

A REVIEW OF JAPANESE ALBACORE FISHERIES
IN THE PACIFIC AND INDIAN OCEANS

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A Review of Japanese Albacore Fisheries in the Pacific and Indian Oceans

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Japanese albacore fisheries were developed by pole-and-line fishery in waters adjacent to Japan in the late half of 1940's. Then, as longline fishery expanded their fishing grounds in eastern North Pacific, South Pacific, Indian and Atlantic Oceans in 1950's, catches of albacore by Japanese fishing boats increased rapidly. The report offers a general discussion at the trend of Japanese albacore fisheries in the Pacific (North and South) and Indian Oceans, based on the data from 1951 to 1987. Albacore catches by area and gear, and annual trends of catches by three areas are shown in Table 1 and Figure 1, respectively. And distribution of catch in number of albacore caught by longline in each five year is shown in Figure 2.

1. North Pacific Ocean

1) Catch

The total catch of North Pacific albacore by Japanese vessels remained on the high level of 49,000 - 104,000 tons in the 1970s. In 1983-1987, however, the catch declined to 40,000 - 55,000 tons which was the level of the early 1960s.

The catch by the pole-and-line fishery fluctuated between 24,000 - 85,000 tons in the 1970s. During 1981 to 1985 the catch declined to 21,000 - 30,000 tons. It further slipped to 16,000 and 19,000 tons in 1986 and 1987 and the catch in 1988 substantially fell to 7,000 tons.

By contrast, the catch by longline fishery has more or less remained at the 15,000 ton level since the late 1970s, though there can be seen some decline in 1986.

The catch by the drift-gillnet substantially increased after 1981 reach to 7,000 - 13,000 tons during 1981-1985, in 1986 to 1987 the catch fluctuated from 7,700 to 9,800 tons.

The total catch of North Pacific albacore by Japanese fisheries has declined in recent years. Figure 3 shows the catch by all fisheries and the yearly change in catch by pole-and-line and longline vessels which are the principal fisheries. As is clear in the Figure, there is close correspondence between the decrease of the total catch and the catch by pole-and-line vessels (Nishikawa et al. 1989). Because the longline catch has been stable in recent years, the present diminution can be ascribed to the curtailed catch by pole-and-line vessels. Moreover, because the number of pole-and-line vessels in operation has not greatly changed since 1985 (Table 2), the drop is greatly attributable to the decline of catch by pole-and-line vessels. Although it is not clear why the pole-and-line catch rapidly decrease from the 19,000 to 7,000 ton in 1988, it may be such as cold-water masses observed along Japanese coast since 1986 could affect albacore migration and or the formation of fishing grounds, the main albacore fishing grounds for summer pole-and-line, in the low-temperature areas outside the Kuroshio current and decrease the availability by pole-and-line fishery. Changes in the cohort structure in recent years, as pointed out by Warashina and Honma (1989), could have be influenced.

2) Fishing effort

Table 2 shows the number of pole-and-line vessels in operation by year and by tonnage class. The number peaked at 700 vessels in the 1970s and gradually decreased in the 1980s. The number of pole-and-line vessels in operation in 1987 has diminished to about three fifth that of the early 1980s. But the number of large vessels over 100 tons, that account for the main pole-and-line albacore catch, has not changed for the last two or three years, remaining stable at around 100 vessels. Medium and small vessels have markedly diminished during these years.

As shown in Table 3 the number of drift-gillnet vessels in operation have remained around 470 since 1986, and there have been no great changes.

Fig. 4 shows the yearly changes in albacore CPUE and effective effort of longline fishery during 1952-1988, taken from Shiohama (1989). The

effective effort has been declining since the latter 1960s when it was highly active. Whereas in 1975 it registered a record low of 160 million hooks, effective effort in recent years rose gradually to the 260-300 million hooks level.

3) CPUE

The yearly trend of the albacore CPUE amount of catch tons per day by pole-and-lining during 1979-1988 is shown in Table 4 (Nishikawa et al. 1989).

During the last decade, the CPUE of albacore has stayed around 4.6 in average, though there are some fluctuations including from the lowest 3.1 of 1981 to the highest 6.6 of 1987. As shown in Table 1, the pole-and-line catch in 1988 declined to less than half that of the previous year. In contrast, CPUE did not show such a marked decline as that in catch.

The longline CPUE (catch in number/effective effort) shown in Figure 4 and Table 5 has hovered around 0.2 since 1985, and the fluctuations have been small. As previously mentioned, this tallies with the stable, longline catch of recent years.

2. South Pacific Ocean

1) Catch

In the South Pacific Ocean, Japanese fishery vessels caught albacore only by longline. Recently, Japanese gillnet fishery caught some albacore in this areas, but that information were not described in this report because there is no official statistics of gillnet fishery in Japan. And JAMARC also caught albacore by pole and line and gillnet for research, but catch were small (Watanabe et al. 1989).

Japanese longline fishery started from 1952 in the South Pacific Ocean, the albacore catch rapidly increased above 20,000 tons in 1958 and 39,000 tons in 1962. From 23,000 tons of 1966, catch decreased year to year. In 1975 the catch was 1,045 tons as a 1/40 values of the peak. After that year, it was slightly increasing. Recently, the catch of albacore ranged 3,600 tons to 4,900 tons and stable.

2) Fishing effort

The data of catch effort (numbers of hooks) of longline in the South Pacific Ocean, south of 50N and west of 130oW from 1962 to 1985 were divided. The number of hooks ranged 81 to 130 million from 1962 to 1966, then it gradually decreased to 65 million hooks in 1975. After that, number of hooks increased to the maximum 153 million in 1980. Recently high level of 110 million hooks were continuing (Fig. 5). Since Japanese longline fishery changed main target species from yellowfin tuna to other species, these fluctuation of catch effort was not same of albacore catch.

3. Indian Ocean

1) Catch

Albacore were caught by only longline of Japanese fishery in the Indian Ocean. It started from 1952, the catch reached 10,000 tons level in 1959 and the maximum about 18,000 tons in 1964. However, after that periods the catch of albacore rapidly decreased 8,500 tons of 1969 and 400 tons of 1977 as a 1/45 of the peak. Recently, it slightly increased around 2,500 tons in 1986 and stable at low level.

2) Fishing effort

As same as the South Pacific Ocean, annual variation of catch effort (number of hooks) and catch number from 1952 to 1985 are shown in Fig. 6. The number of hooks rapidly increased 68 million in 1962 to 126 million in 1967, then gradually decreased to the minimum number of 60 million in 1977. After that, it increased again to the maximum number of 127 million hooks in 1985. Annual variation of effort and catch were different. The reason of this difference was considered that Japanese longline fishery changed the target species to southern bluefin tuna like as the South Pacific Ocean.

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Table 1. Albacore catch by Japanese fishing boats

Unit : ton

Area	North Pacific						South Pacific	Indian Ocean
	Long-line	Pole and line	Gill-net**	Purse seine	Others	Total	Longline	Longline
1951		16,463						
1952	26,687	41,786	-	154	83	68,710	210	67
1953	27,777	32,921	-	38	94	60,830	1,091	1,099
1954	20,958	28,069	-	23	15	49,065	10,200	2,759
1955	16,277	24,236	-	8	128	40,649	8,420	3,098
1956	14,341	42,810	-	-	57	57,208	6,220	5,118
1957	21,053	49,500	-	83	68	70,704	9,764	4,664
1958	18,432	22,175	-	8	116	40,731	21,558	6,285
1959	15,807	14,252	-	-	62	30,121	19,344	10,412
1960	17,369	25,156	-	-	76	42,601	23,756	11,066
1961	17,437	18,636	-	7	261	36,341	25,628	15,438
1962	15,764	8,729	-	53	138	24,684	38,880	17,668
1963	13,464	26,420	-	59	159	40,102	33,500	12,546
1964	15,458	23,858	-	128	191	39,635	21,435	17,874
1965	13,701	41,491	-	11	110	55,313	19,305	11,375
1966	25,050	22,830	-	111	474	48,465	23,401	13,130
1967	28,869	30,481	-	89	431	59,870	16,640	14,098
1968	23,961	16,597	-	267	842	41,667	7,707	10,034
1969	18,006	31,912	-	521	1,154	51,593	5,559	8,546
1970	15,372	24,263	-	317	752	40,704	6,560	4,684
1971	10,915	52,957	-	902	721	65,495	4,339	3,140
1972	12,622	60,591	1	277	842	74,333	2,796	1,257
1973	16,000	69,640	39	1,353	760	87,792	2,381	1,835
1974	12,952	73,576	224	161	1,005	87,918	1,847	2,606
1975	9,931	52,157	166	159	372	62,785	1,045	1,168
1976	15,738	85,336	1070	1,109	443	103,696	1,906	1,166
1977	15,512	31,934	688	669	595	49,398	2,240	404
1978	12,888	59,877	4,029	1,115	2,267	80,176	2,520	418
1979	14,174	44,662	2,856	125	1,230	63,047	2,350	396
1980	14,660	46,743	2,986	329	1,270	65,988	2,488	577
1981	17,876	27,426	10,348	252	851	56,753	4,856	1,174
1982	16,661	29,615	12,511	561	594	59,942	4,900	1,184
1983	15,017	21,098	6,884	350	207	43,556	4,928	1,592
1984	15,013	26,015	10,569	3,380	616	55,593	3,607	1,824
1985	14,235	20,714	13,132	1,533	492	50,106	3,746	2,280
1986	12,852	16,096	9,749	1,542	743	40,982	4,466	2,492
1987	14,642	19,091	7,617	1,205	189*	42,744*	4,085	
1988	-	7,000†						

* Estimated

** Includes South Pacific albacore catch

Table 2. Number of Japanese pole-and-line vessels by size, 1961-1987

Year	G.total	Total	Size of vessel (gross tons)				
		<20 tons	-20	20-50	50-100	100-200	200<
1961	5,523	477	5,046	141	132	178	26
1962	4,460	451	4,009	186	111	126	28
1963	6,533	492	6,041	240	111	112	29
1964	4,361	532	3,829	291	103	106	32
1965	4,226	572	3,654	298	91	148	35
1966	4,191	571	3,620	299	71	167	34
1967	4,114	564	3,550	296	54	173	41
1968	3,231	561	2,670	276	60	170	55
1969	4,008	533	3,475	248	71	158	56
1970	3,666	518	3,148	220	91	143	64
1971	3,684	516	3,168	165	133	132	86
1972	4,156	560	3,596	131	162	119	148
1973	3,587	589	2,998	93	211	83	202
1974	3,941	716	3,225	136	269	84	227
1975	3,344	696	2,648	95	283	39	279
1976	3,754	653	3,101	51	318	17	267
1977	4,010	662	3,348	40	348	14	260
1978	3,680	645	3,035	26	358	10	251
1979	4,105	625	3,480	14	370	13	228
1980	3,804	572	3,232	14	350	10	198
1981	3,612	548	3,064	10	353	6	179
1982	3,484	473	3,011	10	320	6	137
1983	3,452	431	3,021	11	296	9	115
1984	3,298	394	2,904	8	271	10	105
1985	3,108	354	2,754	8	242	9	95
1986	2,783	328	2,455	6	222	9	91
1987	2,718	314	2,404	6	207	12	89

Table 3. Number of Japanese large-mesh driftnet fishing boats
by size, 1981-1986

Year	Total	Size of vessel (gross tons)					?
		10-20	20-50	50-100	100-200	200-	
1981	559	81	30	341	14	85	8
1982	717	80	44	375	24	189	5
1983	620	93	31	302	27	167	-
1984	547	82	24	273	34	134	-
1985	470	105	19	190	53	103	-
1986	474	104	20	157	74	119	-

Table 4. Estimated CPUE of the Japanese pole-and-line fishery
for the North Pacific albacore, 1979-1988

Year	Pole-and-line tons/day
1979	3.70
1980	4.72
1981	3.17
1982	3.82
1983	4.68
1984	5.73
1985	4.41
1986	4.37
1987	6.61
1988	4.34

Table 5. Annual estimates of CPUE of albacore caught by longline vessels over 20 tons in size for North Pacific albacore stock

Year	Effective effort (A)	Catch in number (B)	CPUE (Bx100/A)
1952	306,078,720	1,693,445	0.55
1953	334,449,440	1,738,996	0.52
1954	431,159,392	1,336,942	0.31
1955	420,706,560	1,047,926	0.25
1956	407,147,104	924,937	0.23
1957	379,629,952	1,285,128	0.34
1958	414,528,128	1,154,631	0.28
1959	411,544,096	997,359	0.24
1960	503,458,624	1,081,594	0.22
1961	476,949,952	1,070,673	0.22
1962	353,795,456	915,657	0.26
1963	323,992,864	821,475	0.25
1964	271,986,656	926,334	0.34
1965	276,359,904	801,844	0.29
1966	306,433,280	1,491,939	0.49
1967	462,823,520	1,741,411	0.39
1968	381,508,000	1,360,534	0.36
1969	383,774,368	1,017,129	0.27
1970	281,274,144	786,142	0.28
1971	278,540,640	528,682	0.19
1972	223,325,850	559,485	0.25
1973	202,819,266	667,879	0.33
1974	168,183,020	518,659	0.31
1975	164,530,652	367,656	0.22
1976	242,213,544	677,983	0.28
1977	249,463,114	657,923	0.26
1978	246,593,436	576,192	0.23
1979	285,876,608	674,452	0.24
1980	225,433,234	662,860	0.29
1981	298,843,438	867,564	0.29
1982	258,300,650	737,992	0.29
1983	290,264,672	646,081	0.22
1984	266,255,078	692,208	0.26
1985	289,820,992	614,386	0.21
1986	303,576,746	466,112	0.15

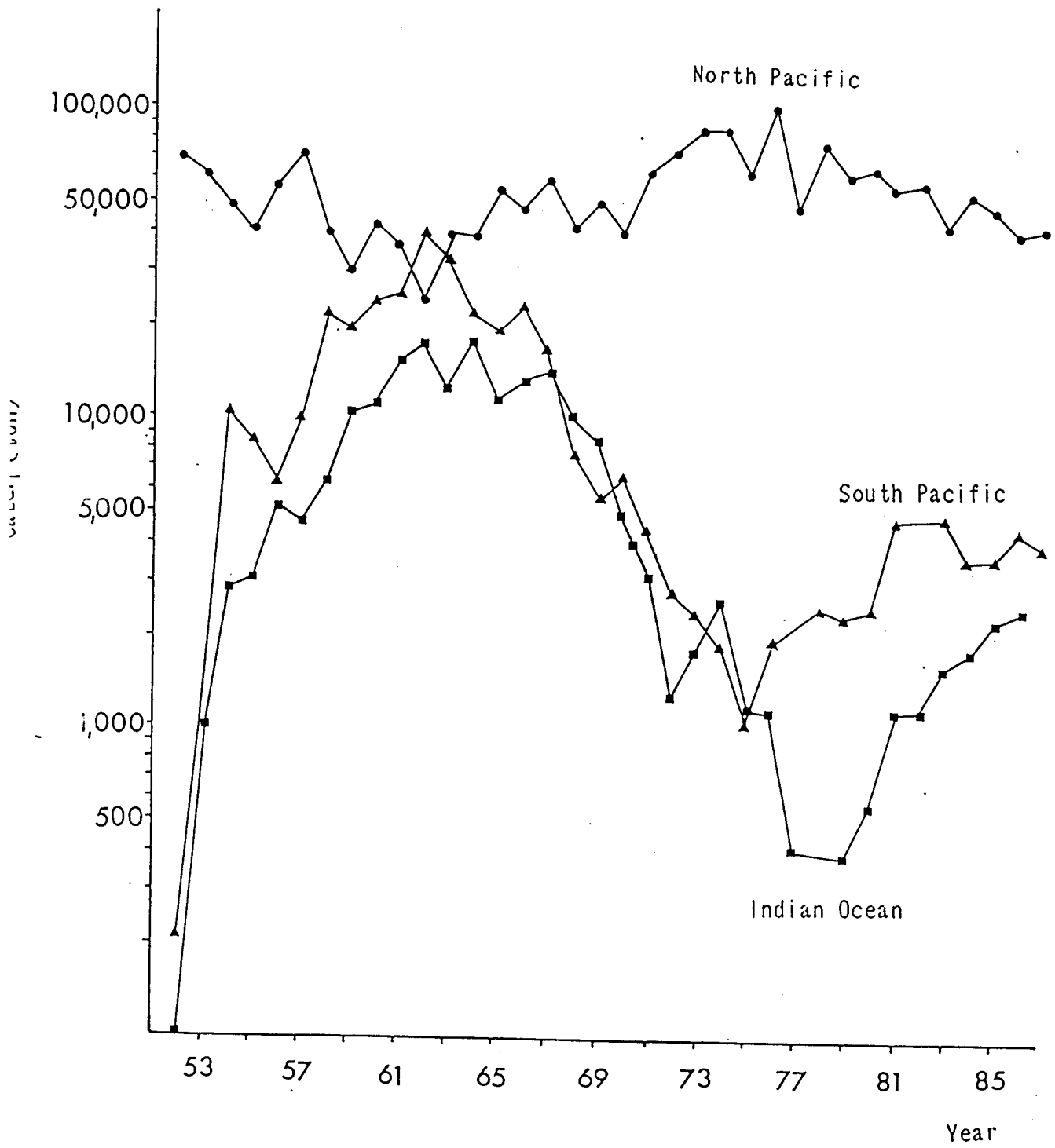


Fig. 1. Annual trends of albacore catch by Japanese fishing boats

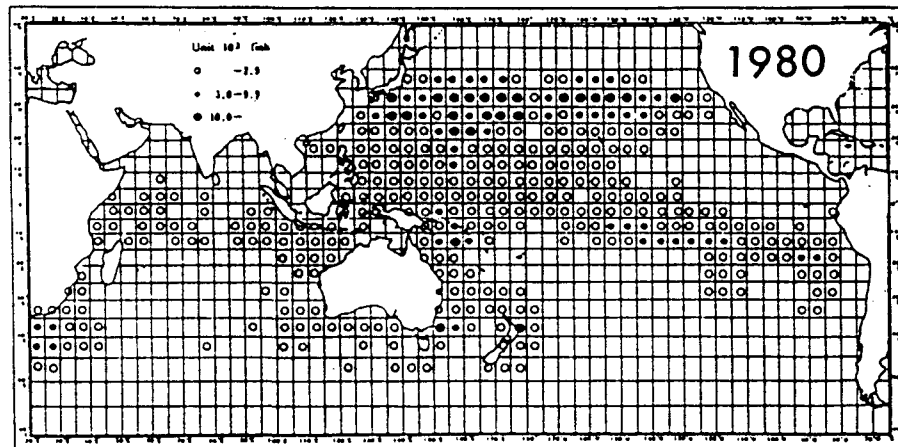
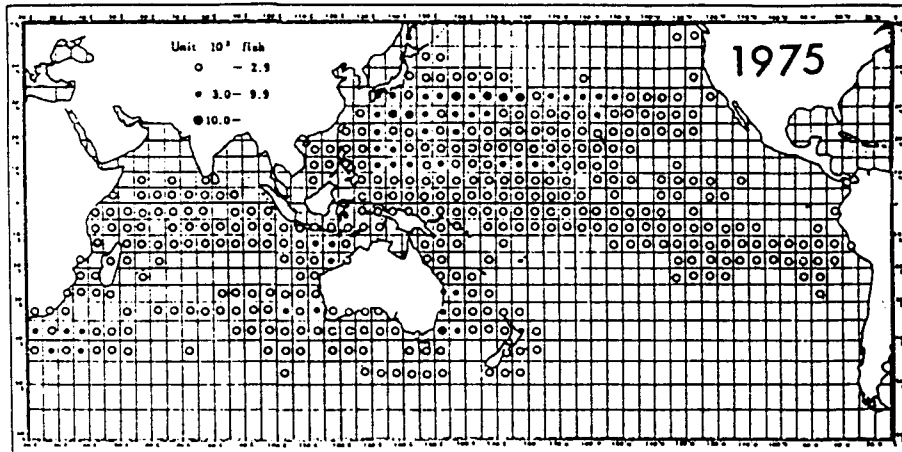
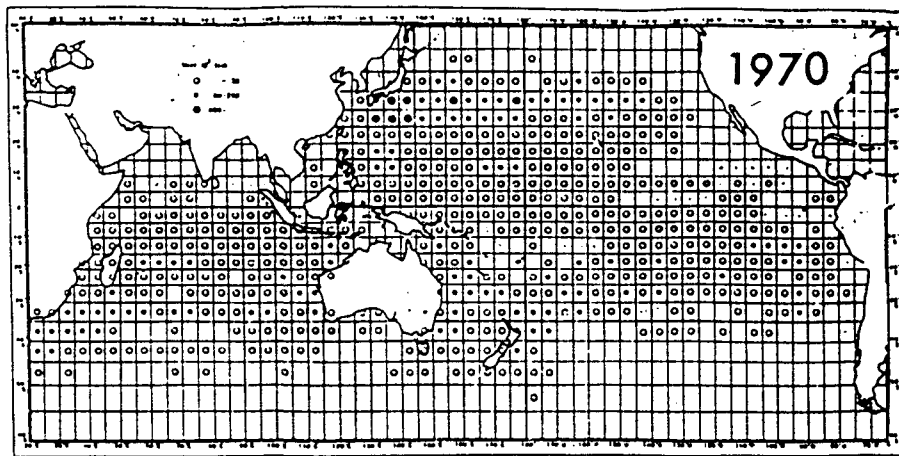


Fig. 2. Distribution of albacore catch in number of fish by 5 degree squares

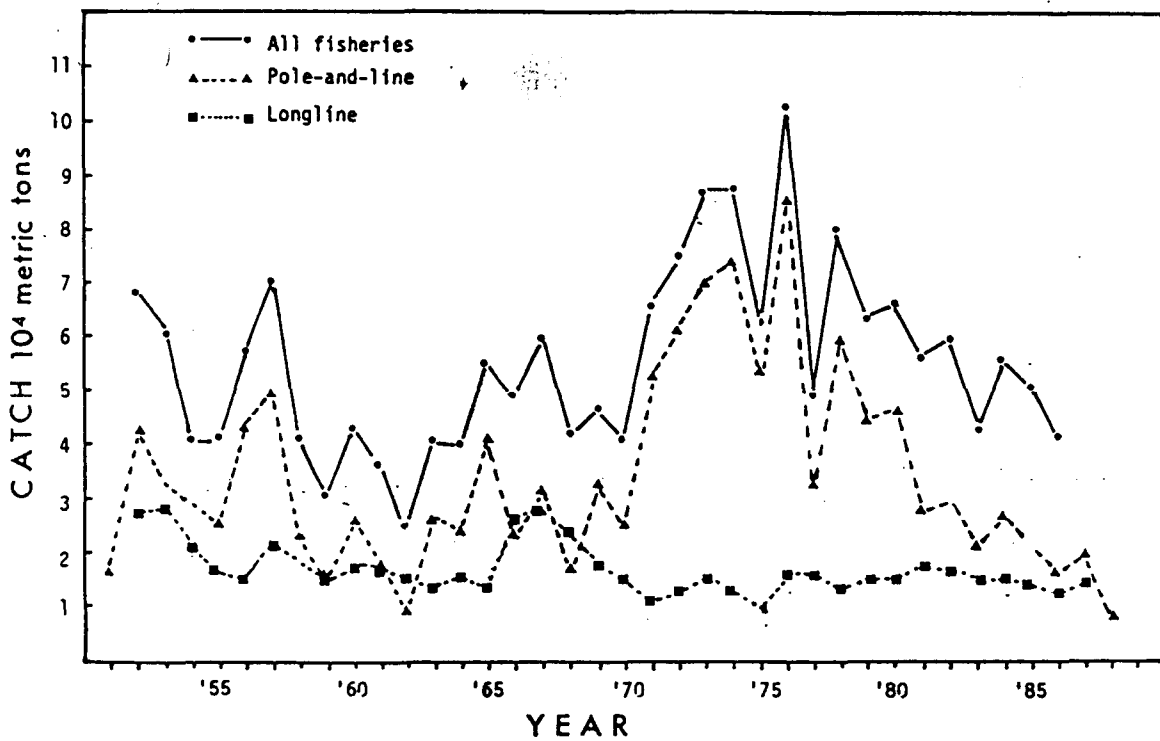


Fig. 3. Annual catch of North Pacific albacore for Japanese fisheries, 1952-1987

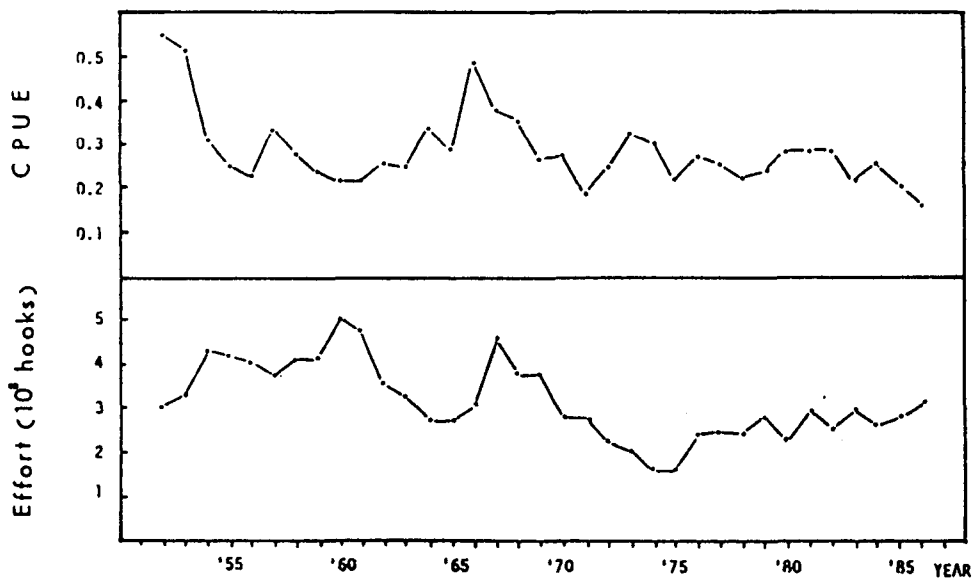


Fig. 4. Annual change in albacore CPUE (Number of catch x 100/Effective effort) and effective effort of longline of North Pacific albacore of Japanese longline fishery

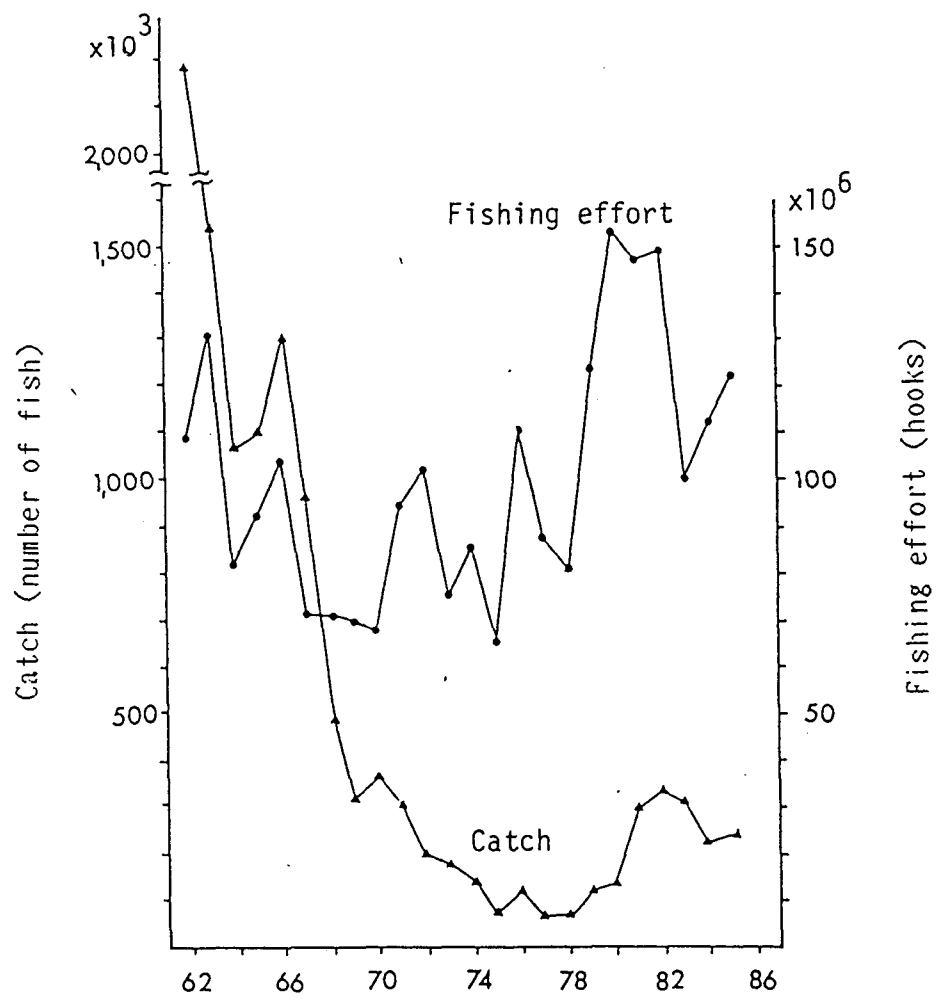


Fig. 5. Annual trends of albacore catch and fishing effort of Japanese longline in South Pacific

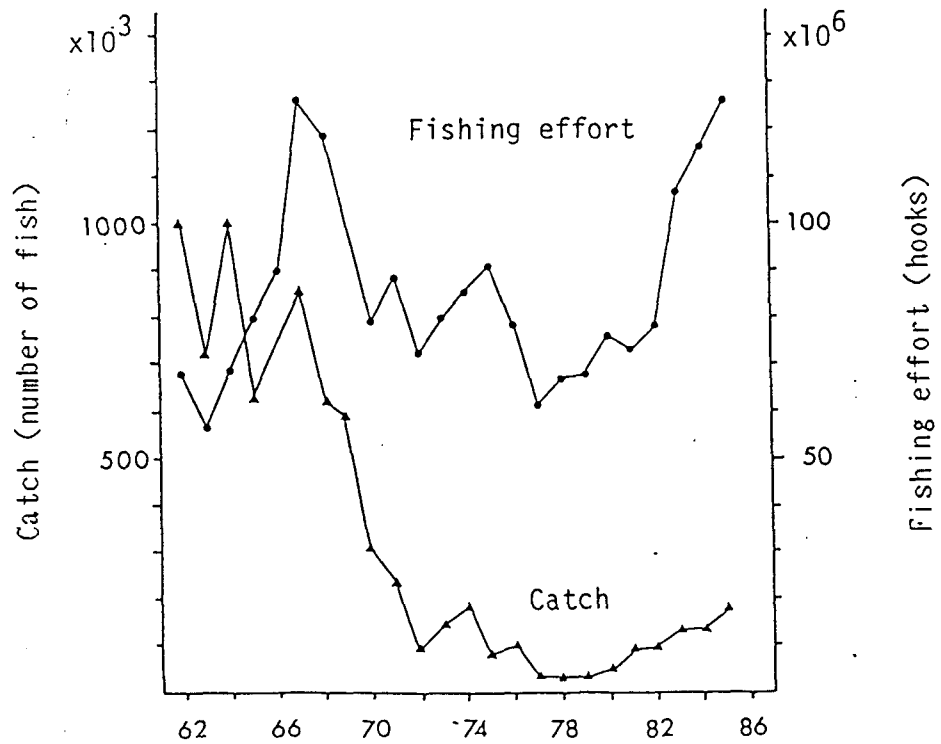


Fig. 6. Annual trends of albacore catch and fishing effort of Japanese longline in Indian Ocean