# Annual Report of Korea to the 9th Ecologically Related Species Working Group

Ministry of Food, Agriculture, Forestry and Fisheries
National Fisheries Research and Development Institute

## 1. Introduction

Korean fleet is using only longline gear to fish southern bluefin tuna (*Thunnus maccoyii*, SBT). Korean tuna longline fishery in the Indian Ocean started with a small experimental operation in the 1957 and since then has targeted bigeye tuna, yellowfin tuna and albacore tuna. The Korean SBT fishery commenced in 1991 with a few vessels shifting from the Indian Ocean tuna longline fleet because of higher market price. Fishing occurred in the area of 30°S-45°S and 15°-115°E, mainly in the western Indian Ocean from March to July/August and in the eastern Indian Ocean from July to December. In recent years, the Korean SBT fishery is being strictly controlled by the Government in terms of catch and the number of vessels in order to fulfill the strong conservation and management of the stock by the CCSBT.

This report describes information and data on Ecologically Related Species (ERS) of Korean SBT fishery collected by scientific observers up to 2010.

## 2. Review of SBT Fisheries

Korean longline fleet for the SBT are all deep freezers. The size ranges from 258 to 424 gross tonnage. The annual numbers of vessel were fluctuated from 8 in 1996 to 19 in 1998, 2008 and 2009, largely depending on market price and fishing ground conditions of the SBT. In 2010, the numbers of active vessel were 9, so as to be equivalent to the national quota (Table 1).

The catch was low at the beginning, but it increased up to 1,796 mt in 1998. Korea became the member of the CCSBT Commission in 2001 and was allocated 1,140 mt of annual catch limit as membership, while the catches were much lower than the national catch limits until 2007 mostly because of the availability of vessels, as low market price and high fuel price. In 2008 and 2009, the catches were 1,134 and 1,117 mt, respectively, which were well commensurate with the national catch limits. In 2010 fishing year, Korea set 876.4 mt as the yearly catch limits out of the two year (2010-2011) catch limits of 1,718, from which a total catch was 869.1 mt (867.4 mt in calendar year) (Table 1). The geographical distribution of nominal CPUE (no. of fish/1000hooks) showed two fishing grounds. One was the western Indian Ocean over the eastern Atlantic Ocean from April to July/August and the other was the eastern Indian Ocean from April to July/August and from July to December (Fig. 1).

## 3. Fisheries Monitoring for Each Fleet

Catch and effort data from fishing for SBT have been daily recorded in the logbook since 1977. Until

2011, the logbook had been required to be submitted to the National Fisheries Research and Development Institute (NFRDI) within 30 days (home-based) or 60 days (foreign-based) after completion of their operations. The operation of VMS is mandatory to all SBT fishing vessels. The Trade Information Scheme was introduced in 2009 and the Catch Documentation Scheme (CDS) entered into force as from 1 January 2010. To monitor the catch of SBT, five foreign ports (Shimizu, Cape-town, Durban, Port Louis, and Bali) were designated as SBT landing and transhipment by Korean flagged vessel since 2010.

Scientific observer program for Korean SBT fishery started in 2005. Observers are collecting and recording all data such as catch and effort data, ERS and non-target species data, interaction between species and fishing gear, and bycatch mitigation measures being used. Observers are required to submit the reports in one month from the point when their activities are completed. The observer coverage rate by effort are shown in Table 2. There was no catch of SBT during observation in 2005 and 2006, and observer was not dispatched in 2008 because of no observer avilable. In 2010, The observer coverage rate was 11%.

For catch verification, the government compares and contrasts the submitted data with such information as the transhipped amount, the landed amount, observer data and other documentations stipulated in the CDS Resolution. The recent catch limits have been controlled such that, when 90% of each vessel's allocation is exhausted, every fishing vessel reports its catch amount to the Ministry in every 10 days and when 98% of the catch allocation is counted against, the vessel should report its catch every day so that the vessels can keep their catches within limits.

From 2012 on, the logbook has been improved by adding columns for newly required informations such as discards and ERS species and obliged to be submitted monthly in electronic format to NFRDI. There are penalties for over catch, transshipment or unloading catch at any other non-designated foreign ports or any violation of regulation.

**4. Seabird**

Total numbers of seabird by species incidentally caught by Korean SBT fishing fleet observed is shown in Table 3. A summary of observed seabird mortality by species is shown in Table 4. Total of 10 seabird species, except for unidentified species, were recorded by the Korean observer program during 2005-2010. It showed that the number of individuals and species was high in 2009 and in 2010, respectively. In 2010, 76 individuals, 8 species were caught by the Korean SBT fleet, of which 1 individual was alive and released and 75 individuals were dead and discarded.

**5. Other Non-target Fish**

The number of catch, effort and BPUE (bycatch per unit effort) of sharks caught by Korean tuna longline fleet observed by the scientific observer program are shown in Table 5. The numbers of shark

species bycaught are shown in Table 6. Total of 18 shark species were recorded during 2005-2010. It showed that the number of individuals and species was high in 2009 and in 2006, respectively. The dominant species caught were blue shark, pobeagle and shortfin mako sharks. The BPUEs for sharks were less than 5 before 2007 and the highest in 2009.

**6. Marine Mammal and Marine Reptile**

No data is available for marine mammals or reptiles incidentally caught by Korean SBT longline fleet. There were no records of marine mammals and reptiles by the scientific observer program onboard Korean SBT longline fleet.

**7. Mitigation Measures to Minimise Seabird and Other Species Bycatch**

***Current Mandatory Measures***

As an effective mitigation measures to reduce the incidental catch of seabird, Korean longliners operating south of 25°S have been required to use at least 2 measures which are only one from each column A and B.

Korean longliners should not have onboard fins that total more than 5% of the total weight of sharks onboard, up to the first point of landing. Any part or whole carcass of thresher sharks of all the species of the family Alopiidae have been prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale and should be promptly released unharmed, to the extent practicable, when brought along side for taking on board the vessel.

To mitigate the impact of fishing operations on sea turtles, Korean longliners should retain and use some necessary equipment such as de-hooking, line cutting tools and scoop nets, and appropriately release the seaturtles bycaught and incidentally caught.

**8. Public Relations and Education Activities**

To avoid or reduce mortality of ecologically related species by tuna longline vessels, guidebooks, booklets and posters and releasing manual by species have been distributed to tuna longline vessels since 2007. NFRDI have conducted a regular education for vessel captains and crew by visiting the Korean Tuna Longline Fishing Association before their fishing trip. The education largely includes recording and reporting of fishing activity, information of target species and ERS, newly adopted measures and better practices recommended from tuna RFMOs.

**9. Information on other ERS (non-bycatch) such as prey and predator species**

**10. Others**

**11. Implementation of the IPOA-Seabirds and IPOA-Sharks**

Korean NPOA-Sharks has been implemented since late 2011 and Korean government carried out education for fishermen including the SBT fishery. NPOA-Seabirds is under drafting so as to implement in late 2013.

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in CCSBT convention area, 1991-2010

| Year | Number of longline vessel | Catch (mt) | Year | Number of longline vessel | Catch (mt) |
|---|---|---|---|---|---|
| 1991 | 3 | 246 | 2001 | 10 | 845 |
| 1992 | 1 | 41 | 2002 | 10 | 746 |
| 1993 | 1 | 92 | 2003 | 4 | 254 |
| 1994 | 1 | 137 | 2004 | 7 | 131 |
| 1995 | 3 | 365 | 2005 | 7 | 38 |
| 1996 | 8 | 1,320 | 2006 | 9 | 150 |
| 1997 | 14 | 1,424 | 2007 | 12 | 521 |
| 1998 | 19 | 1,796 | 2008 | 19 | 1,134 |
| 1999 | 16 | 1,462 | 2009 | 19 | 1,117 |
| 2000 | 13 | 1,135 | 2010 | 9 | 867 |

Table 2. Observer coverage for Korean SBT fishery by Korean scientific observer program, 2006-2010

| Year | Trips observed | Effort observed (X1,000) | Total effort estimated (X1,000) | Catch observed of SBT (mt) | Coverage (%) |
|---|---|---|---|---|---|
| 2005 | 1 | 71 | - | - | - |
| 2006 | 1 | 63 | - | - | - |
| 2007 | 1 | 246 | 11,454 | 11 | 2 |
| 2008 | - | - | - | - | - |
| 2009 | 2 | 446 | 5,419 | 92 | 8 |
| 2010 | 2 | 389 | 3,535 | 95 | 11 |

Table 3. The numbers of seabird species bycaught by Korean longline fleet observed in the scientific observer program, 2006-2010

| Species | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Black-browed albatross *Diomedea melanophris* | | | | - | 4 | 24 |
| Royal albatross *Diomedea epomophora* | | | 1 | - | 11 | |
| Northern giant petrel *Macronectes halli* | | | | - | 2 | |
| Southern giant petrel *Macronectes giganteus* | | | | - | | 1 |
| Yellow-nosed albatross *Diomedea chlorhynchos* | 1 | | 1 | - | 3 | 15 |
| Buller's albatross *Diomedea bulleri* | | | | - | | 9 |
| Cape petrel *Daption capense* | | | | - | | 1 |
| Grey headed albatross *Diomedea chrysostoma* | | | | - | | 2 |
| Wandering albatross *Diomedea exulans* | | | | - | | 11 |
| Shy albatross *Diomedea cauta* | | | | - | | 3 |
| Unidentified | | | | - | 92 | 10 |
| Total | 1 | 0 | 2 | - | 112 | 76 |

Table 4. Summary of seabirds mortality for Korean longline fleet observed in the scientific observer program, 2005-2010

| Total number of observed sea bird interaction (mortality) by species | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Black-browed albatross *Diomedea melanophris* | | | | - | (4) | (24) |
| Royal albatross *Diomedea epomophora* | | | (1) | - | (11) | |
| Northern giant petrel *Macronectes halli* | | | | - | (2) | |
| Southern giant petrel *Macronectes giganteus* | | | | - | | (1) |
| Yellow-nosed albatross *Diomedea chlorhynchos* | (1) | | (1) | - | (3) | (15) |
| Buller's albatross *Diomedea bulleri* | | | | - | | (9) |
| Cape petrel *Daption capense* | | | | - | | (1) |
| Grey headed albatross *Diomedea chrysostoma* | | | | - | | (2) |
| Wandering albatross *Diomedea exulans* | | | | - | | (11) |
| Shy albatross *Diomedea cauta* | | | | - | | (3) |
| Unidentified | | | | - | 1 (91) | 1 (9) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total | 0 (1) | 0 (0) | 0 (2) | - | 1 (111) | 1 (75) |

Table 5. The number of catch, effort and BPUE of sharks caught by Korean longline fleet

| Year | Effort observed (X1,000) | No. of sharks | BPUE (inds./1,000 hooks) |
|---|---|---|---|
| 2,005 | 71 | 148 | 2.1 |
| 2,006 | 63 | 188 | 3.0 |
| 2,007 | 246 | 749 | 3.0 |
| 2,008 | - | - | - |
| 2,009 | 446 | 6,641 | 14.9 |
| 2,010 | 389 | 4,415 | 11.3 |

* Data sources from the Korean observer program.

Table 6. The numbers of sharks bycaught by species by Korean longline fleet observed in the scientific observer program, 2005-2010

| Species | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Blue shark *Prionace glauca* | 115 | 39 | 613 | - | 6,123 | 3,879 |
| Pobeagle *Lamna nasus* | | | 53 | - | 450 | 439 |
| Shorfin mako *Isurus oxyrinchus* | 15 | 9 | 66 | - | 62 | 87 |
| Longfin mako *Isurus paucus* | | 1 | | - | | |
| Oceanic whitetip shark *Carcharhinus longimanus* | 5 | 17 | 1 | - | | |
| Pelagic thresher shark *Alopias pelagicus* | | 1 | | - | 1 | |
| Scalloped hammerhead *Sphyrna lewini* | | 4 | | - | | |
| Smooth hammerhead *Sphyrna zygaena* | | 12 | | - | | |
| Silky shark *Carcharhinus falciformis* | 2 | 97 | 12 | - | | 1 |
| Blacktip shark *Carcharhinus limbatus* | | 1 | | - | | |
| Galapagos shark *Carcharhinus galapagoensis* | | 1 | | - | 2 | 2 |
| Velvet dogfish *Zameus squamulosus* | | 1 | 1 | - | | |
| Crocodile shark *Pseudocarcharias kamoharai* | 11 | | 3 | - | | |
| Tiger shark *Galeocerdo cuvier* | | 5 | | - | 1 | |
| Dusky shark *Carcharhinus obscurus* | | | | - | 2 | |
| Sandbar shark *Carcharhinus plumbeus* | | | | - | | 3 |
| Bigeye thresher shark *Alopias superciliosus* | | | | - | | 3 |
| Thresher shark *Alopias vulpinus* | | | | - | | 1 |
| Total | 148 | 188 | 749 | - | 6,641 | 4,415 |

Table 7. Summary of sharks mortality for Korean longline fishery observed in the scientific observer program, 2005-2010

| Total number of observed shark interaction (mortality) by species | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Blue shark *Prionace glauca* | 113 (2) | 34 (5) | 582 (31) | - | 5,672 (451) | 3,731 (148) |
| Pobeagle *Lamna nasus* | | | 51 (2) | - | 343 (107) | 352 (87) |
| Shorfin mako *Isurus oxyrinchus* | 15 (0) | 7 (2) | 59 (7) | - | 53 (9) | 68 (19) |
| Longfin mako *Isurus paucus* | | 1 (0) | | - | | |
| Oceanic whitetip shark *Carcharhinus longimanus* | 5 (0) | 15 (2) | | - | | |
| Pelagic thresher shark *Alopias pelagicus* | | 1 (0) | | - | (0) 1 | |
| Scalloped hammerhead *Sphyrna lewini* | | 4 (0) | | - | | |
| Smooth hammerhead *Sphyrna zygaena* | | 2 (10 | | - | | |
| Silky shark *Carcharhinus falciformis* | 2 (0) | 87 (10) | 11 (1) | - | | 1 (0) |
| Blacktip shark *Carcharhinus limbatus* | | 1 (0) | 1 (0) | - | | |
| Galapagos shark *Carcharhinus galapagoensis* | | 1 (0) | | - | 2 (0) | 1 1 |
| Velvet dogfish *Zameus squamulosus* | | 1 (0) | 1 (0) | - | | |
| Crocodile shark *Pseudocarcharias kamoharai* | 10 (1) | | 3 (0) | - | | |
| Tiger shark *Galeocerdo cuvier* | | 5 (0) | | - | 1 (0) | |
| Dusky shark *Carcharhinus obscurus* | | | | - | 2 (0) | |
| Sandbar shark *Carcharhinus plumbeus* | | | | - | | 3 (0) |
| Bigeye thresher shark *Alopias superciliosus* | | | | - | | 3 (0) |
| Thresher shark *Alopias vulpinus* | | | | - | | 1 (0) |
| Total | 145 (3) | 159 (29) | 708 (41) | - | 6,073 (568) | 4,160 (255) |

Table 8. The numbers of predominant species bycaught by Korean longline fleet observed in the Korean observer program, 2005-2010

| Species | Year | | | | | |
|---|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| Albacore tuna *Thunnus alalunga* | 315 | | 435 | - | 2,396 | 1,413 |
| Yellowfin tuna *Thunnus albacares* | 388 | 251 | 517 | - | 22 | 91 |
| Bigeye tuna *Thunnus obesus* | 93 | 78 | 222 | - | 161 | 63 |
| Skipjack tuna *Katsuwonus pelamis* | 10 | 1 | 13 | - | 3 | |
| Swordfish *Xiphias gladius* | 24 | 33 | 31 | - | 13 | 6 |
| Striped marlin *Tetrapturus audax* | 2 | | 1 | - | | |
| Indo-pacific sailfish *Istiophorus platypterus* | 1 | 36 | 16 | - | 3 | |
| Black marlin *Makaira indica* | 1 | | 2 | - | | |
| Blue marlin *Makaira mazara* | | | | - | | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total | 834 | 399 | 1,237 | - | 2,598 | 1,574 |

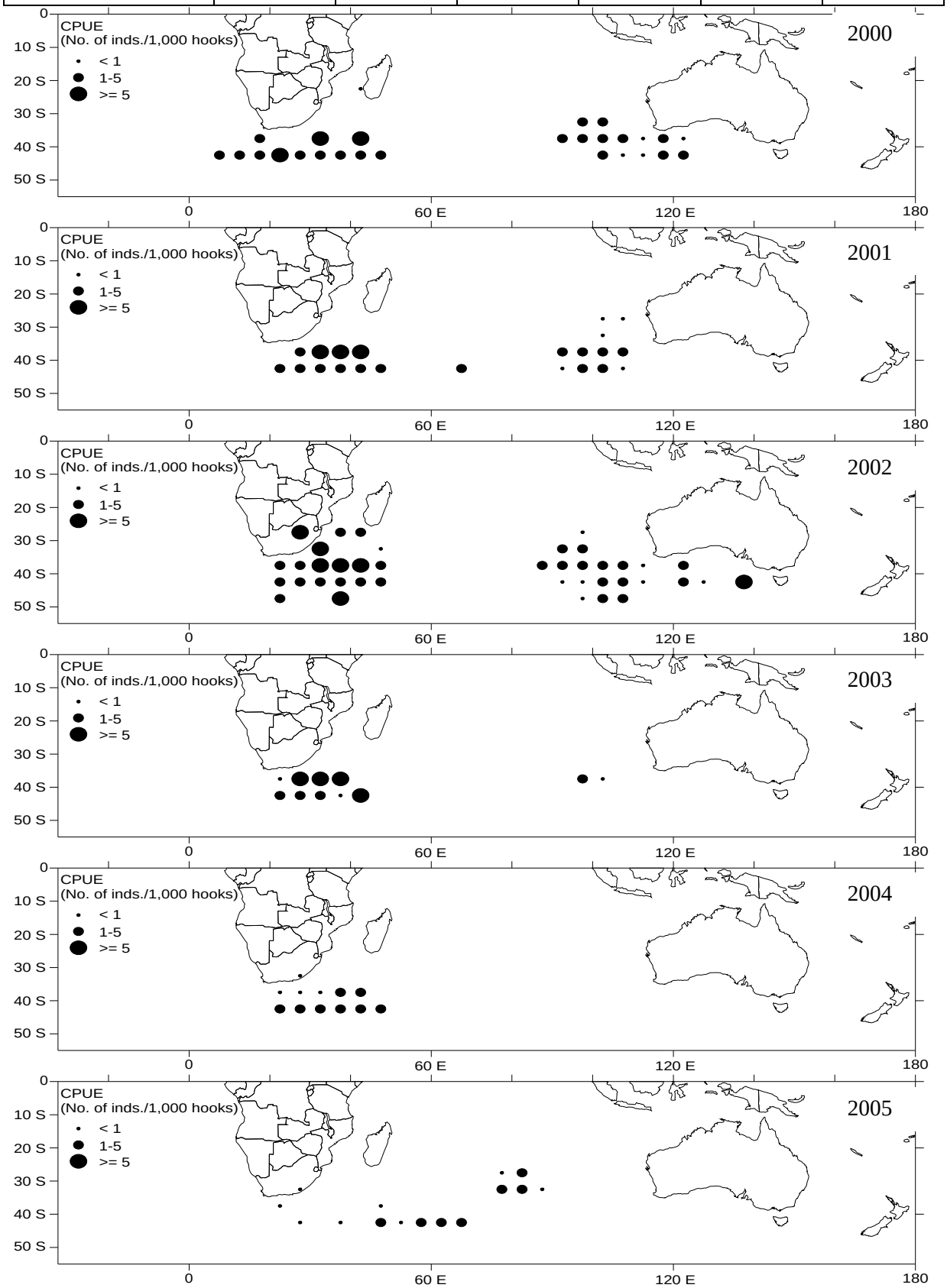


Fig. 1. The nominal CPUE distributions of SBT by Korean tuna longline fleet by year and by area, 2000-2010.

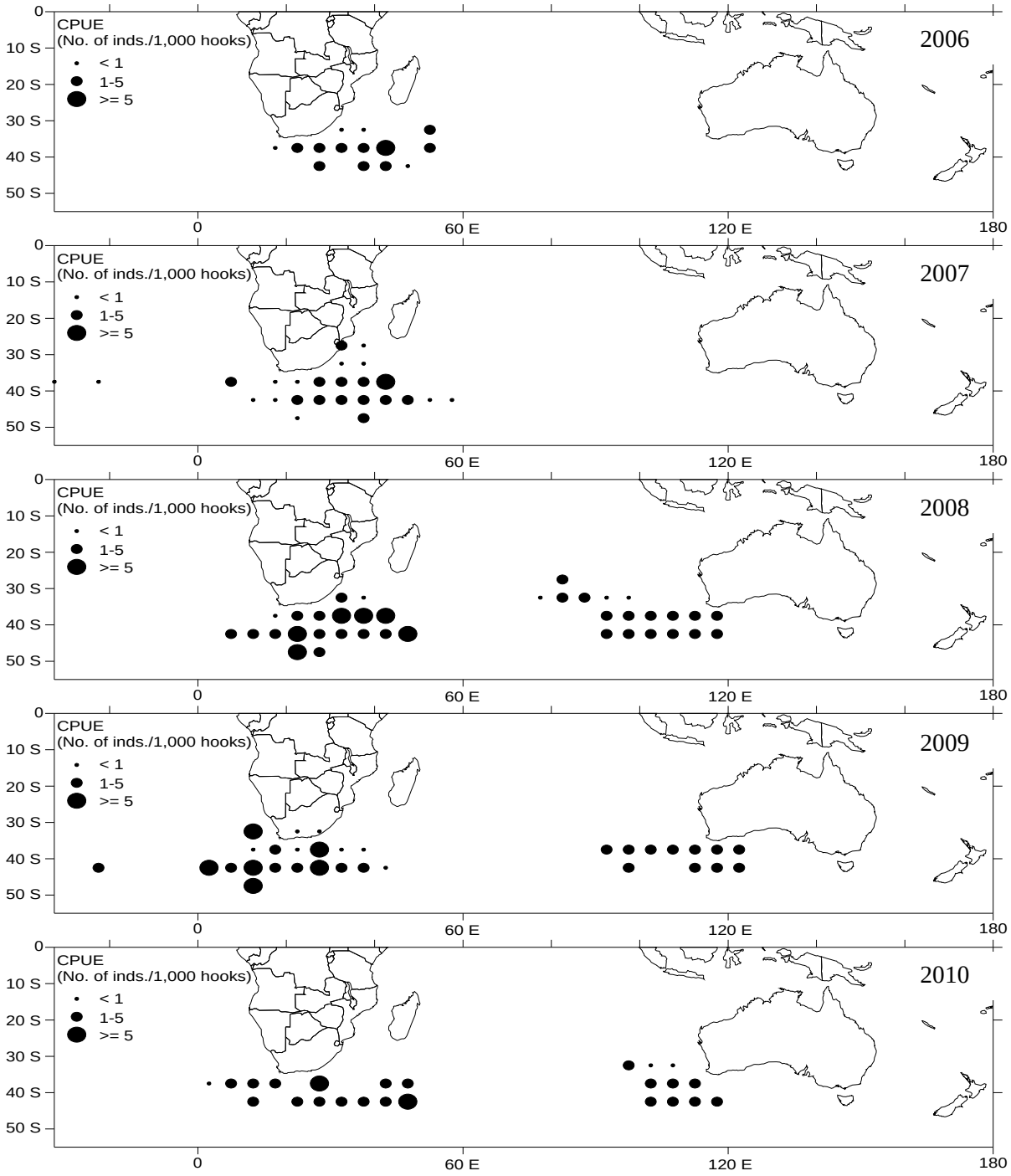


Fig. 1. Continued.