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China Annual Report (Jack mackerel)

China

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Annual Report of China to the 2020 SPRFMO Scientific Committee
Part I: the Jack Mackerel Fishery

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Summary

In 2019, the two Chinese trawlers, KAI FU and KAI YU HAO operated in the SPRMFO Convention Area for jack mackerel. The jack mackerel catch was 22,706 tons with 135 tons of Chub mackerel. The fishing season of 2019 was from February to September (last year was from March 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 nominal CPUE was very stable and maintained at a high level, which indicated the stock has been recovered. 90 fishing days and 137 tows were observed by an observer, and the coverage rate was 41.5%. A total of 11,091 jack mackerel were measured by the observer in 2019.

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 in 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. KAI YU started to fishing on 20 February 2019 and ended operation on 16 September, while the other trawler, KAI FU HAO, began to operate on 26 February and completed its final towing on 1 July. Thus the 2019 fishing season increased one month compared to 2018.

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 2019 and peaked in 2006, and then it declined continuously and decreased to 8,329 tons at the lowest level since 2001. During the recent 5 years, the annual catch of jack mackerel was over 20 thousand tons except 2017.

Table 1 Number of vessels from 2015 to 2019

Year	Number of fishing vessels	Registered tonnage, GRT		Gear type
		<4,000	≥4,000	
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
2020	0	-	-	-

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 2019, 135 tons' chub mackerel was caught which accounted for 0.55% 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 2019 was 22.7 thousand tons, declined by 6.81% last year but increased obviously when compared catch in 2015, 2016, and 2017. No Chinese trawlers operated in the Convention Area for jack mackerel this year.

Fishing days or trawling hour-based effort showed a similar trend with the catch from

2014 to 2019 (Table 2). Fishing days were fluctuant between 217 to 363 with trawling hours ranged from 2421 to 3704, both peaked in 2015 and reached their troughs in 2017. Fishing efforts showed a significant increase in 2018 but had a small decrease in 2019. Contrary to 2018, fishing days and trawling hours decreased 5.7% and 6.2%, respectively. The catch rate during the last three years maintained a high level, fishing days based CPUE was over 100 tons per day, and the trawling hour based CPUE ranged from 9.4 to 11.2 tons per hour.

Table 2 Catch, effort, and catch per fishing effort of the Chinese fishing fleets for 2015-2020.

Year	Catch in tons	Fishing days	Catch per day in tons	Trawling time in hours	Catch per hour in tons
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	22,706	217	105	2421.2	9.4
2020*	0	0	0	0	0

Note: There are no Chinses trawlers operates in the Convention area in 2020.

Monthly catches of jack mackerel in the last five years are shown in Figure 1. The second and third quarters were the main fishing season and there were almost no fishing activities either in January and the fourth quarter of 2019. The 2019 fishing season started in late February, two weeks earlier than 2018, and ended in mid-September, thus it was extended about 4 weeks comparing to the 2018 fishing season. However, one of the two trawlers stopped fishing in August. 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, 2018, and 2019, the highest catches were taken in May, however, in 2017, jack mackerel catch was highest in April. In 2019, the monthly catch did not fell gradually after its top, instead, it reached the second peak in August.

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. In 2019, the nominal CPUE

was highest in September (16.6 tons per hour) and the lowest CPUE, as well as monthly catch, was shown in February.

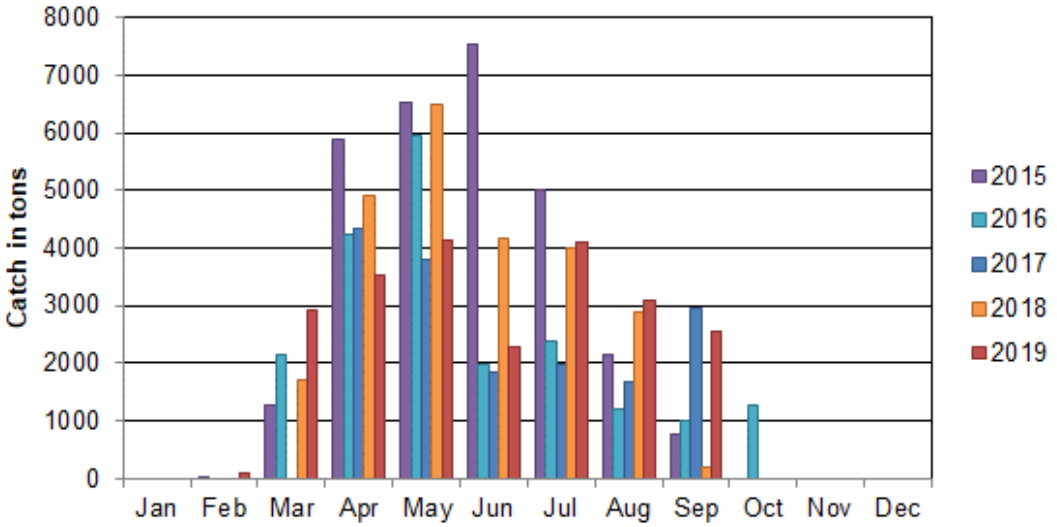

Figure 1. Monthly catches of jack mackerel by the Chinese trawling vessels during 2012-2018.

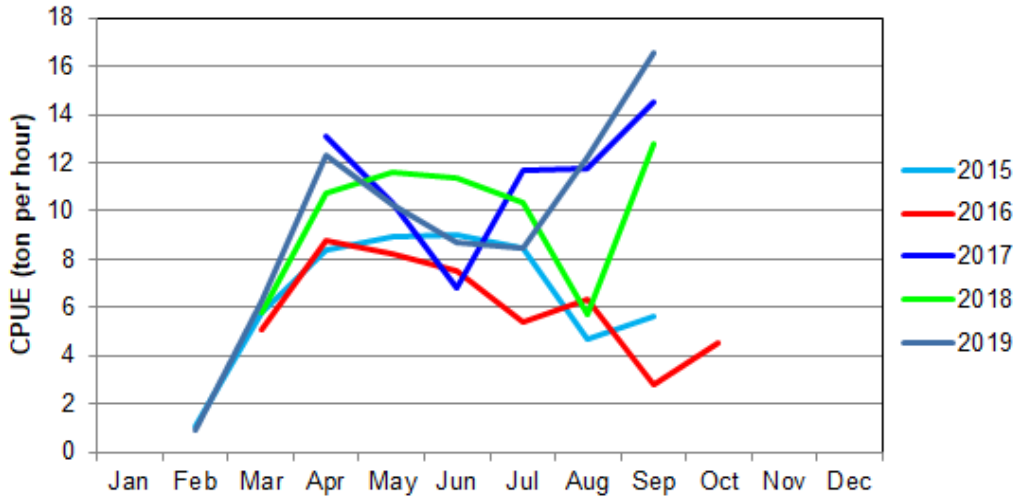

Figure 2. Monthly CPUE of the Chinese trawl fishery during 2014-2019.

The monthly catch distribution in 2019 derived from the tow-by-tow information was presented in Figure 3. Catch geographical distributions during 2015-2018 were also shown for comparison in Figures 4, 5, 6, and 7. The special and temporal distribution patterns 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. KAI YU moved to the northern fishing ground in August 2019, the same as previous years.

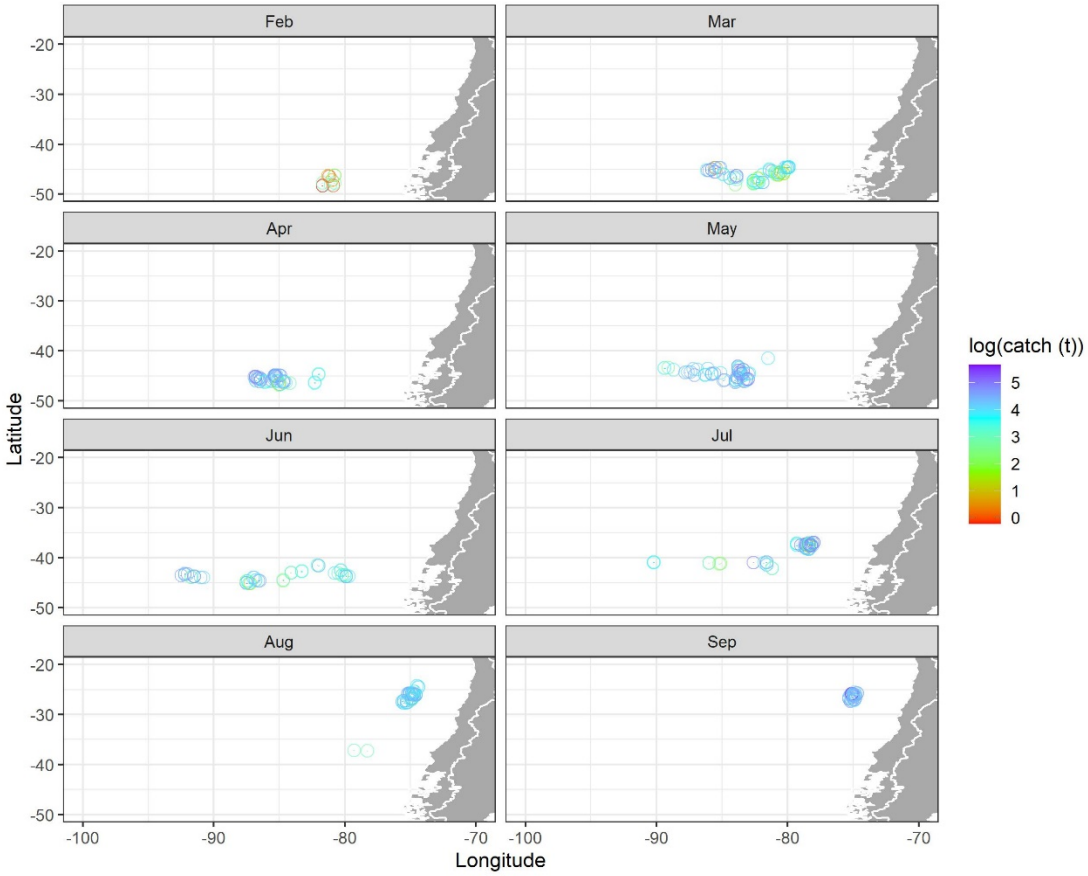

Figure 3. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2019.

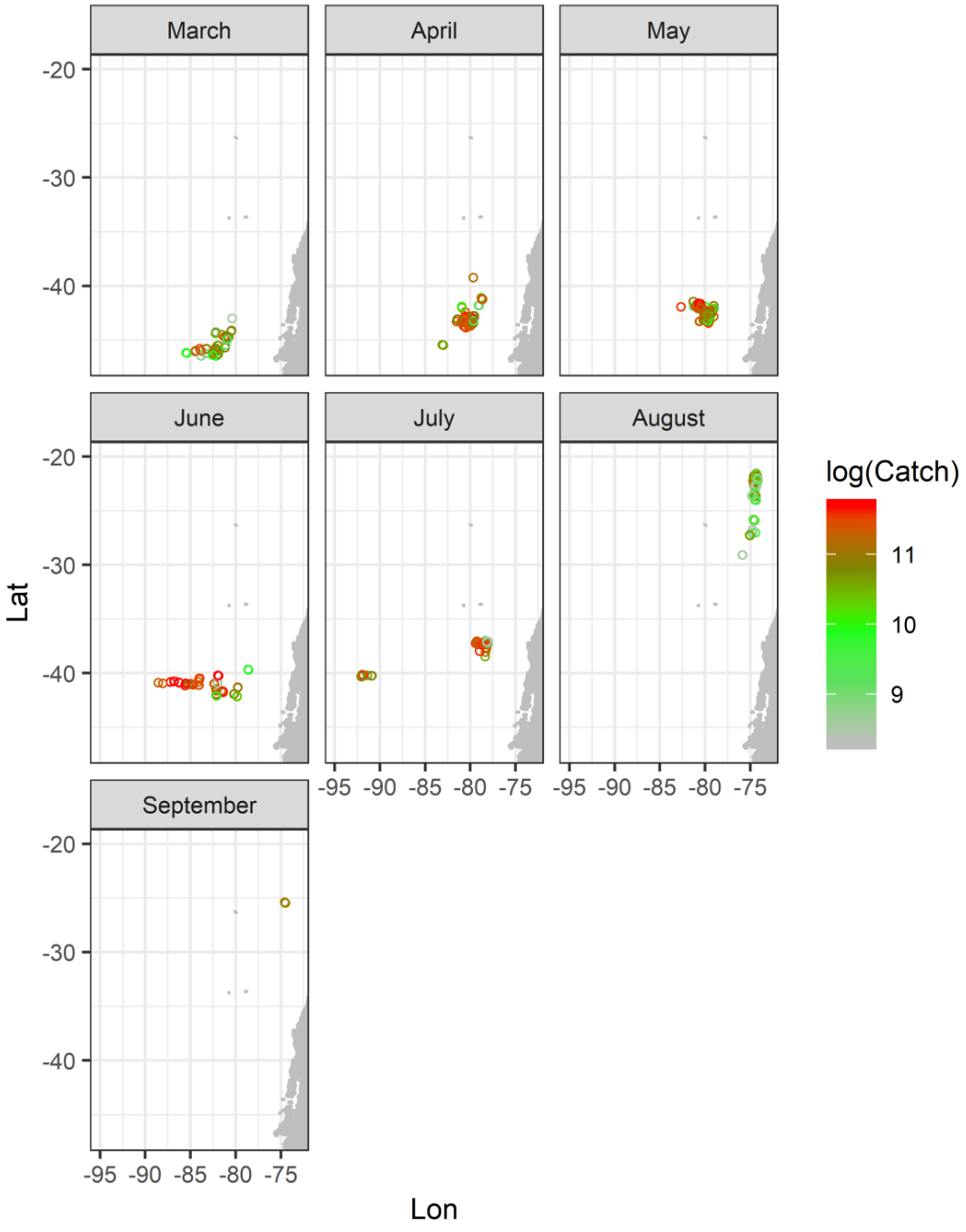

Figure 4. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2018.

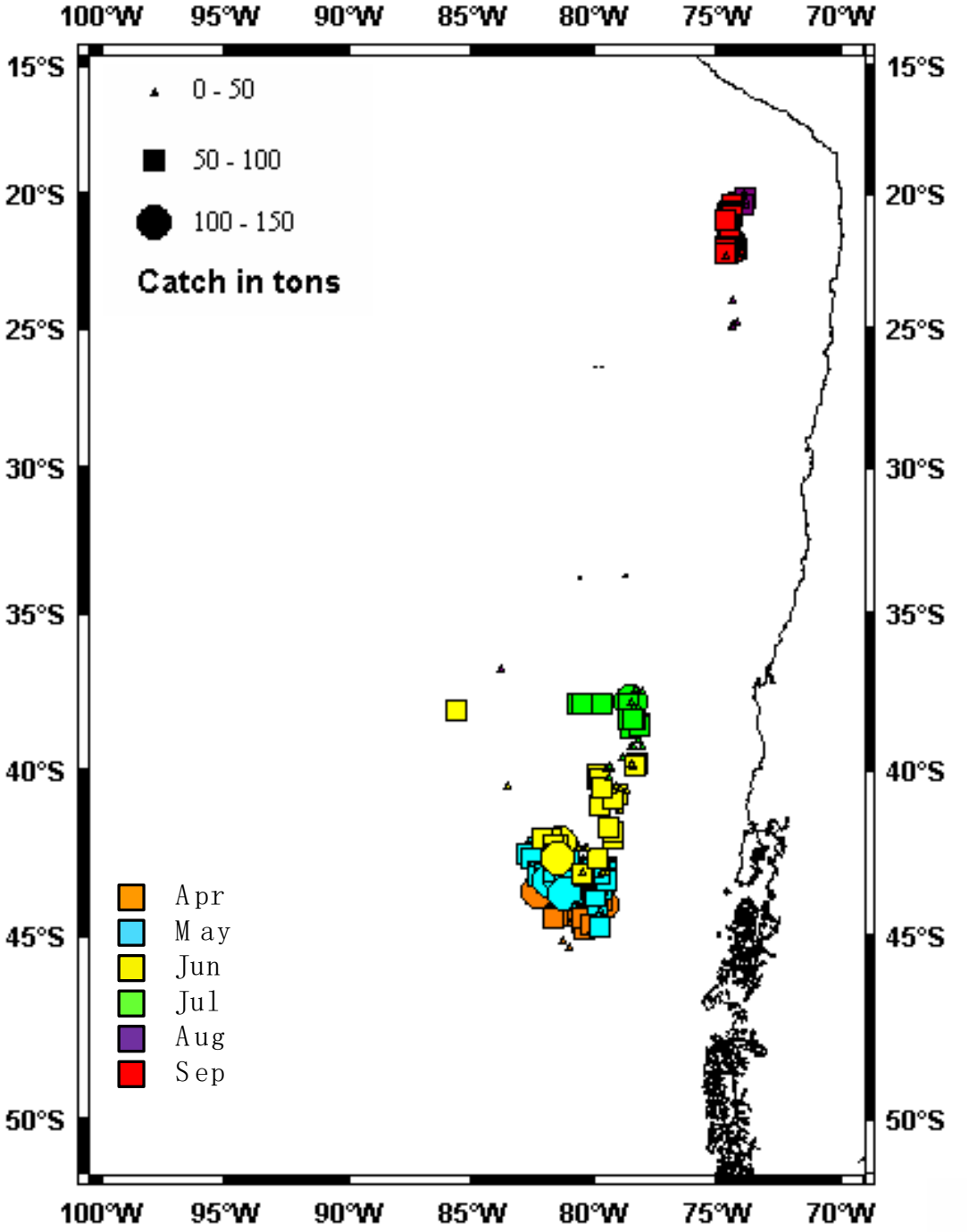

Figure 5. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2017.

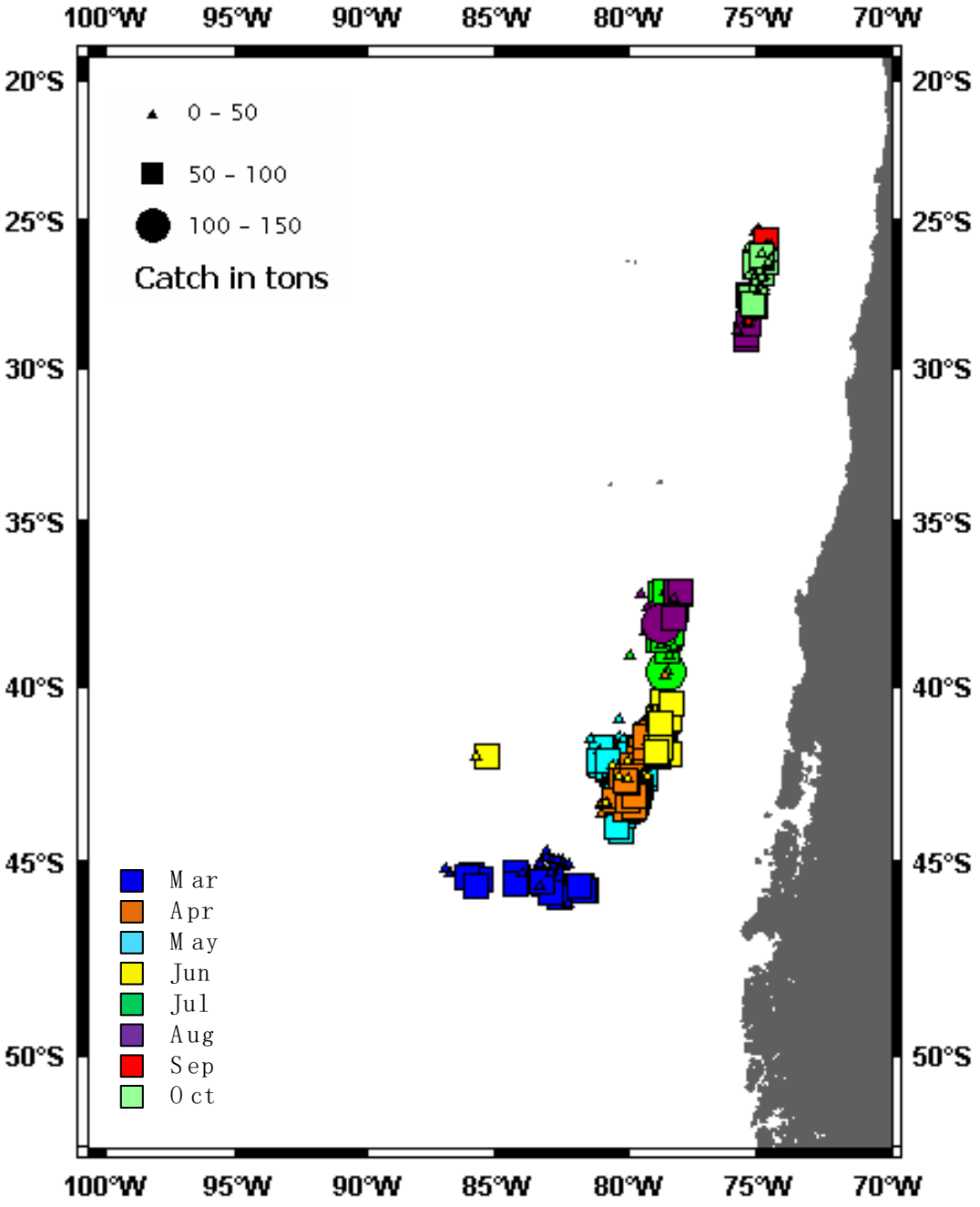

Figure 6. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2016.

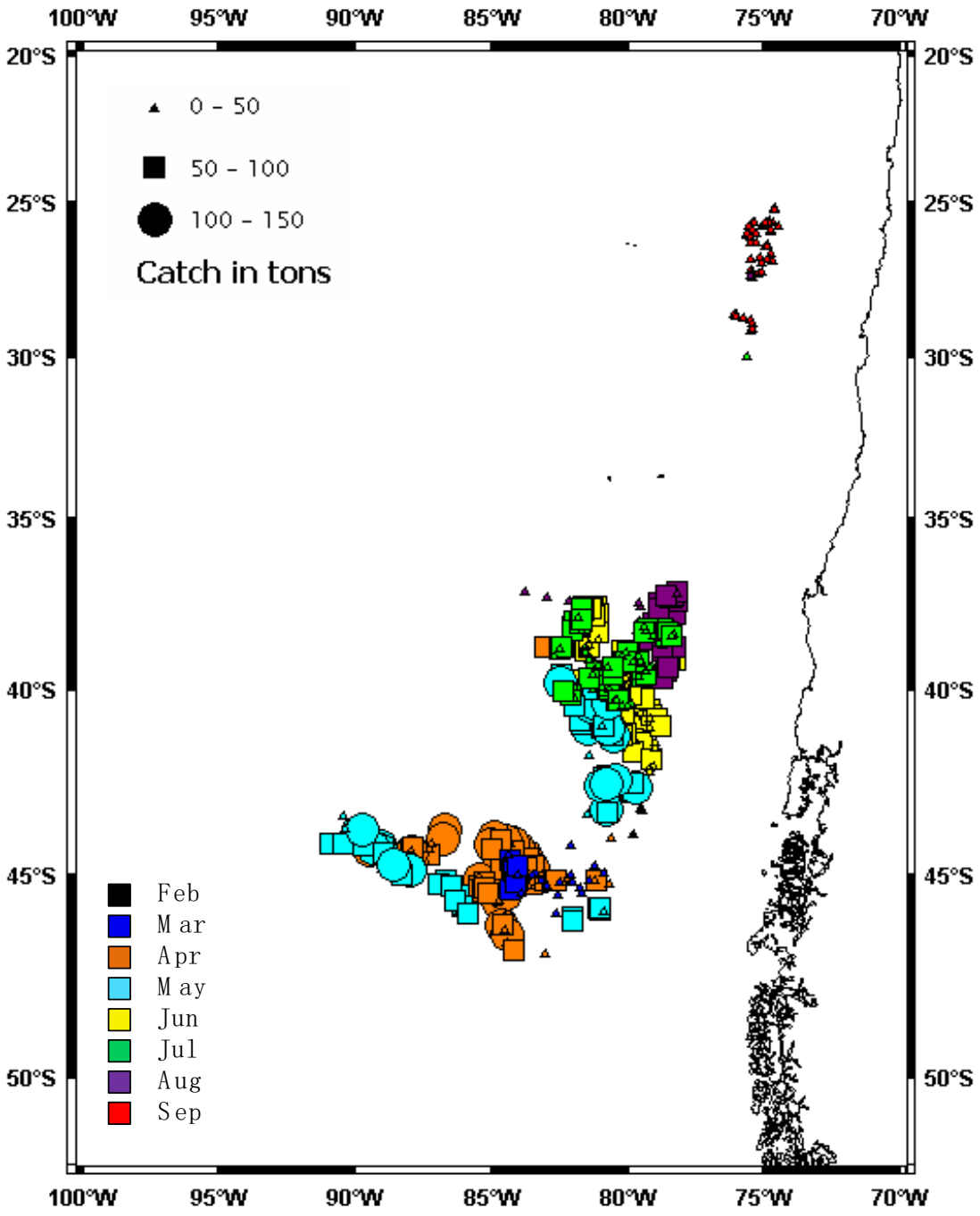

Figure 7. Monthly catch distributions by the Chinese fleets in SPRFMO Convention Area in 2015.

3 *Fisheries Data Collection*

Two types of fisheries data are collected for jack mackerel, the fishing activity data and 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 jack mackerel and other by-catch species, etc. In 2019, a total of 356 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 KAI FU HAO at ZHOU SHAN Port on January 18 and stayed on board until it returned to ZHOUSAN Port on October 16. The observer began to carry out his task when KAI FU HAO arrived at the fishing ground and stat its first tow on 26 February and observed the last tow on 31 July. A total of 90 fishing days and 137 tows were observed by the observer except one tow, and the coverage rate was 41.5% (calculated by fishing days) or 38.5% (calculated by tows).

4 *Biological Sampling and Length Composition of Catches*

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 11,091 jack mackerel were sampled, among them 9893 were only measured fork length to get length frequency information.

Fork length data were collected from 26 February to 31 July 2019, in which the trawler was operating on the high seas off Central-south Chile that the adult jack mackerel distributed in general, thus catch at size information on the northern nursing area was missing, however, a group of young jack mackerel were caught and observed in mid-July (Table 4). After 14 July, the small jack mackerel was disappeared from the catch.

The dominant size was 42-48 cm, followed by 37-42 cm and 23-27 cm (Figure 8). 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.

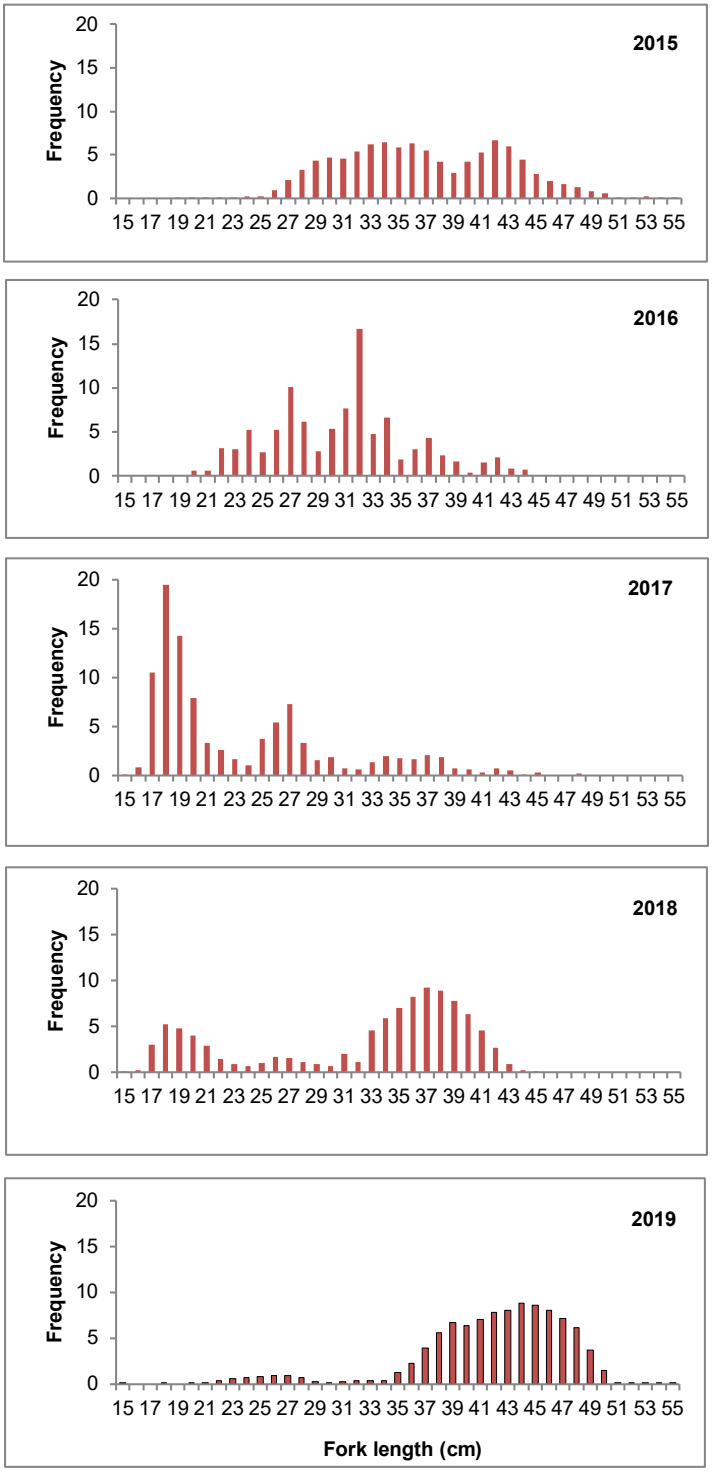

Figure 8. Fork length frequencies of jack mackerel sampled in 2015-2019

Although KAI FU HAO ended its operation on 31 July and did not enter the northern nursing area in 2019, the small jack mackerel were still caught and dominated the catch in some days of mid-July.

5 *Ecosystem Approach Considerations*

The observer inspected whether the trawlers installed the bird-scaring lines when operating. In 2019, all the Chinese vessels were equipped with bird-scaring lines (Figure 9). 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 9. Photographs on Bird scaring lines attached to KAI FU HAO

6 *Observer Implementation Report*

The observer embarked on the KAI FU HAO at ZHOU SHAN Port on January 18, began to worked on 26 February till KAI FU HAO stopped fishing on 31 July. A total of 90 fishing days and 137 tows were observed, accounted for 41.5% (calculated by fishing days) or 38.5% (calculated by tows) of the total effort 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 2019

Time	<110	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	440	450	460	470	480	490	500	510	520	530	540	550	560	570	Total
Late Feb	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	50	48	60	45	34	20	10	2	3	0	1	1	1	0	1	3	0	0	0	1	0	1	314
Early Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	45	88	127	105	93	56	19	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	549
Mid Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	16	26	33	23	19	30	19	10	26	53	58	66	42	28	1	1	0	0	0	0	0	464
LateMar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	35	82	147	157	102	92	72	93	120	103	89	80	47	7	1	0	0	0	1	0	0	0	1230
Early Apl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	27	40	27	44	61	51	58	74	86	80	67	62	20	3	3	2	1	0	1	0	712
Mid Apl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	27	20	46	47	58	62	77	64	55	32	42	14	6	1	0	0	0	0	0	0	0	560
LateApl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	14	31	37	45	32	49	50	63	80	42	20	3	0	0	0	0	0	0	471
Early May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	20	53	67	69	84	90	91	63	30	11	0	2	1	1	0	0	0	584
Mid May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18	20	17	29	56	52	51	40	40	43	36	31	13	0	2	2	0	0	0	0	455
LateMay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	7	15	31	27	19	41	44	44	34	45	18	14	1	4	0	1	0	0	0	356
Early Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	24	45	46	66	69	74	70	54	40	18	2	2	0	2	0	0	0	517
Mid Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	40	85	103	144	143	132	140	161	161	131	101	110	75	37	3	2	0	3	0	0	0	1586
LateJun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	29	49	46	58	56	56	54	48	41	43	36	12	2	2	2	0	1	0	0	0	548
Early Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	9	20	28	41	65	93	105	117	99	83	59	45	31	10	1	0	0	1	0	0	0	808
Mid Jul	0	0	3	0	3	15	47	71	81	96	105	104	79	35	16	28	40	38	25	38	39	45	59	79	70	68	66	43	24	15	7	4	3	2	0	0	0	0	0	0	0	0	1348
LateJul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	17	21	47	65	92	111	120	133	140	171	156	135	77	65	38	4	1	3	0	0	0	0	0	1399
Total	1	0	3	0	3	15	47	71	81	96	105	104	79	35	16	28	40	38	43	142	264	467	668	798	753	841	933	955	1041	1023	956	847	732	436	180	20	21	5	11	1	1	1	**11901**