
Data for *Field Data on Artificial Flooding and thickening of Snow-Covered First-Year Sea Ice and the Melting of Thickened Ice.**

*The data for this study was collected during a field campaign in the Vallunden lake on Spitsbergen in 2024.

For questions about the data or test campaign, please contact Tim. C. Hammer (t.c.hammer@tudelft.nl).

1 Data

The background of the data, the data description, the experimental design, materials, methods and limitations of the data have been documented and submitted to the journal article Data in Brief as: *Field Data on Artificial Flooding and thickening of Snow-Covered First-Year Sea Ice and the Melting of Thickened Ice.*

The present document here supports the submitted journal article by providing detailed descriptions of the uploaded data. The test locations, drilling locations, and reference system can be found in the submitted journal publication. The sampling periods of the thermistor strings and data logger are presented in Table 1 and Table 2. Note that the raw data of the data logger had not been necessary chronologically logged which is why sorted data in *.mat* format has been uploaded to mitigate confusion (i.e., *Site_B(z6-25195)-1719296946-4TU.mat* and *Site_A(z6-25201)-1719296946-4TU.mat*). Detailed descriptions of the data can be found in Table 3-9.

Table 1 Sampling periods of the thermistor string for given measurement periods. Note that the measurement periods in italics are valid for all four test sites.

Names	Measurement periods	Sampling interval
<i>Site A</i>	10.04.2024 20:00 – 11.04.2024 08:00	6hrs
	11.04.2024 08:00 – 23.04.2024 16:15	15min
	<i>23.04.2024 16:15 – 03.05.2024 14:15</i>	2hrs
	<i>03.05.2024 14:15 – 03.05.2024 18:15</i>	4hrs
	<i>03.05.2024 18:15 – 06.05.2024 12:15</i>	6hrs
	<i>06.05.2024 12:15 – 24.06.2024 12:15</i>	2hrs
<i>Site B</i>	21.03.2024 19:00 – 10.04.2024 19:00	6hrs
	10.04.2024 19:00 – 23.04.2024 16:15	15min
<i>Site C</i>	10.04.2024 20:00 – 23.04.2024 16:15	15min
<i>Site D</i>	10.04.2024 21:00 – 23.04.2024 16:15	15min

Table 2 Sampling periods of the sorted data provided by the Data logger for given measurement periods.

Names	Measurement periods	Sorted sampling interval
<i>Site A*</i>	11.04.2024 16:55 – 18.06.2024 20:35	5min
<i>Site B</i>	21.03.2024 20:35 – 18.03.2024 23:35	5min

1 *No data between 13.04.2024 16:16 and 14.04.2024 as data logger was temporally removed to fix
 2 problems with the network configuration.
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4 **Table 3 Data description of data collected with a thermistor string. For example (Site A):**
 5 **reflar0104td_2024-06-25_07-27-47.csv. The description are based on the SAMS Enterprise**
 6 **SIMBA User Manual 004_ACTIVE.pdf.**

Column	Message type	Explanation
A	SN	Sample period number (increments each time the SIMBA unit wakes up).
B	msgtype	Message type: 10 = Unheated temperature profile The following relate to the heated mode. Each set of measurements is the change (positive is a rise) relative to the initial temperature. 11 = Temperature change at time HST1. 12 = Temperature change at time HST1+HST2. 13 = Temperature change at time HST1+HST2+HST3. 14 = Temperature change at time HST1+HST2+HST3+HST4. Heater
C	messages	Message number of the data transmission (e.g. 1 of 2)
D	SendTime	Time of sample according to the SIMBA unit clock (in ASCII format).
E	MOMSN	The iridium message number for that modem. A sequential number for each message it sends.
F	recs	Total number of records in message (total of both parts if message split). Usually the same as the number of sensors on the chain.
G	sensors	Total number of sensors.
H	software	Software version.
I	H_MeasureTime	Total time of heating for heating cycles from start of heating (in seconds)
J	H_Dutycycle	No longer used. Always 0.
K	H_Endvolt	Reported voltage applied to heaters (measured at end of heating cycle). Should be 8V with healthy batteries. Only applies to heated profiles.
L-	T 0 to T239	Reported Sensor temperatures or temperature change in the case of heating cycles Celsius. Unused records set to default -99.9. Note that last sensor is an external air temperature measurement.

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 8 **Table 4 Data description of data collected with a radiometer and anemometer. Document name**
 9 **(Site B): Site_B(z6-25195)-1719296946-4TU.mat.**

Column	Message type	Explanation
1	Timestamps	Time of sample according to the SIMBA unit clock (in ASCII format).
2	Radiometer Incident Short Wave	Measured incident short wave in W/m ²
3	Radiometer Reflected Short Wave	Measured reflected short wave in W/m ²
4	Radiometer Incident Long Wave	Measured incident long wave in W/m ²
5	Radiometer Emitted Long Wave	Measured emitted long wave in W/m ²
6	Radiometer Net Radiation	Internally calculated net radiation in W/m ²
7	Anemometer Wind Direction	Measured wind direction in ° with reference to true North
8	Anemometer Wind Speed	Measured wind speed in m/s
9	Anemometer Gust Speed	Measured gust speed in m/s
10	Anemometer Temp	Internal measurement of temperature in °C
11	Anemometer X-axis level	Tilt of the sensor in a range of -90° to 90° in the x-axis
12	Anemometer Y-axis level	Tilt of the sensor in a range of -90° to 90° in the y-axis
13	Barometer Reference Pressure	Measured reference pressure in kPa

14	Barometer Logger Temperature	Internal measurement of temperature in °C
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Table 5 Data description of data collected with a radiometer. Document name (Site A): Site_A(z6-25201)-1719296946-4TU.mat.

Column	Message type	Format
1	Timestamps	Time of sample according to the SIMBA unit clock (in ASCII format).
2	Radiometer Incident Short Wave	Measured incident short wave in W/m ²
3	Radiometer Reflected Short Wave	Measured reflected short wave in W/m ²
4	Radiometer Incident Long Wave	Measured incident long wave in W/m ²
5	Radiometer Emitted Long Wave	Measured emitted long wave in W/m ²
6	Radiometer Net Radiation	Internally calculated net radiation in W/m ²
7	Barometer Reference Pressure	Measured reference pressure in kPa
8	Barometer Logger Temperature	Internal measurement of temperature in °C

Table 6 Description of meta-data documented during the ice core sampling. Document name: Core_matix.xlsx.

Column	Message type	Explanation
A	Label	DD_MM_SX_L#_FX DD = Day MM = Month SX = Site X (X = A, B, C, or D – see picture xy) L# = Location # (# = 0,1,2,3,4,5,6,7) FX = Function X (X = Bulk salinity(S), Density(D), Biological assessment(Bio) or Thin sectioning(Thin) The entry for each label row is linked to a separate spread sheet. The spread sheet gives meta information about the ice core (e.g., additional measurements taken at the drilling location or at the station when determining temperature or density; additional comments; or ice core pictures).
B	Date	DD_MM (DD = Day, MM = Month)
C	Site	A, B, C or D
D	Location	0,1,2,3,4,5,6,7
E	Purpose	Also Function; Bulk salinity, Density, Biological assessment or Thin sectioning
F	Picture included	Yes or no
G	Comments	-

Note that a separate worksheet is provided per ice core.

Table 7 Description of temperature data measured in specific intervals in the ice core. Table document name: Temperature_measurements_all.xlsx.

Column	Message type	Format
A	Date	DD-MM-YYYY DD = Day MM = Month YYYY = Year
B	Site	A, B, C or D (see Figure 2 of submitted journal publication)
C	Location	0,1,2,3,4,5,6,7 (see Figure 6 of submitted journal publication)
D	Height	Measurement position along the ice core within the established coordinate system (see Figure 7 of submitted journal publication).
E	Temperature	Measured temperature in the centre of the ice core in °C.

F	Comments	Documented comments.
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Note that a separate worksheet is provided per test day.

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Table 8 Description of density data measured for specific ice sample sections. Table document name: Density_measurements_all.xlsx.

Column	Message type	Format
A	Date	DD-MM-YYYY DD = Day MM = Month YYYY = Year
B	Site	A, B, C or D (see Figure 2 of submitted journal publication)
C	Location	0,1,2,3,4,5,6,7 (see Figure 6 of submitted journal publication)
D	Start	Measured start position of the tested ice core section within the established coordinate system (see Figure 7 of submitted journal publication).
E	End	Measured end position of the tested ice core section within the established coordinate system (see see Figure of submitted journal publication).
F	Dry mass	Measured dry mass of the ice core section in g.
G	Submerged mass	Measured submerged mass of the ice core section in g.
H	Paraffin temp	Measured temperature of paraffin in °C.
I	Comments	Documented comments.

Note that a separate worksheet is provided per test day.

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Table 9 Description of bulk salinity data measured in specific intervals in the ice core. Table document name: Bulk_salinity_measurements_all.xlsx.

Column	Message type	Format
A	Date	DD DD = Day
B	Site	A, B, C or D (see Figure 2 of submitted journal publication)
C	Location	L# (# = 0,1,2,3,4,5,6,7) (see Figure 6 of submitted journal publication)
D	start	Measured start position of the tested ice core section within the established coordinate system (see Figure 7 of submitted journal publication).
E	end	Measured end position of the tested ice core section within the established coordinate system (see Figure 7 of submitted journal publication).
F	bulk salinity	Measured bulk salinity in ppt
G	temp	Measured liquid temperature during bulk salinity measurement in °C.
I	Comments	Documented comments.

Note that a separate worksheet is provided per test day.

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