North Pacific albacore catch and size composition from the Japanese longline fishery.

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Introduction

After we conducted several preliminary SS3 runs with data prepared by the data preparatory meeting, poor length fits were found especially larger size between 1985 and 1993. In this document, we examined representativeness of JPN LL size sampling as compared with JPN LL catch in the northwestern North Pacific and any reasons of poor fit in larger size during 1985 and 1993..

Data and Method

Japanese longline (JPN LL) data used for estimating CPUE (Catch per unit effort) by Ijima et al. (2013). Length data for SS3 input data submitted on January 1, 2014. North Pacific albacore catch caught by the JPN LL were aggregated during 1986 and 1993 in each 1^{o} x 1^{o} grid and overlaid size sampling locations. Catch and sampling frequency were also aggregated in each latitude.

Results and Discussion

Figure 1 (left) shows aggregated catch between 1986 and 1993 in each 1x1 with sampling locations and Fig. 2 (right) represent catch (solid black line) and number of size sampling (solid red line) frequency, respectively. Main fishing grounds of the JPN LL for albacore were found the latitude between 25^{o}N and 40^{o}N, which gave close agreement with the size sampling. By contrast, while sampling frequency was higher in fishing ground formed south of 20^{o}N, amount of catch were not so large but size sampling was placed a disproportionate emphasis on larger size.

Figure 2 represent size sampling in two periods (1966-1992 and 1993-2012) in area of (130^{o}E-180^{o}, 10^{o}N−20^{o}N). Mode of length was 109cm (1966-1992) and 99cm (1993-2012), respectively. As the southern areas has been thought to be spawning area (e.g. Otsu and Uchida, 1963), it would have possibility that extra larger mature albacore appeared in southern area before 1992. However, there should be necessarily to investigate thoroughly reasons why extra large size of albacore disappeared after 1992.

In summary, following recommendations were raised to improve SS3 results and area definition for the JPN LL.

1. Length data should be reprocessed in the same area as JPN LL CPUE especially during 1966 to 1992. (become synonymously with excluding data below south of 20^{o}N during this period).
2. Define new fishery for catching extra large size of albacore between 10^{o}N and 20^{o}N only in the northwestern North Pacific Ocean (130^{o}E-180).
3. Define new fishery for catching extra large size of albacore in (10^{o}N-20^{o}N, 130^{o}E-150W: including EPO) with not only Japanese LL but combined with Taiwanese LL and US LL around Hawaii.

Reference

Ijima, H., Kiyofuji, H. and Okamoto, H. (2013) Abundance indices of albacore tuna by Japanese longline shery in the north Pacic Ocean. ISC/13/ALBWG-2/02.

Otsu, T. and Uchida, R. N. (1963) Model of the migration of albacore in the North Pacific Ocean. Fish. Bull., **63:** 33-44.

Table 1. Number of measured fish in each quarter during 1966 and 2012 in area within 130E-180 and 10N-55N.

Year	Quarter			
	1	2	3	4
1966	5427	125	158	5022
1967	7059	503	624	9234
1968	14400	563	329	6456
1969	6034	227	668	7815
1970	10512	1127	1190	7698
1971	5255	89	682	1424
1972	1454	45	291	1686
1973	1031	100	141	1798
1974	1877	234	255	1044
1975	1633	66	9	1286
1976	2378	157	85	2877
1977	4556	8	284	2772
1978	4828	467	91	2891
1979	3652	75	8	2805
1980	4174	197	118	2825
1981	2052	91	379	3396
1982	2895	166	374	2153
1983	1820	1114	247	5841
1984	3331	1063	829	5495
1985	1391	1438	859	3021
1986	2668	1519	2123	5936
1987	4411	1030	1546	8987
1988	5027	957	861	7794
1989	7911	741	881	6145
1990	8271	830	418	4260
1991	8966	1646	236	8025
1992	5781	724	506	8920
1993	5753	1162	64	5350
1994	9919	854	430	4568
1995	11114	842	1	6241
1996	7101	973	95	6819
1997	8695	1685	68	1877
1998	5894	2258	66	2529
1999	6395	637	-	8978
2000	7241	1826	3	2441
2001	5462	2003	312	7276
2002	18257	10148	6138	15257
2003	15499	12538	6051	11205
2004	8816	5660	4648	13405
2005	8741	10906	8197	10848
2006	8282	3455	379	9952
2007	10904	2491	427	10829
2008	9871	9114	5163	5430
2009	8884	6616	4381	6878
2010	7984	8149	5635	10744
2011	4204	11665	6385	11679
2012	5137	7408	7022	7263

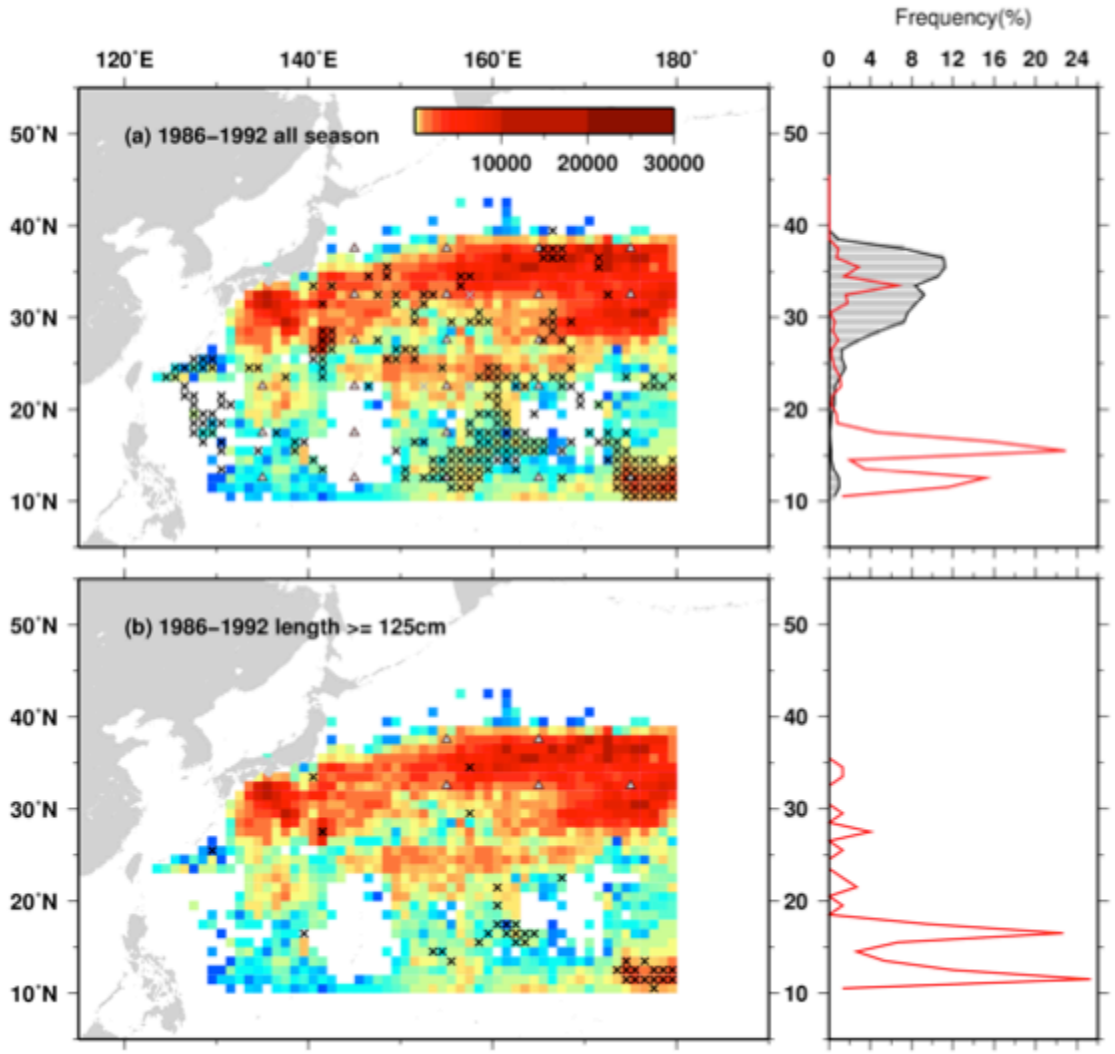

Figure 1. (Left) Catch distribution in 1986-1992 and size sampling (x: sampling resolution 1^{o}x1^{o}, gray x : 1^{o}x1^{o} and gray triangle: 10^{o}x5^{o}). (Right) Catch histogram by latitude (gray) and number of measured fish (red). All size location were plotted in upper figure, but only measured fish >= 125cm was plotted in lower figure.

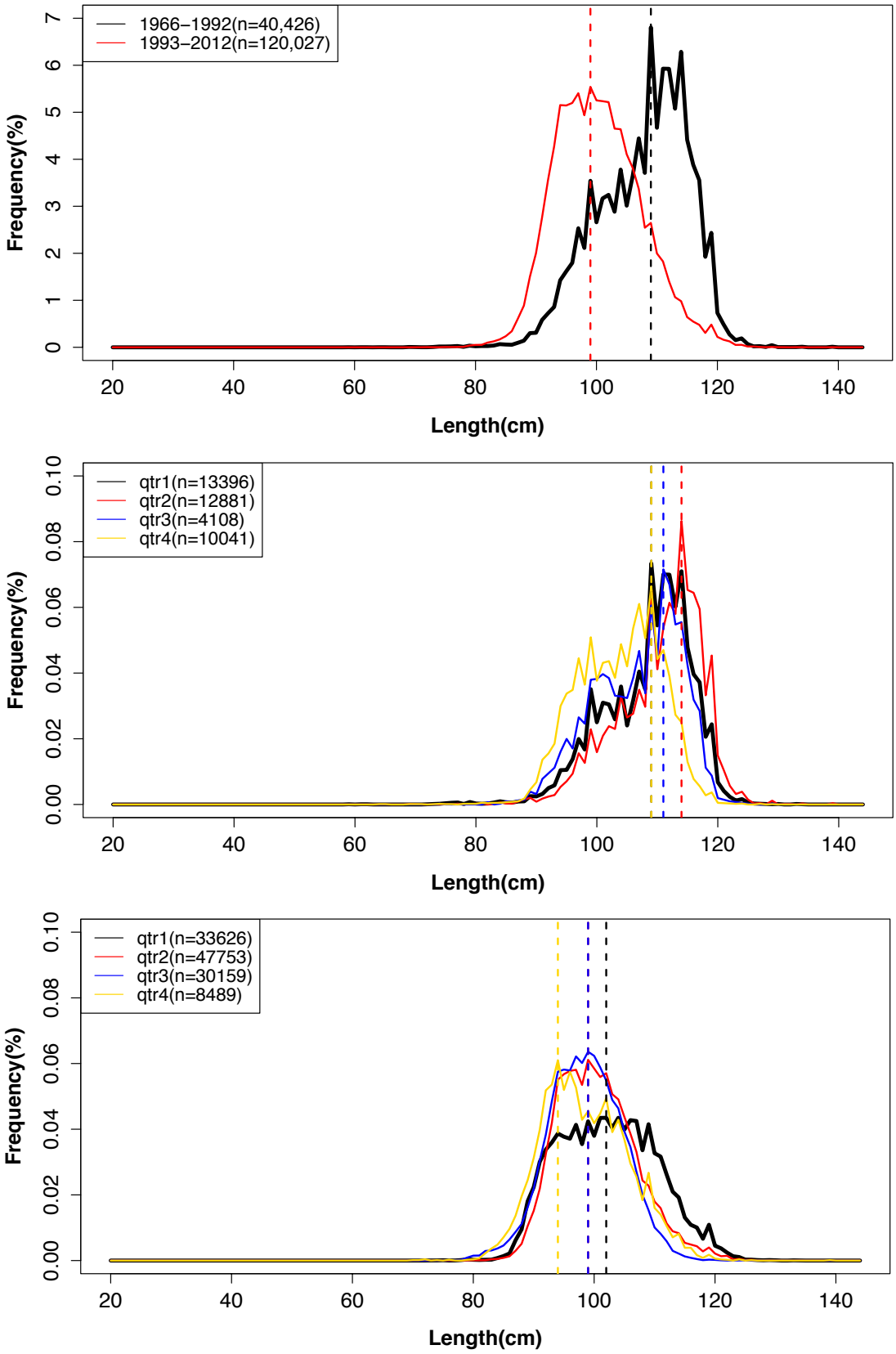

Figure 2. NPALB size frequency in the area of (120°E-180, 10°N-20°N) including all seasons (upper, black : 1966-1992, red : 1993-2012), 1966 and 1992 (middle), 1993 and 2012 (lower). （black : quarter1, red : quarter2, blue: quarter3 and yellow: quarter4）.