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Japan National Report
to the Scientific Committee of the Indian Ocean Tuna Commission, 2014

Takayuki Matsumoto and Tsutomu Nishida
National Research Institute of Far Seas Fisheries, Fisheries Research Agency
and
Fisheries Agency, Government of Japan

Executive Summary

This Japanese national report describes following 8 issues in recent five years (2010-2014), 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 10/02, final scientific data for the previous year was provided to the Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National report submitted to the Secretariat in 2014, final data for the 2013 calendar year must be provided to the Secretariat by 30 June 2014)	YES 30/June/2014
In accordance with IOTC Resolution 10/02, provisional **longline data** for the previous year was provided to the Secretariat by 30 June of the current year [e.g. for a National report submitted to the Secretariat in 2014, preliminary data for the 2013 calendar year was provided to the Secretariat by 30 June 2014). **REMINDER:** Final longline data for the previous year is due to the Secretariat by 30 Dec of the current year [e.g. for a National report submitted to the Secretariat in 2014, final data for the 2013 calendar year must be provided to the Secretariat by 30 December 2014).	YES 30/June/2014
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, up until 2007. Thereafter, it has been decreasing down to about 29 million hooks in 2011 due to piracy activities. It slightly increased to 31 million hooks in 2012, but decreased to 30 million hooks in 2013. 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 increasing activity of piracy 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 2013 is shown in Table 1. In the last fifteen 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 2012 was 75, and it decreased to 57 in 2013.

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 2013 is shown in Table 1. Although more than 10 Japanese purse seiners operated during 1991-1994, it decreased year by year and the last 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. A few commercial vessels have been operating since 2006. The number of purse seine vessels operated in 2013 was 1.

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
Longliners	272	235	245	216	184	181	206	206	224	251	243	242	223	192
Purse seiners	1	1	3	4	11	12	11	11	8	5	3	4	3	2

Fleet/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Longliners	199	228	172	189	184	188	250	173	130	84	72	75	57

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

Purse seiners	2	1	1	1	1	3	3	3	2	1	1	1	1

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

3.1 Longline fishery

The latest available longline data is that of 2013.

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 has been dramatically decreasing since 2008 (Table 2) because of the effect of piracy activities off Somalia. Fishing effort in 2013 (30 thousand hooks) was only about 25% of that in 2007.

Table 2. Annual catch and effort and primary species in the IOTC area of competence (longline fishery, 2009-2013).

(catch in mt and hooks in thousand)

Year	Sets	Hooks	SBF	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SFA	SPF	SKJ
2009	19,896	64,951	1,910	3,568	8,993	4,877	1,027	55	416	106	160	92	44
2010	11,004	36,569	1,480	3,839	4,159	3,284	622	203	243	61	84	105	16
2011	8,804	28,454	1,497	2,427	3,696	4,415	571	319	242	51	68	188	26
2012	9,635	31,466	1,388	2,918	5,474	3,330	619	158	238	53	56	94	15
2013	9,094	29,640	955	2,298	5,630	4,349	665	96	202	52	58	90	25

Yearly distributions of longline effort for 2013 and average of 2009-2013 are shown in Fig. 2. In 2013, 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 2009-2013. The effort in the northwestern area has dramatically decreased since 2008 and few effort in 2013 because of the expanded activity of piracy off Somalia.

Catch

Historical catch in weight by species and catch statistics for 2009-2013 by Japanese longliners in the Indian Ocean are shown in Fig. 1 and Table 2, respectively, and geographical distributions of catch in 2013 and average of 2009-2013 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 2012 and 2013 was 14,343MT and 14,420MT, 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 2010 were lowest after 1980s, and this decrease was mainly derived from decrease in effort especially in the tropical area.

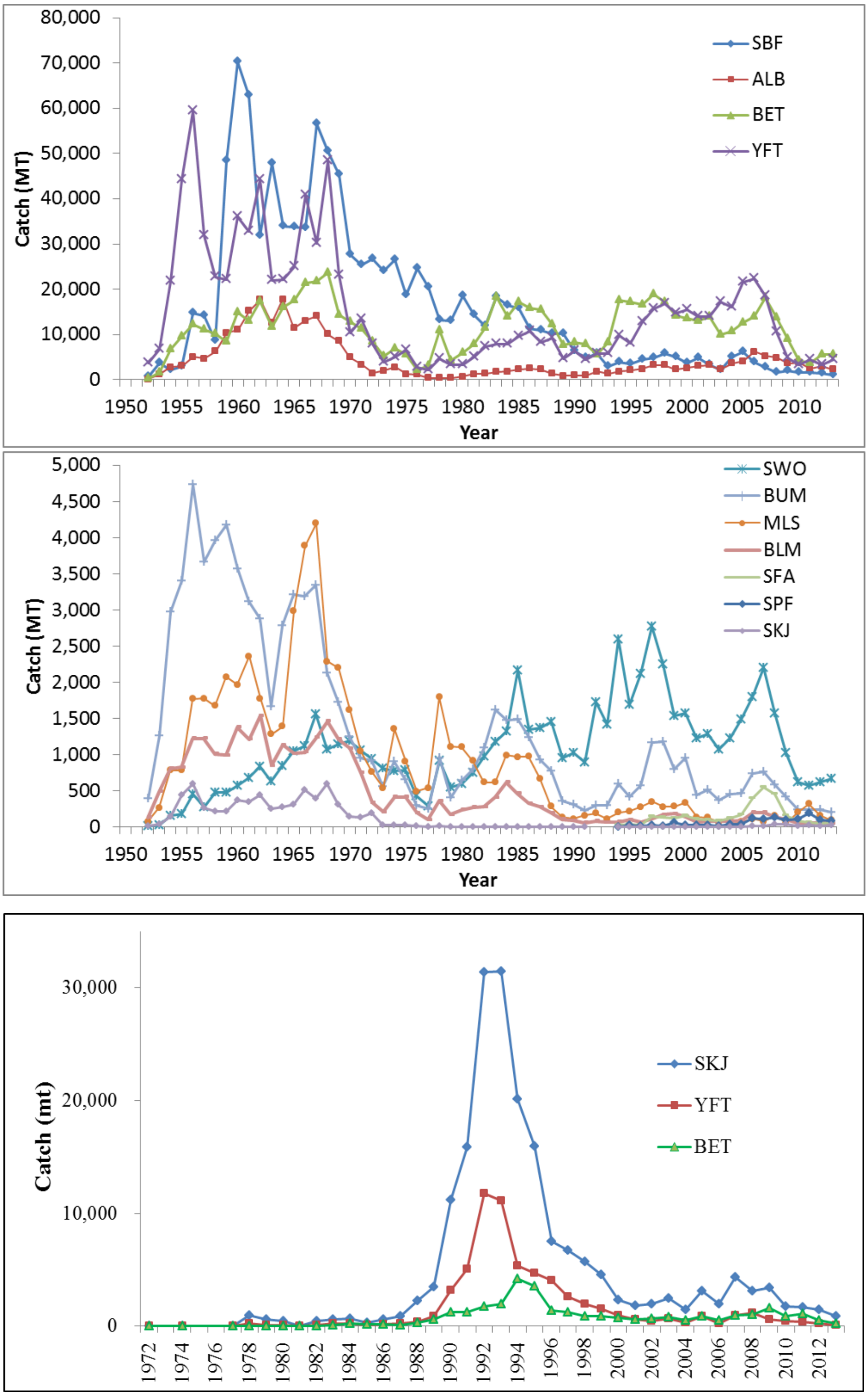


Fig. 1. Historical change of effort exerted into each of West and East Indian Ocean. Upper: longline (tuna species), middle: longline (skipjack and billfish species), lower: purse seine.

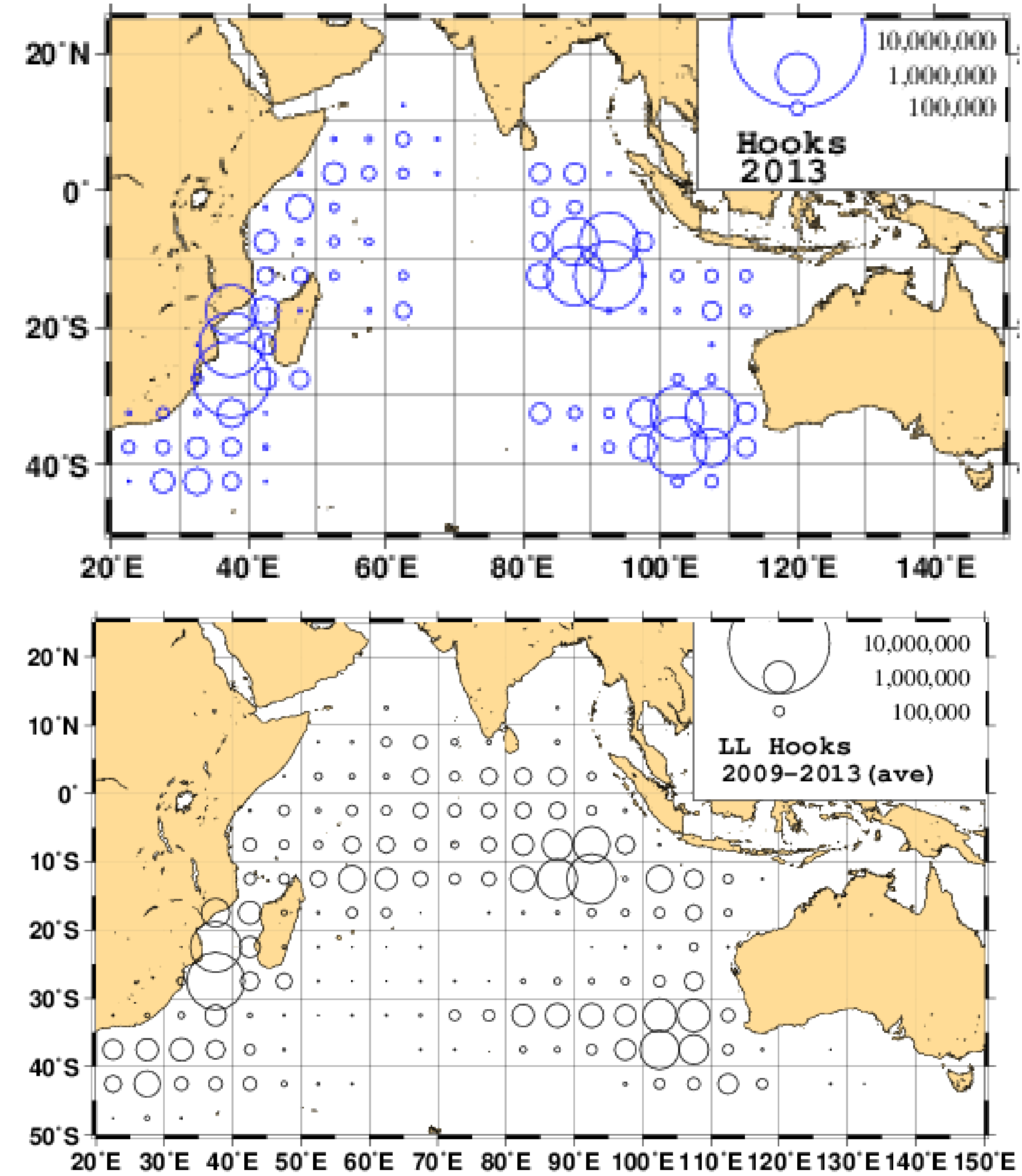
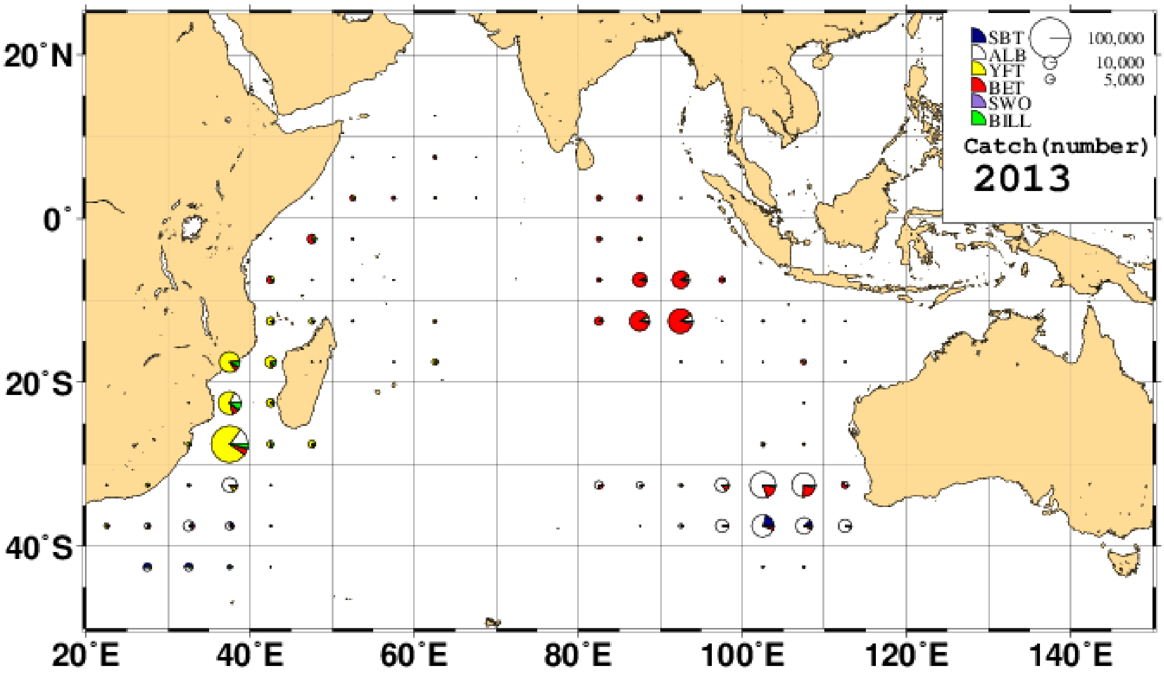


Fig 2. Yearly distributions of longline effort for 2013 (above) and average of 2009-2013 (below)



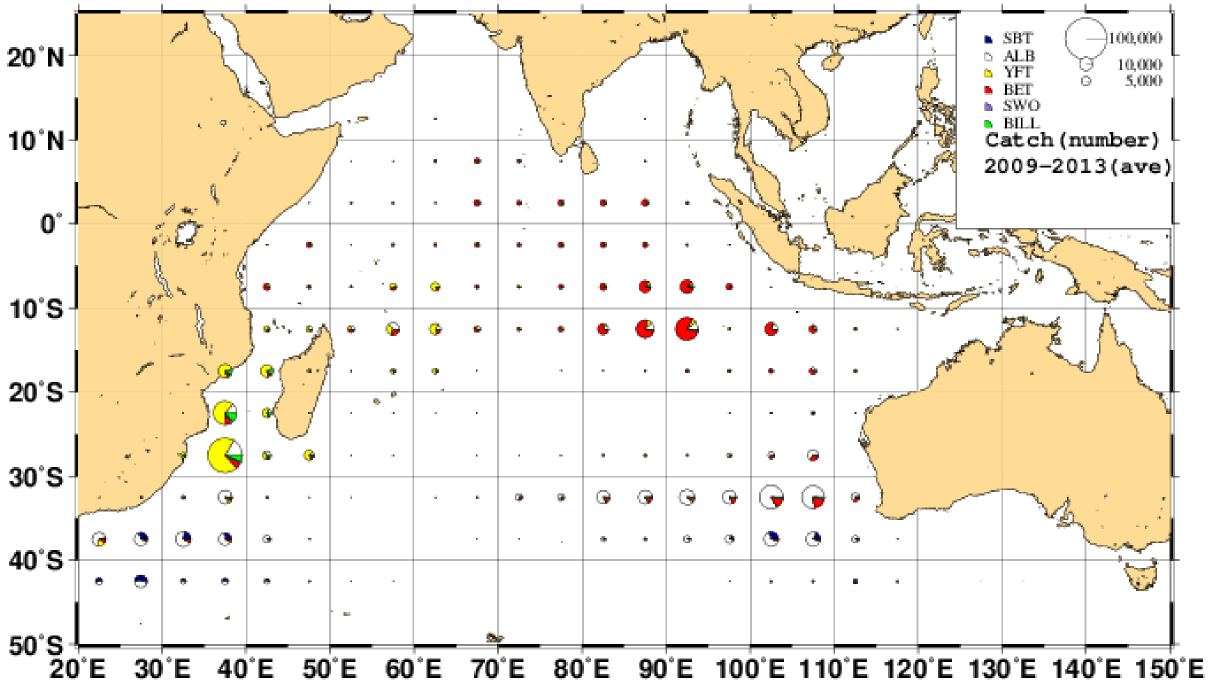


Fig. 3 Geographical distributions of catch (in number) of major species in 2013 (upper) and in average of 2009-2013(lower). Southern bluefin tuna (SBT), albacore (ALB), bigeye tuna (BET), yellowfin tuna (YFT), swordfish (SWO) and billfishes (BILL).

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 around South Africa and west off Australia, where this species is one of main components of the catch. In 2013 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 2013.

Fishing Effort

Total fishing effort (number of set) was 72 in 2012 and 27 in 2013 (Table 3). Geographical distributions of effort for 2013 and the average of 2009-2013 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 (2009-2013) (purse seine fisheries).

		Catch (mt)			
Year	Number of set	SKJ	YFT	BET	others
2009	185	3,434	557	1,571	0
2010	92	1,731	481	868	0
2011	105	1,675	352	1,130	0
2012	72	1,437	232	536	0
2013	27	861	95	197	0

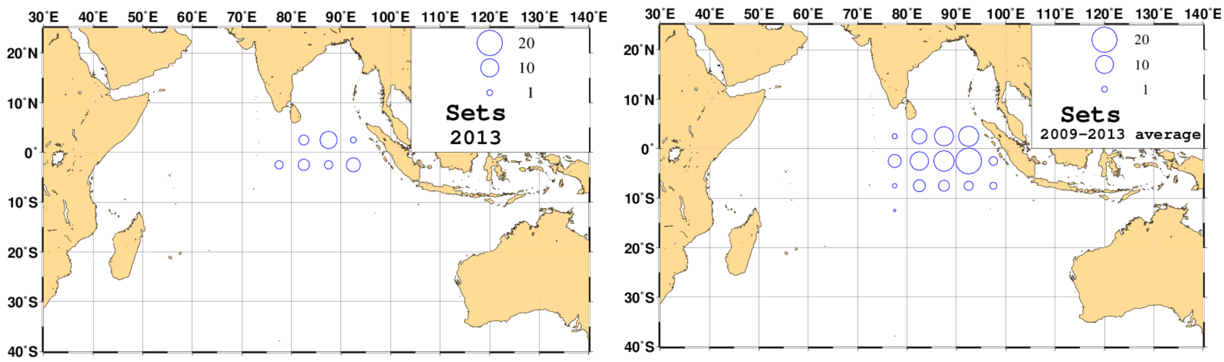


Fig. 4. Distributions of fishing effort in the Indian Ocean in 2013(left) and average of 2009-2013 (right) (Purse seine fisheries)

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 decreased to 1.2 thousand MT. Catch in weight of skipjack, yellowfin and bigeye in 2013 (2012) was 861 (1,437) MT, 95 (232) MT and 197 (536) MT, respectively. Geographical distributions of catch in 2013 and average of 2009-2013 for major tuna species are shown in Fig. 5. Main component of the catch was skipjack tuna in all the area operating.

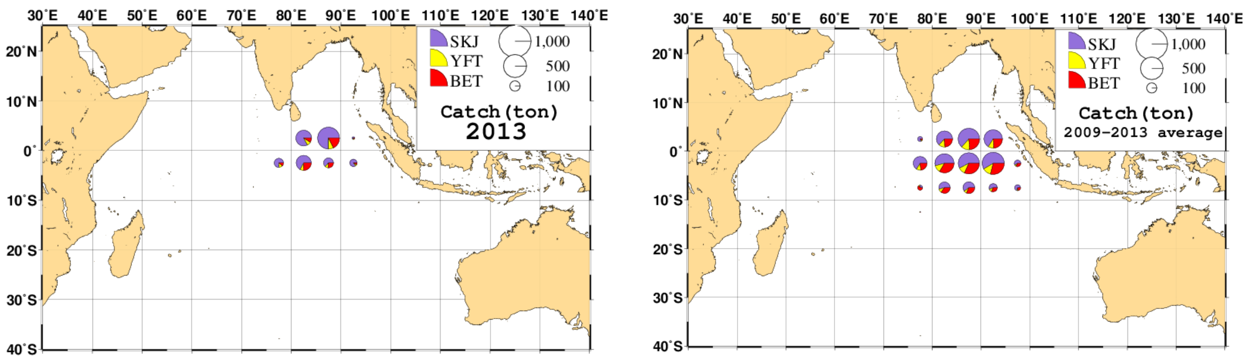


Fig. 5 Geographical distributions of catch of major species in 2013 (left) and the average in 2009-2013 (right)

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 2011. 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 (1994-2013). 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.

Table 4. Reported annual catch (tons) of three major sharks species caught by Japanese tuna longliners in the Indian Ocean (1994 -2013). (*) 2013 is preliminary.

year	Blue shark	Shotfin mako	Porbeagle
1994	414	425	145
1995	724	328	47
1996	736	666	51
1997	805	494	62
1998	645	283	48
1999	557	372	37
2000	530	310	39
2001	477	246	33
2002	433	224	25
2003	355	126	10
2004	330	297	10
2005	577	276	20
2006	398	216	24
2007	790	162	12
2008	2,240	208	53
2009	2,657	154	26
2010	1,503	170	13
2011	1,390	155	18
2012	1,557	148	8
2013*	1,114	104	2

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 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 (2010-2013).

Table 5 Summary of bycatch information collected by scientific observers on board to Japanese tuna longline vessels

code	English name	2010	2011	2012	2013
Sharks					
200	Unidentified_sharks	3	1	0	0
202	Velvet_dogfish	1	0	1	0
225	Crocodile_shark	0	12	0	1
231	Bigeye_thresher	159	0	0	0
235	Unidentified_mackerek_sharks	0	1	0	0
237	Shortfin_mako	67	161	83	73
238	Longfin_mako	0	1	0	0
239	Salmon_shark	0	0	0	1
240	Porbeagle	182	171	39	23
262	Silky_shark	18	2	3	1
269	Oceanic_whitetip_shark	10	1	0	0
280	Tiger_shark	2	0	0	0
281	Blue_shark	1,016	1,806	831	407
291	Scalloped_hammerhead	2	0	0	0
320	Unidentified_rays	0	0	1	0
322	Pelagic_stingray	2	18	10	5
Sea birds					
350	Unidentified_birds	0	1	3	0
375	Black-browed_albatross	0	2	0	0
378	Indian_yellow-nosed_albatross	0	7	0	1
384	Wandering_albatross	0	0	1	0
407	Black-browed_albatross_group	1	1	0	0
409	Shy-type_albatrosses	0	0	1	1
412	Yellow-nosed_albatross_group	1	0	0	0
413	Grey-headed_albatross	0	0	1	0
423	Southern_giant_petrel	0	1	0	0
Sea turtles					
601	Loggerhead_turtle	0	0	0	1

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 separately recorded 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.

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 2010-2013, 6, 8, 10 and 9 observers were dispatched to the IOTC area respectively. They covered 5.7% in average of the total operations (Table 6). Japanese observer program in the IOTC area is a part of the southern bluefin tuna one. Data in 2010-2012 have been submitted to the IOTC Secretariat and the 2013 data will be submitted soon. Fig. 6 shows areas where observers covered in 2010-2013. Most areas monitored in 2011 are limited to the temperate waters in the southern hemisphere.

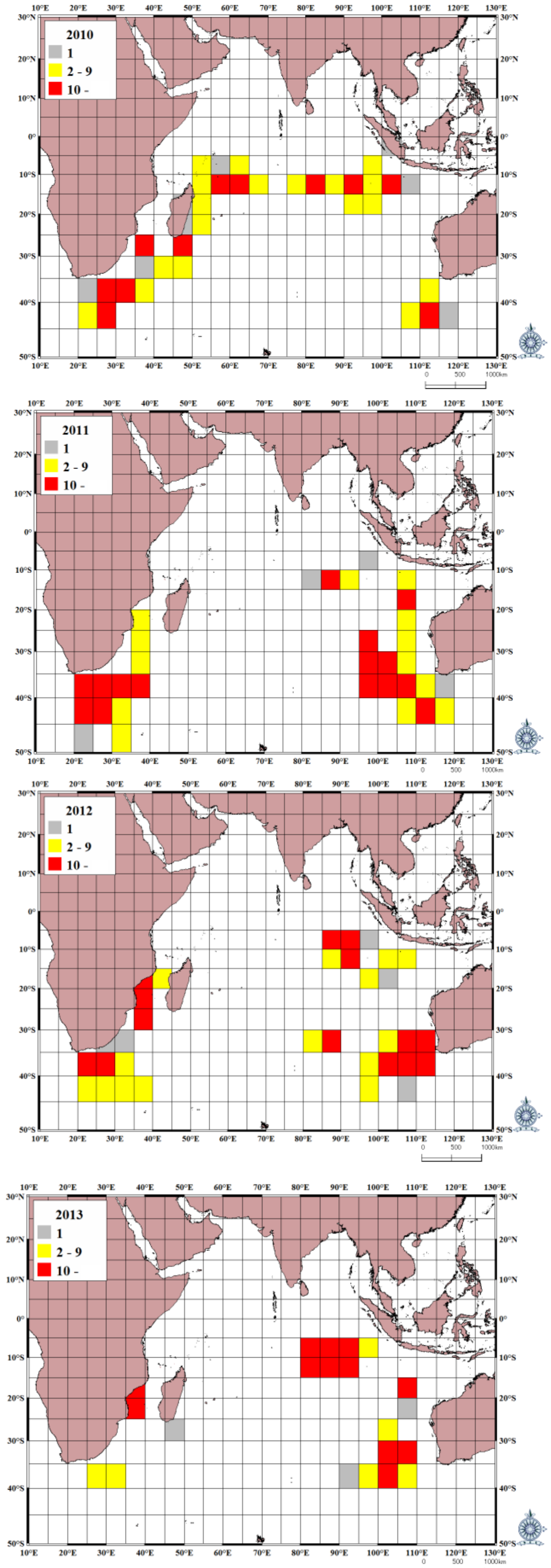


Fig. 6 5°x5° Areas monitored for Japanese tuna longline operations by scientific observers under IOTC ROS (2010-2013)

(Red: 10 operations or more, Yellow: 2-9 operations and Grey: 1 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 2008 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. In case of unloading abroad the owner of fishing vessels are required to obtain approval from the Government of Japan in advance. To apply for unloading abroad, fishers have to submit relevant documents to the Government of Japan 10 days before the planned date.

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 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 (2010-2014)

In recent 5 years, JAMARC has been conducting the experimental purse seine fishing in the eastern Indian Ocean. RV Nippon-Maru (2009-2012) and Taikei-Maru No.1 (2013-2014) were used for the study. The main object of the research program is to mitigate by-catch of juvenile yellowfin and bigeye tuna in purse-seining with FADs. Two kinds of study have been conducted, i.e., (a) Study on the application of light stimuli to force juvenile tuna escaping through large mesh panels of the purse seine net and (b) Study on pre-set estimation of species and size composition of school around 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 Development of Kobe plots I+II and ADMB_ASPM software (2009-2014)

Since 2009, the project to develop software for ADMB_ASPM (Age Structure Production Model) and Kobe plots I+II has been implemented to 2014. This project was funded by Fisheries Agency of Japan. Developed softwares are available at:

http://ocean-info.ddo.jp/kobeaspm/kobeplot/KobePlot.zip
http://ocean-info.ddo.jp/kobeaspm/aspm/ASPM.zip

7.3 Project to mitigate depredations by toothed whales (2009-2014)

The international collaborative project to mitigate depredations of longline caught tuna by toothed whales was implemented for 3 years (2009-2011) by a senior scientist in the NRIFSF (Dr Nishida). The counter part was Dr McPherson (James Cook University, Australia) who is the world outstanding expert in this area. The International Fishers Forum 5 (Taipei, Taiwan,China, 2010) provided the best research award to this project. This project was also funded by Fisheries Research Agency (FRA) of Japan.

7.4 IOTC-OFCF projects (2002-2014)

The IOTC-OFCF joint project to improve tuna fisheries statistics in the IOTC water have been implemented for last 12 years in three phases (1st phase for 5 years: 2002-2006, 2nd phase for 3 years: 2007-2009 and 3rd phase: 2010-2012). From 2013, the 4th phase started for maximum 3 years (2013-2015). Along with the IOTC-OFCF joint project, one additional activities on capacity buildings for fisheries officers and scientists in developing counties was also implemented by OFCF (Mr Fujiwara) and one NRIFSF senior scientist (Dr Nishida), i.e., the atlas project to create tuna fisheries and resources atlas in Indonesia, Thai, Maldives and Sri Lanka using Marine Explorer (GIS) developed by Environmental Simulation Laboratory for 3 years in the 2nd phase of the IOTC-OFCF project (2007-2009).

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. The observer coverages (2010-2013) are 6.9%, 6.3%, 4.8% and 4.7 % respectively (average =5.7%) based on the number of operation (Table 6).

Table 6 Observer coverage rates of the Japanese tuna longline fisheries based on the number of operations

year	Coverage rate	Basic background statistics (Number of operations covered by observers)/(Total number of operations)
2010 (July 1-)	6.9 %	328/4,770
2011	6.3 %	558/8,804
2012	4.8 %	461/9,635
2013	4.7 %	424/9,094
Average	5.7 %	

8.2 Collection of size data

Tuna longliners in Japan have been collecting size data voluntary basis 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 high levels of coverage. 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- 2013 under the IOTC ROS (*)

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

Year	No of observers (vessels)	Yellowfin	Bigeye	Albacore	Swordfish
2010 (July 1 -)	6	2,195	2,794	2,628	232
2011	8	452 (4,893) (9%)	2,501 (4,884) (51%)	5,904 (2,442) (242%)	95 (576) (16%
2012	10	1,784 (3,562) (50%)	4,096 (6,010) (68%)	3,316 (2,918) (114%)	234 (619) (38%)
2013	9	2,817 (4,519) (62%)	3,678 (5,716) (64%)	3,713 (2,293) (162%)	216 (661) (33%)
Average (%)		(41%)	(61%)	(172%)	(29%)

(*) negligible numbers from commercial fisheries are included.

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.

8.5 Improvement of the CPUE standardization (2010-2014)

[2010]

Seven studies to improve CPUE standardizations have been made, i.e., (1)IOTC-2010-WPB8-09 :Estimation of the Abundance Index (AI) of swordfish in the Indian Ocean based on the fine scale catch and effort data in the Japanese tuna longline fisheries (1980-2008) (Nishida and Wang), (2) IOTC-2010-WPB8-11: CPUE standardization of swordfish caught by Taiwanese longline fishery in the Indian Ocean during 1995-2008 (Wang and Nishida), (3) IOTC-2010- WPTT-29: Japanese longline CPUE for bigeye tuna in the Indian Ocean up to 2009 standardized by GLM (Okamoto and Shono), (4) IOTC-2010- WPTT-30: Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2009 standardized by general linear model (Okamoto and Shono), (5) IOTC-2010-WPTT-32: Searching comparable standardized YFT CPUE between Japanese and Taiwanese tuna longline fisheries in the common fishing grounds in the Indian Ocean (Nishida and Chang), (6) IOTC-2010- WPTT-33: Yellowfin tuna CPUE standardization of the Korean tuna longline fisheries in the Indian Ocean (1980-2009) (Hwang and Nishida) and (7) IOTC-2010-WPTT-44: Comparisons of STD YFT CPUE of tuna longline fisheries among Japan, Korea and Taiwan (Nishida). These CPUE studies played key roles in the stock assessments conducted by MULTIFAN-CL, SS3 and ASPIC for yellowfin tuna, swordfish and bigeye tuna.

[2011]

Six studies to improve CPUE standardizations have been made in WPB09 (July, 2011), i.e., (1) IOTC–2011–WPB09–11: Validation of the Global Ocean Data Assimilation System (GODAS) data in the NOAA National Center for Environmental System (NCEP) by theory, comparative studies, applications and sea truth (T. Nishida, T. Kitakado, H. Matsuura and S. P. Wang), (2) IOTC–2011–WPB09–12_rev2: CPUE standardization of blue marlin (*Makaira mazar*a) caught by Taiwanese longline fishery in the Indian Ocean (S. P. Wang, S. H. Lin and T. Nishida), (3) IOTC–2011–WPB09–14: Estimation of the Abundance Index (AI) of swordfish (*Xiphias gladius*) in the Indian Ocean (IO) based on the fine scale catch and effort data of the Japanese tuna longline fisheries (1980–2010) (T. Nishida, T. Kitakado and S. P. Wang), (4) IOTC–2011–WPB09–15: Investigation of the sharp drop of swordfish CPUE of Japanese tuna longline fisheries in 1990‘s in the SW Indian Ocean (T. Nishida and T. Kitakado), (5) IOTC–2011–WPB09–16_rev1: CPUE standardization of swordfish (*Xiphias gladius*) caught by Taiwanese longline fishery in the Indian Ocean (S. P. Wang and T. Nishida), (6) IOTC–2011–WPB09–25: Note for discussion on the Indian Ocean (IO) swordfish (SWO) CPUE (T. Nishida and T. Kitakado)

One study to improve CPUE standardizations have been made in WPTmT03 (September, 2011), i.e., IOTC–2011–WPTmT03–15: Standardization of albacore CPUE by Japanese longline fishery in the Indian Ocean (T. Matsumoto and K. Uosaki).

Seven studies to improve CPUE standardizations have been made in WPTT13 (October, 2011), i.e., (1) IOTC–2011–WPTT13–32: A comparison of methods for prediction of Integrated Habitat Index of *Thunnus albacares* in the Indian Ocean – general linear model and quantile regression model considerations (L. Song, Y. Wu and T. Nishida), (2) IOTC–2011–WPTT13–34 Rev_1: Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2010 standardized by general linear model (H. Okamoto), (3) IOTC–2011–WPTT13–38: Standardization of bigeye tuna CPUE of Korean tuna longline fisheries in the Indian Ocean (S. Lee, Z. Kim and T. Nishida), (4) IOTC–2011–WPTT13–44: Preliminary analyses of the effect of the Piracy activity in the northwestern Indian Ocean on the CPUE trend of bigeye and yellowfin (H. Okamoto), (5) IOTC–2011–WPTT13–52: Updated Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM for the period from 1960 to 2010 (H. Okamoto), (6) IOTC–2011–WPTT13–INF05: Validation of the Global Ocean Data Assimilation System (GODAS) data in the NOAA National Centre for Environmental System (NCEP) by theory, comparative studies, applications and sea truth (T. Nishida, T. Kitakado, H. Matsuura and S.-P. Wang), (7) IOTC–2011–WPTT13–INF12: Influence of the marine environment variability on the yellowfin tuna (*Thunnus albacares*) catch rate by the Taiwanese longline fishery in the Arabian sea, with special reference to the high catch in 2004 (K.-W. Lan, T. Nishida, M.-A. Lee, H.-J. Lu, H.-W., Huang, S.-K. Chang and Y.-C. Lan)

Three studies to improve CPUE standardizations have been made in WPEB07 (October, 2011), i.e., (1) IOTC–2011–WPEB07–33 Rev_1: Standardized CPUE for blue shark caught by Japanese tuna longline fishery in the Indian Ocean, 1971-1993 and 1994-2010 (Y. Hiraoka and K. Yokawa), (2) IOTC–2011–WPEB07–34: Standardized CPUE of shortfin mako shark (*Isurus oxyrinchus*) caught by Japanese longliners in the Indian Ocean in the period between 1994 and 2010 (A. Kimoto, Y. Hiraoka, T. Ando and K. Yokawa) and (3) IOTC–2011–WPEB07–35: Trends of standardized CPUE of oceanic whitetip shark (*Carcharhinus longimanus*) caught by Japanese longline fishery in the Indian Ocean (Y. Semba and K. Yokawa)

[2012]

Following works improved CPUE standardization and also contributed stock assessments such as ASPIC, ASPM, SS3 and MFCL in WPmT04, WPB10, WPEB07 and WPTP14 in 2012:

For albacore, IOTC–2012–WPTmT04–10 Rev_1: Standardization of albacore CPUE by Japanese longline fishery in the Indian Ocean (Takayuki Matsumoto, Toshihide Kitakado and Hiroaki Okamoto).

For billfish, IOTC–2012–WPB10–19 Rev_2. Standardization of catch rates for Striped marlin (Tetrapturus audax) and Blue marlin (*Makaira nigricans*) in the Indian Ocean based on the operational catch and effort data of the Japanese tuna longline fisheries incorporating time-lag environmental effects (1971–2011) (T. Nishida, Y. Shiba, H. Matsuura and S.-P. Wang). IOTC–2012–WPB10–20: CPUE standardization of blue marlin (Makaira mazara) caught by Taiwanese longline fishery in the Indian Ocean for 1980 to 2010 (S.-P. Wang, S.-H. Lin and T.Nishida). IOTC–2012–WPB10–21: CPUE standardization of striped marlin (*Tetrapterus audax*) caught by Taiwanese longline fishery in the Indian Ocean for 1980 to 2010 (S.P. Wang and T. Nishida).

For sharks, IOTC–2012–WPEB08–26: Update of the standardized CPUE of oceanic whitetip shark Carcharhinus longimanus) caught by Japanese longline fishery in the Indian Ocean (K. Yokawa and Y. Senba) IOTC–2012–WPEB08–28: "Update of CPUE of blue shark caught by Japanese longliner and estimation of annual catch series in the Indian Ocean (Y. Hiraoka and K. Yokawa)".

For yellowfin and bigeye tuna, IOTC–2012–WPTT14–26 Rev_1: Updated Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (K. Satoh and H. Okamoto), IOTC–2012–WPTT14–34 Rev_1: CPUE standardization for yellowfin tuna caught by Korean tuna longline fisheries in the Indian Ocean (1978–2011) (S.I. Lee, Z.G. Kim, M.K Lee, D.W. Lee and T. Nishida), IOTC–2012–WPTT14–35: Rev_1Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2011 standardized by general linear model (T. Matsumoto, H. Okamoto and T. Kitakado.

[2013]

13 papers were made to improve CPUE standardizations as below:

Blue and striped marlin (3): Core area approach was developed. IOTC–2013–WPB11–23 Rev_1 : Standardization of catch rates for Striped marlin (*Tetrapturus audax*) and Blue marlin (*Makaira mazara*) in the Indian Ocean by the core fishing area approach using operational catch and effort data of the Japanese tuna longline fisheries (1971-2012) (T. Nishida & S.P. Wang). IOTC–2013–WPB11–24 Rev_2: CPUE standardization of blue marlin (*Makaira mazara*) caught by Taiwanese longline fishery in the Indian Ocean for 1995 to 2011 (S.-P.

Wang & T. Nishida). IOTC–2013–WPB11–26 Rev_2: CPUE standardization of striped marlin (*Kajikia audax*) caught by Taiwanese longline fishery in the Indian Ocean for 1995 to 2011 (S.-P. Wang & T. Nishida)

Bigeye and yellowfin tuna (2): IOTC–2013–WPTT15–25: Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (T. Matsumoto, K. Satoh and H. Okamoto) and IOTC–2013–WPTT15–37: Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2012 standardized by generalized linear model (T. Matsumoto, H. Okamoto & T. Kitakado)

CPUE Workshop to improve STD_CPUE (8): Overview of Japanese longline statistics (Okamoto), Procedures used for standardization for Japanese longline CPUE (Matsumoto), .Analyses of operational data based on Vessel ID (Okamoto). Area stratification based on Tree model (Satoh and Matsumoto), Spatial GLM Approaches to use incorporating spatial auto-correlation (Nishida), Core area approach to estimate JPN STD_CPUE of Striped and Blue Marlin (Nishida), Incorporating environmental factors in STD_CPUE, useful or useless? (Nishida) and Which tuna LL STD_CPUE is useful, Japan, Korea or Taiwan,China? (Nishida)

[2014]

9 papers were made to improve CPUE standardizations as below:

Albacore (1): IOTC–2014–WPTmT05–18 Standardization of albacore CPUE by Japanese longline fishery in the Indian Ocean (T. Matsumoto, T. Kitakado & T. Nishida)

Swordfish (application of cluster analyses for targeting correction) (2): IOTC–2014–WPB12–21 CPUE standardization of swordfish (*Xiphias gladius*) of Japanese tuna longline fishery in the Indian Ocean using cluster analysis for targeting effect (Nishida T & Wang S-P) and IOTC–2014–WPB12–22 CPUE standardization with targeting analysis for swordfish (*Xiphias gladius*) caught by Taiwanese longline fishery in the Indian Ocean (Wang S-P & Nishida T)

Blue shark (1): IOTC–2014–WPEB10–26 Standardized CPUE of blue shark caught by Japanese longliners (Yokawa K & Kanaiwa M)

Discrepancies of STD_CPUE between Japan and Taiwan,China (2): IOTC–2014–WPTT16–28 Provisional study on comparison of CPUE trend of bigeye and yellowfin tuna between Japanese and Taiwan-China longline fisheries based on whole and shared strata in the Indian Ocean (Okamoto H) and IOTC–2014–WPTT16–31 CPUE of bigeye and yellowfin tuna caught by Japanese longliners in the Indian Ocean standardized by GLM considering several aspects of area, catchability and data resolution (Okamoto H)

Bigeye tuna (1): IOTC–2014–WPTT16–29 Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (Ochi D, Matsumoto T, Satoh K & Okamoto H)

Yellowfin tuna (1): IOTC–2014–WPTT16–47 Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2013 standardized by generalized linear model (Ochi D, Matsumoto T, Okamoto H & Kitakado T)

Area stratification (1): IOTC–2014–WPTT16–48 Exploration of area stratification for CPUE standardization of yellowfin tuna by Japanese longline (Satoh K.)

9. WORKING DUCUMENTS (total 23 Documents)

9.1 WPNT04 (Neritic tuna) (Phuket, Thailand) (July, 2014) (2 documents)

IOTC–2014–WPNT04–28 Standardization of longtail tuna (Thunnus tonggol) catch rates of drift gillnet fisheries in Sultanate of Oman (B. Al-Siyabi, L. Al-kharusi, T. Nishida & H. Al-Busaidi)

IOTC–2014–WPNT04–34 Stock assessment of longtail tuna (Thunnus tonggol) in the NW Indian Ocean by ASPIC using standardized CPUE from drift gillnet fisheries in Sultanate of Oman (F.R. Al-Kiyumi, L. Al-Kharusi, T. Nishida & I. Al-Anboori)

9.2 WPTmT05 (Temperate tuna) (July, 2014) (Busan, Korea) (5 documents)

IOTC–2014–WPTmT05–15 Review of Japanese longline fishery and its albacore catch in the Indian Ocean (T. Matsumoto)

IOTC–2014–WPTmT05–16 Consideration of albacore parameters for stock assessments in the Indian Ocean (T. Nishida, T. Kitakado, T. Matusmoto, J. Zhu & L.-K. Lee)

IOTC–2014–WPTmT05–18 Standardization of albacore CPUE by Japanese longline fishery in the Indian Ocean (T. Matsumoto, T. Kitakado & T. Nishida)

IOTC–2014–WPTmT05–22 Stock and risk assessments of albacore in the Indian Ocean based on ASPIC (T. Matsumoto, T. Nishida & T. Kitakado)

IOTC–2014–WPTmT05–23 Rev_1 Stock assessments of albacore albacore (Thunnus alalunga) in the Indian Ocean by Age-Structured Production Model (ASPM) (T. Nishida, T. Matsumoto & T. Kitakado)

9.3 WPB12 (Billfish) (October, 2014) (Yokohama, Japan) (5 documents)

IOTC–2014–WPB12–17 Evaluating data and model structure uncertainty for the stock assessment of swordfish (*Xiphias gladius*) in the Indian Ocean (Wang S-P, Maunder M, Nishida T & Chen Y-R)

IOTC–2014–WPB12–21 CPUE standardization of swordfish (*Xiphias gladius*) of Japanese tuna longline fishery in the Indian Ocean using cluster analysis for targeting effect (Nishida T & Wang S-P)

IOTC–2014–WPB12–22 CPUE standardization with targeting analysis for swordfish (*Xiphias gladius*) caught by Taiwanese longline fishery in the Indian Ocean (Wang S-P & Nishida T)

IOTC–2014–WPB12–23 Stock assessment of swordfish (*Xiphias gladius*) in the Indian Ocean using age-structured integrated analysis (Wang S-P & Nishida T)

IOTC–2014–WPB12–24 Stock assessments of swordfish (*Xiphias gladius*) in the Indian Ocean by A Stock-Production Model Incorporating Covariates (ASPIC) (Nishida T & Wang S-P)

9.4 WEPB10 (Ecosystem and Bycatch) (October, 2014) (Yokohama, Japan) (1 document)

IOTC–2014–WPEB10–26 Standardized CPUE of blue shark caught by Japanese longliners (Yokawa K & Kanaiwa M)

9.5 WPTT16 (Tropical tuna) (November, 2014) (Bali, Indonesia) (8 documents)

IOTC–2014–WPTT16–10 Review of Japanese fisheries and tropical tuna catch in the Indian Ocean (Matsumoto T)

IOTC–2014–WPTT16–28 Provisional study on comparison of CPUE trend of bigeye and yellowfin tuna between Japanese and Taiwan-China longline fisheries based on whole and shared strata in the Indian Ocean (Okamoto H)

IOTC–2014–WPTT16–29 Japanese longline CPUE for bigeye tuna in the Indian Ocean standardized by GLM (Ochi D, Matsumoto T, Satoh K & Okamoto H)

IOTC–2014–WPTT16–31 CPUE of bigeye and yellowfin tuna caught by Japanese longliners in the Indian Ocean standardized by GLM considering several aspects of area, catchability and data resolution (Okamoto H)

IOTC–2014–WPTT16–47 Japanese longline CPUE for yellowfin tuna in the Indian Ocean up to 2013 standardized by generalized linear model (Ochi D, Matsumoto T, Okamoto H & Kitakado T)

IOTC–2014–WPTT16–48 Exploration of area stratification for CPUE standardization of yellowfin tuna by Japanese longline (Satoh K.)

IOTC–2014–WPTT16–53 Kobe I (plot) + II (risk assessment) software (version 3, 2014) (Nishida T, Kitakado T, Iwasaki K & Itoh K)

IOTC–2014–WPTT16–54 ASPM software (version 3, 2014) (Nishida T, Kitakado T & Iwasaki K)

9.6 WPDCS10 (Data collection and Statistics) (December, 2014) (Victoria, Seychelles) (1 document)

IOTC-2014-WPDCS10-__ Proposal to use “number of operations” to compute observer coverages for Japanese tuna longline fisheries operated in the Indian Ocean (T. Nishida)

9.7 SC17 (Scientific Committee) (Victoria, Seychelles) (December, 2014) (1 document)

IOTC-2014-SC17_NR12 Japan National Report 2014 to the IOTC SC (Matsumoto and Nishida)