Received: 15 November 2017
IOTC-2017-SC20_NR11

Japan National Report
to the Scientific Committee of the Indian Ocean Tuna Commission, 2017

National Research Institute of Far Seas Fisheries, Japan Fisheries Research and Education Agency
and
Fisheries Agency, Government of Japan

Executive Summary

This Japanese national report describes following 8 issues in recent five years (2012-2016), i.e., (1) tuna fisheries (longline fishery and purse seine fishery) (2) fleet information, (3) catch and effort by species and gear, (4) ecosystem and bycatch, (5) national data collection and processing systems including "logbook data collection and verification", "vessel monitoring system", "scientific observer program", "port sampling program" and "unloading and transshipment", (6) national research programs and (7) Implementation of Scientific Committee recommendations & resolutions of the IOTC relevant to the Scientific Committee and (8) working documents.

INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National Report submitted to the IOTC Secretariat in 2017, final data for the 2016 calendar year must be provided to the Secretariat by 30 June 2017)	YES 30/June/2017
In accordance with IOTC Resolution 15/02, provisional **longline data** for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2017, preliminary data for the 2016 calendar year was provided to the IOTC Secretariat by 30 June 2017). **REMINDER:** Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2017, final data for the 2016 calendar year must be provided to the Secretariat by 30 December 2017).	YES 30/June/2017
If no, please indicate the reason(s) and intended actions:	

Contents

1. BACKGROUND/GENERAL FISHERY INFORMATION

Longline and purse seine fisheries are two types of Japanese tuna fisheries currently operating in the Indian Ocean. Longline fishery started its operation in 1952 when the limitation of operational area imposed by the GHQ*[1], was removed. On the other hand, commercial purse seine fleet commenced fishing in the Indian Ocean in 1991 after several years of experimental fishing.

The total fishing effort (the number of hooks) of Japanese longliners in the Indian Ocean had been keeping at similar level with fluctuation since 1971, i.e., around 100 million hooks, until 2007. Thereafter, it has been decreasing down to about 28 million hooks in 2011 due to piracy activities. It kept in a low level after that and was 27 million hooks in 2016. Percentage of effort used in this Ocean in the total effort in all oceans fluctuated around 20% until 2003 after when it increased to 35% in 2006 and 2007. Thereafter it has drastically decreased to 16% in 2010 and kept in a low level after that, mainly because of piracy activities off Somalia.

As for the purse seine fishery, fishing took place mainly in the tropical western Indian Ocean until 1993 after when fishing effort shifted almost completely to the eastern Indian Ocean mainly because of economic problem derived from rise of Japanese Yen during that time.

2. FLEET STRUCTURE

All Japanese longline vessels operating in the Indian Ocean have been the distant water category (120-500GRT) with some exceptional offshore vessels (10-120GRT). Historical change in the number of longline vessels from 1987 to 2016 is shown in Table 1. In the last 20 years, the number of vessels operated in this Ocean was around 170-250 per year until 2008. Although the number of operating vessels was relatively large in number (224-251) during 1995-1999, after that it decreased to less than 200 except for 228 in 2002. Although the number of vessels in 2007 increased to 250, it decreased rapidly year by year until 2011 due to effect of piracy activities. The number of longline vessels in 2016 was 45.

Japanese purse seine vessels operating in the Indian Ocean are 350-700 GRT class (700-1000 carrying capacity). Historical change in the number of purse seine vessels from 1987 to 2016 is shown in Table 1. Although more than 10 Japanese purse seiners operated during 1991-1994, it decreased year by year and commercial purse seiner retreated from the Indian Ocean in 2001 leaving only one vessel “Nippon-Maru”, the research vessel of Fisheries Research Agency (FRA), which was replaced by another research vessel “No.1 Taikei-Maru” in 2013. Since 2015 commercial vessels also have been operating and the number of total vessels operated in 2016 was 3.

Table 1. Number of vessels operating in the IOTC area of competence, by gear type

Fleet/Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Longliners	272	235	245	216	184	181	206	206	224	251	243	242	223	192	199
Purse seiners	1	1	3	4	11	12	11	11	8	5	3	4	3	2	2

Fleet/Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Longliners	228	172	189	184	188	250	173	130	84	72	75	57	53	52	45
Purse seiners	1	1	1	1	3	3	3	2	1	1	1	1	1	3	3

* *GHQ (General Headquarters) of the occupying forces of the Allies after the World War II*

3. Catch and effort (by species and gear)

3.1 Longline fishery

The latest available longline data is that of 2016 (data for 2016 are preliminary).

Fishing effort

The longline fishery commenced in 1952 in the eastern equatorial waters in the Indian Ocean. In the late 1960s, the effort covered entire fishing ground of the longline in the Indian Ocean. The annual amount of the effort has increased until the late 1960s and fluctuated after that. However, fishing effort had been dramatically decreasing since 2008 and then kept in a low level (Table 2) because of the effect of piracy activities off Somalia. Fishing effort in 2016 (27 thousand hooks) was only about 23% of that in 2007.

Table 2. Annual catch and effort and primary species in the IOTC area of competence (longline fishery, 2012-2016).

(catch in mt and hooks in thousand)

Year	Sets	Hooks	SBF	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SFA	SPF	SKJ
2012	9,635	31,466	1,389	2,918	5,474	3,330	619	158	238	53	56	94	15
2013	8,926	29,127	953	2,275	5,582	4,158	657	94	195	51	56	87	24
2014	9,800	31,786	1,272	3,737	5,310	3,639	770	56	173	51	72	112	26
2015	9,181	28,958	1,864	2,917	4,876	3,137	706	23	137	49	60	109	14
2016	8,591	27,079	1,621	2,387	4,056	2,956	724	96	121	48	33	60	8

Geographical distributions of longline effort for 2016 and average of 2012-2016 are shown in Fig. 1. In 2016, the effort in African offshore area from off Cape Town to Mozambique and in the eastern part west off Australia and Indonesia seems relatively larger than that for 2012-2016. The effort in the northwestern area has dramatically decreased since 2008 and the effort in 2016 is still few because the threat of activity of piracy still remains off Somalia.

Catch

Historical catch in weight by species and catch statistics for 2012-2016 by Japanese longliners in the Indian Ocean are shown in Fig. 2 and Table 2, respectively, and geographical distributions of catch in 2016 and average of 2012-2016 for major tuna and billfish species are shown in Fig. 3. Catch of albacore, yellowfin and southern bluefin tunas were very high during 1950s and 1960s, and then sharply decreased. After mid 1990s bigeye and yellowfin tunas have been main components of the catch.

Total catch (the catch of southern bluefin tuna, albacore, bigeye, yellowfin, swordfish, striped marlin, blue marlin, black marlin, sailfish, shortbill spearfish, and skipjack) in 2015 and 2016 was 13,892MT and 12,110MT, respectively. It should be noted that the catch of yellowfin and bigeye drastically decreased during 2007-2010, although the catch of albacore was roughly at the same level during this period. Furthermore, bigeye catch in 2011 and yellowfin catch in 2016 were lowest after 1980s, and this decrease was mainly derived from decrease in effort especially in the tropical area.

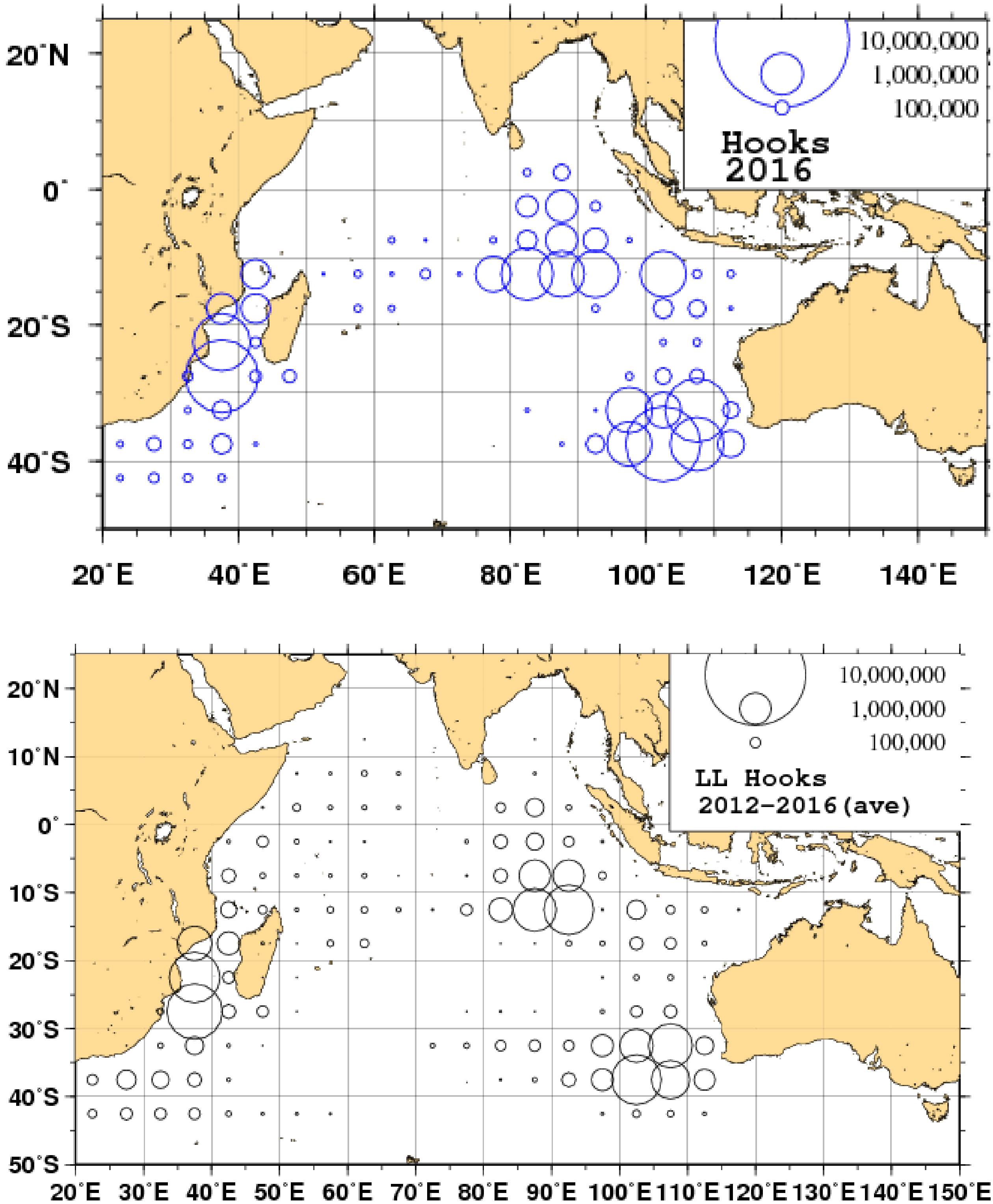


Fig 1. Geographical distributions of longline effort for 2016 (above) and average of 2012-2016 (below).

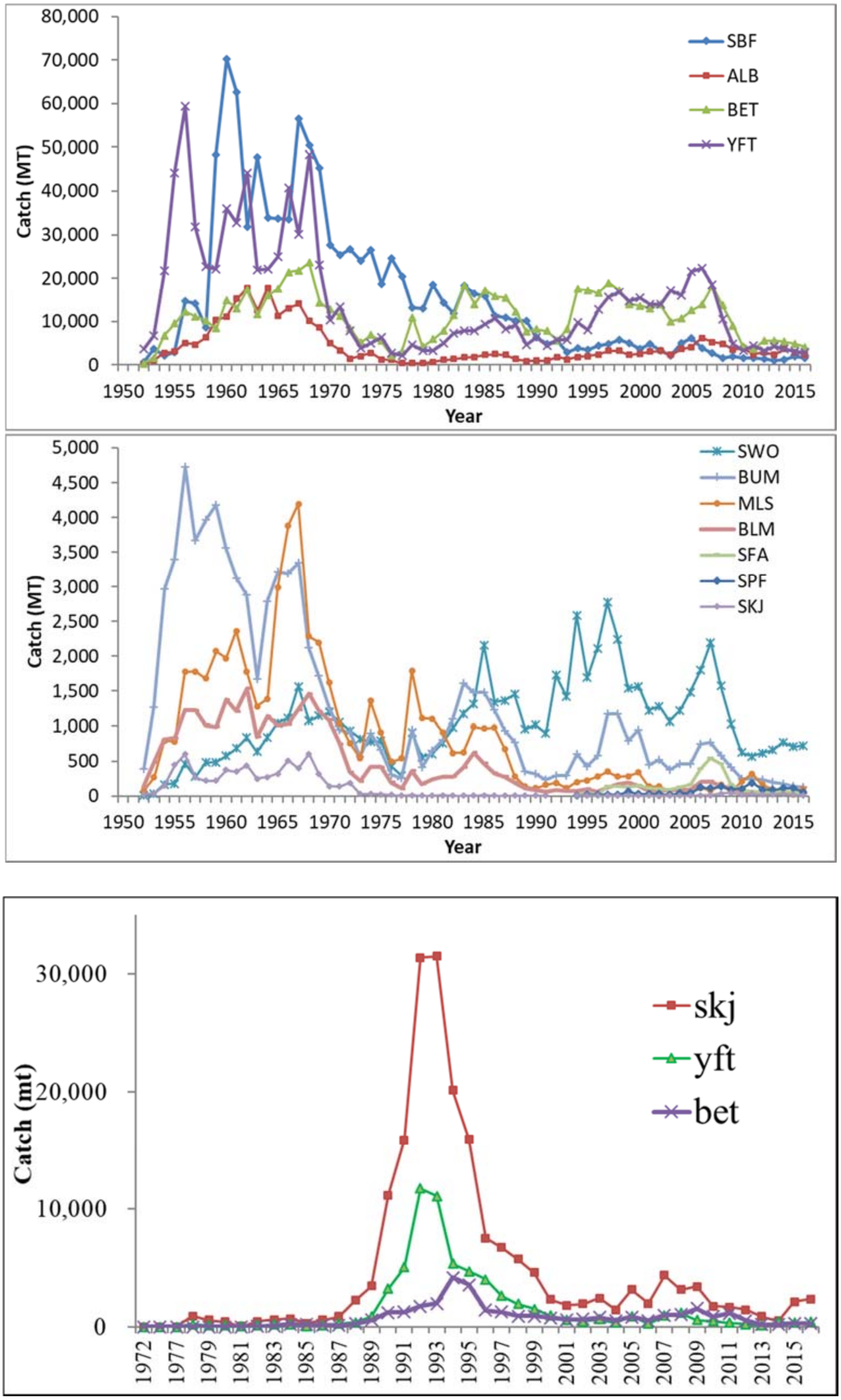
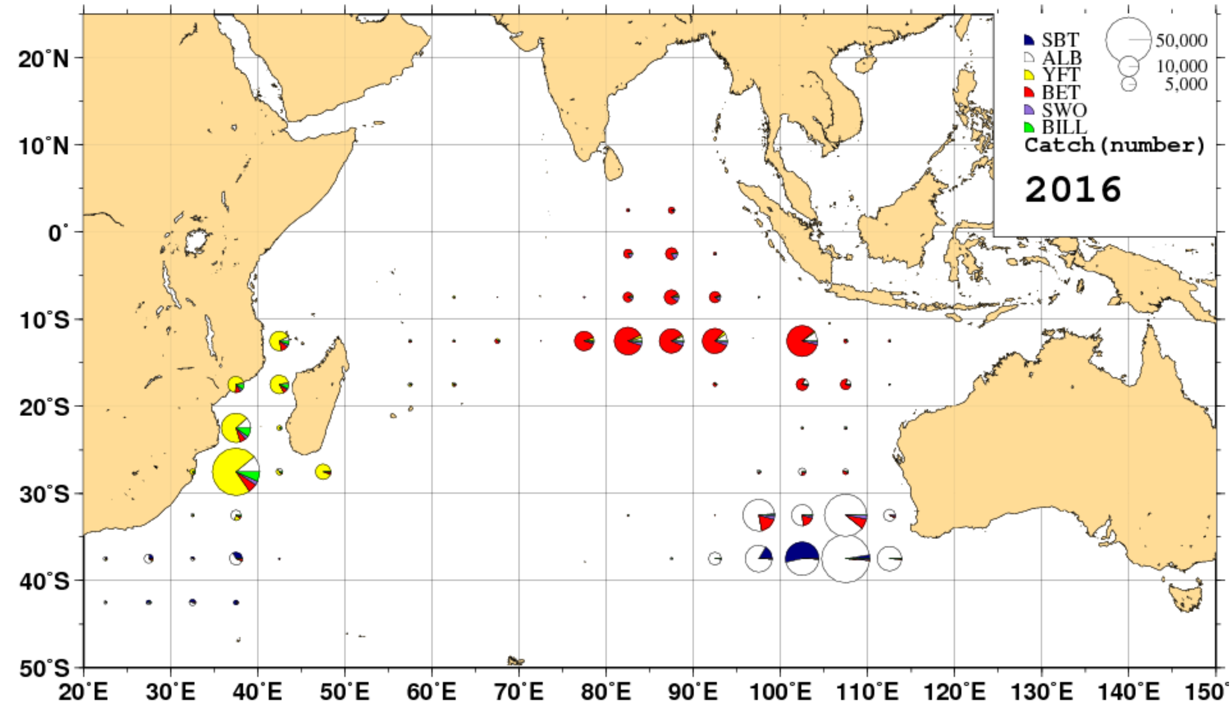


Fig. 2. Historical change in longline and purse seine catch of main tuna and tuna-like species in the Indian Ocean. Upper: longline (tuna species), middle: longline (skipjack and billfish species), lower: purse seine.



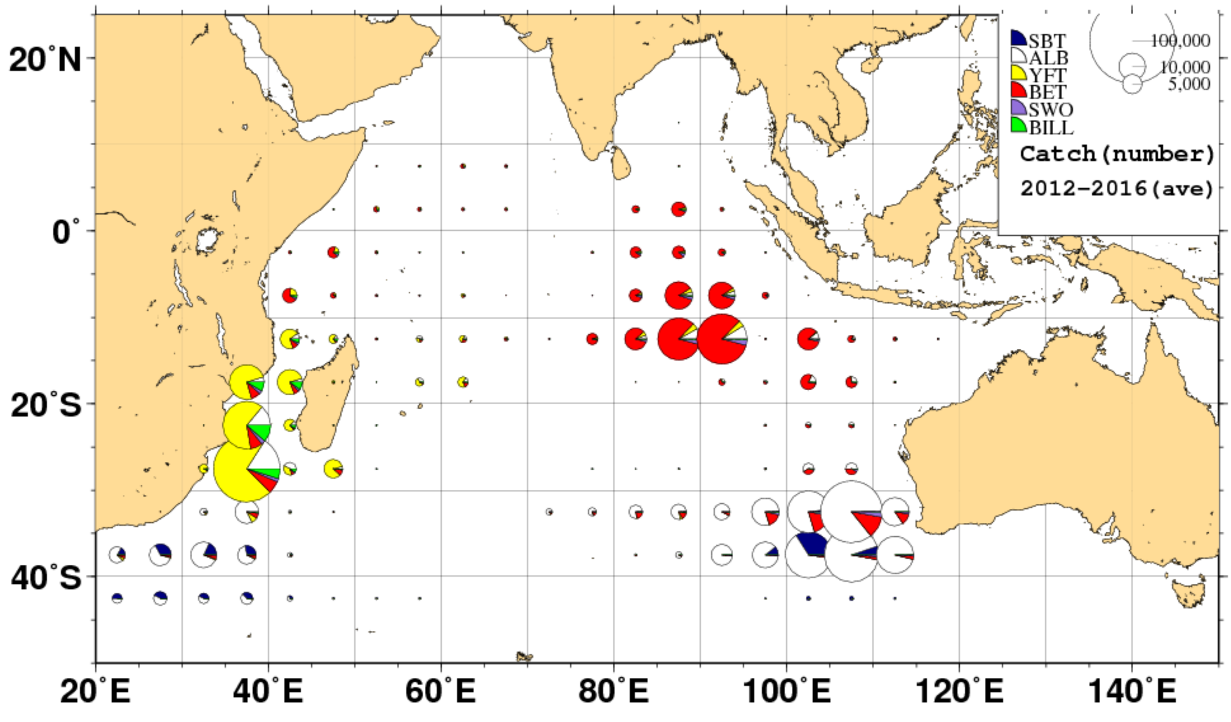


Fig. 3 Geographical distributions of longline catch (in number) of major species in 2016 (upper) and in average of 2012-2016 (lower). Southern bluefin tuna (SBT), albacore (ALB), bigeye tuna (BET), yellowfin tuna (YFT), swordfish (SWO) and billfishes (BILL).

Seeing geographical distribution of the catch, yellowfin and bigeye tunas are mainly caught in the western and eastern part, respectively. Albacore is mainly caught in the temperate area west off Australia and subsequently around South Africa, where this species is one of main components of the catch. In 2016 there was little effort in the northwestern area and so yellowfin was mainly caught in the area around Madagascar.

3.2 Purse seine fishery

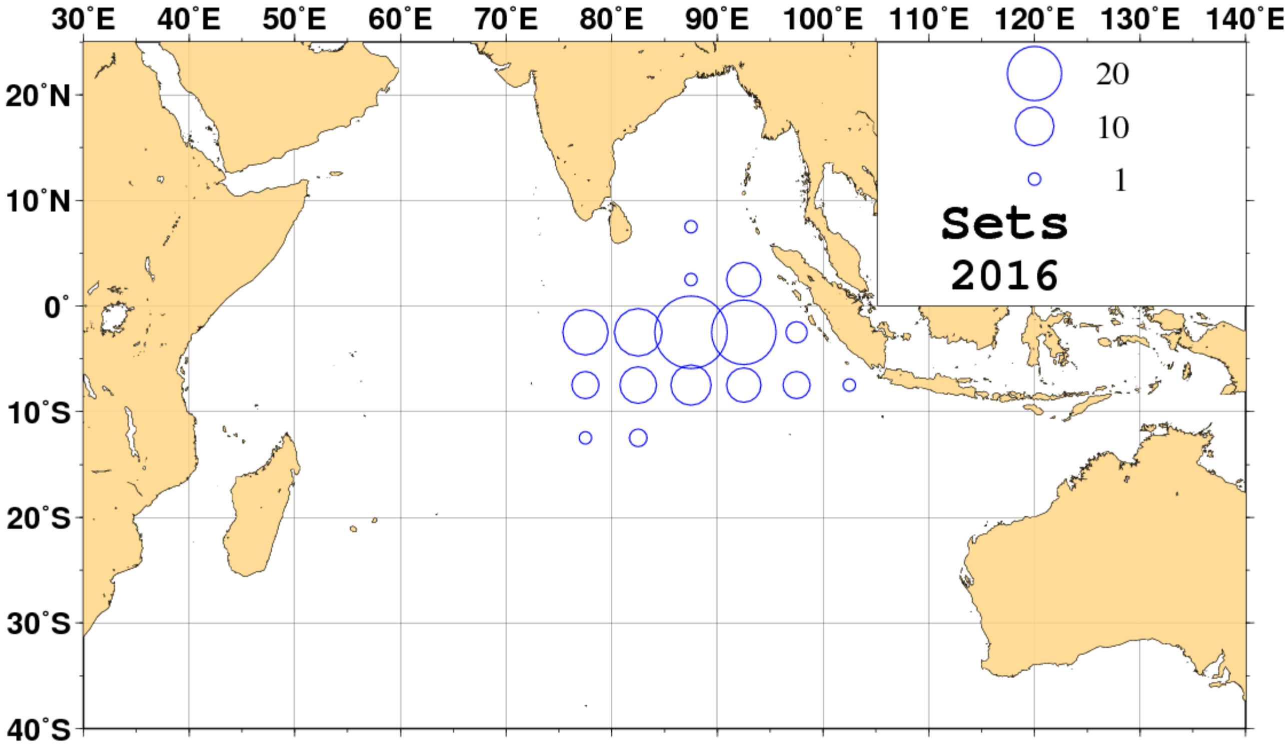
The latest available data for Japanese purse seine fishery is that for 2016.

Fishing Effort

Total fishing effort (number of set) was 154 in 2015 and 147 in 2016 (Table 3). These are larger than those in the early 2010s due to increase in the number of vessels. Geographical distributions of effort for 2016 and the average of 2012-2016 are shown in Fig. 4. Operations were conducted almost only in the eastern part in recent years.

Table 3. Annual catch and effort and primary species in the IOTC area of competence (2012-2016) (purse seine fisheries).

Year	Number of set	Catch (mt)				
		SKJ	YFT	BET	others	Total
2012	72	1,437	232	536	0	2,205
2013	27	861	95	197	0	1,153
2014	51	496	433	192	0	1,121
2015	154	2,140	338	294	0	2,772
2016	147	2,357	422	258	0	3,037



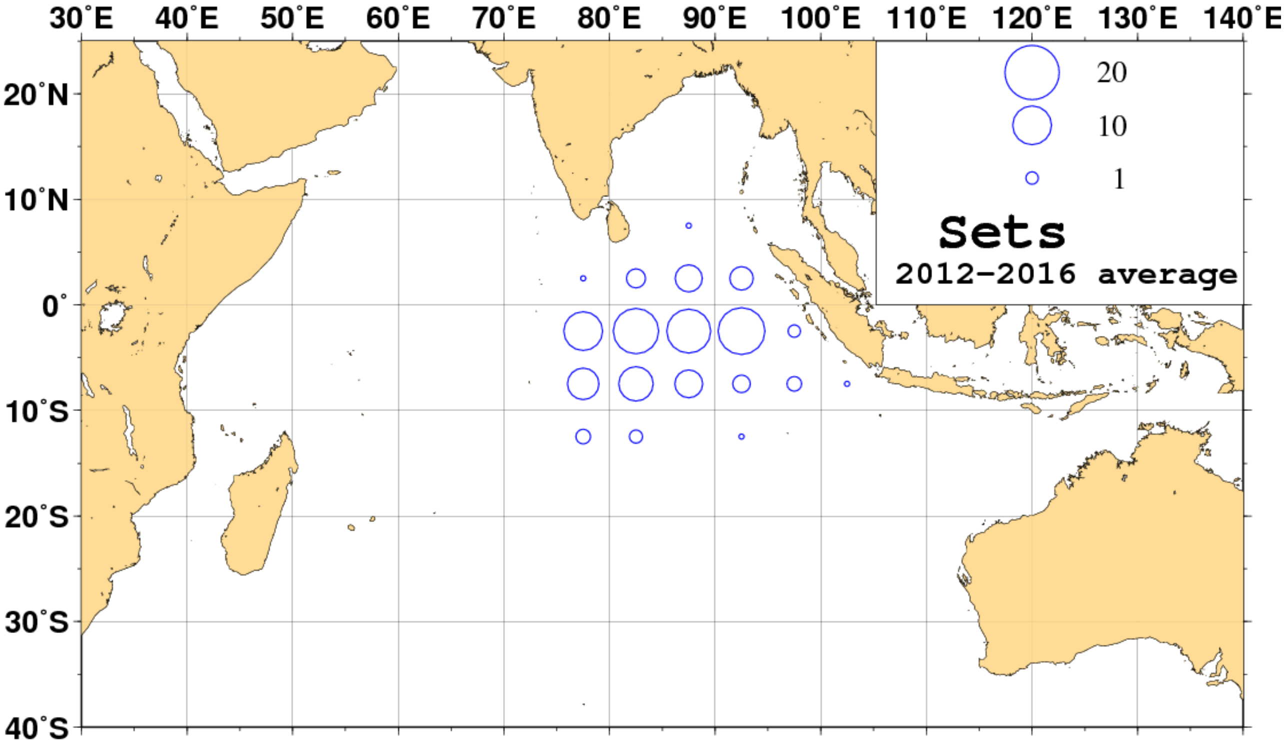


Fig. 4. Distributions of purse seine fishing effort in the Indian Ocean in 2016 (upper) and average of 2012-2016 (lower).

Catch

Total catch was low (around 1,000 MT or less) until mid-1980s, then increased rapidly to about 45 thousand MT in 1992 and 1993 after when it decreased to 10 thousand MT in 1997 and 10 thousand MT in 1999 (Fig. 1). Thereafter it has fluctuated between 2.0 and 8.6 thousand MT until 2012 and total catch in 2013 and 2014 decreased to approximately 1 thousand MT. Total catch in 2015 increased to 2.8 thousand MT because of increase in the number of vessels operated, and kept in a similar level (3.0 thousand MT) in 2016. Catch in weight of skipjack, yellowfin and bigeye in 2016 (2015) was 2,357 (2,140) MT, 422 (338) MT and 258 (294) MT, respectively. Geographical distributions of catch in 2016 and average of 2012-2016 for major tuna species are shown in Fig. 5. Main component of the catch was usually skipjack tuna in all the area operating, and was partly yellowfin and/or bigeye tuna.

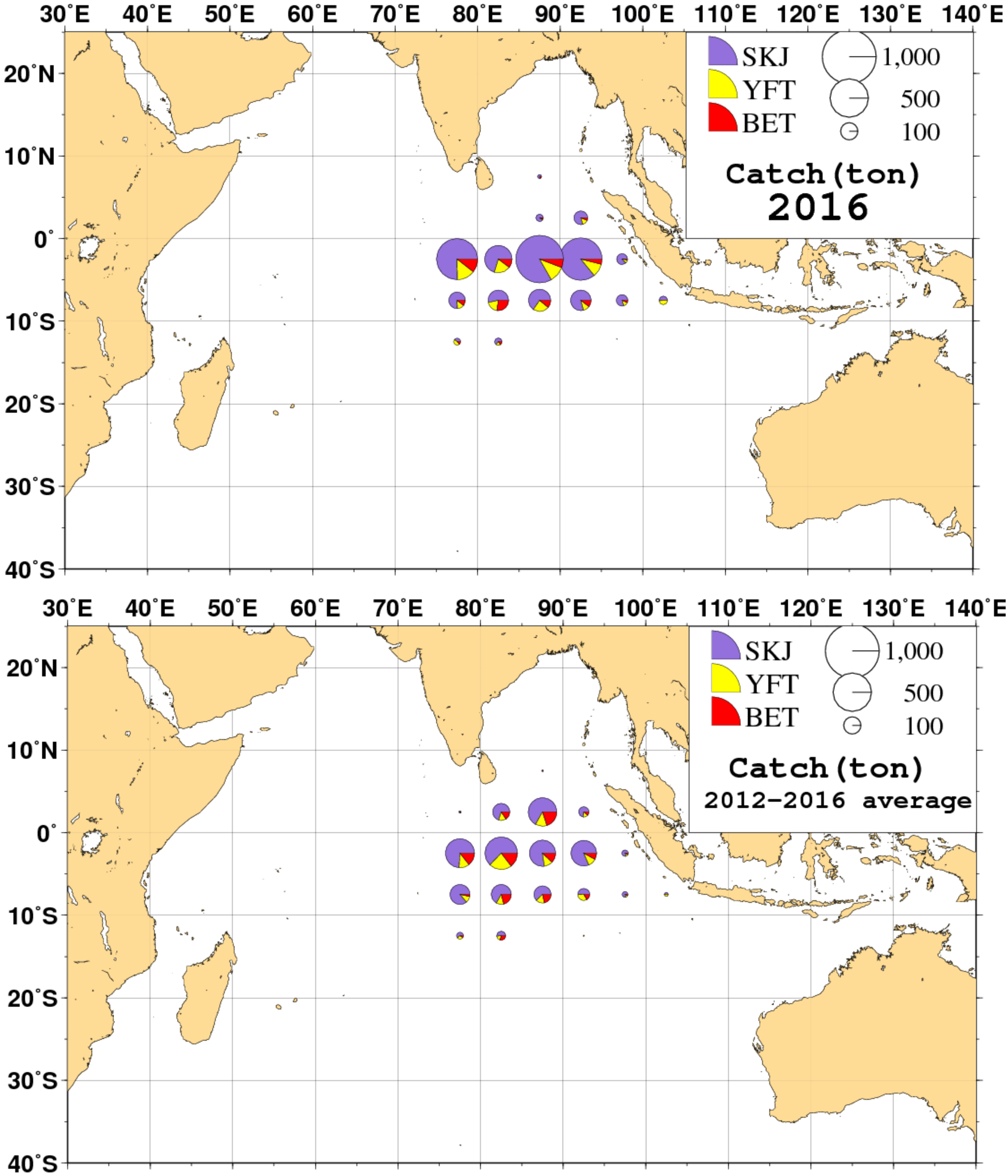


Fig. 5 Geographical distributions of purse seine catch of major species in 2016(upper) and average of 2012-2016 (lower).

4. RECREATIONAL FISHERY

None

5. ECOSYSTEM AND BYCATCH ISSUES

5.1 National Action Plans

In accordance with FAO International Action Plans on sharks and seabirds, Japan established the National Action Plans on sharks and seabirds in 2001 then revised in 2009 and 2016. In addition, Japan has been taking actions in accordance with the FAO Guidelines on sea turtle by-catch. Japan has been taking actions in accordance with IOTC conservation and management measures on by-catch of sharks, sea turtles and seabirds.

5.2 Logbooks information (Sharks)

Table 4 shows annual catch of three major shark species by Japanese tuna longliners (1994-2016). These catch data were collected through the logbook and compiled in the National Research Institute of Far Seas Fisheries (NRIFSF). In August 2008, the Japanese government obliged Japanese distant water longliners to land all the parts of sharks (although heading, gutting and skinning are allowed) and the quantities given in Table 4 represents the whole weight including the weight of fins. These figures are based on the new conversion factors introduced in 2013 (for details on the new conversion factors, refer to National Report in 2013). In April 2013, silky and hammerhead sharks were added into shark species to be recorded in the logbooks for longline fishery, in addition to blue, Porbeagle, shortfin mako, oceanic whitetip, thresher and other sharks. Statistics of newly added species will be available in the near future.

Table 4. Reported annual catch (tons) of three major sharks species caught by Japanese tuna longliners in the Indian Ocean (1994 -2016). (*) 2016 is preliminary.

Year	Blue shark	Porbeagle	Shortfin mako
1994	414	145	425
1995	724	47	328
1996	736	51	666
1997	805	62	494
1998	645	48	283
1999	557	37	372
2000	530	39	310
2001	477	33	246
2002	433	25	224
2003	355	10	126
2004	330	10	297
2005	577	20	276
2006	398	24	216
2007	790	12	162
2008	2240	53	208
2009	2657	26	154
2010	1503	13	170
2011	1390	18	155
2012	1557	8	148
2013	1102	2	99
2014	832	2	112
2015	974	4	111
2016	496	4	99

5.2 Observer data

Under the IOTC ROS staring July 1, 2010, scientific observers have been deployed to the Japanese tuna longliners and collecting bycatch data in the Indian Ocean mainly as a part of the southern bluefin tuna observer program. Observers take photo of bycatch species according to the procedures given in the observer manual made by the NRIFSF scientists. Bycatch experts in the NRIFSF identified species using these photos. Table 5 shows the summary of bycatch information (2010-2015).

Table 5 Summary of bycatch information (number of individuals retained) observed by scientific observers on board to Japanese tuna longline vessels

IOTC code	English name	2010	2011	2012	2013	2014	2015
Sharks							
BSH	Blue shark	1,033	1,803	823	407	809	213
BTH	Bigeye thresher	159	0	0	0	0	0
FAL	Silky shark	18	2	3	1	4	13
LMA	Longfin mako	0	1	0	0	1	0
OCS	Oceanic whitetip shark	10	1	0	0	0	0
POR	Porbeagle	181	171	39	23	5	0
PSK	Crocodile shark	0	12	0	1	0	0
RSK	Unidentified requiem sharks	0	0	0	0	1	4
SMA	Shortfin mako	69	162	83	73	90	39
SPL	Scalloped hammerhead	2	0	0	0	0	0
TIG	Tiger shark	2	0	0	0	0	0
Pelagic stingray							
PSL	Pelagic stingray	2	18	10	5	0	0
Sharks, Rays and Skates (unidentified)							
SKH	Sharks, rays, skates, nei	4	2	2	1	0	0
Sea Turtle							
	Un-identified	0	0	0	1	0	0
Sea bird (for specimen)							
DCU	Shy-type albatrosses	0	0	0	0	1	0
TQH	Indian yellow-nosed albatross	0	0	0	0	2	0

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1 Logbook data collection and verification

Longline

In the logbook of longline, set by set data on catch number and weight in each species, and other information data such as fishing date and location, fishing effort (the number of basket and hooks used), water temperature and time of starting and setting the gear are included. The number of hooks per basket is important information as it suggests the depth of the gear and target species. As for tuna and tuna-like fishes, six tunas (bluefin, southern bluefin, albacore, bigeye, yellowfin and skipjack), and six billfishes (swordfish, striped marlin, blue marlin, black marlin, sailfish and shortbill spearfish) are recorded by species in the logbook. Additionally, information on the cruise (date and port of departure and arrival of the cruise), vessel (name, size, license number and call sign), number of crew and the configurations of the fishing gear (material of main and branch lines) are asked to fill on the top part of the sheet by each cruise. Japan revised the logbook format for distant water fishing vessels in accordance with IOTC Resolution 12/03,13/03 and 15/01.

Submitted logbooks are processed into electronic data files. Various error checks, such as date, location, range of weight of the fish, CPUE, are conducted before these data are finalized. Vessel characteristics (call sign, name, license number, etc) are verified with a register.

Purse seine

The logbooks of purse seiners are required to be submitted every month to the Japanese government. The reported catch by species could be verified by comparing with the landing data, which were obtained from market receipts of three major unloading ports (Yaizu, Makurazaki, and Yamagawa).

6.2 Vessel Monitoring System

VMS installation on all distant water and offshore longline and distant water purse seine vessels is obligated since 1st August in 2007.

6.3 Scientific Observer programme

In July, 2010 Japan started the observer programs under IOTC ROS. During 2010-2015, 6, 8, 10, 9, 15 and 9 observers were dispatched to the IOTC area respectively. Average observer coverages (2010-2015) were 6.9% (sets) and 6.7 % (hooks) (Table 6). Japanese observer program in the IOTC area is a part of the southern bluefin tuna one. Data in 2010-2015 have been submitted to the IOTC Secretariat. Fig. 6 shows areas where observers covered in 2010-2015.

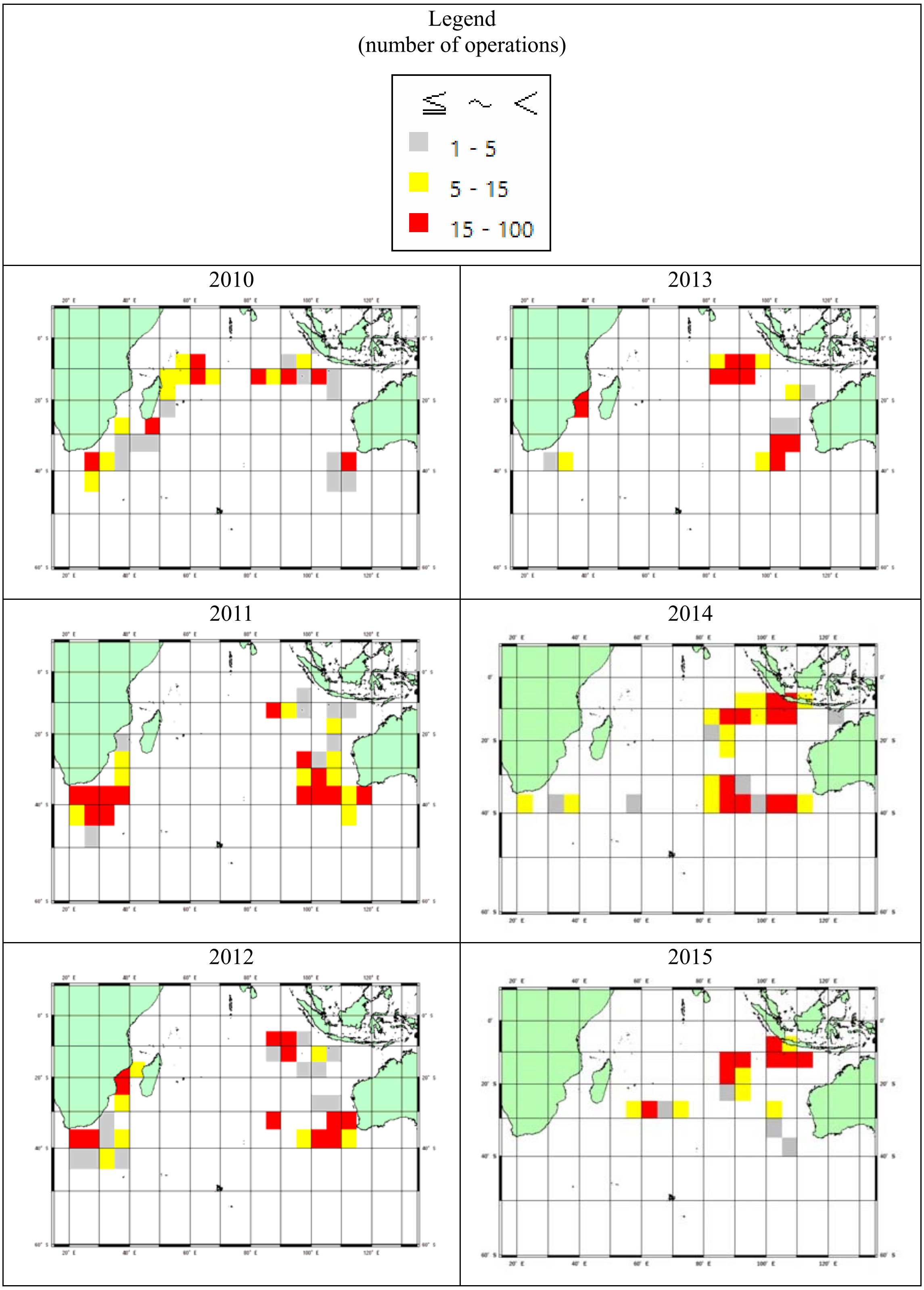


Fig. 6 5°x5° areas covered by scientific observers in the Japanese tuna longline fisheries (2010/July-Dec - 2015)
(Red: 15 operations or more, Yellow: 5-14 operations and Grey: 1-4 operation)

6.4 Port sampling program

Because catch in the Indian Ocean is mainly unloaded abroad, the port sampling in Japanese ports was held only once in 2006 recently.

6.5 Unloading/Transhipment

Unloading

The owners of fishing vessels are required to submit relevant documents to the Japanese Government 10 days before the planned landing date including unloading abroad. In case of unloading abroad the owner of fishing vessels are required to obtain approval from the Government of Japan in advance.

Transshipment

The owners of fishing vessels are required to obtain approval from the Government of Japan for at port transhipments in advance. To apply for at port transhipment, fishers have to submit relevant documents to the Government of Japan 10 days before the planned transhipment date. Fishers shall complete the IOTC transshipment declaration and transmit it to the Government of Japan not later than 15 days after the transshipment. Japan also controls at sea transhipments by its vessels in accordance with the Resolution 08/02 on establishing a programme for transhipment by large-scale fishing vessels.

7. NATIONAL RESEARCH PROGRAMS

7.1 Research cruises by Marine Fisheries Research and Development Center (JAMARC), Fisheries Research Agency (2013-2017)

In recent 5 years, JAMARC has been conducting the experimental purse seine fishing in the eastern Indian Ocean. RV Taikei Maru No.1 were used for the study. The main object of the research program is to mitigate bycatch of juvenile yellowfin and bigeye tunas in purse seining with FADs. Two kinds of study have been conducted; (a) Study on how large mesh size affect the catch size distribution of skipjack, yellowfin and bigeye tunas and (b) Study on preset estimation of species and size composition of schools associated with FADs using wide band echo sounder. With accurate estimation, sets on FADs with larger concentration of juvenile tunas could be avoided and would lead to protection of juveniles.

7.2 IOTC-OFCF projects (2002-2017)

The IOTC-OFCF joint project to improve tuna fisheries statistics in the developing countries in the IOTC water have been implemented for last 16 years in five phases, i.e., 1st phase (5 years: 2002-2006), 2nd phase(3 years: 2007-2009), 3rd phase (3 years: 2010-2012), 4th phase(4 years :2013-2016) and 5th phase (tentatively for 3 years: 2017-2019).

8. IMPLEMENTATION OF SC RECOMMENDATIONS & RESOLUTIONS OF THE IOTC RELEVANT TO THE SC.

Progress on the implementation of recommendations of the past SCs relating to Japan is as below:

8.1 Observer coverages

In accordance with the Resolution 11/04 (IOTC ROS), Japan started to deploy observers from July 2010. Average observer coverages (2010-2015) are 6.9% (sets) and 6.7 % (hooks) (Table 6).

Table 6 Observer coverage rates of the Japanese tuna longline fisheries (as of February 2017).

Color legend of coverage	5% ≦	< 5%

Year	2010 (July-Dec)	2011	2012	2013	2014	2015	**Average**
Sets							
Total Sets	4,470	8,804	9,635	8,926	9,800	9,203	8,473
Obseved sets	360	557	472	420	886	780	579
Coverage(%)	8.1	6.3	4.9	4.7	9.0	8.5	**6.9**
Hooks							
Total Hooks (1,000)	15,851	28,454	31,466	29,127	31,786	29,062	27,624
Obseved hooks (1,000)	1,197	1,791	1,495	1,388	2,770	2,395	1,839
Coverage(%)	7.6	6.3	4.8	4.8	8.7	8.2	**6.7**

8.2 Collection of size data

Tuna longliners in Japan have been collecting size data voluntary basis to now, except the observer program under the IOTC Regional Observer Scheme (ROS) started in July 2010. In 1960-70's, size data were covered up to 20% of the total catch, afterwards the coverage decreased to a few %. In 1980-1990's, high school training vessels off Java Island, Indonesia collected size data in high coverage rates. For example, as for bigeye tuna, its coverage of size data was 10-20% of the total catch in the Indian Ocean before 1992. But, afterwards it sharply decreased to only a few %. This is mainly because these training vessels shifted their operations to the Pacific Ocean due to the pirate problems in the Strait of Malacca. Under such situation, size data sampled have been limited. After the IOTC ROS started in July 2010, Japanese observer started to collect more size data (Table 7).

Table 7 Number of size measured (4 major species) in 2010- 2015 under the IOTC ROS.

(   ) Numbers recommended by IOTC (1 fish per ton in the annual catch) and (%) coverage

Color legend of coverage	< 60%	60%-100%	100% <

Year	No of observers (vessels)	Yellowfin	Bigeye	Albacore	Swordfish
2010 (July-December)	6	2,195	2,794	2,628	232
2011	8	452 (4,415) (10%)	2,501 (3,696) (68%)	5,904 (2,427) (243%)	95 (571) (17%)
2012	10	1,784 (3,330) (54%)	4,096 (5,474) (75%)	3,316 (2,918) (114%)	234 (619) (38%)
2013	9	2,817 (4,558) (62%)	3,678 (5,583) (66%)	3,713 (2,275) (163%)	216 (657) (33%)
2014	15	1,243 (3,639) (34%)	9,345 (5,310) (176%)	11,851 (3,737) (317%)	770 (770) (100%)
2015	9	1,994 (3,149) (63%)	7,793 (4,929) (158%)	1,149 (2,918) (39%)	419 (709) (59%)
Average (%)		45%	109%	175%	49%

8.3 Modification of log-sheet collection system

The owners of fishing vessels larger than or equal to 10 GRT are required to submit the logbook on their operations and catch information to the Japanese government within three months after each cruise was finished. As the duration of one cruise for distant water longliners is long, sometimes longer than one year, it used to take about two years to complete compiling statistics of longline fishery. Starting in August 2008, distant water longliners are required to submit it every ten days. This change in submission rule of logbook has facilitated earlier compilation of tuna statistics.

8.4 Improvement to speed up to submit fisheries data to the IOTC

From August 1, 2008 Japan has mandated that all the long-distance longline vessels submit the logbook more quickly by revising the ministerial ordinance. This change facilitates more speedy data submission to the IOTC secretariat.

9. WORKING DUCUMENTS (total 24 Documents)

9.1 WGFAD01 (IOTC ad hoc Working Group on FADs) (Spain) (April 2017) (2)

IOTC–2017–WGFAD01–17 Size selectivity of tuna purse seine nets estimated from FAD sets data (Tatsuki Oshima, Mitsunori Susuki, Shoko Wada, Yasuyuki Sasaki, Takayoshi Uehara, Hajime Miyahara, Ippei Fusejima)

IOTC–2017–WGFAD01–18 New method which combines acceleration logger and acoustic pinger to measure fine scale movement of tuna associated with FADs (Tatsuki Oshima, Shoko Wada, Yuuki Shimizudani, Tsutomu Takagi, Kazuyoshi Komeyama, Yasuhiro Yoshimura, Ippei Fusejima)

9.2 WPEB13 (Ecosystem and Bycatch) (Spain) (September 2017) (2)

IOTC–2017–WPEB13–29 Revised standardized CPUE of blue shark (Prionace glauca) in the Indian Ocean estimated from Japanese observer data collected between 1992 and 2016 (Y. Semba)

IOTC–2017–WPEB13–37 Bycatch records of sea turtles obtained through Japanese Observer Program in the IOTC Convention Area (K, Okamoto and K. Oshima)

9.3 WPB15 (Billfish)(Spain) (September 2017) (5)

IOTC–2017–WPB15–19 CPUE standardization of the Indian Ocean Swordfish (Xiphias gladius) by Japanese longline fisheries: Using negative binomial GLMM and zero inflated negative binomial GLMM to consider vessel effect (Hirotaka Ijima)

IOTC–2017–WPB15–22 Preliminary stock assessment of swordfish (Xiphias gladius) in the Indian Ocean using Statistical-Catch-At-Age (SCAA) (Tom Nishida and Hiroki Yokoi)

IOTC–2017–WPB15–23 Model diagnostic for Stock Synthesis in the assessment of the Indian Ocean swordfish (Xiphias gladius) (Hiroki Yokoi and Hirotaka Ijima)

IOTC–2017–WPB15–31 CPUE standardization of the Indian Ocean Striped marlin (Tetrapturus audax) by Japanese longline fisheries: Using negative binomial GLMM and zero inflated negative binomial GLMM to consider vessel effect (Hirotaka Ijima)

IOTC–2017–WPB15–33 Stock assessments of Striped marlin (Tetrapturus audax) in the Indian Ocean using A Stock-Production Model Incorporating Covariates (ASPIC) (1950-2015) (Hiroki Yokoi and Tom Nishida)

9.4 WPM08 (Method) (Seychelles) (October 2017) (4)

IOTC–2017–WPM08–18 Collaborative study of tropical tuna CPUE from multiple Indian Ocean longline fleets in 2017 ((S.D. Hoyle, C. Assan, S. Chang, D. Fu, R. Govinden, D.N. Kim, T. Kitakado, S.I. Lee, J. Lucas, T. Matsumoto and Y.M. Yeh)

IOTC–2017–WPM08–19 Exploring possible causes of historical discontinuities in Japanese longline CPUE (S. Hoyle, K. Satoh and T. Matsumoto)

IOTC–2017–WPM08–20 Selectivity changes and spatial size patterns of bigeye and yellowfin tuna in the early years of the Japanese longline fishery (S. Hoyle, K. Satoh and T. Matsumoto)

IOTC–2017–WPM08–21 Exploration of Japanese size data and historical changes in data management (S. Hoyle, K. Satoh and T. Matsumoto)

9.5 WPTT19 (Tropical tuna) (Seychelles) (October 2017) (9)

IOTC–2017–WPTT19–24 How shear currents affect catch rates of Yellowfin tuna and Bigeye tuna in tuna longline fisheries (Tom Nishida)

IOTC–2017–WPTT19–27 Consideration on high jump of Japanese longline CPUE for bigeye and yellowfin tuna in the late 1970s in the Indian Ocean (Takayuki Matsumoto and Keisuke Satoh)

IOTC–2017–WPTT19–28 Updated Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (Takayuki Matsumoto)

IOTC–2017–WPTT19–29 Standardization of bigeye and yellowfin tuna CPUE by Japanese longline in the Indian Ocean, which includes cluster analysis (Takayuki Matsumoto, Keisuke Satoh and Simon Hoyle)

IOTC–2017–WPTT19–32 Collaborative study of tropical tuna CPUE from multiple Indian Ocean longline fleets in 2017 (Simon D. Hoyle, Cindy Assan, Shu-Ting Chang, Dan Fu, Rodney Govinden, Doo Nam Kim, Sung Il Lee, Juliette Lucas, Takayuki Matsumoto, Kaisuke Satoh, Yu-Min Yeh, and Toshihide Kitakado.)

IOTC–2017–WPTT19–33 Exploring possible causes of historical discontinuities in Japanese longline CPUE (Simon D. Hoyle, Kaisuke Satoh and Takayuki Matsumoto)

IOTC–2017–WPTT19–34 Selectivity changes and spatial size patterns of bigeye and yellowfin tuna in the early years of the Japanese longline fishery (Simon D. Hoyle and Takayuki Matsumoto)

IOTC–2017–WPTT19–35 Exploration of Japanese size data and historical changes in data management (Simon D. Hoyle, Kaisuke Satoh and Takayuki Matsumoto)

IOTC–2017–WPTT19–48 Japanese longline CPUE for yellowfin tuna in the Indian Ocean standardized by generalized linear model (Takayuki Matsumoto)

9.6 WPDCS13 (Data collection and statistics) (Seychelles) (November 2017) (0)

9.7 SC20 (Scientific Committee) (Seychelles) (November-December 2017) (1)

IOTC–2017-SC20- NR12National Report (Japan) (Takayuki Matsumoto, Yasuko Semba and Tom Nishida)