2016 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. These fisheries 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 2015, SBT catch in calendar year of Korean tuna longline fishery was 1,051 mt (1,051 mt in fishing year) with 10 vessels in active. In general, fishing occurs between 35ºS-45ºS and 10ºE-120ºE, especially in the western Indian Ocean from April to July/August and in the eastern Indian Ocean from July/August to December. However, in 2014/15 and 2015/16 fishing year, fishing vessels moved westward than previous years, and operated in the Atlantic Ocean of the area between 20ºW-15ºE in the western part. Especially, the efforts in 2015/16 fishing year were concentrated at the Atlantic Ocean of the area between 10ºW-5ºE. SBT catch and effort were relatively higher in the western Indian Ocean (area 9), and the fishing season had finished earlier in September as unusual.

2. Catch and Effort

The catch was low with less than 400 mt at the beginning during 1991-1995 and increased up to 1,796 mt in 1998 but largely decreased to below 200 mt in the mid-2000s. Korea became the member of the CCSBT Commission in 2001 and was allocated to 1,140 mt 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 mt to 1,134 mt, which was well commensurate with the national catch limit (Table 1, Fig. 1). In 2015/16 fishing year, Korean Government has set 1,140 mt for the yearly total allowable SBT catch, from which the catch was 1,051 mt (1,051 mt in calendar year).

The historical distribution of SBT catch and effort of Korean tuna longline fishery by area is shown in Table 2. Korean SBT fishing vessels have generally operated between 35ºS-45ºS and 10ºE-120ºE, especially in the western Indian Ocean (10ºE-50ºE) of area 9 from April to July/August and in the eastern Indian Ocean (90ºE-120ºE) 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. However, for 2014/15 and 2015/16 fishing year,

SBT catch and effort were relatively higher in the western Indian Ocean (area 9), and the fishing season had finished in September.

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, recorded the second of 5.9 in 2013 and the highest of 7.81 in 2015 (Fig. 2). In general, the CPUE by area was apparently higher in area 9 than in areas 2 and 8 throughout the period of 2000-2015, and especially showed a sharp increasing in area 9 since 2011 (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 to130 cm in 2013 and showed the largest of 147 cm in 2014 for recent years, with a higher mode of 150 cm than in other years. In 2015 the average length was similar to that of 2014, but the size class of 120-130 cm was higher than that of 2014 (Fig. 3).

5. Fleet size and distribution

Korean longline vessels for the SBT are all deep freezers with a range from 200 to 500 gross tonnage. The annual numbers of vessel were fluctuated from 8 in 1996 to 19 in 1998, 2008 and 2009. Since 2010, 7 or 10 vessels have operated in active for fishing SBT so as to be equivalent to the national quota, and 10 vessels operated to fish for SBT in 2015 (Table 1 and Fig. 1).

The geographical distribution of nominal CPUE (no. of fishes/1,000hooks) 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 generally higher in the western Indian Ocean (area 9) than in the eastern Indian Ocean (area 8). Fishing occurred from April to July/August in the western Indian Ocean and from July/August to December in the eastern Indian Ocean. 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. For 2014/15 fishing year, fishing vessels moved westward than previous years and operated in the Atlantic Ocean of the area between 20ºW-15ºE, then in the eastern Indian Ocean off the Western Australia. The CPUE in 2014 was also higher in area 9. The distributions of fishing ground and CPUE were similar to those of 2014, but they were concentrated at the Atlantic Ocean of the area between 10ºW-5ºE.

6. Development and implementation of scientific observer programs

A. Observer Training

The 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. First 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 complete 100% attendance of the training course can be qualified as a scientific observer. At present, Korea has 31 persons being able to be deployed onboard as an active scientific observer.

B. Scientific Observer Program Design and Coverage

In 2014, 3 observers were placed onboard 3 longline vessels targeting SBT (Table 3). They observed the SBT catch of 223 mt and the effort of 349×10^3 hooks in 161 sets during 189 days in fishing area, which the observer coverage was estimated to be 15% in fishing efforts (Table 3). Table 4 shows the amount of SBT catch and effort compiled from the Korean observer program by area in 2015.

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 ERS (ecologically related species) and sighting of marine mammals. The biological measurements were conducted on all SBT, ERS and other species. In 2015, 2,822 individuals of SBT were observed and measured of length, weight and so on during the trips. The information of ERS and other species were collected as well (Table 5).

D. Tag Return Monitoring

During the 2015 scientific observation, no SBT tagged was recaptured and 20 individuals were released by Korean observer programs (Table 6).

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 the 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 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. The Korea Overseas Fisheries Association (KOSFA) collects total SBT catch by month and vessel through Catch Documentation Scheme (CDS) issued by National Fishery Products Quality Management Service (NFQS). The NIFS collects logbook data from vessels filled out by

captain onboard. The data collected are verified and confirmed through cross-checking between the NIFS and the KOSFA.

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 prior to issuing CDS. In 2015, there are few difference (1.7%) among NIFS (1,069 mt from logbook), NFQS (1,051 mt from CDS) and Secretariat (1,051 mt) in the total catch.

9. Research activities

Since 2013 Korea has conducted a sea trial to mitigate bycatch of seabird in the Korean tuna longline fisheries in collaboration with BirdLife International, and is carrying out the work in 2016 as well. In addition, since 2015 Korea has collected SBT ovary through the observer program in order to contribute to the SPR proposal for estimating size/age at maturity of southern bluefin tuna.

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2015

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

Table 2. The catch of SBT and the effort of Korean longline vessels targeting SBT by year and area, 2000-2015

Year	Total			Area 2			Area 8			Area 9			Others		
	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE
2000	21,840	9,689	2.25	85	18	4.83	10,909	5,770	1.89	10,077	3,315	3.04	768	586	1.31
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			

* Catch and effort data compiled from logbook.

Table 3. Observer coverage for the Korean SBT fishery through the Korean observer program, 2011-2015

Year	Trips observed	Effort observed (X1,000)	Total effort estimated (X1,000)	Catch observed of SBT (mt)	Coverage (%)
2011	-	-	4,048	-	-
2012	3	421	3,635	162	12
2013	3	654	2,688	170	24
2014	2	219	3,274	92	7
2015	3	349	2,387	223	15

Table 4. Amount of SBT effort observed by area, 2015

Year	Stratum	Catch (mt)			Effort (no. of hooks)		
		Total estimate	Total observed	Coverage	Total estimate	Total observed	Coverage
2015	2	-	-	-	104,312	-	0
	8	275	43	16	754,751	91,190	12
	9	775	180	23	1,528,085	258,300	17

Table 5. Number of fish measured or collected for biological information by species, 2015

Species	No. sampled	No. measured	No. weighted	No. sexed	No. maturity stage
SBT	2,822	2,811	2,812	2,822	2,783
ALB	75	74	75	75	
BET	20	20	20	20	20
YFT	21	21	21	21	21
SWO	1	1	1	1	
Sharks	2,400	2,102	2,325	2,358	969
Seabirds	29	24	18		
Others	1,430	1,143	1,407	1,246	502
Sum	6,798	6,196	6,679	6,543	4,295

Table 6. Number of SBT tag recaptured and released through the Korean observer program, 2015

Size class (cm)	Number	
	Recaptured	Released
100-109		
110-119		3
120-129		13
130-139		4
140-149		
150-159		
Total	0	20

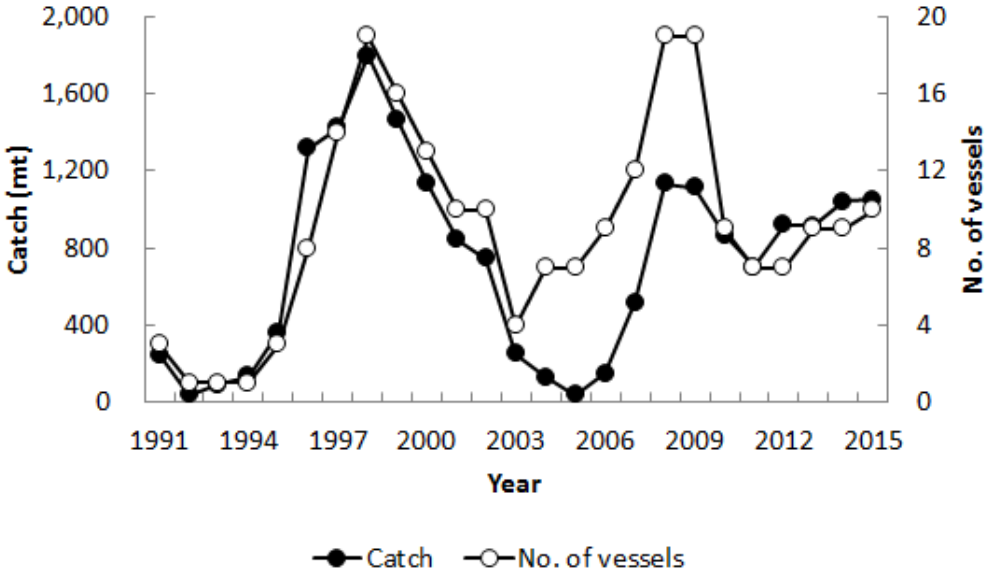

Fig. 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2015.

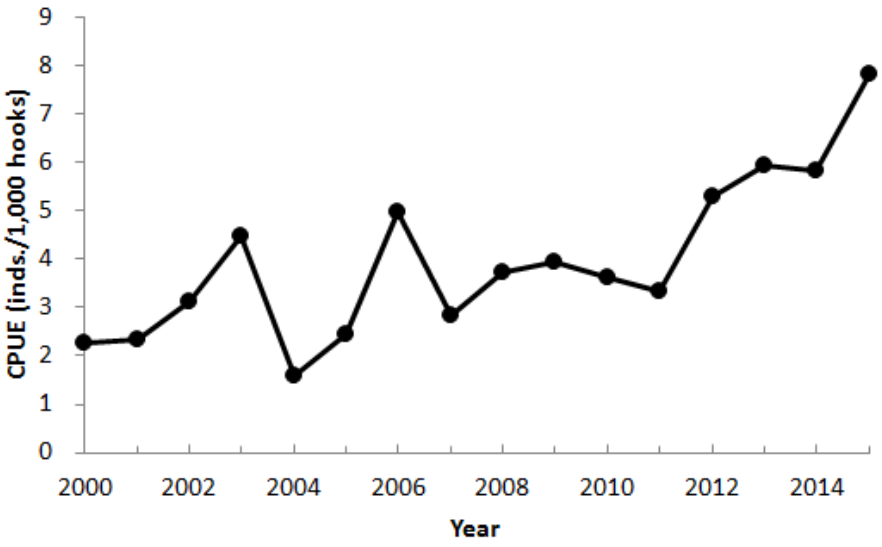

Fig. 2. The nominal CPUE series of Korean tuna longline vessel targeting SBT, 2000-2015.

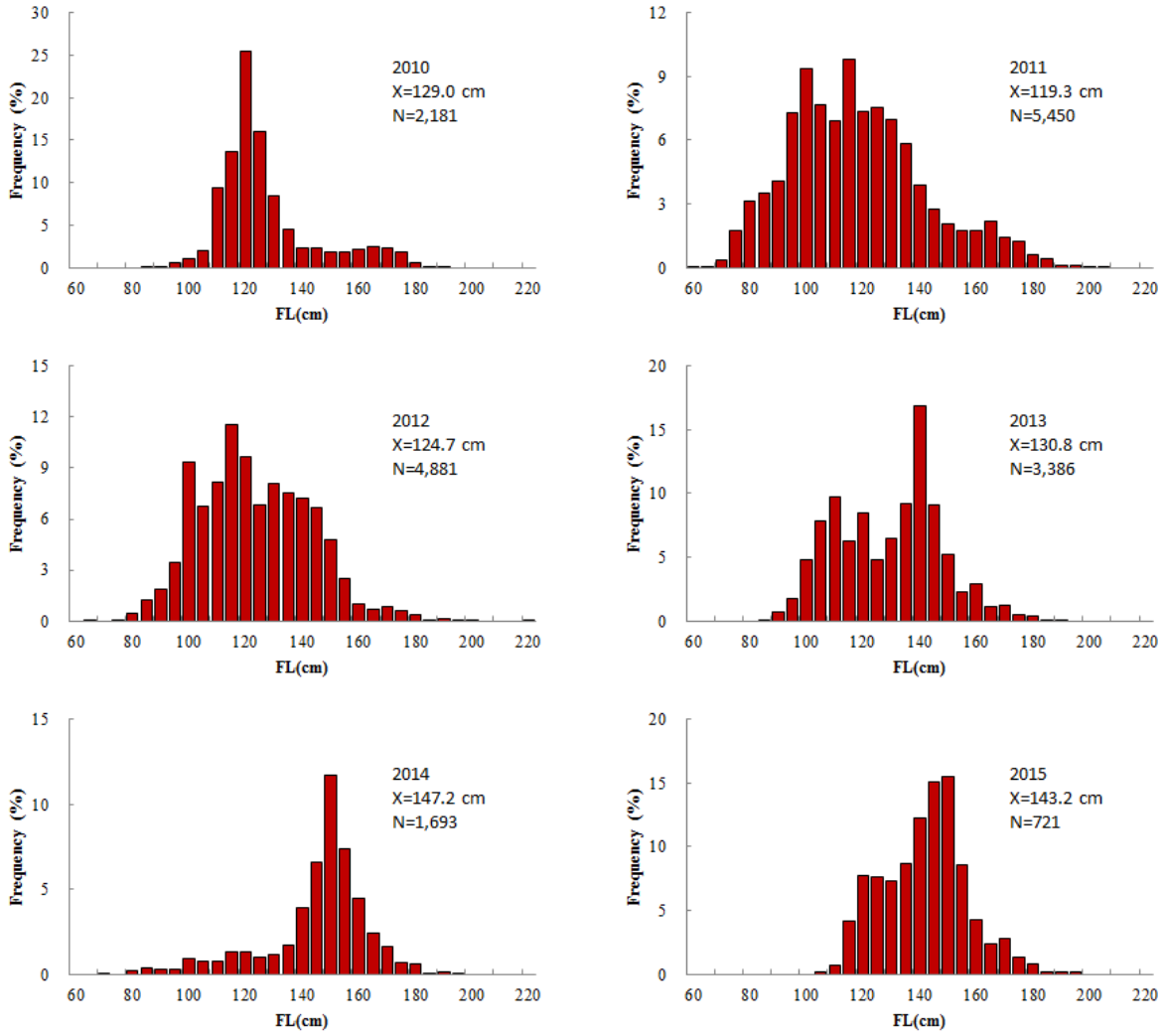

Fig. 3. Length frequency distribution of SBT caught by Korean tuna longline fishery, 2010-2015.

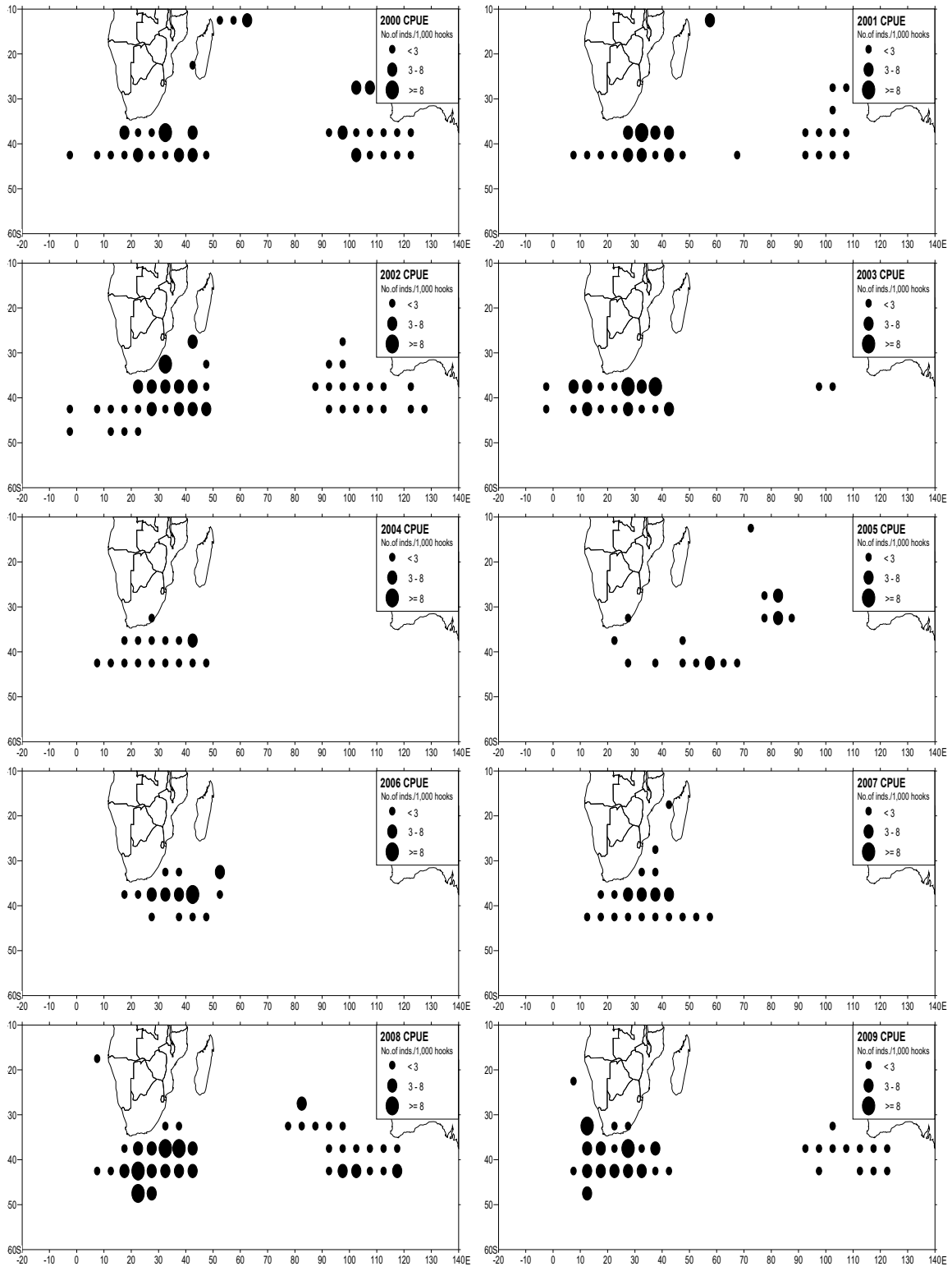

Fig. 4. The CPUE distribution of Korean tuna longline targeting SBT by year and by area, 2000-2015.

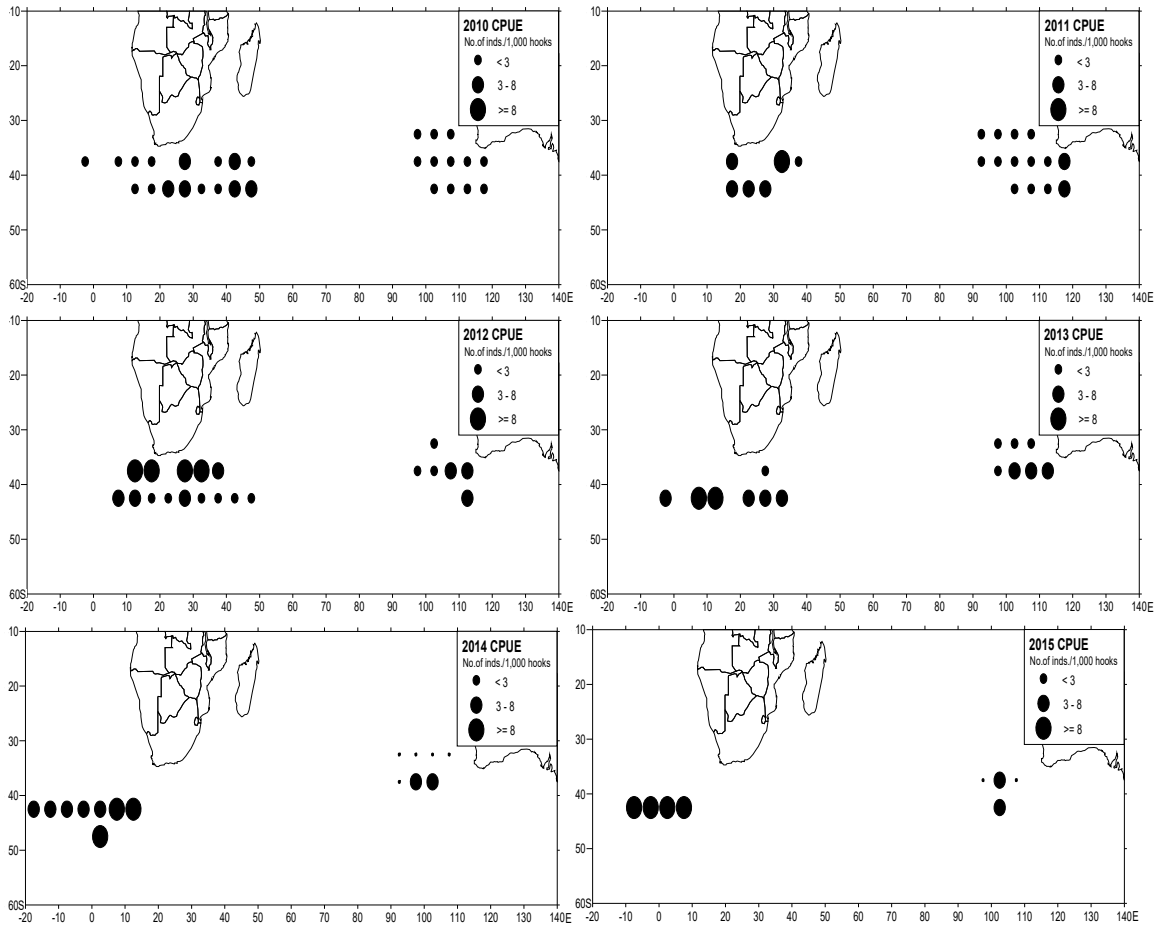

Fig. 4. Continued.