

FOR COLLATING CENTRE USE

CRUISE SUMMARY REPORT

Centre: DOD Ref. No.:

Is data exchange Yes In part No
restricted**SHIP** enter the full name and international radio call sign of the ship from which the data were collected, and indicate the type of ship, for example, research ship; ship of opportunity, naval survey vessel; etc.Name: PolarsternCall Sign: DBLKType of ship: Research Ice BreakerCRUISE NO. / NAME ARK XVIII/1

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

CRUISE PERIOD start 25/06/2002 to 24/08/2002 end
(set sail) day/ month/ year day/ month/ year (return to port)PORT OF DEPARTURE (enter name and country) Bremerhaven, GermanyPORT OF RETURN (enter name and country) Tromsø, Norway**RESPONSIBLE LABORATORY** enter name and address of the laboratory responsible for coordinating the scientific planning of the cruiseName: AWIAddress: Postfach 120161, 27515 BremerhavenCountry: Germany**CHIEF SCIENTIST(S)** enter name and laboratory of the person(s) in charge of the scientific work (chief of mission) during the cruise.Prof. Dr. Peter Lemke, AWI, Bremerhaven**OBJECTIVES AND BRIEF NARRATIVE OF CRUISE** enter sufficient information about the purpose and nature of the cruise so as to provide the context in which the report data were collected.

1. Geology and benthos biology in the vicinity of Denmark Strait (piston corer, box corer, multi corer)
2. Geology and benthos biology in the East Greenland Current near 75N (gravity corer, multi corer, box corer, OFOS, Agassiz-trawl)
3. Hydrography and biology at 75N across the Greenland Sea (CTD/Rosette water sampler, ADCP, 3 Yo-Yo moorings recovered and re-deployed)
4. Hydrography and biology at 78°50'N across Fram Strait (CTD/Rosette water sampler, 10 moorings recovered, 12 moorings deployed)
5. Benthos biology and geochemistry in the eastern Fram Strait at 79N, 4E (multi corer, OFOS, bottom water sampler, lander: micro-profiler and respirometer)
6. Benthos biology and geochemistry at Hakon Mosby Mud Volcano (multi corer, OFOS, CTD/Rosette water sampler, bottom water sampler, lander: micro-profiler)

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

SUMMARY OF MEASUREMENTS AND SAMPLES TAKEN

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

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

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

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

PI	NO	UNITS	DATA TYPE	DESCRIPTION
see page 2	see above	see above	Enter code(s) from list on cover page	Identify, as appropriate, the nature of the data and of the instrumentation/sampling gear and list the parameters measured. Include any supplementary information that may be appropriate, e. g. vertical or horizontal profile, depth horizons, continuous recording or discrete samples, etc. For samples taken for later analysis on shore, indication should be given of the type of analysis planned, i.e. the purpose for which the samples were taken.
A	9	cores	G04	piston corer in the vicinity of Denmark Strait
A	5	cores	G04	multi corer in the vicinity of Denmark Strait
A	11	cores	G04	box corer in the vicinity of Denmark Strait
B	2	cores	G04	gravity corer in the Greenland Sea
B	13	cores	G04	multi corer in the Greenland Sea
B	6	cores	G04	box corer in the Greenland sea
B	6	stations	G08	OFOS in the Greenland Sea
B	3	hauls	B17, B18	Agassiz-trawl in the Greenland sea
B	13	stations	G90	sediment samples on sea ice floes in East Greenland Current
B	21	stations	B08, B09	rosette water bottles for biology in Greenland Sea and Fram Strait
B	18	stations	B08, B09	sea ice samples for biology in East Greenland Current
B	13	stations	B08, B09	melt pond samples on sea ice floes for biology in East Greenland Current
B	5294	n. miles	G74	bathymetry, HydroSweep, Parasound during most of the cruise
C	90	stations	H10	CTD casts in Greenland Sea
C	2	stations	H10	towed CTD in Greenland Sea
C	7	stations	H09, H33	rosette water bottles for CFCs
C	101	stations	H10	CTD casts in Fram Strait
D	11	stations	H21, H33	bottom water sampler in eastern Fram Strait
D	16	cores	G04	multi corer in eastern Fram Strait
D	4	stations	G08	OFOS in eastern Fram Strait
D	4	stations	G71	micro-profiler lander in eastern Fram Strait
D	2	stations	G71	respirometer lander in eastern Fram Strait
D	10	stations	H21, H33	bottom water sampler near Hakon Mosby Mud Volcano
D	9	cores	G04	multi corer near Hakon Mosby Mud Volcano
D	4	stations	G08	OFOS near Hakon Mosby Mud Volcano
D	3	stations	G71	micro-profiler lander near Hakon Mosby Mud Volcano
D	10	stations	H33	rosette water bottles for methane near HMMV
D	15	stations	H09, B07	rosette water bottles for oligothrophic bacteria in Greenland Sea and Fram Strait
E	22	cores	B18	box corer on Jan Mayen Sporn and Vesterisbanken
E	3	hauls	B18	Agassiz-trawl in eastern Fram Strait
E	2	stations	B18	rosette water bottles on Jan Mayen Sporn and Vesterisbanken
F	59	ascents	M06	routine radiosonde ascents and met. observations

Please continue on separate sheet if necessary

<p>TRACK CHART: You are strongly encouraged to submit, with the completed report, an annotated track chart illustrating the route followed and the points where measurements were taken.</p>	<p>Insert a tick(✓) in this box if a track chart is supplied</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> ✗ </div>
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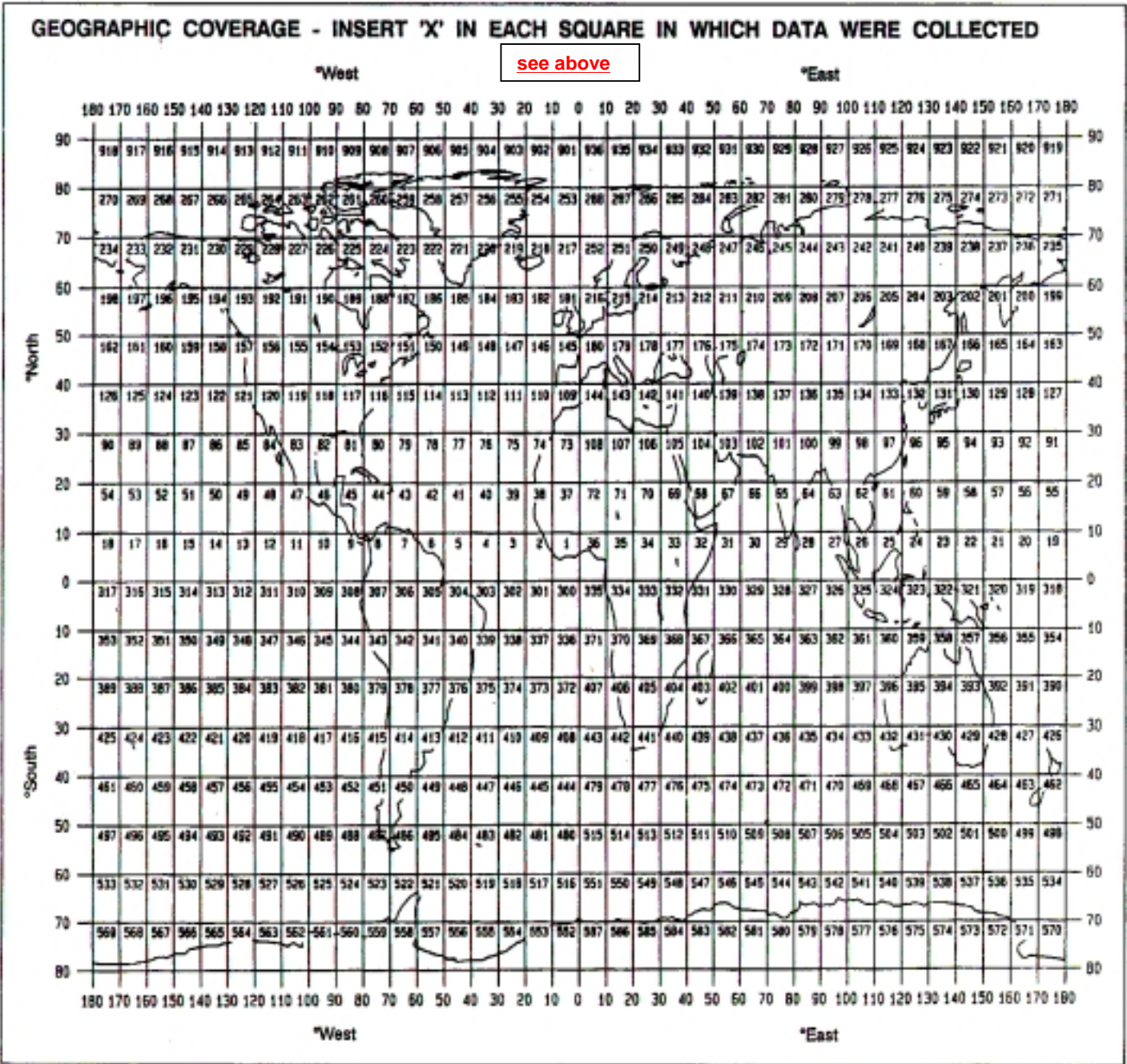
GENERAL OCEAN AREA(S): Enter the names of the oceans and/or seas in which data were collected during the cruise – please use commonly recognised names (see, for example, International Hydrographic Bureau Special Publication No. 23, 'Limits of Oceans and Seas').

Irminger Sea, Denmark Strait, Greenland Sea, Fram Strait, Norwegian Sea

SPECIFIC AREAS: If the cruise activities were concentrated in a specific area(s) of an ocean or sea, then enter a description of the area(s). Such descriptions may include references to local geographic areas, to sea floor features, or to geographic coordinates.

Please insert here the number of each square in which data were collected from the below given chart

220, 219, 254, 253, 288, 287



THANK YOU FOR YOUR COOPERATION
 Please send your completed report without delay to the collating centre indicated on the cover page

Polarstern Expedition

ARK XVIII/ 1 a, b

25.06.2002 – 24.08.2002

Bremerhaven - Tromsø

Fahrtleiter / Chief Scientist

Peter Lemke

KOORDINATOR /COORDINATOR

Eberhard Fahrbach

Summary and itinerary

Polarstern left the port of Bremerhaven for cruise ARK XVIII/1 on 25 June 2002 to perform oceanographic, geological and biological investigations in the East Greenland Current and the northern Greenland Sea (see figure). In the beginning long sediment cores were taken on several transects across the lower East Greenland continental margin to the south and north of Denmark Strait, which will help to uncover the variability of thermohaline surface and deepwater circulation at multidecadal resolution over the last 150,000 years from glacial to interglacial and stadial to interstadial times. At the same time a multicorer was employed on several transects for sampling the modern faunal, geo-chemical, and isotopic distribution patterns on the lee and luff side of the Denmark Strait Overflow. Continuing north of Denmark Strait sponge communities on arctic spiculite mats of Vesterisbanken and Jan Mayen Sporn were investigated. Autochthonous spiculites are mats of sponge silicate spicules which host a rich endofauna of sponge species.

The goal of biological and biochemical work performed on Polarstern during the BMBF project ARKTIEF-II was to assess large-scale distribution patterns of benthic organisms in and around channel systems crossing the eastern Greenland continental margin and the deep central Greenland Sea, and to estimate benthic processes within these areas and their relevance for the Arctic Ocean ecosystem. The geological work of ARKTIEF-II aimed at characterizing the influence of resuspension and transport processes on the vertical fluxes of biogenic and terrigenous particles in the Greenland basin in order to estimate the influence of these sedimentation processes on geological time-scales.

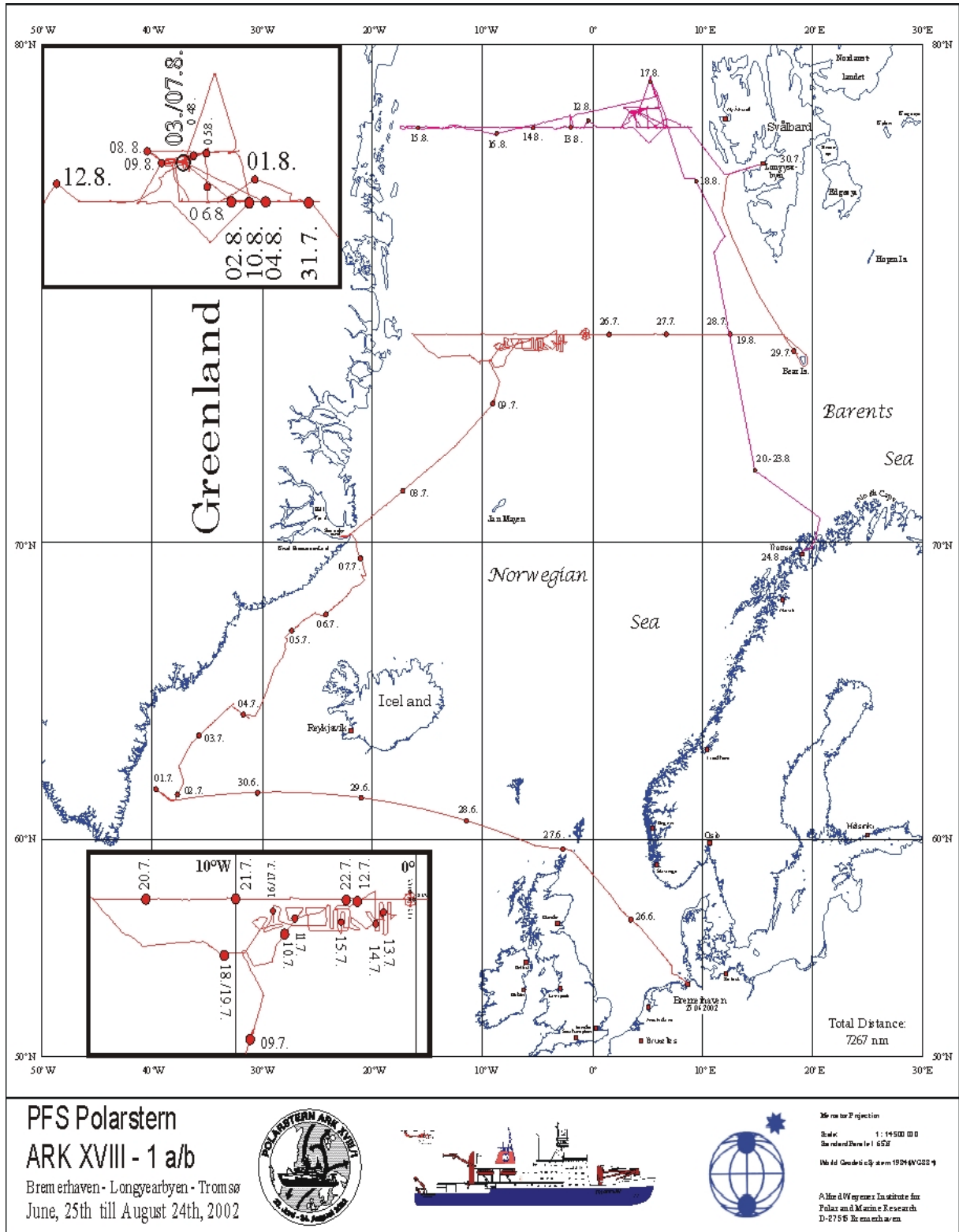
The following oceanographic work included a hydrographic section along 75N, which is repeated each year in order to investigate long-term changes in water masses and especially in the renewal of deep and bottom water in the Greenland Sea. Due to light ice conditions this section started for the first time in immediate vicinity of the coast of Greenland. Another highlight were the extensive measurements of a deep sea eddy. During the course of the section and the eddy work, velocity profiles were taken with a new ADCP (Acoustic Doppler Current Profiler) to obtain estimates of vertical mixing rates. Furthermore, the existing time-series of CFC measurements were continued.

After completion of this work, several members of the scientific community were exchanged at Longyearbyen. In the beginning of the second part of this cruise leg, interdisciplinary work at a deep-sea long-term station in the benthic 'Hausgarten' was performed to investigate the effects of physical, chemical and biological gradients in the deep sea on the dynamics of benthic bacterial communities.

Oceanographic work, which followed was dedicated to investigate the water mass exchange between the Arctic and the North Atlantic and the circulation in Fram Strait. A hydrographic section along 79N was taken, and water samples for tracer determination were collected. In total, on both sections (75N and 79N) eighteen moorings were recovered, and sixteen were re-deployed, to enlarge the existing time-series for the investigation of long-term variability.

During the entire cruise studies of protists in the food web of the Greenland Sea were undertaken, especially concerning the role of mixotrophic protists in the water column, the trophic function of heterotrophic and mixotrophic protists of the sea ice and the relative importance of grazing and nutrient control within the pelagic microbial food web, with special reference to species-specific differences. In addition the quantitative distribution and diversity of oligotrophic, low-nutrient bacteria was investigated by means of classical and molecular biological methods.

The final research component of this cruise was concerned with geo-chemical investigations at the Håkon Mosby Mud Volcano. These investigations aimed at the assessment of the total methane release and of the fate of methane within the water column. After the conclusion of this work Polarstern steamed towards Tromsø and reached port on 24. August 2002.



RV "Polarstern"
 Reederei F. Laeisz GmbH
 - master -

On board, 2002-08-14

Research Cruise ARK XIII /1 a + b - RV "Polarstern"
 25. June – 24. August 2002

Recover	Description	Depth	Latitude	Longitude
<u>moorings recovered:</u>				
08/ 2002	F 1-4	260m	78 50,33 N	008 38,65 E
08/2002	F 2-5	790m	78 50,37 N	008 18,35 E
08/2002	F 3-4	1030m	78 50,33 N	007 56,16 E
08/2002	F 4-4	1480m	78 49,95 N	006 56,60 E
08/2002	F 5-4	2470m	78 50,38 N	005 50,86 E
08/2002	F 6-5	2640m	78 50,01 N	005 02,53 E
08/2002	F 7-3	2320m	78 50,00 N	004 03,07 E
08/2002	F 8-4	2470m	78 50,00 N	002 33,70 E
08/2002	F 9-3	2440m	78 56,60 N	000 22,50 W
08/2002	F 10-4	2550m	79 01,48 N	002 01,57 W
08/2002	F 11-4	2350m	78 59,93 N	003 04,32 W
08/2002	F 12-4	1890m	78 59,84 N	004 05,74 W
08/2002	F 13-4	980m	78 59,59 N	005 24,63 W
08/2002	F 14-4	270m	79 00,61 N	006 49,12 W
08/2002	FEVI-1	2456m	79 001,7 N	004 20,90 W
07/2002	JO 11	2700m	74 55,00 N	004 38,00 W
07/2002	JO 12	2700m	75 05,00 N	003 27,00 W
07/2002	JO 13	2700m	74 50,00 N	002 30,00 W

moorings deployed :

08/2002	F 1-5	248m	78 49,96 N	008 39,90 E
08/2002	F 2-6	794m	78 50,02 N	008 19,78 E
08/2002	F 3-5	1035m	78 50,01 N	007 59,72 E
08/2002	F 4-5	1472m	78 49,95 N	007 00,03 E
08/2002	F 5-5	2477m	78 49,96 N	006 00,16 E
08/2002	F 6-6	2704m	78 50,03 N	005 00,52 E
08/2002	F 7-4	2346m	78 50,00 N	003 59,99 E
08/2002	F 8-5	2495m	78 50,00 N	002 48,15 E
08/2002	F 9-4	2666m	78 50,03 N	000 48,13 W
08/2002	F 10-4	2721m	78 49,89 N	000 15,94 W
08/2002	F 16-1	2587m	78 50,10 N	000 23,99 E
08/2002	F 15-1	2554m	78 49,96 N	001 36,72 E
08/2002	FEVI-3	2594m	79 01,04 N	004 19,77 E
07/2002	JO 14	3624m	74 55,00 N	004 38,10 W
07/2002	JO 15	3678m	75 05,00 N	003 27,39 W
07/2002	JO 16	3708m	74 49,99 N	002 30,29 W