolidated FY ice floes
23:00 soft ice, steaming with 2 engines, nice floes with brash and new ice inbetween



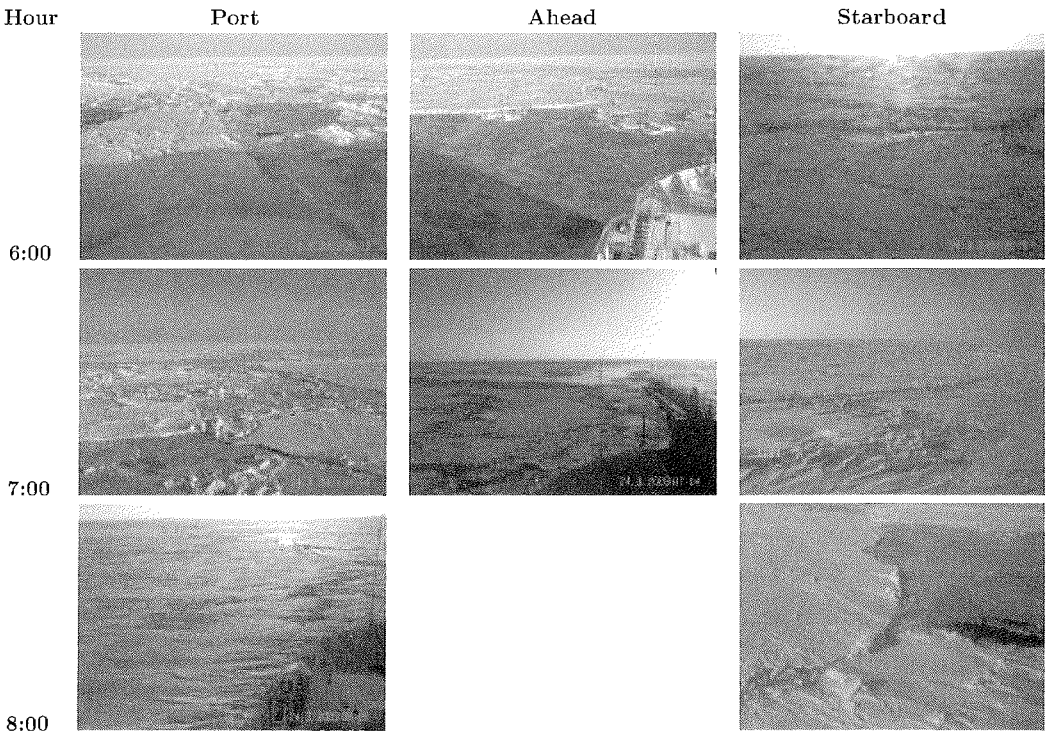
23.3.2003

Hour	Port	Ahead	Starboard
10:00			

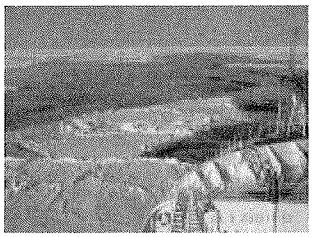
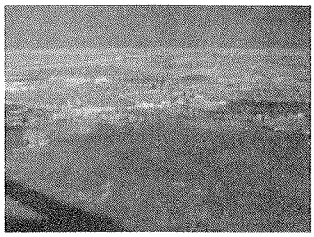
24.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	76.05	25.20	6.8	357	-19.8					99	30	7	69	0.5	15	100	1000					0.3	1	100	1	10	
07	76.05	25.24	2.8	332	-19.2			1.6	4	100	20	7	80	0.5	10	100	500					0.5	1.5	50	1	10	
08	76.03	25.41	6.9	253	-18.5			6.7	3	99	20	7	79	0.4	10	100	500					0.5	1.5	50	1	10	
09	76.01	25.46	5.6	18	-19			3.7	3	100	20	7	80	0.5	10	150	3000					0.5	1	50	2	10	
12	75.58	25.35	5.8	358	-18.3			0.8	1	95	40	7.5	40	0.5	10	150	500					0.5	1.5	100	1	10	
19	75.58	25.32	4.7	326	-18.3			4.8	3	98	10	7	90	0.8	10	50	150					1	1	20	1		
23	75.59	26.03	1.5	347	-19					100	30	6	70	0.4	5	50	200					0.3	0.6	50	2		

23:00 on station in light nilas with frost flowers



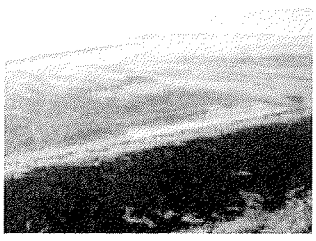
24.3.2003

Hour	Port	Ahead	Starboard
9:00			
12:00			

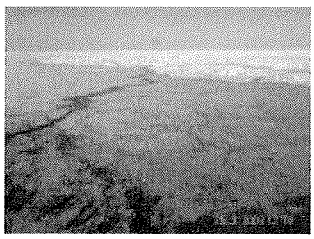
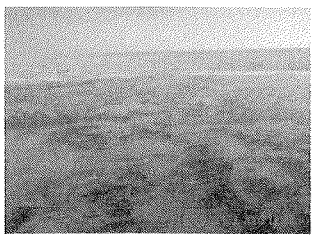
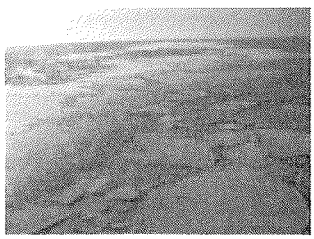
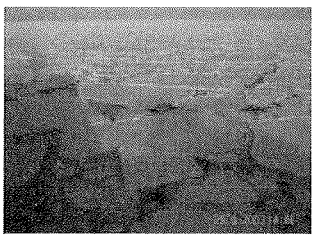
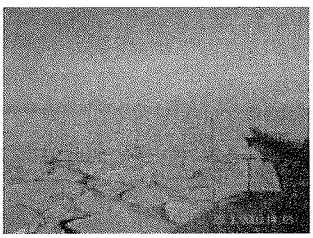
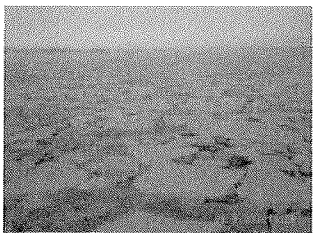
25.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes. diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	75.54	27.01	2.1	3	-19			1	1.2	95	60	3	60	0.04	5													
08	75.55	26.59	1.9	28	-19			1	1.2	95	60	3	60	0.1	0.5	10	20				10		0.3	1	10	2		1
10	75.55	27.01	2.1	17	-18.2	-1.74	34.49	1.3	1	100	80	3	80	0.08	0	20	50											
11	75.53	27.27	1.5	41	-18.4	-1.72	34.54	9.6	1	95	70	3	70	0.08	0	10	30				100	30	0.3			2		
12	75.53	27.32	1.5	99	-17.9	-1.73	34.53	0.2	1	95	80	3	80	0.5		20	150				150		0.5	2	20	0	10	2
13	75.52	27.31	2.9	115	-17.7	-1.77	34.53	4.9	2	100	20	7	80	0.4	10	10	20				20	5	0.5	1	50	2	0	10
14	75.49	27.33	4	106	-17.7	-1.75	34.52	6	2	100	20	7	80	0.4	10	10	21					5	0.3	0.4				2
15	75.41	27.45	6	102	-16.3	-1.7	34.53	8.8	2	99	20	7	80	0.5	10	10	20						0.3	1	50	2		3
16	75.33	27.56	7.8	117	-14.5	-1.77	34.54	9	2	95	30	7	70	0.5	10	5	20				0		0.3	1	50	2		
23	75.20	29.53	13	117	-8.5	-1.57	34.53	6	2	90	40	8	60	0.9	20	10	20						0.5	1.5	100	1		1

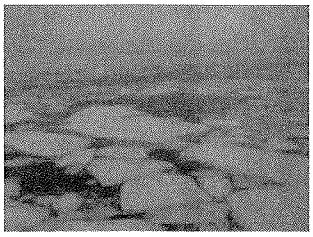
06:00 on station, entirely dark nilas covered with frost flowers, g/w ice behind ship
10:00 nilas with finger rafting and intense frost flowers
12:00 on station, dark nilas with frost flowers
13:00 broken, angular floes embedded in new ice, some wider leads with nilas and frost flowers
14:00 broken angular floes with raised edges, new ice inbetween and some nilas, swell on radar
23:00 thick floes, rounded, with thinnner ice, nilas in between; strong swell

Hour	Port	Ahead	Starboard
6:00			
8:00			

25.3.2003

Hour	Port	Ahead	Starboard
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			

25.3.2003

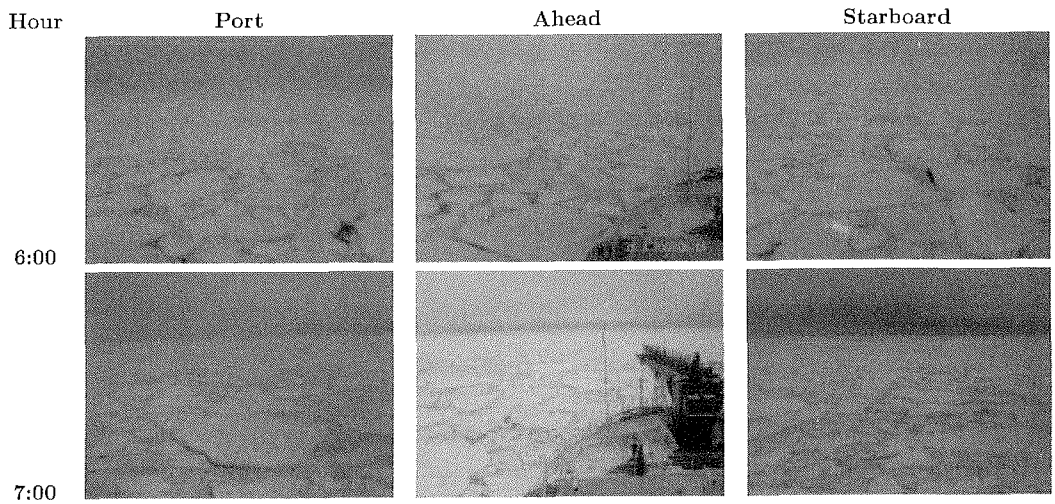
Hour	Port	Ahead	Starboard
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

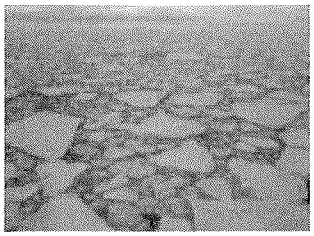
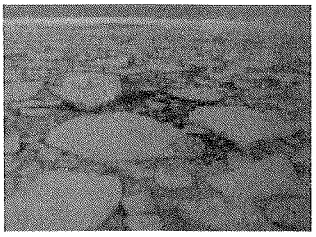
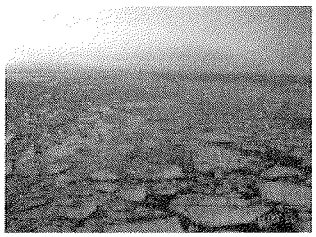
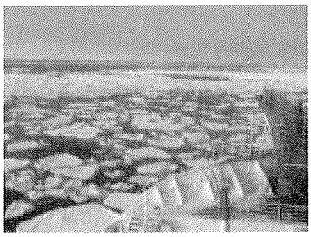
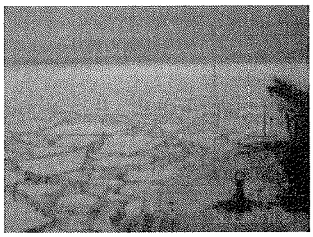
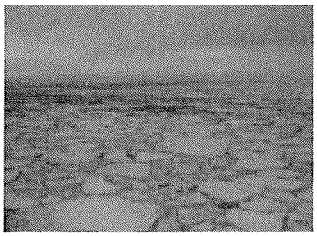
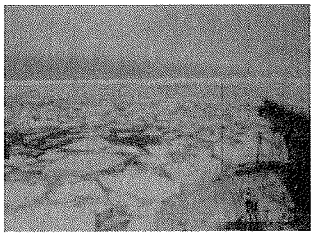
26.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	75.20	29.56	14.6	137	-3.4	-1.66	34.5	7.2	2	95	10	7	80	0.5	10	8	15						0.2	0.5		1		
07	75.22	29.32	3.3	33	-2.4	-1.62	34.49	7.1	2	90	20	7	70	0.6	10	4	10						0.2	0.8		1		
08	75.25	28.25	1.4	342	-1.8	-0.93	34.59	8.9	0	70	10	7	60	0.5	10	5	10				300	35	0.2	0.8		1		
09	75.28	28.30	6.5	299	-3.1	-1.46	34.58	8.6	2	30	10	7	20	0.5	2	5	10											
10	75.30	28.00	9.3	315	-4.2	-1.37	34.57	1.3	2	40		7	40	0.5	5	5	10											
12	75.31	27.59	73	336	-4.5	-1.38	34.56	0	2	65		7	65	0.5	5	5	10											
13	75.30	27.59	4.9	307	-5.9			1.2	2	70		7	70	0.5	5	5	10											
15	75.29	27.52	8	382	-6.6	-1.4	34.46	8.5	2	60		7		60	0.5	5	10											
17	75.13	26.33	12.4	332	-10.2	-1.4	34.56	10.8	2	50	5	7	95	0.5	3	3	10											
19	75.20	25.41	10.1	347	-11.1	-1.2	34.6	10.7	2	40	5	7	95	0.4		1	3											
23	74.41	24.00	8.5	8	-12.4	-1.45	34.53	7.9	2	1	100	7	100	0.2	0	1	3											

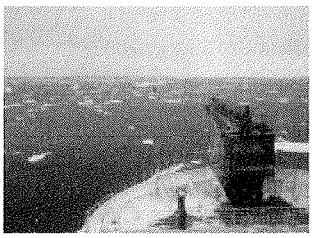
06:00 steaming through broken FY/cake ice, nice swell frmo ~220, pancakes and slush between floes
07:00 broken FY and pancake ice, swell
09:00 stripes of more compact ice
10:00 ice edge, areas of different sea ice concentration from 1/10 to 9/10
12:00 floe fragments and brash, swell
13:00 broken floes
17:00 partly flooded floes with rims
23:00 narrow (~20m) bands of floes and brash, moderate swell, dfined ice edge on the ppi, 1nm to the right



26.3.2003

Hour	Port	Ahead	Starboard
8:00			
9:00			
10:00			
11:00			
12:00			
13:00			

26.3.2003

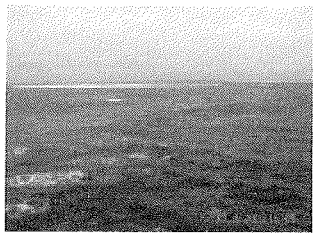
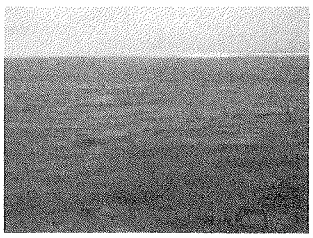
Hour	Port	Ahead	Starboard
14:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

27.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	74.02	20.60	8.9	59	-7.7	3.84	35.05	8.3		0																		
07	74.00	20.38	9.3	60	-7.7	3.92	35.1	8.3		0																		
09	74.00	19.35	7.9	61	-7.3	0.95	34.93	8.1		0																		
16	74.33	17.09	15.4	78	-1.44	34.55	-9.1	9.6		0.1	100	7	100	0.2	0	1												
17	74.45	16.48	14.4	74	-9.9	4.1	35.1	8.8		0																		
22	75.18	15.53	10.1	77	-12.8	0.73	34.61	6.6	2	70	5	7	65	0.5	10	10	20											

06:00 some sea smoke
07:00 open water, some smoke, snow fall
09:00 ice edge can be seen at from starboard
16:00 band of brash ice with 1m floes
17:00 no ice but high heat exchange
22:00 crossing patch or band of almost consolidated FY/pancake ice

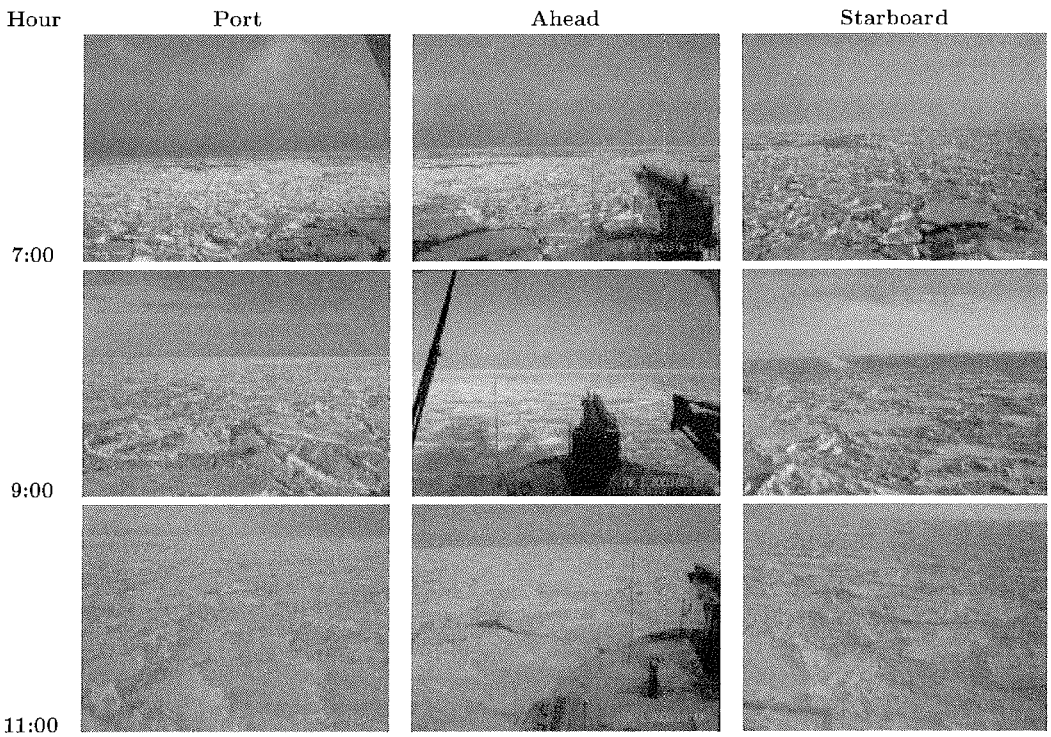
Hour	Port	Ahead	Starboard
16:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

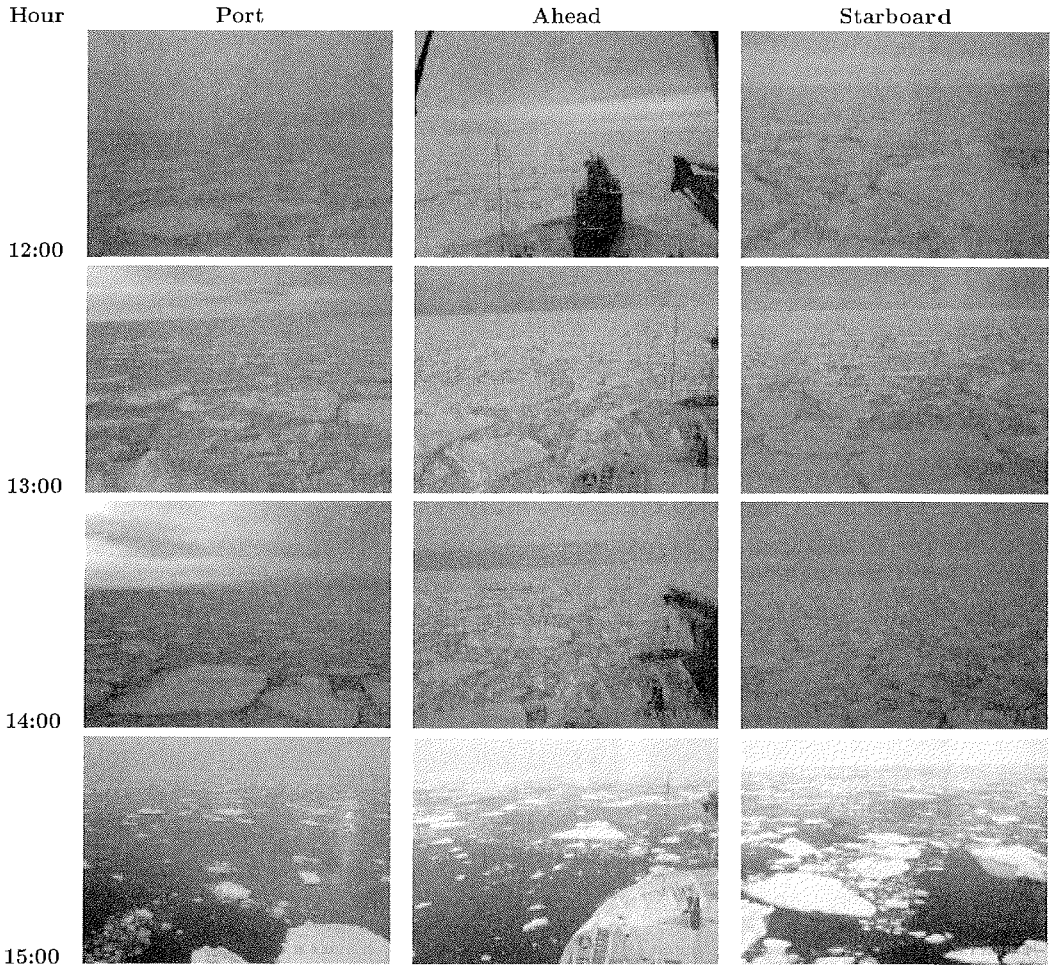
28.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs. Number of
07	76.39	13.29	6.2	144	-12.2	1.19	34.46	10.2	2	50	10	7	40	0.4	10	5	15						0.2	0.5		1		
09	70.56	12.57	5	135	-12.9	-1.83	33.61	6.8	2	90	10	7	60	0.8	25	50							1.5	3		1	30	
10	77.03	12.43	3	110	-13.6	-1.39	33.58	3.3	2	100	5	7	95	0.8	15	10	30						1	1.5		1	20	
11	77.06	12.38	4.5	104	-14.5	-1.72	33.6	5.5	2	95	0	7	90	0.8	15	10	25	5	0	1			1.5	2		1	30	
13	77.18	12.15	4	120	-14.4	-1.1	33.09	9.4	2	99	30	7	100	0.9	15	10	20	5	2	1	0		0.5	1		1		
14	77.23	12.30	3.5	123	-14.6	-0.5	33.33	9	2	95	40	7	50	0.8	15	10	20	5	2	1			0.5	1		1		
15	77.33	11.45	4.6	119	-13.7	0.75	33.84	10.7	2	40	20	7	20	0.4	10	3	8											

07:00 old small floes, crashed by swell, concentration varying stronlgy within 1 km
09:00 multiyear ice floes are quite common
13:00 thick MY ice floes with loose but thick brash inbetween
14:00 floe concentration on port side much less than concentration on starboard
15:00 passing area with melting FY ice, nice pancakes



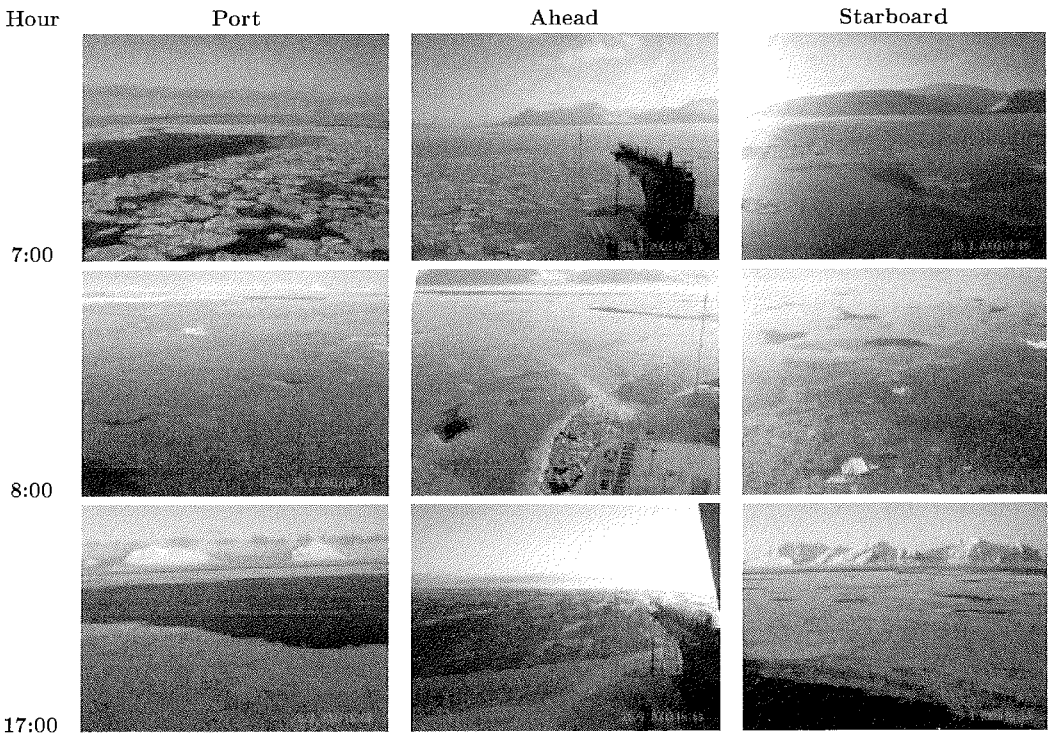
28.3.2003



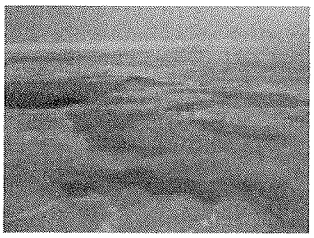
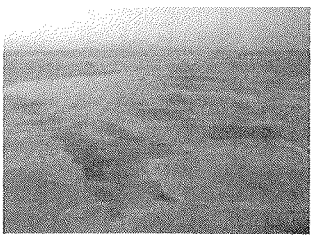
29.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
07	78.17	15.12	6.1	39	-19.4	-1.7	34.39	1.5	2	80	80	3	60	0.1	5		100											
08	78.16	15.18	5.7	48	-19.6			0.2		90	90	2	90	0.1								20						
17	78.08	13.20						9.8	4	45	100	3	60	0.5	0	0.5	1	0			200			1.5		1		1
18	78.04	12.46						9.7	2	30	100	1	70	0.01	0	0.2	0.5	0										1
19	78.02	11.58	6.2	38	-16.6	-1.77	34.21	8.7	2	95	100	3	100	0.01	0			0										1
21	78.03	11.06	1.5	248	-16.1	-1.48	34.03	8.2	2	95	5	6	90	0.3	2	5	10	0										
23	78.18	10.36	15	355	-15.5	-1.7	34.79	9.8	2	85	85	4	85	0.1	0	5	10											

07:00 fjord area with nilas and probably smashed old FY floes
08:00 on station
17:00 a lot of sea smoke, some pancake and grease: PS leaves Isfjorden
18:00 during watch, prevailing ice type changed to pancake or dark nilas and back to open water
21:00 floes made up from pancakes frozen together with little rims
23:00 ight nilas and grey ice floes and patches attached and consolidated sill with little rims, some dark nilas



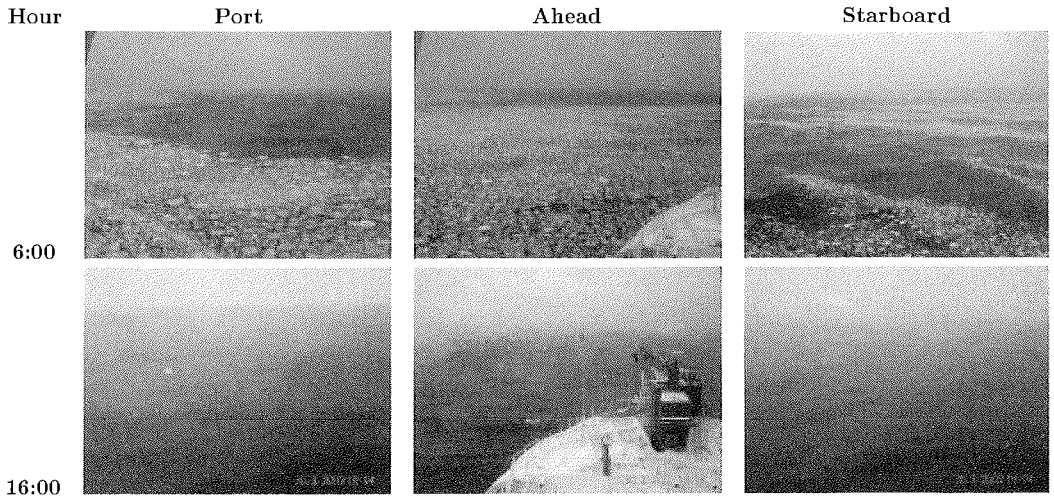
29.3.2003

Hour	Port	Ahead	Starboard
18:00			
19:00			

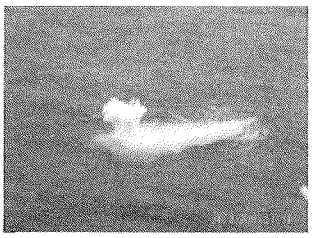
30.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kt]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	78.55	07.35	12	64	-18.2	-0.69	34.37	9.9	2	10		2	10	0.1	0	0.2	1											
07	78.56	06.57	10.7	10	-18	-0.5	34.33	10																				
09	79.05	05.28	10.4	5	-18.6	1.84	34.91	9.6		0																		
13	79.04	04.19	9.9	332	-19.3	1.88	34.96	0.4		0																		
16	79.04	04.16	9.2	343	-18	1.76	34.94	0.6		3		8	100															
17	79.04	04.18	9.9	327	-19.4	1.52	34.96	0.6		2		8	100															
19	79.02	04.19	10.1	348	-16.3	1.67	34.93	1.5		2		8	100															
23	79.28	06.30	8.5	345	-18.4	0	34.71	6.6		1			1															

06:00 crossing bands of brash/ice breccia with very small floes of almost completely melted GFY ice
07:00 completely open water, sea smoke
13:00 on station, fog, low visibility
16:00 only pieces of broken and partly melted floes around Polarstern
17:00 bad visibility due to sea smoke
19:00 RMT station
23:00 some very small pieces of ice (~10cm) , snowfall and sea smoke, bad visibility



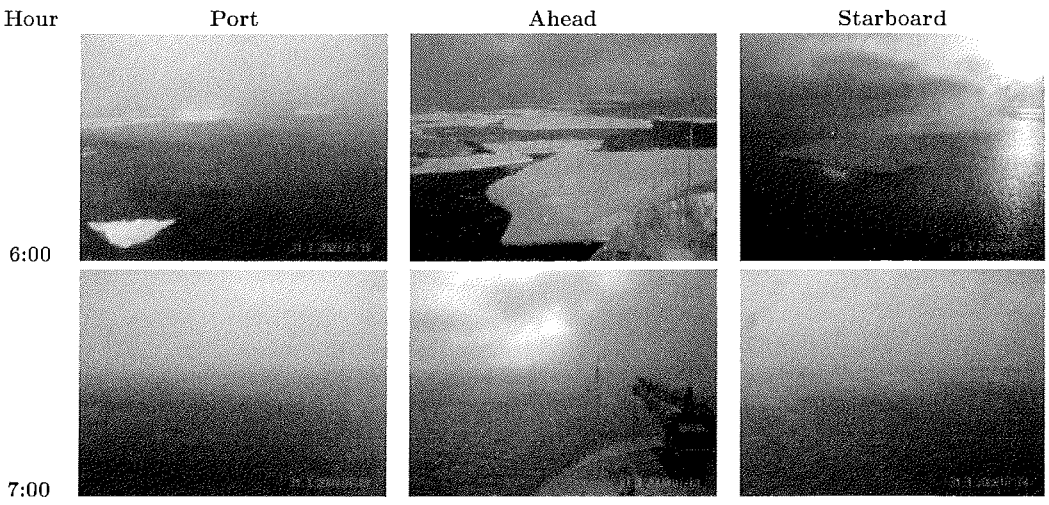
30.3.2003

Hour	Port	Ahead	Starboard
17:00			

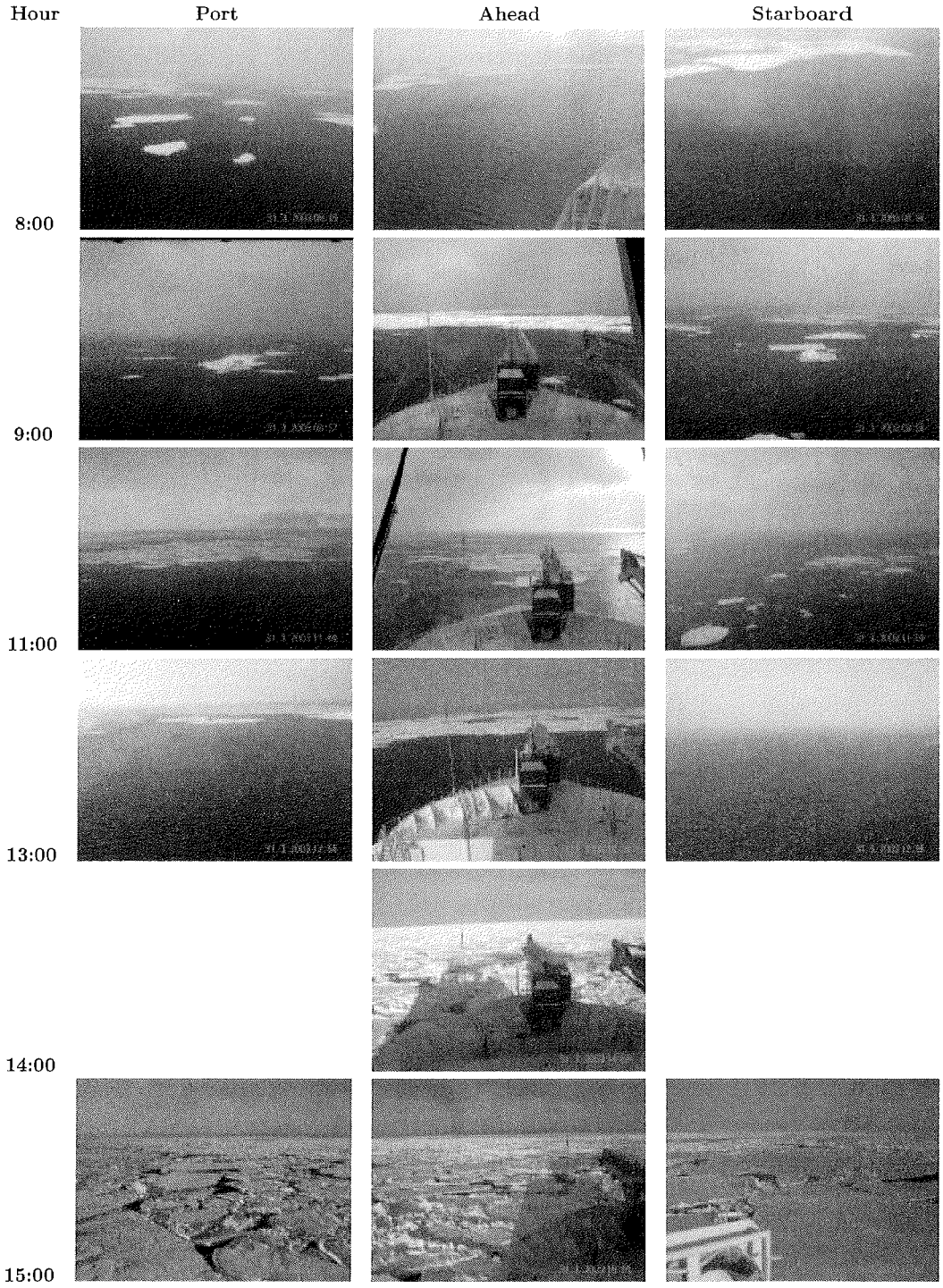
31.3.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	79.56	09.01	6	314	-23	-0.39	34.66			30	10	7	20	0.7	20	30	60						0.3	1.5	50	1	2	
07	79.54	09.19	5.9	340	-22.6	-0.39	34.63	8.6	2	10	0	7	10	0.8	20	20	50						0.5	20		1		
08	79.51	09.34	5.1	316	-21.5	-0.11	34.63	9.3	2	5	0	7	5	0.5	10	10	20						0.5	1		1		
09	79.49	10.02	5.9	333	-21	0.01	34.58	0.8		4	5	7	30	0.7	10	10	40						0.5	1				
11	79.46	10.24	3.5	347	-19.6	-0.39	34.55	0.3		40		7	40	0.7		20	20						0.5	2				
13	79.57	10.40	5.3	285	-23	-1.57	34.48	9.4		25	5	7	60	0.7	10	10	20						0.5	1		2	1	
14	80.05	11.18	4.7	306	-23.9	-0.51	34.24	3.9	2	85	15	7	60	0.7	10	10	10									0	2	
15	80.09	11.43	5.9	303	-24.5	0.3	34.6	3.6	2	80	30	7	70	0.4	5	10	30	0			5		0.5	1	20	1		
16	80.13	11.57	5.9	275	-25	0.69	34.53	6.1	2	85	20	7	70	0.3	3	100	300	0			5		0.3	0.5	10	0	0	0
17	80.14	12.87	77	303	-25.7	1.05	34.47	2.6	3	95	15	7	90	0.7	10	100	500	0					0.3	0.5	20	2	5	0
19	80.13	12.15	3.1	329	-26.8	-0.84	34.48	0.4	4	95	2	7	98	0.8	20						100		1	1.5	30	1	5	0
20	80.13	12.15	4	326	-28.4	-0.18	34.54	0.3	4	99	1	7	98	0.8	20		0				20		1	1	100	2	0	0
21	80.15	12.35	4.5	297	-28.2	-1.64	34.5	6.8	3	95	90	6	90	0.1	0			0			5							
23	80.19	12.43	4.3	302	-28.6		34.45	0.9	4	100	2	7	80	0.8	20	100	1000						1	2	100	1	30	

06:00 at ice edge, scatztered FY level ice floes with patches of nilas inbetween
07:00 isolated floes, sea smoke, thin cloud cover
13:00 mainly open water but some bands of ice with isolated floes inbetween
14:00 field of first year floes
15:00 ice cover is more closed now, ship running on only two engines
17:00 ice cover closed
21:00 ice covered by frost flowers
23:00 ramming through thick FY/MY floes, rubble fields, good visibility



31.3.2003



31.3.2003

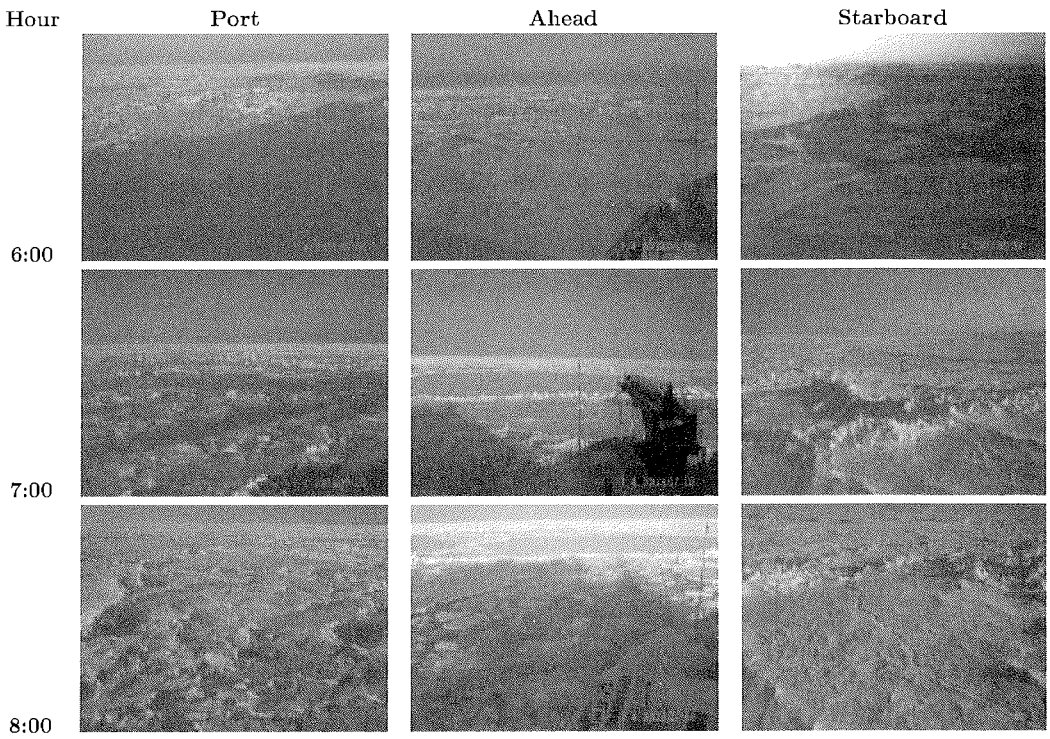
Hour	Port	Ahead	Starboard
16:00			
17:00			
23:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

1.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	80.26	12.50	2.6	341	-28.9		34.47	0.5	4	100	30	7	70	1	20	50	200					1	2	50	1	30	
07	80.26	12.51	4.1	328	-28.8	-0.47	34.53	0.7	4	100	10	7	80	1	20	100	500					1	3	50	1	30	
08	80.26	12.49	5.1	321	-29			2.7	4	100	0	7	100	1.5	40	100	500					1.5	3	50	1	40	
09	80.26	12.49	2.7	348	-29.6			0																				

06:00 very heterogeneous consolidated ice
08:00 on 24 hrs station

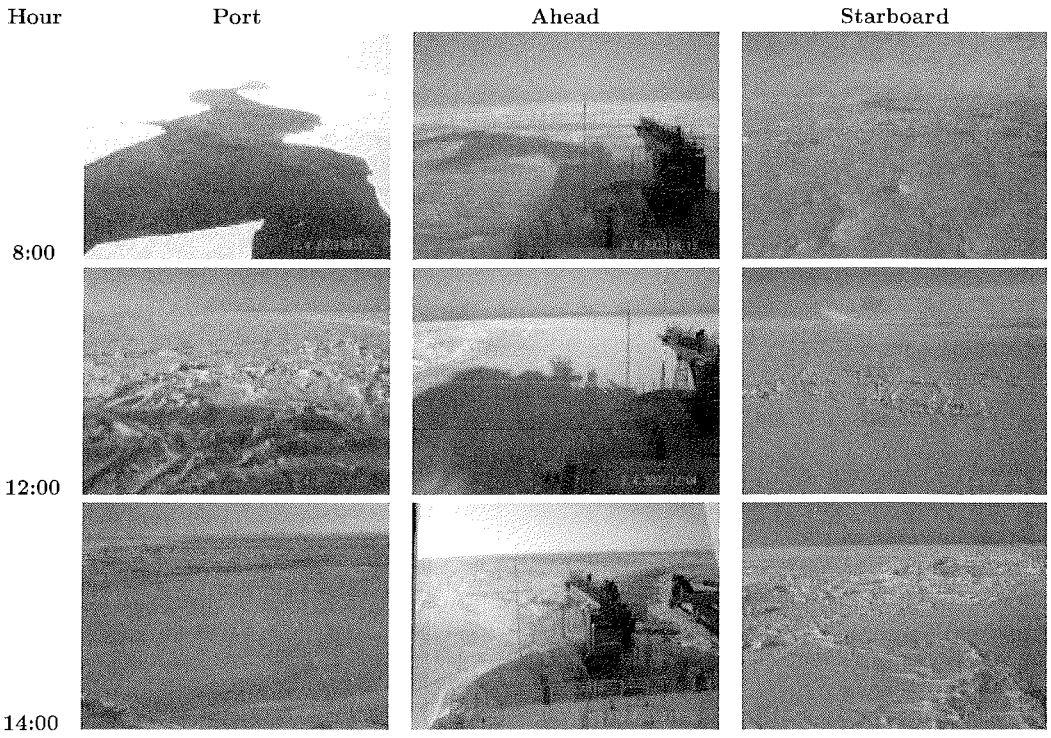


Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

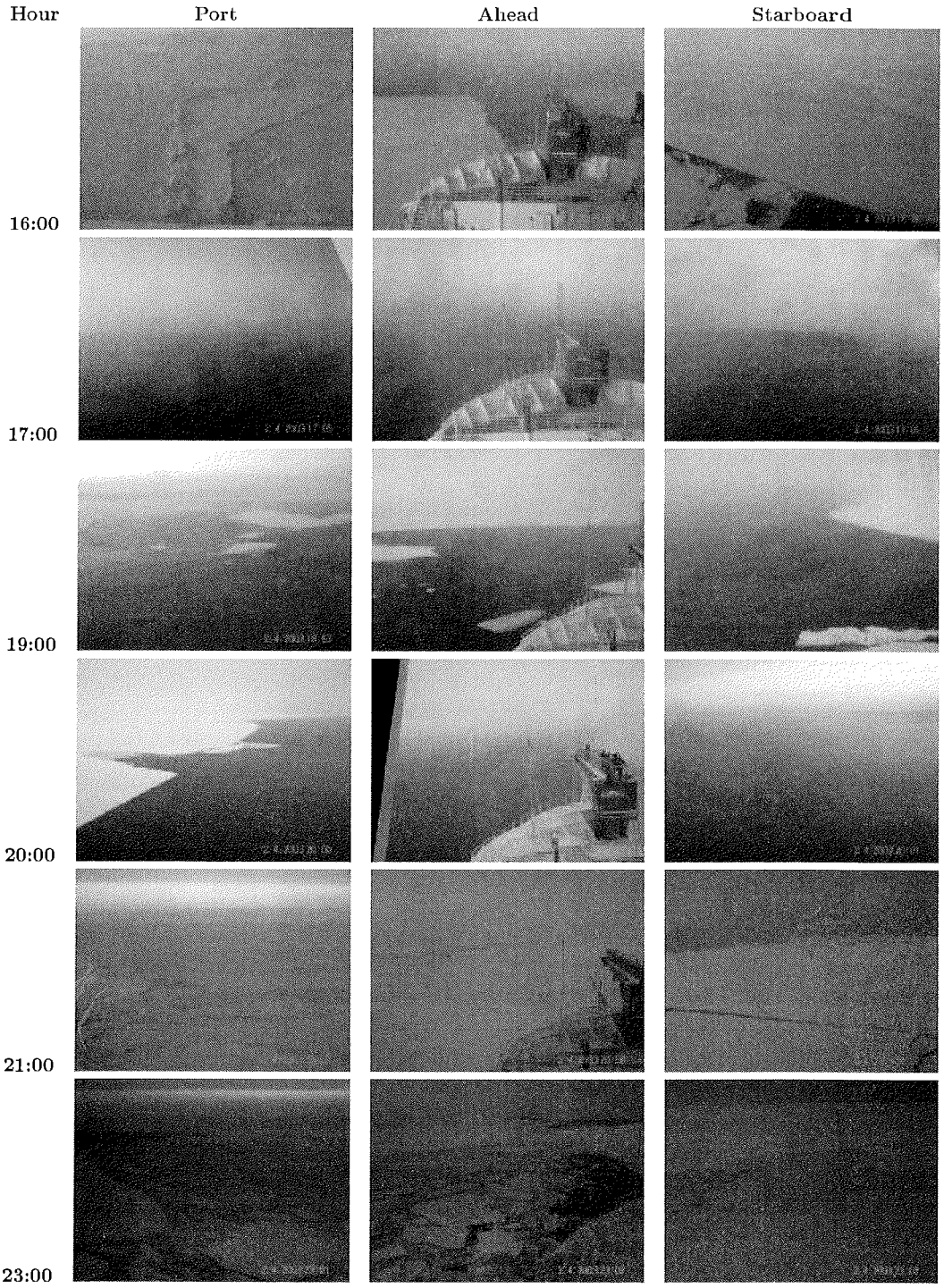
2.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]
08	80.22	12.18	9.2	51	-29.3			0		99	0	7	99														
12	80.20	11.50	7.9	34	-27.9	-0.93	34.47	0.4		100	60	25	1000	2000						1.5	3	500	2	15			
14	80.19	11.49	7.5	41	-27.3	-0.99	34.44	3	0	99	10	7	60	25	25	1000	2000						1.5	3	500	1	15
16	80.19	11.46	8.4	28	-26.6			0.3	1	90	20	7	80	0.4	5								0.5	1	100	1	
17	80.20	11.48	7.4	20	-26.8	-0.68	34.46	0.4	1	10	50	7	50	0.4		1	2				500	1					
19	80.19	11.46	8.1	23	-26.8			0.6		50	10	7	90		10						500	30	1	1.5	100	2	
20	80.14	11.47	7	28	-27	-0.51	34.47	0.6		50	10	7	90	0.4	10						500		1	1.5	100	2	
21	80.18	12.01	3.7	341	-26.8	-1.29	34.41	7.5	3	80	5	7	75	0.4	10						100	40	1.5	20	100	2	
23	80.22	12.22	4.9	32	-27.4	-0.97	34.49	0.7	3	85	30	7	40	0.4	10								0.5	1.5		2	

08:00 station, crack opened within 20 minutes to 50m width, further drifting
12:00 in vast thin ice area
17:00 open water, a lot of sea smoke, bad visibility
19:00 still on Met station
21:00 just leaving station
23:00 very heterogenous ice cover with MY floes, level white FY ice and grey ice, leads/polynia



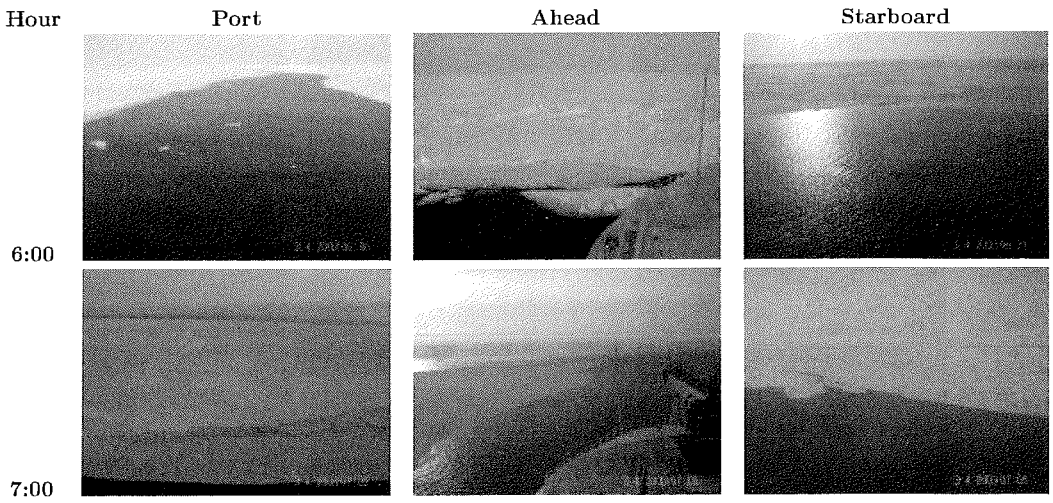
2.4.2003



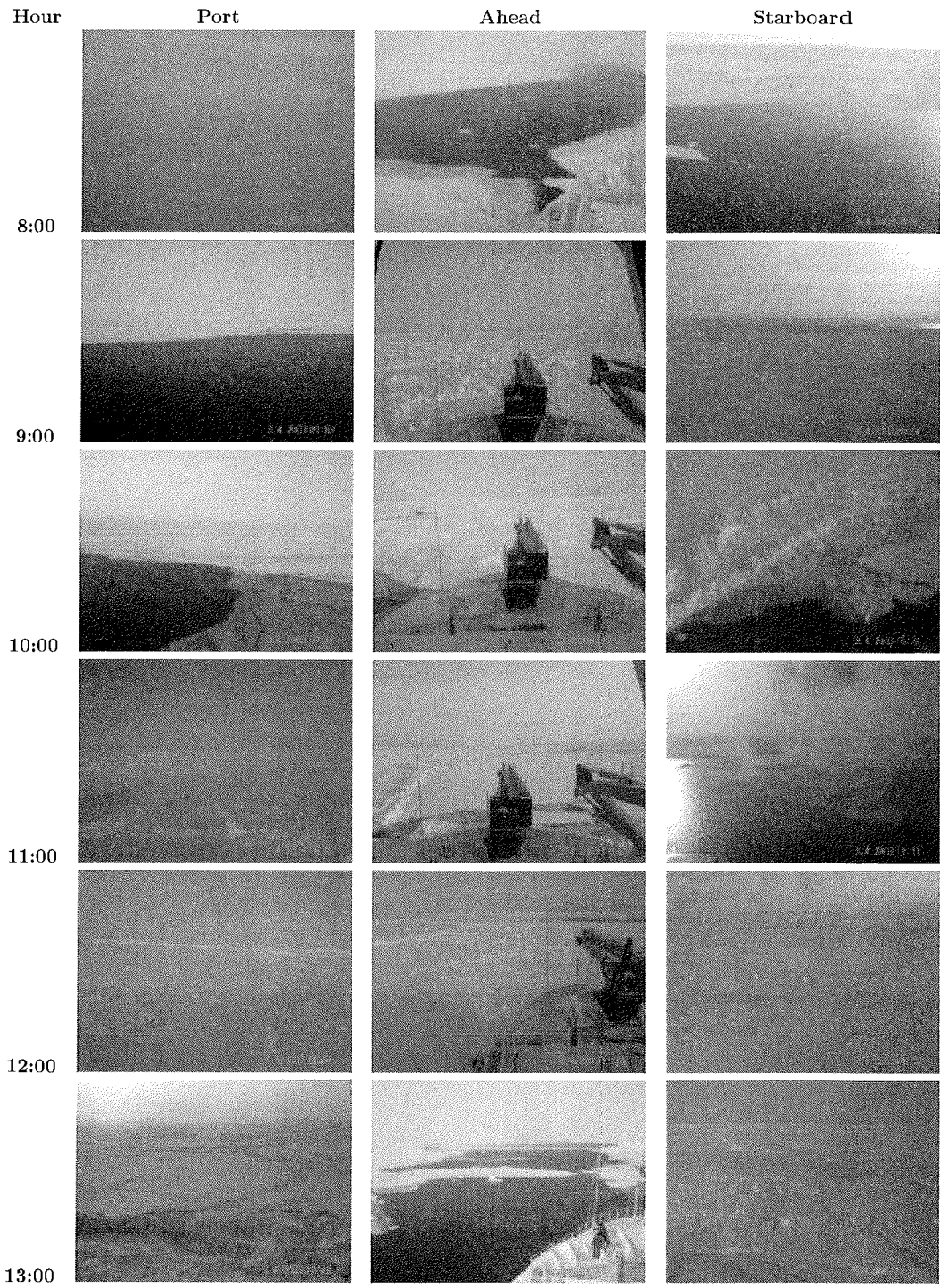
3.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	80.28	13.15	7.6	37	-28.6		34.34			90	10	8	50		20		1000	5	1	1	100		0.8	2	200	2	10	
07	80.30	13.23	6.9	31	-28.6	-1	34.33	3		90	20	7	70	0.8	20	200	1000				60		0.7	1.5	100	2	10	
08	80.31	31.28	6.1	26	-28.9			2.9	1	90	20	7	70			100	500				100		0.7	2	100	2	10	
09	80.35	13.15	5.9	19	-29			0.5	1	90	35	7	60		15	100	700				200		1.5	2.5	70	2	20	
10	80.40	13.50	6.1	24	-28.4	-1.55	34.31	0.4	1	80	10	8	70	2	10	300	1000				80		2	3	100	1		
11	80.40	13.40	7.2	17	-28.3			0.5		80	5	8	50	12	30	200	2				50		1	2	100	1		
12	80.40	13.60	7.9	23	-27.9	-1.66	34.31	1.8	1	85	5	8	75	0.5	5	200	1000				50		1	3	100	2	10	
13	80.41	13.12	7.5	33	-28.1			2.2	1	90	10	7	75	0.5	2	100	500	10			20	1	2.5	100	2			
14	80.43	13.53	8.3	33	-27.7	-1.86	34.49	0.2	3	90	10	7	75	0.5	5	200	1000				80	10	1	2.5	100	2	10	
15	80.42	13.14	6.2	32	-28	-1.55	34.33	3	4	90	5	8	80	1.5	5	50	500	20	1	2			1	1.5	50	2		
17	80.42	13.15	3.9	18	-27.6	-1.75	34.26	0.5	4	85	2	8	90	1.5	10	100	700	10	1	2	50		1.5	3	30	2	10	
19	80.44	13.12	7.1	26	-28.1	-1.72	34.28	0.3	1	75	10	7	90								300		15	1.5	100	2		
20	80.46	13.13	8.4	27	-28.1	-1.7	34.29	8.9	1	75	75	5	100	10				0			800							
21	80.49	13.12	7	18	-28.9	-1.76	34.24	0.4		80	70	4	70	10			40				600	30						
23	80.59	13.02	9.2	14	-28.6	-1.77	34.24			70	50	5	50		0		100				800	20						

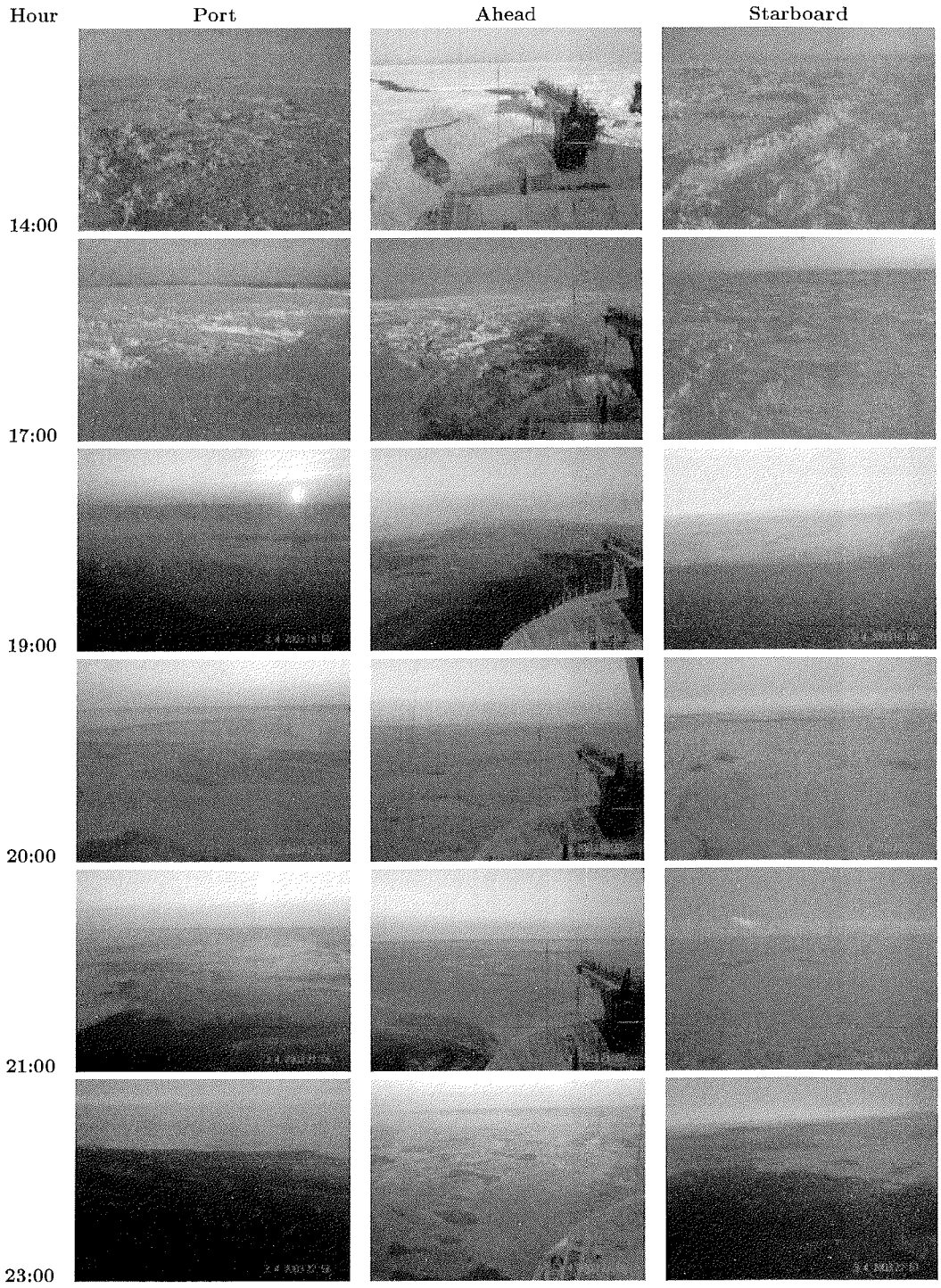
06:00 in lead, no new ice formation, but some sea smoke
07:00 relatively smooth ice surface
14:00 breaking through pressure ridges in a floe within a system of leads/polynias
15:00 only two ship lengths left to break
17:00 still trying to break the heavily ridged floe
20:00 steaming through wide lead
23:00 on station in lead, dark and light nilas, some slush and grease in bands



3.4.2003



3.4.2003

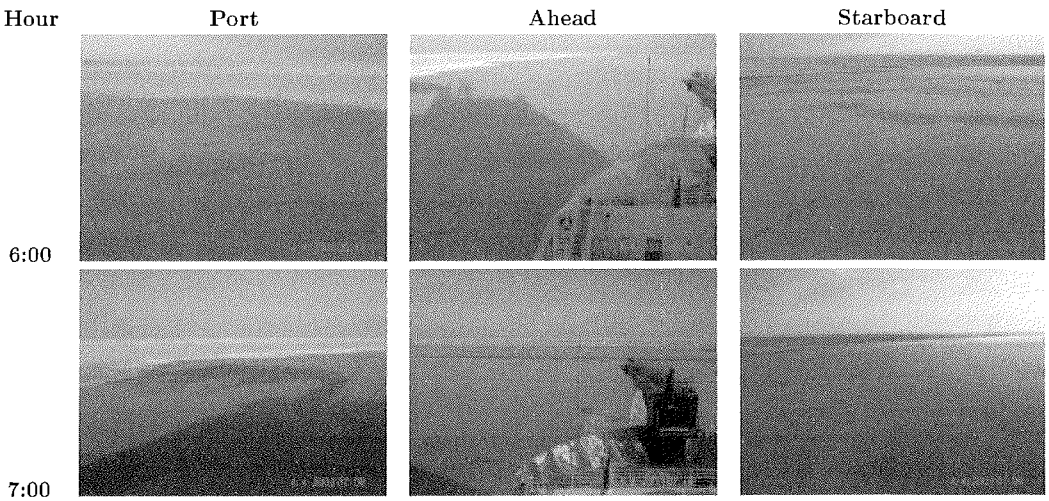


Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

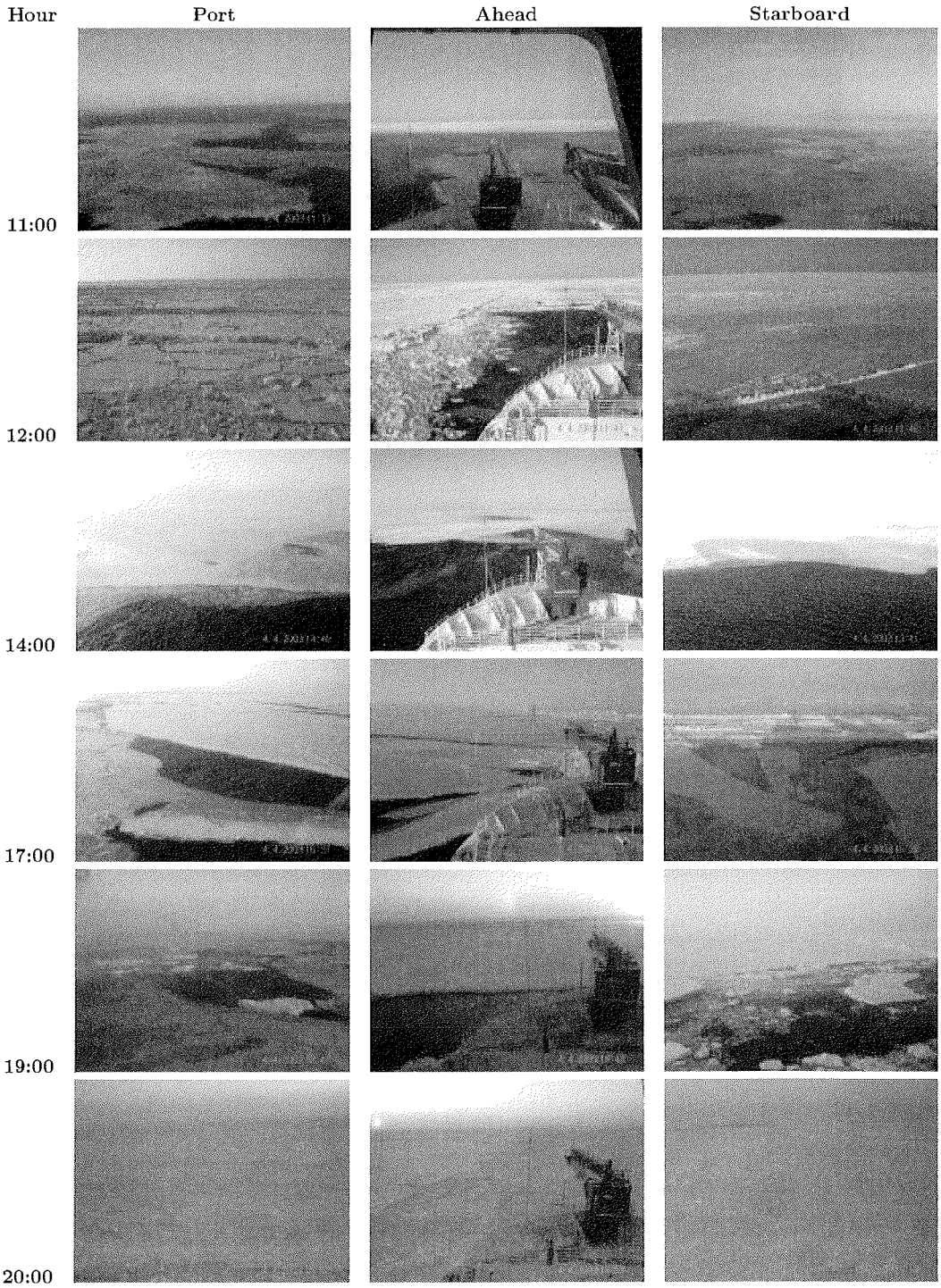
4.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1, floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]
06	81.18	11.38	8.4	23	-29.7	-1.82	34.18	9.1	1	99	80	4	80	0.05	0						800		0.5	1.5	50	1	5
07	81.18	11.30	7.5	10	-29.8	-1.79	34.19	0.4		99	20	7	79	1							500		0.5	1.5	100	1	5
08	81.19	10.56	8.8	20	-29			8.9	1	99	50	7	79	0.2	5	100	500				50		0.5	1.5	100	1	5
09	81.22	10.33	9.3	8	-27.9			0.2	1	90	60	1			5	200	1000				50		1	2		0	10
11	81.21	10.32	8.8	2	-27.6			0.7		70	50	1	50	0.03							2000						
12	81.21	10.18	9.9	3	-28.6			5.3	3	90	70	6	70	20	1	1000	2000						0.3	2	300	0	5
14	81.30	10.12	10.7	351	-28.8			0.4	1	90	75	6	70	0.2		1000	2000						0.1	0.2	500	1	
17	81.39	09.48						0.8	3	95	70	5	60	0.1	2	500	2000				10		0.3	1	100	2	20
19	81.43	09.22	11.2	4	-29.2	-1.8	34.15	2	4	97	25	7	75		15			2	1	2	30		1.5	3	100	2	40
20	81.45	09.20	10.5	352	-29.6	-1.78	34.16	0.5	4	100	5	7	95		0			0					2	5	80	2	10
23	81.44	09.15	9.7	351	-29.8	-1.79	34.16	0.2	4	98	10	7	88	0.4	2	200	1000						1	2	200	2	30

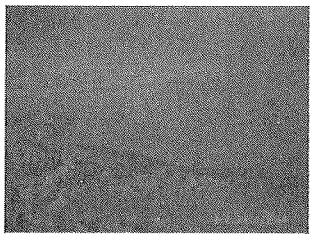
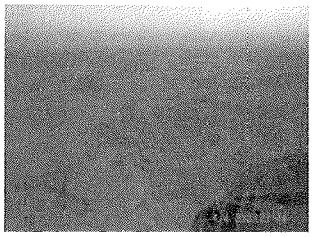
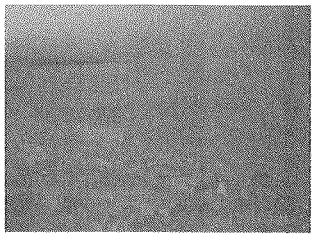
06:00 flying through broad lead with nilas, completely covered with frost flowers
07:00 on CTD station, in a lead with grey/white nilas, large ice floes along the lead
14:00 sailing in the middle of a wide, recently refrozen lead
19:00 completely inhomogenous ice situation
20:00 large and small floes, at the end of a lead
23:00 stuck in rafted/ridged FY/SY ice, some nilas ahead, good visibility



4.4.2003



4.4.2003

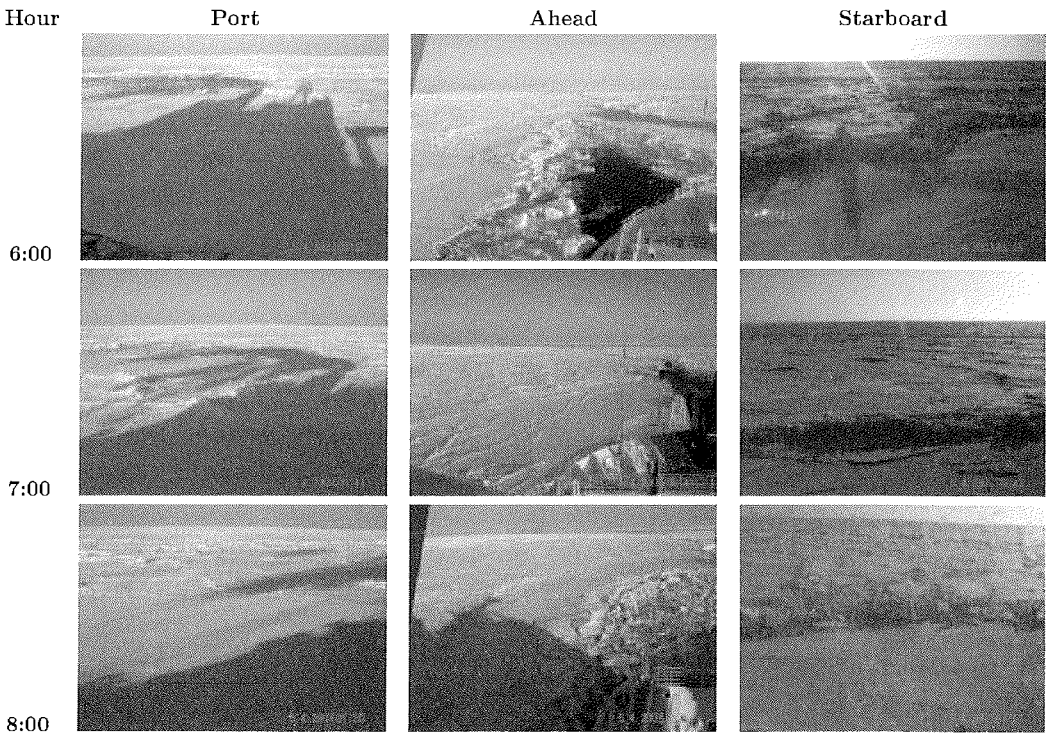
Hour	Port	Ahead	Starboard
23:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/Ark19/html/IceObsArk19.html

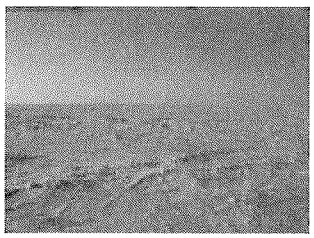
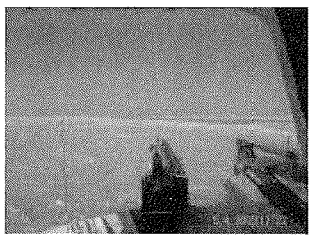
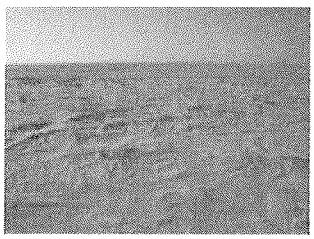
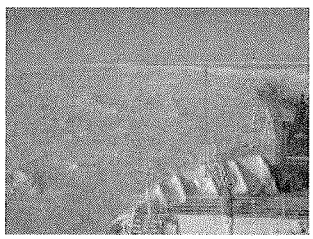
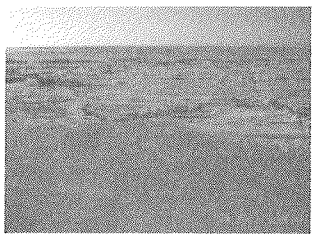
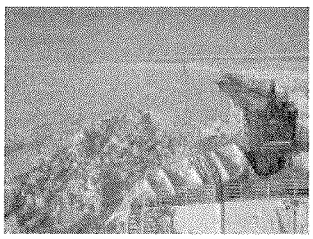
5.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	81.48	09.25	6.3	342	-29.2	-1.78	34.15	0.2	4	99	20	8	50	1.5	30	200	2000	1	1	1			0.8	1.5	200	2	10	
07	81.48	09.25	5.4	343	-28.5	-1.74	34.17	0.1	4	99	20	8	79	1.2	20	200	1000						0.8	2	200	2	20	
08	81.47	09.23	5	333	-27.7			0.3	4	100	20	8	80	1.2	20	200	1000						1	3	200	2	20	
09	81.47	09.24	4.2	328	-27.5			0																				
12	81.47	09.22	3.6	309	-26.2			0.2	4	100	20	8	80	2	20	200	1000							2	200	2	20	
13	81.47	09.22	3.3	299	-25.7	-1.77	34.15	0		99	10	8	90	1.9	10	200	1000						1.5	3	200	2		
14	81.47	09.22	3.8	242	-25.6	-1.87	34.18	1.2	3	99	20	8	90	2	20	200	1000						1	2	200	2	15	

06:00 try to manage passage of thick FY/MY ice, ship itself is in 0.8-1.2m FY ice floe, lead with nilas behind and ahead
07:00 still stuck in the ice floe



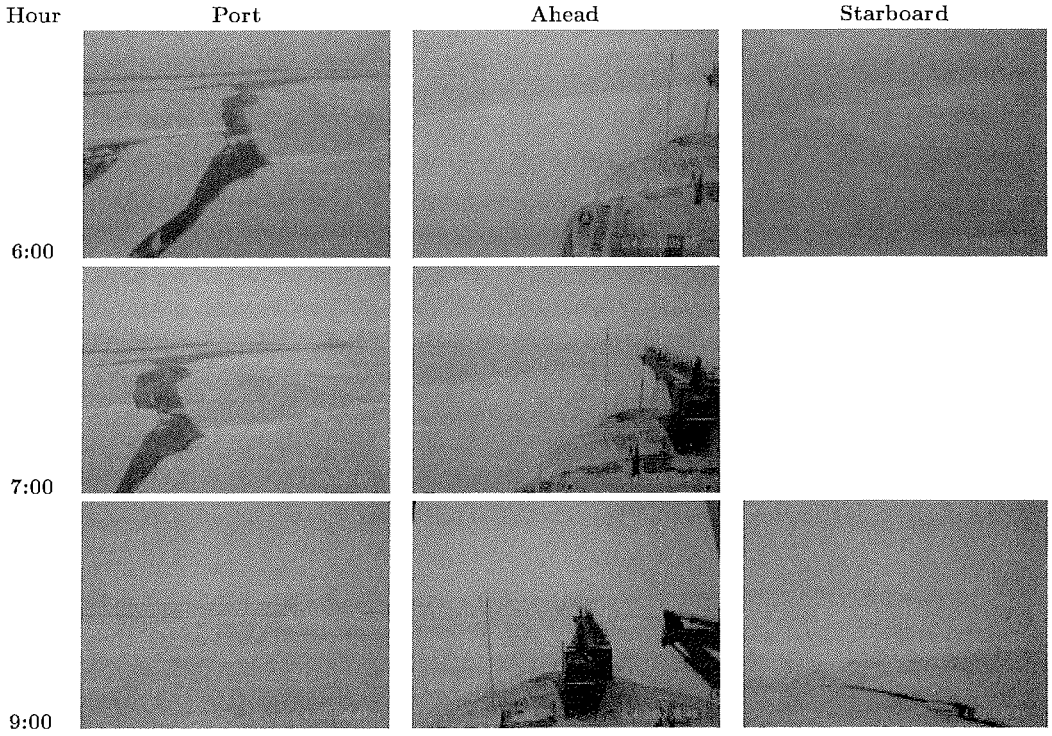
5.4.2003

Hour	Port	Ahead	Starboard
11:00			
13:00			
14:00			

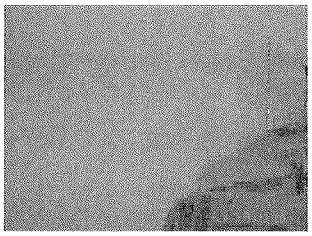
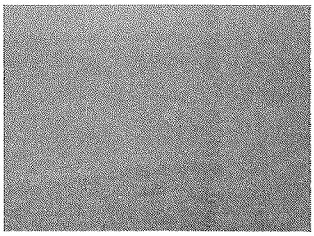
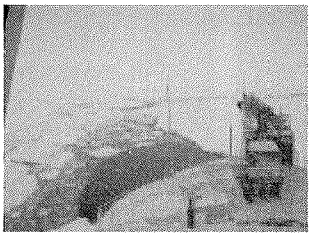
6.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Melt ponds, coverage [%]
06	81.51	09.30	7.8	149	-23.6	-1.78	34.16			95	85	5	80	0.15	0													
07	81.51	09.30	9.2	152	-23.2	-1.78	34.15			98	50	5	50	0.2	2													
09	81.52	09.31	12.1	148	-19	-0.18	34.12	2.4	1	100	60	5	60	0.2	2	100	200	5	0	1			1	2		2	5	
11	81.51	09.36	13	153	-15.3	-1.78	34.14			98	15	7	60	0.8	10			1	1	1			0.5	2				
13	81.51	09.35	14.2			0																						
14	81.52	09.34	15	147	-14.1	-1.79	34.17	3.3	2	98																		
19	81.54	09.27	16.7	136	-12.2	-1.77	34.17	0.5		99	5	7	95															
23	81.54	09.28	4.2	138	-11.7	-1.73	34.18	0.1		99	5	7	95	1.5	30	500	2000	0	0	0	10		1	1.5		2	20	

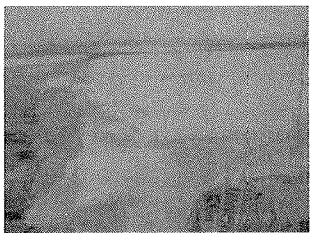
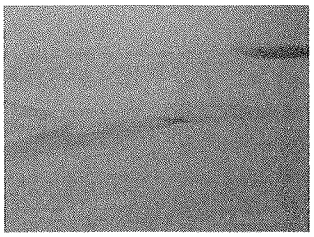
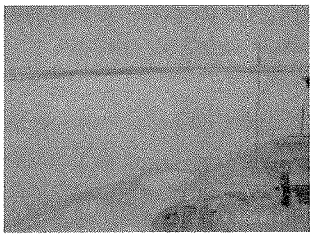
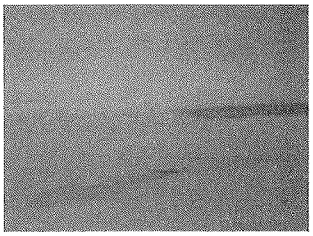
06:00 on station in thin ice area with grey ice with small but dense frost flower mats
07:00 in a lead with nilas surrounded by thick floes, only a few hundred meters ahead of our position the prev. day
09:00 we are in a polynia covered with young ice
11:00 arrived at the ultimate floe for a 10 days' drift station
13:00 waiting for better visibility
19:00 still waiting
23:00 visibility improved, deployment of instruments begins



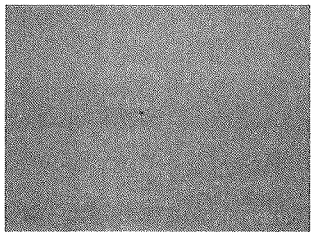
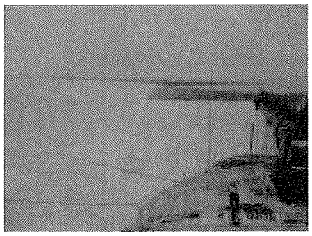
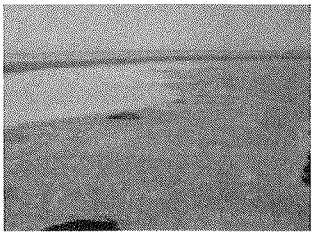
6.4.2003

Hour	Port	Ahead	Starboard
11:00			
23:00			

7.4.2003

Hour	Port	Ahead	Starboard
6:00			
7:00			

9.4.2003

Hour	Port	Ahead	Starboard
11:00			

18.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
20	81.38	09.59	9	304	-19	-1.85	34.15	7.5	1	98	10	8	90	2	15	300	800				150	2	1	3	200	2	50	
21	81.35	10.09	81.8	288	-20.1	-1.77	34.16			99	20	8	79	2	20	200	1000				150		1.5	3	100	2	30	
23	81.30	10.11	6.7	273	-21.5	-1.82	34.17	1.1	1	99	10	8	89	3	30	200	1000				150		1	2	100	2	20	

21:00 on station in lead covered with dark/light nilas and frost flowers, MY ice floes of all sizes
23:00 at the end of the lead

19.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kt]	Operation mode: channel=0, lead=1 Floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	81.23	10.32	1.9	39	-18.1	-1.81	34.16	2	4	98	10	8	88	2.5	25	600	2000	5	1	1			0.5	1.5	100	2	5	
07	81.23	10.33	2.6	2	-18.2	-1.87	34.15	7.7	1	99	10	8	89	2	30	500	1000				150	30	10	2	100	2	10	
08	81.18	10.47	8.3	83	-17.7			0.4	4	100	0	8	100	1	30	500							1	2	100	2	10	
09	81.18	10.46	54	95	-16.8			0.3	4	100	0	8	80	1	20	300							1	2	100	2	10	
11	81.18	10.44	6	150	-17	-1.86	34.15	0.3	4	90	20	8	60		20	100	1000						1	2	50	2	20	
12	81.17	10.43	6.3	336	-18.2	-1.8	34.17	0.4	4	95	15	8	80	3	30	500	2000	0.5	0	1				2	100	2	20	
16	81.15	10.37	7.6	334	-19.1	-1.85		0.4	1	95	50	7	50	0.2	0						1000							0
19	81.15	10.33	7.5	345	-21.1	-1.79	34.2	0.3		99	40	7	60										1	1.5	50	2	5	0
06	81.23	10.32	1.9	39	-18.1	-1.81	34.16	2	4	98	10	8	88	2.5	25	600	2000	5	1	1			0.5	1.5	100	2	5	
07	81.23	10.33	2.6	2	-18.2	-1.87	34.15	7.7	1	99	10	8	89	2	30	500	1000				150	30	10	2	100	2	10	
08	81.18	10.47	8.3	83	-17.7			0.4	4	100	0	8	100	1	30	500							1	2	100	2	10	
09	81.18	10.46	54	95	-16.8			0.3	4	100	0	8	80	1	20	300							1	2	100	2	10	
11	81.18	10.44	6	150	-17	-1.86	34.15	0.3	4	90	20	8	60		20	100	1000						1	2	50	2	20	
12	81.17	10.43	6.3	336	-18.2	-1.8	34.17	0.4	4	95	15	8	80	3	30	500	2000	0.5	0	1				2	100	2	20	
16	81.15	10.37	7.6	334	-19.1	-1.85		0.4	1	95	50	7	50	0.2	0						1000							0
19	81.15	10.33	7.5	345	-21.1	-1.79	34.2	0.3		99	40	7	60										1	1.5	50	2	5	0

07:00 in a nilas covered lead
12:00 stuck in a big ridge
16:00 measuring air turbulence in a refrozen lead

20.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]	Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	80.35	10.20	11.3	14	-19.9	-1.76	34.27	7.7	2	95	80	7	80	0.3	5	50	200					0.1	0.8	20	2			
07	80.30	10.90	13.4	17	-21.4			0.3	314	70	5	8	65	1.5	20	20	50					1.5	2	20	2	20		
09	80.29	10.80	14.6	20	-21.7	-1.7	34.24	2.2	3	80	10	8	60	1.5	20	20	50					1	2		2	10		
10	80.25	10.60	14.6	18	-22.4	-1.41	34.3	0.7	0.3	90	5	8	80	1.5	20	20	50					0.5	1.5		2	20		
14	80.21	09.23	11.5	4	-22.4	-1.56	34.28	6.5	2	80	5	7	80	10	20	30	100					0.8	0.5		1	5		
18	80.20	08.21	11.9	350	-23.9	-1.47	34.29	5.2	2	90	5	7	90	1.2	15	35	250				10	0.2	0.5		1	5		

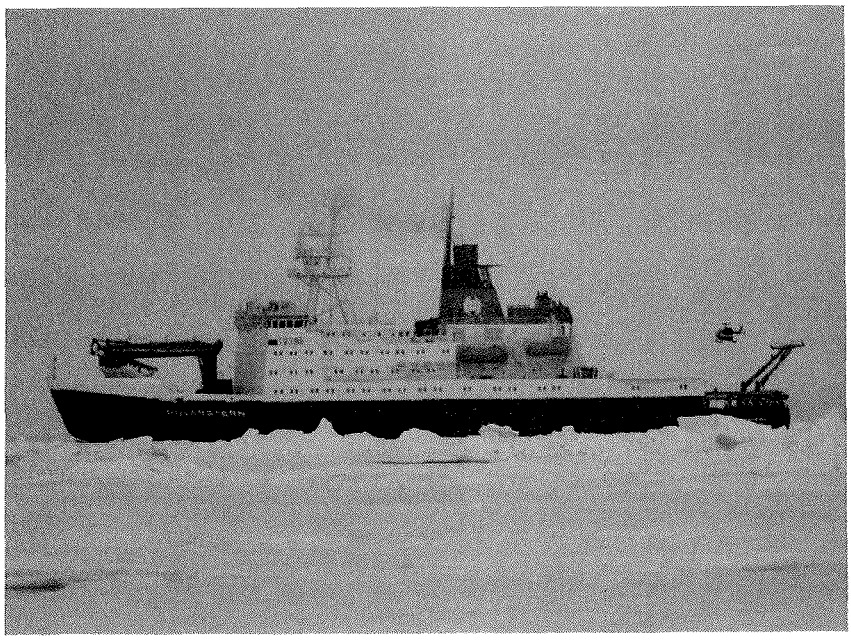
21.4.2003

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Water Temperature [°C]	Water Salinity [ppt]	Ship speed [kn]
09	79.34	03.51	13.3	320	-17.5	-0.97	34.32	9.2
11	79.24	03.53	11.8	311	-17.1	-10.5	34.4	10.1

Operation mode: channel=0, lead=1 floe ice=2, breaking=3, ramming=4	Total ice concentration [%]	C thin ice <30cm [%]	Prevailing ice type	Concentration of prevailing ice type [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Dirty ice concentration [%]	Dirty ice: surface=0, interior=1, both=2	Dirty ice: none=0, some=1, heavy=2	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: new=0, old=1, both=2	Rubble fields, coverage [%]	Icebergs, Number of
2	20	0	7	20	0.8	10	10	100											
2	60	0	7	50	0.2	10	20	50						0.5	1.5				

Sea ice conditions in Fram Strait in July/August 2004

Observations during RV POLARSTERN cruise ARKTIS XX/2



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Programming:
Martin Holzke

February 2005

Alfred Wegener Institute for Polar and Marine Research
Bremerhaven, Germany

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General ice conditions 106
References 107
Data and images 108

A detailed description of the sea ice measurements and sampling during the expedition ARKTIS XX-2 can be found in Lemke et al. (2005, in prep.).

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

Abstract

This report presents visual shipboard sea ice observations carried out during leg ARKTIS XX/2 (ARK XX/2) of RV POLARSTERN in July and August 2004. The operation area was the northern Fram Strait region between Greenland and Svalbard. The cruise started in Longyearbyen, Spitzbergen, at 16 July 2004. Figure 6 shows the cruise track until 26 August 2004 when the ship headed towards Tromsø, Norway.

Along with estimates of general sea ice conditions, the observer team took photographs from the ship's bridge to give a characteristic impression on the surrounding area. Due to different experience and background of the observers the estimates of ice conditions are subject of variation and uncertainties. However, this report can provide a general impression on the ice situation and weather conditions in northern Fram Strait in late July and August 2004. It is a continuation of observations made during previous cruises of RV POLARSTERN to the Arctic Ocean, for example in 2001 (Haas and Lieser, 2003).

Introduction

The main objective of the sea ice physics measurements during the Polarstern cruise ARK XX-2 was to provide a comprehensive data set for the validation and interpretation of remote sensing information and the AWI Helicopter-borne Electromagnetic induction sensor (HEM-Bird). Figure 6 gives an overview of the cruise track, superimposed on an image showing sea ice concentration as derived from Advanced Microwave Scanning Radiometer (AMSR-E) for 3 August 2004.

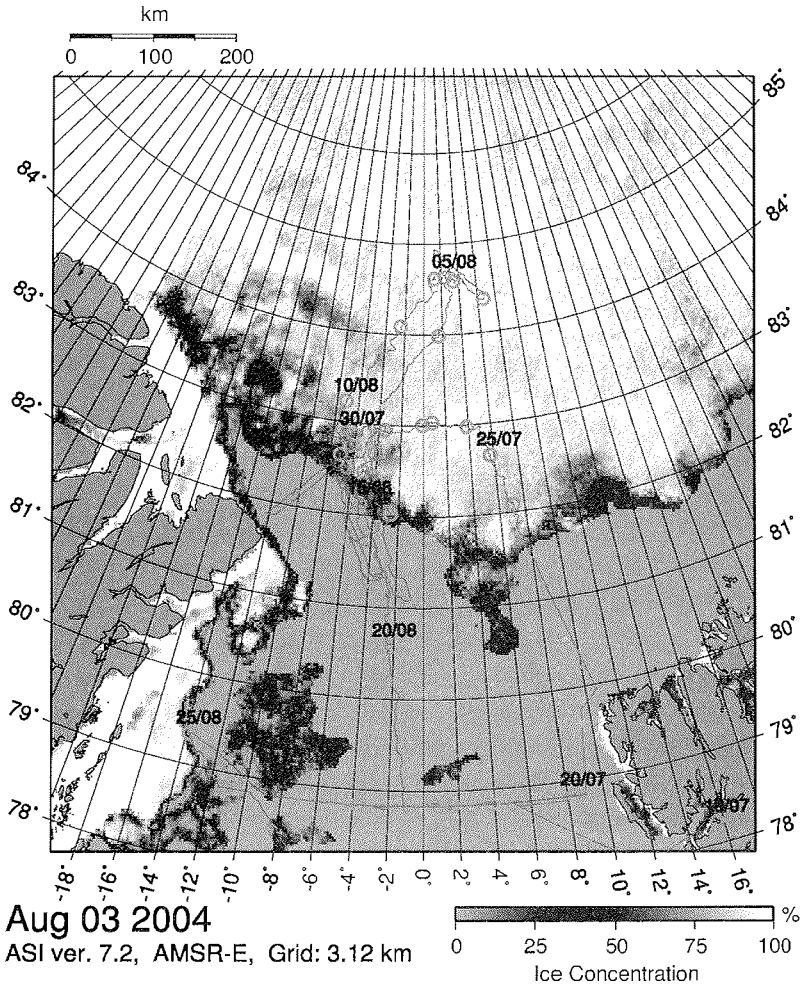


Figure 6: Cruise track of RV POLARSTERN leg ARK XX/2, superimposed on an image showing sea ice concentration as derived from Advanced Microwave Scanning Radiometer (AMSR-E) for 3 August 2004. Circles mark noon positions. The ship entered the sea ice on the easterly track, performed scientific work in the marginal ice zone and the central pack, and left the area on the westerly track.

Satellites carry a variety of instruments for monitoring the changing surface conditions of

the Earth. For polar regions, especially radar, microwave, and optical sensors are suitable to gain information on the sea ice cover, for example surface roughness, ice concentration, and surface temperature, respectively. Radar and microwave wavelengths are able to travel through the atmosphere without major interference with the atmospheric constituents and, therefore, provide information irrespective of cloud cover or sunlight illumination. However, a weather filter has to be applied to the microwave data, depending on the frequency used. In contrast, remote sensing information in the visible spectrum are always dependent on cloud-free conditions and sun illuminated regions.

During the cruise near real time data from Advanced Synthetic Aperture Radar (ASAR) and Advanced Microwave Scanning Radiometer (AMSR-E) were received and processed regularly onboard the ship and provided valuable information for route planning and ships navigation. Also, the activities included pre-launch ground truth data collection for the upcoming CryoSat satellite mission, which is a dedicated radar altimeter mission for large scale monitoring of the global ice sheets and sea ice thickness. This mission will complement to the existing remote sensing techniques and is scheduled to start in May 2005.

General ice conditions

Hourly standardized visual observations have been performed from the ships bridge by the members of the sea ice group. The surrounding of the ship was described with different variables, such as ice concentration, typical ice thickness, melt pond size and coverage, floe and lead size, and ridge information (size and spacing). Additionally, photos showing the views to port side, ahead and starbord were taken whenever weather situation allowed.

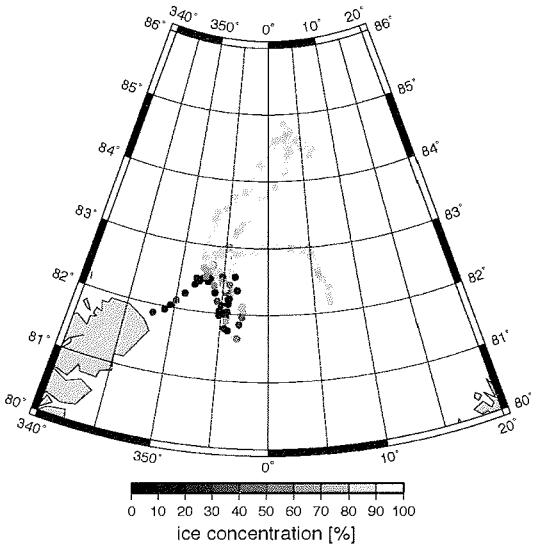


Figure 7: Sea ice concentration along cruise track of RV POLARSTERN during leg ARK XX/2 from visual observations.

Figure 7 displays sea ice concentration during the cruise. The ship entered ice covered waters northwest of Spitzbergen and performed a transect along 83° N in high and compact ice concentrations. After a detour to the northern coast of Greenland sailing in almost open waters the ship entered high ice concentration north of approximately 82.6° N again, but faced favourable traveling conditions in leads and polynyas up to almost 85° N. Figure 8 shows the observed melt pond coverage during the cruise. By the end of July and during August the melt pond coverage was on an almost constant level between 30% and 40%.

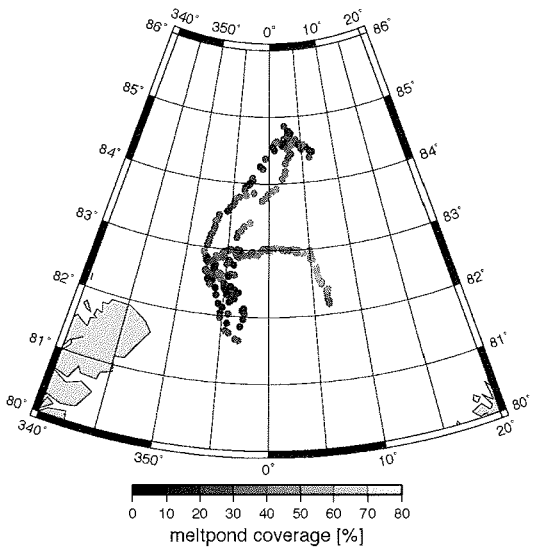


Figure 8: Melt pond coverage along cruise track of RV POLARSTERN during leg ARK XX/2 from visual observations.

References

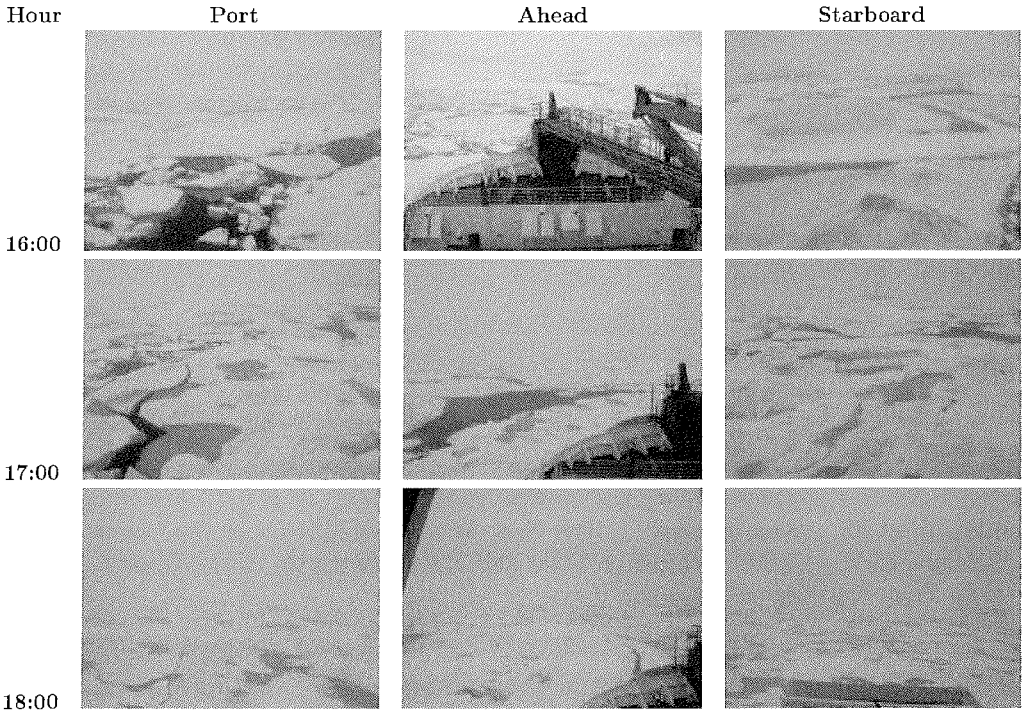
Haas, C. and J. L. Lieser , 2003: Sea ice conditions in the Transpolar Drift in August/September 2001: Observations during POLARSTERN cruise ARKTIS 17/2, Reports on Polar and Marine Research (**441**), Alfred Wegener Institute for Polar and Marine Research.

Lemke, P. et al. , 2005 in prep. : The Expedition ARKTIS XX of the Research Vessel "Polarstern" in 2004 , Reports on Polar and Marine Research, Alfred Wegener Institute for Polar and Marine Research.

24.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kt]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
15	82,16	6.67	7,5	184	1,1	3,0	1	80	0	1,5	10	50	100	25	3	10	5	30	2	1.0	4,0	100	2	0	0
16	82,20	6.67	7,0	183	1.3	0,5	0	85	0	1.5	10	100	1000	30	5	15	1	20	3	1.0	2,5	100	2	0	0
17	82,21	6.67	7,0	186	1.2	1,8	3	85	0	1.5	5	80	1000	25	2	25	0	35	2	1.0	2,0	50	2	0	0
18	82,24	6,55	6,9	197	1,0	4,0	2	80	0	1,5	10	200	2000	20	5	20	0	30	10	1,5	4,0	1000	1	0	0
19	82,29	6,56	5,6	182	0.7	3,3	2	80	0	1.5	10	200	2000	30	5	20	0	20	5	1,0	1,5	1000	1	0	0
20	82,33	6,58	7,1	184	0,8	5,4	3	90	0	1.0	5	100	1000	25	4	20	5	10	2	1.0	3.0	50	2	0	0
21	82,34	6,56	7,7	176	1,0	0,0	3	95	0	2,5	5	200	1000	30	5	20	5	0	0	1,5	1,5	200	1	0	0
22	82,35	6,57	10.3	179	1.4	5.8	3	100	0	2,5	5	500	2000	25	5	20	6	0	0	1,5	2,0	100	2	0	0
23	82.36	6,56	10.6	175	1.4	0,6	3	100	0	2.0	5	500	2000	30	10	50	7	0	0	1.0	2,0	100	2	0	0

15:00 a bit foggy, stuck 2 times during observation, first obs done by the whole sea ice group
16:00 still foggy, on CTD station
17:00 still figgy, start ramming with only two machines running
18:00 still foggy, floes getting bigger
19:00 still foggy
20:00 foggy, visibility less than 1km
21:00 foggy, we are stuck in the ice, 4th machine started
22:00 very foggy, running with 4 machines, floe diameter as far as you can see
23:00 foggy, one big ice area



24.7.2004

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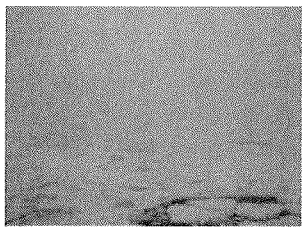
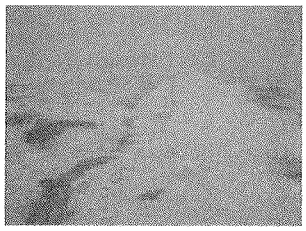
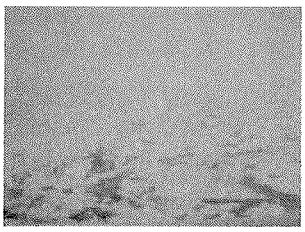
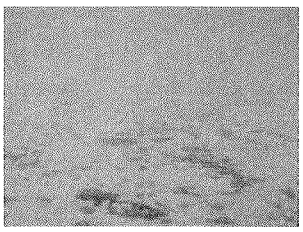
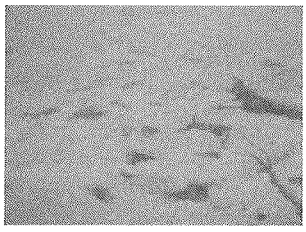
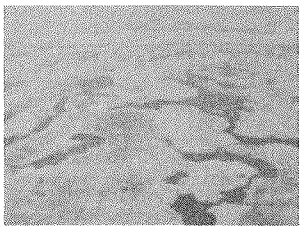
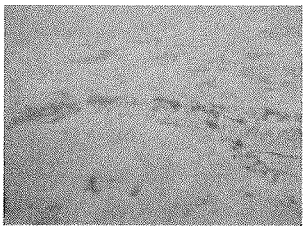
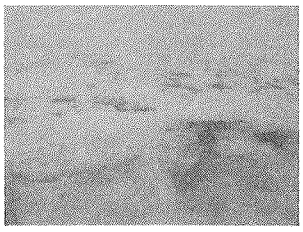
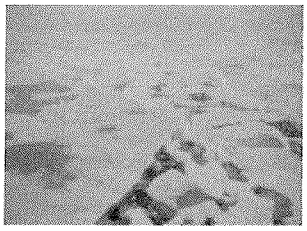
19:00			
20:00			
21:00			
22:00			
23:00			

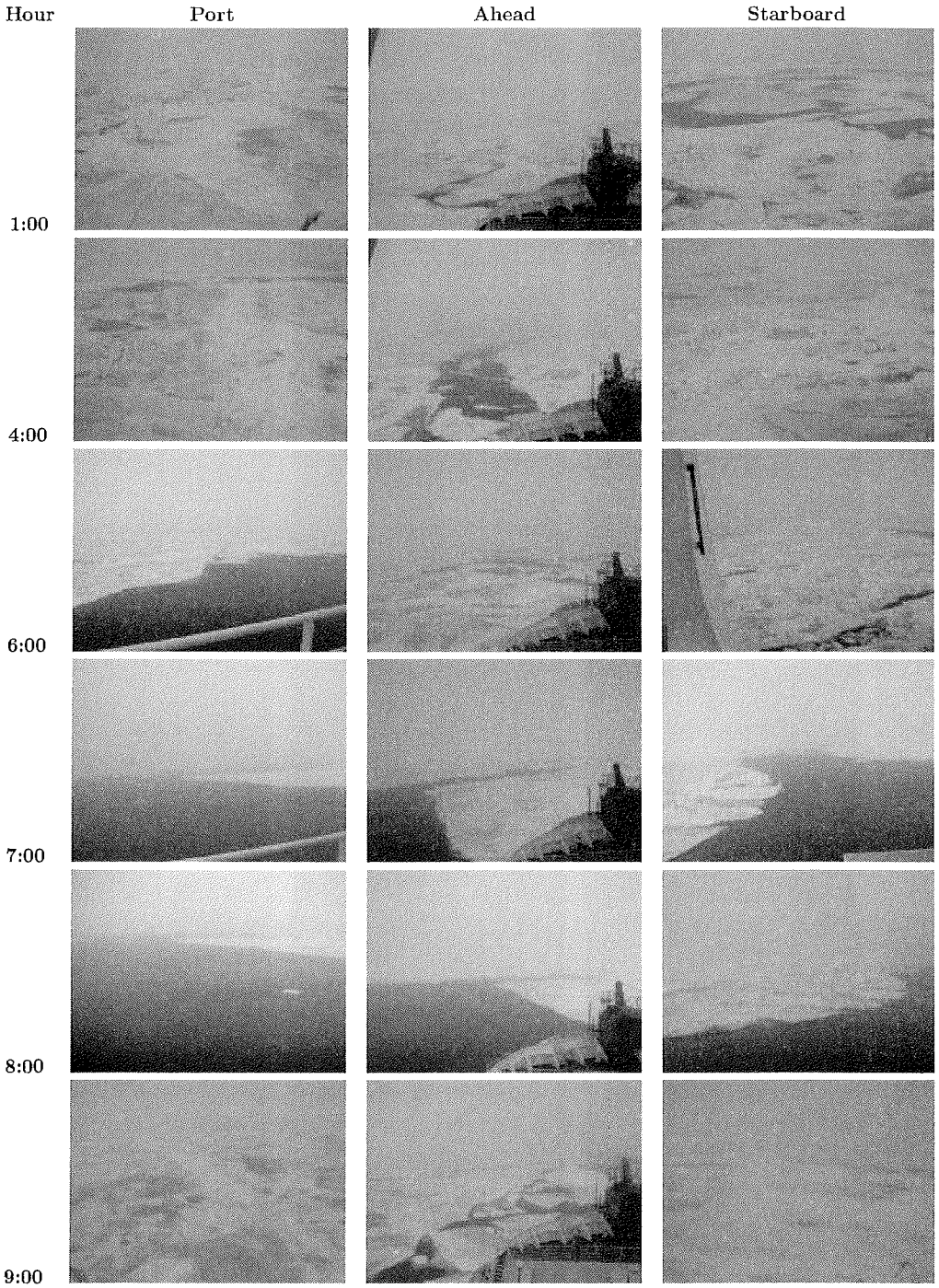
25.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,36	6,57	10,8	188	1.7	2.1	3	90	0	2.0	5	200	1500	40	8	40	6	0	0	1,0	3,0	80	2	0	0
01	82,37	6,63	11,7	187	2.0	3,4	3	95	0	2.0	5	150	500	35	10	40	5	0	0	1,5	3,0	40	2	0	0
04	82,38	6.74	12.9	185	2,4	8.8	2	80	0	1,5	5	300	1500	40	10	40	4	50	10	1,0	4.0	80	1	0	0
06	82,47	6.07	12,4	176	2,2	4,3	2	95	0	2,0	5	300	2000	35	5	15	1	20	2	1,0	3,0	100	2	0	0
07	82,50	5,99	12.9	189	2.2	0,5	0	70	0	2.0	5	400	2000	25	3	10	0	100	3	1,5	2,0	50	2	0	0
08	82,50	6,05	11,4	189	2,0	0,4	0	65	0	1,8	5	300	1000	25	3	10	0	150	2	1,0	2,0	50	2	0	0
09	82,50	5,98	8.7	186	1.8	1.1	0	90	0	2.0	5	100	1000	50	3	8	20	10	1	1,5	3,0	80	22	0	0
10	82,53	5,83	9.1	181	1,9	3.8	3	80	0	1,5	5	100	5000	40	3	10	2	5	1	1,0	2,0	100	2	0	0
11	82,58	5.73	9,3	182	1,6	7,0	2	70	0	2.0	5	300	1000	50	4	20	0	150	5	0,5	1.0	150	2	0	0
12	82,65	5,67	9.6	197	1,5	10.5	1	75	0	1,5	5	200	500	50	3	15	5	100	3	0,5	1,5	100	2	0	0
13	82,68	5,58	10,1	189	1,3	0,8	1	80	0	1,5	5	300	1000	50	3	20	3	40	3	0,5	1,0	70	2	0	0
14	82,68	5,58	10,1	190	1,3	0.0	1	80	0	1,5	5	300	1000	50	3	20	3	40	3	0,5	1,0	70	2	0	0
15	82.68	5,62	10,4	193	1.4	0.4	0	85	0	1,5	5	400	1000	40	4	20	10	40	3	1,0	2,0	90	1	0	0
16	82.72	5,58	7,8	196	1.6	1.5	1	90	0	2,0	5	500	1000	40	10	50	3	80	10	1,0	2,0	200	1	0	0
17	82.75	5,43	7.7	187	1,3	3.8	1	90	0	1,0	5	500	1000	50	10	40	5	50	40	1,0	1,5	100	2	0	0
18	82.78	5,38	8.5	172	1.1	0,9	1	90	0	1,5	5	500	2000	50	10	30	0	40	20	0,5	1,0	500	1	0	0
19	82.80	5,40	8.3	174	1.4	3.4	2	90	0	1,5	10	500	2000	70	10	30	0	40	10	1,0	1.5	500	1	0	0
21	82.83	5,25	7,3	189	1,0	0.0	0		0																
22	82.84	5,23	6.4	179	1,1	1,1	0																		
23	82.84	5,21	6,5	176	0.9	0,9	3	90	0	1,5	5			40	10	50	1	25	2	1	2,0	50	1	0	0

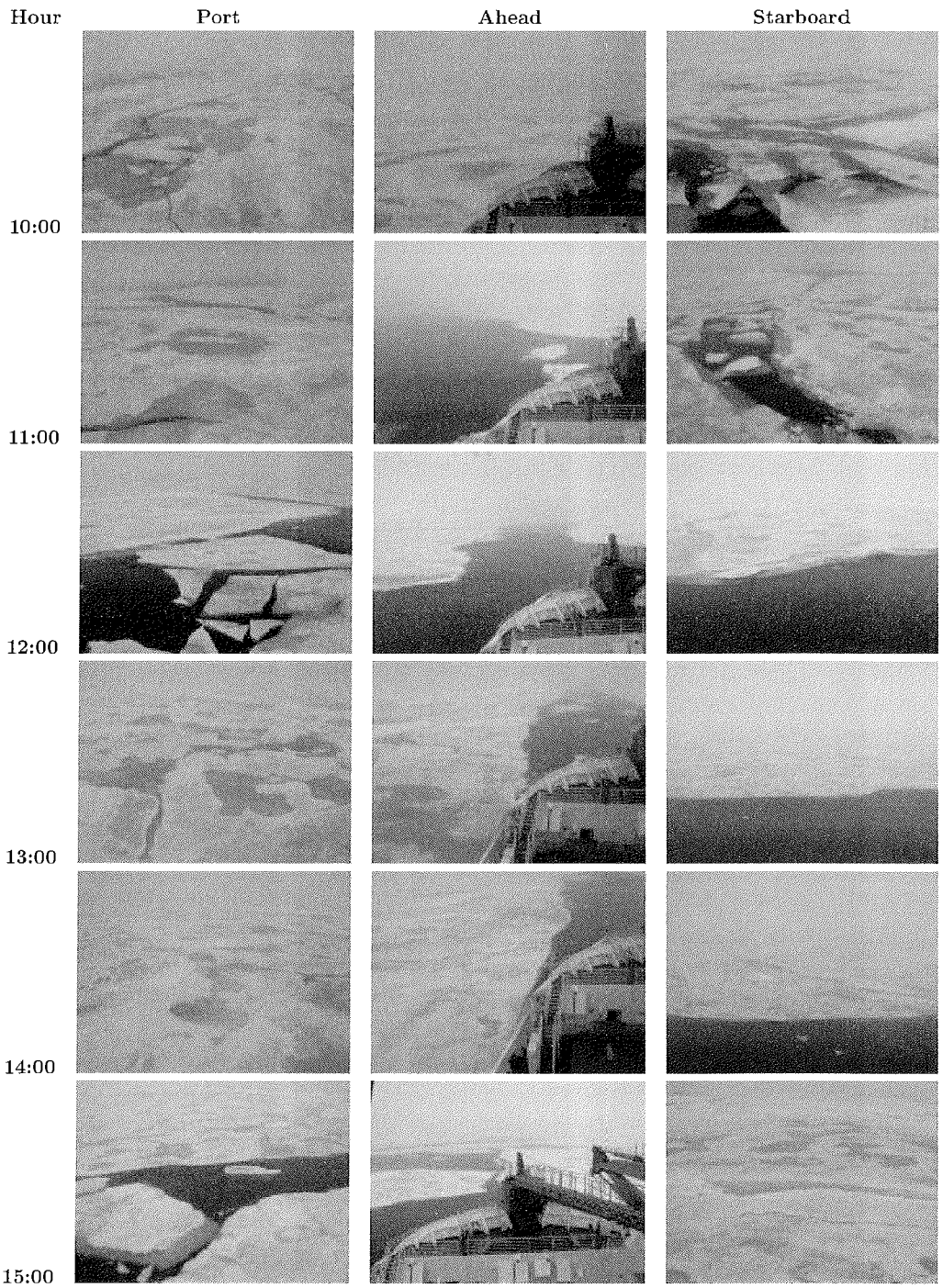
00:00 foggy, many ridges, some are very long, some are very short
01:00 foggy, very slow progress tgrough the ice during the last hours
04:00 still foggy, ice seems to have molten quicker here, partially very dirty surface
06:00 foggy, good progress through the ice, many small floes
07:00 stationary in a big lead, almost no lead floes, surrounding floes very big
08:00 very foggy, on station in a big patch of open water
09:00 still very foggy, visibility only about 200m
10:00 very foggy, visibility may be 300m , Polarstern ramming once, floes surrounded by water
11:00 very foggy, visibility 100-200m , Polarstern using a water highway
12:00 still foggy, visibility 400-500m
13:00 still foggy, visibility 400-500m, on CTD-station
14:00 still foggy, visibility 400-500m, on CTD-station
15:00 still foggy, visibility 400-500m, leaving CTD-station
16:00 fog, visibility 250m, ramming floes in lead
17:00 fog, visibility 500m, pushing floes apart in lead
18:00 still foggy, entering a bigger lead
19:00 visibility getting much better about 3km, area of melting ponds has apparently increased
21:00 poor visibility 200-300m, fog, we are making a CTD-station in a lead, ice is partly visible
22:00 same posn - CTD in progress
23:00 typical and max floe diameter are > visibility ~200m

Hour	Port	Ahead	Starboard
0:00			

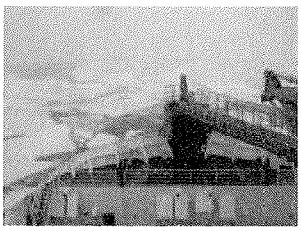
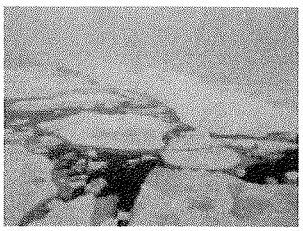
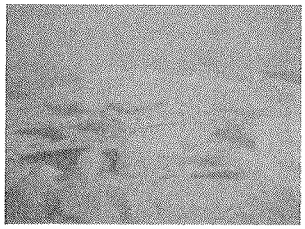
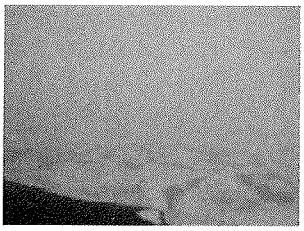
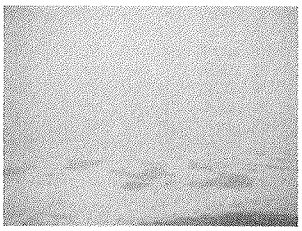
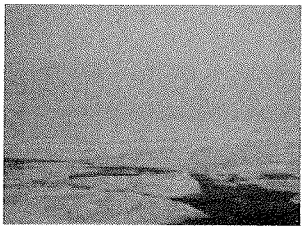
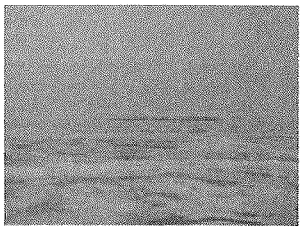
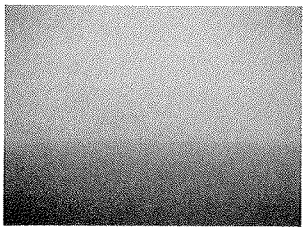
25.7.2004



25.7.2004



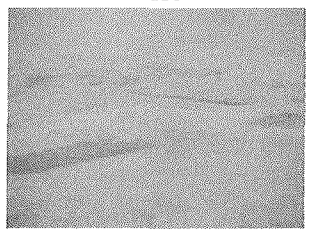
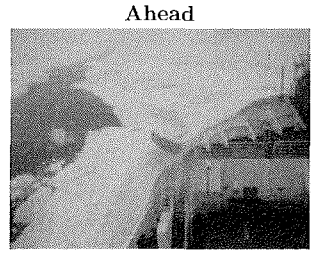
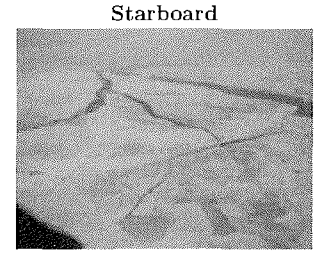
25.7.2004

Hour	Port	Ahead	Starboard
16:00			
17:00			
18:00			
19:00			
21:00			

26.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes. diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,86	5,01	5,7	171	0,7	0,7	3	80	0	1,5	5	200	2000	40	10	30	1	15	2	0,5	1,5	25	2	0	0
01	82,90	5,09	5,4	198	1,5	1,5	2	85	0	2,0	10	300		45	5	25	3	30	10	1	2,0	40	1	0	0
02	82,93	4,95	3,9	187	1,1	1,1	2	60	0	2,0	5	150	500	30	4	10	1	20	10	0,5	1,0	30	1	0	0
04	82,97	5,00	4,0	161	0,4	0,4	3	95	0	1,5	5	200		30	4	50	1	30		0,5	2,0	20	1	0	0
05	82,98	4,96	4,1	159	0,4	0,4	3	90	0	2,0	5			25	4	20	2			0,5	1,5	30	1	0	0
06	82,98	4,92	3,5	159	0,3	0,3	0	80	0	2,0	5			40	5	10	1	50	10	1	2,0	50	2	0	0
07	82,98	4,92	3,7	170	0,6	0,6	0	80	0	2,0	5	200		45	5	15	1	50	5	1	3,0	40	2	0	0
08	82,98	4,93	3,9	171	0,6	0,6	0	70	0	1,8	5	100		45	5	10	6	20	2	1	2,0	50	2	0	0
09	82,95	4,66	4,8	156	0,4	0,4	1	95	0	1,5	5	200		50	5	10	2	5	1	1	2,0	50	2	0	0
10	82,94	4,47	4,5	160	0,5	0,5	3	90	0	1,5	5	300	3000	50	3	20	2	1	1	1	3,0	100	2	0	0
11	82,95	4,09	4,6	160	1,1	4,2	2	80	0	1,2	5	100	500	40	2	10	5	20	2	1,0	2,0	50	2	0	0
12	82,98	3,86	3,1	155	0,7	3,8	2	85	0	1,8	7	200	1000	60	3	30	5	20	1	1,0	2,5	100	2	0	0
13	82,99	3,59	4,7	151	0,8	7,4	1	85	0	1,5	7	150	1000	70	4	25	5	15	3	1,0	2,0	80	2	0	0
14	83,00	3,55	4,3	176	0,8	0,0	2	85	0	1,5	10	300	1000	40	3	30	2	15	3	1,0	2,0	50	2	0	0
15	83,00	3,51							0																
16	83,00	3,47	3,9	179	0,9	1,0	3	90	0	2,0	5	150	1000	30	3	20	2	10	5	1,0	1,0	300	2	0	0
18	82,97	3,50	4,5	185	0,6	6,5	3	90	0	2,0	30	100	1000	40	5	30	0	20	1	2,5	2,5	200	2	0	0
19	82,96	3,47	4,8	178	0,8	1,7	3	90	0	2,5	30	150	1000	40	5	30	0	10	1	2,5	2,5	200	2	0	0
20	82,96	3,44	4,9	193	0,8	1,3	3	95	0	2,5	5	100	500	30	5	20	5	15	1	3.0	3,0	150	2	0	0
21	82,96	3,41	4,5	198	0,6	0.0	3	90	0	2.0	5	200	1000	35	5	15	2	20	1	2.0	2,0	400	2	0	0
22	82,97	3,26	4,2	195	0,5	2.5	3	90	0	2,0	5			30	5	20	5	10	5	2.0	2,0	100	2	0	0
23	83,01	2,91	4,9	215	0,1	2,8	3	85	0	2.0	5	200		40	5	10	3	20	2	2.0	2,0	100	1	0	0

00:00 very foggy, very bad visibility
01:00 still foggy
02:00 foggy getting worse
04:00 foggy, visibility 200m
05:00 foggy, visibility 200m
06:00 foggy, visibility 200m, much dirty snow
07:00 same position but ship has turned, visibility 300m, still foggy
08:00 poor visibility, leaving station, very foggy, station was in a patch of open water
09:00 still foggy, following small lead/big fracture in the ice
10:00 quite good visibility, it's raining ! A lot of cracks
11:00 good visibility, a lot of cracks surrounding the single floe
12:00 good visibility, close to giant linear features in satellite picture
13:00 good visibility, wet surface
14:00 visibility ~800m, CTD-station
15:00 CTD-station
16:00 visibility ~200m, leaving station
18:00 very low visibility, foggy, parameters are very difficult to estimate, higher snow depth, thicker ice
19:00 ramming in very thick ice
20:00 visibility gets better
21:00 ramming, no movement, visibility ~300m
22:00 visibility ~200m, floes larger than 250m
23:00 visibility ~250m

Hour	Port	Ahead	Starboard
0:00			

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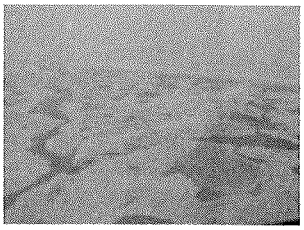
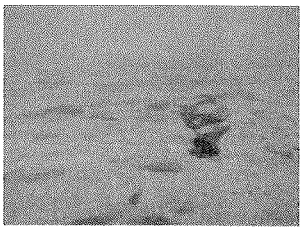
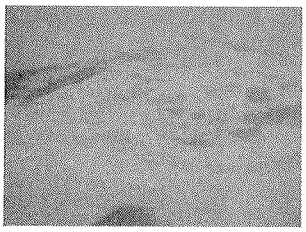
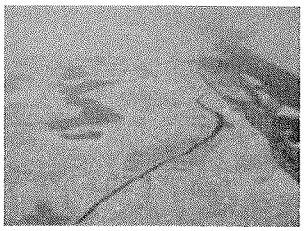
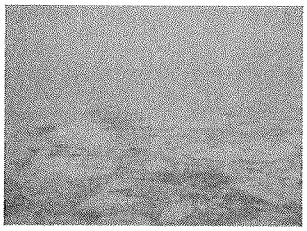
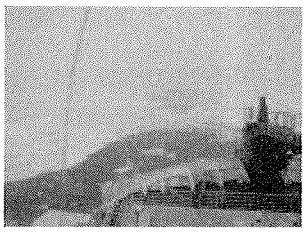
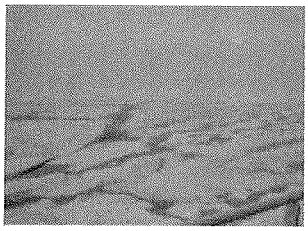
Hour	Port	Ahead	Starboard
1:00			
2:00			
4:00			
5:00			
6:00			
7:00			

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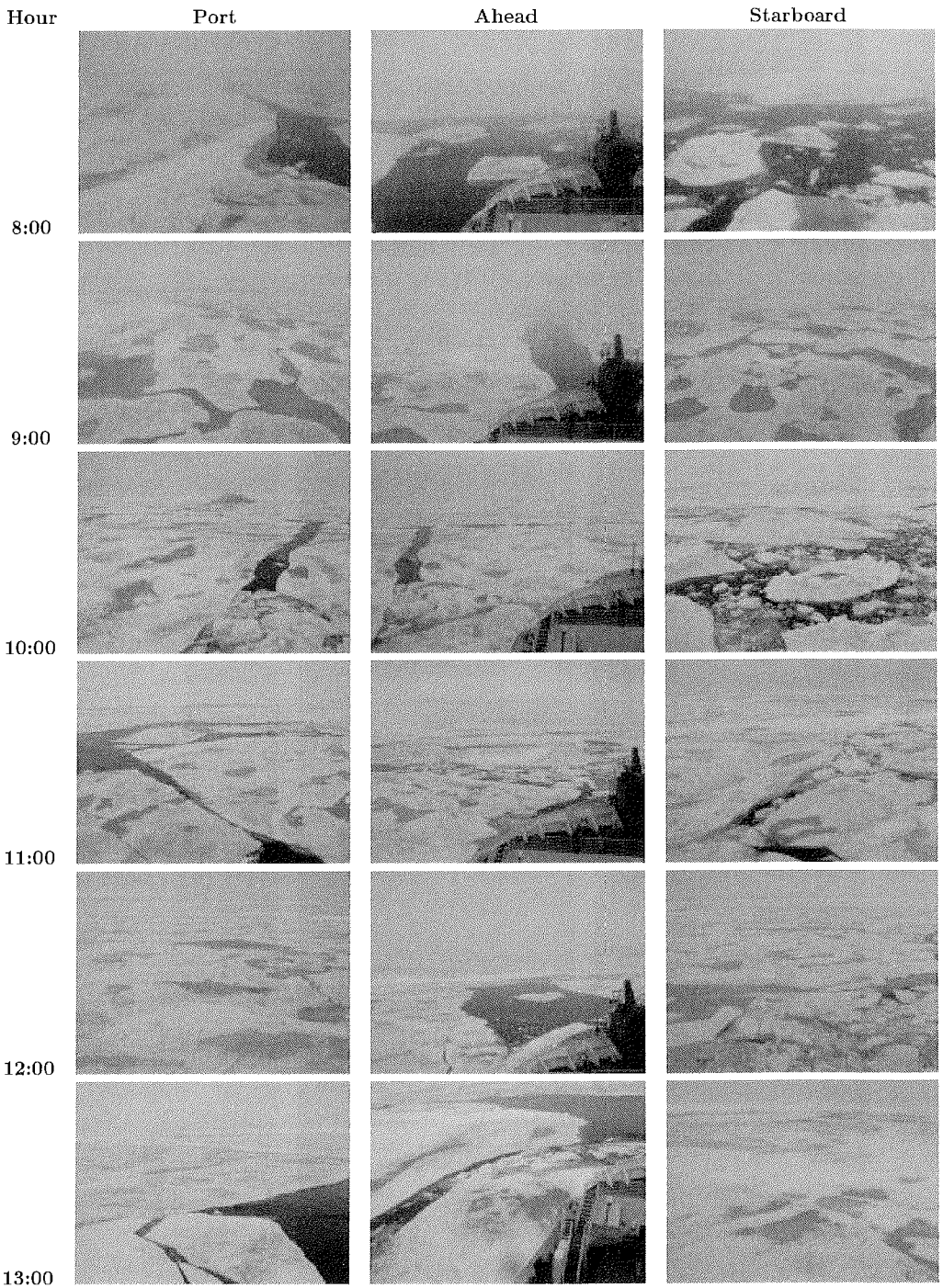

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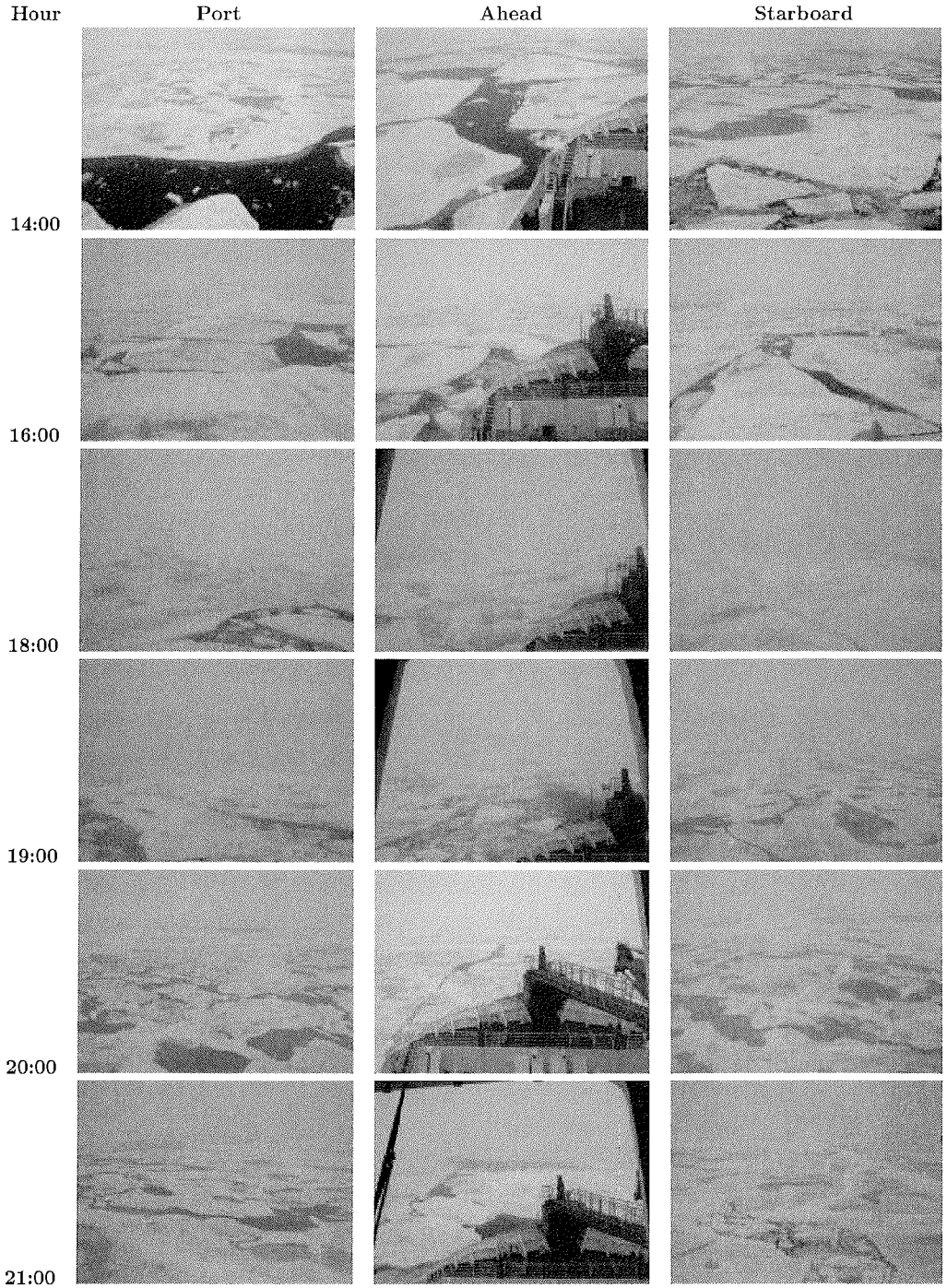

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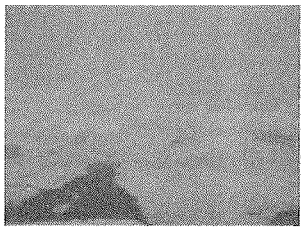
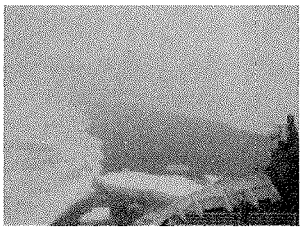
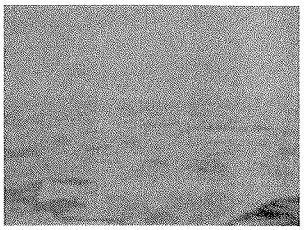
Hour	Port	Ahead	Starboard
22:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

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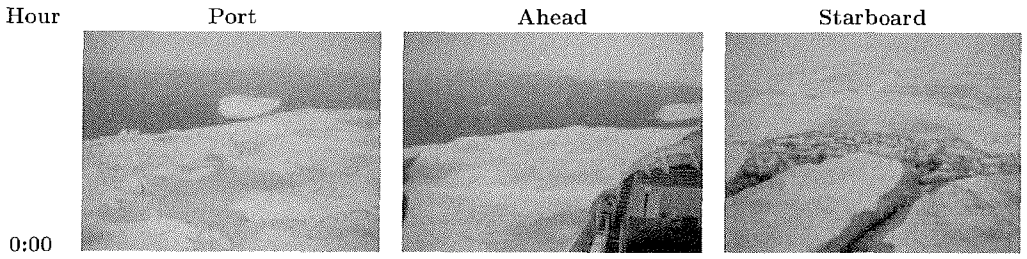
Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	83.00	2,54	3,7	204	0,2	8,0	2	70	0	1,2	5	200	1000	25	5	15	5	10	3	2,5	2,5	100	2	0	0
04	83.00	2,03	2,8	192	-0,2	5,7	2	95	0	2,0	10			25	5	25	1	25	5	2,0	3,0	50	2	0	0
06	83.01	1,70	3,4	178	-0,1	2,3	2	95	0	2,0	10	300	1000	30	4	10	5	20	5	4,0	4,0	50	2	0	0
07	83.01	1,60	3,4	169	-0,1	3,0	2	90	0	2,5	10	300	1000	25	3	10	5	15	3	4,0	4,0	20	2	0	0
08	83,04	1,09	3,2	168	-0,1	4,8	2	95	0	2,0	5	500	1000	60	3	7	3	15	5	1,0	3,0	30	2	0	0
09	83,03	0,77	2,7	166	0,0	0,0	0	95	0	2,0	2	300	500	75	5	10	15	5	1	1,0	3,0	30	2	0	0
10	83,03	0,77	4,2	161	0,1	0,0	0	98	0	2,0	2	300	500	75	5	10	15	2		1,0	3,0	30	2	0	0
11	83,03	0,77	4,4	161	0,4	0,0	0	95	0	2,0	2	300	1000	60	5	40	15	5		1,0	4,0	30	2	0	0
13	83,04	0,77	5,3	162	0,3	0,0	0	95	0	3,0	3	300	1000	50	5	50	15	5		1,0	4,0	30	2	0	0
14	83,04	0,77	6,5	166	0,0	0,0	0	95	0	3,0	3	300	1000	50	5	50	15	0		1,0	4,0	30	2	0	0
15	83,04	0,77	6,4	170	0,2	0,0	0	95	0	3,0	5	300	1000	50	5	50	15	0		1,0	4,0	30	2	0	0
16	83,02	0,49	6,4	161	0,7	4,3	1	95	0	2,0	5			30	4	10	20	100		0,5	1,0	100	1	0	0
17	83.01	0,13	6,1	159	0,7	1,1	2	98	0	2,0	5	200	1000	30	2	10	5	10		1,0	2,0	100	2	0	0
18	82,99	0,18	6,9	169	0,3	2,2	3	95	0	2,0	5	500	2000	50	5	20	10	10	2	1,5	4,0	500	2	0	0
19	83,00	0,12	6,2	170	0,1	5,8	2	95	0	2,0	10	500	2000	40	5	20	10	10		1,5	4,0	500	2	0	0
20	83.00	0,01	7,3	167	-0,1	2,1	3	98	0	1,5	5	300	2000	30	3	15	2	3	1	0,5	2,5	500	2	0	0
21	83.00	-0,09	7,8	182	-0,1	0,5	3	98	0	1,5	5	500	1000	25	5	20	5	5		1,0	1,5	500	2	0	0
22	83.00	-0,08	7,5	172	-0,1	2,1	3	98	0	3,0	5			25	5	20	2			1,0	2,0	75	2	0	0
23	83,02	-0,07	6,9	182	-0,6	2,8	3	100	0	3,0	10	500		30	10	200	3			1,0	2,0	75	2	0	0

00:00 visibility ~400m, very foggy
04:00 vis 176m (from instrument)
06:00 good visibility, many ridges
07:00 good visibility, very high ridges
08:00 vis getting worse again, fog is denser than in the morning, some floes > 2m thick, some meltpond melted through
09:00 on CTD-station, manoeuvering on ice floe to start station
10:00 ice station first, afterwards CTD
11:00 ice station still, visibility 1000m, sun starting to come out
13:00 a little further on, vis 1000m, no more sun
14:00 getting foggy, visibility ~500m
15:00 vis ~300m, on station
16:00 vis ~200m
17:00 vis ~200m
18:00 foggy conditions
19:00 foggy conditions, parameters are therfore not very accurate
20:00 vis ~200m, foggy
22:00 vis ~200m, ice appears to be one floe
23:00 again ice appears to be one large floe, poor visibility, very slow progress



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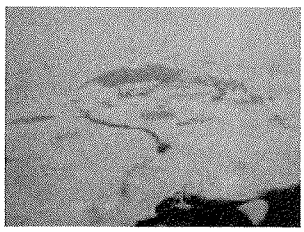
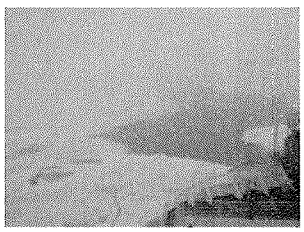
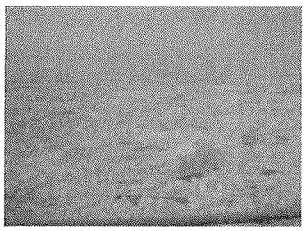
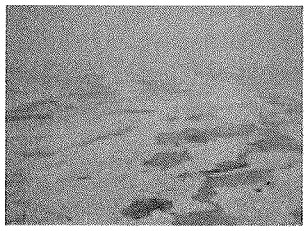
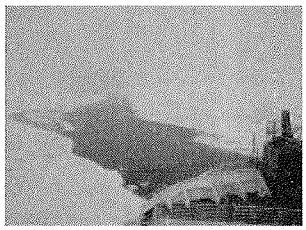
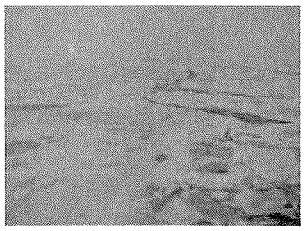
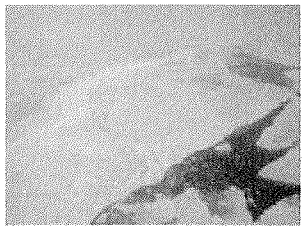
Hour	Port	Ahead	Starboard
4:00			
6:00			
7:00			
8:00			
11:00			
14:00			

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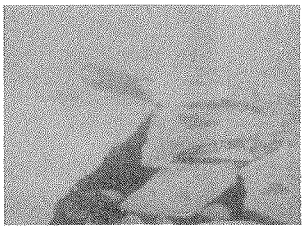
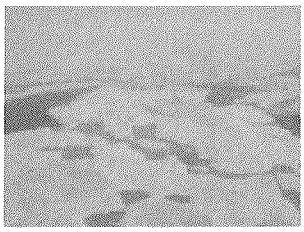
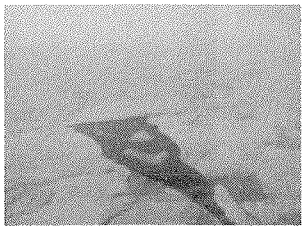
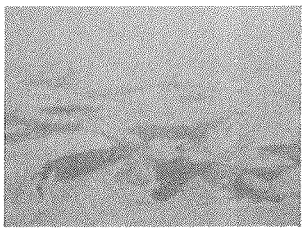
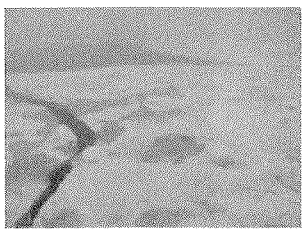
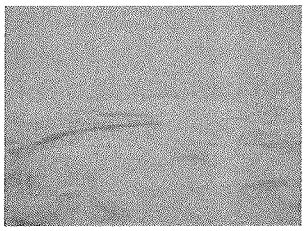
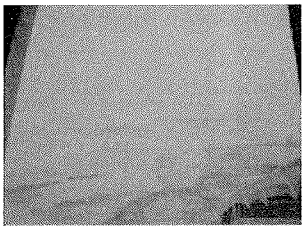
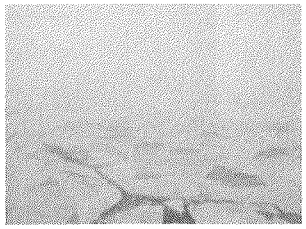
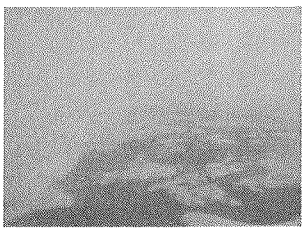
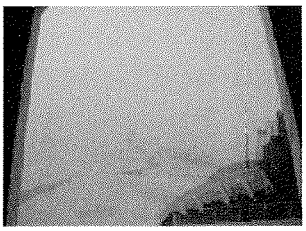
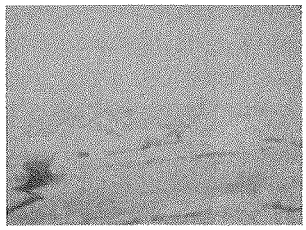
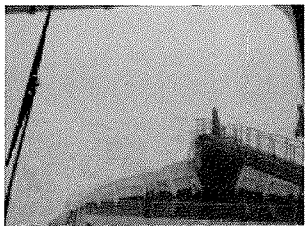
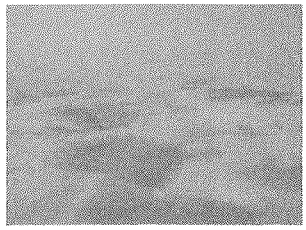
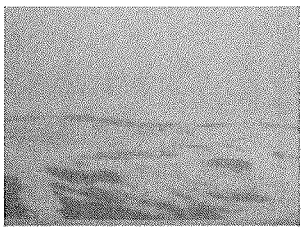
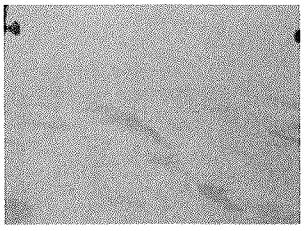
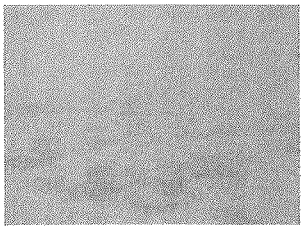
Hour	Port	Ahead	Starboard
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			

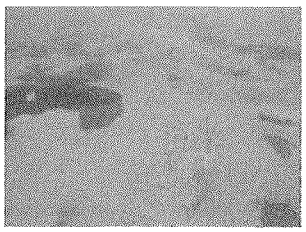
27.7.2004

Hour	Port	Ahead	Starboard
21:00			
22:00			

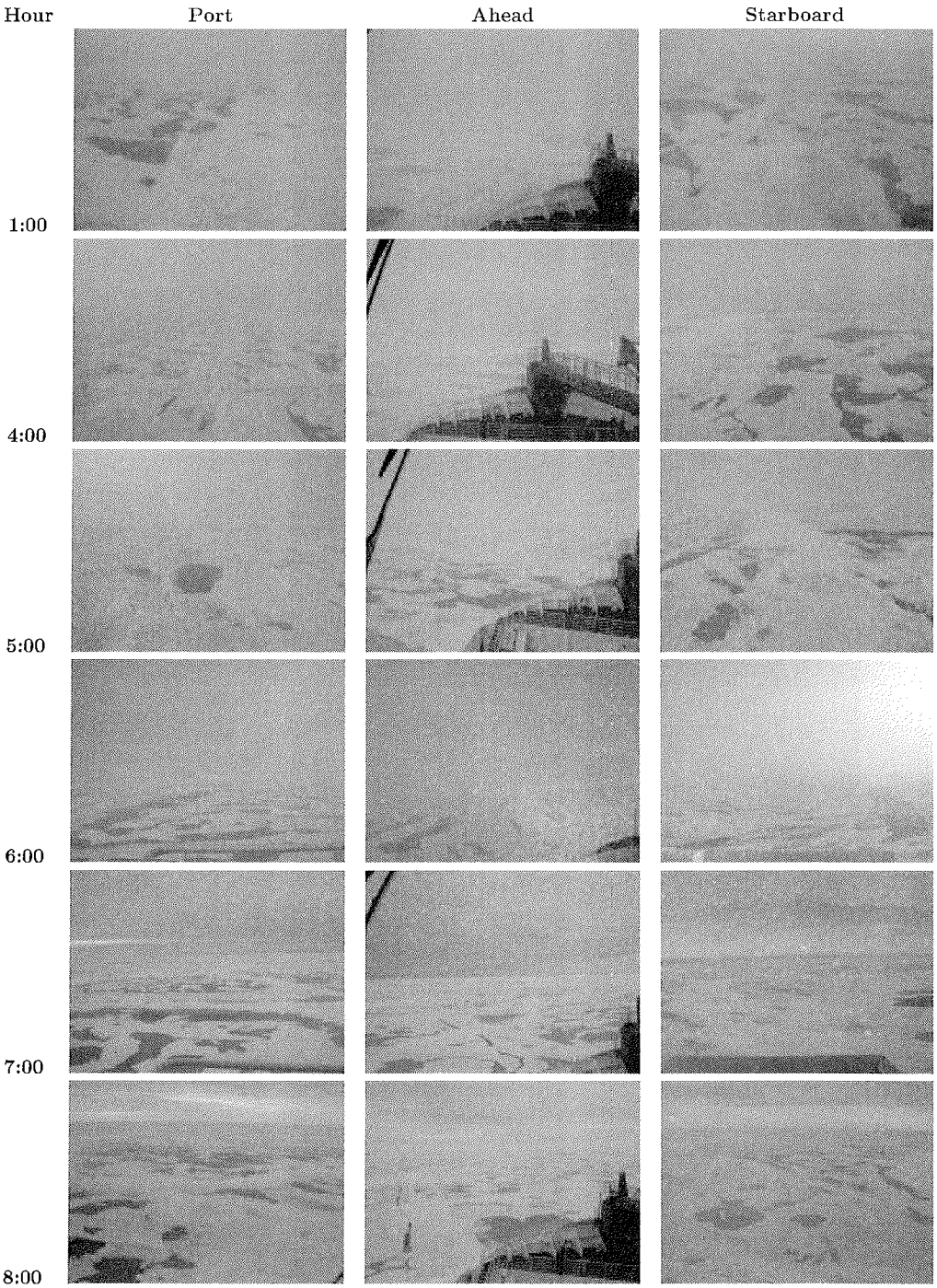
28.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	83,00	-0,06	6,6	180	-0,8	2,3	3	85	0	3,0	20			40	7	50	3	5		1,0	2,0	80	2	0	0
01	83,00	-0,05	7,1	182	-0,7	0,4	3	100	0	2,0	20			40	4	25	1			1,0	1,0	40	1	0	0
04	83,00	-0,01	4,9	158	-0,8	0,8	33	100	0	2,0	10			30	4	40	1			0,5	2,5	60	1	0	0
05	83,00	0,00	4,1	142	-1,1	2,9	3	100	0	2,0	10			30	4	40	2			1,0	2,0	40	1	0	0
06	83,00	-0.02			-0,9	1,3	3	100	0	2,5	10	300	800	35	5	10	1	0	0	1,5	3,0	50	2	0	0
07	83.01	-0,02	3,3	133	-0,2	0,0	3	100	0	2,5	10	300	800	35	5	10	7	0	0	1,0	2,0	50	2	0	0
08	83,00	-0,02	3,7	106	0,2	1,0	3	100	0	3,0	5	300	1000	40	5	10	20	0	0	1,5	2,5	50	2	0	0
09	83.00	-0.03	5,1	104	0,0	2,9	3	100	0	3,0	5	300	1000	40	5	10	25	0	0	1,5	2,5	100	2	0	0
10	83.00	-0.05	6,2	103	0,5	0.6	3	100	0	3,0	5	500	1000	40	5	10	25	0	0	1,5	2.5	100	2	0	0
12	83.00	-0,09	5,6	88	0,7	2,4	3	100	0	2,5	8	500	1000	35	3	10	20	0	0	1,5	3,0	100	2	0	0
13	83,01	-0.11	6,0	70	0,9	0,3	3	100	0	2,5	8	300	1000	30	5	20	20	0	0	1,5	3.0	100	2	0	0
14	83,01	-0,12	6,9	62	0,6	1,5	3	100	0	2,5	8	300	1000	25	5	40	20	0	0	1,0	3.0	100	2	0	0
15	83.03	-0.08	6,6	87	0,5	3.0	3	98	0	1,5	8	300	1000	25	4	20	20	5		1.0	2,5	80	2	0	0
16	83.03	-0,46	6,3	72	0,5	3,0	3	95	0	1,5	5	200	1000	20	2	10	10				2,0	500	2	0	0
17	83.02	-0,63	6,2	77	0,3	0,0	0	90	0	2,0	5	300	1000	20	5	10	5				1,5	300	1	0	0
18	83.02	-0.65	6,7	84	0,2	0,0	0	90	0	2,0	5	300	1000	20	5	10	5				1.5	300	1	0	0
19	83.02	-0.69	5,7	89	0,2	7,0	1	90	0	2,0	10	300	1000	20	5	10	5	15	2		1,5	300	1	0	0
20	83.00	-0.80	4,7	93	0,2	0,0	3	95	0	2,0	10	500		30	7	15	10	50	10	1,0	1,5		1	0	0
21	82.98	-0.98	4,6	87	0,2	6,5	1	95	0	1,0	5	300	1000	30	7	20	5	10	2	1,0	2,0	500	2	0	0
22	82.93	-1,33	4,7	80	0,2	3,4	1	95	0	1,5	5	200	200	30	5	50	5	20	5	1,0	2,0	200	1	0	0
23	82.94	-1,81	4,3	89	0,4		2	90	0	1,0		200	200	30	3	10	2	100	10	1,0	3,0	200	1	0	0

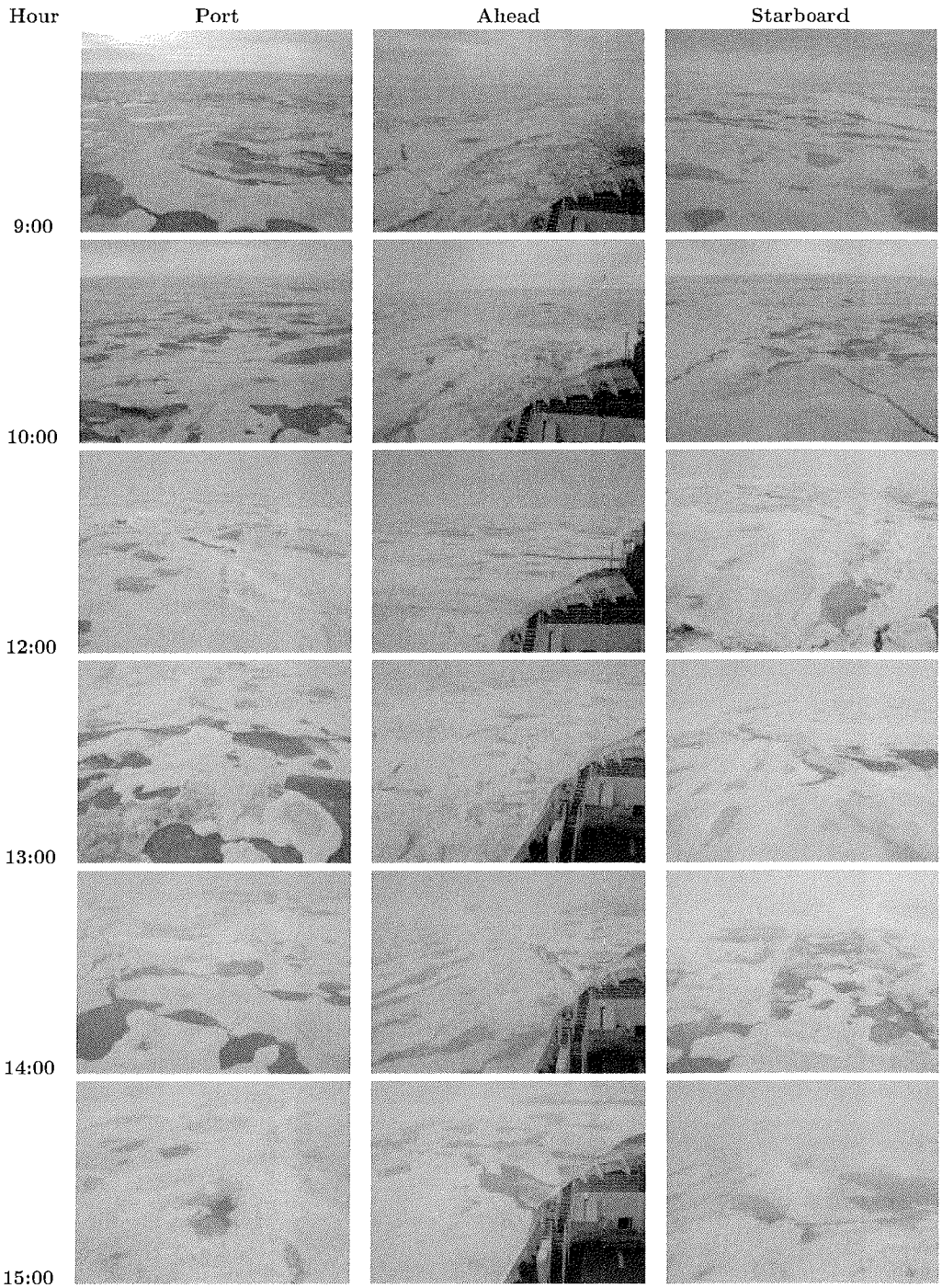
00:00 foggy, visibility 500m
01:00 very bad visibility, very slow progress
04:00 very bad visibility, very slow progress, vis <200m
05:00 very bad visibility, very slow progress
06:00 visibility 150m, very slow progress, sunshine through the fog
07:00 visibility 10km
08:00 good vis, stuck in the middle of a thick floes field, Officers give up, ice reconnaissance flight
09:00 good vis, ramming with little progress
10:00 good vis, ramming with little progress, EM-Bird flight lift off
12:00 vis got worse, fast changes during EM flight, still searching for lead
13:00 getting foggy, visibility ~500m
14:00 foggy, vis ~300m
15:00 very foggy, vis ~300m
16:00 vis ~150m
17:00 CTD station, vis 170m
18:00 CTD station, vis 163m
19:00 vis 264m, entering a bigger lead
20:00 vis. 182m, very foggy
21:00 vis. 148m, very foggy, we are operating in a lead
22:00 vis. less than 200m, we are in a small discontinuous lead
23:00 vis. less than 200m, lead now varies considerably in width

Hour	Port	Ahead	Starboard
0:00			

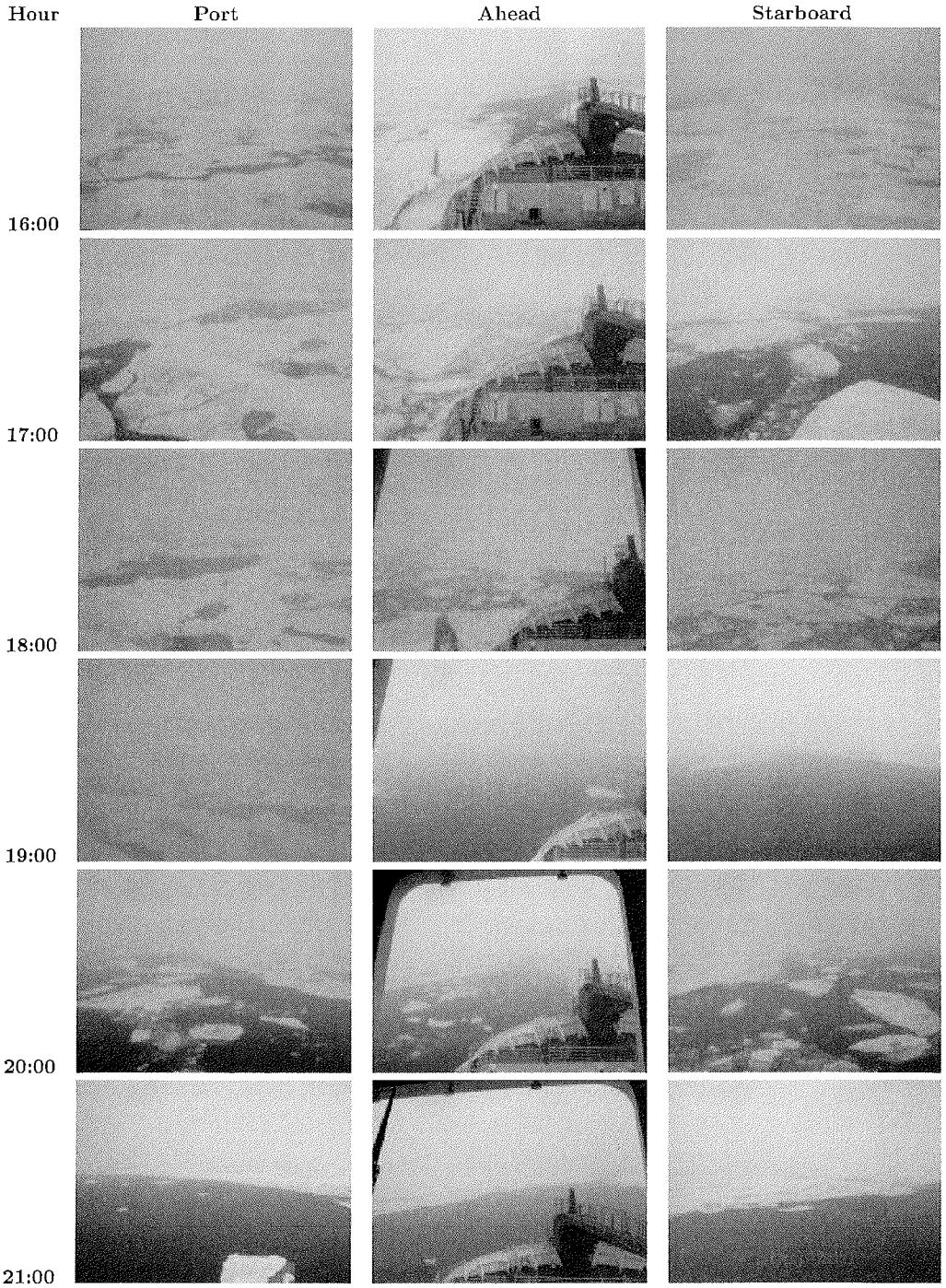
28.7.2004



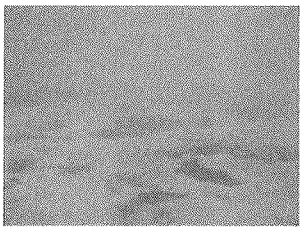
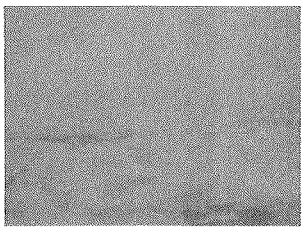
28.7.2004



28.7.2004



28.7.2004

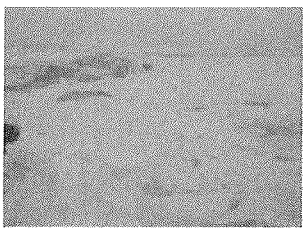
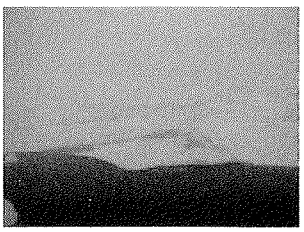
Hour	Port	Ahead	Starboard
22:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

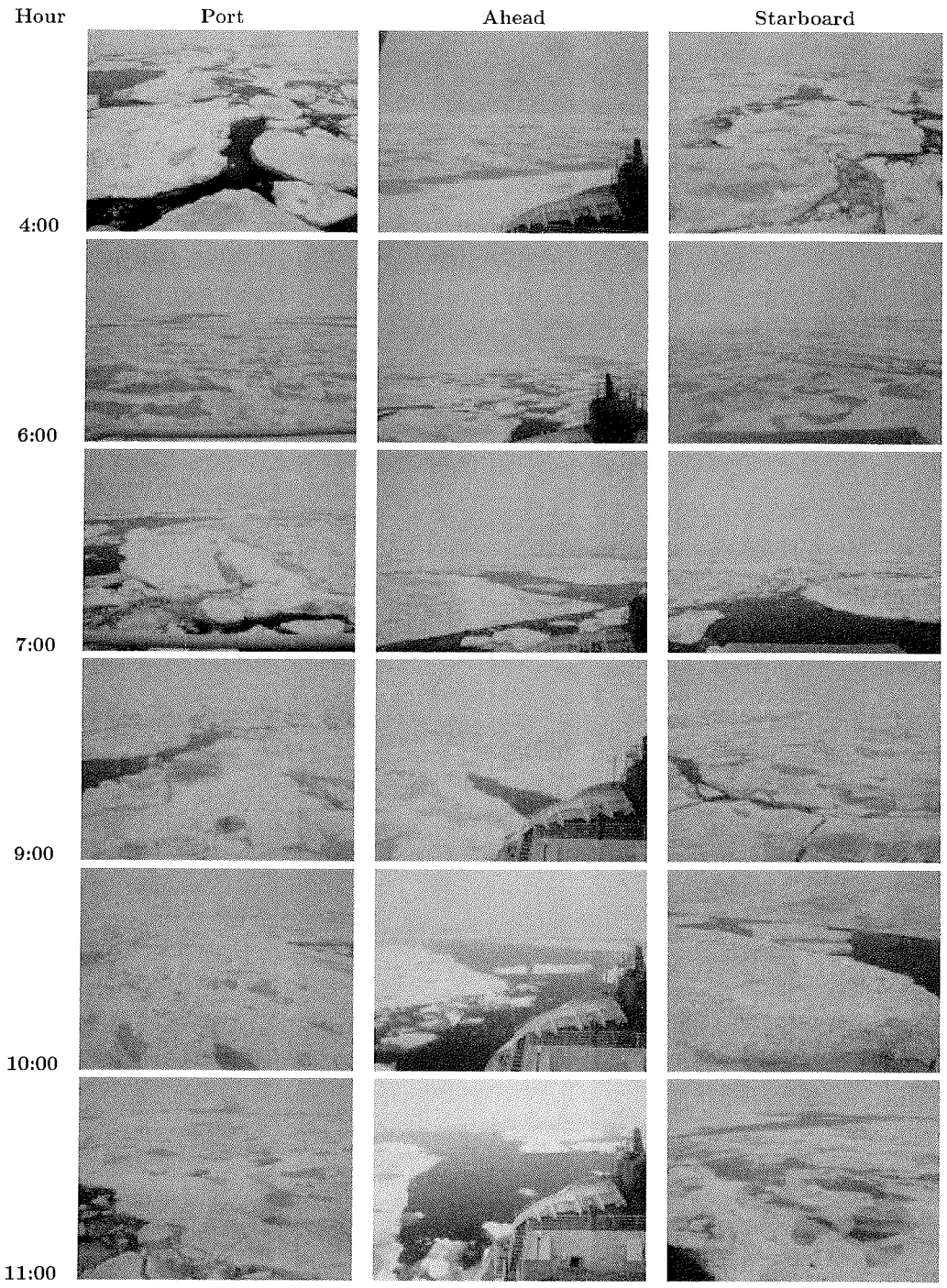
29.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,97	-2,02	4,1	102	0,1	1,5	3	85	0	1,5	55	300	1000	20	3	10	5	25	2	1,0	5.0	300	2	0	0
04	82,93	-2.32	3,7	166	0,4	3,8	2	90	0	2.5	10	300	1000	25	4	20	10	20	1	1,0	3.0	40	2	5	0
06	82,92	-3.02	4.4	154	0,6	0,8	3	95	0	1,5	5	200	800	30	3	8	10	20	2	1,5	2,0	50	2	5	0
07	82,93	-3,25	4,8	163	0,5	0,1	0	85	0	1,5	5	200	1000	20	5	50	5	20	5	1,0	2,0	100	2	0	0
08	82,93	-3,24	4,6	157	0,8	0,0	0	90	0	1,5	5			20	5		5	10	5	1,0	2,0		2	0	0
09	82,93	-3,49	4,3	142	1,1	4,7	3	90	0	1,5	5	200		30	5	20	5	5		5,0	1.5	100	2	0	0
10	82,93	-3,70	5,4	152	0,7	4,0	2	80	0	1.5	5	200		30	3	10	2	20	5	1,0	2,0	50	2	0	0
11	82,96	-4,11	5,7	163	0,5	6,4	1	80	0	1,5	5	100		25	2	10	5	25	5	1,0	2.0	100	2	0	0
12	82,99	-4.44	5.6	163	0,5	4,9	2	85	0	1,8	10	100	500	30	3	20	5	10	2	1,5	2.0	50	2	0	0
13	83,00	-4.69	7,5	161	0,3	0,2	0	50	0	1,5	10	30	200	10	1,5	3	2	250	8	1,5	2.0	25	2	0	0
14	82,83	-4.67	5,5	172	0,9	0,0	0	50	0	1,5	10	30	200	10	1,5	3	2	250	8	1,5	2.0	25	2	0	0
15	83,00	-4.66	5,1	171	0,7	0,0	0																		
16	83,00	-4.65	4.4	147	-0,1	0,0	0	50	0	2.0	5	500	1000	20	5	20	10	500	40	1,5	3.0	300	2	0	0
17	82,98	-4,76	3,6	148	0,6	1,1	1	70	0	2.0	8	300	1000	20	4	20	15	500	20	1,5	1,0	300	2	0	0
18	82,97	-4,92	3,6	128	0,8	0,3	0	60	0	2,0	20	500	1000	40	5	20	10	400	30	1,5	2.5	500	2	0	0
20	82,98	-5,00	3,1	138	0,9	0,7	0	75	0	1.5	10	100		25	5	20	5	400	20	1,5	2.0		2	0	0
21	82,98	-5,05	2,9	140	0,8	0,0	0	75	0	1,5	10	100		25	5	20	5	400	20	1,5	2,0		2	0	0
23	82,96	-5,38	3,1	169	0,8	4,1	2	85	0	1.0	5	100	300	20	3	10	10	10	2	1,0	3.0	200	2	0	0

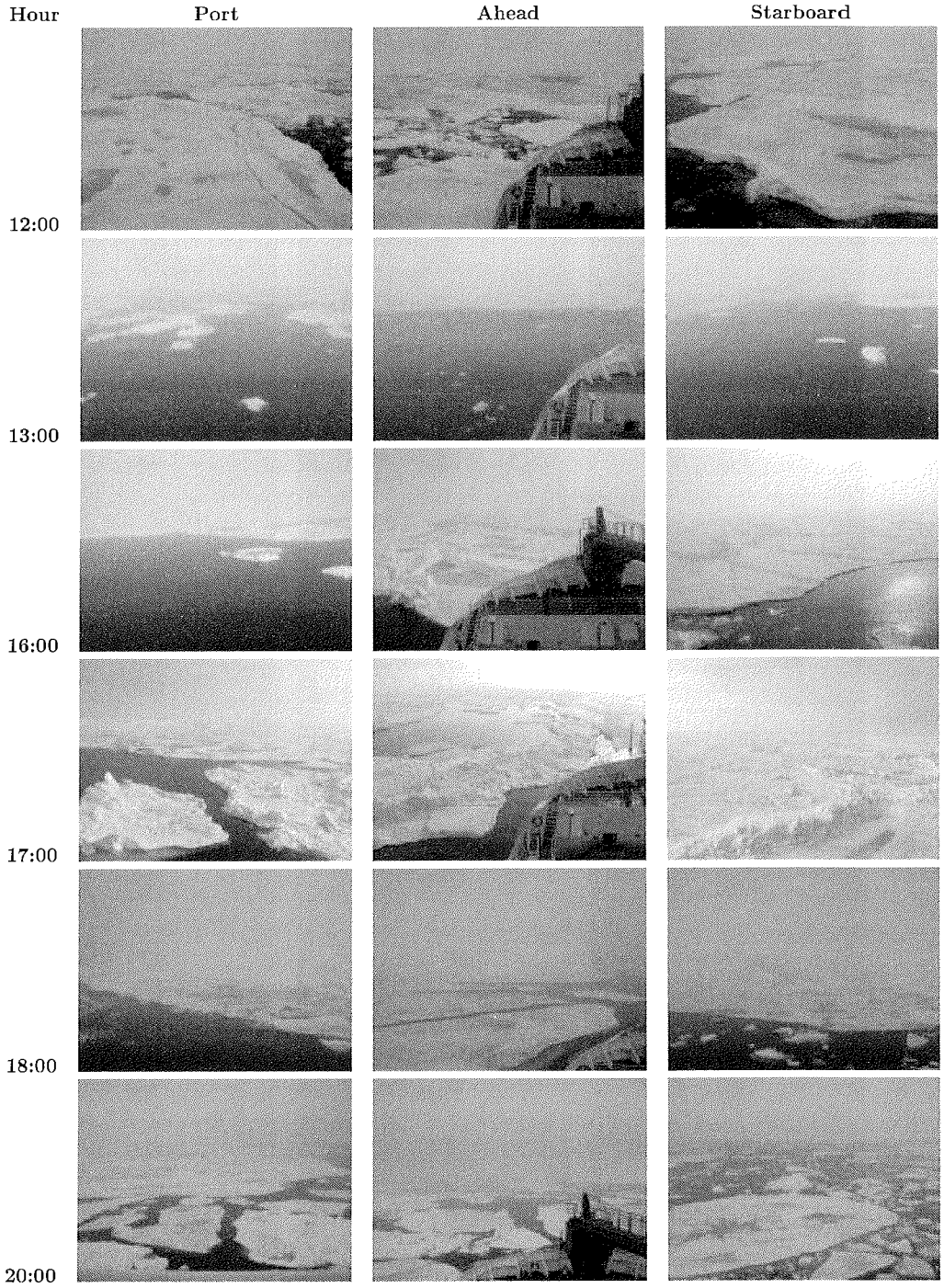
00:00 vis. about 200m, very foggy, ramming since 10 min
04:00 vis very good
06:00 visibility 10000m
07:00 more fog, vis ~1000m
08:00 vis. 124m, hard to estimate sea ice values
09:00 still poor vis. <200m ramming through pack westward
10:00 vis ~500m, lead and floe ice operation
11:00 vis ~500m, leads are not very long, often seperated by floes of ~100m
12:00 vis <500m, a lot of small floe pieces in short leads, approaching dredge station
13:00 vis ~300m, CTD station, lead around the ship, ice outside vis radius
14:00 still CTD station, same weather, no photos
15:00 vis. 170m, on station
16:00 on station, vis. improving (~200m)
17:00 vis. ~700m
18:00 foggy, first dredge is placed to the ground
20:00 foggy, dredging in a lead
21:00 nearly same position at 8pm (see above)
23:00 vis. 400m, progressing through areas of smaller floes

Hour	Port	Ahead	Starboard
0:00			

29.7.2004



29.7.2004

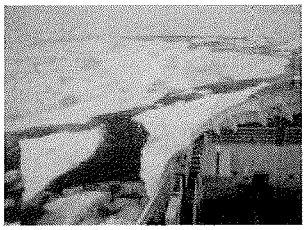
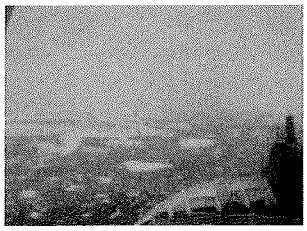
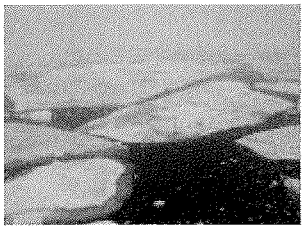


Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

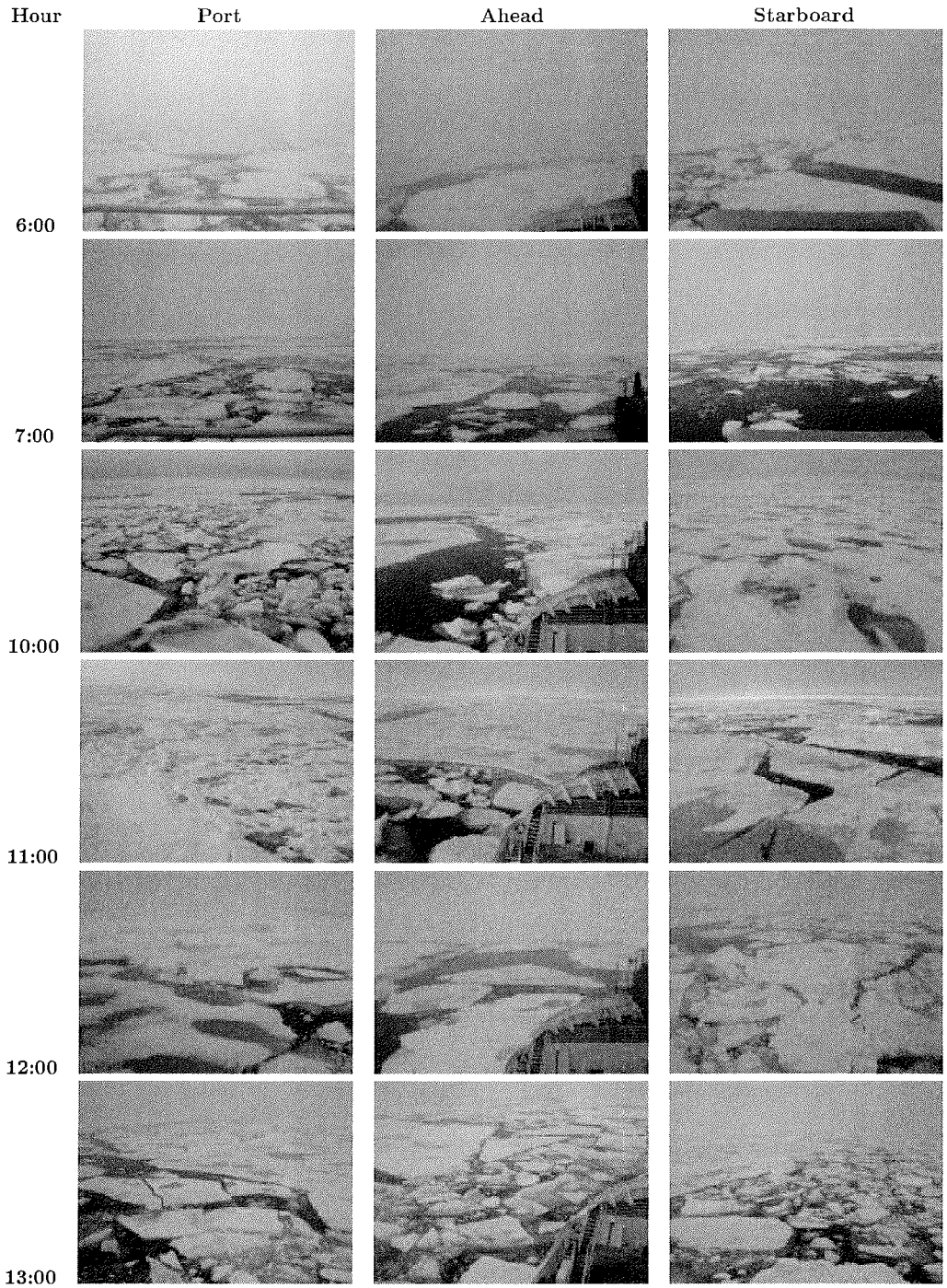
30.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice: <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
01	82,93	-5,56	3,2	167	0,7	2,7	2	85	0	1,5	5	100	500	15	3	20	5	5		1,0	2,5	200	2	0	0
03	82,92	-5,50	1,7	170	0,4	0,8	0	70	0	2,0	10			15	3	30	0	30	3	2,0	3,0	50	1	0	0
04	82,93	-5,48	3,5	185	0,3	0,4	0	70	0	2,0	5	80		25	4	20	1	200	5	2,0	2,5	100	1	0	0
06	82,92	-5,44	4,9	176	0,4	6,5	2	80	0	2,0	10			30	4	10	2	20	10	1,0	1,5	100	1	0	0
07	82,87	-5,50	4,3	184	0,4	0,5	0	80	0	2,0	10	150	500	25	4	10	1	20	5	1,0	2,0	100	2	0	0
10	82,86	-6,21	5,0	198	0,1	4,4	2	85	0	1,5	10	200	800	30	2	10	2	10	2	1,0	2,0	50	2	0	0
11	82,88	-6,34	3,7	193	0,0	2,0	2	80	0	2,0	5	100	800	30	2	5	2	5	1	1,0	1,5	100	2	0	0
12	82,87	-6,20	4,7	227	-0,1	5,1	2	85	0	1,5	7	200		40	3	10	2	10	3	1,0	2,5	100	2	0	0
13	82,86	-6,14	4,3	234	0,0	1,1	2	85	0	2,0	5	200	1000	25	5	5	2	5	2	1,0	2,5	80	2	0	0
14	82,86	-6,15	3,5	209	0,0	0,0	0	85	0	1,8	5	20	2000	25	3	15	2	5	2	1,0	2,5	80	2	0	0
15	82,86	-6,21	4,1	199	0,0	0,9	0	90	0	2,0	5	500	1000	25	3	10	2	100	20	0,5	1,0	500	1	0	0
16	82,87	-6,22	4,0	193	0,2	0,9	0	85	0	2,0	3	400	1000	15	3	20	2	20	5	1,0	1,5	500	1	0	0
17	82,88	-6,23	3,2	196	0,2	0,1	0	90	0	2,0	5	500	1000	25	5	20	5	20	5	1,0	2,0	500	2	0	0
18	82,88	-6,21	2,9	196	1,3	0,2	0	85	0	2,0	5	300	1000	25	5	20	5	20	5	1,0	2,0	500	2	0	0
22	82,88	-6,18	5,7	165	0,0	0,2	0	85	0	2,0	5	200	200	30	5	20	1	20	20	1,0	2,0	200	2	0	0
23	82,86	-6,29	8,1	160	-0,1	5,0	2	80	0	1,5	5			30	5	20	2	150	10	0,5	1,5	500	2	0	0

01:00 vis. ~700m
03:00 vis. 181m, 2nd dredge
04:00 vis. 197m, foggy, nearly same as above (dredging), 1h later vis 128m, same place, still dredging
06:00 vis 150m, very foggy
07:00 vis. 1495m
10:00 2nd Bird flight just has taken off
11:00 sun is breaking through
12:00 fog again :-(breaking lead for dredging
13:00 vis. ~800m, still breaking lead
14:00 dredge station, vis. ~700m, dredge lead ahead
15:00 dredging, vis. ~500m
16:00 dredging, vis. ~1000m
17:00 dredging, visibility perfect
18:00 start of a session on the floe, geoelectric, good visibility
22:00 CTD just finishing, vis. back to ~200m
23:00 vis. 150m

Hour	Port	Ahead	Starboard
1:00			
3:00			

30.7.2004



30.7.2004

Hour	Port	Ahead	Starboard
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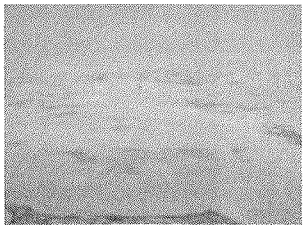
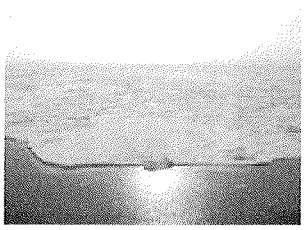
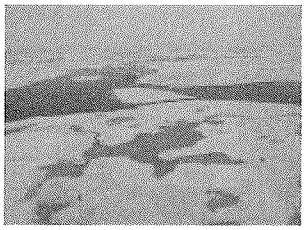
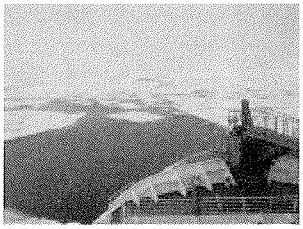
15:00			
16:00			
17:00			
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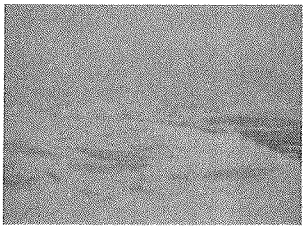
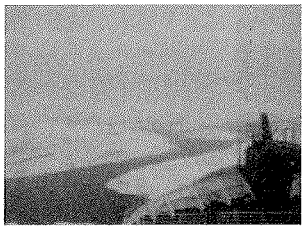
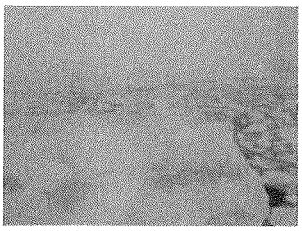
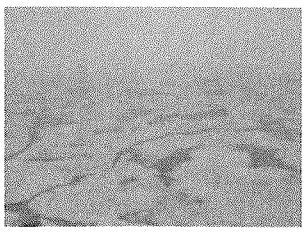
22:00			

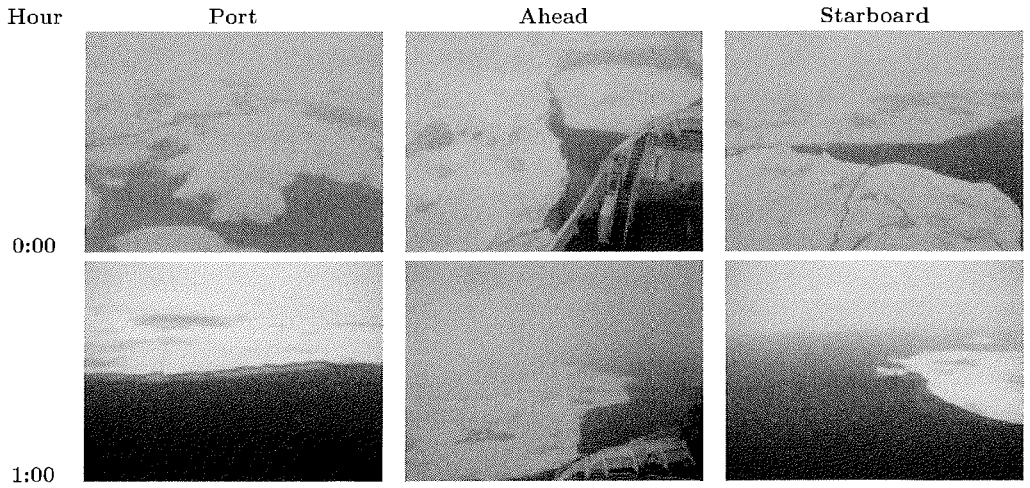
30.7.2004

Hour	Port	Ahead	Starboard
23:00			

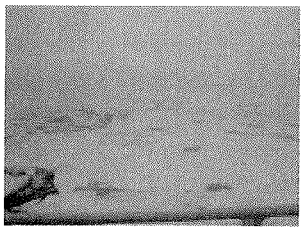
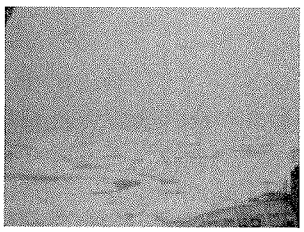
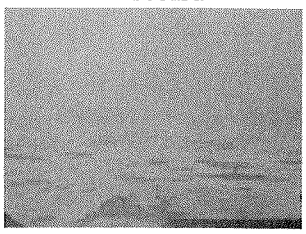
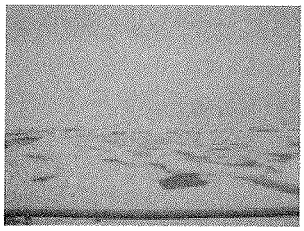
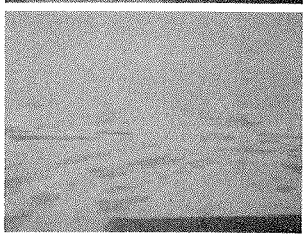
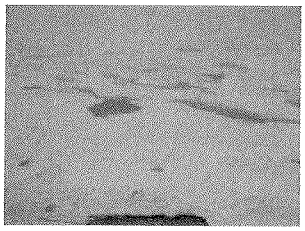
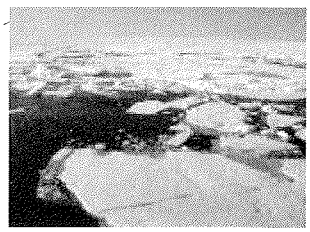
31.7.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,84	-6,45	7,8	153	-0,1	3,3	2	85	0	2,0	5	200	200	30	5	20	2	50	20	1,0	2,0	500	2	0	0
01	82,80	-6,58	8,4	156	-0,7	5,2	1	40	0	2,0	5	150		20	2	25	5	120	10	1,0	2,0	30	1	0	0
06	82,79	-6,68	9,9	148	-0,7	0,7	3	85	0	2,0	10	150		30	4	20	1	20	5	1,0	2,5	100	2	0	0
07	82,80	-6,66	8,7	147	-0,9	0,3	0	85	0	2,0	10	150	500	25	4	15	1	15	3	1,5	2,5	150	2	0	0
08	82,80	-6,62	9,5	144	-0,6	0,3	0	90	0	2,0	5	150	400	25	5	15	5	20	3	1,5	3,0	100	2	0	0
10	82,75	-6,37	8,7	185	0,0	0,4	0	90	0	2,0	10	100	300	20	2	8	2	5	1	1,5	3,0	100	2	0	0
11	82,75	-6,34	9,0	194	0,0	0,4	0	90	0	2,0	10	100	300	20	2	8	2	5	1	1,5	3,0	100	2	0	0
12	82,75	-6,32	9,7	198	-0,1	0,3	0	90	0	2,0	10	100	300	20	2	8	2	5	1	1,5	3,0	100	2	0	0
13	82,72	-6,44	8,0	197	-0,2	4,3	1	85	0	2,0	10	100	300	15	3	20	1	30	8	1,0	3,0	100	2	0	0
14	82,70	-6,41	9,8	202	-0,6	0,5	1	85	0	2,0	10	150	500	10	5	20	2	20	10	1,5	3,0	100	2	0	0
15	82,70	-6,37	7,1	198	-1,0	0,4	0	89	0	2,0	10	200	500	10	3	10	2		2	1,0	3,0	500	2	0	0
16	82,71	-6,39	9,6	177	-0,9	1,0	0	30	0	1,5	5	300	400	10	3	10	5	300	50					0	0
17	82,71	-6,50	9,0	182	-0,8	1,9	0	80	0	2,0	5	300	500	10	3	10	2	100	5	1,0	1,5	500	2	0	0
22	82,61	-6,51	12,0	181	-0,4	7,6	1	60	0	1,0	10	50	500	15	5	20	0	0	3	1,0	1,5	200	2	0	0

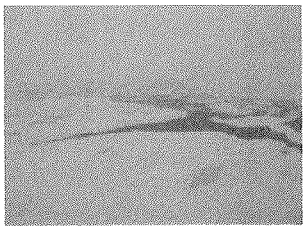
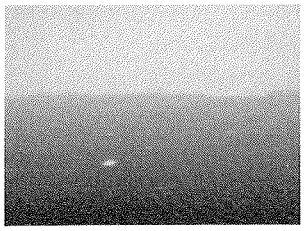
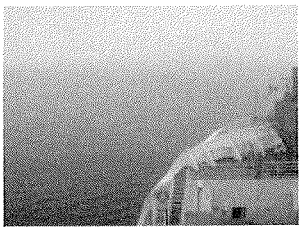
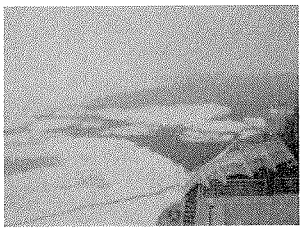
00:00 vis. 200m
01:00 vis. 360m
06:00 vis. 1400m, fog, very thick ice, Polarstern not moving
07:00 less foggy, vis. 4300m, dredge station
08:00 foggy, poor visibility, dredge out of the water
10:00 best sunshine! CTD station, floes surrounded by water (cracks, small leads)
11:00 still on same station, no movement relatively to ice floes
12:00 still on station, still very sunny
13:00 vis. 7000m, but not so sunny anymore
14:00 starting dredging, vis. ~1000m, foggy
15:00 dredging, vis. 300m
16:00 dredging, vis. 300m
17:00 dredging, vis. 300m
22:00 obs started in wide lead, which rapidly closed



31.7.2004

Hour	Port	Ahead	Starboard
6:00			
7:00			
8:00			
10:00			
13:00			
14:00			

31.7.2004

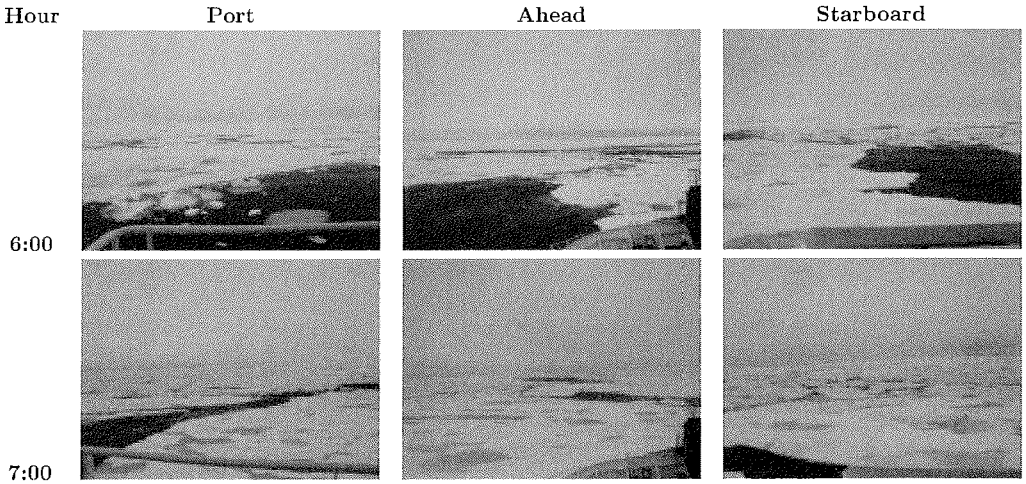
Hour	Port	Ahead	Starboard
15:00			
16:00			
17:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

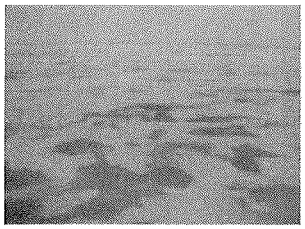
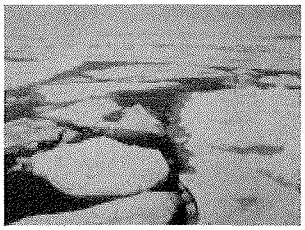
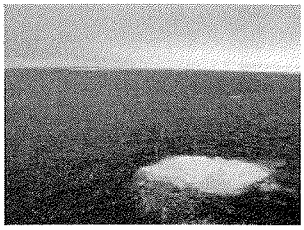
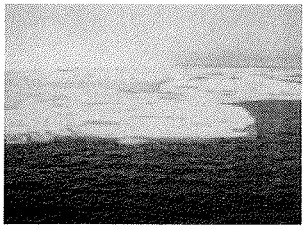
1.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	82,59	-6,50	13,2	188	-0,7	0,5	0	80	0	2,5	20	150	500	20	4	10	1	15	2,5	1,5	3,0	100	2	0	0
07	82,59	-6,59	15,3	175	-0,4	1,5	0	80	0	2,0	20	200	500	20	4	10	1	15	3	1,5	3,0	100	2	0	0
08	82,58	-6,69	14,4	169	-0,4	1,1	0	80	0	2,0	15	150	300	15	5	10	2	15	5	1,5	2,0	50	2	0	0
09	82,57	-6,75	15,4	172	-0,4	0,5	0	75	0	2,0	10	100	200	10	5	10	1	100	5	1,0	2,0	50	2	0	0
10	82,57	-6,69	9,9	195	-0,5	0,5	0	70	0	2,0	10	150	500	30	5	15	5	100	5	1,0	2,5	50	2	0	0
11	82,55	-6,68	12,4	176	-0,5	6,0	2	50	0	1,5	5	120	300	25	5	10	2	300	10	1,0	1,5	50	1	0	0
12	82,52	-6,40	13,1	188	-0,7	5,9	2	40	0	1,5	10	100	500	25	5	10	2	500	15	1,0	2,0	50	1	0	0
13	82,52	-6,40	14,7	186	-0,7	0,3	2	60	0	1,5	10	125	1000	25	5	10	2		2	1.0	2,0	50	2	0	0
14	82,51	-6,58	13,7	189	-0,6	2,1		10	0		3	2	200	0			0								0
15	82,50	-6,66	11,3	192	-0,7	0,1		2	0		5	5	300				0								0
16	82,50	-6,63	13,5	188	-0,7	0,4		2	0																0
17	82,50	-7,39	13,1	188	-0,6	9,0		1	0																0
18	82,49	-8,11	10,5	200	-0,7	0,4	0	10	0	1,5	5	20	1000				0								
20	82,49	-8,10	10,5	207	-0,8	0,0	0	25	0	1,0	1	200					0							0	0
21	82,39	-8,83	5,1	240	-1,0	9,2																			

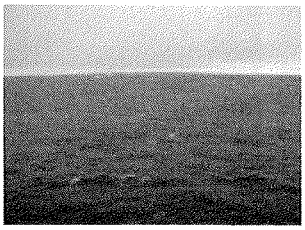
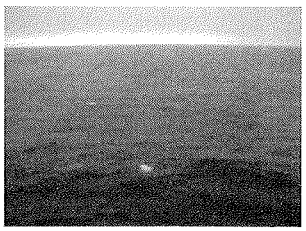
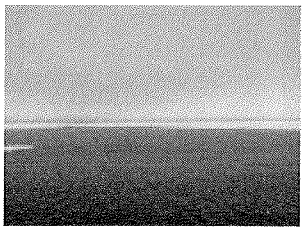
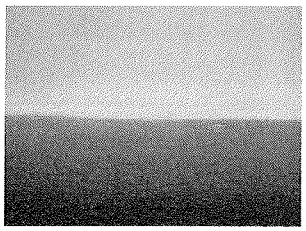
06:00 vis. 10km
07:00 vis. 9km
08:00 vis. decreasing, dredge in progress, many small floes, strong wind, strong ocean current
09:00 vis. decreasing, dredge in progress, operating in patch of open water, many small floes
10:00 variing vis. quite good but fog within open water ares, many leads, dredge station
11:00 leaving station, heading 170, crossing the ice edge
12:00 large open water areas, approaching ice edge
13:00 large open water ares
14:00 open water, some last floes
15:00 dredging station
16:00 same station
17:00 steaming 280
18:00 CTD in open water at ice edge, small floes ahead, at port side bigger floes
20:00 CTD station
21:00 out of the ice



1.8.2004

Hour	Port	Ahead	Starboard
8:00			
9:00			
10:00			
11:00			
12:00			
13:00			

1.8.2004

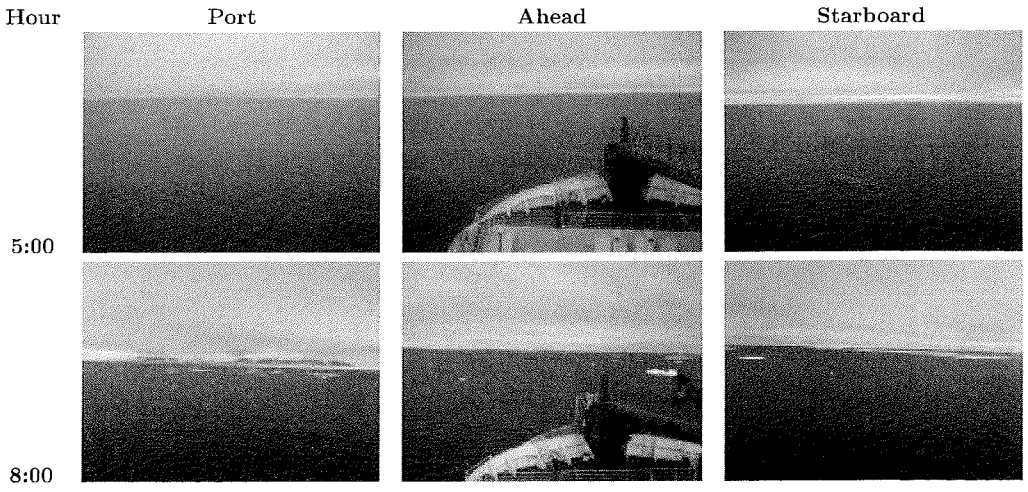
Hour	Port	Ahead	Starboard
14:00			
15:00			
17:00			
19:00			
20:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

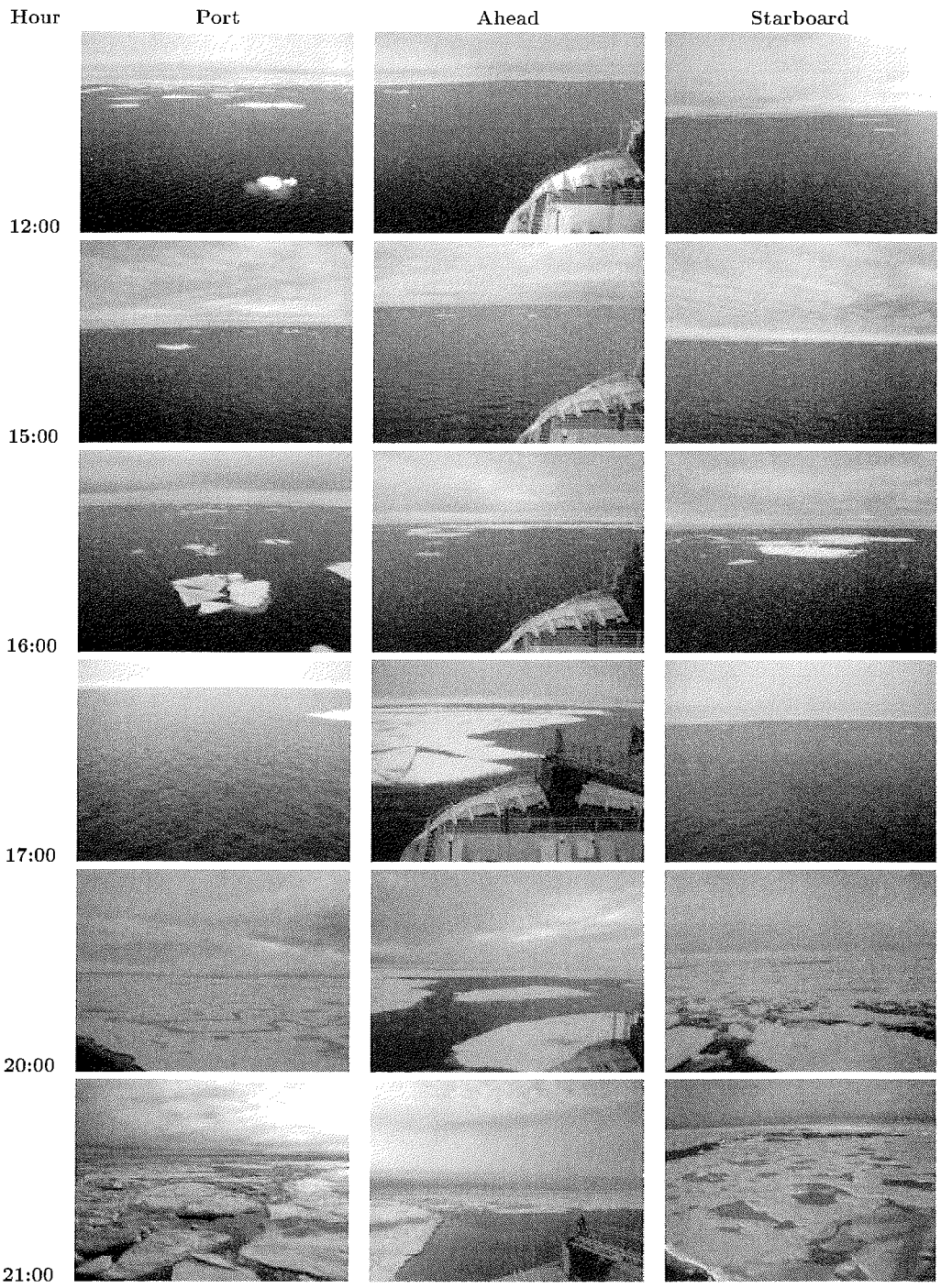
2.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
05	82,12	-10,57	6,1	303	-0,7	0,3	0																		
07	81,98	-11,51	7,8	310	-0,5	9,5																			
08	81,87	-12,16	6,3	288	-0,2	0,4	0	10																	
10	81,95	-10,98	8,4	281	-0,4	6.7		5				5	20												0
11	82,03	-10,47	7,7	277	-0,4	7.3		5				5	10												0
12	82,12	-9,93	5,4	293	-0,4	8.4		30	0	1,5	5	5	300							1,0	2,0	50		0	0
13	82,24	-9,13	6,7	278	-0,4	9,6		2				0,5	5												
15	82,39	-8,20	6,1	289	-0,4	0,1	0	10	0	2,0	5	5	100											0	0
16	82,45	-7,72	7,9	281	-0,4	9.5		10	0	2,0	5	10	200							1,0	2,0	50		0	0
17	82,46	-6,77	7,4	279	-0,2	9.4		5	0	1,0	5	200	300	20	2	10	0								
20	82,54	-5,52	8,3	269	-0,3	3,4	2	80	0	1,0	5	200	500	30	4	15	0	5	1	1,0	1,5	200	0		
21	82,59	-5,96	7,8	274	-0,4	4,5	2	85	0	1,5	2	50	500	20	3	5	0	10	0	1,5	2,0	300	1		
22	82,62	-5,71	8,8	260	-0,5	5.2	2	75	0	2,0	5	100	500	20	5	10	3	10	2	2,0	5,0	100	1	2	0
23	82,63	-5,70	8,1	269	-0,3	0,4	0	85	0	1,0	10	300	500	30	5	10	1	20	5	1,0	3,0	150	2	0	0

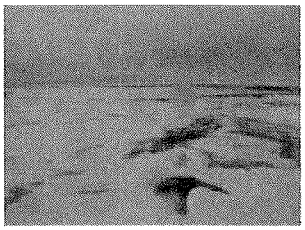
05:00 surrounded by a belt of ice ~1 mile away, visibility good, CTD station
07:00 few ice drifting around ship, Greenland visible
08:00 N of Greenland, only remlins of sea ice around
10:00 steaming back in open water, some small single floes, Greenland still in view
11:00 still in open water, marginal ice zone coming closer north of our position
12:00 marginal ice zone, still steaming in open water
13:00 open water area
15:00 Hydrosweep restart, operating in open water
16:00 steaming again, mostly in open water
17:00 steaming again, mostly in open water
20:00 in the ice again, good visibility
21:00 nice weather, ice is broken up in a lot of floes
22:00 thick floes loosly packed, preparing a way for dredge station, one bergy bit or huge pressure ridge on the way
23:00 large flat areas plus other areas of closely ridged ice, about to dredge



2.8.2004



2.8.2004

Hour	Port	Ahead	Starboard
22:00			
23:00			

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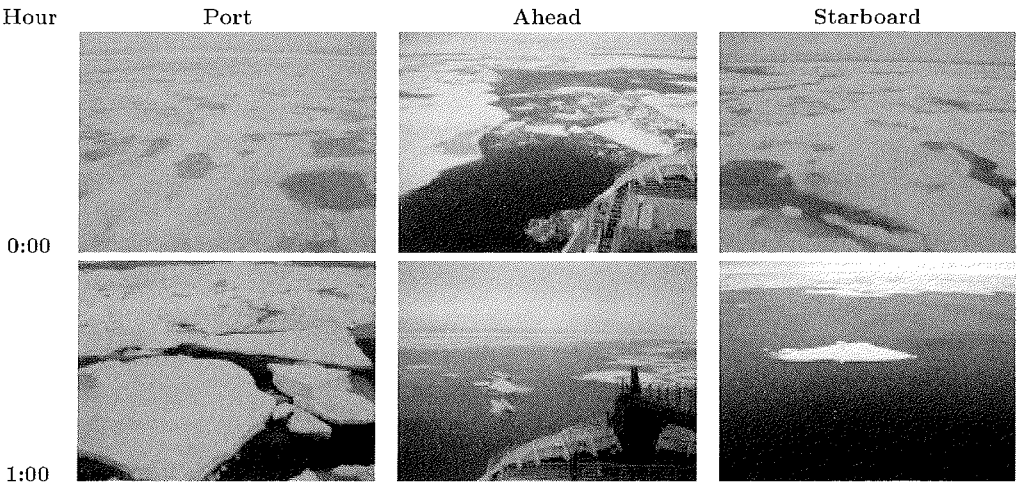
3.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,62	-5,64	6,4	268	-0,3	1,0	0	90	0	1,5	10	200	1000	30	5	20	5	15	3	1,0	3,0	100	2	0	0
01	82,62	-5,54	6,1	266	-0,5	0,5	0	80	0	1,5	10	60	1000	30	5	10	1	250	10	1,0	3,0	20	2	0	0
06	82,77	-4,96	5,7	247	-0,2	3,8	3	95	0	2,5	15	200		20	4	10	1	15	3	1,5	3,0	100	2	0	0
07	82,84	-4,87	5,5	247	-0,3	0,4	3	98	0	2,5	15	100	500	20	4	10	1	10	2	1,5	3,0	50	2	0	0
10	82,90	-3,88	5,5	265	-0,2	7,9	2	80	0	2,0	10	100	300	20	3	15	2	200	30	1,0	2,5	50	2	0	0
11	82,89	-3,61	5,6	244	0,0	5,1	2	80	0	2,0	10	150	400	25	3	10	5	200	10	1,0	2,0	100	2	0	0
12	82,95	-3,39	7,0	245	-0,3	1,7	2	85	0	2,0	5	200		20	2	5	5	20	5	1,0	2,0	50	2	0	0
13	82,99	-3,52	6,0	252	-0,4	4,9	2	90	0	1,5	5	200	500	15	4	8	3	15	3	1,0	2,5	80	2	0	0
14	83,00	-3,90	5,7	253	-0,2	5,9	2	90	0	2,0	5	200	500	20	3	6	3	10	2	1,0	2,5	80	2	0	0
16	83,18	-4,01	5,4	251	0,2	2,2	2	80	0	2,0	5	30	500	20	3	10	0	4	1	1,0	2,5	50	2	0	0
20	83,25	-3,87	3,6	253	1,7	5,8	2	70	0	2,0	5	150	500	20	3	10	0	10	1	1,0	2,5	50	2	0	0
22	83,28	-3,55	5,8	277	-0,4	4,2	2	80	0	1,0	10	100	300	35	3	10	1	10		2,0	3,0	50	2	0	0
23	83,35	-3,20	4,8	241	-0,2	3,2	2	80	0	1,0	15	100	300	35	3	8	2	20		1.5	3,0	100	2	0	0

00:00 good vis. ~5km, old ice floes
01:00 only poor possibility of estimation due to very large lead, on dredge station
06:00 vis. 642m, foggy
07:00 vis. 10000m
10:00 good vis, loose ice pack
11:00 vis 5km, floes becoming larger again
12:00 vis ~300m, very foggy
13:00 vis. ~500m
14:00 vis. ~800m
16:00 very good vis. ~10000m, high ridge density, sea ice group on floe for cryoelectric
20:00 still good vis. Members of ice group still on floe, what a sunny day!
22:00 sun is shining, high ceiling
23:00 vis. very good



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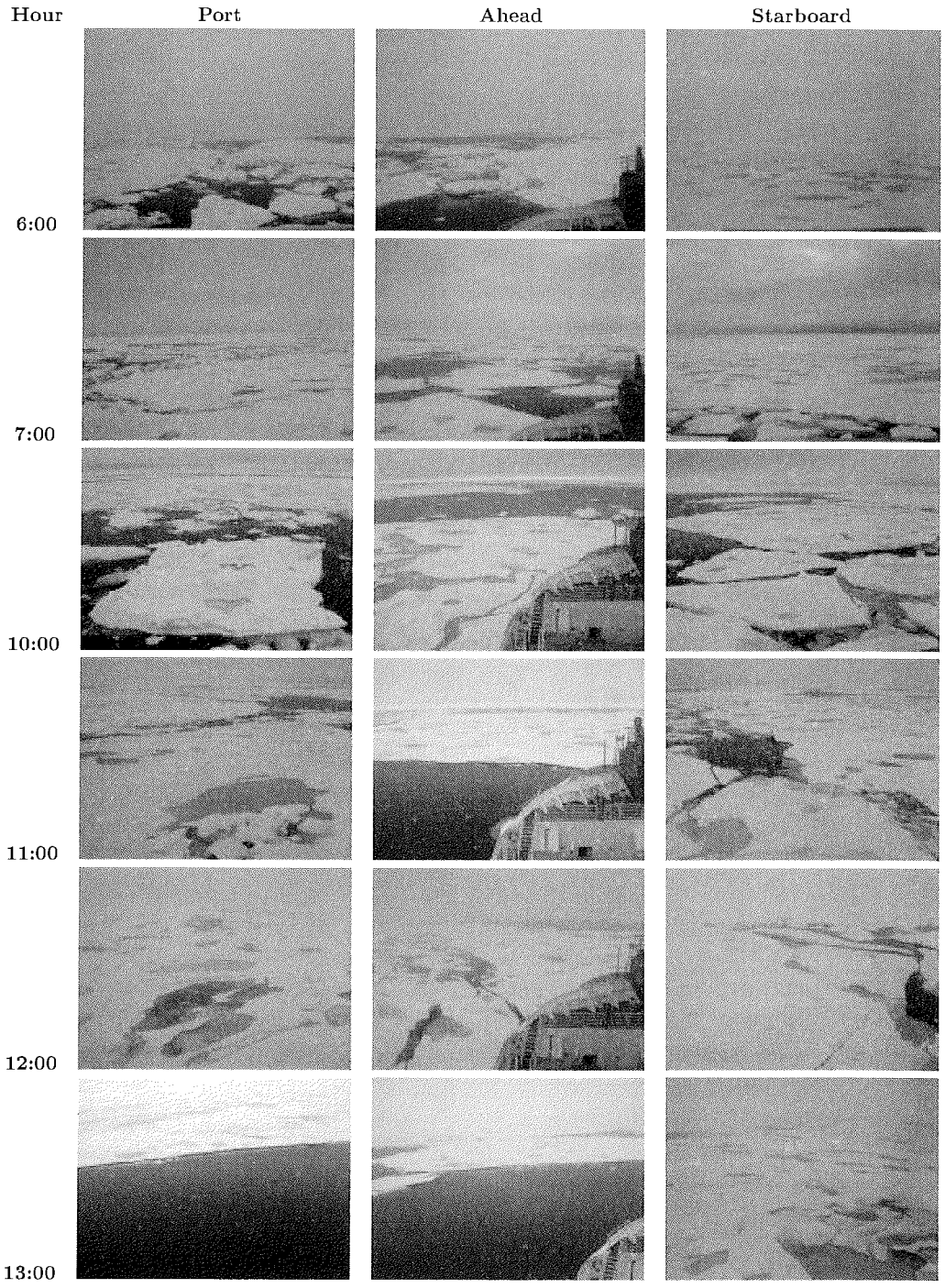
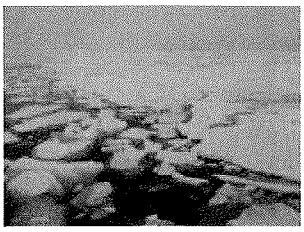


3.8.2004

Hour	Port	Ahead	Starboard
14:00			
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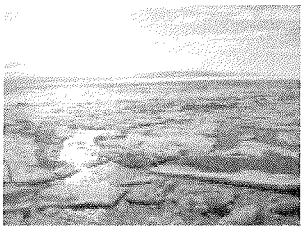
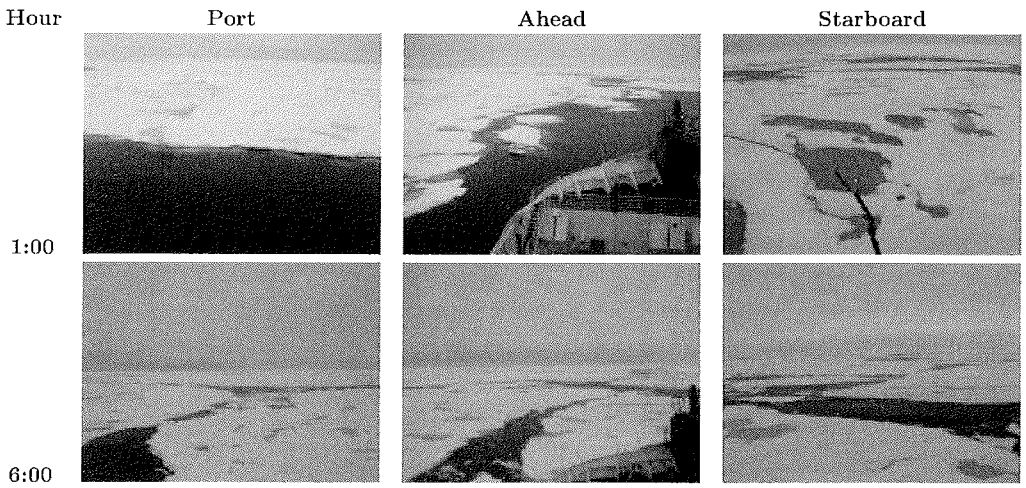
20:00			
21:00			
22:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

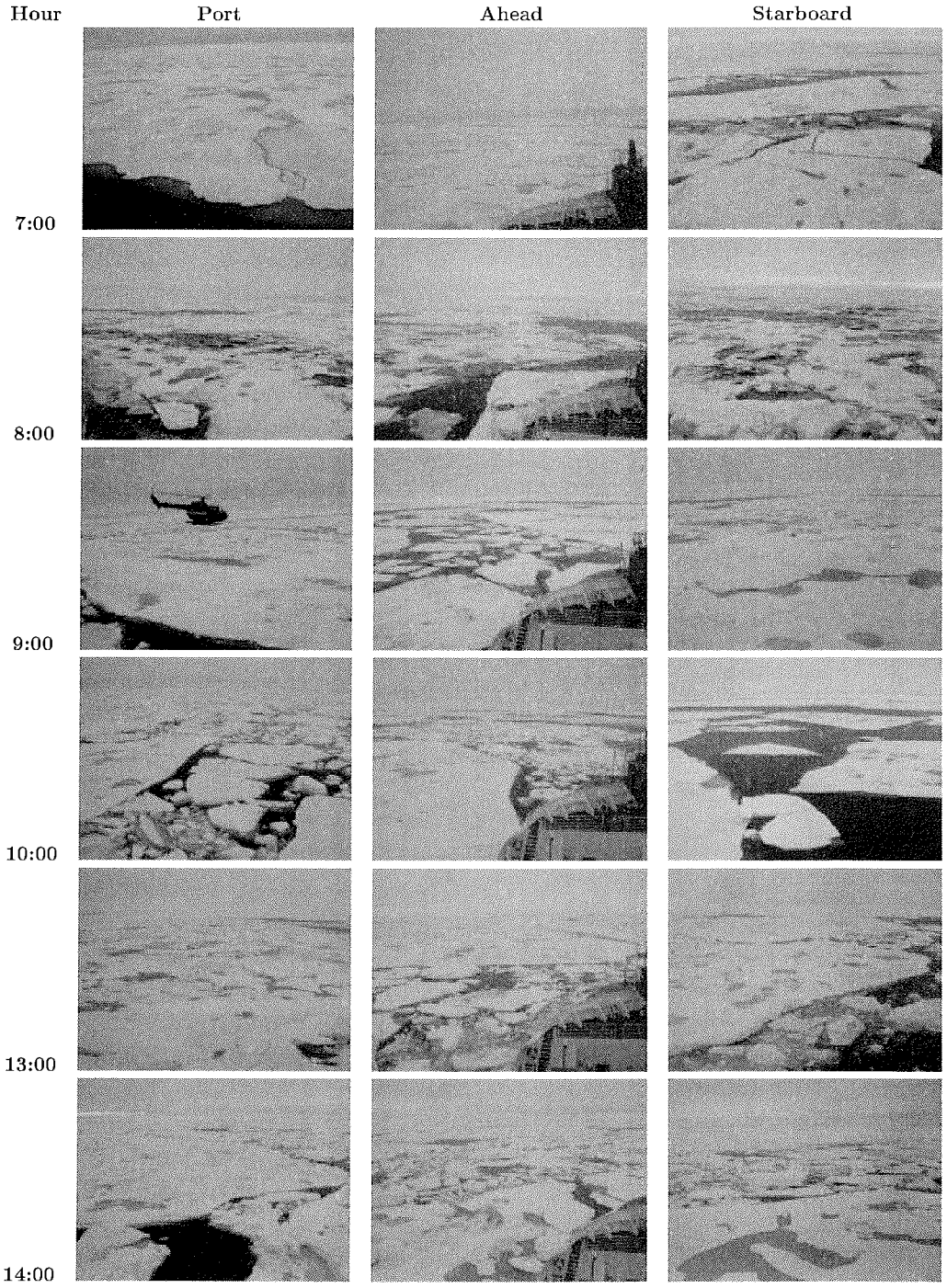
4.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
01	83,41	-2,47	5,5	244	0,1	7,7	2	90	0	1,5	5	100	1000	40	2	5	2	20	4	1,0	1,5	30	1	2	0
06	83,74	-0,94	2,9	241	0,2	4,4	2	90	0	2,0	15	200	500	35	2	5	2	15	2	1,5	2,0	50	2	0	0
07	83,78	-0,47	5,5	250	0,2	5,0	2	90	0	2,0	15	200	800	30	3	10	5	30	3	1,0	1,5	50	2	0	0
08	83,84	-0,12	6,2	239	0,2	6,7	2	90	0	1,5	5	250	1000	33	5	10	50	20	3	1,0	2,0	50	2	0	0
09	83,89	0,43	5,5	252	0,0	6,1	2	90	0	1,5	5	100	500	33	5	10	40	20	3	1,0	2,0	50	2	0	0
10	83,92	0,96	6,1	236	0,2	4,5	2	85	0	1,5	5	100	500	40	3	10	40	10	3	1,0	1,5	50	2	0	0
13	83,02	1,59	7,2	234	-0,1	0,8	2	90	0	1,5	5	200	500	30	4	10	40	10	1	1,0	2,0	100	2	0	0
14	84,07	1,89	6,9	240	0,1	5,1	2	90	0	1,5	5	150	500	30	4	20	40	5	0	1,0	2,0	50	2	0	0
15	84,14	2,31	5,8	268	0,3	4,5	2	85	0	1,0	5	300	1000	30	5	20	20	50	20	1,0	2,0	100	2	0	0
16	84,18	2,37	6,1	264	0,1	4,3	2	90	0	1,5	5	200	1000	30	3	10	5	50	5	0,5	1,0	500	2	0	0
18	84.30	2,43	6,4	266	-0,1	3,4	1	90	1	1,5	5	300	500	33	5	10	20	20	5	1,0	2,0	100	2	0	0
20	84.38	2,91	4,5	264	-1,0	5,1	2	85	1	1,5	10	300	1000	20	5	30	5	10	2	1,5	2,5	200	2	0	0
22	84.47	3,10	6,1	270	-1,1	6,6	2	85	0	1,5	10	200	500	30	5	10	1	20	3	1,0	4,0	100	2	0	0
23	84.51	2,80	4,6	252	-1,4	6,7	1	80	0	1,5	15	200	500	35	5	10	0	15		0,5	2,0	100	1	0	0

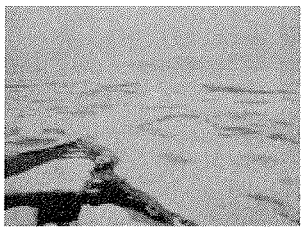
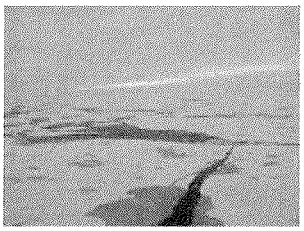
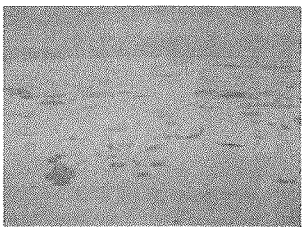
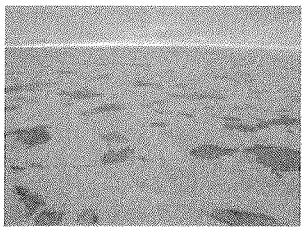
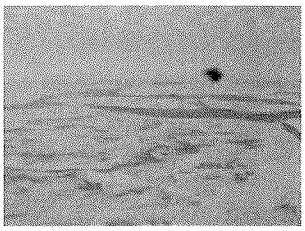
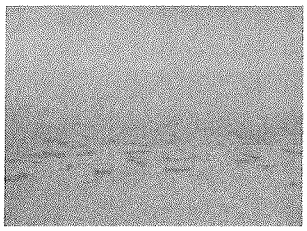
01:00 vis. very good
07:00 vis. 10000m
08:00 good progress, heading 48
09:00 good progress, floe crew is starting
10:00 many meltponds are dark colored or have cracks, good vis.
13:00 vis. 1500m
14:00 vis 10km. big floes (old), much broken ice
15:00 enough water to push floes away
18:00 good vis., 2nd Heli bird flight of the day under way
20:00 good weather and visibility
22:00 good vis.
23:00 sun nearly shining through (ridges in the dist. to 3 or 4m)



4.8.2004



4.8.2004

Hour	Port	Ahead	Starboard
15:00			
16:00			
17:00			
20:00			
22:00			
23:00			

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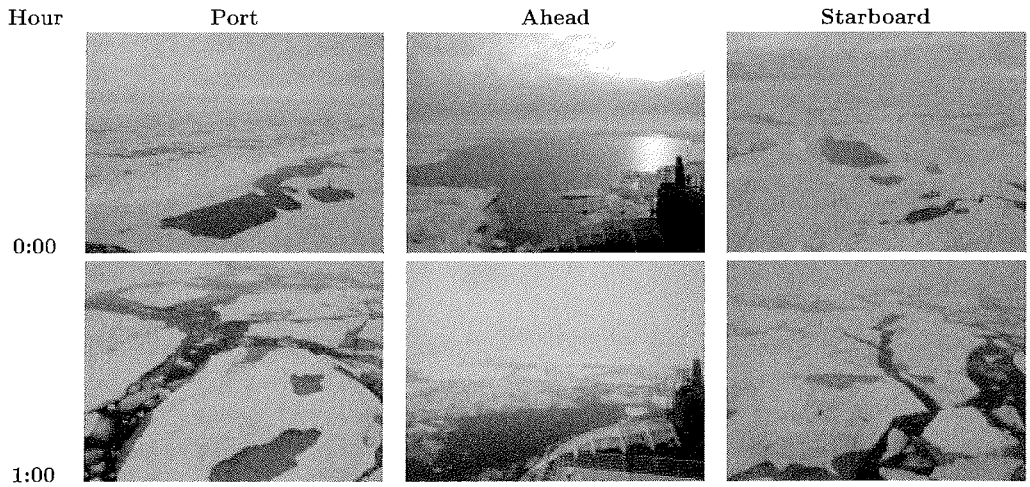
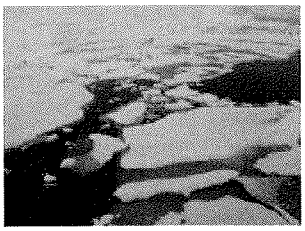
5.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	84,55	2,38	3,6	265	-1,5	0,0	3	90	0	2,0	5	500	2000	20	3	10	2	30	5	1,5	2,5	500	2	0	0
01	84,57	2,32	5,2	267	-0,8	6,6	0	95	0	1,0	10	100		20	2	8	3	6	2	1,0	2,0	30	2	0	0
06	84,56	2,03	11,0	241	-0,9	0,6	0	90	0	1,5	15	150	500	25	4	8	1	20	2	1,0	2,0	50	1	0	0
07	84,59	1,97	1,7	243	-0,7	5,6	2	90	0	2,0	15	200		25	4	8	1	10	2	1,0	1,5	50	1	0	0
08	84,66	2,33	2,3	202	-0,8	6,3	0	80	3	2,0	5	100	250	20	5	10	2	20	5	1,0	2,5	50	2	0	0
10	84,62	2,61	1,0	210	-0,7	0,2	0	75	5	1,8	5	100	250	15	5	10	2	30	2	1,0	2,5	50	2	0	0
11	84,63	2,53	0,3	206	-0,5	0,6	0	80	2	1,8	5	100	250	15	5	10	2	30	2	1,0	2,5	50	2	0	0
12	84,63	2,50	1,3	123	-0,6	0,1	0	78	0	1,8	5	100	250	15	5	10	2	40	2	1,0	2,0	50	2	0	0
13	84,63	2,50	1,6	136	-0,5	0,6	0	80	0	1,8	5	100	250	15	5	10	2	40	2	1,0	2,0	50	2	0	0
14	84,64	2,58	1,7	174	-0,6	5,4	0	80	0	2,0	5	100	250	15	5	10	2	40	2	1,0	2,0	50	1	0	0
16	84,72	3,15	1,9	119	-0,7	0,4	0	70	0	2,0	5	150	250	15	5	10	2	100	2	1,5	2,0	50	1	0	0
17	84,72	3,07	1,9	137	-0,8	0,9	0	70	0	2,0	5	150	250	15	5	10	2	100	2	1,5	2,0	50	1	0	0
18	84,72	2,94	1,5	97	-0,9	0,6	0	70	0	2,0	5	150	250	15	5	10	2	100	2	1,5	2,0	50	1	0	0
20	84,70	3,07	1,5	82	-0,9	2,7	1	85	0	1,5	10	200	500	20	3	10	2	30	3	1,0	2,5	200	2	0	0
21	84,67	3,40	1,6	78	-0,9	0,0	0	80	0		5	300	500	25	4	5	2	100	10	1,5	2,0	400	2	0	0
22	84,67	3,37	1,4	66	-0,9	0,9	0	80	0	1,5	20	200	500	30	5	10	2	30	3	0,5	3,0	300	2	0	0
00	84,69	3,24	2,5	33	-1,0	0,3	0	75	10	1,5	10	250	500	20	5	10	1	30	3	1,0	3,0	150	2	0	0

00:00 just reached a bigger lead
01:00 dredge station, very foggy
06:00 dredge station, vis. 10km
07:00 slightly foggy, vis. 4400m
08:00 at dredge position, preparing a track, vis. improved signifficantly since 0700 UTC
10:00 lowering dregde in an open water patch, dredge track prepared, visibility worsening
11:00 dredging, bad. vis. very variable, fog patches passing by
12:00 hieving dredge, vis. getting better
13:00 still hieving, vis. getting worse again
14:00 just left the station, going 7nm in 30 for next dredge
16:00 on dredge station, just operating in a big patch of open water, lowering dredge
17:00 still on dredge station
18:00 still on dredge station, cloudy conditions
20:00 dredge G11, searching for a good drdge sattion, cloudy but good vis.
21:00 it is snowing, dredge station G11 reached
22:00 light snow falling, dredge station
00:00 on dredge station, it is snowing, vis. 500m



5.8.2004

Hour	Port	Ahead	Starboard
6:00			
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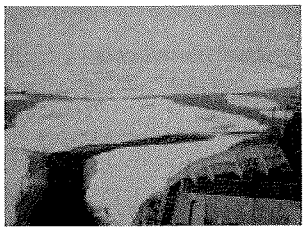
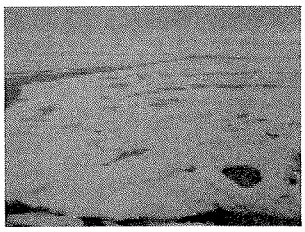
8:00			
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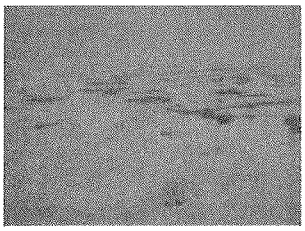
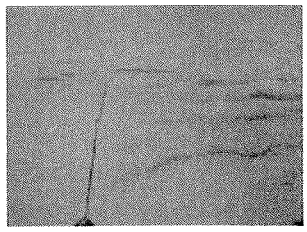
11:00			
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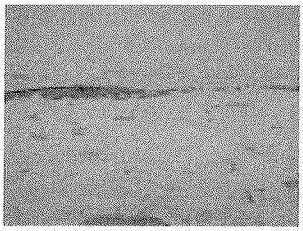
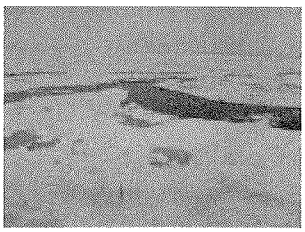
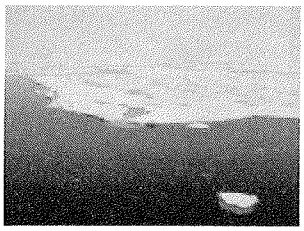
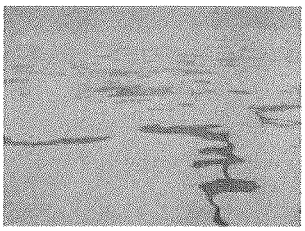
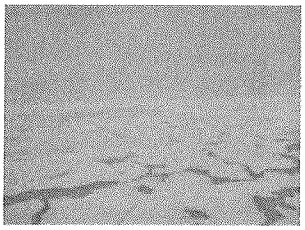
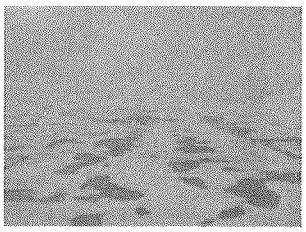
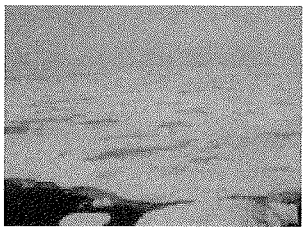
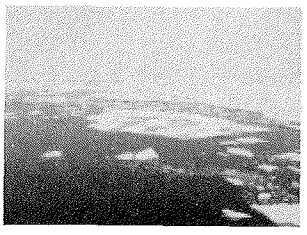
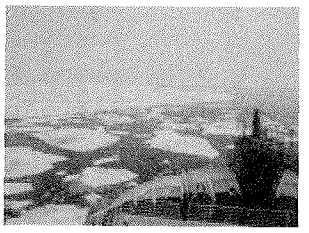
5.8.2004

Hour	Port	Ahead	Starboard
13:00			
14:00			
16:00			
17:00			
19:00			
20:00			

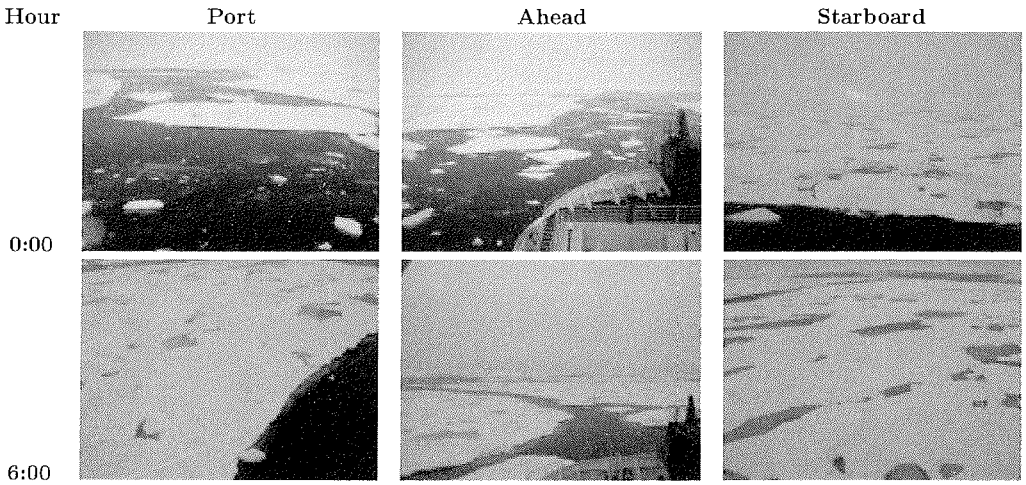
5.8.2004

Hour	Port	Ahead	Starboard
21:00			

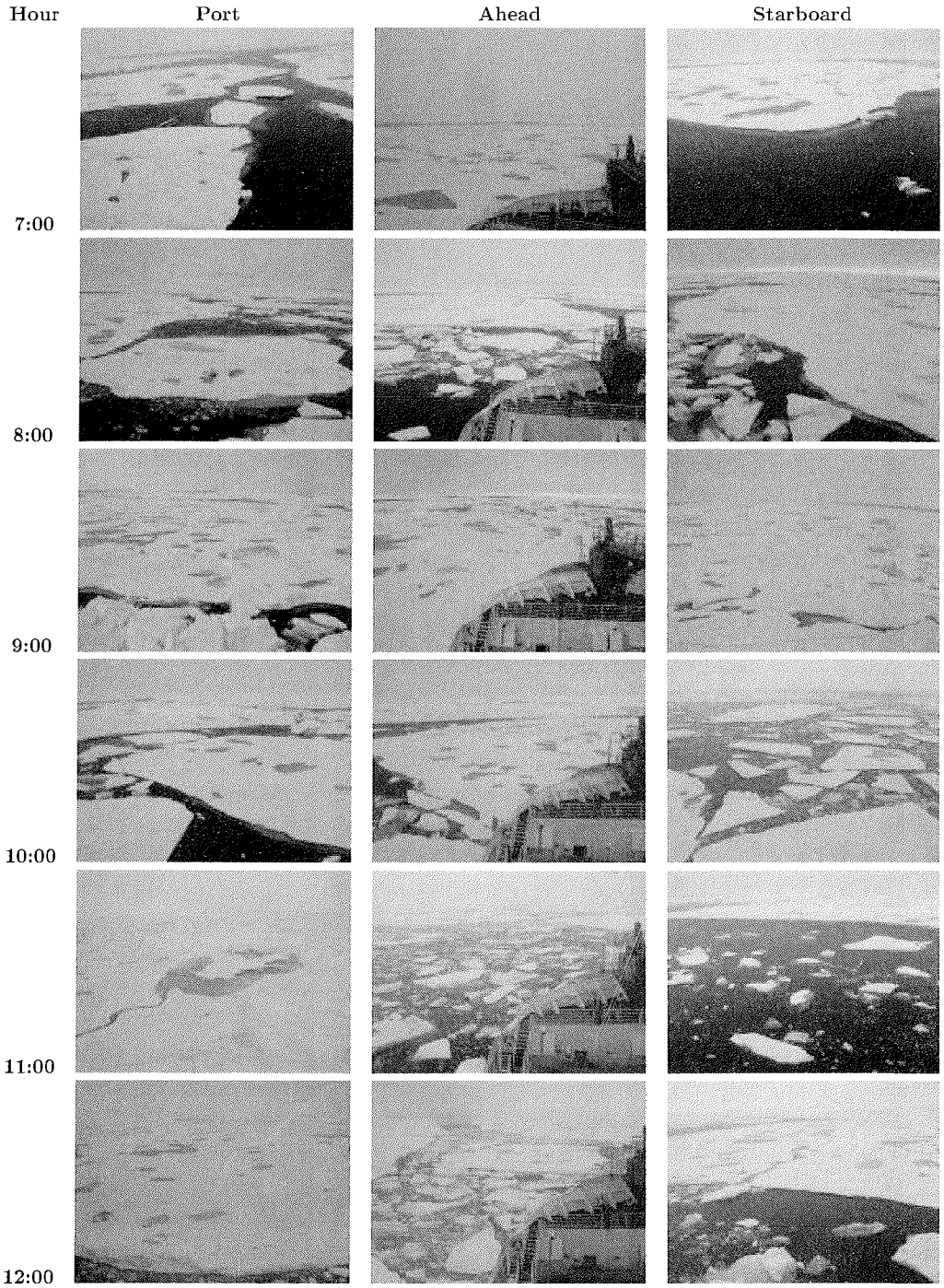
6.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
06	84.65	3.68	4.7	353	-1.3	0.3	0	80	0	2.0	15	150	500	20	5	10	1	20	2	1.0	2.0	30	2	0	0
07	84.64	3.66	5.1	343	-1.8	0.3	0	80	0	2.0	15	150	500	20	5	10	1	20	2	1.0	2.0	30	2	0	0
08	84.64	3.60	6.9	347	-1.7	6.0	2	80	2	2.0	10	100	250	20	5	10	5	10	2	1.5	2.5	50	2	0	0
09	84.60	3.46	7.6	332	-2.1	5.2	2	85	1	2.0	10	80	200	15	2	5	2	5		1.5	2.5	40	2	0	0
10	84.44	3.38	5.0	331	-2.2	0.2	0	85	1	2.0	10	100	300	20	3	15	1	30	3	1.5	2.5	50	2	0	0
11	84.59	3.41	5.6	335	-1.1	0.4	0	85	0	2.0	10	100	500	20	2	10	2	30	3	1.0	2.0	50	2	0	0
12	84.58	3.43	9.1	321	-0.8	1.3	0	90	0	2.0	10	150	500	20	2	15	1	30	3	1.0	2.0	100	2	0	0
14	84.57	3.53	9.8	312	-1.3	6.5	2	90	0	1.5	10	200	500	30	4	15	1	50	3	1.5	2.5	100	2	0	0
15	84.62	3.91	9.4	310	-1.7	0.2	1	90	0	1.5	10	400	1000	30	4	15	0	40	5	1.5	2.5	100	2	0	0
16	84.64	4.11	11.9	308	-1.8	6.0	2	90	0	1.5	5	300	500	40	5	10	1			1.0	2.5	200	1	0	0
17	84.65	4.22	11.3	317	-2.2	0.5	0	90	0	1.5	5	100	500	30	3	10	0				2.0	500	2	0	0
18	84.64	4.19	10.3	318	-2.1	0.7	0	90	0	1.5	5	100	500	30	3	10	0	20	2	1.5	3.0	400	2	0	0
19	84.64	4.20	11.0	319	-1.9	0.5	0	90	0	1.5	5	100	500	30	3	10	0	20	2	1.5	3.0	400	2	0	0
20	84.63	4.21	11.1	316	-1.7	0.4	0	90	0		10	200	500	20	3	20	0	50	5	1.5	2.5	500	2	0	0
21	84.59	4.47	9.5	312	-1.5	0.4	1	85	1		5	300	500	10	3	10	1	80	3	1.5	2.5	300	2	0	0
22	84.59	4.47	11.0	305	-1.9	2.7	0	85	0	1.5	10	300	500	30	3	10	1	100	10	2.0	4.0	200	2	0	0
23	84.57	4.55	10.6	315	-2.0	2.5	0	85	0	1.5	15	300	500	20	3	8	1	10	5	1.0	3.0	50	2	0	0

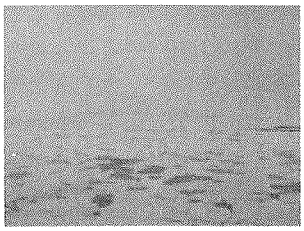
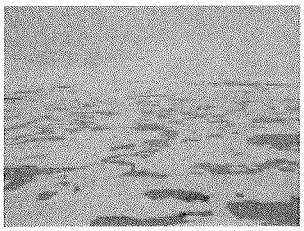
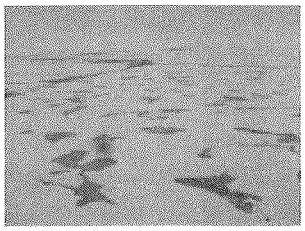
06:00 dredge station. vis. 7km
07:00 still dredge station vis. 4700m
08:00 heading for next dredge station ~3nm, vis. changing, fog fileds around
09:00 dense fog patches passing through, ice with fresh snow cover from yesterday evenings snow fall
10:00 dredging, vis. 5km but low ceiling, melt ponds start to refreeze
11:00 still dredging, foggy again, vis. 1000m
12:00 still dredging, foggy again, vis. 1000m, started to rain
14:00 Bird under way, good vis. for the moment
15:00 Bird is back, vis. decreasing
16:00 lot of ~50m leads between the floes
17:00 dredge station, scientists on the ice
18:00 dredge station, scientists on the ice
19:00 dredge station, scientists on board
20:00 dredge station, nice weather
21:00 searching for next dredge station
22:00 between dredge stations
23:00 between dredge stations (similar to an hour ago)



6.8.2004



6.8.2004

Hour	Port	Ahead	Starboard
14:00			
15:00			
16:00			
17:00			
18:00			
20:00			

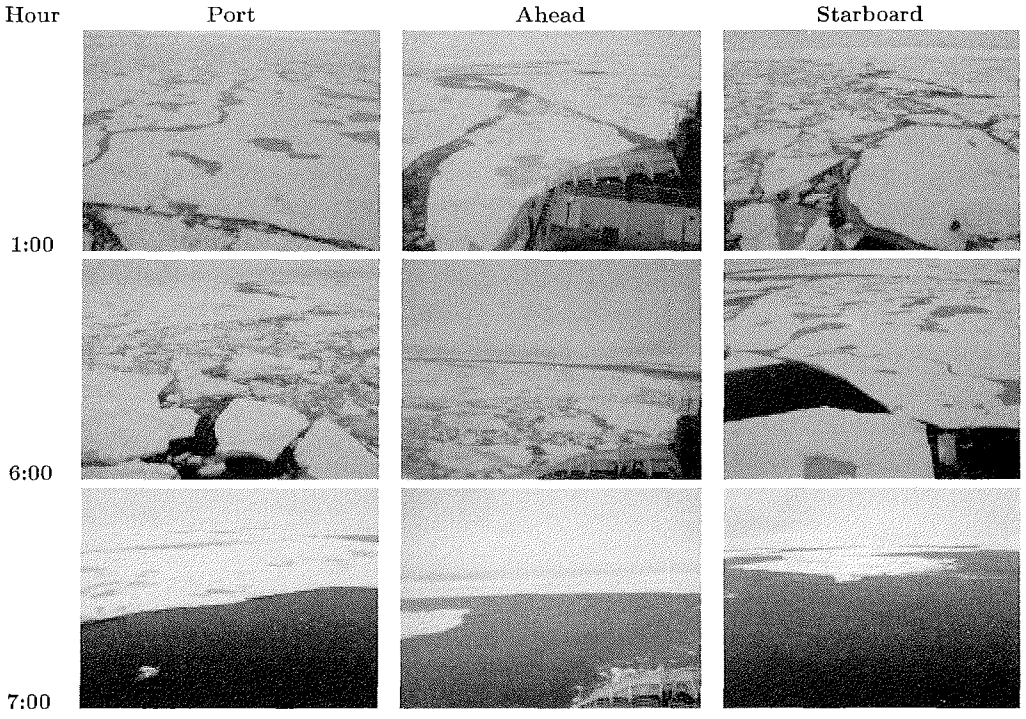
6.8.2004

Hour	Port	Ahead	Starboard
21:00			

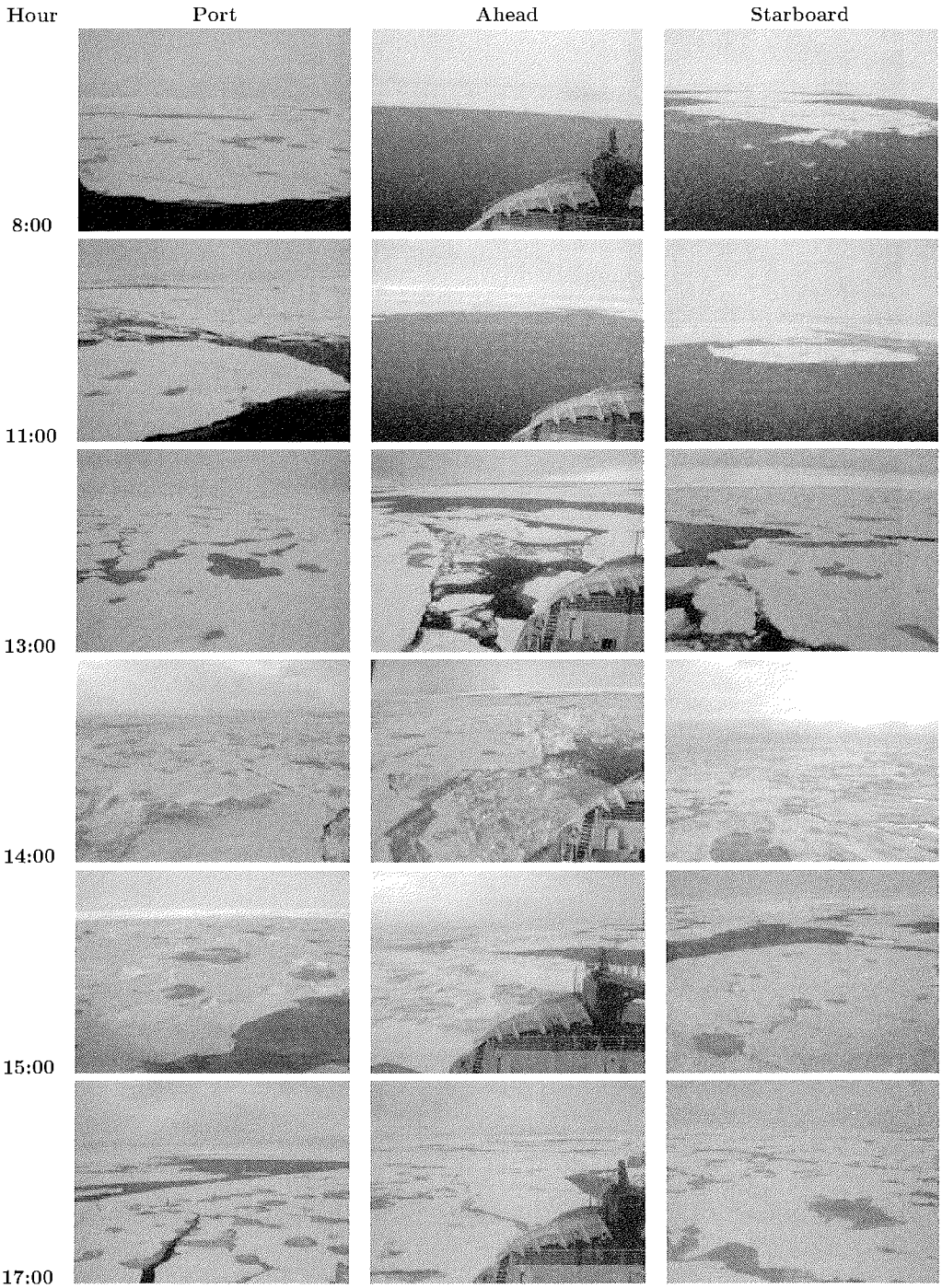
7.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	84,57	4,55	8,4	303	-1,8	2,0	0	85	0	1,5	15	300	1500	15	3	10	1	10	5	1,0	3,0	50	2	0	0
01	84,57	4,55	9,8	312	-1,9	0,3	0	85	0	2,0	10	300	600	10	2	10	3	30	2	1,0	2,0	40	2	0	0
06	84,51	4,95	8,6	308	-1,4	0,5	0	85	0	2,0	15	150	500	25	5	15	1	15	2	1,0	2,5	50	2	0	0
07	84,50	5,00	7,3	305	-1,0	0,2	0	80	0	2,0	20	150	500	25	5	20	1	75	2	1,0	2,5	30	2	0	0
08	84,50	5,00	7,6	306	-0,6	0,6	0	80	0	2,0	10	100	500	20	5	20	2	100	5	1,5	3,0	30	2	0	0
11	84,37	6,16	7,9	313	-0,9	6,2	2	80	0	1,8	10	150	500	20	5	15	2	30	10	1,5	3,0	30	2	0	0
13	84,45	6,63	7,3	312	-1,0	6,3	2	80	0	2,2	10	200	1000	15	5	15	2	30	2	1,0	3,0	40	2	0	0
14	84,48	6,20	7,8	309	-0,8	3,6	3	90	0	2,8	10	200	1000	15	5	15	2	20	2	1,5	3,0	70	2	0	0
15	84,53	5,75	10,0	307	-1,0	2,0	2	90	0	2,0	5	200	1000	10	3	10	0	20	5	1,0	2,0	75	2	0	0
16	84,57	5,23	8,6	315	-0,9	3,0	2	90	0		5	200	1000	30	5	20	2	20	5	1,0	2,0	200	2	0	0
20	84,75	3,37	8,3	325	-2,3	4,2	2	85	1	2,0	10	400		10	3	10	0	20	5	1,0	1,5	300	2	0	0
21	84,79	3,04	5,4	326	-1,9	4,1	1	90	0	1,5	10	300	1000	15	3	10	0	20	2	1,5	3,0	300	2	0	0
23	84,86	2,40	5,9	296	-2,2	2,6	1	85	0	2,0	10	500	1000	25	5	10		30	5	2,0	3,0	200	2	0	0

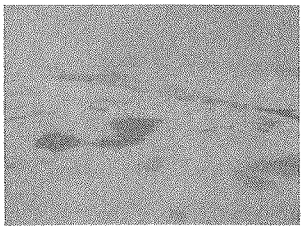
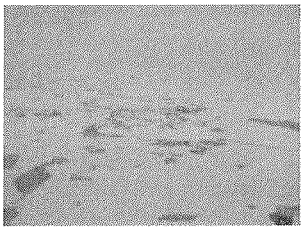
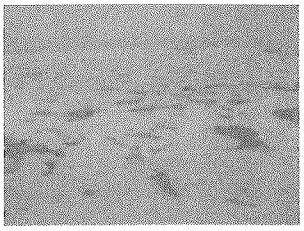
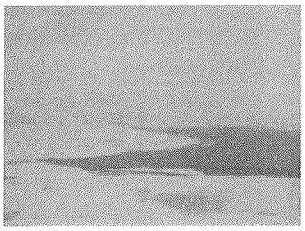
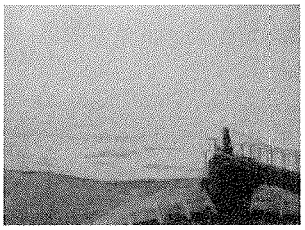
00:00 vis. 10km, dredging starts
06:00 vis. 10km, dredge station
07:00 dredge station in large lead, vis. 10km
08:00 hiving dredge, ship positioned in open water patch, variable vis., snow fall, next HS survey
13:00 some open water leads/areas without lead floes, vis. some km's
14:00 almost no more open water, ramming, ice gets thicker
20:00 vis. 2km, today is Bergfest day
21:00 vis. 3660m



7.8.2004



7.8.2004

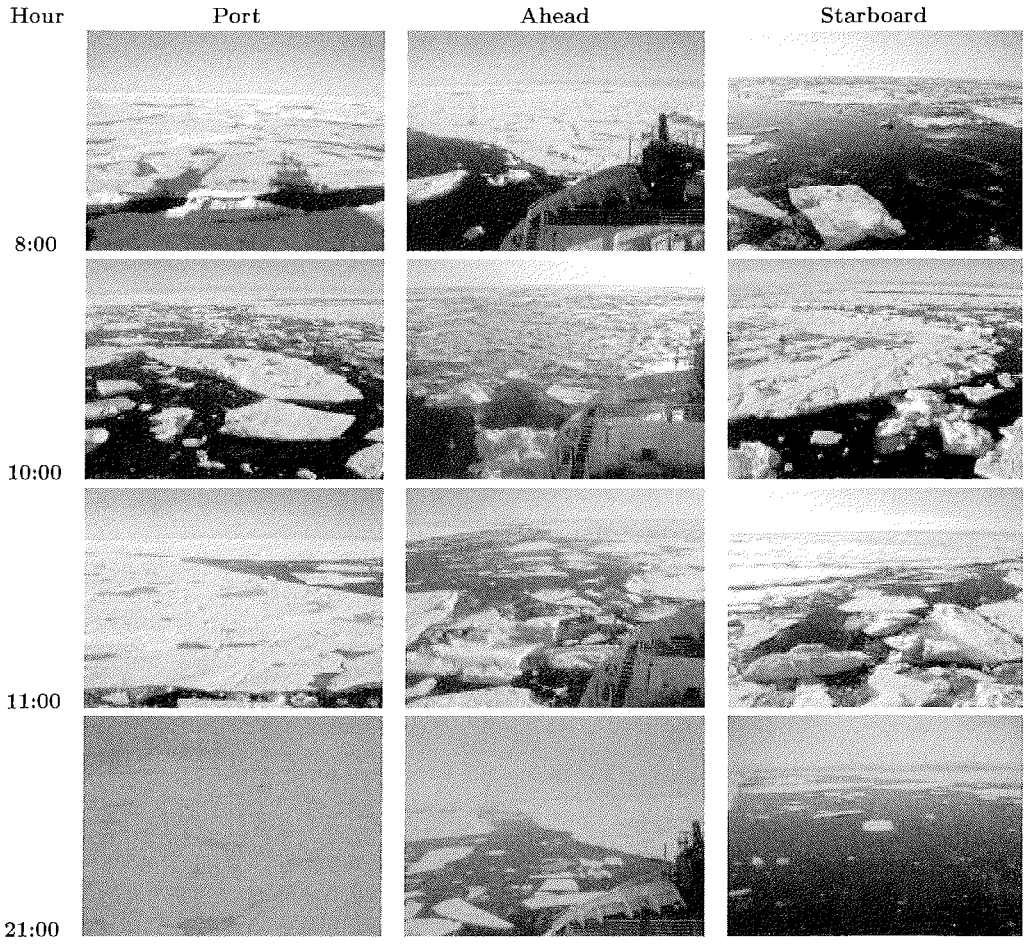
Hour	Port	Ahead	Starboard
20:00			
21:00			
23:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

8.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
08	84,63	1,14	3,1	285	-2,8	1.8	0	85	15	2,0	10	150	500	20	5	15	10	20	2	1.5	3,0	100	2	0	0
10	84,63	1.18	3.7	302	-2,3	0.7	0	85	20	2,0	10	100	500	20	5	10	10	30	2	1.5	2,5	100	2	0	0
11	84,62	1,25	3,1	306	-0,8	0,6	0	85	20	2,0	10	100	500	20	5	10	10	30	2	1.5	2,5	100	2	0	0
21	84,62	1.07	1,6	110	-2,4	0,0	0	80	1	1,5	5	200	1000	20	3	10	0	30	10	1.0	1,5	300	2	0	0
23	84,60	0,88	2,2	101	-3,5	5,3	1	85	10	2.0	10	300	400	30	5	10	1	50	10	2,0	3,0	200	2	0	0

08:00 arrived at dredge station
10:00 dredging, floe search successfull, enter THE floe with helicopter, best sunshine
11:00 dredging, setting grid on THE floe, still very sunny
21:00 still at ice station since 13:00, our floe diameter is around 740x550m
23:00 finger ice - winter is returning



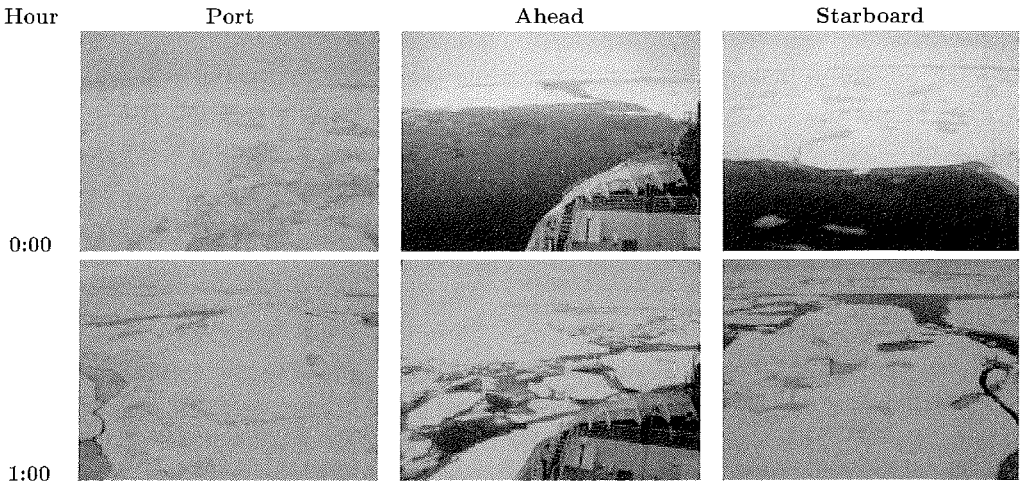
8.8.2004

Hour	Port	Ahead	Starboard
23:00			

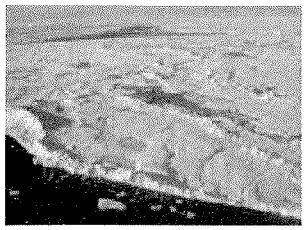
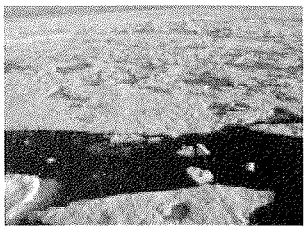
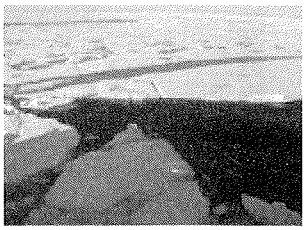
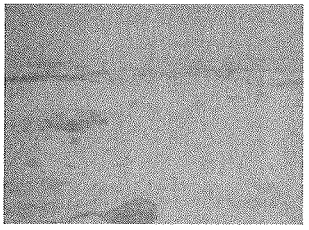
9.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing, [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	84,55	0,56	0,9	154	-3,7	4,4	2	85	1	2,0	10	40	200	15	3	15	1	8	1	1,0	3,0	20	2	1	0
01	84,50	0,86	1,7	103	-4,4	1,2	2	95	1	2,0	10	100	500	10	2	6	1	25	5	0,5	2,5	20	2	0	0
06	84,37	-0,56	2,6	133	-4,5	3,7	2	90	1	1,5	15	100	600	20	2	8	1	10	3	1,0	1,5	20	2	0	0
07	84,22	-0,91	2,3	150	-4,4	5,0	2	90	3	1,5	15	200	1000	20	3	8	1	10	2	1,0	1,5	15	2	0	0
08	84,25	-1,33	3.9	108	-4.5	7,8	2	85	3	1,8	10	250	1000	15	3	5	2	20	5	1,0	1,5	20	2	0	0
12	84,08	-2,39	3,1	140	-2,8	0,8	0	90	2	1,8	10	200		25	3	8	5	10	1	1,0	1,5	30	2	0	0
13	84,04	-2,32	4.1	148	-1.8	4,1	2	90	2	1,5	10	200	400	25	2	10	10	10	2	1,0	1.5	20	2	0	0
14	84,00	-2,71	3.3	134	-0.9	1,3	2	90	1	2,0	10	200	500	10	3	8	5	10	2	1,5	2.0	30	2	0	0
15	83,97	-2,94	4,2	126	-0.7	1,7	2	90	0	2,0	10	200	400	10	2	5	5	10	2	1,5	2.0	50	2	0	0
16	83,94	-3,32	4,4	141	-0.2	3,4	1	90	2	1,8	5	200	1000	15	3	10	2	50	50	1,0	2.5	200	2	0	0
17	83.89	-3,38	5,3	156	-0.1	3,5	2	90	2	1,5	5			25	5	20	0	50	20	1,0	1.5	500	2	0	0
18	83,85	-2,09	4,6	168	-0,1	6,8	1	90	0	1,5	10	300	2000	30	5	20	5	50	10	1,0	2,5	300	2	0	0
19	83.82	-3,15	4,4	145	-0.1	5,1	1	85	0	1,5	10	200	2000	30	5	20	5	20	10	1,5	2.5	200	2	0	0
21	83.79	-4,07	4,3	151	-0,1	2,1	2	90	1	1,5	10	200	500	20	3	15	0	15	5	1,0	2,0	300	2	0	0
22	83.76	-4,48	4,2	141	0,0	3,7	1	85	1	1,5	20	300	500	30	3	10	1	20	2	1,5	2,0	200	2	0	0
23	83.70	-4,72	4,5	166	0,2	3,8	1	80	3	1,5	20	300	600	25	3	10	2	40		1,5	3.0	100	2	0	0

00:00 vis. 2km, a little foggy, manyy broken ice floes
01:00 vis. 10km
06:00 vis. 10km
07:00 vis. 429496629m :-) melt ponds are frozen over, some finger rafting
12:00 very foggy, vis. 372m :-(waiting for helicopter to find ship in fog
13:00 "still very foggy, vis. 770m, steaming ""south"""
14:00 still very foggy, vis. 300m
15:00 vis. 250m
16:00 cloudy, vis. improved
17:00 vis. 500m
18:00 foggy, vis. 923m
19:00 slightly better vis.
21:00 a bit foggy, some larger floes in front of us
22:00 "A's ""Punsch"" observation"
23:00 foggy but vis. > 500m



9.8.2004

Hour	Port	Ahead	Starboard
6:00			
7:00			
8:00			
12:00			
13:00			
14:00			

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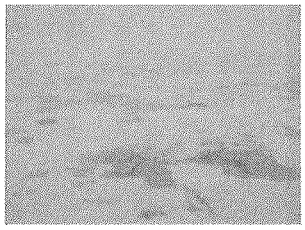
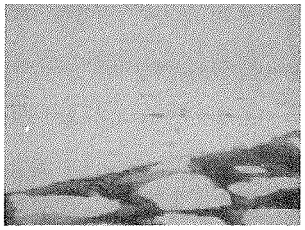
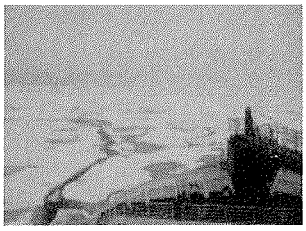
Hour	Port	Ahead	Starboard
15:00			
16:00			
17:00			
18:00			
19:00			
21:00			

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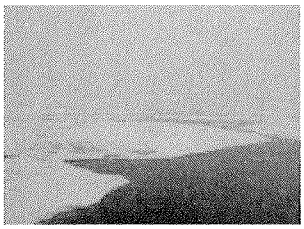
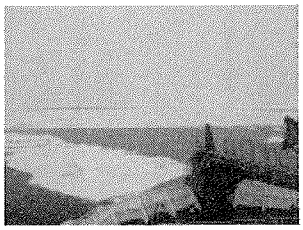
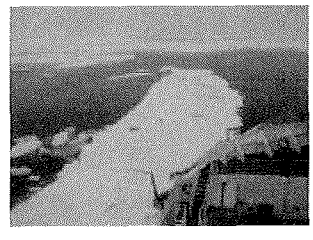
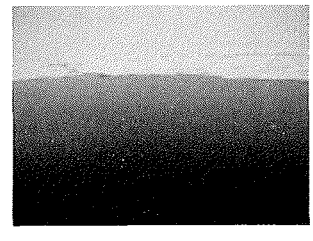
Hour	Port	Ahead	Starboard
22:00			

10.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	83,66	-4,83	3,6	163	0,4	7,2	2	90	0	1.5	10	200	1000	20	4	20	2	30	3	1.0	2,0	50	2	0	0
01	83,63	-5,15	4,0	156	0,3	2,9	3	90	0	1,5	5	50	1000	20	3	8	5	20	3	0.5	3,0	30	2	0	0
02	83,57	-5,51	4,6	154	0,2	5,0	2	85	0	2,0	10	30	1000	15	2	5	2	25	5	0.5	1,5	30	2	0	0
06	83,50	-6,56	3,2	130	-0,1	4,5	2	80	0	2.0	15	100	300	20	2	5	1	10	3	0.7	1,5	30	2	0	0
07	83,42	-6,70	2,9	122	-0,1	3,8	2	80	0	1,5	15			20	3	5	1	15	5	0,7	1,5	30	1	0	0
08	83,40	-6,94	2,9	121	-0,2	6,1	2	85	2	1,5	10			33	5	10	2	10	3	0,5	1,5	50	1	0	0
10	83,32	-6,88	1,9	164	-0,6	1,6	3	85	1	1,5	10	150		25	3	10	1	30	2	0,5	2,0	100	2	0	0
11	83,29	-6,97	1,1	189	-0,5	3,1	3	90	2	1,5	10	300		25	2	5	5	40	1	0,5	1,5	100	2	0	0
12	83,22	-7,14	0,4	114	-0,3	2,5	3	90	0	1,5	10	200		30	3	10	5	20	2	0,5	1,0	50	1	0	0
13	83,19	-7,30	0,7	356	-0,5	0,0	3	90	0	1.7	10	200	1000	25	5	10	4	8	2	1,0	1,5	30	2	0	0
14	83,13	-7,38	1,7	302	-0,4	0,0	3	95	0	1.8	10	200	500	20	5	10	3	5	1				2	0	0
15	83,08	-7,46	1,9	320	-0,5	6,5	2	90	5	1,9	5	50	200	25	3	8	2	2	0,5	1,0	1,3		1	0	0
16	83,03	-7,57	2,7	316	-0,5	6,8	2	90	5	2,0	5	500	1000	25	3	10	5	50	20	0,5	1,5	300	2	0	0
18	82,93	-7,82	4,1	318	-0,3	4,5	2	90	0	2,0	10	500	2000	30	4	20	5	20	5	1,5	2,5	200	2	0	0
19	82,87	-7,60	3,4	315	-0,2	4,2	2	90	0	2,0	10	500	2000	30	4	20	10	50	5	1,0	1,5	200	2	0	0
20	82,84	-7,37	5,2	322	-0,2	5,6	2	90	0	1,5	10	500	2000	15	3	25	2	30	5	1,5	3,0	300	2	0	0
21	82,80	-7,18	3,0	307	-0,2	0,6	0	90	0	1,5	5	300	2000	20	5	20	0	50	10	1,5	2,5		2	0	0
22	82,80	-7,20	3,9	308	-1,0	0,9	0	75	5	1,8	8	300	1000	20	3	10	0	30	5	1,5	2,5	200	2	0	0
23	82,80	-7,27	4,5	298	-1,5	0,4	0	85	2	1,8	5	300	1000	20	3	20	0	35	2	1,0	2,5	50	2	0	0

00:00 vis ~1km, foggy
01:00 vis ~6km
02:00 vis ~8km (instr.) but getting worse
06:00 vis 690m, very foggy
07:00 vis 250m
08:00 vis ~250m, dense fog
10:00 vis ~700m, still foggy, short ramming to get to next lead
11:00 vis 300m, short ramming, then again in lead (for 200m)
12:00 vis 200m, short ramming, then again in lead (for 200m)
13:00 vis ~300, very foggy
14:00 vis ~250m, very foggy, no ridges in vis. Radius
15:00 vis ~250m, very foggy, no ridges in vis. Radius
16:00 vis good, still cloudy
18:00 good vis, no sunshine, sun is fighting
19:00 decreasing vis.
20:00 vis ~1km, foggy
21:00 vis ~300m, very foggy but with some sunny parts
22:00 dredging, vis ~300m
23:00 dredging, vis ~1km, sunshine and fog

Hour	Port	Ahead	Starboard
0:00			

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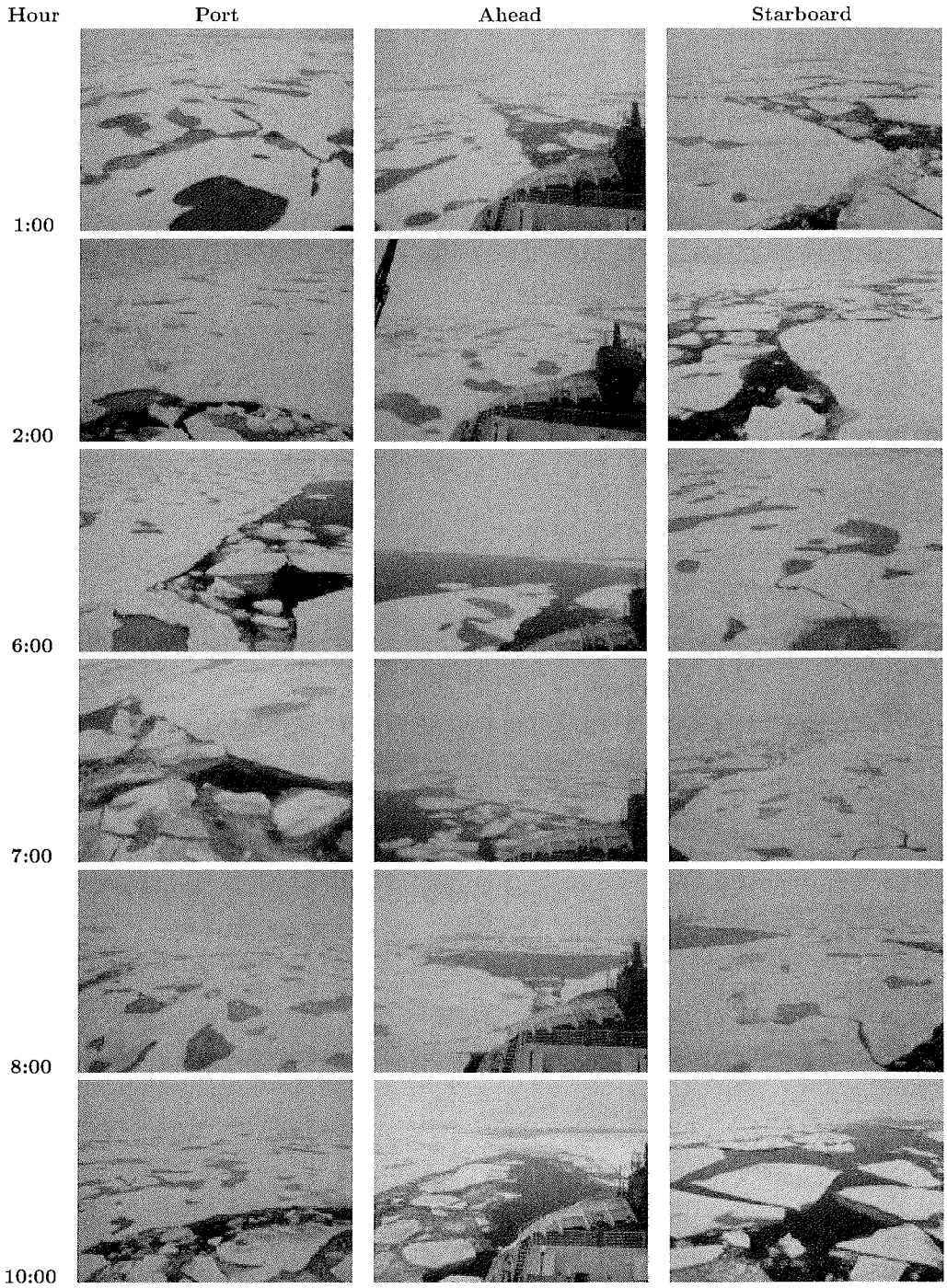

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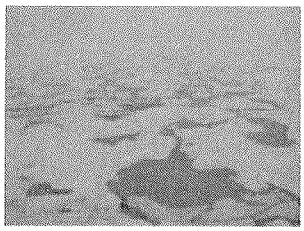
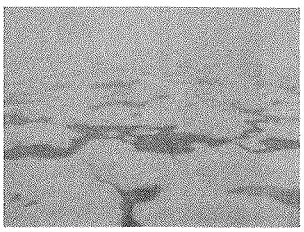
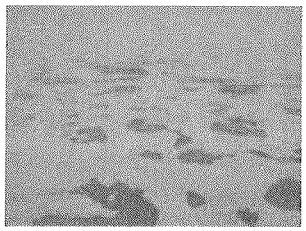
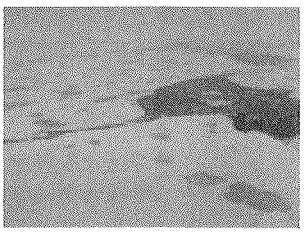
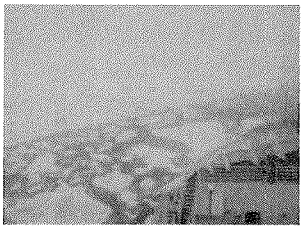
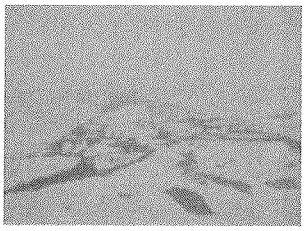
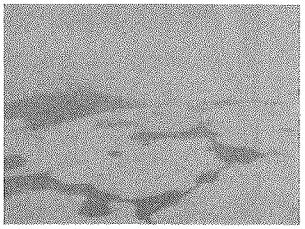
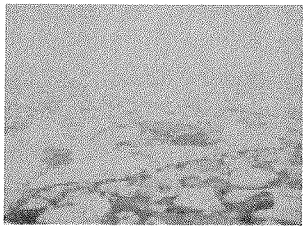
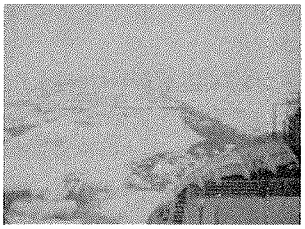
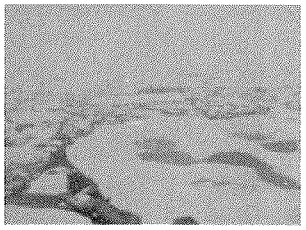
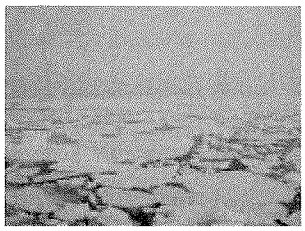
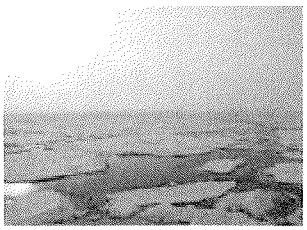
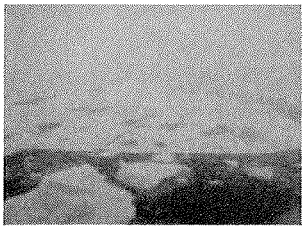
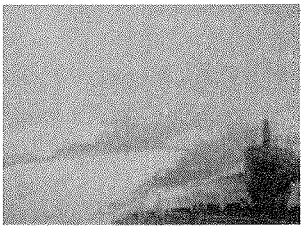
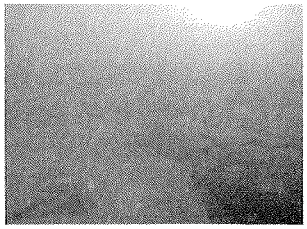
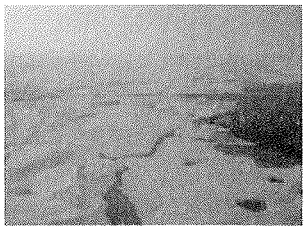
Hour	Port	Ahead	Starboard
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			

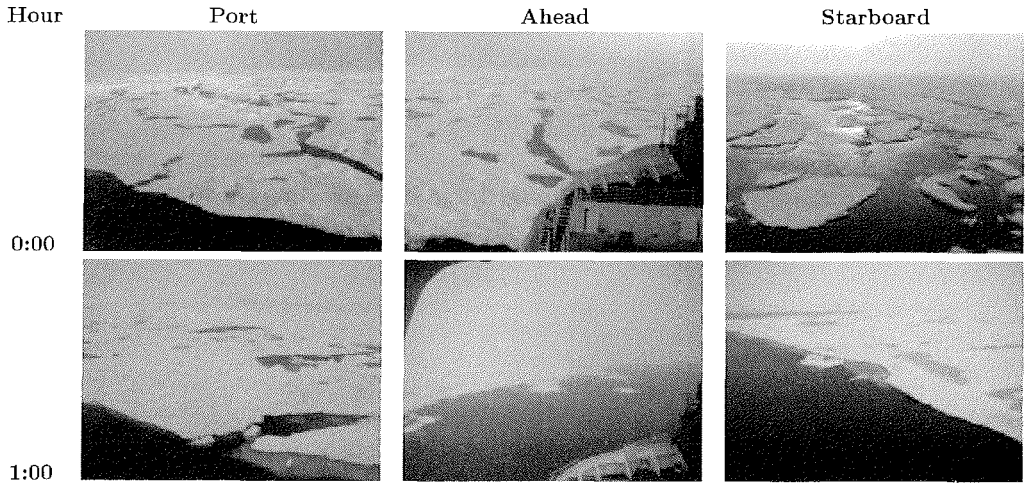
10.8.2004

Hour	Port	Ahead	Starboard
18:00			
19:00			
20:00			
21:00			
22:00			

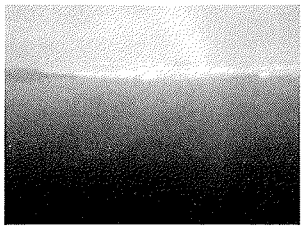
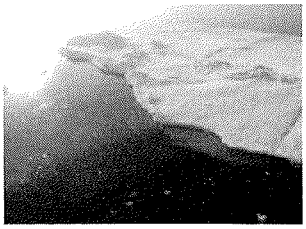
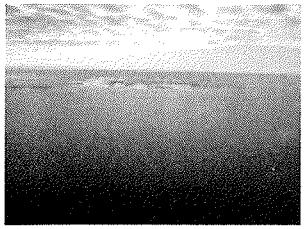
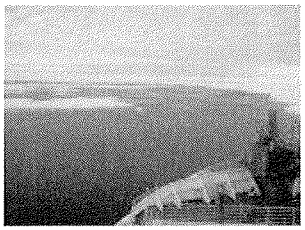
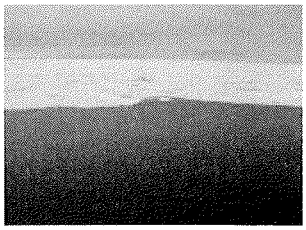
11.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,78	-7,26	5,5	309	-2,4	0,3	0	90	1	1,8	7	200	1000	20	5	20	0	100	3	1,0	2,0	80	2	0	0
01	82,81	-7,47	6,0	311	-2,4	5,4	2	80	0	1,0	5	200		15	2	15	5	10	3	1,0	2,0	25	2	0	0
07	82,65	-7,44	1,7	221	-3,4	2,2	2	75	10	1,0	10			20	2	5	1	100	10	0,7	1,5	50	2	0	0
08	82,66	-7,37	3,8	218	-2,8	0,9	0	70	2	1,0	10	100	1000	15	3	10	1	300	5	0,5	1,0	50	1	0	0
10	*82,65*	*-7,30*	*1,1*	*223*	*-1,5*	*0,3*	*0*	*70*	*3*	*1,0*	*10*	*150*	*800*	*20*	*3*	*10*	*2*	*200*	*5*	*0,5*	*1,5*	*100*	*2*	*0*	*0*
11	82,64	-7,28	1,3	186	-1,5	7,6	1	65	1	1,0	5	200	1000	20	3	15	1	100	5	1,0	1,5	100	2	0	0
12	82,62	-7,08	3,4	198	-1,0	3,4	1	65	0	1,0	8	100	500	20	3	10	2	150	5	0,5	1,5	100	2	1	0
13	82,53	-7,02	2,6	198	-0,6	6.8	1	50	0	1,0	5	100	500	15	3	10	1	300	7	1,0	2,0	100	2	0	0
14	82,41	-6,04	2,6	192	-0,4	9,6	1	50	0	1,2	5	200	1000	5	3	8	1	250	3	1,0	2,5	50	2	0	0
15	82,30	-5,86	3,3	165	-0,4	9,1		5	0	1,0	5	20	200	10	2	5	0			0,5	1,5	100	1	0	0
16	82,18	-5,53	1,6	194	-0,3	8,0	1	35	0	1,5	5	30	1000	15	2	5	0	300	30	1,0	1,5	500	2	0	0
17	82,04	-5,22	3,6	319	0,1	9,1		10	0	1,0	5	30	100	10	2	5	0			0,5	1,0		1	0	0
18	81,97	-5,21	3,6	327	0,3	8,5		10	0	1,0	5	30	200	20	2	5	0			1,0	1,5		2	0	0
19	*81,78*	*-4,56*	*3,7*	*317*	*0,2*	*9,2*		*10*	*0*	*1,0*	*5*	*20*	*200*	*20*	*2*	*5*	*0*			*1,0*	*1,5*		*2*	*0*	*0*
20	81,75	-4,21	3,8	304	0,4	9,3		5	0	1,0	5	5	60	20			0								
21	81,66	-3,48	3,2	344	0,8	0,0	0	85	1		5	300	1000	20	5	20	0	30	5	1,0	2,0	300	2	0	0
22	81,64	-3,13	3,7	355	-0,2	6,0	1	40	0	2,0	10	100	500	20	3	10				1,0	1,0		1	0	0

00:00 dredging, vis ~1km, sunshine and fog
01:00 vis ~350m, very foggy
07:00 very large lead, dredge station, very thin ice in lead, vis ~400m
08:00 on dredge station in a big patch of open water, at stb big ice floe, at port only small floes
10:00 on dredge station in open water patch, best vis, ceiling at 5000ft
11:00 best vis, ceiling at 5000ft
12:00 steaming south, approaching ice edge, best vis, ceiling at 5000ft
13:00 sunshine, vis ~10km, large open water areas
14:00 sunshine, vis ~10km, large open water areas
15:00 still some ice on the horizon
16:00 vast floe on stb
18:00 leaving the ice into open waters, calm sea, burning sunlight
19:00 at ice edge, sunny conditions, very good vis.
20:00 steaming parallel to the ice edge, sunny, good vis
21:00 good vis., back in higher ice concentration
22:00 fast approaching ice edge with tongues of ice on the horizon



11.8.2004

Hour	Port	Ahead	Starboard
7:00			
8:00			
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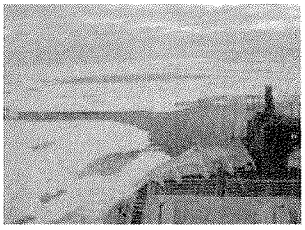
11:00			
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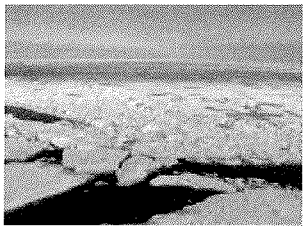
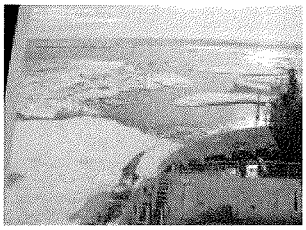
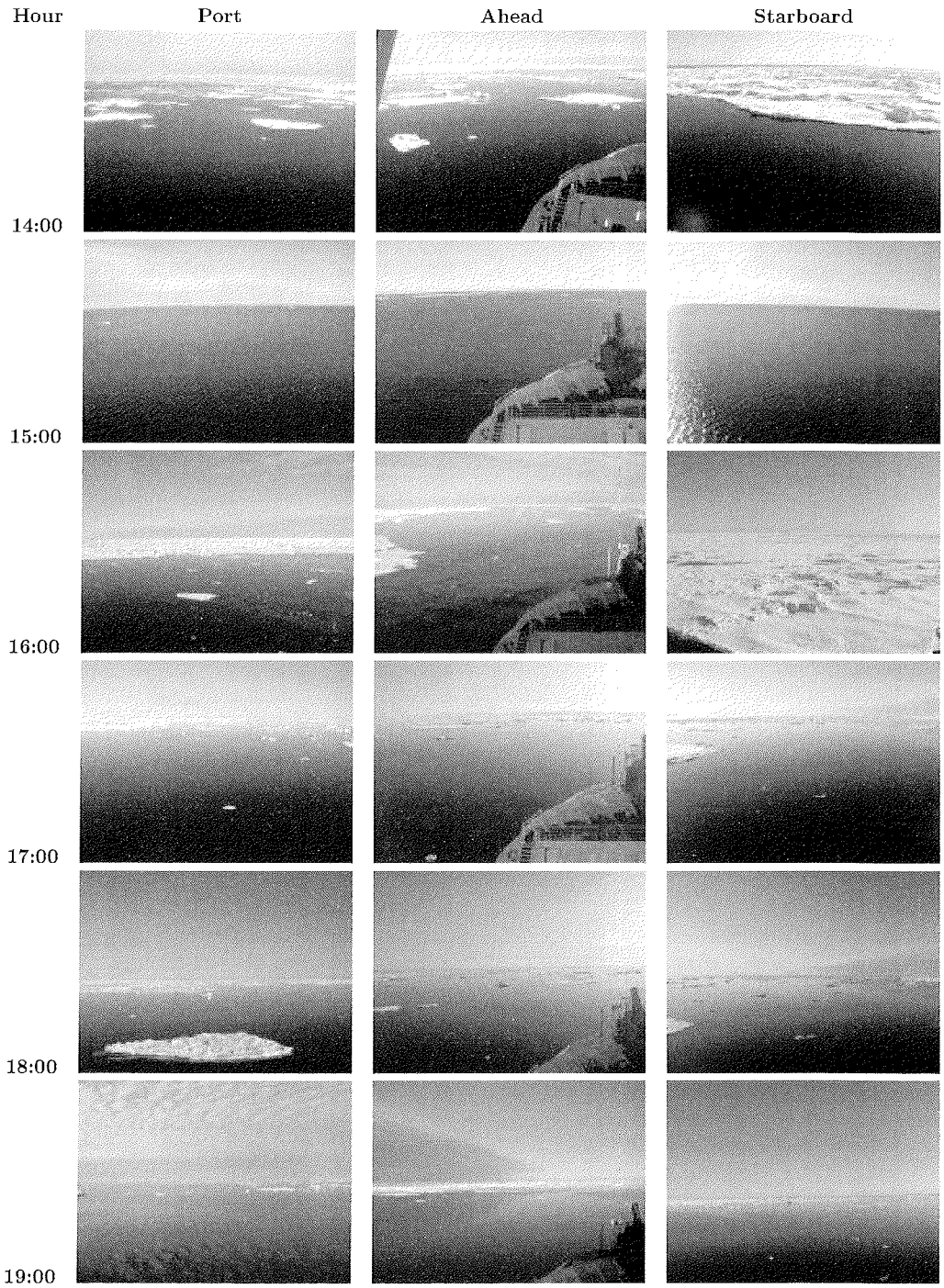
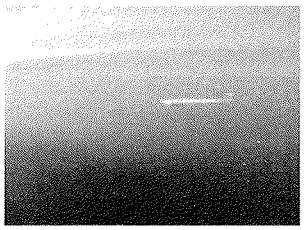
13:00			

11.8.2004



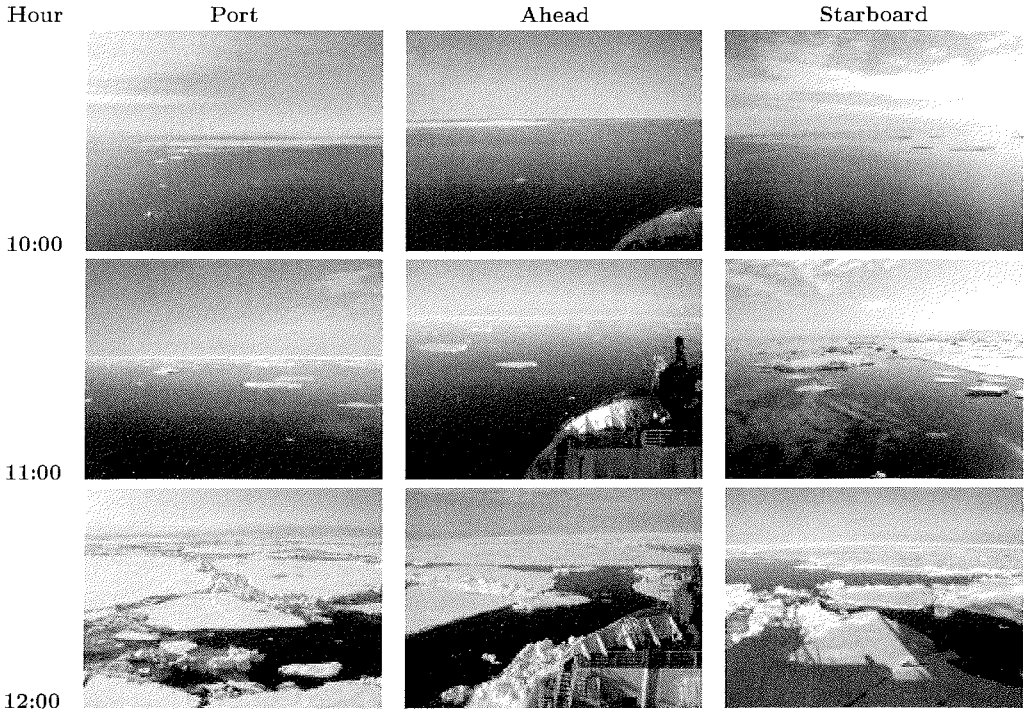
11.8.2004

Hour	Port	Ahead	Starboard
20:00			
21:00			

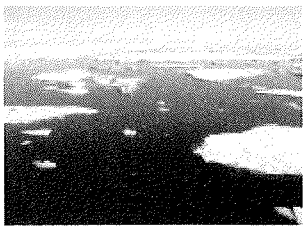
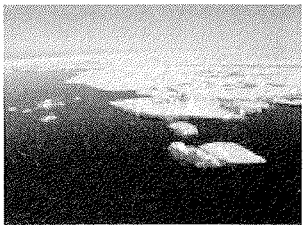
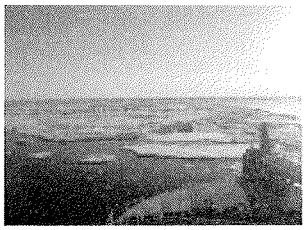
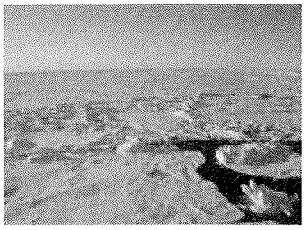
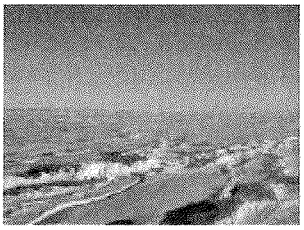
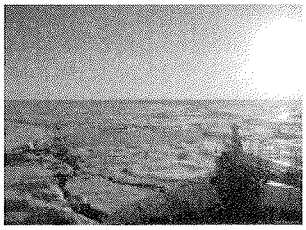
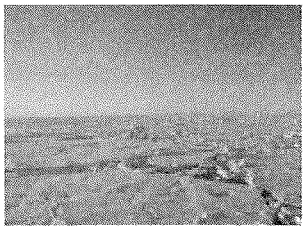
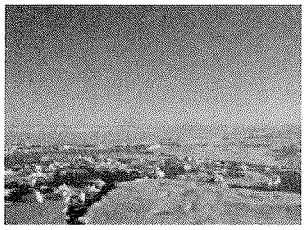
12.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
08	81,55	-2,46	0,7	110	-2,4	9,0																		0	0
10	81,85	-3,04	1,9	70	-1,1	8,9		25	0		10	20	200	10	2	5	0			1,0	1,5		2	0	0
11	81,96	-2,74	0,7	182	-1,2	8,7		30	0		5	10	150	10	2	5	0							0	0
12	82,04	-2,66	0,6	280	-0,9	6,5	2	75	0	1,5	8	50	200	20	2	5	1	20	2	1,0	1,5	100	2	0	0
13	82,09	-2,87	0,5	250	-1,1	8,5	2	75	0	1,5	5	100	250	15	4	8	0	20	2	1,0	2,0	100	2	0	0
14	82,12	-2,72	0,9	276	-0,5	0,0	0	75	0	1,5	5	200	1000	10	5	10	0	50	5	0,5	1,5	500	1	0	0
21	82,26	-3,79	4,1	267	-1,1	3,3	1	90	2	1,5	5	500	2000	10	3	10	0	20	5	1,0	2,0	300	2	0	0
22	82,29	-4,04	4,4	164	-0,7	4,1	2	80	1	1,5	10	200	1000	10	3	10			5	1,0	3,0	200	2	0	0
23	82,33	-4,31	5,0	165	-1,0	4,9	2	90	1	1,5	10	100	500	20	5	10				1,0	3,0	200	2	0	0

08:00 dense fog, only water around, no ice estimates
10:00 steaming in open water, best vis, nearly blue sky
11:00 steaming in open water, best vis, nearly blue sky
12:00 still sunny, best weather, waiting for floe, back in the ice
13:00 very good vis., beautiful ridges
14:00 stopped for floe station (port side)
21:00 good waether and vos.,increasing polar bear density, just seen the 3rd today
22:00 short leads or ponds to 200m
23:00 cloudless sky



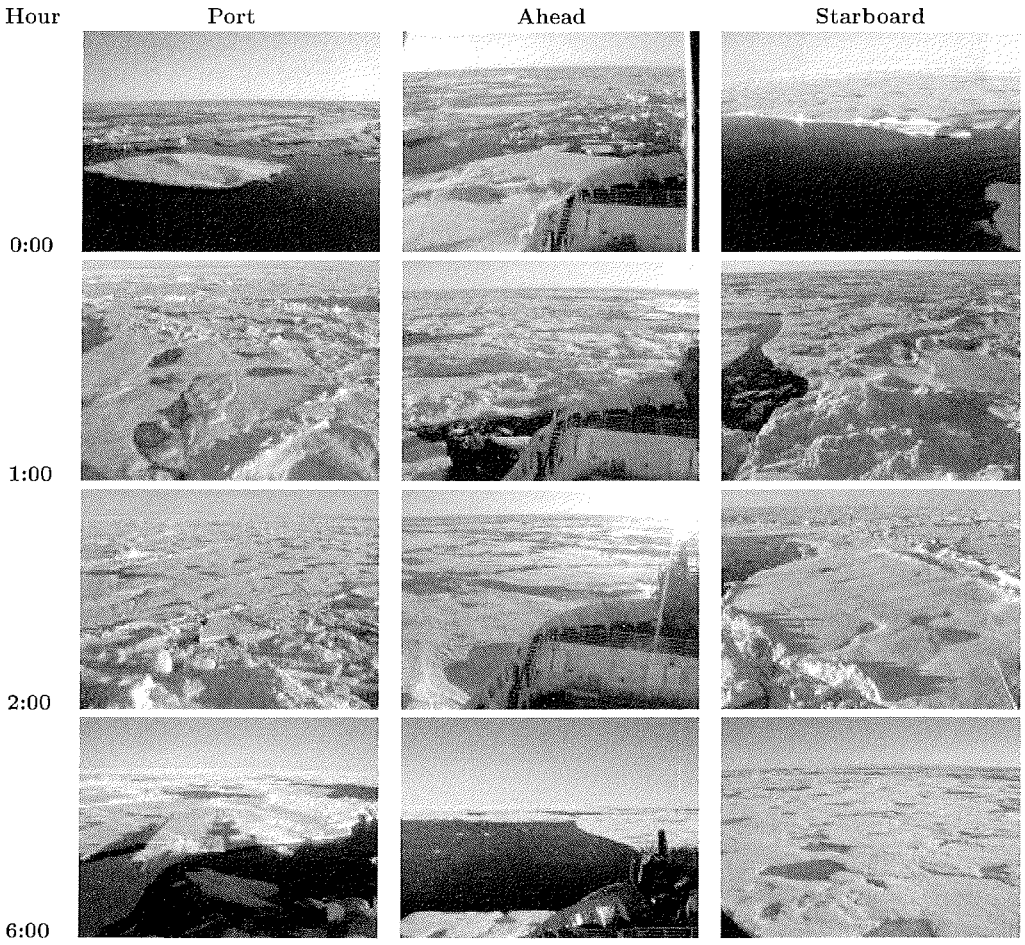
12.8.2004

Hour	Port	Ahead	Starboard
13:00			
14:00			
21:00			
22:00			
23:00			

13.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,34	-4,25	5,7	162	-1,6	5,3	2	90	1	1.8	5	100	1000	10	4	10	0	15		1,0	3,0	100	2	0	0
01	82,38	-3,85	6,1	170	-1,3	5,6	2	95	1	1.5	10	80	800	10	4	50	5			1,0	2,0	80	2	0	0
02	82,40	-3,89	5,6	161	-0,8	1,8	3	90	1	1.5	10	500	1000	10	3	10				1,5	4,0	30	2	0	0
06	82,63	-4,43	5,0	168	-0,4	4,5	2	80	0	2,0	10	200	500	15	5	10		5	1	2,0	5,0	50	2	0	0
08	82,61	-4,49	6,9	168	-0,6	0,3	0	80	0	2,0	10	150	1000	20	5	10	0	30	5	2,0	4,0	50	1	0	0

00:00 best weather, vis. max, many ridges
01:00 very high ice concentration , melt ponds refrozen at their surface
02:00 lovely, sunny, snow on floes like stars
06:00 pretty large pressure ridges
08:00 on station, dredge lowering in open water patch

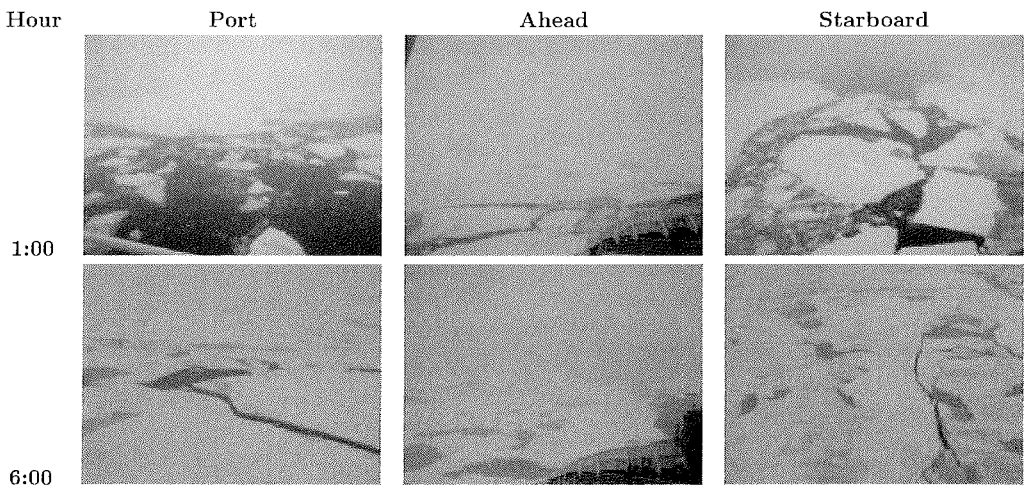


Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

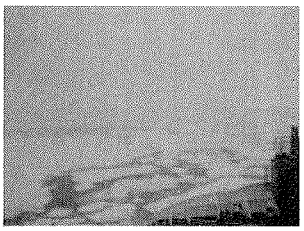
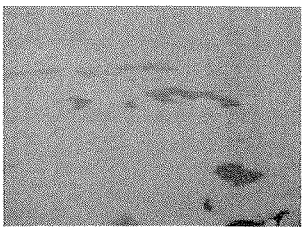
14.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes. diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
01	82.77	-4,18	4,2	199	-0,1	2,9	3	95	0	2,5	15			10	3	26	5		2	1,0	2,0		1	0	0
06	82,62	-3,97	4,4	204	-0,2	3,0	2	90	2	1,5	15	150		20	3	10	1	10	3	1,0	1,5	20	1	0	0
07	82,61	-4,75	4,0	209	-0,2	3,4	2	90	2	1,5	15	200	800	20	2	8	1	15	5	1,0	1,5	25	2	0	0
08	82,59	-4,65	3,7	260	-0,3	4,4	2	90	5	2,0	15	150		15	2	10	2	3		1,5	5,0	25	2	0	0
09	82,55	-5,14	2,0	292	-0,9	7,9	1	25	0	1,5	15	10													
10	82,43	-5,06	3,0	256	-0,7	8,0	1	50	2	1,5	10	50	200	20	2	10	1	100	5	1,0	2,0	30	2	0	0
11	82,48	-5,09	3,0	270	-0,4	0,8	0	60	2	1,5	10	50	300	20	2	10	0	150	5	1,0	1,5	50	2	0	0
12	82,48	-5,03	2,3	273	-0,1	0,1	0	65	2	1,5	10	50	200	20	2	10	0	100	5	1,0	1,5	30	2	0	0
14	82,47	-4,93	2,8	229	-0,2	6,4	2	60	2	1,5	10	100	1000	20	3	10	2	10	3	1,0	2,0	50	2	0	0
16	82,36	-4,32	3,1	202	-0,3	5,2	1	70	2	1,5	5	200	1000	25	4	8	3	100	20	1,0	2,0	200	2	0	0
17	82,34	-4,28	3,3	201	-0,2	4,5	1	65	0	1,5	5	200	1000	20	3	8	0	600	50	1,0	2,0	100	2	0	0
19	82,32	-4,68	4,0	178	-0,3	0,8	0	40	0	1,0	10	20	500	20	3	8	0	500	5	1,0	2,0		2	0	0
20	82,32	-4,62	4,3	168	-0,3	0,2	0	30	2		5	30	500	10	3	5	0	1000		1,0	2,0		2	0	0
21	82,33	-4,60	4,7	176	-0,3	0,2	0	30	2		5	30	500	10	3	5	0	1000		1,0	2,0		2	0	0
22	82,37	-4,75	6,1	162	-0,3	3,5	2	80		2,0	20	100	200	20	3	10	1			2,0	2,0		2	0	0

01:00 very poor vis ~150m
06:00 very foggy, vis ~180m
07:00 still very foggy, vis ~150m
08:00 very foggy, sea ice conditions hard to estimate
09:00 just operating in a wide lead, still very foggy, only remlins of sea ice around
10:00 good vis again, still in a lead, positioning for dredge
11:00 on dredge station
12:00 on dredge station, HEM flight to THE other floe, good vis., but cloud cover
14:00 good vis, many ridges, small spacing
16:00 Polarbear on port side
19:00 Polarbear on stb side (distance ~250m), on dredge station
20:00 on dredge station, Polarbear still swimming in front of us
21:00 same position and condition as on 20:00, bur more fog
22:00 very poor vis



14.8.2004

Hour	Port	Ahead	Starboard
7:00			
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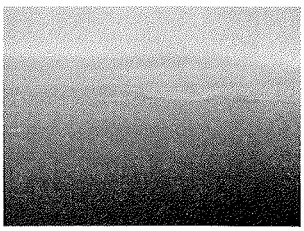
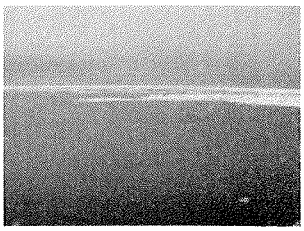
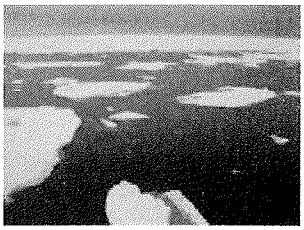
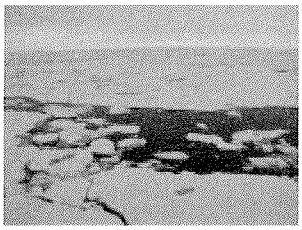
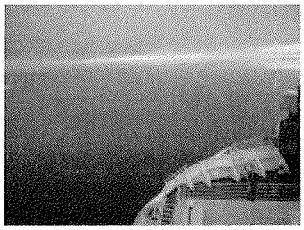
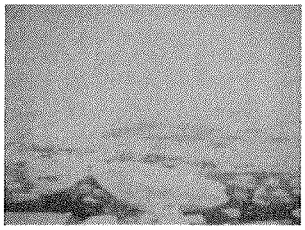
9:00			
10:00			
11:00			
12:00			

14.8.2004

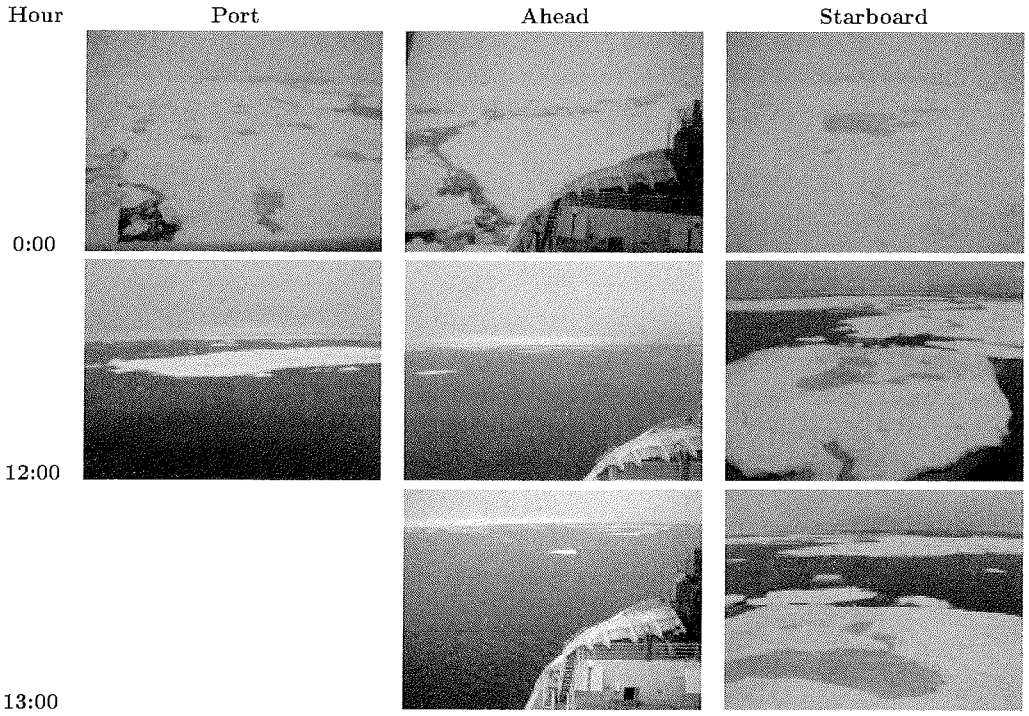
Hour	Port	Ahead	Starboard
14:00			
17:00			
19:00			
20:00			
22:00			

Data and color images are available via
http://www.awi-bremerhaven.de/Modelling/SEAICE/icereport04/index.html

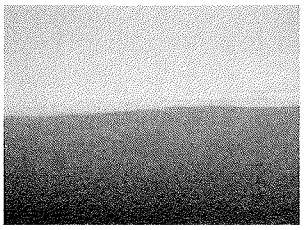
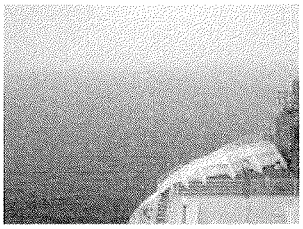
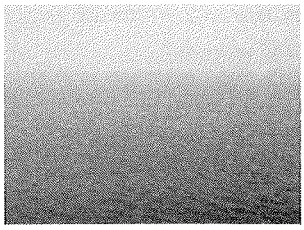
15.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes. diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,40	-4,93	6,0	155	-0,4	4,0	2	90	0	2,0	15	200	1000	10	2	8	1	2		1,0	2,0	100	2	0	0
12	82,12	-5,10	8,4	187	-0,1	0,6	0	25	0	2,0	10	50	200	15	3	15	1			1,0	2,5	50	2	0	0
13	82,12	-5,05	7,4	183	-0,1	0,0	0	20	0	1,8	8	50	200	15	3	15	1			1,0	3,0	50	2	0	0
15	82,03	-4,40	7,5	178	0,0	8,4	1	20	0	1,5	5	800	1000	20	2	10	0	1000	1	1,0	2,0	200	1	0	0
16	82,01	-4,68			-0,1	0,0	2	0																	
18	82,02	-4,62	7,2	181	0,0	0,7	2	15	0	1,0															
19	81,96	-4,47	7,5	172	0,2	8,7	1	15	0	1,0															
20	81,89	-4,42	6,6	171	0,3	7,2	1	60	0	1,5	10	100	500	10	3	5	5	80	15	1,0	2,0	300	2	0	0
23	82,15	-4,29	7,3	167	0,7	9,1	1	5																	

00:00 foggy, vis ~500m
12:00 good vis, low ceiling, on dredge station, single floes in open water
13:00 vis ok, a lot of open water, dredge station
15:00 fog coming in
16:00 no ice within vis ~200m, dense snowfall
18:00 good vis, dredging
19:00 foggy again
20:00 bathymetry profile, vis >6000m
23:00 ships dir 353 deg



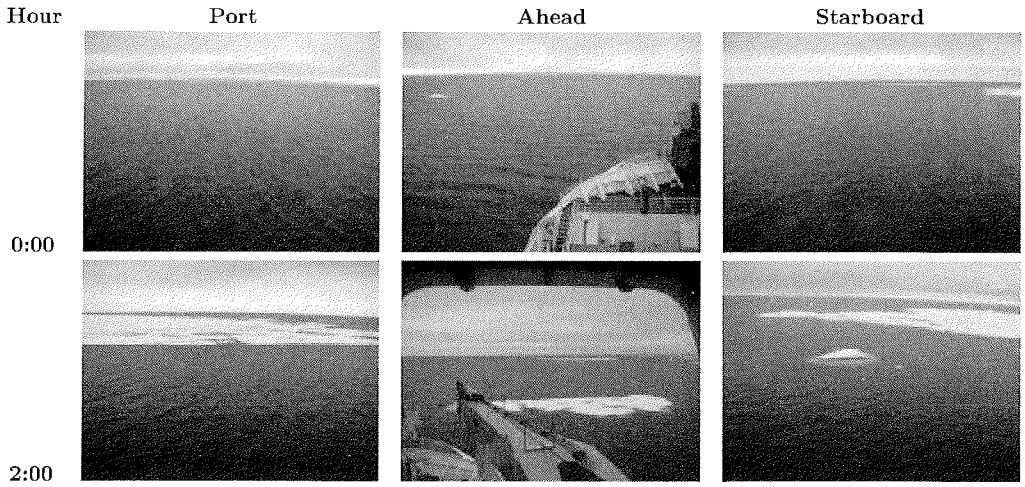
15.8.2004

Hour	Port	Ahead	Starboard
15:00			
16:00			
18:00			
19:00			

16.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
00	82,21	-4,35	7,5	165	0,2	9,2	1	5	0	1,0	10	10	200	10	3	6	0								
02	82,23	-4,21	7,5	170	0,2	4,3	2	10	0	1,0	10	10	150	10	2	5	0			1,0	2,0	30	2	0	0
18	82,56	-3,72	6,1	132	0,5	8,5		1																	2

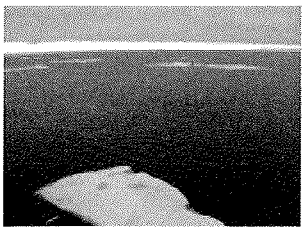
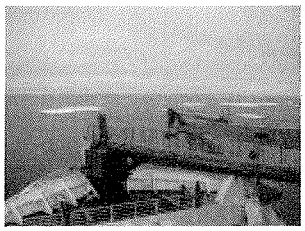
00:00 open water
02:00 ship stopped because of abandoned drift station N-32
18:00 iceberg on port side near the ship, another ahead several nm away



17.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
11	82,36	-3,39	4,5	142	1,0	0.0	0	10	0		5	10	100	15	2	5	0			1.0	1.5		2	0	0

11:00 just finished dredge station, cloudy but good vis

Hour	Port	Ahead	Starboard
11:00			

18.8.2004

Time UTC	Latitude [°N]	Longitude [°E]	True Wind speed [m/s]	True Wind direction [°]	Air Temperature [°C]	Ship speed [kn]	Operation mode: lead=1, floe ice=2, ramming=3	Total ice concentration [%]	C thin ice <30cm [%]	Typical sea ice thickness [m]	Snow thickness [cm]	Typical floe diameter [m]	Max. floe diameter [m]	Melt pond coverage [%]	Typical pond diameter [m]	Maximum pond diameter [m]	Dirty ice concentration [%]	Lead width [m]	Lead floes, diameter [m]	Typical ridge height [m]	Max. ridge height [m]	Typical ridge spacing [m]	Ridges: New=0,Old=1,Both=2	Rubble fields, coverage [%]	Icebergs, Number of
13	82,44	-4,32	8,2	179	-1,5	0,0	0	40	0	1,5	5	200	300	15	3	5	0			1,0	2,0	50	2	0	0

13:00 arrived at abandoned russian ice station N-32 again at ice edge, stay there for several hours

Hour	Port	Ahead	Starboard
13:00			