2015 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 2014, SBT catch in calendar year of Korean tuna longline fishery was 1,044 mt (1,044 mt in fishing year) with 9 vessels in active. In general, fishing occurs between 35^{o}S-45^{o}S and 10^{o}E-120^{o}E, especially in the western Indian Ocean from April to July/August and in the eastern Indian Ocean from July/August to December, but for 2014/15 fishing year, fishing vessels moved westward than previous years and operated in the Atlantic Ocean of the area between 20^{o}W-15^{o}E, then in the eastern Indian Ocean off the Western Australia. SBT catch and effort were relatively higher in the western Indian Ocean (area 9) as usual, and the fishing season had finished earlier in September.

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 2014/15 fishing year, Korean Government has set 1,075 mt for the yearly total allowable SBT catch (including 30 mt of carry-forward to this fishing season), from which the catch was 1,044 mt (1,044 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 35^{o}S-45^{o}S and 10^{o}E-120^{o}E, especially in the western Indian Ocean (10^{o}E-50^{o}E) of area 9 from April to July/August and in the eastern Indian Ocean 90^{o}E-120^{o}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 since 2008. For 2014/15 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 highest of 5.9 in 2013, and in 2014, it was similar to that of 2013 (Fig. 2). In general, the CPUE by area was apparently higher in area 9 than in areas 2 and 8 throughout the period of 2000-2014, 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 5 years, with a higher mode of 150 cm than in other years (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 9 vessels have operated in active for fishing SBT so as to be equivalent to the national quota (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 20°W-15°E, then in the eastern Indian Ocean off the Western Australia. The CPUE in 2014 was also higher in area 9.

6. Development and implementation of scientific observer programs

A. Observer Training

National Fisheries Research and Development Institute (NFRDI) 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 24 persons being able to be deployed onboard as an active scientific observer.

B. Scientific Observer Program Design and Coverage

In 2014, 2 observers were placed onboard 2 longline vessels targeting SBT (Table 3).They observed the SBT catch of 92 mt and the effort of 219×10^3 hooks in 81 sets during 90 days in fishing area, which the observer coverage was estimated to be 7% of fishing efforts (Table 3). Table 4 shows the amount of SBT catch and effort compiled from the Korean observer program by area in 2014. Observers were deployed in areas 2 and 8 in 2014, which did not cover all fishing ground of Korean tuna longline vessels fishing for SBT (Table 4), because the fishing season had finished earlier than usual.

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. Biological samplings carried out were stomach content and gonads of SBT and other tunas. In 2014, 1,377 individuals of SBT were observed and measured of length and weight during the trips (Table 5). The information of SBT and ERS on sex and maturity stage, including other species, were collected (Table 5).

D. Tag Return Monitoring

During the 2014 scientific observation, 4 individuals of SBT tagged were recaptured and 32 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 September 2014, the Act on Fisheries Information and Data Reporting has obliged fishers to report the catch statistics to National Fisheries Research and Development Institute (NFRDI) every week, and it will be revised on 1st September 2015 that fishers report every day 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. 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). NFRDI collects logbook data from vessels filled out by captain onboard. The data collected are verified and confirmed through cross-checking between NFRDI and 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 NFRDI from logbook and NFQS prior to issuing CDS. In 2014, there are few difference (0.5%) among NFRDI (1,049 mt from logbook), NFQS (1,044 mt from CDS) and Secretariat (1,044 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 2015 as well. In addition, in 2015 Korea is collecting SBT otolith and ovary through the observer program in order to contribute to the SPR proposal for estimating size/age at maturity of southern bluefin tuna (CCSBT-ESC/1409/23).

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2014

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

Table 2. The catch of SBT and the effort of Korean longline vessels targeting SBT by year and area, 2000-2014

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			

* Catch and effort data compiled from logbook.

Table 3. Observer coverage for the Korean SBT fishery through the Korean observer program, 2010-2014

Year	Trips observed	Effort observed (X1,000)	Total effort estimated (X1,000)	Catch observed of SBT (mt)	Coverage (%)
2010	2	389	4,104	95	9
2011	-	-	4,048	-	-
2012	3	421	3,635	162	12
2013	3	654	2,688	170	24
2014	2	219	3,274	92	7

Table 4. Amount of SBT effort observed by area, 2014

Year	Stratum	Catch (mt)			Effort (no. of hooks)		
		Total estimate	Total observed	Coverage	Total estimate	Total observed	Coverage
2014	2	13	0.4	3	369,312	3,410	1
	8	328	92	28	1,168,529	215,112	18
	9	572	-	0	1,735,878	-	0

Table 5. Number of fish measured or collected for biological information by species, 2014

Species	No. sampled	No. measured	No. weighted	No. sexed	Maturity stage
Southern bluefin tuna	1,377	1,377	1,375	1,143	134
Albacore tuna	52	52	52		
Sharks	1,148	1,148	1,148	767	33
Seabirds	2	2	2		
Ohers	798	798	795	139	42
Sum	3,377	3,377	3,372	2,049	209

Table 6. Number of Tag recaptured and released by species through the Korean observer program, 2014

Size class (cm)	Number	
	Recaptured	Released
80-89		3
90-99		3
100-109		13
110-119		7
120-129		5
130-139		1
140-149	2	
150-159		
160-169		
170-179	1	
180-189	1	
Total	4	32

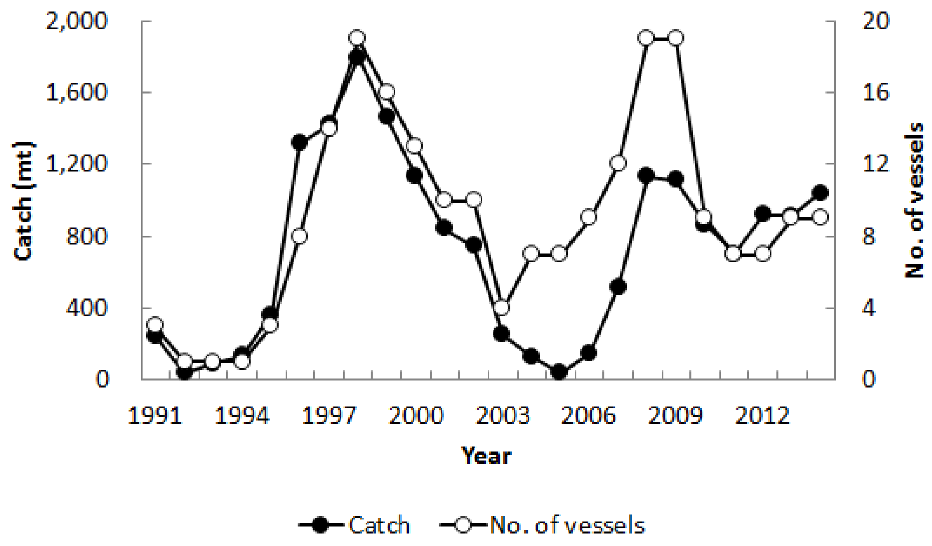

Fig. 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2014.

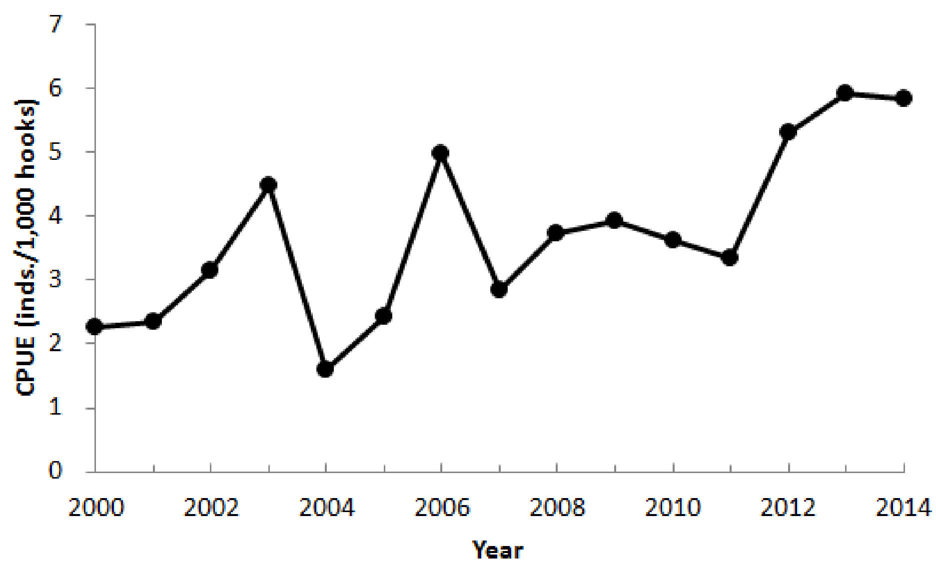

Fig. 2. The nominal CPUE series of Korean tuna longline vessel targeting SBT, 2000-2014.

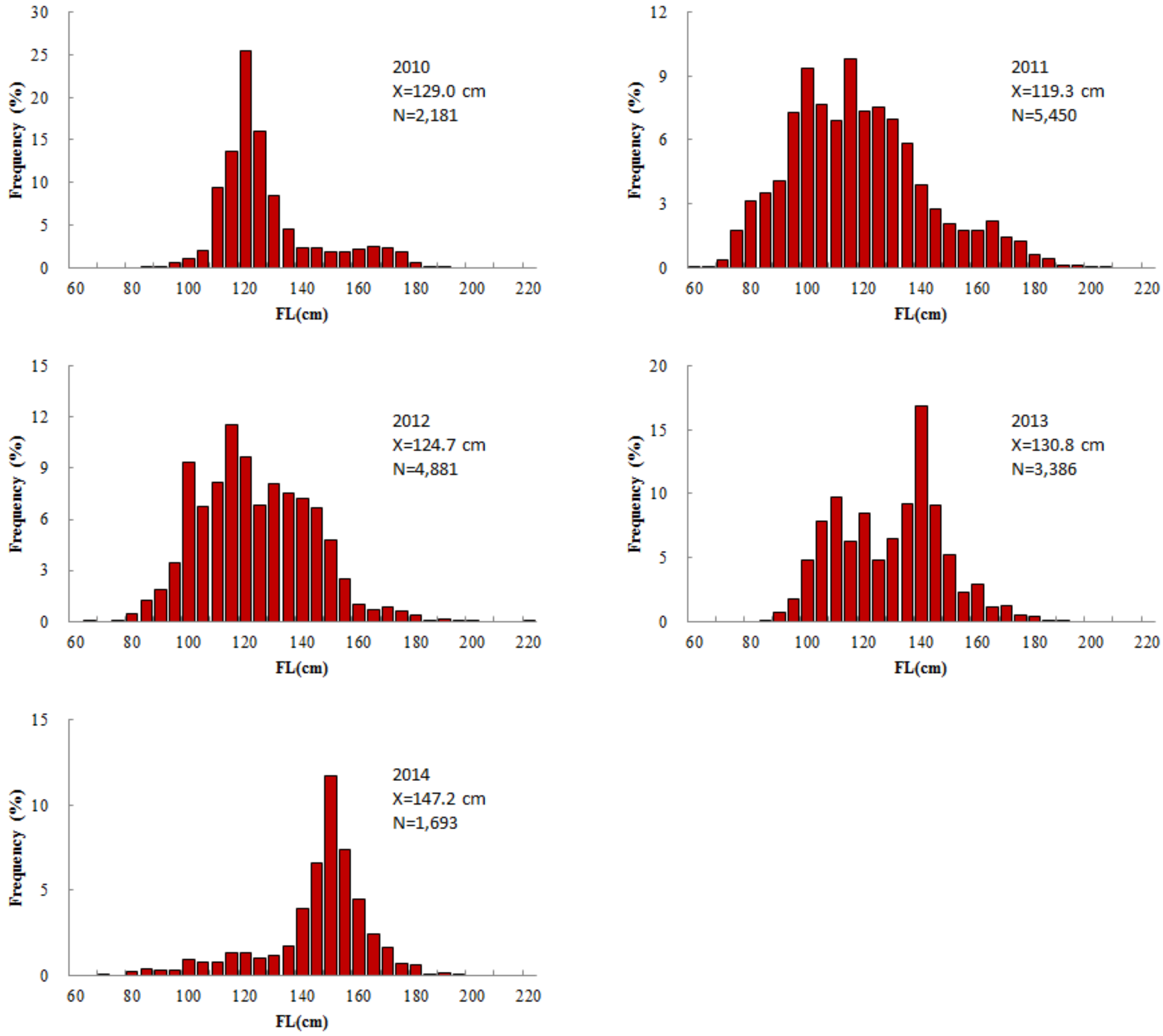

Fig. 3. Length frequency distribution of SBT caught by Korean tuna longline fishery, 2010-2014.

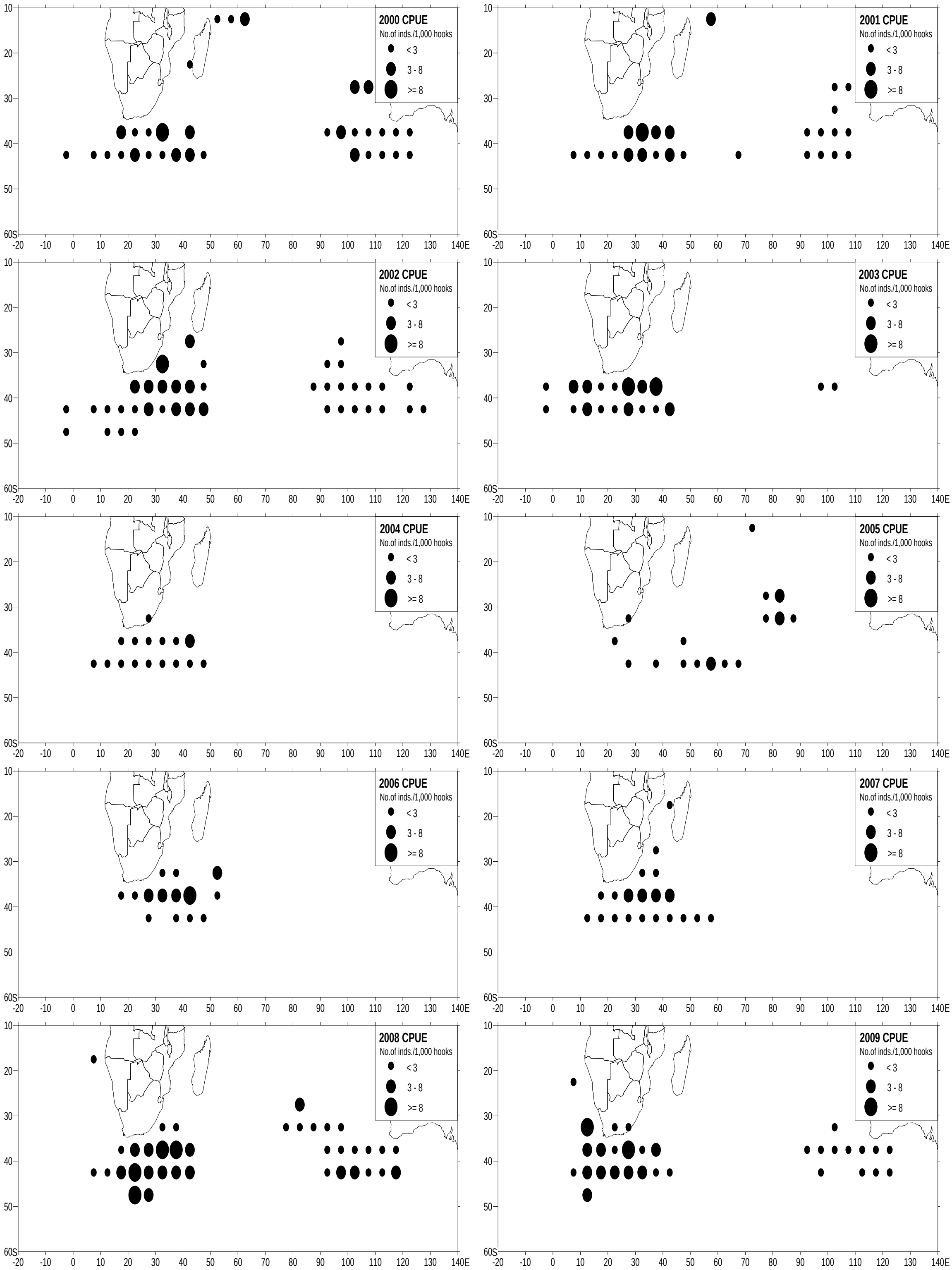

Fig. 4. The CPUE distribution of Korean tuna longline targeting SBT by year and by area, 2000-2014.

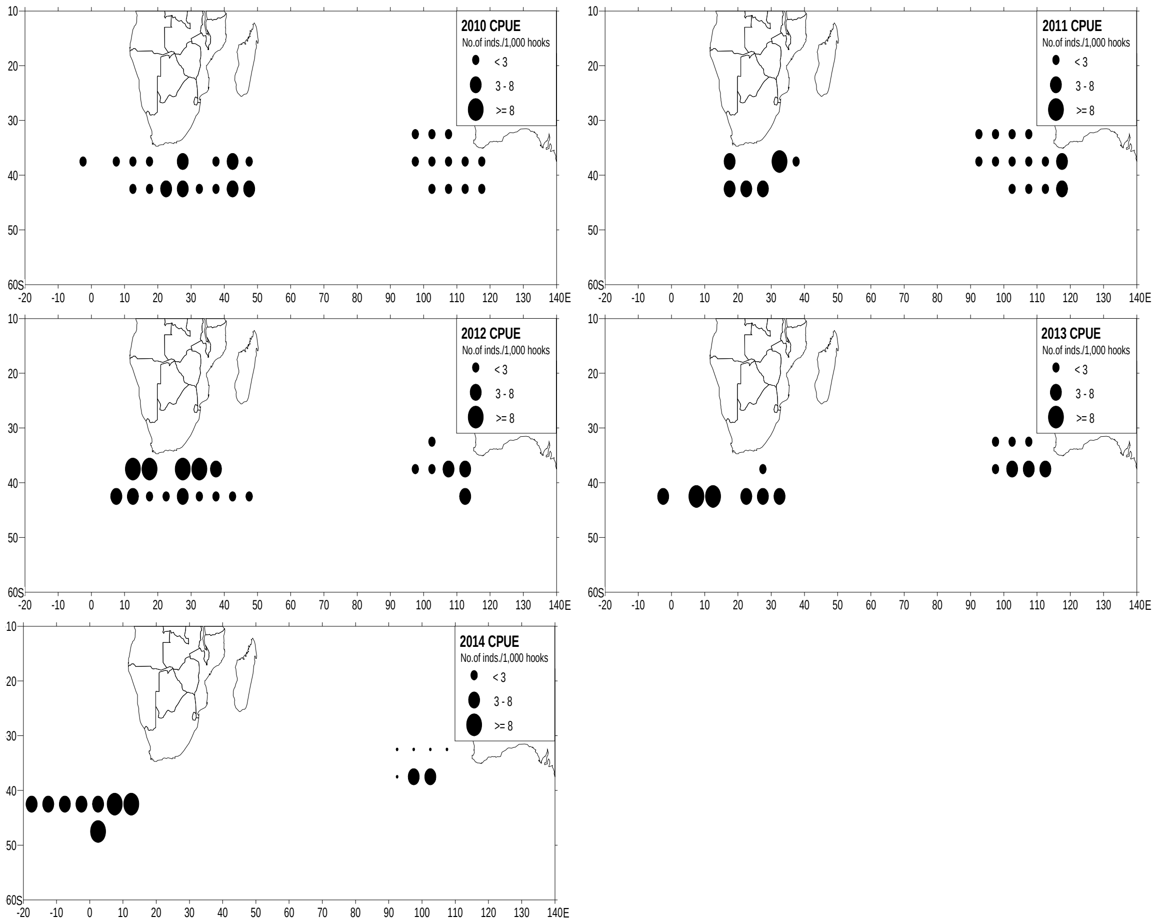

Fig. 4. Continued.