

A Summary of North Pacific Albacore Tuna Fishery Data Reported by Non-ISC Countries

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ABSTRACT

The Albacore Working Group (ALBWG) of the International Scientific Committee on Tuna and Tuna-like Species in the North Pacific Ocean (ISC) will be conducting a benchmark assessment of the North Pacific albacore stock (NPALB) in 2023. This Working Paper summarizes the annual catch, size composition, and the spatial distribution of catch from 1994 to 2021 reported for NPALB by countries that do not submit data directly to the ISC. These countries do submit data to the two Regional Fisheries Management Organizations (RFMOs) responsible for the management of NPALB: the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fisheries Commission (WCPFC). These two data sources were reviewed for the inclusion in to the upcoming 2023 stock assessment. Several non-ISC countries have reported catches of NPALB, however only China and Vanuatu, have significant catches and time series to incorporate into the assessment model. The data were also compared to data used in the 2017 and 2020 stock assessments. Relatively large differences in the catches of China and Vanuatu longline fleets were noted between 2017 and 2020 (ISC/23/ALBWG-01/03). For the 2023 data no difference was found between 2020 and 2023 catch data reported by China and only minor differences in the Vanuatu catches in some years. It was also found that Vanuatu had some minor catches reported in numbers of fish, rather than in weight, in the IATTC area in recent years, 2016-2021.

INTRODUCTION

The Albacore Working Group (ALBWG) of the International Scientific Committee on Tuna and Tuna-like Species in the North Pacific Ocean (ISC) will be conducting a benchmark assessment of the North Pacific albacore stock (NPALB) in 2023. This Working Paper summarizes the annual catch, size composition, and the spatial distribution of catch reported for NPALB by countries that do not submit data directly to the ISC. These countries do submit data to the two Regional Fisheries Management Organizations (RFMOs) responsible for the management of NPALB: the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fisheries Commission (WCPFC). These two data sources were reviewed for the inclusion in to the upcoming 2023 stock assessment. Several non-ISC countries have reported catches of NPALB, however only China and Vanuatu, have significant catches and time series to incorporate into the assessment model. ISC member countries that do submit data directly to the ISC include, Canada, Chinese-Taipei, Japan, the Republic of Korea, Mexico and the United States of America.

METHODS

Non-ISC member annual catch (Category I), spatial distribution of monthly catch and effort (Category II), and size composition data (Category III) for the western and central Pacific Ocean were requested from the Secretariat of the Pacific Community (SPC – the science service provider to the Western and Central Pacific Fisheries Commission) and were received from the data manager, Peter Williams, on 04 November 2022. Similar data reported for the eastern Pacific Ocean (east of 150°W longitude) were downloaded from the IATTC website (<https://www.iattc.org/en-US/Data/Public-domain>) on 18 October 2022. The data from both sources were combined into single dataset and values from the south Pacific were removed.

RESULTS

Catch and Effort Data

Nine (9) non-ISC countries (Belize, China, Panama, Vanuatu, Federated States of Micronesia, Marshall Islands, Kiribati, Palau, and Fiji) reported catches of NPALB between 1994 and 2021 (Figure 1). The majority of the non-ISC NPALB catch reported was, however, from China and Vanuatu longline fleets. In 2020 the ALBWG compared the non-ISC catch data submitted to the WCPFC and IATTC in 2017 with the

data used in the 2020 stock assessment. There appeared to be relatively large differences in the catches of China and Vanuatu longline fleets between 2017 and 2020 and the cause for this could not be identified. In 2023 there were no differences in the data submitted by China compared to the 2020 data submission, however the data submitted by Vanuatu was slightly different from that submitted in 2020 (Table 1). The source of this difference in Vanuatu data submissions is still unclear.

China and Vanuatu were the only non-ISC countries that had substantial NPALB catches when disaggregated to quarters (Figure 2). All other non-ISC countries catches were combined with Vanuatu catches. The Chinese fleet reported similar annual catches amongst the four quarters while catches by the Vanuatu longline fishery occur primarily in the first and fourth quarters.

All nine countries that reported catch of NPALB reported longline effort in the north Pacific Ocean but countries other than China and Vanuatu have mostly fished in equatorial waters (0-5°N) where tropical tuna species are targeted rather than NPALB.

Spatial and Seasonal Distribution of Catch

The China and Vanuatu longline fleets operated in both the IATTC and the WCPFC areas (Figures 3-6).

Before 2001 the Chinese longline fleet only operated in a small part of the WCPFC area (Figure 3). In 2001 the fleet expanded into the eastern Pacific ocean IATTC area (Figure 4) and catches increased substantially after 2010. In most years the catch occurs in all seasons in the IATTC area and in the last 4 years of data there was slightly more catch seen in seasons 1 and 2 (Figure 5). In the WCPFC area the distribution of the catch is fairly even across the seasons in the last four years of data (Figure 6).

Before 2007 the Vanuatu longline fleet reported spatial catch data only in the WCPFC area (Figure 7) and then expanded into the eastern Pacific Ocean IATTC area (Figure 7). Since 2016 the Vanuatu fleet also reported parts of the fleets catch in numbers of fish rather than metric tonnes in some areas. The majority of the Vanuatu reported catch occurred in the seasons 1 and 4 (Figure 2) in both the WCPFC (Figure 9) and the IATTC (Figure 10).

Size Composition Data

Six non-ISC countries have reported fork length measurements for north Pacific albacore in 1994-2021 (Table 1). Only the data from the China fishery were abundant enough to be considered in analyses (Figure 11). Catch size composition data reported by China in northern areas north of 30°N (Figure 12) was not as abundant as in the southern areas, south of 30°N (Figure 13). The mean size frequency was larger for the China fleet data in the southern area compared to the northern area in season 1, 3 and 4, however, no size composition data was available for season 2 in the southern area (Figures 14 and 15). The largest fish were reported in seasons 1 and 4 in the northern areas (Figure 15). The size composition data from the China fleet is not documented and it is still uncertain if the collection program is sufficient enough to include in the 2023 stock assessment.

TABLES

Table 1. Comparison of the NPALB total catch provided by the SPC and IATTC for China and Vanuatu for the 2017 (ISC/20/ALBWG-01/04), 2020, and 2023 stock assessments.

Year	Quarter	China					Vanuatu				
		2017	2020	Δ	2023	Δ	2017	2020	Δ	2023	Δ
2002	1	372	98	274	98	0	0	36	-36	38	-1
2002	2	61	14	47	14	0	0	23	-23	23	-1
2002	3	109	42	67	42	0	0	107	-107	110	-3
2002	4	2	226	-224	226	0	294	1335	-1041	1378	-43
2003	1	180	195	-16	195	0	661	428	232	446	-18
2003	2	228	122	106	122	0	0	0	0	0	0
2003	3	180	94	86	94	0	0	0	0	0	0
2003	4	482	411	71	411	0	3472	1371	2102	1427	-56
2004	1	196	219	-23	219	0	1234	1443	-209	1443	0
2004	2	317	196	121	196	0	0	52	-52	52	0
2004	3	151	81	71	81	0	0	77	-77	77	0
2004	4	359	350	9	350	0	2862	2904	-42	2904	0
2005	1	395	180	215	180	0	2280	1772	508	1802	-30
2005	2	249	152	98	152	0	0	47	-47	48	-1
2005	3	159	89	70	89	0	0	0	0	0	0
2005	4	15	41	-26	41	0	1888	1394	494	1418	-23
2006	1	23	191	-168	191	0	1743	1299	444	1301	-2
2006	2	598	353	245	353	0	0	76	-76	76	0
2006	3	251	183	68	183	0	0	1	-1	1	0
2006	4	231	302	-70	302	0	3045	1906	1139	1909	-3
2007	1	49	30	19	30	0	2092	1318	774	1318	0
2007	2	57	23	34	23	0	810	454	357	454	0
2007	3	16	4	12	4	0	0	0	0	0	0
2007	4	7	47	-40	47	0	1574	1400	174	1400	0
2008	1	97	162	-66	162	0	1704	1602	102	1602	0
2008	2	67	19	48	19	0	441	310	131	310	0
2008	3	18	1	17	1	0	2	22	-20	22	0
2008	4	7	5	3	5	0	939	871	68	871	0
2009	1	11	9	2	9	0	782	836	-54	836	0
2009	2	8	4	4	4	0	0	24	-24	24	0
2009	3	19	19	-1	19	0	0	0	0	0	0
2009	4	59	71	-12	71	0	787	726	61	726	0
2010	1	93	121	-28	121	0	1742	844	898	868	-25
2010	2	302	182	120	182	0	1	69	-68	71	-2
2010	3	307	228	79	228	0	0	4	-4	5	0
2010	4	609	380	229	380	0	1129	1432	-303	1477	-45
2011	1	727	754	-28	754	0	7019	2671	4348	2739	-68
2011	2	1062	1045	17	1045	0	80	138	-58	142	-4
2011	3	375	420	-45	420	0	0	10	-10	11	0
2011	4	677	620	56	620	0	1380	738	643	759	-22
2012	1	3182	1867	1315	1867	0	766	749	17	779	-30
2012	2	1608	840	768	840	0	1	9	-8	9	0
2012	3	1516	837	679	837	0	0	0	0	0	0
2012	4	2914	1712	1202	1712	0	2538	1374	1163	1420	-46
2013	1	2444	1443	1001	1443	0	1574	1652	-78	1727	-74
2013	2	1123	637	486	637	0	98	185	-87	191	-6
2013	3	1121	670	451	670	0	339	257	82	257	0
2013	4	480	505	-24	505	0	639	778	-139	808	-30
2014	1	493	368	125	368	0	1973	1542	430	1547	-5
2014	2	445	268	178	268	0	135	107	28	107	0
2014	3	585	304	281	304	0	554	247	307	248	-1
2014	4	1287	820	467	820	0	1228	989	239	993	-4
2015	1	167	474	-307	474	0	2622	2259	362	2144	115
2015	2	229	551	-322	551	0	5	231	-225	220	11
2015	3	28	149	-122	149	0	0	29	-29	29	0
2015	4	350	549	-199	549	0	2	822	-820	780	42
2016	1		286		286	0		775		775	0
2016	2		44		44	0		7		7	0
2016	3		36		36	0		0		0	0
2016	4		318		318	0		456		456	0
2017	1		200		200	0		556		583	-27
2017	2		136		136	0		3		3	0
2017	3		230		230	0		4		4	0
2017	4		402		402	0		1186		1244	-58
2018	1		341		341	0		934		1000	-66
2018	2		139		139	0		4		5	0
2018	3		94		94	0		1		1	0
2018	4		272		272	0		574		614	-40

Table 2. Number of length measurements by annual quarter reported by non-ISC countries to the IATTC and WCPFC.

Country	Years	Quarter			
		1	2	3	4
China	1993- 2021	5178	619	6434	11649
Vanuatu	2000 - 2019	616	281	925	1377
Federated States of Micronesia	1994 - 2021	307	495	451	649
Kiribati	2016 - 2020	25	0	7	123
Marshall Islands	1993 - 2022	177	260	139	242
Palau	2000 2018	1	0	2	0

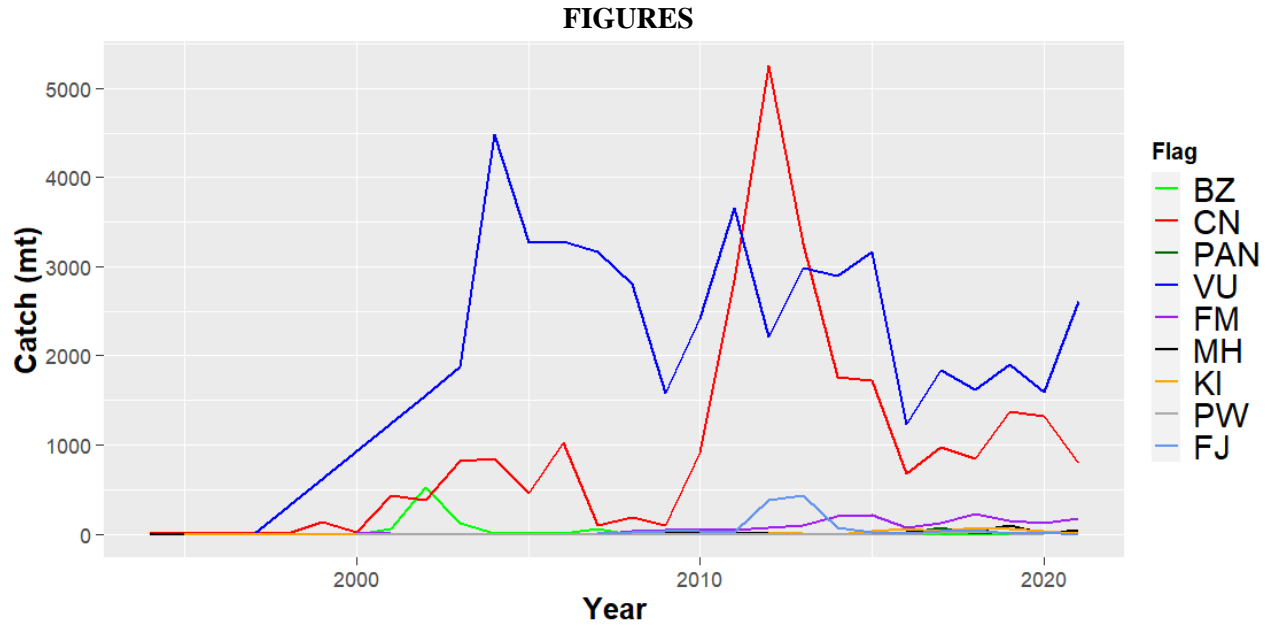


Figure 1. Annual north Pacific albacore catches (metric tonnes) reported by non-ISC countries including Belize (BZ); China (CN); Panama (PAN); Vanuatu (VU); Federated States of Micronesia (FM); Marshall Islands (MH); Kiribati (KI); Palau (PW); and Fiji (FJ).

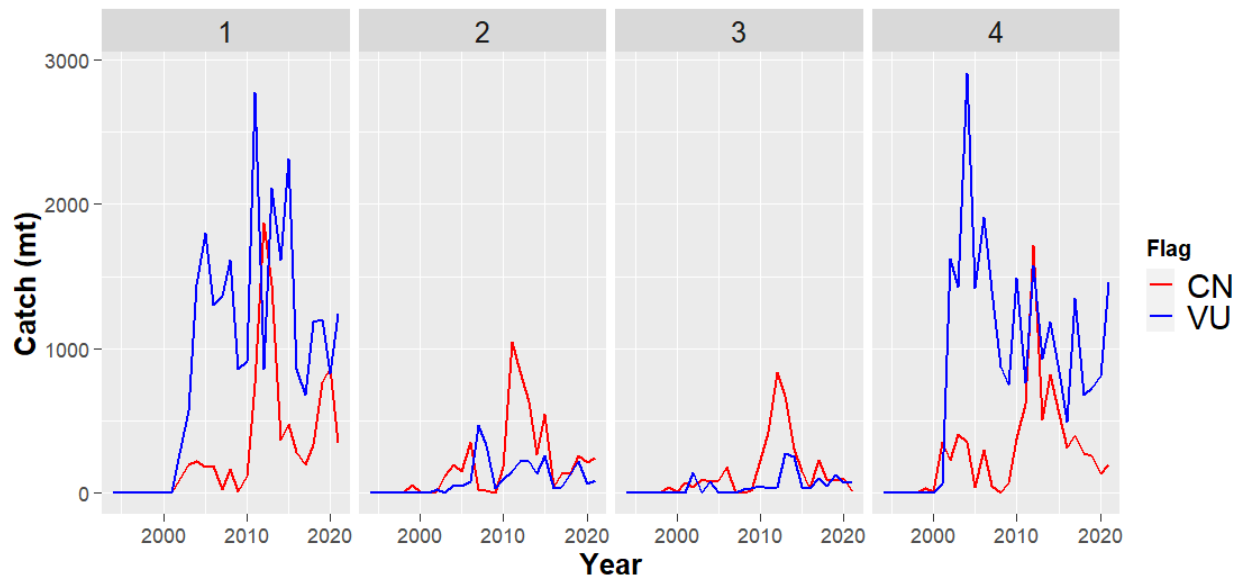


Figure 2. Annual north Pacific albacore catches (metric tonnes) by quarter reported by China (CN) and Vanuatu (VU). Note all non-ISC countries catch other than China are combined with Vanuatu catches.

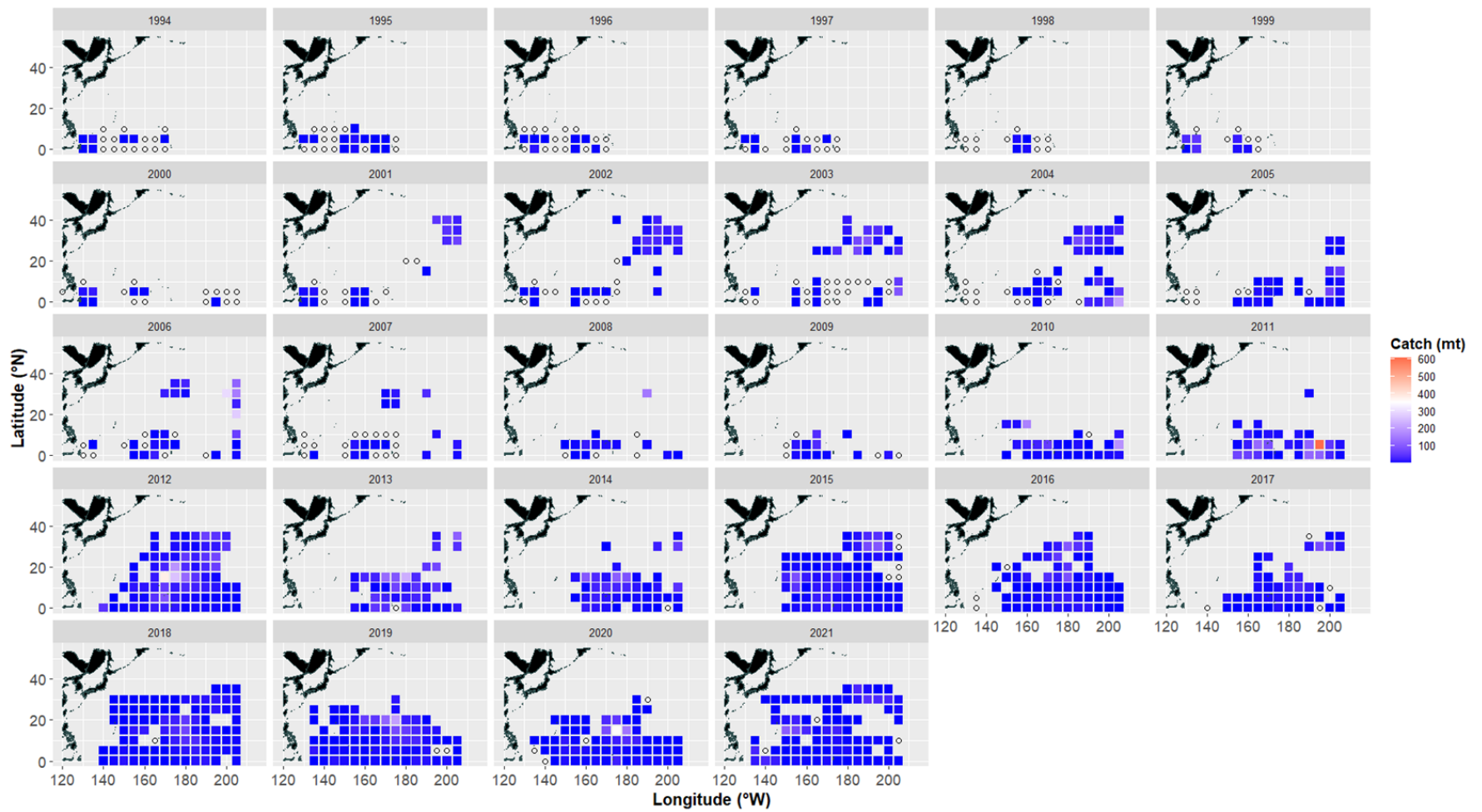


Figure 3. Spatial distribution of the annual north Pacific albacore catches (metric tonnes) reported by Chinese longline fishery ($5^\circ \times 5^\circ$) in the WCPFC area. Circles indicate areas where zero catch in metric tonnes was reported.

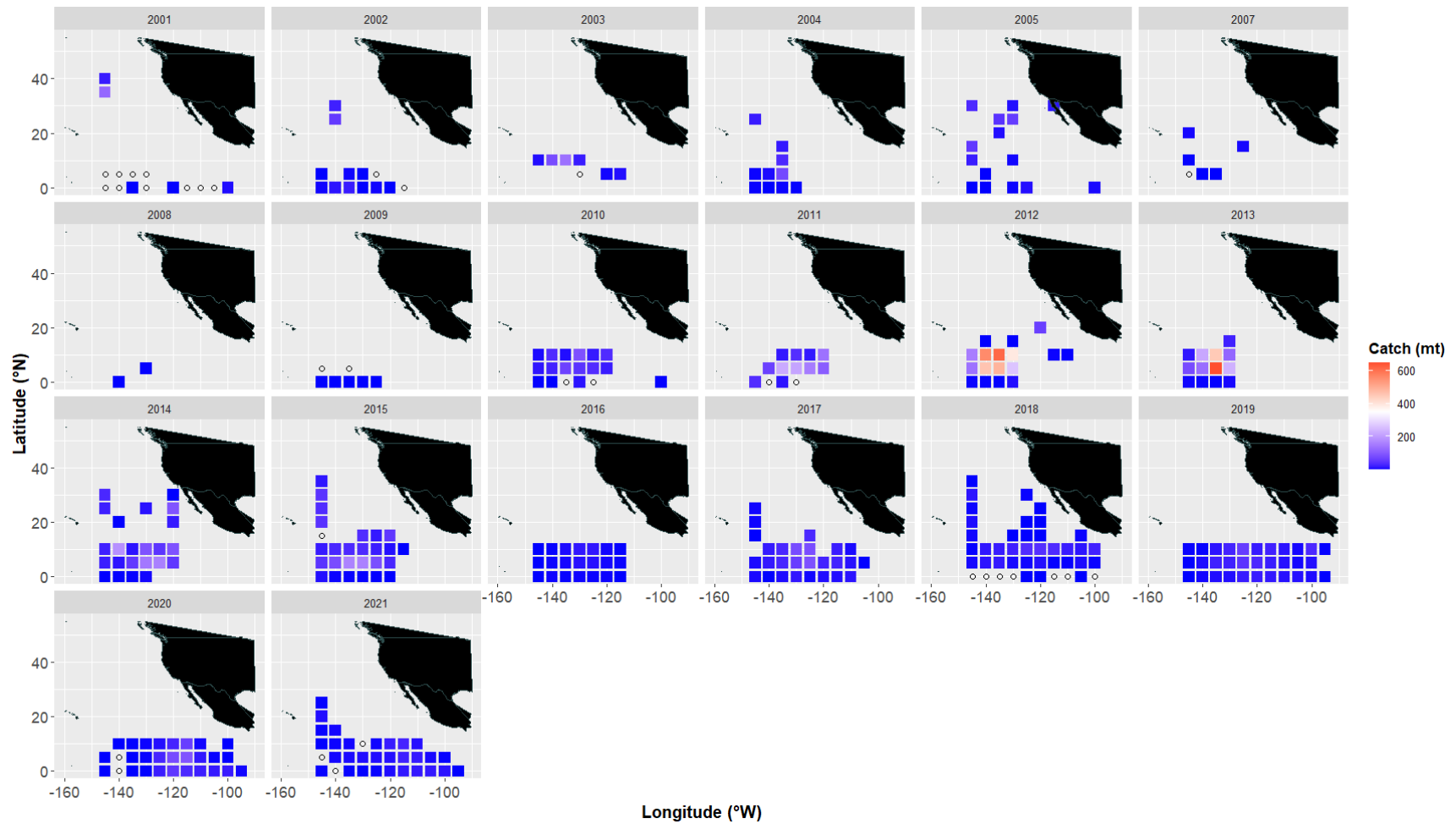


Figure 4. Spatial distribution of the annual north Pacific albacore catches (metric tonnes) reported by Chinese longline fishery ($5^{\circ} \times 5^{\circ}$) in the IATTC area. Open circles indicate areas where zero catch in metric tonnes was reported.

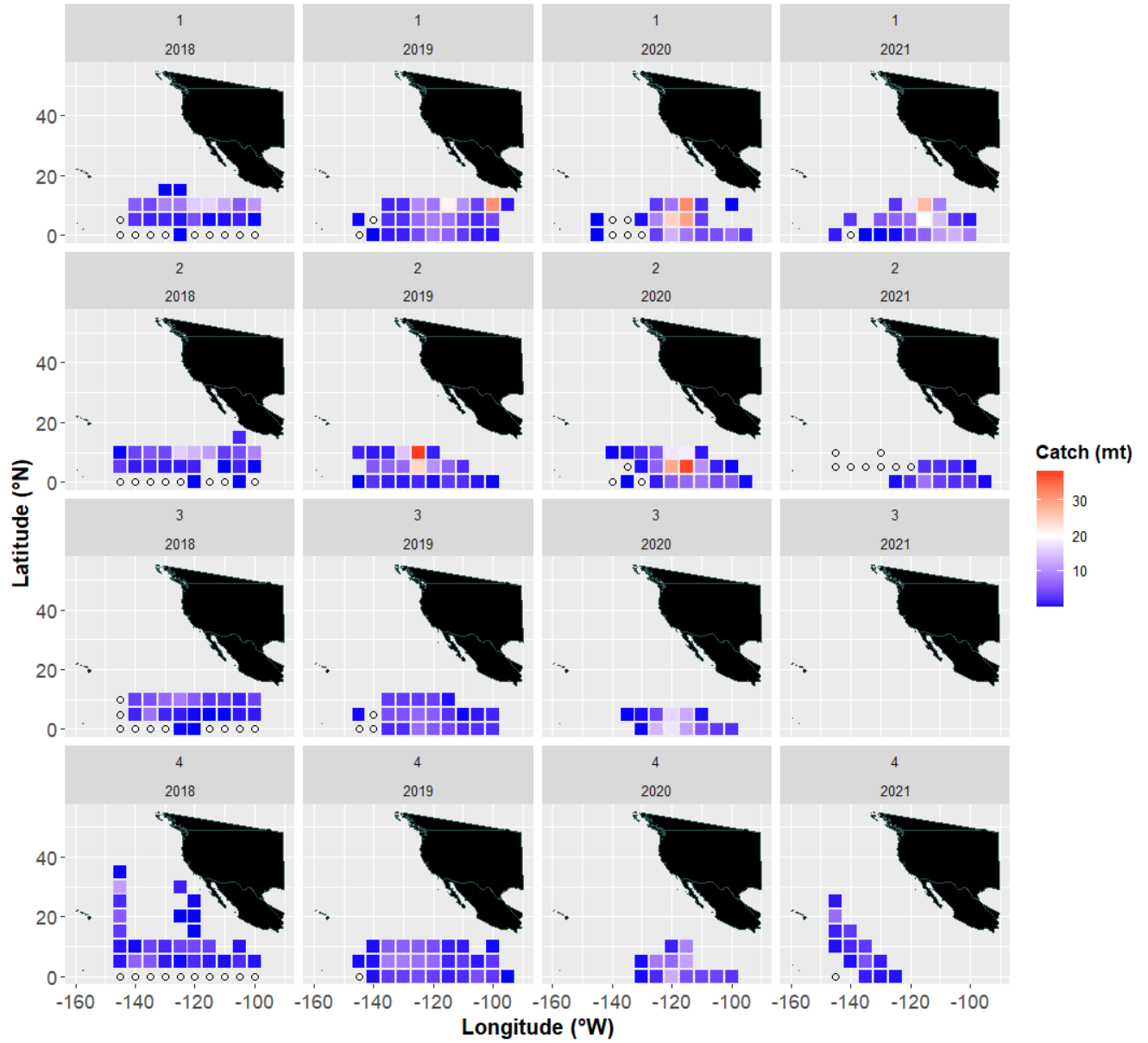


Figure 5. Annual north Pacific albacore catch in the IATTC area by China from 2018 to 2021 by and by quarter. Open circles indicate areas where zero catch in metric tonnes was reported.

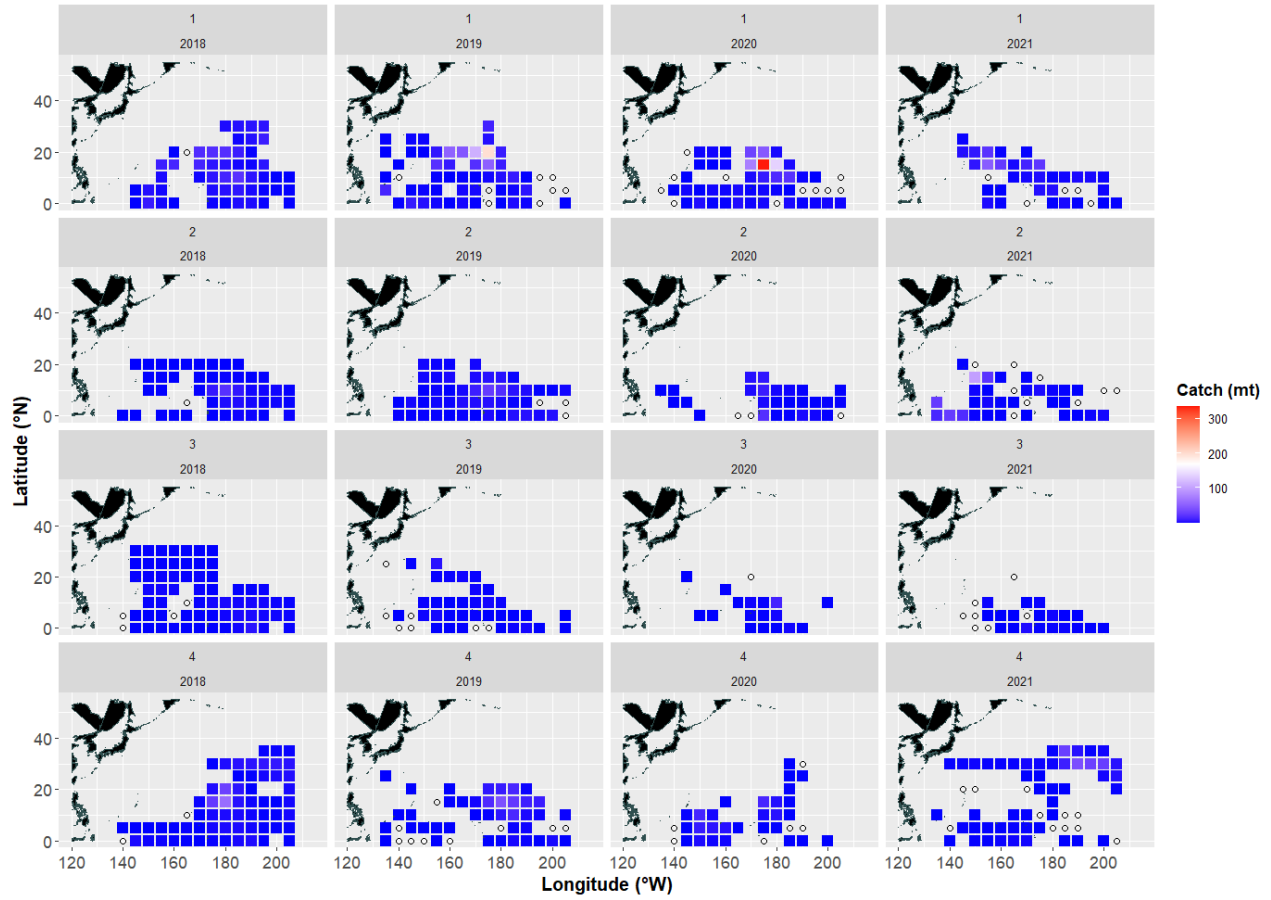


Figure 6. Annual north Pacific albacore catch in the WCPFC area by China from 2018 to 2021 by quarter. Open circles indicate areas where zero catch in metric tonnes was reported.

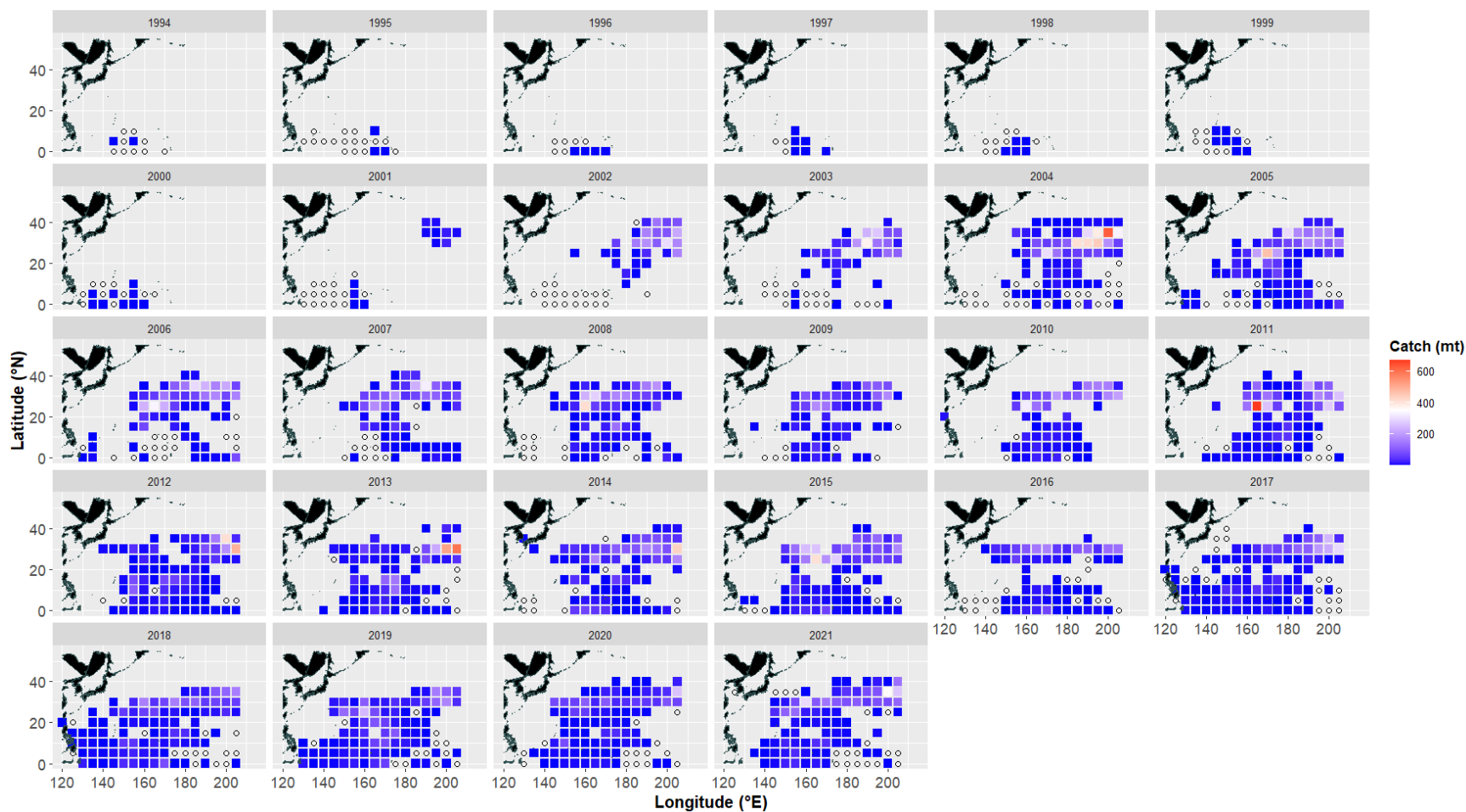


Figure 7. Spatial distribution of the annual north Pacific albacore catches (metric tonnes) reported by Vantuatuan longline fishery (5° x 5°) in the WCPFC area. Circles indicate areas where zero catch in metric tonnes was reported. Note all non-ISC countries catch other than China are combined with Vanuatu catches.

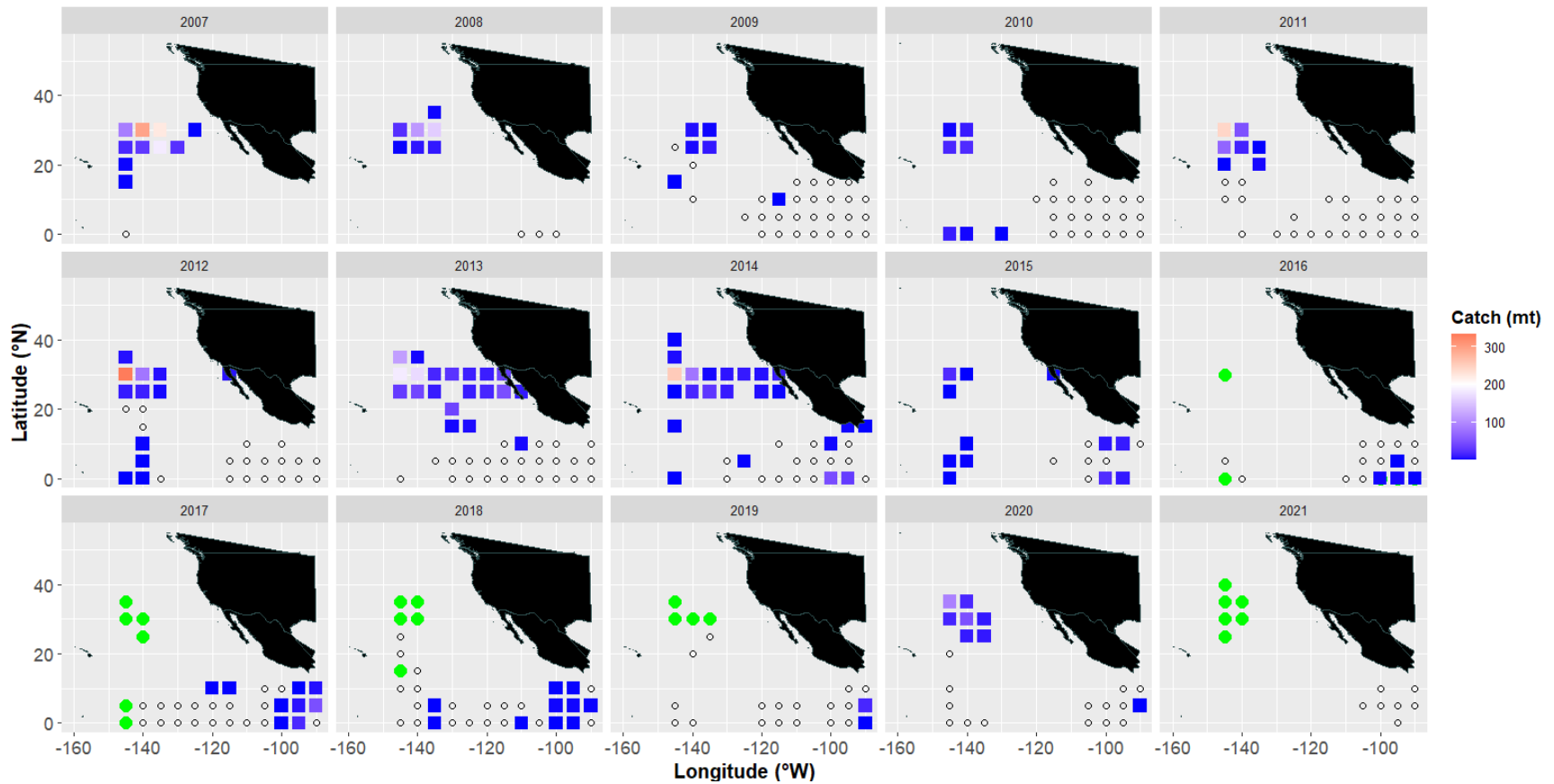


Figure 8. Spatial distribution of the annual north Pacific albacore catches (metric tonnes) reported by Vantuatu longline fishery ($5^{\circ} \times 5^{\circ}$) in the IATTC area. Open circles indicate areas where zero catch in metric tonnes was reported and green circles are areas where catch was reported in numbers of fish.

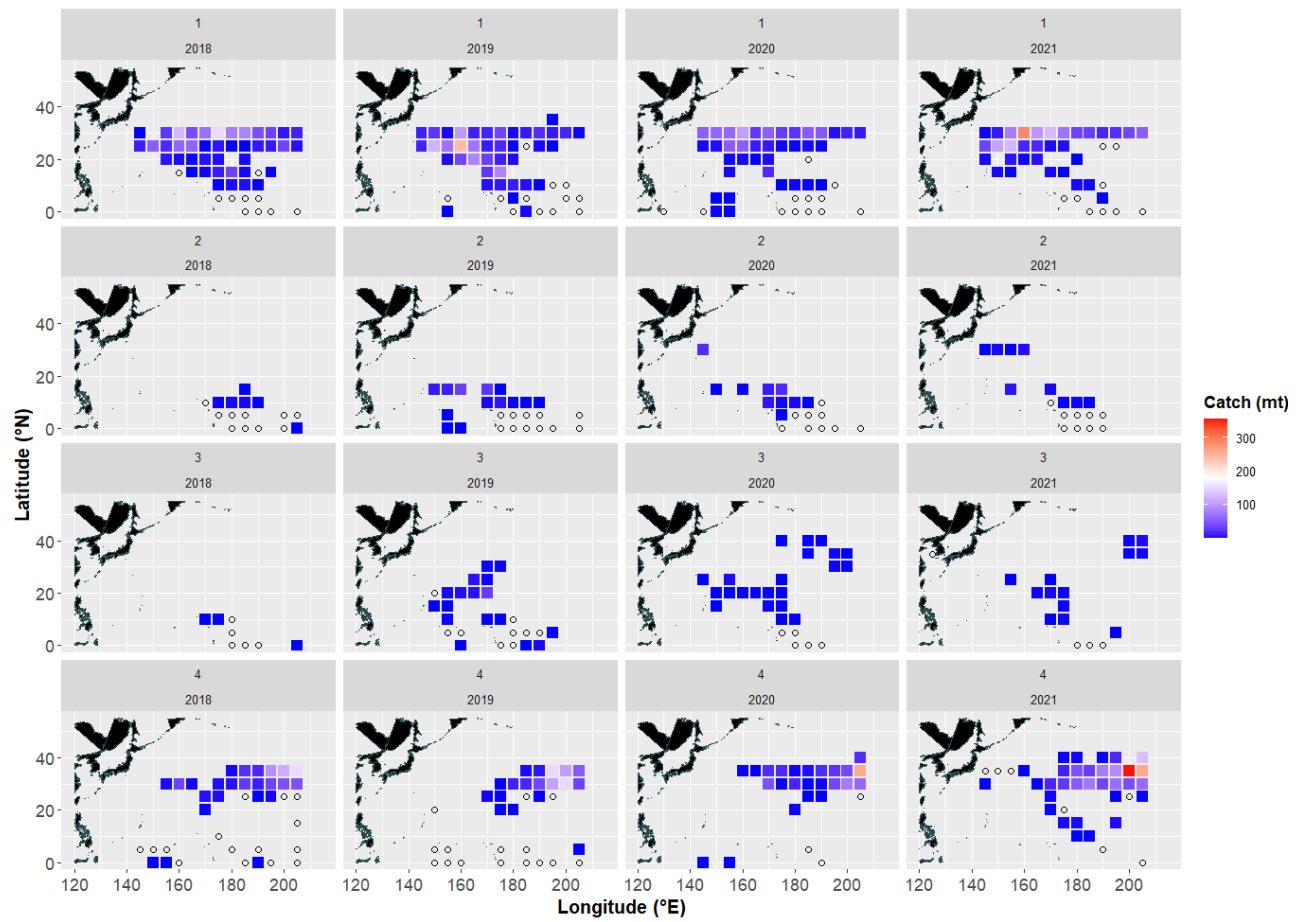


Figure 9. Annual north Pacific albacore catch in the WCPFC area by Vanuatu from 2018 to 2021 by quarter. Open circles indicate areas where zero catch in metric tonnes was reported.

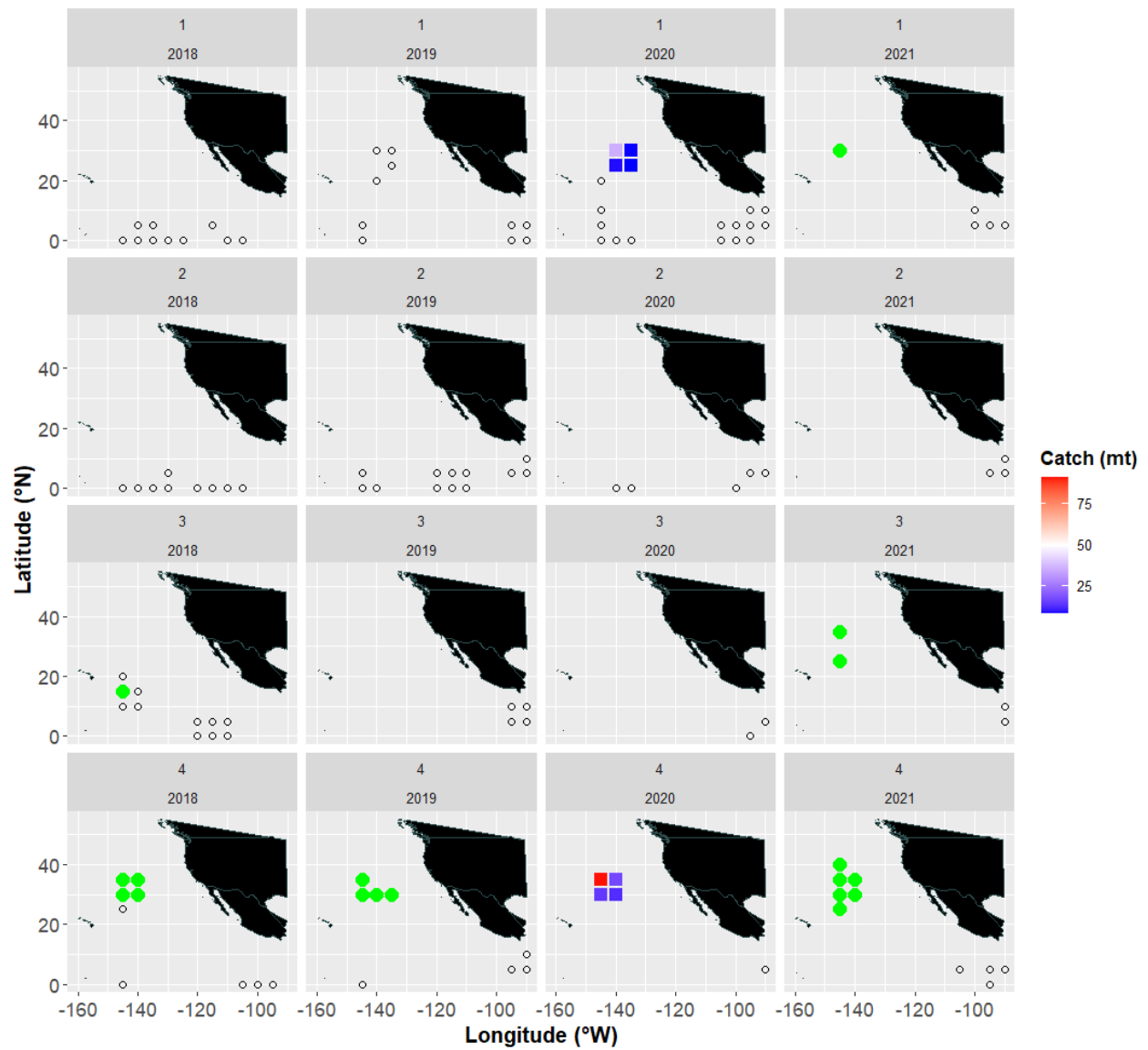


Figure 10. Annual north Pacific albacore catch in the IATTC area by Vanuatu from 2018 to 2021 by quarter. Open circles indicate areas where zero catch in metric tonnes was reported and green circles are areas where catch was reported in numbers of fish.

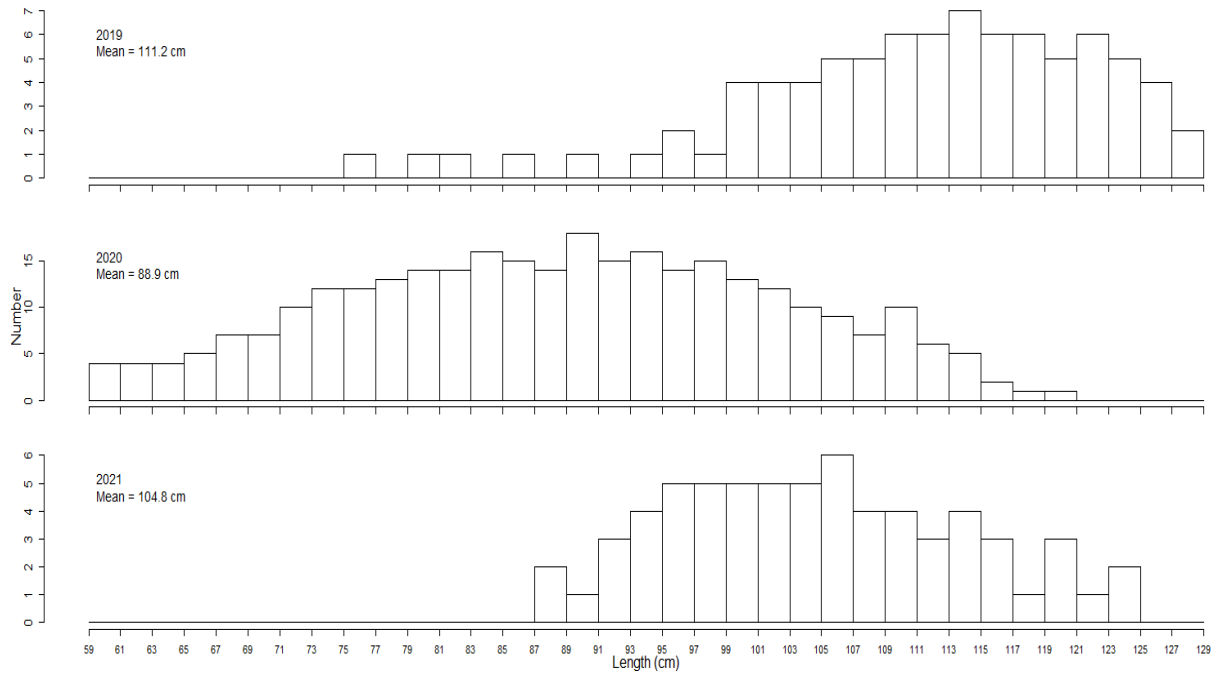


Figure 11. Size composition data reported for the Chinese longline fishery, 2019-2021.

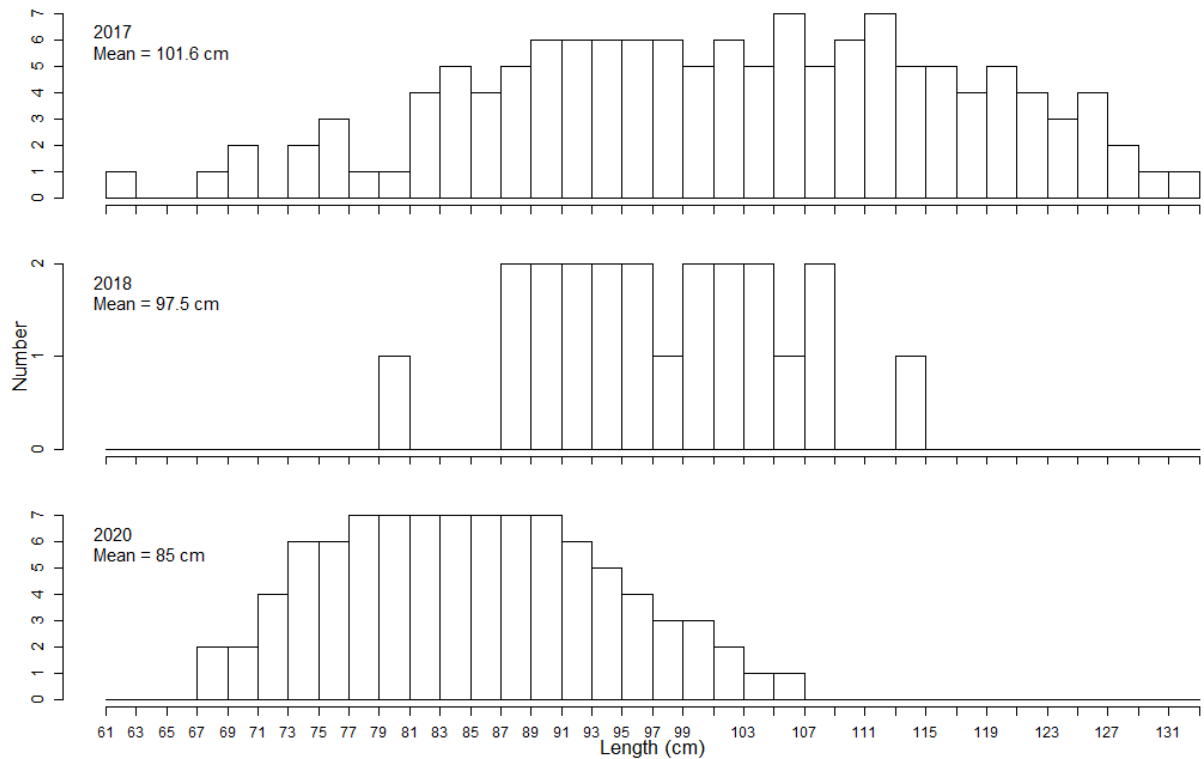


Figure 12. Annual size composition data reported for the Chinese longline fishery north of 30°N for the last three years of data, 2017, 2018, and 2020.

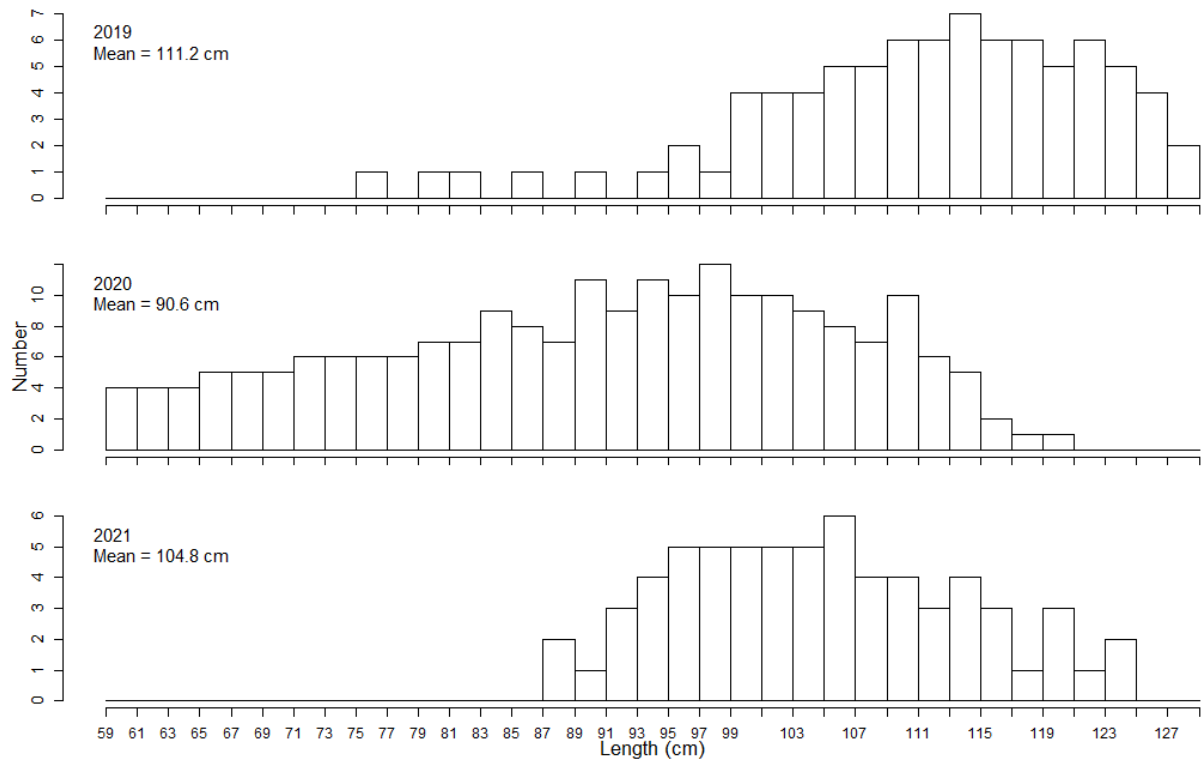


Figure 12. Annual size composition data reported for the Chinese longline fishery north of 30°N for the last three years of data, 2019 to 2021.

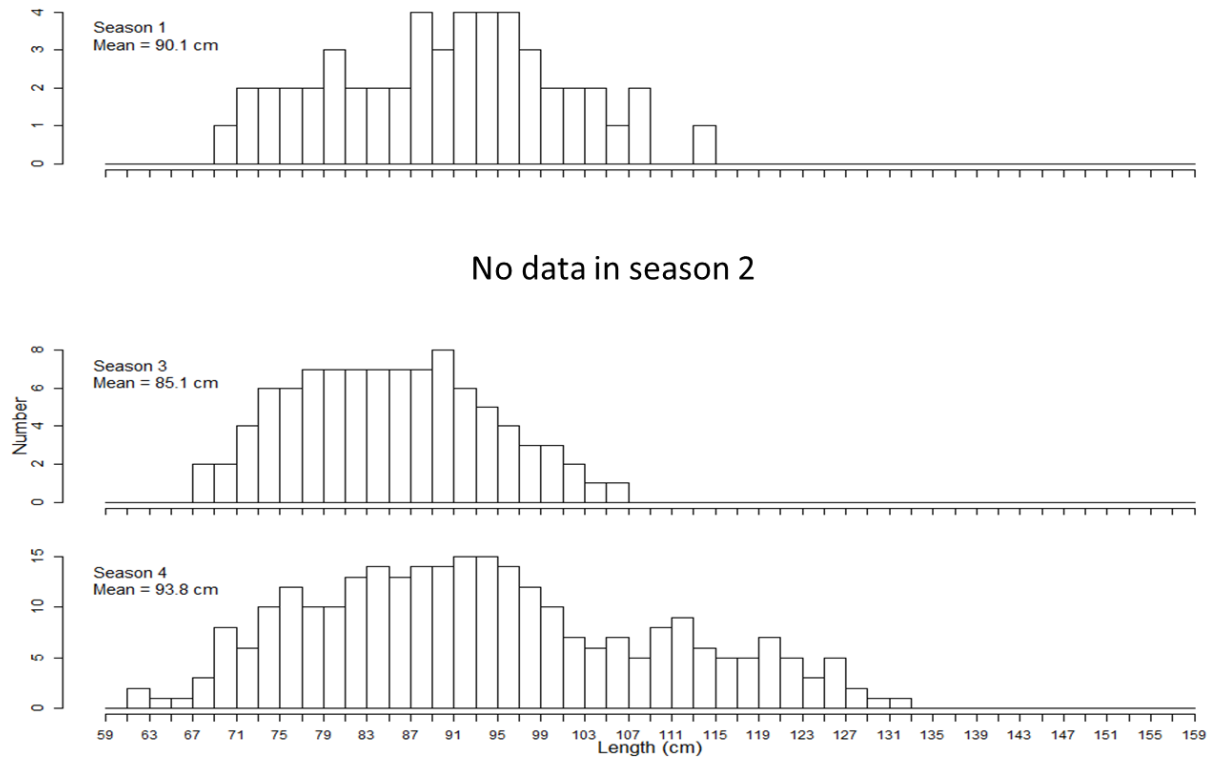


Figure 14. Quarterly size composition data reported for the Chinese longline fishery north of 30°N, 1994-2021.

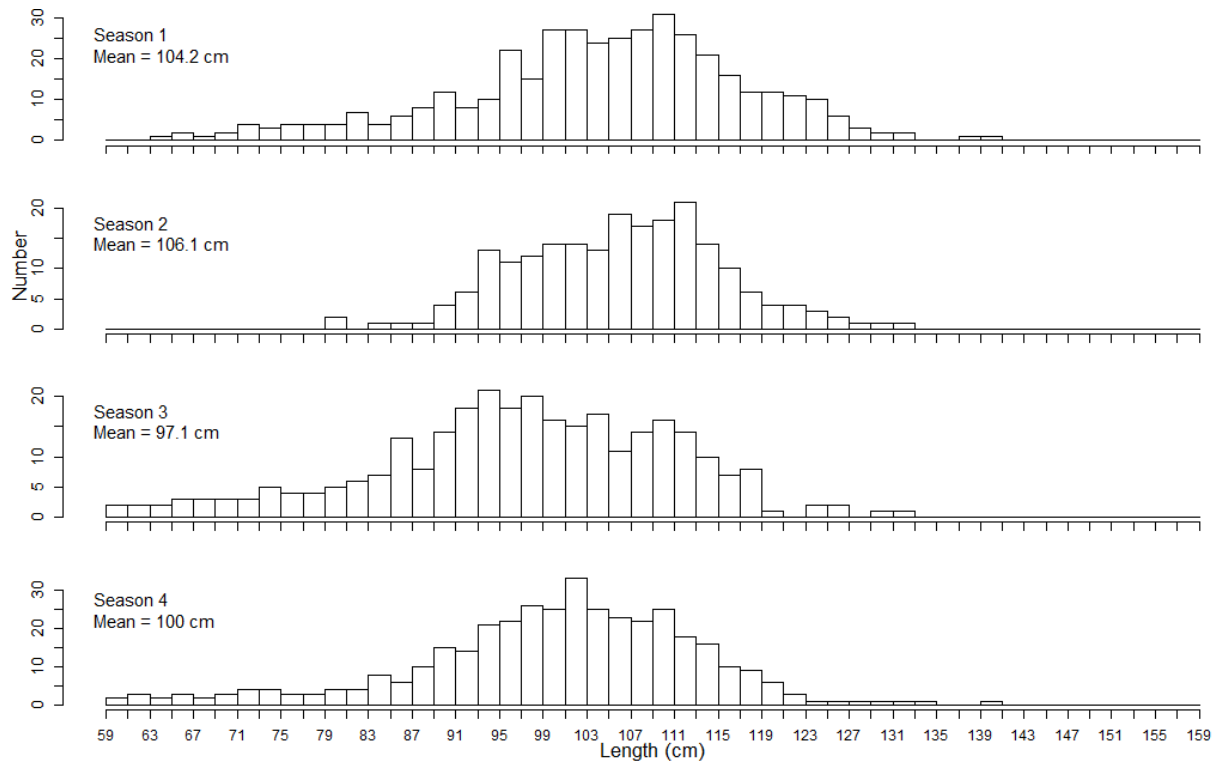


Figure 15. Quarterly size composition data reported for the Chinese longline fishery south of 30°N , 1994-2021.