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China's Annual report (Jack mackerel)

China

Annual Report of China to the 2019SPRFMO Science Committee
Part I: the Jack Mackerel Fishery

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Summary

Two Chinese trawlers operated in the SPRMFO Convention Area for jack mackerel in 2018, and the total catch was 24,678 tons, in which 311 tons of Chub mackerel were included. The main fishing season this year was from March to August (last year was from April to August). Similar to the previous years, the fishery firstly took place in the high seas off South-central Chile and then moved to northern Chile, where the young jack mackerel distributed, at the end of the fishing season. The total catch, as well as nominal CPUE reached a higher level than previous years. It may because that the biomass has been recovering. A total of 12,189 jack mackerel were measured by the scientific observer in 2018. The observation and biology sample covered the main fishing season and fishing ground. 86 fishing days and 149 tows were observed, and the coverage rate was 37.4%.

1 Description of Chinese Pelagic Trawl Fishery

The Chinese pelagic trawlers have been harvesting jack mackerel (*Trachurus murphyi*) in the high seas in the Convention Area since 2000. The first Chinese pelagic trawler KAIXIN arrived at the Southeast Pacific on June 2000 and worked for two months. During the early years the Chinese fleet fish for jack mackerel all year round, however, it only worked for 8 to 10 months that covered the main fishing season (March to October) after 2006. In 2018, the fishing season began on 5 March and ended 1 September, so the actual operation time decreased to six months, the shortest record since 2001.

The number of active Chinese trawlers was 11 in 2008, and then continued to decrease. Although it recovered to 6 in 2015, three of them only worked for 2 or 3 months. In the past three years, only 2 trawlers operated in the Southeast Pacific for

jack mackerel. The number of vessels in recent years is shown in table 1.

Annual catch fluctuated from 2,318 to 160,000 tons from 2000 to 2018 and peaked in 2006, and then it declined continuously and decreased to 8,329 tons at the lowest level since 2001. In recent years, catches increase with the jack mackerel biomass recovered, especially in 2018.

Table 1 Number of vessels from 2014 to 2019

Year	Number of fishing vessels	Registered tonnage, GRT		Gear type
		<4,000	≥4,000	
2014	3	0	3	Pelagic trawl
2015	6	0	6	Pelagic trawl
2016	2	0	2	Pelagic trawl
2017	2	0	2	Pelagic trawl
2018	2	0	2	Pelagic trawl
2019	2	0	2	Pelagic trawl

2 Catch, Effort and CPUE Summaries

The Chinese trawl fishery targets jack mackerel with some by-catch of which the majority is chub mackerel (*Scomber japonicus*). Chub mackerel makes up a small fraction of the total catch. In 2018, 312 tons' chub mackerel was caught which accounted for 1.26% of the total catches.

Table 2 presents the summary of annual catch, fishing effort (fishing days and trawling hours) and catch per fishing effort of the Chinese trawl fishery during the last six years. Catch, fishing days, as well as catch per fishing effort of the Chinese vessels increased in the previous five years. These increases are related to the increased biomass of jack mackerel.

Annual catch in 2018 was 24.4 thousand tons and increased obviously when compared catch in 2015, 2016 and 2017. The growth rate of catch in 2018 reached to 47.6%. Up to July 2019, the two Chinese pelagic trawlers had caught about 16.8 thousand tons jack mackerel, while the catch was only 12.9 thousand tons during the same period of 2018.

Fishing days or trawling hours based effort showed a similar trend with the catch from 2013 to 2018 (Table 2). Fishing days and trawling have continued to grow since 2013 and peaked in 2015, however, they both dropped in 2016 and 2017. Contrary to 2017, fishing days and trawling hours increased 39.4% and 74.1%, respectively. The CPUE based on fishing days peaked in 2018 and were 5% higher than 2017, but trawling hour based CPUE dropped by 19.1%.

Table 2 Catch, effort, and catch per fishing effort of the Chinese fishing fleets over the period of 2014-2019.

Year	Catch in tons	Fishing days	Catch per day in tons	Trawling time in hours	Catch per hour in tons
2014	21,155	298	71	3655.2	5.8
2015	29,180	362	81	3704.4	7.9
2016	20,208	277	73	3162.5	6.4
2017	16,586	165	101	1482.3	11.2
2018	24,366	230	106	2581.1	9.4
2019	16,808*				

Note: The total catch of jackmackerel was 16,808 tons through July 2019.

Monthly catches of jack mackerel in the last five years are shown in Figure 1. The second and third quarters were the main fishing seasons and there were almost no fishing activities either in the first or the last two months in 2018. The two trawlers only operated one day on the sea in September. Generally, jack mackerel catches increased from the beginning of the fishing season and reached the highest value in the middle term and then decreased. In 2016 and 2018, highest catches were taken in May, and then the catch declined month by month, however, in 2017, jack mackerel catch was highest in April, the first month of 2017 fishing season. In 2014 and 2015, highest catches occurred in June and July respectively. Excluding September, Monthly catch of 2018 was higher than it of 2017.

Monthly CPUE fluctuated between to 1.1 (February 2015) to 14.5 tons per hour (September 2017). The monthly CPUE trend followed a dome-shaped curve in general except for 2017, and consistent with the catch. The nominal CPUE in September 2018 was highest, but because all the 203 tons' jack mackerel were

caught on September 1st by three tows.

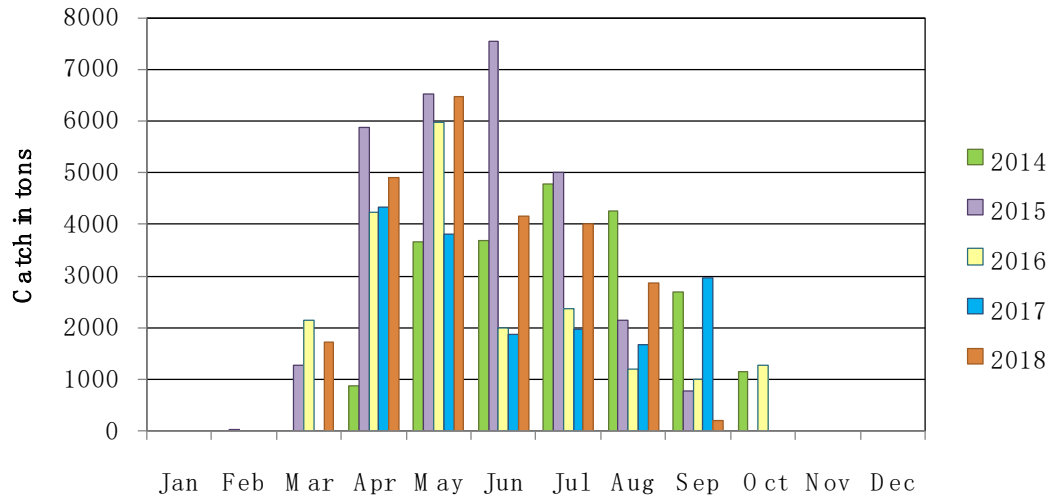


Figure 1. Monthly catches of jack mackerel by the Chinese trawling vessels during 2012-2017.

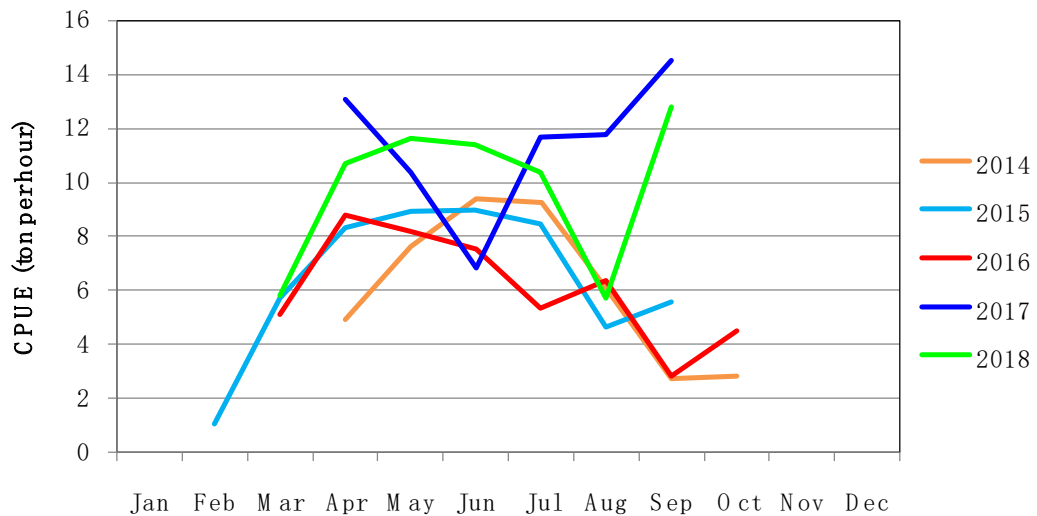


Figure 2. Monthly CPUE of the Chinese trawl fishery during 2014-2018.

Monthly catch distribution in 2018 derived from the tow-by-tow information was presented in Figure3. Catch geographical distributions during 2015-2017 were also shown for the purpose of comparison in Figure 4,5 and 6. The special and temporal distribution pattern did not fundamentally change during these years. Chinese fishing vessels operated in the waters off south-central Chile in the second quarter and move to northern Chile at the end of the third quarter. The two vessels moved to the

northern fishing ground in August 2017, same as 2016 and 2017 but a month earlier than 2015.

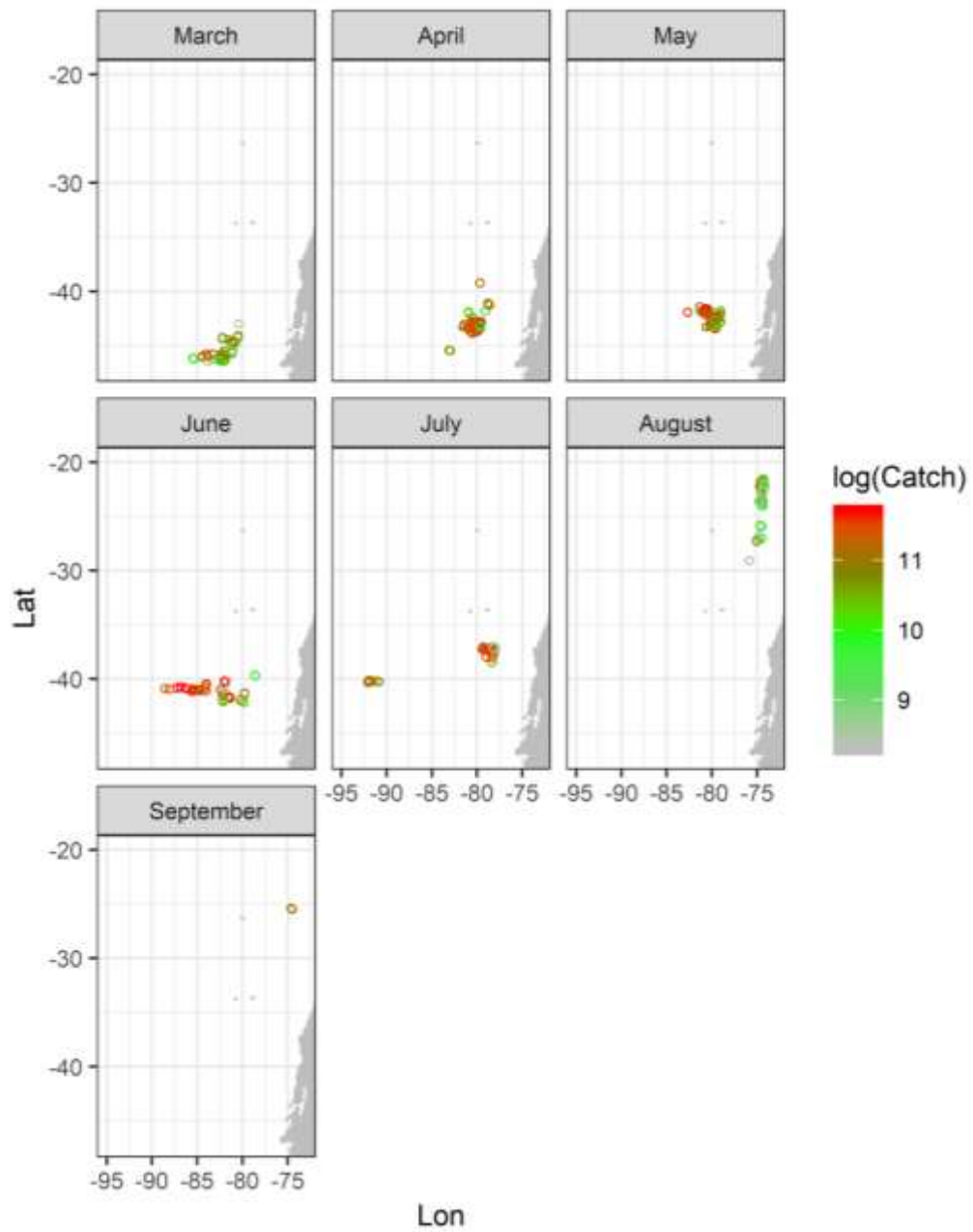


Figure 3. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2018.

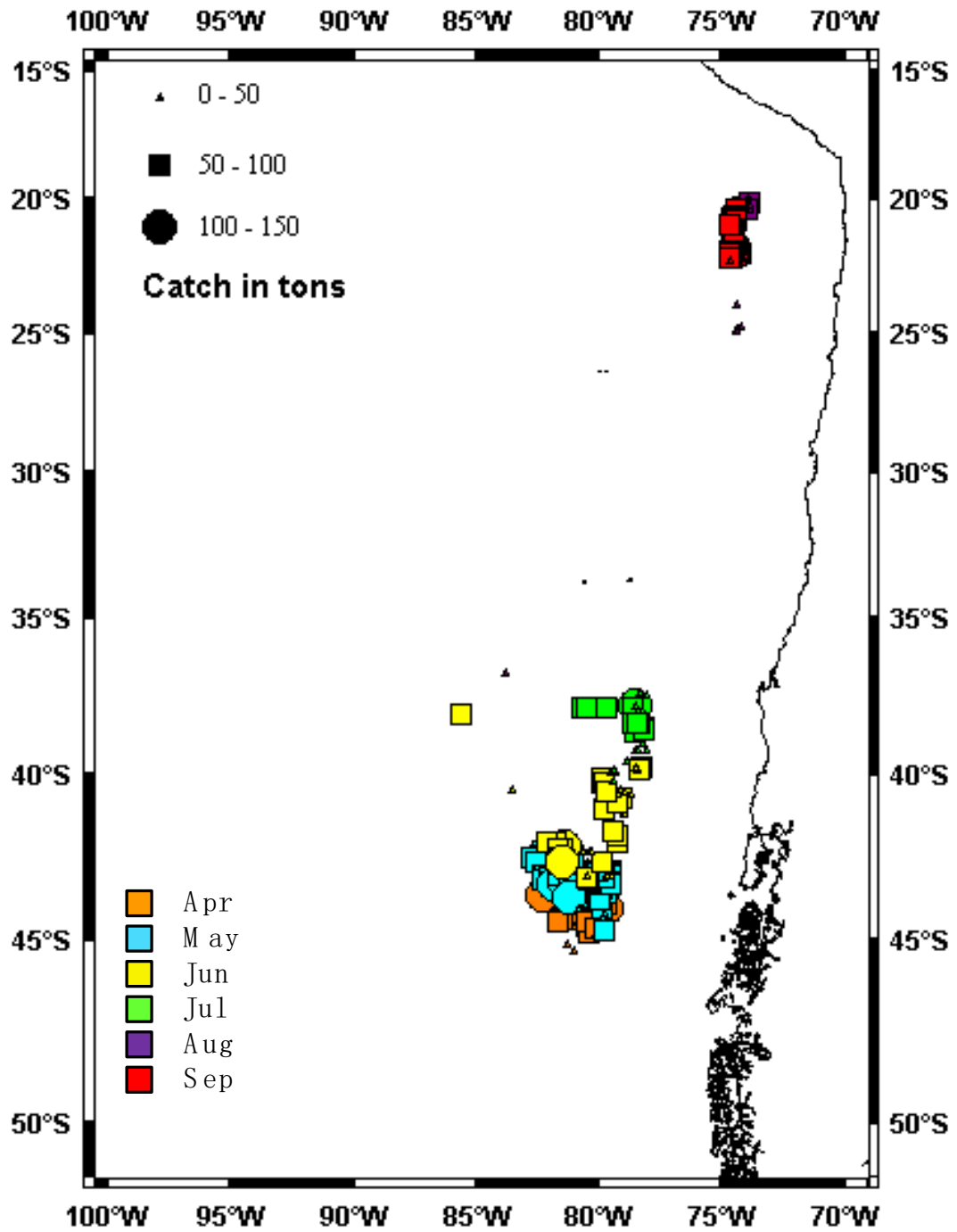


Figure 4. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2017.

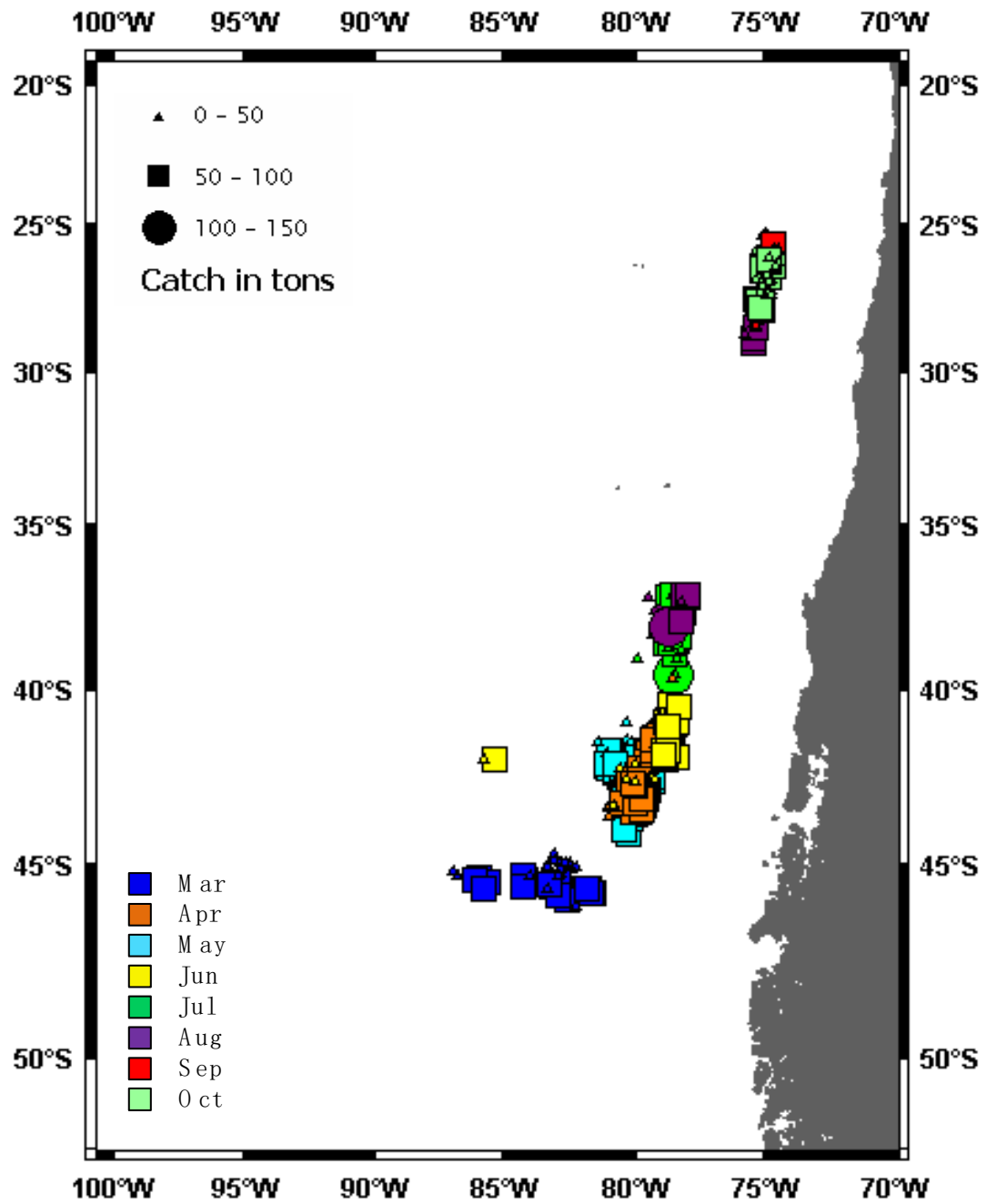


Figure 5. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2016.

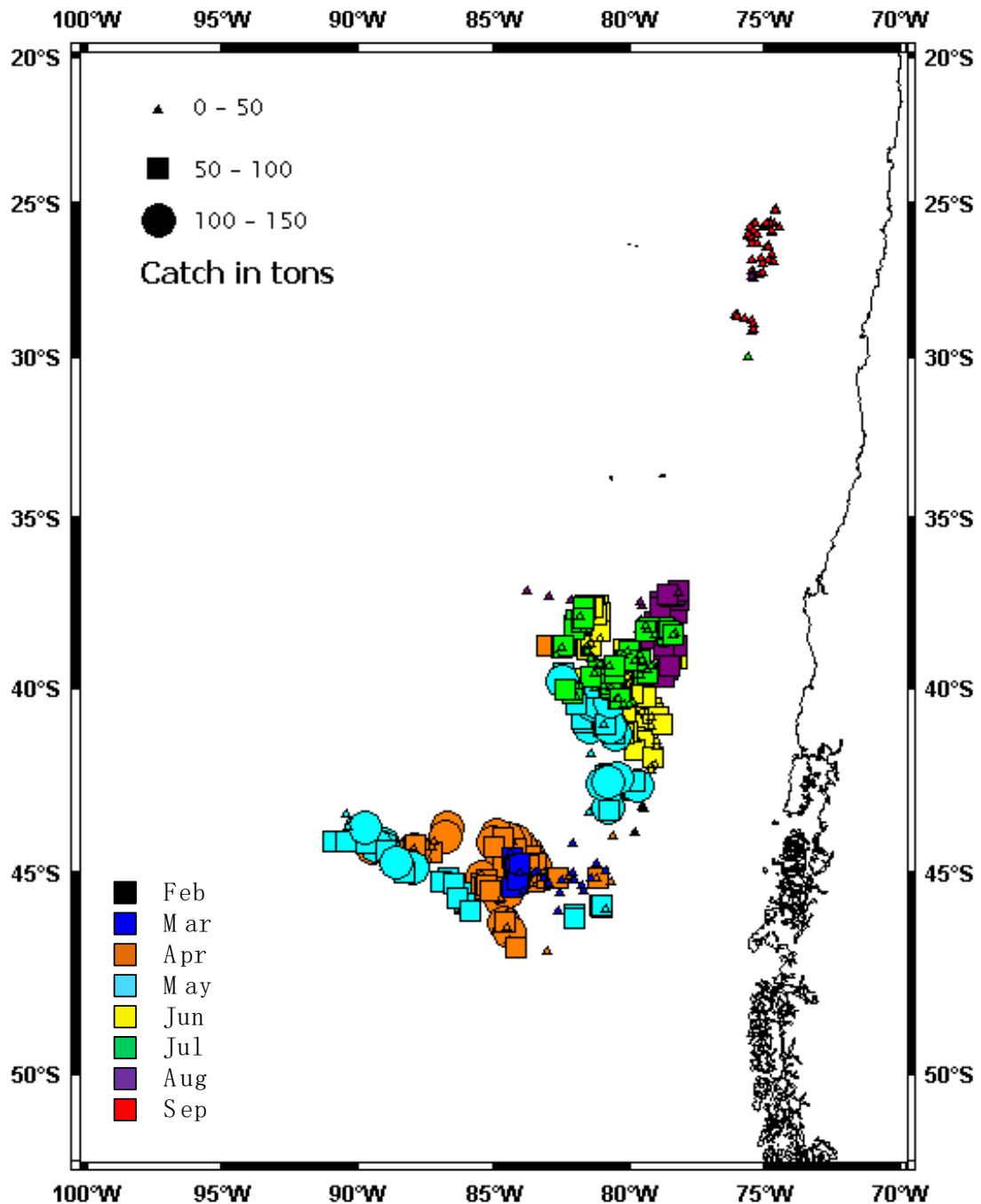


Figure 6. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2015.

3 Fisheries Data Collection

Two types of fisheries data are collected for jack mackerel, the fishing activity data and scientific onboard observed data. Catch data collection were carried out in 2000, in which the Chinese trawlers began to fish jack mackerel in the Southeast Pacific. The Chinese trawlers were requested to supply the fishing logbooks and report the

monthly catch statistics. Fisheries data from the logbooks include names of trawlers, start and end locations and time (date and UTC time) of each tow, catch of jackmackerel and other by-catch species, etc. In 2018, a total of 377 recorders of tow-by-tow information were collected.

Observer data collected are usual biological information such as fork length, weight, sex, maturity stage, etc. An observer embarked on the Chinese trawler KAI FUHAO on the sea on April 14 to work and stayed on board until it returned to ZHOUSAN Port China on October 18. So most of the fishing activities were observed in 2018 and a total of 86 fishing days and 149 tows were observed, and the coverage rate was 37.4% (calculated by fishing days) or 39.5% (calculated by tows).

4 Biological Sampling and Length Composition of Catches

In 2018 fishing season, only the first one and a half month (from March 5 to April 13) were not covered. The observer sampled jack mackerel in the catch and measured fork length sex and maturity stage. Information such as operating location and time, by-catch species of each observed tow were also recorded. During the observed fishing days, a total of 12,819 jack mackerel were sampled and measured, the highest number in recent years.

Fork length data were collected from April 14 to 1 September 2018, which covered the most of the fishing season and the waters that both adult and young jack mackerel distributed, thus the length composition can reflect the information of catch at the size and was repetitive. The dominant size in 2018 fishing season was 33-41 cm, followed by 17-21 cm and 25-28 cm (Figure 6). Compared with the historic length composition, it can be seen that the length distribution was different from year to year, the main reasons are related to where and when the jack mackerel were sampled. The trawlers fish large jack mackerel in the southern fishing area before August in recent years, afterward they move to the northern fishing area to target young jack mackerel. For example, length composition in 2014 and 2015 derived from jack mackerel samples caught during April-July in the waters off central-southern Chile, so the small fish disappeared from catch. In 2016, the sampling area and time covered the whole fishing area and season, so the percentage of younger age jack mackerel was relative higher. It can be seen that there was the highest percentage of young jack mackerel in 2017 because most of the jack mackerel were measured during August-September in the northern area that the young jack mackerel distributed. The catches in 2018 also contained a high percentage of young fish.

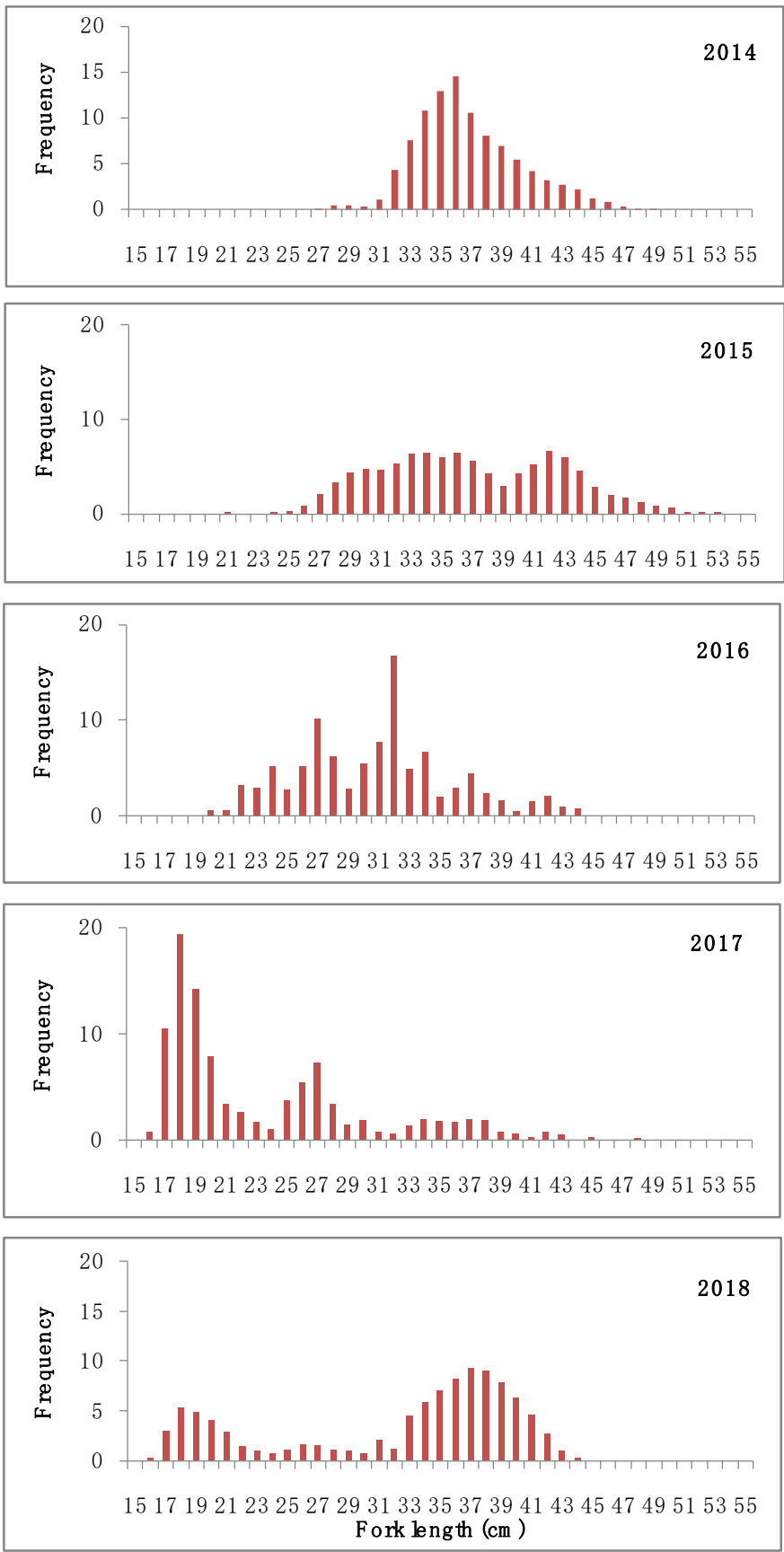


Figure 6. Fork length frequencies of jack mackerel sampled in 2014-2018

5 Ecosystem Approach Considerations

The observer inspected whether the trawlers installed the bird-scaring lines when operating. In 2017, all the Chinese vessels were equipped with bird-scaring lines (Figure 8a and b). Sea birds were wandering around the stern when the trawlers were operating, but no birds were found in the net and no collisions were observed.



Figure 7a. Bird scaring lines attached to KAI FU HAO



Figure 7b Bird scaring lines attached to KAI FU HAO

6 Observer Implementation Reports

China National Data Center for Distant-water Fisheries took full responsibility for fishery data collection and national observer program in 2015. China Distant-water Fishing Observer Programme is financed by the government, and organized by Shanghai Ocean University's College of Marine Science structurally. The program concentrates on placing observers on pelagic trawlers and concerned about collecting data for science.

Trainers of China Distant-water Fishing Observer Programme are from the highly qualified personal teaching at the College of Marine Science at the Shanghai Ocean University. These trainers have been observers in the past and also have other qualifications of expertise. Observers employed in this program require at least a high school pass as a minimum to be eligible. An observer was chosen and received special training at Shanghai Ocean University before placed on KAI FU HAO in 2018. The training courses include skills on data collection, safety on the sea, management measures and so on.

The observer embarked on KAI FU HAO on April 14 and worked till the end of 2018 fishing season. A total of 86 fishing days and 149 tows were observed which covered about 37.4% or 39.5% of the total fishing days and met the 10% observer coverage requirement of CMM01-2019. Based on the CMM 02-2019 about data standards, the observer collected catch and effort data, biological data and other relevant information. No seabirds, mammals, reptiles and other species of concern were caught and observed during the fishing operation.

Table 4. Fork length frequency data of Jack Mackerel catch in 2018

Time	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	Total
Middle Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	21	41	95	140	189	175	133	88	59	30	7	15	1000
Late Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	14	36	53	72	86	94	89	75	43	29	2	0	0	600
Early May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	95	143	181	196	243	210	177	144	113	57	17	0	0	1600
Middle May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	58	77	86	106	115	101	78	64	47	29	11	0	0	800
Late May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	76	102	113	121	135	126	105	90	66	30	15	2	0	1000
Early Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	36	54	78	94	106	92	93	80	63	50	33	5	3	0	790
Middle Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	13	37	45	56	57	73	81	76	62	53	29	14	0	0	0	600
Late Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	74	99	124	129	127	116	99	85	60	33	13	0	0	1000
Early Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	46	72	114	123	130	130	118	100	71	46	34	11	0	0	1000
Middle Jul	1	13	244	359	309	165	90	12	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1200
Late Jul	0	13	26	27	17	29	27	18	15	3	2	19	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200
Early Aug	4	47	109	173	136	143	90	35	19	16	9	10	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	799
Middle Aug	0	0	21	57	65	67	67	56	20	10	26	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	400
Late Aug	0	0	0	22	48	53	54	56	60	54	88	159	167	133	104	67	52	27	21	13	8	6	7	0	0	1	0	0	0	0	1200
Total	5	73	400	638	575	457	328	177	117	87	125	194	183	133	109	88	291	521	747	885	1036	1155	1130	965	778	543	318	104	12	15	12189

