Review of Japanese SBT Fisheries in 2012
日本のミナミマグロ漁業のレビュー：2012 年

Osamu SAKAI[1], Tomoyuki ITOH[1] and Sayako TAKEDA[2]
境 磨[1] ・伊藤智幸[1] ・竹田紗也子[2]
1:National Research Institute of Far Seas Fisheries 国際水産資源研究所
2:Fisheries Agency of Japan 水産庁

要約

本文書では、日本延縄漁業による 2012 年のミナミマグロの漁獲量、努力量、ノミナル CPUE、体長組成、隻数と操業海域分布を、それ以前の年代もカバーして歴史的に記す。2012 年には 93 隻の許可を受けた商業延縄漁船により 2,528 トンが漁獲された（漁期年では 94 隻により 2,467 トン）。2009 年以降、主要な CCSBT 統計海区（4、7、8、および 9 海区）では高いノミナル CPUE が観察されている。2012 年の 4 海区・7 海区では 110～150cmFL の小型～中型魚が、8 海区では 130～180cmFL の中型～大型魚が漁獲の主体であった。9 海区では約 100cmFL の小型魚の漁獲も見られた。漁業者により 2012 年に 10,101 尾の小型魚放流が報告された。科学オブザーバを配乗した 10 隻の商業延縄船が、4～9 海区でミナミマグロを対象とした操業を行い、そのカバー率は、隻数で 10.4%、使用釣鈎数で 7.9%、ミナミマグロ漁獲尾数で 6.9%であった。また、豪州南西沿岸において曳縄による加入量調査を実施した。これらの科学調査活動により耳石 209 個体分を収集した。

Summary

This document describes the Japanese commercial longline fishery for southern bluefin tuna (SBT) in the recent season and its history. In 2012 calendar year, 93 authorized commercial longline vessels caught a total of 2,528 t of SBT (Total catch in 2012 fishing year was 2,467 t by 94 vessels). The nominal CPUEs have been in a high level in the major CCSBT statistical areas (Area 4, 7, 8, and 9) since 2009. Japanese longline vessels mainly caught small or middle sized fish (110-150cm FL) in CCSBT statistical area 4 and 7. In CCSBT statistical area 8, middle or large sized fish (130-180cm FL) were caught. Smaller fish (with mode of around 100cm FL) were also caught in CCSBT statistical area 9. Japanese longline vessels reported 10,101 individuals of release and discard in 2012 calendar year. A total of 10 vessels operated in the SBT fishing ground (area 4-9) while scientific observers were onboard in 2012. Observer coverage was 10.4% in terms of the number of vessels, 7.9% in terms of the number of hooks used, and 6.9% in terms of the number of SBT caught. Off the south west coast of Australia, the recruitment monitoring survey was conducted by trolling. Otoliths were collected from 209 individuals by these scientific activities.

1. 緒言 Introduction

本文書では、日本によるミナミマグロ漁業の歴史と 2012 年の状況を概観する。なお、ここで提示した漁獲量の統計値は商業船による漁業情報（RTMP を含む）のみを対象としており、科学調査による漁獲については、本文書の「他の関連情報」に記述してある。

【歴史】

日本のミナミマグロの漁獲は全て延縄による。漁獲は 1952 年に本格的に始まった。当初漁獲されていたミナミマグロは、インド洋東部の低緯度水域（CCSBT 統計海区 1,2 海区; 以下では単に海区と称す）でのメバチやキハダを対象とした操業で混獲された経産卵魚であり、その肉質は非常に悪かった。その後、良質の魚を求めて漁場は高緯度域へと拡大していき、1956 年にニュージーランド北東部海域（5 海区）、1961 年にタスマニア島周辺からオーストラリア南東岸沖（4,7 海区）、1965 年に南インド漁場（8 海区）、1967 年にケープ沖漁場（9 海区）が開発された。1960 年代にミナミマグロを対象としていた操業隻数は約 300 隻であった。さらに、ニュージーランド東部からチリ沖合にかけての海域、ケープの西沖からアルゼンチン沖合にかけての海域でも操業が行われた。これらの海域では、ミナミマグロの漁獲はあったものの、その分布密度が低いと評価されたため、主要な漁場とはならなかった。

1970 年代には、親魚の漁獲量の減少と、総漁獲に占める小型魚の増加から、資源量の低下が懸念され、1971 年 10 月から産卵場における 12−3 月の操業、ならびに小型魚が多獲される漁場（シドニー沖 5-7 月、オーストラリア大湾 10-3 月、ケープ沖 10-1 月）での操業を禁止する国内規制が導入された。これらの規制ならびに漁業者がより高価な漁獲物を志向するようになったことにより、1・2 海区での操業は激減した。また、1973-1974 年に日本のまぐろ延縄漁業では深縄を導入し始め、ミナミマグロ狙いからメバチ狙いへ転換していく船も相当数あった。

1980 年代前半にオーストラリアの表層漁業による漁獲が急増したのに対し、日本の延縄漁業での漁獲量は低下した。1982 年には日、豪、NZ によるミナミマグロ三国間会議が組織され、1985 年に 3 国の漁獲割当量が設定された。この時点での日本の割当量は 23,150 トンであり、その後 1986 年会議で 19,500 トン、1988 年会議で 8,800 トン、1989 年会議で 6,065 トンへと漸減した。1989 年以降、漁獲枠の削減の結果として、日本延縄漁船は漁獲枠の消化が漁期途中で終了するようになった（Table 1）。1994 年にはミナミマグロ保存条約（CCSBT）が発効した。日本の漁獲割当量は 1997 年まで 6,065 トンが維持され、その後、2003 年の年次会合において 6,065 トンで合意されるまで自主規制枠（6,065 トン）を設定していた。2006 年の漁獲割当量も前年同様の 6,065 トンであったが、2005 年に 1790 トンの漁獲量超過が見つかったため、同量を差し引いた 4,275 トンを漁獲量の上限として漁獲が管理された。2006 年の年次会合では、2007 年以降 5 年間の日本の漁獲割当量を 3000 トンに削減することで合意されたが、資源状態の悪化を受けて 2010・2011 年の漁獲量の上限をそれぞれ 2,200 トン・2,600 トン[1]として管理した。日本の 2012・2013 年の漁獲割当量は、それぞれ 2,519 トン・2,689 トンである。

割当量に対する日本漁船の漁獲量の管理方策としては、1990 年から 2005 年までは、主要 3 漁場に対し、入漁隻数、操業開始日、漁場別の漁獲割当量を各々設定し、漁獲状況に応じて漁場閉鎖日を設定するオリンピック方式の漁業管理制度を用いていたが、2006 年からは個々の漁船に対する漁獲枠の個別割当制度（IQ 制）へ転換した。また同年より、漁獲したミナミマグロ全個体に識別標識を装着する制度を併せて導入し、漁獲量管理を強化した。現在、ミナミマグロの高い CPUE に対し、各漁船は

[1] ニュージーランドからの年間移譲分（139 トン）が含まれる。

少ない漁獲枠しか持たないため、少ない操業回数で漁獲枠を消化しミナミマグロ漁場を離脱する場合が多い。2011 年における日本漁船の操業パターンの詳細は CCSBT-ESC/1309/28 を参照されたい。

2. 漁獲量と努力量　Catch and Effort

1952 年から最近年までのミナミマグロの漁獲尾数、重量（原魚換算）と努力量（釣鈎数）を Table 2、Fig.1 に示す。日本の製品形態は、基本的に鰓、内臓、および尾部を除去した「GG」であるため、原魚重量は製品重量に係数「1.15」を掛け合わせることで算出した。2012 年の日本商業延縄漁船による総漁獲重量は 2,528 トン（漁期年では 2,467 トン）、総漁獲尾数は約 5 万尾であった。なお、本レポートの 2012 年の統計値は主として RTMP 調査から得られた暫定値である。また 2011 年以前の統計値についても、今後、若干の修正が行われる可能性がある。2012 年に漁船から報告された放流・投棄尾数の総計は 10,101 尾であった。放流・投棄の詳細は CCSBT-ESC/1309/33 を参照されたい。

漁獲尾数は 1958 年から 1959 年にかけて急増し、1961 年に 122 万尾で最高となり、その後は近年にいたるまで単調に減少した。2000 年代前半には 11 万-14 万尾レベルで推移していたが、2006 年以降、漁獲可能量の削減に伴い急減した。1970 年以降、4-9 海区での漁獲がほとんど全てを占めている。

努力量（釣鈎数）は、1950-1970 年代に増加し、1980 年には最高値 1.3 億本に達した。その後、0.6-0.7 億本前後に落ち込んだ 1990 年代前半を除けば、2000 年代前半まで概ね 1 億本前後で推移していた。しかし、2006 年以降、漁獲可能量の削減に伴い大きく減少し、近年には 2-3 千万本レベルで推移している。なお、この努力量は、CCSBT 統計海区 1-10 の全ての努力量と、その他の海区および海区外でその年に 1 尾以上のミナミマグロが漁獲された 5x5 度区画の年間努力量との合計であり、ミナミマグロを対象としていない操業での努力量も含まれることに注意が必要である。

1972-1993 年には、努力量の大半が 4-9 海区内での操業によるものだが、1994 年以降、8・9 海区の北側に位置する 2・14・15 海区の努力量も多くなった。これらの海域はメバチの主漁場であり、ミナミマグロの漁獲尾数は少ない。4-9 海区の努力量は、これらの海域が開発された 1970 年代初め以降、ほぼ 0.7-1.2 億本レベルで推移した。1990 年以降は 4 千万～6 千万本台で推移し、2006 年には 3 千万本台に、2007～2009 年には 2 千万本台に、そして 2010 年～2012 年には 1 千万本台へ大きく減少した。

最近 5 年間（2008-2012 年）の月、海区別の漁獲努力量とミナミマグロ漁獲尾数を Table 3 と Table 4 に示す。近年の漁獲努力量・漁獲尾数は、主要漁場である 4・7・8・9 海区に集中している。そのなかでも、8・9 海区には従来から漁獲努力量・漁獲尾数が集中する傾向があったが、2010 年以降、8 海区では漁獲努力量の減少に伴い、その漁獲尾数が減少した。その一方で、7 海区での漁獲尾数が増加している。4 海区でも多くの漁獲努力量が見られるが、ミナミマグロの盛漁期となるのは主に 5・6 月であり、その他の月には 2 海区と同様に主にメバチを対象とした漁場となっている。なお、2012 年の漁業データは主に RTMP に基づくため、ミナミマグロを対象とした漁獲以外の努力量の報告が少ない可能性に留意する必要がある。

3. ノミナル CPUE　Nominal CPUE

1952 年から最近年までの CPUE（ノミナル CPUE）を Table 2、Fig.1 に示す。全海域における CPUE は 1957 年に急増し、1959 年に最高値となった後に 1963-1968 年にかけて急減した。CPUE はその後も 1980 年代前半にかけて低下し、1986 年以降はほぼ同レベルで推移した。1990 年から 1993 年にかけて

CPUE は一旦増加し、1994 年から 1997 年までは再度低下した。1997 年以降 CPUE はほぼ横ばいであったが、2009 年以降上昇傾向に転じている。

現在の主漁場である 4-9 海区に限定した CPUE の傾向は全海域の場合とほぼ同じであるが、値は全海域のものよりもやや高くなる。CPUE は 1996-1998 年に低下しているが、その水準は 1986-1989 年並みであり、その後は若干の変動があるものの低位で安定して推移してきた。2009 年以降の CPUE は上昇傾向にある。

2008-2012 年の月・海区別のノミナル CPUE を、全海区について Table 5 に、主漁場である 4・7・8・9 海区について Fig.2 に示す。2008-2009 年の CPUE の上昇傾向は顕著であり、その漁獲物の主体は小型個体であった（後述）。この CPUE の上昇は、近年の若齢魚の高い加入水準を反映したと考えられる。2012 年の CPUE も多くの海域で 2011 年と同様に高水準で推移しており、ミナミマグロ資源が回復傾向にあることを示していると考えられる。詳細は CCSBT-ESC/1309/26 を参照されたい。

4. サイズ組成　Size composition

過去の一部の漁業者による体長測定には 5cm 単位で測定される傾向があったので、これを緩和するために、1996 年までは全船の体長頻度を 5cm ごとの移動平均にしてデータとして用いた。1997-1999 年の体長データは処理をしていない。2000 年以降のデータでは、各年において 5cm 単位の体長値が全体の 40%以上であった船のデータについては測定頻度を 5cm ごとに移動平均して用いた。

1990 年以前に日本が収集したサイズデータは少なく、また 1980 年代には体重データの占める割合が高い（Fig. 3）。1991 年に RTMP が始まると体長測定データ数は急増し、1995 年以降は、RTMP が全船に拡大されたことで、日本の大半の漁獲個体から体長・体重の測定データが得られるようになった。その割合は、2011 年は 99.4%、2012 年は 99.0%であった。

10 年ごとの合計漁獲尾数から求めた体長組成を Fig.4 に示す。体長モードは 1960-1980 年代には 150cmFL にあったが、1990 年代に 120cmFL へ小型化した。この小型化は操業パターンの変化および資源の年齢組成変化の両方を反映したものと思われる。2000 年代は明瞭なモードがない。

近年 5 年間（2007-2011 年）の体長組成を Fig.5 に示す。近年、日本延縄漁業では小型個体の漁獲が目立つ。2007・2008 年には約 100cmFL・120cmFL に、2009 年には 90cmFL・110cmFL にモードを持つ小型個体の漁獲が多数報告されている。2010 年には 100cmFL 以下の個体の漁獲が少なかったが、2011・2012 年には、再び 100cmFL の個体の漁獲が確認されている。このような小型個体の漁獲は、ミナミマグロの加入水準を反映していると考えられるが、他にも漁獲後に放流/投棄されているミナミマグロ小型個体が多数存在することに注意が必要である。

5. 漁船数と分布　Fleet size and distribution

データベースに船別の情報が含まれている 1983 年以降のデータを用いて、4-9 海区においてミナミマグロを 1 尾以上並びに 100 尾より多く漁獲した年別の隻数を、日本の遠洋延縄船の全隻数と共に Table 6 に示す。2012 年については、操業情報の大部分が RTMP の情報に基づくため、2012 年の RTMP の隻数を示すと共に、比較のために 1995 年以降の RTMP の隻数も示す。

日本は延縄漁船に対し、1981 年に 69 隻、1982 年に 100 隻の減船を実施しており、1980 年代前半にはミナミマグロを漁獲する漁船数は既に減少傾向にあった。ミナミマグロを対象とした操業を行う延

縄漁船数の減少幅は 1991・1999・2006 年に特に大きい。1991 年の操業隻数の減少はクォータ有効利用のために出漁隻数を自主的に制限したことの影響と考えられる。1999 年の減少は 1998 年に日本延縄漁船全体で行われた 132 隻の減船の影響と考えられる。また 2006 年の減少は漁船毎の個別枠割当制度への管理方策の変更や燃油の高騰に伴う経営戦略の変化の影響と解釈される。2012 年のミナミマグロ操業隻数は 93 隻であり、2011 年と比べて増加した。

ミナミマグロ漁獲尾数および努力量の四半期、5x5 度別の分布を、1960～2000 年代については 10 年間ごとに、2008-2012 年については 1 年ごとに Fig.6～9 に示す。これらの図は、毎年 CCSBT へ提出している 5x5 度区画・月別に集計したデータを基に作製した。1～9 海区、14・15 海区の努力量は、ミナミマグロの漁獲の有無に関わらず、他の魚種を目的とした操業も含めて全て合計している。1950 年代には 1・2・5 海区に限られた操業海域は、1960 年代には全海区に広がった。1970 年代には 9 海区での努力量・漁獲尾数が増加した一方で、1・2 海区での漁獲尾数が大きく減少した。これは 1・2 海区での操業がミナミマグロを対象としたものからメバチ等の他魚種を対象としたものへ変化したことを示している。1990・2000 年代は、1970・1980 年代に比較して、第 1 四半期の 4～9 海区や、第 4 四半期の 7 海区の努力量･漁獲尾数が減少した。これらは漁場ごとの漁期規制の影響と考えられる。また 1990 年代半ばより、5・6 海区での努力量・漁獲尾数は少なくなっている。近年 5 年間の 4-9 海区では、漁獲努力の分布範囲やミナミマグロの漁獲の地理的分布に大きな変化はみられない。

6. 科学オブザーバプログラム　Scientific observer program

2012 年にミナミマグロを対象とした操業許可を持つ日本延縄漁船へ派遣したオブザーバのうち、10 隻がミナミマグロ主要漁場でのミナミマグロ操業の観察を報告した。4～9 海区での調査カバー率は、隻数で 10.4%、使用釣鈎数で 7.9%、ミナミマグロ漁獲尾数で 6.9%であった。詳細は別文書（CCSBT-ESC/1309/22）を参照されたい。

7. 他の関連情報　Other relevant information

【科学調査活動】

ミナミマグロ 1 歳魚の加入量指数を求めるためのピストンライン曳縄調査を 2013 年 1-2 月に実施した。18 日間調査した結果、本調査により得られたピストンライン上の指数は 3.48 群/100km であった。この調査で漁獲されたミナミマグロ 89 個体には CCSBT 通常標識とアーカイバルタグの装着放流を実施した。また、別の 6 個体にはポップアップアーカイバルタグを装着放流した。承認された調査死亡枠のもとで、耳石、筋肉、および胃内容物の採集のために死亡したミナミマグロは 295.6kg（116 個体）である。詳細は別文書（CCSBT-ESC/1309/23, 27 および 31）に示す。

日本の延縄漁船から報告された通常標識の再捕は 16 本（14 個体分）であった（うち、科学オブザーバからの報告は 7 件）。詳細は別文書（CCSBT-ESC/1309/22 および 23）に示す。

【耳石収集活動および分析】

2012 年にオブザーバ活動にて 121 個体分、2012 年 1-2 月の曳縄調査にて 98 個体分の耳石を収集した（合計 209 個体分）。これらの耳石は現在分析を進めている。詳細は別文書（CCSBT-ESC/1309/24）に示す。

1. Introduction

This document is a review of the Japanese longline fisheries of Southern Bluefin tuna (SBT). All of statistical information written on this document is based on the catch and effort information from Japanese commercial longline vessels. SBT catches under the scientific research is shown at the section of "Other relevant information" in this document.

[History]

Longline is the only method that Japanese commercial fleets have used to catch SBT. This fisheries started in 1952 around the low latitude area of Eastern Indian Ocean (CCSBT statistical area 1 and 2), as the bycatch of post-spawning adult SBT during the operations targeting bigeye tuna and yellowfin tuna. The quality of fish meat in this area was not good, and thus Japanese fishermen extended the fishing ground to the high latitude area. Japanese longline fleets reached the Northeastern region of New Zealand (Area 5) in 1956, around the Tasman Sea (Area 4, 7) in 1961, Southern Indian Ocean (Area 8) in 1965, and around the off Cape Town (Area 9) in 1967. Number of Japanese vessels that caught SBT in 1960s was estimated about 300. Eastern Pacific (Area 12) and off Argentina (Area 10) were not established as SBT fishing grounds because of the lower fish density.

Because of the increasing catches of small SBT and decreasing catches of adult SBT, Japan had adopted the voluntary area-closures for domestic longline fisheries since October 1971. The spawning ground was closed between December and March to protect migrating adults, and some fishing grounds were closed seasonally to protect small SBT (off Sidney in May-July; Great Australian Bight in October-March; off Cape Town in October-January). In addition, since Japanese fishermen began to target high-quality SBT, the number of fishing operations in area 1 and 2 dropped drastically. In those days, Japanese vessels began using "deep tuna longline" in 1973-1974, and then considerable number of vessels changed their target from SBT to bigeye tuna.

In early 1980s, SBT catches by Australian surface fisheries increased rapidly while Japanese longline catches decreased. In 1982, Japan, Australia, and New Zealand organized a voluntary trilateral management framework for SBT, and began to apply quotas to their fisheries in 1985. Japanese quota was 23,150 t in 1985, and decreased to 19,500 t, 8,800 t, and 6,065 t at 1986, 1988, and 1989 trilateral meetings, respectively. After 1989, Japan adopted official area/time-closures for domestic longline fisheries to manage the Japanese SBT quota (Table 1). In 1994, the Convention for the Conservation of Southern Bluefin Tuna (CCSBT) came into force. 6,065 t was applied to Japan as its annual quota in 1989-1997, and Japan voluntarily maintained it as the self-regulation every year to 2003. Japanese quota was also 6,065 t in 2004-2006, but Japan managed its quota as 4,275 t for 2006 because of 1,790 t of exceeds in 2005. The commission meeting in 2006 (CCSBT13) decided to reduce Japanese quota to 3,000 t in next 5 years (2007-2011). In addition, further reduction of catch allocation in 2010-2011 was agreed due to the lower stock status in 2009. For 2010 and 2011 fishing years, Japanese national catch

limit were 2200 t and 2600 t[2], respectively. Japanese quota in 2012 and 2013 were 2,519 t and 2,689 t, respectively.

Area/time-closures in main fishing grounds with the "Olympic system" had been used to manage the Japanese quota before 2005. Under this management system, Fisheries Agency of Japan allocated the quota beforehand to each of three fishing grounds, monitored the SBT catches of authorized vessels, and closed the fishery before the quota was exhausted. In 2006, Japan adopted an individual quota (IQ) system for SBT fisheries, and abolished the area/time-closures at the same time. In addition, catch monitoring tag was adopted to further strengthen the domestic management system. IQ for each vessel has been relatively small considering the recent higher CPUE, thus Japanese vessels tends to consume all of their quota allocations by a few operations targeting SBT in recent years. The details of operation pattern in 2012 are given in the document CCSBT-ESC/1309/28.

2. Catch and Effort

Catches and efforts for Japanese longline vessels by calendar year are provided in Table 2 and Fig. 1. Japanese usual product type is "GG (Gilled and Gutted, tail removed)", thus total SBT catch weight in Table 2 were produced using the conversion factors "1.15" from the processed weight. Total catch weight in 2012 was 2,528 t (2,467 t in fishing year), and total catch number was about 50 thousand. These are provisional values based on the Real Time Monitoring Program (RTMP) and will be updated in next year. There is a possibility that statistical value before 2011 will be also updated slightly. Based on the RTMP data, Japanese longline vessels released and discarded 10,101 SBT in 2012 calendar year. The details of releases and discards in 2012 are given in document CCSBT-ESC/1309/33.

SBT catches for Japanese longline vessels increased rapidly during 1958 and 1959, peaked in 1961 at 1.2 million individuals, and monotonically decreased after that. In early-2000s, Japan's catch was around 110-140 thousand individuals. After the 2006, it decreased as the Japanese quota was reduced. Most of Japanese catch has occurred in area 4-9 since 1970.

Efforts (total hook numbers) of Japanese longline vessels increased between 1950s and 1970s, and reached the peak of about 130 million hooks in 1980. Since then, the efforts had been about 100 million hooks except for early 1990s (60-70 million hooks). After the 2006, efforts have drastically decreased with the reduction of the quota, and recent annual total efforts were 20-30 million hooks. These efforts were calculated as the total hooks used in area 1-10 and the other areas' 5x5 degree cells which had SBT catch in the year. These efforts included not only the efforts targeting the SBT but also the efforts targeting the other tunas (e.g. bigeye tuna and/or yellowfin tuna).

Most of efforts concentrated in area 4-9 between 1972 and 1993. After 1994, the efforts were increased in area 2, 14, and 15 which are north of area 8 of 9 and the fishing grounds of bigeye tuna. In these areas, SBT catches are far lower than main fishing grounds (area 4-9). Total efforts in area 4-9 were 70-720 million hooks in early-1970s and remained 40-60 million hooks for many years after 1990. However, after 2006, total efforts in area 4-9 have decreased (33 million hooks in 2006, and 15-25 million

[2] Allocation for each year includes annual transfer (139 t) from New Zealand. Refer to CCSBT-EC/1010/14 for more information.

hooks in 2007-2012).

Catches and efforts in recent 5 years (2008-2012) for Japanese longline vessels by month and area are provided in Table 3 and Table 4. Japanese catches and efforts tend to be concentrated in area 4, 7, 8, and 9 in recent years, and a lot of SBT catches and efforts have been observed especially in area 8 and 9. After 2010, catches and efforts in area 8 were decreased, while catches in area 7 were increased. There were a lot of fishing efforts in area 4, however most of the efforts were used targeting the bigeye tuna as with area 2, except for the efforts in SBT fishing season (May-June). Catches and efforts in 2012 were mainly based on RTMP, thus there are possibility that some efforts targeting the other tunas (bigeye tuna, yellowfin tuna, and albacore) were not aggregated yet.

3. Nominal CPUE

Nominal CPUE for calendar years are provided in Table 2 and Fig.1. CPUE of Japanese longline vessels in all areas increased rapidly from 1957, peaked in 1959, and decreased rapidly in 1963-1968. After that, CPUE had monotonically decreased, and been stable in lower level after 1986. In 1990s, temporary increase and decrease of nominal CPUE was reported. After 2008, Japanese nominal CPUE has increased again.

Considering the CPUE in area 4-9, CPUE value was higher than that calculated for all areas. CPUE in area 4-9 increased in 1990-1993 and decreased in 1993-1996. After that, it had been stable in end-1980s level. Since 2009, CPUE in area 4-9 has been in a high level.

Nominal CPUE in recent 5 years by month and area are provided in Table 5 and Fig. 2. CPUE increase between 2008 and 2009 was remarkable, and a lot of small SBT tended to be caught at that time. Therefore, this increase of CPUE would be the result of the recent higher recruitment. Nominal CPUE in 2012 was still in a higher level. This fact suggests the recovery of the SBT stock. The details of CPUE trend are shown in document CCSBT-ESC/1309/26.

4. Size composition

Size compositions which were mainly based on the measurement by fishermen are provided in Fig.4 and Fig. 5. In the past, size data provided from some fishermen tended to be measured by 5 cm, thus Fig. 4 were made using the 5 cm moving average for the size composition before 1996. After 2000s, 5 cm moving average were used for the size data which was provided by vessels measuring by 5 cm for over 40% of fish.

Limited size data are available before 1990, and most of size data in 1980s were weight (Fig. 3). When RTMP started in 1991, the availability of length data was drastically improved. Because all of the authorized Japanese vessels joined RTMP, Japan has been able to provide the sized data (length and weight) for most of SBT caught since 1995. Japan provided the size data for 99.4% and 99.0% of SBT caught in 2011 and 2012, respectively.

In 1960s-1980s, the size composition of Japanese longline catches had a mode at 150cm FL. This was changed to a mode at 120cm FL in 1990s, and there was no sharply-defined mode in 2000s (Fig. 4).

In recent 5 years (2007-2011), Japanese longline tended to catch smaller sized SBT (Fig. 5). The size composition of Japanese longline catches had the modes at 100cm FL and 120cm FL in 2007-2008, at 90cm FL and 110cm FL in 2009. There were no clear modes indicating the catch of less than 100cm FL SBT in 2010, though a mode at 100cm FL was observed again in 2011 and 2012. Catches of small sized SBT would reflect the recruitment level of recent SBT stock.

5. Fleet size and distribution

The total number of Japanese high sea tuna longline vessels and authorized SBT longline vessels in 1983-2012 are provided in Table 6. As the most recent year's data was mainly based on the RTMP data, the data from RTMP are also shown for 1995-2012 for comparison.

Japan conducted the drastic cut of the total number of longline vessels to help conserve tuna resources; reduction of 69 vessels in 1981, 100 vessels in 1982, and 132 vessels in 1998 were conducted. The number of authorized SBT longline vessels was already on a declining trend in 1980s. In 1991, 1999, and 2006, the number of SBT vessels declined sharply. The decrease in 1991 would be the result of voluntary restraint of fishing vessels for the effective use of national quota. The decrease in 1999 would be the result of the drastic cut of longline vessels conducted in 1998. The cause of decrease in 2006 would be the change of the business strategy corresponding to the change from the Olympic system to the IQ system and the escalating fuel prices. Total number of SBT longline vessels in 2012 was 93.

The spatial distribution of fishing efforts and SBT catches are provided in Fig. 6-9. These figures were based on the data (5x5 degree aggregated catch and effort data) officially reported to CCSBT. Plotted efforts in area 4-9 and area 14-15 were based on the all operations regardless of whether they were targeting SBT or not. In 1960s, efforts of Japanese longline vessels were spread out all CCSBT areas. After that, in 1970s, SBT catches and efforts in area 9 had increased while catches in area 1 and 2 decreased. This decrease in area 1 and 2 was the results of the changing target from SBT to other tunas. In 1990s-2000s, SBT catches and efforts decreased in area 4-9 during first-quarter and in area 7 during fourth quarter compared to those in 1970s-1980s. These changes would be the results of the area/time closure as the quota management. In addition, catches and efforts in area 5 and 6 have been reduced since mid-1990s. During the recent 5 years (2008-2012), there are little temporal-spatial change for the distribution of SBT catches and efforts.

6. Scientific observer program

A total of 10 authorized Japanese longline vessels with scientific observers operated in area 4-9 and caught SBT in 2012. Observer coverage was 10.4% in terms of the number of vessels, 7.9% in terms of the number of hooks used, and 6.9% in terms of the number of SBT caught. The details of scientific observer activities are given in document CCSBT-ESC/1309/22.

7. Other relevant information

[Scientific research]

The trolling research survey that provides the recruitment index of age-1 SBT was carried out in January-February 2013. The recruitment index, the number of age-1 SBT schools per 100 km searched on the piston-line, was 3.48. During this survey, total of 89 SBT were tagged with the CCSBT conventional tags and archival tags. Pop up archival tags were also attached to 6 SBT. Under the Research Mortality Allowance (RMA), 116 SBT (295.6 kg) were killed and collected their otoliths, muscle, and stomach contents in this survey. The details are given in documents CCSBT-ESC/1309/23, 27, and 31.

From September 2012 to August 2013, CCSBT conventional tags from a total of 10 individuals (12 tags) were recovered by Japanese longline vessels. A CSIRO conventional tag from 1 individual (1 tag) and NSW tags from 3 individuals (3 tags) were also recovered. Scientific observers retrieved 8 conventional tags of them (from 7 individuals). One archival tag was also recovered. The details are given in documents CCSBT-SC/1309/22 and 23.

[Activities of otolith collection]

In 2012, Japan collected otoliths from a total of 209 SBT. 121 of them came from commercial longline vessels through the scientific observer program. Remaining 98 of them came from the trolling survey in January-February 2012. These otoliths samples are now in the process of analyzing. The details are given in document CCSBT-SC/1309/24.

References

Fisheries Agency of Japan. 2013. Report of the 2012/2013 RMA utilization and application for the 2013/2014 RMA. CCSBT-ESC/1309/31

Itoh, T. 2013. Change in operation pattern of Japanese southern bluefin tuna longliners in 2012. CCSBT-ESC/1309/28

Itoh, T., O. Sakai, and D. Tokuda 2013. Report of the piston-line trolling monitoring survey for the age-1 southern bluefin tuna recruitment index in 2012/2013 CCSBT-ESC/1309/27

Itoh, T., O. Sakai, A. Hirai and K. Omote 2013. Activities of southern bluefin tuna otolith collection and age estimation and analysis of the age data by Japan in 2012 CCSBT-ESC/1309/24

Sakai, O. and T. Itoh 2013. Report of activities for conventional and archival tagging and recapture for southern bluefin tuna by Japan in 2012/2013 CCSBT-ESC/1309/23

Sakai, O. and T. Itoh 2013. Releases and discards of small-sized southern bluefin tuna by the Japanese longline fishery in 2012 CCSBT-ESC/1309/33

Sakai, O., D. Tokuda, T. Itoh, H. Minami and O. Abe 2013. Report of Japanese scientific observer activities for southern bluefin tuna fishery in 2012 CCSBT-ESC/1309/22

Secretariat 2010. Total allowable catch and its allocation CCSBT-EC/1010/14

Takahashi, N. and T. Itoh 2013. Summary of fisheries indicators of southern bluefin tuna stock in 2013 CCSBT-ESC/1309/26

Table 1 Fishing season of Japanese SBT longliners.

The area ranges are roughly identical to those of the CCSBT statistical area.

	Off Cape (Area 9)			Tasmania (Area 4 & 7)			South Indian Ocean (Area 8)			Total
Year	Start	End	Days	Start	End	Days	Start	End	Days	days
1989	1-Mar	25-Dec	299	1-Mar	25-Dec	299	1-Mar	25-Dec	299	897
1990	1-Apr	31-Jul	122	1-Apr	25-Jun	86	1-Jul	15-Aug	46	254
1991	15-Apr	31-Jul	108	15-May	31-Jul	78	15-Aug	30-Sep	47	233
1992	15-Apr	31-Jul	108	15-May	31-Jul	78	15-Aug	7-Oct	54	240
1993	15-Apr	3-Jul	80	15-May	30-Jun	47	15-Sep	17-Sep	3	130
1994	15-May	26-Jun	43	1-Jun	15-Jun	15	1-Sep	5-Oct	35	93
1995	15-May	25-Jun	42	15-May	20-Jun	37	1-Sep	10-Nov	71	150
1996	1-May	31-Jul	92	15-May	24-Jun	41	1-Sep	30-Nov	91	224
1997	1-May	31-Jul	92	21-Apr	8-Jul	79	1-Sep	14-Dec	105	276
1998	1-May	10-Aug	102	21-Apr	31-Jul	102	5-Sep	5-Dec	92	296
1999	1-May	10-Aug	102	15-Apr	10-Aug	118	1-Sep	1-Dec	92	312
2000	1-May	1-Aug	93	15-Apr	1-Aug	109	1-Sep	27-Dec	118	320
2001	1-May	1-Aug	93	15-Apr	15-Jul	92	1-Sep	28-Nov	89	274
2002	1-May	5-Jul	66	15-Apr	19-Jul	96	1-Sep	28-Nov	89	251
2003	1-May	8-Jul	69	15-Apr	30-Jul	107	1-Sep	16-Dec	107	283
2004	1-May	9-Aug	101	15-Apr	31-Jul	108	1-Sep	23-Dec	114	323
2005	1-May	27-Aug	119	15-Apr	31-Jul	108	1-Sep	13-Dec	104	331
2006	Fishing season was started at 1-May in all area. There was no reguration as the seasonal area closure.									
2007	Fishing season was started at 1-April in all area. There was no reguration as the seasonal area closure.									
2008										
2009										
2010										
2011										
2012										

Table 2 Number of SBT caught, effort and nominal CPUE of SBT by Japanese commercial longline.

N_hooks is the number of hooks in thousand. CPUE = Total SBT/Total Hooks x 1000.
W_SBT is the whole weight of SBT in ton. Figures for 2011 and 2012 are preliminary.

Area	ALL	Area4-9	ALL	Area4-9	ALL	Area4-9	ALL
Calendar year	N_SBT	N_SBT	N_Hook	N_Hook	CPUE	CPUE	W_SBT
1952	6,178	5	1,158	1	5.81	6.42	565
1953	49,888		6,290		9.19		3,890
1954	30,734		5,557		6.44		2,447
1955	24,381		4,368	20	6.16		1,964
1956	119,878	1,102	10,022	169	12.98	6.52	9,603
1957	417,506	215,534	12,108	2,954	34.94	72.96	22,908
1958	225,917	106,306	8,959	1,342	27.26	79.21	12,462
1959	1,003,570	310,294	21,978	3,989	46.48	77.78	61,892
1960	1,189,823	118,269	30,697	1,502	39.49	78.73	75,826
1961	1,215,941	306,323	36,297	5,168	33.82	59.27	77,927
1962	663,558	263,039	30,618	4,270	22.25	61.59	40,397
1963	1,018,040	416,741	43,154	11,280	24.19	36.95	59,724
1964	745,402	278,303	44,287	8,464	17.59	32.88	42,838
1965	722,448	317,388	49,028	14,229	14.74	22.31	40,689
1966	683,668	431,044	69,503	26,667	9.84	16.16	39,644
1967	933,364	714,625	81,634	46,113	11.43	15.50	59,281
1968	831,302	766,092	96,185	61,268	8.64	12.50	49,657
1969	845,692	807,924	94,005	74,839	9.00	10.80	49,769
1970	704,760	685,109	101,472	75,509	6.95	9.07	40,929
1971	698,070	690,172	110,822	92,194	6.30	7.49	38,149
1972	803,335	801,929	98,072	92,746	8.19	8.65	39,458
1973	651,462	649,602	104,310	95,420	6.25	6.81	31,225
1974	673,071	667,237	105,344	91,039	6.39	7.33	34,005
1975	441,100	435,903	94,586	81,643	4.66	5.34	24,134
1976	634,432	628,518	111,677	107,797	5.68	5.83	34,099
1977	536,115	531,027	89,574	87,128	5.99	6.09	29,600
1978	451,655	438,597	87,641	79,006	5.15	5.55	23,632
1979	519,987	517,975	109,581	104,019	4.75	4.98	27,828
1980	585,760	579,872	130,524	122,290	4.49	4.74	33,653
1981	476,696	468,346	124,894	110,758	3.82	4.23	27,981
1982	330,634	326,001	108,967	99,888	3.03	3.26	20,789
1983	426,360	425,454	115,295	107,031	3.70	3.98	24,881
1984	364,993	363,431	133,174	111,861	2.74	3.25	23,328
1985	304,430	303,351	127,095	111,831	2.40	2.71	20,396
1986	212,546	211,671	122,045	110,277	1.74	1.92	15,182
1987	193,670	191,924	121,316	105,120	1.60	1.83	13,964
1988	164,945	164,382	104,232	93,120	1.58	1.77	11,422
1989	175,217	174,885	97,852	89,429	1.79	1.96	9,222
1990	138,979	138,250	63,760	56,506	2.18	2.45	7,056
1991	153,194	152,721	79,463	58,923	1.93	2.59	6,477
1992	147,653	146,995	71,324	55,827	2.07	2.63	6,121
1993	175,874	174,611	75,412	47,860	2.33	3.65	6,318
1994	132,264	130,999	80,809	43,167	1.64	3.03	6,063
1995	123,805	121,058	128,989	47,928	0.96	2.53	5,867
1996	120,109	118,855	110,406	59,846	1.09	1.99	6,392
1997	119,538	118,253	106,771	61,978	1.12	1.91	5,588
1998	129,684	128,940	108,289	60,915	1.20	2.12	7,500
1999	111,108	110,253	94,683	48,372	1.17	2.28	7,554
2000	113,221	112,053	76,730	50,969	1.48	2.20	6,000
2001	139,083	132,809	103,480	52,839	1.34	2.51	6,674
2002	119,243	116,960	86,943	42,353	1.37	2.76	6,192
2003	105,335	103,883	65,068	42,969	1.62	2.42	5,770
2004	105,686	103,417	58,487	47,885	1.81	2.16	5,982
2005	128,661	116,381	73,198	53,630	1.76	2.17	7,855
2006	79,382	67,812	51,040	33,745	1.56	2.01	4,207
2007	56,968	54,557	34,416	24,962	1.66	2.19	2,840
2008	48,579	48,078	38,732	25,675	1.25	1.87	2,950
2009	56,320	56,111	34,749	20,662	1.62	2.72	2,659
2010	46,212	44,620	31,662	15,674	1.46	2.85	2,223
2011	59,405	55,872	28,141	17,754	2.11	3.15	2,519
2012	51,732	50,840	24,245	15,957	2.13	3.19	2,528

*1: Effort of "ALL" area is the sum of the all effort in area 1-10 and the total effort in 5x5 degree cells where has SBT catch in the year.

Table 3 Number of SBT caught by area, year and month by Japanese commercial longline.

Data in 2011 and 2012 are preliminary.

Year	Month	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Others	Total
2008	1	19	45	0	0	0	0	2	4	0	0	70
	2	24	89	0	0	0	0	0	0	0	0	113
	3	3	0	0	0	0	0	0	419	165	0	587
	4	0	0	0	101	0	344	3161	10	342	0	3958
	5	0	8	0	1757	0	1021	3317	279	1583	138	8103
	6	0	2	0	1255	0	30	0	0	6941	0	8228
	7	0	23	0	664	0	0	0	667	7463	9	8826
	8	0	17	0	0	27	0	0	5221	3372	12	8649
	9	0	0	0	27	21	0	0	3022	2019	3	5092
	10	0	2	0	11	2	0	0	636	999	69	1719
	11	0	0	0	0	0	0	0	1921	326	27	2274
	12	0	11	0	0	0	0	0	910	39	0	960
2009	1	27	2	0	0	0	0	0	13	0	0	42
	2	1	0	0	0	0	0	0	0	0	0	1
	3	0	0	0	1	0	0	0	0	0	0	1
	4	0	0	0	826	0	116	3285	0	395	0	4622
	5	0	6	0	3269	0	1631	1210	0	2882	0	8998
	6	0	4	0	1569	0	1531	0	0	3644	11	6759
	7	0	0	0	1976	161	3	0	498	7845	25	10508
	8	0	12	0	33	2	0	0	7320	2668	9	10044
	9	10	64	0	9	0	0	0	6397	1685	16	8181
	10	0	0	0	0	0	0	0	1449	1067	16	2532
	11	0	0	0	0	0	0	0	2646	0	0	2646
	12	4	2	0	0	0	0	0	1980	0	0	1986
2010	1	132	130	0	0	0	0	0	381	0	0	643
	2	49	173	0	39	0	0	27	0	4	1	293
	3	2	122	0	199	0	0	485	0	1211	32	2051
	4	0	81	0	43	0	0	6710	179	5320	13	12346
	5	0	200	0	3020	0	0	1947	90	6659	0	11916
	6	0	431	0	1195	0	0	0	416	5109	35	7186
	7	0	161	0	0	1	0	0	35	4021	2	4220
	8	0	0	0	7	0	0	0	3265	1639	21	4932
	9	0	4	0	4	0	0	0	154	334	0	496
	10	0	0	0	0	0	0	0	70	198	1	269
	11	0	0	0	0	0	0	0	1135	705	2	1842
	12	0	0	0	0	0	0	0	15	3	0	18
2011	1	9	0	0	0	0	0	0	0	0	0	9
	2	0	0	0	0	0	0	0	0	0		0
	3	0	0	0	8	0	0	249	0	177	0	434
	4	0	26	0	48	0	0	11298	1	2150	0	13523
	5	0	762	0	1676	0	0	2782	76	5746	0	11042
	6	0	779	0	1145	0	0	0	33	10092	175	12224
	7	0	904	0	45	0	0	0	197	8848	216	10210
	8	0	226	0	55	91	0	0	1874	2020	392	4658
	9	12	6	0	5	7	0	0	1975	2347	14	4366
	10	2	3	0	1	2	0	0	870	288	7	1173
	11	0	0	0	0	0	0	0	1305	0	0	1305
	12	0	0	0	0	0	0	0	461	0	0	461
2012	1	0	17	0	0	0	0	0	9	0	2	28
	2	6	7	0	0	0	0	0	0	0	0	13
	3	99	29	0	0	0	0	909	0	816	0	1853
	4	0	8	0	8	0	0	12302	2	3122	0	15442
	5	0	53	0	1232	0	0	1559	0	5180	3	8027
	6	0	273	0	79	0	0	0	54	8851	37	9294
	7	0	270	0	0	1	0	0	213	6632	70	7186
	8	0	0	0	0	0	0	0	4120	2868	18	7006
	9	0	0	0	4	0	0	0	1823	566	0	2393
	10	0	0	0	0	0	0	0	89	12	0	101
	11	0	0	0	0	0	0	0	366	13	0	379
	12	0	0	0	0	10	0	0	0	0		10
2008	Total	46	197	0	3815	50	1395	6480	13089	23249	258	48579
2009	Total	42	90	0	7683	163	3281	4495	20303	20186	77	56320
2010	Total	183	1302	0	4507	1	0	9169	5740	25203	107	46212
2011	Total	23	2706	0	2983	100	0	14329	6792	31668	804	59405
2012	Total	105	657	0	1323	11	0	14770	6676	28060	130	51732

Table 4 Number of hooks (x1,000) by area, year and month by Japanese commercial longline. Data in 2011 and 2012 are preliminary.

Year	Month	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Others	Total
2008	1	440	132					16	21		2517	3126
	2	446	50								1992	2488
	3	266			145				89	130	790	1420
	4	108	370		255		80	614	27	675	349	2477
	5		989		617		193	644	219	1149	488	4299
	6	3	1911		1242		11		17	2801	872	6858
	7	78	1581		863	154			579	3685	505	7446
	8	30	465			410			3050	2298	861	7113
	9	680	64		142	101			1622	767	1505	4881
	10	815	122		150	58			446	397	1571	3561
	11	99							1268	93	1453	2912
	12	75	26						629	17	2245	2992
2009	1	1196	4						11	25	2114	3349
	2	591			55					56	1308	2010
	3	130			431					78	699	1338
	4	69	195		387		21	634		311	576	2192
	5	6	1078		1024		358	222		664	699	4050
	6		1403		872	49	332			1466	993	5115
	7		2126		334	384	7		189	1557	649	5246
	8	131	507		26	371			3304	1066	1197	6601
	9	779	167		324	19			1975	630	1530	5423
	10	347	43		14	54			550	529	674	2211
	11								1232	127	342	1701
	12	436	16						976		280	1707
2010	1	672	105		14				216		1695	2701
	2	267	137		354			24		11	1402	2196
	3	68	113		878	29		104		317	954	2464
	4		550		357			969	203	1119	770	3969
	5		1206		1144			208	444	1766	767	5534
	6		1787		835	14			304	1821	1730	6491
	7		1969		27	284			16	996	1760	5052
	8	139	593		113	31			849	739	1451	3915
	9	527	243		88				43	529	978	2407
	10	615							27	332	833	1807
	11	185							334	125	1208	1852
	12	30							7	4	1629	1670
2011	1	56			78						1838	1972
	2	27	6		393				43		1704	2173
	3	50	24		741			81	91	218	1467	2672
	4		396		190			1527	98	694	800	3705
	5		1011		969			378	185	1795	1043	5382
	6		1175		682				115	1810	1394	5177
	7		1170		517	158			67	1140	2003	5055
	8	3	362		25	848			695	765	1290	3988
	9	200	85		259	456			748	617	909	3276
	10	282	19		129	174			221	196	1113	2134
	11				95				407	16	1401	1920
	12	4							130		1202	1335
2012	1	14	21		141				7		2119	2302
	2	56	14		265	16					1788	2139
	3	49	16		398			440		291	1103	2297
	4	7	436		208			1853	161	902	995	4561
	5		1035		1294	7		158	36	1168	1137	4835
	6		1390		570	78			180	1796	1037	5051
	7		1216		202	570			184	1096	1335	4605
	8		122		104	721			1375	464	2001	4786
	9	91	35		77	57			504	305	1680	2749
	10	3			87	15			23	108	1490	1726
	11								49	21	619	689
	12					26					150	176
2008	Total	3041	5709		3415	723	283	1274	7967	12013	15148	49573
2009	Total	3683	5539		3466	877	718	856	8238	6507	11060	40945
2010	Total	2503	6703		3810	359		1304	2442	7758	15176	40056
2011	Total	621	4249		4077	1637		1986	2801	7252	16164	38788
2012	Total	219	4285		3347	1490		2451	2519	6151	15455	35916

Table 5 Nominal CPUE of SBT by area, year and month by Japanese commercial longline. Data in 2011 and 2012 are preliminary. CPUE=1000x Total_N SBT_N/Total_N Hooks.

Year	Month	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Area 9	Others
2008	1	0.04	0.34					0.13	0.19		0.00
	2	0.05	1.78								0.00
	3	0.01			0.00				4.73	1.27	0.00
	4	0.00	0.00		0.40		4.33	5.15	0.36	0.51	0.00
	5		0.01		2.85		5.29	5.15	1.27	1.38	0.28
	6	0.00	0.00		1.01		2.73		0.00	2.48	0.00
	7	0.00	0.01		0.77	0.00			1.15	2.02	0.02
	8	0.00	0.04			0.07			1.71	1.47	0.01
	9	0.00	0.00		0.19	0.21			1.86	2.63	0.00
	10	0.00	0.02		0.07	0.03			1.42	2.51	0.04
	11	0.00							1.52	3.50	0.02
	12	0.00	0.42						1.45	2.32	0.00
2009	1	0.02	0.56						1.16	0.00	0.00
	2	0.00			0.00					0.00	0.00
	3	0.00			0.00					0.00	0.00
	4	0.00	0.00		2.14		5.59	5.18		1.27	0.00
	5	0.00	0.01		3.19		4.56	5.45		4.34	0.00
	6		0.00		1.80	0.00	4.61			2.49	0.01
	7		0.00		5.91	0.42	0.42		2.63	5.04	0.04
	8	0.00	0.02		1.28	0.01			2.22	2.50	0.01
	9	0.01	0.38		0.03	0.00			3.24	2.68	0.01
	10	0.00	0.00		0.00	0.00			2.63	2.02	0.02
	11								2.15	0.00	0.00
	12	0.01	0.13						2.03		0.00
2010	1	0.20	1.24		0.00				1.77		0.00
	2	0.18	1.26		0.11			1.13		0.36	0.00
	3	0.03	1.08		0.23	0.00		4.66		3.82	0.03
	4		0.15		0.12			6.93	0.88	4.75	0.02
	5		0.17		2.64			9.38	0.20	3.77	0.00
	6		0.24		1.43	0.00			1.37	2.81	0.02
	7		0.08		0.00	0.00			2.15	4.04	0.00
	8	0.00	0.00		0.06	0.00			3.85	2.22	0.01
	9	0.00	0.02		0.05				3.61	0.63	0.00
	10	0.00							2.61	0.60	0.00
	11	0.00							3.40	5.64	0.00
	12	0.00							2.08	0.86	0.00
2011	1	0.16			0.00						0.00
	2	0.00	0.00		0.00				0.00		0.00
	3	0.00	0.00		0.01			3.07	0.00	0.81	0.00
	4		0.07		0.25			7.40	0.01	3.10	0.00
	5		0.75		1.73			7.36	0.41	3.20	0.00
	6		0.66		1.68				0.29	5.58	0.13
	7		0.77		0.09	0.00			2.94	7.76	0.11
	8	0.00	0.62		2.18	0.11			2.70	2.64	0.30
	9	0.06	0.07		0.02	0.02			2.64	3.80	0.02
	10	0.01	0.15		0.01	0.01			3.94	1.47	0.01
	11				0.00				3.21	0.00	0.00
	12	0.00							3.56		0.00
2012	1	0.00	0.80		0.00				1.36		0.00
	2	0.11	0.50		0.00	0.00					0.00
	3	2.04	1.82		0.00			2.06		2.80	0.00
	4	0.00	0.02		0.04			6.64	0.01	3.46	0.00
	5		0.05		0.95	0.00		9.85	0.00	4.44	0.00
	6		0.20		0.14	0.00			0.30	4.93	0.04
	7		0.22		0.00	0.00			1.15	6.05	0.05
	8		0.00		0.00	0.00			3.00	6.18	0.01
	9	0.00	0.00		0.05	0.00			3.62	1.86	0.00
	10	0.00			0.00	0.00			3.85	0.11	0.00
	11								7.49	0.62	0.00
	12					0.38					0.00
2008	Total	0.02	0.03		1.12	0.07	4.92	5.09	1.64	1.94	0.02
2009	Total	0.01	0.02		2.22	0.19	4.57	5.25	2.46	3.10	0.01
2010	Total	0.07	0.19		1.18	0.00		7.03	2.35	3.25	0.01
2011	Total	0.04	0.64		0.73	0.06		7.21	2.42	4.37	0.05
2012	Total	0.48	0.15		0.40	0.01		6.03	2.65	4.56	0.01

Table 6 Number of Japanese longline vessels that caught SBT.

The numbers of vessel that caught SBT more than 0 and that more than 100 are shown.
Data in recent years are preliminary.

Year	All longline (1)	SBT>0 (2)	SBT>100 (2)	RTMP_SBT>0 (3)	RTMP_SBT>100 (3)
1983	770	270	265		
1984	761	287	276		
1985	773	293	275		
1986	771	271	253		
1987	770	276	248		
1988	759	255	223		
1989	764	256	229		
1990	758	250	240		
1991	737	196	187		
1992	723	205	192		
1993	722	209	186		
1994	716	201	193		
1995	703	210	201	184	177
1996	674	230	218	210	200
1997	661	213	205	207	201
1998	663	220	205	211	200
1999	528	188	183	185	180
2000	529	180	168	167	163
2001	529	196	187	186	182
2002	523	187	175	173	167
2003	517	173	162	163	159
2004	506	171	167	169	165
2005	491	164	160	160	156
2006	435	133	125	133	125
2007	420	137	128	136	127
2008	407	125	123	126	124
2009	313	99	96	100	94
2010	296	84	82	86	83
2011	*288*	*82*	*78*	*83*	*80*
2012	*270*	*91*	*86*	*93*	*86*

*(1): The total number of Japanese high sea longline vessels.

*(2): The total number of Japanese high sea longline vessels operated in the statistical area 4-9.

*(3): The total number of Japanese high sea longline vessels based on the RTMP data (for all the statistical areas).

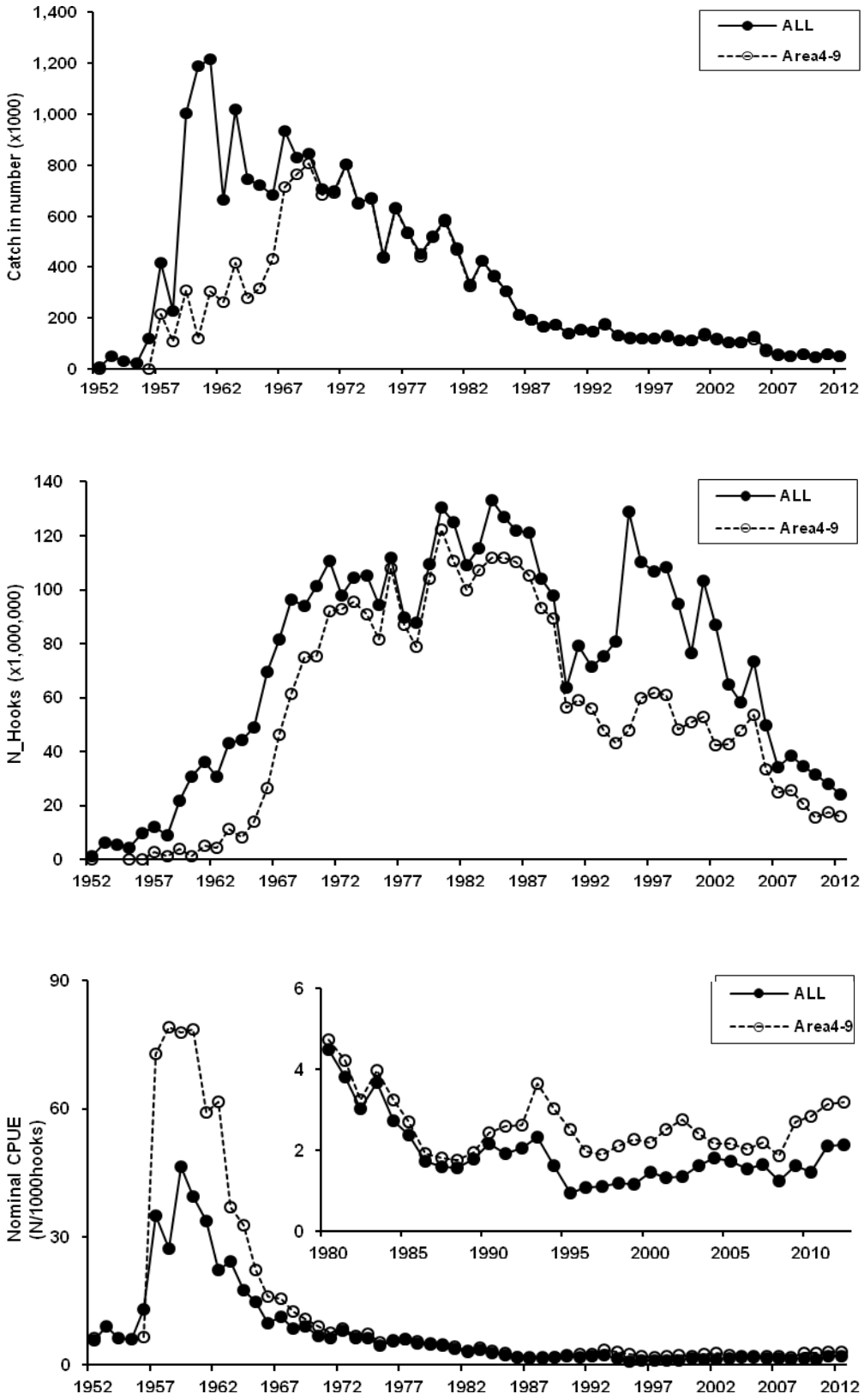

Fig. 1 Number of SBT caught, effort and nominal CPUE of SBT by Japanese longline.

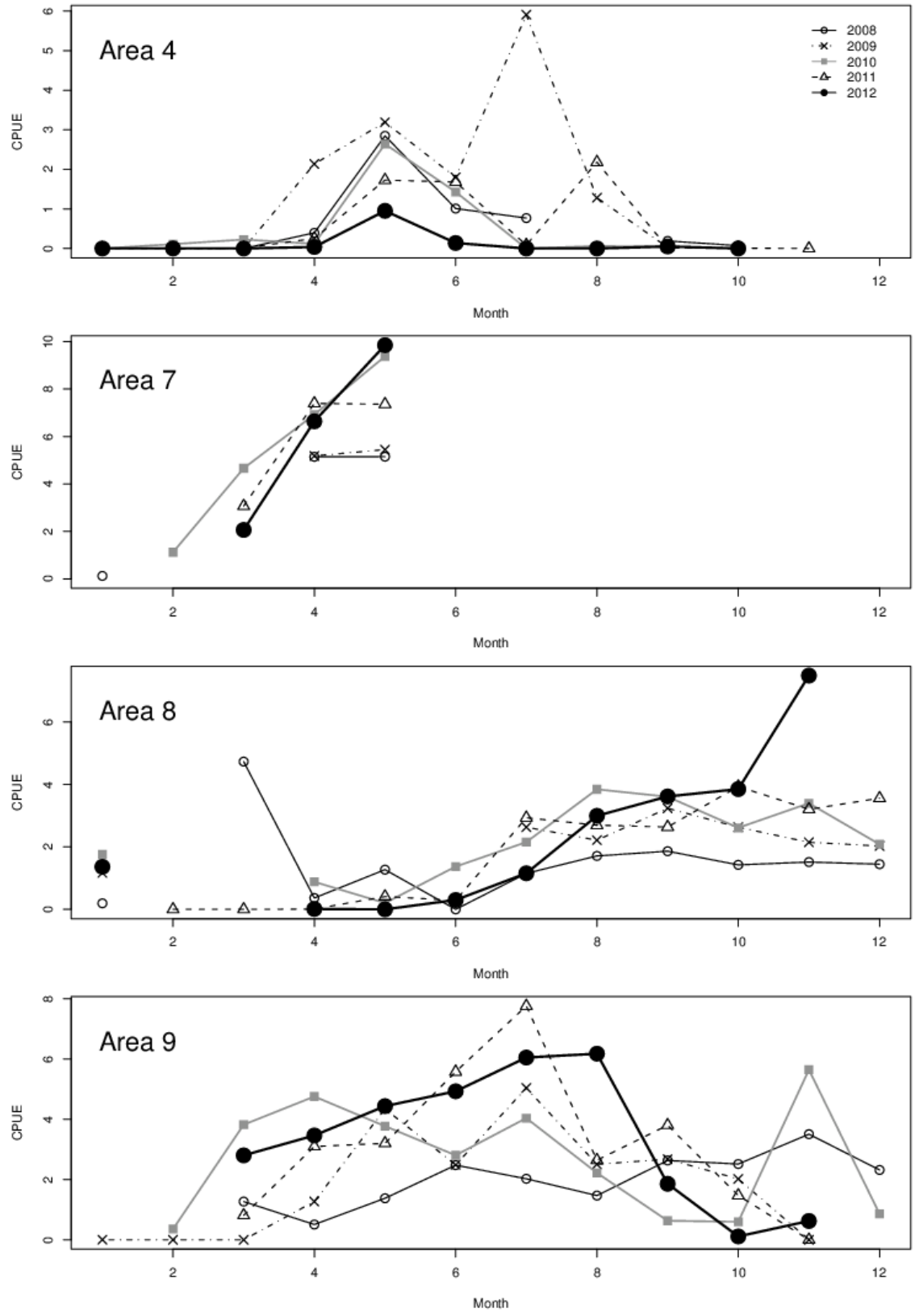

Fig. 2 Nominal CPUE of SBT by area, year and month.

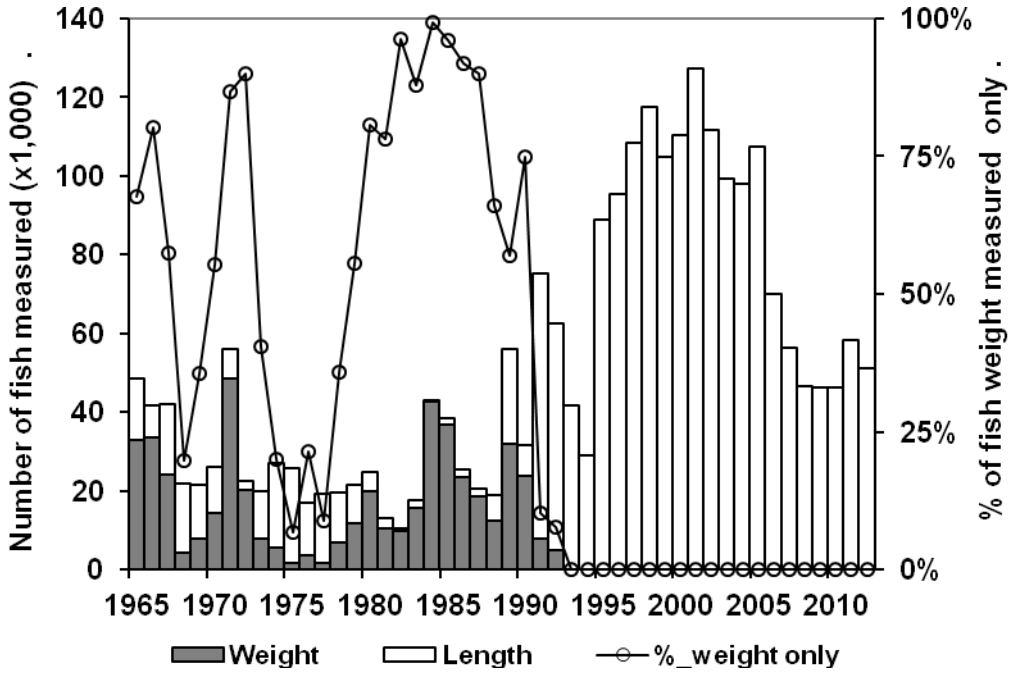

Fig. 3 Number of size measured SBT in length or weight.

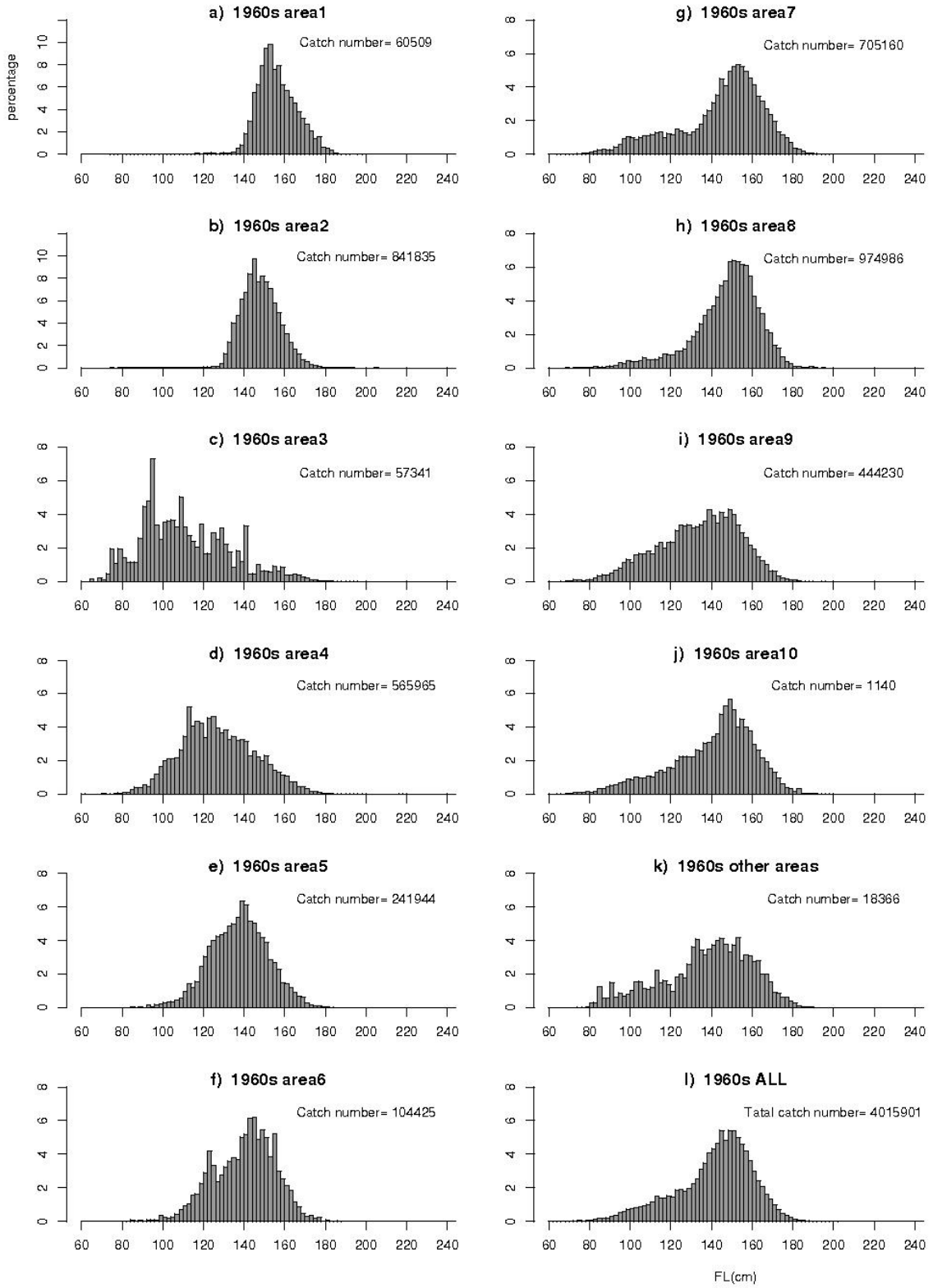

Fig. 4 (1) Length frequency distribution (by Area, the 1960s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

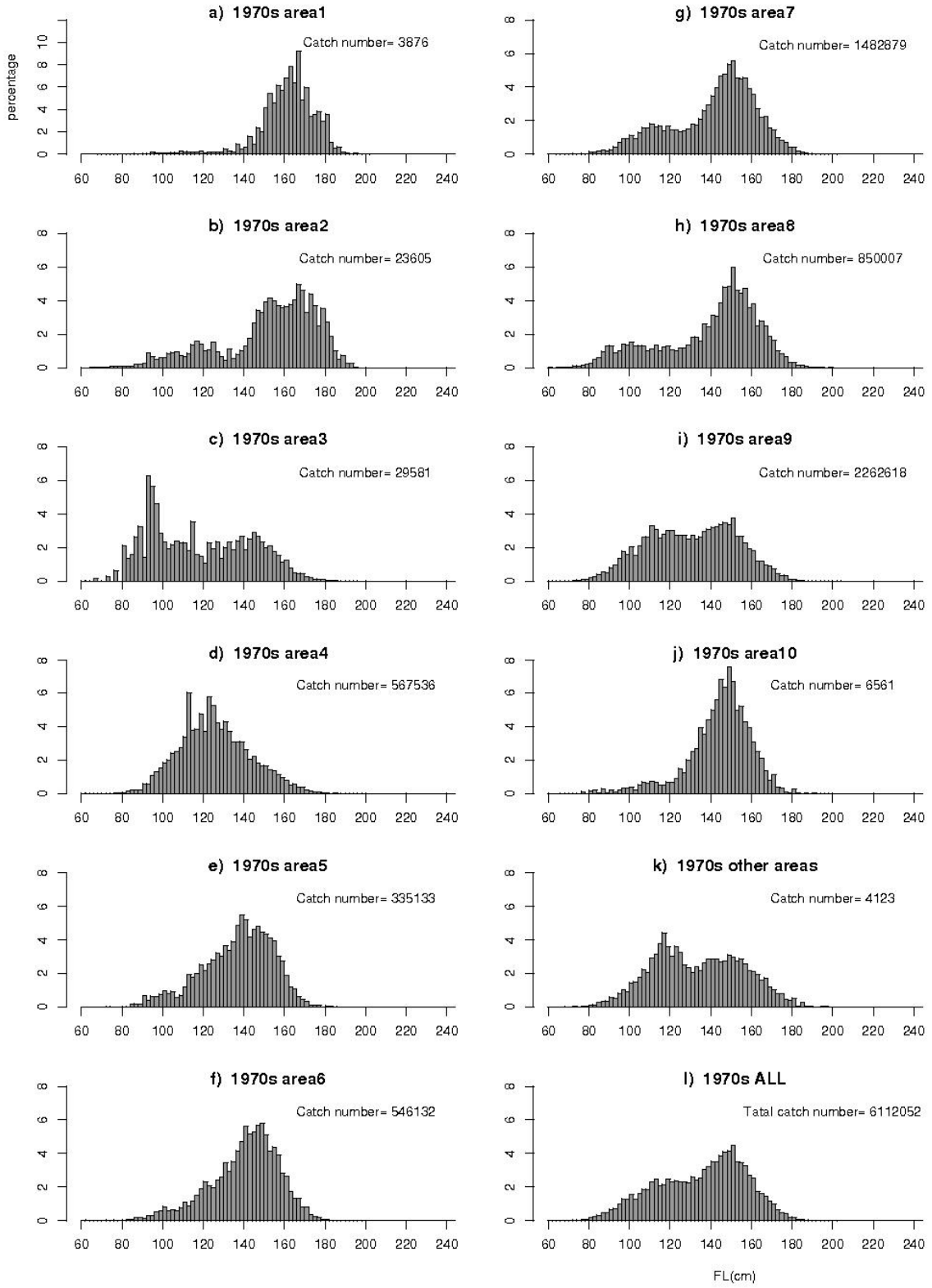

Fig. 4 (2) Length frequency distribution (by Area, the 1970s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

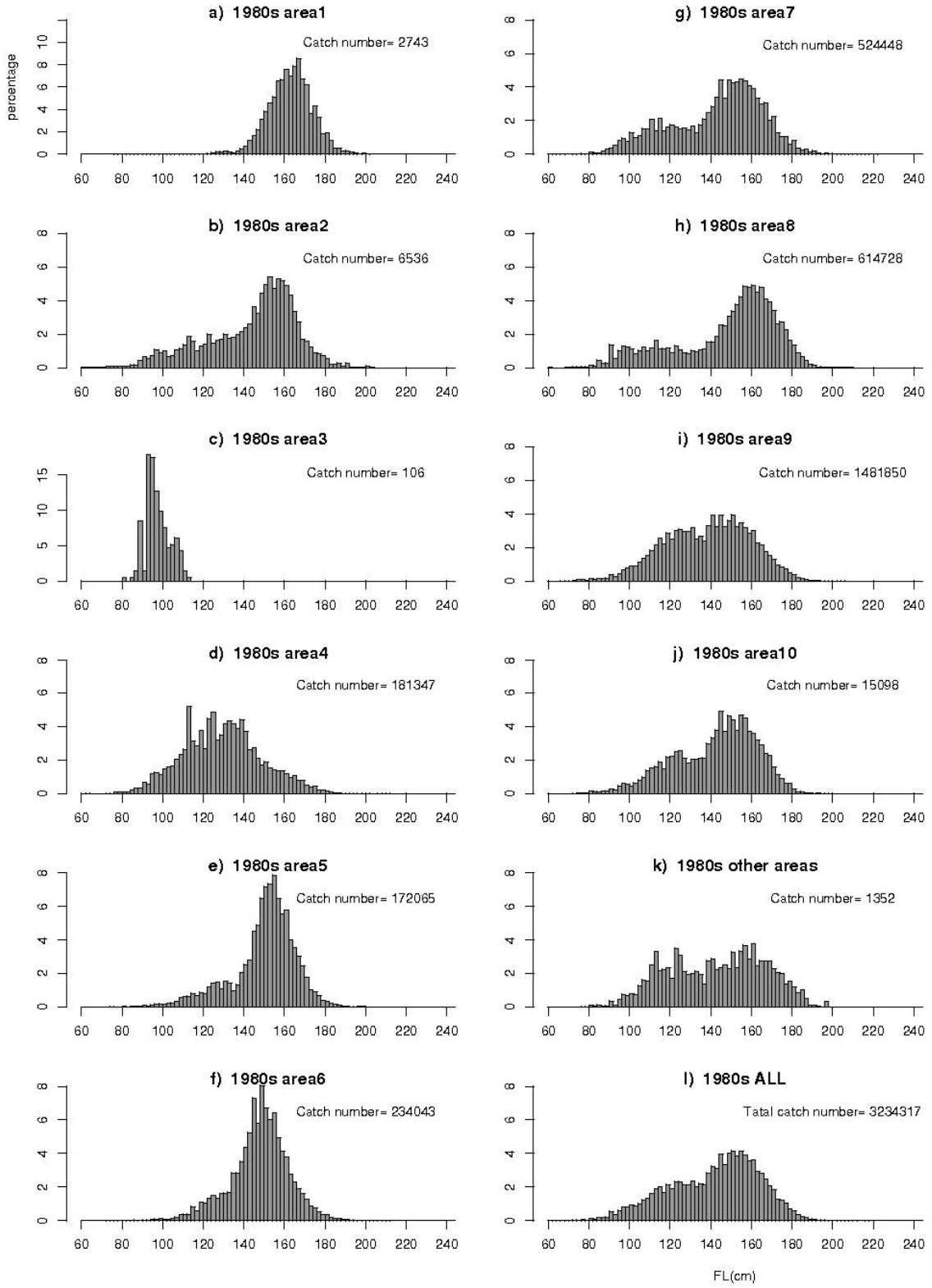

Fig. 4 (3) Length frequency distribution (by Area, the 1980s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

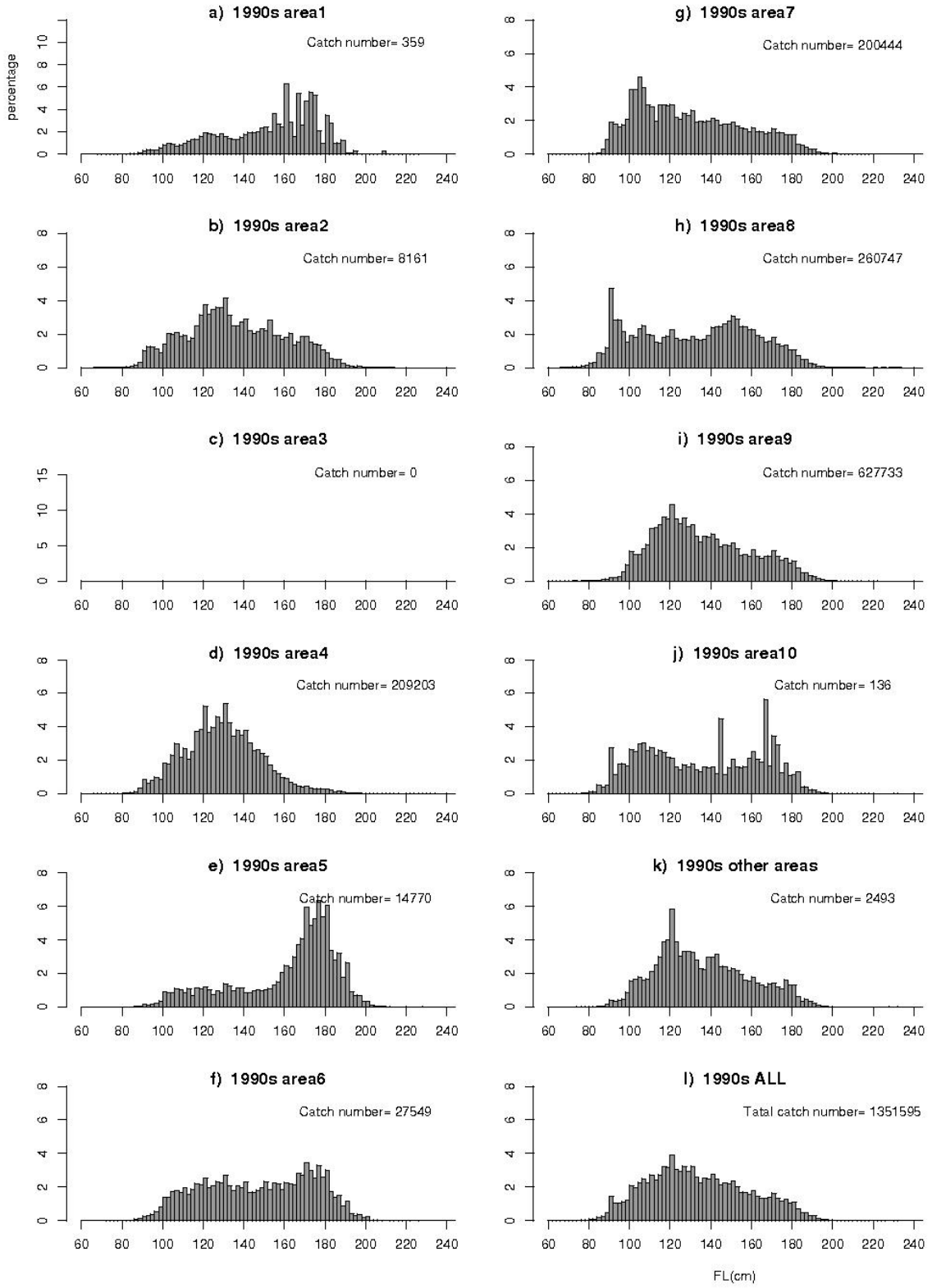

Fig. 4 (4) Length frequency distribution (by Area, the 1990s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

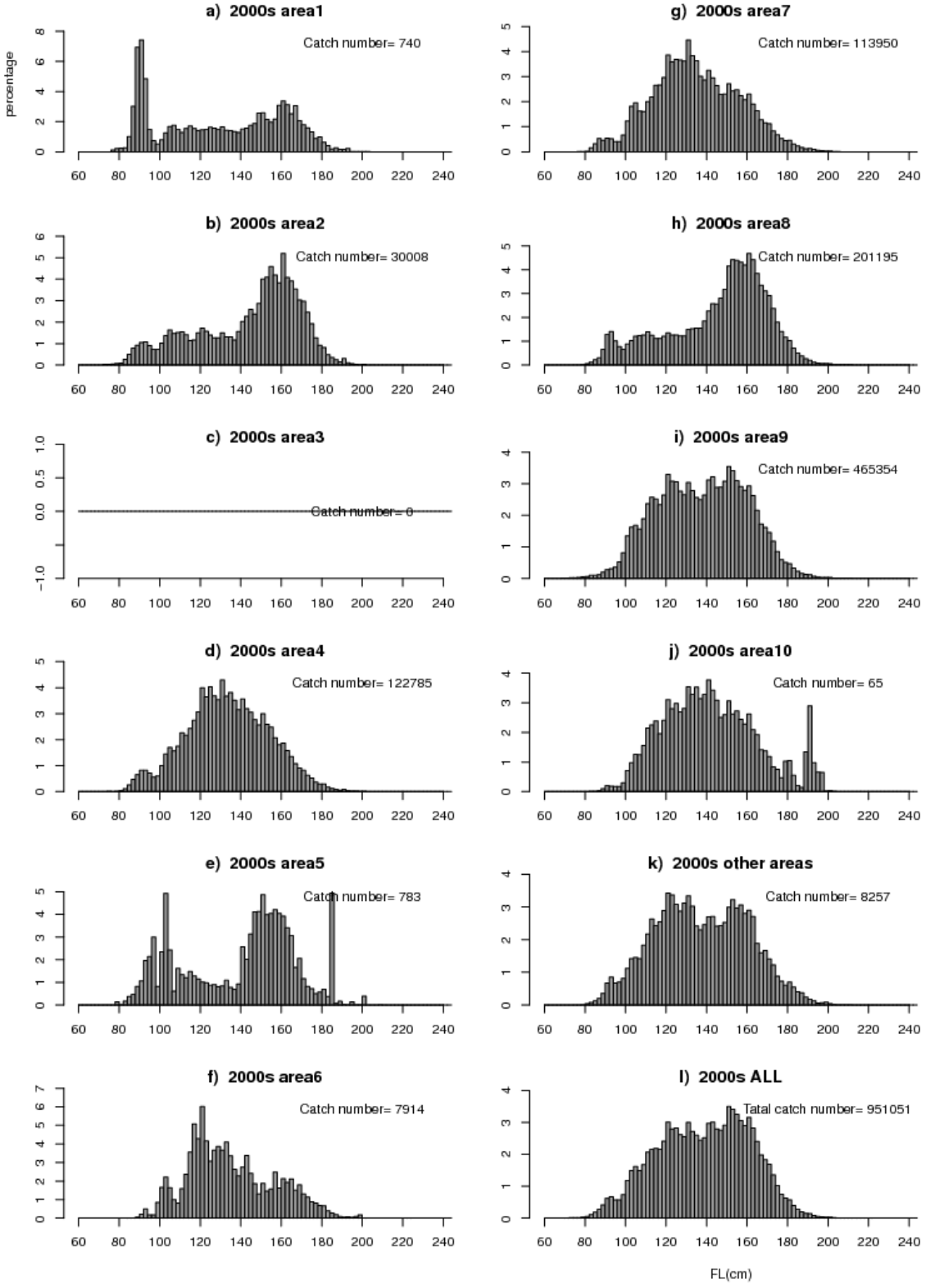

Fig. 4 (5) Length frequency distribution (by Area, the 2000s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

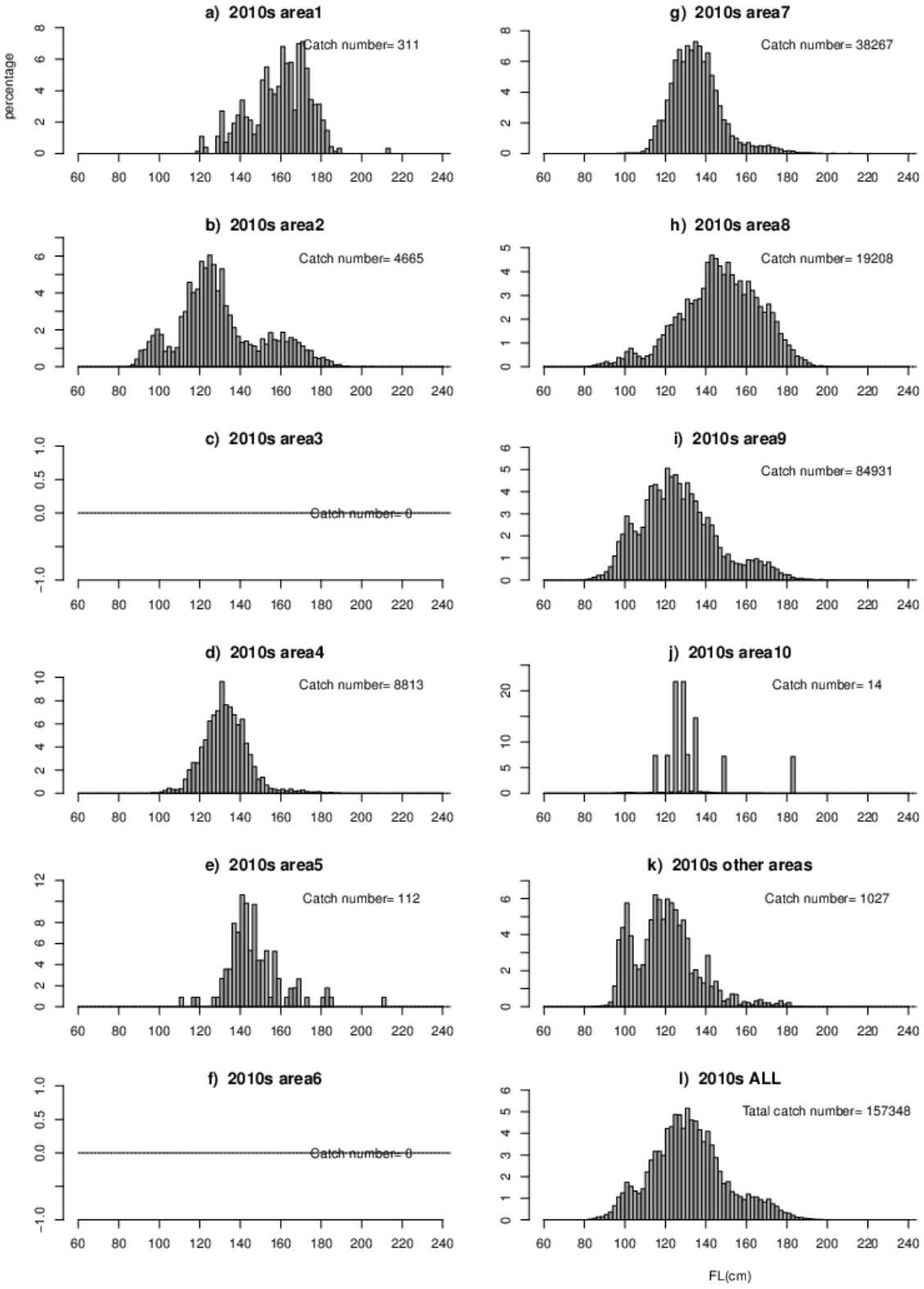

Fig. 4 (6) Length frequency distribution (by Area, the 2010s)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.
Data are up to 2012.

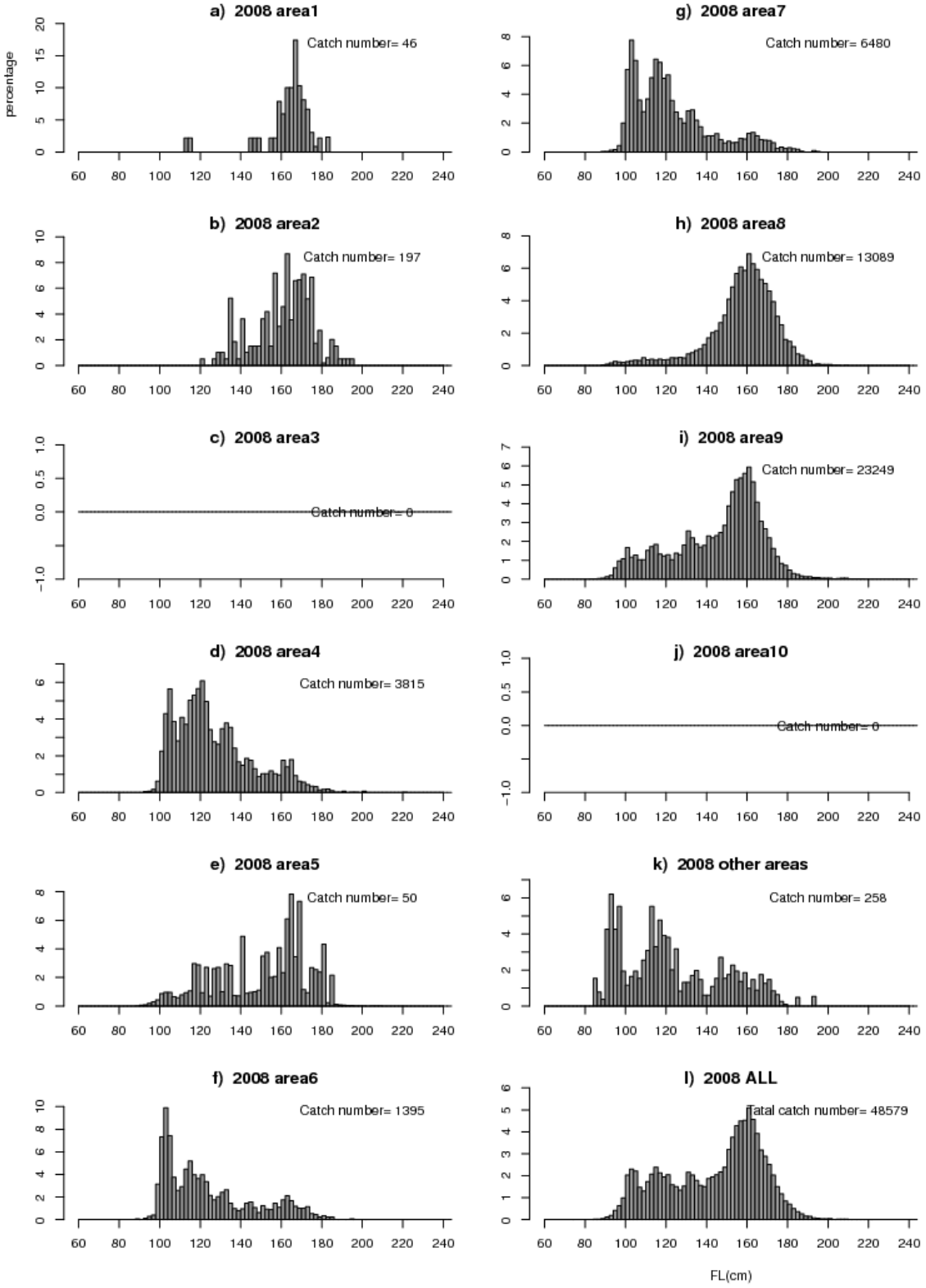

Fig. 5 (1) Length frequency distribution (by Area, year=2008)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

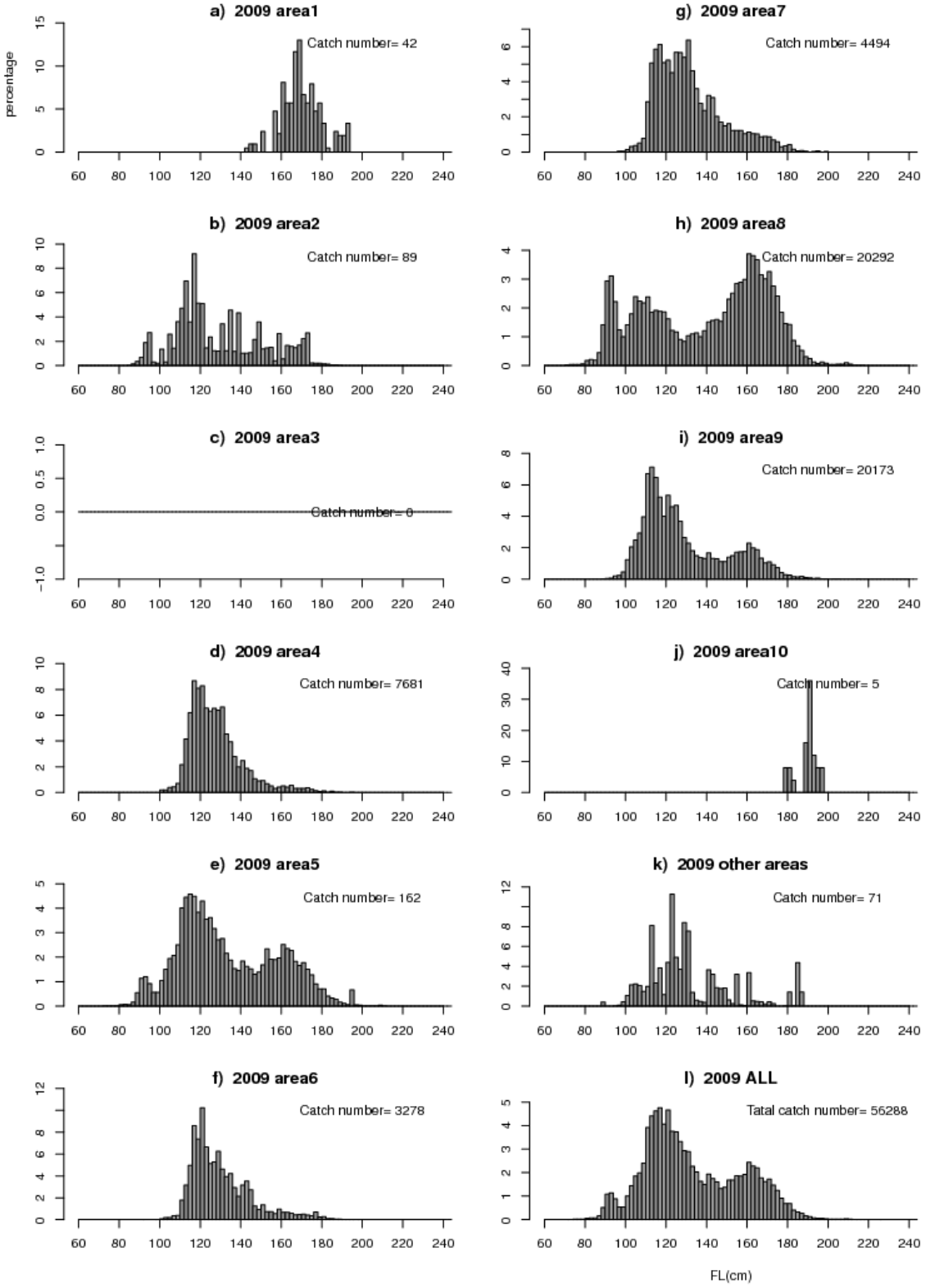

Fig. 5 (2) Length frequency distribution (by Area, year=2009)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

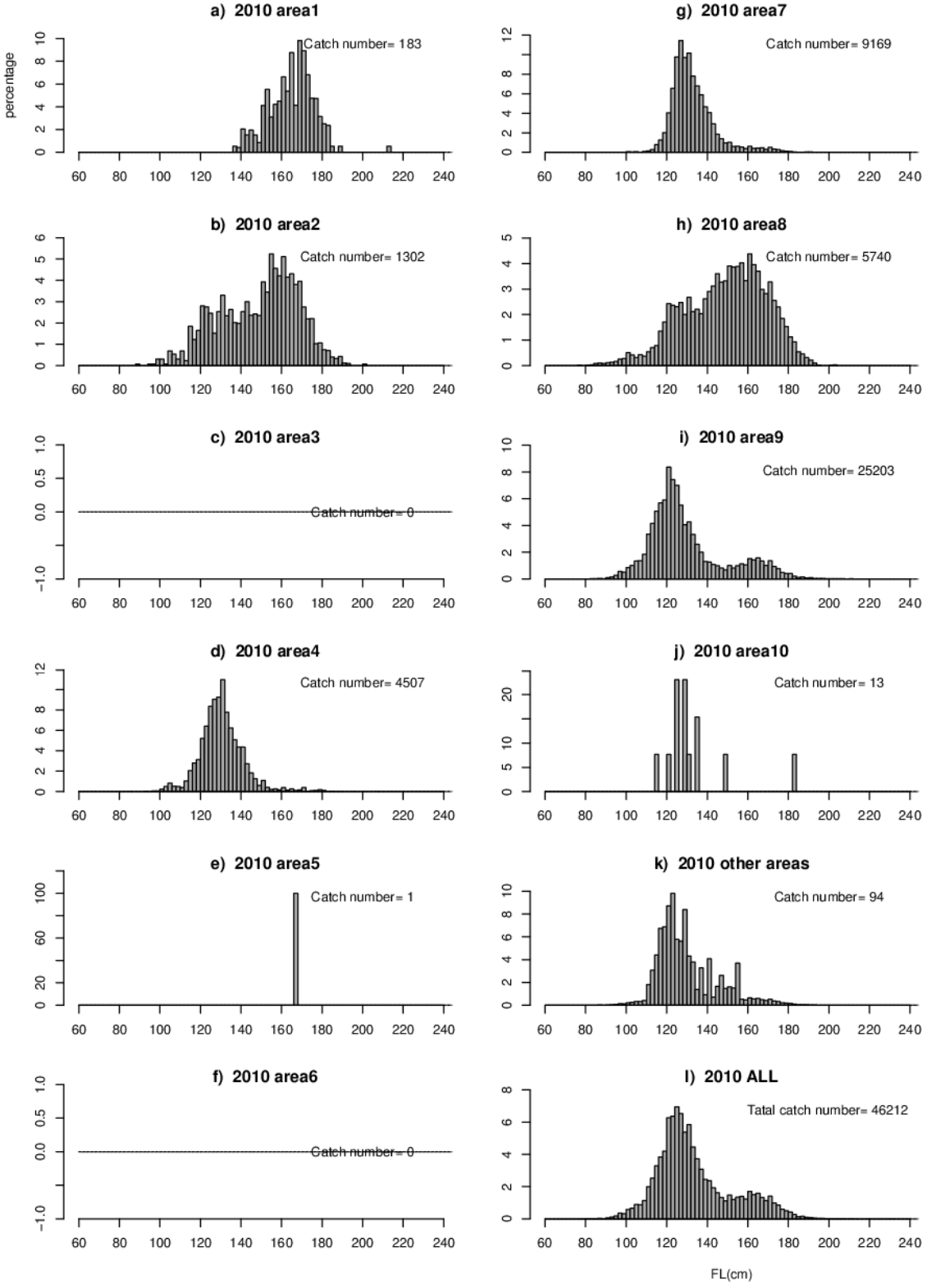

Fig. 5 (3) Length frequency distribution (by Area, year=2010)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

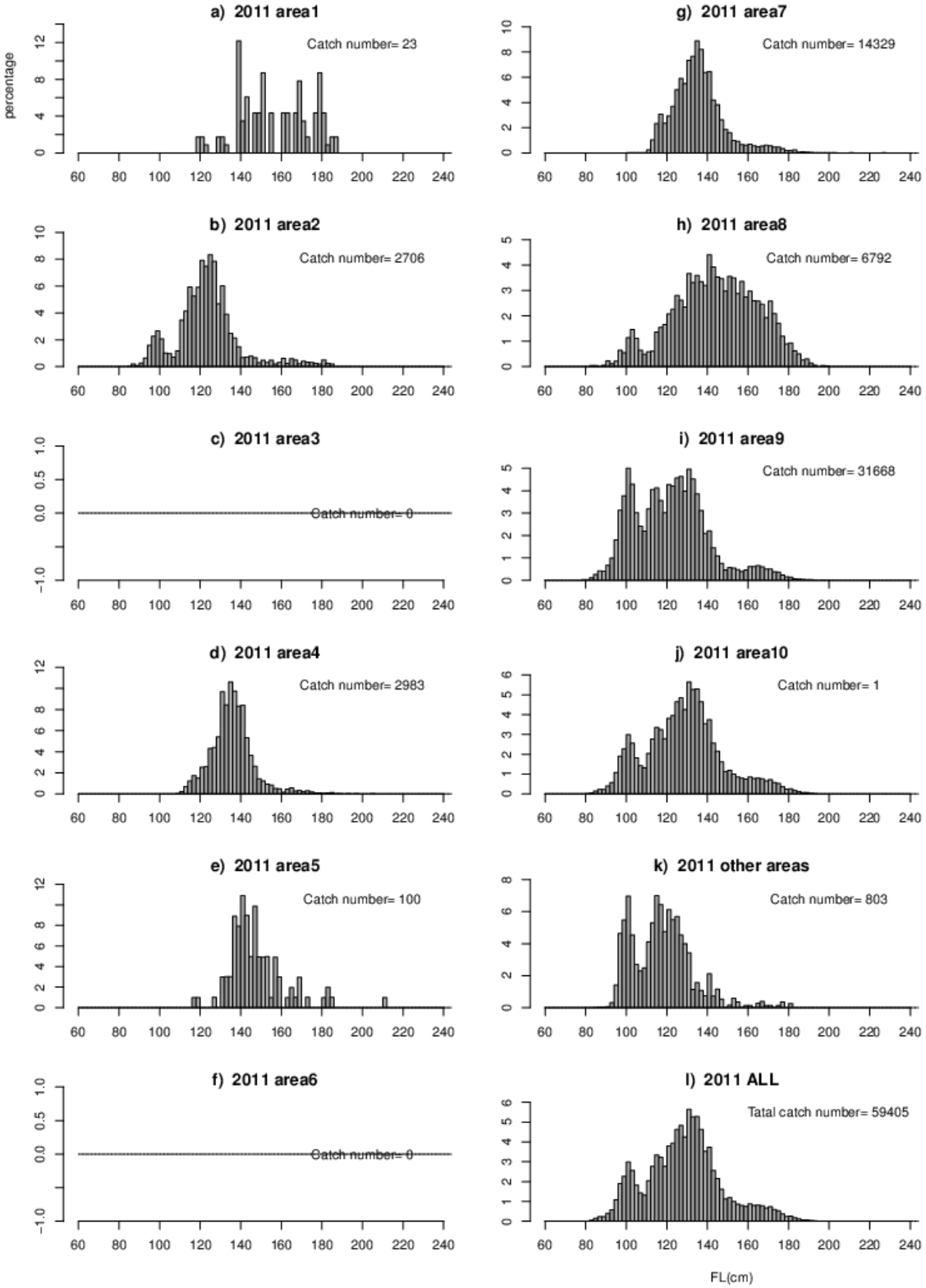

Fig. 5 (4) Length frequency distribution (by Area, year=2011)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

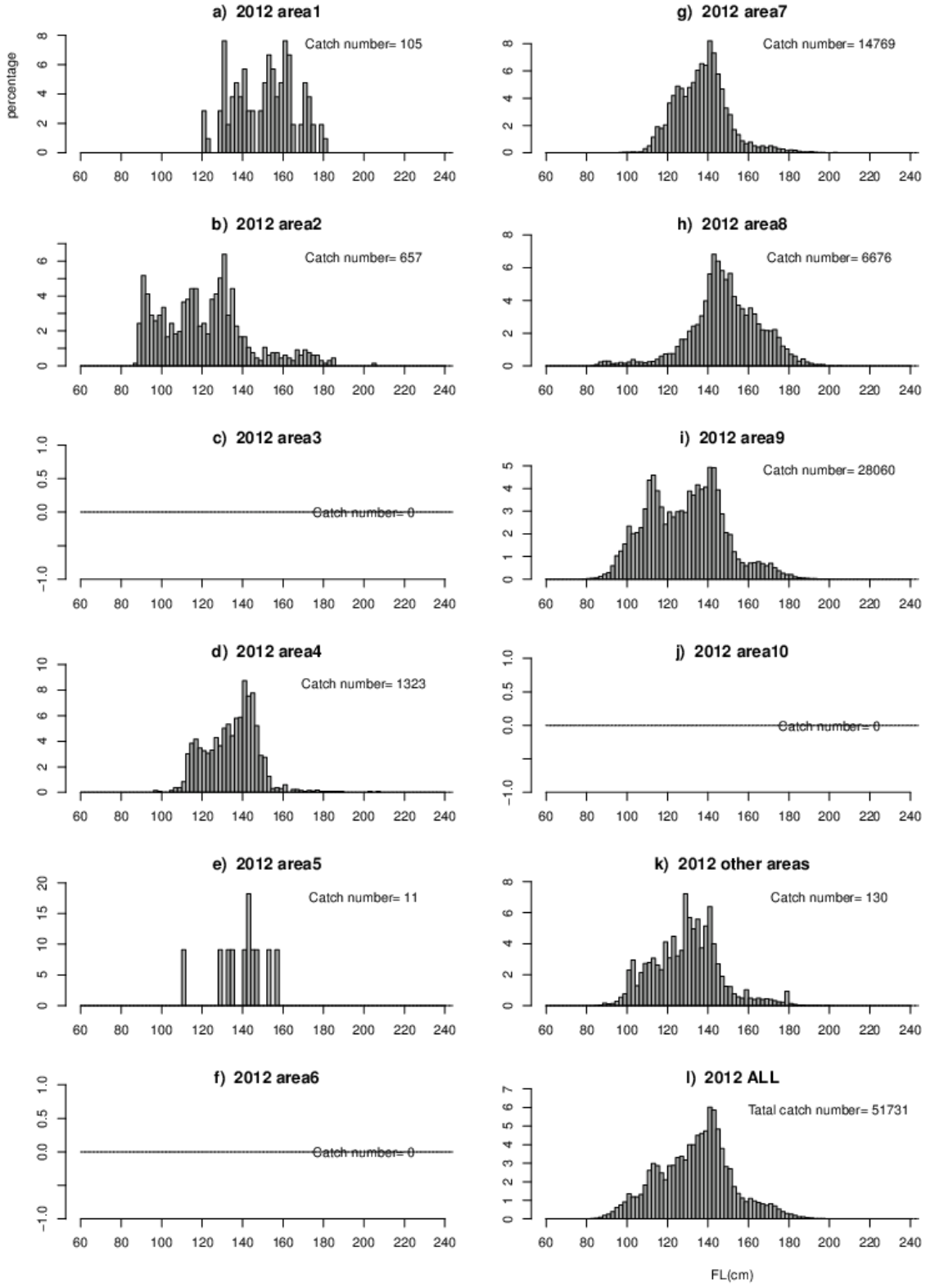

Fig. 5 (5) Length frequency distribution (by Area, year=2012)

X-axis is fork length in cm and Y-axis is %.
These histograms included the estimated data based on the length frequency of all areas.
This estimation was made following the procedure of 1994 workshop.

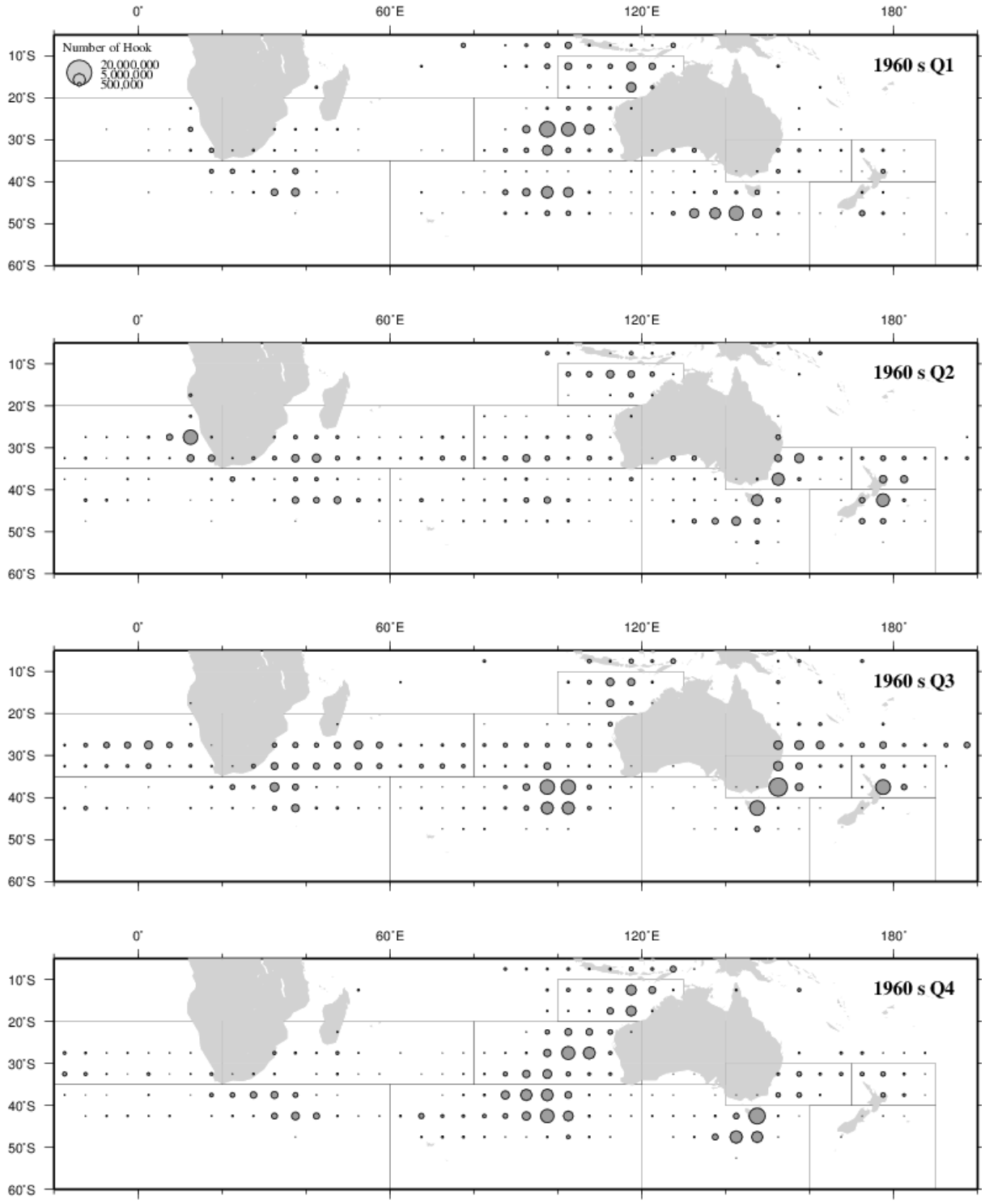

Fig.6 (1) Number of Hooks by decade, quarter and 5x5 degrees square (1960s)

Data are between 1965 and 1969.

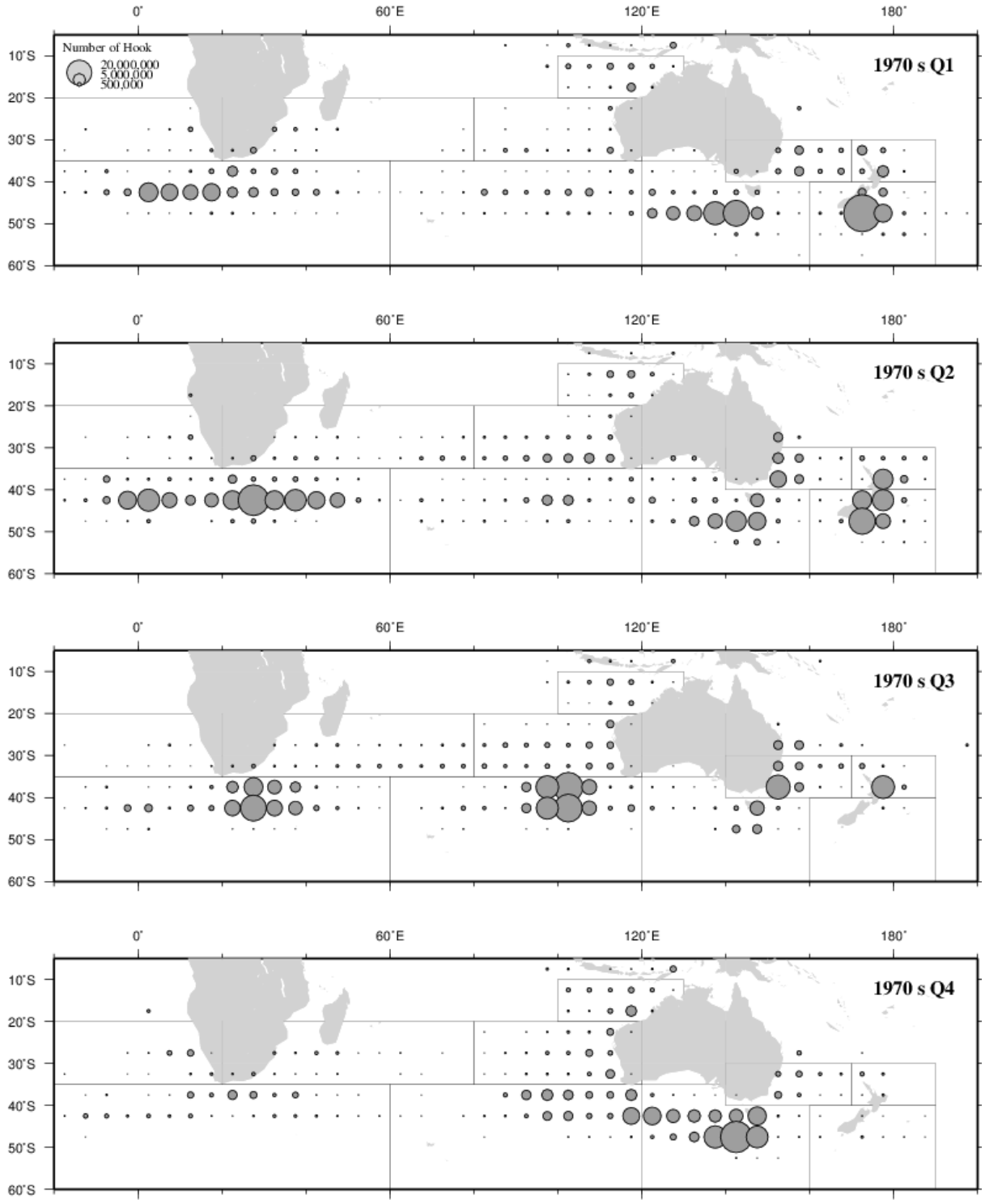

Fig.6 (2) Number of Hooks by decade, quarter and 5x5 degrees square (1970s)

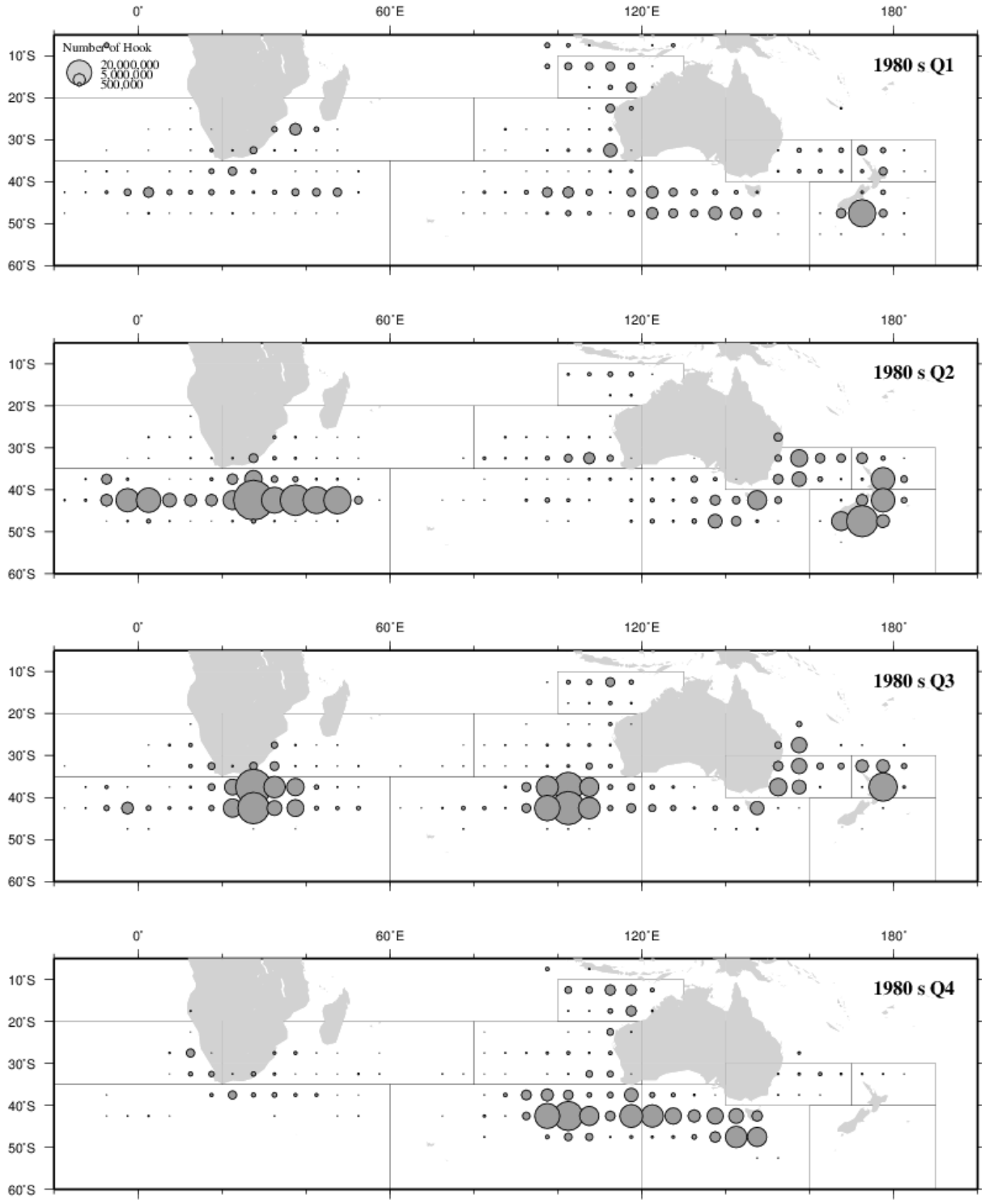

Fig.6 (3) Number of Hooks by decade, quarter and 5x5 degrees square (1980s)

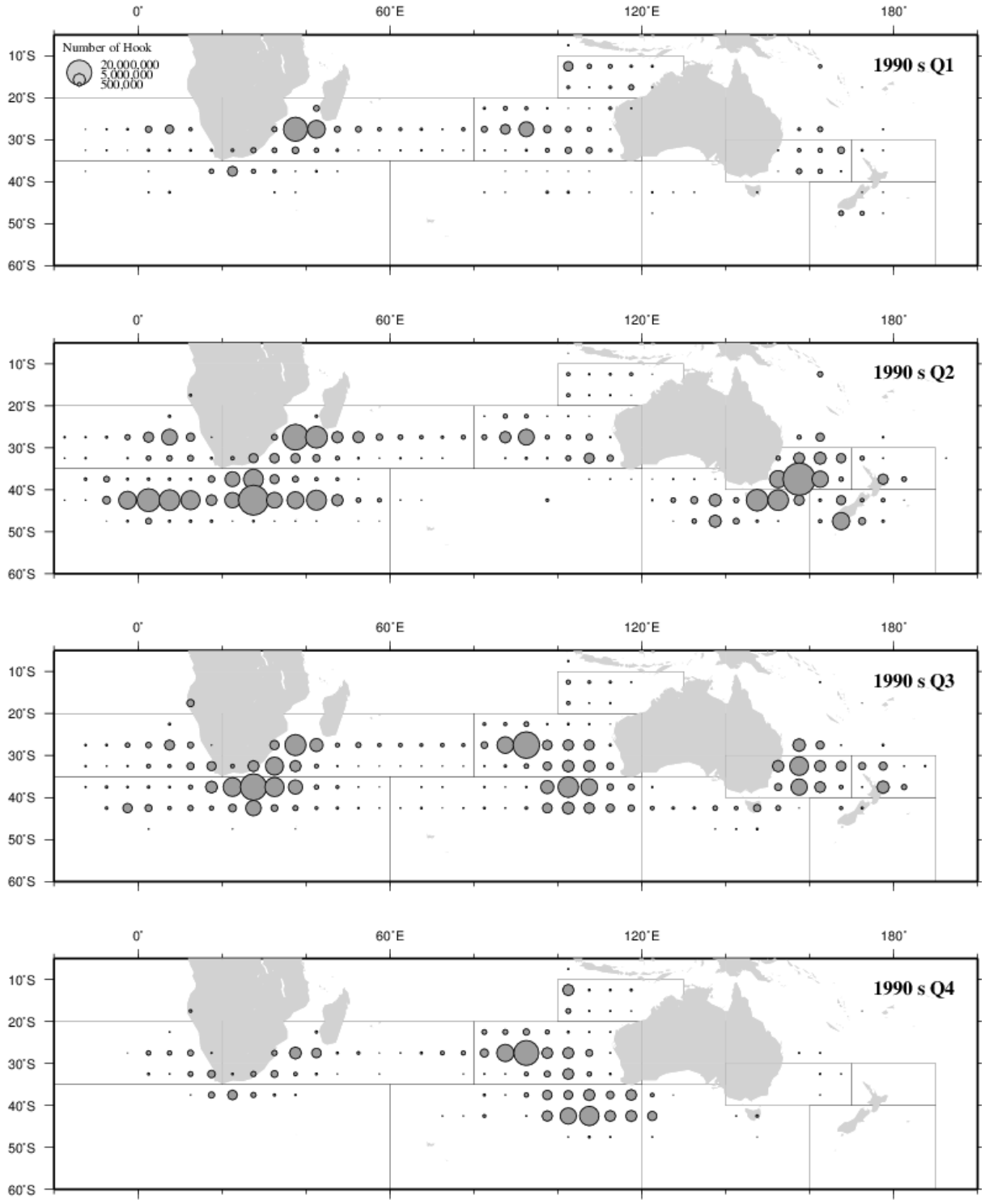

Fig.6 (4) Number of Hooks by decade, quarter and 5x5 degrees square (1990s)

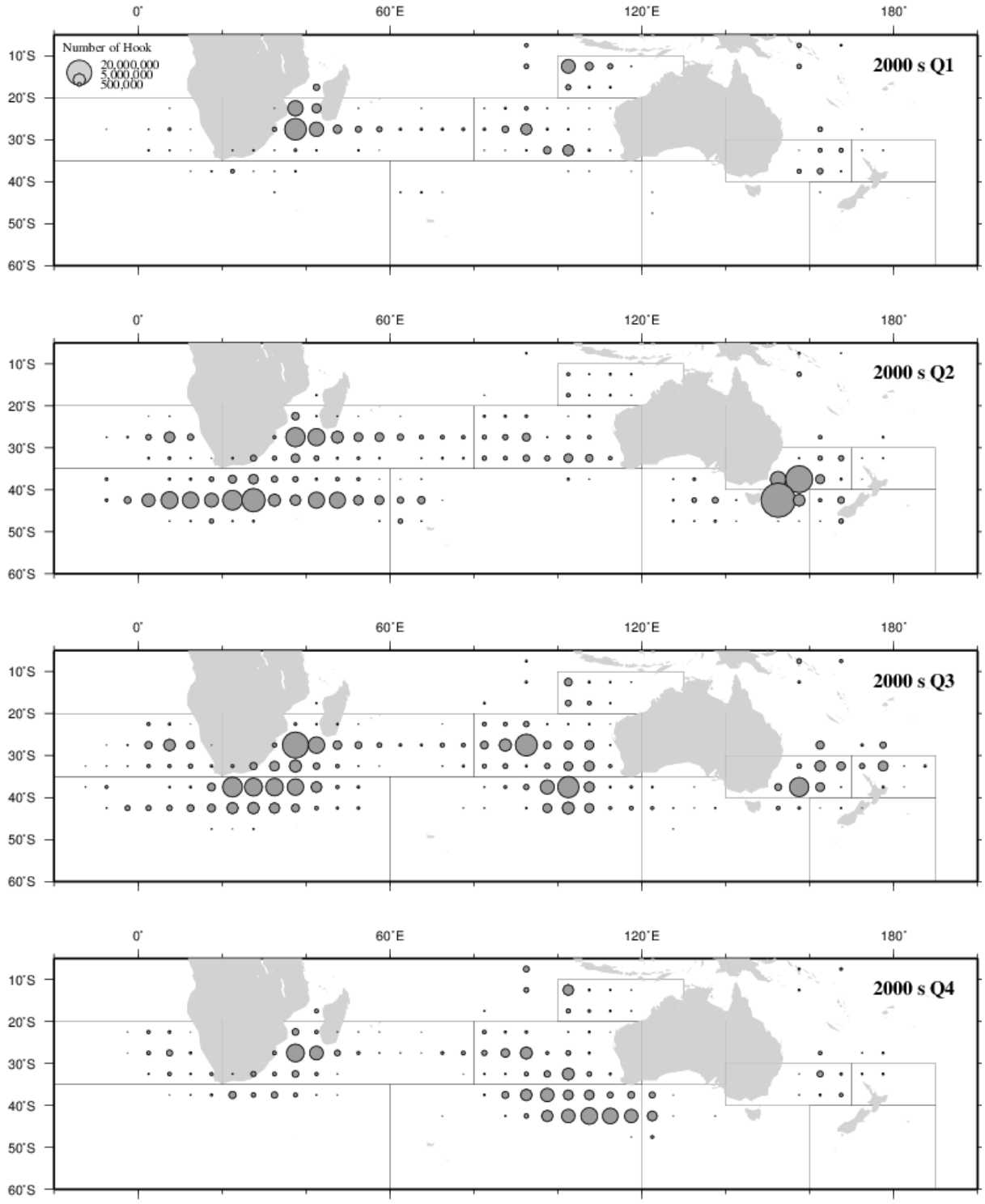

Fig.6 (5) Number of Hooks by decade, quarter and 5x5 degrees square (2000s)

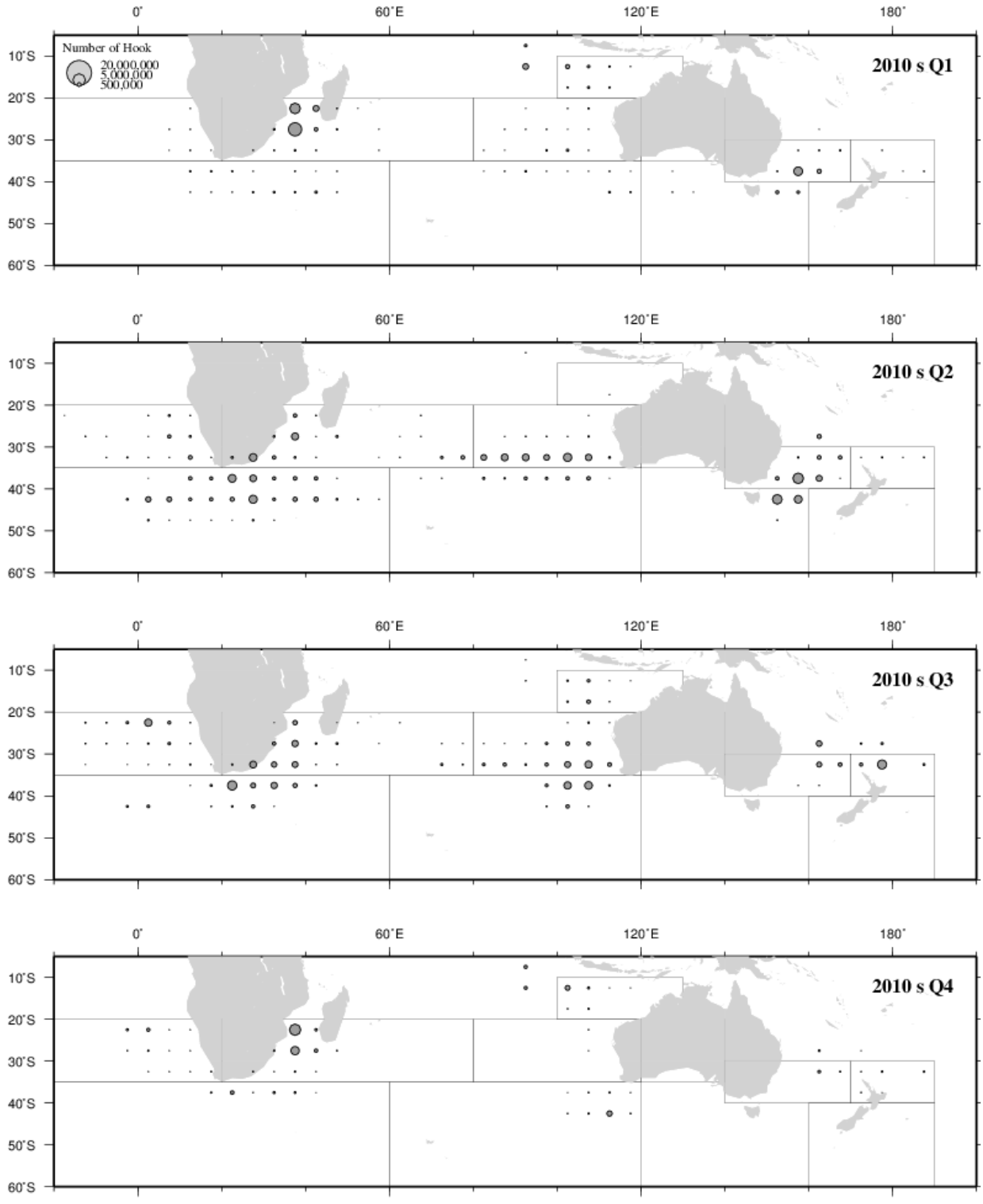

Fig.6 (6) Number of Hooks by decade, quarter and 5x5 degrees square (2010s)

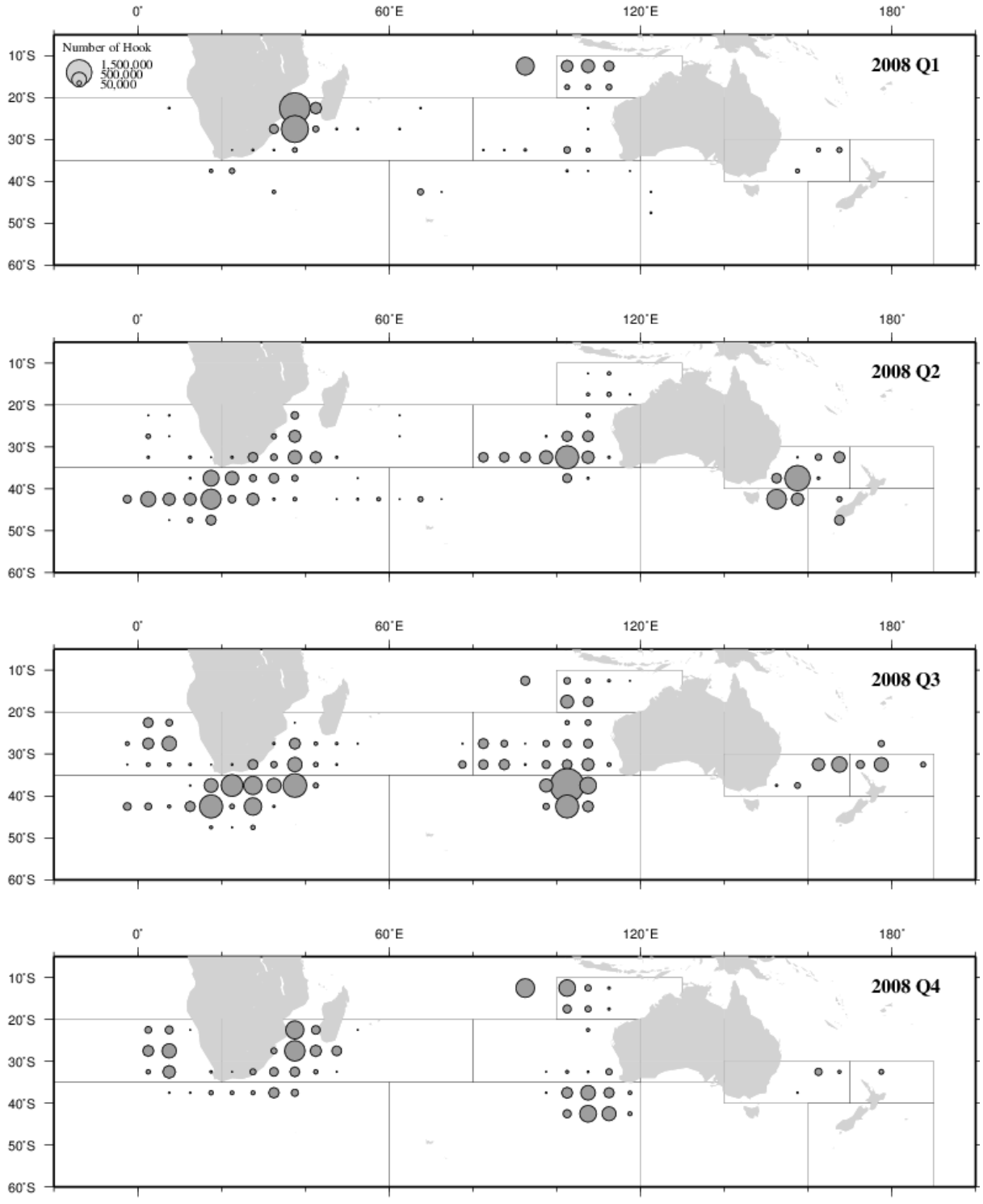

Fig.7 (1) Number of Hooks by year, quarter and 5x5 degrees square (2008)

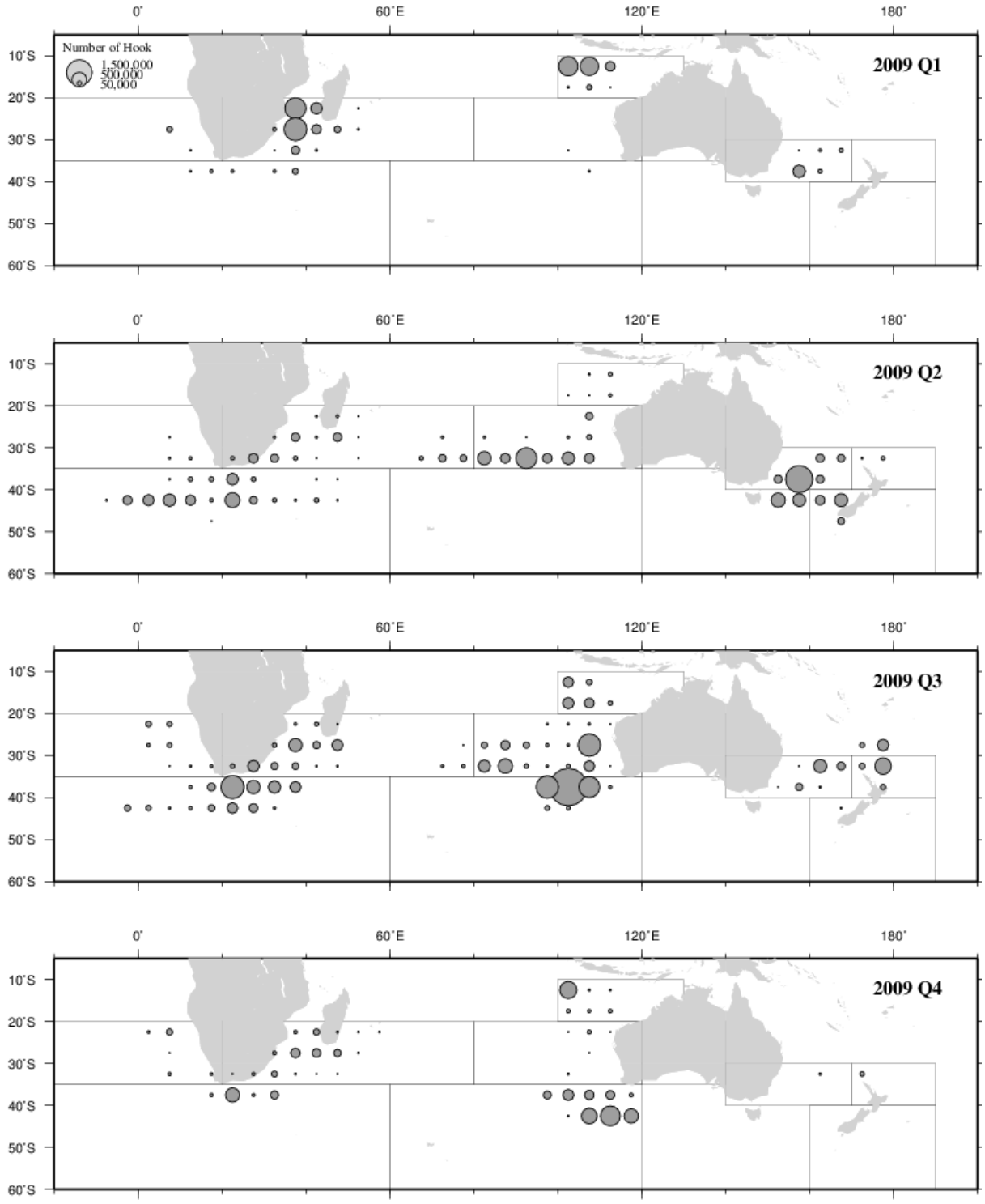

Fig.7 (2) Number of Hooks by year, quarter and 5x5 degrees square (2009)

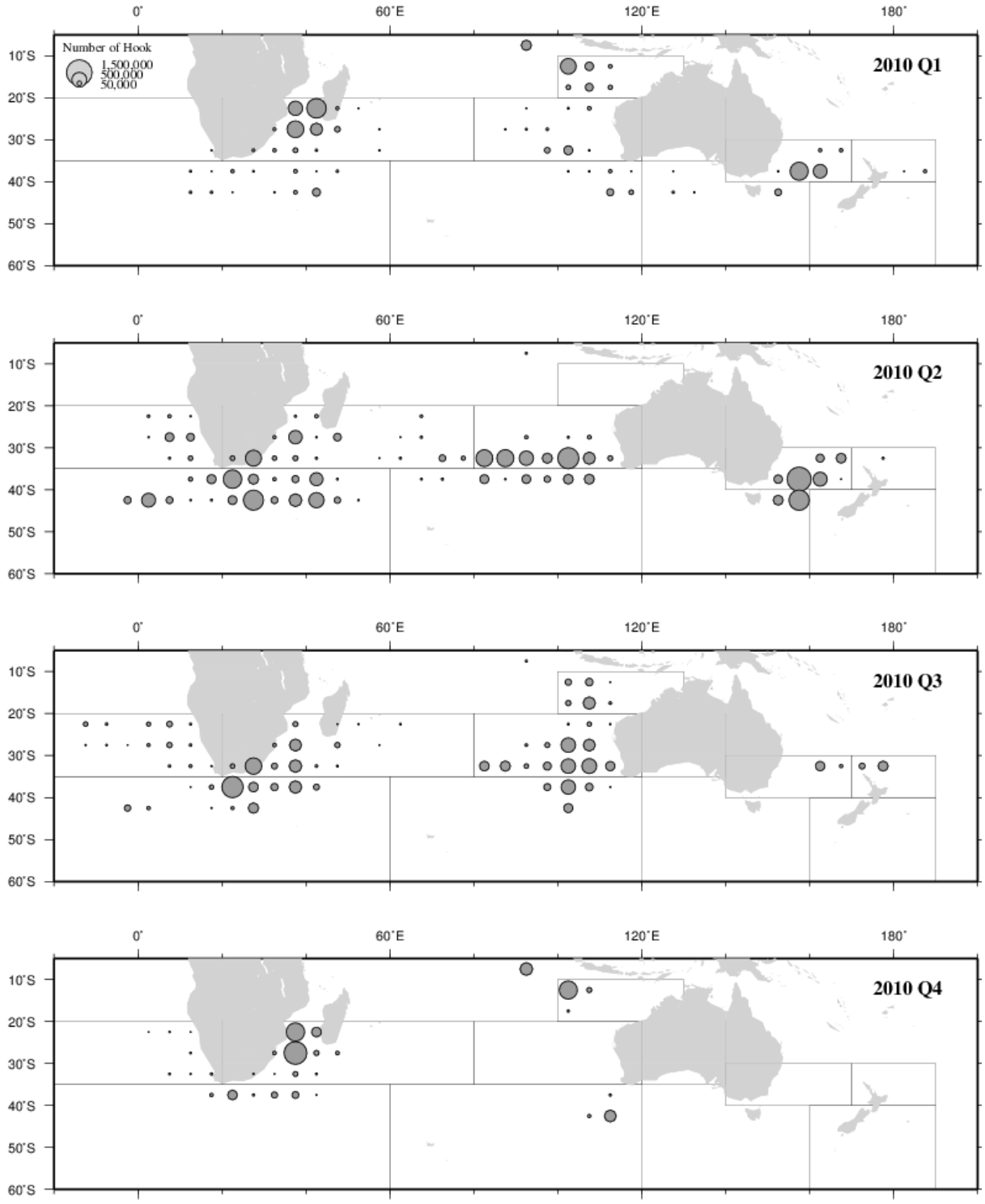

Fig.7 (3) Number of Hooks by year, quarter and 5x5 degrees square (2010)

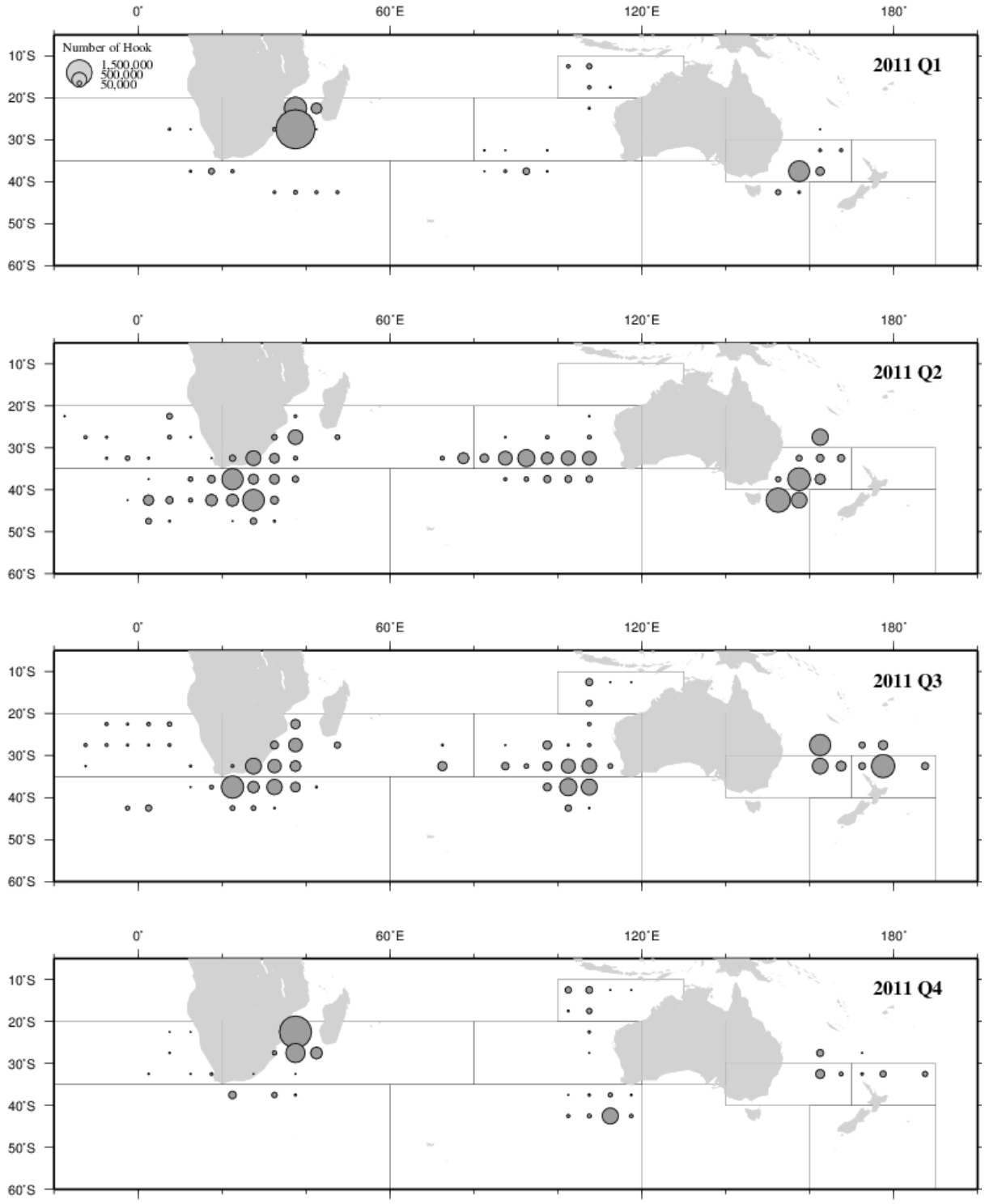

Fig.7 (4) Number of Hooks by year, quarter and 5x5 degrees square (2011)

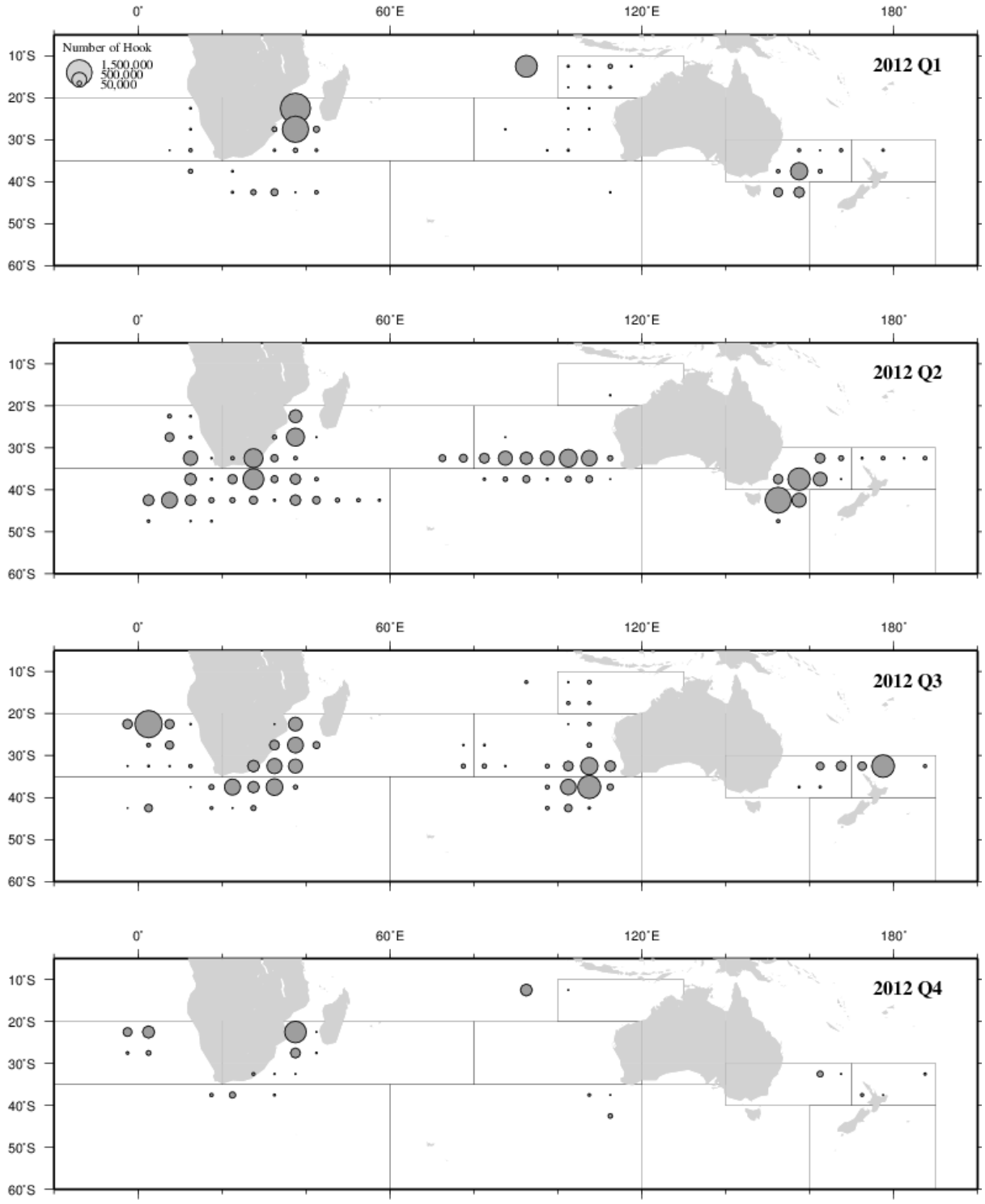

Fig.7 (5) Number of Hooks by year, quarter and 5x5 degrees square (2012)

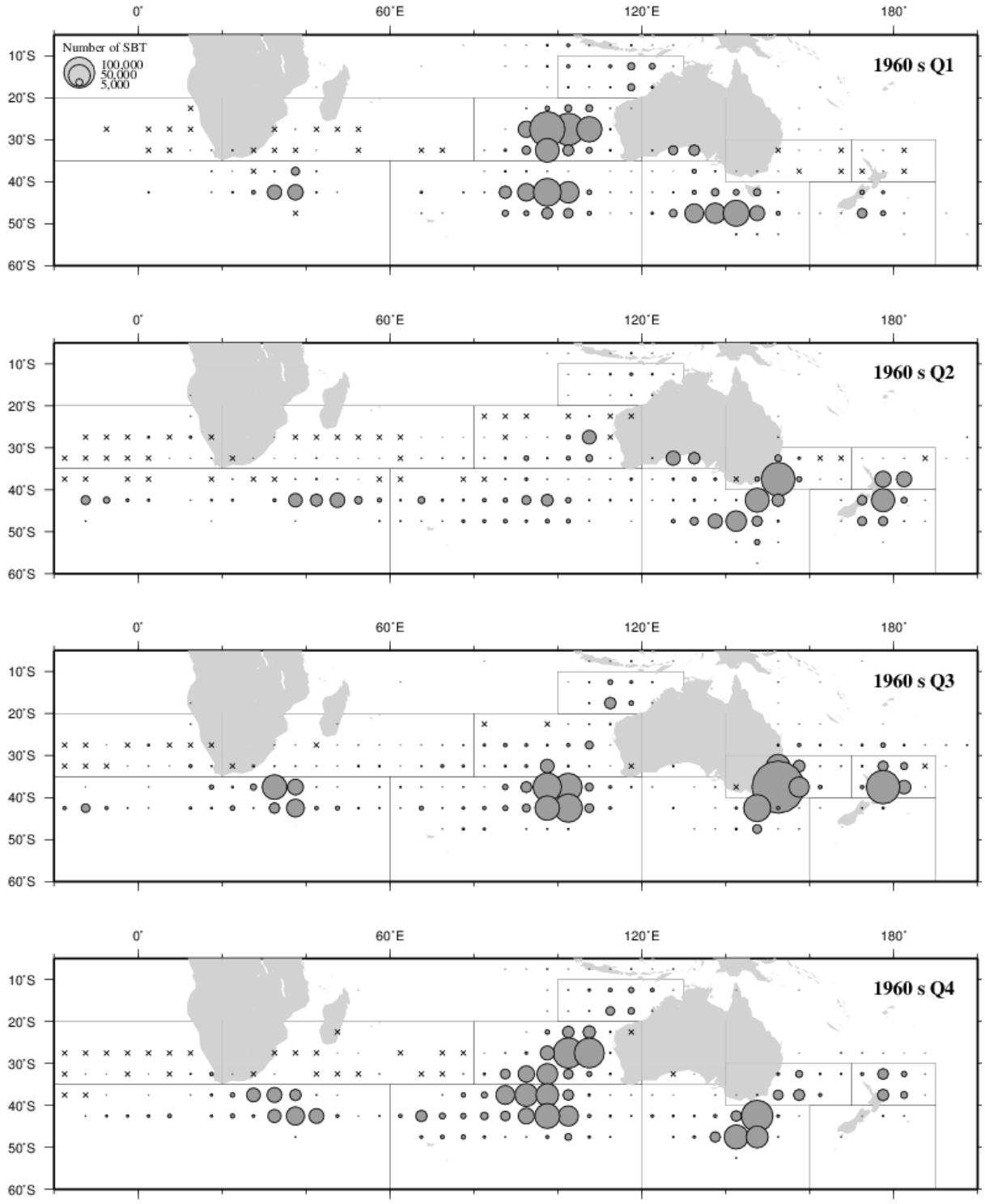

Fig.8 (1) Number of SBT caught by decade, quarter and 5x5 degrees square (1960s)

"x" indicates where longline operation conducted. Data are between 1965 and 1969.

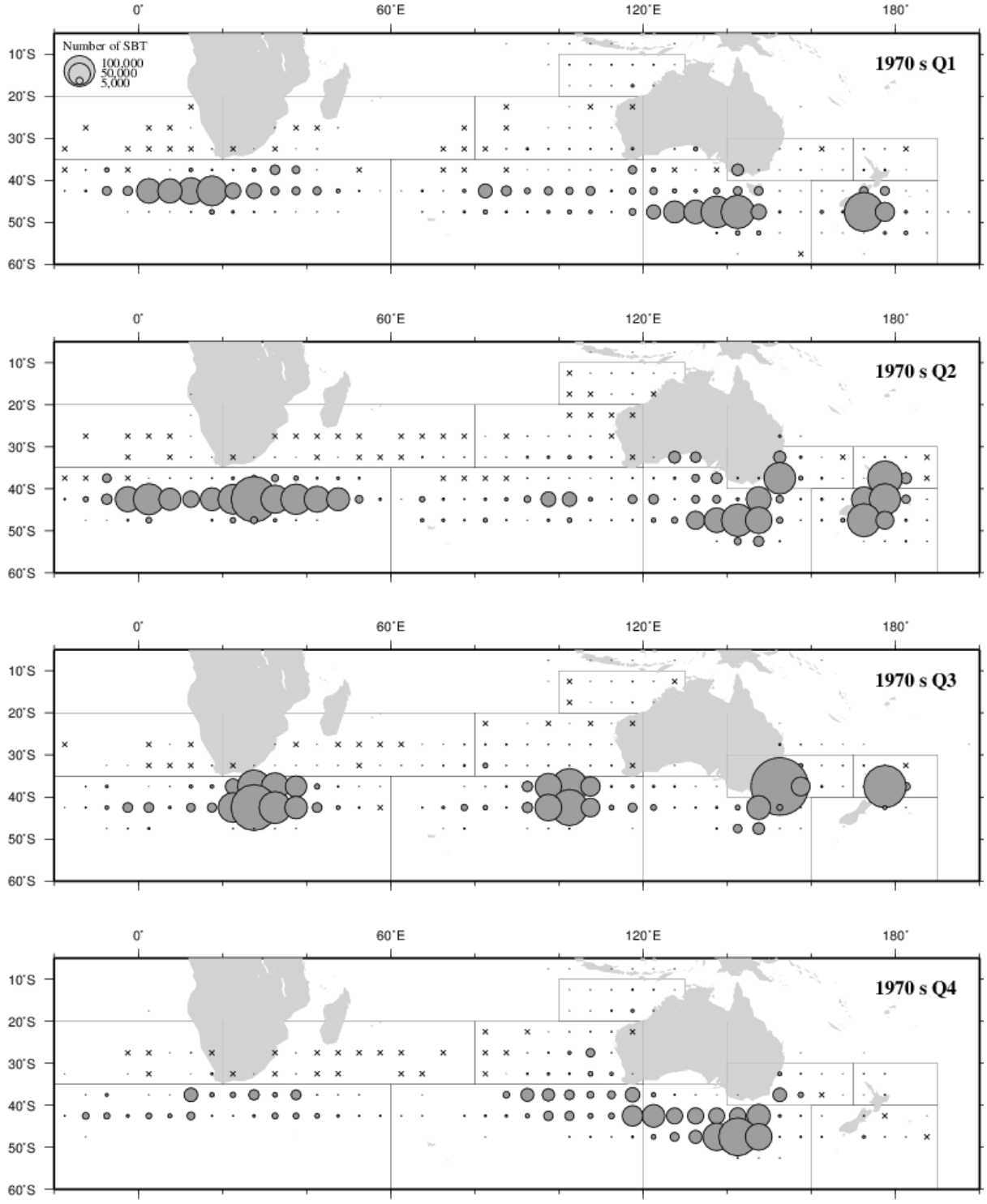

Fig.8 (2) Number of SBT caught by decade, quarter and 5x5 degrees square (1970s)

"x" indicates where longline operation conducted.

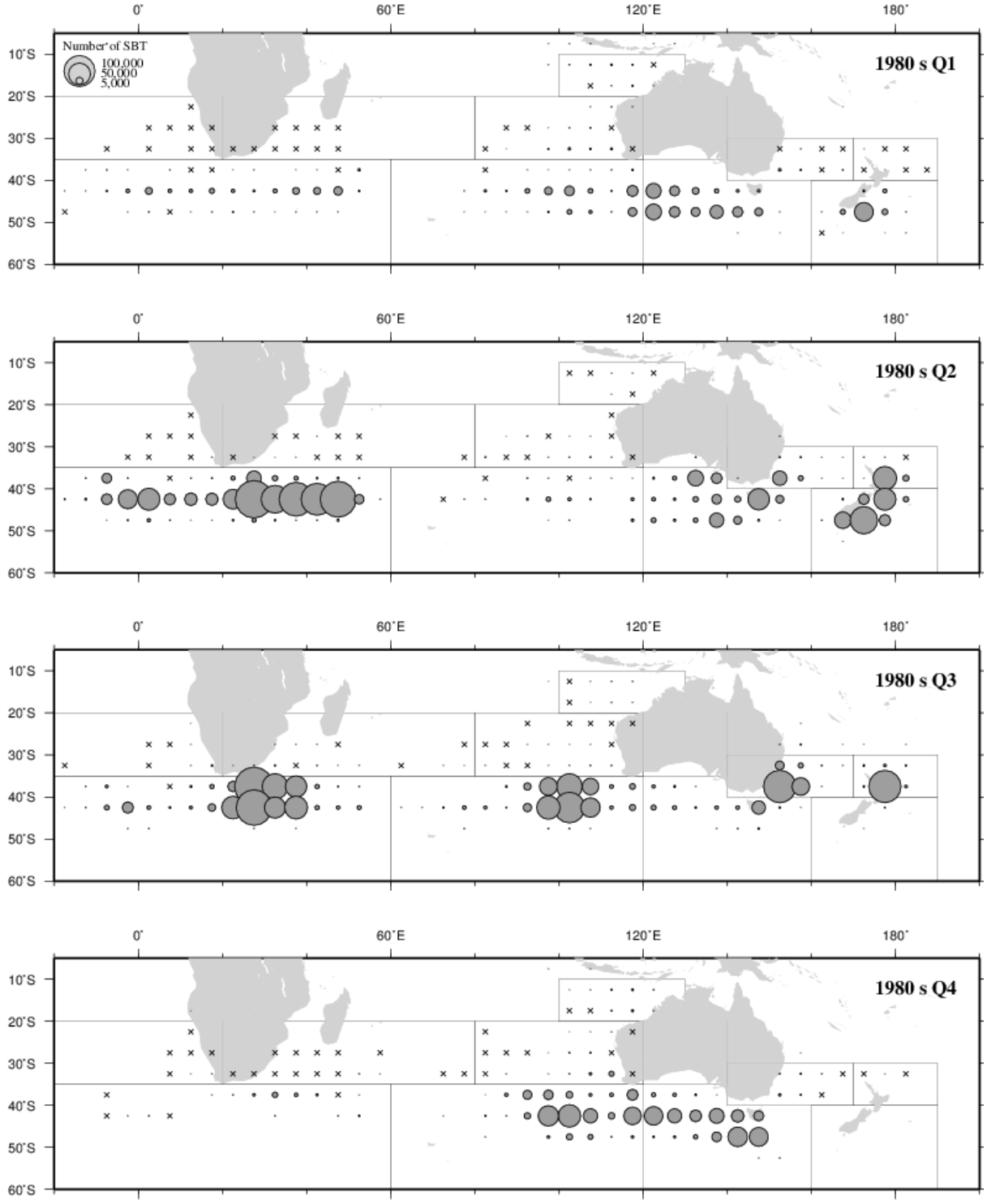

Fig.8 (3) Number of SBT caught by decade, quarter and 5x5 degrees square (1980s)

"x" indicates where longline operation conducted.

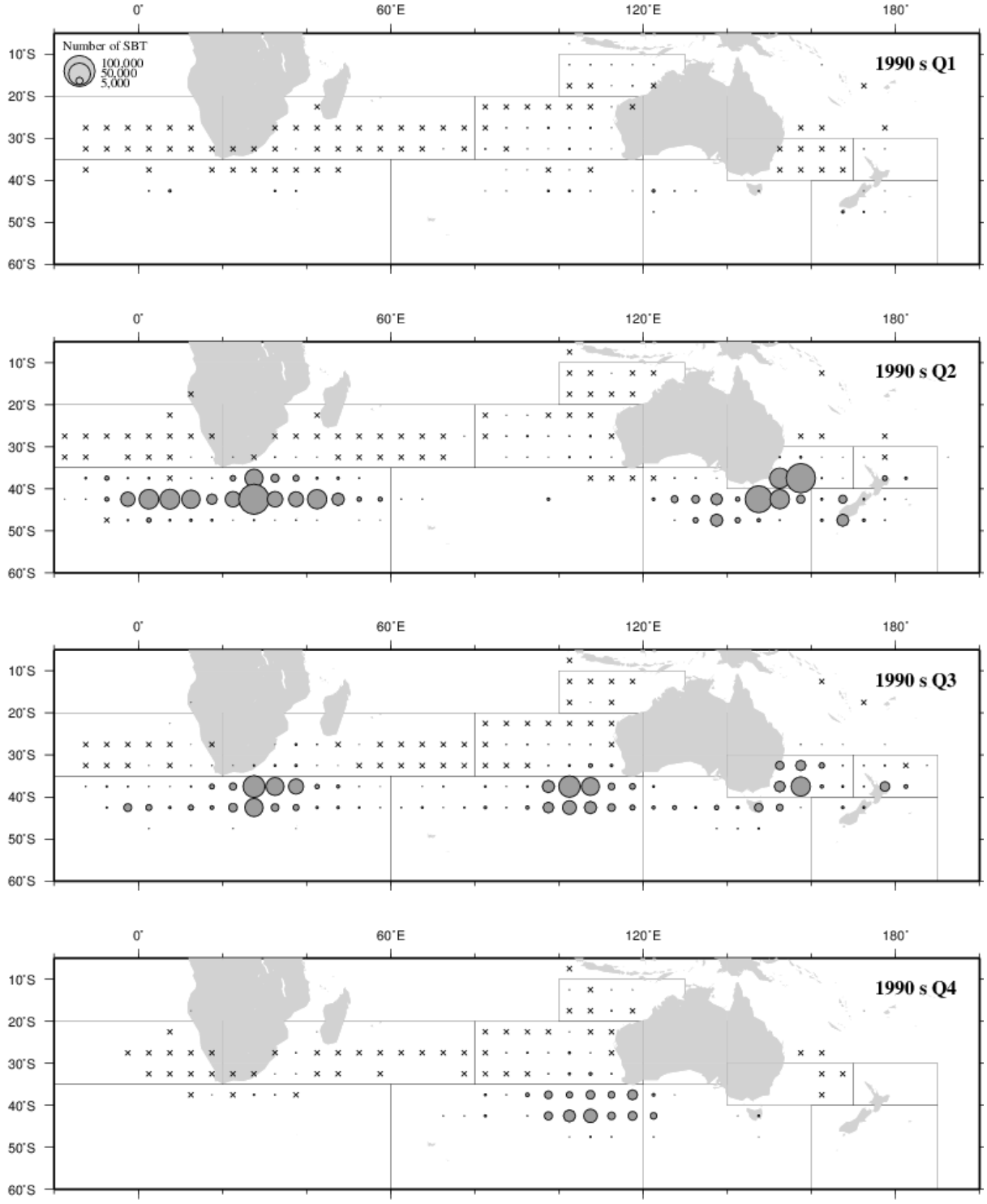

Fig.8 (4) Number of SBT caught by decade, quarter and 5x5 degrees square (1990s)

"x" indicates where longline operation conducted.

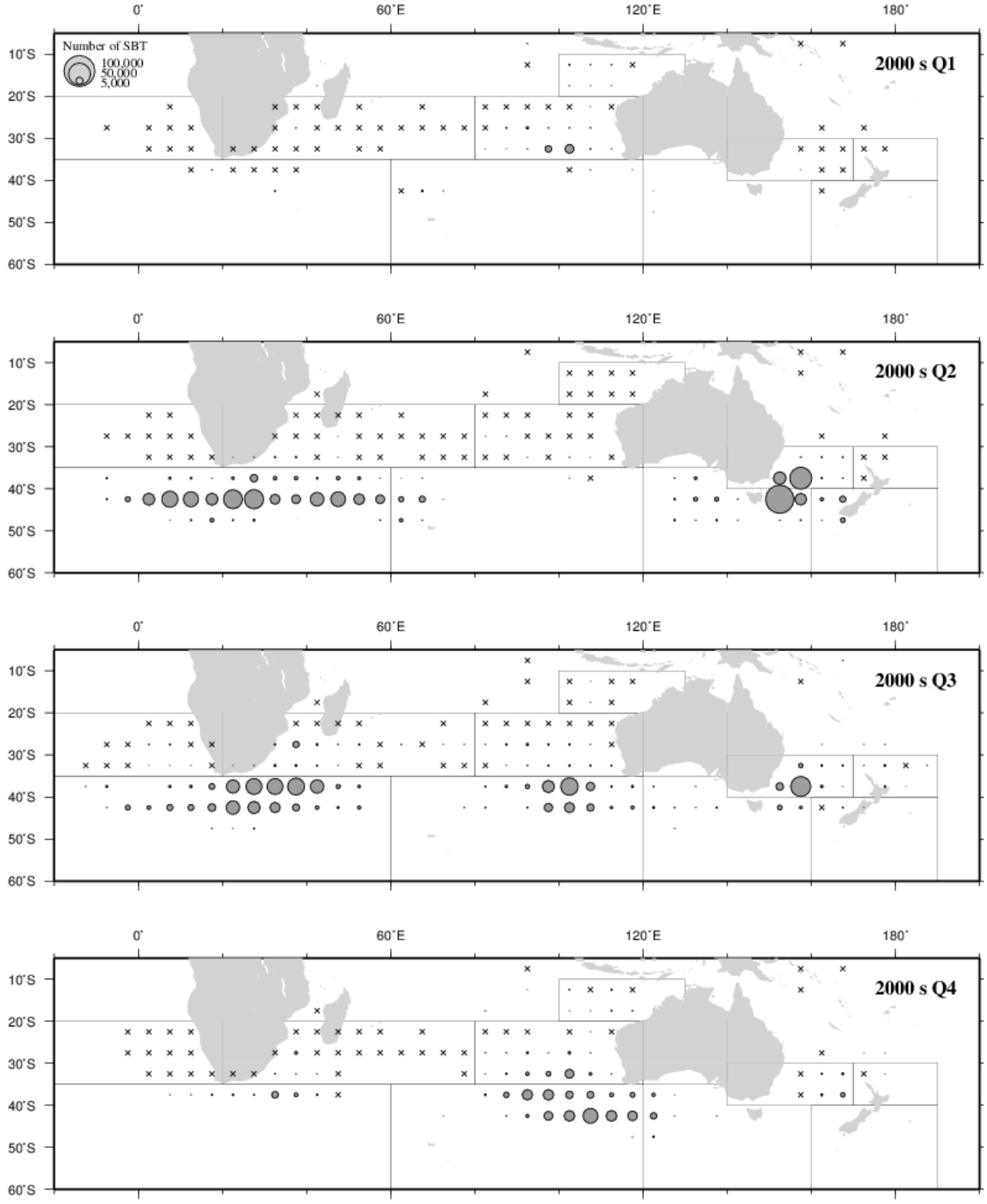

Fig.8 (5) Number of SBT caught by decade, quarter and 5x5 degrees square (2000s)

"x" indicates where longline operation conducted.

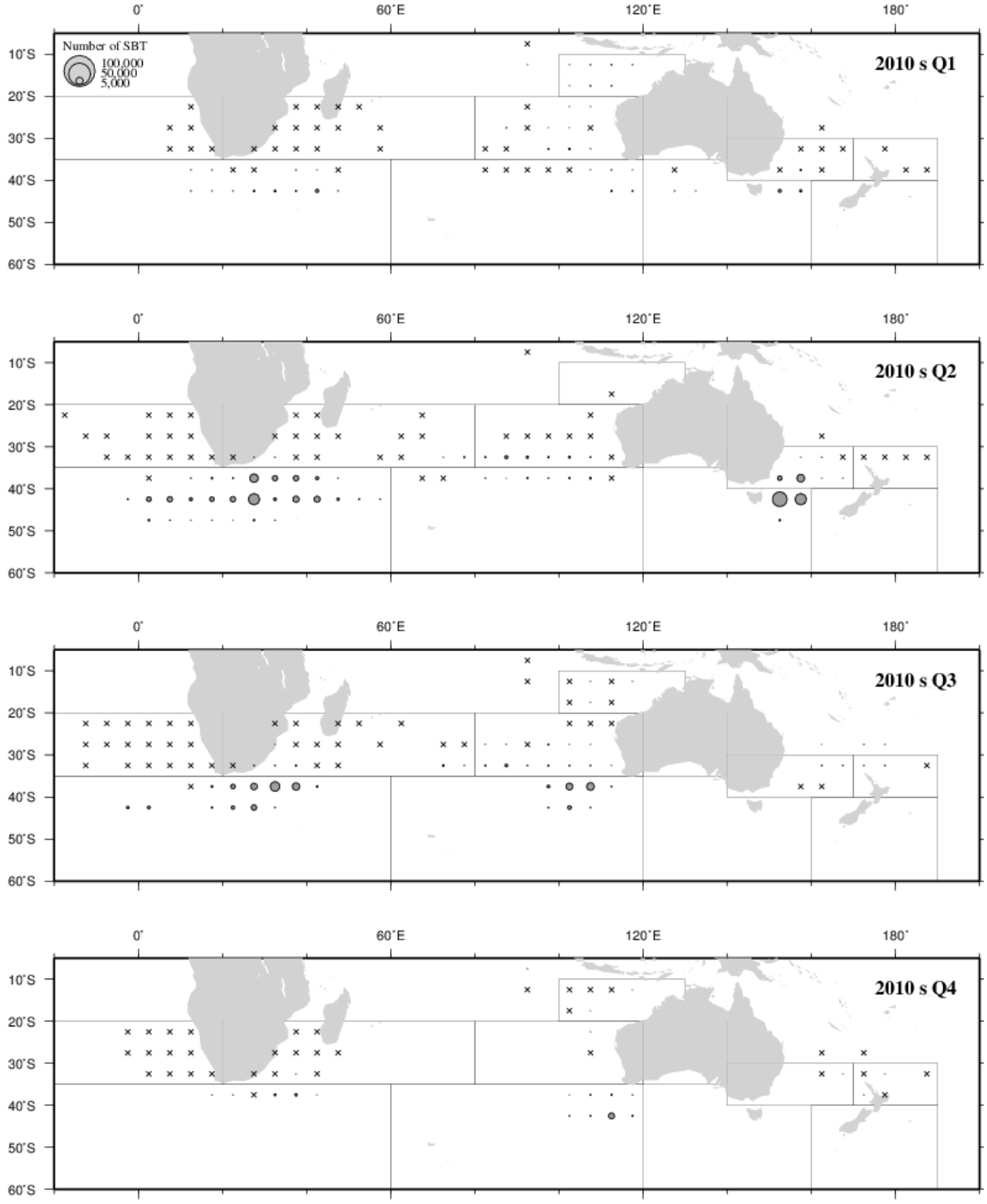

Fig.8 (6) Number of SBT caught by decade, quarter and 5x5 degrees square (2010s)

"x" indicates where longline operation conducted.

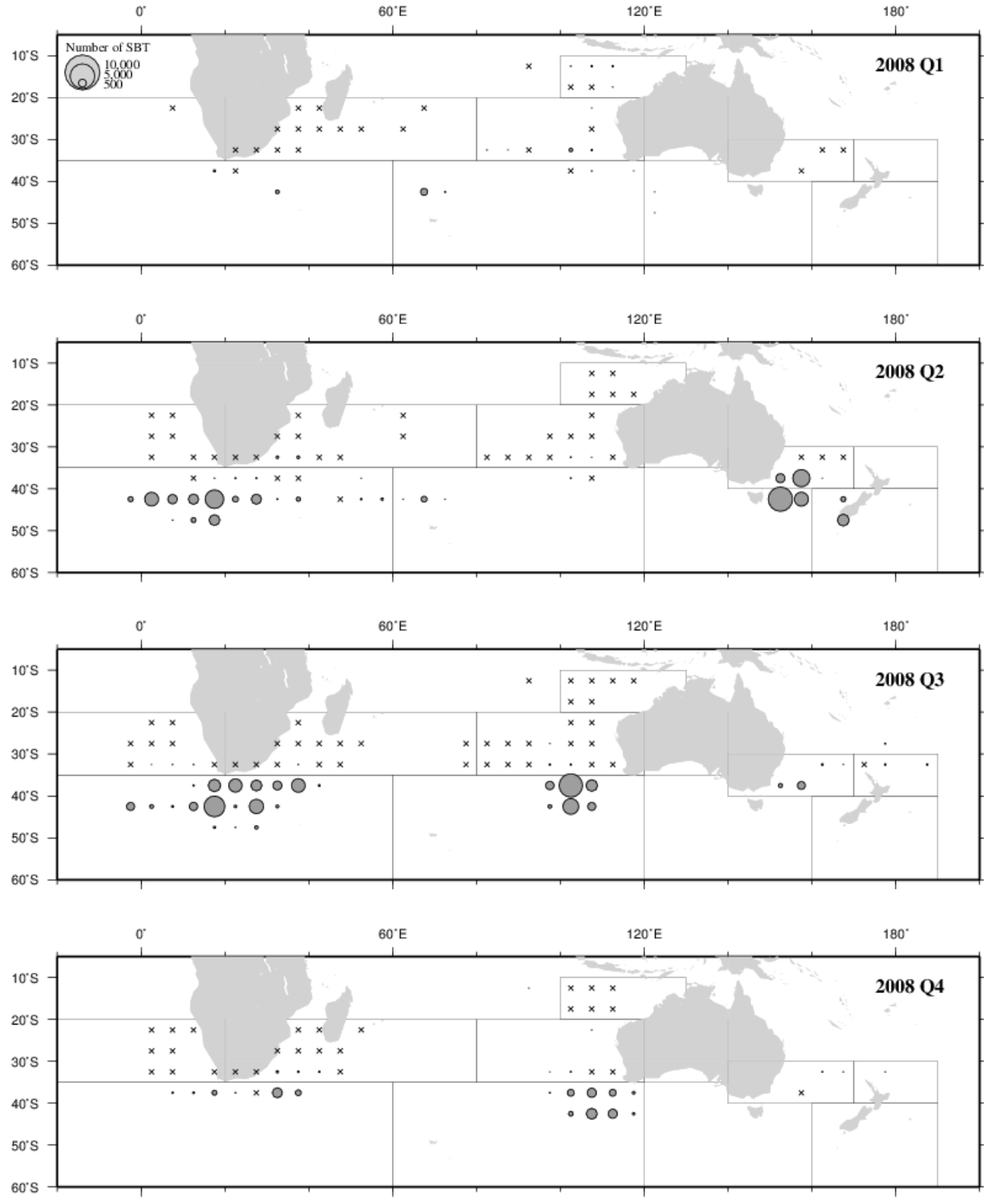

Fig.9 (1) Number of SBT caught by year, quarter and 5x5 degrees square (2008)
"x" indicates where longline operation conducted.

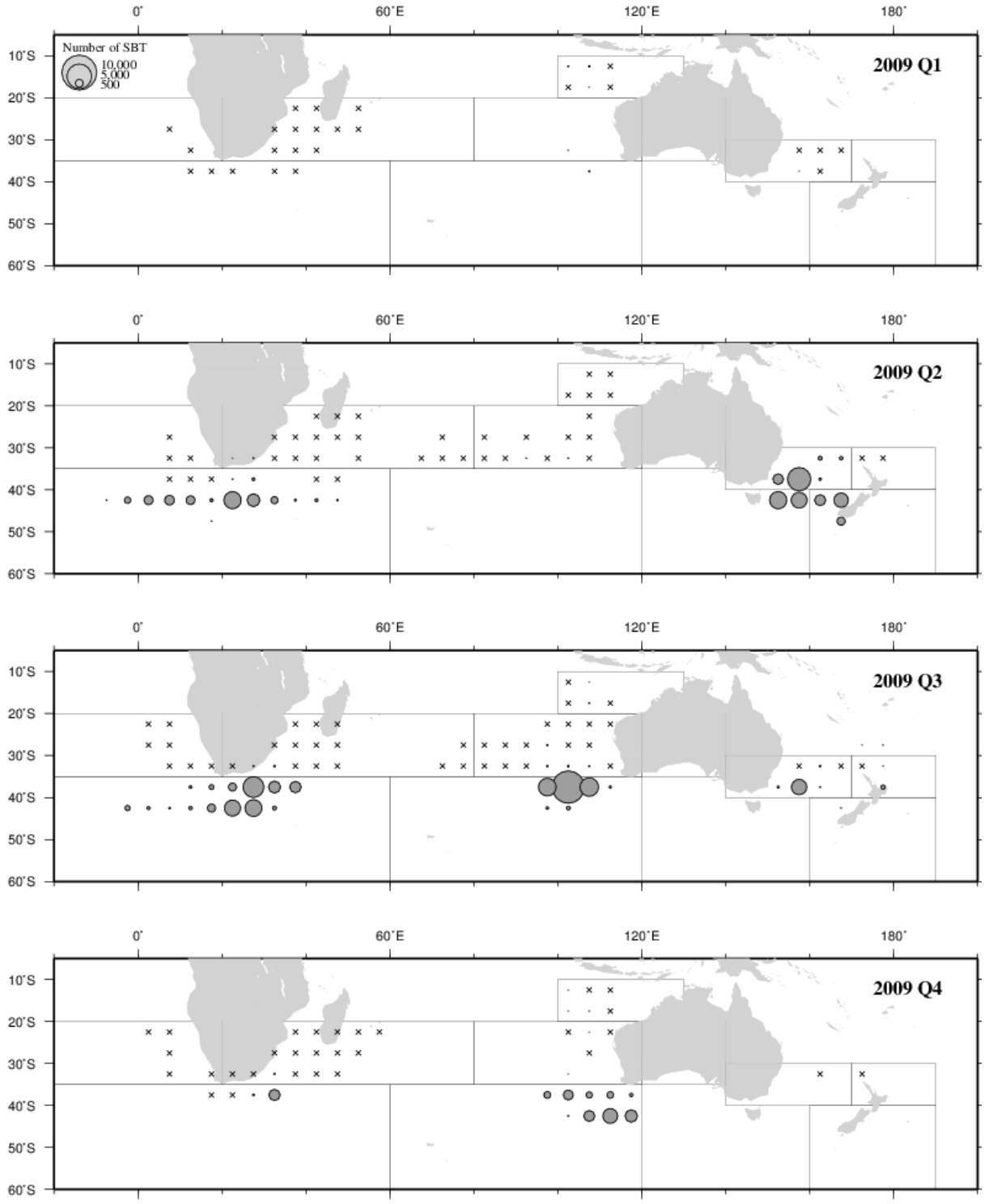

Fig.9 (2) Number of SBT caught by year, quarter and 5x5 degrees square (2009)
"x" indicates where longline operation conducted.

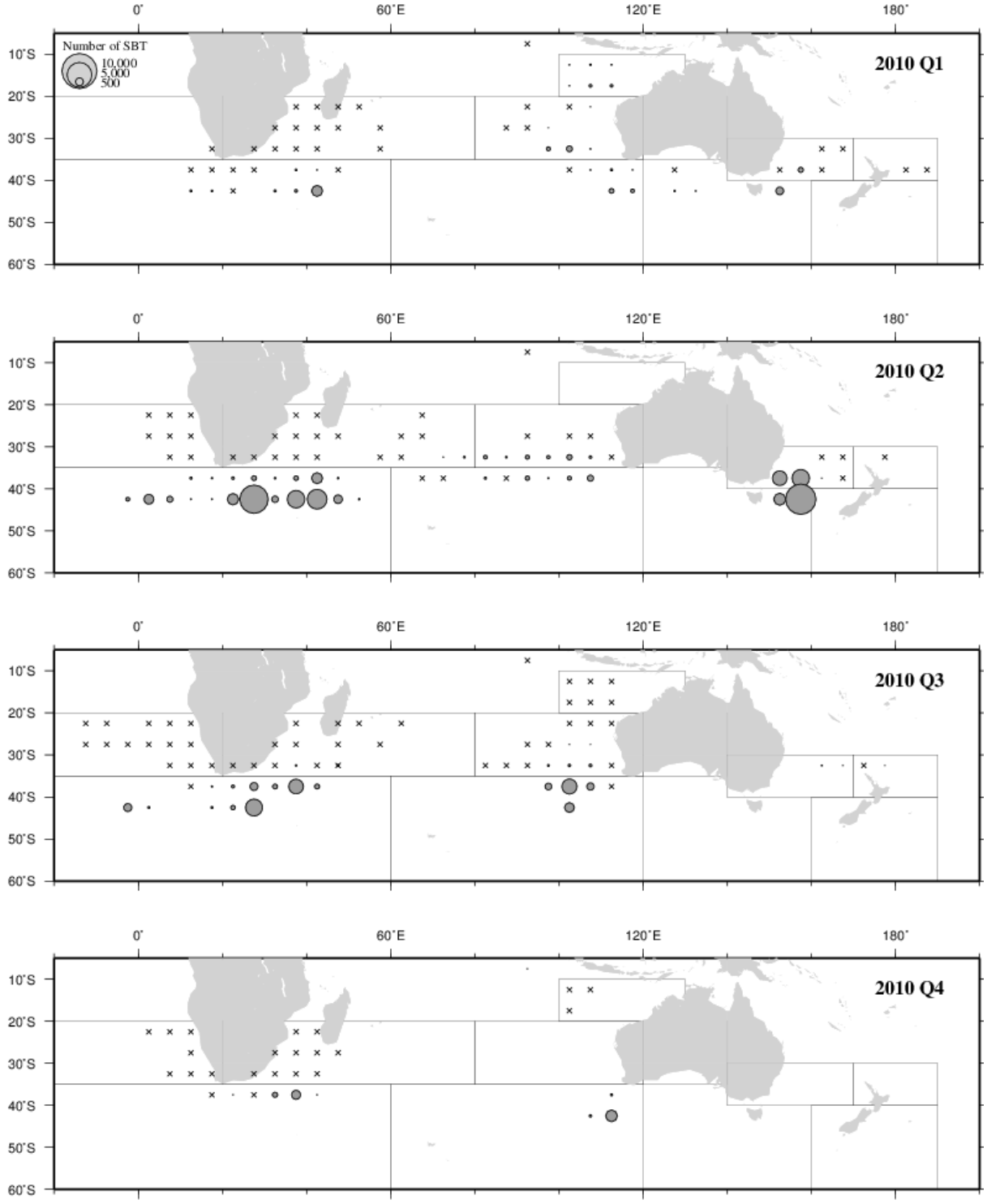

Fig.9 (3) Number of SBT caught by year, quarter and 5x5 degrees square (2010)
"x" indicates where longline operation conducted.

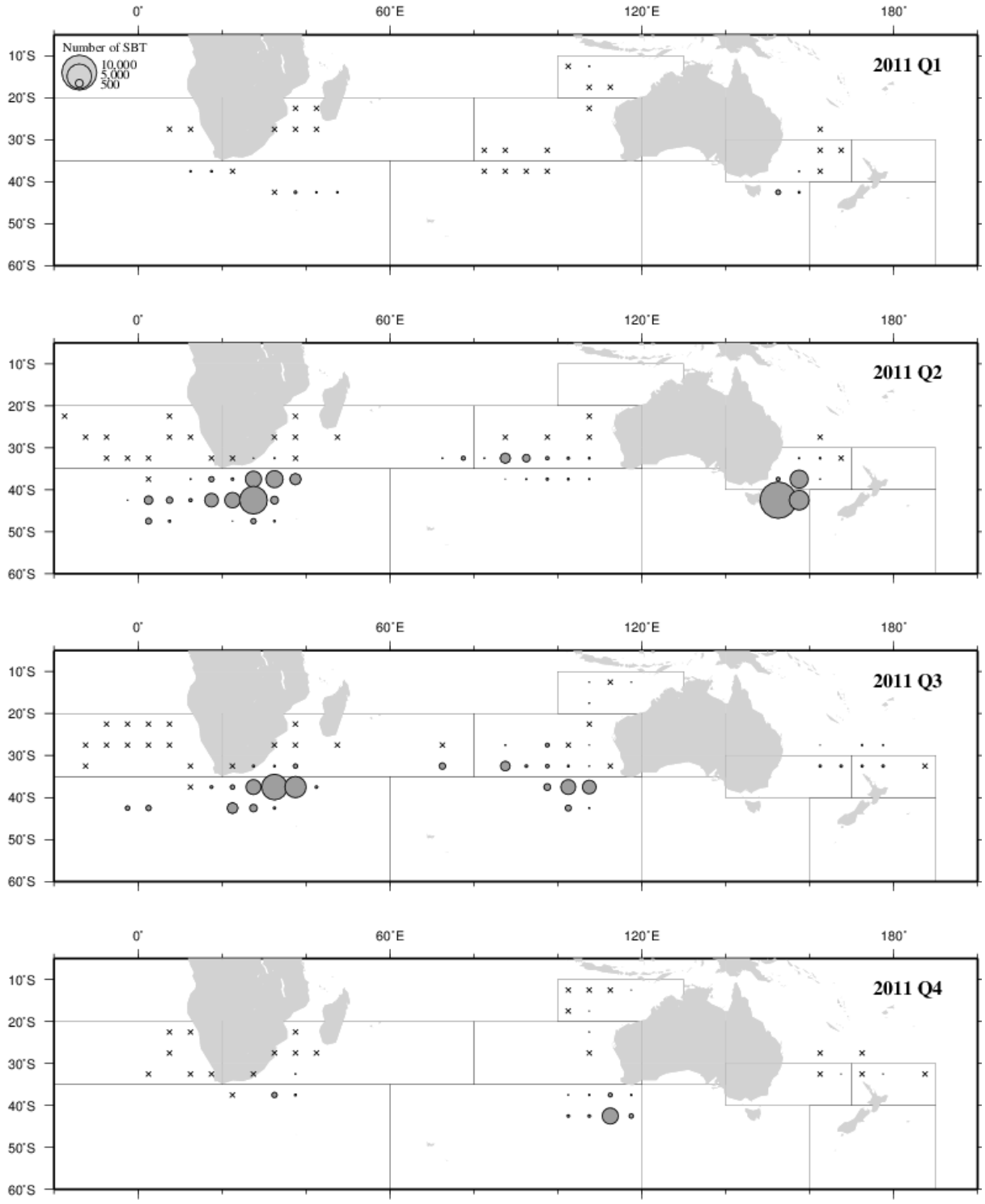

Fig.9 (4) Number of SBT caught by year, quarter and 5x5 degrees square (2011)
"x" indicates where longline operation conducted.

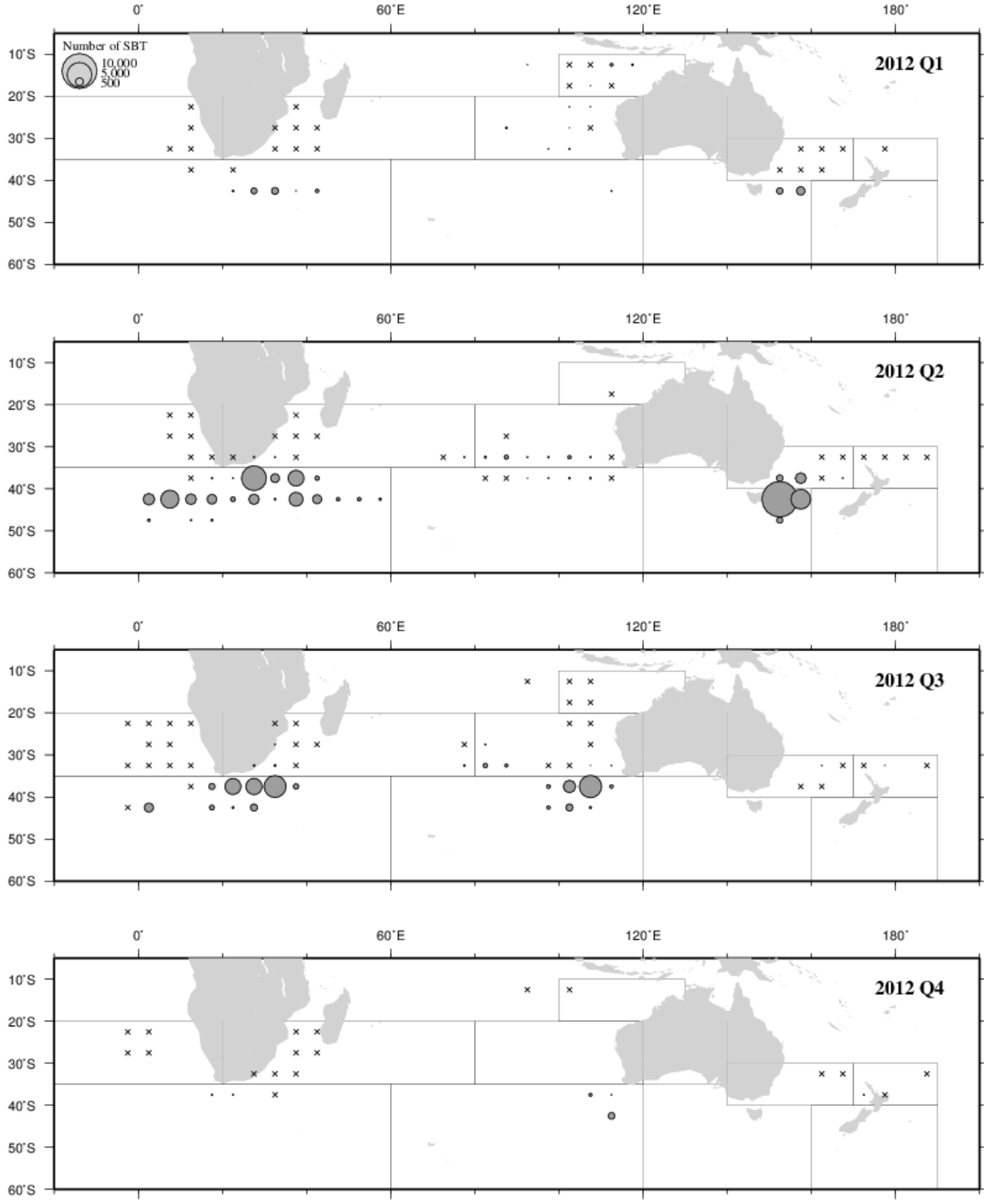

Fig.9 (5) Number of SBT caught by year, quarter and 5x5 degrees square (2012)
"x" indicates where longline operation conducted.