2019 Annual National Report of Korean SBT Fishery

Republic of Korea

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1. Introduction

Korean longline fleets have engaged in fishing for southern bluefin tuna, *Thunnus maccoyii* (SBT) in the CCSBT convention area. This fishery commenced with a small experimental operation in the Indian Ocean in 1957, mainly fishing for bigeye tuna, yellowfin tuna and albacore tuna but shifted targeting SBT in 1991. In 2018, SBT catch in calendar year of Korean tuna longline fishery was 1,268 t (1,247 t in fishing year) with 10 vessels in active. In general, fishing occurs between 35°S-45°S and 10°E-120°E, especially in the western Indian Ocean (area 9) from April to July/August and in the eastern Indian Ocean (area 8) from July/August to December. However, since 2014 SBT fishing vessels have moved westward than previous years, and mainly operated in the western Indian Ocean and eastern Atlantic Ocean between 20°W-35°E (area 9). The CPUE in area 9 is higher than in area 8. In 2017 and 2018, fishing vessels operated only in the western Indian Ocean and the eastern Atlantic Ocean, which were quite similar.

2. Catch and Effort

The catch was low with less than 400 t at the beginning during 1991-1995 and increased up to 1,796 t in 1998 but largely decreased to below 200 t in the mid-2000s. Korea became the member of the CCSBT Commission in 2001 and was allocated to 1,140 t of annual catch limit as membership, while Korean SBT catches were much lower than the national catch until 2007. It was mostly attributed to the availability of vessels as well as low market price and high fuel price. Since 2008 the annual catch ranged from 705 t to 1,268 t, which was well commensurate with the national catch limit (Table 1, Fig. 1). In 2018 fishing year, SBT catch by Korean longline fishery was 1,247 t (1,268 t in calendar year).

The historical distribution of SBT catch and effort of Korean tuna longline fishery by area is shown in Table 2. Until 2013 Korean SBT fishing vessels generally operated between 10°E-120°E of 35°S-45°S, especially in the western Indian Ocean (10°E-50°E) of area 9 from April to July/August and in the eastern Indian Ocean (90°E-120°E) of area 8 from July/August to December. It is noted that there were less fishing efforts in the eastern Indian Ocean (area 8) during 2002-2007 but replenished after 2008. Since 2014, however, SBT catch and effort has decreased in area 8, while has increased in area 9. In 2015 and 2016, the catch and effort was relatively higher in the western Indian Ocean (area 9), and there was no fishing

for SBT in area 2. And in 2017 and 2018, longline vessels fishing for SBT were operated only in area 9.

3. Nominal CPUE

The nominal CPUE prior to 2008 was at below 3.0 except 2002, 2003 and 2006, but increased to above 3.0 in 2008 and maintained until 2011. It further increased to 5.3 in 2012, and recorded the highest of 7.8 in 2015. In 2016 it showed somewhat of decreasing, but again increased in 2017 and showed the second highest of 7.4 in 2018 (Fig. 2). In general, the CPUE in area 9 was higher than in areas 2 and 8. In particular, the CPUE in area 9 sharply increased after 2011 but decreased in 2016, which was similar to that of area 8, and is again showing an increase after 2017 (Table 2).

4. Size composition

The size composition data of SBT have collected from the logbooks and the observer programs. From 2010 to 2012 the average of fork length (FL) was below 130 cm, but it got larger to 130 cm in 2013 and showed the largest of 147 cm in 2014 with a main mode of 150 cm. The average length in 2015 was similar to that of 2014, but the size class of 120-130 cm was higher. In 2016 and 2017, the average length was 139 cm and 140 cm, respectively, and the main mode became smaller to around 130 cm class than in 2014 and 2015. This might be because fishing vessels kept almost SBT caught with few discarding/releasing. And the average length in 2018 was 142 cm, which was similar to that of 2017, and the main mode was 140 cm class (Fig. 3).

5. Fleet size and distribution

Korean longline vessels for SBT are all deep freezers with a range from 200 to 500 gross tonnage. The annual number of vessels was fluctuated from 8 in 1996 to 19 in 1998, 2008 and 2009. Since 2010, annually 7 to 12 vessels have operated in active fishing for SBT so as to be equivalent to the national quota, and 10 vessels operated to fish for SBT in 2018 (Table 1 and Fig. 1).

The geographical distribution of nominal CPUE (no. of fishes/1,000 hooks) showed two fishing grounds, of which one was located in the western Indian Ocean off South Africa with an occasional expansion to the eastern Atlantic Ocean, and the other was in the eastern Indian Ocean off the Western Australia (Fig. 4). The CPUE was higher in the western Indian Ocean (area 9) than in the eastern Indian Ocean (area 8). In general, fishing occurred from April to July/August in the western Indian Ocean and from July/August to December in the eastern Indian Ocean. From 2000 to 2013, the distributions of fishing ground have rarely changed throughout the history, except in 2005 when some catches were taken in the central and southern Indian Ocean. However, since 2014 fishing vessels have moved westward than previous years and mainly operated in the western Indian Ocean and in the eastern Atlantic Ocean between 20°W-35°E. In 2017 and 2018, fishing vessels operated only in the western Indian Ocean and the eastern Atlantic Ocean, which were quite similar.

6. Development and implementation of scientific observer programs

A. Observer Training

National Institute of Fisheries Science (NIFS) is responsible for implementing and developing the observer programs. Observer training programs include basic safety for seafaring, necessary handling of navigation devices, fishing operational data collection, and biological knowledge and sampling for target, non-target species and ecologically related species (ERS), including interaction information and tagging project. In the end of the training they have to pass two tests. One is for technical term of fisheries and biology, and the other is for species identification. The person who scores 70% overall from the two tests and completes 100% attendance of the training course can be qualified as a scientific observer. At present, Korea has 48 persons being able to be deployed onboard as an active scientific observer.

B. Scientific Observer Program Design and Coverage

In 2018, 3 observers were placed onboard 3 longline vessels targeting SBT (Table 3). They observed the SBT catch of 243 t and the effort of 573×10^3 hooks in 253 sets during 360 days in fishing area, which the observer coverage was estimated to be 21% in fishing efforts (Table 3). Table 4 shows the amount of SBT catch and effort compiled from the Korean observer programs by area in 2018.

C. Observer Data Collected

The data collected by observer programs were vessel and gear attributes, setting and catch details (including discard/release), incidental catch and interaction of ecologically related species (ERS) and sighting of marine mammals.

D. Tag Return Monitoring

During the 2018 scientific observation, 10 pop-up tags (MiniPAT 2and sPAT 8) were released by Korean observer programs, and no SBT tagged was recaptured.

E. Problems Experienced

Nothing

7. Other relevant information (Data collection and reporting)

The progress was made in terms of data collection and reporting requirements. The Act on Fisheries Information and Data Reporting was revised and put into effect from December 2012. It includes data collection and reporting requirements recently adopted by the tuna RFMOs regarding especially ecologically important species, discards/release and bycatch mitigation, etc. Since 1st September 2015, the Act on Fisheries Information and Data Reporting has obliged fishers to report the catch statistics every day to National Institute of Fisheries Science (NIFS) through the electronic reporting (ER) system in order to manage/cross-check the data in real time.

SBT catch statistics of Korea are obtained from two sources of data reporting. Korea Overseas Fisheries Association (KOFA) collects total SBT catch by month and vessel through

Catch Documentation Scheme (CDS) issued by National Fishery Products Quality Management Service (NFQS). As mentioned above, NIFS collects logbook data through ER system filled out by captain onboard. The data collected are verified and confirmed through cross-checking between NIFS and KOFA.

8. Catch data verification

Korea established the Fisheries Monitoring Center (FMC) in March 2014 to monitor/manage the Vessel Monitoring System (VMS) data so that the data are cross-checked with fishing position from logbook. And also SBT catch data are cross-checked between those of NIFS from logbook and NFQS from CDS before issuing CDS. In 2018, there are few difference (1.4%) among NIFS (1,286 t from logbook), NFQS (1,268 t from CDS) and Secretariat (1,268 t) in the total catch (calendar year).

9. Research activities

Since 2015 we have collected SBT otolith and ovary through the observer program in order to contribute to the SRP proposal for estimating size/age at maturity of southern bluefin tuna. In addition, since 2017 we have carried out Pop-up tagging program to investigate the post-release survival rate of SBT, and could provide a preliminary result at next meeting.

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2018

Year	Number of longline vessel	Catch (t)	Year	Number of longline vessel	Catch (t)
1991	3	246	2005	7	38
1992	1	41	2006	9	150
1993	1	92	2007	12	521
1994	1	137	2008	19	1,134
1995	3	365	2009	19	1,117
1996	8	1,320	2010	9	867
1997	14	1,424	2011	7	705
1998	19	1,796	2012	7	922
1999	16	1,462	2013	9	918
2000	13	1,135	2014	9	1,044
2001	10	845	2015	10	1,051
2002	10	746	2016	11	1,121
2003	4	254	2017	12	1,080
2004	7	131	2018	10	1,268

Table 2. The catch of SBT and the effort of Korean longline vessels targeting SBT by year and area, 2001-2018

Year	Total			Area 2			Area 8			Area 9			Others		
	No. of inds.	No. of hooks (×10³)	CPUE	No. of inds.	No. of hooks (×10³)	CPUE	No. of inds.	No. of hooks (×10³)	CPUE	No. of inds.	No. of hooks (×10³)	CPUE	No. of inds.	No. of hooks (×10³)	CPUE
2001	15,974	6,816	2.34	16	12	1.30	7,118	3,756	1.89	8,776	3,028	2.90	65	21	3.14
2002	17,136	5,467	3.13	27	17	1.61	1,768	1,322	1.34	15,201	4,054	3.75	140	74	1.88
2003	5,770	1,287	4.48				130	110	1.18	5,640	1,177	4.79			
2004	2,486	1,562	1.59							2,477	1,552	1.60	9	11	0.84
2005	1,047	430	2.43	490	165	2.97	16	11	1.49	347	119	2.91	194	135	1.44
2006	5,548	1,117	4.97							5,491	1,094	5.02	58	23	2.45
2007	16,544	5,811	2.85							16,373	5,706	2.87	171	105	1.64
2008	25,826	6,932	3.73	919	296	3.10	10,494	3,939	2.66	14,383	2,674	5.38	30	23	1.32
2009	26,584	6,769	3.93	2	4	0.65	6,394	3,083	2.07	19,990	3,641	5.49	198	42	4.71
2010	14,818	4,104	3.61	99	111	0.89	5,249	2,022	2.60	9,470	1,971	4.80			
2011	13,474	4,048	3.33	52	76	0.68	8,315	3,252	2.56	5,107	720	7.10			
2012	19,257	3,635	5.30	19	10	1.86	5,680	1,695	3.35	13,558	1,930	7.03			
2013	15,904	2,688	5.92	14	39	0.36	5,969	1,537	3.88	9,921	1,111	8.93			
2014	19,129	3,274	5.84	216	369	0.58	4,923	1,169	4.21	13,990	1,736	8.06			
2015	18,649	2,387	7.81	0	104	0.00	3,643	755	4.82	15,006	1,528	9.82			
2016	19,110	3,482	5.49				1,588	268	5.92	17,522	3,214	5.45			
2017	18,375	2,805	6.55							18,375	2,805	6.55			
2018	20,280	2,738	7.41							20,280	2,738	7.41			

* Catch and effort data compiled from logbook.

Table 3. Observer coverage for the Korean SBT fishery through the Korean observer program, 2014-2018

Year	Trips observed	Effort observed (X1,000)	Total effort estimated (X1,000)	Catch observed of SBT (t)	Coverage (%)
2014	2	219	3,274	92	7
2015	3	349	2,387	223	15
2016	3	660	3,482	178	19
2017	3	509	2,805	181	18
2018	3	573	2,738	243	21

Table 4. Amount of SBT catch and effort observed by area, 2018

Year	Stratum	Catch (t)			Effort (X1,000)		
		Total estimate	Total observed	Coverage (%)	Total estimate	Total observed	Coverage (%)
2018	8	-	-	-	-	-	-
	9	1,268	243	19	2,738	573	21

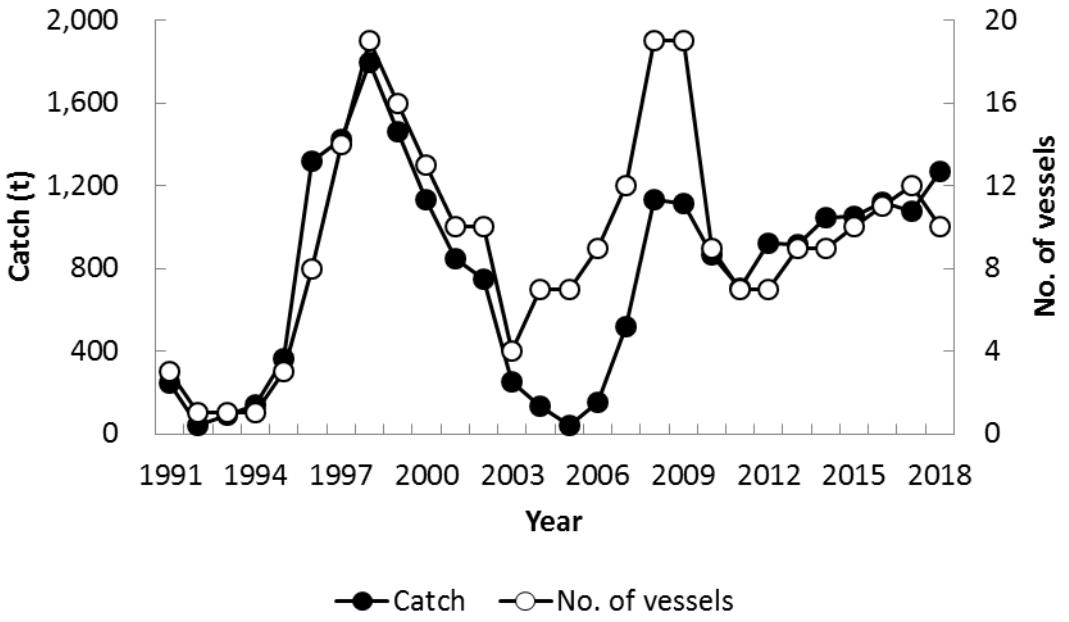

Fig. 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2018.

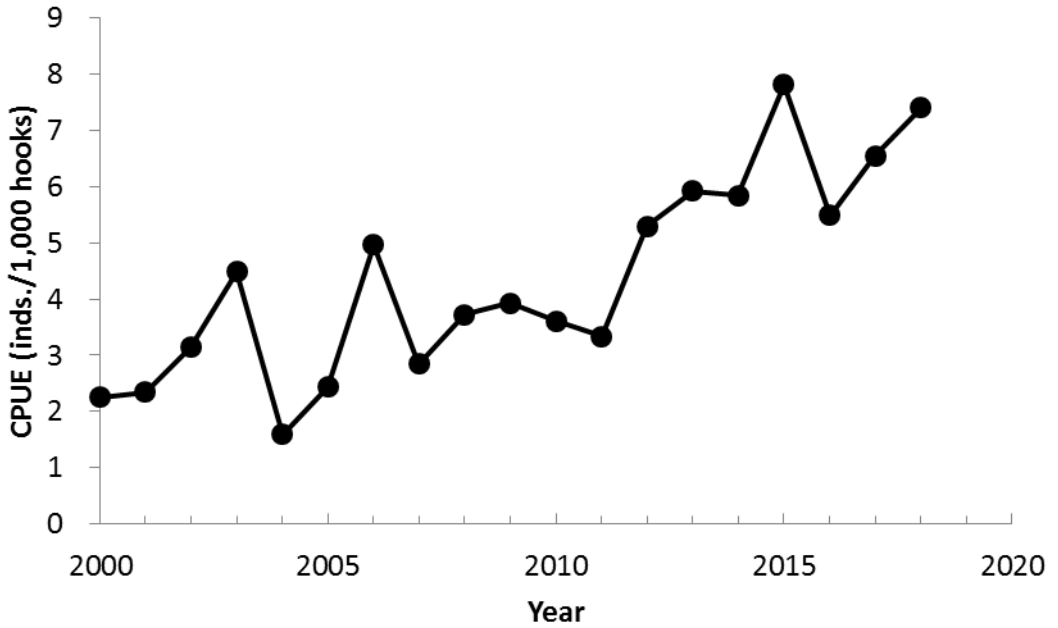

Fig. 2. The nominal CPUE series of Korean tuna longline vessels targeting SBT, 2000-2018.

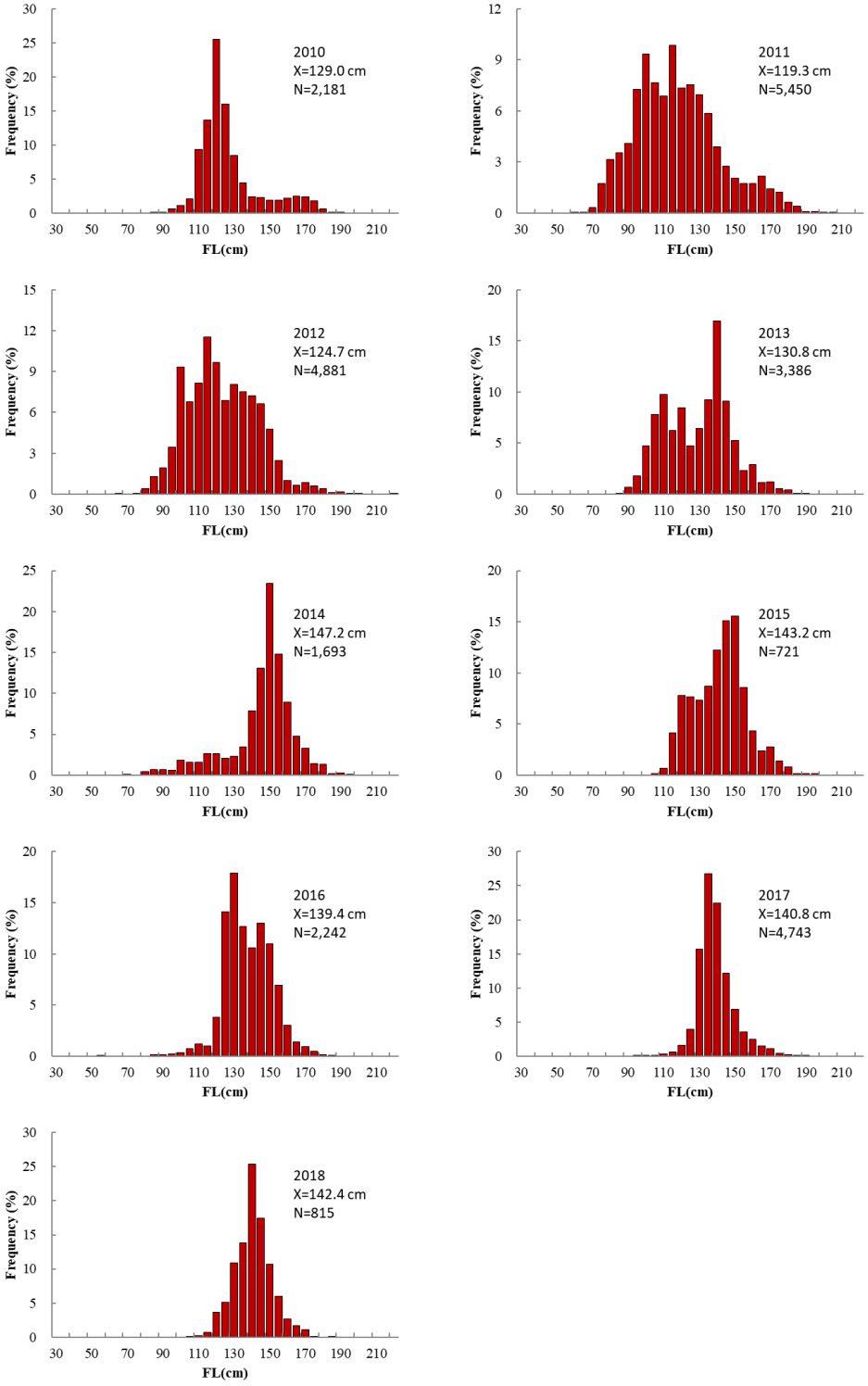

Fig. 3. Length frequency distribution of SBT caught by Korean tuna longline fishery, 2010-2018.

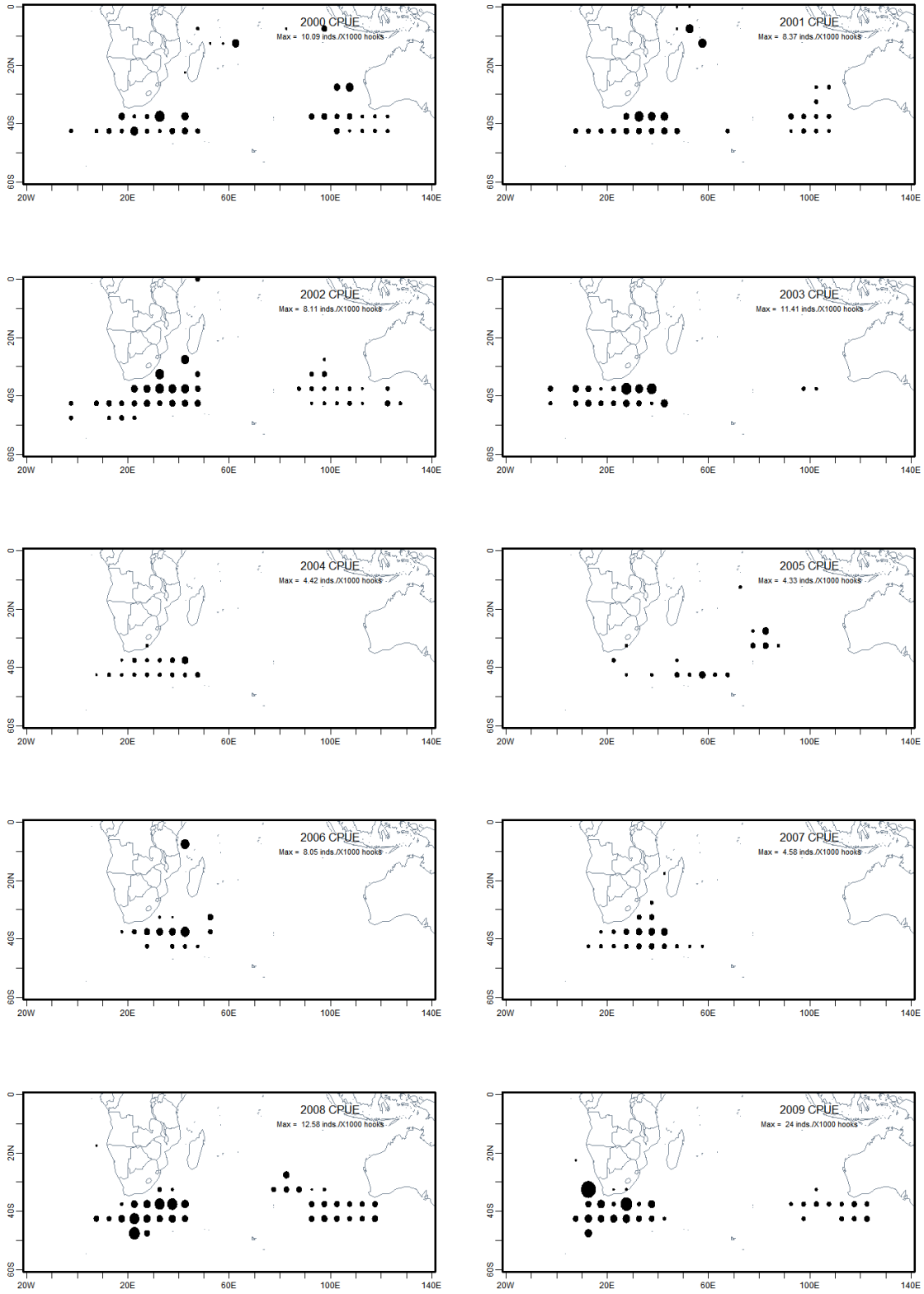

Fig. 4. The CPUE distribution of Korean tuna longline vessels targeting SBT by year and by area, 2000-2018.

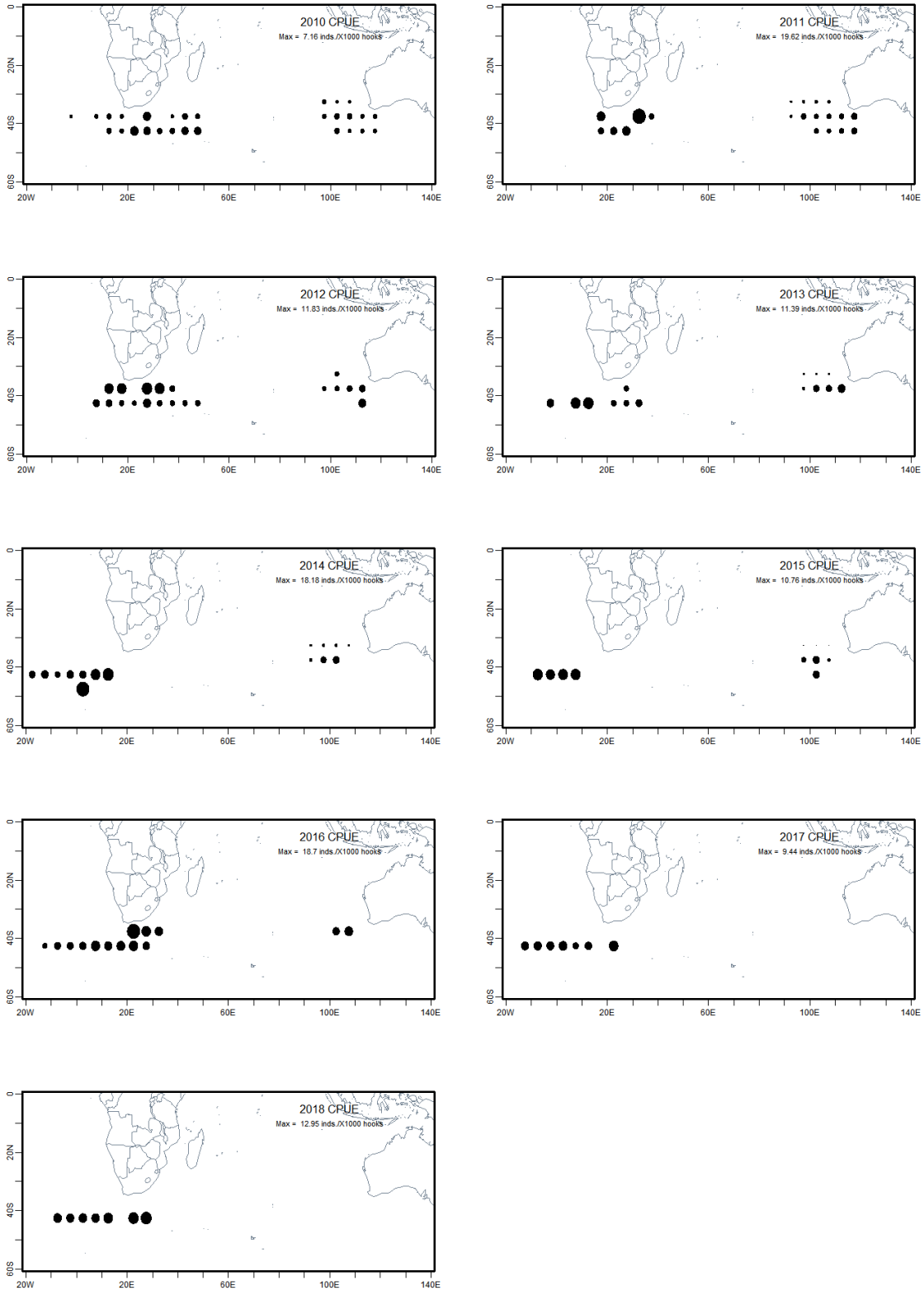

Fig. 4. Continued.