Comparison of CPUE in time and area of Korean and Japanese longliners for southern bluefin tuna

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Abstract

Comparison of CPUE in time and area of Korean and Japanese longliners for southern bluefin tuna (SBT) was explored to understand their fishing characteristics and to provide information for developing the CPUE series using their fishery data during 1991-2013. The fishing grounds between them overlapped overall, of which main fishing grounds were areas 8 and 9.

要 旨

韓国と日本のミナミマグロはえ縄漁業を理解し、1991-2013 年の漁業データを用いた CPUE シリーズ開発のための情報を提供するために、両者の CPUE を比較検討した。両者の漁場は全体的に重複しており、特に主漁場は 8 海区と 9 海区であった。

1. Introduction

Korean and Japanese fleets have used only longline gear to catch SBT in the CCSBT statistical area. Korean longline fishery in the Indian Ocean started with a small experimental operation in the 1957, since then has targeted bigeye tuna, yellowfin tuna and albacore tuna, and started targeting SBT in 1991. Japanese longline fishery started in 1952 around low latitudes of the Eastern Indian Ocean. At that time, SBT was caught as bycatch of bigeye tuna and yellowfin tuna, and since the 1960s it has become a target species. In the ESC18 meeting, as noted that Korean fleet seemed to operate in

similar areas to those of the Japanese fleet, this analysis was conducted to provide some informative comparison between the two fleets for better understanding on their fishing characteristics and developing the CPUE series needed to stock assessment.

2.   Data and Methods

We used the dataset (Interim_CCSBT_DataCD_2014_Revised.mdb) in the CCSBT data exchange process where Secretariat compiled data files submitted from all Members. Data tables, including catch-and-effort and size, were extracted. To select Korean data, country code was used. To select Japanese data, country code and dataset code ("JP_ADJ") was used.

Age of Korean catch was not estimated in the database. We calculated catch-at-age from the catch-at-size data based on cohort slicing age estimation method that currently used in CCSBT. Note that this catch-at-age is tentative, because there are minor issues to be checked, e.g. how length measurement was round to centimeter bin.

Distributions of catch and effort, age composition and nominal CPUE were compared between the two fleets in CCSBT statistical area 8 (southeast Indian Ocean) and area 9 (off Cape Town).

3.   Results and Discussion

3.1. Temporal and spatial distribution

Fig. 1 shows temporal and spatial distribution of total SBT catch by Korean and Japanese longliners for all years (1991-2013) combined. It indicates that there is a good agreement of the main fishing grounds between the two fleets, found mainly in the area of 0°-50^oE (area 9) and 90^oE-120^oE (area 8) between 35^oS-45^oS.

There were some differences observed in annual fishing distribution in the 1991-1995 and 2003-2007 periods (Fig. 2). This is because Korea had very low amount of catch during these periods due to not targeting SBT (see Fig. 1 of CCSBT-ESC/1409/SBT Fisheries/Japan).

Fig. 3 shows monthly catch distribution between the two fleets. The distribution patterns were very similar between two fleets except for March when Korean catch was larger in area 9 than that by Japanese fleet. Korea fleet had relatively higher catch during 1995-2002 than other years, but its catch was reduced thereafter due to applying TAC along with becoming a member of the CCSBT. Both fleets operated mainly in

area 9 from April to June, started to move eastward to area 8 in July, operated in both of area 8 and 9 from July to September, and operated mainly in area 8 from October to December. There were few operations in January and February.

3.2. Catch-at-age

Catch-at-age by year was analyzed for areas 8 and 9 which were main fishing grounds for both fleets. The monthly data, July to September for area 8 and April to September for area 9, were used in this comparison.

Figs. 4 and 5 show catch-at-age by year in area 9 and area 8, respectively. As for area 9, it showed good agreements after 2002, of which those of 2004, 2007, 2009 and 2010 were very good. As for area 8, generally there are some differences between two fleets except 2002, 2012 and 2013 when good agreements were observed.

3.3. Nominal CPUE

The nominal CPUE by month was calculated for areas 8 and 9. Figs. 6 and 7 show the nominal CPUE by month in area 9 and area 8, respectively. It indicates good agreements in months 5, 6 and 7 for area 9 and months 7, 9, 10 and 11 for area 8. There were differences between two fleets in other months, which have small data in some years. Therefore, months 5-7 (May-July) in area 9 and months 7-11 (July-November) in area 8 were chosen to use for standardizing CPUE for each area. Figs. 8 and 9 show the CPUE trends for these month/area combinations.
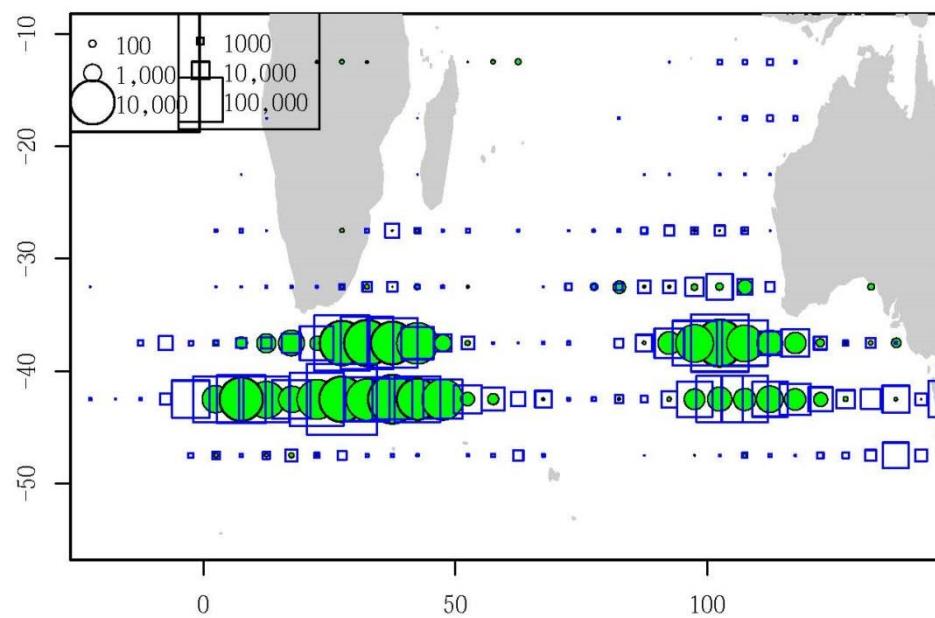
Fig. 1. Geographical distribution of total SBT catch (in number) of Korean and Japanese longliners by 5×5 degrees, 1991-2013. Circle and square are for Korean and Japanese ones, respectively.
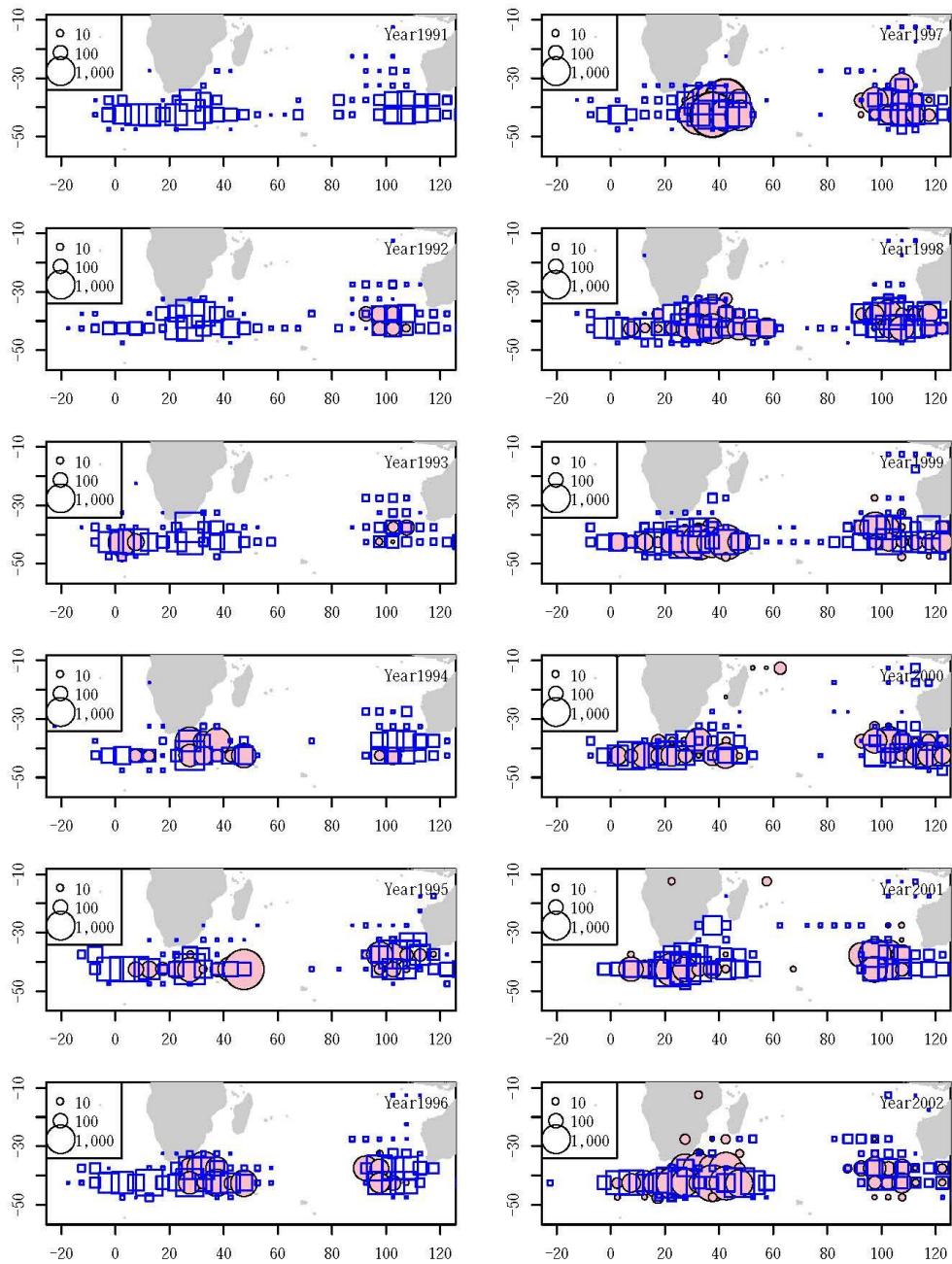
KR N.SBT

Fig. 2. Annually geographical distribution of SBT catch (in number) of Korean and Japanese longliners by 5×5 degrees, 1991-2013. Circle and square are for Korean and Japanese ones, respectively.

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Fig. 2. Continued.

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1991-2011 Green circle:Korean catch, Blue square: Japanese catch
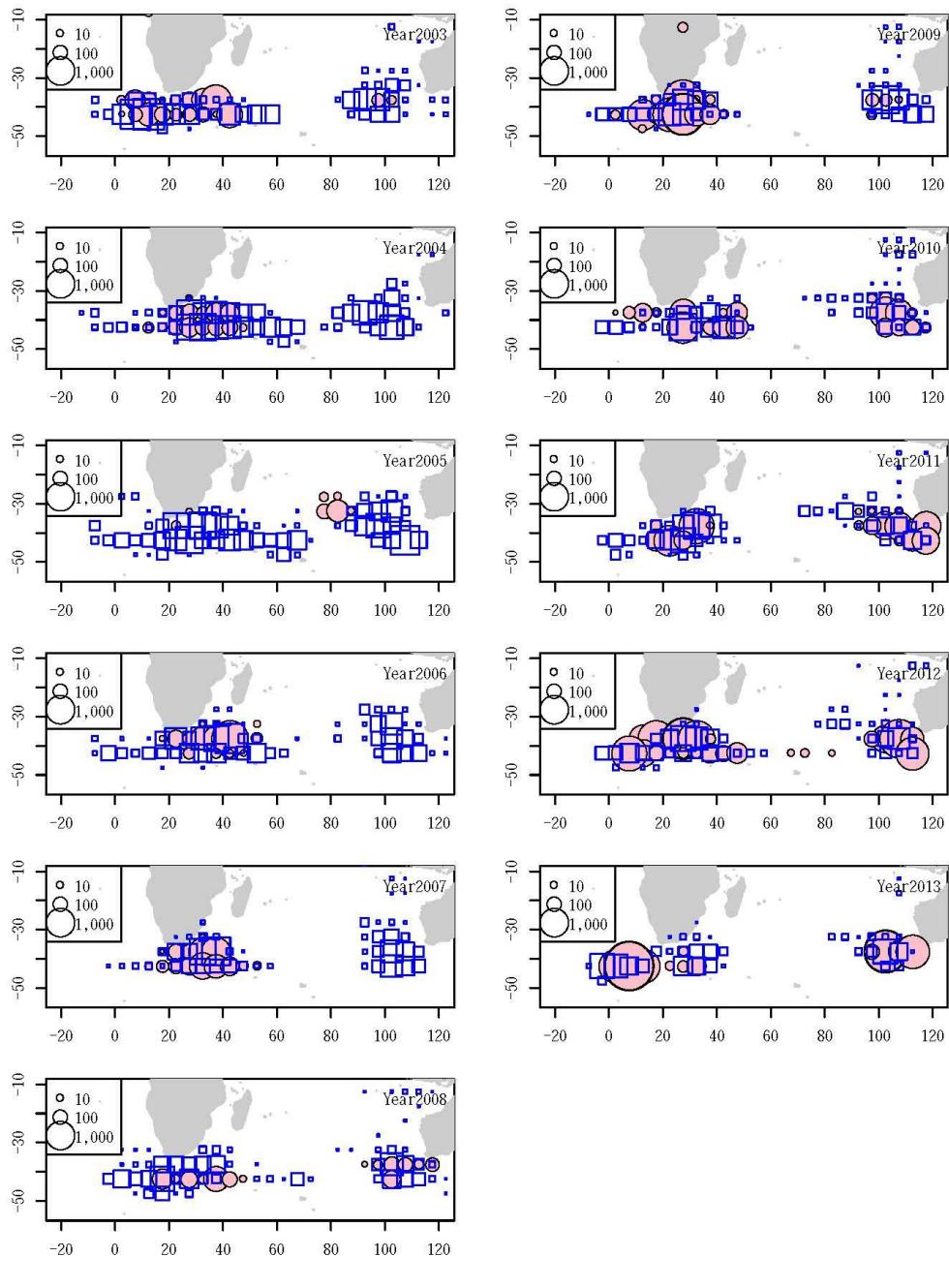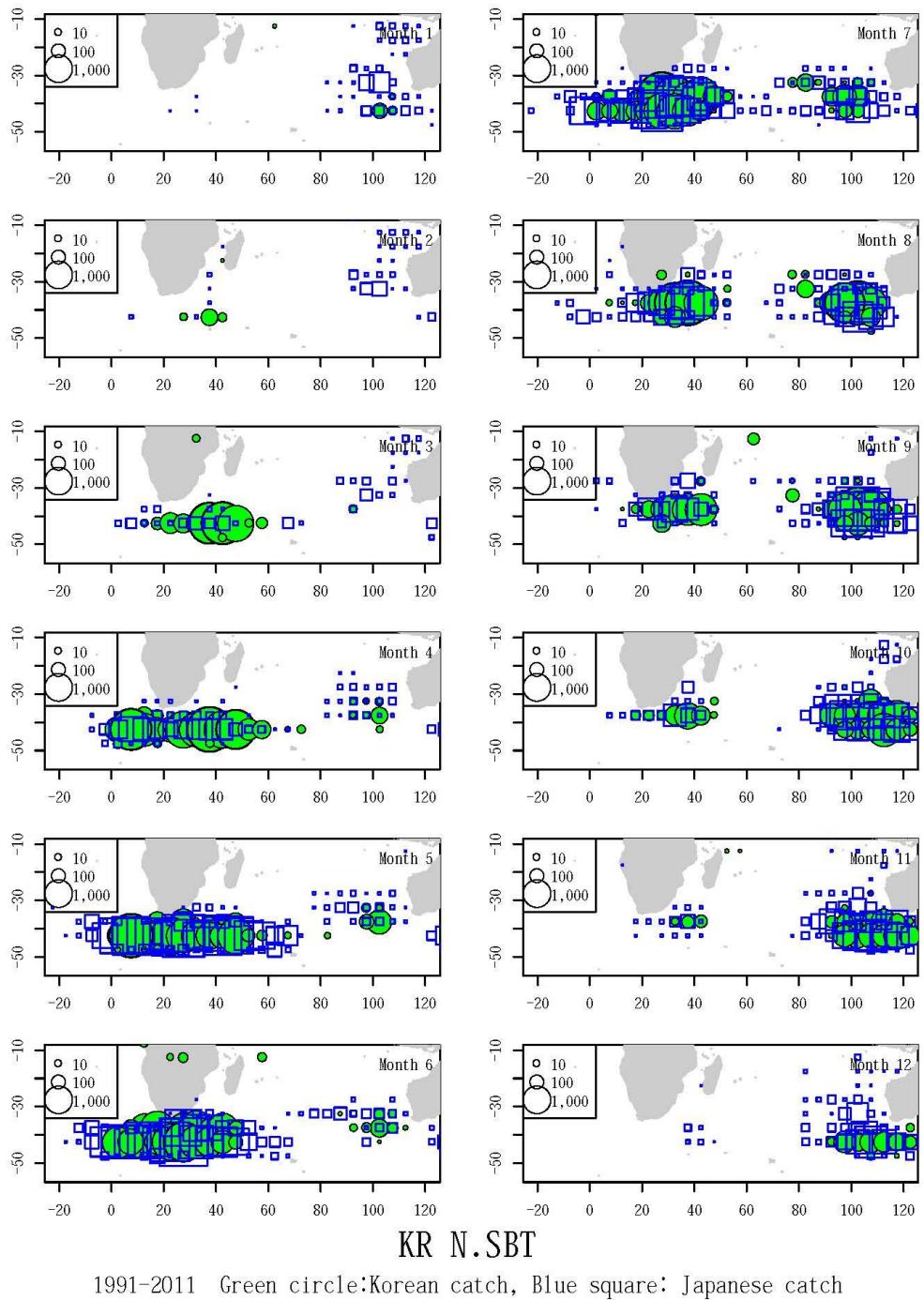
Fig. 3. Monthly geographical distribution of SBT catch (in number) of Korean and Japanese longliners by 5×5 degrees, 1991-2013. Circle and square are for Korean and Japanese ones, respectively.
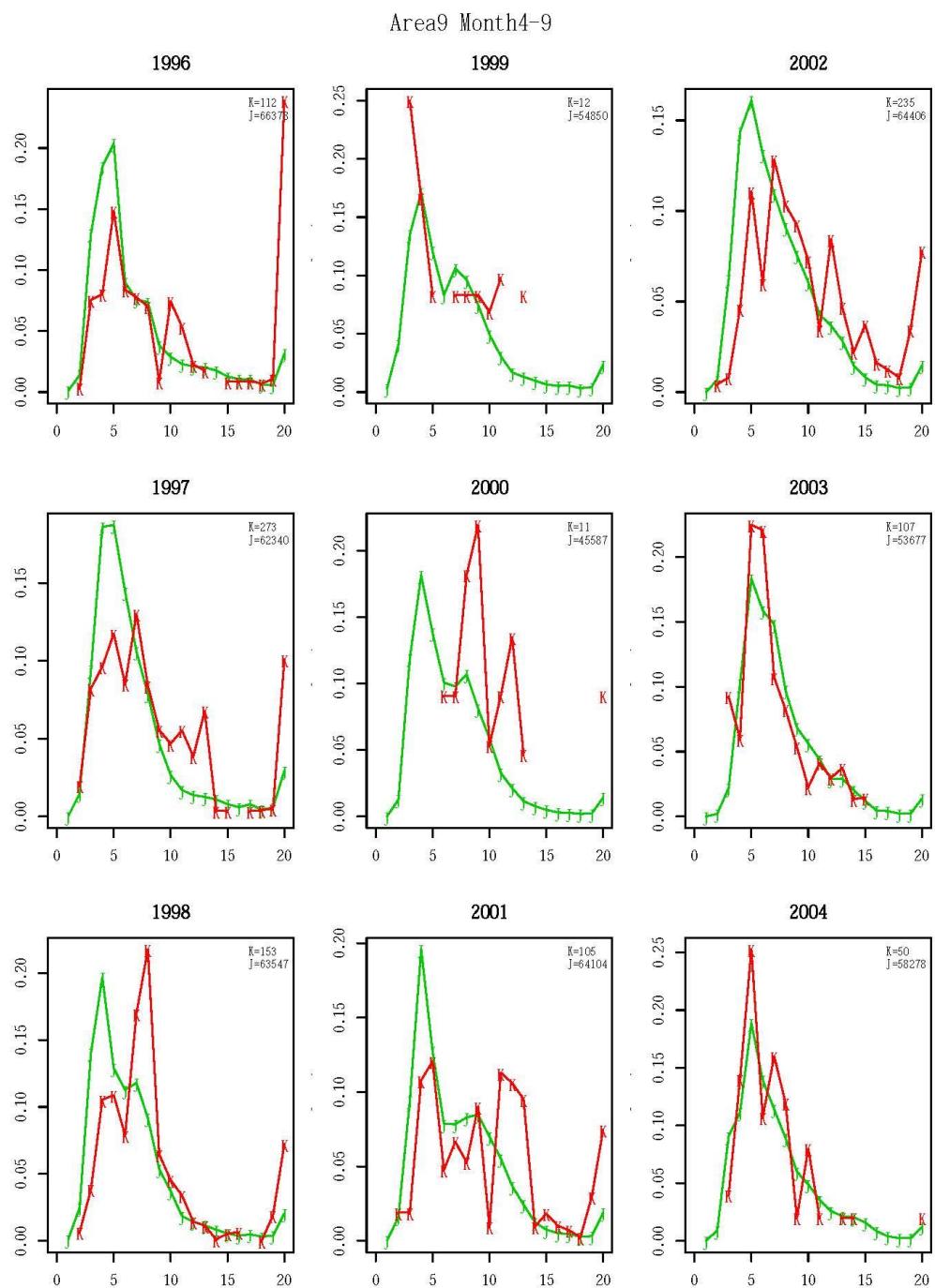
Fig. 4. Catch-at-age of SBT by year in Area 9 for months 4-9.
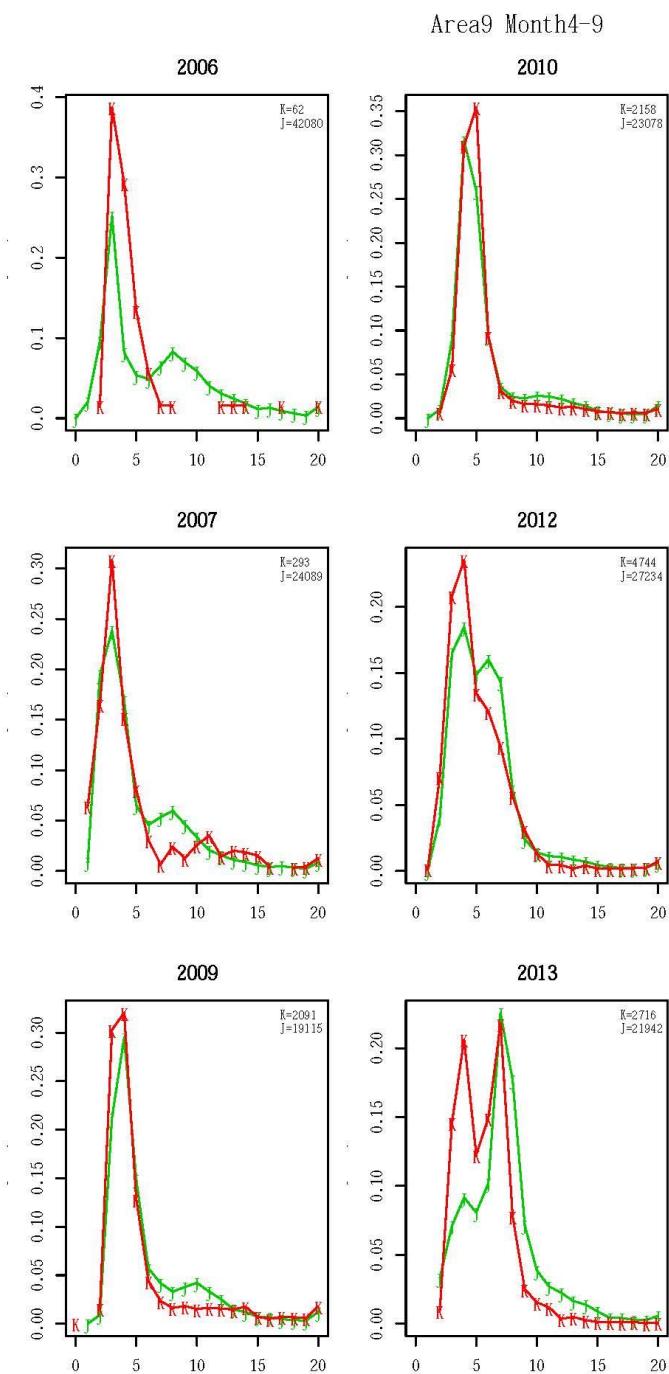
Fig. 4. Continued.
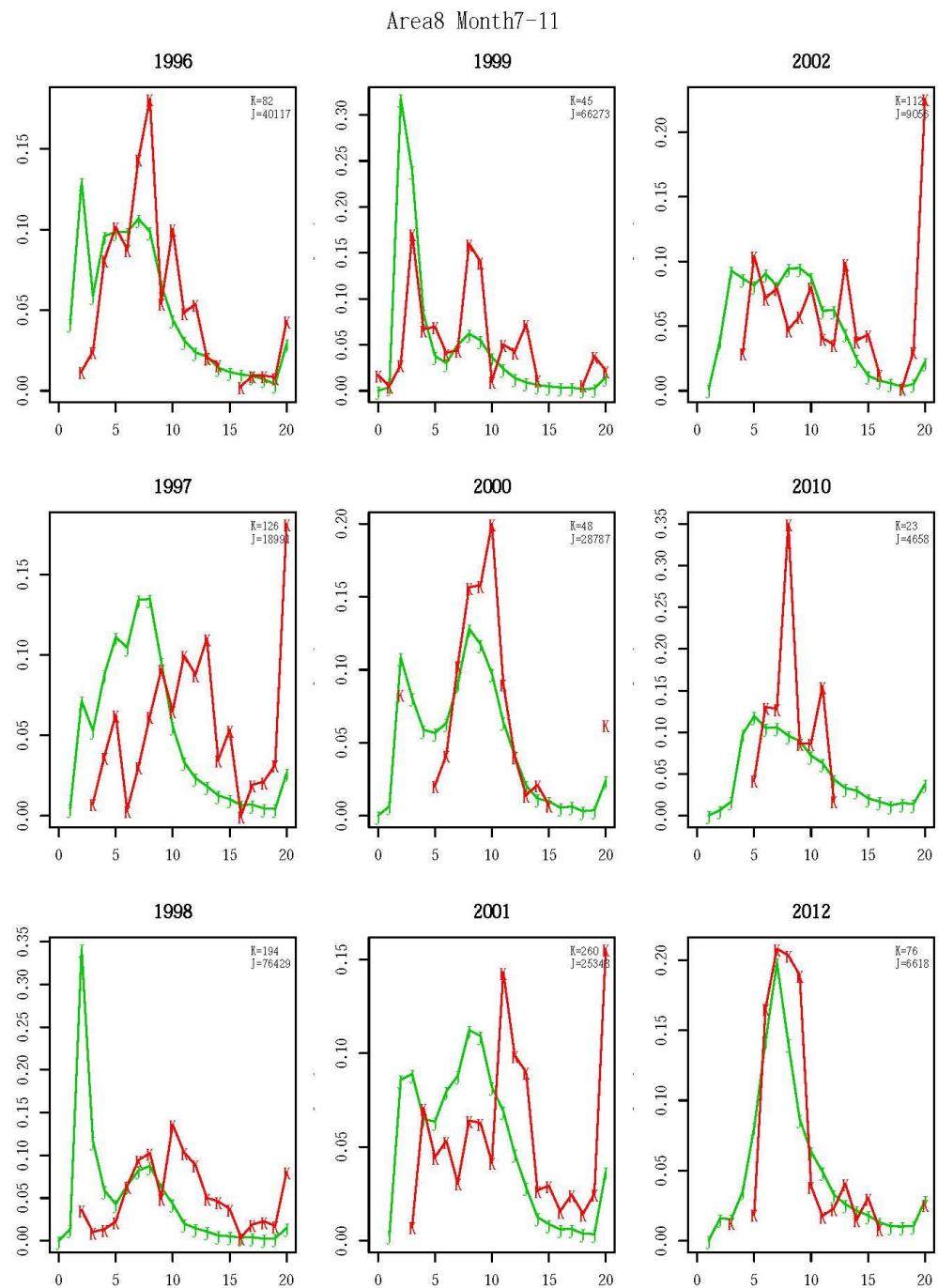
Fig. 5. Catch-at-age of SBT by year in Area 8 for months 7-11.
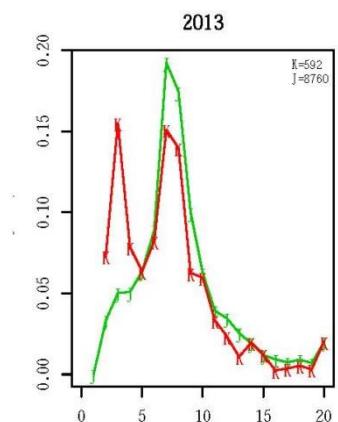
Fig. 5. Continued.
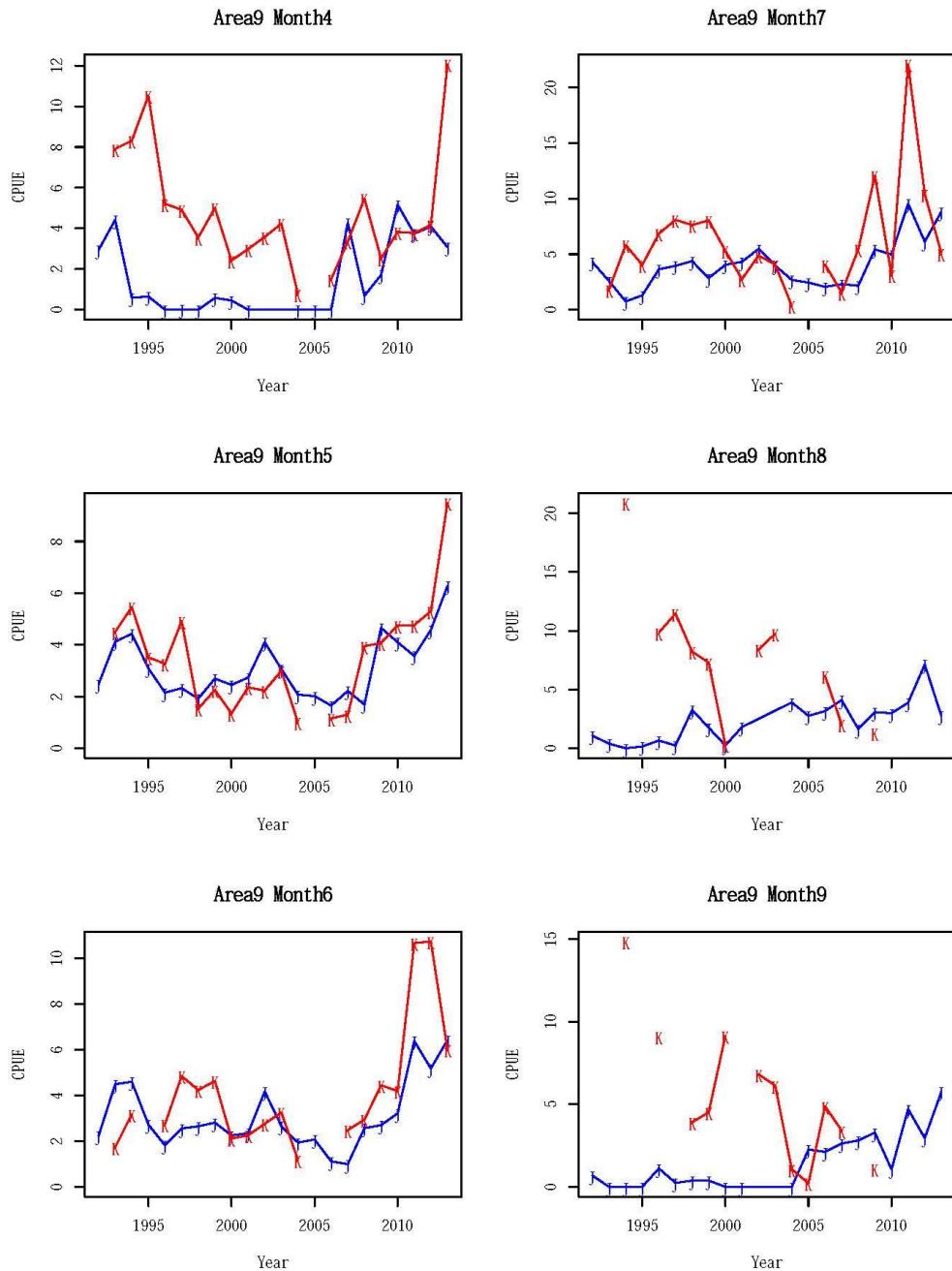
Fig. 6. Nominal CPUE for SBT by month in area 9.

Fig. 7. Nominal CPUE for SBT by month in area 8.
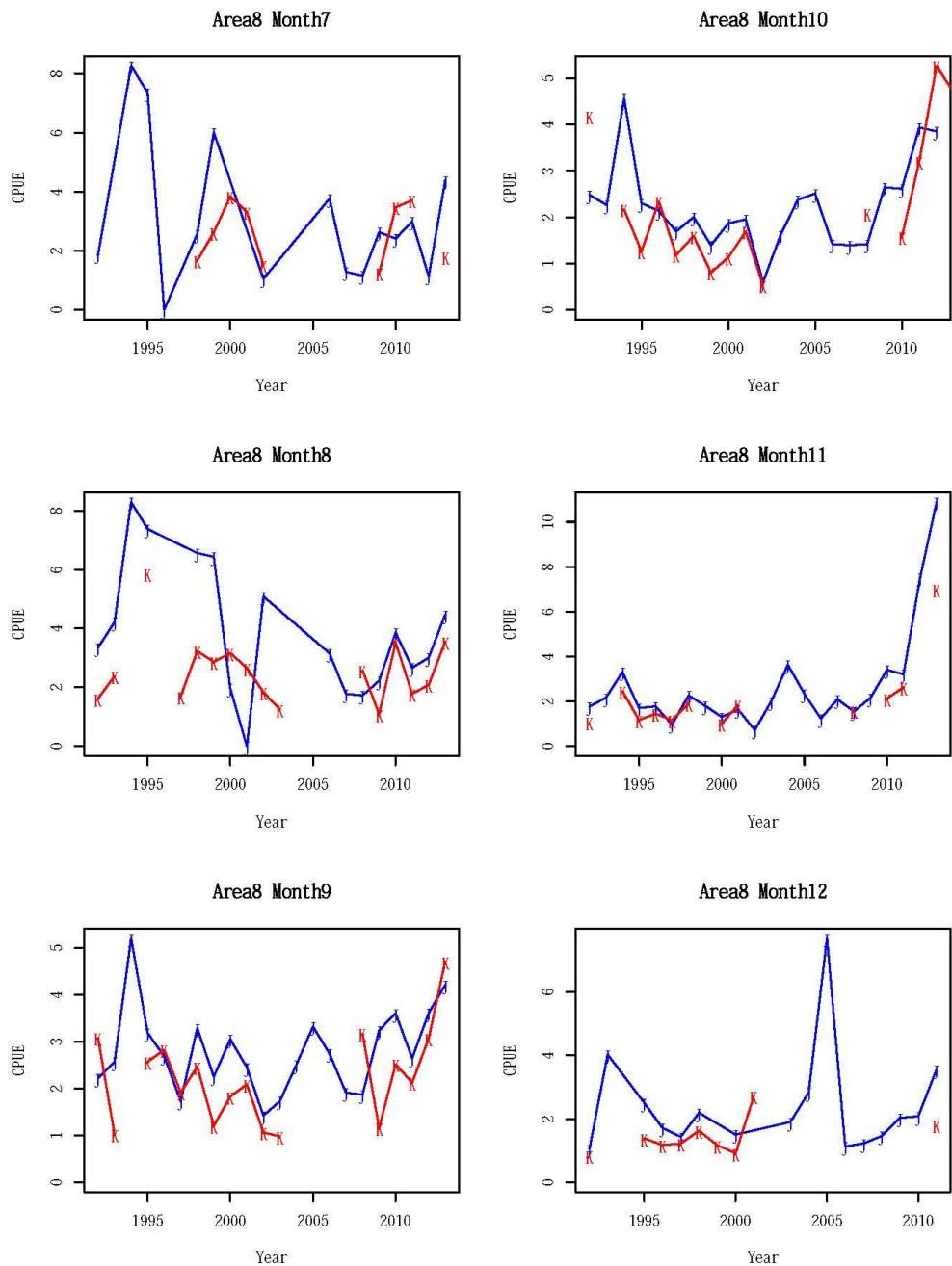
Area 9 Months 5-7
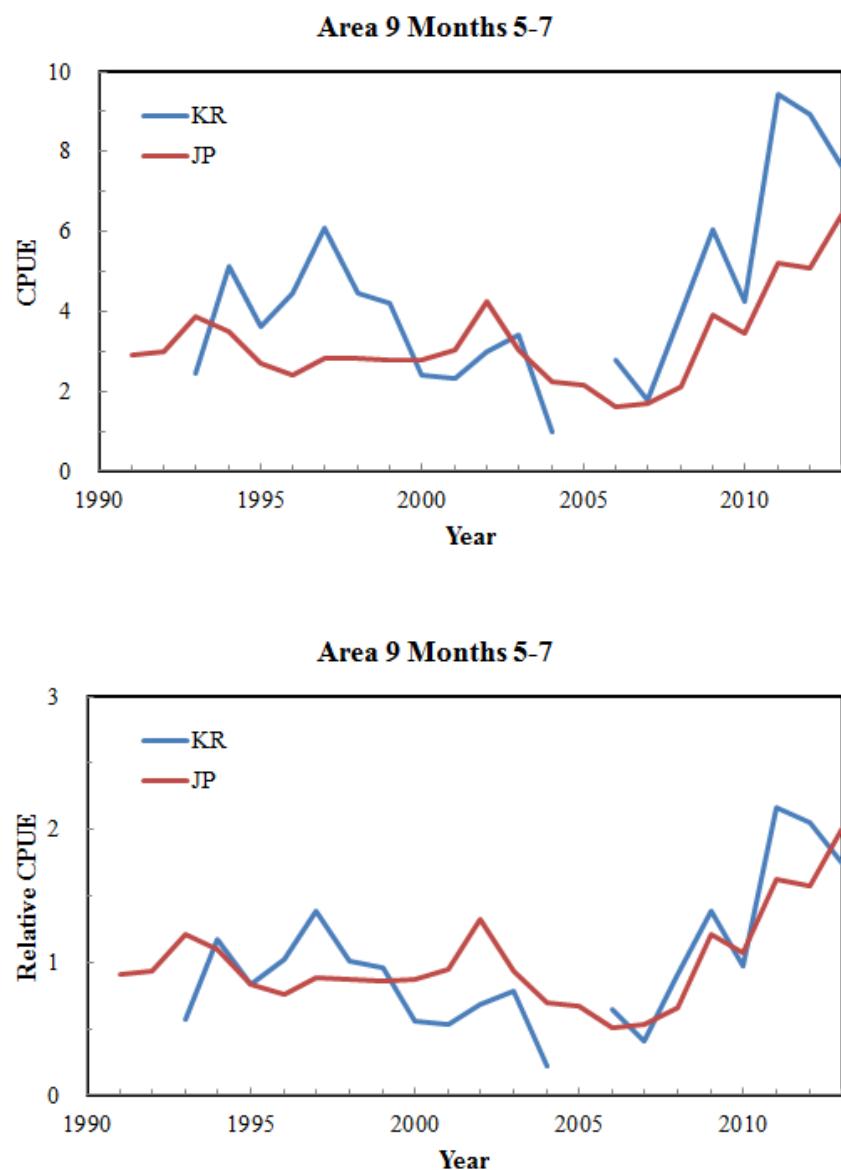
Area 9 Months 5-7

Fig. 8. Nominal CPUE in real and relative scales for SBT in area 9 for months 5-7.
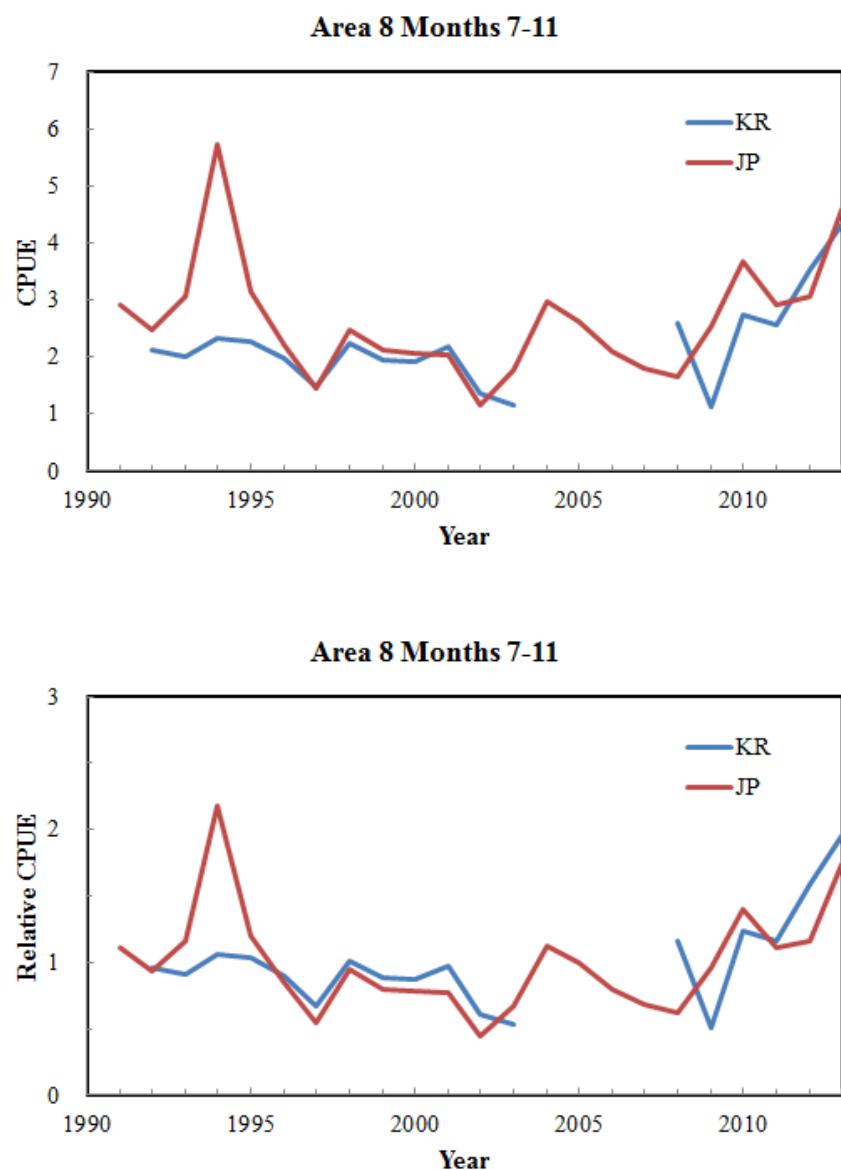
Fig. 9. Nominal CPUE in real and relative scales for SBT in area 8 for months 7-11.

Appendix

Figs. A1-4 show comparison of the nominal CPUE in time and area using revised Korean catch and effort data (see "CCSBT-ESC 1409/41" for detail information on its catch and effort data).

Fig. A1. Nominal CPUE for SBT by month in area 9.
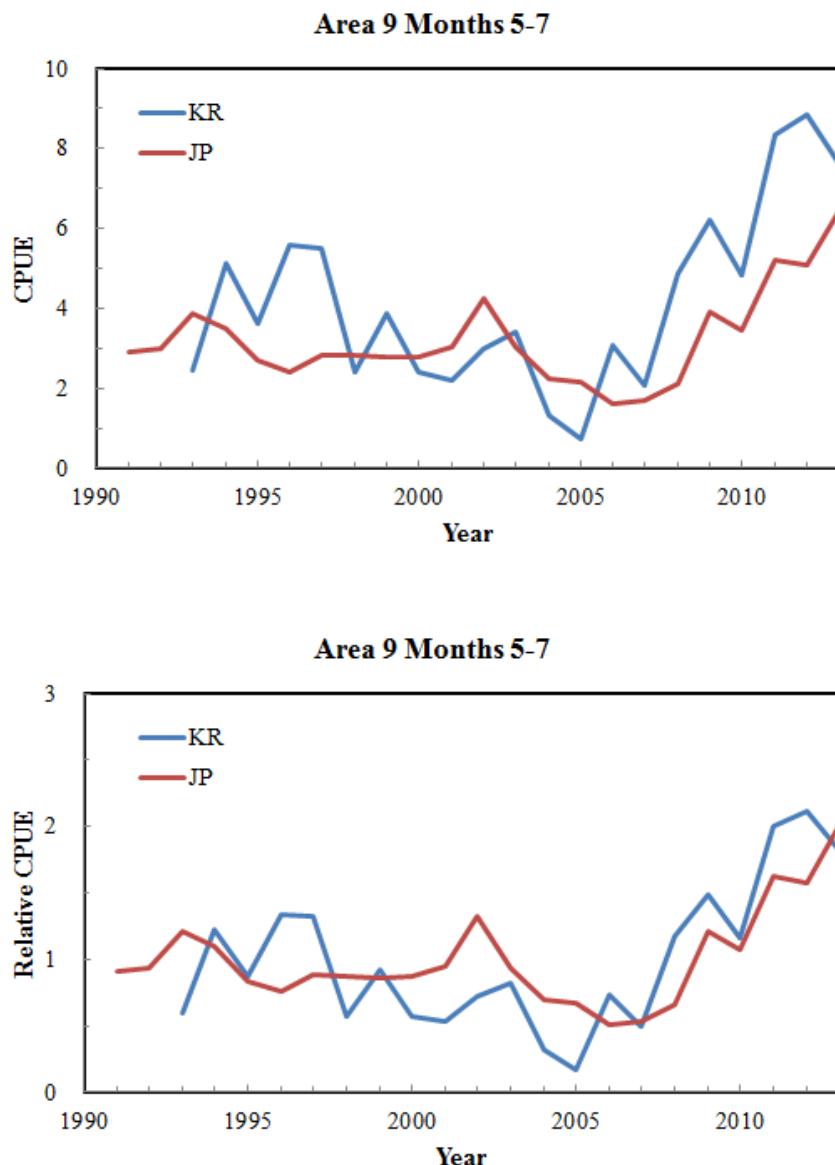
Fig. A2. Nominal CPUE in real and relative scales for SBT in area 9 for months 5-7.

Fig. A3. Nominal CPUE for SBT by month in area 8.

**Area 8 Months 7-11**

Area 8 Months 7-11

Fig. A4. Nominal CPUE in real and relative scales for SBT in area 8 for months 7-11.