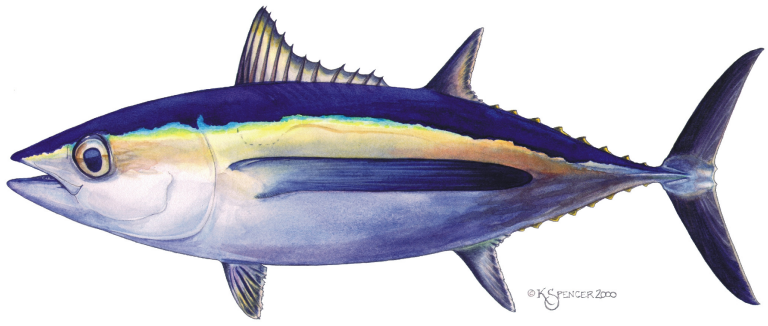
Size composition and CPUE of the North Pacific albacore based on Chinese longline observer data[1]

Jiangfeng Zhu, Xiaojie Dai, and Yan Chen

College of Marine Sciences, Shanghai Ocean University,
999 Hucheng Huan Road, Shanghai 201306, China;

Scientific Observing and Experimental Station of Oceanic Fishery Resources, Ministry of Agriculture, Shanghai Ocean University, 999 Hucheng Huan Road, Shanghai 201306, China

Email: jfzhu@shou.edu.cn



[1]This working paper was submitted to the ISC Albacore Working Group Intercessional Workshop, 19-26 March 2013, held at the College of Marine Sciences, Shanghai Ocean University, Shanghai, China. Document not to be cited without author's permission.

ABSTRACT

This working paper presented the size composition and nominal CPUE of the North Pacific albacore caught during size Chinese longline observer trips in 2006-2012. All the albacores were caught as bycatch since the observed longline vessels were targeting bigeye tuna in the central or western tropical Pacific during those trips. Size composition was presented by month. CPUE data was presented by month and 1° x 1° spatial block. The observed albacore size range was 70-120 cm (fork length). The observed CPUE range was 0-9.13 individuals/1000 hooks.

INTRODUCTION

Albacore in the Pacific Ocean consist of the north Pacific stock and the south Pacific stock. North Pacific albacore are highly migratory and these movements are influenced by oceanic conditions (e.g., Polovina *et al*. 2001; Zainuddin *et al*. 2006, 2008).A portion of the juvenile fish are believed to move into the eastern Pacific Ocean (EPO) and central Pacific Ocean (WPO) in the spring and early summer, returning to the CPO in the late fall and winter where mixing among the eastern and western juvenile components of the stock probably occurs (Otsu and Uchida 1963). Some of juvenile albacore undergo a trans-Pacific movement from the WPO to the EPO where they display seasonal movements between the EPO and CPO (Childers *et al*. 2011). Therefore, the size distributions for albacore caught in different seasons and/or areas might show different patterns, which was important information for fishery definition in stock assessment modeling.

Albacore is a valuable tuna species with a long history of fishery in the North Pacific Ocean (NPO). During the last decade (2000-2009), fisheries in Japan accounted for 65.4% of the total catch on average annually, followed fisheries in the United States, which accounted for 16.7%, 7% by the Canadian fishery, and 6.5% by fisheries in Chinese Taipei. Historically, there was no albacore fishery from China and albacores were occasionally captured by deep-freezing longliners targeting bigeye tuna. Therefore, albacore catch from China mainly came out of the tropical areas across the Pacific Ocean. This study presented the size composition and CPUE data for albacore caught during six longline observer trips of China in 2006-2012.

MATERIALS AND METHODS

Data from six observer trips in the tropical Pacific Ocean since year 2006 were the data source of this study. In each trip, the observer worked 3~6 months onboard. All these trips were conducted by deep-freezing tuna longliners and bigeye tuna was the target species. The albacore was captured as bycatch. Because observers were usually not able to monitor all baskets in each set (they usually observed 70-90% of total baskets deployed), only observed individual size, catch and effort data were used in this study. The deep longlines caught a few amount of albacore. Length frequency data was analyzed by month, i.e., all animals observed in the northern hemisphere was aggregated by month. Catch and effort data by set were aggregated into monthly 1° x 1° spatial blocks and CPUEs were calculated as catch in number/1000 hooks. CPUEs within same block and same month were averaged.

RESULTS AND DISCUSSION

The length frequency data of albacore were available only for June-November 2009, October-November 2011. The fork length distributions were shown in **Figure 1**. The fork length ranges were 89-109 cm for June 2009, 86-111 cm for July 2009, 92-110 cm for August 2009, 93-110 cm for September 2009, 92-109 cm for October 2009, 92-112 cm for November 2009, 70-120 cm for October 2011, and 94-119 cm for November 2011, respectively. Albacore data from other months were very few and not presented here.

The monthly CPUEs by 1° x 1° spatial block from February 2006 to February 2012 were shown in **Figure 2**. CPUEs from other months were not presented because either the sample size was too small or there was no observed catch and effort data. The observed CPUEs before January 2010 were mostly located in the central Pacific; while the observed CPUEs since January 2011 were mostly located in the western Pacific. Most observed CPUEs in 1° x 1° spatial blocks were less than 1 individual/1000 hooks. The highest CPUE (9.13 individuals/1000 hooks) was observed at 162.5° W, 5.5° N in August 2009.

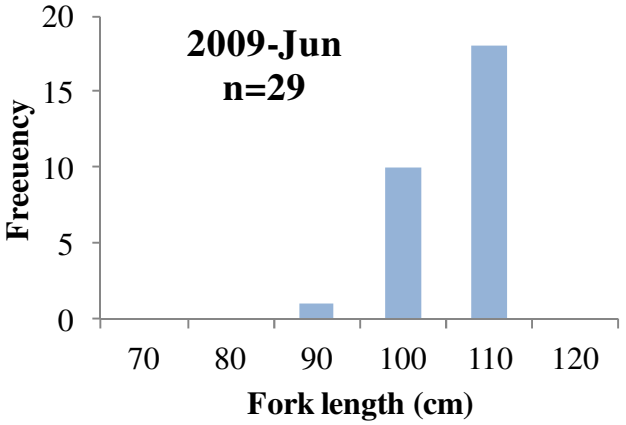
REFERENCES

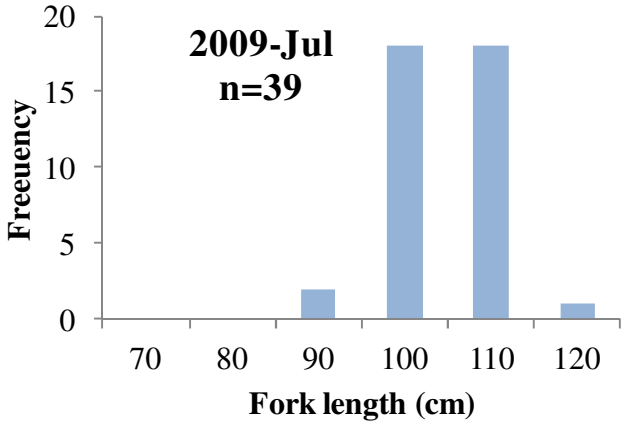
Otsu, T., and Uchida, R.N. 1963. Model of the migration of albacore in the north Pacific Ocean. Fish. Bull. 63: 33-44.

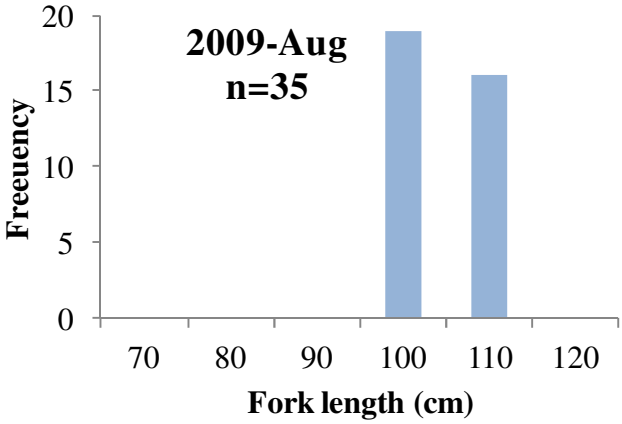
Polovina, J.J., Howell, E., Kobayashi, D.R., and Seki, M.P. 2001. The transition zone chlorophyll front, a dynamic global feature defining migration and forage habitat for marine resources. Prog. Oceanogr. 49: 469–483.

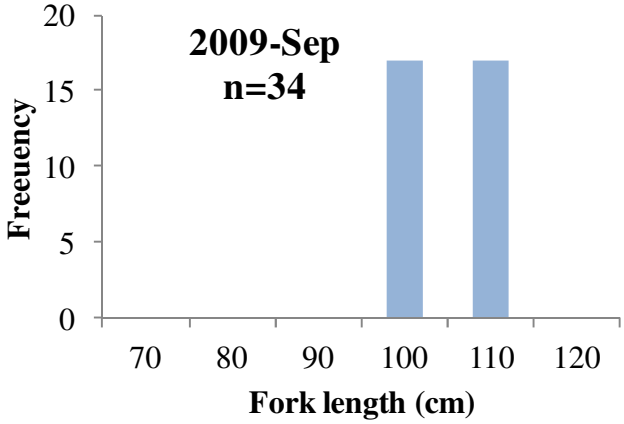
Zainuddin, M., Kiyofuji, H., Saitoh, K., and Saitoh, S.-I. 2006. Using multi-sensor satellite remote sensing and catch data to detect ocean hot spots for albacore (*Thunnus alalunga*) in the northwestern North Pacific. Deep-Sea Res. II 53: 419–431.

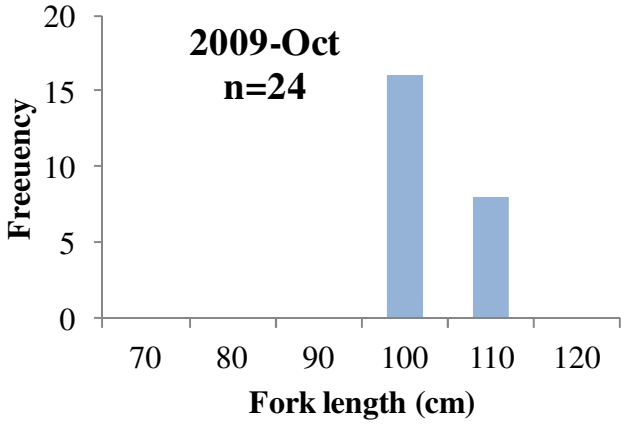
Zainuddin, M., Saitoh, K., and Saitoh, S.-I. 2008. Albacore (*Thunnus alalunga*) fishing ground in relation to oceanographic conditions in the western North Pacific Ocean using remotely sensed satellite data. Fish. Oceanogr. 17: 61–73.

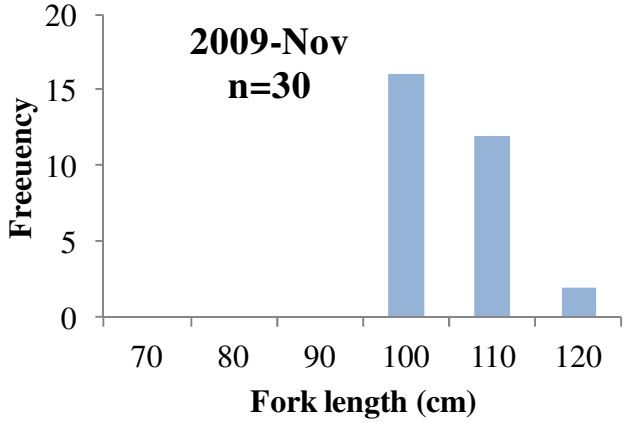

2009-Jun
n=29
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120


2009-Jul
n=39
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120


2009-Aug
n=35
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120


2009-Sep
n=34
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120


2009-Oct
n=24
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120


2009-Nov
n=30
Freeuency
Fork length (cm)
0
5
10
15
20
70
80
90
100
110
120

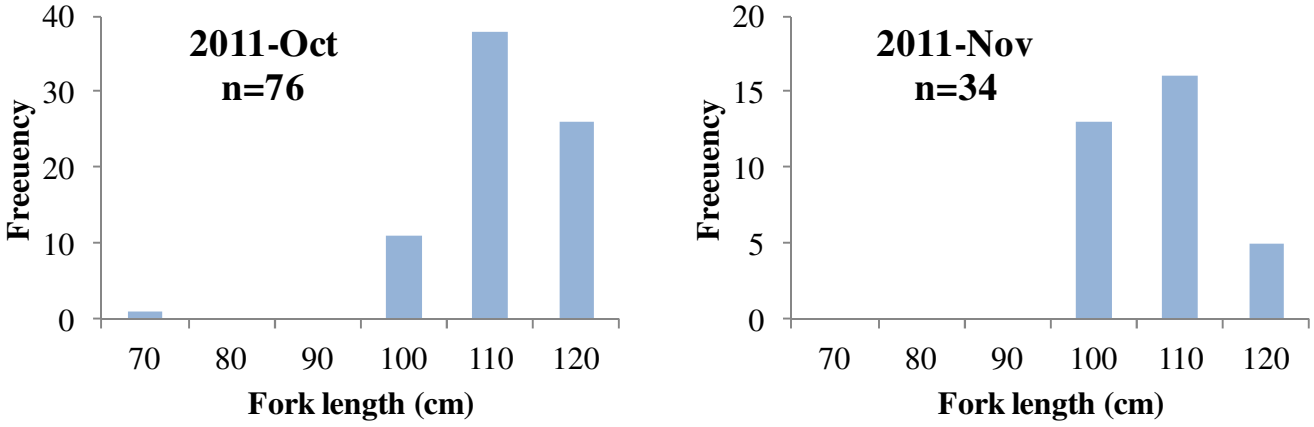


Figure 1 Size distribution of albacore recorded by Chinese longline observer in the North Pacific

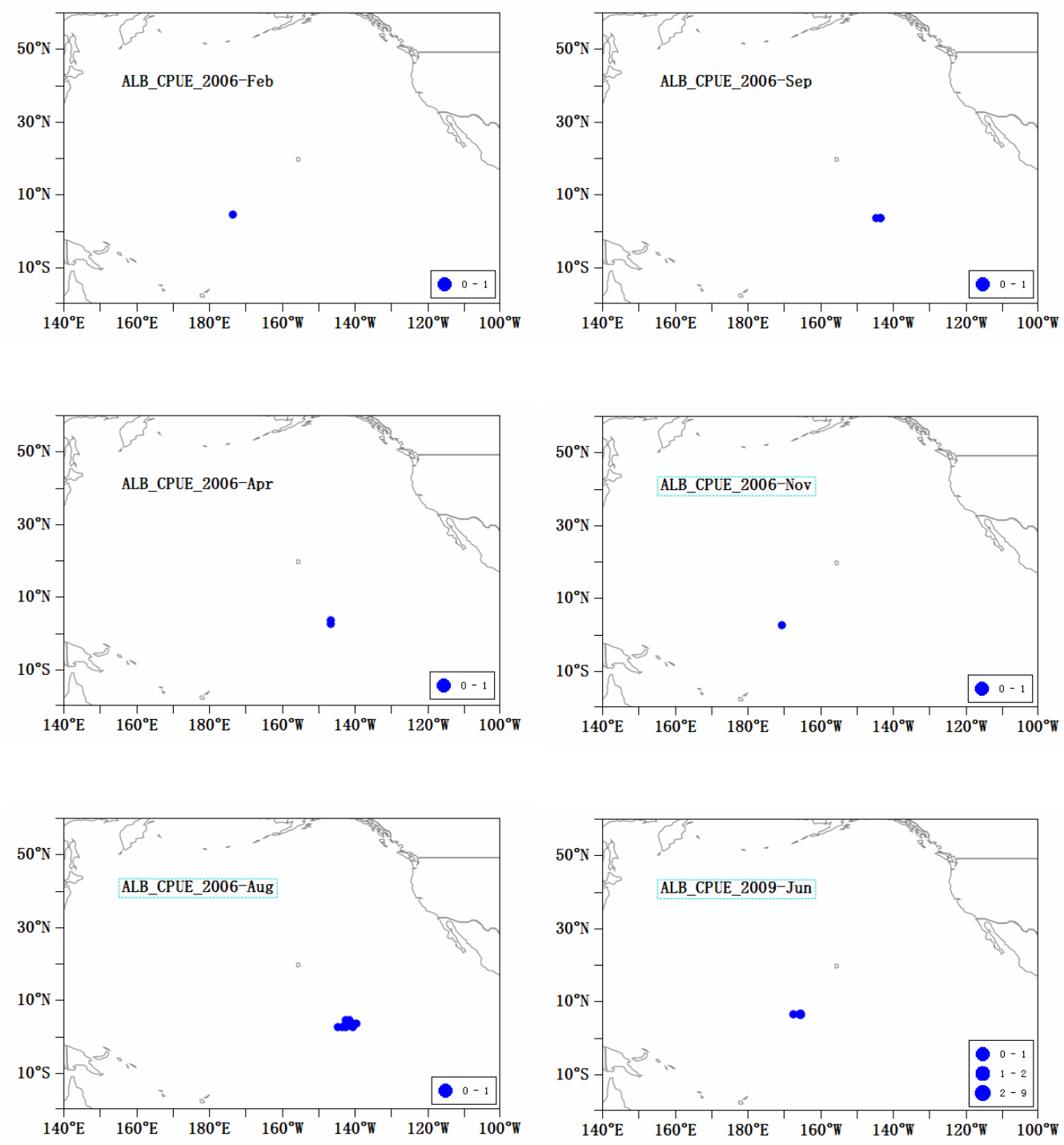


Figure 2 Nominal CPUE of albacore recorded by Chinese longline observer in the North Pacific (CPUE unit: number per 1000 hooks)

Figure 2 Continued.

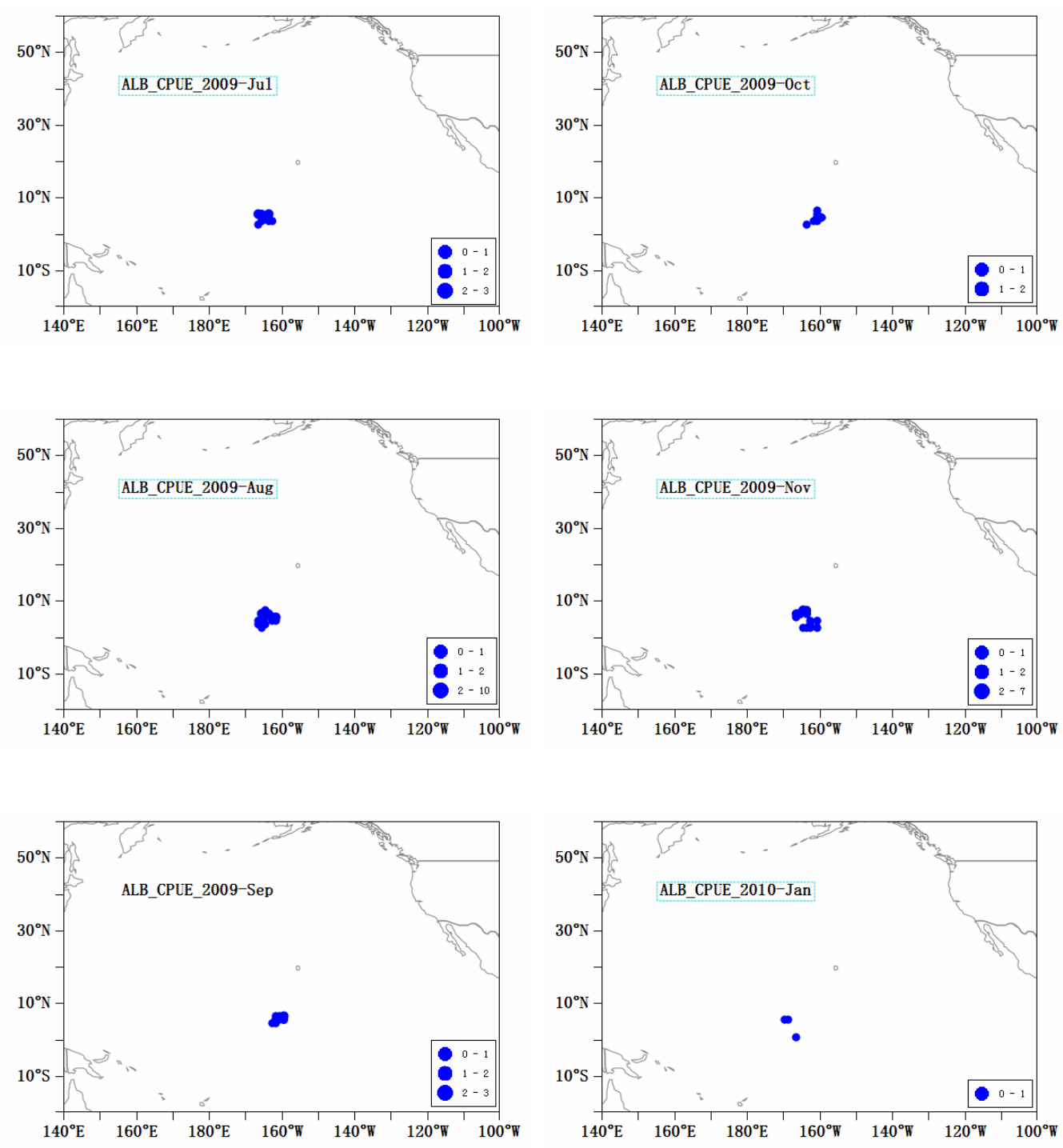


Figure 2 Continued.

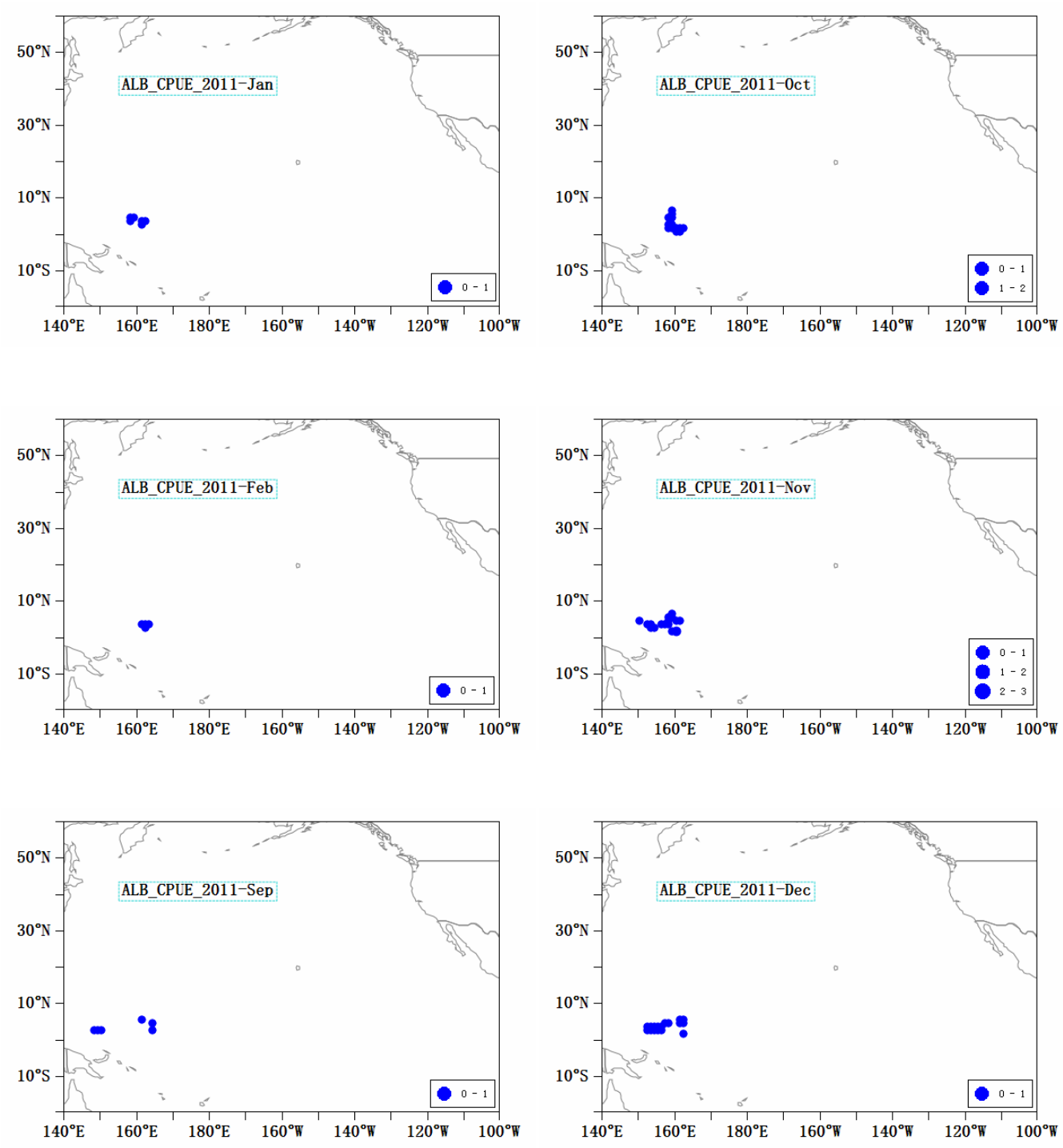


Figure 2 Continued.