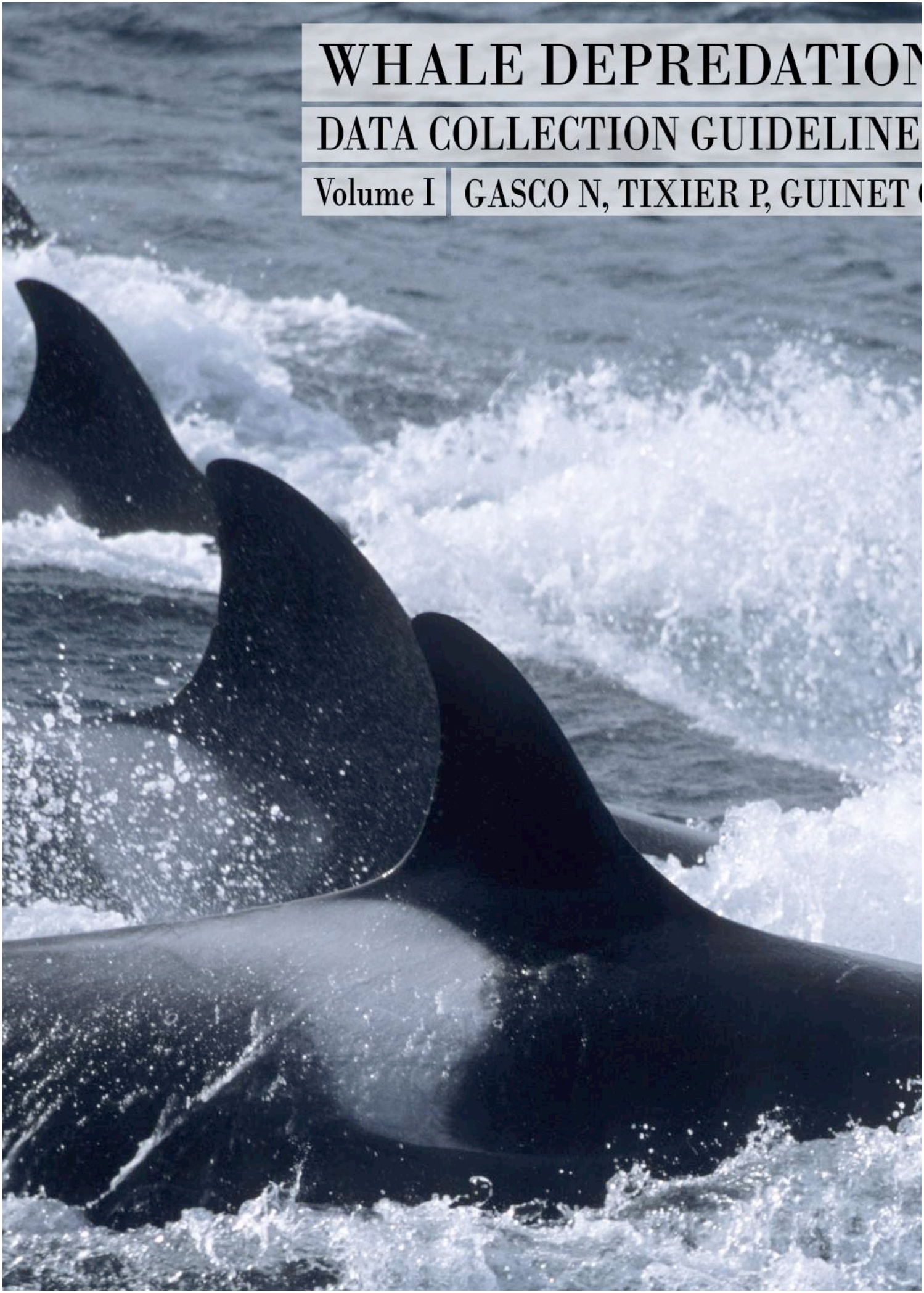


WHALE DEPREDATION

DATA COLLECTION GUIDELINE

Volume I | GASCO N, TIXIER P, GUINET

1 INTRODUCTION

Marine mammal interactions with fisheries are a growing major world-wide issue with both significant ecological and economic consequences. Most longline fisheries operating around the world, in particular toothfish fisheries in the Southern Ocean, are seriously impacted by such interactions, causing losses of tens of millions dollars to the fishing industry annually (i.e. marine mammals eating fish directly from fishing gear, known as "depredation"). As such, depredation involves substantial socio-economic issues, which, in some cases, are challenging the sustainability of local fisheries. Depredation can also have negative impacts on the conservation of recovering marine mammal populations as a result of incidental bycatch, lethal responses from fishers, and increased dependence through artificial provisioning. Finally, depredation can affect the management of fisheries and the fish stock assessment as in many fisheries the depredated fish are disregarded when defining quotas and many stocks have been under pressure from illegal fishing activity at some stage, making them particularly sensitive to the impact of depredation.

The first international workshop dedicated to marine mammal depredation on the Patagonian toothfish (*Dissostichus eleginoides*) longline fisheries, organised by the Coalition of Legal Toothfish Operators (COLTO) in Punta Arenas, March 2016, has emphasised the urgent need to find global solutions to this issue. Most of these fisheries, which are operated in Australian, French, UK, Argentinian, Chilean, South African and international waters of the Southern Ocean, experience either well-established or increasing depredation by killer whales (*Orcinus orca*) and/or sperm whales (*Physeter macrocephalus*). However, the state of local knowledge, efforts and means to reduce depredation greatly varies between these fisheries. In several cases, increasing depredation paired with a lack of research effort jeopardize the fisheries' economic viability if mitigation solutions are not found in the near future, and have negative impacts on fish stocks and marine mammal populations.

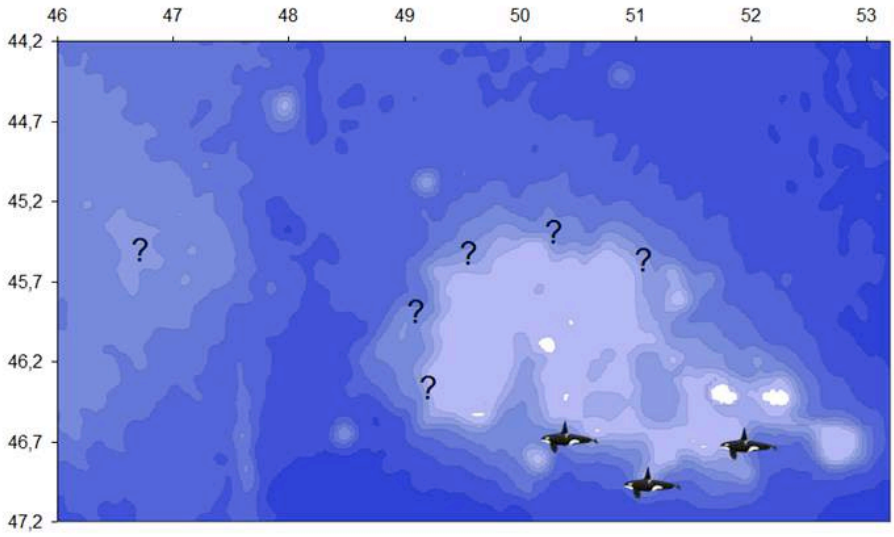
Collecting routinely high quality data in a standardised framework across all the fisheries confronted to interactions with odontocetes is the key for a better understanding of depredation and for solutions to be developed, both locally and globally.

Using COLTO as an excellent opportunity of international science, industry, government and NGO collaboration, this document aims at providing guidelines for observer programs dealing with marine mammals interactions. It is based on a 10-year experience taking place in Kerguelen and Crozet (South Indian Ocean) mainly with sperm whales and killer whales interacting with longlining fishery targeting Patagonian toothfish. As an example, in the French EEZ, seven vessels operate all year round using only automatic (weight integrated) bottom longlin. The fishery has had a 100% observer coverage for the last 15 years. Data on interactions with marine mammals has been implemented for 60,000 fishing events and more than 100,000 pictures of marine mammals have been taken for photo-identification purposes.

1.1 What kind of data can be collected and what information can be used out of it?

1.1.1 If you have presence data:

longline	killer whale
1	present
2	
3	
4	
5	present
6	
7	

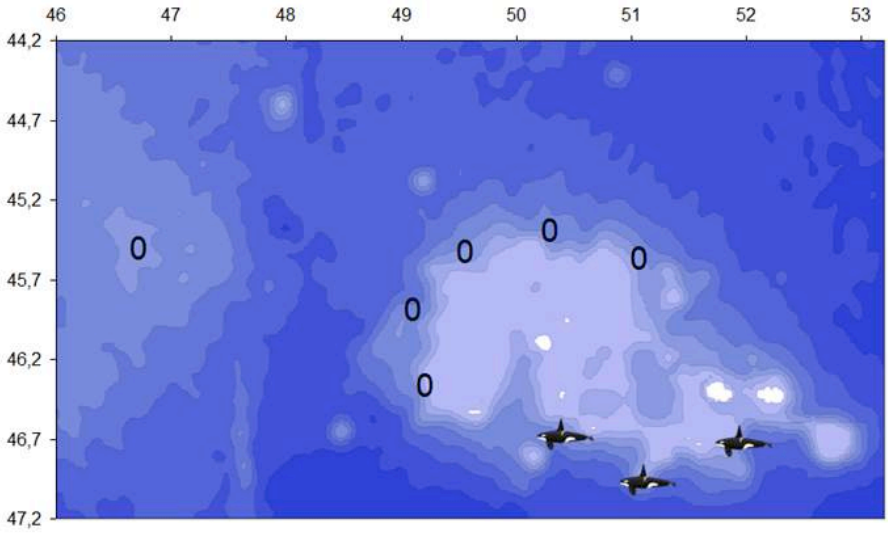


You know where the whales are but not really where they ar not

Requirement: data must be collected for every haul.

1.1.2 If you have presence/absence data:

longline	killer whale
1	present
2	absent
3	absent
4	absent
5	present
6	absent
7	absent

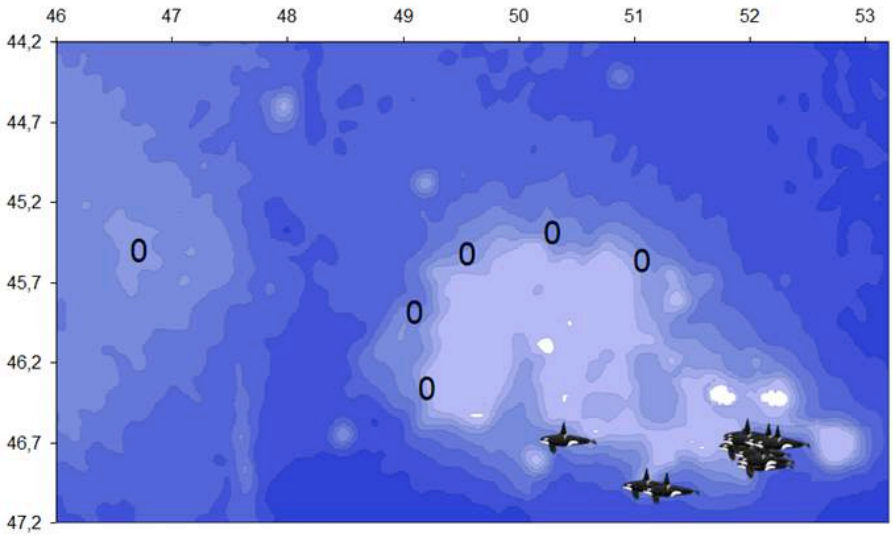


With presence and absence then you can get an idea of where whales are absent and see if there are trends of presence / absence in certain areas over time

Requirement: data must be collected for every haul.

1.1.3 If you have abundance data:

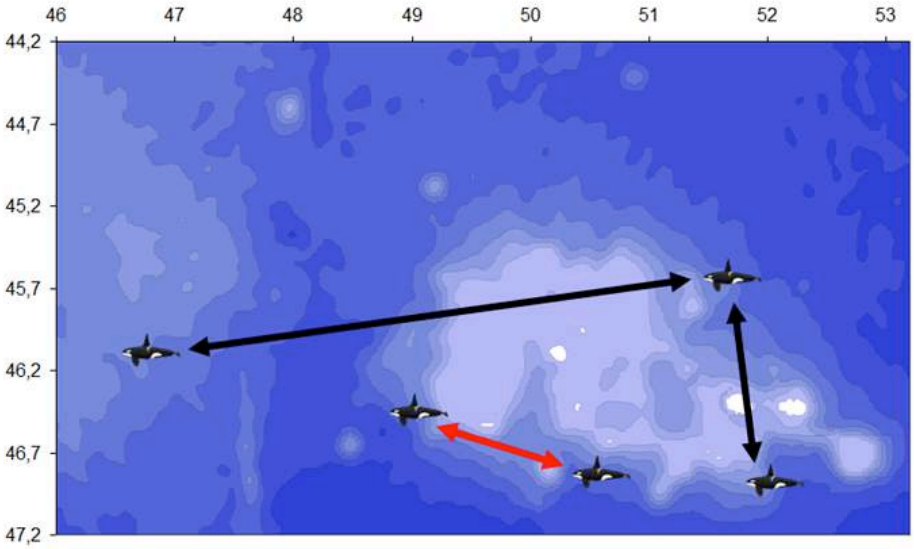
longline	killer whale	number
1	present	30
2	absent	
3	absent	
4	absent	
5	present	5
6	absent	
7	absent	



If you can collect data on the number of whales then you get information on possible densities on hot spot and changes over time.

Requirement: data must be collected for every haul.

1.1.4 If you have photo-identification data:



This is the highest level of data collection we have experimented.

With photo-identification you can:

- study differences in interaction rate between individuals or pods
- study demography
- study movements of whales
- study depredation dispersion behavior
- build catalogues to mach individuals with other areas
-

Requirement at sea:

- photo identification gear (SLR camera, lens, memory card, computer)
- naming convention for pictures

Requirement after trip:

- hard drive archiving
- sorting pictures and collect data on individuals etc, can be time consuming
- data base storage and data treatment

2 DATA COLLECTION AT SEA

This chapter describes the data collection used on a routine basis with 100% coverage by observers. Every haul is observed for odontocetes, if one longline is hauled in two sections data are collected for each of these sections.

Longlines are set only at night so observations are only possible during hauling.

Basic data collection for each haul includes:

- Date and time, lat and long and depth for setting and hauling, start and end
- Catches by species, number and weigth

	latitude		longitude		depth	latitude		longitude		depth	hooks	toothfish		grenadier	
longline	°	min	°	min		°	min	°	min			number	kg	number	kg
1	47	05,23	69	08,03	1 316	47	09,90	69	14,86	1 032	10 000	162	342	411	1 191
2	46	44,35	68	49,42	911	46	51,66	68	58,24	823	10 000	193	1 375	412	983
3	46	26,16	68	14,27	1 046	46	27,33	68	19,48	1 171	10 000	340	1 754	283	650
4	46	22,41	67	46,36	1 316	46	31,75	67	48,03	860	10 000	240	1 852	458	1 120
5	46	37,40	67	10,18	796	46	40,36	67	17,07	689	10 000	308	2 743	394	956
6	47	00,94	66	51,57	817	47	06,26	66	55,93	1 166	10 000	471	2 601	67	136
7	47	30,38	66	42,78	1 359	47	33,15	66	52,43	1 197	10 000	160	1 393	285	905
8	48	03,02	66	44,33	861	48	04,93	66	47,14	1 433	10 000	171	1 115	155	567
9	48	36,74	66	50,02	1 222	48	46,47	66	53,03	843	10 000	628	2 566	132	341
10	49	10,45	67	01,39	918	49	16,62	67	09,64	1 421	10 000	298	2 496	612	1 421
11	49	47,38	67	21,55	956	49	50,31	67	29,81	939	10 000	71	432	142	299
12	50	28,05	67	59,80	1 283	50	30,05	67	59,00	1 226	10 000	250	1 482	246	868
13	51	03,90	68	44,25	1 016	51	04,13	68	46,58	1 147	10 000	651	1 797	144	562
14	51	27,99	69	05,96	1 296	51	33,92	69	12,14	965	10 000	164	396	377	987
15	51	19,42	69	26,64	1 460	51	23,74	69	26,75	1 004	10 000	631	1 809	159	604
16	50	54,81	69	57,14	510	50	61,13	69	59,00	640	10 000	103	673	395	843
17	50	30,72	70	21,43	731	50	31,33	70	27,95	1 001	10 000	397	1 318	639	1 295
18	50	09,32	70	42,11	1 022	50	18,83	70	43,06	1 412	10 000	109	852	522	1 394
19	49	41,49	71	10,02	1 205	49	43,74	71	17,47	663	10 000	125	696	234	825
20	49	00,60	71	33,12	626	49	10,10	71	37,26	1 287	10 000	518	2 593	413	1 357
21	48	27,64	71	49,82	1 311	48	28,45	71	56,32	1 055	10 000	104	994	71	221
22	47	55,53	71	56,02	945	47	59,12	71	58,86	598	10 000	63	271	35	108
23	47	17,53	71	58,61	1 397	47	18,53	71	59,00	601	10 000	1 027	2 596	6	20
24	46	50,24	71	47,75	1 252	46	59,00	71	55,21	815	10 000	115	795	209	537
25	46	28,30	71	23,98	1 181	46	34,52	71	32,12	751	10 000	125	322	195	753
26	46	14,92	70	48,31	741	46	22,68	70	54,13	765	10 000	14	36	256	518
27	46	19,74	70	19,88	756	46	25,35	70	24,69	1 215	10 000	867	2 003	438	1 036
28	46	29,37	69	53,52	1 223	46	30,62	69	59,00	1 231	10 000	309	2 449	173	469
29	46	42,21	69	31,81	1 001	46	47,79	69	41,06	1 295	10 000	43	362	325	932
30	47	12,72	69	14,23	655	47	16,82	69	19,75	501	10 000	179	1 127	72	284

Specific data collection dedicated to odontocetes includes the following:

2.1 Odontocetes abundances

« how many whales are around the boat?? »

Counting sperm whales is a difficult exercise as they dive for long periods of time. When interacting with longliners they tend to come back to the surface at the end of line but it is not always the rule.

Counting killer whales is also difficult because some of them stay away from the ship, they don't stay long at surface and they move fast.

For these reasons it can be difficult for observers to come up with numbers and they might just rather not fill up the field than entering figures that they are not convinced with which perfectly understandable.

To take this into account we divided data collection into 3 fields for each species:

Presence / min number / max number

2.1.1 Presence

Variable type	Drop down menu	comment
string	Presence Absence Not observed	Has to be one of the 3 options, cannot be left blank

This field is mandatory, observer must fill it up. Three different cases are possible:

Presence / absence / not observed.

It has to be one of these three cases.

"presence": Favourable conditions (visibility is at least a several hundred meters with sufficient light) and observation effort provided by the observer (observer can be alerted by the crew and told to get on upper deck when whales are sighted). The presence of whales is confirmed by direct observation of at least one individual at the surface in the vicinity of the

vessel at least once during 1 haul. Absence: Favourable conditions and no odontocete spotted at any time during the entire haul.

“Not observed” is used either if observer did not have time to gather information (like if line broke etc) or if conditions are too bad to conclude (either weather conditions, or hauling at night).

NB presence can also be observed at night when killer whales come very close to the boat.

Using this system allows to use data set in presence / absence even if the observer did not record any number. The other advantage of this field is to get rid of the empty fields that are always a problem to interpret as they can be either observed of no individuals or not observed which is a common confusion for observers at sea.

2.1.2 Min / max number

Variable type	Drop down menu	comment
integer		Conditional formatting flags when min > max

Those two fields are not mandatory. When odontocetes are present, they can be both filled up or only one of them:

Presence?*	min	max	comment
Not observed			Hauling at night
Absence			Line observed for whales and no whale around
Presence			Whales are present but no idea how many
Presence	10		Whales are at least 10
Presence		15	Whales are not more than 15
Presence	10	15	Whales are between 10 and 15

Inconsistencies in data set need to be detected preferably at sea, such as:

Presence/absence	minimum	maximum
absence	10	15
not observed	10	15

For killer whales, data collected at sea by observers can be corrected by photo-identification when photos allows to identify matriline for which composition is known.

2.2 Identification of individuals

Variable type	Drop down menu	comment
string	List of individuals	Other text than what is in the dropdown menu can be entered

It is obviously not the role of the observer to learn all the individuals by heart to fill up this field but we do provide identification catalogues to them as a feedback for all their work.

In some rare cases when conditions did not allow to take pictures and with some very distinctive individuals such as this:

we have been able to collect information on a group from Crozet observed in Kerguelen waters.

This field is rarely used but nevertheless usefull.

Sperm whale identification can also be considered for some individuals.

2.3 Interaction with longline.

Some individuals make it clearer than others.

Variable type	Drop down menu	comment
boolean	Yes No	A comment field related to interaction is also available for observers to comment on interactions details

This field is obviously very important as some killer whale may pass close to the boat showing no interest (without changing speed or course and not stopping around the ship) for the line as observed some times in Kerguelen.

Killer whale interactions clues:

- They arrive straight to the boat at high speed:

- Individuals stay around the boat (at least more than 15 minutes) when hauling occurs, distance may vary widely between groups and individuals (a few meters to 1 nautical mille or so):

- Directions varies, they do not go from point to another point

- They dive either next to the line or at distance, when they get back to surface flocks of birds follow them to grab fish remains:

Sperm whale interactions clues:

Interactions with sperm whale is more difficult to assess as they do not leave clues at surface.

- They stay around the boat for more than 15 minutes

- they actively follow the boat during hauling (which can mean several kilometres)

- they mainly dive in the direction of the line, they may dive at long distance from the boat due to higher diving capacities than killer whale.

-

- If orcas are not present sperm whales do not form a group

2.4 ETA

Variable type	constraints	comment
Time (format hh:mm)	>00:00 <24:00	If this if filled up, crosschecks that abundance field is filled up with 'presence'

The Estimated Time Arrival here corresponds to the time between the first hook of the line hauled on board and the arrival of sperm whales / killer whales.

If whales are already present when hauling starts then time equal zero.

This information is used to assess the distance at which whales detect the ship in different places and can give information on natural foraging areas.

2.5 Photos

Variable type	Drop down menu	comment
boolean	Yes No	

Knowing if photos have been taken is always a useful information for data and photo processing in order to check photos are not missing.

2.6 Number of magazines with presence

Variable type	Drop down menu	comment
decimal	(no)	

Depending on boats, magazines correspond to about 750 hooks and is an easy to use sub-division of the longline which is formalised by a knot between the sections.

Odontocetes sometimes arrive in the middle of the line which means their impact is only on half of the hooks hauled and this information can be usefull for data analyses of depredation rate.

2.7 Interaction between KW / SW

Variable type	Drop down menu	comment
string	(no)	

Comment field on interaction between killer whale and sperm whales: fighting, blood at surface etc…

2.8 Comment

Variable type	Drop down menu	comment
string	(no)	

Any usefull comment from observer on behaviour etc.

All those field are derived (except “interaction between KW/ SW) for both species.

2.9 Summary

		sperm whale	killer whale
abundances	presence or absence or not observed	presence	presence
	number min	12	10
	number max	15	15
identification		CRO0147 present ?	C037 and its friends
interaction with LL	yes / no	yes	yes
	comment	high depredation	
estimated time arrival		00:30	00:20
photos	yes / no	yes	
	comment	good series of tail	stay a bit far
number of magazines with presence		12:00	00:00
Interaction between KW / SW	yes / no	yes	
	comment	SW form circles with tails outside to flap water, blood seen at surface when KW attack one individual left alone	
comment		dive and come up at surface all together	same group as yesterday

3 PHOTO IDENTIFICATION

This chapter is dedicated to observers.

3.1 Introduction

This document is a synthesis of experience acquired since the 1960's around the Crozet (Division 58.6) and Kerguelen islands (Division 58.5.1). It is provided in order to help starting a photo-identification program.

Since 2003, all fishery observers working aboard French Patagonian toothfish fishing vessels are equipped with advanced photographic gear. These observers have collected about 100,000 whales pictures from fishing vessels between 2003-2016.

The photo-identification technique consists in taking pictures of individuals to be able to recognize them between different sightings by using shape, colors, scars and notches on the body.

Information harvested can be used in mark-recaptures models to assess the dynamic and the behaviour of populations in relation with fisheries.

3.2 Best gear configuration

Here is the list of what is provided to observers at sea in the case of the French EEZ:

- DSLR camera body
- Canon EF 100-400mm f/4.5-5.6L IS II USM
- 2 SD memory card, high speed and high capacity (>32 Go)
- one memory card reader
- Hard drive to archive copies of the pictures

Best results were obtained with a 100-400mm lens which allows photographer to take pictures of individuals close to the boat as well as individuals at distance without the need to change lenses, which can be difficult on a boat.

The contribution from the camera Body is not as important as the lens quality in terms of picture quality.

Flash drive: the size of memory card available has increased dramatically. A single sighting usually uses less than 4 Go. It's worth having a High speed memory card as the buffer of the body will not be saturated as easily since saving files on the card is quicker.

It is obviously better to collect pictures with a compact camera than no picture at all, but those pictures will be very limited when it comes to analyse individual’s presence, especially if whales are at distance.
A compact camera can’t compete with an SLR camera on which you can use a large zoom like 100-400mm.

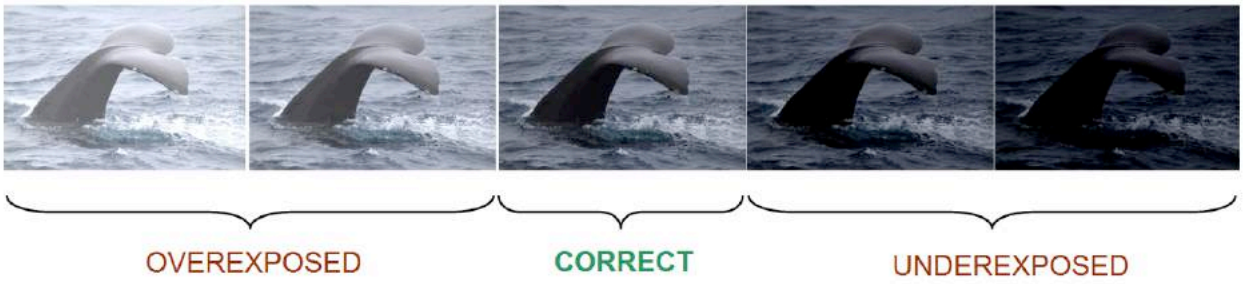
3.3 Gear protection

Lens should be protected by a UV filter, thus water projection can be cleaned without any risk for the lens itself.

The gear should be protected from water projection by a plastic bag, anyway taking pictures in bad weather is not recommended at all as the electronic will not stand long in these conditions.

3.4 Understanding your camera

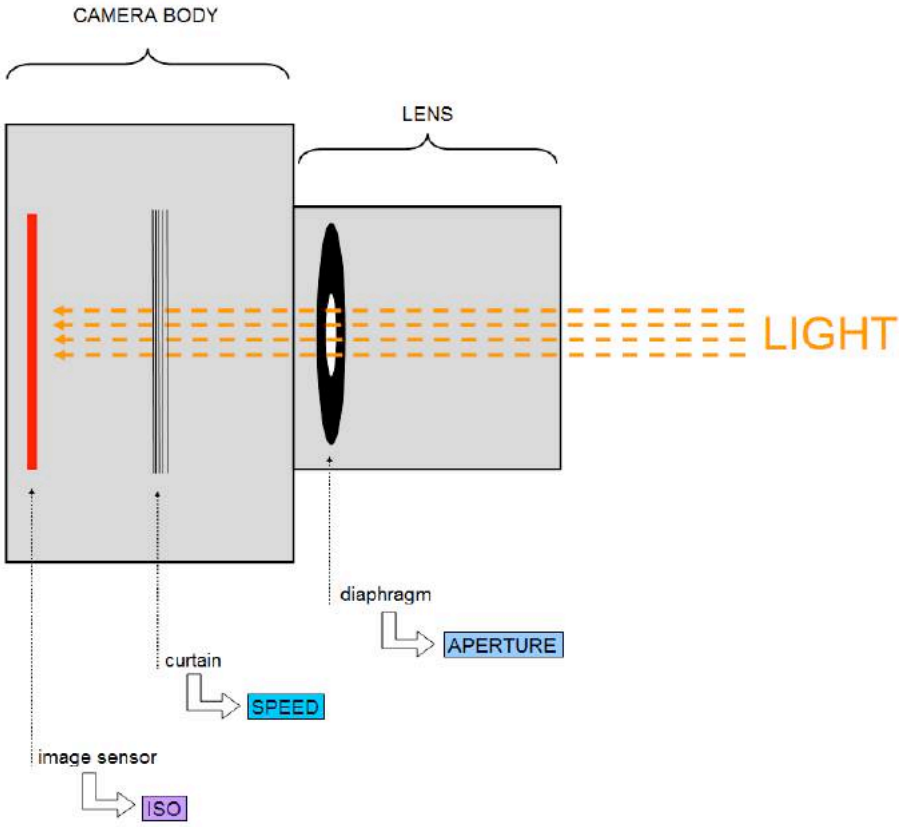
Your camera's job is to get a well balanced picture, not too dark… not too light.



Everything is about the amount of light that gets in your camera.

You can play with three parameters for that:

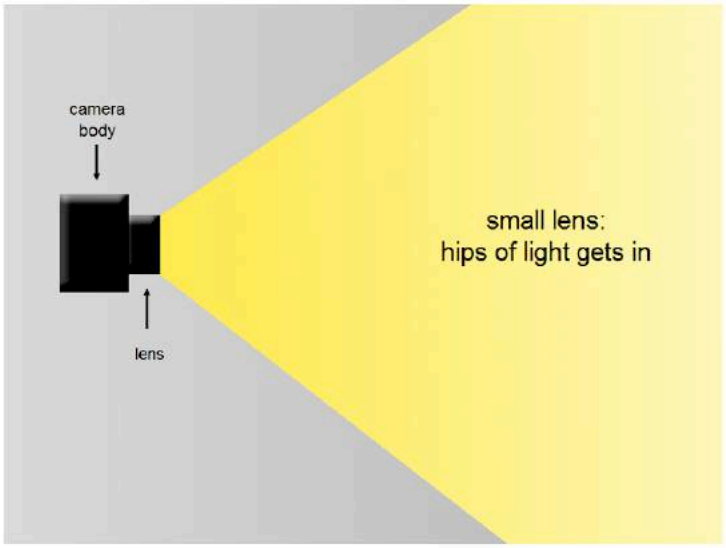
- ISO. (how sensitive the image sensor is to light)
- Speed (how long the curtains stay open)
- Aperture (how wide diaphragm is open)

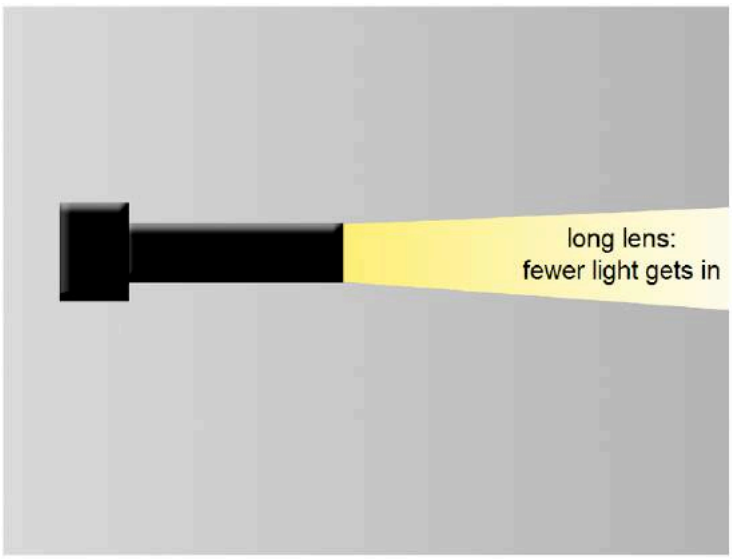


3.4.1 Lens

Depending on what kind of pictures you take the lens you will use will be different. Taking close focus pictures of orcas 500 m away will be a different situation compared to landscape.

The difference is the amount of light (again…) that can get in the camera.





For photo-identification purposes you will need long lens so you won't have much light getting in the camera.

LENS ADVICE: we obtained best results with a 100-400 mm lens that allows you to take pictures of whales at distance (400 mm) as well as very close to the boat (100 mm)

3.4.2 Speed

Shutter speed is how long the shutter "curtains" stay open to allow light into the camera.

Fast speed allows you to "freeze" the action, on the example below you can see water drops shot at 1/1000s.

If speed is 1/125s: then you will get two times more light than if the speed is 1/250s

Camera body should be set on Speed Priority and speed should be 1 / 1000s.
Slower speed will not allow to have 100% focused images, higher speed will only use more of the available light without improving focus.

We experienced that very low speed can give very interesting results for art exhibitions though.. not really for photo ID…

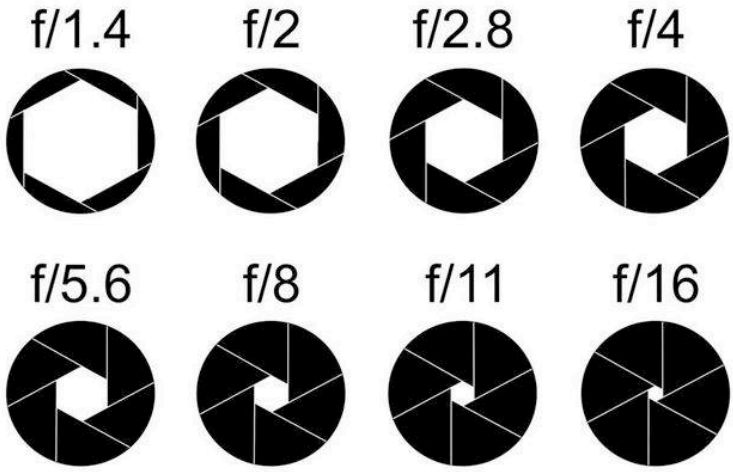
Best choice for photo identification:
1/1000s at all time

Photo-identification conditions are difficult because there is not much light available when using high speed and a long lens!

3.4.3 Aperture

- aperture (the closest it will be the less light will enter)

Now if aperture is 4 you will have two times more light than if you set it to 5.6 (it is not 1; 2; 3 etc, that would be too easy, numbers are as follow)

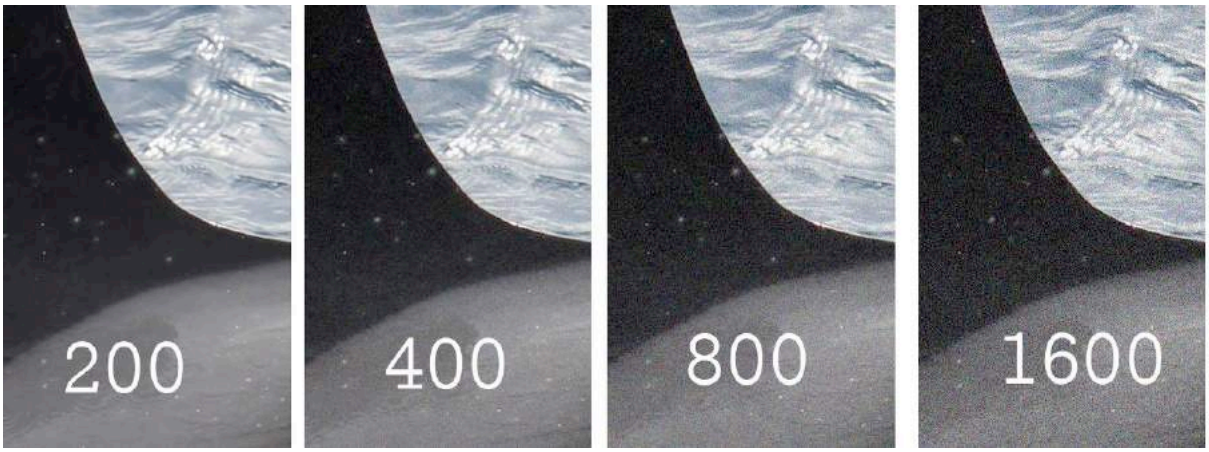


Best choice for photo identification:
let the camera calculate aperture using speed priority mode.

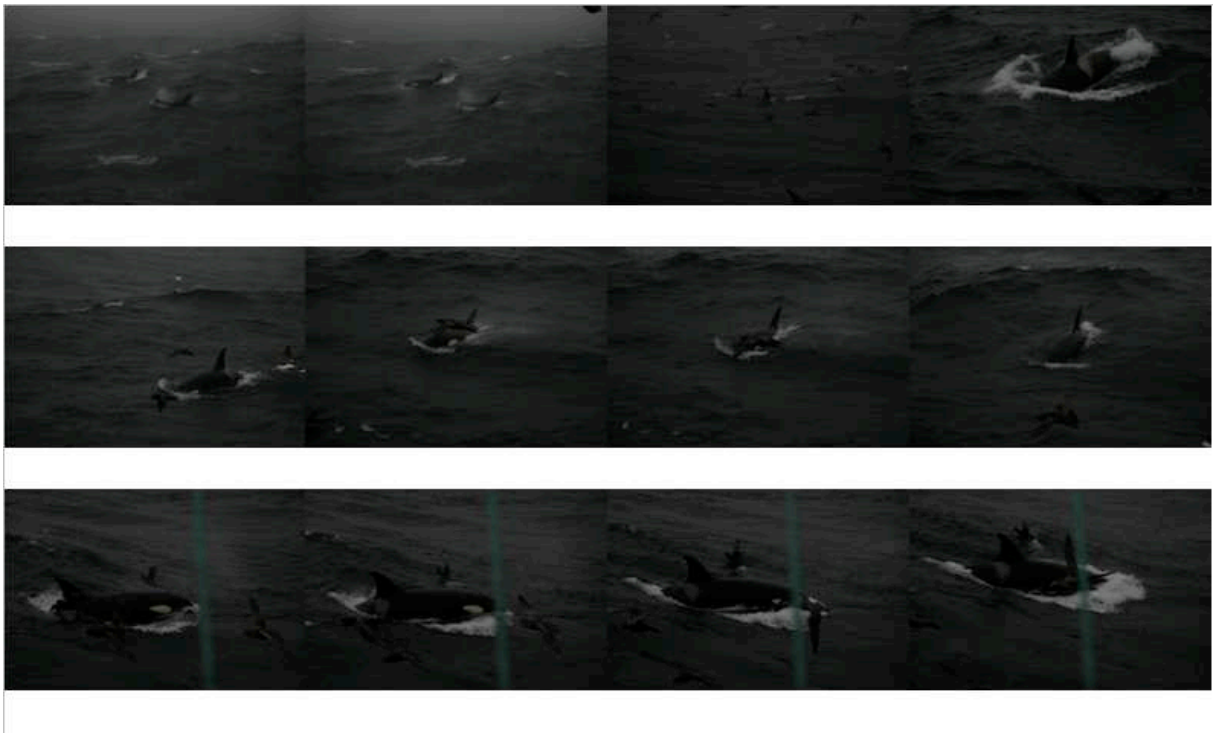
3.4.4 ISO

The ISO determines how sensitive the camera image sensor is to light.

A high ISO requires less light but the image will be grainier.
A low ISO requires more light but the image will be “cleaner”.



you can use high numbers (1600) to take pictures with less light



if you're using the maximum iso and you still don't have enough light then the picture will be dark, no worries you do what you can

if the groups are the same all day long you'll get pictures during day time, if whales arrive only very late then you might get a dark but priceless picture containing information on a very rare group never seen where you are!

look at what can be done with a dark picture in the following pages.
it's better to have a better quality picture than this but it's better to have this than nothing

ISO is a bit different and it's never good to use on an automatic mode, ISO should always be as low as possible because you loose resolution when it increases.

100 ISO would be the best but in photo-identification conditions at sea it is often not possible to have enough light so 200 ISO does the job better at all time and observer does not need to switch from 100 to 200 ISO and back all the time.

Best choice for photo identification:
200 ISO and up only if necessary

3.4.5 Speed priority mode

You're not going to change the three settings for every picture: that would be unmanageable for photo-identification, it was actually the case long time ago but now camera can do the job for you.

You can set your camera in to three basic modes:

- manual (you do all the settings, as said above, not interesting in our case)
- aperture priority: you choose aperture and your camera will calculate the speed (not interesting in our case because speed will be to low and pictures will be blurred)
- speed priority: this is what we want: speed is set to the value we want and the camera will calculate the amount of light and open or close the diaphragm for you

those are basics modes

Best choice for photo identification:
Speed priority

You can also find “sport modes” those are set to high speed but ISO can be set on an automatic mode so it’s better not to use it.

when set to Speed Priority the body calculates automatically the correct aperture and user does not need to make any changes.

3.4.6 resolution

Camera body must be set to maximum resolution to obtain the best possible quality image.

3.4.1 summary

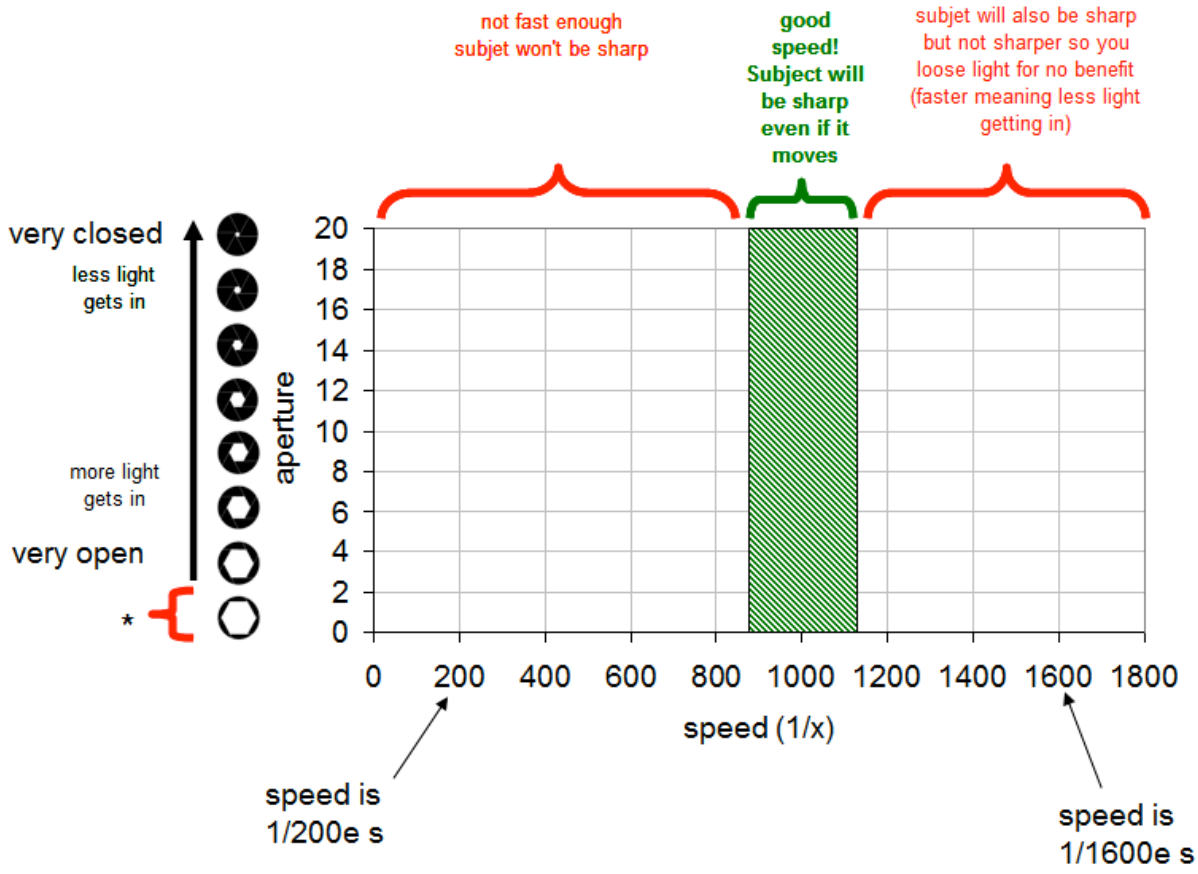
lens	100-400mm
memory card	several >32 Gb, high speed
mode	speed priority (shutter priority)
speed	1/1000s at all time
ISO	200 and more only when necessary
aperture	calculated automatically when you use speed priority
quality	"fine" jpeg, highest quality available
Autofocus	on

3.4.2 Feedback to observers

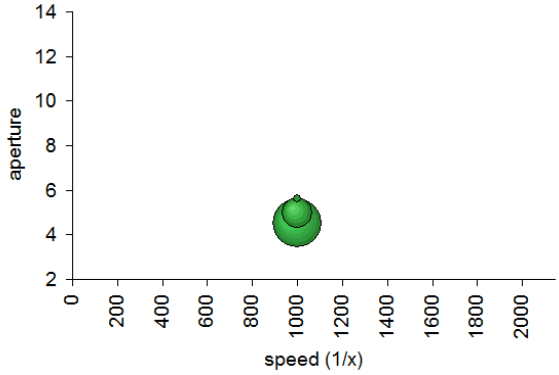
Observers deal with hard work conditions, it is fair to recognize their work and give them some feedback on the data and pictures they collected.

Feedback consists in copies of scientific papers, workshop and conferences presentations and can also be some information on the settings of pictures collected:

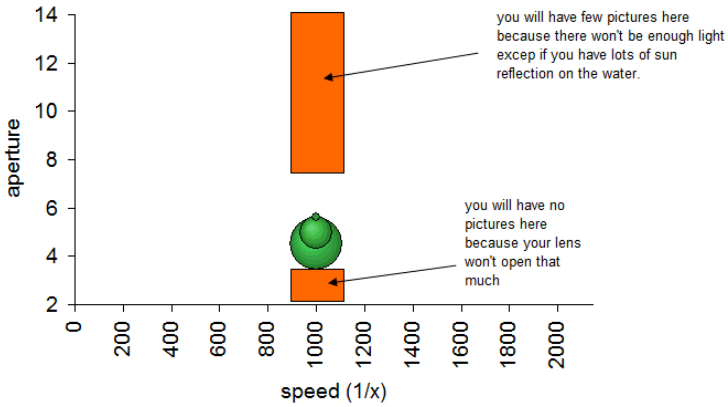
How does the graphs work?



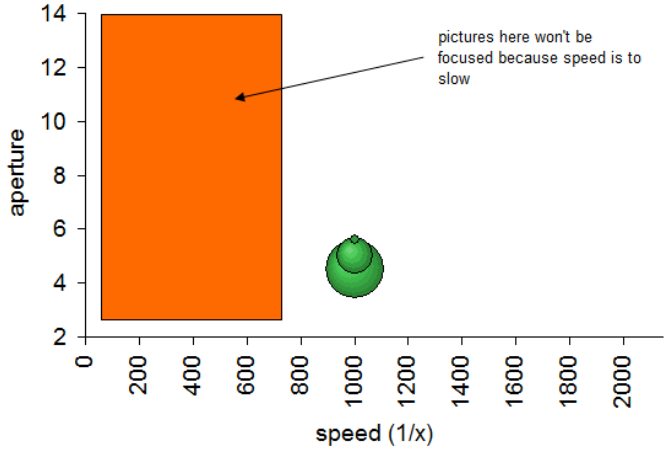
ideally, in good conditions (not dusk or dawn or dark weather) iso should be set to 200, speed: 1/1000 s and aperture will probably be around minimum (meaning around 5). On the plot below you can see most of the pictures (bigger buble) were taken with 1/1000s and aperture around 5:



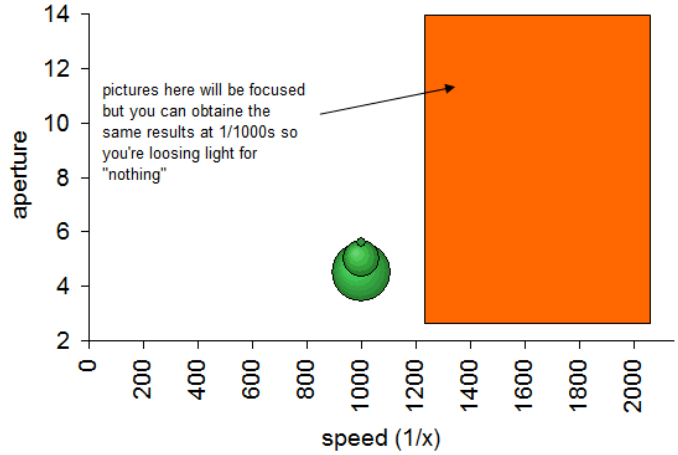
Aperture at this speed works like this :



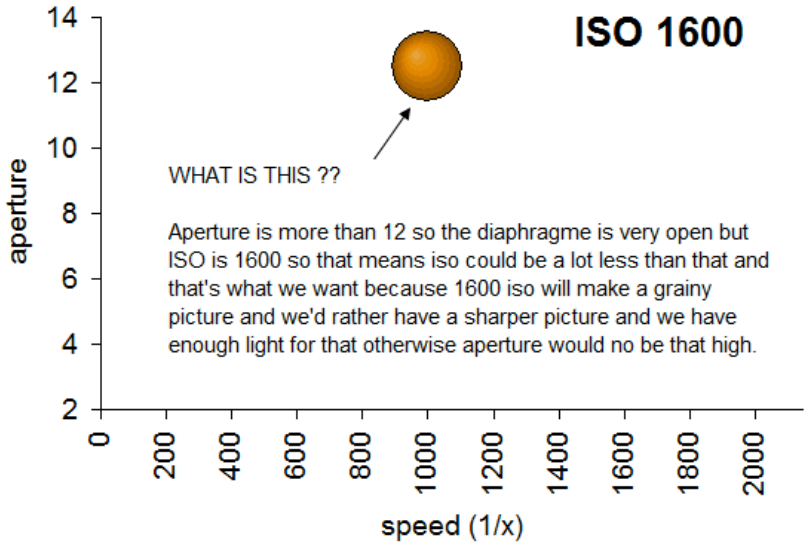
Lower speed :



Higher speed:



what is this??

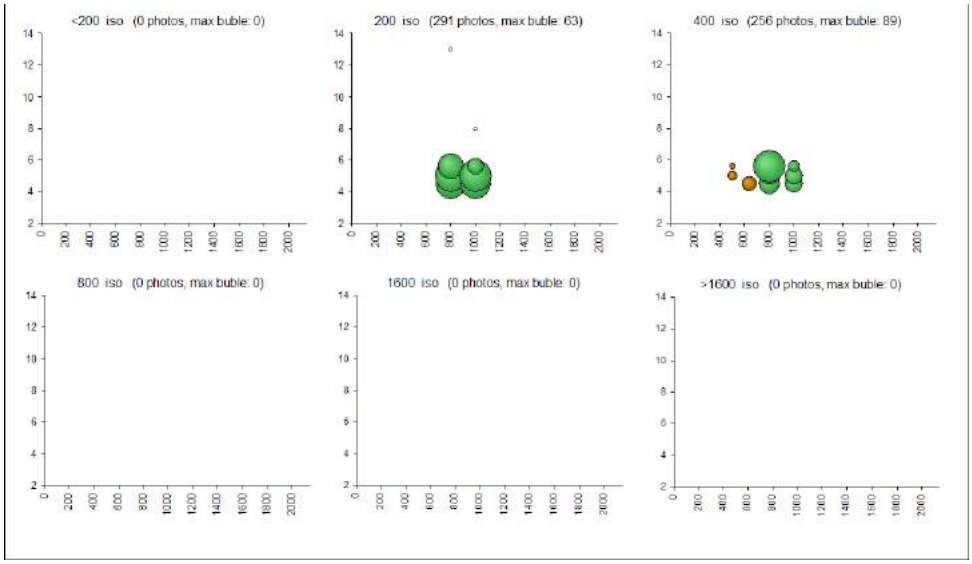


this can happen if you did use 1600 iso when conditions were very dark and you forgot to set your gear back to 200 iso, its worth checking settings time to time to avoid situations where you might miss good pictures.

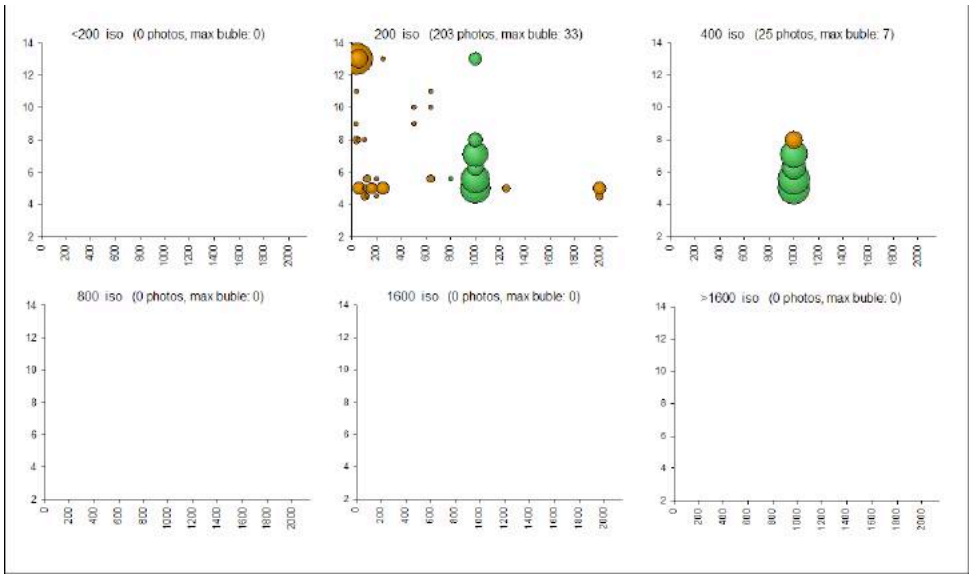
Commented examples:

X axis corresponds to speed (1/x) and Y avis corresponds to aperture. We are thankfull to all observers who took all those pictures, feedback is given to get things even better next time.

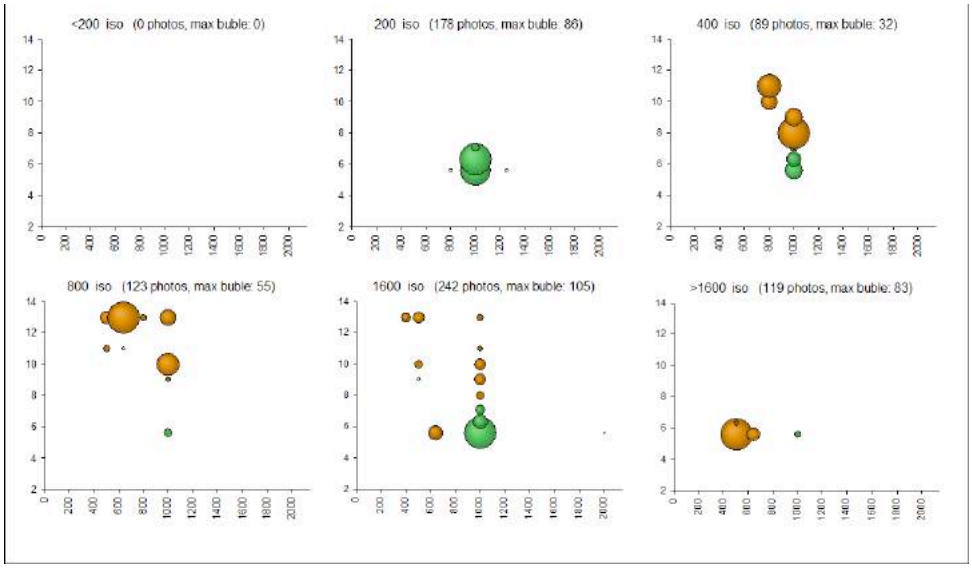
Below, a few images at 400 ISO that are too slow but this is only a few, the others are fine. Advice would be also to not hesitate to take more pictures if possible:



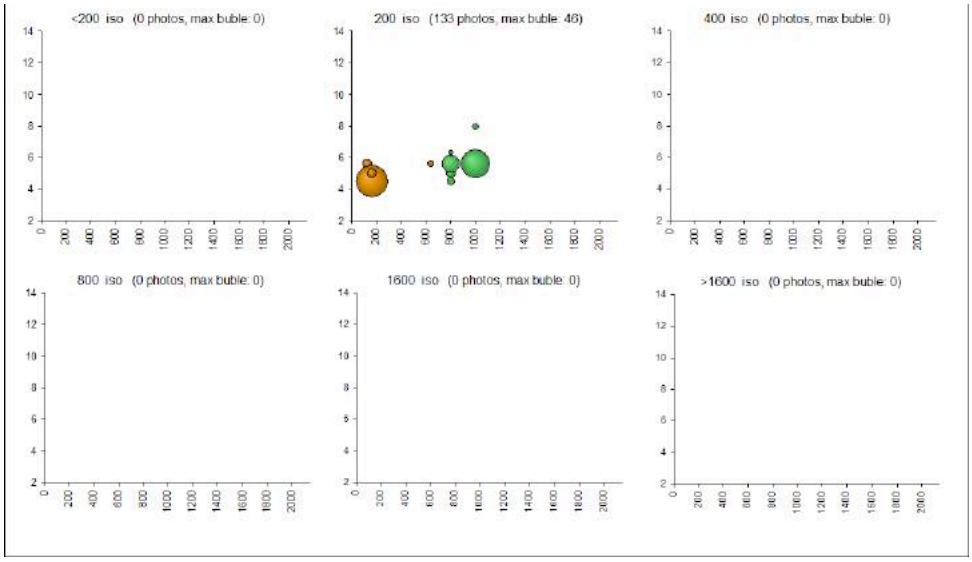
Below, something went wrong when using 200 iso, the gear was not set properly and all the pictures on the left won't be usable. Also a few pictures at speed more 1/1000s but it's only a few. The moral of the story is: don't change the gear settings too much and check sometimes that it is correct. Also we would advise to take more pictures.



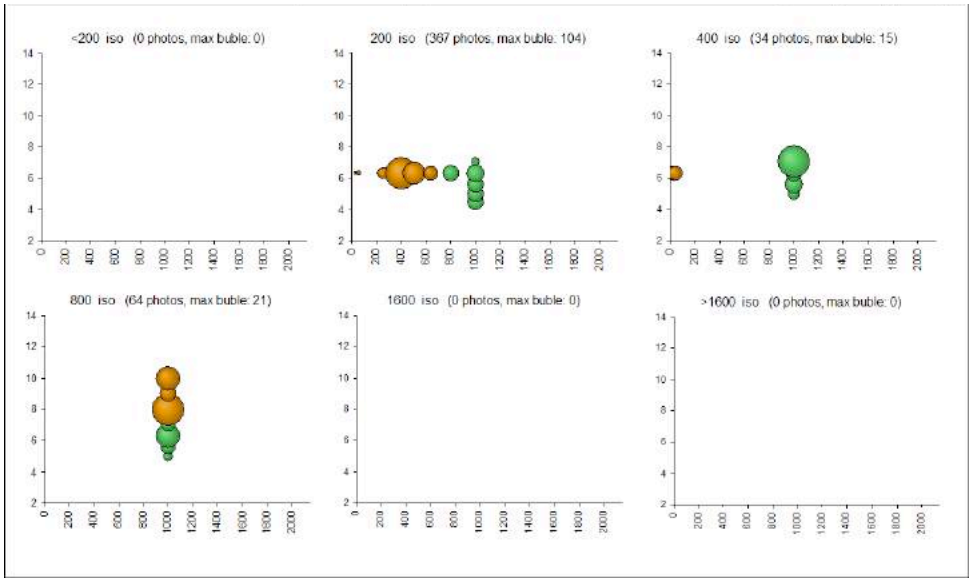
Below, 200 iso is fine, for others many pictures are too slow and/or using 400 iso when 200 would have been better (aperture is more than 5), the brown bubbles in 800 and 1600 should have been done with 200 iso. Anyway apart from pictures slower than 1/800s all those pictures can be used so it's fine.



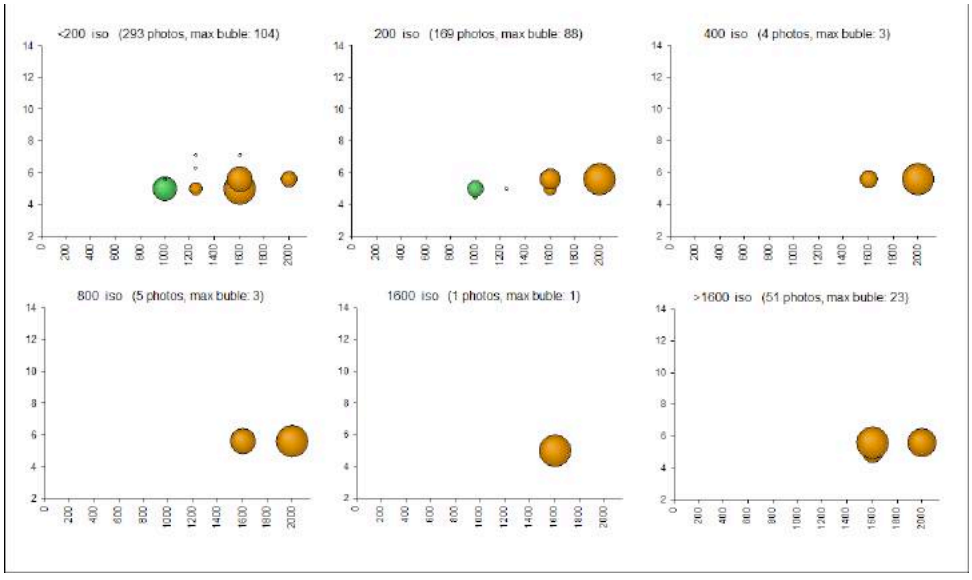
Below, the green part is fine but something went wrong with some pictures at very low speed. Advice would also be to take more pictures.



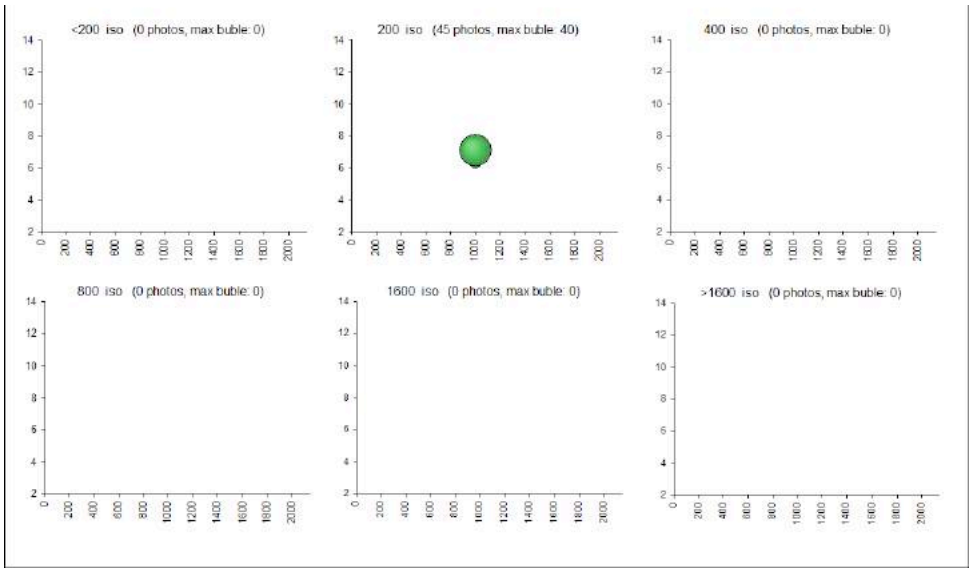
Below, something went wrong here: gear was set to aperture priority at some stage instead of speed priority. Also 800 iso has been used when 200 iso would probably have been enough but that's as much of a problem.



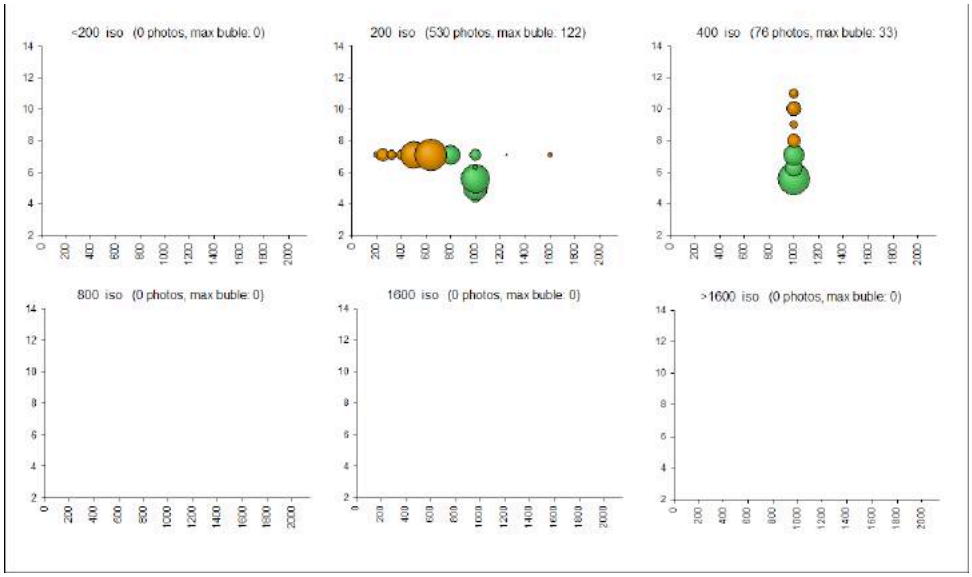
Below, this is very typical of a "sport mode", this mode does give priority to speed and doesn't care about iso. This is what we don't want because 1/1000s is enough. All those pictures will probably be usable but more grainy than what they could have been.



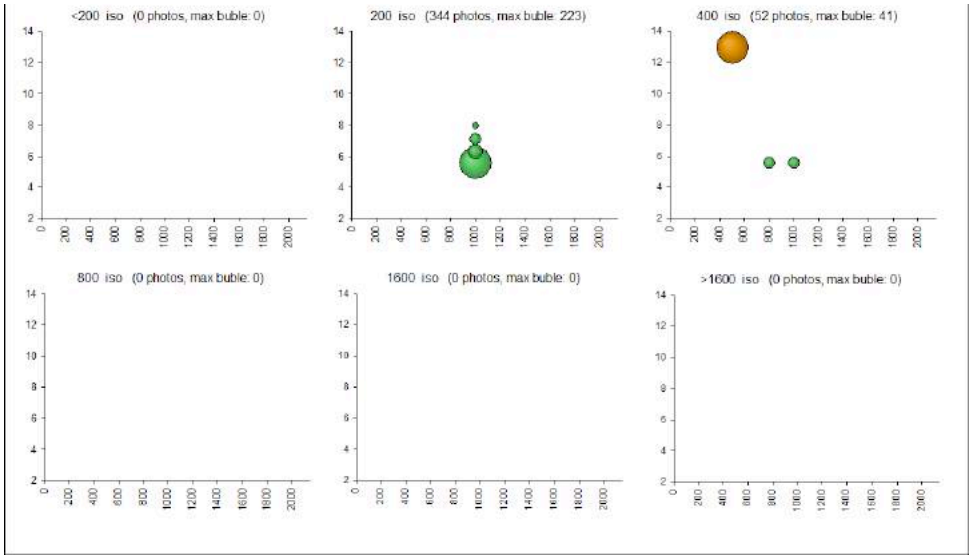
Below, too bad there were not more pictures because they are just perfect!



Below, in 200 iso a typical “aperture priority” horizontal pattern.



Below, something wrong with low speed in 400 iso, those 50 or so pictures won't be usable but the 344 pictures in 200 iso are just fine.



You can generate your own plots with PINT
https://dx.doi.org/10.6084/m9.figshare.3380269.v1

3.5 Number of pictures

During a normal length trip (something like 3 months) and if whales are around almost every day the number of pictures can be around several thousands.

If killer whales are around the boat and conditions are ok several hundreds of pictures can be taken

3.6 Training

If you don’t have killer whales or sperm whales around where training workshop takes place you can still project some footage on a large screen and have observers to take pictures almost like in real conditions, at least they can really practice with the gear.

3.7 Checking at sea

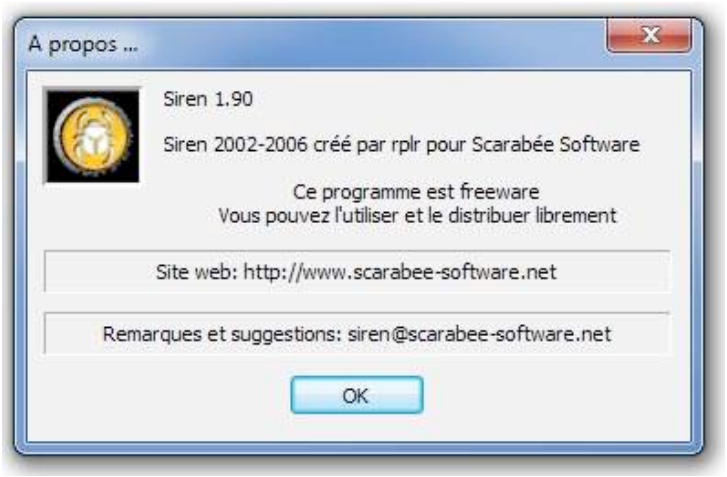
Checking the speed and exposure mode on the pictures returned by the observer after the trip highlighted that some observers, even when given clear instructions, did not correctly set the camera. Subsequently, since it's is very important that the time spent on harvesting pictures produces interpretable information, it has been decided to check the setting before the arrival on fishing grounds.

Observers at sea in the french EEZ are asked to take several pictures on the way to the fishing grounds and to send those in low resolution by email:

- 3 pictures of a bird flying with the same settings as for photo-identification:

- 1 picture of the GPS

the pictures of the GPS allows the technical coordinator to check the correct settings of date and time while the 3 bird pictures allows him to check the settings of speed, iso and speed priority mode using a software such as "Siren" to read the EXIF and IPTC information:



But you can also use PINT tool
https://dx.doi.org/10.6084/m9.figshare.3380269.v1

The following features are checked using the bird pictures:

file	Ex-ExposureTime	Ex-FNumber	Ex-ExposureProgram	Ex-ISOSpeedRatings
test 1.jpg	1/1000s	F5.6	shutter priority	100
test 2.jpg	1/1000s	F5.0	shutter priority	100
test 3.jpg	1/1000s	F4.5	shutter priority	100

in this case it has been advised to the observer to set the camera to 200 ISO instead of 100.

This routine check is processed at the start of each trip at sea.

Of course if the camera does have an integrated GPS things will be a lot easier because position does not need to come from the data base.

3.8 Killer Whale

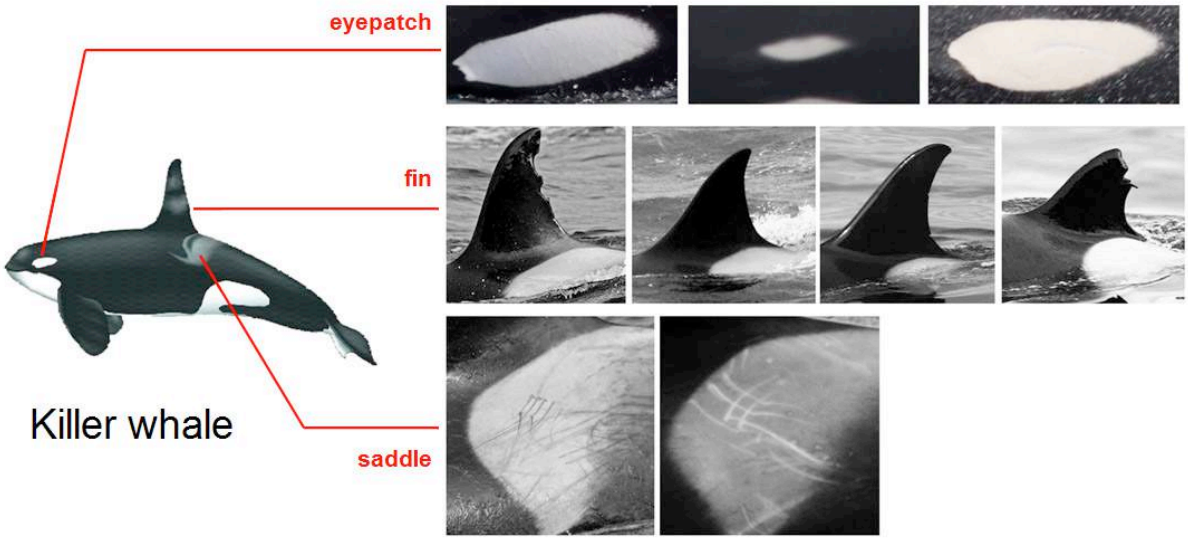
Killer whales can be very fast when depredating on a line and predicting where they will come at the surface to breath can be a hard job.

3.8.1 What is the best distance to take pictures?

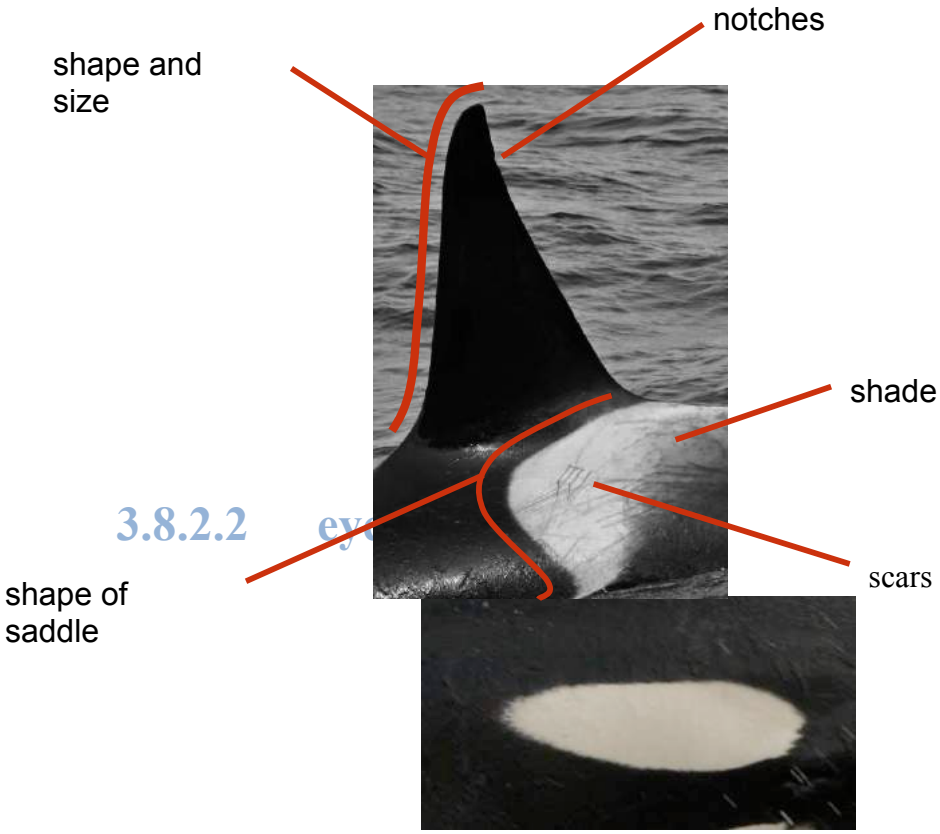
Since digital camera allows to take a lot of pictures without additional cost **the number of pictures should not be a constraint** when taking pictures.
It is impossible to know if the group is going to come closer to the boat or not, some might come very close and some other groups never get closer (probably having learned from bad experience with IUU fishing)
To increase chances of collecting information on the group the observer must take a series of pictures as soon as they are sighted and then take more pictures if they get closer.

and closer:

3.8.2 what are the important elements to get images of?



3.8.2.1 dorsal fin and saddle



3.8.2.2 eye

Size and shape can give enough information to identify an individual

3.8.2.3 linking eye patch and dorsal fin

or

Dorsal information and eye patch information is not obviously linked if no picture is showing both on the same picture or a series of pictures show a continuous gradient on the individual.

3.8.2.4 linking individuals

Pictures showing information of several individuals are the very informative to understand the social-structure of the pod and possible changes over time.

3.8.3 How often should pictures be taken?

Now that almost all individuals are correctly illustrated in a catalogue in our zone, two different types of sightings are conducted by observers: quick sighting and accurate sighting:

	quick	accurate
What information is seeked?	To know which social unit(s) is interacting with each longline	Best quality pictures and all individuals present during the sighting to update catalogue.
How much time should be dedicated to this?	5 - 10 minutes	30 minutes or more
Quality and quantity	It's not the priority here, only to get pictures of main individuals to identify the social unit(s)	As many pictures as possible of all individuals on both sides
How many pictures	As many as possible during the limited time	No limit
conditions?	Even pictures taken from the open door of the bridge can be informative	Good weather conditions to go outside and sufficient light.

3.9 Sperm Whale

3.9.1 what are the important elements to get images of.?

3.9.1.1 Caudal fin

Tail flukes is the main source of information, angle is definitely crucial for quality as this last series show pictures that will not be easy to use.

3.9.1.2 Dorsal fin

Dorsal fin can be informative for identification but so far has been hard to use and flukes pictures should be favoured...

3.10 Other species

Any picture of large whales, and in particular blue whales and humpback whales might be useful as part of the SORP program. For blue whales back pictures should be favoured as individual are identified according to their back pigmentation. But even sighting information about that species can be usefull.

For humpback whales. Under-side Fluke tail pictures can be extremely usefull to refine our understanding of movement of that species between tropical breeding ground and subantarctique-antarctic feeding ones.

3.11 Uploading pictures

The observer takes the flash memory out of the camera and uses a card reader to connect to his laptop through USB port.
Using directly usb cable to connect to the camera is a lot slower to transfer files and uses the battery of the camera which has a limited life time.
A tool has been developed for observers at sea, it does allow use to rename pictures of whales and other species.

3.12 PiNT – a tool for renaming observer photographs at sea

Gasco N., Chazeau C., Tixier P., Heineken C., Clark J., Soeffker M.

Document presented to Fish Stock Assesment meeting (CCAMLR) in 2015

https://dx.doi.org/10.6084/m9.figshare.3380269.v1

Abstract

Within the CCAMLR area, high quantities of images are collected by scientific observers at sea while performing the tasks outlined the Scheme on International Scientific Observation (SISO). These include photos of tags, cetaceans, birds and bird bands, fishing gear, or unusual and unidentified species. In order to maintain version control, to process and file the photographs efficiently, and to ensure compatibility and transferability between statistical subareas during different observer deployments, it is crucial to develop a common naming convention that allows to keep track of where, when, and on which vessel a picture was taken by whom, together with basic information on the picture content. This paper describes the naming convention discussed between MNHN, CapFish, MRAG and CEFAS and the development of a tool in excel.

Introduction

Within the CCAMLR area, high quantities of images are collected by scientific observers at sea while performing the tasks outlined the Scheme on International Scientific Observation (SISO). These include photos of tags, cetaceans, birds and bird bands, fishing gear, or unusual and unidentified species, and together form a record of the observer's deployment at sea during a given trip. The images are an essential reference collection that can be used either during or after the trip for analysis, data checks, identification help of species or any potential conflict or compliance issues. In order to maintain version control, to process and file the photographs efficiently, and to ensure compatibility and transferability between statistical subareas during different observer deployments, it is crucial to develop a common naming convention that allows to keep track of where, when, and on which vessel a picture was taken by whom, together with basic information on the picture content.
This issue was discussed during a meeting on observer data collection held at MRAG in London earlier this year with representatives from CCAMLR, MNHN, CapFish, MRAG and CEFAS. As a result, the present organisations who provide observers agreed to a common naming convention for their observers deployed within the CCAMLR Area (see below), and to the trial use of an excel tool for batch-implementing a chosen naming convention already used by French observers. The tool and naming convention are described below and in the annex. Sharing the same naming convention allows users to share scripts for data processing allowing among other things:

- enhanced photo identification,
- automation of picture-to-trip assignment based on defined codes; and
- Linking of each photo to the vessel C2 data using the fishing event reference.

In addition, the naming convention within the French EEZ also accounts for pictures taken of marine mammals taken from land, which is not done in other CCAMLR Subareas. The tool has been trialled at sea outside the French EEZ during the 2014/15 season.

Naming convention

The naming convention between MRAG, Capfish, MNHN and Cefas for at-sea observer (or from dry land) photographs contains the following information:

	at sea		on dry land	
	1415 AUS 15 11 AUBA P_013 SPW		1415 CRO 15 12 AUBA P_098 KIW new group	
characters	description	example	description	example
4	CCAMLR Season. This will remain unchanged throughout the season	1415	season	1415
3	The vessel name, this uses a 3 letter code taken from the first 3 letters of the vessels name, or if two words are used the first letter from the first word and second two from the second	AUS	dry land location code using 3 letters	CRO
2	year start of trip	15	year of picture	15
2	month start of trip	11	month of picture	12
4	Name of the photographer. This uses a 4 letters code, this code is unique and related to one observer only.	AUBA	photographer	AUBA
5	longline number (or fishing event number, start at 1 and go up consecutively)	P_013	sighting ID	P_098
3	species (3 letters ccamlr code)*	SPW	species (ccamlr code)	KIW
no constraint	comment (optional and should be kept short)		comment (optional and should be kept short)	new group

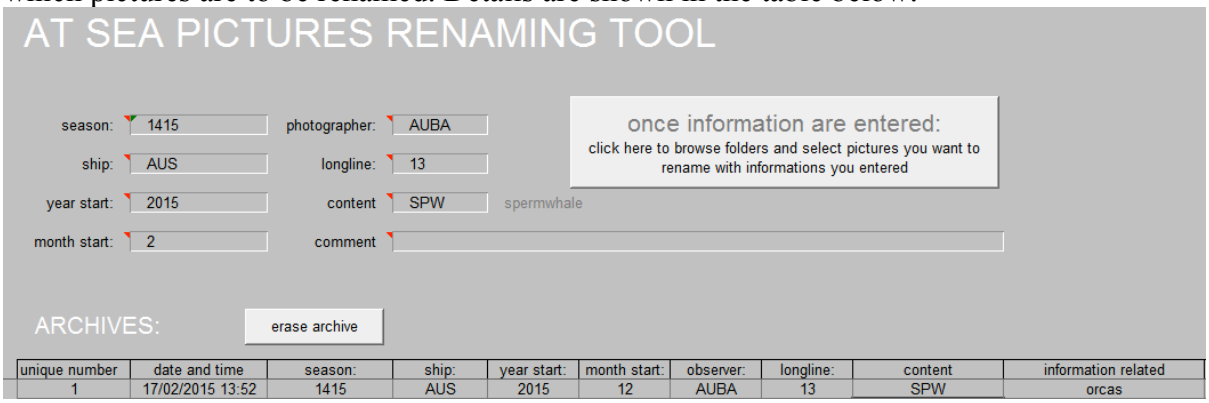
* The species are designated with the standard CCAMLR species code. However there are additional non-CCAMLR codes that can be used or developed, some examples are shown below:

- **KSP –** Orcas and sperm whales together
- **TAG –** Tag return
- **BAN –** Bird band
- **GEA –** Fishing gear (hooks, line, weights etc.)
- **DEB –** Marine debris / oil
- **MIT –** Mitigation device
- **OTH –** Other event or object

- **Comment –** General comments, should be kept short. An example for tag recapture would be to enter the tag numbers with the lowest number first, space in between for example A213333 A213334.

The Picture Naming Tool (PiNT)

The picture naming tool allows observers to automatically rename anything from individual to large numbers of photos and to put them in a designated folder. Each photo will have a unique name generated through a number of fixed fields and codes. The instructions and outputs are shown below.
The interface allows to enter data using dropdown menus and to browse to folders to choose which pictures are to be renamed. Details are shown in the table below:



unique number	date and time	season:	ship:	year start:	month start:	observer:	longline:	content	information related
1	17/02/2015 13:52	1415	AUS	2015	12	AUBA	13	SPW	orcas

Drop down menus can be filled according to Subarea specifications, and conditional formatting highlights data with incorrect number of characters:

DROP DOWN MENU SOURCES

CONTENT

3 letters code	Species Name	Common Name
KIW	orcas	
SPW	spermwhale	
KSP	orcas + spermwhale	
AJH	Anthozoa	Anthozoa
AJZ	Alcyonacea	Alcyonacea soft corals
AQZ	Antipatharia	Black corals and thorny corals
ATX	Actiniaria	Sea anemones
AXT	Stylasteridae	Hydrocorals
AZN	Anthoathecatae	Hydroids, hydromedusae
BVH	Brachiopoda	Brachiopods, lamp shells
BWY	Bathylasmatidae	Barnacle
BZN	Bryozoa	Bryozoans
CNI	Cnidaria	Cnidarians nei
CSS	Scleractinia	Hard corals, stony corals
CVD	Cidaroida	Pencil urchins
CWD	Crinoidea	Feather stars and sea lilies
CXV	Chemosynthetic	Chemosynthetic communities
CZR	Chordata	Chordata
DMK	Adamussium colbecki	Antarctic scalop
DMO	Demospongiae	Siliceous sponges
ECH	Echinodermata	Echinoderms (starfish,urchins etc.)
GGW	Gorgoniidae	Gorgonians
HQZ	Hydrozoa	Hydrozoans
HXY	Hexactinellida	Glass sponge
NHE	Annelida	Annelid worms
NTW	Pennatulacea	Pennatulacea sea pens
OEQ	Euryalida	Basket stars
OOY	Ophiurida	Basket and snake stars
PBQ	Pterobranchia	Pterobranchs
SCX	Pectinidae	Scallops nei
SZS	Serpulidae	Serpulid tube worms
URX	Echinoidea	Sea urchins, etc. nei
XEF	Xenophyophora	Xenophyophores
ZOT	Zoanthidea	Zoanthids

PHOTOGRAPHER

4 letters code	information related:
ADER	Trop Ical
AUBA	
AUBJ	
BCHA	
BEAF	
BEAJ	
BEIL	
BERT	
BODI	
BOSIHDGF	
BOUN	
BOUT	
CADE	
CANT	
CAUV	
CPDV	
DELO	
DERR	
DISS	
ECOR	
FAUB	
FMOU	
GASC	
GASP	
GHOU	
GUIL	
HOAR	
JHUI	
MAKA	
OGRA	
RBOC	
SCAS	
THOM	

ship

3 letters code	information related:
T01	Tagan IOOO
AUS	
T03	
T04	
T05	
T06	
T07	
T08	
T09	
T10	
T11	
T12	
T13	
T14FDGH	
T15	
T16	
T17	
T18	
T19	
T20	
T21	
T22	
T23	
T24	
T25	
T26	
T27	
T28	
T29	
T30	
T31	
T32	
T33	
T34	
T35	
T36	

Conclusion

This paper gives a brief overview of a tool that can be used to easily rename photographs taken by observers during the season and suggests a format for the photograph names. We would recommend that a naming convention be considered by the secretariat as part of the SISO review, particularly in regards to those photos that are key to ensuring the quality of data collected, for example tag returns, so that they can easily be identified and accessed at a later date if necessary. We would also recommend that the PiNT be made available on the CCAMLR site as a resource for other members to use if needed.

4 Acknowledgment

This chapter has been illustrated thank's to the french observers operating in the french EEZ of Kerguelen and Crozet: Aubert Anthony, Aubert Fabien, Aubert Jean-Luc, Beaufils David, Beaujean Alain, Beilloeil Michel, Bertrand Geoffrey, Bochard Romain, Bodiger Gwenaël, Bosio, Bouney, Boutain Jérome, Cadet Jean-Fred, Canté Stephen, Capedeville Didier, Cauvin Gilles, Corouge Ewen, Delorme Quentin, Derrien, Dervaux Antoine, Fabien Moullec, Gasco Nicolas, Gaspard Patrick, Granaud Olivier, Guillotin Olivier, Hoarau Eric, Houillot Grégoire , Le Berrigaud Patrice, Le Corre Yann, Le Petitcorps Jean-Marie, Lemarchand Christian, Menault , Moiroux Nicolas, Richard Emilie, Ringelstein Julien , Rochard Denis, Servera Nicolas, Simiand Frederic, Tixier Paul, Vermande Hugues, Vicinati Eric.

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