Arctic Ship Traffic Data

USER GUIDE

PAME
Protection of the Arctic Marine Environment

About this document

- This document has been created to help current and future users of the ASTD Database.
- Please read carefully before contacting for assistance.
  - The PAME Secretariat provides technical assistance for ASTD: pame@pame.is
- The document is divided into sections according to the ASTD Menu.
  - The guide is best used when testing ASTD alongside this document.
  - We recommend a PDF viewer with a Thumbnail setting to view this document.

Version history:
V. 1: April 2020
V. 2: August 2022
V. 3: February 2023

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USER GUIDE MENU *(with links)*

ASTD SYSTEM

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Introduction

The Arctic Ship Traffic Data system (ASTD) is a U.S & Norway led Arctic Council initiative that has been in the making since 2015. The system is a first of its kind developed in collaboration and resources from the eight Arctic Council member states; United States, Canada, Sweden, Finland, Norway, Iceland, Russia, Finland and the Kingdom of Denmark. The 2009 Arctic Marine Shipping Assessment collected information to create the AMSA Shipping Database which sparked interest within PAME to create a long-term sustainable collection of Arctic marine shipping activity. The result is the ASTD project and its database.

Together, the member states identified the need to track shipping trends, patterns, ports data, ice movement, vessel traffic, vessel emissions and more. The system has the capability to execute all of these needs and continues to be improved by its primary developers located at the Norwegian Costal Administration who takes direction from representatives of all the nations led by CG7611 at the US Coast Guard Headquarters. Management of user accounts, administrative functions and liaison for the nations resides with the PAME Secretariat. The approved *Cooperative Agreement among the Arctic States Regarding Arctic Ship Traffic Data Sharing* outlines access and use of the ASTD data and includes the role of the participants in the project, the Arctic States who choose to do so. Together, the nations have put forth the ASTD as the leading and only tool to track human, marine and environmental activity in the ever-changing Arctic .

The purpose of this document is to help current and future users of the ASTD database and its data to advance its work.

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ASTD Website and ASTD Library

- **ASTD website:** The website for the project. Contains general information about the ASTD project.
  - *www.astd.is*

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ASTD Data

The data from ASTD can be accessed by two means:

ASTD SYSTEM

- ✓ Easy access to data
- ✓ Quick analysis on pre-defined area
- ✓ Data is pre-calculated
- ✓ Simple to use

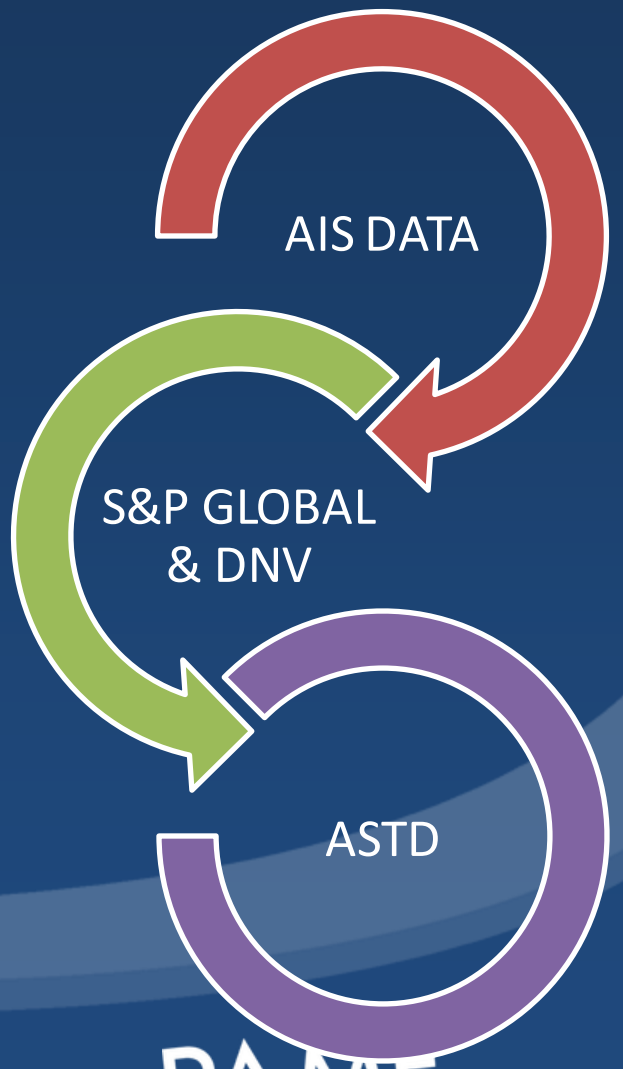
FTP SERVER

- ✓ Area from whole of ASTD area
- ✓ Data needs to be filtered, cleaned
- ✓ Needs professional GIS experts
- ✓ Vast amounts of data
- ✓ Intended for specific analysis
- ✓ Contact PAME for access

ASTD DATA

The ASTD Database contains four types of information. These are:

1. Automatic Identification System (AIS data) received from ships operating in the Arctic. This data is collected by satellites and is provided by USA and Norway.
2. Ship characteristic information (e.g., type, size, flag, gross tonnage, ownership, construction date) from S&P Global (formerly IHS Markit, which had acquired Lloyds Register in 2009). Lloyds Register had collected information on ships since 1790. On behalf of IMO, S&P Global hosts a ship information database and is the sole issuer of IMO numbers. An IMO number is a unique number assigned to each ship. The IMO ship identification number scheme was introduced in 1987 as a measure to enhance ship safety and security. It established a mechanism for assigning a permanent number to each ship for identification purposes. That number remains unchanged through the ship's life. From this, information in the table on page 8 is generated.
3. Information on the types of fuel ships are burning and calculated air emissions from such combustion are obtained from DNV. DNV makes these calculations using IMO emission factors. DNV is the world's largest classification society and a recognized advisor to the maritime industry. See page 18.
4. Sea ice data from the U.S. National Snow and Ice Data Center (NSIDC). ASTD contains monthly sea ice extent information obtained from the NSIDC Sea Ice Index.



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ASTD DATA – ACCESS LEVELS

Arctic State approved government agencies and ministries, Arctic Council Permanent Participants and Arctic Council Working Groups get free access to the database. Others, such as Arctic Council Observers, pay a small fee for access to ASTD. A document which outlines the access has been created and is available here.

Access to ASTD data may be granted to eligible applicants at one of three access levels:
Level I, Level II and Level III

I	**Access to all available data**
II	**Access to all data in the System except that vessel identity data (MMSI, IMO ship identification number and ship name) is not included.**
III	**Access to the same data as under Level 2 except that ship type information is aggregated to 15 ship types instead of 56 ship types.**

See table on page 10 what is included in the ASTD Data for each access level.

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ASTD SYSTEM

Data fields for each ship in ASTD for each access level. See example of data on page 11.

DATA FIELD	LEVEL 1	LEVEL 2	LEVEL 3	EXPLANATION
period	YES	YES	YES	Month and year chosen
area_type	YES	YES	YES	Type of area chosen (EEZ, LME etc.)
area_id	YES	YES	YES	Number of the area in the database
area_name	YES	YES	YES	Name of the area chosen
mmsi	YES	NO	NO	MMSI number of the ship
imonumber	YES	NO	NO	IMO number of the ship
ship_id	NO	YES	YES	Id of the ship – unique for each month.
Vesselname	YES	NO	NO	Name of the vessel
Flagcode	YES	YES	YES	Code for the ship flag, see page 13.
iceclass	YES	YES	YES	Ice class of the ship – see page 14.
norwegianshiptypeid	YES	YES	YES	ID of the type of ship (ASTD aggregation). See pages X and X
norwegianshiptypename	YES	YES	YES	Type of ship (Lloyds aggregation). See pages X and X
lloydsshiptypeid	YES	YES	NO	ID of the type of ship (Lloyds aggregation). See pages X and X
lloydsshiptypename	YES	YES	NO	Type of ship (Lloyds aggregation). See pages X and X
lloyds5_cat	YES	NO	NO	Type of ship (Lloyds aggregation). See pages X and X
vesselsizeid	YES	YES	YES	ID of size of vessel on Gross Tons – see page 11
vesselsizedescription	YES	YES	YES	ID of size of vessel on Gross Tons – see page X
fuelquality	YES	YES	YES	Type of fuel used – See page 12.
distance_nm	YES	YES	YES	Distance sailed in nautical miles in chosen month
consumption	YES	YES	YES	Fuel consumption on cubic meters in chosen month, p.21.
co2emission	YES	YES	YES	Co2 emissions by ship in chosen month. See page 22.
coemission	YES	YES	YES	CoE emissions by ship in chosen month. See page 22.
noxemission	YES	YES	YES	NOX emissions by ship in chosen month. See page 22.
so2emission	YES	YES	YES	So2 emissions by ship in chosen month. See page 22.
operationhour	YES	YES	YES	Hours operated in chosen month.

DATA EXAMPLE: ASTD System Data download function – Level 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	period	area_type	area_id	area_name	mmsi	imonumber	vesselname	flagcode	iceclass	norwegianshiptypeid	norwegianshiptypename	lloydsshiptypeid	lloydsshiptypename	lloyds5_cat	vesselsizeid	vesselsizedescription	fuelquality	distance_nm	consumption	co2emission	coemission	noxemission	so2emission	operationhour
2	2013-04	polarcode	1	Polarcode area	273296700	8134912	ACHINSK	RUS		13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	387.975346	10.2065183	32.3546631	0.07552823	0.45133116	0.01837173	153.8761111
3	2013-04	polarcode	1	Polarcode area	331168000	9228928	AKAMALIK	DEN	FS Ice Class 1B	13	Fishing vessels	B11	Fish Catching	B12A2FF	2	1000 - 4999 GT	0	1615.87621	74.2301087	235.309445	0.5493028	3.29113852	0.1336142	719.3272222
4	2013-04	polarcode	1	Polarcode area	273349220	8811015	AKHILLES	RUS		15	Oil product tankers	A13	Oil	A13B2TP	2	1000 - 4999 GT	1	104.802355	1.94329452	6.16024364	0.01438038	0.08586554	0.00816184	97.20555556
5	2013-04	polarcode	1	Polarcode area	273849700	9055216	ALANETT	RUS	FS Ice Class II	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	166.886043	7.20506771	22.8400646	0.0533175	0.31794896	0.01296912	115.0858333
6	2013-04	polarcode	1	Polarcode area	273443790	7720025	ALIOT	RUS	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	563.983912	8.55310881	27.1133549	0.06329301	0.37633679	0.0153956	124.7077778
7	2013-04	polarcode	1	Polarcode area	273429300	9076222	ANDROMEDA	RUS		13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	1072.6771	15.378587	48.7501209	0.11380154	0.67665783	0.02768146	353.0461111
8	2013-04	polarcode	1	Polarcode area	273312530	9310018	ANTEY	RUS		10	Offshore supply ships	B21	Offshore Supply	B21B2OA	3	5000 - 9999 GT	0	985.098539	231.61864	734.231088	1.71397794	10.8462793	0.41691355	485.9561111
9	2013-04	polarcode	1	Polarcode area	273311280	8616221	AQUAMARINE	RUS		13	Fishing vessels	B11	Fish Catching	B12A2FF	2	1000 - 4999 GT	0	211.931313	12.4092362	39.3372788	0.09182835	0.5500658	0.02233663	68.0175
10	2013-04	polarcode	1	Polarcode area	273219900	7604403	ARCTIC PRINCESS	RUS		8	Refrigerated cargo ships	A34	Refrigerated Cargo	A34A2GR	2	1000 - 4999 GT	1	205.591365	6.79479816	21.5395102	0.0502815	0.30074522	0.02853814	273.5475
11	2013-04	polarcode	1	Polarcode area	258535000	9258739	ARCTIC SWAN	NOR	FS Ice Class 1B	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	2341.9418	118.777312	376.52408	0.8789521	5.29994933	0.21379916	658.1366667
12	2013-04	polarcode	1	Polarcode area	231053000	8517437	ARCTIC VIKING	FAR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	2025.45609	86.64113	274.652382	0.64114436	3.83629198	0.15595403	614.1652778
13	2013-04	polarcode	1	Polarcode area	224871000	8617469	AROSA NUEVE	SPN	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	1068.92061	13.7096945	43.4597315	0.10145174	0.60322656	0.02467745	409.7125
14	2013-04	polarcode	1	Polarcode area	341049000	8860444	ASIAN ENTERPRISE	SKN		8	Refrigerated cargo ships	A34	Refrigerated Cargo	A21A2BC	3	5000 - 9999 GT	1	181.656708	28.9922618	91.9054698	0.21454273	1.30882491	0.12176748	359.4775
15	2013-04	polarcode	1	Polarcode area	352986000	9648491	ASTRA-G	PAN		12	Other activities	B31	Research	B31A2SR	1	< 1000 GT	2	1040.69866	5.19044797	16.4537201	0.03840931	0.22837971	0.00934281	265.4608333
16	2013-04	polarcode	1	Polarcode area	316323000	9252515	ATLANTIC ENTERPRISE	CAN	FS Ice Class 1B	13	Fishing vessels	B11	Fish Catching	B12A2FF	2	1000 - 4999 GT	0	441.419929	46.934891	148.783604	0.34731819	2.06613296	0.0844828	200.7741667
17	2013-04	polarcode	1	Polarcode area	257591000	9239355	ATLANTIC GUARDIAN	NIS		12	Other activities	B34	Other Activities	B34D2SB	3	5000 - 9999 GT	0	1005.68958	20.5852283	65.2551736	0.15233069	0.98850497	0.03705341	374.2336111
18	2013-04	polarcode	1	Polarcode area	258563000	9134555	ATLANTIC STAR	NOR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	242.50584	22.4048219	71.0232856	0.16579568	0.99005484	0.04032868	139.4513889
19	2013-04	polarcode	1	Polarcode area	273436830	6808674	AZURIT	RUS		13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	405.773216	0.91125949	2.88869258	0.00674332	0.04009542	0.00164027	157.1944444
20	2013-04	polarcode	1	Polarcode area	273148810	7808334	BELOMORYE	RUS	FS Ice Class II	8	Refrigerated cargo ships	A34	Refrigerated Cargo	A34A2GR	2	1000 - 4999 GT	1	840.653884	23.6767626	75.0553374	0.17520804	1.04776008	0.0994424	419.7719444
21	2013-04	polarcode	1	Polarcode area	273217010	8620179	BOOTES	RUS	FS Ice Class 1B	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	165.999611	10.0124344	31.739417	0.07409201	0.44591782	0.01802238	40.51222222
22	2013-04	polarcode	1	Polarcode area	273451570	7720001	BOREY	RUS	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	373.828783	5.63602399	17.866196	0.04170658	0.24798506	0.01014484	63.18111111
23	2013-04	polarcode	1	Polarcode area	263516000	7107431	BRITES	PTG		13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	603.305897	10.6353492	33.714057	0.07870158	0.47348591	0.01914363	119.8536111
24	2013-04	polarcode	1	Polarcode area	273317810	7700087	CANOPUS	RUS	FS Ice Class II	8	Refrigerated cargo ships	A34	Refrigerated Cargo	A34A2GR	2	1000 - 4999 GT	1	356.147301	20.260546	64.2259307	0.14992804	0.89388276	0.0850943	456.6391667
25	2013-04	polarcode	1	Polarcode area	273358310	8401236	CAPTAIN STAROSTIN	RUS	FS Ice Class 1A	5	General cargo ships	A31	General Cargo	A31A2GX	2	1000 - 4999 GT	1	31.5669737	6.39359221	20.2676873	0.04731258	0.28240096	0.02685309	121.5075
26	2013-04	polarcode	1	Polarcode area	263501000	8803537	CIDADE DE AMARANTE	PTG		13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	1087.9862	24.570772	77.8893473	0.18182371	1.08795068	0.04422739	259.1941667
27	2013-04	polarcode	1	Polarcode area	273559500	9076636	DISTINKT	RUS		13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	1174.18618	18.7385779	59.4012918	0.13866548	0.82449743	0.03372944	395.3813889
28	2013-04	polarcode	1	Polarcode area	273357330	9585273	ENISEY	RUS	FS Ice Class 1A Supe	15	Oil product tankers	A13	Oil	A13B2TP	4	10000 - 24999	2	2771.43524	280.029327	895.554654	2.07221702	21.4932607	3.3249848	366.2658333
29	2013-04	polarcode	1	Polarcode area	231045000	8816974	ENNIBERG	FAR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B12A2FF	2	1000 - 4999 GT	0	1484.23231	84.013226	266.321926	0.62169787	3.70497467	0.15122381	586.5691667
30	2013-04	polarcode	1	Polarcode area	257563600	9234563	FISKENES	NOR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	601.221313	6.95500005	22.0473502	0.051467	0.30602	0.012519	489.3408333
31	2013-04	polarcode	1	Polarcode area	259457000	9169263	FJELLMOY	NOR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	592.56299	7.35990514	23.3308993	0.0544633	0.32383583	0.01324783	215.4666667
32	2013-04	polarcode	1	Polarcode area	257105000	9260316	G. O. SARS	NOR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	385.177344	26.9301987	85.3687298	0.19928347	1.2059942	0.04847436	85.71666667
33	2013-04	polarcode	1	Polarcode area	231751000	8615318	GADUS	FAR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	589.62826	27.3656013	86.7489561	0.20250545	1.20587216	0.04925808	484.4677778
34	2013-04	polarcode	1	Polarcode area	273514800	8721935	GEMMA	RUS		13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	449.475916	7.12840098	22.5970311	0.05275017	0.31364964	0.01283112	140.9541667
35	2013-04	polarcode	1	Polarcode area	211214200	8716928	GERDA MARIA	GEU		13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	793.040731	43.2405378	137.072505	0.31997998	1.90492366	0.07783297	446.9027778
36	2013-04	polarcode	1	Polarcode area	354498000	8521658	GLOMAR 4-WINDS	PAN		11	Other service offshore vess	B22	Other Offshore	B22G2OY	1	< 1000 GT	0	835.92832	3.29540003	10.4464181	0.02438596	0.1449976	0.00593172	189.5108333
37	2013-04	polarcode	1	Polarcode area	259050000	9312107	HARSTAD	NOR		12	Other activities	B34	Other Activities	B34H2SQ	2	1000 - 4999 GT	0	261.022847	6.24847899	19.8076784	0.04623874	0.27739805	0.01124726	104.065
38	2013-04	polarcode	1	Polarcode area	257461000	9418042	HAVILA JUPITER	NOR	FS Ice Class 1C	10	Offshore supply ships	B21	Offshore Supply	B21B2OA	3	5000 - 9999 GT	0	80.0465953	48.5426763	153.880284	0.3592158	2.16270316	0.08737682	81.05777778
39	2013-04	polarcode	1	Polarcode area	257524500	7817256	HAVSEL	NOR		12	Other activities	B12	Other Fishing	B12E2FX	1	< 1000 GT	0	265.383041	1.69658452	5.37817292	0.01255473	0.07464972	0.00305385	126.2544444
40	2013-04	polarcode	1	Polarcode area	257471500	8716655	HELMER HANSSEN	NOR	FS Ice Class 1C	12	Other activities	B31	Research	B31A2SR	2	1000 - 4999 GT	0	567.262329	17.2449765	54.6665757	0.12761283	0.76746346	0.03104096	100.5002778
41	2013-04	polarcode	1	Polarcode area	258410000	9230036	HERMES	NOR	FS Ice Class 1B	13	Fishing vessels	B11	Fish Catching	B12A2FF	2	1000 - 4999 GT	0	964.376688	33.7645248	107.033544	0.24985748	1.50696802	0.06077614	181.7538889
42	2013-04	polarcode	1	Polarcode area	273319940	9338230	HERMES	RUS		12	Other activities	B32	Towing / Pushing	B21B2OA	3	5000 - 9999 GT	0	639.714343	122.909721	389.623817	0.90953194	5.91957755	0.2212375	586.4472222
43	2013-04	polarcode	1	Polarcode area	231042000	8609357	HOGABERG	FAR	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	2	1000 - 4999 GT	0	679.154768	61.1851578	193.95695	0.45277017	2.69941248	0.11013328	458.625
44	2013-04	polarcode	1	Polarcode area	273445430	7383011	HUGINN	RUS	FS Ice Class 1C	13	Fishing vessels	B11	Fish Catching	B11B2FV	1	< 1000 GT	0	1348.10112	11.1928169	35.4812295	0.08282684	0.49248394	0.02014707	400.2333333
45	2013-04	polarcode	1	Polarcode area	273354480	8502107	INZHENER VESHNYAKOV	RUS	FS Ice Class 1A Supe	5	General cargo ships	A31	General Cargo	A31A2GX	3	5000 - 9999 GT	1	1778.0855	90.0163031	285.351681	0.66612064	4.61762609	0.37806847	366.2619444

ASTD FTP SERVER

Data fields for each ship in ASTD for each access level. See example of data on page 13.

DATA FIELD	LEVEL 1	LEVEL 2	LEVEL 3	EXPLANATION
mmsi	YES	NO	NO	MMSI number of the ship.
imonumber	YES	NO	NO	IMO number of the ship
ship_id	NO	YES	YES	Id of the ship – unique for each month.
date_time_utc	YES	YES	YES	Date and time of signal collected
vesselname	YES	NO	NO	Name of the ship
flagname	YES	YES	YES	Name of the ship flag.
flagcode	YES	YES	YES	Code for the ship flag, see page 13.
iceclass	YES	YES	YES	Ice class of the ship – see page 14.
astd_cat	YES	YES	YES	Type of ship (ASTD aggregation). See pages 15 and 16.
lloyds3_	YES	YES	NO	Type of ship (Lloyds aggregation). See pages 15 and 16.
lloyds5_cat	YES	NO	NO	Type of ship (Lloyds aggregation). See pages 15 and 16.
sizegroup_gt	YES	YES	YES	Size of ship (ASTD aggregation). See page 11.
fuelquality	YES	YES	YES	Type of fuel used. See page 12.
fuelcons	YES	YES	YES	Fuel consumption. See page 21.
co	YES	YES	YES	Co emissions from last signal. See page 22.
co2	YES	YES	YES	Co emissions from last signal. See page 22.
so2	YES	YES	YES	So2 emissions from last signal. See page 22.
nox	YES	YES	YES	Nox emissions from last signal. See page 22.
n2o	YES	YES	YES	n2o emissions from last signal. See page 22.
nmvoc	YES	YES	YES	Non-methane volatile organic compounds (NMVOCs) emissions from last signal. See page 22.
ch4	YES	YES	YES	Methane emissions from last signal. See page 22.
blackcarbon	YES	YES	YES	Black carbon emissions from last signal. See page 22.
organiccarbon	YES	YES	YES	Co emissions from last signal. See page 22.
oilbilgewater	YES	YES	YES	Production of bilge oil (liters). See page 22.
blackwater	YES	YES	YES	The amount of black water produced (m3). See page 22.
greywater	YES	YES	YES	Grey water production volume (m3). See page 22.
garbage	YES	YES	YES	Garbage production mass (kg). See page 22.
dist_nextpoint	YES	YES	YES	Distance sailed since last point
sec_nextpoint	YES	YES	YES	Seconds from last point
longitude	YES	YES	YES	Longitude position signal
latitude	YES	YES	YES	Latitude position signal

DATA EXAMPLE: FTP Server Data download – Level 1

Opened in Notepad++ - imported to Excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD
1	mmsi	imonumber	date_time_utc	vesselname	flagname	flagcode	iceclass	astd_cat	lloyds3_cat	lloyds5_cat	sizegroup_gt	fuelquality	fuelcons	co	co2	so2	nox	n2o	nmvoc	ch4	blackcarbon	organic carbon	oilbilgewater	blackwater	greywater	garbage	dist_nextpoint	sec_nextpoint	longitude	latitude
2	255806313	9412517	12/15/2022 13:53	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.033825	0.000154466	0.10733953	6.77E-05	0.000886567	5.14E-06	5.34E-05	5.70E-06	6.09E-06	1.12E-05	6.38E-08	0.002604167	0.019270834	0.00015625	0.092	360	26.914562	60.418304
3	255806313	9412517	12/15/2022 13:59	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	0.522	361	26.914568	60.4183
4	255806313	9412517	12/15/2022 14:08	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.367	540	26.914576	60.4183
5	255806313	9412517	12/15/2022 14:29	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.033825	0.000154466	0.10733953	6.77E-05	0.000886567	5.14E-06	5.34E-05	5.70E-06	6.09E-06	1.12E-05	6.38E-08	0.002604167	0.019270834	0.00015625	0.495	360	26.914558	60.41831
6	255806313	9412517	12/15/2022 14:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	0.414	361	26.91455	60.41831
7	255806313	9412517	12/15/2022 16:14	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.034012917	0.000155324	0.10793586	6.80E-05	0.000891493	5.17E-06	5.37E-05	5.73E-06	6.12E-06	1.12E-05	6.41E-08	0.002618634	0.019377893	0.000157118	1.313	362	26.914568	60.418324
8	255806313	9412517	12/15/2022 17:11	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.332	540	26.91456	60.418304
9	255806313	9412517	12/15/2022 17:17	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	0.383	361	26.914562	60.41831
10	255806313	9412517	12/15/2022 17:56	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.033825	0.000154466	0.10733953	6.77E-05	0.000886567	5.14E-06	5.34E-05	5.70E-06	6.09E-06	1.12E-05	6.38E-08	0.002604167	0.019270834	0.00015625	0.621	360	26.914547	60.418324
11	255806313	9412517	12/15/2022 18:56	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.034012917	0.000155324	0.10793586	6.80E-05	0.000891493	5.17E-06	5.37E-05	5.73E-06	6.12E-06	1.12E-05	6.41E-08	0.002618634	0.019377893	0.000157118	0.784	362	26.914566	60.41831
12	255806313	9412517	12/15/2022 19:23	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	1.243	361	26.91458	60.418324
13	255806313	9412517	12/15/2022 20:26	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.792	540	26.914555	60.418297
14	255806313	9412517	12/15/2022 21:02	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.05064354	0.00023127	0.16071112	0.000101287	0.001327388	7.70E-06	8.00E-05	8.54E-06	9.12E-06	1.67E-05	9.54E-08	0.003899016	0.02885272	0.000233941	0.743	539	26.91456	60.4183
15	255806313	9412517	12/15/2022 21:23	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.033825	0.000154466	0.10733953	6.77E-05	0.000886567	5.14E-06	5.34E-05	5.70E-06	6.09E-06	1.12E-05	6.38E-08	0.002604167	0.019270834	0.00015625	1.681	360	26.914555	60.418316
16	255806313	9412517	12/15/2022 21:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.06774396	0.000309361	0.21497722	0.000135488	0.001775597	1.03E-05	0.00010695	1.14E-05	1.22E-05	2.24E-05	1.28E-07	0.005215567	0.038595196	0.000312934	1.493	721	26.914553	60.41829
17	255806313	9412517	12/15/2022 23:02	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.05064354	0.00023127	0.16071112	0.000101287	0.001327388	7.70E-06	8.00E-05	8.54E-06	9.12E-06	1.67E-05	9.54E-08	0.003899016	0.02885272	0.000233941	0.557	539	26.914557	60.4183
18	255806313	9412517	12/15/2022 23:08	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.034012917	0.000155324	0.10793586	6.80E-05	0.000891493	5.17E-06	5.37E-05	5.73E-06	6.12E-06	1.12E-05	6.41E-08	0.002618634	0.019377893	0.000157118	0.495	362	26.914564	60.4183
19	255806313	9412517	12/15/2022 23:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.332	540	26.914562	60.418297
20	255806313	9412517	12/16/2022 0:08	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.06746209	0.000308074	0.21408272	0.000134924	0.001768209	1.03E-05	0.000106505	1.14E-05	1.21E-05	2.23E-05	1.27E-07	0.005193866	0.038434606	0.000311632	0.412	718	26.914572	60.418297
21	255806313	9412517	12/16/2022 0:17	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.933	540	26.91457	60.418304
22	255806313	9412517	12/16/2022 0:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.06765	0.000308932	0.21467906	0.0001353	0.001773135	1.03E-05	0.000106801	1.14E-05	1.22E-05	2.24E-05	1.28E-07	0.005208334	0.038541667	0.0003125	0.722	720	26.914568	60.418304
23	255806313	9412517	12/16/2022 2:20	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.06755604	0.000308503	0.21438089	0.000135112	0.001770672	1.03E-05	0.000106653	1.14E-05	1.22E-05	2.23E-05	1.27E-07	0.005201099	0.038488135	0.000312066	0.946	719	26.914557	60.418297
24	255806313	9412517	12/16/2022 2:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.033825	0.000154466	0.10733953	6.77E-05	0.000886567	5.14E-06	5.34E-05	5.70E-06	6.09E-06	1.12E-05	6.38E-08	0.002604167	0.019270834	0.00015625	0.765	360	26.914572	60.418297
25	255806313	9412517	12/16/2022 3:23	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.743	540	26.914566	60.418312
26	255806313	9412517	12/16/2022 3:47	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.0507375	0.000231699	0.1610093	0.000101475	0.001329851	7.72E-06	8.01E-05	8.55E-06	9.13E-06	1.68E-05	9.56E-08	0.00390625	0.02890625	0.000234375	0.784	540	26.914581	60.418297
27	255806313	9412517	12/16/2022 4:02	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	0.332	361	26.914576	60.4183
28	255806313	9412517	12/16/2022 4:50	ARA AMSTERDAM	Portugal (Mar)	MAR	FS Ice Class 1A	Container ships	Container	Container Ship (Fully Cellular)	10000 - 24999	6	0.03391896	0.000154895	0.107637696	6.78E-05	0.00088903	5.16E-06	5.35E-05	5.72E-06	6.11E-06	1.12E-05	6.39E-08	0.002611401	0.019324364	0.000156684	3.287	361	26.914581	60.41829

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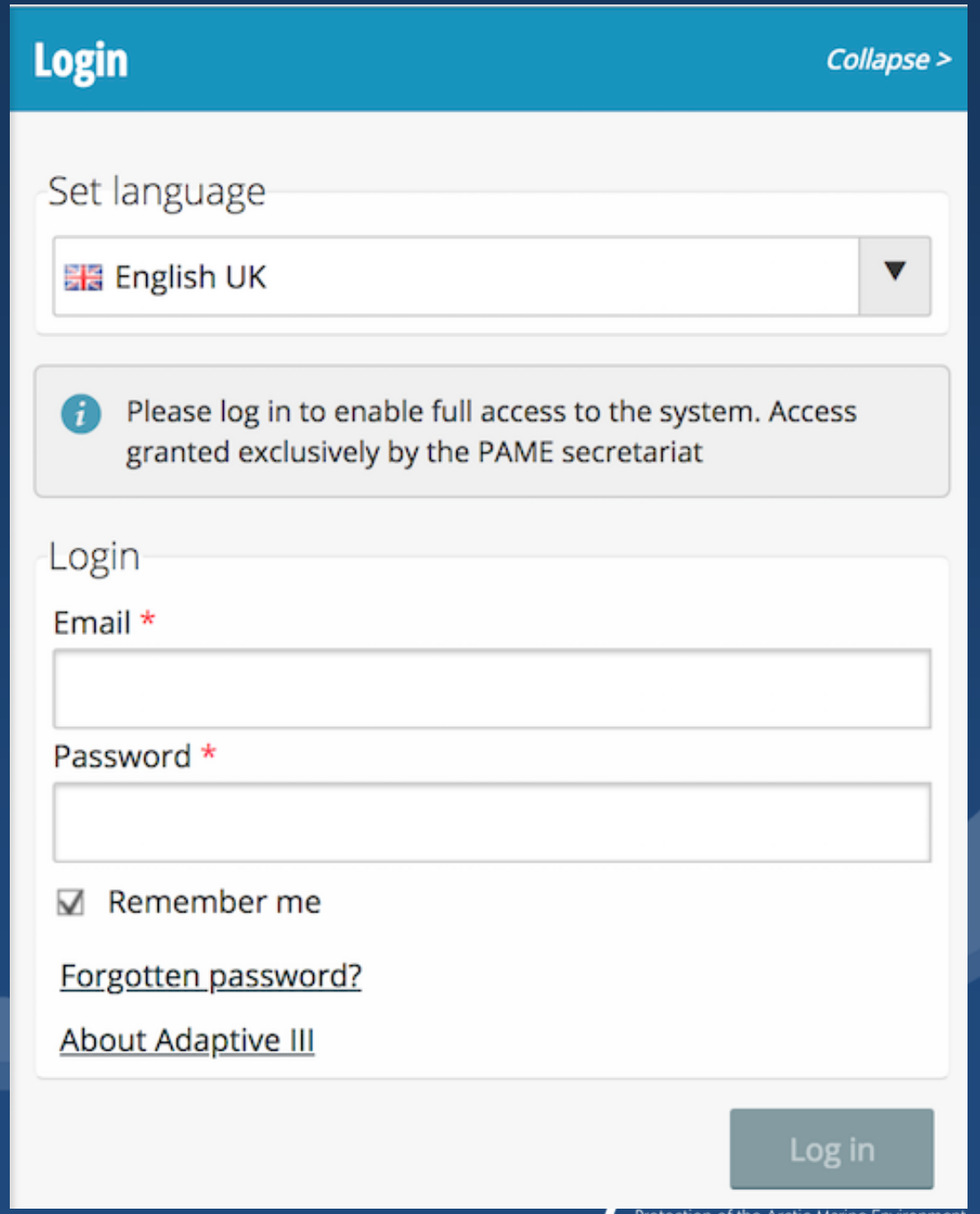
User access

- Access to ASTD and its data is outlined in this document - *ASTD User access (link).*
  - A username and password is required to access the database.
- The PAME Secretariat is the administrator for the user access
  - Contact PAME at *pame@pame.is*
- Note that all information inserted to the system, all areas drawn and information otherwise created or imported is only available to that specific user.



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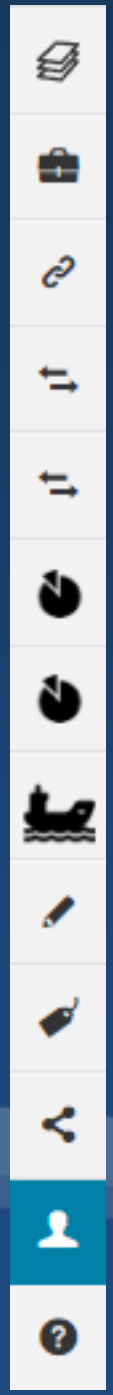
1. Layer manager
   Identify ship tracks of ships in the Arctic, by shiptype.
1. Add data
   Add WMS information, file data like .csv or shapefiles.
1. Port calls
   Identify the number of ships entering over 50 ports in the Arctic.
1. Traffic over passing lines
   Identify the number of passes (and heading) over specific lines in ASTD.
1. Traffic over user created passing lines
   Create passlines and identify the number of passes.
1. Arctic area traffic
   Detailed statistics in areas in the Arctic, including the EEZ and other areas.
1. Arctic area traffic (user created areas)
   Define your own areas and analyse ship movements and statistics.
1. Ship voyage
   See the ship tracks of a specific ship or ships. For Level 1 users only.
1. Draw and measure



Layer manager
- Identify ship tracks of ships in the Arctic, by shiptype.

Add data
- Add WMS information, file data like .csv or shapefiles.

Port calls
- Identify the number of ships entering over 50 ports in the Arctic.

Traffic over passing lines
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- Create passlines and identify the number of passes.

Arctic area traffic
- Detailed statistics in areas in the Arctic, including the EEZ and other areas.

Arctic area traffic (user created areas)
- Define your own areas and analyse ship movements and statistics.

Ship voyage
- See the ship tracks of a specific ship or ships. For Level 1 users only.

Draw and measure
- Draw or measure distances, including to insert to maps created by users.

Legend
- Shows what items are on the map visualized.

Save, Share or print map
- Send files directly to e-mails, save as JPG, embed maps or print from ASTD.

Profile
- User information, change password etc.

General information
- About ASTD.

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ASTD Menu

The menu is available to logged in users only

Layer manager: Identify ship tracks of ships in the Arctic, by shiptype.

Add data: Add WMS information, file data like .csv or shapefiles.

Port calls: Identify the number of ships entering over 50 ports in the Arctic.

Traffic over pre-defined passlines: Identify the number of passes (and heading) over specific lines in ASTD.

Traffic over user created passlines: Create passlines and identify the number of passes.

Arctic area traffic: Detailed statistics in areas in the Arctic, including the EEZ and other areas.

Arctic area traffic (user created areas): Define your own areas and analyse ship movements and statistics.

Ship voyage: See the ship tracks of a specific ship or ships. For Level 1 users only.

Draw and measure: Draw or measure distances, including to insert to maps created by users.

Legend: Shows what items are on the map visualized.

Save, Share or print map: Send files directly to e-mails, save as JPG, embed maps or print from ASTD.

Login: User information, change password etc.

General information: About ASTD.

Ship types

- As a main rule, ships need to be registered to be eligible to navigate. Each ship is designated a ship type when it enters the market.
- To maintain a comprehensive and accurate database IHS Markit has developed over a period of time a number of key strategic agreements with governmental and inter-governmental organisations. Agreements exist with the International Maritime Organization regarding the issuing of the IMO Ship Number, IMO Company Number and IMO Registered Owner Number.
- ASTD utilizes the *IHS Markit StatCode 5 Shiptype Coding System* accordingly to categorize ship types in the ASTD System. In the ASTD System IHS Fairplay Category 5 is used to aggregate to two new ship type levels.

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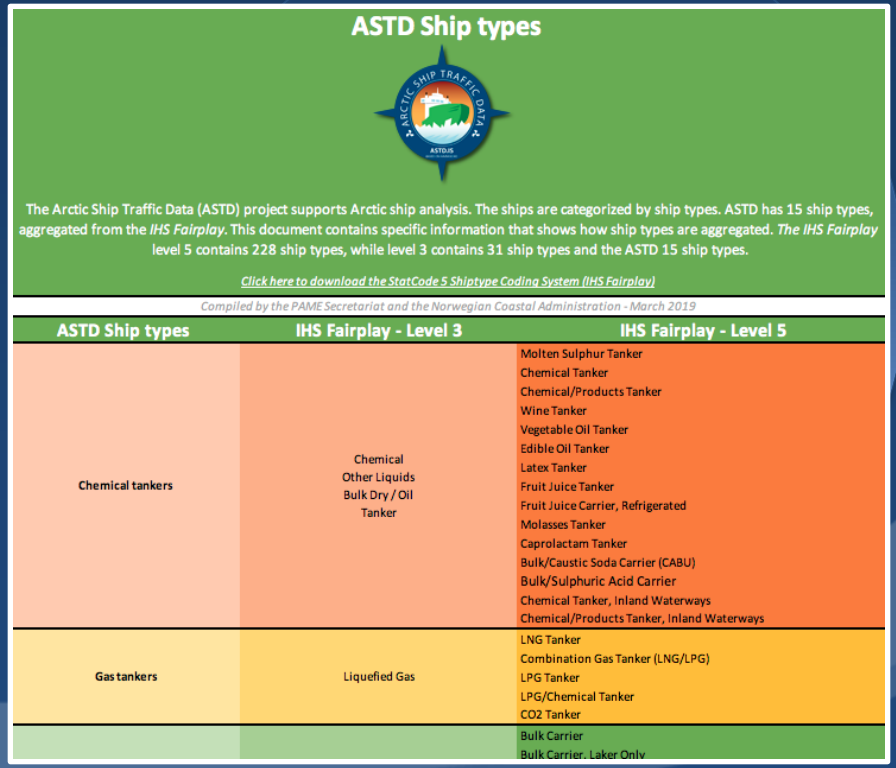
ASTD Ship type aggregation

Access level	Ship types available
1	✓ ASTD ship types (15) ✓ IHS Fairplay shiptypes (50) ✓ IHS Fairplay shiptypes (292)
2	✓ ASTD ship types (15) ✓ IHS Fairplay shiptypes
3	✓ ASTD ship types (15)

Click here to download the ASTD Ship type document



ASTD Ship types

The Arctic Ship Traffic Data (ASTD) project supports Arctic ship analysis. The ships are categorized by ship types. ASTD has 15 ship types, aggregated from the *IHS Fairplay*. This document contains specific information that shows how ship types are aggregated. *The IHS Fairplay* level 5 contains 228 ship types, while level 3 contains 31 ship types and the ASTD 15 ship types.

Click here to download the StatCode 5 Shiptype Coding System (IHS Fairplay)

Compiled by the PAME Secretariat and the Norwegian Coastal Administration - March 2019

ASTD Ship types	IHS Fairplay - Level 3	IHS Fairplay - Level 5
Chemical tankers	Chemical Other Liquids Bulk Dry / Oil Tanker	Molten Sulphur Tanker Chemical Tanker Chemical/Products Tanker Wine Tanker Vegetable Oil Tanker Edible Oil Tanker Latex Tanker Fruit Juice Tanker Fruit Juice Carrier, Refrigerated Molasses Tanker Caprolactam Tanker Bulk/Caustic Soda Carrier (CABU) Bulk/Sulphuric Acid Carrier Chemical Tanker, Inland Waterways Chemical/Products Tanker, Inland Waterways
Gas tankers	Liquefied Gas	LNG Tanker Combination Gas Tanker (LNG/LPG) LPG Tanker LPG/Chemical Tanker CO2 Tanker
		Bulk Carrier Bulk Carrier, Laker Only

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Ship type aggregation - example

ASTD Ship types	IHS Fairplay - Level 3	IHS Fairplay - Level 5
Chemical tankers ASTD Level 3	Chemical Other Liquids Bulk Dry / Oil Tanker ASTD Level 2	Molten Sulphur Tanker Chemical Tanker Chemical/Products Tanker Wine Tanker Vegetable Oil Tanker Edible Oil Tanker Latex Tanker Fruit Juice Tanker Fruit Juice Carrier, Refrigerated Molasses Tanker Caprolactam Tanker Bulk/Caustic Soda Carrier (CABU) Bulk/Sulphuric Acid Carrier Chemical Tanker, Inland Waterways Chemical/Products Tanker, Inland Waterways ASTD Level 1

Click here to download the ASTD Ship type document

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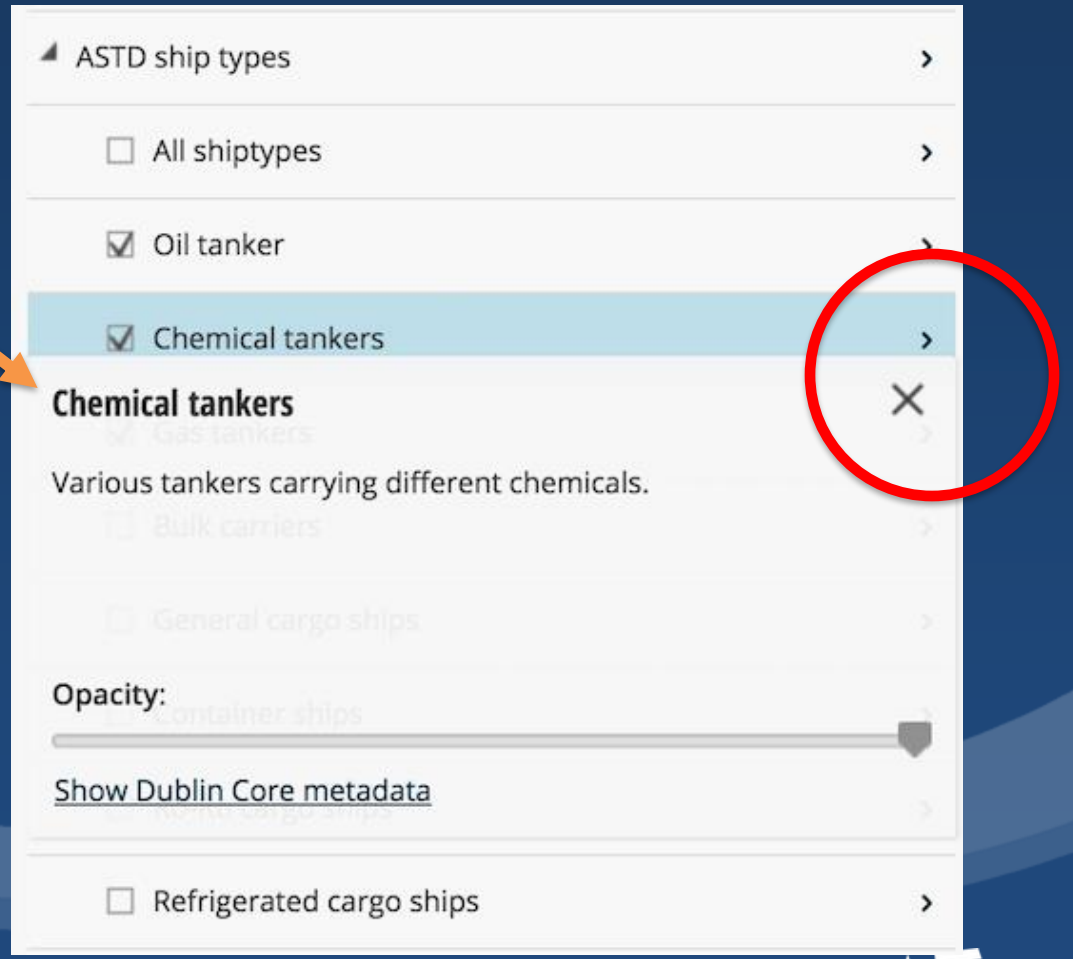
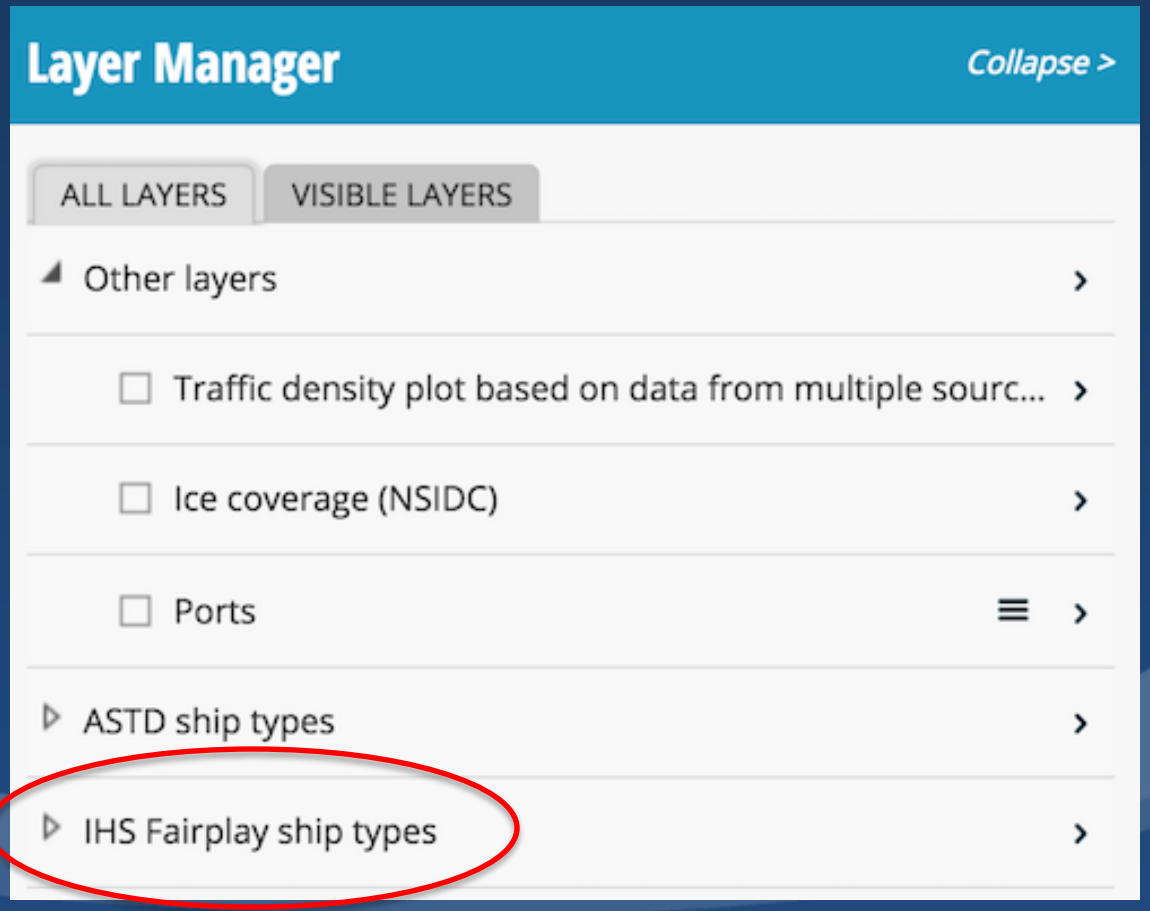
Ship type metadata

- A description of each ship type is given in the ASTD system.
- Click on the arrow to the right to display the information.



Layer manager

- The number and availability of ship types is dependent on user rights.
  - Access to ASTD is given on 3 levels, based on user rights - each access level has different shiptype aggregation.
  - Click the buttons to display the ice information from NSIDC.



Only available on Level I and II – Not on Level III

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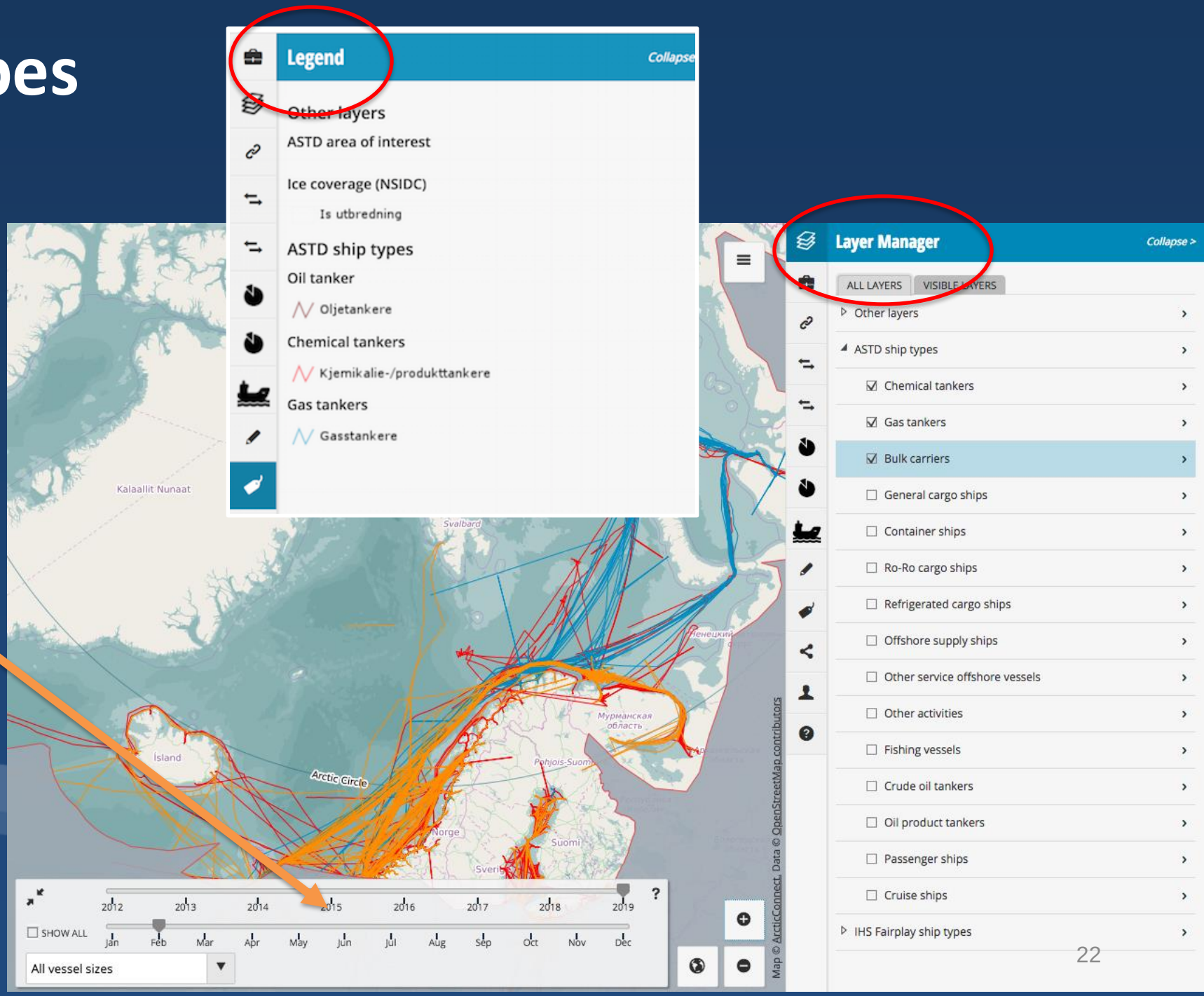
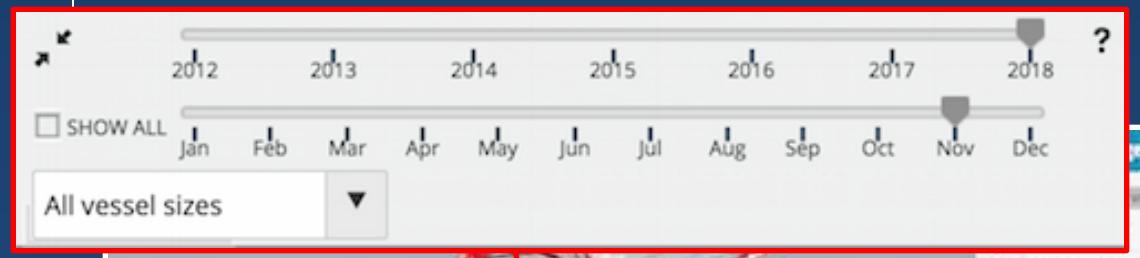
Adding ship types to the map

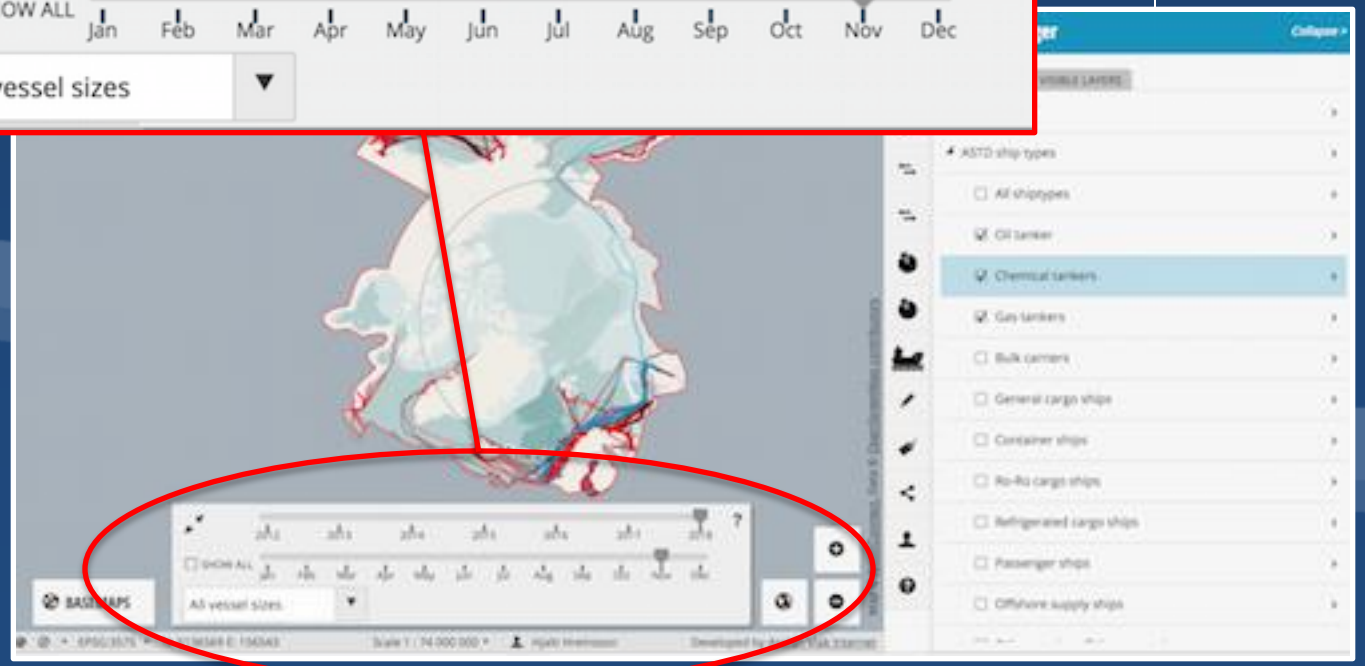
- Simply click the boxes and choose what time to display on the Time slider.
- Users can add multiple ship types
  - The Legend box identifies which ship type is which color



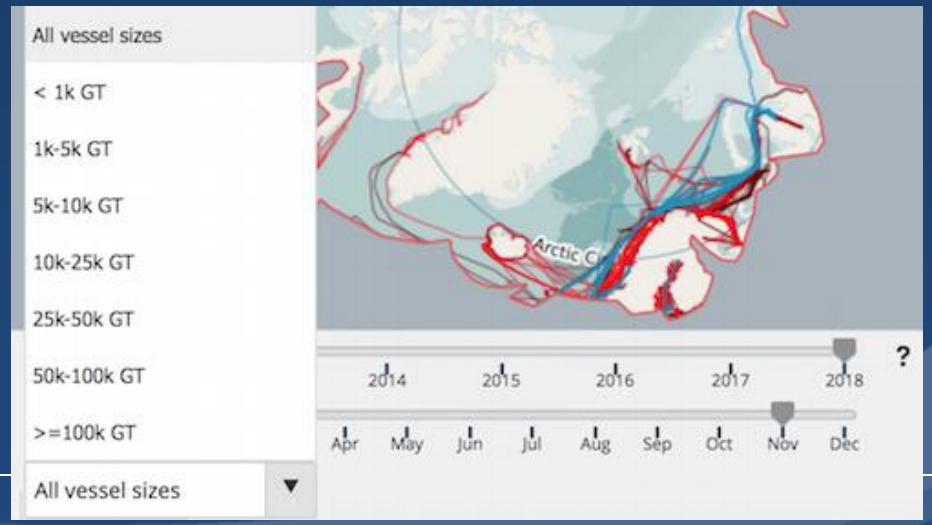
Track timings and ship sizes

The layer manager allows for analysis for a specific month in a given year. Choose the timing with the Time slider.



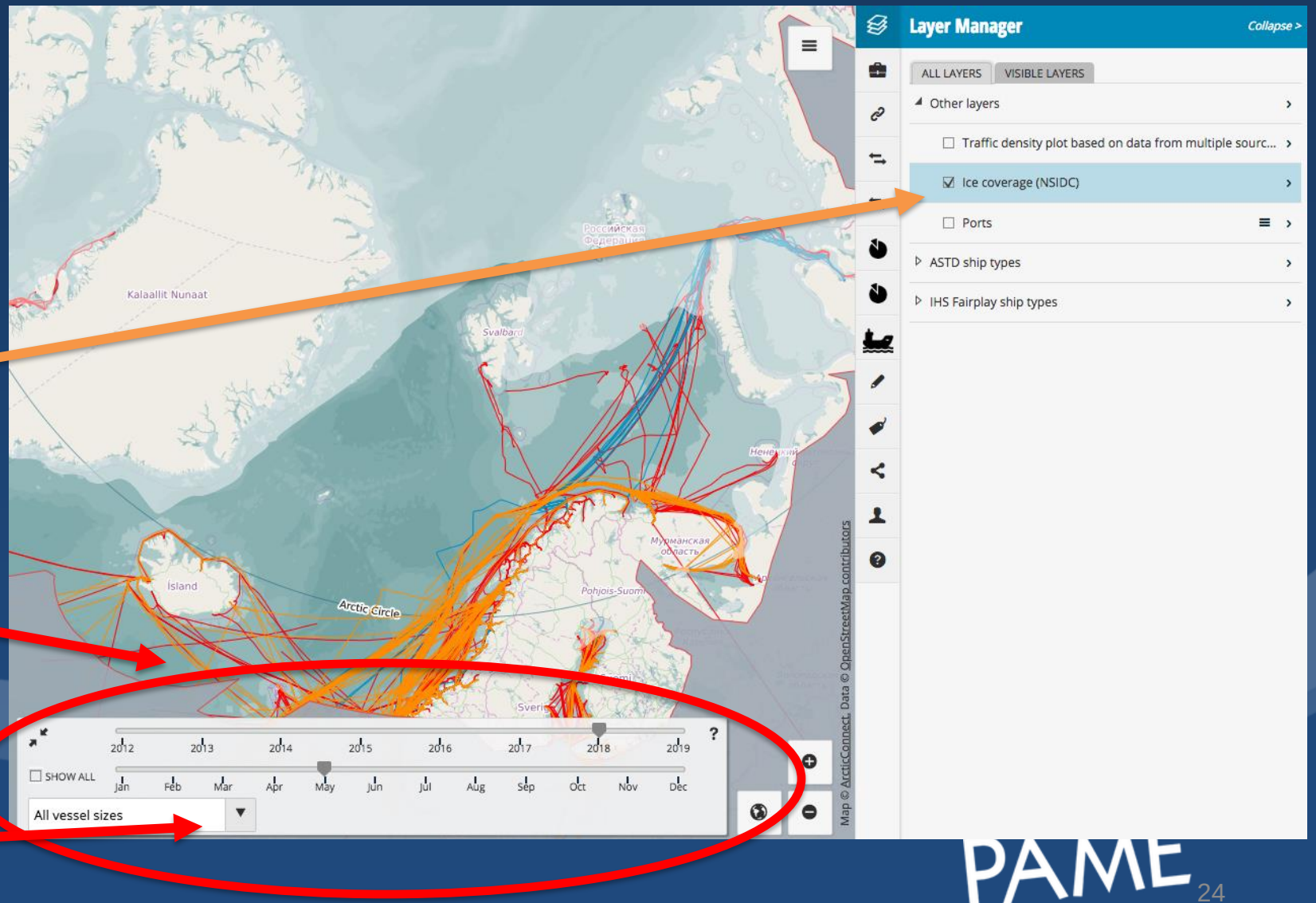


Users can also analyse specific sizes of vessels from the Time slider.



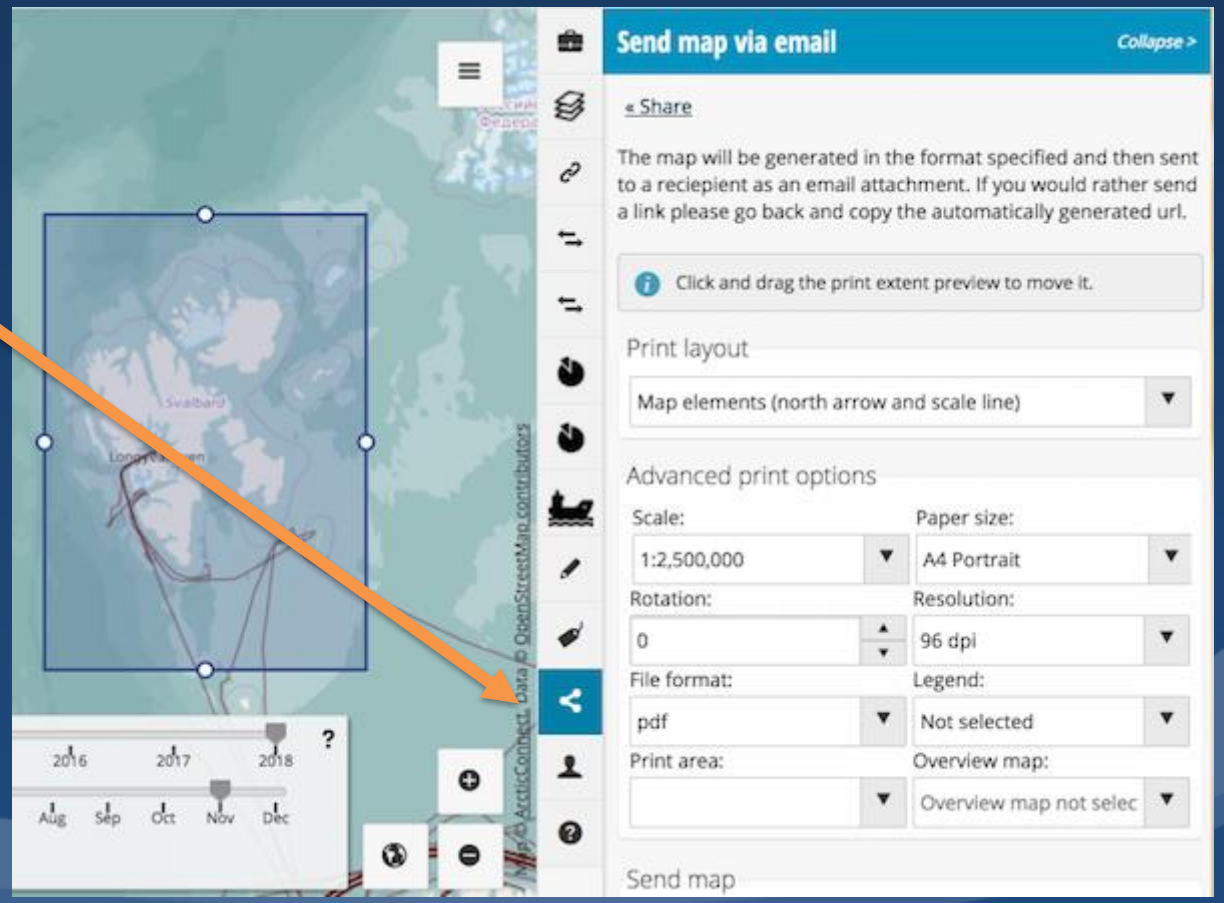
Ice information

- Sea ice information is from the National Snow and Ice Data Center (NSIDC).
- Click on the Ice coverage button.
- Choose the period in the Time slider.
- Choose to see what sizes of vessels to display on the map

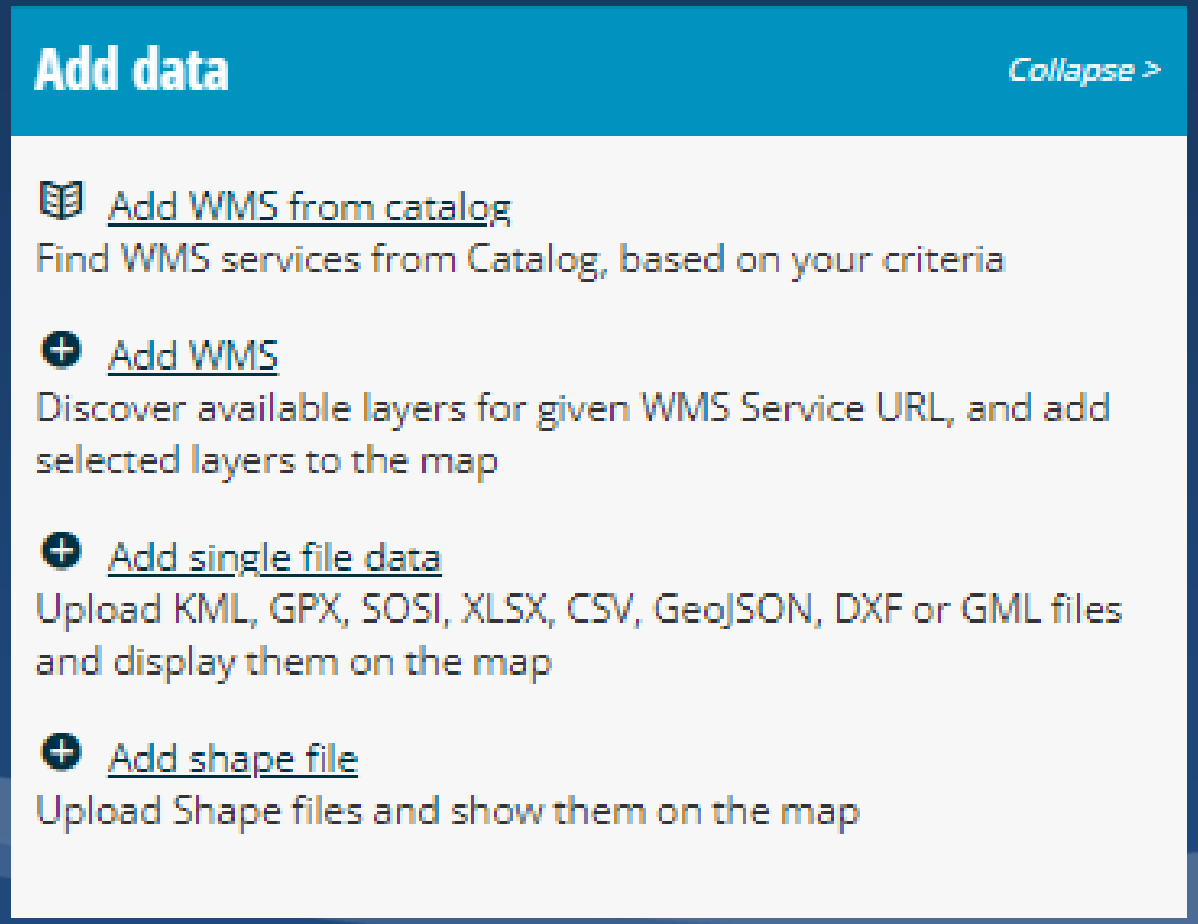


Save maps

- Use the *Save, share or print* function to save the map created.
- See more information below in the user guide.



Add data



PAME
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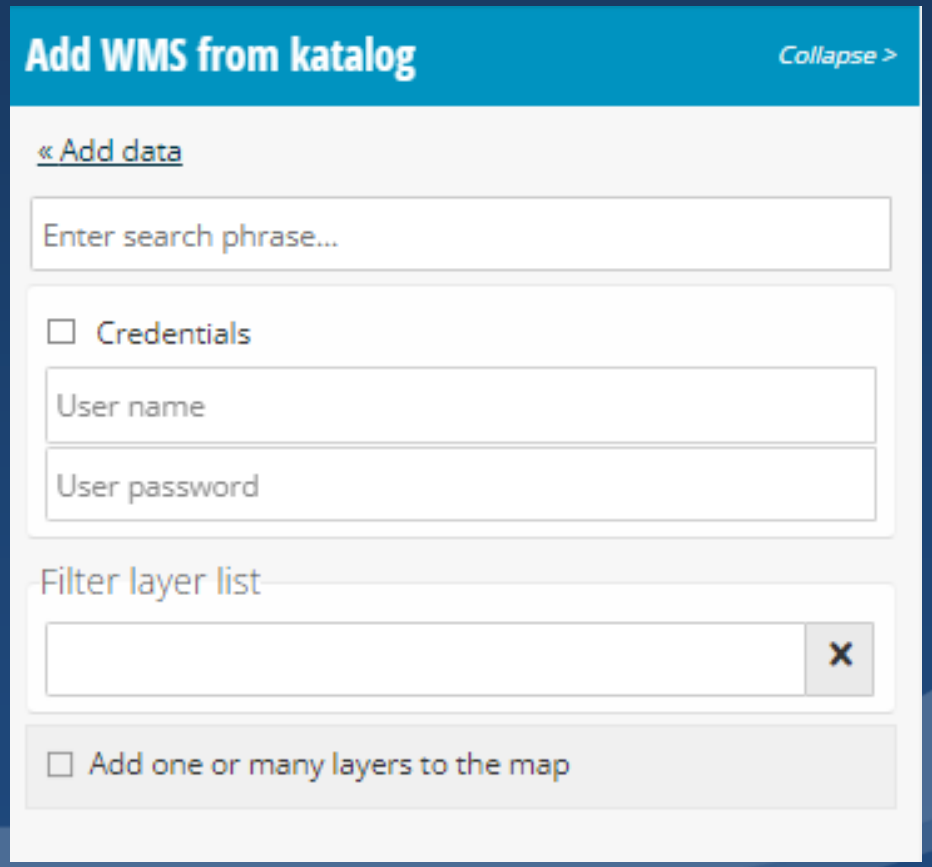
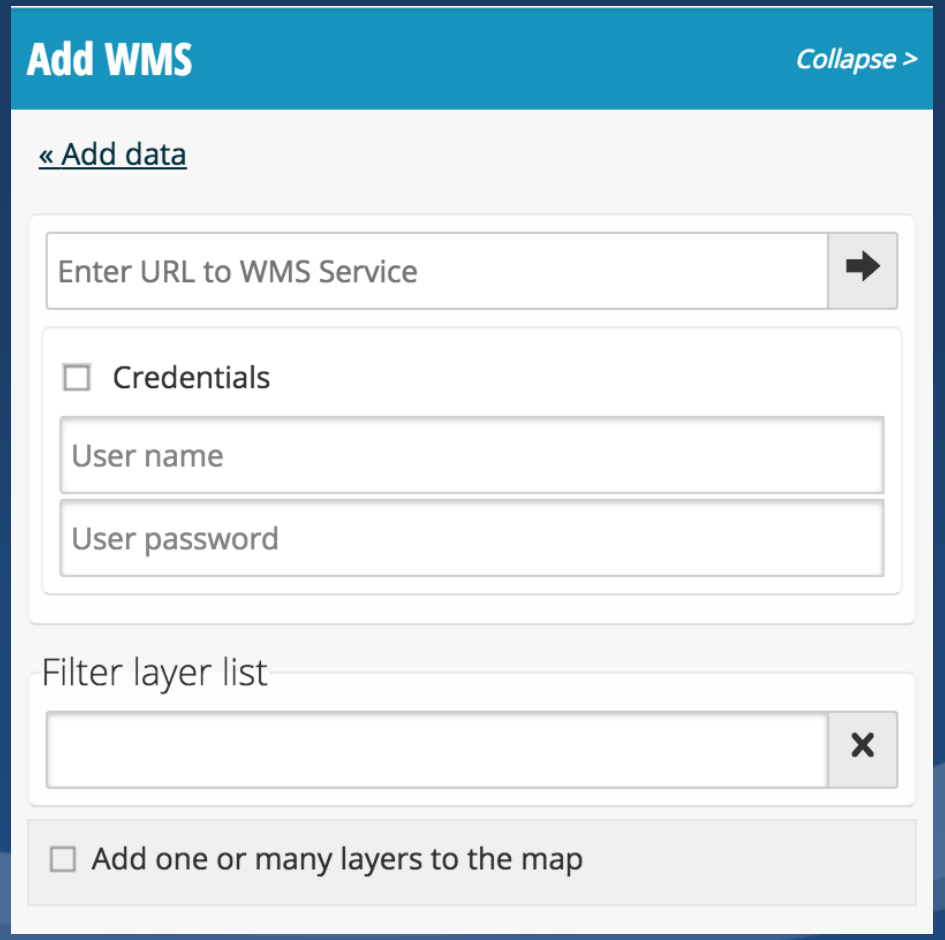
Add WMS from catalog

- Users can add certain WMS services directly via a Norwegian WMS service, in Norwegian.
- Next page shows availability for a service in English.



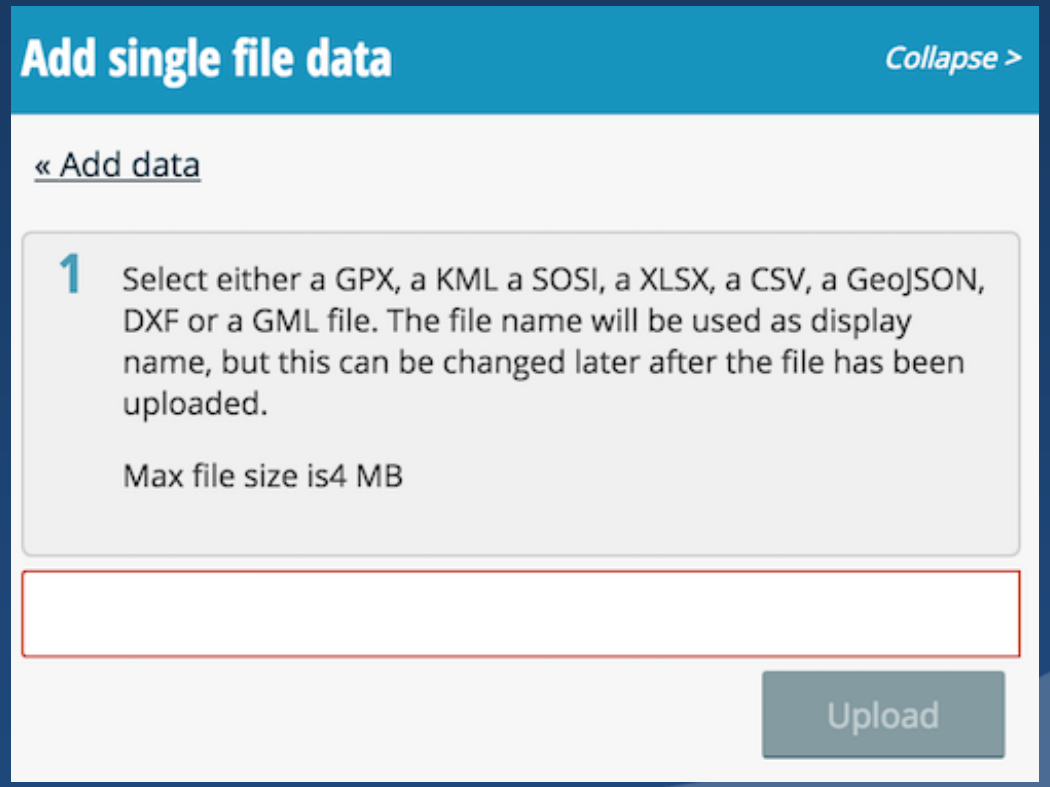
Add WMS

- Users can add feeds from WMS services of their choice.
- Copy and paste the link from the WMS service and press the arrow.
- Insert the credentials if needed.
- A list of layers is available below.



Add single file data

- Users can add their data to ASTD.
- List of available formats to the right.



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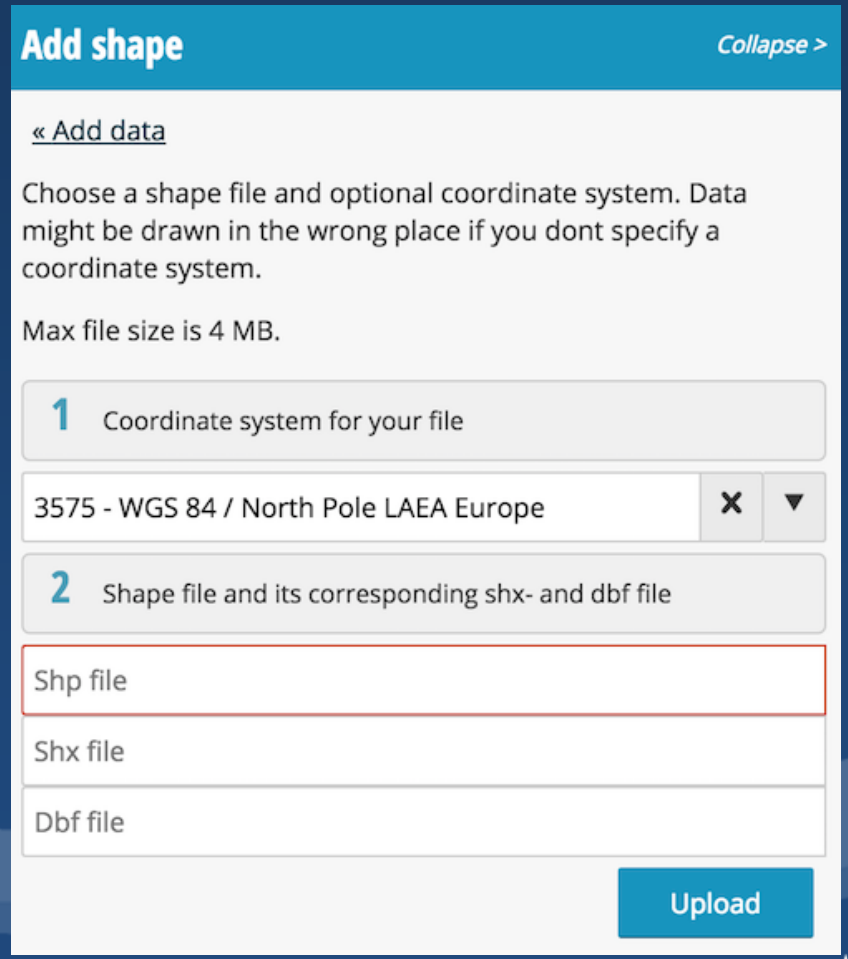
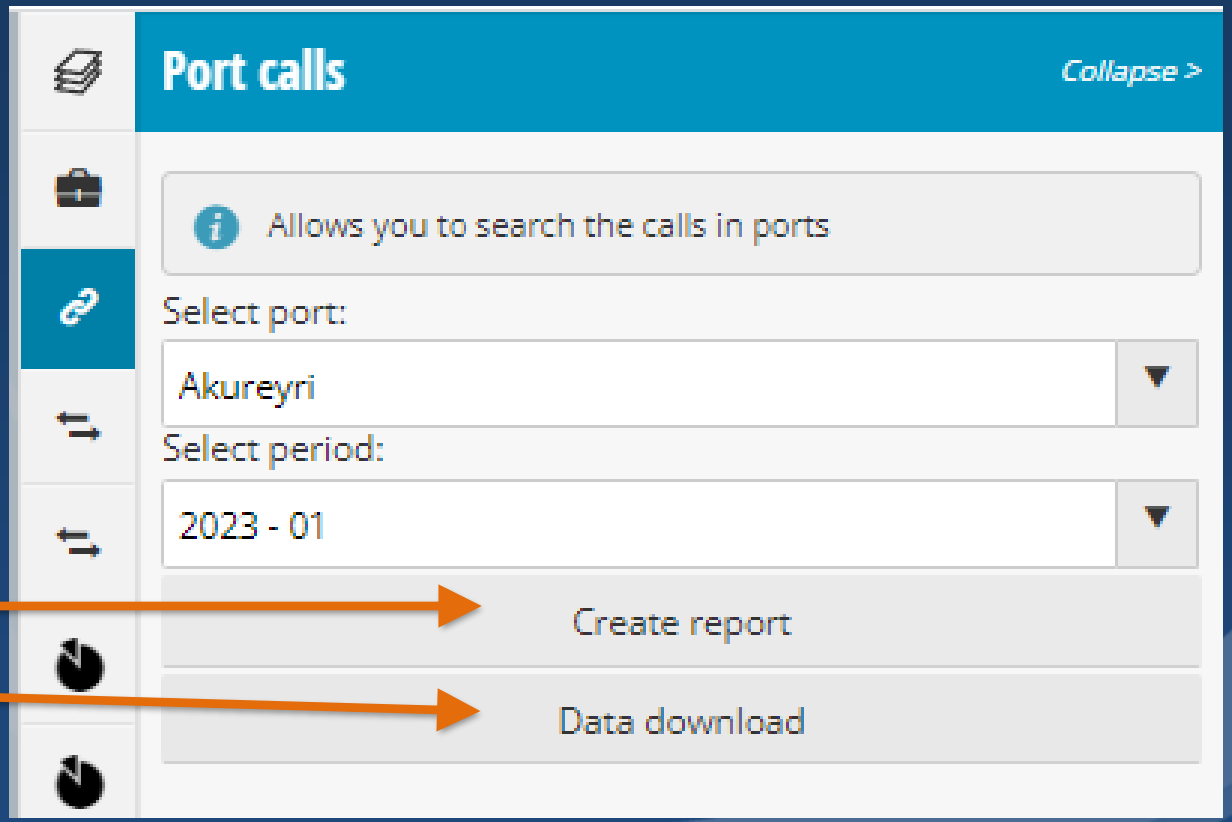
Add shape file

- Upload shapefiles to display
  - Max size is 4mb.
- Make sure the file is in any of the projections available in the drop-down list.
  - Choose the appropriate projection
- Press upload to display



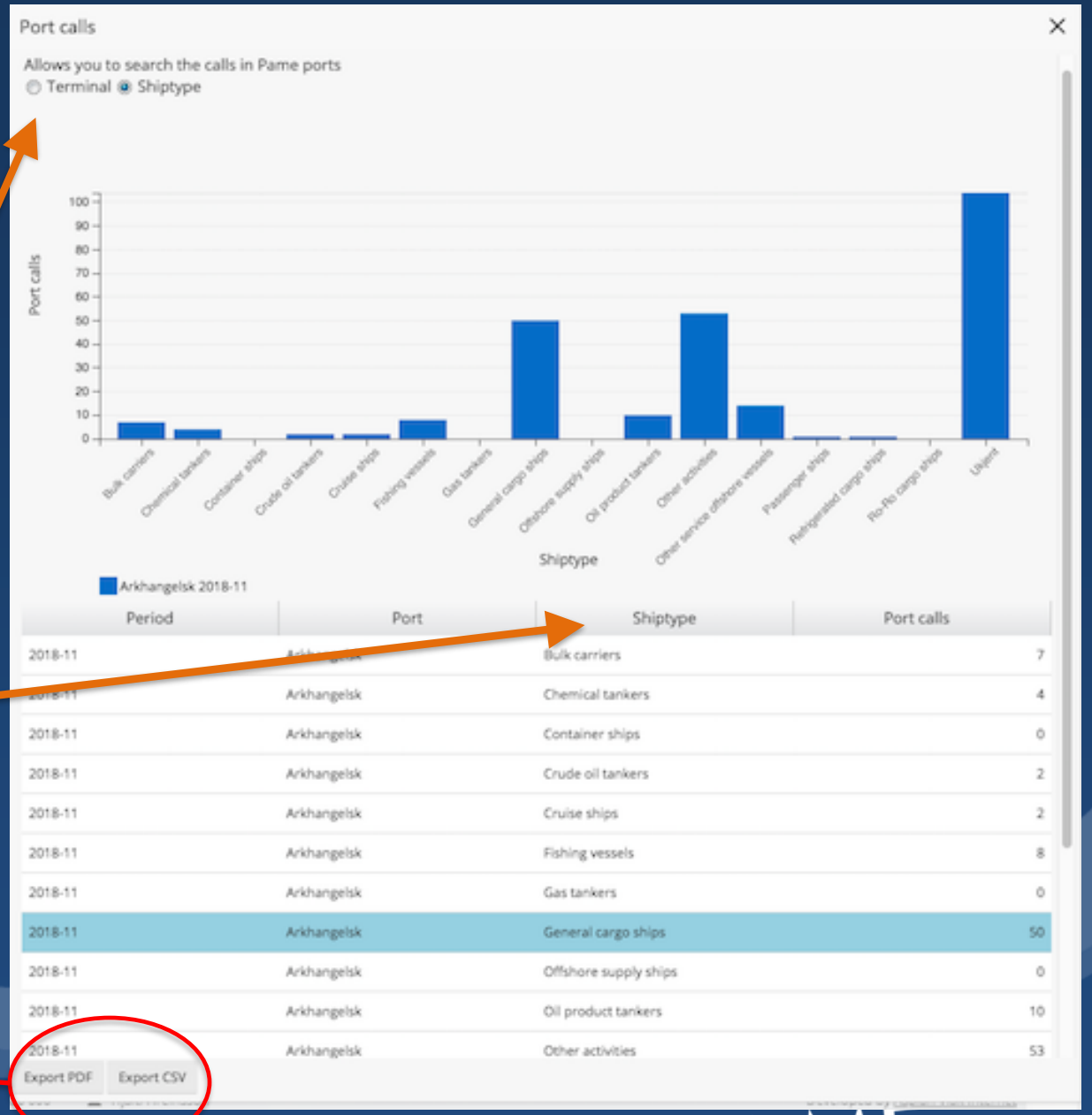
Port calls

- Select the port and period to see how many ships entered the selected port.
  - *Note: Each ship entering the port is counted every time it enters the port.*
- Click create report
- Download of the data is available



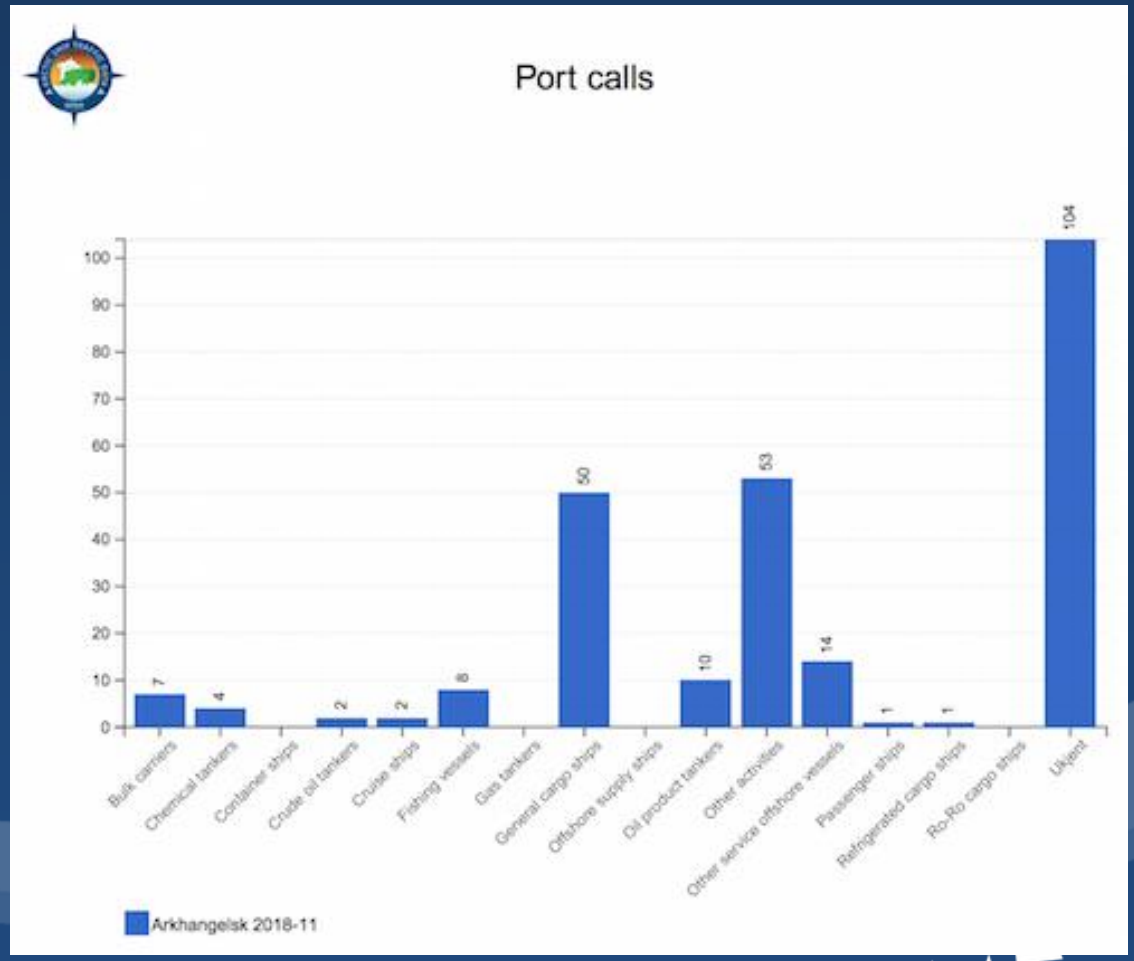
Ports: Create Report

- Port calls refers to the number of ships entering the port
- Terminal: Some ports are divided into terminals. If that is the case, the port calls can be divided by terminals.
- Ship types: Analysis port calls by ship type
- The total number is at the bottom of the pop-up window.
- Users can from here choose two export options:
  - Export PDF
  - Export CSV (to download the data)



Exporting Ports: PDF

- Automatically creates a PDF report
- Includes a chart with the number of ships for each ship type
- These files can be easily shared.



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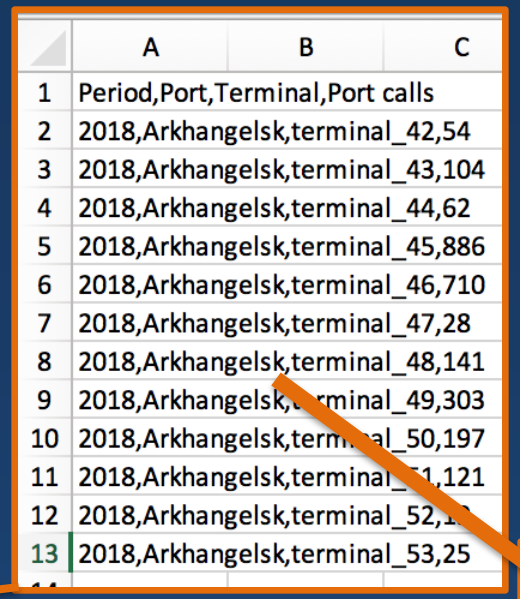
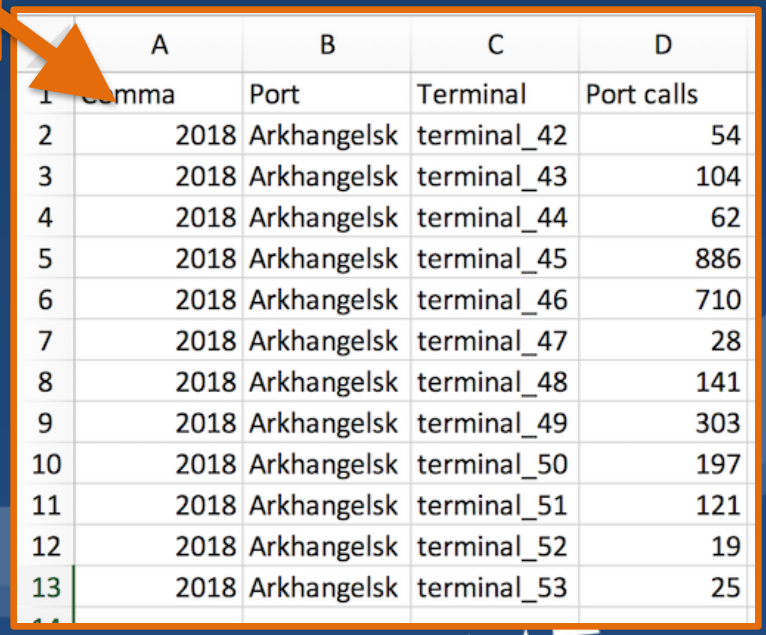
Exporting Ports: CSV

- .CSV files mean ”Comma Seperated Values”
  - These are files for many strings of data
- Export CSV and open the file in Excel
- Choose the A field > Press Data > Text to columns > Deliminated > Next > Comma > Finish
  - This results in each field with only one value
  - The file and information can be easily worked within Excel



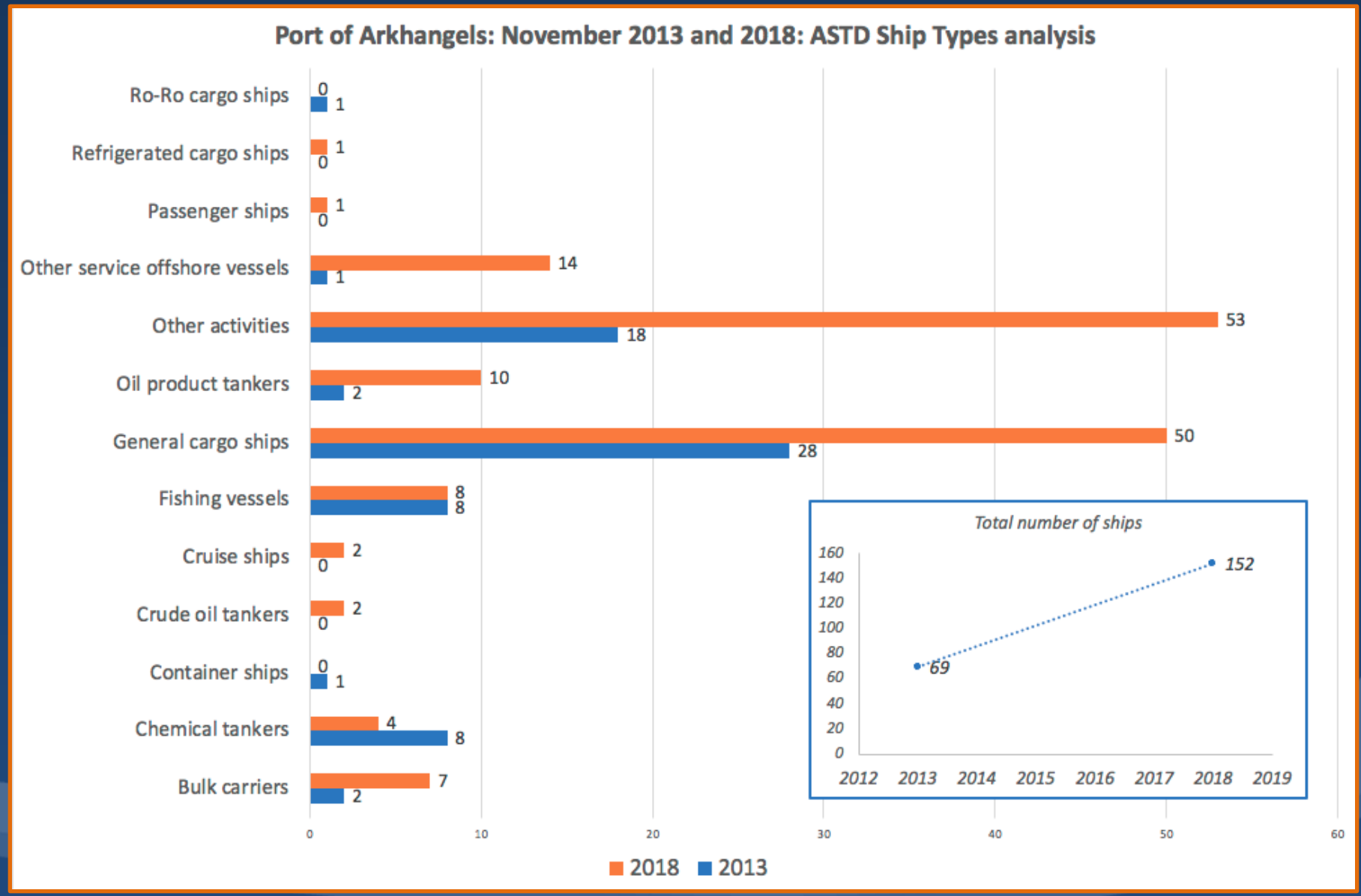
	A	B	C
1	Period,Port,Terminal,Port calls		
2	2018,Arkhangelsk,terminal_42,54		
3	2018,Arkhangelsk,terminal_43,104		
4	2018,Arkhangelsk,terminal_44,62		
5	2018,Arkhangelsk,terminal_45,886		
6	2018,Arkhangelsk,terminal_46,710		
7	2018,Arkhangelsk,terminal_47,28		
8	2018,Arkhangelsk,terminal_48,141		
9	2018,Arkhangelsk,terminal_49,303		
10	2018,Arkhangelsk,terminal_50,197		
11	2018,Arkhangelsk,terminal_51,121		
12	2018,Arkhangelsk,terminal_52,19		
13	2018,Arkhangelsk,terminal_53,25		



	A	B	C	D
1	Period	Port	Terminal	Port calls
2	2018	Arkhangelsk	terminal_42	54
3	2018	Arkhangelsk	terminal_43	104
4	2018	Arkhangelsk	terminal_44	62
5	2018	Arkhangelsk	terminal_45	886
6	2018	Arkhangelsk	terminal_46	710
7	2018	Arkhangelsk	terminal_47	28
8	2018	Arkhangelsk	terminal_48	141
9	2018	Arkhangelsk	terminal_49	303
10	2018	Arkhangelsk	terminal_50	197
11	2018	Arkhangelsk	terminal_51	121
12	2018	Arkhangelsk	terminal_52	19
13	2018	Arkhangelsk	terminal_53	25

Ports: Case Study

- Downloading this data can help with comparing either ports or months/years.
- Simply copy/and paste from the data download files to create graphs/tables etc to highlight what you want.
- See an example of an analysis made by downloading data.



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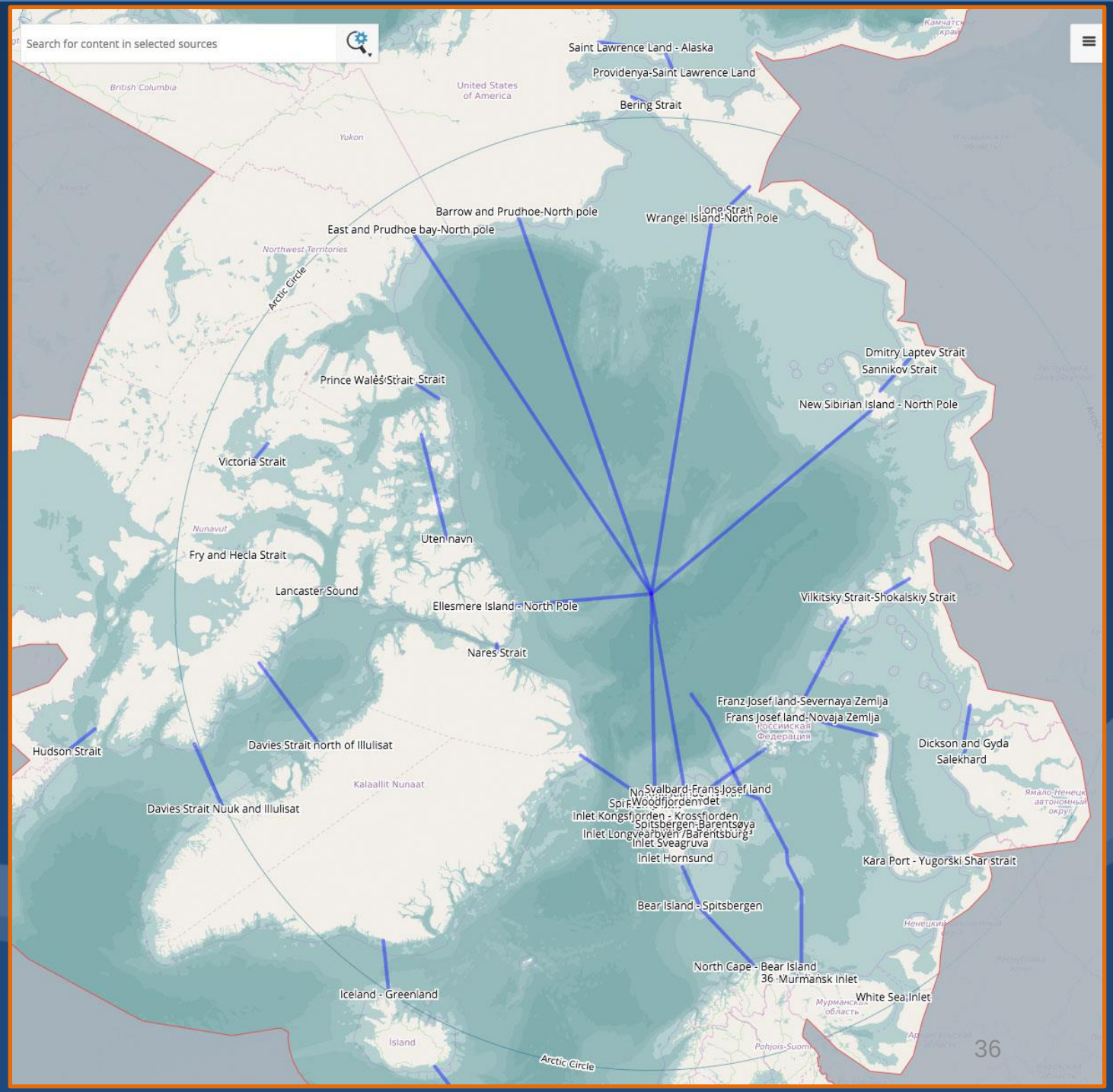
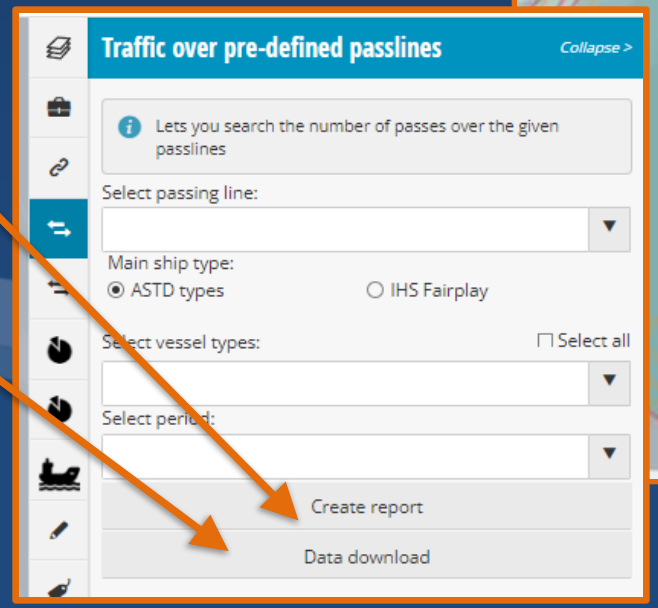
Traffic over pre-defined passing lines

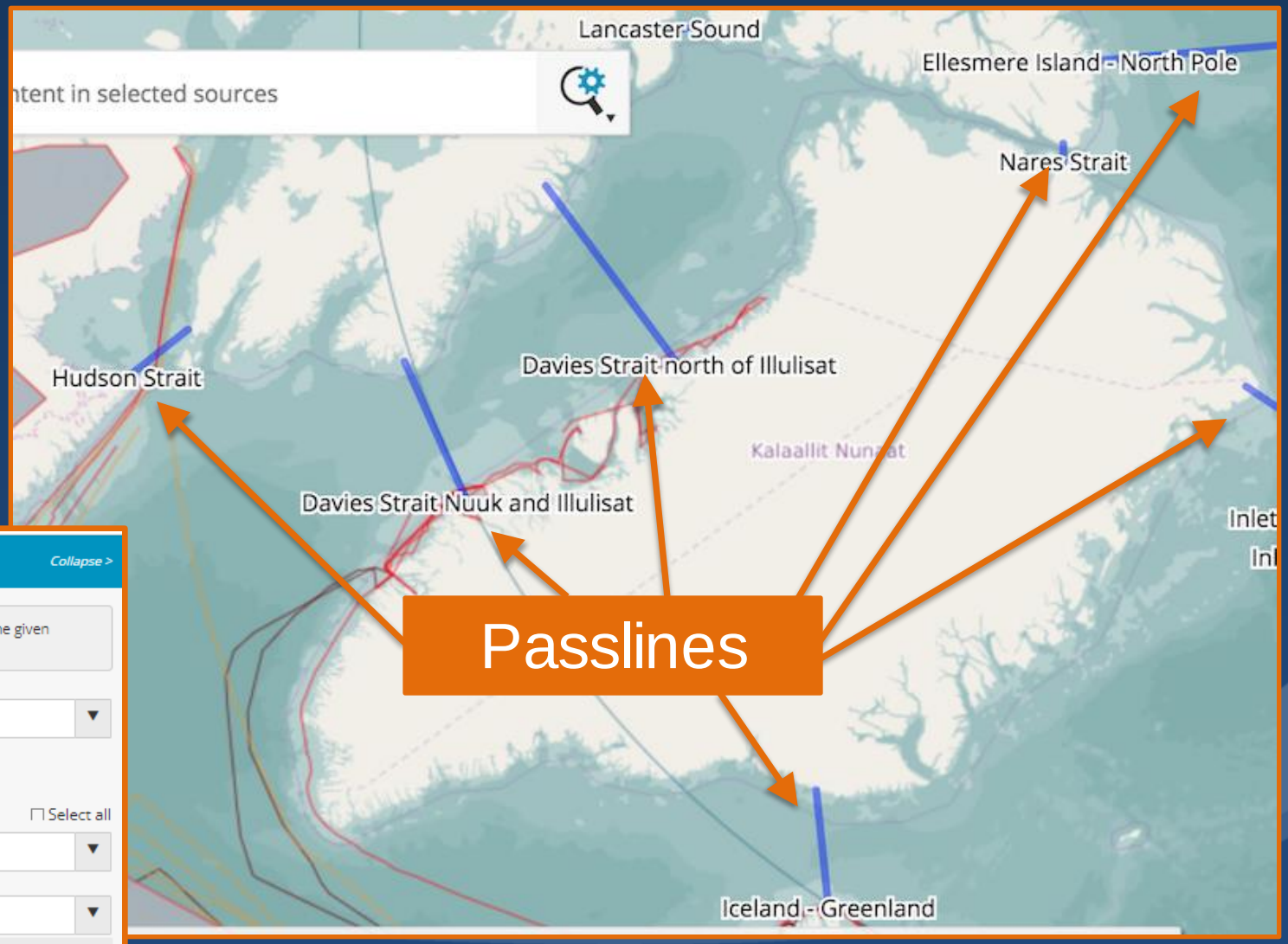
- ASTD has 47 pre-defined passlines
- The ships are counted in each passing
- Users can see the heading of the ships over the passline as well



Traffic over pre-defined passing lines

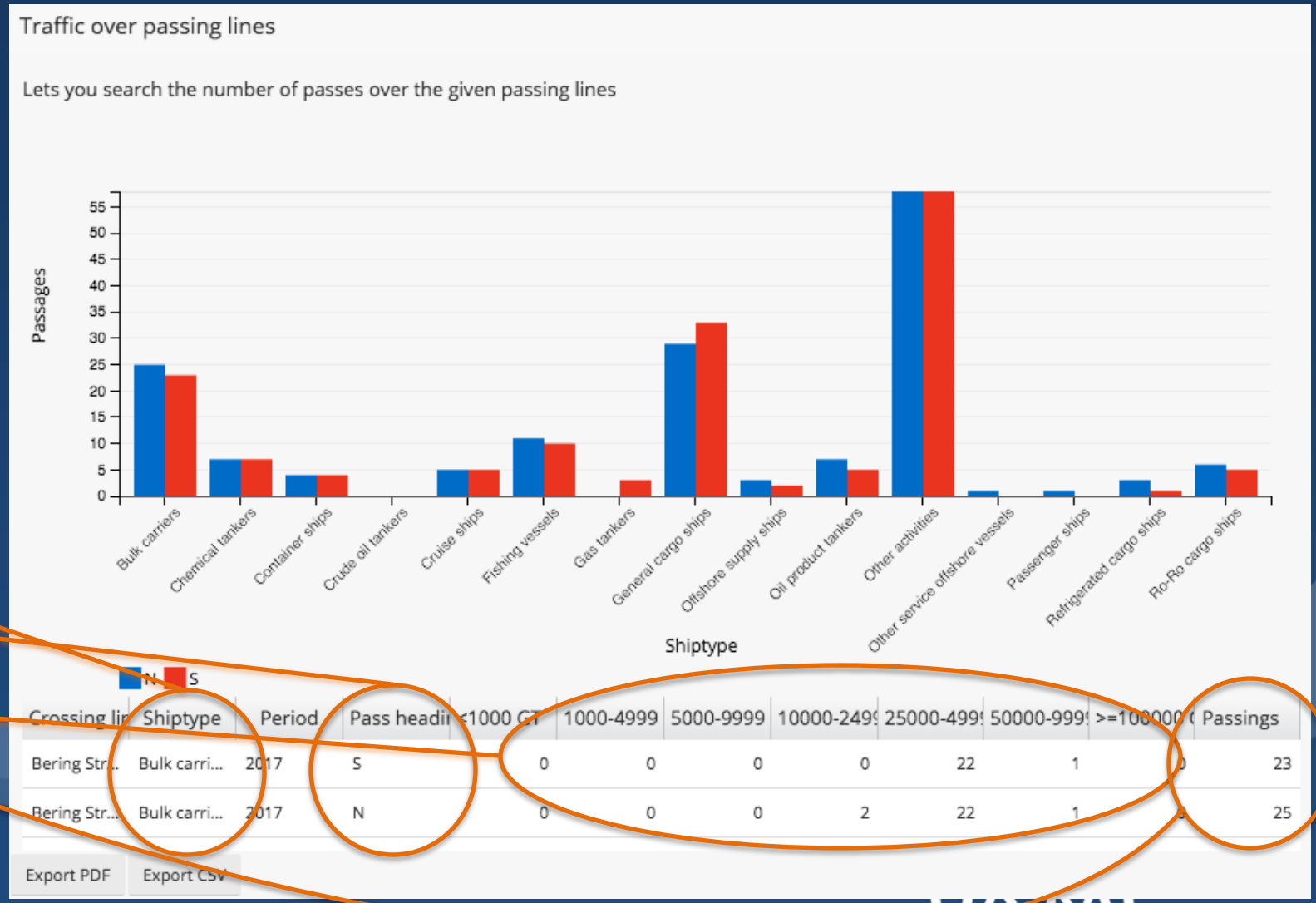
- Passline refers to a line drawn between two locations to count the number of ships passing that line.
- Click create report
- Or Data download





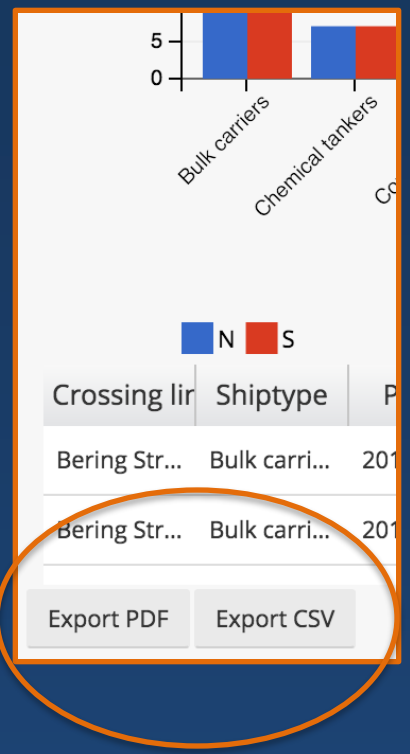
Traffic over pre-defined passing lines: Reports

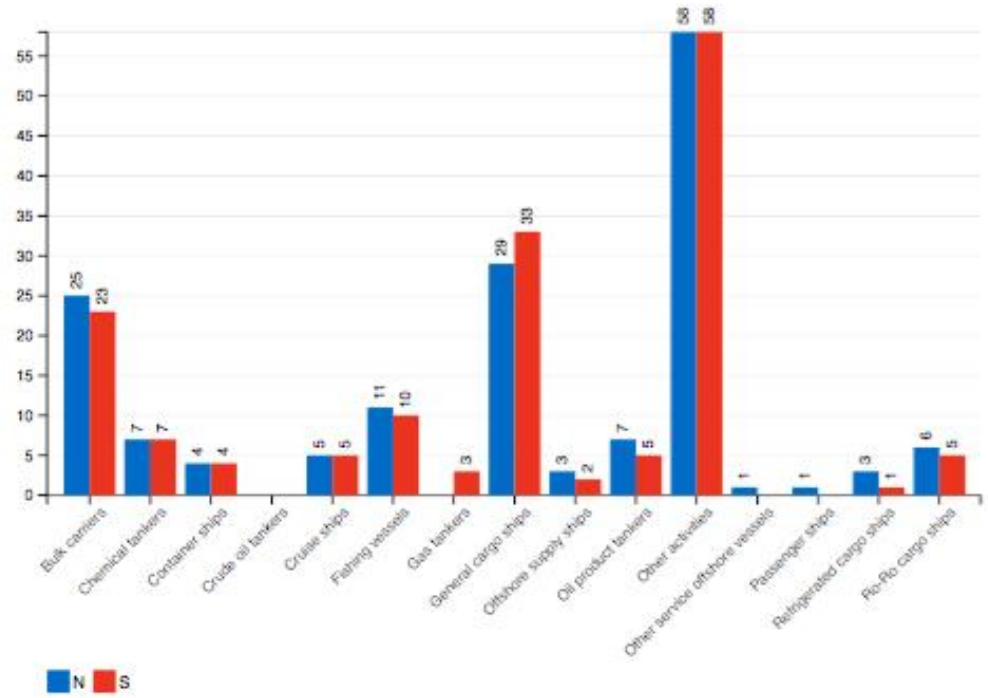
- Select a passing line
- Select vessel type(s)
- Select period
- Click Create report
- The report shows:
  - The ship type
  - The heading of the ships
  - The size of the ships
  - The number of passings
  - Total number of passings (at the bottom of the report)



Traffic over passing lines: Export PDF

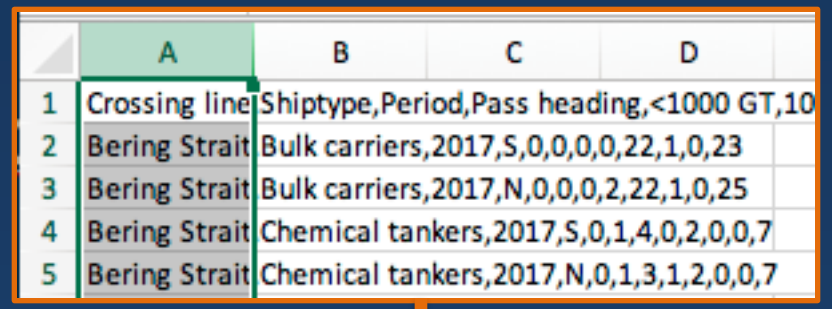
- The Reports can be Exported to either PDF, or CSV (Comma Seperated Values)
  - If you download CSV you can work with the data.
- The PDF contains the chart and is easily share-able.





Traffic over passing lines: CSV

- .CSV files mean ”Comma Seperated Values”
  - These are files for many strings of data
- Export CSV and open the file in Excel or other programs
- Choose the A field > Press Data > Text to columns > Deliminated > Next > Comma > Finish
  - This results in each field with only one value
  - The file and information can be easily worked within Excel



	A	B	C	D
1	Crossing line	Shiptype,Period,Pass heading,<1000 GT,10		
2	Bering Strait	Bulk carriers,2017,S,0,0,0,0,22,1,0,23		
3	Bering Strait	Bulk carriers,2017,N,0,0,0,2,22,1,0,25		
4	Bering Strait	Chemical tankers,2017,S,0,1,4,0,2,0,0,7		
5	Bering Strait	Chemical tankers,2017,N,0,1,3,1,2,0,0,7		

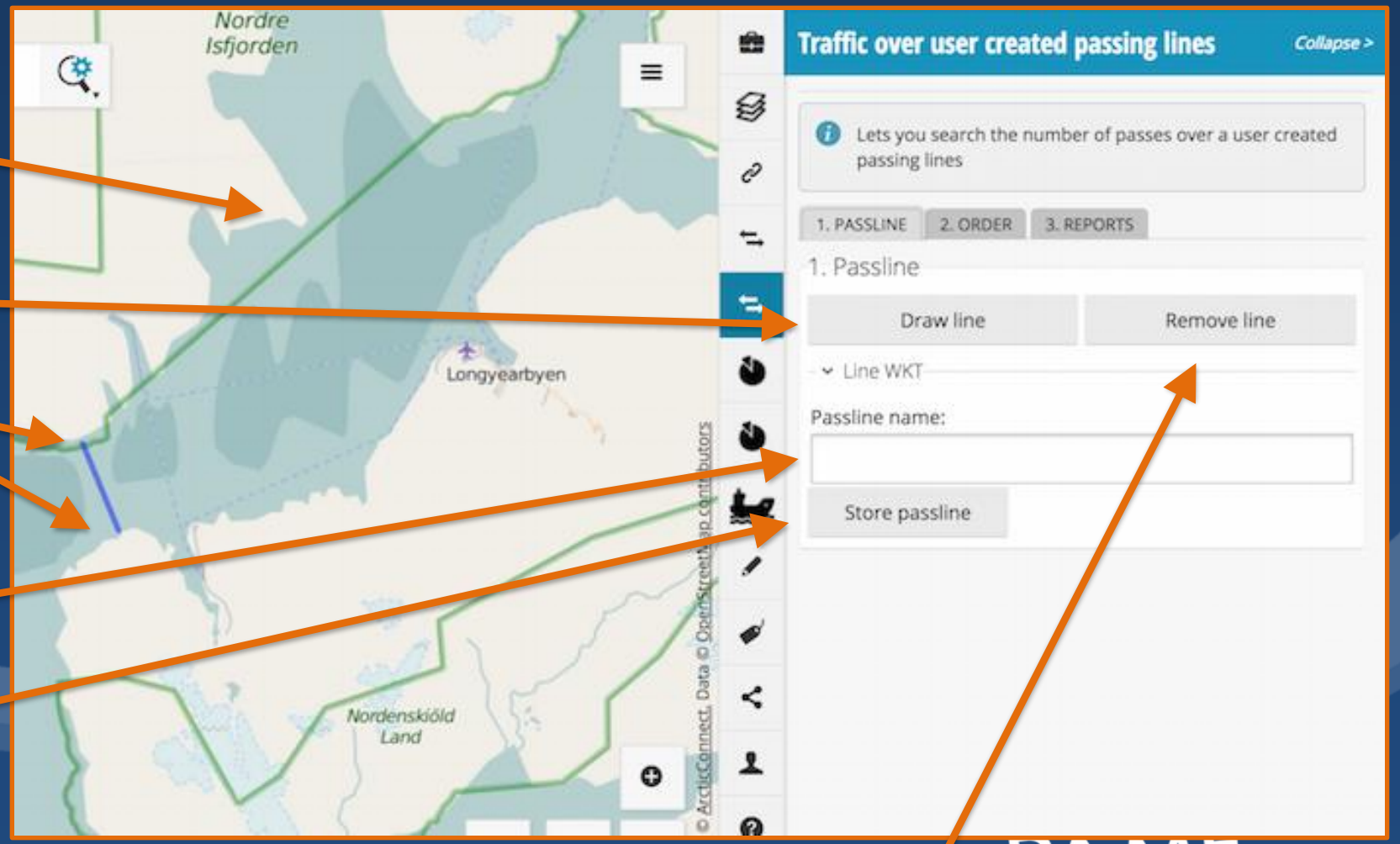
	A	B	C	D	E	F	G	H	I	J	K	L
1	Crossing line	Shiptype	Period	Pass heading	<1000 GT	1000-4999 GT	5000-9999 GT	10000-24999 GT	25000-49999 GT	50000-99999 GT	>=100000 GT	Passings
2	Bering Strait	Bulk carriers	2017	S	0	0	0	0	22	1	0	23
3	Bering Strait	Bulk carriers	2017	N	0	0	0	2	22	1	0	25
4	Bering Strait	Chemical tankers	2017	S	0	1	4	0	2	0	0	7
5	Bering Strait	Chemical tankers	2017	N	0	1	3	1	2	0	0	7
6	Bering Strait	Container ships	2017	S	0	0	4	0	0	0	0	4
7	Bering Strait	Container ships	2017	N	0	0	4	0	0	0	0	4
8	Bering Strait	Crude oil tankers	2017	S	0	0	0	0	0	0	0	0
9	Bering Strait	Crude oil tankers	2017	N	0	0	0	0	0	0	0	0
10	Bering Strait	Cruise ships	2017	S	0	2	2	0	0	1	0	5
11	Bering Strait	Cruise ships	2017	N	0	3	1	1	0	0	0	5
12	Bering Strait	Fishing vessels	2017	S	10	0	0	0	0	0	0	10
13	Bering Strait	Fishing vessels	2017	N	9	2	0	0	0	0	0	11
14	Bering Strait	Gas tankers	2017	S	0	0	0	0	1	0	2	3
15	Bering Strait	Gas tankers	2017	N	0	0	0	0	0	0	0	0
16	Bering Strait	General cargo ships	2017	S	0	6	18	6	3	0	0	33
17	Bering Strait	General cargo ships	2017	N	1	7	13	5	3	0	0	29
18	Bering Strait	Offshore supply ships	2017	S	2	0	0	0	0	0	0	2
19	Bering Strait	Offshore supply ships	2017	N	2	1	0	0	0	0	0	3
20	Bering Strait	Oil product tankers	2017	S	0	2	2	0	1	0	0	5
21	Bering Strait	Oil product tankers	2017	N	0	2	4	0	1	0	0	7
22	Bering Strait	Other activities	2017	S	34	15	3	6	0	0	0	58
23	Bering Strait	Other activities	2017	N	31	17	2	8	0	0	0	58
24	Bering Strait	r service offshore ve	2017	S	0	0	0	0	0	0	0	0
25	Bering Strait	r service offshore ve	2017	N	0	0	1	0	0	0	0	1
26	Bering Strait	Passenger ships	2017	S	0	0	0	0	0	0	0	0
27	Bering Strait	Passenger ships	2017	N	0	1	0	0	0	0	0	1

Traffic over user created passing lines

- Users can create their own passlines
  - The passlines created are only available and seen by that logged in user
- Historical analysis can be performed by comparing passings over the line created.

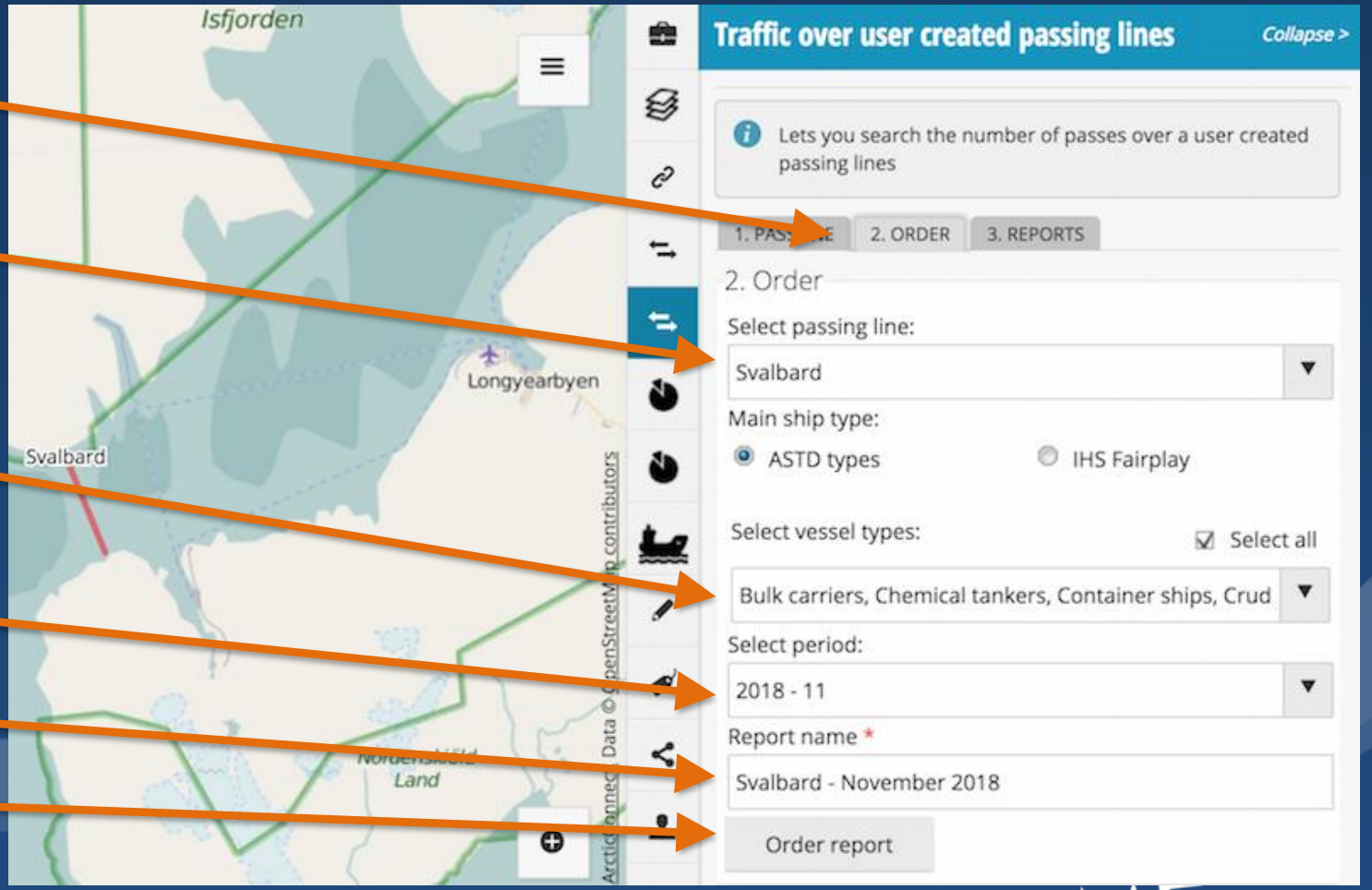
Traffic over user created passing lines

1. Find the location on the map where you want to draw the line
2. Click Draw line
3. Click on two locations on the map
4. Give the passline a name
5. Click Store passline
6. Users can also remove the line by clicking the line and then Remove line



Traffic over user created passing lines

1. Choose order
2. Select the passline you created, or another line previously created
3. Select the ship types to analyse
4. Select the period
5. Give the Report a name
6. Click Order report



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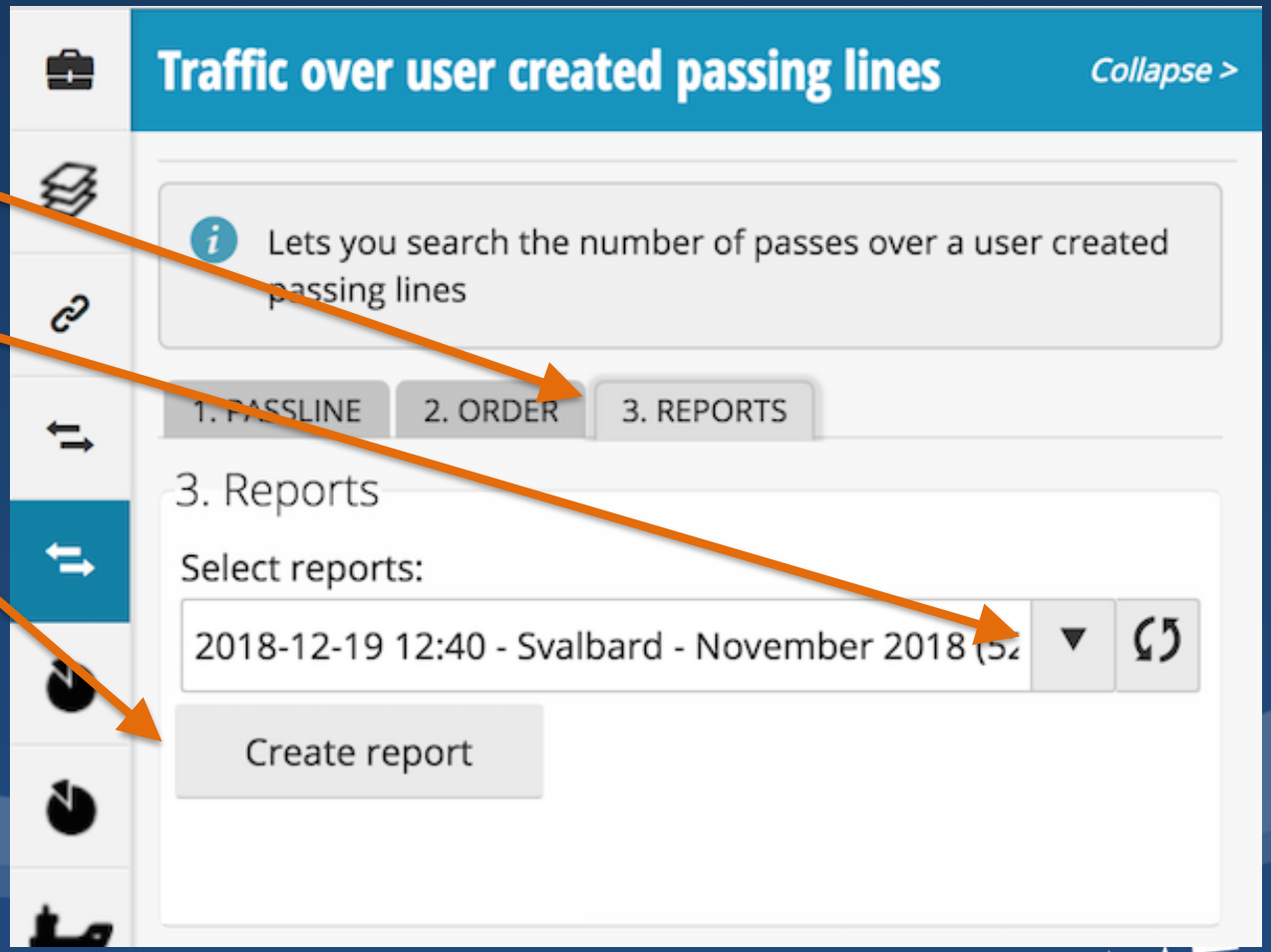
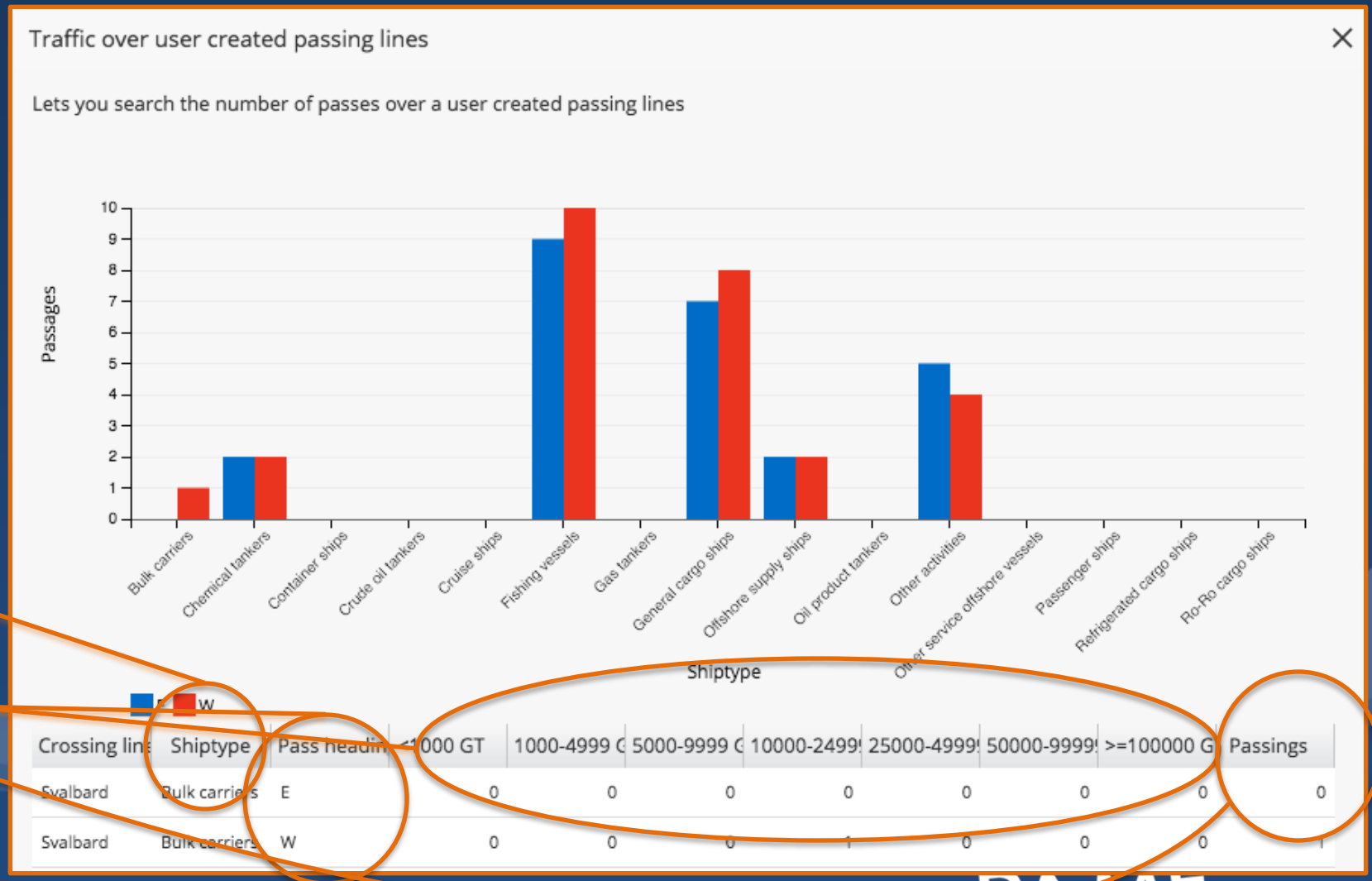
Traffic over user created passing lines

1. Select Reports
2. Select the Report name from the list
3. Click Create report



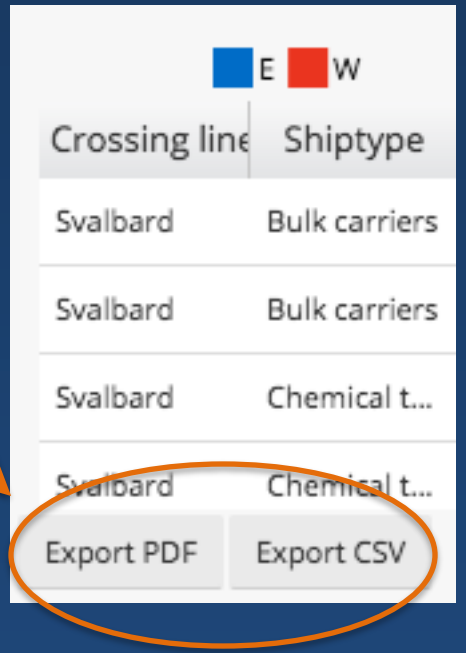
Traffic over user created passing lines: Reports

- Select a passing line
- Select vessel types
- Select period
- Click Create report
- The report shows:
  - The ship type
  - The heading of the ships
  - The size of the ships
  - The number of passings
  - Total number of passings (at the bottom of the report)

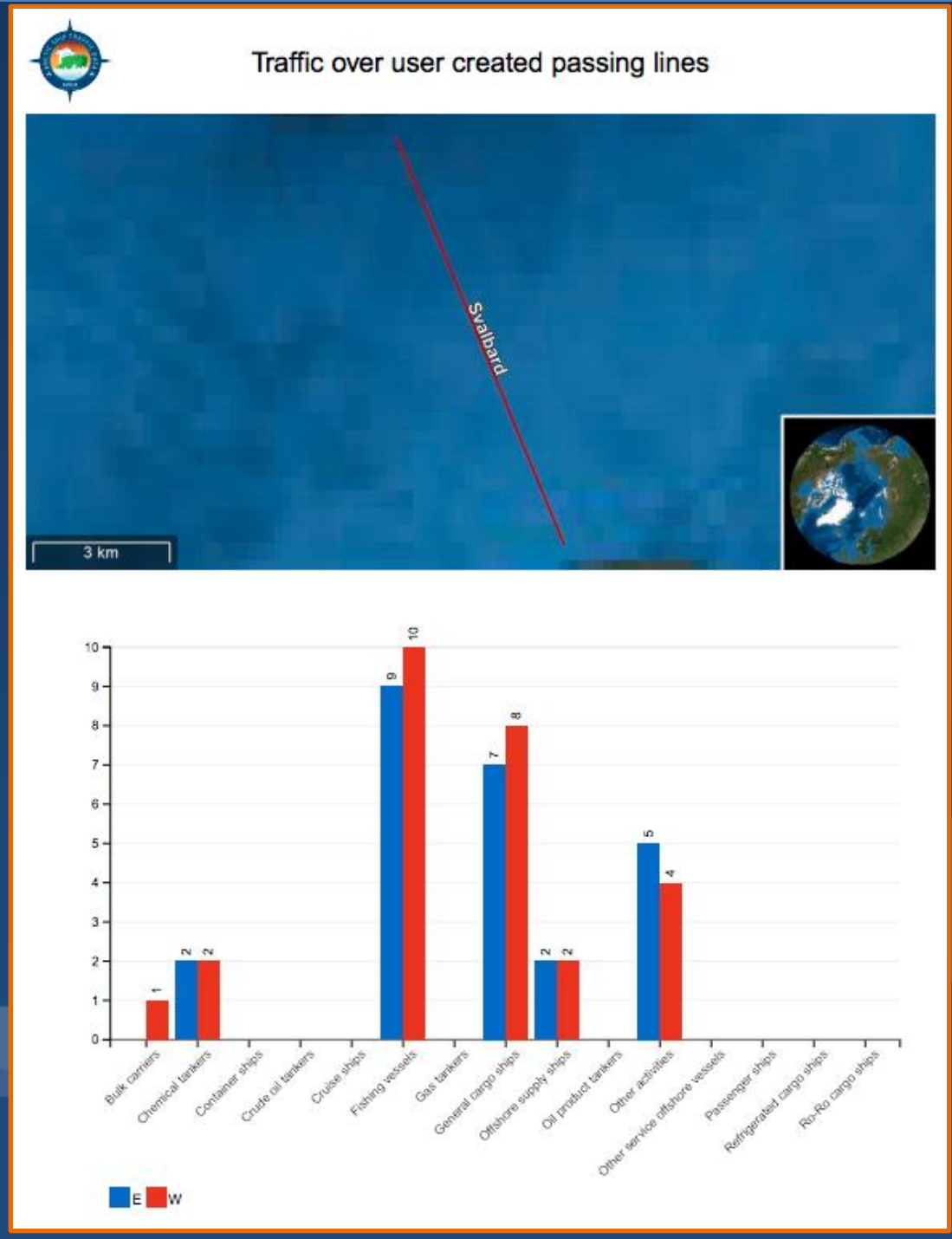


Traffic over user created passing lines: Export PDF

- The Reports can be Exported to either PDF, or CSV (Comma Seperated Values)



- The PDF contains the chart and is easily share-able.



Traffic over user created passing lines: CSV

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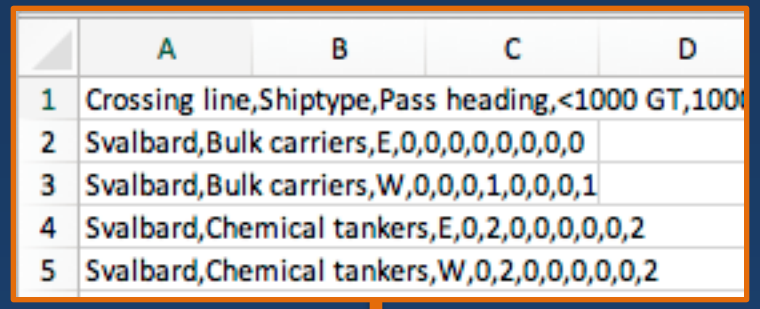
- Export CSV and open the file in Excel
- Choose the A field > Press Data > Text to columns > Deliminated > Next > Comma > Finish
  - This results in each field with only one value
  - The file and information can be easily worked with in Excel



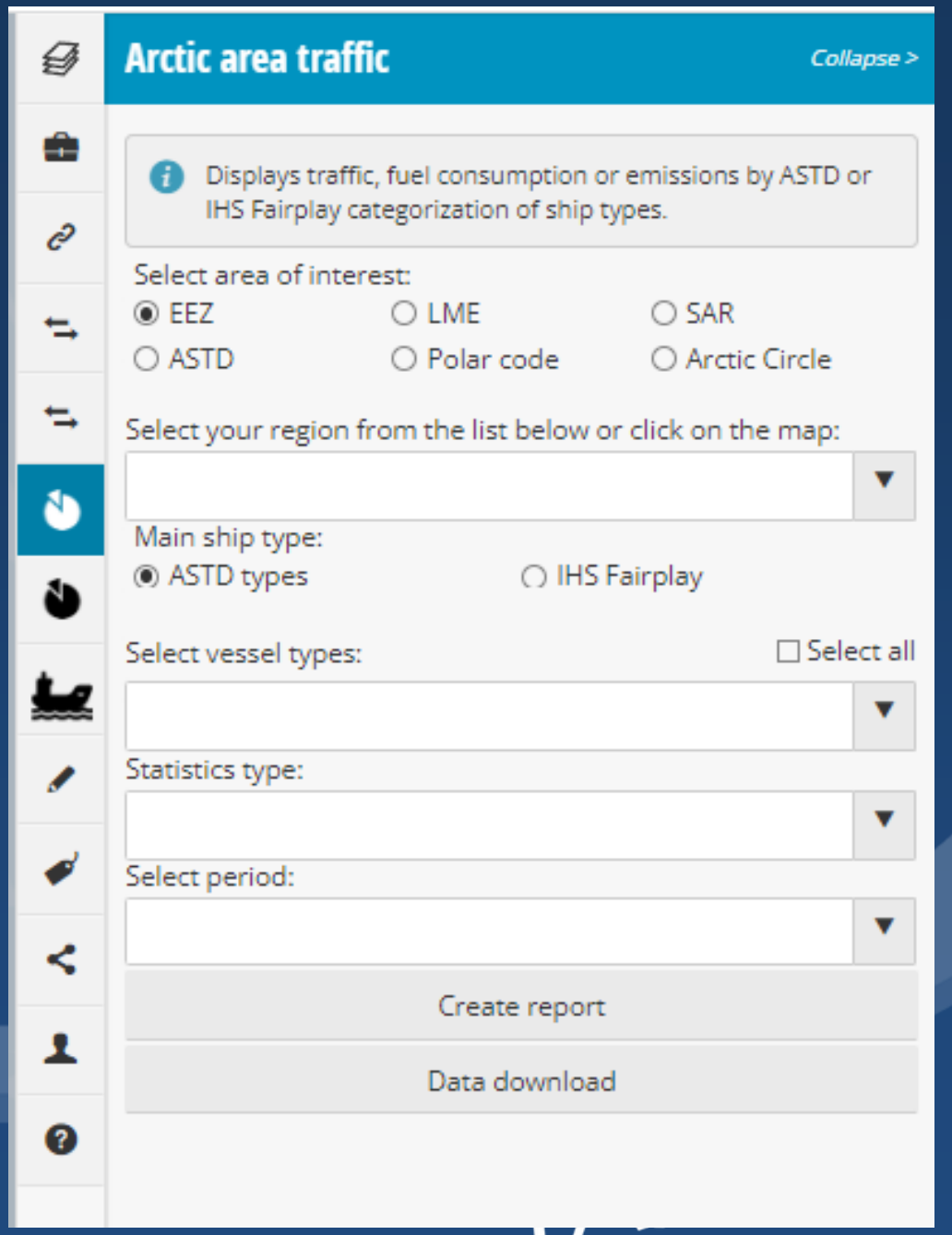
	A	B	C	D
1	Crossing line,Shiptype,Pass heading,<1000 GT,100			
2	Svalbard,Bulk carriers,E,0,0,0,0,0,0,0,0			
3	Svalbard,Bulk carriers,W,0,0,0,1,0,0,0,1			
4	Svalbard,Chemical tankers,E,0,2,0,0,0,0,0,2			
5	Svalbard,Chemical tankers,W,0,2,0,0,0,0,0,2			

	A	B	C	D	E	F	G	H	I	J	K
1	Crossing line	Shiptype	Pass heading	<1000 GT	1000-4999 GT	5000-9999 GT	10000-24999 GT	25000-49999 GT	50000-99999 GT	>=100000 GT	Passings
2	Svalbard	Bulk carriers	E	0	0	0	0	0	0	0	0
3	Svalbard	Bulk carriers	W	0	0	0	1	0	0	0	1
4	Svalbard	Chemical tankers	E	0	2	0	0	0	0	0	2
5	Svalbard	Chemical tankers	W	0	2	0	0	0	0	0	2
6	Svalbard	Container ships	E	0	0	0	0	0	0	0	0
7	Svalbard	Container ships	W	0	0	0	0	0	0	0	0
8	Svalbard	Crude oil tankers	E	0	0	0	0	0	0	0	0
9	Svalbard	Crude oil tankers	W	0	0	0	0	0	0	0	0
10	Svalbard	Cruise ships	E	0	0	0	0	0	0	0	0
11	Svalbard	Cruise ships	W	0	0	0	0	0	0	0	0
12	Svalbard	Fishing vessels	E	1	8	0	0	0	0	0	9
13	Svalbard	Fishing vessels	W	1	9	0	0	0	0	0	10
14	Svalbard	Gas tankers	E	0	0	0	0	0	0	0	0
15	Svalbard	Gas tankers	W	0	0	0	0	0	0	0	0
16	Svalbard	General cargo ships	E	0	7	0	0	0	0	0	7
17	Svalbard	General cargo ships	W	0	7	1	0	0	0	0	8
18	Svalbard	Offshore supply ships	E	0	2	0	0	0	0	0	2
19	Svalbard	Offshore supply ships	W	0	2	0	0	0	0	0	2
20	Svalbard	Oil product tankers	E	0	0	0	0	0	0	0	0

Arctic Area Traffic

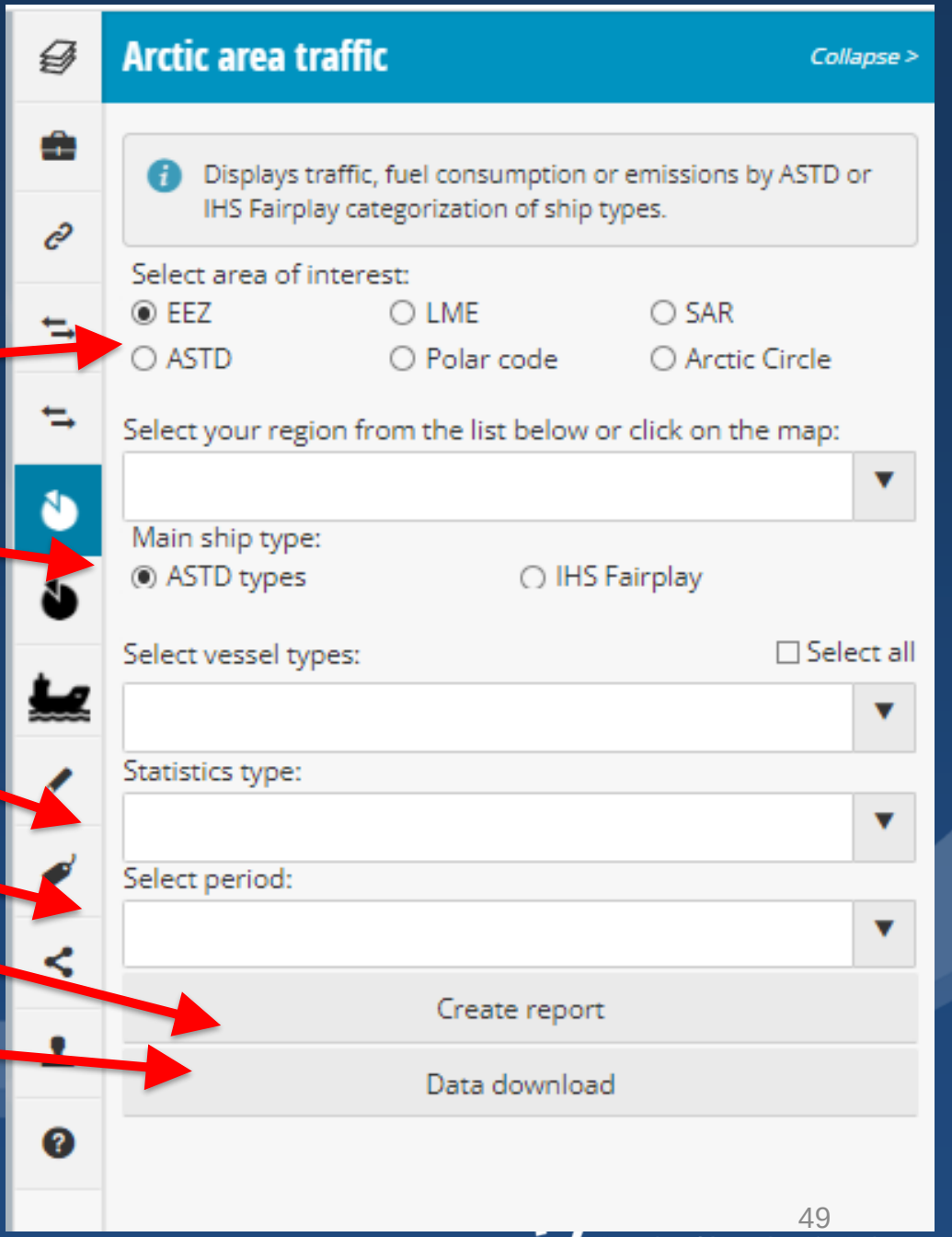
Allows users to analyse statistics in specific areas in the Arctic. The areas are:

1. The eight Arctic States' Exclusive Economic Zones (EEZ)
2. The 18 Large Marine Ecosystems of the Arctic (LME)
   - Read more about the LME's here: https://pame.is/index.php/projects/ecosystem-approach/arctic-large-marine-ecosystems-lme-s
3. Search and Rescue areas (SAR)
   - According to the Arctic Council *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic* (signed 2011)
4. Polar code area
   - As defined in the IMO Polar Code: http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx



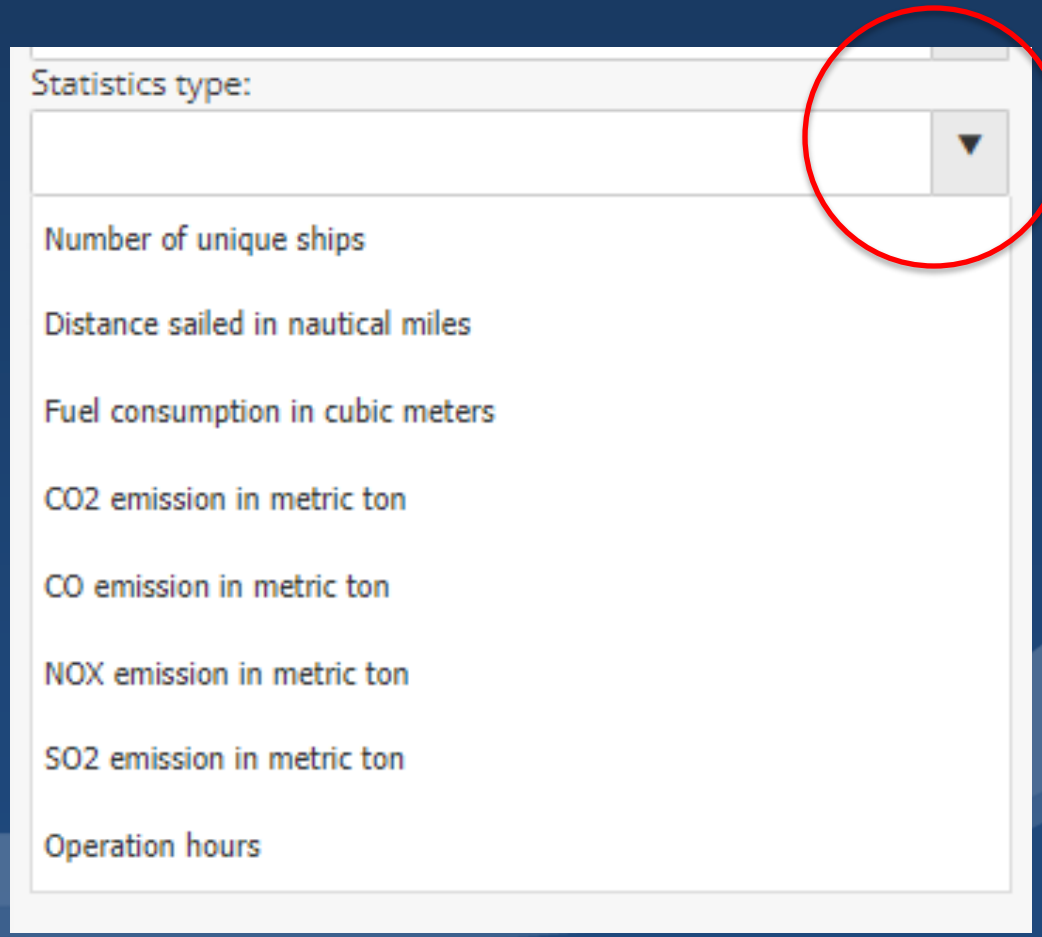
Using Arctic area traffic

- As before, users:
  1. select an area
  2. then the ship types to look at
     - (Dependent on user rights)
  3. Choose the Statistics type
  4. Select the period
  5. Click Create report
  6. Or Download the data directly to CSV



Types of Statistics 1/3

- User reports can show each statistic type
  - When data is downloaded, all these data features are automatically included.
- These Types of statistics are available:
  - Number of unique ships
  - Distance sailed in nautical miles
  - Fuel consumption in cubic meters
  - CO2 emission in metric ton
  - CO emission in metric ton
  - NOX emission in metric ton
  - SO2 emission in metric ton
  - Operation hours



Types of Statistics 2/3

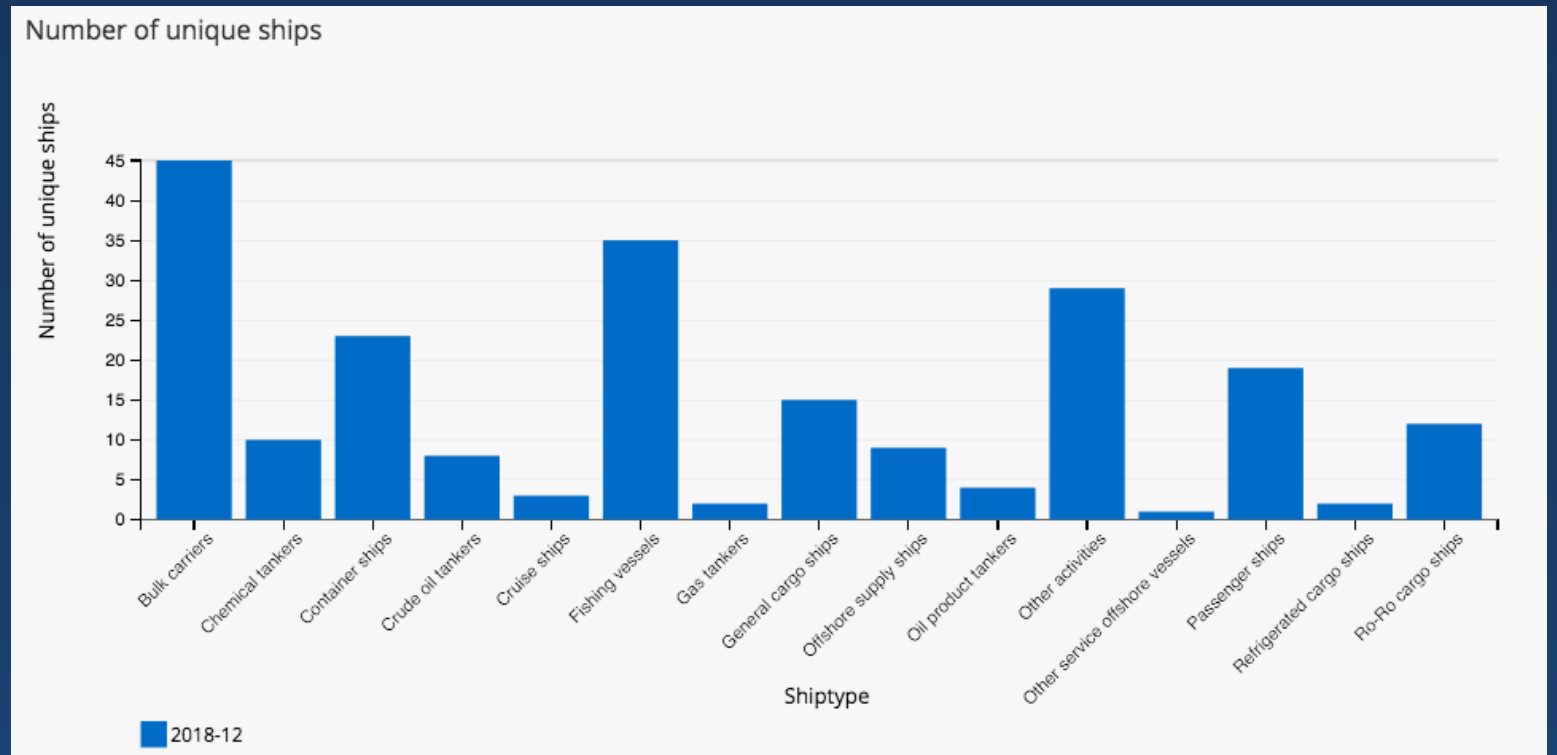
- **Number of Unique ships**
  - Refers to the number of ships entering the chosen area. Each ship is only counted once, so the total number of ship entries during the chosen period can be multiple because each ship can enter the area multiple times during the chosen period.
- **Distance sailed in nautical miles**
  - Refers to the total distance sailed in nautical miles by the chosen ship types within the chosen area.
- **Fuel consumption in cubic meters**
  - Refers to the estimated fuel consumption calculated in cubic meters.
  - Includes all ships of the chosen shiptype in the chosen area.
  - Each individual ship is identified and the amount of fuel used calculated by identifying the fuel, the engine type, the speed of the ship and other factors.

Types of Statistics 3/3

- **CO2 emission in metric ton**
  - Refers to the amount of **Carbon Dioxide (CO_2)** released by the total number of ships of the chosen ship type in the chosen area.
- **CO emission in metric ton**
  - Refers to the amount of **Carbon monoxide** released by the total number of ships of the chosen ship type in the chosen area.
- **NOX emission in metric ton**
  - Refers to the amount of **Nitrogen Oxide** (NOx) released by the total number of ships of the chosen ship type in the chosen area.
- **SO2 emission in metric ton**
  - Refers to the amount of **Sulfur Dioxide** (SO2) released by the total number of ships of the chosen ship type in the chosen area.
- **Operation hours**
  - Refers to the total number of hours the total number of ships of the chosen ship type spent in the chosen area.

Statistics reports

- The reports show a graphic with the numbers according to the chosen Statistics type.
  - Here, the number of unique ships in the Canadian EEZ in December 2018 was chosen.
- The report shows:
  - Ship type
  - Size of the ship
  - The number of ships
  - Total number of ships
  - Can be exported to PDF or to CSV



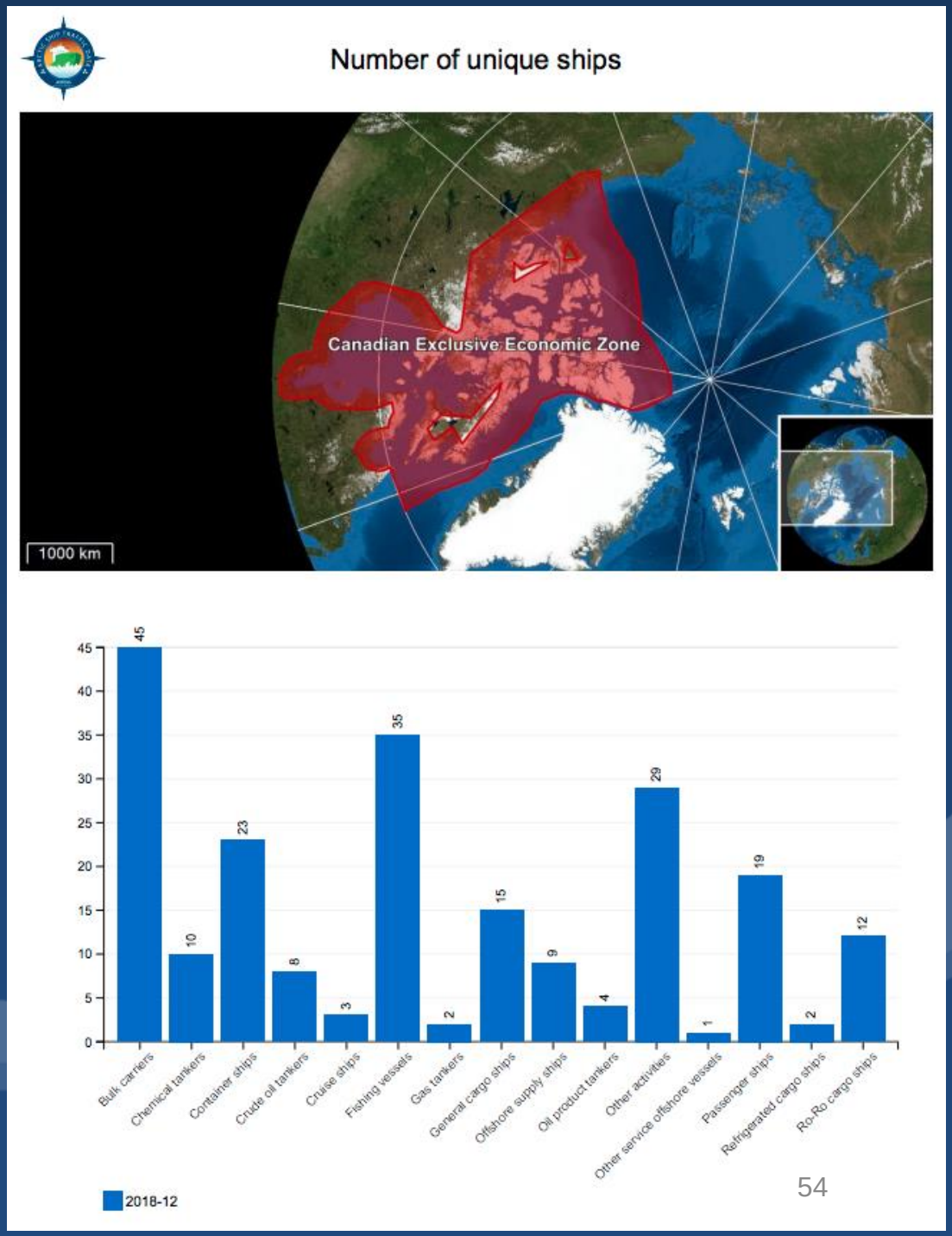
Shiptype	Period	<1000 GT	1000-4999 GT	5000-9999 GT	10000-24999	25000-49999	50000-99999	>=100000 GT	Total
Bulk carriers	2018-12	0	0	0	13	24	7	1	45
Chemical ta...	2018-12	0	1	0	4	5	0	0	10
Container sh...	2018-12	0	0	1	2	3	14	3	23
Crude oil ta...	2018-12	0	0	0	1	1	5	1	8
Cruise ships	2018-12	0	0	0	2	0	0	1	3

Export PDF Export CSV

Shiptype	Period	<1000 GT	1000-4999 GT	5000-9999 GT	10000-24999	25000-49999	50000-99999	>=100000 GT	Total
		68	30	8	33	38	34	6	217

Exporting Arctic area traffic: PDF Reports

- The Arctic area PDF reports are simple to make and use
- Click the PDF button after choosing the criteria



Exporting Arctic Area Traffic: CSV

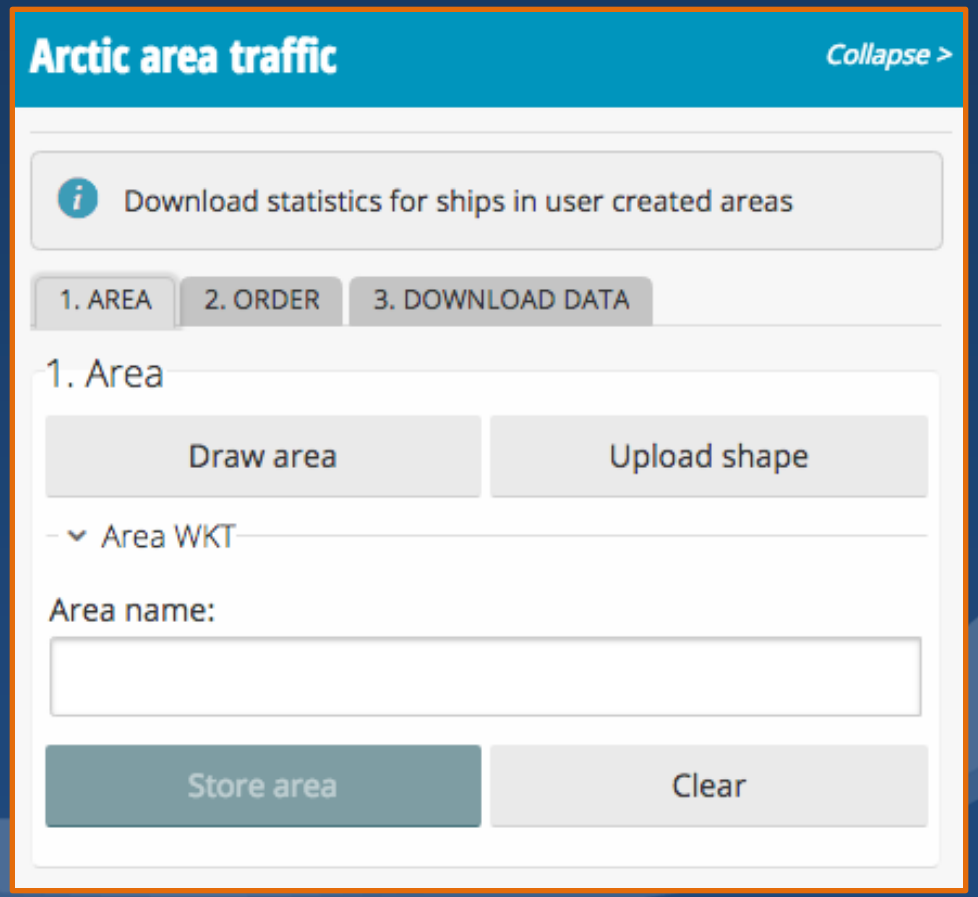
- .CSV files mean ”Comma Seperated Values”
  - These are files for many strings of data
- Export CSV and open the file in Excel
- Choose the A field > Press Data > Text to columns > Deliminated > Next > Comma > Finish
  - This results in each field with only one value
  - The file and information can be easily worked with in Excel

	A	B	C	D
1	ï»¿Shiptype,Period,<1000 GT,1000-4999 GT,5000-9999			
2	Bulk carriers,2018-12,0,0,0,13,24,7,1,45			
3	Chemical tankers,2018-12,0,1,0,4,5,0,0,10			
4	Container ships,2018-12,0,0,1,2,3,14,3,23			
5	Crude oil tankers,2018-12,0,0,0,1,1,5,1,8			
6	Cruise ships,2018-12,0,0,0,2,0,0,1,3			
7	Fishing vessels,2018-12,22,13,0,0,0,0,0,35			
8	Gas tankers,2018-12,0,0,0,0,2,0,0,2			
9	General cargo ships,2018-12,3,4,2,5,1,0,0,15			
10	Offshore supply ships,2018-12,5,3,1,0,0,0,0,9			
11	Oil product tankers,2018-12,1,2,0,1,0,0,0,4			
12	Other activities,2018-12,25,3,1,0,0,0,0,29			
13	Other service offshore vessels,2018-12,0,0,0,1,0,0,0,1			
14	Passenger ships,2018-12,9,4,2,3,1,0,0,19			
15	Refrigerated cargo ships,2018-12,2,0,0,0,0,0,0,2			
16	Ro-Ro cargo ships,2018-12,1,0,1,1,1,8,0,12			

	A	B	C	D	E	F	G	H	I	J
1	ï»¿Shiptype	Period	<1000 GT	1000-4999 G	5000-9999 G	10000-24999	25000-49999	50000-99999	>=100000 GT	Total
2	Bulk carriers	2018-12	0	0	0	13	24	7	1	45
3	Chemical tankers	2018-12	0	1	0	4	5	0	0	10
4	Container ships	2018-12	0	0	1	2	3	14	3	23
5	Crude oil tankers	2018-12	0	0	0	1	1	5	1	8
6	Cruise ships	2018-12	0	0	0	2	0	0	1	3
7	Fishing vessels	2018-12	22	13	0	0	0	0	0	35
8	Gas tankers	2018-12	0	0	0	0	2	0	0	2
9	General cargo ships	2018-12	3	4	2	5	1	0	0	15
10	Offshore supply ships	2018-12	5	3	1	0	0	0	0	9
11	Oil product tankers	2018-12	1	2	0	1	0	0	0	4
12	Other activities	2018-12	25	3	1	0	0	0	0	29
13	Other service offshore vessels	2018-12	0	0	0	1	0	0	0	1
14	Passenger ships	2018-12	9	4	2	3	1	0	0	19
15	Refrigerated cargo ships	2018-12	2	0	0	0	0	0	0	2
16	Ro-Ro cargo ships	2018-12	1	0	1	1	1	8	0	12

Arctic Area Traffic: User created areas

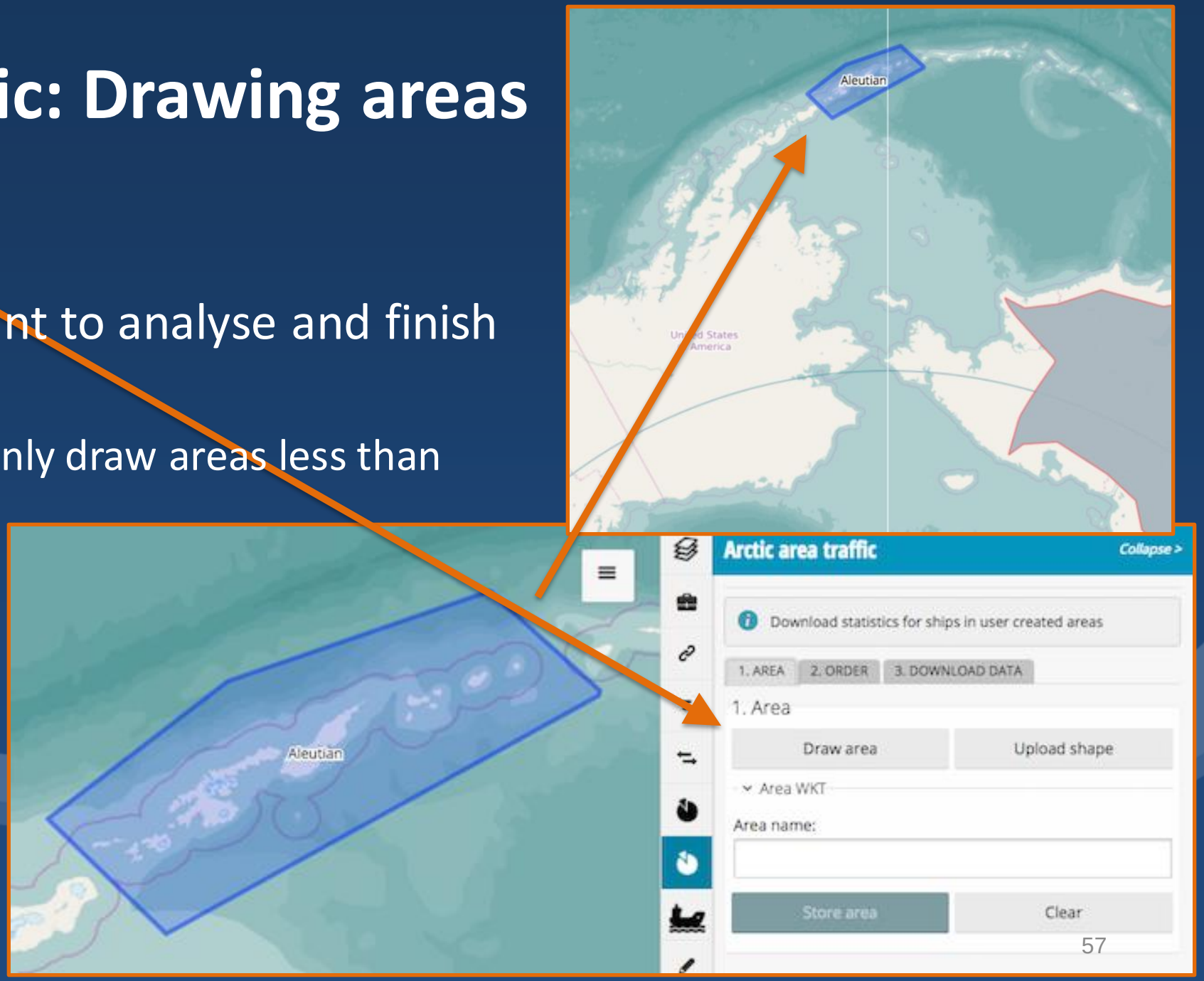
- ASTD users can draw areas in the system for analysis.
- Each area drawn is only available for that specific user which is logged in.
- Users can also upload shapefiles to the system and analyze shipping activity within the area uploaded.



PAME
Protection of the Arctic Marine Environment

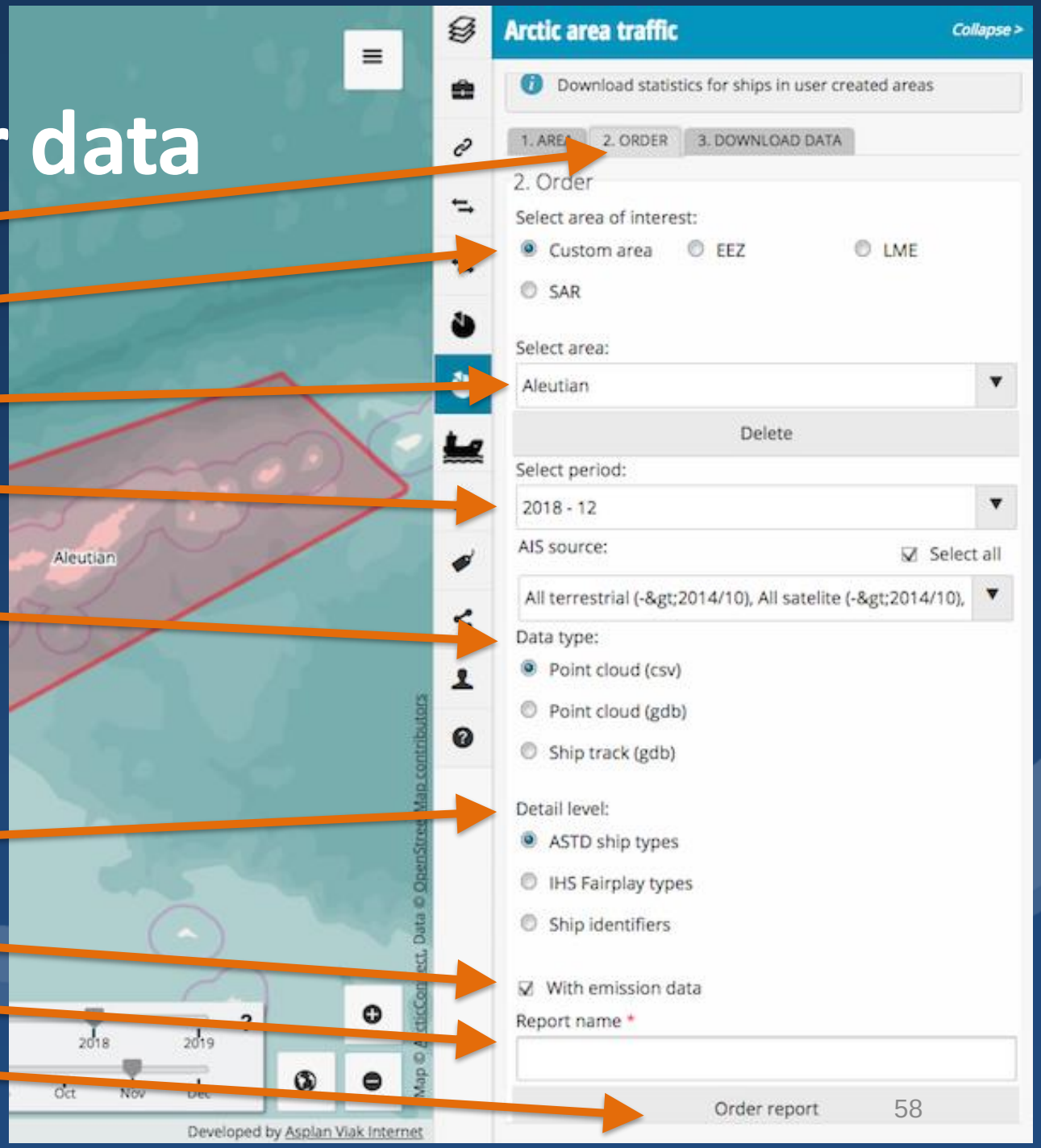
Arctic area traffic: Drawing areas

- Click draw area
- Click the area you want to analyse and finish by double clicking
  - Note that users can only draw areas less than 100.000 km^2



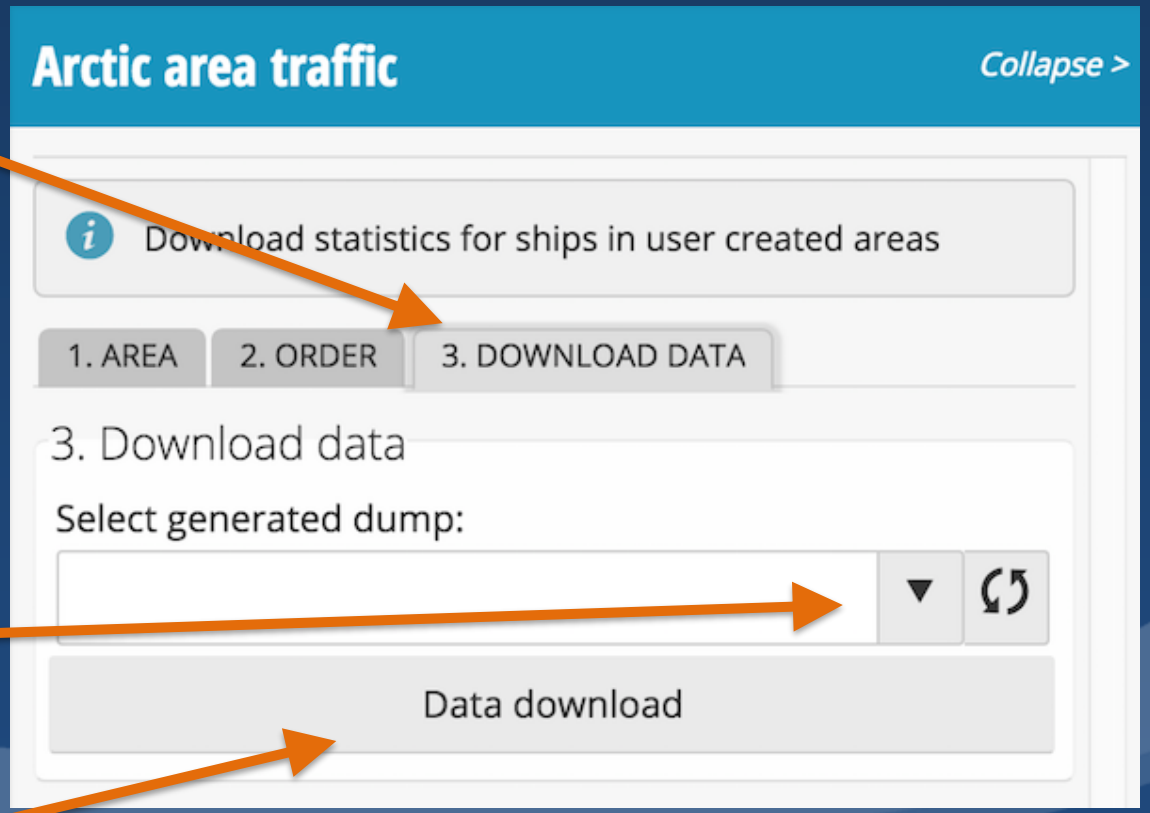
Arctic area traffic: Order data

1. Click order
2. Select Custom area
3. Find the area you created
4. Select the period
5. Choose type of data
   - Point cloud (csv format)
   - Point cloud (gdb format)
   - Ship track (gdb format)
     - Shows the tracks of the ships in the chosen area
6. Choose detail level (ship levels are available according to your user rights)
7. Choose if you want the emission data or not
8. Give the report a name
9. Click order report



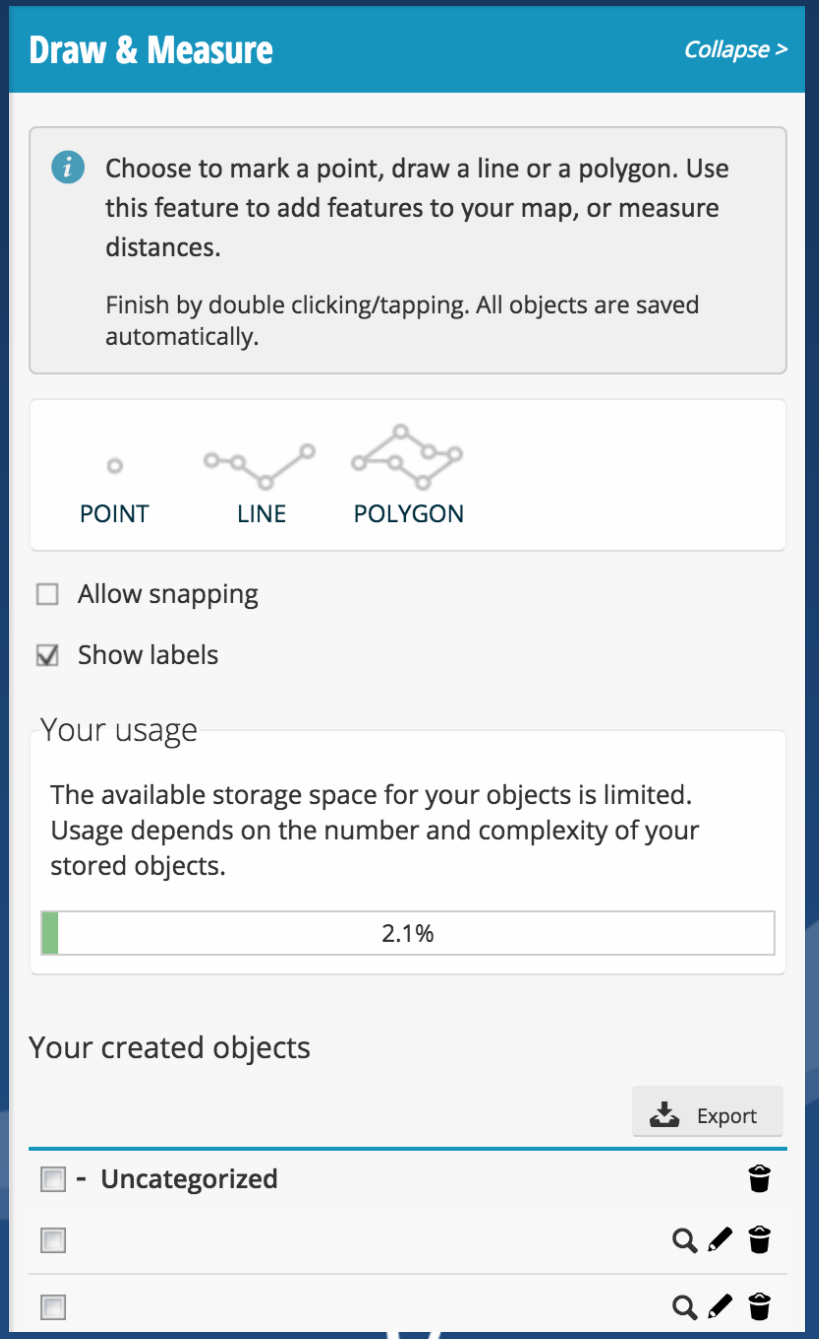
Arctic area traffic: Downloading data

- Click download data
  - Note: Now the data will be generated by the database. This might take some time, depening on the size of the area chosen and the information requested. Please show patience and allow for some time, up to one day, for the data to be generated.
  - **Only click Data download once**
- Find the report you ordered in the list
  - You will receive an e-mail when the report is ready
- Click Data download



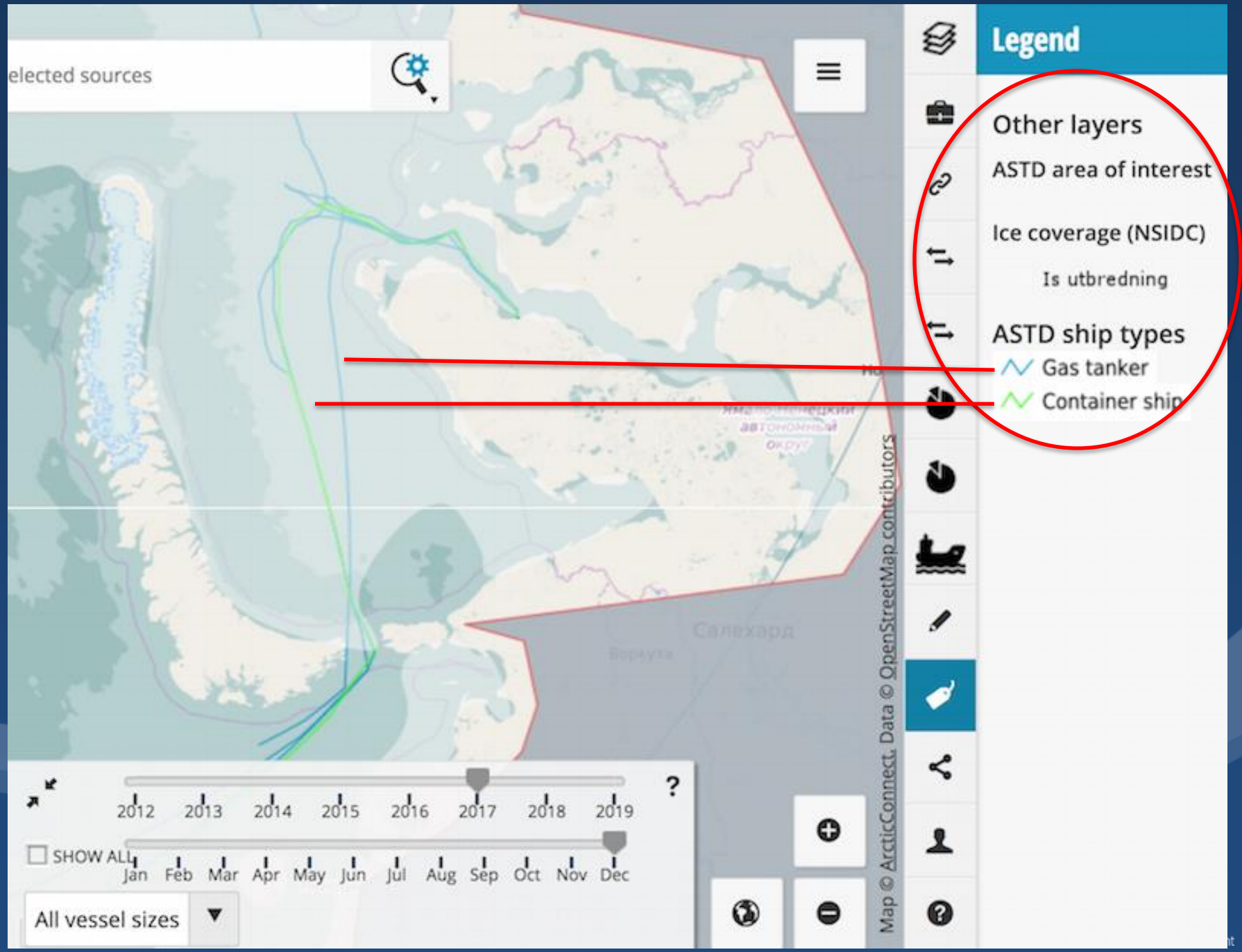
Draw and Measure

- Users can draw into the maps, either :
  - Points (e.g. to mark places)
  - Lines, or;
  - Polygons
- Users can include this in exports, e.g. Maps
- Objects are saved for that particular users
  - Limited storage space for each user



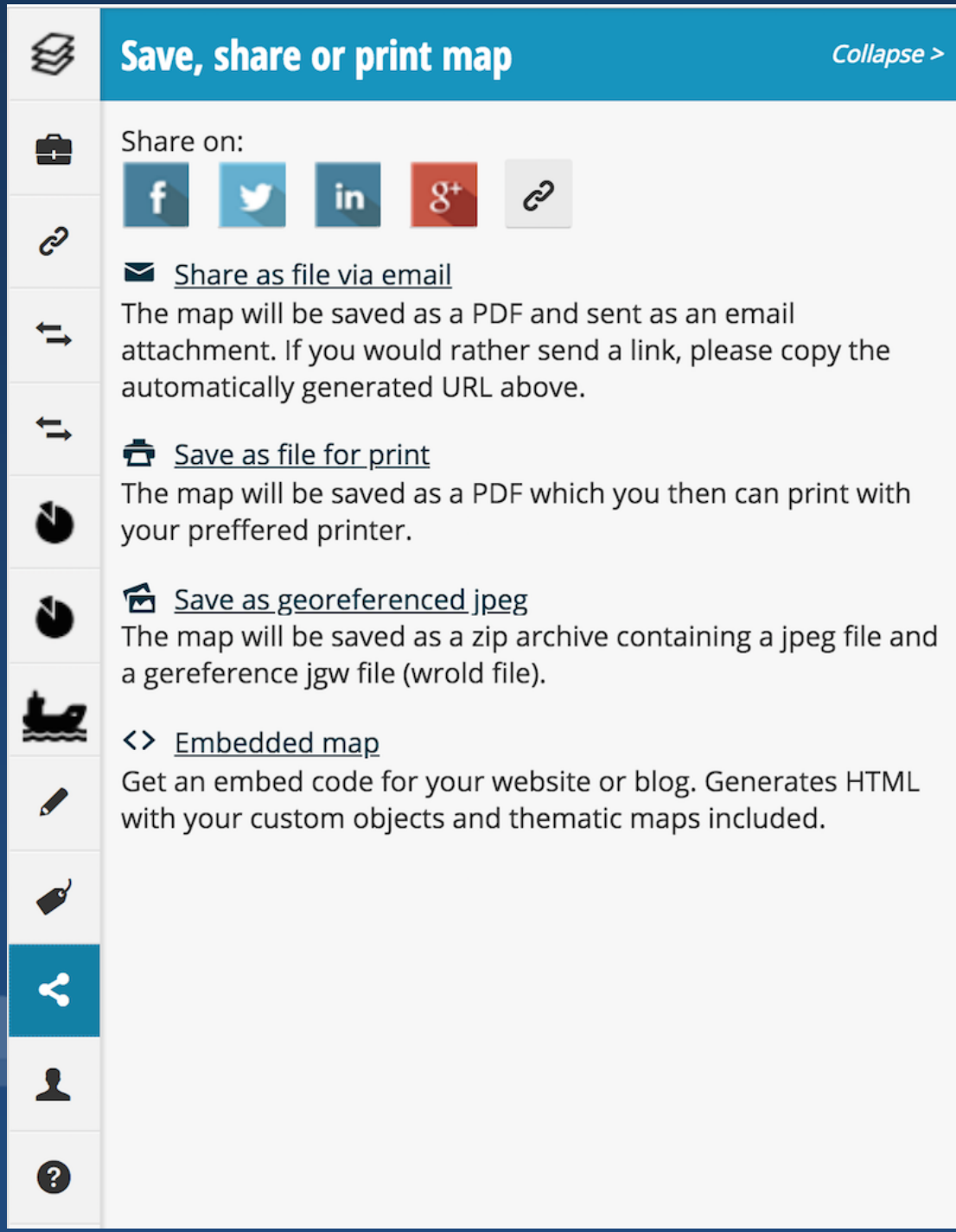
Legend

- Shows what layers are visible



Save, share or print map

- Allows users to share their maps easily
- Follow instructions in the system



Login

- Users can:
  - Switch to Norwegian language
  - Change their password
  - Or change their information
  - Log out