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(Taiwanese Tuna and Tuna-like Fisheries in the North Pacific Ocean)

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Introduction

Taiwanese tuna fisheries are comprised of two major fisheries, longline, and purse seine fisheries, and other small scale fisheries, such as harpoon, set net, gill net in the North Pacific Ocean (North of equator). Longline and purse seine fisheries occupy around 99% of the total tuna catch of Taiwanese fisheries. For longline fishery, it consists of large-scale tuna longline fleet (LTLL, previous named DWLL,≧100 GRT) and small-scale tuna longline fleet (STLL, previous named OSLL,＜100 GRT). The total catch of tunas and billfish (including swordfish, striped marlin, blue marlin, black marlin, and sailfish) for longline fishery (including the catch of LTLL and STLL) in the North Pacific Ocean was 25,046 mt (metric ton) in 2015. The active vessels of LTLL operating in the Pacific Ocean in 2015 were 76 and STLL were 1,306. For purse seine fishery, the total catch was 194,249 mt caught by 34 vessels in the Pacific Ocean in 2015. This paper described the recent trend of Taiwanese tuna fishery in the North Pacific Ocean, and purse seine fishery in the Pacific Ocean. Regarding the Close-Kin Mark Recapture project, Taiwan has already collected 1,389 tissue samples of Pacific bluefin tuna.

1. Fisheries Monitoring

1.1. Tuna Longline fishery

1.1.1 Large-scale tuna longline fleet

Large-scale tuna longline (LTLL) vessels refer to those vessels larger than or equal to 100 gross register ton (GRT). Those vessels mostly operate in the high sea areas or in the EEZs of coastal countries under fisheries cooperation agreements. Table 1 shows the number of Taiwanese vessels actually engaged in fishing in the Pacific Ocean from 2006 to 2015. For the purpose of sustainable use of fishery resources, Taiwan imposed a fleet size reduction program on its large-scale tuna longline vessels from 2005 to 2007. Through this program, 32 large-scale tuna longline vessels were reduced in the Pacific Ocean during 2005 - 2007. The number of active vessels reached low level in 2009 due to high fuel price with some fishing vessels ceasing operation temporarily, and the vessel number returned to 90 in 2010 and slightly increased to 95 for some shifting from Indian Ocean for pirate issue in 2011. After that, the vessels have been reduced to 87 in 2012 and 82 in 2013 with some vessels shifting back to the Indian Ocean. The number of active vessels in 2014 was 73, and it slightly increased to 76 in 2015.

Table 2 shows catch and effort of Taiwanese LTLL vessels operated in North Pacific Ocean during 1997-2015. Before the mid 1990s, the catch and effort of albacore in the North Pacific was very low. Thereafter, as fishing condition got better, the fishing effort in the North Pacific increased from 1997 and peaked in 2004. However, since 2005, the fishing efforts gradually decreased due to the above mentioned fleet reduction program. Additionally affected by the high fuel price in 2008 and 2009, the number of active vessels targeting albacore in the North Pacific Ocean decreased from 24 in 2006 to 13 in 2009. Thereafter, the number gradually recovered to 23 in 2015.
From 1997 to 2000, albacore is the main catch of Taiwanese LTLL in the North Pacific Ocean, occupied more than 70% of total catch, but since 2001, the catch of bigeye tuna, yellowfin tuna and swordfish increased significantly. The catch of albacore have gradually declined to 1,866 mt in 2009,

which was the lowest catch of pass ten years, but it showed slight increasing trend during the recent years. The albacore catch in 2013 and 2014 was estimated as 3,836 mt and 2,302 mt respectively. The catch in 2015 was preliminarily estimated as 2,629 mt. For LTLL, Pacific bluefin tuna was caught incidentally, and the amount was very small. Before 2000, the catch of swordfish in the North Pacific was low and less than 100 mt. Thereafter, the catch increased substantially to more than 1,000 mt from 2001 to 2003 for the increase of fishing efforts on bigeye tuna, but declined to less than 500 mt from 2005 to 2009 due to reducing efforts. The catch of swordfish increased to more than 500 mt from 2010 to 2011, but thereafter showed a decreasing trend. The preliminary estimated catch in 2015 was 724 mt, increased from 2014. Table 3 shows sharks catch by species for Taiwanese LTLL operated in the North Pacific Ocean during 2009-2015. The annual shark catch was preliminary estimated as 1,104 mt in 2015. The distribution of fishing efforts of Taiwanese LTLL vessels operating in the Pacific Ocean during 2013-2015 is shown in Figure 1.

The length frequency of albacore, swordfish caught by LTLL in the North Pacific are shown in Figures 2 and 3 which were obtained from commercial logbooks. The predominant size range for albacore caught by LTLL from 2013-2015 were 82-94cm, 80-92cm and 92-96cm in fork length, respectively. The dominant size range for swordfish caught by LTLL from 2013-2015 was 140-185cm, 130-175cm and 140-180cm in low jaw fork length, respectively. It is noted that the length data of 2014 and 2015 are not recovered completely and still in preliminary.

1.1.2 Small-scale tuna longline fleet

The small-scale tuna longline (STLL) vessels generally refer to those vessels smaller than 100 GRT (mostly 50-70 GRT). Table 4 shows catch of domestic-based and foreign-based STLL vessels operated in the North Pacific by species from 1997 to 2015. STLL vessels were mainly is targeted on yellowfin with some bycatch of albacore. Estimated albacore catch in the region fluctuated between 315 and 930 mt during 2002 to 2015. A preliminary albacore catch was estimated as 391 mt in 2015. The catch of swordfish fluctuated between 1,200 mt to 4,000 mt from 1997 to 2014. The catch of swordfish in 2015 was preliminary estimated as 2,475 mt. As for Pacific bluefin tuna, in 2007, the catch was 1,401 mt, but it gradually decreased to 210 mt in 2012, which was the lowest in the late decade. The preliminary estimated catch in 2015 was 577 mt, slightly increased from 2014. Table 5 shows sharks catch by species for Taiwanese STLL operated in the North Pacific Ocean during 2009-2015. The annual shark total catch was preliminary estimated as 10,201 mt in 2015. The distribution of fishing efforts for STLL vessels from 2013 to 2015 is shown in Figure 4.

The length frequency of albacore, swordfish, and Pacific bluefin tuna caught by STLL vessels in the North Pacific are shown in Figure 2, Figure 3, and Figure 5 separately. For STLL, the size measurements for albacore, swordfish and Pacific bluefin tuna were sampled from domestic fishing ports. The amount of size measurements for albacore from 2013-2015 were 424, 662 and 646. The dominant size range for albacore caught by STLL from 2013-2015 was 92-102cm, 92-102cm and 94-102cm. Since the low jaw of swordfish was generally cut on board, eye-fork length was then measured instead. The amount of length measurement for swordfish from 2013-2015 was 713, 1,074 and 1,579. The dominant size range for swordfish caught by STLL from 2013-2015 was 100-125cm, 105-125cm and 105-115cm, separately. The amount of size measurements for Pacific bluefin tuna from 2013-2015 were 1,090, 1,633 and 2,141. The dominant size range for Pacific bluefin tuna caught by STLL from 2013-2014 was 225-250cm, and 230-245cm. However, the length frequency of Pacific bluefin tuna in 2015 revealed two modes at 195-220cm, and 230-255 cm, which showed the increase of smaller sized fish <230cm. It is noted that the length data of 2014 and 2015 are not recovered completely and still in preliminary.

1.2. Distant water purse seine fishery

Tuna purse seine fishery was introduced into Taiwan in 1982. At the outset second-hand Japanese group purse seiners were imported and Japanese fishing masters were employed. Through years of research, the first single boat purse seiner was launched in October 1984, as the cornerstone for rapid development of this fishery in the following 10 years. In 1992 the number of purse seiners reached to the highest level of 45 boats. Due to the adjustment of business strategy of some companies, the number of fishing vessels was then reduced to 42. The fleet further reduced to 34 vessels in 2003, after 8 vessels were exported. Since then, it maintained around 34.

Fishing operations of the fleet moved along the equator under a seasonal pattern, mainly concentrating in the exclusive economic zones of Papua New Guinea, Federated States of Micronesia, Kiribati, Nauru, Marshall Islands and Solomon Islands, as well as the neighboring high seas. In the years where El Niño phenomena occur the fish tends to move eastwards and the fishing activities will follow the pattern of this movement. In contrary, in years of La Niña, fish schools tend to concentrate more in the western part of the Pacific, and likewise do the fishing activities.

In 2015, the number of active distant water purse seine vessels was 34. The fishing effort distribution in recent three years was shown in Figure 6. In 2015, some purse seine vessels tend to move eastwards, compared to the previous year. The total catch by purse seine fishery in 2015 was decreased to 194,249 mt from 237,120 mt in 2014 (Table 6). Fishing effort and catch by species for Taiwanese DWPS operated in the North Pacific Ocean is shown as Table 7.

1.3 Other fisheries

Some other small scale fisheries, such as harpoon, set net and gill net may also catch tunas and tuna-like species in Taiwanese coastal and offshore waters. Table 8 shows the catch of 2015 for Taiwanese small scale coastal and offshore fisheries in the North Pacific Ocean.

2. DATA COLLECTION

2.1 Tuna longline fishery

2.1.1 Large-scale tuna longline fleet

Two types of fisheries statistical data are routinely collected for LTLL: the commercial data (for estimation of total catches), and the logbook data (for stock assessment purposes). Several sources of commercial information were available including traders, Taiwan Tuna Association, certified weight reports provided by the Organization for the Promotion of Responsible Tuna Fisheries (OPRT) and so on. After cross-checking and compilation, the commercial information was used to estimate total catches of the Category I data.

The logbook data includes each set of catch in number and weight by species, effort deployment, fishing location, as well as the length measurement of the first 30 fishes caught each day. Categories II and III data were all compiled based on this data set.

Except for paper-based logbooks, Taiwan has also introduced the electronic logbook mechanism in the Pacific Ocean since 2014. The electronic logbook mechanism has been gradually implemented on large-scale longline vessels. The format of e-logbook is consistent with the paper-based logbook.

These fishing vessels are required to record the fishing activity data on a daily basis, and report to Fisheries Agency of Taiwan through the way of satellite transmission. The aforesaid mechanism conduces to the rising recovery rate of logbooks and to obtain near-real-time fisheries information.

2.1.2 Small-scale tuna longline fleet

Two categories of STLL are defined: one is that station and unload their catches at domestic fishing ports (domestic-based STLL), and the other is that station and unload catches at foreign ports (foreign-based STLL). For domestic-based STLL, the landing records from local fishing markets provide the best information for estimating the ISC Category I data. For foreign-based STLL, preliminary estimations of Category I data were based on fishing vessels activities, landing reports from foreign-based agents and monthly catch report.

Since 1997, logbooks of STLL have been collected, and port sampling at domestic fish markets has also been strengthened by collecting size data of major tuna species (mainly bigeye tuna and yellowfin tuna). However, at the beginning, the recovery rate of logbook was about 2%-5% which was too low to be compiled for Category II data, and insufficient for stock assessment. To improve the recovery rate of logbook, Fisheries Agency have launched a data improving program by dispatching its staffs to collect logbooks, to interview with fishermen so as to obtain fisheries information, and to conduct size sampling program at main domestic fishing ports of Tungkang, Nanfangao and Singang since April 2007. Through the program, the recovery rate of logbook was improved to 21% in 2015.

Since 2015, Fisheries Agency has gradually started implementing the electronic logbook mechanism on small -scale longline vessels. The electronic logbooks are collecting the same information as the current paper-based logbook. These fishing vessels shall daily report back their catches through the satellite transmission. The aforesaid reason conduces to the rising recovery rate of logbooks.

For the purpose of conservation and management of Pacific bluefin tuna resource and well collection of catch data, Fisheries Agency has imposed a Catch Documentation Scheme (CDS) since March 2010. According to the regulation, all vessels fishing for Pacific bluefin tuna shall be authorized by Fisheries Agency every year and satellite based vessel monitoring system (VMS) is required to be installed on board. Once Pacific bluefin tuna was caught, fisher shall attach a tag issued by Fisheries Agency to each Pacific bluefin tuna, record the number and individual weight of Pacific bluefin tuna. The record shall be reported to Fisheries Agency on a daily basis. When the catch of Pacific bluefin tuna is landing, Fisheries Agency would dispatch its staffs to fishing ports to measure individual weight and length. In addition, Catch Documentation shall be validated by local authorities before the first sale whether the catch is for domestic consumption or for export. Through the program, the data collection of individual weight and length of Pacific bluefin tuna has reached 100% from 2010 to 2014.

2.2 Distant water purse seine fishery

The logbook recovery rate for distant water purse seine fishery has always been satisfactory, reaching 100% since the development of the fishery. Regarding length data, the logbook format of purse seine fishery was revised and added additional columns to record the information on size measurement in 2013. Since then, Fisheries Agency has required fishermen to fill in both the length and weight of the ten fishes caught for each set. Category III data was compiled based on this data set.

2.3 Other fisheries

The annual catch data of small scale coastal and offshore fisheries was collected from yearbook directly. For collecting information and developing estimation system of these coastal and offshore fisheries, a new program is under construction.

2.4 Observer program

For the purposes of better understanding the fishing activities of the longline fishery, including target and non-target fish species and to be in line with the international requirement for conserving marine resources, Fisheries Agency has launched a pilot observer program since 2001 in the Indian Ocean. Table 9 shows the number of observers in each year during 2002-2015. The observer program has been carried out in Pacific Ocean since 2002. In accordance with the government's policy in establishing an observers program and availability of budgets to support the increase of observers, the number of observers gradually increased year by year. In addition, Fisheries Agency began to dispatch observers to STLL from 2012. Totally the number of observers deployed on longline vessels in 2015 was 23, including 12 observers for LTLL vessels and 11 observers for STLL vessels respectively.

The duty of observer on board is to collect catch and effort data, and biological data, such as otoliths, gonads and muscles.

2.5 VMS monitoring

Vessel monitoring system (VMS) has been installed on some longliners (over 100 tons) prior to 2005. Since 2005, Taiwanese tuna vessels over 20 tons fishing for highly migratory fish stocks in the area beyond national jurisdiction were required to install VMS. In addition to monitoring fishing activities, those data were also used to verify logbook data for improving data quality.

3. RESEARCH

For the purpose of improving stock assessment of species in the North Pacific, government of Taiwan has commissioned scientists to conduct a series of researches in 2015 as follows：

1. Studies on abundance index and stock assessment of tropical tuna in the Western and Central Pacific and bluefin tuna in the Pacific Ocean.
2. A study on CPUE standardization and stock status for billfishes in the three oceans.
3. Study on age composition of southern bluefin tuna and Pacific bluefin tuna in the longline fishery.
4. Study on the Pacific albacore resource.
5. Studies of shark by-catch, abundance index and non-detriment findings in the three Oceans.
6. Research on Incidental Catch of Ecological Related Species by Taiwanese Distant Water Tuna Longline Fisheries
7. Study of reducing seabird bycatch operated on small-scale longline vessels in the Western and

Central Pacific.
8. Feasibility analysis on the fishing condition forecast of albacore tunas for the Taiwanese tuna longline fishery in the three oceans.
9. Feasibility analysis on the fishing condition forecast of yellowfin and bigeye tunas for the Taiwanese tuna longline fishery in the three oceans.
10. Feasibility analysis on the fishing condition forecast of swordfish for the Taiwanese tuna longline fishery in the three oceans.
11. The feasibility analysis on purse seine fishing condition of skipjack tuna in the western and central Pacific Ocean.

And the scientific papers presented at recent ISC meetings during 2015 to 2016 were as follows:
1. Revised CPUE standardization and catch estimate of shortfin mako shark, caught by the Taiwanese large-scale longline fishery in the North Pacific Ocean. (ISC/15/SHARKWG-1/07)
2. Standardized CPUE of striped marlin for the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean. (ISC/15/BILLWG-1/09)
3. Catch and length data of striped marlin (Kajikia audax) from Taiwanese fisheries in the western and central North Pacific Ocean. (ISC/15/BILLWG-1/08)
4. Stock Assessment of Striped Marlin (Kajikia audax) in the Western and Central North Pacific Ocean Using an Age-structured Model: Updated to 2013. (ISC/15/BILLWG-2/03)
5. Estimation of standardized CPUE SERIES of Pacific bluefin tuna for Taiwanese longline fishery under incomplete data. (ISC/15/PBFWG-2/10)
6. Update of Standardized PBF CPUE Series for Taiwanese Longline Fishery. (ISC/16/PBFWG-1/02)
7. CPUE Standardization of Blue Marlin (Makaira nigricans) for the Taiwanese Distant-Water Tuna Longline Fishery in the Pacific Ocean. (ISC/16/BILLWG-1/10)

Table 1. Number of Taiwanese tuna fishing vessels operated in the Pacific Ocean

Fishery / Year	Longline Fishery		Purse Seine Fishery
	LTLL	STLL	
2006	104	1,490	34
2007	90	1,750	34
2008	84	1,260	34
2009	75	1,220	34
2010	90	1,236	34
2011	95	1,376	34
2012	87	1,326	34
2013	82	1,296	34
2014	73	1,275	34
*2015	76	1,306	34

LTLL: large scale tuna longline vessel, STLL: small scale tuna longline vessel
* Data of 2015 is still preliminary.

Table 2. Fishing effort and catch by species for Taiwanese LTLL operated in the North Pacific Ocean

Unit: MT

Year	Hooks	ALB	PBF	BET	YFT	SWO	MLS	BUM	BLM	SFA	SKJ	TOTAL
1997	5,254,707	9,119	0	112	41	15	59	20	1	13	72	9,452
1998	9,752,453	8,617	0	156	39	20	90	21	5	34	444	9,426
1999	15,129,625	8,186	0	360	122	70	66	53	8	5	114	8,984
2000	24,950,519	7,898	0	1,450	584	325	153	75	19	49	195	10,748
2001	22,232,830	7,852	0	4,569	1,882	1,039	121	209	4	4	243	15,923
2002	32,474,088	7,055	0	7,257	2,689	1,633	251	138	5	1	16	19,045
2003	20,676,890	6,454	0	2,936	1,105	1,084	241	218	4	7	40	12,089
2004	34,997,887	4,061	0	4,939	1,230	884	261	372	2	11	191	11,951
2005	29,897,156	3,990	0	3,963	1,552	392	199	376	15	63	175	10,725
2006	22,532,898	3,848	1	2,756	1,035	438	204	363	5	11	8	8,669
2007	20,775,642	2,465	0	2,965	657	345	102	275	1	2	3	6,815
2008	17,301,213	2,490	+	2,840	484	338	78	255	1	20	129	6,635
2009	11,789,456	1,866	0	2,302	303	373	37	225	0	8	175	5,289
2010	16,044,584	2,281	0	3,139	467	531	53	409	32	4	44	6,960
2011	18,559,170	2,972	0	3,318	448	502	74	675	16	40	85	8,130
2012	14,424,473	2,055	0	2,653	285	350	91	287	5	29	82	5,837
2013	13,577,870	3,836	0	1,814	281	291	87	253	+	23	102	6,687
*2014	9,439,566	2,302	0	1,349	221	225	25	146	1	0	47	4,316
*2015	13,829,566	2,629	0	2,745	730	724	47	468	1	39	90	7,473

Species -- Albacore (ALB), Pacific bluefin tuna (PBF), bigeye tuna (BET), yellowfin tuna (YFT), swordfish (SWO), striped marlin (MLS), blue marlin (BUM), black marlin (BLM), sailfish (SFA), skipjack tuna (SKJ)
* Data of 2014 and 2015 is still preliminary.

Table 3. Shark catch by species for Taiwanese LTLL operated in the North Pacific Ocean

Unit: MT

Year	BSH	FAL	SMA	OCS	THR	SPN	POR	SKX	TOTAL

2009	417	155	78	32	10	-	0	29	721
2010	238	109	54	21	9	3	0	11	445
2011	670	289	208	53	43	9	0	29	1,301
2012	401	197	74	11	6	+	0	3	692
2013	453	173	107	0	3	+	0	13	749
2014	481	68	119	0	2	0	0	5	675
*2015	664	13	322	0	50	6	0	49	1,104

Species -- blue shark (BSH), silky shark (FAL), shortfin mako sharks (SMA), oceanic whitetip (OCS), thresher sharks (THR), hammerhead sharks (SPN), porbeagle shark (POR), other sharks & rays (SKX).

* Data of 2015 is still preliminary

Table 4. Tuna and billfish catch by species for Taiwanese STLL operated in the North Pacific Ocean

Unit: MT

Year	ALB	PBF	BET	YFT	SKJ	SWO	MLS	BUM	BLM	SFA
1997	337	1,814	3,506	9,419	59	1,358	290	3,625	611	527
1998	193	1,910	3,520	8,955	32	1,178	205	3,603	469	868
1999	207	3,089	2,578	8,961	27	1,385	128	3,362	563	402
2000	944	2,780	2,041	7,848	31	3,390	161	4,056	453	499
2001	832	1,839	1,898	8,166	26	3,813	129	4,524	428	640
2002	910	1,523	2,150	9,145	67	3,766	226	4,310	173	504
2003	712	1,863	6,136	15,689	14	3,687	681	7,467	1,110	2,079
2004	927	1,714	4,067	12,617	32	3,364	261	6,300	1,506	2,081
2005	482	1,368	5,314	12,181	33	3,572	584	7,254	1,144	1,333
2006	469	1,148	6,204	13,116	24	3,944	537	5,366	961	488
2007	451	1,401	5,075	11,885	17	3,754	199	4,842	259	1,059
2008	579	979	6,055	12,567	15	3,407	192	5,222	249	918
2009	512	877	3,807	13,122	66	3,177	225	4,413	298	372
2010	537	373	1,967	13,692	169	2,313	200	4,550	383	960
2011	462	292	2,769	11,382	235	3,075	269	3,950	335	876
2012	588	210	4,240	11,237	190	3,396	352	3,803	240	740
2013	591	331	3,493	9,928	265	2,555	285	4,354	444	665
2014	315	483	2,687	6,964	122	2,592	115	4,715	441	443
*2015	391	577	2,504	6,679	70	2,475	181	3,838	386	472

Species -- Pacific bluefin tuna (PBF), albacore (ALB), bigeye tuna (BET), yellowfin tuna (YFT), skipjack tuna (SKJ), swordfish (SWO), striped marlin (MLS), blue marlin (BUM), black marlin (BLM), sailfish (SFA).

* Data of 2015 is still preliminary

Table 5. Shark catch by species for Taiwanese STLL operated in the North Pacific Ocean

Unit: MT

Year	BSH	FAL	MAK	OCS	THR	SPN	POR	SKX
2009	11,124	390	477	15	628	552	0	3,217
2010	7,432	146	620	7	498	320	0	1,925
2011	12,447	216	976	2	788	388	0	3,087
2012	10,205	94	686	2	579	349	0	3,051
2013	5,868	55	518	0	717	316	0	2,644
2014	7,670	35	391	0	531	218	0	1,403
*2015	7,608	19	571	0	459	245	0	1,299

Species -- blue shark (BSH), silky shark (FAL), mako sharks (MAK), oceanic whitetip (OCS), thresher sharks (THR), hammerhead sharks (SPN), porbeagle shark (POR), other sharks & rays (SKX).
The catches of shark species in frozen form still needs to be converted to process the round weight.
* Data of 2015 is still preliminary

Table 6. Fishing effort and catch for Taiwanese DWPS operated in the Pacific Ocean

Unit: MT

Year	Fishing days	SKJ	YFT	BET	Total
2005	4,823	165,289	27,572	2,178	195,039
2006	4,493	189,392	19,793	978	210,163
2007	4,873	209,002	21,147	2,386	232,535
2008	4,783	165,007	35,770	3,196	203,973
2009	4,363	173,725	16,237	2,113	192,075
2010	5,129	166,211	29,203	3,437	198,851
2011	5,359	155,641	18,143	2,151	175,935
2012	5,097	172,664	25,750	2,239	200,653
2013	5,520	186,330	22,659	3,491	212,480
2014	5,361	213,154	20,548	3,418	237,120
*2015	4,022	160,597	28,593	5,059	194,249

DWPS: distant water purse seiner
Species -- skipjack tuna (SKJ), yellowfin tuna (YFT), and bigeye tuna (BET).
* Data of 2015 is still preliminary

Table 7. Fishing effort and catch by species for Taiwanese DWPS operated in the North Pacific Ocean

Unit: MT

Year	Fishing days	ALB	PBF	BET	YFT	SWO	MLS	BUM	BLM	SFA	SKJ	TOTAL
2005	-	-	-	1,167	11,166	-	-	-	-	-	69,500	81,833
2006	1,873	-	-	182	7,717	-	-	-	-	-	75,442	83,341
2007	2,082	-	-	564	8,037	-	-	-	-	-	87,232	95,833
2008	1,370	-	-	1,243	9,994	-	-	-	-	-	50,587	61,824
2009	1,859	-	-	568	6,319	-	-	-	-	-	69,026	75,913

2010	1,370	-	-	121	1,215	-	-	-	-	-	42,397	43,733
2011	1,463	-	-	724	4,037	+	-	2	3	+	42,796	47,562
2012	2,072	-	-	764	7,517	-	+	12	2	+	71,482	79,777
2013	1,842	-	-	1,749	8,714	-	+	9	3	+	66,694	77,170
2014	2,232	-	-	1,248	8,700	+	1	7	4	+	95,091	105,051
*2015	1,613	-	-	2,082	17,873	-	-	3	2	+	59,274	79,234

DWPS: distant water purse seiner

Species -- Albacore (ALB), Pacific bluefin tuna (PBF), bigeye tuna (BET), yellowfin tuna (YFT), swordfish (SWO), striped marlin (MLS), blue marlin (BUM), black marlin (BLM), sailfish (SFA), skipjack tuna (SKJ).

* Data of 2015 is still preliminary

Table 8. The annual catch of 2015 for Taiwanese small scale coastal and offshore fisheries in the North Pacific Ocean

Unit: MT

Fisheries	PBF	ALB	BET	YFT	SKJ	SWO	MLS	BUM	BLM	SFA	SSP	SKX	TOTAL
Offshore Gillnet	0	0	0	1	+	+	0	0	0	+	-	142	143
Offshore Others	0	+	+	75	2485	+	+	5	0	2	-	395	2961
Coastal Gillnet	4	1	+	7	52	4	5	11	52	134	-	64	335
Coastal Setnet	38	1	3	25	1691	4	+	4	3	46	-	10	1824
Coastal Harpoon	0	0	0	0	0	0	64	124	179	158	-	0	525
Costal Longline	0	0	0	3	0	0	0	0	0	2	-	4	9
Coastal Others	0	0	0	10	103	0	0	0	0	0	-	5	118

Species -- Pacific bluefin tuna (PBF), albacore (ALB), bigeye tuna (BET), yellowfin tuna (YFT), skipjack tuna (SKJ), swordfish (SWO), striped marlin (MLS), blue marlin (BUM), black marlin (BLM), sailfish (SFA), shortbill spearfish (SSP), other sharks & rays (SKX).

Data of 2015 is still preliminary.

Table 9. The number of observers deployed on longline vessels in Pacific Ocean during 2002-2015

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	*2015
Number of observers	1	3	4	5	10	15	14	22	17	15	32	24	24	23

* Data of 2015 is still preliminary

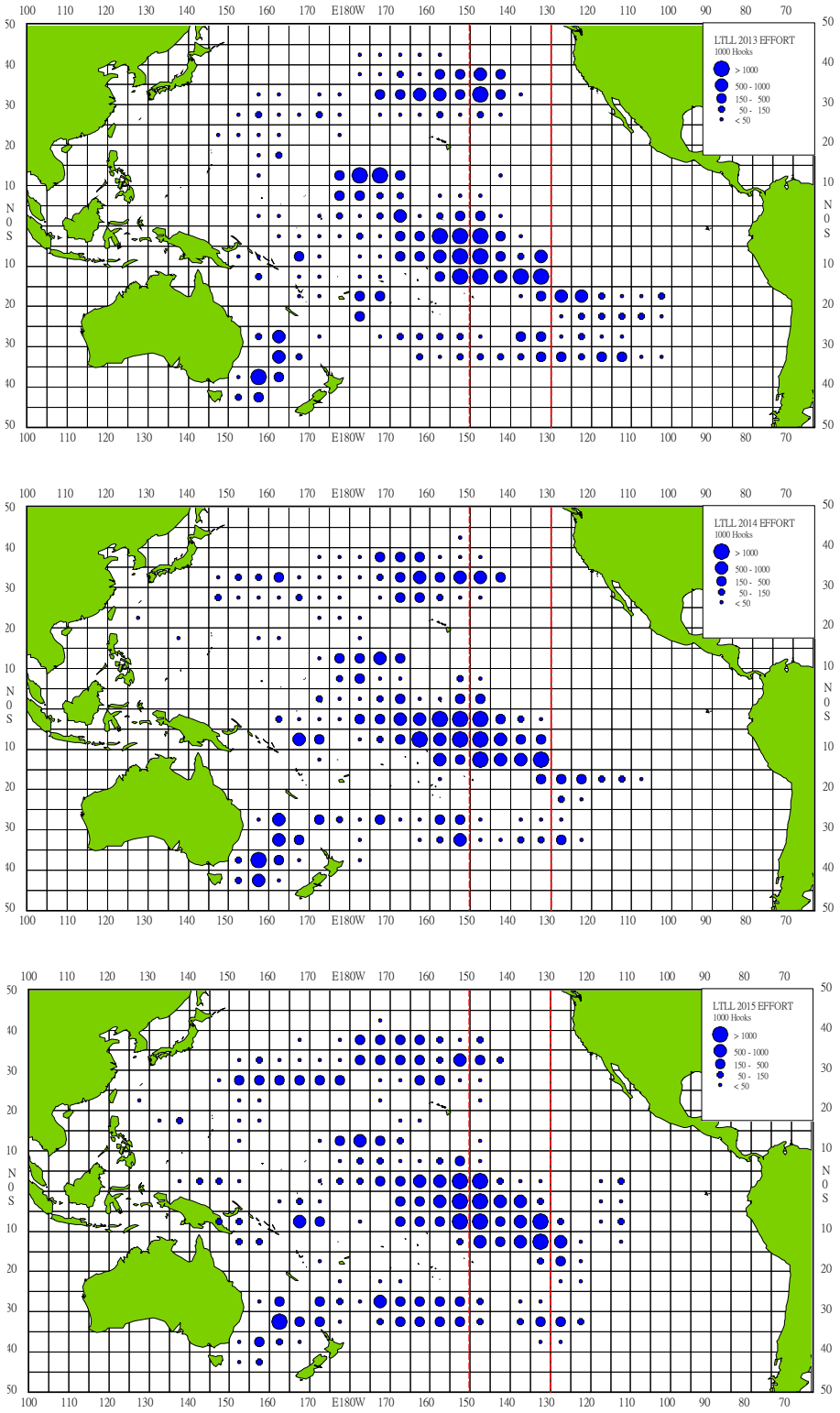

Figure 1. Distribution of fishing effort for Taiwanese LTLL vessels operated in the Pacific Ocean during 2013-2015 (Note: Map of 2014 and 2015 is still preliminary and will be revised shortly.)

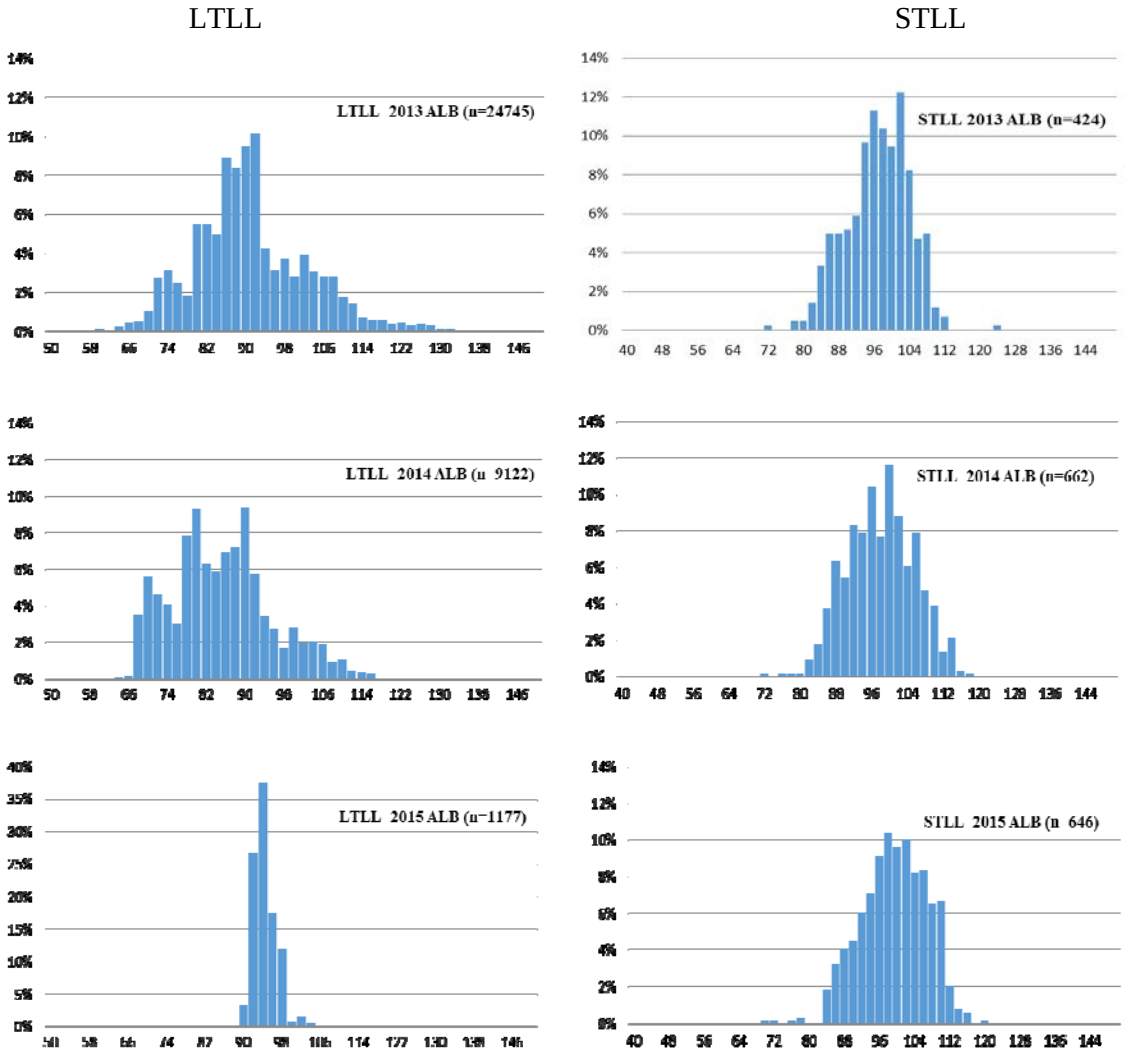

Figure 2. Length frequency distribution of albacore caught by Taiwanese LTLL and STLL vessels in the North Pacific Ocean during 2013-2015.

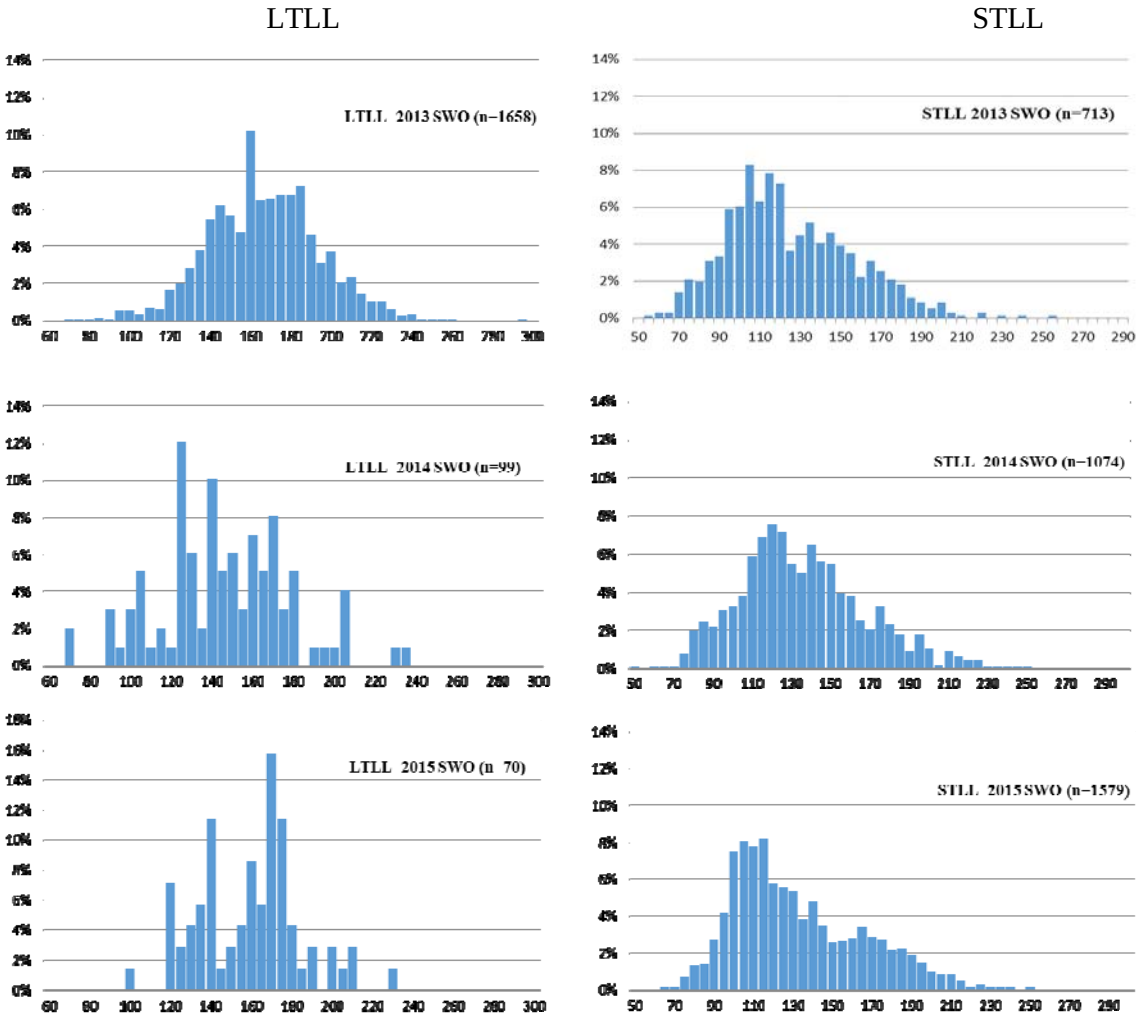

Figure 3. Length frequency distribution of swordfish caught by Taiwanese LTLL and STLL vessels in the North Pacific Ocean during 2013-2015 (measurement: low jaw-fork length for LTLL, eye-fork length for STLL).

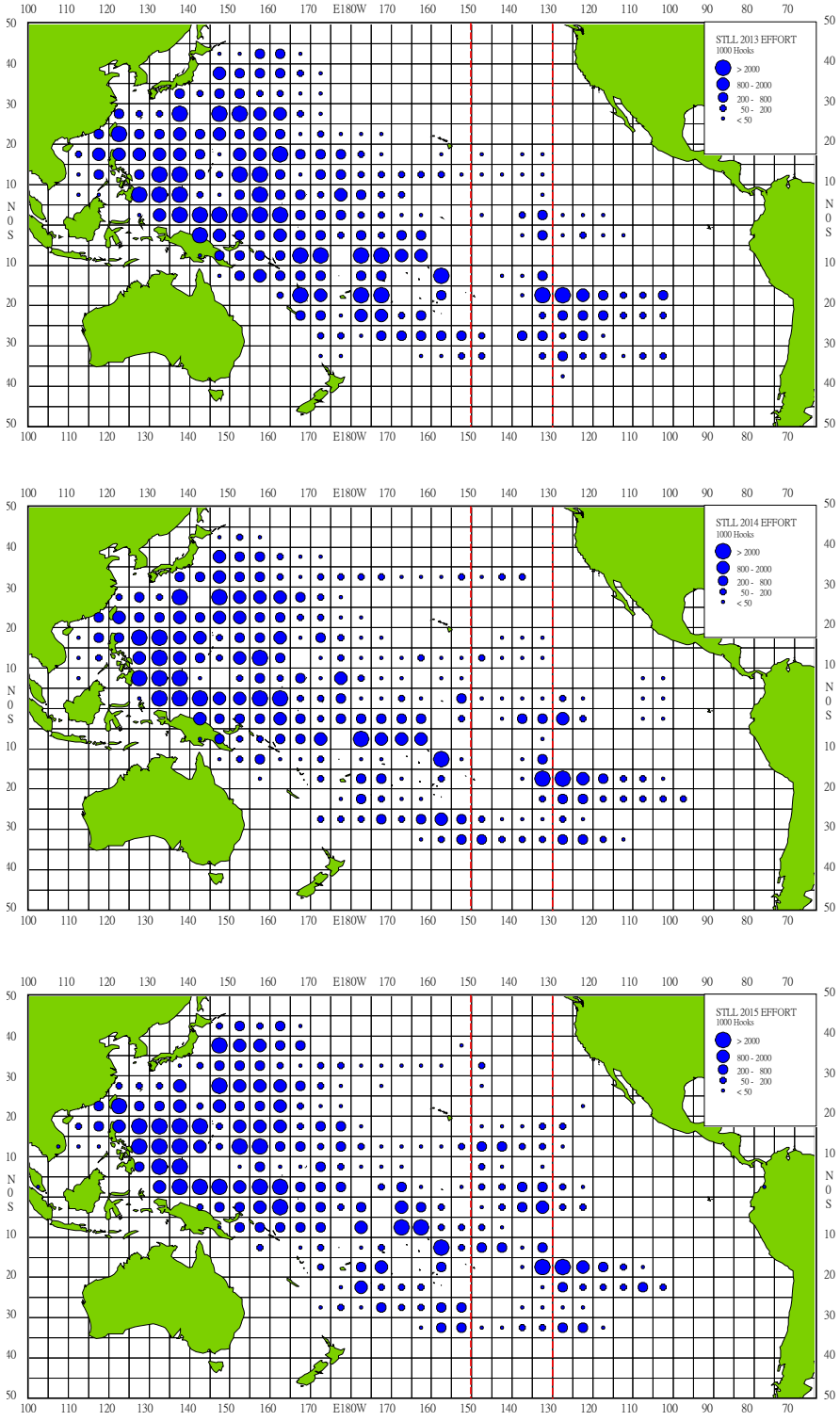

Figure 4. Distribution of fishing effort for Taiwanese STLL vessels operated in the Pacific Ocean during 2013-2015. (Note: Map of 2014 and 2015 is still preliminary and will be revised shortly.)

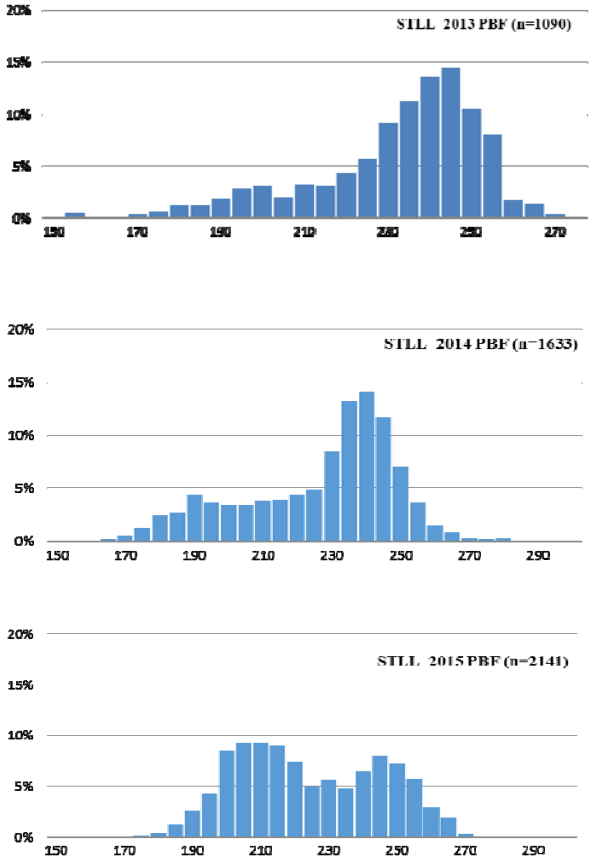

Figure 5. Length frequency distribution of Pacific bluefin tuna caught by Taiwanese STLL vessels in the North Pacific Ocean during 2013-2015.

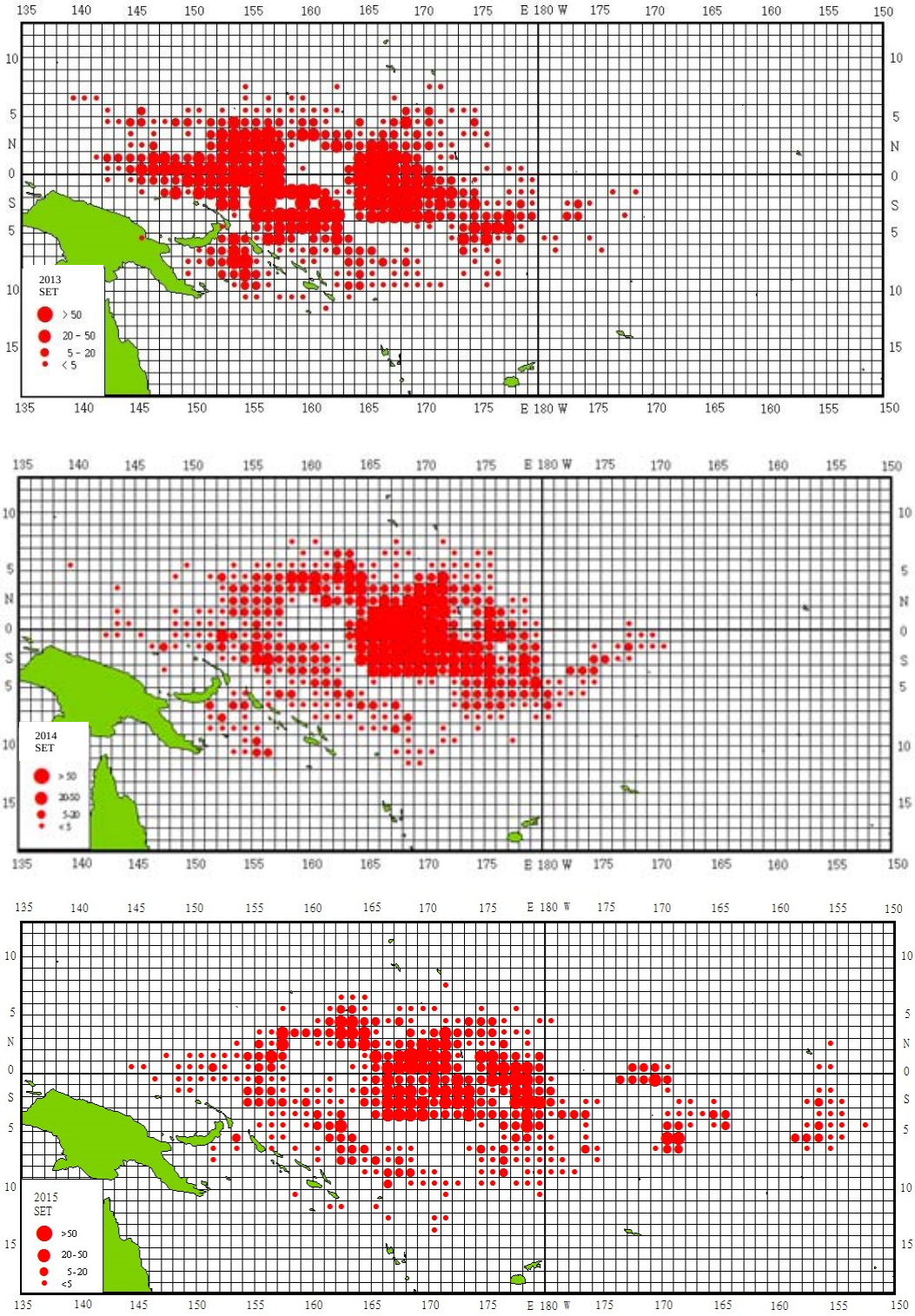

Figure 6. Distribution of fishing effort for Taiwanese distant water purse seine vessels operated in Pacific Ocean during 2013-2015.