Toktrapport/Havforskningsinstituttet/I SSN 1503 6294/Nr. 1 – 2013

Cruise report

Quarter 1 International Bottom Trawl Survey (IBTS Q1)

RV "GO Sars", 23 January – 22 February 2013

Institute of Marine Research, Bergen / Flødevigen

November 2013

INTERNAL SURVEY REPORT

IBTS Q1 2013
GO SARS, survey no. 2013101
Period: 23.01 – 22.02
Area: Northern North Sea between 56° 50′ N and 61° 50′ N

SUMMARY
The IBTS quarter 1 multispecies bottom trawl survey, coordinated by the ICES IBTSWG, involves 7 countries and covers the North Sea and Skagerrak. The Norwegian part of this survey included bottom trawling in water < 200 m to contribute data for trawl indices of several species and MIK tows from water < 200 m to provide an index of herring and sprat larvae. Also completed were the Utsira W hydrographic transect and MIK-M sampling for fish eggs and gadoid larvae (along the transect and north of 48°). Guests included seabird observers from JNC, UK and a student from UiB conducting gadoid egg incubation experiments.

INTRODUCTION

The IBTS (International Bottom Trawl Survey), coordinated by the ICES International Bottom Trawl Survey Working Group (IBTSWG), is a multi-species trawl survey within the ICES area. The main objectives of the survey are:

1) To determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices;
2) To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
3) To monitor the distribution and relative abundance of all fish species and selected invertebrates;
4) To collect data for the determination of biological parameters for selected species;
5) To collect hydrographical and environmental information;
6) To determine the abundance and distribution of late herring larvae (February North Sea survey).

Seven countries cooperate in the survey (Table 1). Two countries typically perform one bottom tow and two MIK tows per ICES rectangle, except for in the Skagerrak, where only Sweden surveys (Figure 1). The data from all countries is combined and used to produce a combined age disaggregated abundance index for use in assessments, primarily WGNSSK (ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak), the Herring Assessment Working Group (HAWG), and the Working Group on Multispecies Assessment Methods (WGSAM).

SURVEY DESCRIPTION AND METHODS

Personnel

Eli Gustad	Plankton	23.01-27.01
Penny Lee Liebig	Plankton	23.01-27.01
Kjetil Fjellheim	Marine data center	23.01-30.01
Jan Henrik Simonsen	Larvae/fish eggs	23.01-30.01
Martin Dahl	Instrument	23.01-30.01
Anne Liv Johnsen	Pelagics	23.01-30.01
Hildegunn Mjanger	Demersal	23.01-09.02
Lisbet Solbakken	Demersal	23.01-09.02
Arne Storaker	Demersal	23.01-09.02
Jennifer Devine	Researcher	23.01-09.02
Magnar Mjanger	Instrument	23.01-09.02
Thomas de Lange Wenneck	Survey leader	23.01-09.02
Rupert Wienerroither	Demersal	23.01-22.02
Jarle Wangensten	Instrument	30.01-22.02
Bjarte Kvinge	Instrument	09.02-22.02
Janicke Skadal	Demersal	09.02-22.02
Frank Midtøy	Demersal	09.02-22.02
Asbjørn Borge	Demersal	09.02-22.02
Jan de Lange	Pelagics	09.02-22.02
Valantine Anthonypillai	Pelagics	09.02-22.02
Jennifer Devine	Survey leader	09.02-22.02

Narrative

The vessel left port on 23 January and headed south to the first station on the Utsira W hydrographic transect (59˚17’ N 05˚02’ E). On route, calibrations for the MIK flow meters were performed. The weather conditions were good for the start of the hydrographic transect, but degraded and only CTDs were completed after station 18, except for the final station, when a WP-2 cast was made (Table 2). Only 1 IBTS bottom tow and 4 MIK tows could be completed.

The vessel called into Lerwick on 27 January, where the plankton technicians disembarked. Because of weather conditions, the vessel remained in port overnight. After leaving Lerwick, the vessel headed southeast, towards Stavanger, but again had difficulties performing tows due to weather. Only 1 MIK and 2 bottom tows were completed before the vessel reached Stavanger on 29 January. Bad weather and a crew change on 30 January meant the vessel remained in port.

After leaving Stavanger on 31 January, the vessel was able to make up for bad weather. Even with adverse conditions and delays, the entire survey area was completed. Germany noted

difficulties in completing their area due to bad weather and problems with the vessel. Therefore, Norway picked up 5 of their bottom tows and 8 MIKs in ICES rectangles 51E8, 51E9, 51F0-F3.

Survey protocol errors and changes

MIK tows were conducted in water of depths < 200 m except for at the beginning of the survey, when a mistake was made and tows were taken from water depths > 200 m.

The amount of area less than 200 m is restricted in ICES rectangles 50F3 and 49F3. The requirement that MIKs must be 10 n. mi. apart had to be ignored. Bottom tows were also closer to the border (within 5 n. mi.) than mandated in the manual (ICES 2012) for these rectangles.

A change in bottom trawl procedures was implemented. The IBTS manual (v. VIII; ICES 2012) states that bottom tows must be performed as near to the center of the rectangle as possible, but at least 5 n. mi. from the border. However, there was a tendency for the tows to be clustered near the corners of adjoining rectangles (just within the mandatory limit) in previous years. This occurs because of time constraints and attempts to complete four bottom tows per day. To avoid the potential bias created by this clustering, tows were placed at least 10 n. mi. within a rectangle (Figure 2). This limited the number of tows performed each day to three because of the longer steam time between stations; however, all stations were completed even with extremely poor weather conditions.

CTD casts were accidentally omitted on the first 3 bottom trawl stations.

MIK-M samples, for gadoid egg and larvae, were collected and preserved after the survey personnel changes on 09.02.

Rigging of the trawl

For tows at depths of 70 m and less, the GOV trawl with short sweeps was used; long sweeps were used otherwise. This is standard procedure on this survey.

In previous years, it was noted that the Norwegian trawl configuration had been plagued by low headline height. Strapping was discussed briefly, but the G.O. Sars crew had no recollection of it being used on Q1 previously. The decision to not use strapping was made after careful analysis of the trawl eye sensor data. Most tows met the headline and opening requirements outlined in the manual; two tows did not (quality code = 3).

Recordings from the trawl eye were sporadic until the sensor was moved slightly off center. What was noted, and had been remarked on in previous years, were the presence of large gaps, sometimes several minutes long, in the received data. After investigating all potential causes, it was found that the sensor, which is mounted behind the kite on this survey, must be mounted slightly off center because the kite physically interfered with the signal to the boat.

Note: On IBTS Q3 (July 2013), a similar problem occurred, but this time it was due to the sensor display settings set to look for the bottom and the headline in the wrong area.

Biological sampling

Total weight was recorded for the entire catch. Sub-sampling was done when the catch was large.

A scheme similar to previous years was used to sample otoliths, sex, and maturity stage: 2 samples per 1 cm for cod, haddock, whiting, hake, plaice, witch flounder, and Norway pout, and 5 samples per 5 cm for saithe. For cod, haddock, and saithe under 20 cm, only 1 fish per 1 cm had full samples taken; these fish are typically 1 year old, therefore intensive sampling was not required. Herring and mackerel were fully sampled if more than 25 individuals were captured; otherwise, only length measurements were taken. Samples were collected on up to 100 individuals per station per species.

Full biological sampling was not done on every tow for haddock, whiting, or Norway pout. Haddock and whiting were sampled on alternate tows unless very few were captured in a haul or the total catch of all species was small. While this alternate sampling was common procedure in previous years, it should be reassessed to determine if this sampling bias is introduced. Norway pout had full biologicals sampled every several hauls. This species is found throughout the entire survey area in high abundance, but typically has very few age classes.

Length measurements on up to 50 individuals per station were taken for all other species. Weight and sex were also recorded for elasmobranchs. This is now recommended to be routine procedure in the current IBTS manual (v. IX; ICES, 2013).

The IBTS manual recommends measuring carapace length for shellfish, but calipers were not onboard the vessel, therefore, only total weight and number were recorded. Catch of benthos was also registered in the database. Since a taxonomist was on board, most benthos could be identified to species with confidence in the results.

Other requests

1. Marine litter – included type, description, size category, weight, and presence of attached organisms.
2. Collection of Sepiolidae for identification to species level, which were mailed to NCB Naturalis, the Netherlands.
3. Stomach data for hake, grey gurnard, and mackerel, which was part of an EU DG-mare tender; Norway was not a partner in the project. The request was for 5 stomachs per 5 cm length class from most of the survey area (not east of F4). Stomachs were removed from hake and grey gurnard and frozen for later dissection, while mackerel were frozen whole. Hake and grey gurnard were measured for length, individual weight, sex, stage (if possible), and otolithed. Mackerel samples were sent to Ralf van Hal, IMARES, the Netherlands; grey gurnard and hake samples were mailed to Jens

Floeter, IHF, Hamburg. If a similar request is made in the future, samples should be frozen whole due to time and manning constraints.

4. Stomach collection from saithe. Sent to IFREMER Boulogne/Mer.
5. Gill tissue from 100 saithe for genetics, collected from 5 consecutive tows (20 fish per tow) in the spawning area. Internal IMR request (Torild Johansen).
6. Total, head, and headless lengths of cod over 40 cm, saithe over 35 cm, and haddock, pollack, cusk, ling, wolffish, Atlantic halibut, plaice, and monkfish over 30 cm. Internal IMR request; Kjell Nedreaas paid 40% of time for 1 person 09.02-22.02 to ensure collection of data.
7. Fin clips for genetics from 5 individuals (1 per station) of cod, whiting, haddock, pollack, saithe, Norway pout, pout, poor cod, blue whiting, lemon sole, witch flounder, European flounder, common dab, plaice, and American plaice. Internal IMR request (Richard Nash).

RESULTS AND DISCUSSION

Bad weather created severe problems for the first part of the survey. The Utsira W transect was completed, but weather deteriorated near the end. Only CTDs could be taken after station 26, except on the final station, when a WP-2 was completed (Table 2, Figure 2).

Because of the weather, only 3 bottom tows could be completed by the 1st February (within the first 8 days). However, even with adverse conditions and delays, the entire survey area was completed. Norway picked up additional bottom tows (5) and MIKs (8) for Germany in areas 51E8, 51E9, 51F0-F3 (Figure 1). In rectangle 51F2, the amount of area 200 m or less was restricted, therefore only 2 (instead of 4) MIKs were completed. Samples either had to be 10 n. mi. apart, which was not possible due to lack of area < 200 m depth, or separated by 24 hours, which was not possible due to time constraints.

The stipulation to survey 10 n. mi. within a rectangle reduced the effect of clustering of bottom trawls (Figure 3). Two tows (stations 35 and 41) were coded data quality 3 due to low headline height (< 3 m). The trawl was functioning as normal, but catch was reduced according to what was seen on echosounder. The belly of one of the GOVs was ripped near the end of the survey (station 42). It was discovered that there were no spare meshes for repairing the nets onboard the ship. The sweep length was modified on the second GOV onboard the vessel so that the final trawl tows could be completed. This left the vessel without a spare GOV trawl.

The MIK tows, however, did show some evidence of clustering (Figure 4), which is the result of attempting to sample 4 ICES rectangles per night. Two rectangles near the beginning of the Utsira W transect had to be resampled (3 tows) due to an error in processing the larval catch. Rectangle 51F1 shows 2 MIK tows in nearly the same position; these tows were performed several days apart and therefore fulfilled the requirements stated in the MIK manual. One MIK net was destroyed while towing in bad weather. A third spare was loaded at the science crew change in Bergen, so that there was always one spare net on board. No sprat larvae were

recorded. All larvae were frozen for proper identification on land. Preliminary results of the MIK sampling are in Table 3.

Table 4 details the number of biological samples collected, i.e., aging materials or maturity data. Table 5 includes a short summary of the data collected for each request.

Figures 5–20 detail total catches (kg) and mean length (cm) for the main species from all IBTS stations: cod, whiting, haddock, saithe, Norway pout, plaice, herring, and mackerel. Cod was found throughout the survey area, but higher catches typically came from the northern shelf area or along the Norwegian trench (Figure 5); mean size was relatively large throughout the area except in the southern area (Figure 6). A similar pattern was found for whiting (Figures 7–8). Haddock catches were highest in the north (Figure 9), but larger fish were found along the shelf boundary and in the south (Figure 10). Large catches of saithe were also found along the North Sea shelf boundary (Figure 11) and fish were typically large (Figure 12), which is not surprising since saithe are spawning in those areas at the time of the survey. Norway pout catches were largest in the northern half of the survey area (Figure 13) and mean length was relatively small throughout the survey area (Figure 14). Plaice were captured in larger amounts in the southeastern part of the survey area (Figure 15), which is where the substrate is dominated by sand; however, large fish were found in the north (Figure 16). Catches of herring were relatively small, except in the central northern part of the survey area (Figure 17), and mean size was relative similar throughout the sampling area (Figure 18). Mackerel catches were small (Figure 18), but large fish were recorded in the northeastern part of the survey area (Figure 19).

Table 6 summarizes the number of benthic species identified from the bottom trawl catches. This data cannot be used to determine abundance because of the low catchability of the gear, but could be used as a presence/absence indicator. Sixty-five species, making up approximately 8800 individuals, were identified (Table 6). A further 6 phylum, recording approximately 40,000 individuals, was also recorded.

REFERENCES

ICES. 2013. Manual for the International Bottom Trawl Surveys. Series of ICES Survey Protocols. SISP 1-IBTS IX. 83 pp.

ICES. 2012. Manual for the International Bottom Trawl Surveys. Series of ICES Survey Protocols. SISP 1-IBTS VIII. 68 pp.

Table 1. Countries and vessel participating in the IBTS Q1 survey.

COUNTRY	SHIP	DATES
Denmark	Dana	1-2/ 18-2
France	Thalassa II	15-1/ 14-2
Germany	Walther Herwig III	22-1/ 22-2
Netherlands	Tridens 2	22-1/ 21-2
Norway	G.O. Sars	23-1/ 22-2
Scotland	Scotia III	25-1/ 15-2
Sweden	Dana	17-1/ 29-1

Table 2. Summary of stations and sampling along the Utsira-Vest hydrographic transect. Station numbers in red indicated a MIK or MIK-MM were taken. Station 1 (not shown) was the calibration of MIK flow meters.

Station	SAMPLING														
	WATER Sampling							PLANKTON Samping							
	CTD	N.salt		O2	Chloroph.		Pl.plankt.	WP2		MOC	Algae	Secci	WP3		
		taken	of		taken	of	30-0*	Bottom-0	200-0	net	30-0***		Bottom-0	50-0	
2	1	7	7		5	5	1	1			1	0	1	1	
3	1	9	9		5	5							1	1	
4	1	10	10		5	5						0	1	1	
5	1	12	12		5	5									
6	1	11	11		5	5	1	1	1		1	0			
7	1	11	11		5	5									
8	1	12	12		5	5		1	1	**6**	1	0			
9	1	11	11		5	5									
10	1	11	11		5	5	1	1	1		1	1			
11	1	10	11		4	5									
12	1	11	11		5	5						1			
13	1	10	10		5	5									
14	1	9	9		5	5	1	1			1	0			
15	1	8	8		5	5									
16	1	7	7		5	5						0			
17	1	7	7		5	5									
18	1	8	8		5	5	1	1		**3**	1	0			
19	1	8	8		5	5									
20	1	8	8		5	5						0			
21	1	7	8		4	5									
22	1	8	8		5	5	1	1			1	0			
23	1	7	7		5	5									
24	1	8	8		5	5						0			
25	1	8	8		5	5									
26	1	8	8		5	5	1	0		**0**	0	0			
27	1	8	8		5	5									
28	1	8	8		5	5						0			
29	1	8	8		5	5									
30	1	7	7		5	5	1	0			0	0			
31	1	7	7		5	5									
32	1	7	7		5	5									
33	1	6	6		5	5	1	1				0			
Sum	**32**	**277**	**279**		**158**	**160**	**9**	**8**	**3**	**9**	**7**	**2**	**3**	**3**	

Table 3. Preliminary results of MIK sampling, as submitted for the final update while at sea. Numbers of herring larvae are given in n/m^2.

Ship	Station	ICES rect.	Herring.larvae	Ship	Station	ICES rect.	Herring.larvae
GO Sars	22	47F1	0	GO Sars	66	45F2	0.1363
GO Sars	23	48F0	0.0137	GO Sars	67	47F2	0
GO Sars	24	48F0	0	GO Sars	68	46F2	0.0186
GO Sars	25	47F0	0	GO Sars	69	46F3	0
GO Sars	26	47F1	0.0454	GO Sars	70	47F2	0
GO Sars	27	46F3	0	GO Sars	71	47F3	0.0154
GO Sars	28	46F3	0	GO Sars	72	47F3	0
GO Sars	29	45F4	0.0133	GO Sars	73	48F3	0
GO Sars	30	45F4	0	GO Sars	74	48F3	0
GO Sars	31	44F5	0	GO Sars	75	48F2	0
GO Sars	32	44F5	0	GO Sars	76	48F2	0
GO Sars	33	44F4	0.0573	GO Sars	77	48F1	0
GO Sars	34	43F6	0	GO Sars	78	48F1	0
GO Sars	35	43F6	0	GO Sars	79	47F0	0.0442
GO Sars	36	43F7	0	GO Sars	80	49F1	0.0683
GO Sars	37	43F7	0	GO Sars	81	49F1	0
GO Sars	38	42F7	0.0287	GO Sars	82	49F0	0
GO Sars	39	42F7	0	GO Sars	83	49F0	0
GO Sars	40	42F6	0	GO Sars	84	50F0	0
GO Sars	41	42F6	0.0315	GO Sars	85	50F0	0
GO Sars	42	42F5	0.0137	GO Sars	86	50F1	0
GO Sars	43	42F5	0	GO Sars	87	50F1	0
GO Sars	44	43F5	0.0304	GO Sars	88	51F1	0
GO Sars	45	43F6	0.0248	GO Sars	89	51F1	0
GO Sars	46	42F4	0.0157	GO Sars	90	51F0	0
GO Sars	47	42F4	0	GO Sars	91	51F0	0
GO Sars	48	43F4	0.0335	GO Sars	92	51F0	0
GO Sars	49	43F4	0.0170	GO Sars	93	51F0	0
GO Sars	50	44F4	0.0568	GO Sars	94	51E9	0
GO Sars	51	43F3	0	GO Sars	95	51E9	0
GO Sars	52	43F3	0.0765	GO Sars	96	51E9	0
GO Sars	53	42F3	0	GO Sars	97	51E9	0
GO Sars	54	42F3	0	GO Sars	98	51F1	0
GO Sars	55	42F2	0	GO Sars	99	51F1	0
GO Sars	56	42F2	0	GO Sars	100	51F2	0
GO Sars	57	43F2	0.0140	GO Sars	101	51F2	0.0120
GO Sars	58	43F2	0.0211	GO Sars	102	50F2	0
GO Sars	59	45F3	1.1194	GO Sars	103	50F2	0
GO Sars	60	45F4	0	GO Sars	104	49F2	0
GO Sars	61	44F3	0.2023	GO Sars	105	49F2	0
GO Sars	62	44F3	0.0442	GO Sars	106	49F3	0
GO Sars	63	44F2	0.0187	GO Sars	107	49F3	0
GO Sars	64	44F2	0.1332	GO Sars	108	50F3	0
GO Sars	65	45F2	0.1235	GO Sars	109	50F3	0

Table 4. Number of biological samples collected (maturity and/or aging materials).

SPECIES	NO. SAMPLES	SPECIES	NO. SAMPLES
Lophius piscatorius	4	*Micromesistius poutassou*	2
Eutrigla gurnardus	397	*Scomber scombrus*	25
Merluccius merluccius	390	*Glyptocephalus cynoglossus*	11
Microstomus kitt	4	*Merlangius merlangus*	422
Clupea harengus	568	*Pollachius virens*	427
Gadus morhua	207	*Trisopterus esmarki*	106
Melanogrammus aeglefinus	533	*Pleuronectes platessa*	38
Hippoglossus hippoglossus	1	*Hippoglossoides platessoides*	4

Table 5. Summary of special requests.

INSTITUTE	SPECIES	NO. STATIONS
ICES	Grey gurnard	32
ICES	Hake	19
ICES	Mackerel	15
NCB Naturalis	Sepiolidae	23
IFREMER	Saithe	10
IMR, genetics	Saithe	5
IMR, genetics	15 species	18
IMR, headless lengths	8 species	22

Table 6. Benthic invertebrates recorded on IBTS Q1 2013.

Species	Sum	No. Stations	Species	Sum	No. Stations
Adamsia palliata	523	14	Luidia sarsi	490	16
Aequipecten opercularis	227	3	Macropipus tuberculatus	53	1
Alcyonium digitatum	8	2	Macropodia tenuirostris	130	2
Amphiura filiformis	4	1	Modiolus modiolus	53	1
Anseropoda placenta	125	2	Nephrops norvegicus	4	1
Aphrodita aculeata	646	15	Neptunea antiqua	924	18
Ascidia virginea	178	3	Neptunea antiqua?	1	1
Ascidiella scabra	451	8	Ophiopholis aculeata	131	2
Asterias rubens	1547	31	Ophiothrix fragilis	263	6
Astropecten irregularis	2121	40	Ophiura ophiura	525	12
Buccinum undatum	351	11	Ophiura robusta(?)	4	1
Cancer pagurus	4	1	Ophiura sarsii	53	2
Caryophyllia smithii	287	5	Pagurus alatus	80	2
Colus sp.	514	13	Pagurus bernhardus	1141	23
Corystes cassivelaunus	57	2	Pagurus prideaux	591	16
Eledone cirrhosa	16	4	Pagurus pubescens	274	7
Euspira catena	103	2	Pagurus sp.	89	2
Funiculina quadrangularis	2	1	Pandalus montagui	350	8
Galathea dispersa	187	4	Parastichopus tremulus	278	6
Geryon trispinosus	4	1	Pontophilus spinosus	100	2
Henricia sp.	319	5	Porania pulvillus	136	4
Hippasteria phryngiana	514	10	Pseudamussium peslutrae	279	7
Hyalinoecia(?)	72	8	Rossia macrosoma	221	9
Hyas araneus	16	1	Rossia palpebrosa	4	1
Hyas coarctatus	360	8	Scaphander lignarius	819	14
Inachus dorsettensis	121	2	Sepia elegans	115	2
Inachus leptochirus	35	1	Sepietta	96	7
Jorunna tomentosa	4	1	Sepiola	252	6
Leptasterias muelleri	237	4	Species A	87	1
Liocarcinus depurator	747	13	Species B	87	1
Liocarcinus holsatus	244	9	Spirontocaris liljeborgii	226	5
Liocarcinus sp.	37	1	Stichastrella rosea	223	5
Lithodes maja	281	12			

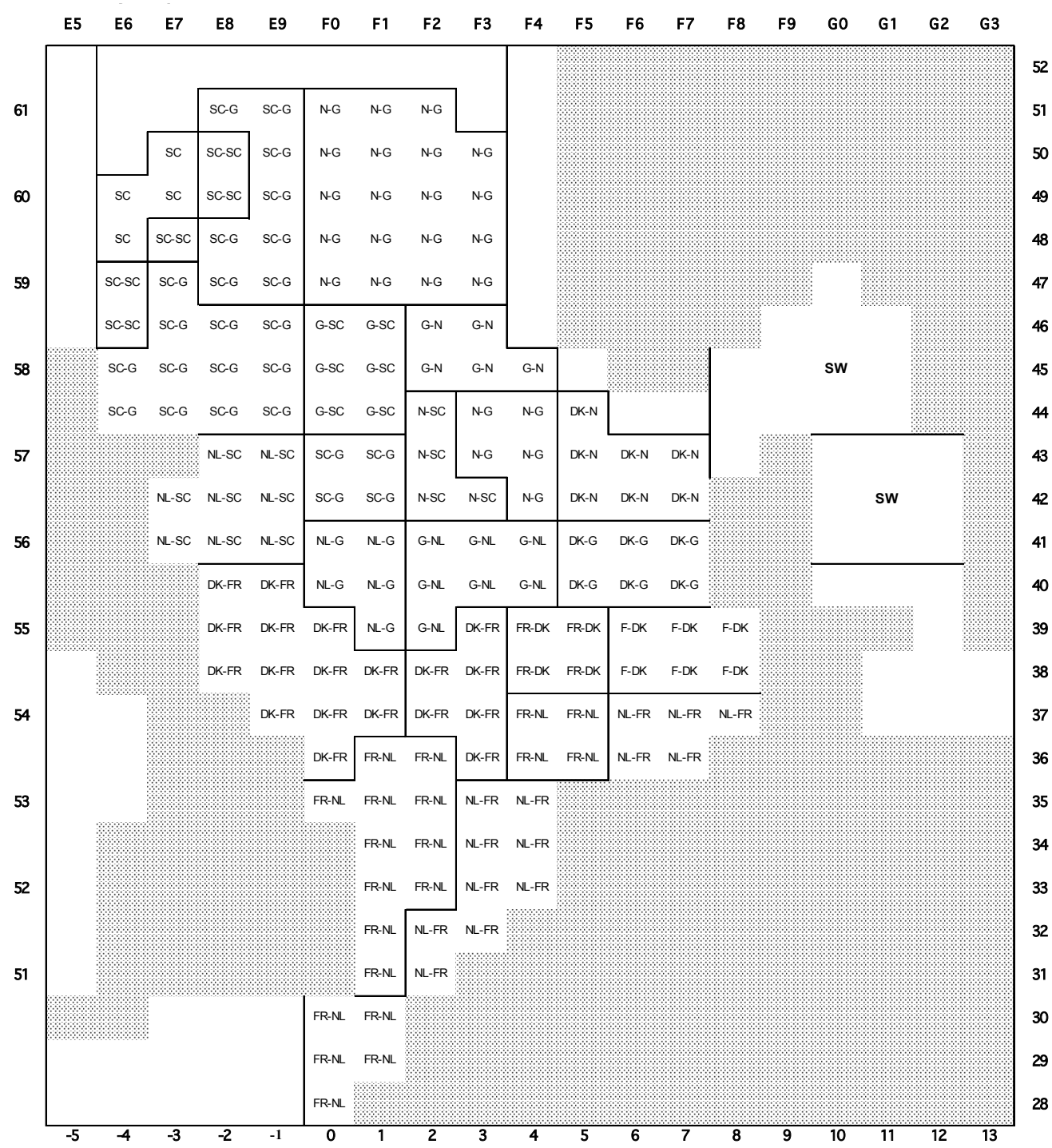

Figure 1. Map of the IBTS Q1 survey area listing the countries responsible for sampling each ICES rectangle. SC=Scotland, G= Germany, N= Norway, DK= Denmark, FR= France, NL= The Netherlands, SW=Sweden.

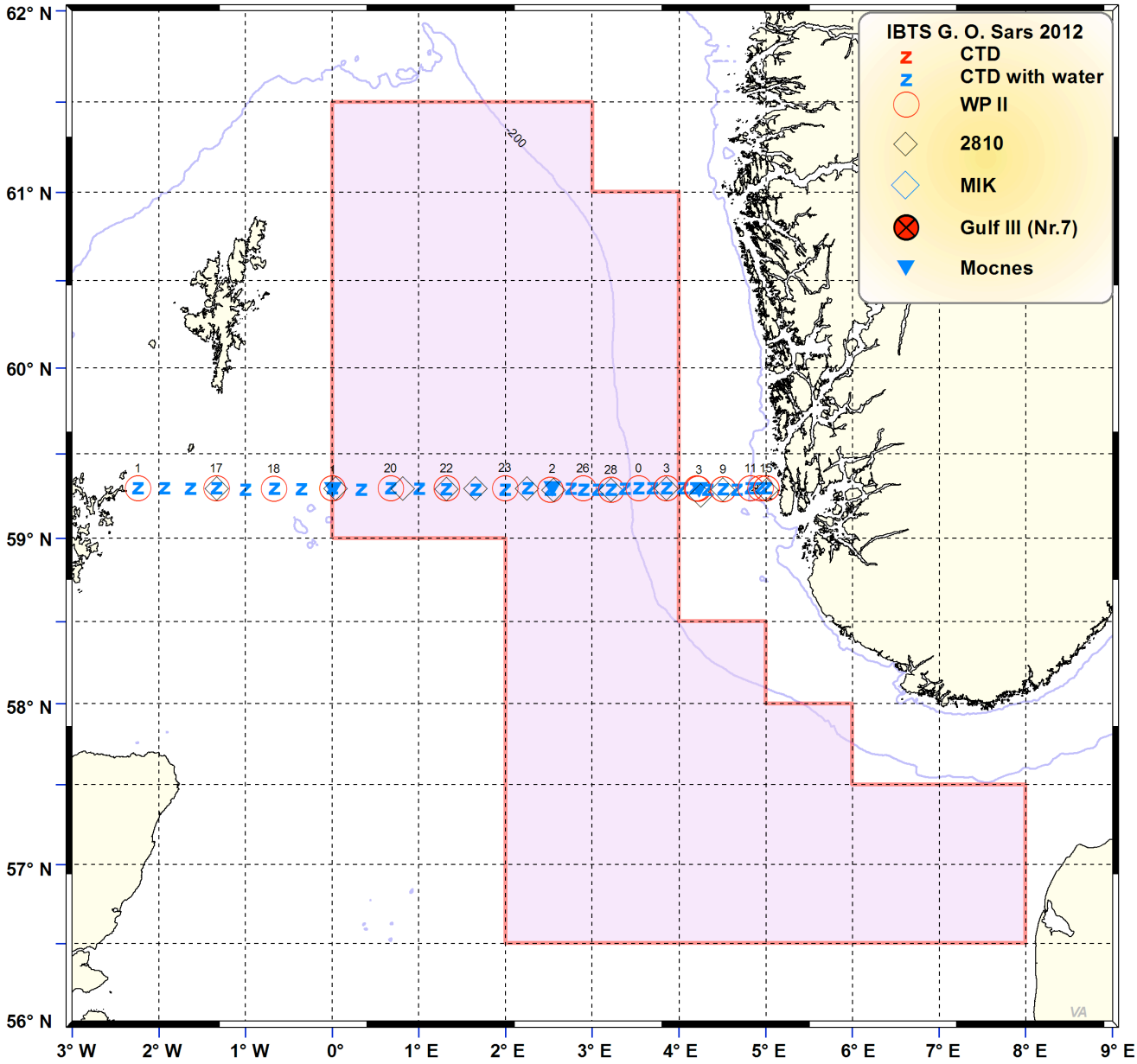

Figure 2. CTD and WP-2 stations on the Utsira-W hydrographic transect.

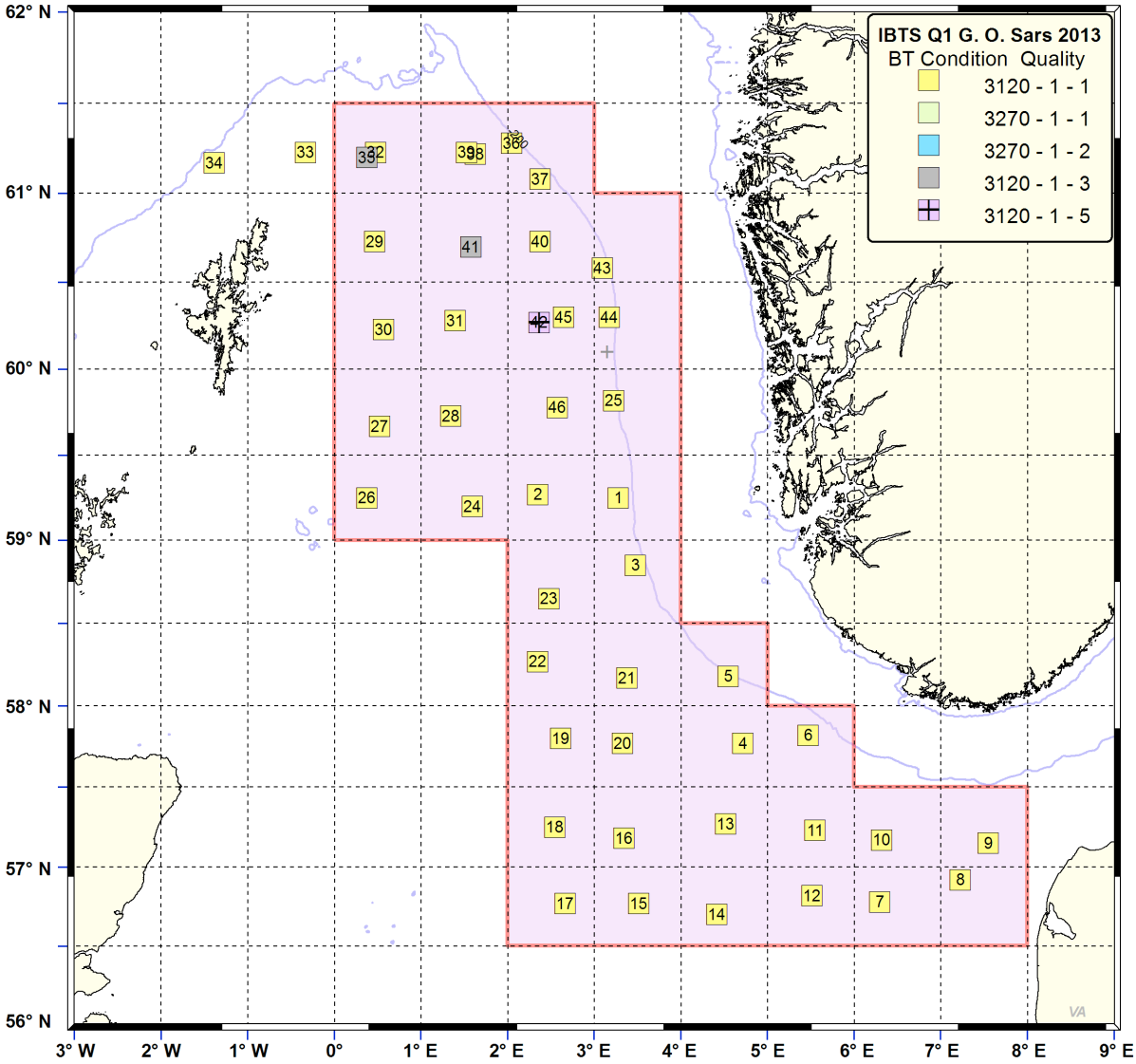

Figure 3. Trawl stations during IBTS 2013 Q1. Bottom trawl is the GOV 36/47 with the Exocet kite. Two stations had tow quality 3 (trawl sensors showed the trawl opening was reduced, most likely due to current) and one quality 5 (tore net, invalid tow). Numbers indicate station number. Contour line indicates 200 m depth.

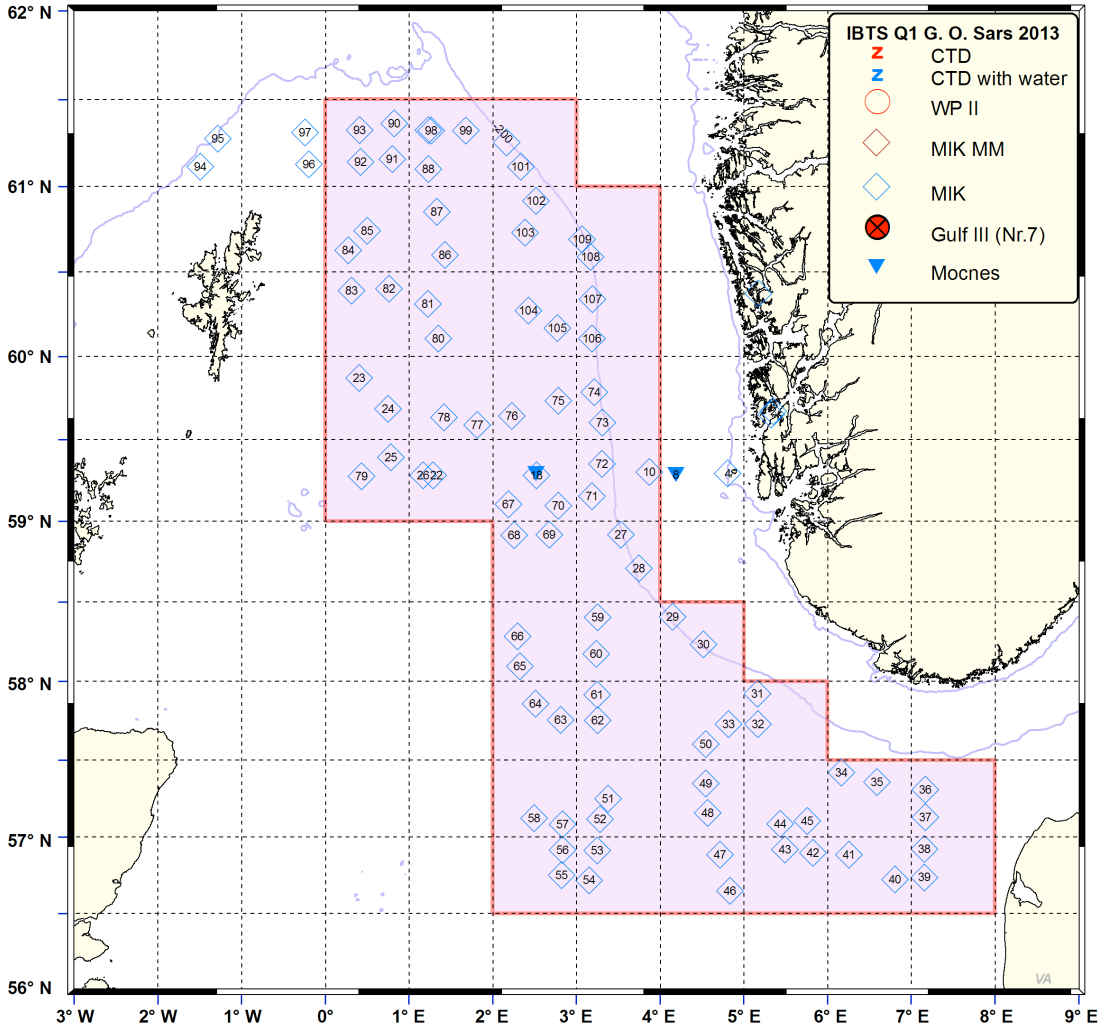

Figure 4. Position of MIK (open diamond) and MOC (solid triangle) stations; numbers indicate stations. Station 89 and 96 were in the same location, but were taken several days apart. Stations 4, 10, and 18 were MIK-M only stations. Contour line indicates 200 m depth.

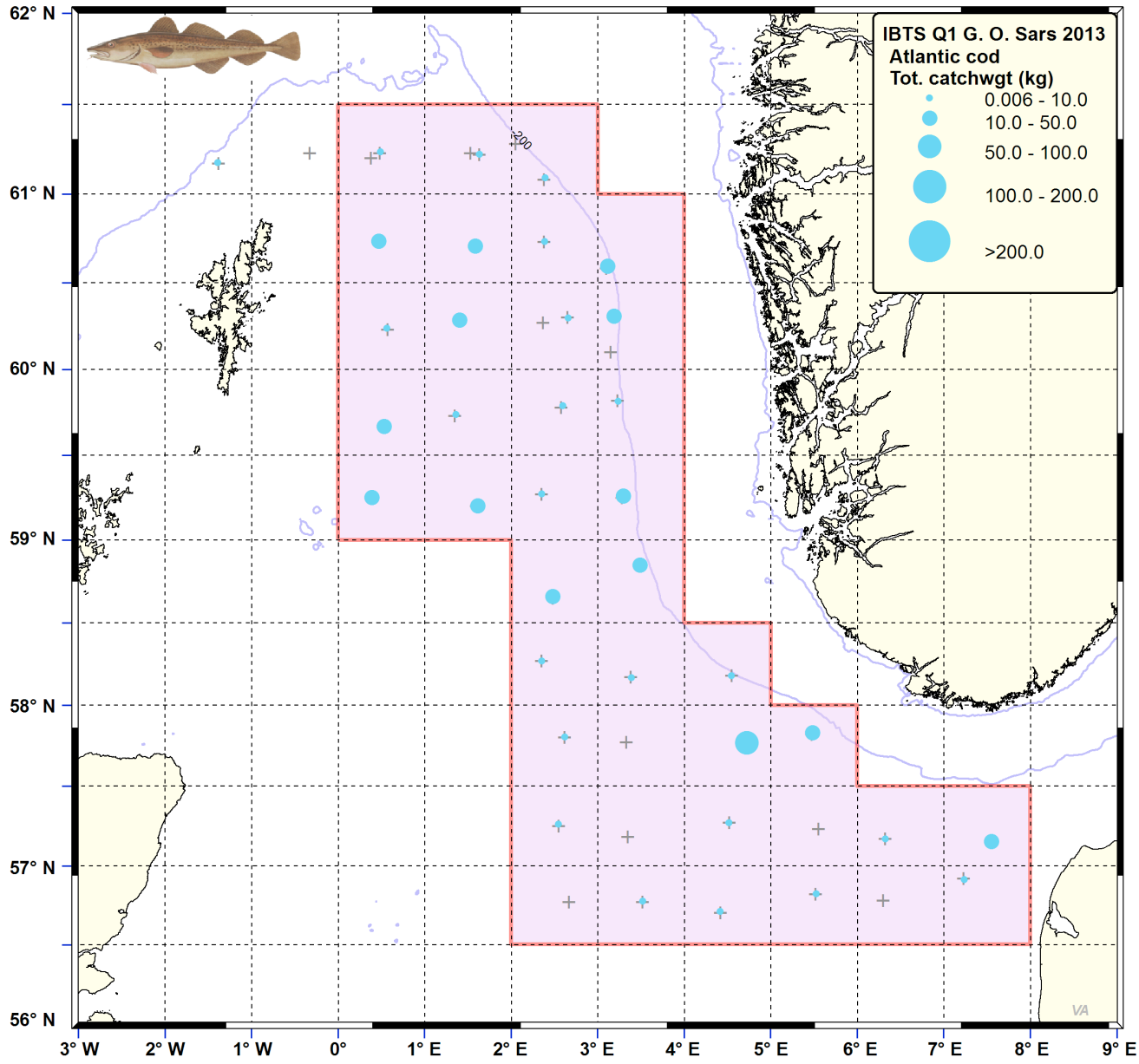

Figure 5. Total catch weight (kg) of cod from IBTS Q1 stations in 2013.

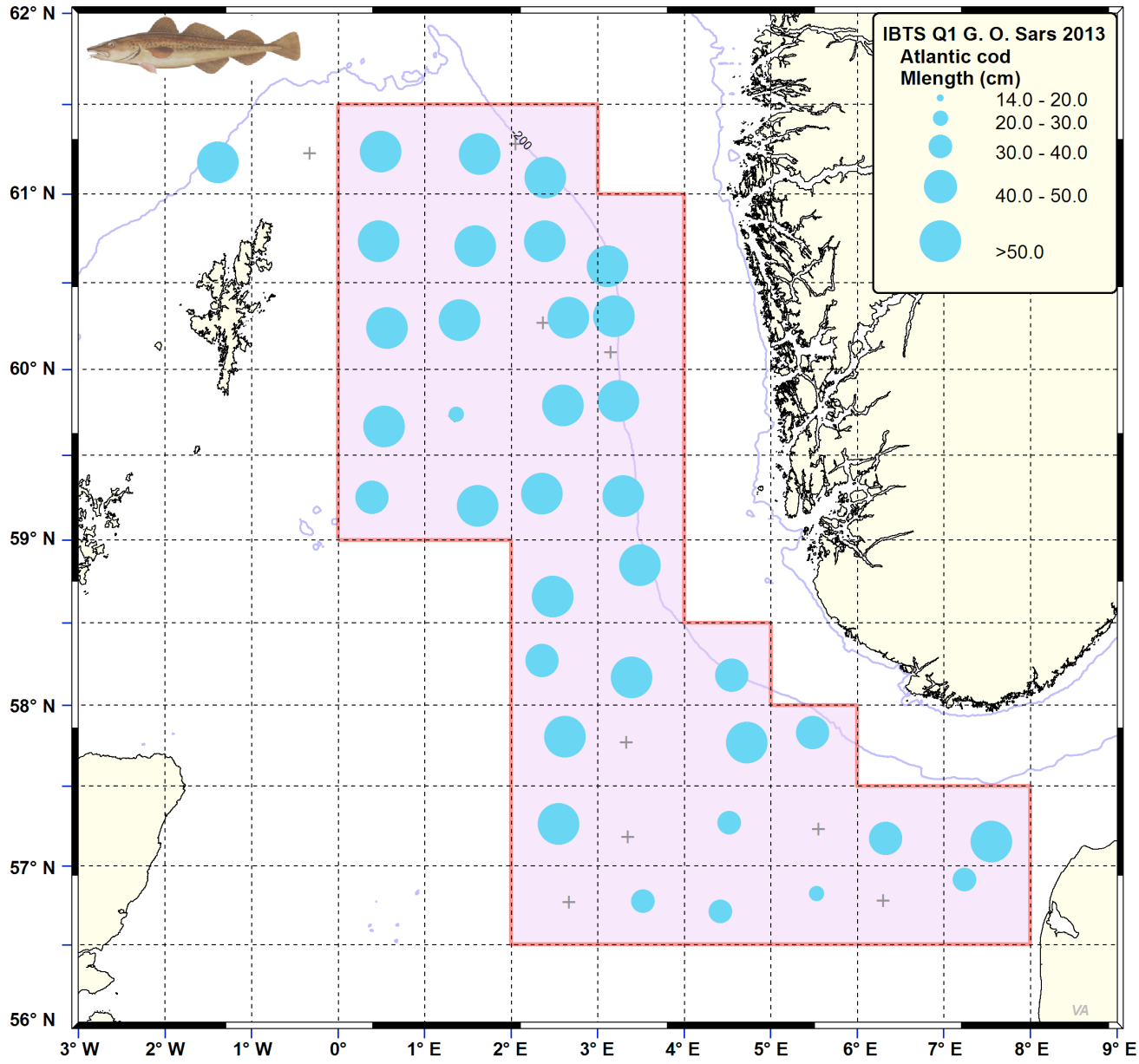

Figure 6. Mean length (cm) of cod from IBTS Q1 stations in 2013.

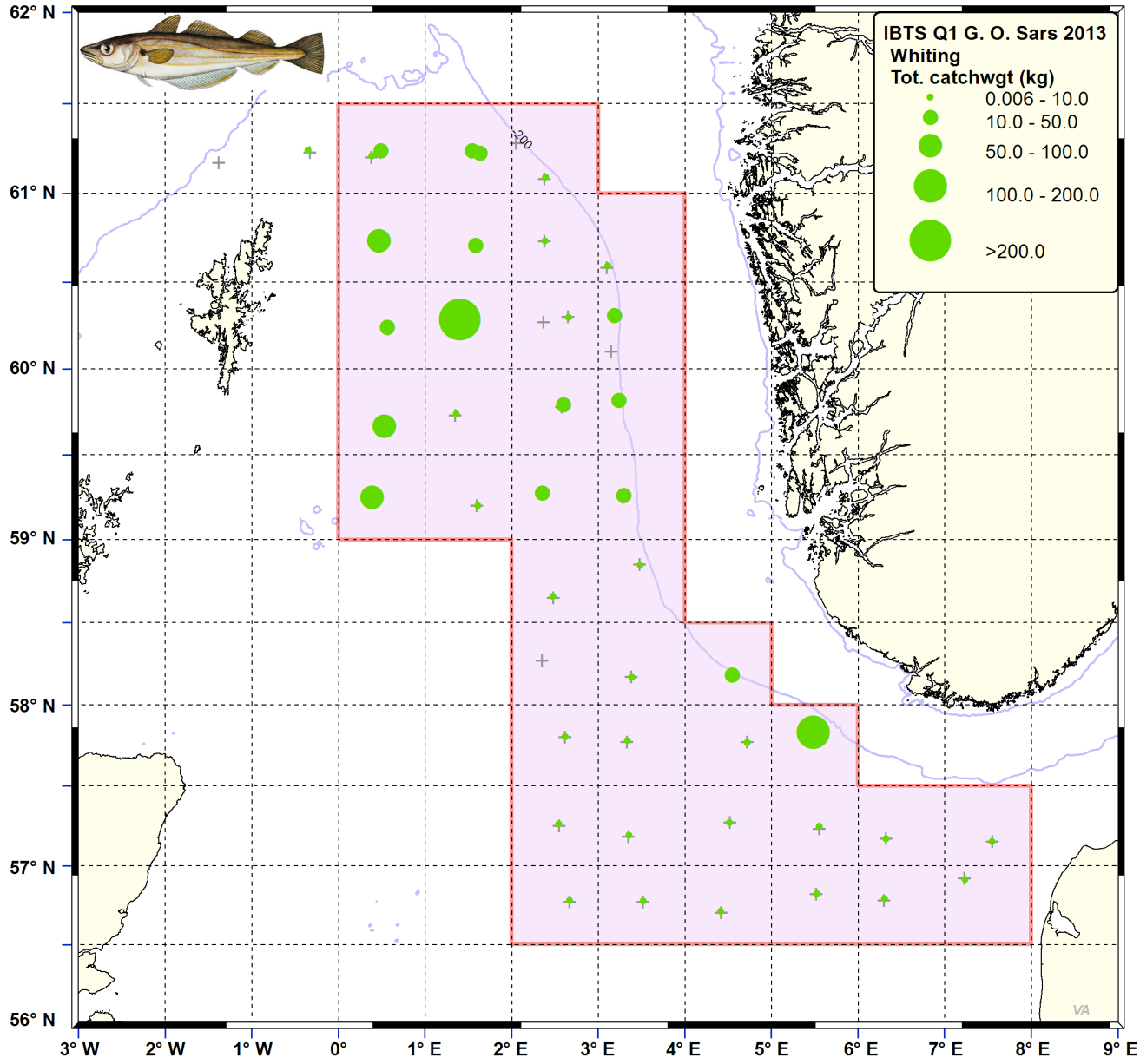

Figure 7. Total catch weight (kg) of whiting from IBTS Q1 stations in 2013.

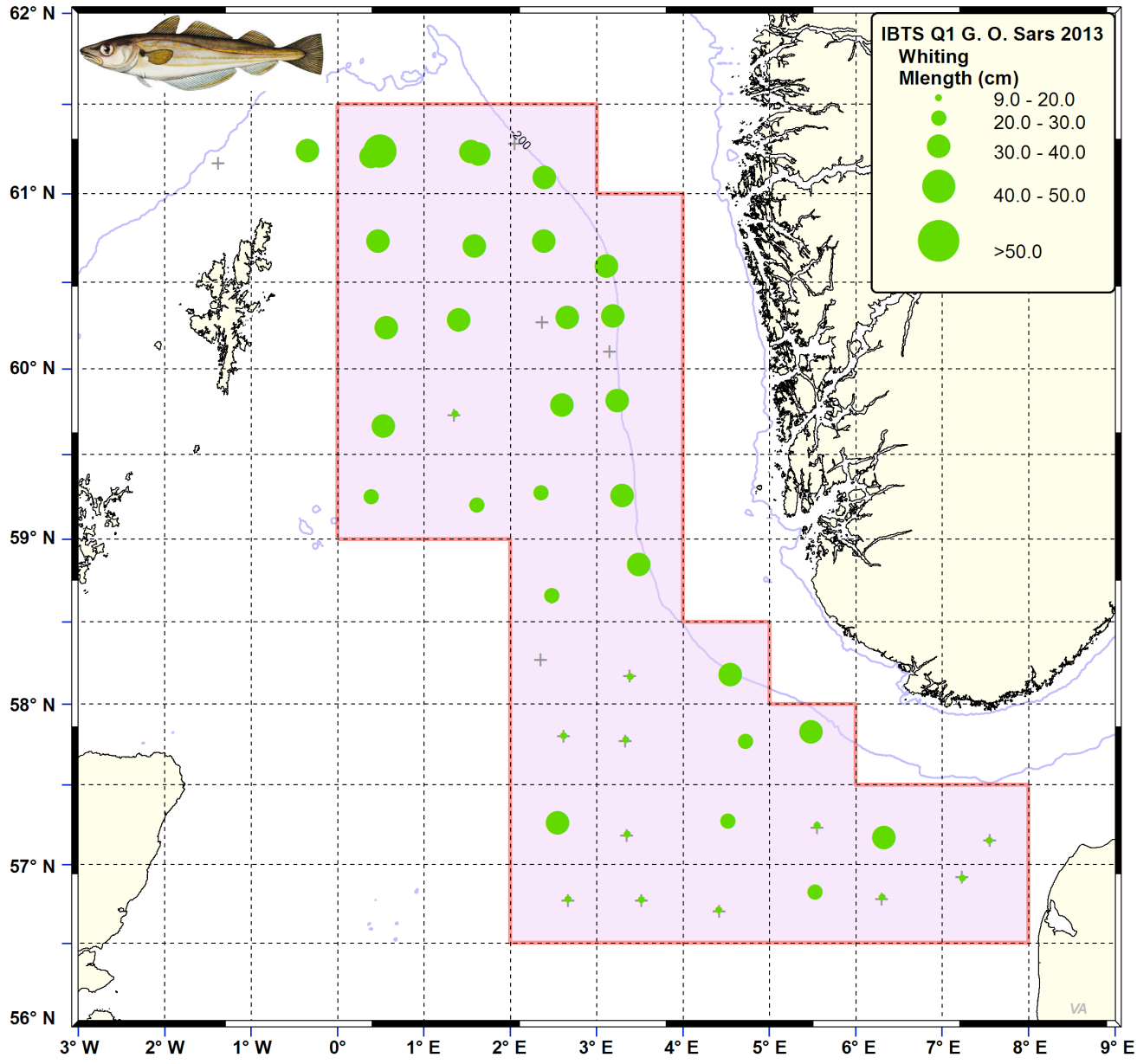

Figure 8. Mean length (cm) of whiting from IBTS Q1 stations in 2013.

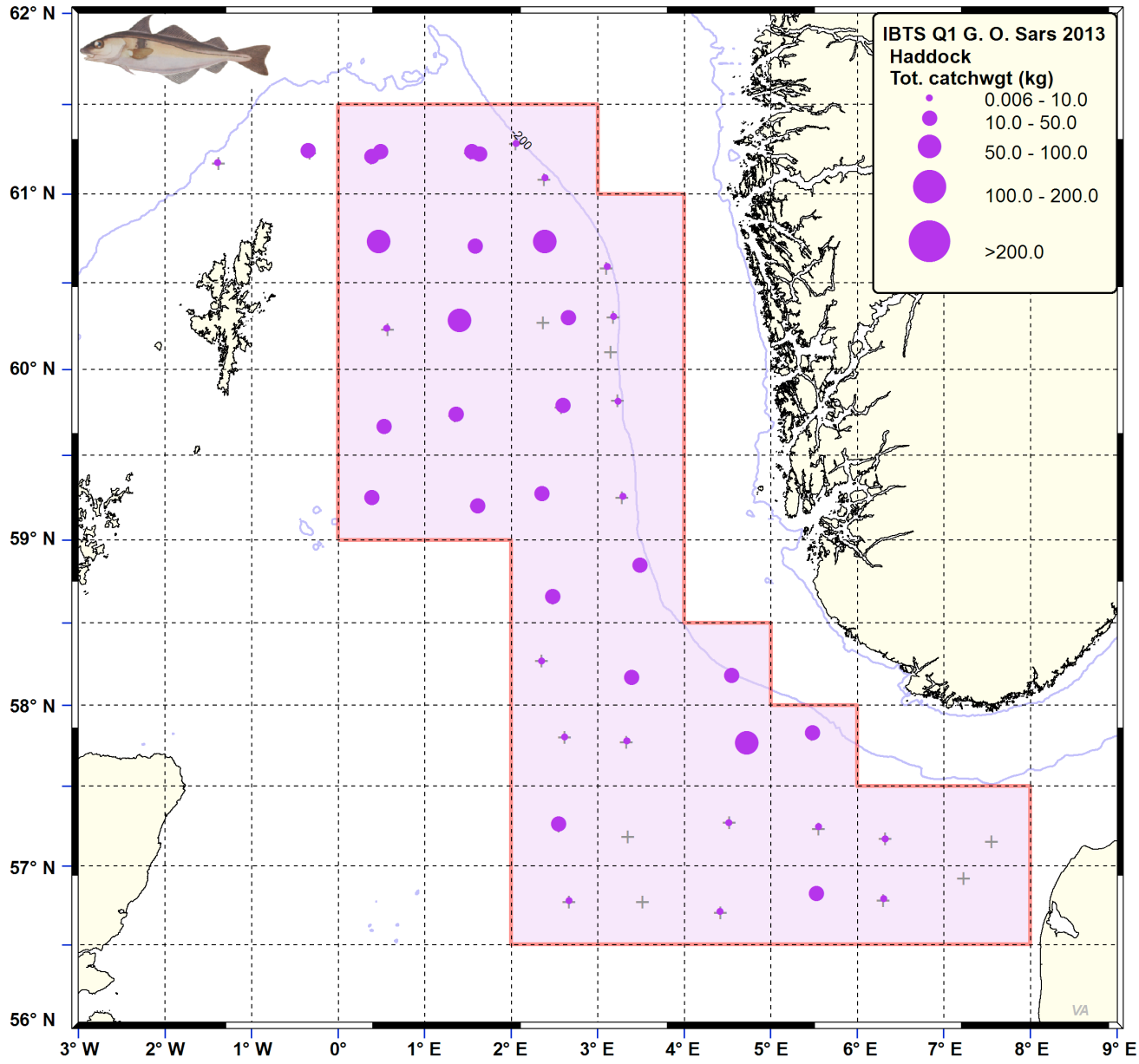

Figure 9. Total catch weight (kg) of haddock from IBTS Q1 stations in 2013.

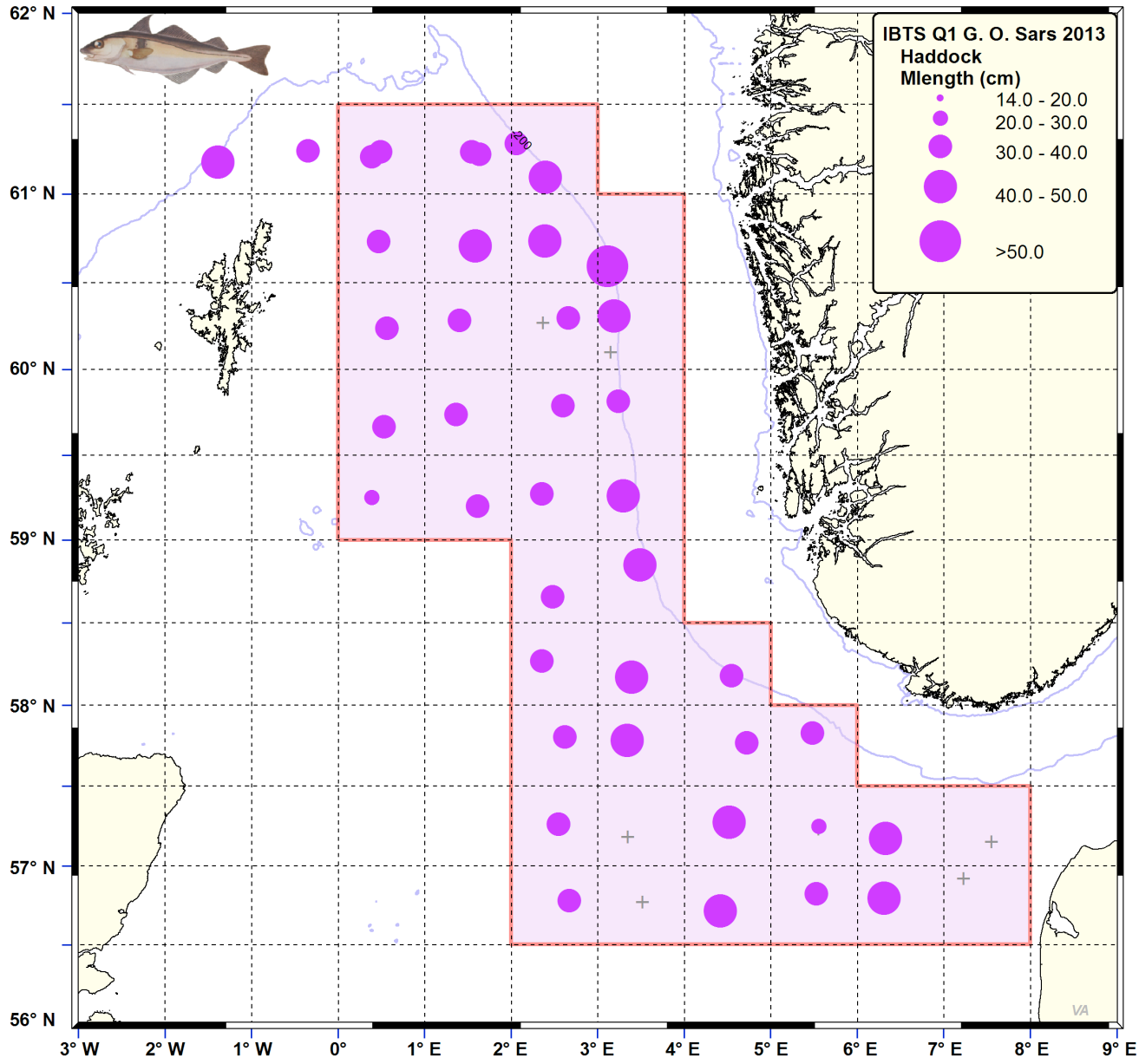

Figure 10. Mean length (cm) of haddock from IBTS Q1 stations in 2013.

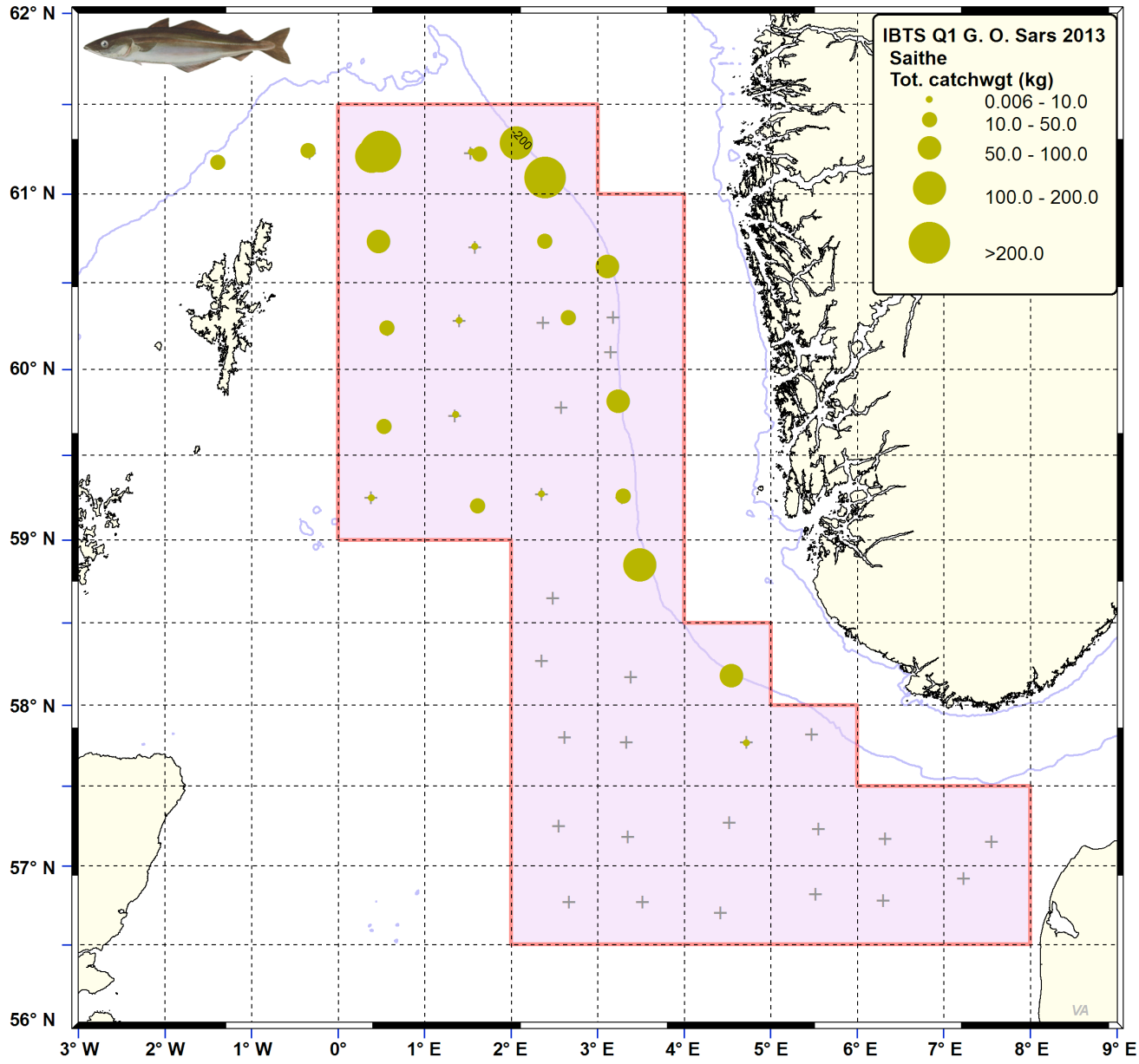

Figure 11. Total catch weight (kg) of saithe from IBTS Q1 stations in 2013.

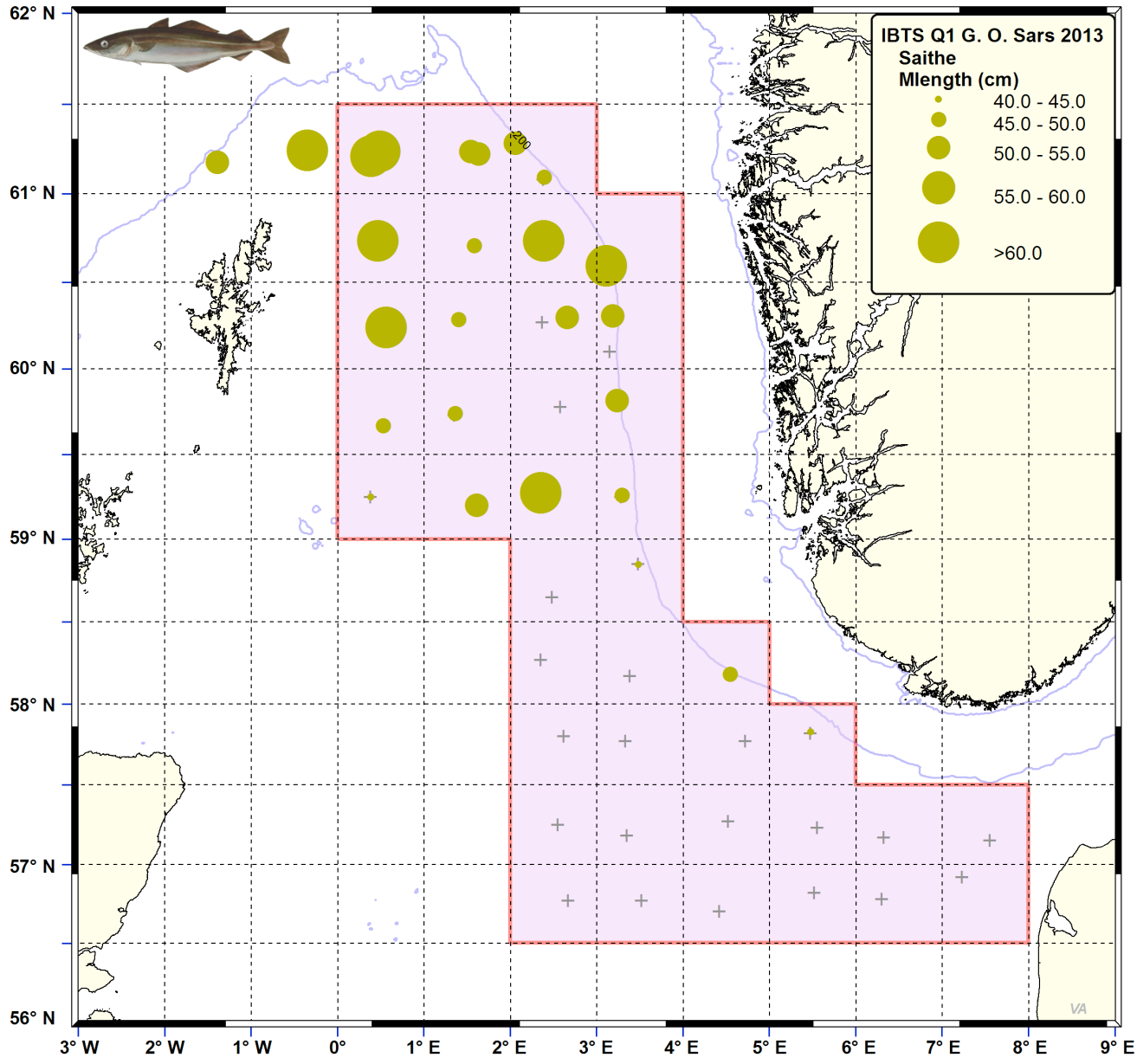

Figure 12. Mean length (cm) of saithe from IBTS Q1 stations in 2013.

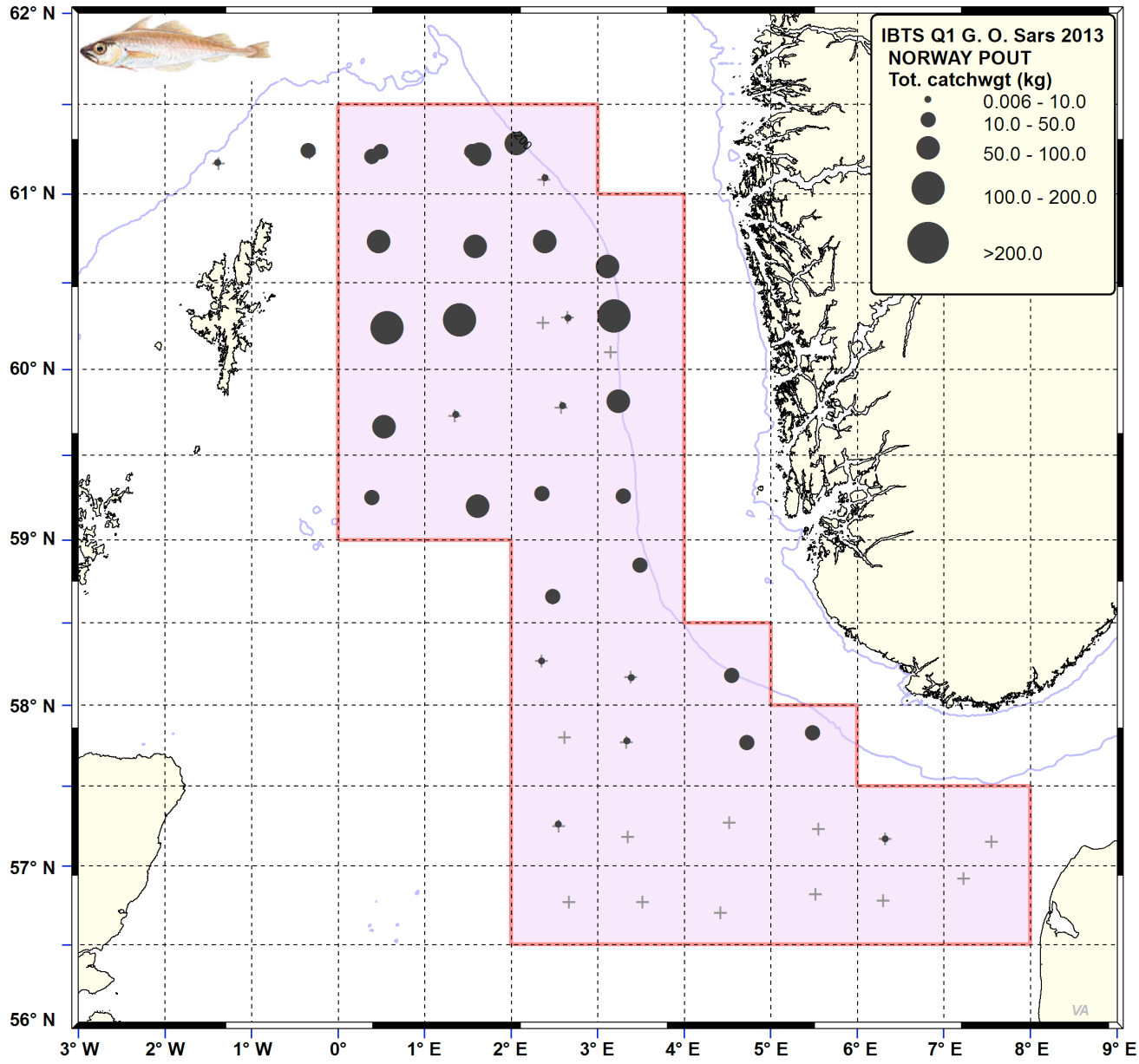

Figure 13. Total catch weight (kg) of Norway pout from IBTS Q1 stations in 2013.

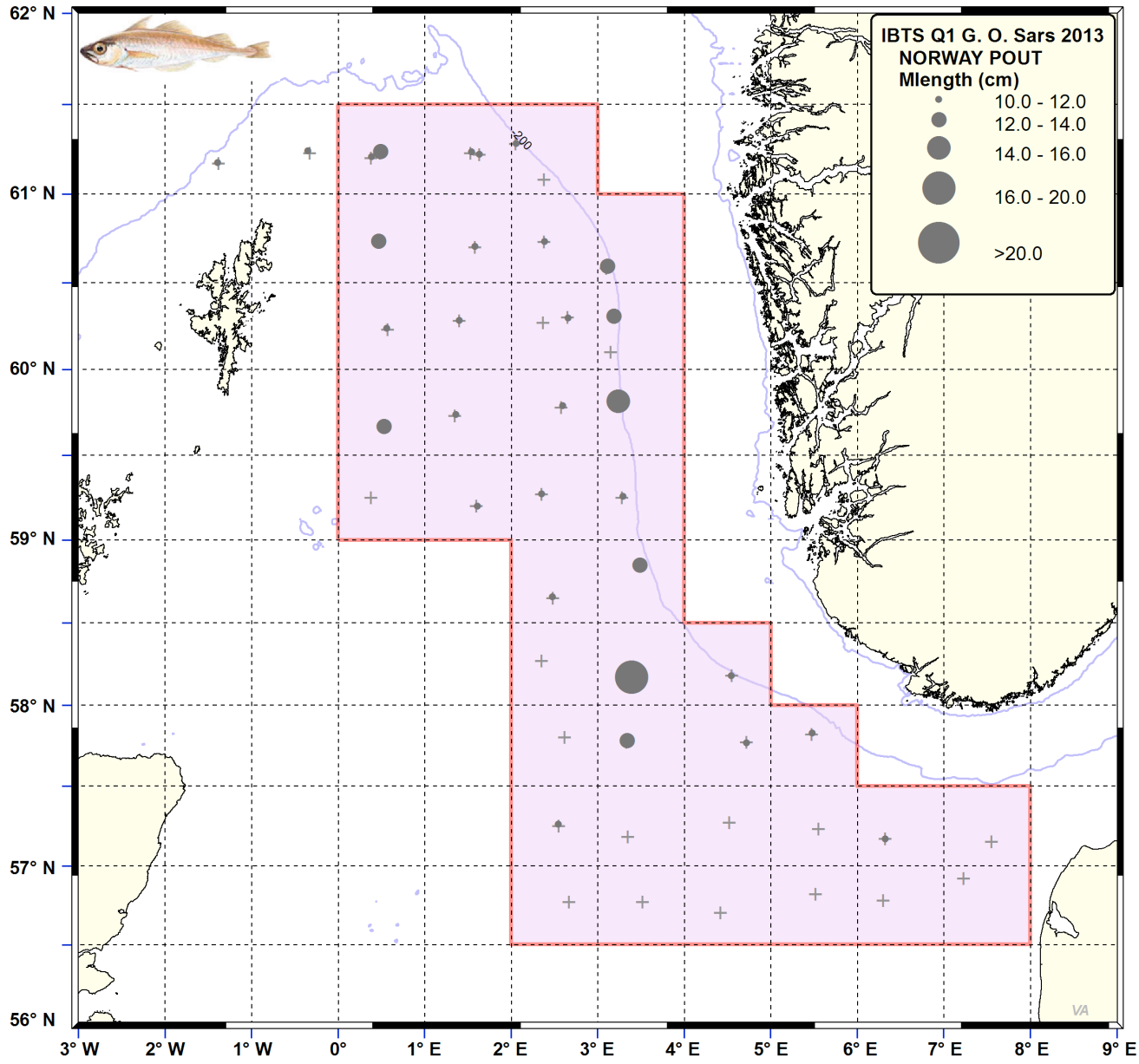

Figure 14. Mean length (cm) of Norway pout from IBTS Q1 stations in 2013.

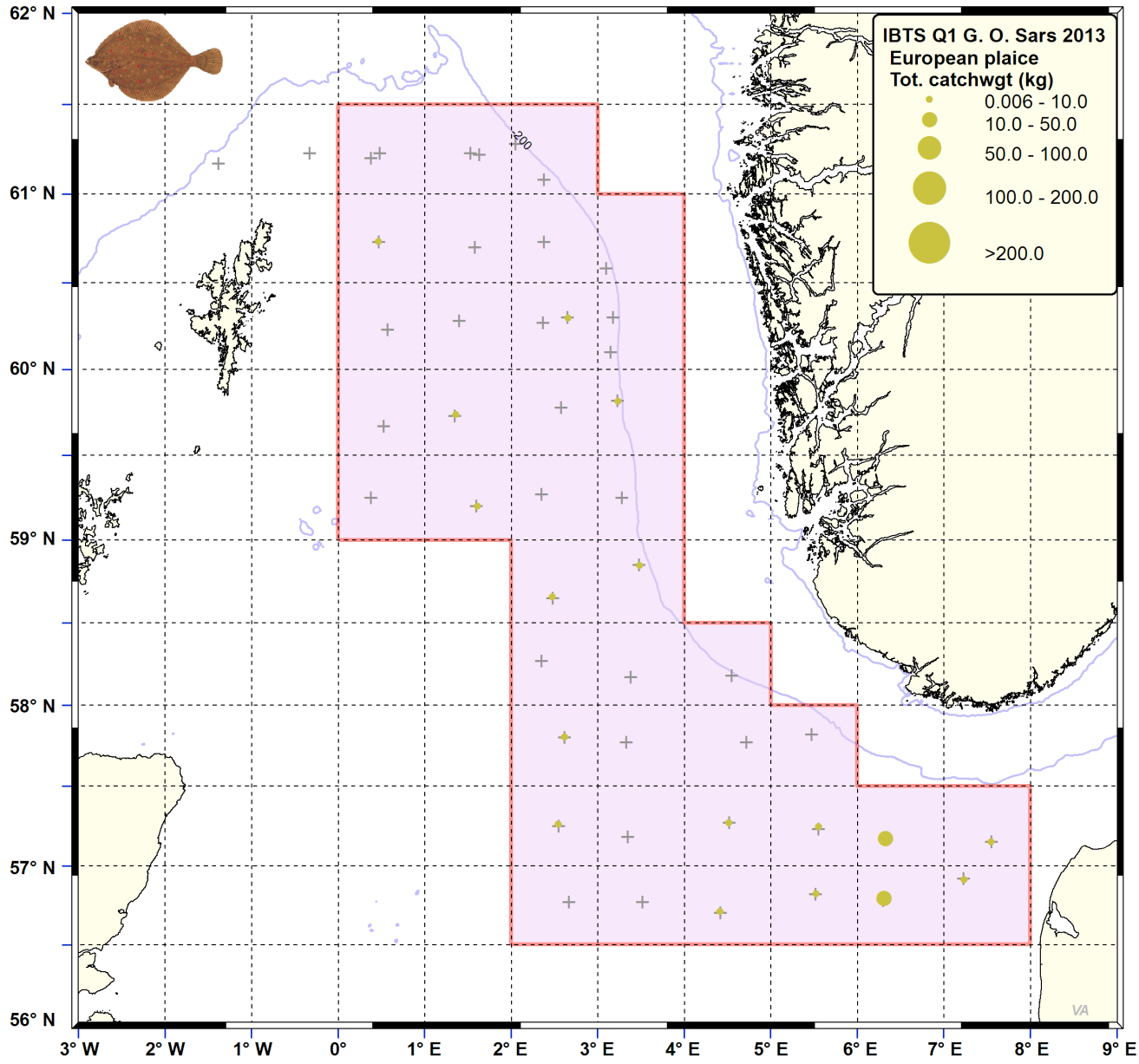

Figure 15. Total catch weight (kg) of plaice from IBTS Q1 stations in 2013.

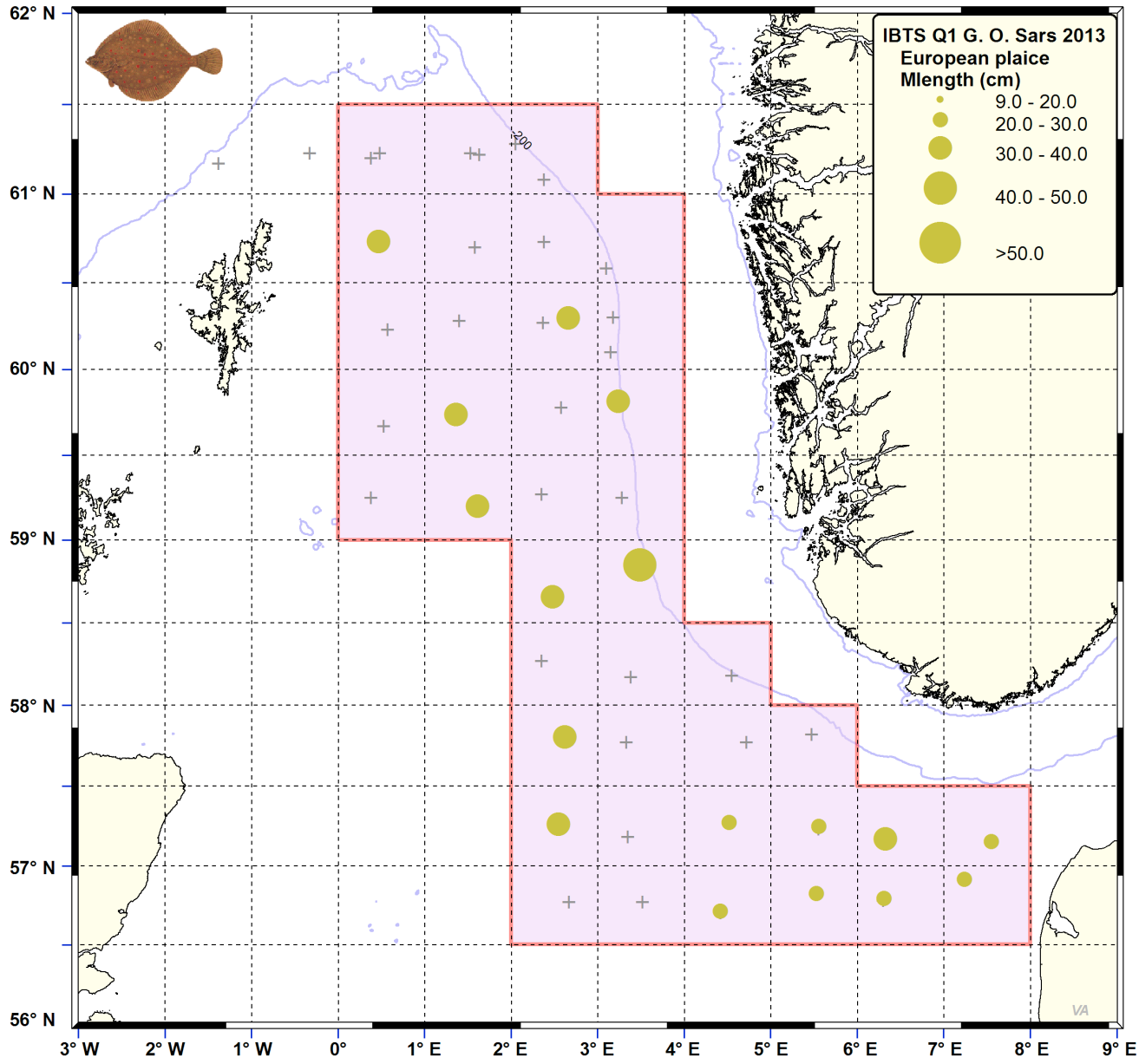

Figure 16. Mean length (cm) of plaice from IBTS Q1 stations in 2013.

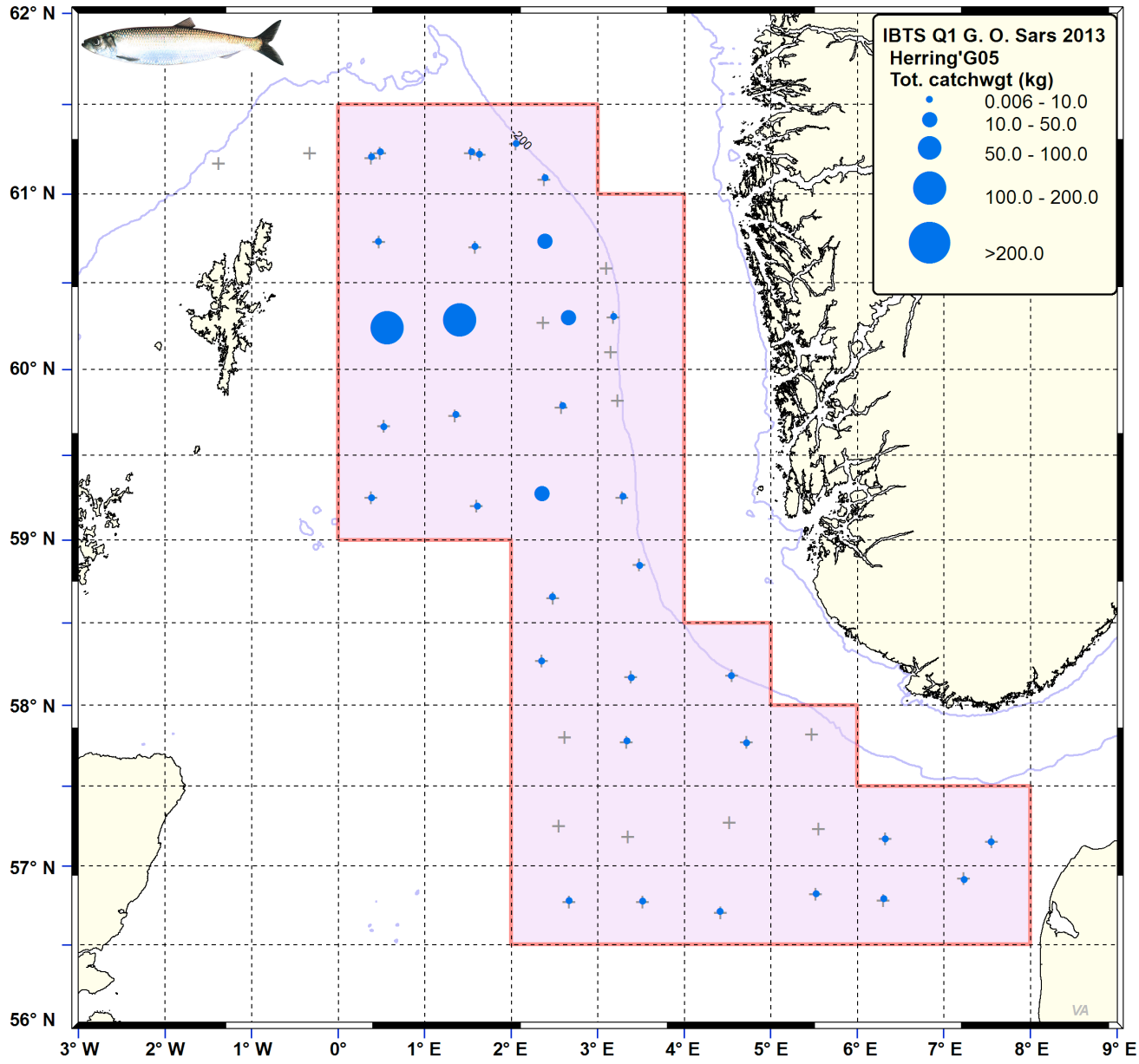

Figure 17. Total catch weight (kg) of herring from IBTS Q1 stations in 2013.

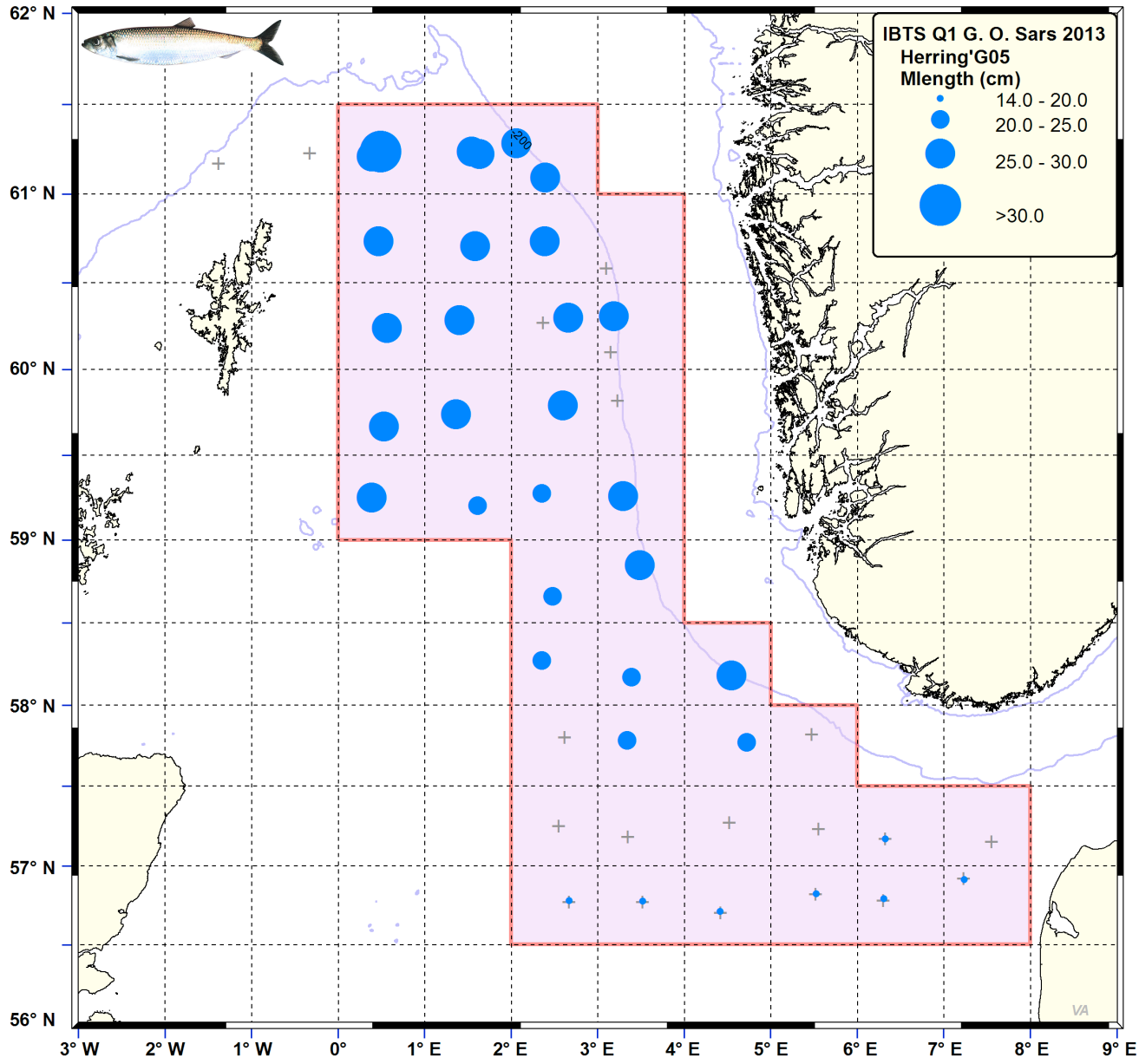

Figure 18. Mean length (cm) of herring from IBTS Q1 stations in 2013.

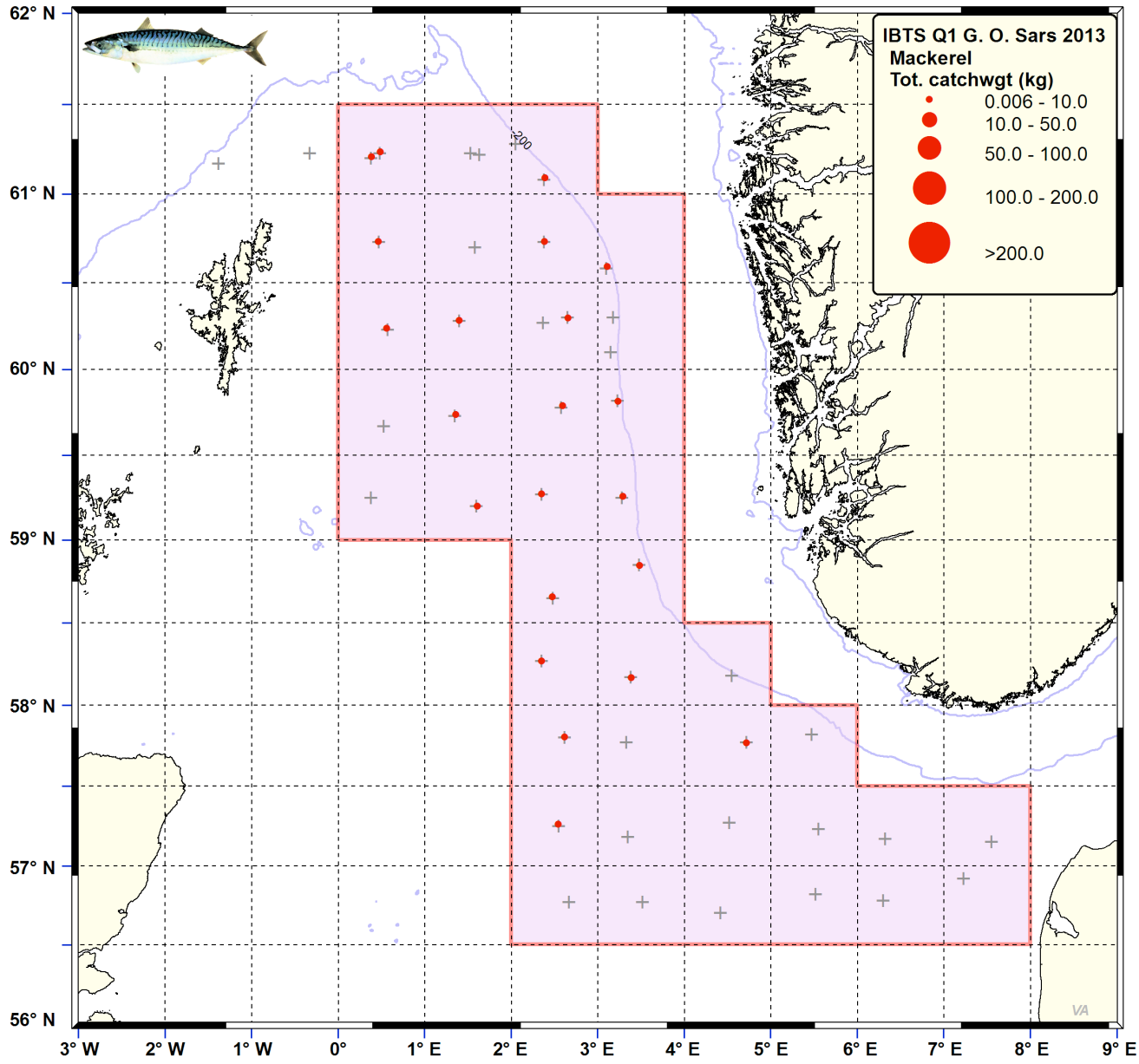

Figure 19. Total catch weight (kg) of mackerel from IBTS Q1 stations in 2013.

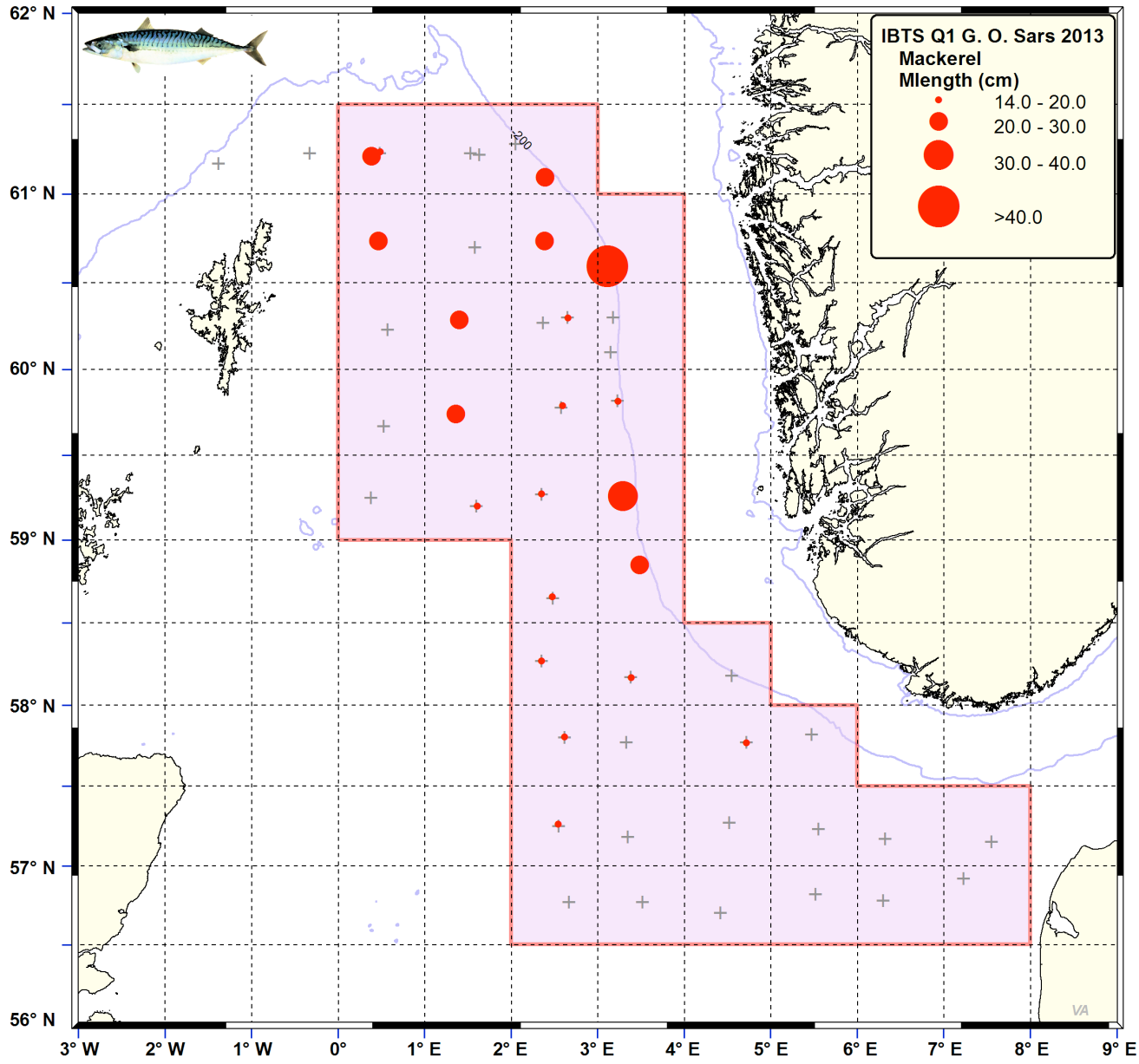

Figure 20. Mean length (cm) of mackerel from IBTS Q1 stations in 2013.