Whaling statistics, weather and sea ice data from the Southern Ocean for the period of 1932 to 1963 from catch logbooks of factory ships of company Thor Dahl A/S.

Ole Edvard Bjørge^{1,3}, Karl Inne Ugland¹, Dmitry V. Divine².

- 1: University of Oslo, Institute for Bioscience, Department of Marine biology and Limnology, Oslo, Norway
- 2: Norwegian Polar Institute (NPI), Fram Centre, P.O. Box 6606 Langnes, 9296 Tromsø, Norway
- 3: Independent scholar, Norway.

Corresponding author: Dmitry V. Divine; e-mail: <u>dmitry.divine@npolar.no</u>

1. Introduction/Motivation

There is a substantial gap in our knowledge of the climate in the Southern Ocean and Antarctica before the IGY-1957 when the first observational network in the region was established. The higher quality regular sea ice data are not available until the start of the satellite-based monitoring in 1979. This limits the skills of climate reanalysis products for the region in the pre-1980 period with implications for understanding the signature and effects of anthropogenic warming in the Antarctic region.

Complementary data sources such as ships' logbooks have proven to be a successful tool in reconstructing past marine climate. Although recent years have seen significant efforts in the recovery of information from ships logbooks, data from the Antarctic region are largely yet to be recovered and analyzed. In contrast to logbooks from infrequent Antarctic expeditions, accounts from commercial vessels are much more abundant and represent a promising source of valuable climate information.

As economic activity in the region started as early as in the late 19th century, a growing number of vessels from different national whaling fleets have been active in the area during austral late spring to early fall until the introduction of restrictions on the SO whaling in the late 1960s. The Norwegian fleet operated in the region since the late 19th century with tens of vessels annually present in the whaling grounds of the Southern Ocean after 1920s. During sailing in high latitudes, the relevant information on weather and sea surface conditions including sea ice would be tabulated in a captains/first mate logbook or catch logbook on at least daily basis.

This publication presents a dataset based on keying of weather, sea ice and whale catch data from several catch logbooks of the Norwegian whaling company Thor Dahl A/S for the period of 1932-1963. These data became a basis of the Master thesis defended by the first author in 2014 at the University of Oslo, Norway (Bjørge, 2014).

2. Norwegian maritime documentary sources of weather, climate and sea ice for the Southern Ocean

The whaling industry became a major factor in Norway throughout the early 20th century, and several whaling companies were established. The whaling of blue whales in the Antarctic started in the 1904/05 season; from there it grew greatly in size until it reached its peak in 1930/31 when staggering 29 409 blue whales were taken (Branch, *et. al.,* 2004). Whaling in the Southern Ocean continued throughout most of the 20th century with only a short "break" in 1931/32 in the midst of the great depression when the year before had seen a massive overproduction in whale oil (Tønnesen, 1970). World war Two (WWII), 1939 – 1945, also put a temporary halt on most of the whaling (Small, 1971). After the war, the whaling companies put in great effort to start up again, and

just 20 years after the war, the blue whale was on the brink of extinction before it became a protected species in 1966.

This study presents keyed (tabulated) whale hunting data of Thor Dahl's whaling company; Thor Dahl A/S. These data were logged together with weather and sea ice/icebergs data in the onboard catch logbooks during the whaling season while vessel was on the hunting grounds in the Southern Ocean.

The whaling period in the Antarctic started during the austral summer, in November-December, lasting typically to March/April, hence covering the turn of the next year. Thor Dahl A/S was a whaling company, which focused on the big whale species, mainly in the Southern Ocean, with its base in the Norwegian city *Sandefjord*. Thor Dahl A/S had initially three big whaling factories: *Solglimt, Thorshammer* and *Ole Wegger*. These factories were the two large, retired tankers and one retired passenger ship rehauled for pelagic whaling. After the Second World War, two of these factories were replaced with new specially constructed whaling factory ships *Thorshavet* and *Thorshøvdi*. A fleet with smaller and faster hunting boats followed every factory. The hunting boats' purposes were to search and actually hunt for whales. The numbers of hunting boats in the 1930s were about 6-8 per factory every year. During the 1940-1960, the number increased to 8-15 hunting boats per factory (Bjørge, 2014) to intensify the harvesting of whales along with their vanishing population.

The logbooks used in this dataset were originally archived in Hvalfangstmuseet (Whaling Museum) in Sandefjord, Norway, which keeps much of the archive material connected to the Norwegian historical whaling industry. Later the documents were moved to the Vestfold archive in Sandefjord. During this study 56 catch logbooks were keyed and analysed. These catch logbooks cover the whaling seasons of 1932/33 to 1962/63, during which a total catch of 12 747 Blue whales was recorded. All relevant information about the catch (species and number) with associated ship positions, dates, weather and sea ice/icebergs conditions were keyed/tabulated into Excel spreadsheet. For details on the structure of catch logbooks as well as final published data structure, please see below.

The logbooks keyed during the study are listed below; whaling seasons are shown in parenthesis:

Solglimt (1932/33 and 1935/36-1937/38) Ole Wegger (1935/36-1938/39) Thorshammer (1935/36-1938/39, 1945/46 and 1947/48-1961/62) Thorshavet (1948/49-1962/63) Thorshøvdi (1948/49, 1950/51-1962/63).

Note that in the season of 1952/53, *Thorshøvdi* and *Thorshavet* had a joined operation. Whaling for blue whales lasted mainly from December to March, and later only from February to March/April (Bjørge, 2014), also see Table 1.

Table 1. Start and end dates for whaling seasons of the vesses of "Thor Dahl" company for years covered by the present data set. The last column shows the number of company factory ships that that started whaling season in the particular date indicated in column.

Season	Starting date for blue whale hunt	Ending date for blue whale hunt	Comments
1932/33	23.10.1932	19.03.1933	All factories (1)
1935/36	01.12.1935	08.03.1936	Solglimt
1935/36	01.12.1935	27.02.1936	Ole Wegger
1935/36	01.12.1935	05.03.1936	Thorshammer
1936/37	08.12.1936	07.03.1937	All factories (3)
1937/38	08.12.1937	16.03.1938	One factory
1937/38	08.12.1937	15.03.1938	Two factories
1938/39	08.12.1938	07.03.1939	All factories (2)
1945/46	24.11.1945	24.03.1946	All factories (1)
1947/48	07.12.1947	31.03.1948	All factories (1)
1948/49	15.12.1948	26.03.1949	One factory
1948/49	15.12.1948	27.03.1949	One factory
1949/50	22.12.1949	15.03.1950	All factories (2)
1950/51	22.12.1950	09.03.1951	Two factories
1950/51	22.12.1950	10.03.1951	One factory
1951/52	02.01.1952	05.03.1952	All factories (3)
1952/53	02.01.1953	16.03.1953	All factories (2)
1953/54	16.01.1954	18.03.1954	All factories (3)
1954/55	21.01.1955	19.03.1955	All factories (3)
1955/56	01.02.1956	04.03.1956	All factories (3)
1956/57	01.02.1957	16.03.1957	All factories (3)
1957/58	01.02.1958	16.03.1958	All factories (3)
1958/59	01.02.1959	16.03.1959	All factories (3)
1959/60	01.02.1960	07.04.1960	All factories (3)
1960/61	01.02.1961	07.04.1961	All factories (3)
1961/62	01.02.1962	07.04.1962	All factories (3)
1962/62	01.02.1963	07.04.1963	All factories (2)

Details on the types and a structure of maritime documentary sources analyzed in this study specific for the focus period follow below.

3. Layout and data contained in catch logbook ("Fangstdagbok")

The catch books were primarily intended to log the information on the capture and processing of whales. However, they also contain meteorological, oceanographic and ice observations though the abundance of data recorded may vary from book to book. The format of all catch books analyzed in this study is the one used throughout the 1930s on Norwegian whaling vessels and consists of a double facing page with one week to a view. Catch logbooks of the 1940s-1960s had slightly different appearance yet the layout was kept the same. All recovered daily vessel positions with weather and sea ice observations are shown in **Figure 1**. In order to highlight the temporal variability in the spatial distribution of recovered observations they were grouped by months. Due to a relatively low number of observations for October and April, they were merged for convenience with data from the



Figure 1: Daily vessel positions for days with recovered observations during 1932 to 1963 grouped by months. Vessel positions for October and April are merged for convenience with the data from the neighboring months of November and March, respectively.

1 1 <th1< th=""> <th1< th=""> <th1< th=""></th1<></th1<></th1<>	4	T	Ture	3.	T					4.		-	Antal	5. I hval inn	bragt	Fat olje	6. produs	ert av:					Summerbule 1
$ \frac{\sin \log_2 e}{\log_2 (2/2)} \frac{d^2 f^2}{d^2 (2/2$	I. Dag	2. Datum	Bredde	Lengde	Tino.	Par:	Ser	Bas:	Va Ten	erforho	Id Jofasta	47.	Bià Pinn	Knel Andro	Sum	Spekk Grats	Press	Hartma	nnsappari Kjøtt	ter Ben	Sum Spekk Kjatt og b	en Total	Spekk Kjøtt olje benolj
$\frac{\operatorname{Reder}}{\operatorname{Rede}} \frac{\frac{1}{2}}{\frac{1}{2}} \frac{\frac{1}{2}}{\frac{1}{2}} \frac{\frac{1}{2}}{\frac{1}{2}} \frac{1}{\frac{1}{2}} 1$	Sondag ,	20/10	543.27	34239	50.2	h.	4	728		9. E	set true pe	sheet inter is for	1.	- 7	10	50	1/22				285	215	954
$ \begin{array}{c} \hline \text{Trade } & \frac{1}{2} & \frac{1}$	Mandag /	21/12	59132'	35:13	5923	e	3	721	. 0	. 6	marche	is fell	11	- 2	of	480	7/24				270	270	Ny.
$ \begin{array}{c} \begin{array}{c} \begin{array}{c} 0 \mbox{transmith} u & 1 & 1 & 2 & 1 & 1 & 1 & 1 & 1 & 1 & 1$	Tirsdag	23/12	60:22'	36:24	1	19	2	722	+	10	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		· 7 1	18	17	240	717				600	600	0/54
$ \begin{array}{c} \hline \mbox{transport} transpo$	Onsdag	23/12	60117'	35:28	/	d	2	735	+1	4'	- 10		, 7 4	- 2	13	435	7/18				455	455	der
$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{1000} \frac{1}{10000} \frac{1}{10000000000000000000000000000000000$	Torsdag, 4	24/12	6125'	33214	050 3	h	2	711	0	\$ Op	First party of	inter Encellent	- 5		5						710	710	1 0/51
$\frac{1}{10000} - \frac{1}{10} \frac{1}{$	Fredageles	25/12	59:20'	29:44	550 5	l.g.	3	729	20	2	Empelle	isfill -	5 -		5						25	35	748
Sum If I G AI G AI G A GA Sum If I G AI G A GA Atta Adde Image AI/A If I G AI G A GA Image Adde Image Ad	Lerdag	76/12	57=30'	28243	547 4	la	3	733	+0	- 2	- 17	10-	<u> </u>	52	10	55	1/20				565	565	9/54
$\frac{1}{10000} \frac{1}{10000} \frac{1}{10000} \frac{1}{100000} \frac{1}{10000000000000000000000000000000000$						0						Sum	26 11	6 21	64	aken 1260					2920	2920	
$ \frac{1}{10000000000000000000000000000000000$			1000		D	7.	-	-			1					Jotal 2705	-	8. Ival one	rhoidet				
$ \frac{1}{1000} \frac{1}{100$				G. Koke	kjeler	arynnig	1	Hertman	adda		both the	nal	Daz	Sort	An	all		Lengle i	engelske	fat - k	rinna - deshela alla	and the first first	
Sandag $\frac{4T_{12}}{12}$ $\frac{4T_{12}}{12}$ $\frac{12}{12}$ $\frac{1}{12}$			Spekk	Grake	Kjett	Ben	Spek	k Kja	tt	Ben	Heproduks Makering	ion 12.645		Blà	3	8201	1. 29.	-	- Area and		dann - errerte redt	torregryzi.	_
Sandag 4/2 54 - 3 2 4 2 - Total 6.825 Tada 4/2 39 - 4 2 30 8 - Costag 4/2 39 - 15 2 3 7 / Tada 4/2 8 2 32 7 / Tada 4/2 8 2 3 7 / Tada 4/2 8 2 3 7 / Tada 4/2 8 2 3 7 / Tada 6 50 50 500 500 500 500 500 500 500 500	Sendag	20/12		13	-	10	18 1	9 4			Tidligere	4-180	Sendag	Finn			7,						
Tanky 4% 39 - 1 4% 30 6 - Cosing 4% 4% - 12 2 1 Tanky 4% - - 8 12 2 1 Tanky 4% - - 8 2 1 - Tanky 4% - - 8 2 1 - Tanky 4% - - 8 2 1 - Tanky 4% - - 5 2 1 - Tanky 4% 1 - - 5 2 1 Tanky 1 7 1 - - 1 1 Tanky 1 7 1 - - 1 1 Tanky 1 7 1	Mandag	21/12		54	-	3	3	4 2			Total	16.825	i	Andre	2	5100	(or)						
Onling 41/2 A1 - 15 41 32 7 1 Tradig 41/2 8 7 2 31 Tradig 41/2 5 7 1 3 1 Tradig 41/2 17 3 19 34 32 8 - Americaninge. 3 inthe sign 1 41/2 19 35 12 8 - Americaninge. 3 inthe sign 1 41/2 19 35 12 8 - Americaninge. 3 inthe sign 2 12/2 12 8 - 3	Tirsdag	22/12		39	-	14	26 3	0 8		-			7	Blå	- 1	7307							
Tordag ¹¹ / ₁₀ <u> 8 4/32 5 2 Treag 4/10 <u> 5 7 3 1 - </u> <u>tarte</u> 4/10 <u> 5 7 3 1 - </u> <u>tarte</u> 4/10 <u>17 3 19 32 8 - </u> <u>Americanage</u>. <u>J</u> utan, light and light operbedeep <u>J</u> utan, light and light operbedeep <u>J</u> utan, light and light operbedeep <u>J</u> utan, light and <u>J</u> utan <u>100 190 000 000 000 000 000 000 000 000 </u></u>	Onsdag	A0/12		29	-	15	28 3	3 7		1			Mandag	Knel	-								
Iredag 41/2 - - 5 7 3 1 -	Torsdag	* 5/12				8	21 3	5 5		2			+	Bia	7	8327	60148	7 240	75077	5400	701		Tinte
Lang 21/2 17 3 19 19/32 1 - Annerkeinger. 3 intens løp en ald 1993 kjørt opanbæstek 3 intens løp en ald 1993 kjørt opanbæstek 1000 ang 1000 1 10 100 100 100 100 100 100 100	Fredag	**/12		-		5	7	3 1		-			Tirsdag	Finn Knal		6/07	*			*			ve/
3 Annerkninger. J intens løp en all rygg fjirtt oparbæstet J intens løp en all rygg fjirtt oparbæstet Sam a b rieder og de for de som ander and ander and ander and ander and ander and	Lordag	= a/12		17	3	19	34 3	2 8						Andre	6	5407.	Clar 5	201570	7 540	7521	d		
Juten lip en all 1997 tjøtt openbæset Juten lip en all 1997 tjøtt openbæset Sau 1997 til starte openbæset Tordag Uni 8 712 start 67g 67g 67g 767g 77 Rad 2 702 start 67g 67g 57g 67g 77 Rad 2 702 start 67g 67g 57g 67g 77 Rad 2 702 start 67g 67g 57g 767g 77 Rad 2 702 start 67g 770 772 Rad 2 702 start 772 Rad						Anmeri	minger						Onedag	Finn	6	\$1968	94076	90779	779	7 77	01		9 0
Jutter løp er all rygg kjøtt oparbæsek Tordag Wal 2 102010 199 63g 63g 63g 63g 63g 63g 10-1- Nal 2 102010 63g 63g 63g 63g 63g 10-1- Nal 2 1020 101 102 1020 Nal 2 1020 102 102 102 102 Nal 2 1020 102 102 102 102 Nal 2 1020 1020 102 Nal 2 1020 1020 102 Nal 2 1020 1020 102 Nal 2 1020 1020 1020 102 Nal 2 1020 1020 1020 1020 1020 1020 Nal 2 1020 1020 1020 1020 1020 1020 1020 1	~						E.c.	-	-			-	onsuag	Knel	4	013	C1 -2 -1	1220	13				
Tordag Date of the second seco	d inte	in	lip	es	all	· n.		1.º		40	the se	1		Blā	1	77.0	7	28.07		-			
Andre - Tord BLod Produg Rad Andre - Bly Bol & Prod BLod 						0	00	2011	2.00		18 C. 1		Torsdag	Knøl	8	710160	167	9 639	67 7 7	096	599 689		2-1- 7
Prose Production and product														Andre	2	7.3	02 5			-		-	
Kade Adv Adv Adv Adv Adv Adv Adv Adv													Fredag	Finn		10000	4.01						
Larding Larding Kunt 9 + 44 370 340 3507 Som 24 500 517 Som 25 500 500 500 500 500 500 500 500 500														Knøl Andre									
Som Read La Contraction of Con														Blá	6	5 by 7 30	7848	107 770	770	7			
Sum Bin 210 512 512 512 Sum Pro 115 Africanterio Allehardensen Derbannen Allehardensen													Lordag	Knal	4	43937	or 343	3507					
Som may "'s aff at Les vancarences B. Da Alleherdensen														Andre Blà	2	530	5581					-	
levenueren B. D. All Anderson													Sum	Finn	211								
levenueren B. D. All Suderson														Apre	21								4
Determine B De all Andersen													, ,	60	-	. 0				1	An	1 .	
													-	De	an	sarce	Te	10	11		Alles	and	user

Figure 2. Example image of the double facing page from catch book ("Fangstdagbok") of factory ship *Solglimt* for 20.12 - 26.12.1936, whaling season of 1936/1937.

neighbouring months of November and March, respectively. Most of the recovered daily positions are for the areas of the Atlantic and Indian oceans sector of the Southern Ocean, though some observations from the Pacific sector of the SO are available as well. A progressive shift in vessels positions southwards towards the continent throughout the austral summer is indicative of a general tendency to relocate factory vessels south along with whale's migration following a gradual recession of the edge of summer ice pack. However, whale catches made outside the ice pack could still constitute a substantial part of the total seasonal catch (Bjorge, 2014).

Figure 2 shows as an example of a catch logbook from *FS Solglimt* covering the week of 20.12 - 26.12 of 1936. The lefthand side of the page shows day of week (*Dag*), date (*Datum*), noon position (*Middagsposisjon*) local time and average daily weather conditions (*Værforhold*) except for SAT and SLP registered per 08:00 LT, according to the instructions (*Dagbokens anvendelse*) found at the front of the catch book.

Typically, the wind force, wind direction and barometric pressure are always recorded. Other data will include weather, sea swell, air temperature and sometimes sea surface temperature. Ice and icebergs observations are logged in the end of each line for a day of week, but the presence of these notes will vary from book to book. Ice observations can sometimes also be found in section *Anmerkninger*, or remarks, at the bottom of the left-hand page if there is insufficient space at the top of the page to record the observation.

The example double-facing page shown in **Figure 2** in column "Weather conditions" (*Værforhold*) logs (in the order of appearance) wind direction and force, general weather conditions shown by weather code, sea swell, barometric pressure in mm Hg, and air temperature. This is followed by information on sea ice/open water and icebergs.

All information related with whaling/whale processing activity takes the rest of the double facing page and indicate details/dimensions and sex on whales caught, the amount of produced oil and meat etc. This data set presents only the information on daily numbers and species of whales caught during the season.

4. System for logging of weather observations on Norwegian vessels throughout the 1920s-1960s.

Logging weather information on Norwegian vessels during the period covered by this study followed a system presented on front pages of the captains/first officer logbooks.

The page marked '*Tegnforklaringer*' at the beginning of each logbook (see Fig. 3) presents standardized tables with various scales/categories used for making observations. Though these tables are not present in catch logs, analysis of these documents indicated that recording weather observations in this type of documents followed an identical system. **Tables 2-4** for the three main scales/categories of weather and sea state are shown below along with English translations. Some of the terms used are not from the modern Norwegian language, being closer to Danish, same as the language used for logging various textual information in the analyzed logbooks.

TEGNFORKLARINGER HAVBUNNENS BESKAFFENHET DAGBOK Betydning bl. blå fin sis antarchic grå Tönsberg 9593,48 net. 5531,88 kjenn sp. st. Einar of G. к. кі. Kor -30 NORGES HANDELS OG SJØFARTSTIDENDE Printed by THE NORWEGIAN MERCANTILE AND SHIPPING GAZETTE with Permission of the Director of Navigation.

Figure 3. Example image of the front double facing page from a logbook of FS *Antarctic* showing on the left-hand page the standardized tables with various scales/categories used for making weather and ocean surface observations. This system of weather codes was used in catch logbooks as well.

Vindstyrke (Wind force/Wind Speed)							
Tegn (category)	Betydning	English Translation					
	(Meaning)						
0	Stille	Quiet or still					
1	Svak	Gentle / Weak					
2	Lett	Easy/Light					
3	Frisk	Fresh					
4	Sterk	Strong					
5	Storm	Storm					
6	Orkan	Hurricane					

Table 2. Wind force categories used in the Norwegian logbooks of the studied period.

Været (Weather)								
Tegn (category)	Betydning (Meaning)	English Translation/Scale in						
		octas						
а	Kart	Clear 0/8 - 1/8						
b	Lett-skyet	Partly cloudy 2/8 - 3/8						
С	Halvklart	Half cloudy 4/8 - 5/8						
d	Skyet	Cloudy 6/8 - 7/8						
е	Overskyet	Overcast 8/8						
f	Meget mørkt og	Very dark and threatening						
	truende							
g	Byget	Showers (snow, rain)						
h	Disig	Наzy						
i	Tåket	Foggy						
k	Regn	Rain						
	Sne	Snow						
m	Torden	Thunder						

Table 3. Weather and state of the sky indices/categories used in the Norwegian logbooks of thestudied period. Approximate conversion of cloud cover to scale in octas (eights) is also provided.

Table 4. Sea state categories used in the Norwegian logbooks of the period. Conversion to the modern scale yet to be made.

Sjøgang (Swell)		
Tegn (sign)	Betydning	English Translation
	(Meaning)	
0	Stille	Quiet/Calm/Still
1	Svak	Weak/Smooth
2	Lett	Easy, Slight
3	Frisk	Fresh/Moderate
4	Sterk	Strong/Rough/Very rough
5	Svær	Severe/High
6	Vældig	Very high/Phenomenal

5. Sea ice and icebergs observations

When a vessel was positioned within or near ice pack, the respective note would typically be made in the catch logbook. For catch books the observations are daily, in line with the daily system of logging weather conditions, or less. During the early 1930s, a system for logging sea ice conditions was not yet well established on Norwegian vessels. The notes on sea ice as well the observational practices are therefore not standardized and tend to vary between the vessels/observers.

During periods with no ice presence while in the areas where sea ice could already be encountered/expected, the open water conditions were typically logged as well. Often, the open water state could also be recovered by references to a rough sea state and a vessel rolling.

In catch logbooks sea ice/open water and icebergs would be reported in the right-hand side in the end of the line for weather conditions (see **Fig. 2**), typically, in a form of a short note on both sea ice and/or icebergs.

During mid- to late- 1930s, a more explicit/systematic category-based system of logging the information on sea ice and icebergs was introduced, as an addendum to item 4 of the "Instruction to logbook keeping" (*Dagbokens anvendelse*) dealing with logging weather and sea ice conditions (See **Figure 4**).



Figure 4. Category-based system of logging the information on sea ice and icebergs that was introduced in mid to late 1930s on Norwegian vessels. This image is from the logbook of *FS Ole Wegger* for season 1938-1939 and represents a sheet with typewriter text with Ice categories/designations (*Isbetegnelser*) pasted into the existing standard catch logbook. See **Table 5** for more details on the indices/categories and notations used.

Classification of sea ice in this system integrates both ice coverage (ice concentration) and stages of ice development as shows **Table 5**.

Table 5. Category-based system of logging the information on sea ice and icebergs that wasintroduced in mid to late 1930s on Norwegian vessels; designations used with their respective Englishtranslation.

Category	Norwegian term used	English translation
Α	lsfritt.	Ice free/Open sea
В	Drivis.	Drift ice (loose/very open)
С	Slak pakkis.	Loose/open pack ice
		Loose/open pack ice with
D	Slak pakkis med klarer.	openings/leads
		Close pack ice with
E	Tett pakkis med klarer.	openings/leads
		Very close or consolidated
F	Sammenhengende pakkis uten klarer.	pack ice
		New ice (brittle ice or
G	Nyis, (sprøis eller tallerkenis).	pancakes)
		Ship is positioned outside,
		but within sight of pack
		ice. Main bearing direction
Н	Kokeriet ligger utenfor, men i sikte av pakkis. Der tilføies s	to ice pack is indicated by
	(syd), n (nord), w (vest) eller f.eks. so (sydost),	S (South), North (N), West
	peileretningen til ispakkene, idet man søker å slutte sig til	(W) or e.g. SE (South
	hvilken hovedretning pakkene har.	West).
Ι	Mange isfjell.	Numerous icebergs
J	Adskillige isfjell.	Several icebergs
К	Enkelte isfjell, (meget få).	Solitary icebergs (very few)

However, this code-based system has not been fully in use during the 1930s. In some of the catch logbooks the notes on sea ice and icebergs were made using an older textual/descriptive way. During keying of the documents, for the sake of data homogenization all textual notes on sea ice and icebergs were interpreted and logged in terms of the system presented in **Table 5**. Though introducing some ambiguity into the final result, it simplifies further analysis of the data.

6. Published data structure

All analyzed data are published in one Excel file. Each line contains a daily observation for a particular vessel and follows a structure indicated below:

Column 1: Vessel name

Column 2: Date

Column 3: Latitude in degrees and tenths of degrees

Column 4: Longitude in degrees and tenths of degrees

Column 5: Air temperature in degrees C

Column 6: Sea surface temperature in degrees C

Column 7: Measured barometric pressure in mBar

Column 8: Weather (weather code following Table 3)

Column 9: Wind direction (16- or 32-compass rose)

Column 10: Wind force (Beaufort scale except for Solglimt 1932/1933 season)

Column 11: Sea surface state (waves) in Norwegian scale 0-6 scale or Douglas 0-9 scale

Column 12: Sea ice and Icebergs (code following Table 5)

Column 13: Daily catch/processing of Blue whales

Column 14: Daily catch/processing of Finn whales

Column 15: Daily catch/processing of Humpback whales

Column 16: Daily catch/processing of Sperm whales

In addition, another spreadsheet of the file contains copies of all tables for weather codes, sea state, wind force and sea ice.

We also publish original images of the logbooks. Images are archived on a vessel-season basis and represent copies of individual documents (catch logbooks) used in this study.

Reference

Bjorge, O. (2014) New information on the Blue whales (Balaenoptera musculus) hunting in the Southern Ocean, based on logbooks. Master's thesis, Institute for Bioscience, Department of Marinbiology and Limnology, University of Oslo, Oslo, Norway.

Branch, T. A., Matsuoka, K. and Miyashita, T. (2004) Evidence for increases in antarctic blue whales based on bayesian modelling. Marine Mammal Science, 20, 726-754. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1748-7692.2004.tb01190.x.