

PRELIMINARY ANALYSIS OF CATCH PATTERN OF JAPANESE AND TAIWANESE LONGLINERS LAYING STRESS ON SWORDFISH

by

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INTRODUCTION

Swordfish catch amount in the Indian Ocean increased drastically from 5,000 tons in the end of 1980's to more than 25,000 tons in the end of 1990's. Majority of increased catches in 1990's were attained by Taiwanese longliners, whose detailed information for the stock assessment is not available in the IOTC billfish working group. This study was done to evaluate the quality of data of Taiwanese longliners which is currently available for IOTC (monthly and 5 by 5 degrees aggregated catch and effort data).

MATERIALS AND METHODS

Catch (in weight) and effort statistics, which was aggregated by month, 5-degree square of Japanese longliners and Taiwanese longliners (1980 – 1999) were used in the analysis. Data for Japanese longliners was aggregated and compiled by National Research Institute of Far Seas Fisheries, and data of Taiwanese longliners was obtained by IOTC database.

RESULTS

Figures 1-4 shows distribution of 5 years average CPUE by quarter of swordfish caught by Japanese and Taiwanese longliners in the periods of 1980-84, 1985-89, 1990-94, and 1995-99. Before 1990, higher values of CPUE were observed in Arabian Sea, central parts of the northwest Indian Ocean, off west coast of Australia, and off South Africa and Madagascar. In these areas, average values of CPUE of Japanese longliners were generally

higher than those of Taiwanese longliners. Seasonal changes of distribution pattern of swordfish CPUE were roughly same between two fleets.

In 1990-94, quite high values of CPUE were observed in same blocks, especially in the southwest Indian Ocean, for Taiwanese longliners, which was contrasted to quite low values of CPUE in other blocks. In 1995-99, number of blocks with high CPUE values increased drastically for Taiwanese longliners, and CPUE values in other blocks were increased suddenly. In the periods between 1990-99, distribution pattern of CPUE of Japanese longliners did not change so much from those in 1980-89.

Figures 5-8 shows the distributions of five years average catch amount by species and by quarter of Taiwanese longliners in the periods of 1980-84, 1985-89, 1990-94, and 1995-99. Before 1990, Taiwanese longliners caught albacore in south Indian Ocean, bigeye tuna in the tropical area in the north Indian and yellowfin tuna in the subtropical area in the north Indian. Amounts of swordfish catch were minor in most fishing areas of Taiwanese longliners in these periods.

In the period of 1990-94, swordfish catch occupied major parts of total catch of Taiwanese longliners in the southwest Indian Ocean, particularly in 3rd and 4th quarters, and this phenomena became more evident in the period of 1995-99. Catch amount of swordfish in the southwest Indian increased drastically from the period before 1995. In the period of 1995-99, swordfish catches appeared in not minor scale in areas other than the

southwest Indian Ocean. In 3rd quarter in 1995-99, majority of catches of Taiwanese longliners were obtained in the southwest Indian.

DISCUSSIONS

Observed drastic increases of CPUE, catch amount and ratio to the total catch of swordfish caught by Taiwanese longliners in the southwest Indian Ocean in 1990's clearly indicated the change of target species of Taiwanese longliners from albacore to swordfish. This indicates that swordfish CPUE of Taiwanese longliners cannot be standardized properly without information of target species or operation pattern.

Sudden increases of Swordfish CPUE of Taiwanese were observed in almost all areas in the Indian in 1995-99, and in the periods of 1990-94, sudden decrease of swordfish

CPUE of Taiwanese longliners occurred in most of area except for some blocks where high swordfish CPUE observed. Distribution pattern of Swordfish CPUE of Japanese longliners did not changed so much in the periods analyzed. These "unnatural" up and down of swordfish CPUE of Taiwanese longliners are seemed to be explained only by the unusual natural events, or drastic changes of operation pattern of Taiwanese longliners, or human artifacts. Distribution pattern of Swordfish CPUE of Japanese longliners did not indicates any sign of unusual natural events. Further investigations should be necessary for data of Taiwanese longliners before analyzing swordfish CPUE of Taiwanese longliners.

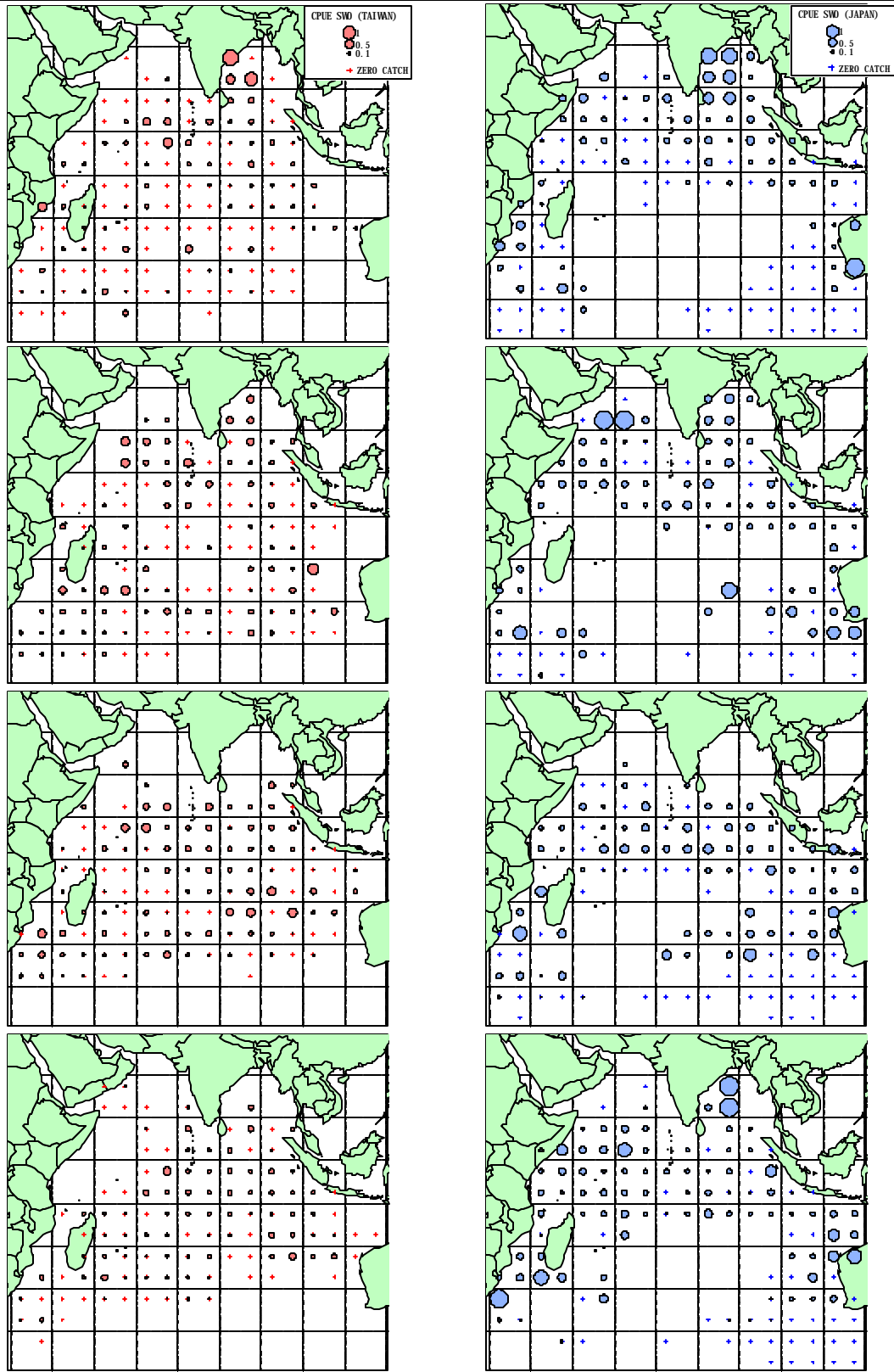


Fig. 1. Distribution of 5 years average CPUE (1980-1984) by quarter of swordfish caught by Japanese (right column) and Taiwanese (left column) longliners. First top panels shows the ones for 1st quarter, 2nd top for 2nd quarter, 3rd top for 3rd quarter and bottom for 4th quarter.

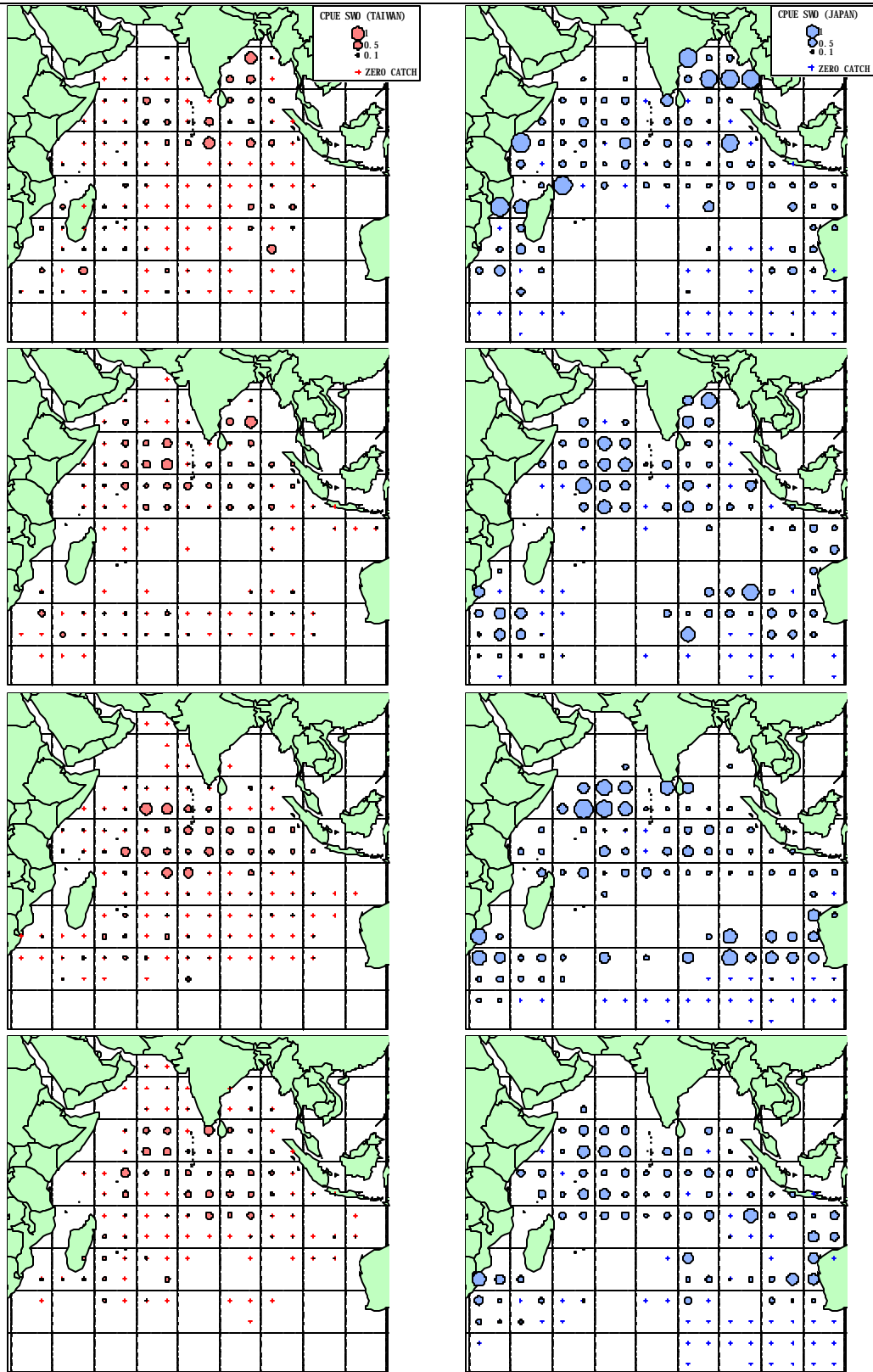


Fig. 2. Distribution of 5 years average CPUE (1985-1989) by quarter of swordfish caught by Japanese (right column) and Taiwanese (left column) longliners. First top panels shows the ones for 1st quarter, 2nd top for 2nd quarter, 3rd top for 3rd quarter and bottom for 4th quarter.

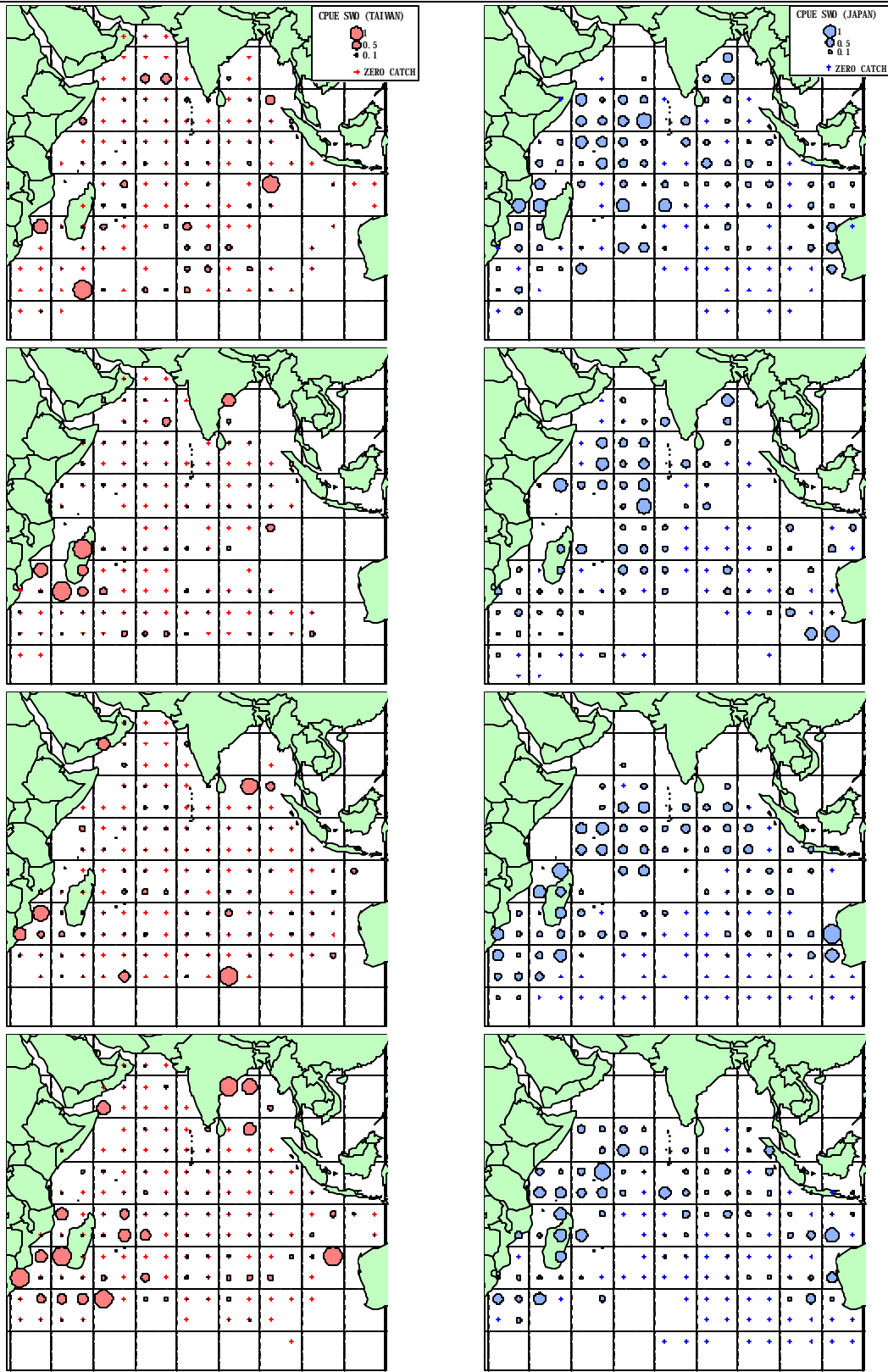


Fig. 3. Distribution of 5 years average CPUE (1990-1994) by quarter of swordfish caught by Japanese (right column) and Taiwanese (left column) longliners. First top panels shows the ones for 1st quarter, 2nd top for 2nd quarter, 3rd top for 3rd quarter and bottom for 4th quarter.

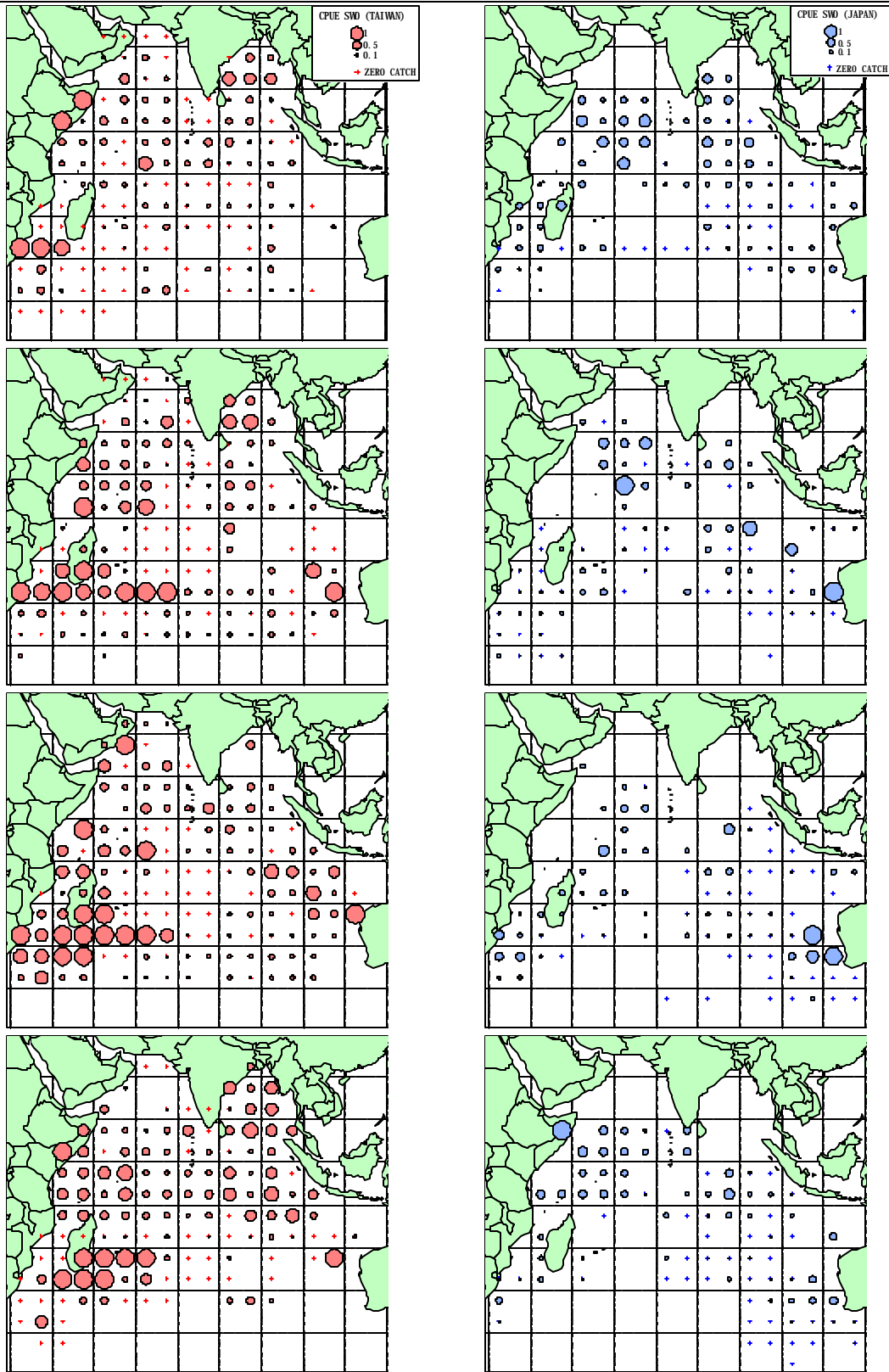


Fig. 4. Distribution of 5 years average CPUE (1995-1999) by quarter of swordfish caught by Japanese (right column) and Taiwanese (left column) longliners. First top panels shows the ones for 1st quarter, 2nd top for 2nd quarter, 3rd top for 3rd quarter and bottom for 4th quarter.

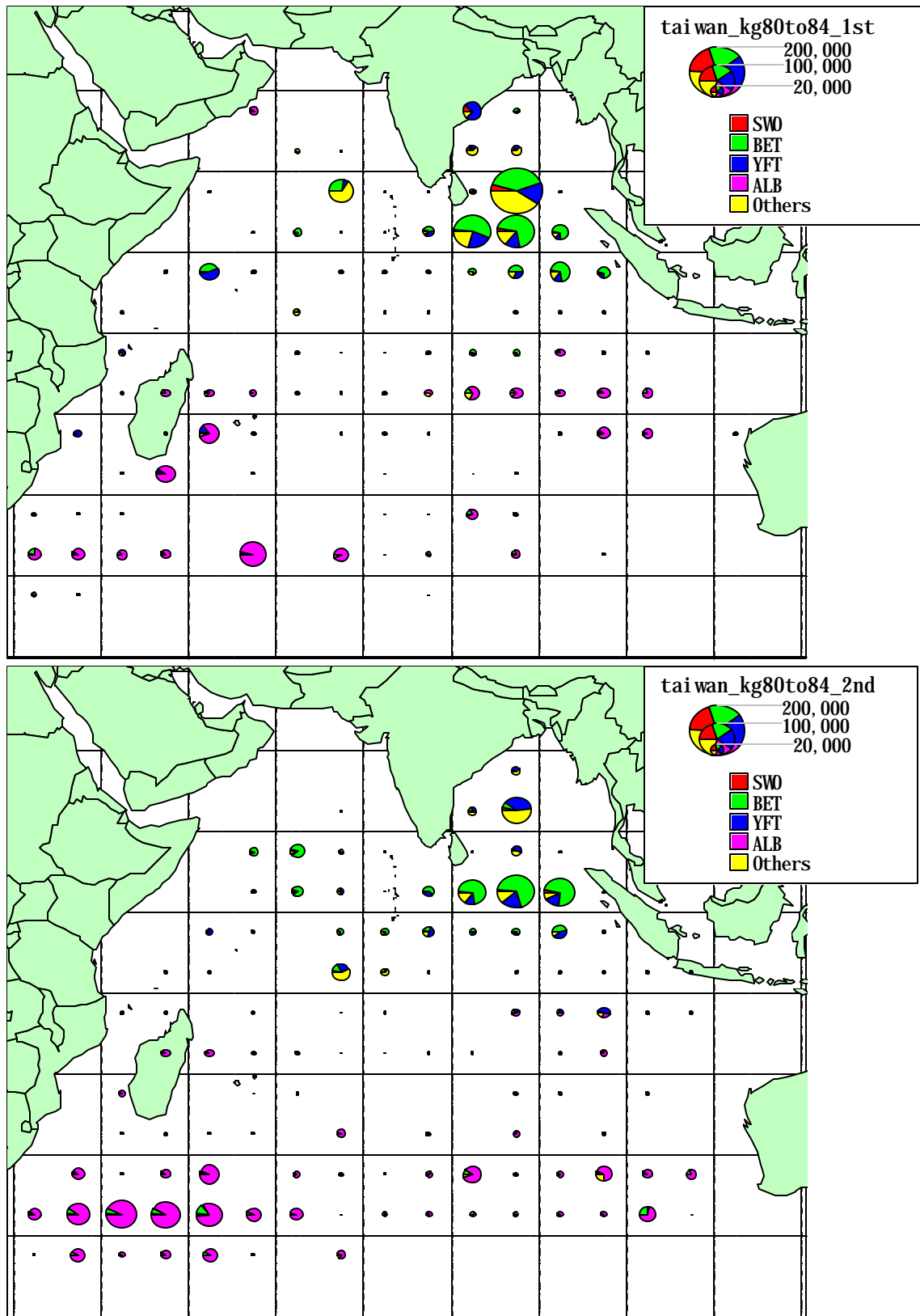


Fig. 5. Distribution of 5 years average catches (kg) of Taiwanese longliners by quarter and by species for the period between 1980 and 1984.

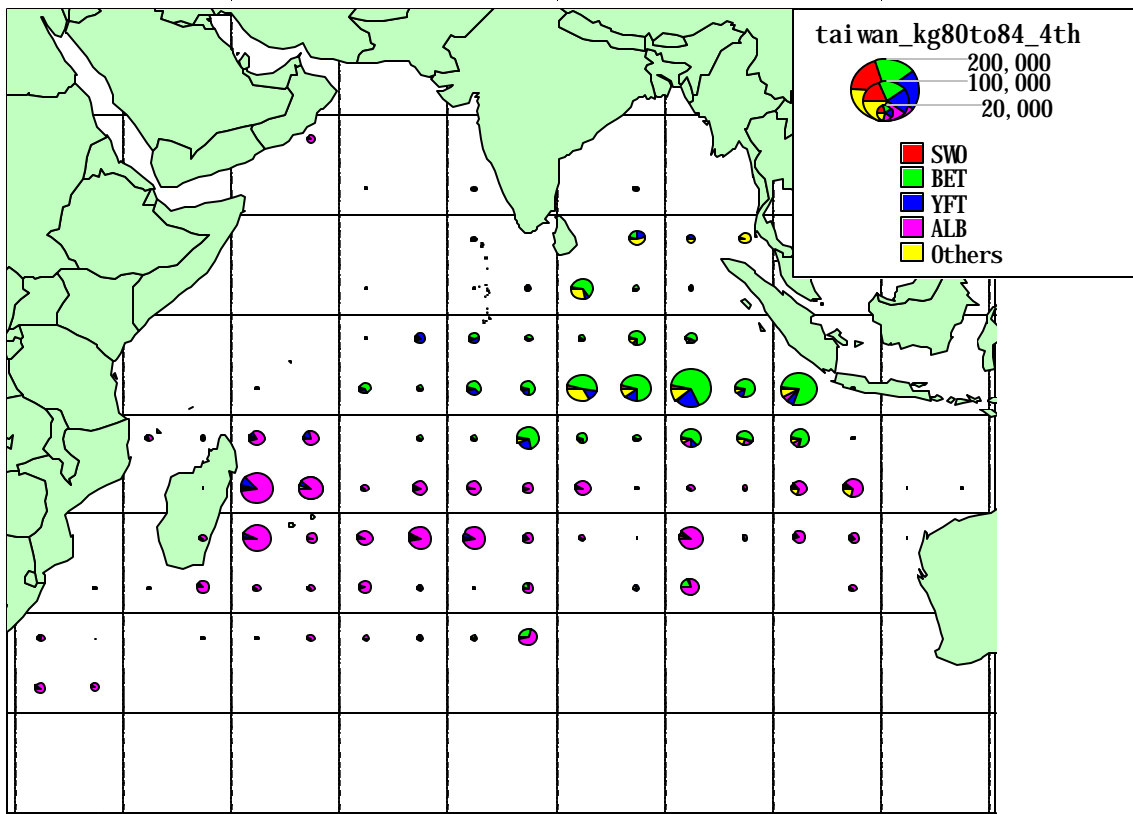
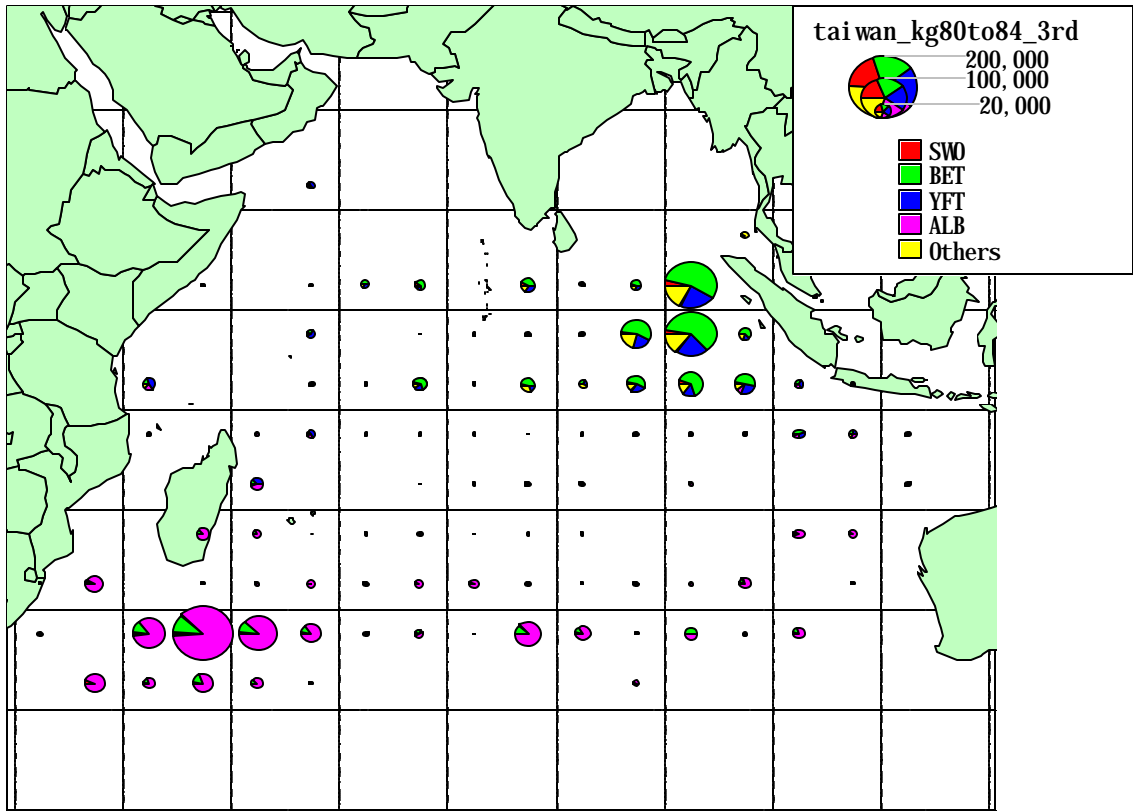


Fig. 5. Continued.

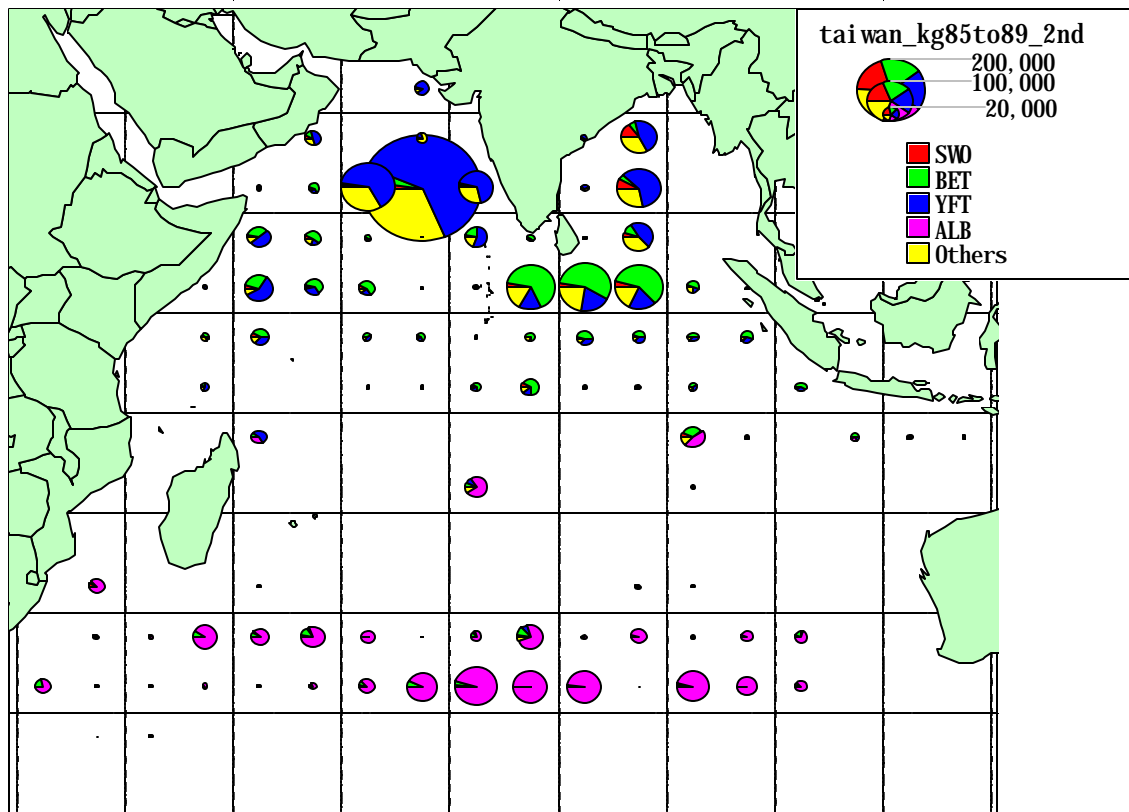
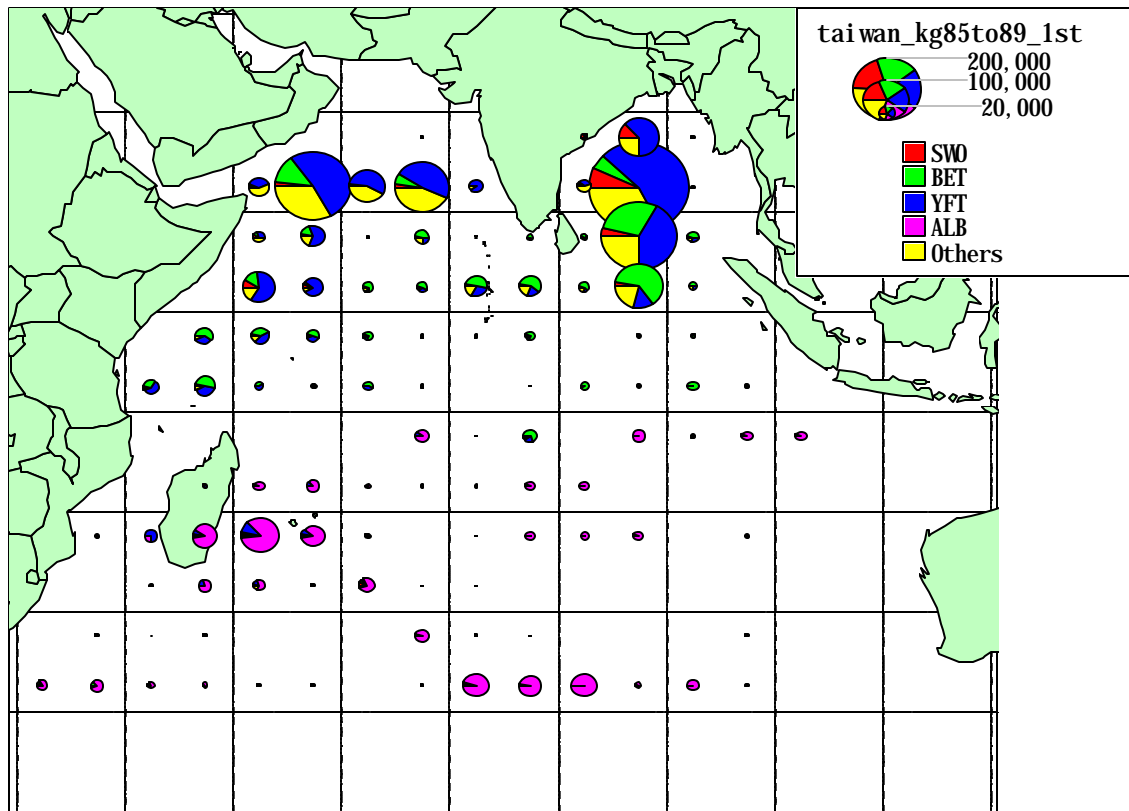


Fig. 6. Distribution of 5 years average catches (kg) of Taiwanese longliners by quarter and by species for the period between 1985 and 1989.

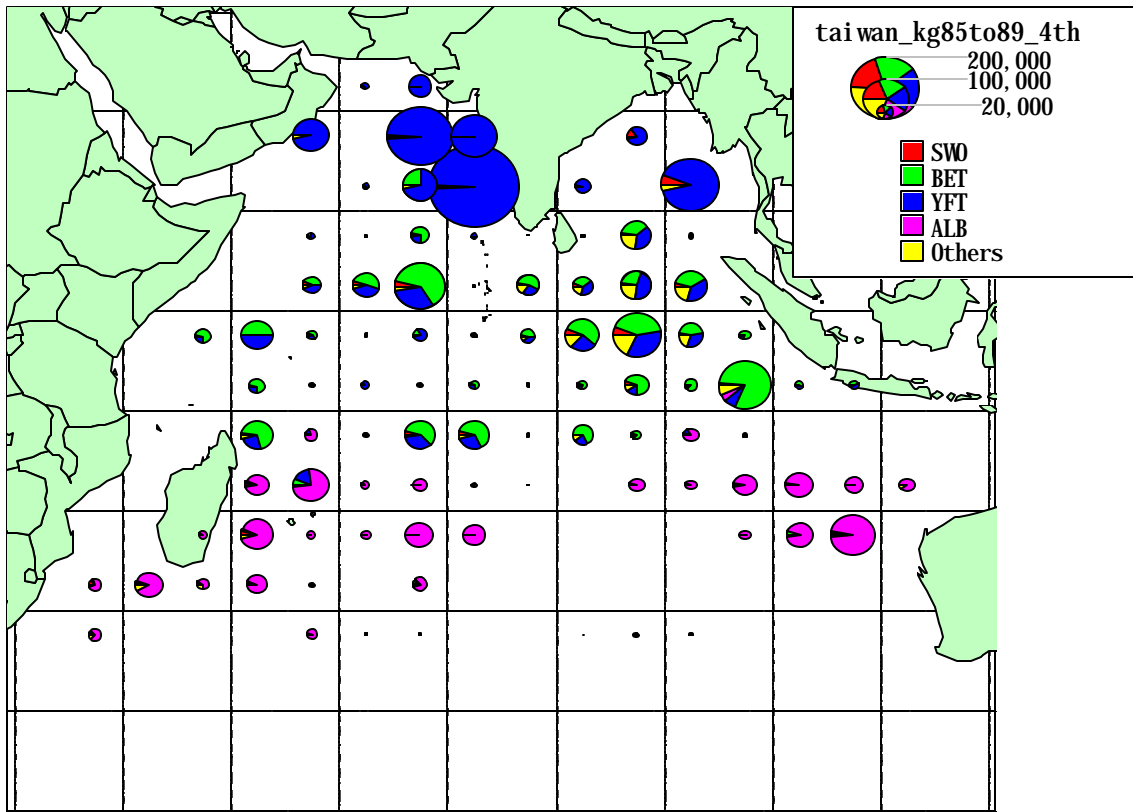
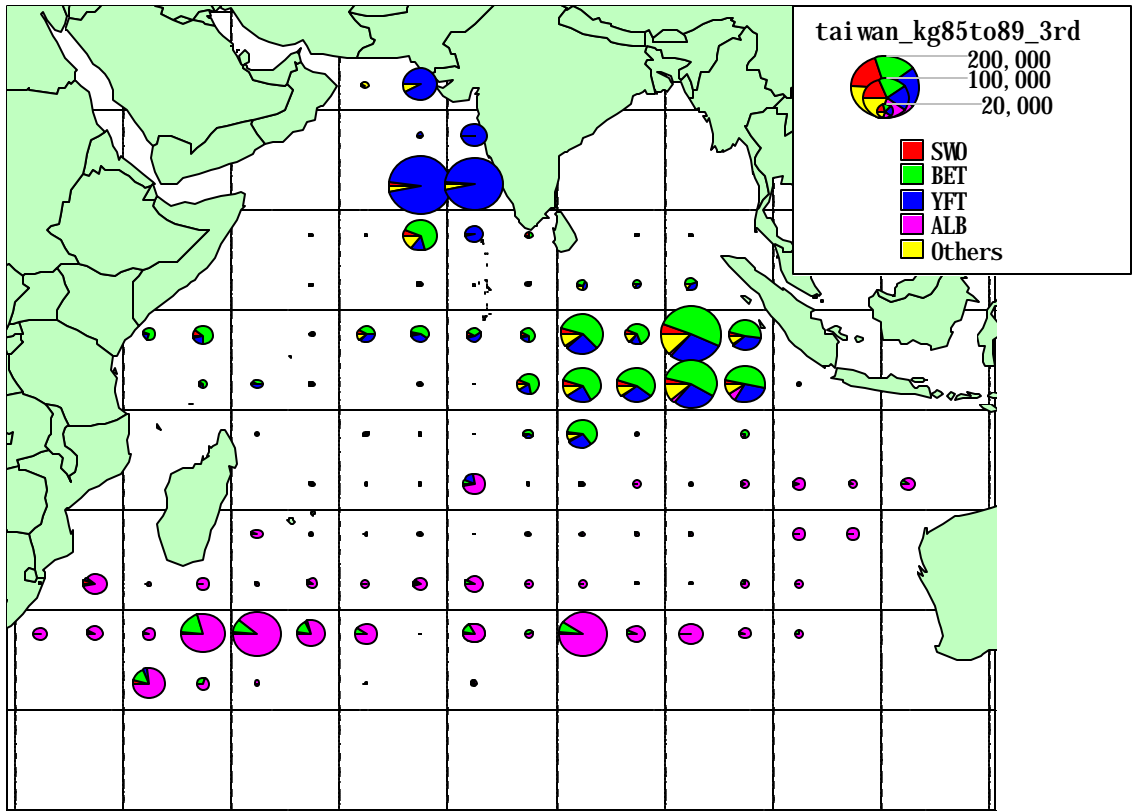


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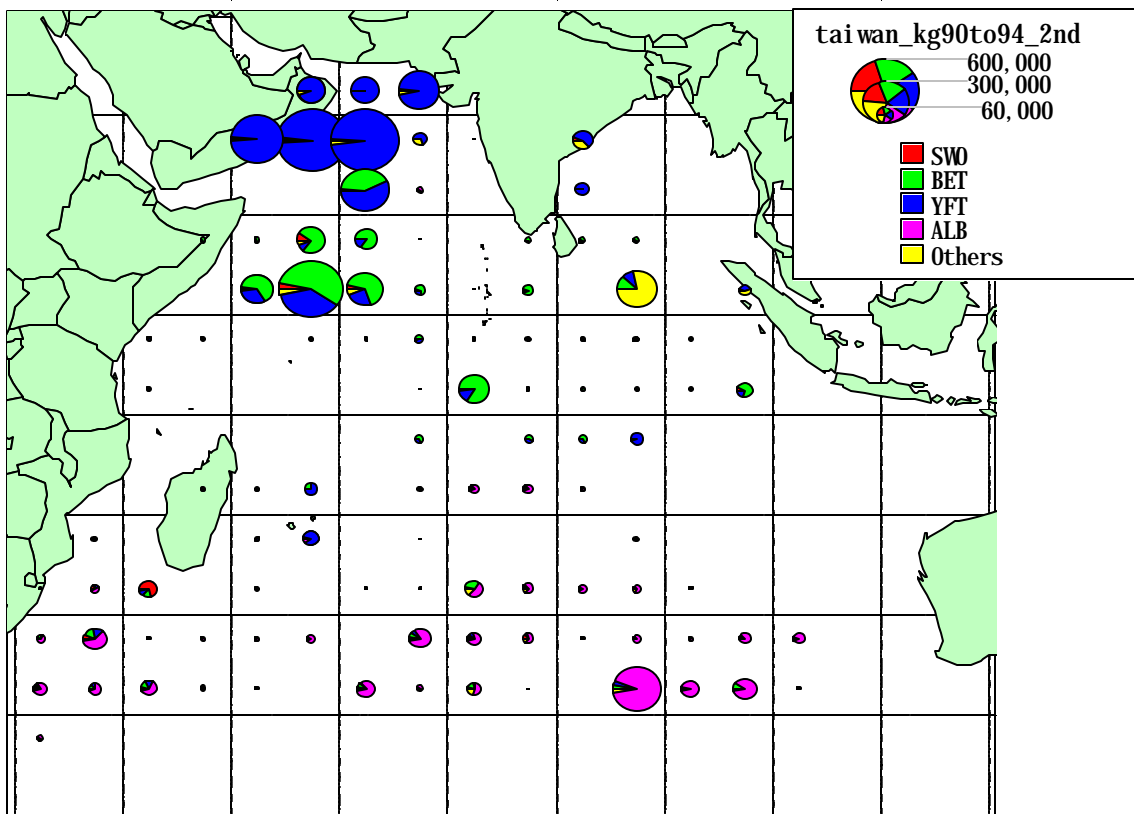
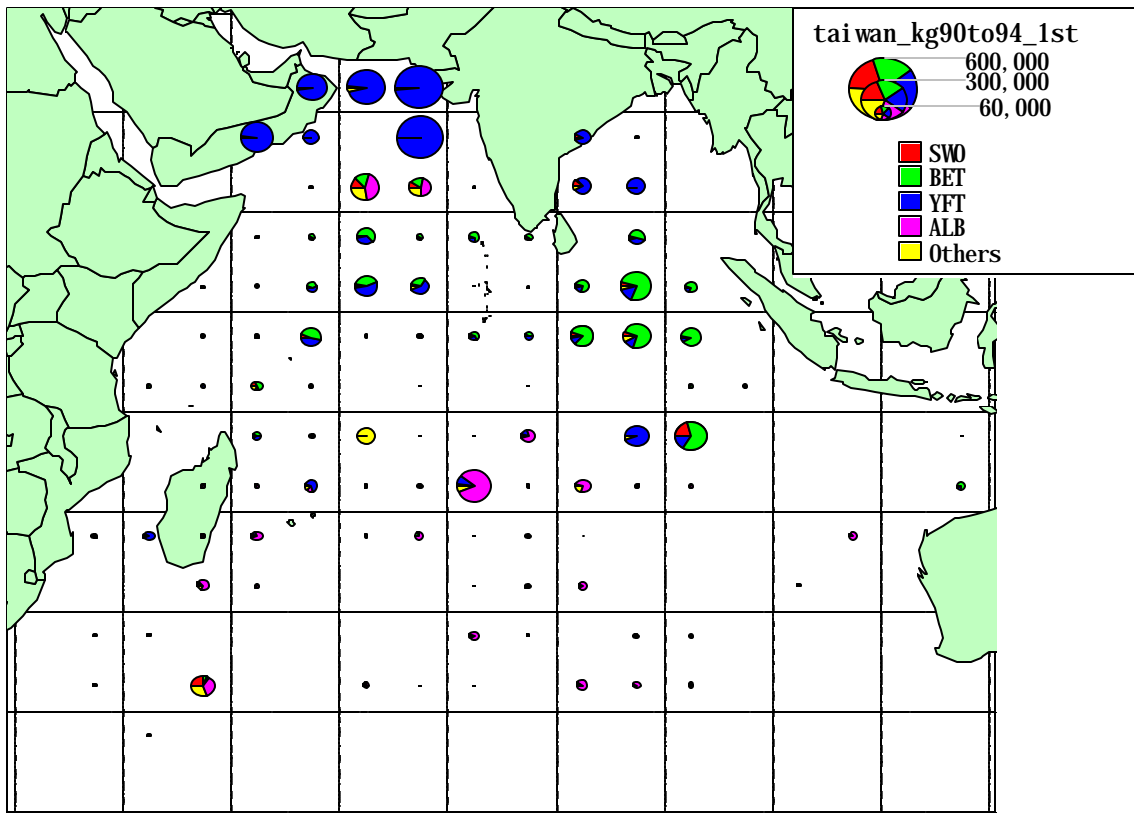


Fig. 7. Distribution of 5 years average catches (kg) of Taiwanese longliners by quarter and by species for the period between 1990 and 1994.

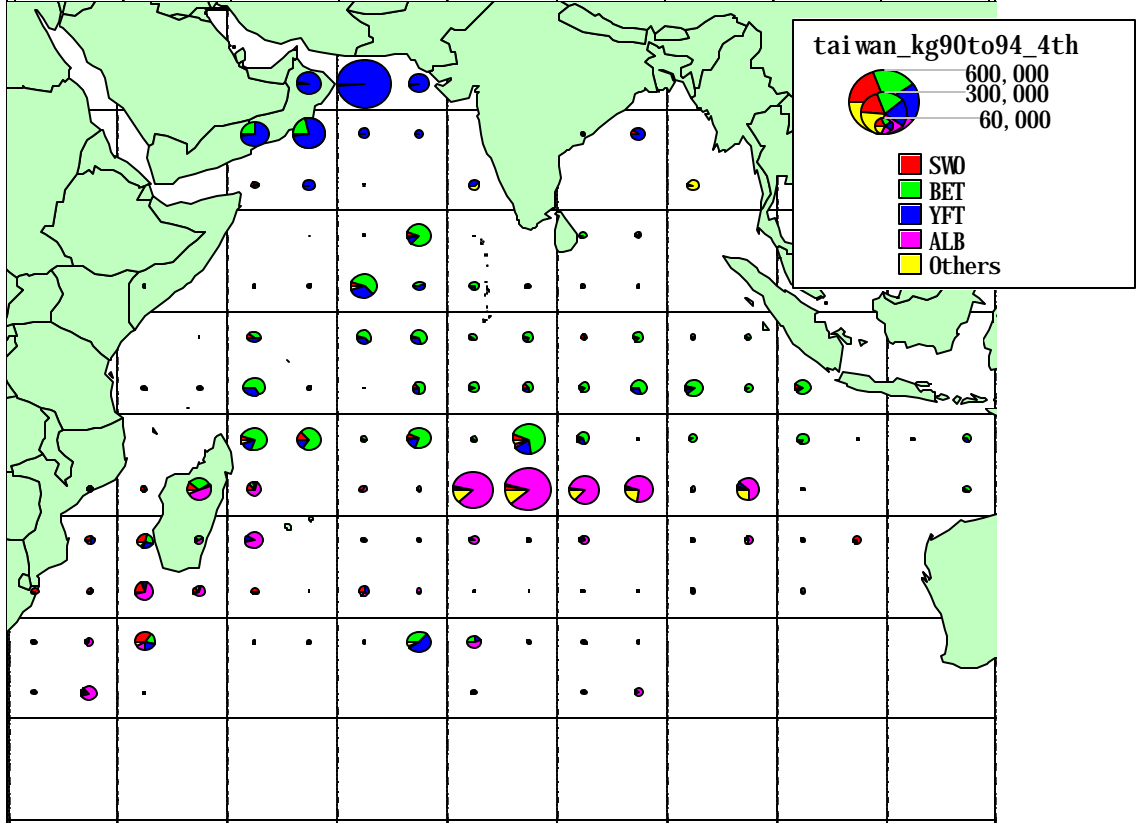
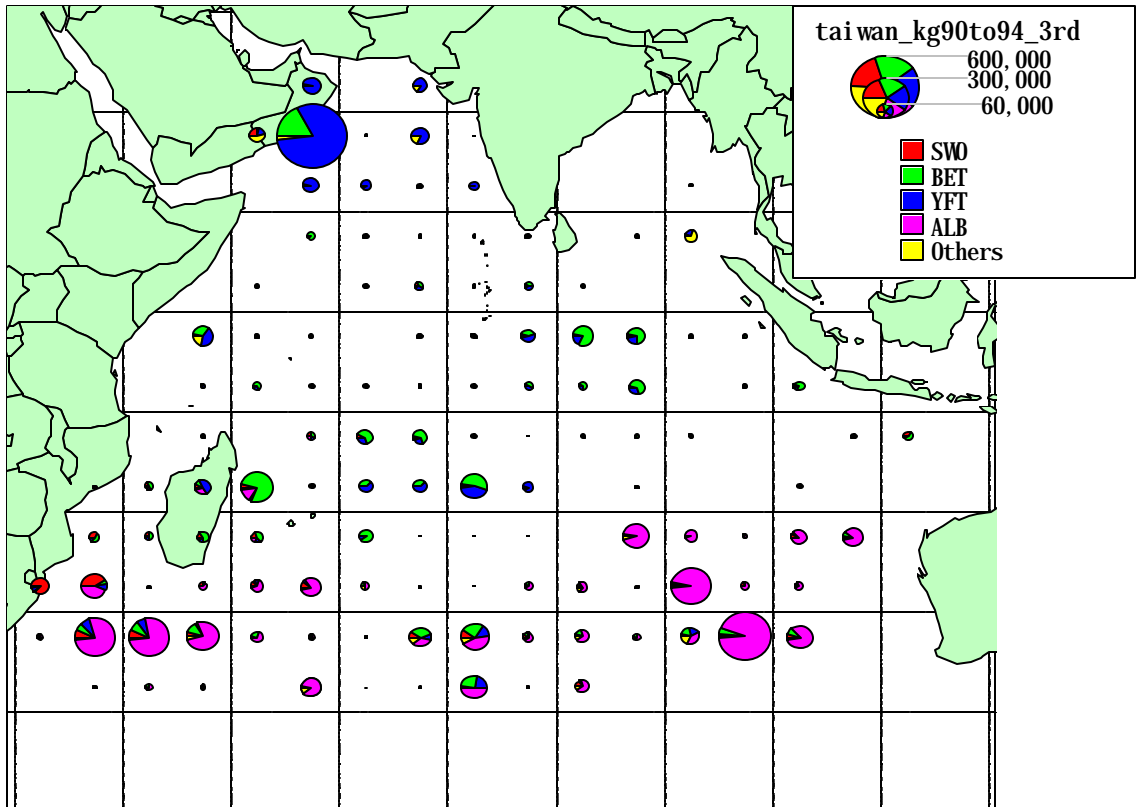


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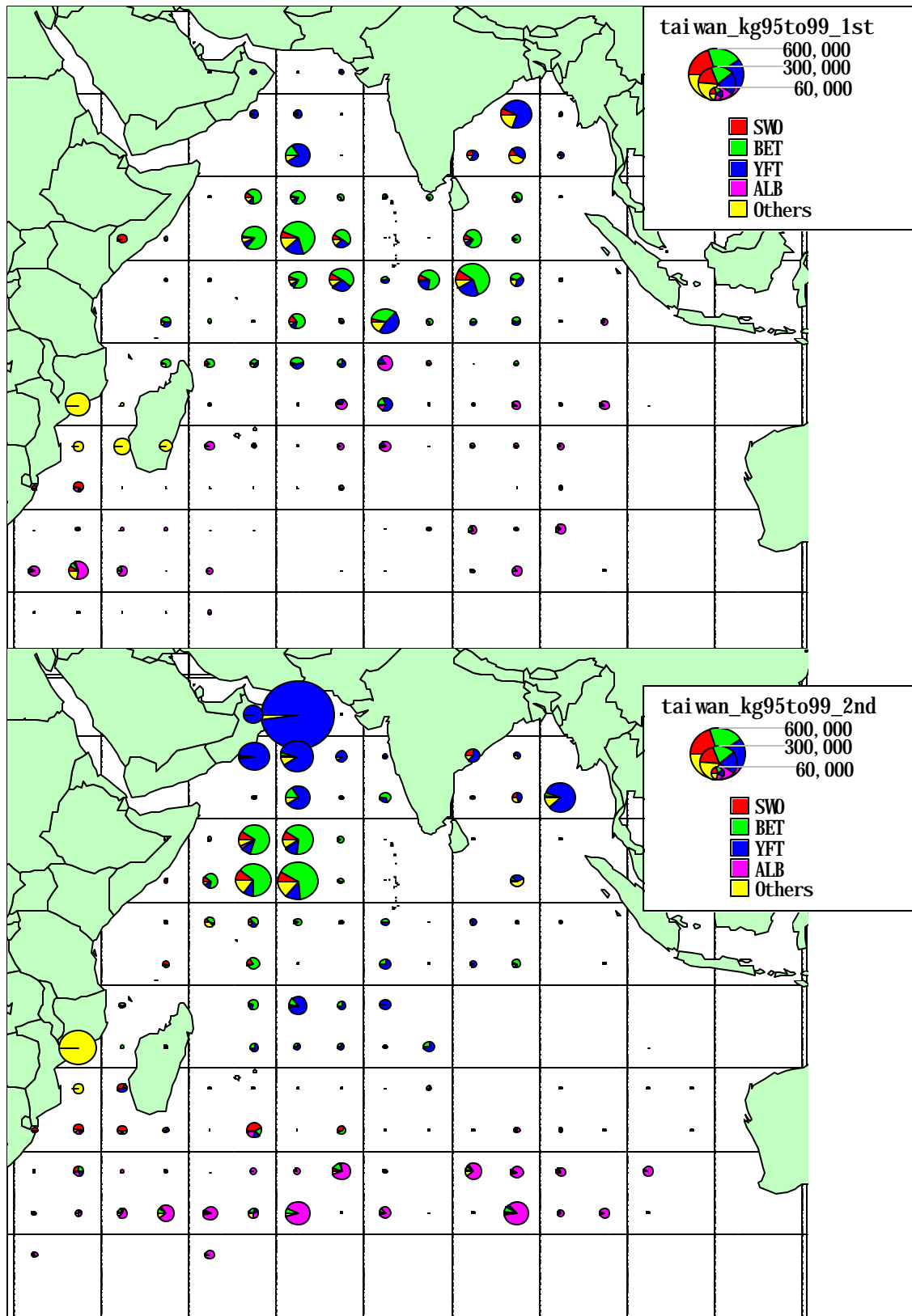


Fig. 8. Distribution of 5 years average catches (kg) of Taiwanese longliners by quarter and by species for the period between 1995 and 1999.

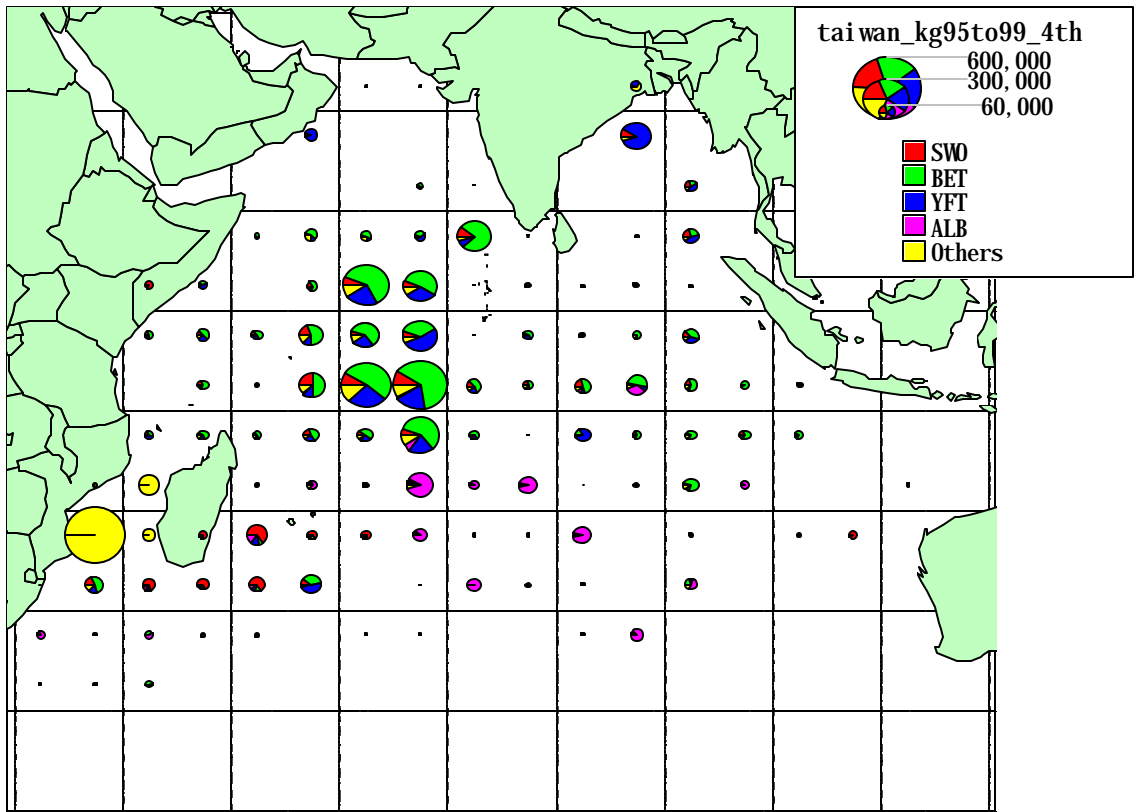
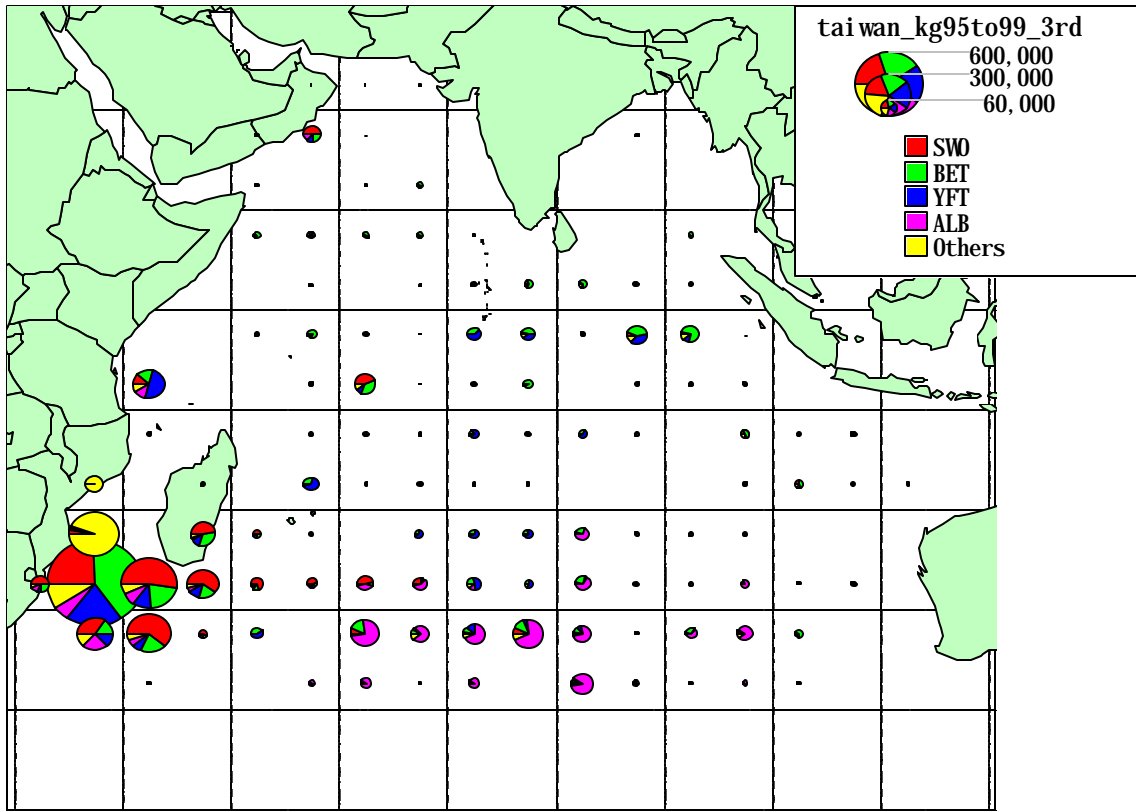


Fig. 8. Continued.