

TIFAX 2016 campaign



Campaign Report (22. July – 03 August 2016)

Basecamp: Station Nord

Aircraft: Polar 6



Crew: Thomas Krumpen (lead scientist), Manuel Sellmann (engineer), Esther Horvath (photographer), William Houghton (chief pilot), Jorgen Christison (second pilot), Lucius Cirtwill (mechanic)

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1.0 Aims/objectives of TIFAX 2016:

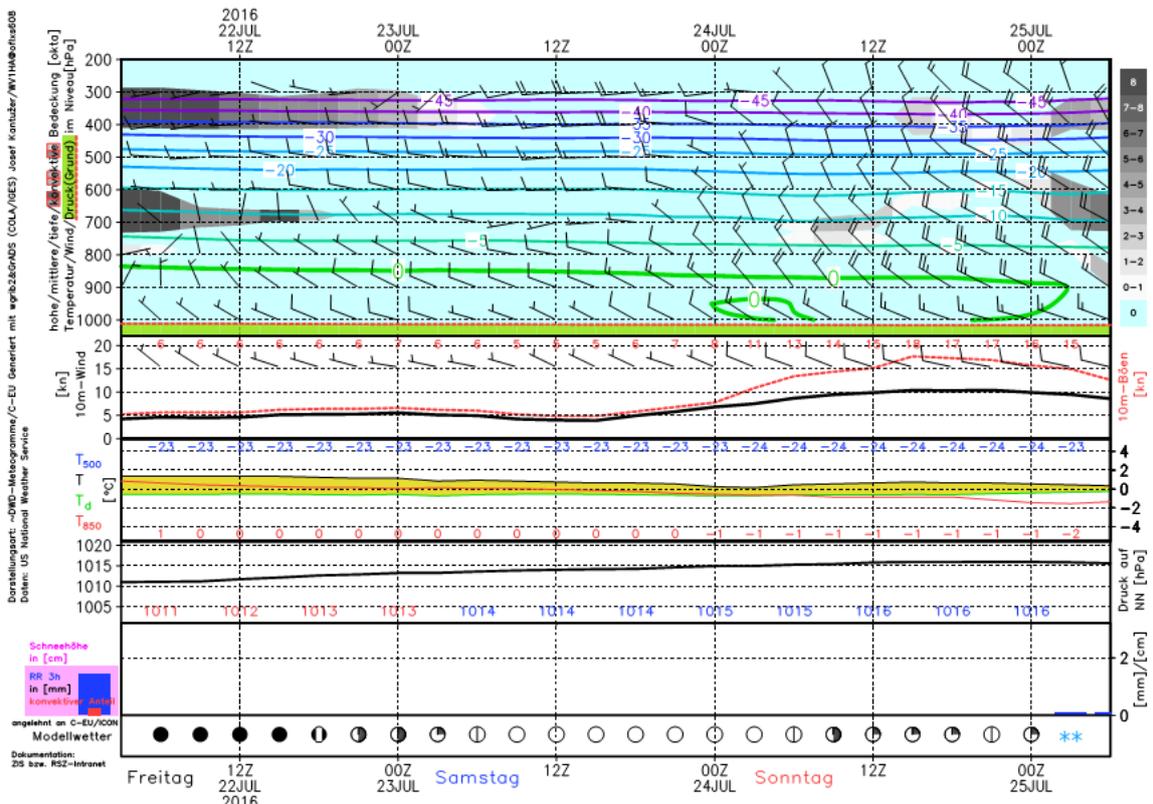
During the last decade, an increased advection of thick multi-year ice that originates from an area north of Greenland, out of the Arctic through the Fram Strait has been observed. A replacement of this old and thick sea ice by much thinner ice might precondition for rapid sea ice retreat in summer. Aim of the TIFAX campaign is therefore to monitor ice conditions during summer in the main export pathway of the Arctic Ocean. The campaign complements the large scale spring sea ice survey PAMARCMIP and is a continuation of earlier TIFAX campaign in 2010, 2011, 2012 and 2015.

Expedition permit: C-16-21

Total number of flight hours: 50 h (excluding ferry)

1.1 Weather and ice information:

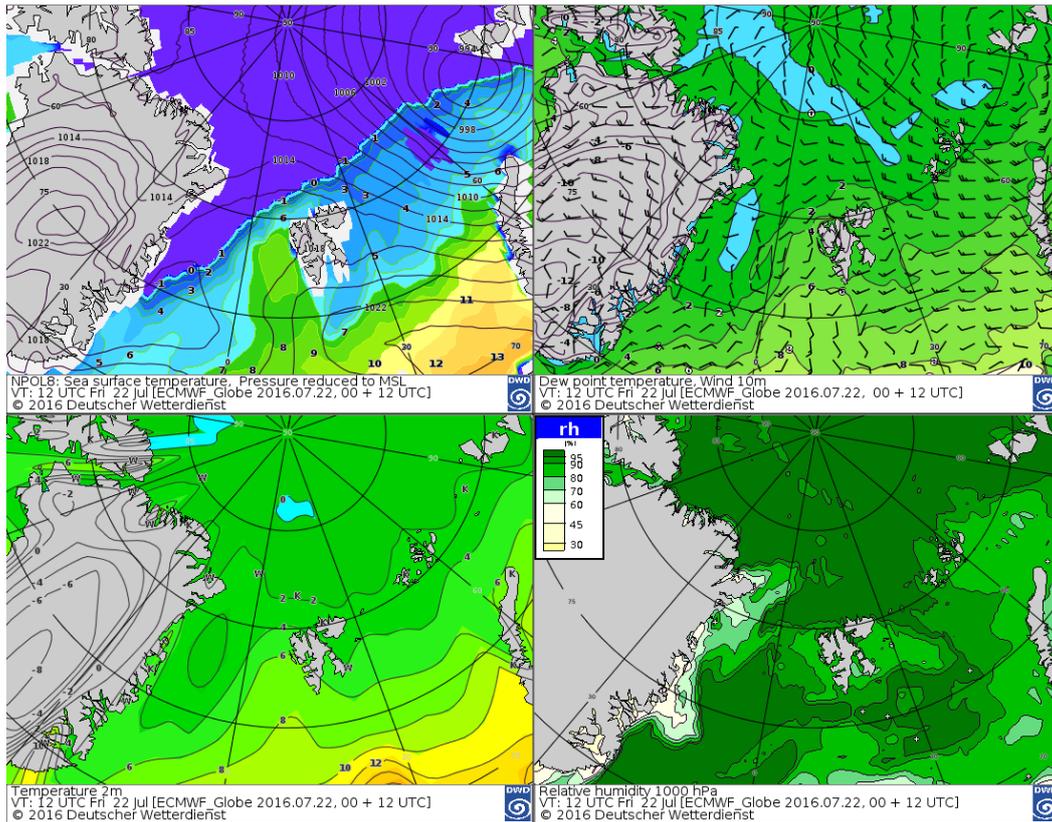
Weather and sea ice information were obtained via FTP from the German Weather Service (DWD). The DWD offers meteograms for different locations, cloud cover forecasts (78 h) from different models and temperature, humidity and pressure charts. Prior flight, weather information is used to locate sites suitable for low level flight operations.



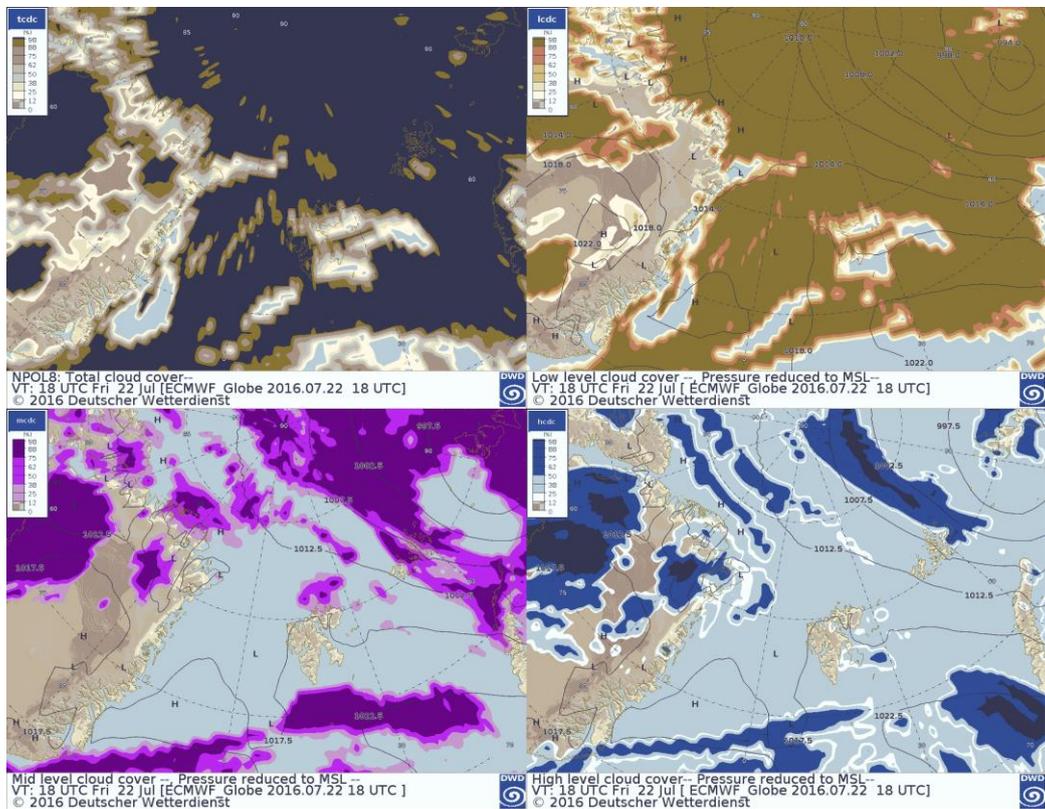
GFS-Meteogramm am Gitterpunkt 86°Nord/15°West
Prognose vom Freitag, den 22.07.2016 [00 UTC]

für WayPoint@86N/15W, 0m über NHH
Modellhöhe 0 [gpm]

Example Data: Meteogramm for Station Nord (source GFS/DWD).



Example Data: 2m temperature, dew point and relative humidity for low level flight planning (source ECMWF/DWD)



Example Data: Low/mid/high level cloud forecast (source ICON/DWD)

1.2 Flight operations

Flights were made towards one or more pre-defined points of return. The point of return and profile length were chosen according to

1. fuel capacity
2. weather condition,
3. ice condition.

1.3 Flight hours

Date	Route	Type	Air Time	T/O Time	Ldg Time
July-13-2016	EDDW- EDDW	Test flight	1,90	12:17	14:09
July-13-2016	EDDW- EDDW	Test flight	0,60	15:18	15:54
July-14-2016	EDDW- EDDW	Test flight	0,70	11:51	12:31
July-15-2016	EDDW- EDDW	Test flight	1,60	11:40	13:18
July 20-2016	EDDW-ENVA	Ferry flight	3,60	05:04	08:39
July 20-2016	ENVA-ENTC	Ferry flight	2,30	09:30	11:50
July 20-2016	ENTC-ENCB	Ferry flight	3,00	13:14	16:16
July 22-2016	ENCB-BGNO	Ferry flight	2,40	09:13	11:38
July 23-2016	BGNO-BGNO	Survey flight	2,50	10:54	13:24
July 23-2016	BGNO-BGNO	Survey flight	0,60	14:55	15:30
July 24-2016	BGNO-BGNO	Survey flight	4,90	11:22	16:13
July 25-2016	BGNO-BGNO	Survey flight	3,50	11:39	15:07
July 26-2016	BGNO-BGNO	Survey flight	6,10	09:51	15:57
July 28-2016	BGNO-BGNO	Survey flight	4,60	06:02	01:36
July 29-2016	BGNO-BGNO	Survey flight	6,00	09:39	15:39
July 31-2016	BGNO-BGNO	Survey flight	5,90	12:25	18:20
August 01-2016	BGNO-BGNO	Survey flight	5,60	10:15	15:49
August 02-2016	BGNO-BGNO	Survey flight	2,00	10:10	11:57
August 02-2016	BGNO-BGNO	Survey flight	0,50	12:42	13:14
August 02-2016	BGNO-BGNO	Survey flight	0,50	14:37	15:07

Total air time (survey and test flights)

47,50

2.0 Daily activities

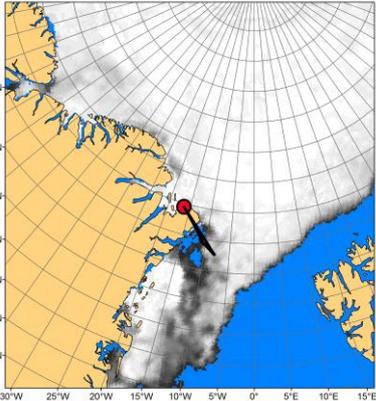
2.1 *July 22, 2016*

After integration of the EM-Bird system in ENCB, ferry flight to BGNO was made on July 22. Additional system checks and preparation of survey flights were made on the same day.

2.2 July 23, 2016

First survey flight was made southeast of BGNO. Due to instrument failures, survey flight had to be interrupted after 120 minutes. Back at BGNO, system was checked and reason for failures indicated. During a second short 30 minutes test flight in the vicinity of BGNO operational readiness was confirmed.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 23-2016	2,50	10:54	13:24
Test flight: BGNO to BGNO	July 23-2016	0,60	14:55	15:30

Instrumentation	Comments	Track
Basic meteorology, INS/GPS EM-Bird, Canon Camera and Video, KT-19	EM-Bird failures during flight. Therefore flight had to be interrupted	

2.3 July 24, 2016

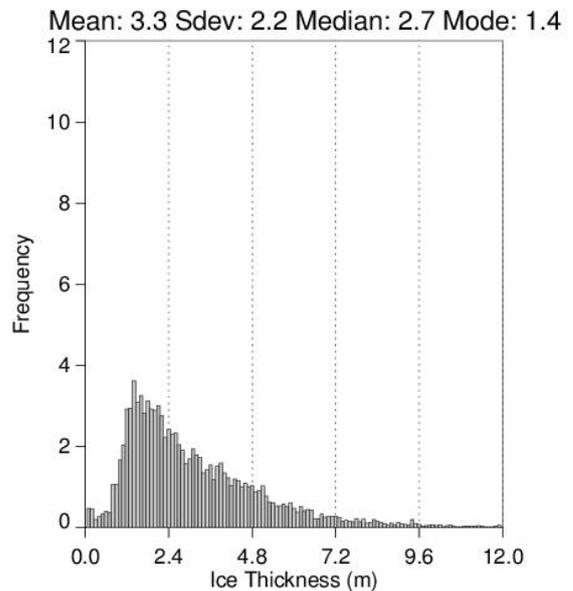
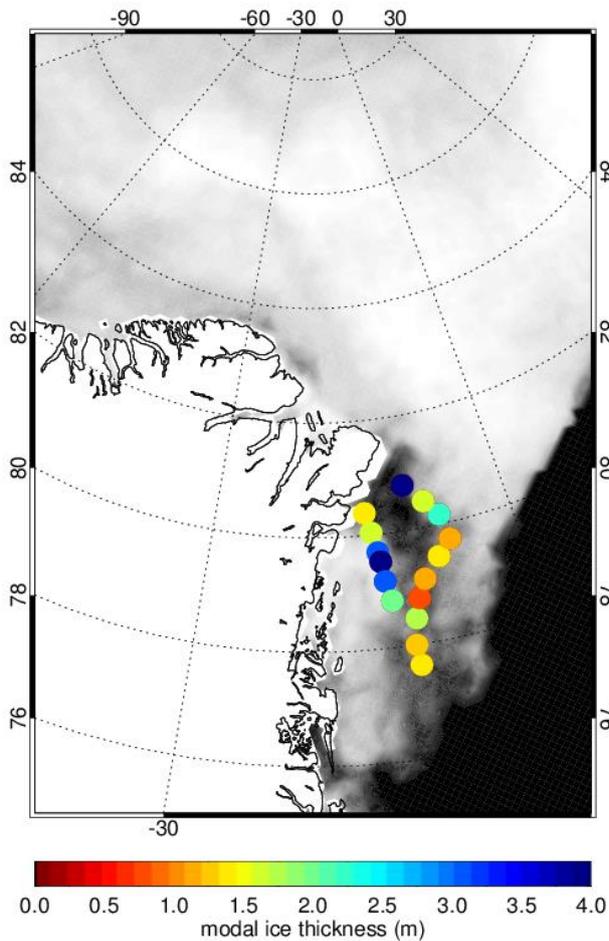
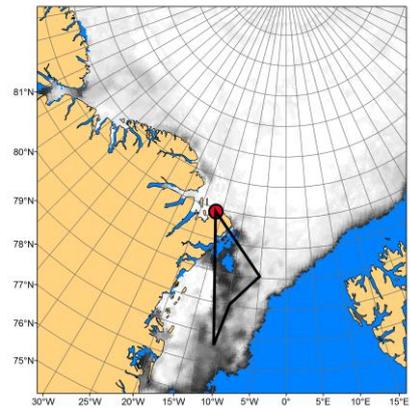
On July 24 flight along Fram Strait (76.5 N – 81 N) was performed. Measurements shall be used to capture along Strait thickness gradients associated to atmospheric and oceanic processes like recirculation of Atlantic Water or increasing surface heat flux with increasing latitude.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 24-2016	4,90	11:22	16:13

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera and Video, KT-19

no comments



Exp: 2016_TIFAX

Flying days:
2016 7 24

2.4 July 25, 2016

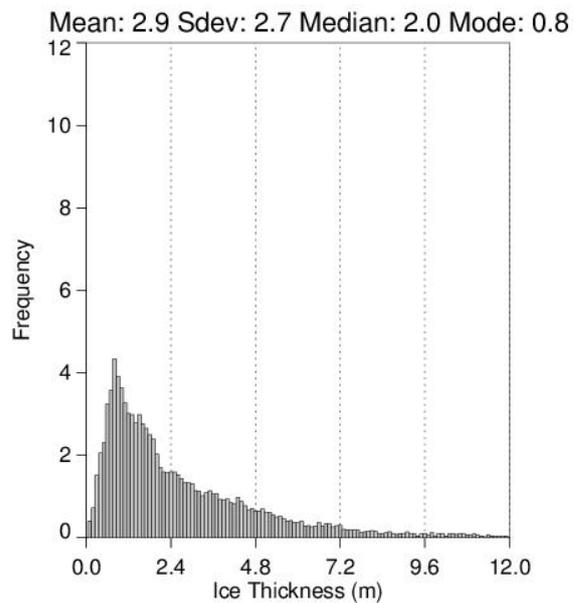
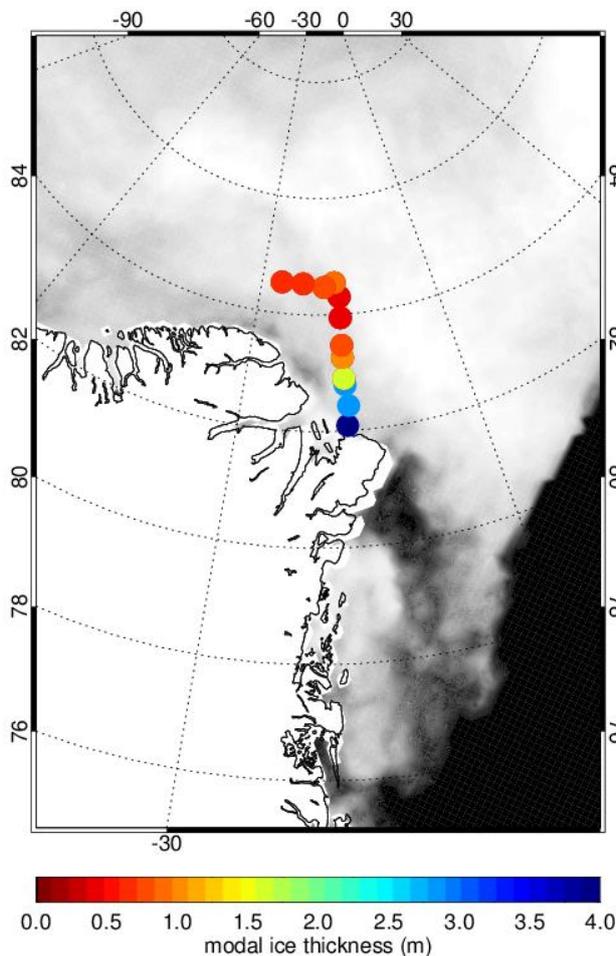
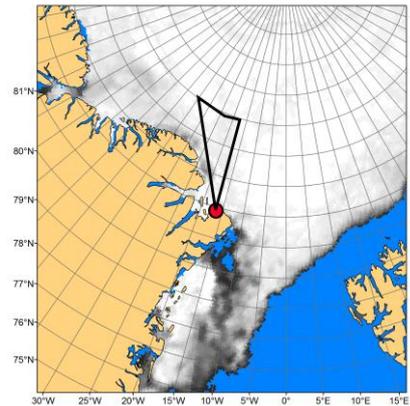
A flight straight North from BGNO was made on July 25 to complement measurements made during TIFAX 2010 – 2012. Due to low cloud cover and fog north of 85°N, flight track was changed towards East.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 25-2016	3,50	11:39	15:07

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera and Video, KT-19

no comments



Exp: 2016_TIFAX

Flying days:
2016 7 25

2.5 July 26, 2016

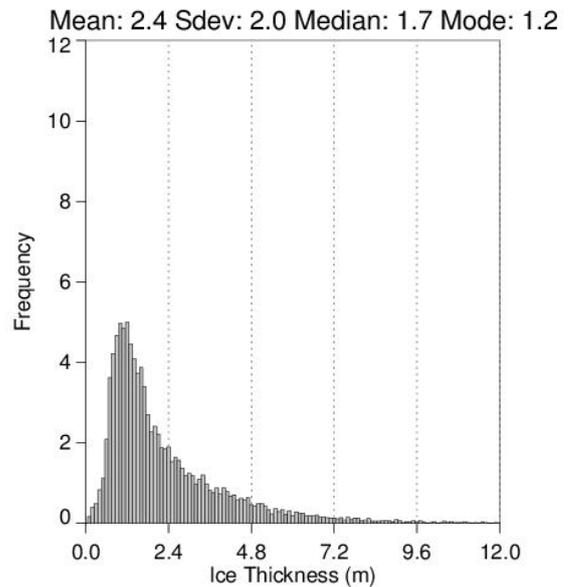
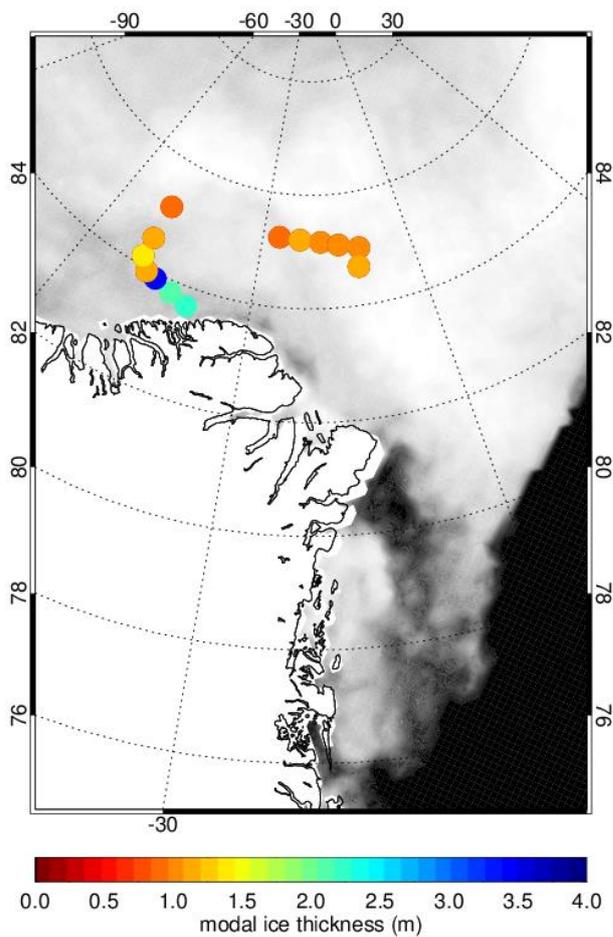
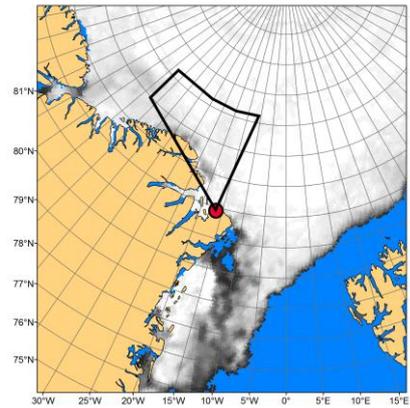
Low level flights along 45 °W towards North were planned for July 26. Flight had to be interrupted at 85.2° N due to low level clouds and fog. Hence, survey was continued in westerly direction until 10 °W.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 26-2016	6,10	09:51	15:57

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera and Video, KT-19

no comments



Exp: 2016_TIFAX

Flying days:
2016 7 26

2.6 July 27, 2016

No flight due to bad weather conditions in the survey areas.

2.7 July 28, 2016

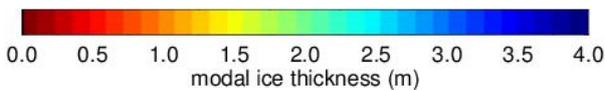
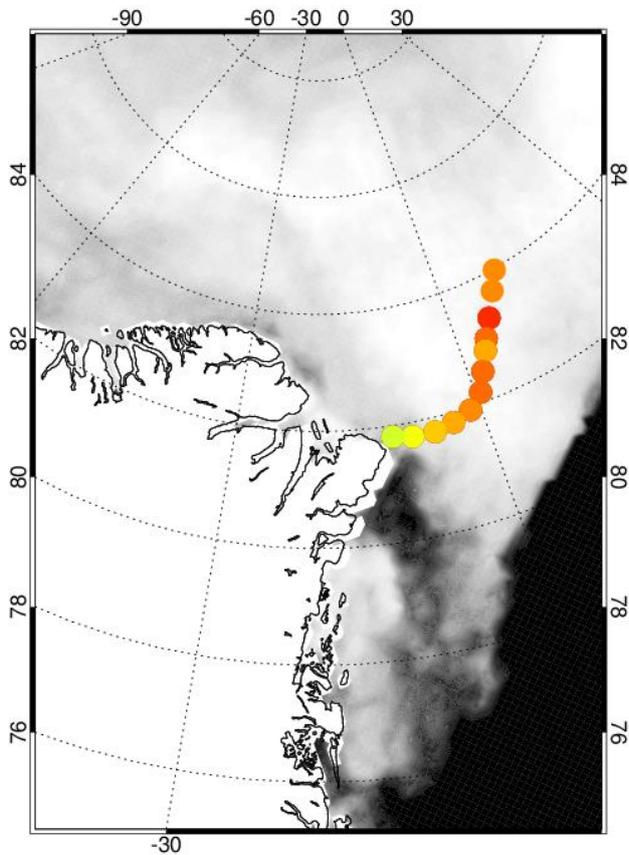
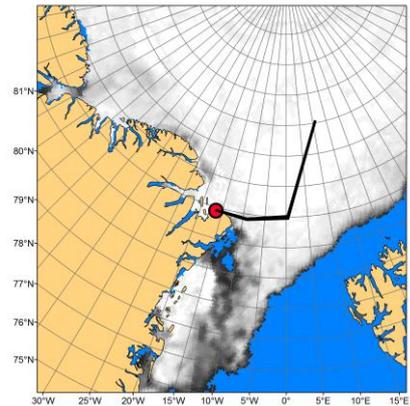
Low rH and cloud coverage in Fram Strait area enabled us to perform a flight across Fram Strait and north towards 84°N 10°E. The way out was performed at high altitude. EM-Bird survey was made on the way back.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 28-2016	4,60	06:02	01:36

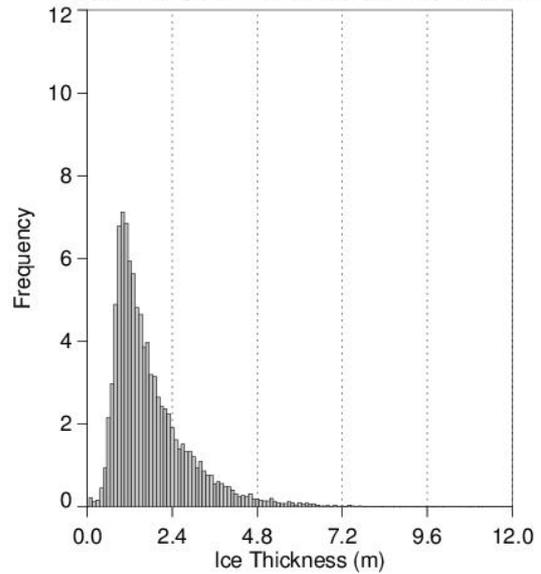
Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera and Video, KT-19

No comments



Mean: 1.9 Sdev: 1.2 Median: 1.5 Mode: 1.0



Exp: 2016_TIFAX

Flying days:
2016 7 28

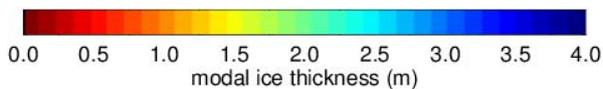
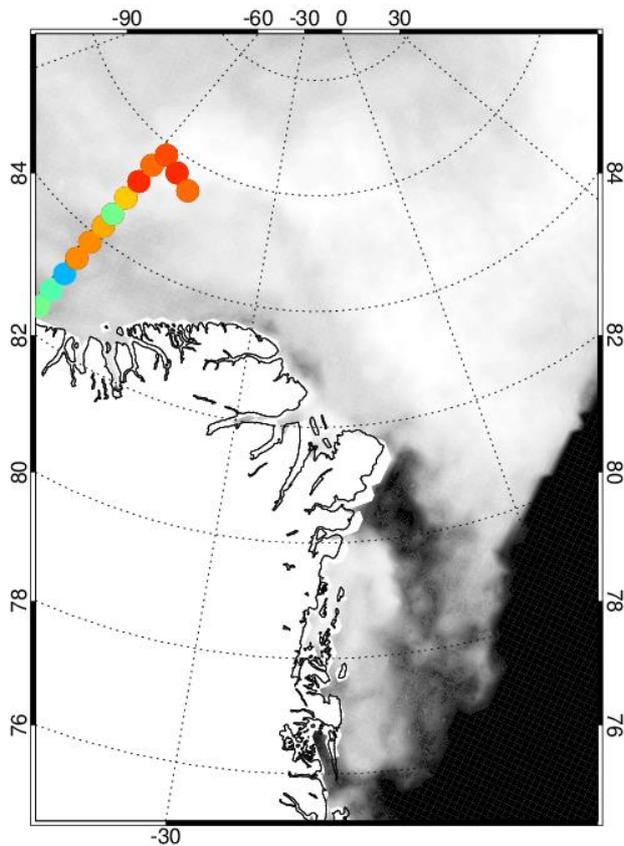
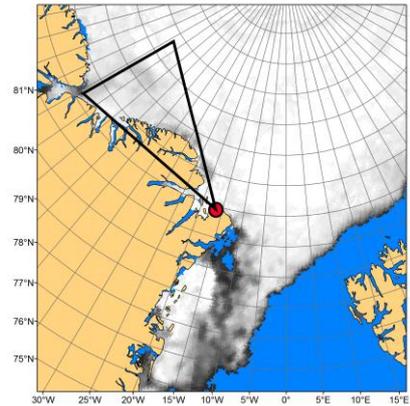
2.8 July 29, 2016

On July 29, a survey at low level along the Canadian border starting from 82° N, 59°W to 86°N, 59°W was made. Most of the flight back to BGNO was made at high level.

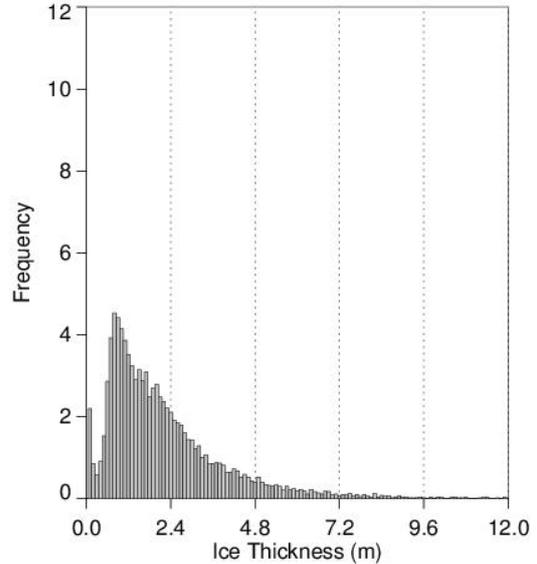
Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 29-2016	6,00	09:39	15:39

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera, No comments
KT-19



Mean: 2.3 Sdev: 1.9 Median: 1.8 Mode: 0.8



Exp: 2016_TIFAX

Flying days:

2016 7 29

2.9 July 30, 2016

No flight due to bad weather conditions in the survey areas.

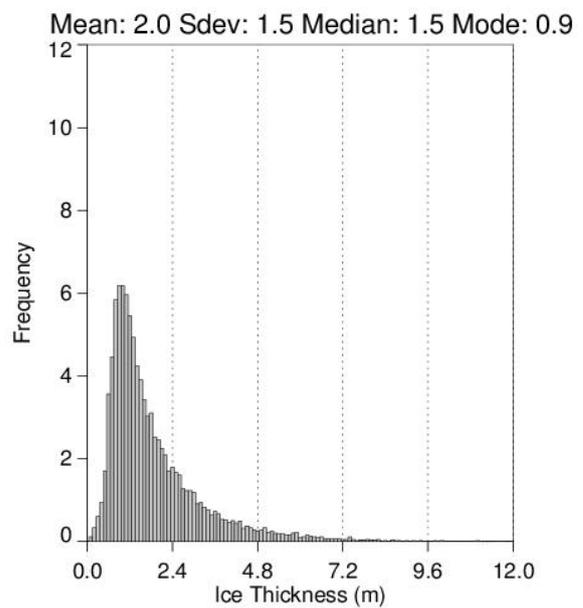
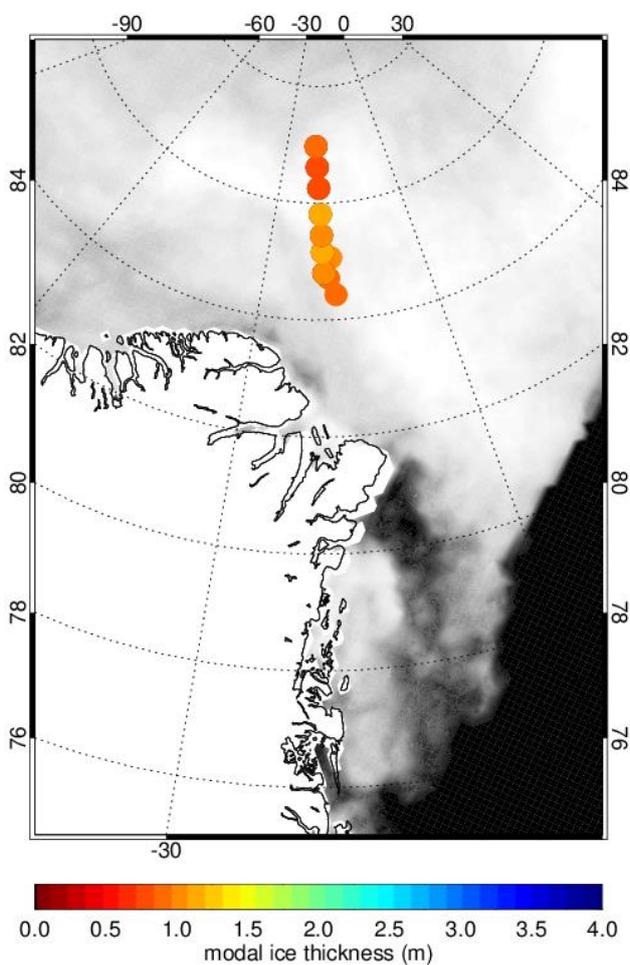
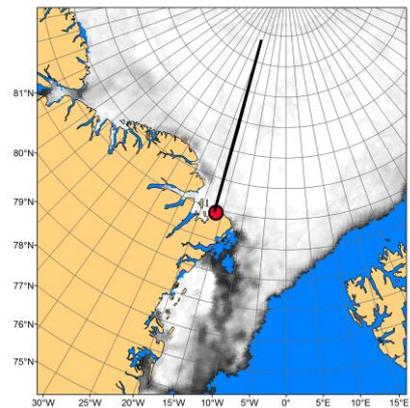
2.10 July 31, 2016

Flight towards 88°N, 19°W at low level and back. On the way out, validation data for a Radarsat and TerraSAR data take were obtained.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	July 31-2016	5,90	12:25	18:20

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera, no comments
KT-19



Exp: 2016_TIFAX

Flying days:

2016 7 31

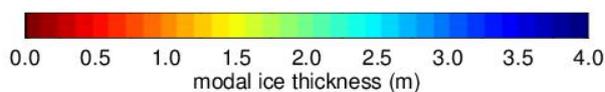
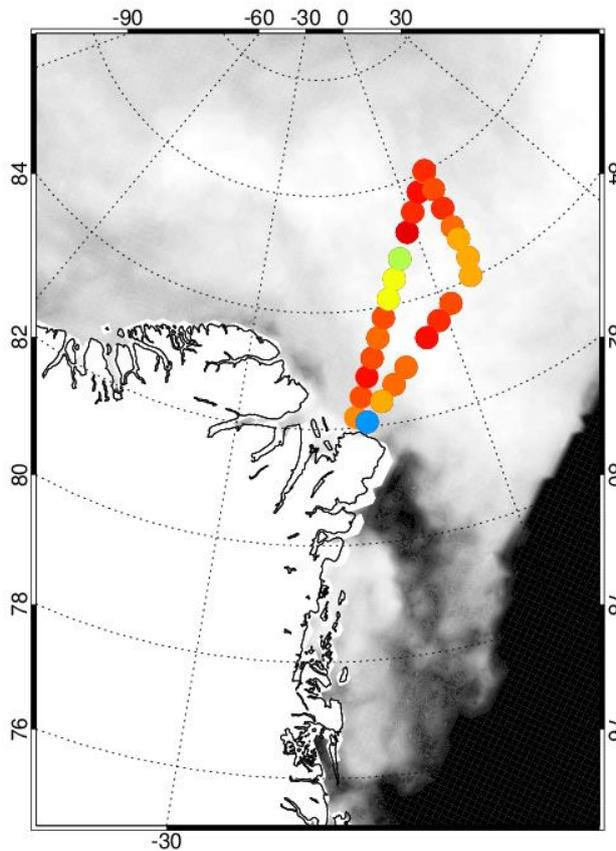
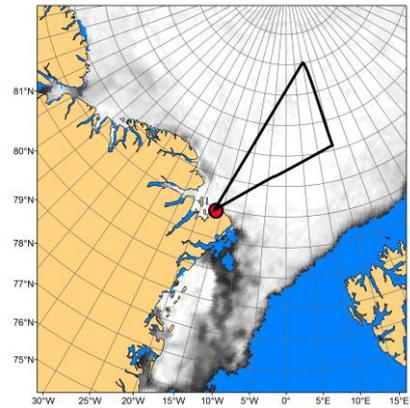
2.11 August 01, 2016

Flight towards 86° N, 7°E and south towards 85°N, 7°E. Flight at low level during entire survey.

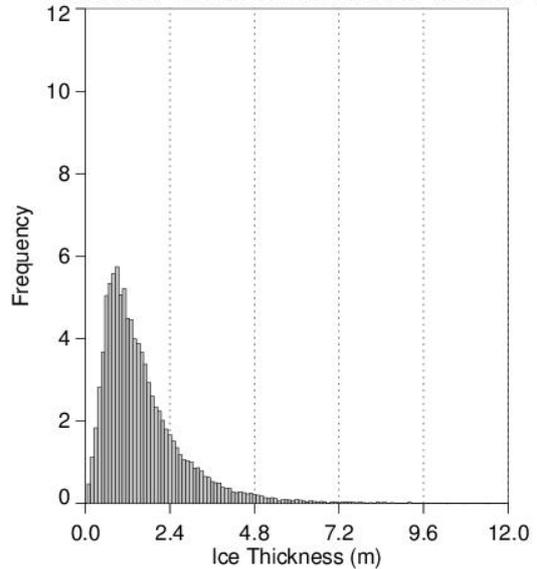
Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	August 01-2016	5,60	10:15	15:49

Instrumentation	Comments	Track
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Basic meteorology, INS/GPS
EM-Bird, Canon Camera, no comments
KT-19



Mean: 1.7 Sdev: 1.3 Median: 1.4 Mode: 0.9



Exp: 2016_TIFAX

Flying days:

2016	8	1
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2.12 August 02, 2016

Fast ice survey flight over Independence Fjord and Danmark Fjord in the morning. Afterward, two short flights for EM-Bird tests were made.

Flight information	Date	Air time	T/O Time	Ldg Time
Survey flight: BGNO to BGNO	August 02-2016	2,00	10:15	15:49
Survey flight: BGNO to BGNO	August 02-2016	0, 50	12:42	13:14
Survey flight: BGNO to BGNO	August 02-2016	0, 50	14:37	15:07

Instrumentation	Comments	Track
	Basic meteorology, INS/GPS EM-Bird, Canon Camera, KT-19	

2.13 August 03, 2016

Ferry flight to Longyearbyen. Official end of campaign.