Ice islands: their presence in the North Atlantic Ocean

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Institute for Ocean Technology
Institut des technologies océaniques

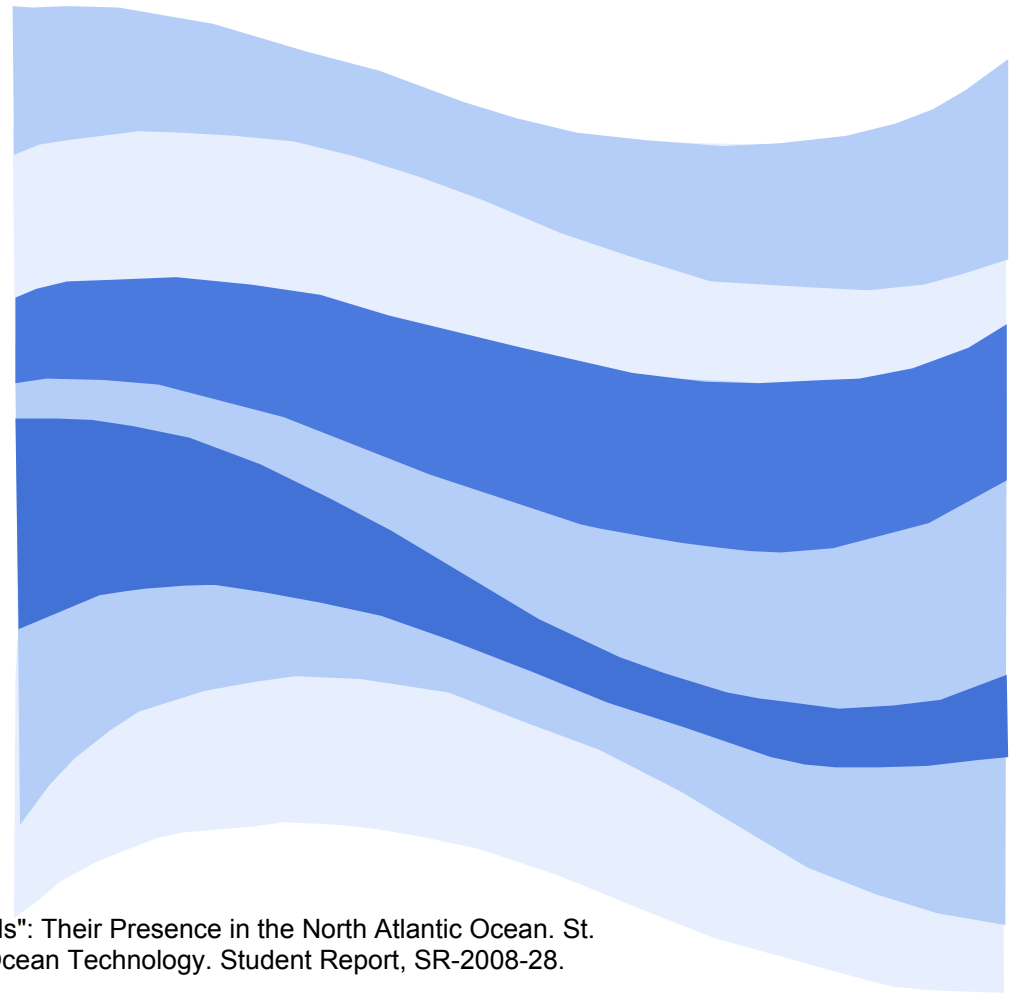
SR-2008-28

Student Report

ICE ISLANDS: THEIR PRESENCE IN THE NORTH ATLANTIC OCEAN

Tessa Armstrong

December 2008



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ICE ISLANDS: THEIR PRESENCE IN THE NORTH ATLANTIC OCEAN

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SUMMARY

Ice islands are extremely large icebergs that break off the ice shelves of Ellesmere Island and the glaciers of Greenland. A percentage of the ice islands will make their way south via the Nares Strait and drift with the Labrador current off the coast of Newfoundland and Labrador.

The content of this paper spans over a century of ice island sightings; beginning in the 1880s up until 2004. Data has been collected from numerous sources, including the historical *Iceberg Sighting Database* by Brian Hill, as well as *PERD Iceberg Database.* A total of 340 ice islands were reported within that data thus far compiled. These reports have been organized into an excel spreadsheet, consisting of detailed information for each ice island such as position, size and date.

The ice island data has been plotted in a series of graphs, displaying different trends related to the position and size of ice islands. These graphs contribute to final analysis of the data as displayed by the graphs and figures.

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1.0 INTRODUCTION

1.1 Ice islands

The International Ice Patrol defines an ice island as any iceberg measuring 300 meters or greater in length. They are "usually characterized by a regularly undulating surface giving a ribbed appearance from the air," [1] and many have melt pools across their surface. Ice islands have been reported in a variety of shapes, including pinnacles, wedges and domes. Many islands are tabular, or flat, as seen in Figure 1. Ice floes have a similar appearance and may be mistakenly identified as an ice island. To eliminate this problem it is generally said that an ice island must have a height equal to or greater than five meters.

Figure 1: A tabular ice island

1.2 Their origin

This paper is a study of the presence of ice islands in the North Atlantic Ocean, focusing on the waters off the coast of Newfoundland and Labrador. The majority of ice islands

reported off the coast of Newfoundland and Labrador originate from the ice shelves off the northern coast of Ellesmere Island in Northern Canada as well as the glaciers of Greenland, most commonly the Petermann and Ryder glaciers. "Many variables control the movement of the ice islands including wind, water currents, time of year, and the location of the pack ice." [1] These large icebergs may drift around the Arctic Ocean for many years before reaching the North Atlantic via the Nares Strait, shown in Figure 2. Once through the Strait the ice islands drift with the Labrador Current down the coast.

There are reported occurrences of ice islands off the east coast of Greenland. This sighting is displayed in Appendix B using Google Maps. In this case the ice island may have broken off a glacier on the east coast of Greenland. The possibility exists that more ice islands have broken off east coast glaciers and followed the east Greenland Current and west Greenland Current before hitting the Labrador Current.

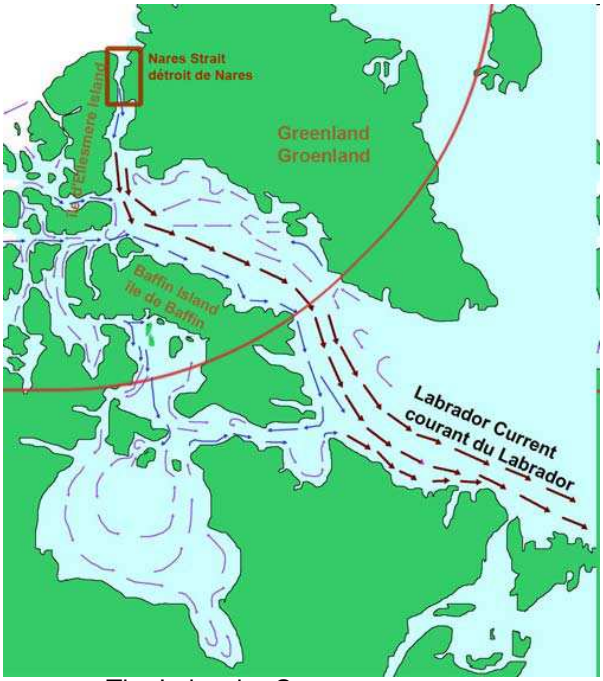

Figure 2: The Labrador Current
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Figure 3: Ice shelves of Ellesmere Island, Ryder and Petermann glaciers of Greenland

1.3 Importance of data

Ice islands have made headlines in recent years due to the accelerated deterioration of ice shelves as the result of a warming trend in the Arctic. Issues may arise if these extremely large ice islands break into smaller islands, allowing them to travel through the Strait into navigable waters where ships and/or oil platforms may be in their path.

An example of the creation of an ice island is illustrated in Figure 4. In the summer of 2001 an extremely large ice island began to break away from the Petermann glacier on the northern coast of Greenland. This figure displays the ice island in August of 2001, after it had broken off the glacier and began to drift.

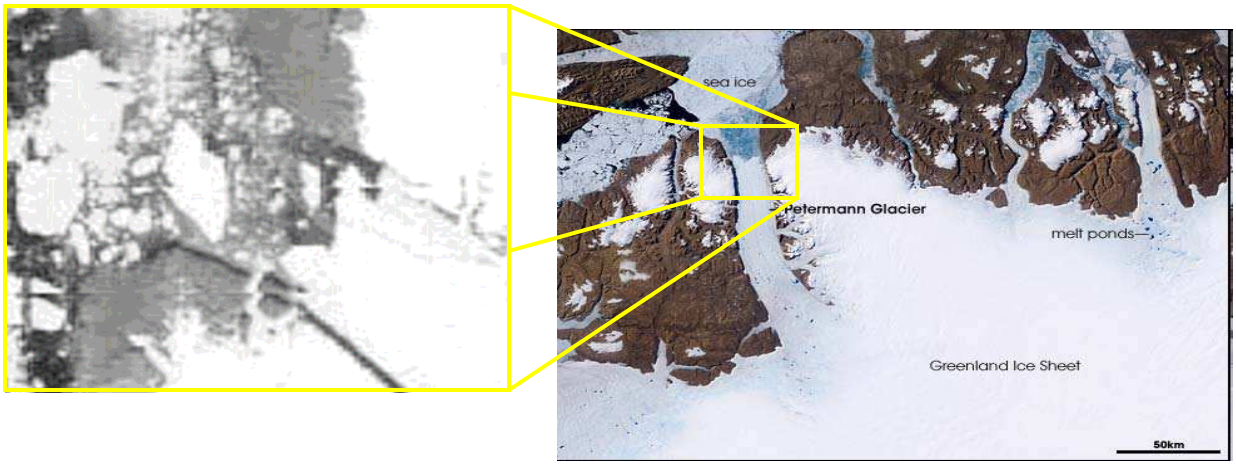


Figure 4: Ice island breaking off the Petermann glacier in August 2001. Photo courtesy of NASA

The ice shelves off the northern coast of Ellesmere Island are also a concern. "During the early part of the 20th century, a large continuous ice sheet extended along 450km of the northern Ellesmere Island coastline. By the beginning of the 21st Century, only 6

major ice shelves, totalling one tenth of the extent of the original shelf, remained along the north coast of Ellesmere Island." [2] "As of the summer of 2008, these ice shelves are undergoing almost daily changes, with some ice shelves collapsing completely and others calving large ice islands and accompanying ice fragments." [1]

These occurrences and the concern for how they may affect trans-Atlantic shipping and recent offshore oil and gas activities off Newfoundland have resulted in a need for data analysis related to ice islands and their presence in the North Atlantic Ocean.

2.0 DATA

Previous ice island studies that have been conducted did not have access to the wide range of data currently available. One paper to note is John P. Newell's *Exceptionally Large Icebergs and Ice Islands in Eastern Canadian Waters: A Review of Sightings from 1900 to Present.* His paper relied on sightings by the International Ice Patrol, which account for a very small percentage of ice island reports in the late part of the 19th century, and early 20th century. The data available today has been collected from a wide range of sources and compiled into the following databases.

2.1 Iceberg Sighting Database

The Iceberg sighting database, created by Mr. Brian Hill of the Institute of Ocean Technology, is a historical log of iceberg sightings off the coast of Newfoundland and Labrador prior to 1960. Iceberg sightings are entered according to year into an Excel spreadsheet where the date, location, size and any additional comments are recorded for clarity. The data are obtained from numerous published sources including but not

limited to the *Hydrographic Bulletin (HB)*, the *New York Maritime Register (NYMR)* and the International Ice Patrol (IIP). The HB, of which transcribing data is still in progress, has only recently been added to the database as a source, and has provided thousands of new entries in the late 1800s and early 1900s. These data provide a significant amount of information which to base observations of early century iceberg sightings.

The International Ice Patrol (IIP) was established in 1912 as a result of the Titanic disaster and began regular patrols of the Trans-Atlantic shipping lanes in 1914. Up to that point ships relied solely on others to report any iceberg sightings as they crossed the Atlantic to their destination. It was not until the late 1920's that the IIP overtook papers such as the HB and NYMR as the main source for iceberg sightings.

2.2 PERD Database

The Program on Energy and Research Development (PERD) Iceberg Sightings Database, compiled by BMT Fleet Technology, is a collection of iceberg sightings off the coast of Newfoundland and Labrador beginning in the late eighteen hundreds to the present day. In collaboration with Brian Hill's historical *Iceberg Sighting Database* and the International Ice Patrol they have created a comprehensive source to assist with the research of iceberg activity over the past century. The database was created to help identify possible problems that may interfere with current offshore activities.

The PERD Database has a similar format to the *Iceberg Sighting Database*, providing iceberg location, size etc. PERD uses Microsoft Access to store, search and display the data instead of the Excel format used in the *Iceberg sighting database*.

2.3 Accuracy of Data

The content of this paper spans over a century of ice island sightings; beginning in the 1880s up until 2004. Prior to the introduction of aircraft patrols in the 1930s followed by radar in later years, ship reports were the main source for iceberg sightings. The accuracy of the visual sightings was highly dependent on weather, sea conditions and the time of day that the ship passed the iceberg. All of these factors must be kept in mind when considering the accuracy of the iceberg positions recorded, as well as their dimensions and shape.

The reports at the early part of the century did not have the consistency that the International Ice Patrol provided with regular patrols. Very rarely did reports reveal the path that the iceberg was taking, and when a ship came across an iceberg they had no way of knowing whether it had already been identified by another ship at a different location. This makes it very difficult to discern whether or not an ice island has been reported more than once, commonly known as a resight, and thus counted more than once in the total number of sightings. Some resights are easily identified; icebergs may have been reported as having a similar size and location at around the same date. These sightings are counted as one report. As technology progresses, and we are capable of following icebergs via radar, this problem becomes one of the past, as this paper spans over a century of sightings, it must be taken into consideration when looking at the accuracy of the total count of ice islands.

3.0 DATA ANALYSIS

3.1 Occurrence of ice islands

As stated, this paper spans 120 years of ice island sightings. During this period of time there were 340 reports of ice islands in the data that has been thus far compiled. These reports have been organized into one spreadsheet (Appendix A), consisting of detailed information for each ice island such as position, size, date, sighting source and any additional comments. Any reports that are known resights of an ice island are not included in this final count. If a sighting was reported as "a number of ice islands," and the actual count is unknown, it was recorded as one island for the purpose of this paper. A visual representation of the data compiled in Appendix A is displayed in Appendix B using Google Earth. Each purple icon is a representation of a reported ice island. One icon may represent more than one report at that location. This illustration gives a general idea of where we may expect to find ice islands.

3.2 Sea ice extent

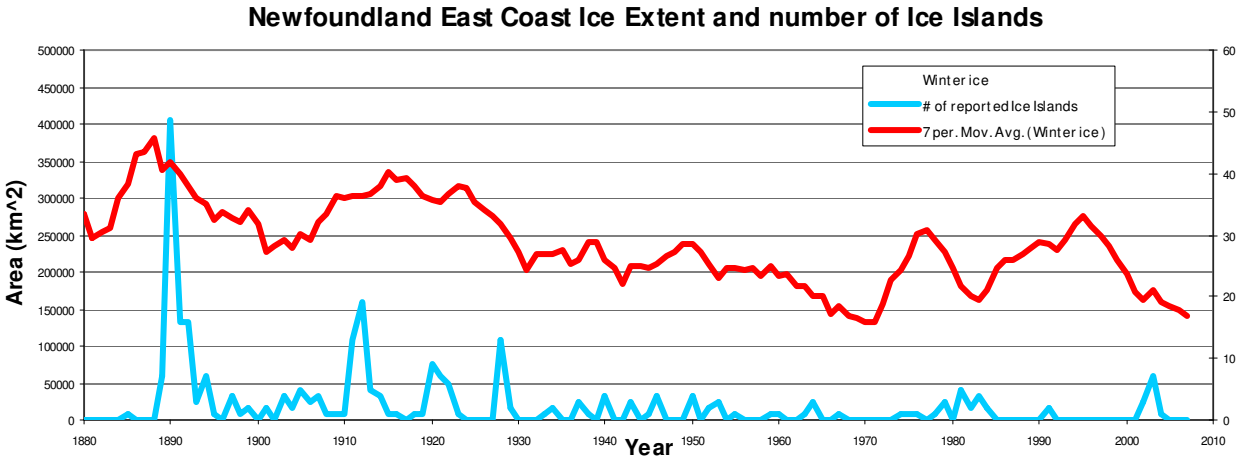


Figure 5: Sea Ice extent plotted with number of ice island reports for each year. Graph courtesy of Brian Hill, Institute for Ocean Technology- National Research Council of Canada

In Figure 5 the area of the sea ice extent off the coast of Newfoundland and Labrador is plotted for each year, beginning in 1880 [11]. On the same graph the total number of ice islands reported has been summed for each year beginning in 1885 and displayed in blue. Zero reports in a year may signify that there were no ice islands reported in that year but it may also be the result of incomplete data; ongoing data entry may have a significant affect on displayed results.

Upon analysis of the two plots it can be seen that both follow a similar downward trend over the past century. In regard to the sea ice extent this indicates that the overall area has decreased in the past 120 years, evidence of a warming trend. This warmer environment may be the cause for the downward trend in the number of ice island reports. Higher water and air temperatures result in the ice islands breaking up and/or melting into much smaller icebergs before they reach more southerly latitudes.

Another relationship that can be discerned between the two plots is that the majority of years that contain a large number of ice islands reports, 1890 and 1928 are two examples, occurred during a warming period as indicated by a downward slope in the sea ice extent. This may be due to the fact that previous to these years of warming the ice islands may have been caught in sea ice up North, which prevented them from drifting further south. It may also indicate that during these warming trends there were a greater number of islands breaking off of the ice shelves in the Arctic, resulting in more reports as they travelled farther south.

Sea ice can have a notable affect on the size of an ice island as well as how far south it will reach. The ice protects the ice island from wave erosion, allowing the berg to

maintain its large size for a longer period of time before breaking up. It can be surmised that a greater area of sea ice of the coast of Newfoundland and Labrador will allow larger ice islands to drift to more southerly latitudes. This was established by Marko et al (1994) in *Iceberg Severity off Eastern North America: Its Relationship to Sea Ice Variability and Climate Change.*[10]

3.3 Further analysis

The following graphs were plotted using information found in each ice island report. Each plot displays different trends related to ice islands and contribute to final conclusions found through analysis of the data as displayed by the graphs and figures.

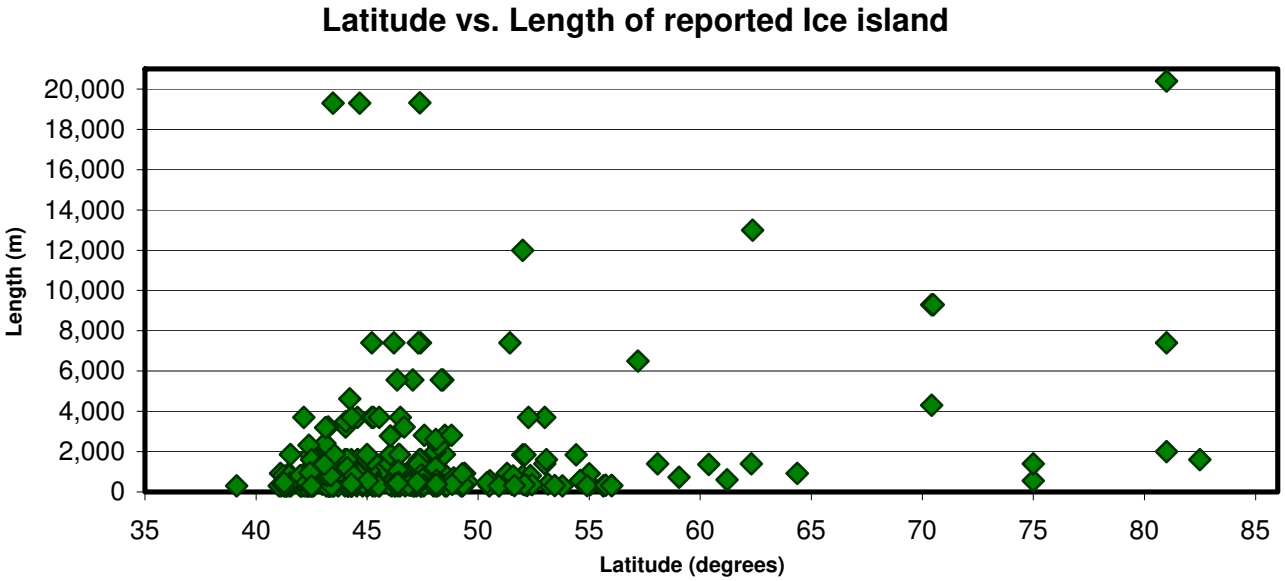


Figure 6: Ice island sightings plotted in Latitude vs. reported Length

Figure 6 displays the latitude of each reported ice island versus its length. The apparent trend is that the lengths of the ice islands, thus their overall size, tend to decrease the farther south they reach. This trend could be attributed to the fact that

there is less sea ice to protect the islands as the travel father south, warmer waters and climate at lower latitudes, and the simple fact that the farther south they reach the longer they have been drifting, giving them more time to deteriorate.

This plot also displays that the largest ice island ever recorded within the data scope of this paper was just over twenty kilometres long, reported at latitude 81 in July of 1963. Reports in more northerly latitudes were not possible prior to the introduction of airplane patrols and radar technology.

Anomalies to the apparent trend are indicated in the top left corner of the plot. These three extremely large ice islands, all reported well below latitude 50, were recorded as having a length greater than nineteen kilometres. These three islands occurred in 1891, 1899 and 1901 respectively. Upon analysis of the length of ice islands versus the year that they were reported, as seen in Figure 7, it can be seen that extremely large ice islands were more common in the late 19th century, early 20th century.

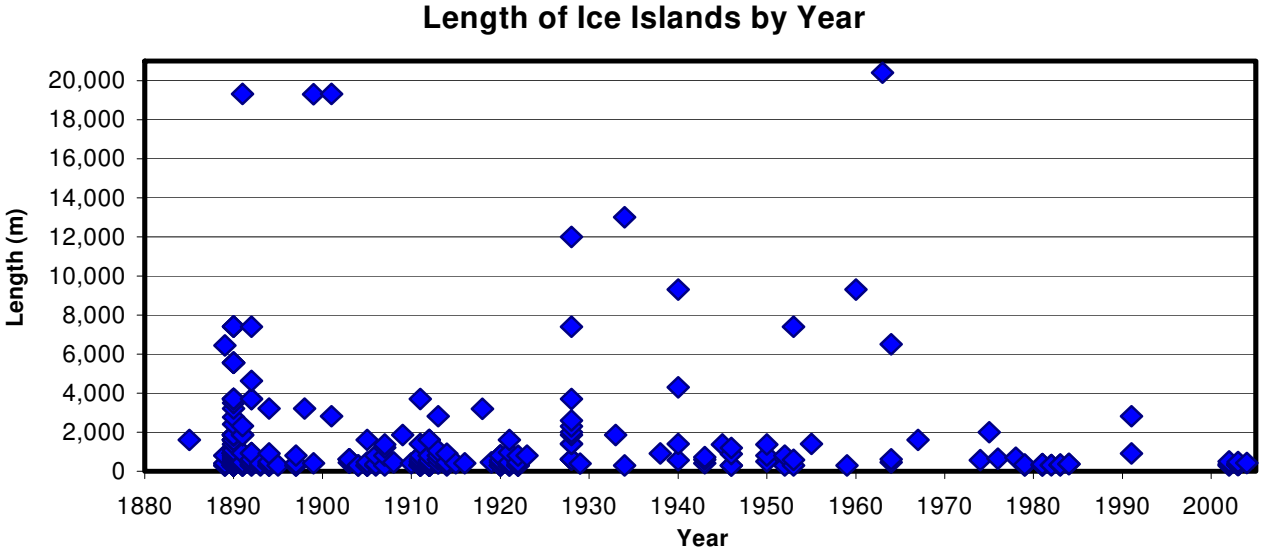


Figure 7: Ice islands length vs. year of report

As stated, technology is allowing ice patrols to go farther north. With this said it could be generally assumed that since patrols had the capability to travel farther north with the introduction of new technologies the average size of ice islands reported would have increased. Upon analysis of the data displayed in Figure 7, the trend indicates the opposite. With few exceptions, the size of the ice islands reported is generally smaller; a downward trend in the length of the ice islands beginning in the 1880's up until 2004 is displayed. This trend reinforces previous analysis, a smaller area of sea ice of the coast of Newfoundland results in smaller ice islands. Another cause for the smaller islands may be that as the Arctic ice shelves break up the reservoir is reduced, resulting in smaller islands.

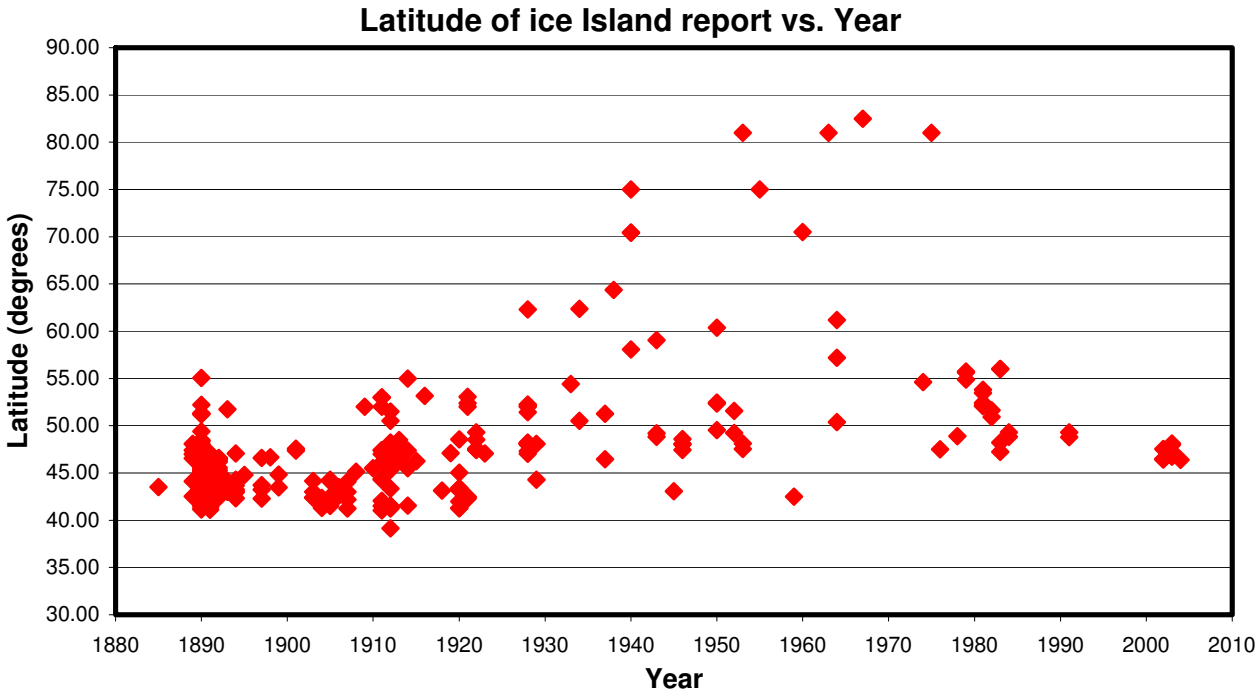


Figure 8: Reported ice island sighting beginning in 1885

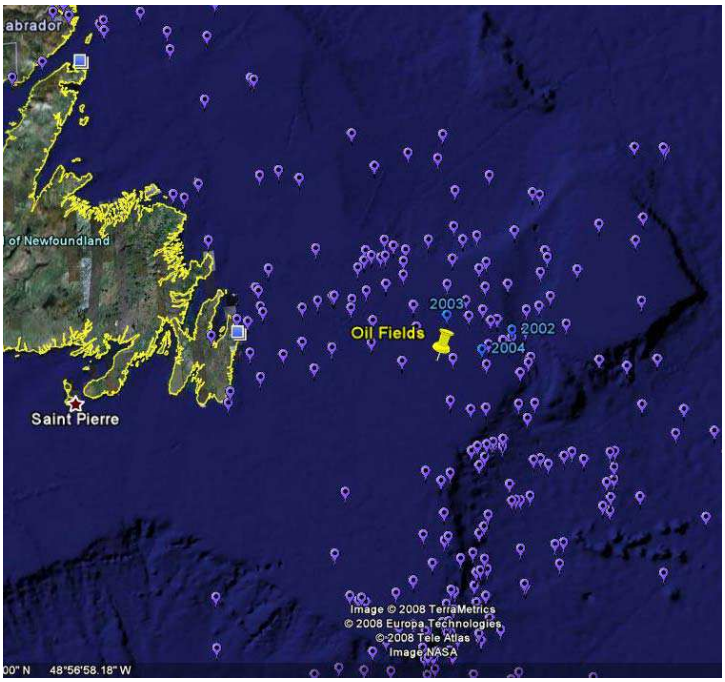
Examining the data points, over the last 100 years there have only been two ice islands within our data scope reported that came near three kilometres below latitude 51. Previous to that there were numerous ice islands reportedly longer than three kilometres as shown in Figure 7. In a graph of the reported latitude versus year, as shown in Figure 8, it can be seen that the majority of reports in the late 1800's, early 1900's were below latitude 51. This again reinforces that larger ice islands were coming much farther south.

Figure 8 also provides a visual representation of when the International Ice Patrol started patrolling farther North in the 1930's with the introduction of airplanes, and in later years radar, as indicated by the more northerly data points.

3.4 Offshore Oil and Gas activity

When exploration of the oilfields off the coast of Newfoundland began, studies were conducted to assess the danger that icebergs may pose to the potential offshore activities. None of the studies that were conducted had access to the large scope of data currently available. Records of historical sightings were sparse and unknown to exist, and data was not as widely available as it is today. In Figure 9 the yellow marker represents the location of the oil fields, and is shown in relation to the reported ice island sightings using Google Earth. As has been discussed, many of these reports occurred over a century ago, but this illustrates that there is a precedence of ice islands in the area. Ice islands that were reported in the vicinity of the oilfields in 2002, 2003 and 2004 have also been identified. The drift patterns of these more recent reports are

illustrated in Figure 10. It can be very difficult or even impossible to alter the path of an ice island, as well as smaller bergs. These figures indicate that it is very possible that the offshore drilling platforms may be in the path of ice islands, posing a threat to their drilling activities as well as their workers.



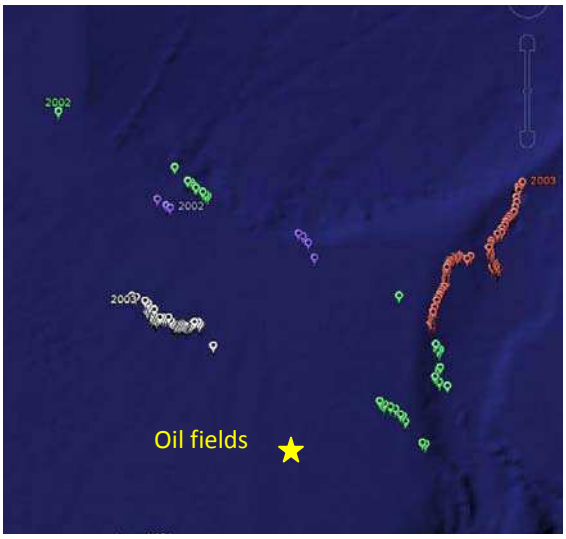


Figure 10: Drift patterns of ice islands

Figure 9: Location of oilfields and ice island reports

As has been indicated throughout the paper, ice islands reaching the southerly latitudes of the oilfields have decreased in size as time progresses. While these smaller ice islands may have the potential to cause less damage if they should hit something it also makes it more likely that they will be able to reach oilfields. As the length of the ice islands decrease so does the draft, or the depth of the berg below the water line. As a rule of thumb the ratio is 1:5. So as the size of the ice islands decreases it is more likely that they will be able to drift over the Grand Banks, as opposed to around, without getting grounded before reaching the oilfields.

4.0 CONCLUSIONS

The data presented within this paper displays a warming trend of the North Atlantic Ocean. Both the number of ice islands reported and the area of the sea ice extent off the coast of Newfoundland and Labrador have decreased over the past century. This could indicate a warmer environment, where sea ice is not allowed to form as it has in past years resulting in little protection for ice islands against wave erosion and other detrimental weather effects that result is smaller ice islands that break up before reaching southerly latitudes. A warmer environment would also have an affect of the melting rates of the ice islands reaching the North Atlantic.

Large ice shelves and glaciers in the Arctic are breaking up at accelerated rates, but there are fewer ice islands reported in recent years as compared to the late 19th early 20th centuries. Those that do reach the North Atlantic are smaller in size; this may be the result of a depleted reservoir as the ice breaks up as well as the warmer temperatures.

A greater scope of data, as compared to the data available for previous papers, has provided a better insight into whether or not the ice islands that drift down the coast of Newfoundland and Labrador pose a potential threat to offshore activities. It was shown that there is a precedence for ice islands in the area of the oil fields over the past century, and as recently as 2004. These large icebergs could cause significant damage to drilling platforms and endanger the lives of their workers if a collision should happen.

Ongoing data compilation will answer more questions, as well as provide a more

complete picture into the analysis of ice island drift patterns, as well as how the number of reports and the sizes being reported relates to a global warming trend.

APPENDIX A

Ice Island Data- Excel Spreadsheet

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
Ship Ice (	9	376	U	Ship	Unknown	Unknown	43.50	49.33	10-May-1885	1	Tabular	1600		
IOT	1	25	N	Ship	La Bourgogne (SS)	Visual	44.13	48.27	20-Jun-1889	1		300	40	
IOT	1	193.1	N	Ship	Iowa (SS)	Visual	48.09	46.45	19-Jul-1889	1		305	122	
IOT	1	24	N	Ship	Saale (SS)	Visual	42.54	49.54	11-Jun-1889	1		400	15	400
IOT	1	114	N	Ship	Jersey City (SS)	Visual	47.00	47.35	30-Sep-1889	1		402	45	
IOT	1	7	N	Ship	Austerlitz (SS)	Visual	47.42	46.12	24-Apr-1889	1	Wedge	805	91	
IOT	1	36	N	Ship	Unknown	Visual	46.57	40.29	3-Jun-1889	1		805	30	
IOT	1	455.21	N	Ship	McLeod (Sp)	Visual		42.00	25-Jun-1889	1		6440		
IOT	1	58	N	Ship	Lahn (SS)	Visual	42.59	49.33	4-Feb-1890	1		305	61	
IOT	1	131	N	Ship	Cephalonia (SS)	Visual	43.49	47.50	13-Feb-1890	1		305	56	
IOT	1	192.2	N	Ship	Unknown	Visual	43.30	51.00	Mar-1890	1		305	61	
IOT	1	278	N	Ship	Catalonia (SS)	Visual	42.03	54.56	16-Mar-1890	1		305	107	
IOT	0	313.22	N	Ship	Norseman (SS)	Visual	42.53	49.52	28-Mar-1890	1		305	30	
IOT	1	328	N	Ship	Borussia (SS)	Visual	43.26	50.56	30-Mar-1890	1		305	61	
IOT	1	349.2	N	Ship	Columbia (SS)	Visual	47.20	38.30	2-Apr-1890	1		305	76	
IOT	1	366	N	Ship	Fulda (SS)	Visual	44.25	41.41	4-Apr-1890	1		305	9	
IOT	1	419	N	Ship	Dania (SS)	Visual	45.00	40.00	8-Apr-1890	1		305	30	
IOT	1	562.21	N	Ship	City of Berlin (SS)	Visual	44.00	40.00	28-Apr-1890	1		305	46	
IOT	1	577.1	N	Ship	Thingvalla (SS)	Visual	47.10	42.30	19-May-1890	1	Tabular	305	12	
IOT	1	803	N	Ship	Richmond Hill (SS)	Visual	45.56	42.02	11-May-1890	1		305	12	
IOT	1	953	N	Ship	Lahn (SS)	Visual	45.00	40.20	26-May-1890	1		305	30	
IOT	1	977	N	Ship	Umbria (SS)	Visual	42.31	49.56	30-May-1890	1		305	91	
IOT	1	984	N	Ship	Eider (SS)	Visual	41.56	50.50	31-May-1890	1		305	50	
IOT	1	1055	N	Ship	Samaria (SS)	Visual	41.13	49.46	6-Jun-1890	1		305	76	
IOT	1	1097.2	N	Ship	Eugenie (SS)	Visual	46.24	46.56	9-Jun-1890	1		305	9.1	
IOT	1	1188	N	Ship	Elbe (SS)	Visual	42.10	49.08	21-Jun-1890	1		305	49	
IOT	1	1214.2	N	Ship	Corona (SS)	Visual	42.30	50.00	21-Jun-1890	1		305		
IOT	1	1520	N	Ship	Lady Nairn (Bk)	Visual	44.53	45.40	12-Aug-1890	1		305	30	
IOT	1	728	N	Ship	Sicilia (SS)	Visual	44.50	43.39	10-Apr-1890	1		366	31	
IOT	1	861.1	N	Ship	Kansas (SS)	Visual	46.04	41.25	21-May-1890	1	Tabular	366	15	
IOT	1	1380	N	Ship	Vancouver (SS)	Visual	55.05	51.20	24-Jul-1890	1		366	18	
IOT	1	1701.1	N	Ship	Chester (SS)	Visual	45.46	47.02	20-Oct-1890	1		366	61	
IOT	1	882	N	Ship	Elbe (SS)	Visual	47.27	45.39	23-May-1890	1		396	58	
IOT	1	1726	N	Ship	Oranmore (SS)	Visual	45.20	48.18	18-Oct-1890	1		396	76	
IOT	0	364.02	N	Ship	La Bretagne (SS)	Visual	44.53	45.46	4-Apr-1890	5	Tabular	400	15	
IOT	1	571	N	Ship	Mentmore (SS)	Visual	46.01	48.40	8-Jan-1890	1		400	60	
IOT	1	597.1	N	Ship	Knight Templar (SS)	Visual	44.10	51.23	13 Jul-1890	1		400	15	
IOT	1	641.1	N	Ship	Fremona (SS)	Visual	45.10	48.12	23-Jan-1890	1		400		

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	54	N	Ship	Unknown	Visual	43.30	50.20	3-Feb-1890	1		402	91	
IOT	1	371.2	N	Ship	Mineola (SS)	Visual	43.47	47.10	4-Apr-1890	1		413	183	
IOT	1	269	N	Ship	Fonar (SS)	Visual	43.45	53.48	14-Mar-1890	1		457	46	
IOT	1	518	N	Ship	Aurania (SS)	Visual	44.50	40.42	24-Apr-1890	2	Tabular	457	15	
IOT	1	349.1	N	Ship	Columbia (SS)	Visual	47.20	38.30	2-Apr-1890	1	Tabular	463	9.1	
IOT	1	920.2	N	Ship	Prussian (SS)	Visual	46.05	40.45	23-May-1890	1		463	61	
IOT	1	980	N	Ship	State of Pennsylvania (SS)	Visual	45.16	47.49	31-May-1890	1		463	18	
IOT	1	1056	N	Ship	Samaria (SS)	Visual	41.29	50.08	6-Jun-1890	1	Tabular	463	30	
IOT	1	1319	N	Ship	St. Pancras (SS)	Visual	43.46	48.33	11-Jul-1890	1		463	61	
IOT	1	1523	N	Ship	Catalonia (SS)	Visual	44.29	45.48	13-Aug-1890	1		463	61	
IOT	1	1584	N	Ship	Snow Bird (Schnr)	Visual	51.19	57.14	23-Aug-1890	2		463	30	
IOT	1	1667	N	Ship	Erl King (SS)	Visual	52.21	50.11	22-Sep-1890	1		463	61	
IOT	1	1688	N	Ship	Runic (SS)	Visual	46.13	47.12	9-Oct-1890	1		463	91	
IOT	1	1190	N	Ship	Elbe (SS)	Visual	42.24	50.40	21-Jun-1890	1	Tabular	466	37	
IOT	1	426.3	N	Ship	Kansas (SS)	Visual	45.00	39.42	10-Apr-1890	1	Tabular	475	11	
IOT	1	1645.1	N	Ship	Friesland (SS)	Visual	47.10	46.18	4-Oct-1890	1		590	76	
IOT	1	997	N	Ship	Saale (SS)	Visual	45.21	39.56	25-May-1890	1	Tabular	610		
IOT	1	1189	N	Ship	Elbe (SS)	Visual	42.30	49.50	21-Jun-1890	1	Tabular	671	24	
IOT	1	1728.1	N	Ship	Maine (SS)	Visual	45.04	48.20	20-Oct-1890	1		792	137	
IOT	0	245	N	Ship	Unknown	Visual	42.30	51.67	08-Mar-1890			805	46	
IOT	0	1087.2	N	Ship	Gothenburg City (SS)	Visual	46.40	49.29	8-Jun-1890		Tabular	826		
IOT	1	883	N	Ship	Elbe (SS)	Visual	47.04	46.34	23-May-1890	1	Tabular	914		
IOT	1	943.1	N	Ship	Wyoming (SS)	Visual	44.30	43.30	26-May-1890	1		914	12	
IOT	1	1740	N	Ship	Ixia (SS)	Visual	45.48	47.21	12-Oct-1890	1		914	30	
IOT	1	258	N	Ship	Prussian (SS)	Visual	42.18	51.40	10-Mar-1890	1		926	46	
IOT	1	371.1	N	Ship	Mineola (SS)	Visual	43.47	47.10	4-Apr-1890	1		926	61	
IOT	1	526.21	N	Ship	La Normandie (SS)	Visual	45.07	40.06	24-Apr-1890	14		926	15	
IOT	1	539	N	Ship	Unknown	Visual	45.16	39.52	26-Apr-1890	1		926	61	
IOT	1	570	N	Ship	Ripon City (SS)	Visual	49.39	47.50	13-Dec-1890	1		926	98	
IOT	1	722.2	N	Ship	Colina (SS)	Visual	44.54	47.00	26-Mar-1890	1		926	30	
IOT	1	736	N	Ship	Norseman (SS)	Visual	45.00	42.20	8-Apr-1890	1		926	32	
IOT	1	872	N	Ship	Cufic (SS)	Visual	43.37	48.40	23-May-1890	1		926	18	
IOT	1	1009	N	Ship	Italy (SS)	Visual	41.48	46.55	31-May-1890	1		926	82	
IOT	1	1236.2	N	Ship	Prussian (SS)	Visual	42.34	49.30	12-Jun-1890	1		926	61	
IOT	0	1245.2	N	Ship	Indrani (SS)	Visual	47.17	49.56	21-Jun-1890			926	30	
IOT	1	1307	N	Ship	Mineola (SS)	Visual	48.02	50.04	6-Jul-1890	1		926	61	463
IOT	1	1338.7	N	Ship	Mareca (SS)	Visual	48.10	47.50	12-Jul-1890	1		926	30	
IOT	0	1342.3	N	Ship	State of Alabama (SS)	Visual	46.46	46.56	14-Jul-1890	1		926	6.1	

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	1461	N	Ship	Anchoria (SS)	Visual	43.23	49.13	14-Aug-1890	1		926	15	
IOT	1	1521	N	Ship	Lady Nairn (Bk)	Visual	45.00	47.16	13-Aug-1890	1		926	24	
IOT	1	1543.2	N	Ship	Vancouver (SS)	Visual	51.30	56.30	29-Aug-1890	2		926	24	
IOT	1	137	N	Ship	La Gascogne (SS)	Visual	44.44	47.49	13-Feb-1890	1		975	40	
IOT	1	513.2	N	Ship	Catania (SS)	Visual	45.08	40.47	23-Apr-1890	1		1067	24	
IOT	1	932	N	Ship	Lero (SS)	Visual	47.20	48.00	25-May-1890	1	Tabular	1389	27	
IOT	1	743	N	Ship	Norrona (SS)	Visual	46.00	44.27	1 May-1890	1	Tabular	1390	12	244
IOT	1	656	N	Ship	Mineola (SS)	Visual	44.29	47.40	29-Jan-1890	1		1600	152	800
IOT	0	9	N	Ship	Unknown	Visual	44.57	48.67	20-Jan-1890			1609	213	
IOT	0	545.22	N	Ship	Unknown	Visual	44.03	41.00	27-Apr-1890			1609	61	
IOT	1	351.21	N	Ship	Peruvian (SS)	Visual	44.56	44.25	2-Apr-1890	3		1609		
IOT	1	385.2	N	Ship	Siberian (SS)	Visual	45.00	41.50	5-Apr-1890	1		1609		
IOT	1	529.2	N	Ship	Wisconsin (SS)	Visual	45.19	40.17	25-Apr-1890	1		1609	9.1	
IOT	1	562.31	N	Ship	City of Berlin (SS)	Visual	44.00	40.00	28-Apr-1890	1		1609		
IOT	1	597.2	N	Ship	Knight Templar (SS)	Visual	44.10	51.23	13 Jul-1890	1		1610	46	1200
IOT	1	308	N	Ship	Thingvalla (SS)	Visual	43.28	51.04	25-Mar-1890	1		1850	12	
IOT	1	723.2	N	Ship	Colina (SS)	Visual	45.00	46.30	26-Mar-1890	1		1850	27	
IOT	1	750	N	Ship	Ludgate Hill (SS)	Visual	42.56	48.39	5-May-1890	1		1850	61	
IOT	1	1250	N	Ship	Palestine (SS)	Visual	42.44	48.54	27-Jun-1890	1		1850		
IOT	1	884	N	Ship	Elbe (SS)	Visual	46.42	47.25	23-May-1890	1		1852		
IOT	1	920.1	N	Ship	Prussian (SS)	Visual	46.05	40.45	23-May-1890	1		1852	46	
IOT	1	1145	N	Ship	Electrique (SS)	Visual	48.48	43.15	9-Jun-1890	1	Tabular	1852	50	926
IOT	1	1455	N	Ship	Circassian (SS)	Visual	43.53	48.45	9-Aug-1890	1		1852	30	
IOT	1	658	N	Ship	Maine (SS)	Visual	43.11	48.51	30-Jan-1890	1		2414	1074	
IOT	1	978.2	N	Ship	Norseman (SS)	Visual	46.05	42.12	30-May-1890	1		2778	21	
IOT	0	545.12	N	Ship	Unknown	Visual	44.03	41.00	27-Apr-1890			3218	27	
IOT	1	312	N	Ship	Endeavor (SS)	Visual	44.05	46.00	27-Mar-1890	1		3500		
IOT	1	407	N	Ship	Teutonic (SS)	Visual	44.56	41.41	6-Apr-1890	1	Tabular	3700		
IOT	1	540	N	Ship	Missouri (SS)	Visual	45.21	39.37	26-Apr-1890	1		3700	27	
IOT	1	797.2	N	Ship	Istrian (SS)	Visual	42.16	50.00	11-May-1890	1		3700		
IOT	1	1107	N	Ship	Saale (SS)	Visual	45.28	40.42	9-Jun-1890	1		3704		
IOT	1	1133.2	N	Ship	Agatha (Bk)	Visual	46.50	40.52	1-Jun-1890	1	Tabular	3704	31	
IOT	1	838	N	Ship	Fulda (SS)	Visual	47.06	41.54	10-May-1890	1		5555		2778
IOT	1	1013.2	N	Ship	Miranda (SS)	Visual	46.35	53.00	29-May-1890	1	Tabular	5556		
IOT	0	1149.2	N	Ship	Portia (SS)	Visual	48.42	53.05	11-Jun-1890	2	Tabular	5556		
IOT	1	1626	N	Ship	Bushmills (SS)	Visual	48.34	46.05	21-Sep-1890	1		5556	183	
IOT	1	1233	N	Ship	Corean (SS)	Visual	47.40	50.59	25-Jun-1890	1		7400	6.1	
IOT	1	1327.1	N	Ship	Loch Eck (SS)	Visual	47.30	50.20	2-Jul-1890	1		7408	18	

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	1749.1	N	Ship	Rock Light (SS)	Visual	45.21	47.59	16-Oct-1890	1		7408	67	
IOT	1	582	N	Ship	Vancouver (SS)	Visual	51.30	56.30	27-Aug-1890	1				
IOT	1	1276	N	Misc.	Unknown	Visual	47.34	52.41	7-Jul-1890	1				
IOT	1	285	N	Ship	Furnessia (SS)	Visual	43.30	47.09	28-May-1891	1		305	15	
IOT	1	352	N	Ship	Aurania (SS)	Visual	41.38	48.15	12-Jun-1891	1	Pinnacle	305		
IOT	1	462	N	Ship	Bushmills (SS)	Visual	46.26	53.04	21-Jun-1891	1		305	30	
IOT	1	11	N	Ship	La Champagne (SS)	Visual	46.45	46.06	26-Feb-1891	1		366	69	
IOT	1	111	N	Ship	Kansas (SS)	Visual	45.18	48.00	1-Mar-1891	1	Pinnacle	366	40	
IOT	0	13.1	N	Ship	Unknown	Visual	45.00	46.68	28-Feb-1891	1		402	49	
IOT	0	13.2	N	Ship	Unknown	Visual	45.00	46.68	28-Feb-1891	1		457	37	
IOT	1	434	N	Ship	Ripon City (SS)	Visual	47.06	49.05	9-Jun-1891	1	Pinnacle	457	61	
IOT	1	112	N	Ship	Kansas (SS)	Visual	45.17	48.26	1-Mar-1891	1	Dome	463	49	
IOT	1	160	N	Ship	Lord Gough (SS)	Visual	41.10	44.31	27-Mar-1891	1	Tabular	926		
IOT	1	243	N	Ship	Ludgate Hill (SS)	Visual	42.59	49.26	18-May-1891	1		926	61	
IOT	1	254	N	Ship	Dania (Bk)	Visual	45.00	51.00	13-May-1891	1		1852	18	
IOT	1	433	N	Ship	Ripon City (SS)	Visual	46.45	51.15	9-Jun-1891	1		1852	55	
IOT	1	455	N	Ship	Hekla (SS)	Visual	41.55	52.05	10-Jun-1891	1		1852	61	
IOT	1	456	N	Ship	Hekla (SS)	Visual	42.38	48.53	10-Jun-1891	1		2315	76	
IOT	0	26	N	Ship	Unknown	Visual	44.67	48.83	13-Mar-1891	1		19308	46	
IOT	1	270	N	Ship	Marsala (SS)	Visual	45.26	44.57	29-May-1892	3		305	15	
IOT	1	364	N	Ship	Gallia (SS)	Visual	44.11	45.22	6-Jun-1892	1	Pinnacle	314	56	
IOT	0	37	N	Ship	Unknown	Visual	43.37	48.32	01-May-1892			366	61	
IOT	1	12.2	N	Ship	Mab (SS)	Visual	46.35	48.28	11-Apr-1892	1		366	22	
IOT	1	213.2	N	Ship	Didam (SS)	Visual	42.44	48.29	23-May-1892	1		366	46	
IOT	1	140.3	N	Ship	Wells City (SS)	Visual	44.08	48.34	12-May-1892	1		463	46	
IOT	1	229	N	Ship	Manhattan (SS)	Visual	44.31	47.28	13-May-1892	1		463	122	
IOT	1	230	N	Ship	Manhattan (SS)	Visual	44.52	46.18	13-May-1892	1		463	122	
IOT	1	383	N	Ship	Wells City (SS)	Visual	46.50	44.30	29-May-1892	1		463	30	
IOT	1	184.1	N	Ship	La Touraine (SS)	Visual	43.15	48.39	19-May-1892	1		617	52	
IOT	1	139	N	Ship	Wells City (SS)	Visual	44.58	46.40	11-May-1892	1		926	61	463
IOT	1	417	N	Ship	Osmanli (SS)	Visual	46.59	50.02	11-Jun-1892	1		926	9.1	
IOT	1	293	N	Ship	Fonar (SS)	Visual	44.30	47.45	31-May-1892	1		3704	61	
IOT	1	438	N	Ship	Ethiopia (SS)	Visual	45.55	42.08	9-Jun-1892	1		3704	30	
IOT	1	294	N	Ship	Fonar (SS)	Visual	44.22	48.20	31-May-1892	1		4630	55	
IOT	1	178.2	N	Ship	Hafis (SS)	Visual	46.20	47.00	18-May-1892	1		7400	183	
IOT	0	8	N	Ship	Unknown	Visual	44.15	49.38	17-Apr-1893	1		305	21	
IOT	0	30	N	Ship	Unknown	Visual	43.00	49.83	16-Jun-1893	1		400	45	
IOT	0	35	N	Ship	Unknown	Visual	51.73	55.72	04-Aug-1893	1				

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	0	13	N	Ship	Unknown	Visual	42.33	51.38	14-Mar-1894	1		305	27	
IOT	0	30	Y	Ship	Unknown	Visual	44.30	48.70	20-Mar-1894	1		305	31	
IOT	0	133	N	Ship	Unknown	Visual	47.08	51.25	03-Nov-1894	1	Pinnacle	305		
IOT	0	11	N	Ship	Unknown	Visual	42.98	49.58	11-Mar-1894	1		403	27	
IOT	0	42	N	Ship	Unknown	Visual	43.03	44.73	26-Mar-1894	1		488	8	
IOT	0	110	N	Ship	Unknown	Visual	43.67	48.75	18-Apr-1894	1		914		
IOT	0	99	N	Ship	Unknown	Visual	43.25	49.17	01-May-1894	1		3218	107	
IOT	0	13.1	N	Ship	Unknown	Visual	44.80	47.67	03-May-1895	1		305	61	
IOT	0	6	N	Ship	Unknown	Visual	43.70	45.67	21-Mar-1897	1		304	152	
IOT	0	30.2	N	Ship	Unknown	Visual	43.25	48.50	06-Apr-1897	1		305	122	
IOT	0	42	N	Ship	Unknown	Visual	42.28	51.10	18-Apr-1897	1		402	46	
IOT	0	50.1	N	Ship	Unknown	Visual	46.60	47.27	10-May-1897	1		805	61	
IOT	0	23.21	N	Ship	Unknown	Visual	46.67	48.00	03-May-1898	1		3219	46	
IOT	0	13.2	N	Ship	Unknown	Visual	44.82	47.47	28-Feb-1899	1	Pinnacle	402	46	
IOT	0	75.21	N	Ship	Unknown	Visual	43.47	47.00	03-Apr-1899	1		19300	183	
IOT	1	2	N	Ship	Ardito (SS)	Visual	47.58	52.13	10-May-1901	1		2816		
IOT	1	1	N	Ship	Ardito (SS)	Visual	47.37	52.08	9-May-1901	1		19312		
IOT	1	18	N	Ship	Norga (SS)	Visual	42.40	50.00	12-Mar-1903	1		445	93	
IOT	1	19	N	Ship	Norga (SS)	Visual	42.40	50.00	12-Mar-1903	1		610	46	
IOT	1	131	N	Ship	Unknown	Visual	44.16	45.56	17-Apr-1903	1		610	61	
IOT	0	140.22	N	Ship	Unknown	Visual	43.01	53.55	23-Apr-1903			610	212	
IOT	1	11.2	N	Ship	Calabria (SS)	Visual	42.35	49.44	12-Apr-1904	1		305	61	
IOT	1	21	N	Ship	Deutschland (SS)	Visual	41.30	47.54	3-May-1904	1		305	61	
IOT	1	138	N	Ship	Oscar II (SS)	Visual	44.30	45.48	19-Mar-1905	1		305	40	
IOT	1	21	N	Ship	Unknown	Visual	42.00	50.22	29-Mar-1905	1		305	15	
IOT	1	132	N	Ship	Lord Charlemont (SS)	Visual	44.12	48.27	31-Mar-1905	1		305	46	
IOT	1	82.1	N	Ship	Unknown	Visual	41.50	49.00	14-Apr-1905	1		460	35	
IOT	1	28.2	N	Ship	Unknown	Visual	42.50	50.40	31-Mar-1905	1		1600	30	
IOT	1	9	N	Ship	Unknown	Visual	43.50	49.00	11-Mar-1906	1		305	30	
IOT	1	13	N	Ship	Unknown	Visual	42.58	49.28	19-Mar-1906	1		365	60	
IOT	1	47	N	Ship	Caledonian	Visual			21-Jul-1906	1		805	120	
IOT	1	151	N	Ship	Oakmore (SS)	Visual	42.20	49.50	11-May-1907	3		305	46	
IOT	1	121	N	Ship	Pola (SS)	Visual	41.23	49.33	13-Apr-1907	1		805	61	
IOT	1	125.1	N	Ship	London City (SS)	Visual	44.10	49.10	29-Apr-1907	1		1207	30	
IOT	1	120.1	N	Ship	East Point (SS)	Visual	43.01	50.06	7-May-1907	1		1372	40	
IOT	1	31	N	Ship	Venango (SS)	Visual	45.14	44.09	25-Apr-1908	1		457	24	
IOT	1	140	N	Ship	Manchester Skipper (SS)	Visual	52.00	55.00	8-Jul-1909	1		1850	30	
IOT	1	99	N	Ship	Westfield (SS)	Visual	45.50	48.00	17-May-1910	1		402	30	

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	19.11	N	Ship	Camillo (SS)	Visual	44.30	47.50	26-Mar-1911	1		305	153	
IOT	1	134	N	Ship	Kentucky (SS)	Visual	46.10	45.36	11-Apr-1911	1		305	37	
IOT	1	485	N	Ship	Numidian (SS)	Visual	47.42	49.58	29-May-1911	1	Flat	305	15	
IOT	1	626	N	Ship	Louisiane (SS)	Visual	41.04	47.14	11-Jun-1911	1		305	30	
IOT	1	26	N	Ship	Baltic (SS)	Visual	41.51	49.16	30-Mar-1911	1		335	8	
IOT	1	133	N	Ship	Kentucky (SS)	Visual	46.00	45.05	11-Apr-1911	1		365	12	
IOT	1	491	N	Ship	Cairntorr (SS)	Visual	47.42	50.38	5-Jun-1911	1		488	91	
IOT	1	38	N	Ship	Devonia (SS)	Visual	42.05	48.17	7-Apr-1911	1		610	30	
IOT	1	108.1	N	Ship	Scotian (SS)	Visual	52.00	55.00	19-Jul-1911	1		800	18	
IOT	1	629	N	Ship	Andijk (SS)	Visual	44.40	45.45	27-Jun-1911	1		805	49	
IOT	1	677	N	Ship	Cape Corso (SS)	Visual	47.00	51.50	16-Jul-1911	1		805	46	
IOT	1	111	Y	Ship	Unknown	Visual	53.00		1-Jul-1911	1		1400	18	
IOT	1	110	N	Ship	Unknown	Visual	53.00		1-Jun-1911	1		3700	18	
IOT	1	74	N	Ship	Unknown	Visual	43.33	51.13	19-Apr-1912	1		300	25	
IOT	1	213	N	Ship	Unknown	Visual	46.38	47.20	3-May-1912	1		305	15	
IOT	1	573	N	Ship	Amerika (SS)	Visual	39.13	47.39	8-May-1912	1		305	30	
IOT	0	227.12	N	Ship	Unknown	Visual	45.35	47.14	8-May-1912	1		305		
IOT	1	1073	N	Ship	Koln (SS)	Visual	48.15	49.16	25-Jun-1912	1		305	18	
IOT	1	1387	N	Ship	Mongolian (SS)	Visual	47.42	52.10	1-Jul-1912	1		305	30	
IOT	1	1111	N	Ship	Oriflamme (SS)	Visual	41.49	50.34	1-Jul-1912	1		305	61	
IOT	1	1286	N	Ship	Pretoria (SS)	Visual	41.37	51.16	19-Jul-1912	1		305	30	
IOT	1	338	N	Ship	Ardanmhor (SS)	Visual	47.00	50.50	25-Apr-1912	1		365	46	
IOT	1	288	N	Ship	Royal Edward (SS)	Visual	48.22	47.58	3-Jun-1912	1	Tabular	365	24	
IOT	1	16	N	Ship	Unknown	Visual	47.00	50.50	1-Apr-1912	1		366	45	
IOT	1	1241	N	Ship	Rhein (SS)	Visual	41.38	51.28	19-Jul-1912	1		366	30	
IOT	1	1681	N	Ship	Montfort (SS)	Visual	51.51	55.00	1-Oct-1912	1		375	29	
IOT	1	1288	N	Ship	Yola (SS)	Visual	41.23	50.00	21-Jul-1912	1		381	30	
IOT	1	391	N	Ship	Cymric (SS)	Visual	47.31	46.24	15-Apr-1912	1		457		
IOT	1	1103	N	Ship	Almora (SS)	Visual	50.53	51.46	30-Jun-1912	1		549	152	
IOT	0	27.22	N	Ship	Carmania (SS)	Visual	41.54	51.30	11-Apr-1912	1		800	120	
IOT	1	1285.1	N	Ship	Oilfield (SS)	Visual	41.49	51.38	19-Jul-1912	1		805	46	
IOT	1	713	N	Ship	Hesperian (SS)	Visual	47.42	50.40	14-May-1912	1		1609	24	
IOT	1	817	N	Ship	Rappahannock (SS)	Visual	47.36	51.19	6-Jun-1912	1		1609		
IOT	1	473.02	N	Ship	Imperial Transport (SS)	Visual	48.15	49.51	10-Dec-1913	1	Pinnacle	400		
IOT	1	135	N	Ship	Snowdon Range (SS)	Visual	47.40	44.20	4-May-1913	1		600	45	
IOT	1	136	N	Ship	Snowdon Range (SS)	Visual	47.40	44.20	4-May-1913	x		805	76	
IOT	1	125	N	Ship	Pisa (SS)	Visual	46.41	47.43	4-May-1913	1		1050	50	
IOT	1	685	N	Ship	Uranium (SS)	Visual	48.50	43.17	14-Aug-1913	1		2815		

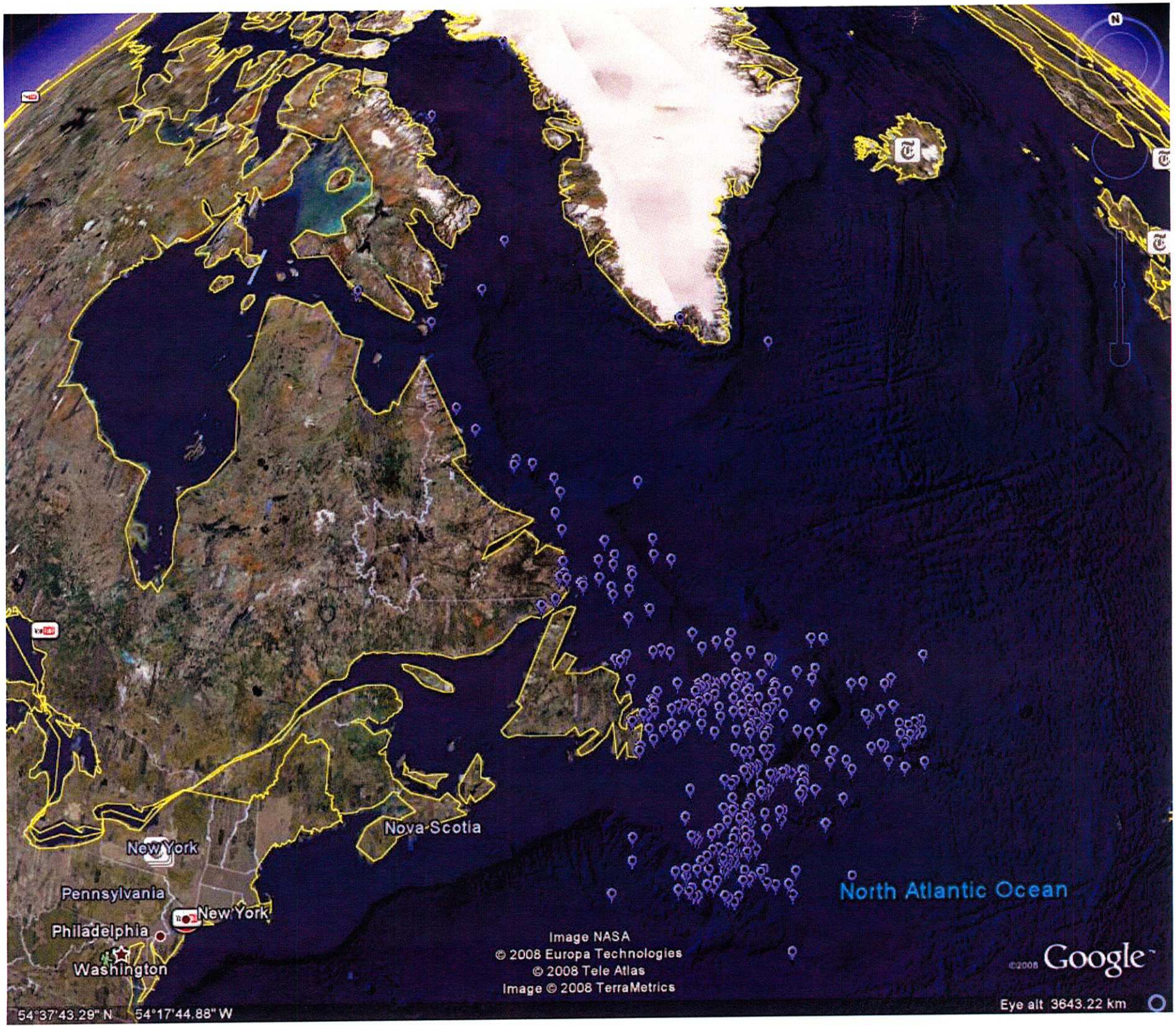
Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	752	N	Ship	Ida (SS)	Visual	45.51	48.18	23-Jun-1914	1		300	50	200
IOT	1	11	N	Ship	Unknown	Visual	47.37	50.17	1-Feb-1914	1		400	45	
IOT	1	143	N	Ship	Zijldijk (SS)	Visual	41.55	48.52	10-Jun-1914	1		457	76	
IOT	1	104	N	Ship	Unknown	Visual	55.00		1-Jul-1914	1		900	46	
IOT	1	632.1	N	Ship	Netherlee (SS)	Visual	46.25	47.50	28-Jul-1915	1		402	61	
IOT	1	236	N	Ship	Unknown	Visual	53.15	53.37	28-Aug-1916	1		402	91	
IOT	1	4	N	Ship	Unknown	Visual	43.14	49.25	20-Apr-1918	2		3200	76	
IOT	1	13	N	Ship	Carmania	Visual	47.10	47.42	16-Apr-1919	1		460	75	
IOT	1	204	N	Ship	Unknown	Visual	43.17	47.52	16-May-1920	1		305	61	
IOT	1	237	N	Ship	Unknown	Visual	41.26	47.20	21-May-1920	1		305	46	
IOT	1	261	N	Ship	Unknown	Visual	43.41	44.11	25-May-1920	1		305	91	
IOT	1	236	N	Ship	Unknown	Visual	41.26	47.20	21-May-1920	1		457	122	
IOT	1	333	N	Ship	Unknown	Visual	45.02	48.55	6-Jun-1920	1		549	91	
IOT	1	176	N	Ship	Unknown	Visual	42.00	48.27	9-May-1920	1		805	46	
IOT	1	203	N	Ship	Unknown	Visual	43.19	47.53	16-May-1920	1		805	213	
IOT	1	334	N	Ship	Unknown	Visual	43.36	48.45	6-Jun-1920	1		805	30	
IOT	1	457	N	Ship	Unknown	Visual	48.56	43.53	19-Jul-1920	1		805	46	
IOT	1	127	Y	Ship	Seneca (IIP)	Visual	42.42	49.19	6-Mar-1921	1		305	30	
IOT	1	290	N	Ship	Unknown	Visual	42.49	49.25	4-Apr-1921	1		305	76	
IOT	1	1351	N	Ship	Unknown	Visual	52.38	54.03	23-Aug-1921	1		396		
IOT	1	804	N	Ship	Canadian Settler (SS)	Visual	52.02	52.22	15-Jun-1921	2		402		
IOT	1	492	N	Ship	Unknown	Visual	42.28	49.28	6-May-1921	1		457	55	
IOT	1	1151	N	Ship	Unknown	Visual	42.43	50.57	16-Jun-1921	1		955	70	
IOT	1	1411	N	Ship	Canadian Ranger (SS)	Visual	53.07	51.00	17-Oct-1921	1	Domed	1609		
IOT	1	1354	N	Ship	Briseis (SS)	Visual	47.44	47.37	30-Jul-1922	1		305	15	
IOT	1	1943	N	Ship	Digby (SS)	Visual	49.29	48.38	22-Sep-1922	1		305		
IOT	1	2400	N	Ship	Peterton (SS)	Visual	48.51	47.48	23-Oct-1922	1		305	61	
IOT	1	2483	N	Ship	Nevier (SS)	Visual	47.48	46.13	1-Oct-1922	1		365	30	
IOT	1	1353	N	Ship	Briseis (SS)	Visual	47.48	47.27	30-Jul-1922	1		457	55	
IOT	1	1173.1	N	Ship	Australia (SS)	Visual	47.57	44.04	11-Jul-1922	1		805	37	
IOT	1	1283	N	Ship	Tiger (SS)	Visual	47.05	52.30	4-Jul-1923	1		805	50	
IOT	1	1062	N	Ship	Cameronia (SS)	Visual	48.15	48.32	08-Nov-1928	1	Tabular	610	30	
IOT	1	1064	N	Ship	Cameronia (SS)	Visual	48.10	49.02	08-Nov-1928	1	Tabular	610	30	
IOT	1	1066	N	Ship	Cameronia (SS)	Visual	48.01	49.07	08-Nov-1928	1	Tabular	610	30	
IOT	1	1074	N	Ship	City of Alton (SS)	Visual	47.03	46.50	12-Nov-1928	1		610	61	
IOT	1	585.1	N	Misc.	Cape Race Radio Station	Visual	47.31	52.28	04-Jun-1928	1	Tabular	1400		
IOT	1	700	N	Ship	Unknown	Visual	62.30	70.30	Jul-1928	1		1400	18	
IOT	1	874.2	N	Misc.	Belle Isle Station	Visual	52.10	52.23	06-Aug-1928	1		1850		

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
IOT	1	1076.1	N	Ship	Sagaporack (SS)	Visual	48.07	49.55	06-Nov-1928	1	Tabular	2000	23	2000
IOT	1	1078.1	N	Ship	Sagaporack (SS)	Visual	48.21	49.26	07-Nov-1928	1		2300	38	2300
IOT	1	1077.1	N	Ship	Sagaporack (SS)	Visual	48.10	49.45	06-Nov-1928	1		2600	46	2600
IOT	1	799	Y	Misc.	Belle Isle Station	Visual	52.26	53.18	13-Jul-1928	1		3700	15	4170
IOT	1	937.2	Y	Misc.	Belle Isle Station	Visual	51.43	53.32	17-Aug-1928	1		7400		
IOT	1	702	N	Ship	Unknown	Visual	52.00		Jun-1928	1		12000	30	
IOT	1	209	N	Ship	Kiel (SS)	Visual	44.29	45.57	14-Apr-1929	1		400	100	
IOT	1	983	N	Ship	Antonia (SS)	Visual	48.07	49.34	28-May-1929	1				
IOT	1	771	N	Unknown	Unknown		54.42		1-Jul-1933	1		1850		
IOT	1	1807	N	Ship	General Greene	Visual	50.51	51.42	18-Jul-1934	1		305		
IOT	1	1832	N	Ship	Unknown	Visual	62.36	60.42	1-Jul-1934	1		13000		
IOT	1	106	N	Ship	Humber Arm	Visual	46.44	52.21	14-Feb-1937	1				
IOT	1	1299	N	Ship	Cairnross	Visual	51.27	53.30	30-May-1937	1				
IOT	1	3323	N	Ship	Unknown	Visual	64.36	59.00	1-Jul-1938	1		920		
IOT	1	170	N	Unknown	Unknown	Visual	75.00	60.00	1-Sep-1940	1		560	101	
IOT	1	109	N	Ship	Winnifred Lee	Visual	58.07	62.07	1-Aug-1940	1		1400		
IOT	1	169	Y	Unknown	Unknown	Visual	70.42	67.48	1-Sep-1940	1		4300	14	
IOT	1	168	N	Unknown	Unknown	Visual	70.42	67.48	1-Sep-1940	1		9300	14	
IOT	1	118.1	N	Unknown	Unknown	Visual	49.20	48.02	23-Apr-1943	1		402	60	230
IOT	0	90.11	N	Unknown	Unknown	Visual	48.83	51.00	17-Apr-1943	x		600		
IOT	0	151.12	N	Unknown	Unknown	Visual	59.05	41.00	9-May-1943	1		730	60	
IOT	1	3114	N	Ship	Convoy ON 303	Visual	43.08	49.18	27-May-1945	1	Tabular	1370	15	1005
IOT	1	1286	N	Ship	Elizabete	Visual	48.58	47.02	19-May-1946	1	Tabular	305		
IOT	1	1477	N	Ship	Thomas Heyward	Visual	48.00	45.00	28-May-1946	1		305	76	
IOT	1	1348	N	Ship	Manchester Progress	Visual	47.45	49.33	24-May-1946	1		878		658
IOT	1	1184.1	N	Ship	Fort Brisebois	Visual	48.08	49.28	15-May-1946	1	Tabular	1200		
IOT	1	1537	N	Misc.	drographic Office, Washing	Unknown	49.53	49.45	1-Jul-1950	1		500		
IOT	1	2074	N	Aircraft	Unknown	Visual	52.35	51.05	12-Sep-1950	1		805		
IOT	1	2081	N	Misc.	drographic Office, Washing	Unknown	60.38	46.30	15-Oct-1950	1		1370	60	
IOT	0	1836.1	N	Ship	Unknown	Visual	52.45	52.70	13-Jun-1950	1				
IOT	1	537	N	Ship	Caxton	Visual	49.24	53.44	1-Jun-1952	1	Tabular	305	43	
IOT	1	464	N	Aircraft	Ice Patrol	Visual	51.57	55.06	14-May-1952	1		800	12	400
IOT	1	156	Y	Aircraft	USAF	Visual	47.55	52.10	22-Mar-1953	1		300	30	
IOT	1	605	Y	Ship	USCGC Unimak	Visual	48.12	51.54	3-May-1953	1		585	73	
IOT	1		U	Unknown	Unknown	Unknown	81.00			1		7400		
IOT	1	2011	N	Unknown	Unknown	Visual	75.00	60.00	8-May-1955	1		1400	24	
IOT	1	14	N	Unknown	Unknown	Visual	42.50	49.30	1-May-1959	1		300	84	
Unknown			U	Unknown	Unknown	Unknown	70.50		Sep-1960	1		9300		

Data source	Flag	IIP #	Resight	Sighting source	Vessel Name	Sighting method	Lat.	Long.	Date	# of Ice Is.	Shape	Length	Height	Width
Unknown			U	Unknown	Unknown	Unknown	81.00		Jul-1963	1		20400		
Unknown			U	Unknown	Unknown	Unknown	50.40	52.50	Apr-1964	1		460	12	
Unknown			U	Unknown	Unknown	Unknown	61.20	63.80	Feb-1964	1		610	3	
Unknown			U	Unknown	Unknown	Unknown	57.20	60.50	Jun-1964	1		6500		
Unknown			U	Unknown	Unknown	Unknown	82.50		Jul-1967	1		1600		
Unknown			U	Unknown	Unknown	Unknown	54.60	55.50	Jul-1974	1		570	61	
Unknown			U	Unknown	Unknown	Unknown	81.00		May-1975	1		2000		
Unknown			Y	Unknown	Unknown	Unknown	47.50	49.10	Jun-1976	1		650		
Unknown			U	Unknown	Unknown	Unknown	48.90	51.50	May-1978	1		700		
Shape Di	0		N	Offshore Ind		Measured	55.63	57.22	8-Jan-1979	1	Wedge	305	61	226
Provincia	10		Y	Offshore Ind		Radar	54.90	55.68	10-Aug-1979	1	Pinnacle	312	49	156
Shape Di	0		N	Offshore Ind		Measured	55.73	57.80	8-Jan-1979	1	Drydock	340	68	250
Shape Di	0		N	Offshore Ind		Measured	53.80	55.72	5-May-1981	1	Unknown	305	71	286
Shape Di	0		N	Offshore Ind		Measured	53.45	55.54	9-Apr-1981	1	Unknown	311	5	173
Shape Di	0		N	Offshore Ind		Measured	52.19	55.56	9-Apr-1981	1	Unknown	320	50	186
Shape Di	0		N	Offshore Ind		Measured	52.42	55.58	5-May-1981	1	Unknown	361	65	219
Shape Di	0		N	Offshore Ind		Measured	52.08	55.49	18-Jun-1981	1	Unknown	366	52	154
Shape Di	0		N	Offshore Ind		Measured	50.94	52.38	20-Apr-1982	1	Drydock	308.5	70.1	303.5
Shape Di	0		N	Offshore Ind		Measured	51.63	53.67	15-May-1982	1	Tabular	317	71	264
Shape Di	0		N	Offshore Ind		Measured	56.02	58.28	1-Aug-1983	1	Dome	310	29	240
Shape Di	0		N	Offshore Ind		Measured	56.02	58.28	6-Aug-1983	1	Pinnacle	310	61	250
Shape Di	0		N	Offshore Ind		Measured	47.23	52.75	9-Mar-1983	1	Drydock	311.9	46.6	245.6
Shape Di	0		N	Offshore Ind		Measured	48.23	50.52	30-Apr-1983	1	Drydock	352	70.3	214
Shape Di	0		N	Offshore Ind		Measured	49.32	50.85	29-May-1984	1	Drydock	360	61.22	254
Shape Di	0		N	Offshore Ind		Measured	48.83	49.23	29-May-1984	1	Wedge	382	36.58	122
Unknown			U	Unknown	Unknown	Unknown	49.30	53.10	Jul-1991			910	76	
Unknown			U	Unknown	Unknown	Unknown	48.80	53.30	Jul-1991			2810	15	
Provincia	0		Y	Offshore Ind		Measured	46.49	46.72	24-May-2002	1	Tabular	300	10	300
Provincia	0		Y	Offshore Ind		Measured	47.56	47.67	18-May-2002	1	Tabular	355	9	206
Provincia	0		Y	Offshore Ind		Measured	46.43	46.74	24-May-2002	1	Tabular	500	12	290
Provincia	0		Y	Offshore Ind		Radar and visu	46.71	47.86	9-May-2003	1	Tabular	307	10	235
Provincia	0		Y	Offshore Ind		Radar and visu	46.96	47.79	17-Apr-2003	1	Tabular	333	9	152
Provincia	0		Y	Offshore Ind		Radar and visu	47.97	46.13	18-May-2003	1	Tabular	350	10	225
Provincia	0		Y	Offshore Ind		Radar and visu	47.27	46.66	26-May-2003	1	Tabular	350	10	250
Provincia	0		Y	Offshore Ind		Radar and visu	46.88	46.94	29-May-2003	1	Tabular	350	10	250
Provincia	0		Y	Offshore Ind		Radar and visu	48.11	46.92	14-May-2003	1	Tabular	380	8	300
Provincia	0		Y	Offshore Ind		Radar and visu	47.24	49.04	22-Apr-2003	1	Tabular	480	10	230
Provincia	0		Y	Offshore Ind		Radar and visu	46.38	47.52	14-Jun-2004	1	Tabular	422	8.8	314

APPENDIX B

Ice Islands using Google Earth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54°37'43.29" N 54°17'44.88" W
Eye alt 3643.22 km