National report of China to the SPRFMO Science Working Group (Rev 1)

1. Brief Introduction of Chinese Jack Mackerel Fishery

In the year 2000, Chinese factory trawler "KAIXIN" began its exploratory trips for Chilean Jack Mackerel (*Trachurus murphyi*) in the high seas of Southeast Pacific. The total catch was 2300 t in 41 fishing days. After that, China fishing fleets have continued their commercial fishing for Chilean Jack Mackerel in this region.

The number of fishing vessel once reached 16 and leveled off between 11 and 13 after the year of 2004. After 2006, the Chinese fishing fleet has make reconstruction their fleet, 5 vessels are replaced by larger vessels which GRT is greater than 4000 ton around 7847 ton, so that all together 7 vessels are greater than 4000 ton and 4 vessels are remained as before.

The annual yield of Chilean Jack Mackerel fluctuated between 130,000 and 160,000 t from the year 2004 to 2008. The average monthly CPUE fluctuated between 2 and 11 t/hour (12-41 t/tow) form Jan. to Dec. in these years. The peak presented during June and July which is about 10-11 t/h or 41 t/tow.

Chilean Jack Mackerel is the main target species in the catch. Japanese mackerel (*Scomber japonicus*) as by-catch was found in catch, however, was less than 10-20% in the total catch. There are a few of other spices, such as pacific scad (*Scomberomorus sierra*), yellowtail (*Seriola laland*), lantrenfishes (*Myctophidae*) etc to be found in the catch. Jumbo flying squid (*Dosidicus gigas*) has been caught by trawls since 2006, which is about 5-10% in the catch.

Table 1 5°×5° catches of Chilean Jack Mackerel by Chinese fishing fleet in Southeast Pacific Ocean (FAO Area 87) between the years of 2004 and 2008 in tones

Fishing area by 5°×5°	Year				
	2004	2005	2006	2007	2008
70°-75°W;25°-30°S	-	-	-	-	1323
75°-80°W;25°-30°S	-	-	-	-	408
75°-80°W; 35°-40°S	-	1222	-	3393	-
75°-80°W; 40°-45°S	-	1834	5767	3044	-
80°-85°W; 30°-35°S	3470	-	-	-	-
80°-85°W; 35°-40°S	21754	10910	17598	25943	9900
80°-85°W; 40°-45°S	31640	21921	43963	46697	7436
80°-85°W; 45°-50°S	-	-	-	263	3435
85°-90°W; 30°-35°S	27399	30140	37998	17623	10480
85°-90°W; 35°-40°S	5434	19902	5005	4236	20975
85°-90°W; 40°-45°S	6967	846	8867	8162	21797
85°-90°W;45°-50°S	-	-	-	969	1551
90°-95°W; 30°-35°S	11749	21131	16324	14340	19914
90°-95°W; 35°-40°S	7242	21614	10008	3149	12820
90°-95°W; 40°-45°S	652	-	111	-	17925
90°-95°W;45°-50°S	-	-	-	-	51
95°-100°W; 30°-35°S	-	464	4100	1700	356
95°-100°W; 35°-40°S	14337	9937	9618	4320	14755
95°-100°W; 40°-45°S	376	2884	641	-	-
100°-105°W; 30°-35°S	-	-	-	5659	-
100°-105°W; 35°-40°S	-	195	-	-	56
105°-110°W;30°-35°S	-	-	-	149	-
110°-115°W;30°-35°S	-	-	-	935	-
Total	131020	143000	160000	140582	143182

Table 2 monthly total catches of Chilean Jack Mackerel by Chinese fishing fleet in Southeast Pacific Ocean (FAO Area 87) between the years of 2004 and 2008 in tones

month	catch	month	catch
1	7602.157	7	119038.9
2	6700.727	8	97476.05
3	11901.91	9	93924.72
4	46808.1	10	78684.45
5	80488.49	11	45004
6	102240.9	12	27913.61
total	717784		

Table 3 Chinese Chilean Jack Mackerel fishing fleet composition between the years of 2004 and 2008

year	number of the fishing vessel	Registered tonnage, GRT		gear type
		<4000	⩾4000	
2004	12	10	2	pelagic trawl
2005	13	11	2	Pelagic trawl
2006	12	6	6	Pelagic trawl
2007	11	4	7	Pelagic trawl
2008	11	4	7	Pelagic trawl

Table 4 the average monthly CPUE of Chilean Jack Mackerel by Chinese fishing fleet in Southeast Pacific Ocean (FAO Area 87) between the years of 2004 and 2008

month	CPUE(t/h)	CPUE(t/tow)
1	2	12
2	2	13
3	2	15
4	5	26
5	9	35
6	10	41
7	11	41
8	8	35
9	7	35
10	6	31
11	4	23
12	3	17

Table 5 the average yearly CPUE of Chilean Jack Mackerel by Chinese fishing fleet in Southeast Pacific Ocean (FAO Area 87) between the years of 2000 and 2008

year	CPUE(t/hour)	CPUE(t/tow)
2000	5.7	25.5
2001	3.9	21.1
2002	5.1	23.0
2003	5.4	23.8
2004	5.2	25.7
2005	6.0	28.4
2006	7.5	41.2
2007	6.5	33.1
2008	8.2	41.0

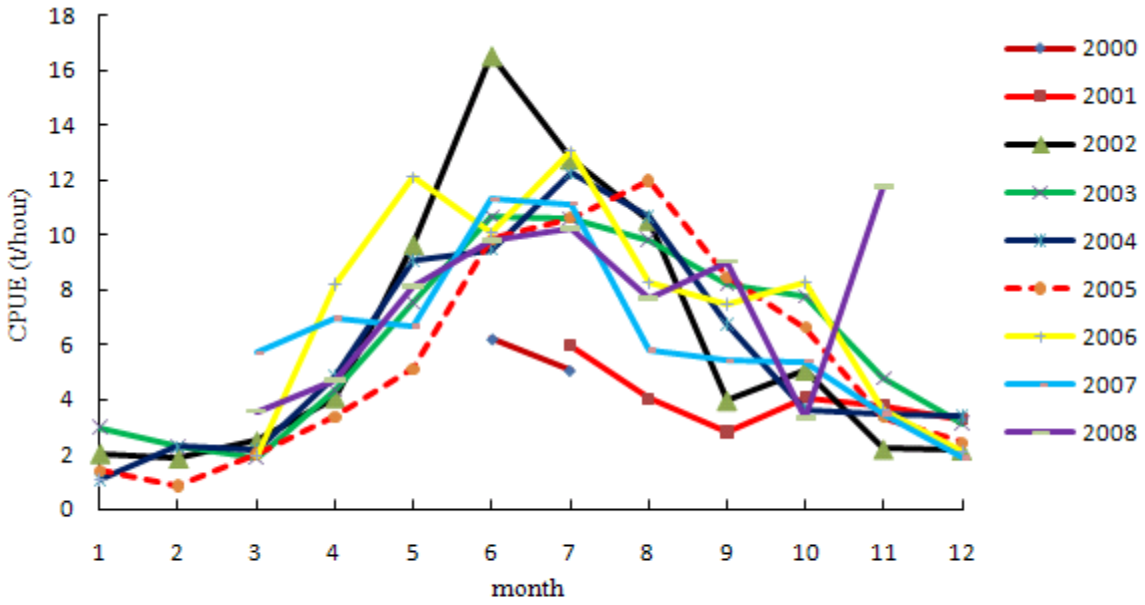

Fig 1 the average monthly CPUE (t/hour) of CJM by Chinese fishing fleet in Southeast Pacific (FAO Area 87) between the years of 2000 and 2008

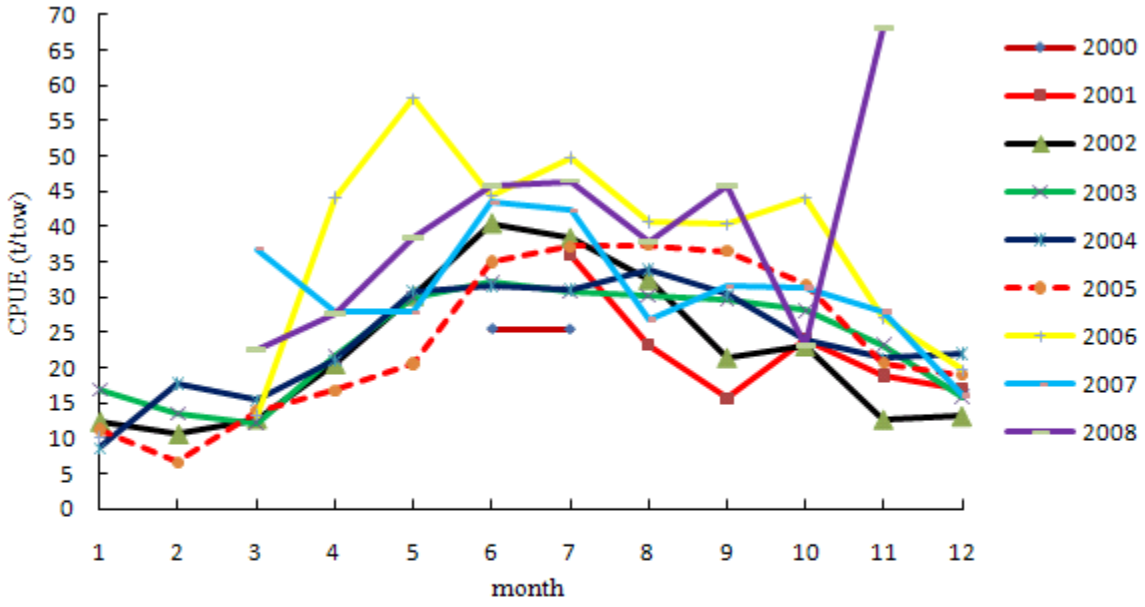

Fig 2 the average monthly CPUE (t/tow) of CJM by Chinese fishing fleet in Southeast Pacific (FAO Area 87) between the years of 2000 and 2008

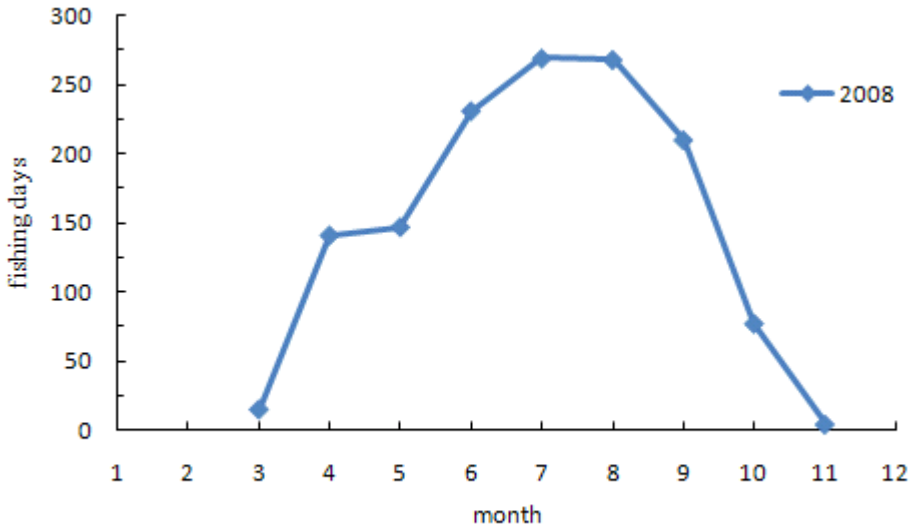

Fig 3 fishing days of Chinese fishing fleet per month

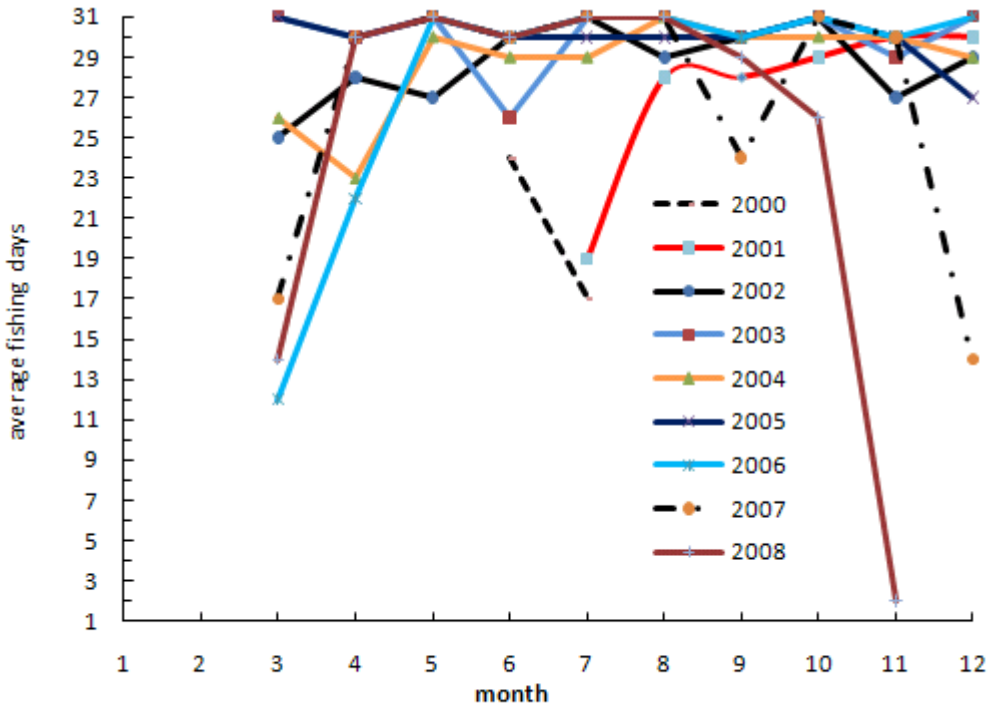

Fig 4 fishing days composition of CJM per vessel in average

2 Fisheries Data Collection and Research Activities

China Fisheries Association (CFA) and Shanghai Ocean University (SHOU) jointly take charge of the Jack Mackerel fisheries data collection and research activities. The fisheries data collection was carried out by Chinese fishing fleet cooperating with the Chinese fishery scientific observers program. And a full log books collection program have been carried out in 2009 and delivered to SHOU for research study purpose.

Three of Chinese fishing vessels (3/11, 27.3%) were dispatched the fishery scientific observers on board, namely “Kai Xin”, “Kai Fu” and “Fu Xing Hai”.

The biological data and environment data were measured and collected on board by the fishery scientific observers. And the catch data were collected from log books or directly sampled from the catch.

Data collected from log book mainly are catch per tow, fishing time and positions, towing speed etc. Environment data about fishing ground are also collected including wind direction and speed, SST, and data of STD etc.

Biological items measured on broad by the random sampling are fork length, body height, width and girth, body weight and net weight without organs, sex, germ cells maturity, contains in the stomach etc.

Depth of fish school inhabited in the water and temperature related were recorded by the echo sounder, net sounder and sonar.

The otolith collected on board and delivered to the SHOU laboratory for appraisal age.

The maturity situation of germ cells and stomach containing were observed and sorted in six grades and five grades respectively according with the national standards of the Chinese marine fish survey.

Plankton and botany were collected in predetermined positions, and identified according to marine fishery survey standard.

The studies on Chilean Jack Mackerel take by Chinese scientists were mainly in the fields of biological characteristic, distribution of stocks and population, fishing ground, oceanic environment, DNA, etc.. The major research activities in the future will be Chilean Jack Mackerel resource survey, stock assessment, DNA tests and so on.

3. Biological Sampling and Length / Age Composition of Chilean Jack Mackerel

Altogether 12,320 Chilean Jack Mackerel samples have been collected in the past years, the measurements have been made on board, i.e. fork length, body weight, net body weight, body girth, body height, body width, the germ cells maturity, the stomach contain and fullness etc. 2550 otoliths and 37972 folk length data by punching hole（mark the folk length on a piece of oilpaper by punching a hole）have been collected too. The results are showed in table 6, 7 and fig. 3.

Table 6 fork length (mm) composition of Chilean Jack Mackerel

year	Min.	Max.	〈250	250~299	300~349	350~399	400~449	450~499	500~549	550~599	〉 600
2000	223	618	4.1%	46.6%	19.7%	11.5%	10.6%	4.4%	1.9%	1.0%	0.2%
2001	212	598	2.7%	57.4%	29.1%	6.1%	2.9%	1.4%	0.3%	0.1%	0.0%
2002	116	483	19.5%	64.5%	12.3%	1.9%	1.3%	0.5%	0.0%	0.0%	0.0%
2006	193	515	0.0%	13.9%	69.0%	12.7%	3.5%	0.8%	0.1%	0.0%	0.0%
2007	305	510	0.0%	0.0%	20.1%	46.4%	25.5%	7.1%	0.9%	0.0%	0.0%
2008	280	520	0.0%	0.5%	52.4%	38.5%	7.2%	1.3%	0.1%	0.0%	0.0%

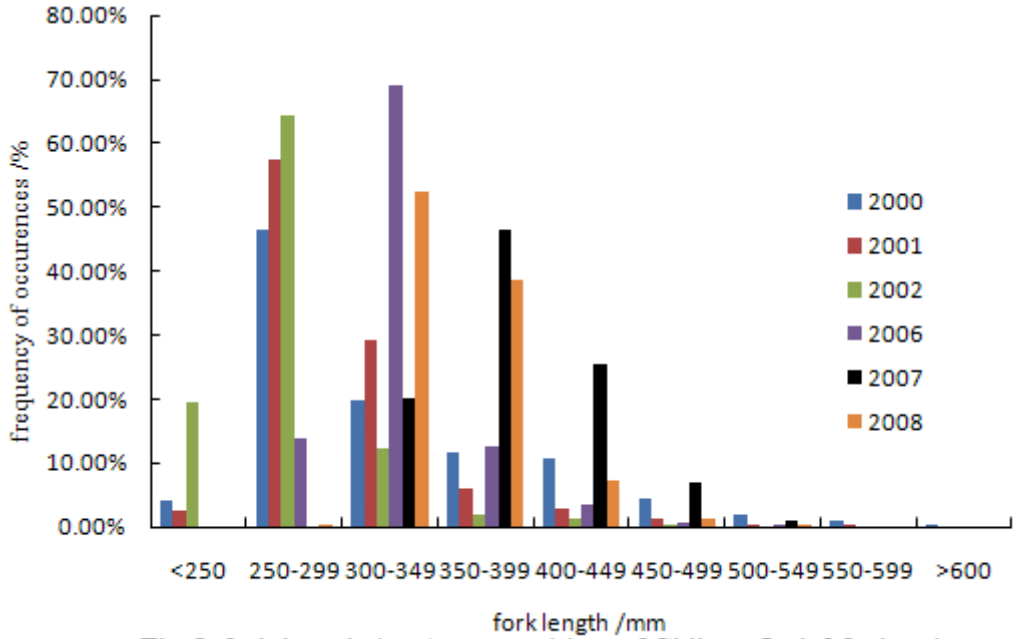

Fig.5 fork length (mm) composition of Chilean Jack Mackerel

Table 7 the relationship between age and fork length of *Trachurus murphyi* in 2006

size class （FL/mm）	age class								tail mumber
	2+	3+	4+	5+	6+	7+	8+	9+	
190-200	1								1
260-270		1							1
270-280		1							1
280-290		15	28						43
290-300		5	113						118
300-310			205						205
310-320			174	1					175
320-330			120	19					139
330-340			45	36					81
340-350			4	41					45
350-360				42					42
360-370				21	2				23
370-380				11	8				19
380-390				4	14				18
390-400					8	1			9
400-410					8	4			12
410-420					1	4			5
420-430						8			8
430-440						5			5
440-450						1	2		3
450-460							4		4
460-470							1		1
470-480							2	1	3
480-490								0	0
490-500								1	1
500-510								0	0
510-520								1	1
tail number	1	22	689	175	41	23	9	3	963
mean fork length	193.00	287.73	311.55	348.66	389.44	421.61	459.67	496.00	
standard deviation	0	5.93	12.33	14.62	12.61	12.36	9.55	15.12	

4. Fishery Scientific Observer Programmers

In order to implement “Standards for the collection, reporting, verification and exchange of data” of SPRFMO, China fishery Authority and CFA accredit SHOU for the observers training, selection and dispatch, and SHOU also responds for the data evaluation and debug, carrying the scientific research and so on. The FSOP has been already under way since 2007.