Improvement of bycatch data quality of Japanese scientific observer program

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1. 現在の日本のオブーザーバープログラムにおける混獲された海鳥の記録法

　日本のオブザーバーデータは，1992 年から現在まで集められている．南半球で観察されている海域は，WCPFC 海域では主にタスマン海，IOTC 海域では主に南東インド洋，CCSBT 海域全域，および ICCAT 海域では主にケープ沖である．これは，日本船団における主な漁場を反映しており，カバー率は，5-10%を目指している．

　オブザーバーは，どのようにデータを取るもしくは写真を取るかのレクチャーを受けた後，乗船する．オブザーバーは主に，投縄開始日時，場所，観察鉤数，種毎の漁獲数，混獲数，トリポールの使用の有無，投餌機使用の有無などを記録する(付録 1)．海鳥の種査定に関しては，原則的にはオブザーバーが大分類群まで分類し，その後，NRIFSF の研究者が写真によって査定を行う．写真は，頭部，翼下面を含む全体，翼上面を含む全体を取ることを推奨している．足輪がついていた海鳥は，そのリング№を記録し，リングの装着元に報告し，例えば、種・年齢等の足輪個体の情報を得ることができる．アホウドリ類は，最も混獲される分類群であるが，現在の日本のオブザーバーデータにおいては，旧分類体系の 14 種に査定されている(appendix にオブマニュアルの英語版を添付する)．

　我々は，現在，バードライフインターナショナル，ACAP とオブザーバーデータの解析を共同で行っており，例えば，トラッキングデータの共有を行っている．

1.　Recording method of bycatch seabird in current Japanese observer program

　Catch data of target and non-target species has been collected by Japanese scientific observer program since 1992. In the southern hemisphere, observed areas are mainly Tasman sea in WCPFC conventional area, mainly south eastern Indian ocean in IOTC area, all area in CCSBT and off south African water in ICCAT area. These reflect main finery grounds by Japanese longliners and which cover ratio of is aimed to be 5-10%.

　Observers is lectured how to record data or how to take pictures before getting on the longline vessels. Observers record mainly date, time and a location when bait casting is started, catch of each fish, bycatch of each seabird, whether tori line and the other mitigation measures are used (Appendix 1). In terms of identification of seabird species, observer divide into rough taxonomic group. After that, scientists of NRIFSF divide it into species by pictures in principle. We recommend to take pictures of the head, whole body with under wing side and whole body with upper wing side. When

an individual with a ring is found, the ring number is recorded and reported to the place where the ring was attached so that we can get information of species and age of the individual. Albatrosses, the most bycaught taxon in seabirds, are divided into 4 genus 14 species based on old identification system in current Japanese observer program.

We collaborate analysis using observer data with ACAP and Birdlife international. For example, sharing the tracking data to analyze distribution of bycatch per unit effort.

2．現在行われているオブザーバーデータの海鳥査定の改善

　オブデータは，長期間の漁獲数，混獲数を示す貴重なデータだが，いくつかの問題点を含んでいる：1)オブザーバーの質．写真がない場合，オブデータの質が直接的にデータに反映されてしまう．オブザーバーの中には，査定が得意なものもいれば，そうでないものもいる．2)写真の質．写真が撮影されていないデータがある．また，撮影されていたとしても，必要な部分が欠けていたり，ピントが合っていない場合がある．3)分類の質．アホウドリ類に関して，旧分類体系を使用している．かなり少ないが，まれに，トラッキングデータから見ると，いるはずのない場所にいる種が認められる．また，成鳥，幼鳥に分類されていない．

　挙げられた問題点を解決するために，現在，混獲された海鳥のそれぞれについて，写真の有無を確認し，まず，査定の根拠を明らかにして，日本のオブデータを整理している．写真が無い場合，査定したオブザーバーの査定能力に応じて，分類の細かさを決めている．例えば，査定にたけたオブザーバーであることが分かっている場合は，種まで落とした結果を採用し，そうでないオブザーバーの場合には，大まかな分類群までで査定をとどめることにしている．

　トラッキングデータを日本のオブザーバーデータによる混獲分布と照らし合わせるためには，日本のデータのアホウドリの旧分類体系を改め，新分類体系で可能な限り分類する必要がある．日本は，バードライフインターナショナルの協力のもと，アホウドリ類を中心とした，オブザーバーデータにおける海鳥の査定の改訂を行っている．バードライフインターナショナルが雇用している分類の専門家に，これまで集められた写真を見せ，現在の査定結果のクロスチェックを行うとともに，アホウドリ類を新分類体系に基づいて可能な限り分類を試みる予定である．この際，成長ステージ（成鳥，幼鳥）や，可能であれば性も分類する予定である．

　同時に，我々は，アホウドリ類を新分類体系の基準で分けるための ID ガイドの改訂を行う．これまで，我々は，嘴の形状を査定の中心とした日本独自の査定表を作成し，アホウドリ類，ミズナギドリ類の分類に用いてきた．これに新分類体系に基づいた種に分類する方法を付け加え，査定表を改善する予定である．つまり，海鳥査定の改善のゴールは，現在のオブデータの整理・改善だけでなく，ID ガイドの改善や今後のオブザーバープログラ

ムへの適用も行うことである.

2. Improvement of data quality of seabird identification in current Japanese scientific observer program

Though observer data are important showing long-term data of fish catches and seabird bycatches, they include some problems:

1) Quality of observers. When there are data which do not have pictures, quality of identification depends on ability of observers directly because there is no check by scientists. Some observers have a high ability of identification but others do not.

2) Quality of pictures. Sometimes observers cannot take a picture because of oceanic condition or too many catch of samples so there are data which do not have pictures. Some pictures are lacking necessary part to identify or are blurred.

3) Quality of identification. In terms of albatross identification, old identification system is applied. It is very rare case but there are some species which locate where they definitely not range according to tracking data. In the identification, species are not divided into developmental stage, such as adult, young or juvenile.

To solve above problem, we are reviewing the identification of the observer data by checking whether there are pictures or not and clarifying ground of identification. If there is no picture, we decide fineness of classification according to observer's identification ability. For example, when the observers have a good ability of identification, their result of the identification is adopted up to species, while when the observers have no such ability, their result of identification is adopted up to rough taxon.

To make tracking data overlap with bycatch distribution by observer data, Japanese observer data need to change the old classification system and to re-classify based on the new classification system as much as possible. We are revising the identification of bycaught seabird, especially albatrosses, in cooperation with Birdlife international. Photos that had been collected until present are shown to identification experts who employed by Birdlife international to cross-check result of our identification, and to update the identification based on new classification system as much as possible. In this process, developmental stage(adult, young or juvenile) or sex, if it is possible, are also divided.

At the same time, we will revise identification guide to divide albatross species based on new classification system. Until now, we had used Japanese original classification guide made mainly based on bill morphology as identification key to identify albatrosses and petrels. We plan to add the method of identification based on new classification system and revise the classification guide. Namely, the aim of improvement of data quality of seabird identification is not only reviewing and revising of current observer data but also revising improvement of Japanese identification guide and

applying the method of classification to observer program in the future.

3．オブザーバーデータを用いた混獲分布の解析の最終的なゴールと今後の課題

　　今後，日本のオブザーバープログラムで集められたデータを用いて，海鳥混獲のホットスポット解析が行われる予定である．この解析は，どの地域にどれだけ混獲が起こるかを様々な要因を考慮してマッピングする．日本では、混獲回避措置の有用性に関する実験を行っている．最終的に，個体群への影響を考慮した混獲ホットスポットの特定を行い，それら混獲回避措置の導入の際，導入エリアの特定に用いたいと考えている．

　　分類の信頼性を上げることにより，上記に示したホットスポット解析だけでなく，分布や混獲データの新しい知見を得ることができる。例えば，これまで知られていなかった場所へのアホウドリ類の移動分布が明らかになる可能性もあると考えられる。

　　今後，解析を行っていくに当たり，単にオブデータのカバー率を上げるだけでなく，オブザーバーの質やデータの質を向上しなくては，有意義な解析を行うことは難しい．それには，オブザーバーの教育が必要不可欠と考えられる．このような、オブザーバーデータの質の向上は、海鳥だけにとどまらず、魚類にも行われていく必要があるだろう。また，日本の漁船数が減少し外国漁船が増加する中で、他国との共同研究が行われつつある。このような現状からも，他国におけるオブデータの情報について，同様の質の向上が求められる．

3.　Final goal of analysis of bycatch distribution using observer data and issues in the future

Seabird bycatch hotspot is going to analyze by using the cross-checked and revised data in the future. In this analysis, where and how much the seabirds are caught is drawn on the map with considered several factors. In Japan, experiment related to usefulness of bycatch mitigation measure is being made. Finally, bycatch hotspot with considered effect to population is going to be analyzed in order to determine the area where mitigation measure should be introduced.

By enhancing the credibility of identification, not only hotspot analysis mentioned above but also new information of range will be obtained. For example, it is possible that new distribution of some albatross species would be revealed.

For the meaningful analysis, it is crucial not only to raise the observer cover ratio but also to raise the quality of observers or quality of data. To achieve that, teaching observers would be a very important element. Also, these progress in quality of observer data should be made against fish data as well as seabird data. Collaboration work with other countries is going to start under the situation where Japanese longliners are decreasing while other country's longliners are increasing. Thus, it will be strongly needed that the quality of observer data in other countries are also improved as it is being done in Japan.

⊠⊠⊠⊠余裕を持って正確に⊠⊠⊠⊠

ミナミマグロ
科学オブザーバー

調査マニュアル

２０１１年　４月版

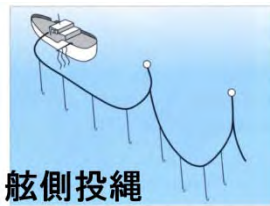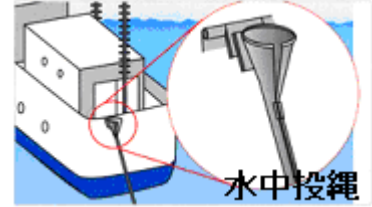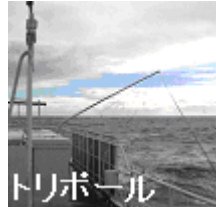## Seabird Survey

1. Line setting

1-1 Observation during line setting

・Mitigation measures　　　　Record deploying seabird mitigation measures in each set. Number of tori-poles/lines also should be recorded (recently some vessels uses three tori-lines).
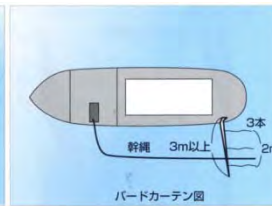
・Seabird observation　　　　**Count abundance of aggregated seabird for 20 minutes during bright time.** The observation would be made just every 4 days but should be made at the first operation when the vessels move to different fishing ground. Seabird abundance must be recorded only when the observer actually observed the line setting. Observation area is within 500m hemisphere from astern of the vessels. Seabirds are defined as two types (albatrosses or other seabirds) and record maximum number of each during the observation

2. Line hauling
2-1. Recording Bycatch
Note the data of the seabird survey into the field note.

General identification of albatrosses, petrels and other seabirds（Fig. 1, 2）

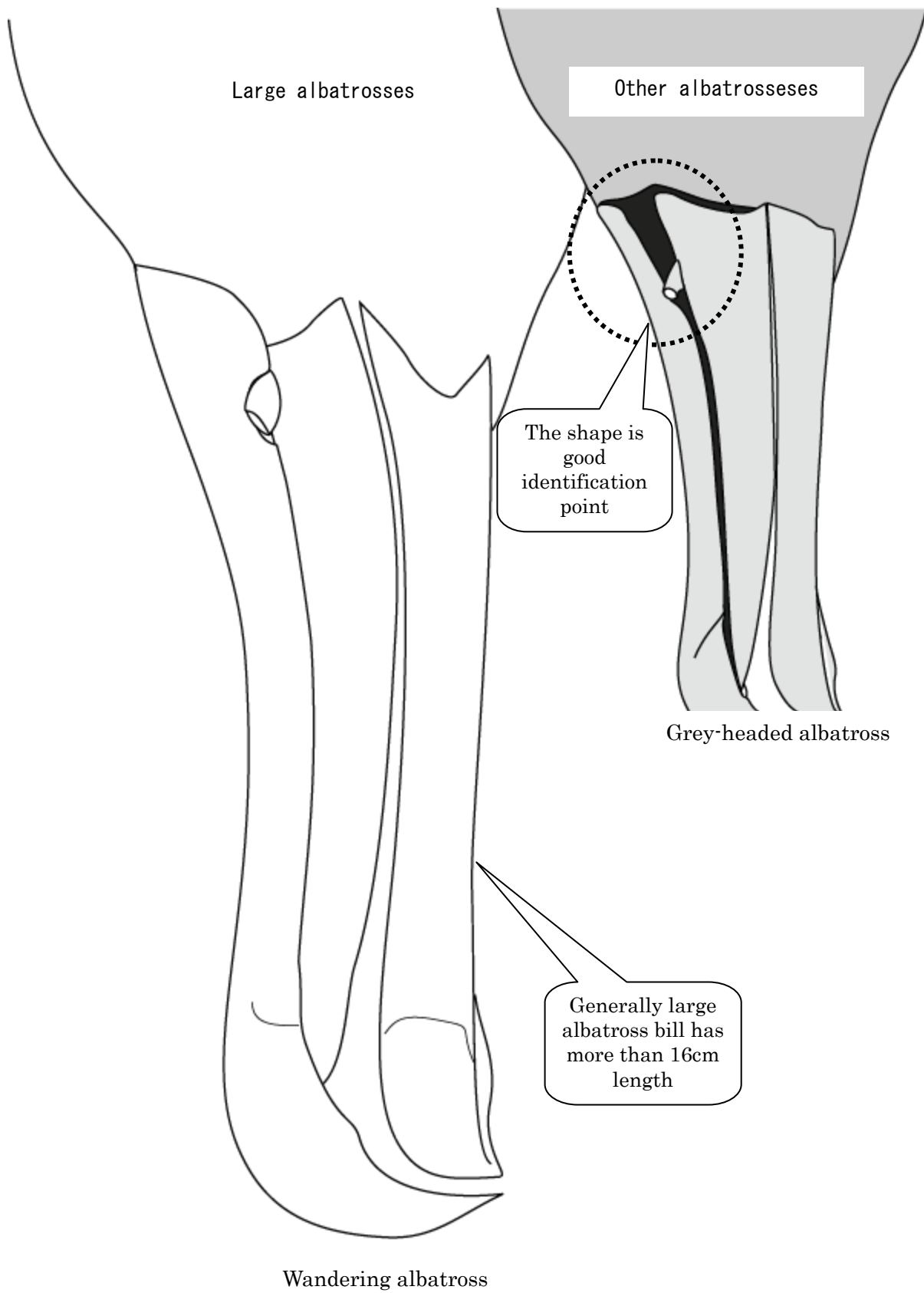| specification-1	specification-2	Classification	Species ID	Bill length	Wing length	Wing span	Body mass
Two tube noses on the both sides of the bill	Large size, white or brown body color, color of under wings is mostly white	Large albatross (Wandering & Royal)	351	16～20cm	60～70cm	260～320cm	6～12kg
	Medium size, white body color, color of upside wings is always black	Other albatrosses (Shy, Black-browed, Grey-headed, Yellow-nosed & Buller's)	353	10～15cm	40～60cm	170～260cm	2.5～7kg
	Medium size, black body/bill color, ashy flesh colored legs	Dark-colored albatrosses (Sooty & Light-mantled)	352	10～12cm	45～55cm	190～220cm	2～4kg
One tube nose on the top of the bill	Medium size, flesh colored bills, black colored body/leg (sometimes brown and white colored body or black marbles on white colored body)	Giant petrels (Northern & Southern)	420	8～11cm	43～55cm	180～220cm	2～4kg
	Small size Various body colors	Petrels (Grey, White-chinned, Pink-footed, Cape, etc)	430	3～6cm	24～40cm	80～150cm	0.5～2kg
No tube nose(only nose holes on the bill)		Other Seabirds (skuas, gulls or gannets)	370 540 etc				

Large albatrosses

The shape is good identification point

Grey-headed albatross

Generally large albatross bill has more than 16cm length

Wandering albatross

Figure 1. Shapes of seabird bill (full size)
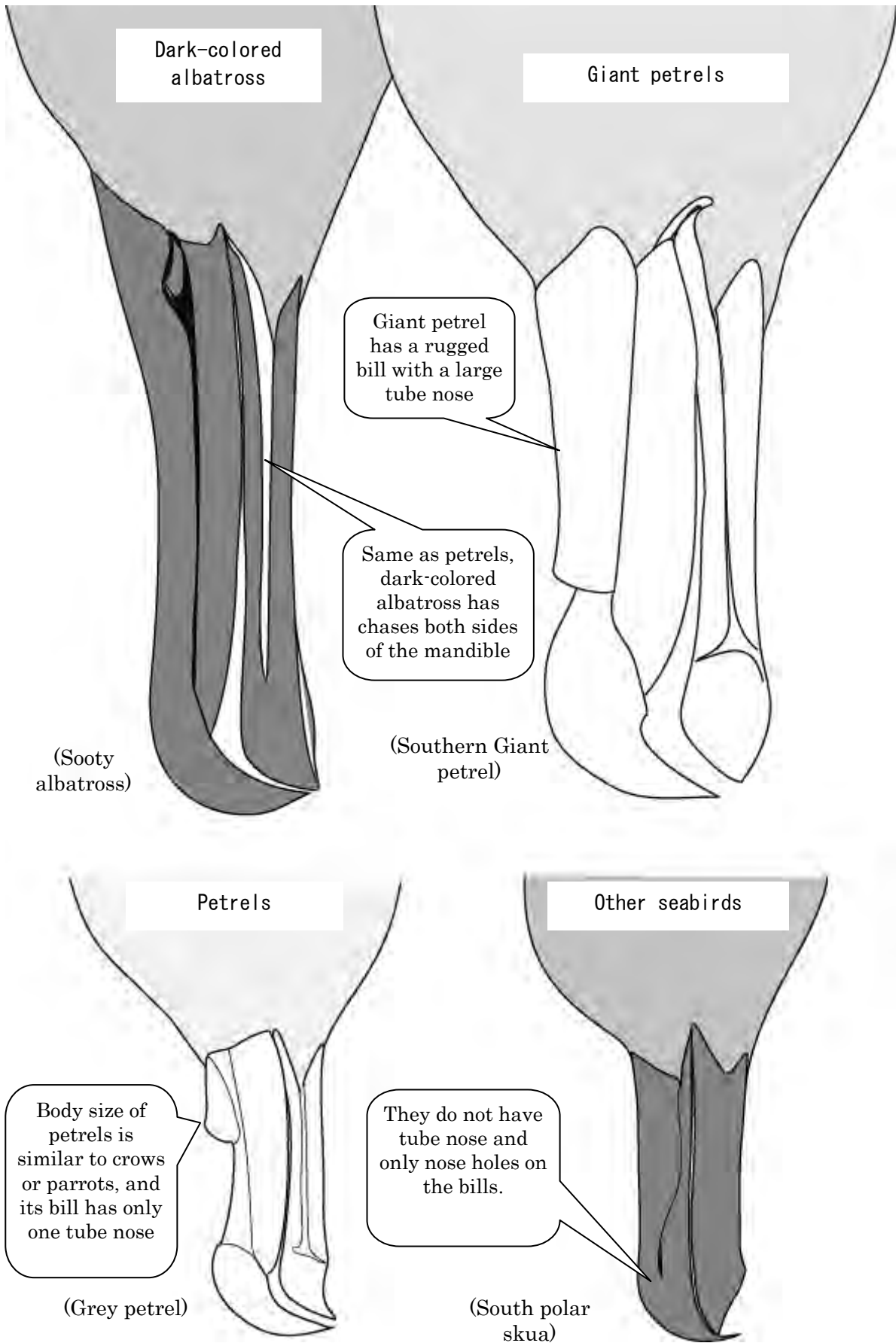
Figure 1 (continued) Shapes of seabird bill (full size)

Bill length

Petrels
Giant petrels
One tube nose on the top of the bill

Albatrosses
(Tube noses locate separately on both side of bill)

Other seabirds
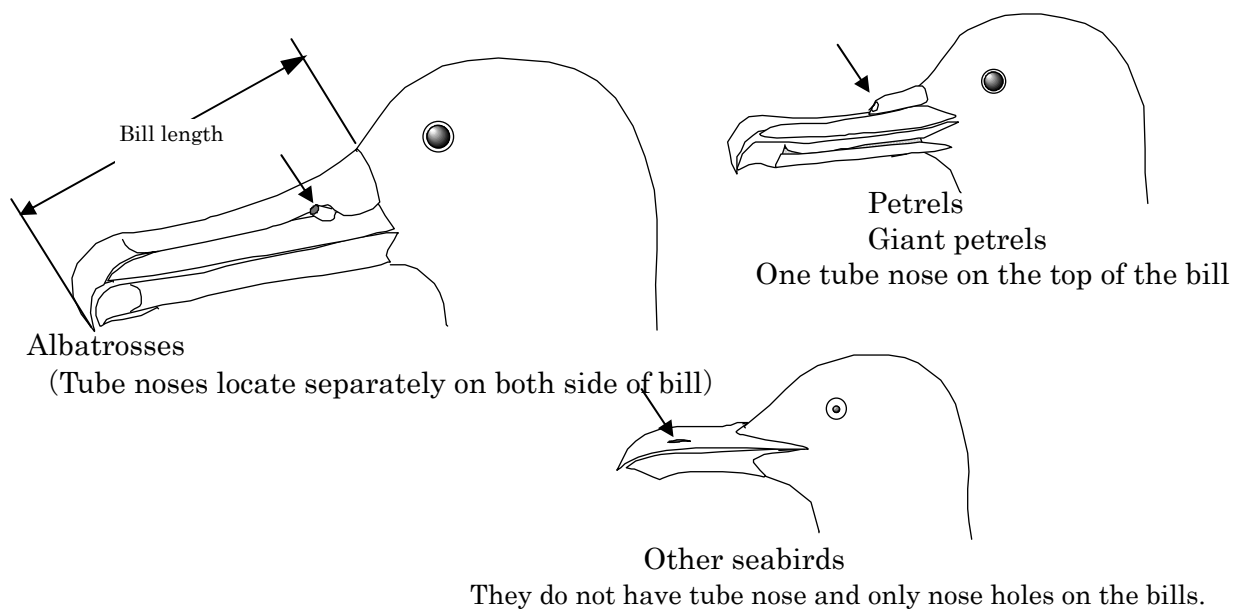They do not have tube nose and only nose holes on the bills.

Figure 2 Identification of albatrosses, petrels and other seabirds

Wing length: Note measured wing length into "体長" column of the survey field note (Fig. 3).
Body mass：   Note measured body mass into "体重" column
Samples　:   When whole body samples were collected, note "1" into "標本" column
Note　　:   When any pictures were taken, write "P" note the "備考" column

2-2. Photographs
To identify seabird species later, pictures of all by-caught seabirds and banded seabirds collected for samples must be taken.
Pictures of tori-pole and tori-lines also must be taken. The photos should clearly illustrate indicate height of the tori-pole from the deck and its exterior length from side of the vessel. Also photos should illustrate deployment conditions and the existence of streamers.

  a. Shooting condition
    Avoid direct sunlight. If any body parts catch the direct sunlight, color of the shot differs from natural. When you use the flash, take care of the reflection. Avoid puddles from shooting seabirds. Sweep water drops from seabird body to avoid reflection and to make feather color visible.
  b. Composition of pictures
  Take three photos for each seabirds;
      (i) side face and underside of wings (IMPORTANT: color patterns of the head and <u>border of underside wings</u>) (Fig. 4a)
      (ii) close shot of side face (IMPORTANT: <u>shape of the bill including tube nose</u>) (Fig. 4b)
      (iii) dorsal body and wings (IMPORTANT: color patterns of upside of wings, dorsal body and tail)(Fig. 4c)
                      (*Especially important points are marked by <u>WAVED LINE</u>)

    When camera memory or time is limited, take a photo of (iii) at least. Each photo should be taken with information board (including vessel name, date and capture ID). If rigor mortis prevent wings from extending, take (ii) and some shots to make visible about color patterns of abdomen, downside and upside of wings (especially ratio of black/white color around ridge of the underside and color of axillar) and body.
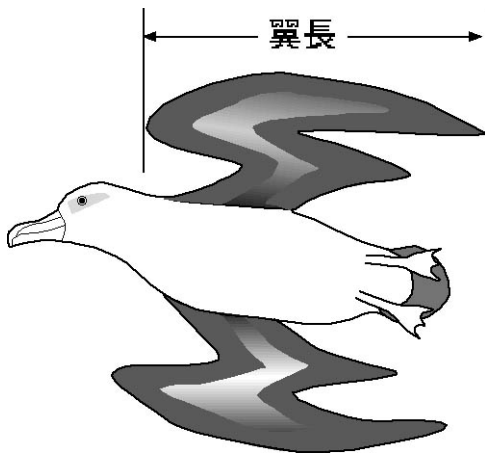
Figure 3 Measurement of wing length

Measure natural length without stretching wing or pressed it to a scale
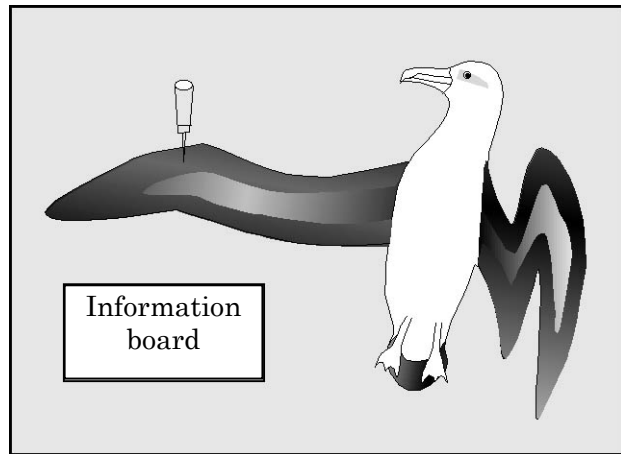

Figure 4a Frame of the photo (i)

Make the side face and underside of wings visible. Stretch either side of wings to show axillar
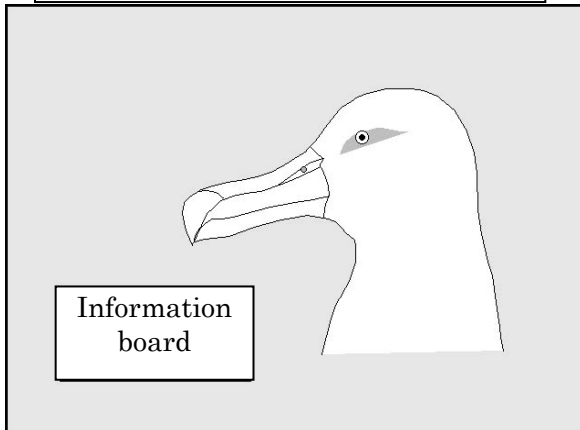

Figure 4b Frame of the photo (ii)

Make the shape of the bill including tube nose visible
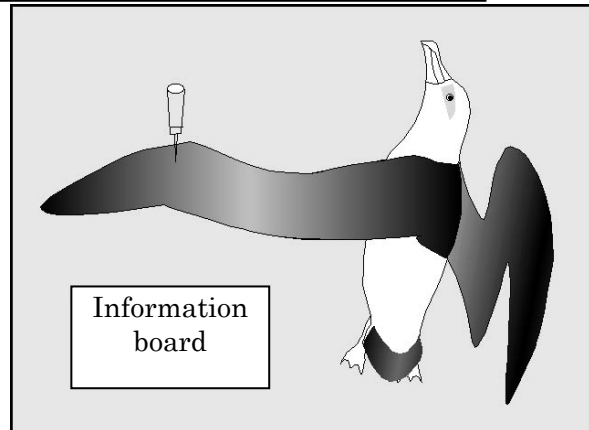
Figure 4b Frame of the photo (iii)

Make upside of wings and body visible

2-3. Collection of samples

　　Under the agreement by the skipper, sample the whole body of **banded seabird** when they are by-caught. The samples were frozen with inserting sample label into their throats (important sample with clear information about birth year and place). If the skipper does not agreed with sampling, remove the band from the leg and stored with a label.

2-4. Record of band tags

　　If a banded seabird is captured, read the ID of the tag, and note the ID into "備考" column of the field note. (e.g. 足環 1347-71074). If captured seabirds are alive, read the ID and release them.

Examples of seabird photograph

GOOD：Abdomen photo of grey-headed albatross
(Underside of wings and bill are clearly visible)

GOOD：Dorsal body of yellow-nosed albatross
(Upside of wings, bill and tail are clearly visible)

GOOD：Face of shy albatross
(Bill and tube nose are clearly visible)

In busy time, taking a photo including two birds is OK.
(It is needed to show each capture ID separately)

BAD：Upside of the bill is not visible.

BAD：Underside of wings and upside of bill are not visible

Example of field note

Labels (annotations): Dead/alive | capture/release | Damage of body | Body length | Body mass

ミナミマグロ科学オブザーバー（様式 3）

生 物 測 定

船名（第 **51** 遠水　丸）　コールサイン（ **JBCD** 　）　投縄開始年月日（20 **11** 年 **6** 月 **25** 日）　時差〈船内時間－グリニッジ標準時〉（⊕/− **9** ）

時刻 日	時	分	種名	コード	生死	取込み	傷度	体長 cm	体重 kg	コード	性別	肉質	漁獲物通し番号	標本全体	耳石	胃内容	筋肉	成熟度 枝縄番号 備考（標識番号、写真番号、サメ成熟等）
25	16	20	Start hauling										0632					
	16	20	ブイ 01	R01									0633					
	18	25	SBT	016	4	1	1	123	29	3	1	1	0634	0	保	1	3	P
	18	53	SBT	016	5	1	5	118	28	3	2	3	0635	2	空	M3		生殖腺 400g
	19	15	ブイ 02	R02									0636					
	20	20	ブイ 03	R03									0637					
	20	24	ヨシキリザメ	281	4	1	1	80	32	5	2		0638				1	ヒレ 1.6 kg
	20	33	アオザメ	012	2	1	1	191	62	4	2		0639		1	S3	4	ヒレ 2.2kg、胎児オス1尾、メス2尾
	21	47	Shy albatross	402	2	2	1	80	9.2	1			0640				1	P
	21	10	種不明魚類	050	4	1	1	99	4.8	1			0641	1				P
	21	33	ブイ 04	R04									0642					
	21	50	シマガツオ G	095	5	2	1	55	3.7	1			0643					
	22	40	ブイ 05	R05									0644					
	22	55	縄切れ 1 開始	X01									0645					
	23	20	縄切れ 1 終了	Y01									0646					ブイ 01 投入
	23	42	Unidentified petrels	430	2	2	1	45	2.8	1			0647					
	23	50	調査 01 終了										0648					
26	00	20	船橋調査 01 開始										0649					悪天候のため船橋からの調査へ変更
	00	42	メバチ	017	5	1	1	143	53	3	1	1	0650				5	
	00	59	SBT	016	4	4							0651				2	舷側で逃げた

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