SC/68D/SH/03

Sub-committees/working group name: SH

Desktop review of southern right whale (Eubalaena australis) offshore sightings south of 40°S (1980-2020)

Els Vermeulen, Cuyler van Jaarsveld and Emma Carroll

INTERNATIONAL
WHALING COMMISSION

Desktop review of southern right whale (*Eubalaena australis*) offshore sightings south of 40°S (1980-2020)

Els Vermeulen[1], Cuyler van Jaarsveld[1], Emma Carroll[2]

1. Mammal Research Institute Whale Unit, University of Pretoria, South Africa
2. School of Biological Sciences, Auckland University, New Zealand

INTRODUCTION

This present desktop study was conducted by Cuyler van Jaarsveld in the scope of his BSc Hons project at the University of Pretoria, under supervision of Drs Vermeulen and Carroll. The aim was to collate all published and unpublished data, grey literature, and other readily available information on the global occurrence of southern right whales (*Eubalaena australis;* hereafter SRWs), offshore (> 5 nautical miles) and south of 40°S into a comprehensive review over the period 1980-2020. The goal is to use these data to advance in our understanding on the location of offshore SRW foraging grounds, likely leading to the ability to select environmental variables which may be relevant for the future investigation of links to reproductive success, pertinent to objective 2 and 4 of the IWC-SORP Theme 6.

METHODS

Sighting data points were gathered from various sources including published and unpublished data and other readily available sources. Data from published literature and other databases were collected by searching for relevant journal articles, maps, books and encyclopaedias via Google Scholar as well as recognized databases including Encyclopaedia Britannica, JSTOR, PANGEA, South Georgia Heritage Trust (SGHT) and Scopus. Data from unpublished data and other available sources were collected by searching through Google Scholar and most importantly by obtaining a letter endorsed by SORP (Appendix 1) which allowed for the sending of data requests to various organisations and research vessels including the SC-IWC, Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Polarstern (research icebreaker from Alfred Wegener Institute for Polar and Marine Research), Brazilian Antarctic Program (PROANTAR), Southern Ocean Whale and Ecosystem Research Program (SOWER), Happywhale, Marine Mammals Research and Conservation Discussion (MARMAM), and Observation International (ObsInt). Furthermore, a data request was also

posted on the IWC-SORP website to increase exposure for the study with the purpose of maximizing data collection.

Information regarding the sightings data requested comprised: the date of the sighting; the coordinates (latitude/longitude); the number of SRWs observed at each sighting; evidence of species confirmation (in the form of photo, video, or bioacoustics); and the general whale behaviour observed (if confirmed). Sightings were categorised into four groups namely austral summer (AS= Dec-Feb), austral autumn (AA= Mar-May), austral winter (AW= Jun-Aug), and austral spring (ASp= Sep-Nov), according to the time of year they were recorded, as reported by Clem and Renwick (2015). Furthermore, data regarding the absence of SRWs based on effort data (hereafter effort data), i.e., where they were not sighted despite large survey effort, was also collected, as it is equally important to know where these whales were absent as it is to know where they were present.

Data from all sources were analysed to ascertain whether they fulfilled the necessary criteria such as being offshore (>5 nautical miles), south of the 40°S and between the years 1980-2020. All relevant information regarding sightings data were then collated in a spreadsheet (Appendix 2), which was subsequently transformed into a CSV file for importation into QGIS. Using QGIS Desktop 3.20.1 (2021) various maps were produced in order to visualize 1) where SRWs have been sighted offshore south of 40°S during the post-whaling era (1980-2020), and 2) when these sightings took place.

RESULTS

DATA SOURCES

A total of 357 sightings data points were collected from 13 separate sources, with the majority of the sightings data (91.3%) collected from organisations and databases (n=326), while 8.7% of the sightings data collected from published literature (n=31). The largest collections of data came from the South Georgia Heritage Trust database (n=109), comprising 30.5% of all data, and the SOWER cruises (n=95) contributing 26.6% of all data. Sightings data from CCAMLR (n=50) made up 14% of the collected data, with Happywhale data (n=32) comprising 9% of all data. PROANTAR data (n=10) comprised 2.8% of the collected data, while data from PANGEA (n=5) and Nijs and Rowntree (2017) (n=6) made up 1.4% and 1.7% of collected data, respectively. Furthermore, both ObsInt data (n=13) and data from IWC reports (n=13),

comprised 3.6% of collected data, while data from both Moore *et al.* (1997) (n=11) and data provided by Dr. Marc Eléaume, from the National Museum of Natural History in France (n=11), made up 3% of collected data. Polarstern data (n=1) and data from Moore *et al.* (1999) (n=1) both contributed 0.3% of all collected sightings data.

SIGHTINGS DATA

Global

A total of 357 sightings of 699 individual SRWs were collated (Figure 1a; Annex II), with an average of 1.96 whales per sighting (hereafter w/s). Temporal analysis found that 20% (n=72) of these were recorded during the AA, while the majority of the sightings were recorded during the AS (64%; n=226). Sightings recorded during the AW (n=32) made up 9% of total sightings, whilst 7% of sightings were recorded during the ASp (n=26) (Figure 1b). Furthermore, of the 357 sightings collected, 3% were recorded during the 1980's (n=11), while 22.6% were recorded during the 1990's (n=80). 32.2% of the sightings were recorded during the 2000's (n=115), with 38% of the sightings recorded during the 2010's (n=136). Only 4.2% of the sightings collected were recorded during 2020 (n=15), although, more sightings may be made available in future months as sightings are added to databases or included in research studies. The lack of information regarding the behaviour of SRWs during sightings should be noted.

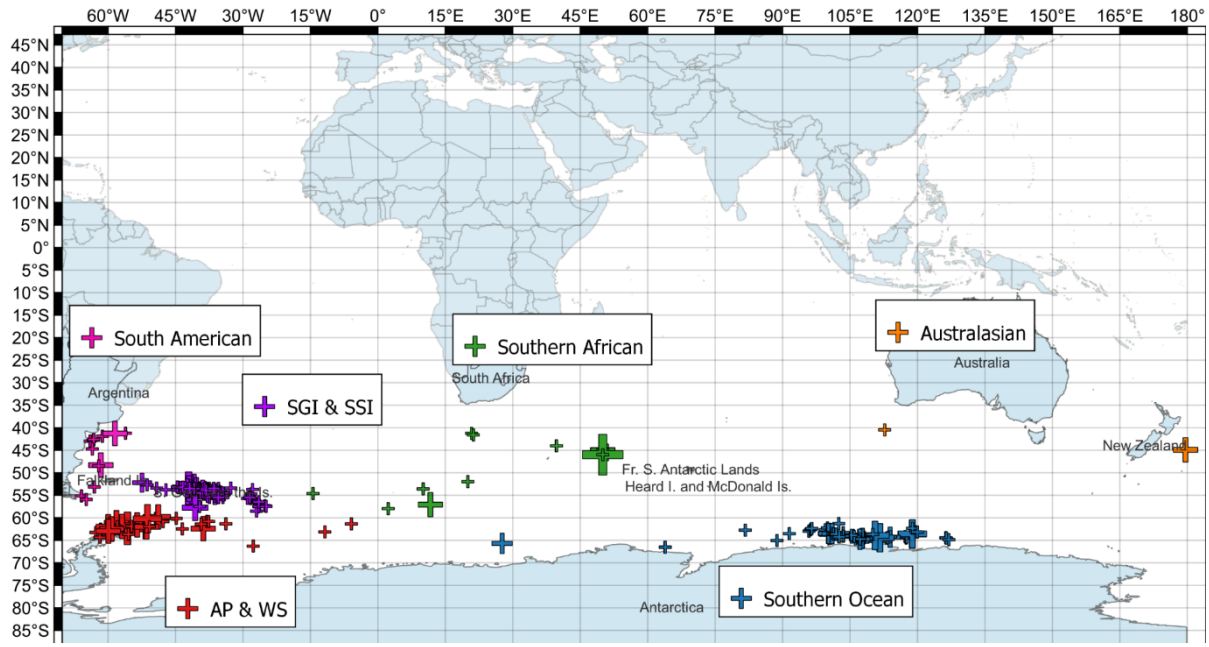

Figure 1a. Map of Global SRW sightings including those from South America (pink marks), South Georgia and South Sandwich Islands (purple marks), Antarctic Peninsula and Weddell Sea (red marks), southern Africa (green

marks), Australasia (orange marks), and Southern Ocean (blue marks), each mark represents a single sighting (size of mark indicating number of SRWs per sighting, see legend).

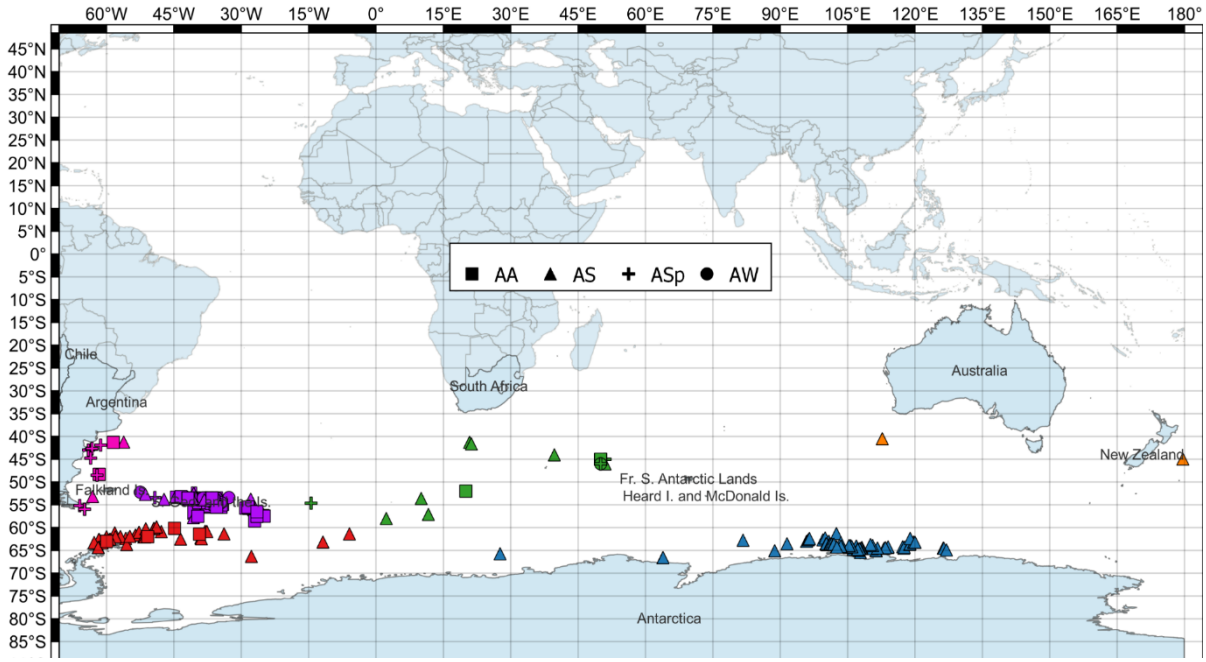

Figure 1b. Map of Global SRW sightings (1980-2020) per season, including South America, South Georgia and South Sandwich Islands, southern Africa, Australasia, and Southern Ocean (see legend for season of sightings).

South America

Only 4% of all the sightings reported came from South America (n=14) (Figure 2a), with an average of 1.21w/s. SRW sightings for this area were recorded in the following range: 41-56°S and 56-66°W. Temporal analysis indicated that of these sightings the majority, 64.3%, occurred during the ASp (n=9) while 21.4% of the sightings occurred during the AA (n=3) and only 14.3% during the AS (n=2), with no sightings being recorded during the AW (n=0) (Figure 2b). All sightings collected from South America were recorded during the 1980's (7%), 2010's (86%) and in 2020 (7%), with no sightings recorded during the 1990's or 2000's (Figure 2c). Sightings recorded during the 2010's were found to be relatively closer to shore, west of 60°W and were spread over a larger latitudinal range (42-56°S), while sightings recorded during the 1980's and 2020 were more concentrated east of 60°W between 41-42°S. Furthermore, sightings recorded during the ASp were generally recorded closer to shore (max=152.2 nautical miles, NM) compared to sightings recorded during other seasons.

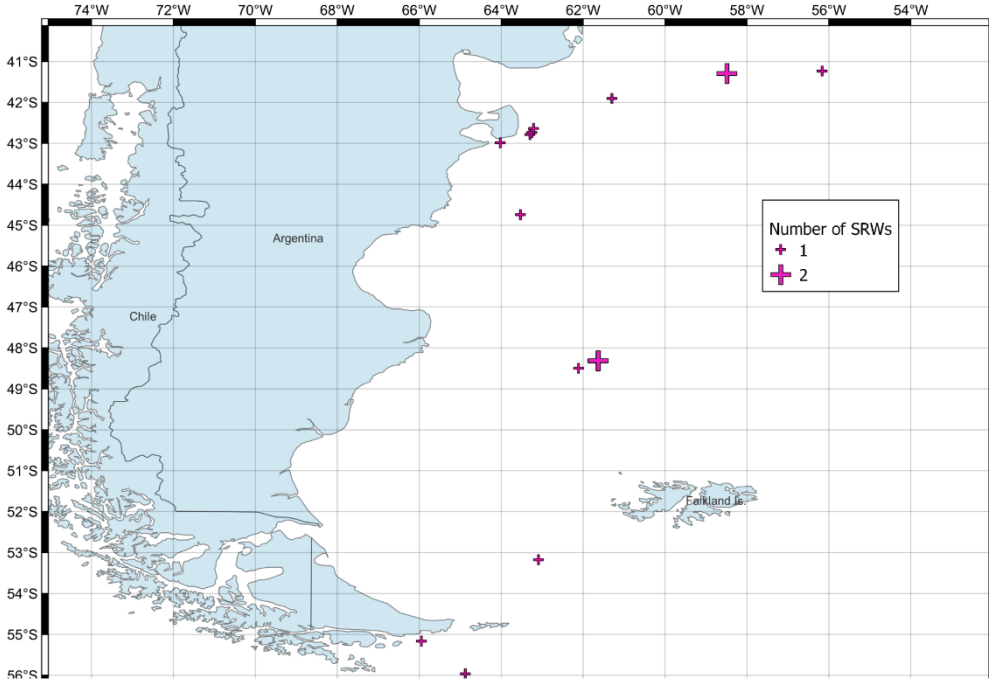

Figure 2a. Map of South American SRW sightings (1981-2020) along the Patagonian shelf, each cross mark represents a single sighting (size of cross mark indicating the number of SRWs per sighting, see legend).

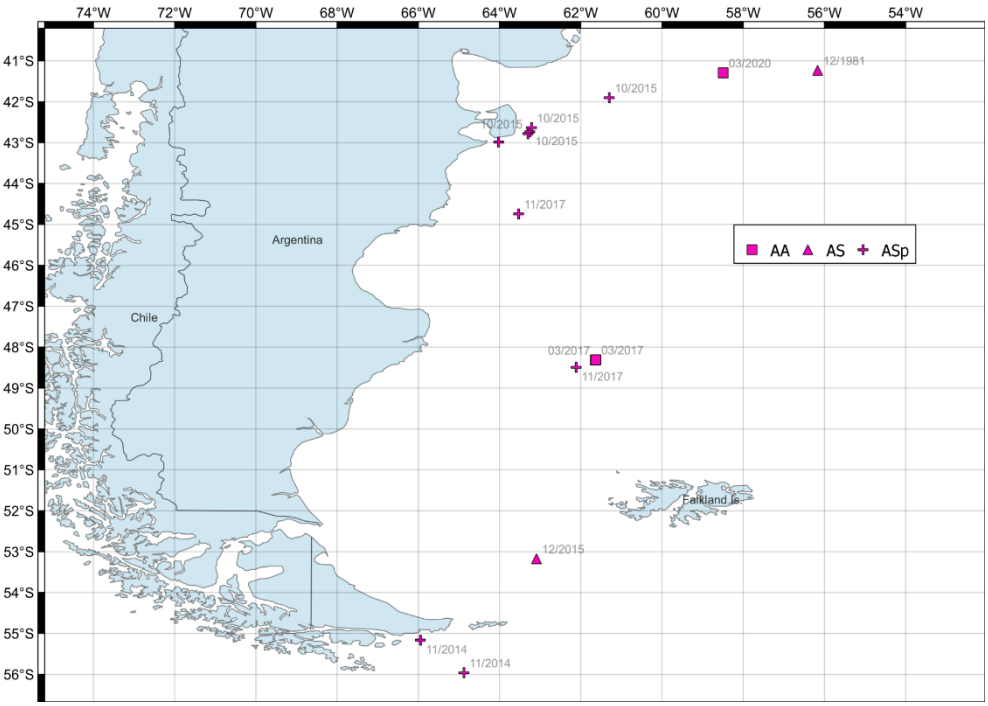

Figure 2b. Map of South American SRW sightings (1981-2020) per season, along the Patagonian shelf (see legend for season of sightings), sighting dates included for discriminating between years.

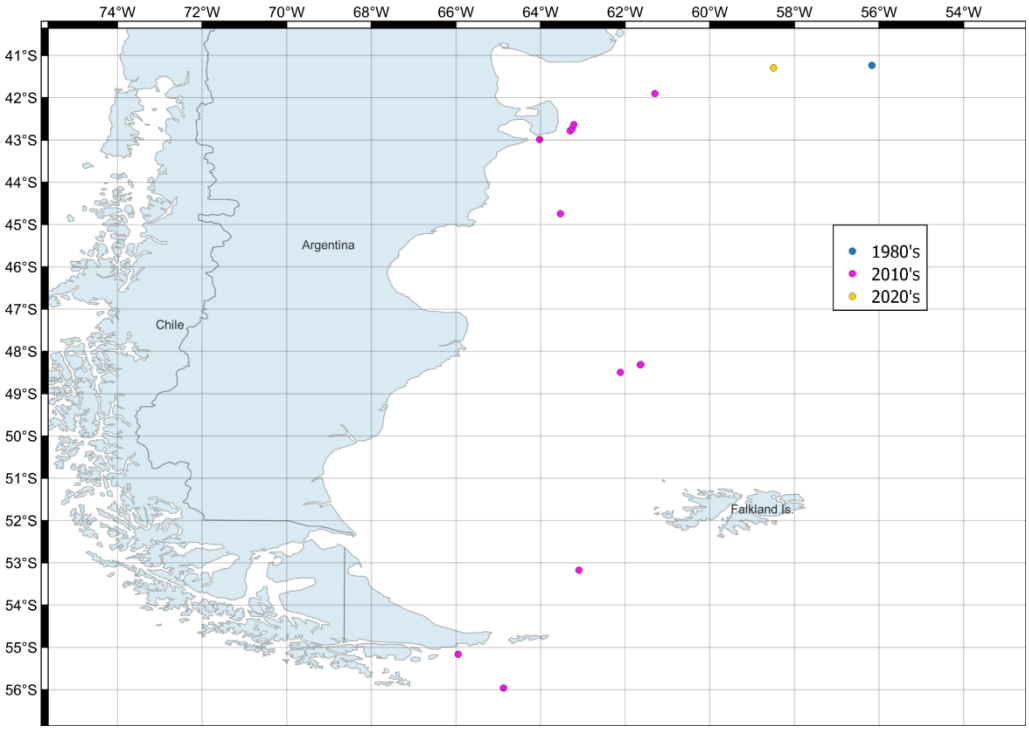

Figure 2c. Map of SRW sightings (1981-2020) along the Patagonian shelf categorized by sightings recorded during the 1980's (blue), 2010's (pink), and 2020 (yellow).

South Georgia and South Sandwich Islands

Sightings collected from the South Georgia and South Sandwich Islands (52-58°S; 25-52°W) comprised the majority 57.02% (n=204) of total sightings (Figure 3a), with an average of 2.33w/s. Of these sightings 30.5% were recorded during the AA (n=62) whilst the majority, 47.8%, were recorded during the AS (n=97) (Figure 3b). Only 15.3% of the sightings were recorded during the AW (n=31), while the fewest number of sightings, 6.4%, occurred during the ASp (n=13). Of the sightings collected from the South Georgia and South Sandwich Islands, 13.3% were collected during the 1990's (n=27), 47.8% during the 2000's (n=97), 33% during the 2010's (n=68), and only 5.9% during 2020 (n=12) (Figure 3c). Geographically sightings from all seasons were distributed equally around the islands with no apparent trend.

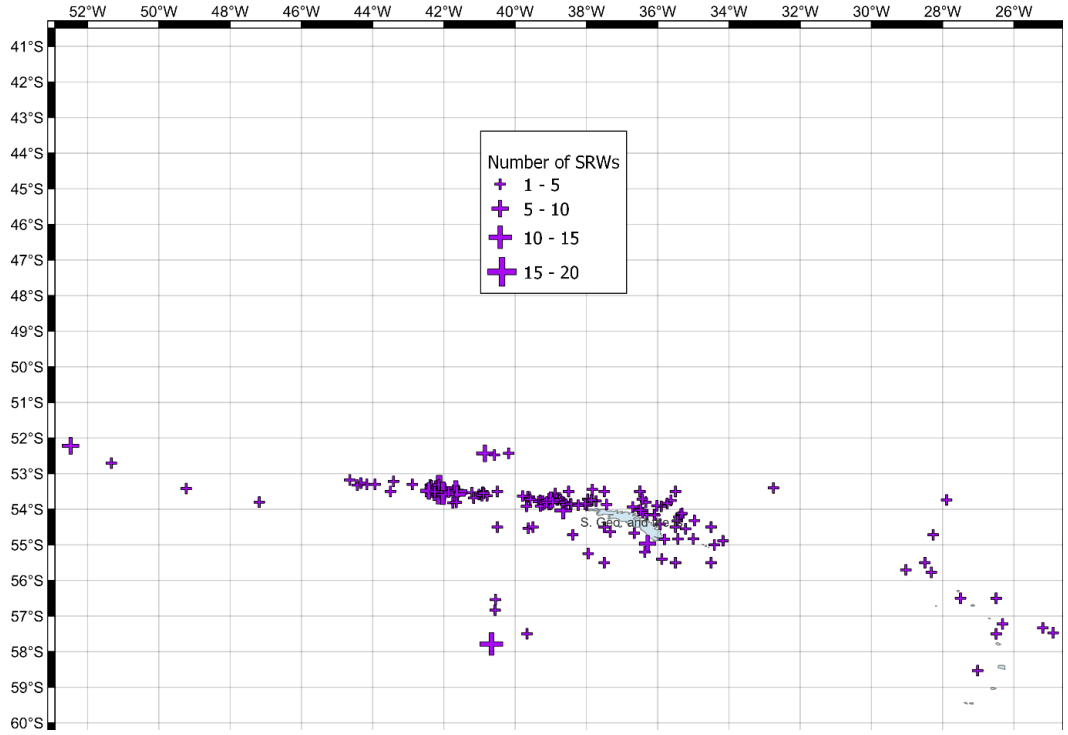

Figure 3a. Map of SRW sightings (1992-2020) around the South Georgia and South Sandwich Islands, each mark represents a single sighting (size of cross mark indicating the number of SRWs per sighting, see legend).

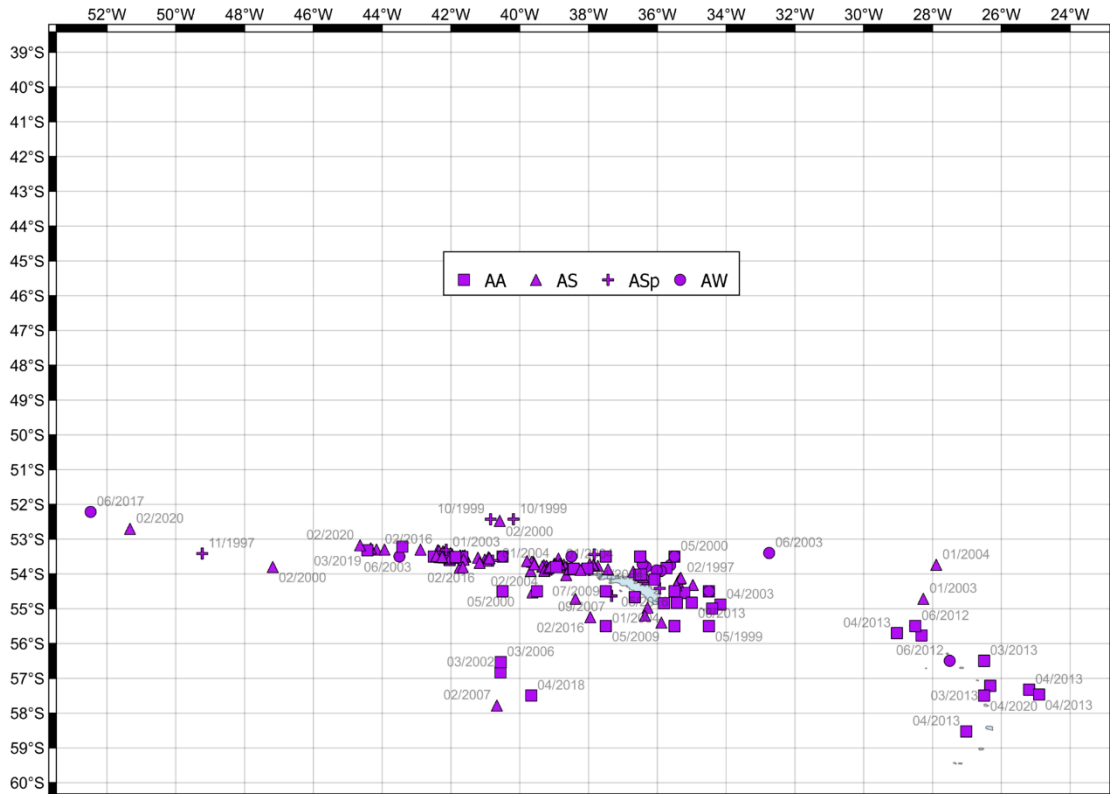

Figure 3b. Map of SRW sightings (1992-2020) per season, near and around the South Georgia and South Sandwich Islands, sighting dates were included for discriminating between years (see legend for season of sightings).

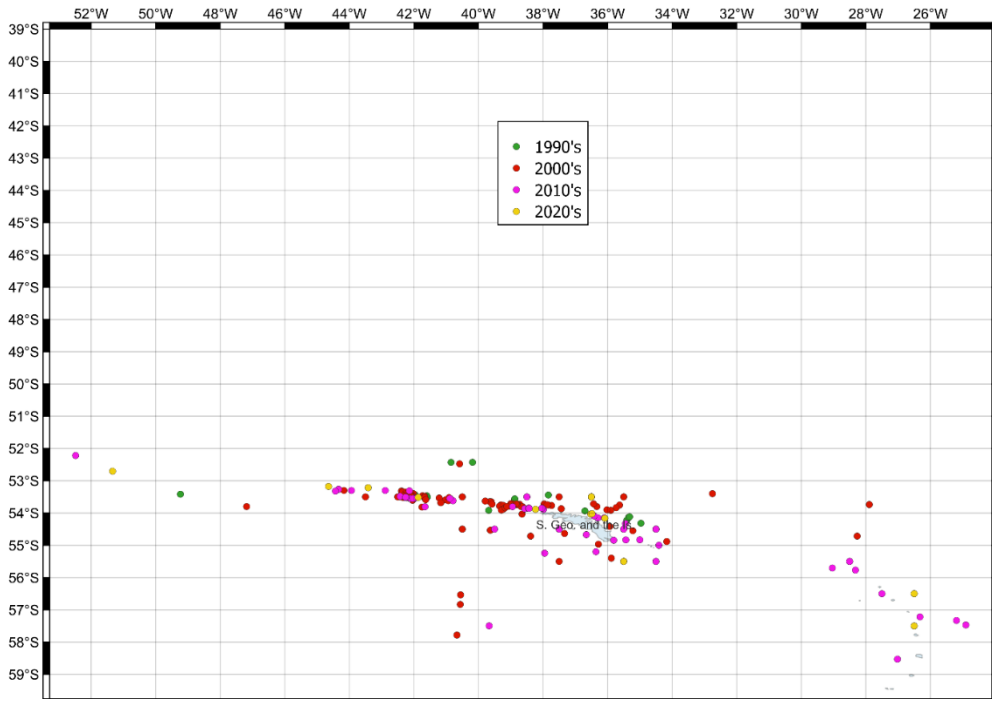

Figure 3c. Map of SRW sightings (1992-2020) near and around the South Georgia and South Sandwich Islands, sighting, categorized according to the decade the sighting was recorded including the 1990's (green), 2000's (red), 2010's (pink), and 2020 (yellow).

Antarctic Peninsula and Weddell Sea

Sightings recorded in the Antarctic Peninsula and Weddell Sea, comprised 11.5% (n=41) of total sightings (Figure 4a). Of these sightings the majority, 88%, were recorded during the AS, while only 12 % (n=5) were recorded during the AA (Figure 4b). No sightings were recorded during the ASp and AW for this area. Furthermore, AS sightings were spread out over a larger area, ranging from 60-66°S and 5-63°W, while AA sightings were concentrated around the tip of the Antarctic Peninsula (60-63°S; 40-60°W). Sightings collected around the Antarctic Peninsula and in the Weddell Sea, were recorded during all decades concerned, with 17% of the sightings recorded during the 1980's (n=7), 41.5% during the 1990's (n=17), and 9.8% during the 2000's (n=4) (Figure 4c). Furthermore, 26.8% of the sightings were recorded during the 2010's (n=11), while only 4.9% were recorded during 2020 (n=2). Sightings recorded during the 1980's and 1990's were spread out over a larger area (60-66°S; 5-60°W) compared to sightings from the 2000's to 2020, which were concentrated between 60-64°S and 40-60°W.

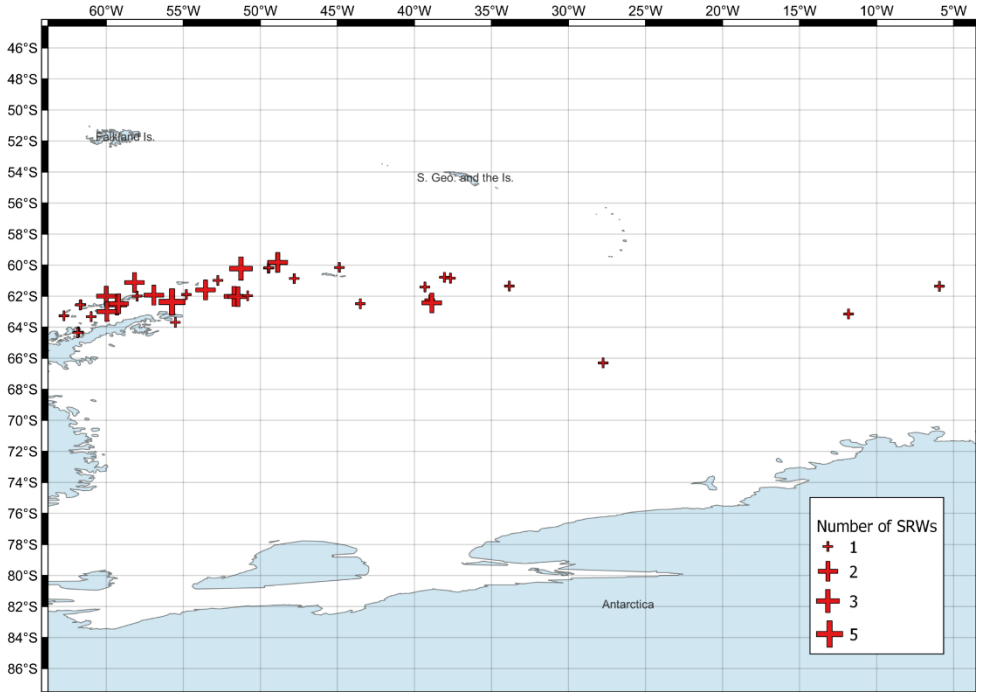

Figure 4a. Map of SRW sightings (1982-2020) around the Antarctic Peninsula and in the Weddell Sea, each mark represents a single sighting (for number of SRWs per sighting see legend).

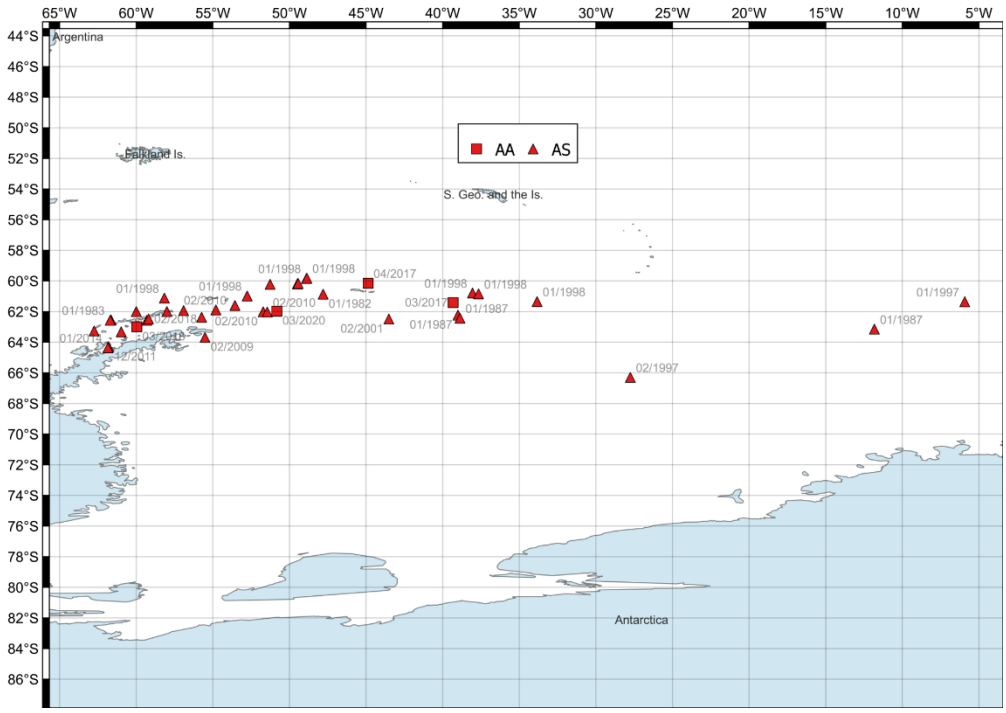

Figure 4b. Map of SRW sightings (1982-2020) per season, around the Antarctic Peninsula and in the Weddell Sea, sighting dates included for discrimination between years (for season of sighting see legend).

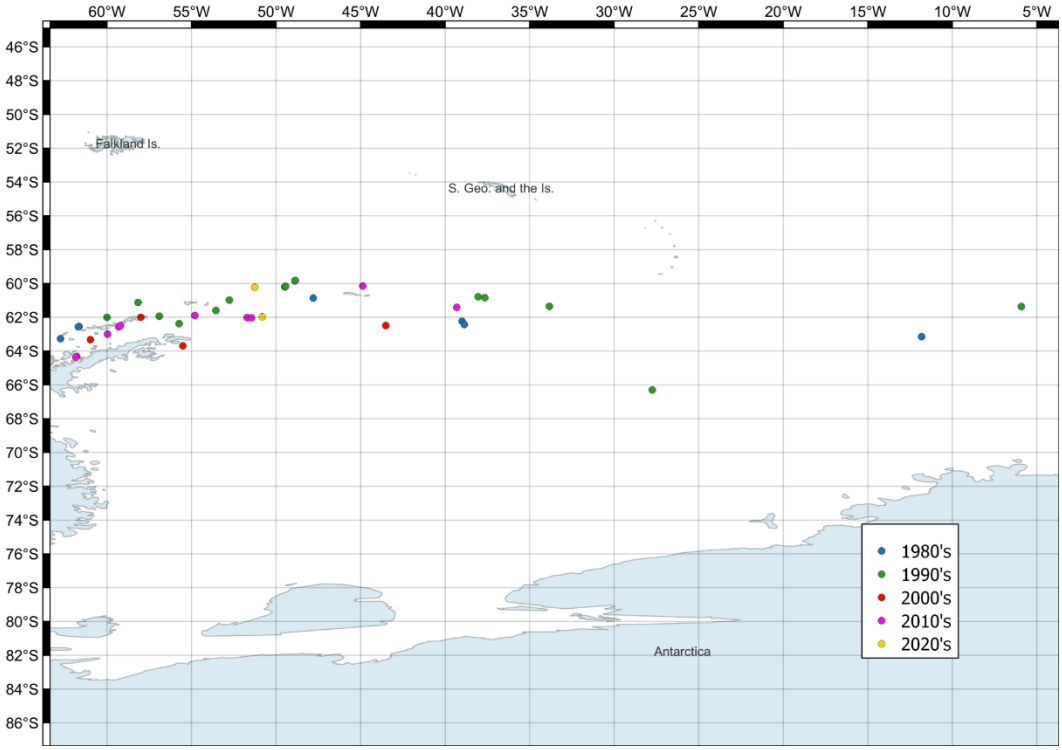

Figure 4c. Map of SRW sightings (1982-2020) around the Antarctic Peninsula and in the Weddell Sea, categorized according to the decade the sighting was recorded including 1980's (blue), 1990's (green), 2000's (red), 2010's (pink), and 2020 (yellow).

Southern Ocean

SRW sightings from the Southern Ocean, taken as sightings south of 60°S (McNeil and Matear, 2008), ranged between 27-125°E, and comprised 21.6% (n=77) of total sightings (Figure 5a), with an average of 1.25w/s. Temporal analysis indicated that all of these sightings were recorded during the AS (n=77) (Figure 5b). Furthermore, sightings collected from the Southern Ocean were recorded during the 1980's to 2010's, with 2.6% of the sightings recorded during the 1980's (n=2), 39% during the 1990's (n=30), 14.3% during the 2000's (n=11), and 44.1% during the 2010's (n=34) (Figure 5c). No sightings were collected during 2020. Sightings recorded during the 1990's were collected over a larger longitudinal range (25-125°E) compared to sightings recorded during the 1980's (80-115°E), 2000's (65-110°E) and especially during 2010's which were concentrated between 100-115°E.

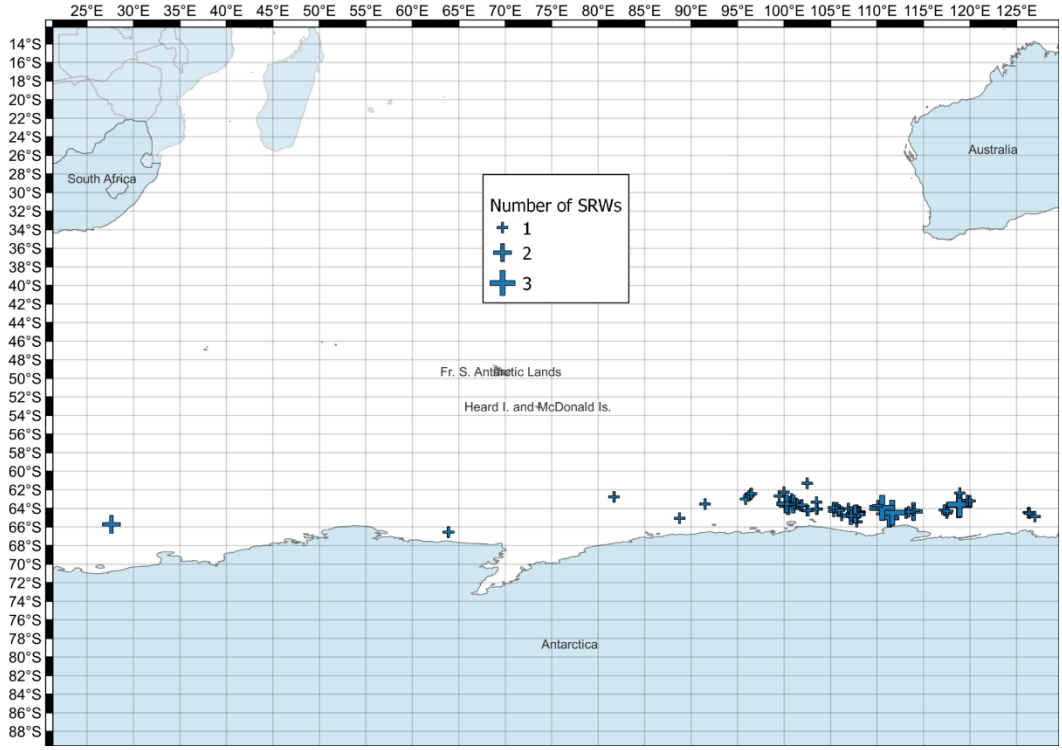

Figure 5a. Map of SRW sightings (1985-2010) from the Southern Ocean (south of 60°S), each mark represents a single sighting (size of cross mark indicating the number of SRWs per sighting, see legend).

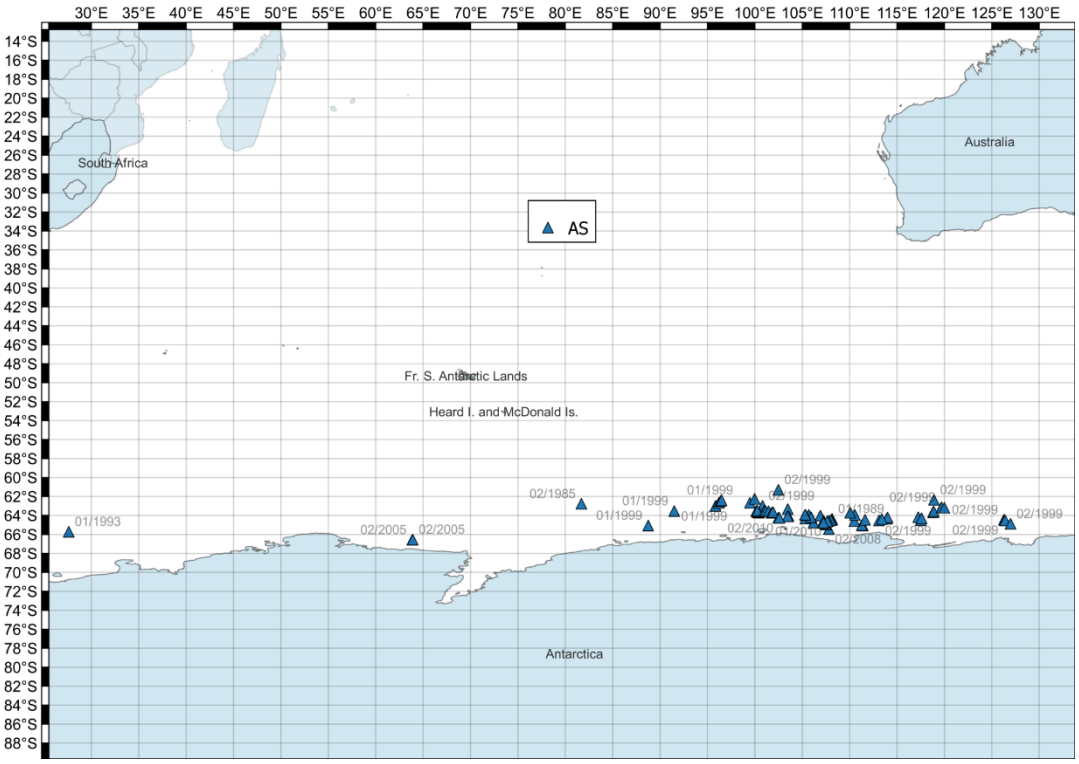

Figure 5b. Map of SRW sightings (1985-2010) per season, from the Southern Ocean (south of 60°S), sighting dates included for discrimination between years (see legend for season of sightings).

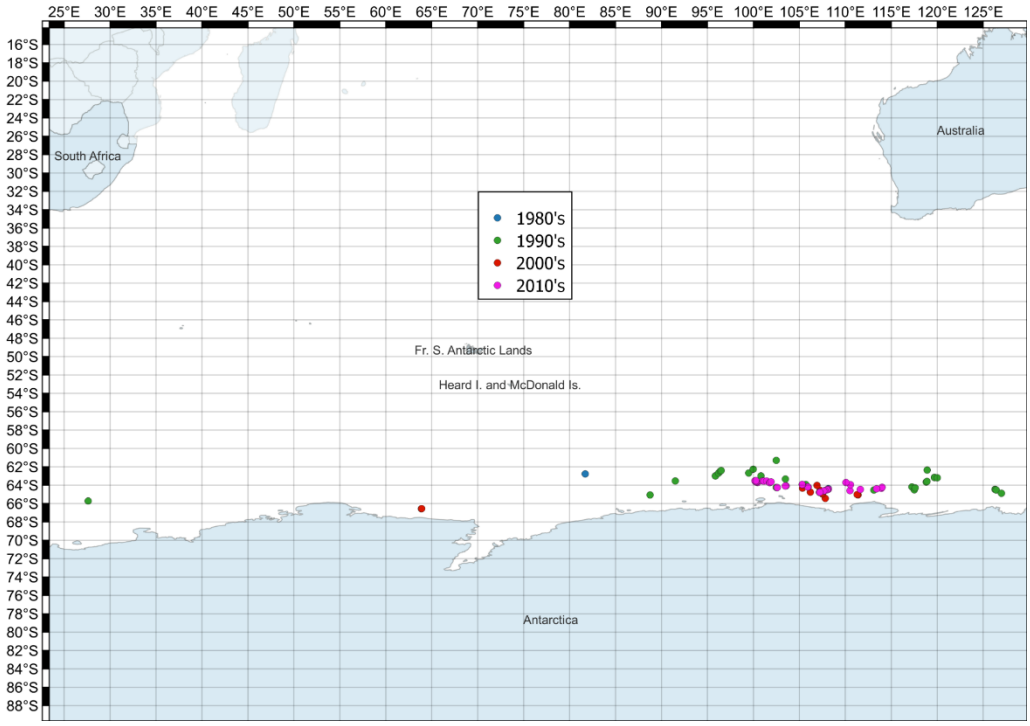

Figure 5c. Map of SRW sightings (1985-2010) from the Southern Ocean (south of 60°S), categorized according to the decade the sighting was recorded including the 1980's (blue), 1990's (green), 2000's (red), and 2010's (pink).

Southern Africa

Southern African SRW sightings occurred between 40°S to 58°S and 15°W to 50°E. These sightings represented 5.3% (n=19) of total sightings (Figure 6a), with an average of 2.68w/s. Temporal analysis indicated that the majority of the sightings, 63%, occurred during the AS (n=12), with an average of 1.2w/s during this period, with only a single sighting (5%) recorded during the AW with an average of 15.5w/s (Figure 6b). 21% of these sightings were recorded during the ASp (n=4), and 11% of the sightings were recorded during the AA (n=2). It should be noted that on the single AW sighting ~30 whales were spotted in 2018. Furthermore, sightings recorded during the AA were more concentrated, ranging between 45-52°S and 20-50°E, compared to sightings recorded during the other seasons, while ASp sightings were spread out over a larger area (45-54°S; 15°W-50°E). Southern African sightings collected were recorded during the 1980's to 2010's, with 5.3% of sightings recorded during the 1980's (n=1), 26.3% during the 1990's (n=5), 10.5% during the 2000's (n=2), and the majority, 57.9%, during the 2010's (n=11) (Figure 6c). No sightings were collected from 2020. Sightings recorded during the 1980's (44°S; 40°E) and 2010's (44-46°S; 50°E) were more concentrated when

compared to sightings recorded during the 1990's (40-58°S; 0-22°E) and 2000's (54-58°S; 15°W-10°E), which were spread out over larger areas.

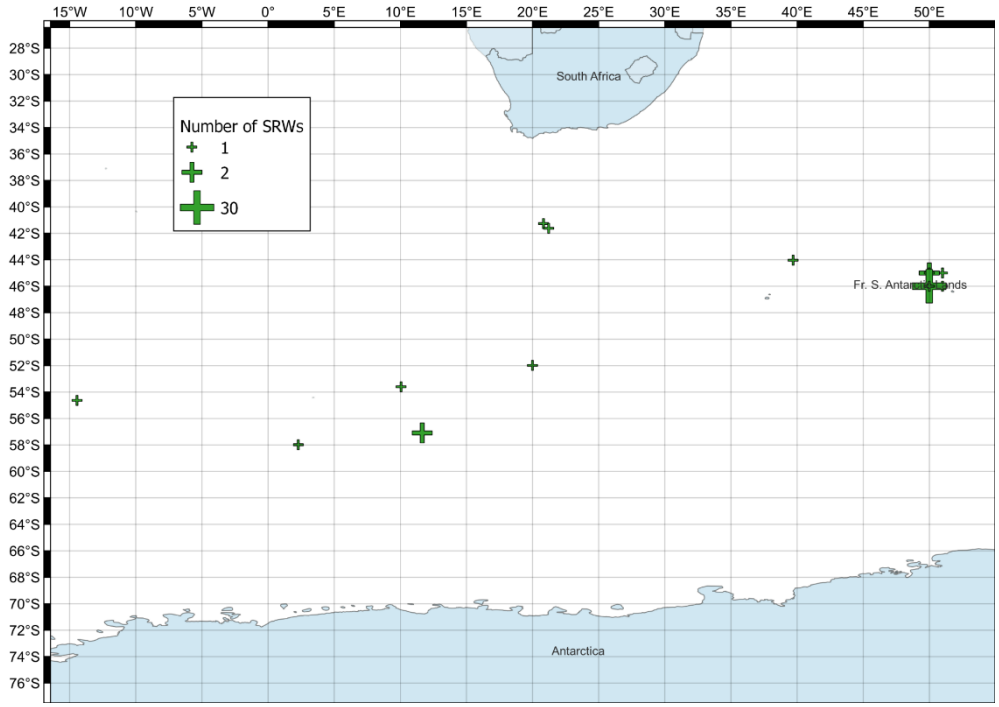

Figure 6a. Map of SRW sightings (1988-2019) in the southwestern Indian Ocean off the South African southern coast, and around the French Southern and Antarctic lands, with each mark representing a single sighting (size of marks indicating the number of SRWs recorded per sighting, see legend).

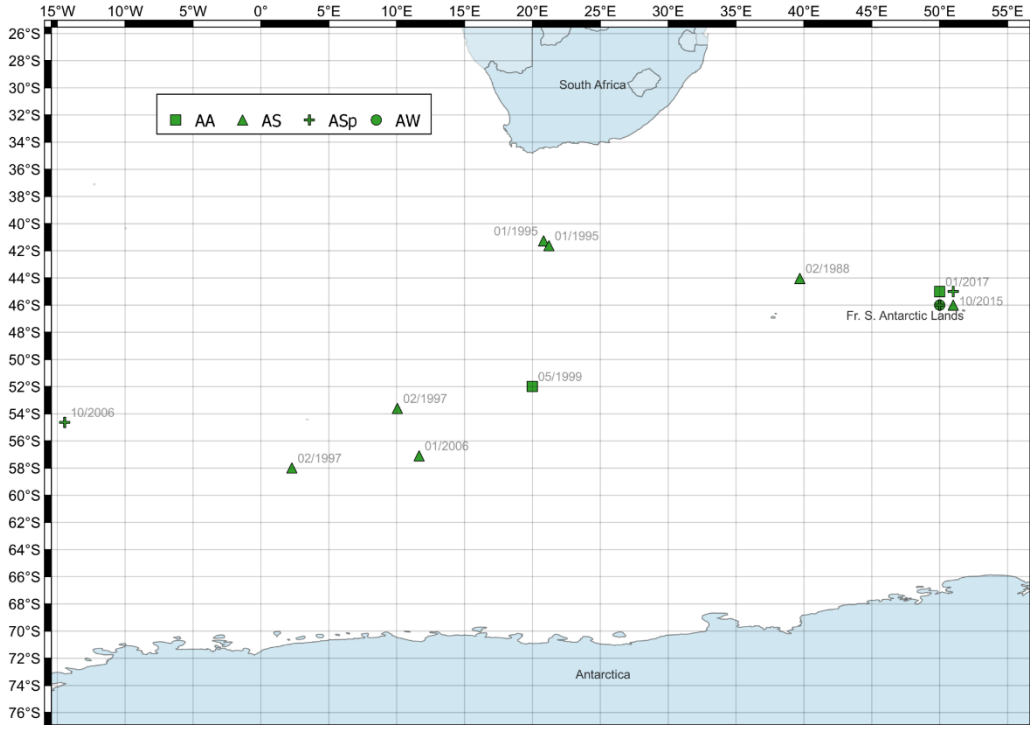

Figure 6b. Map of SRW sightings (1988-2019) per season, in the southwestern Indian Ocean off the South African southern coast, and around the French Southern and Antarctic lands, sighting dates included for discriminating between years (see legend for season of sightings).

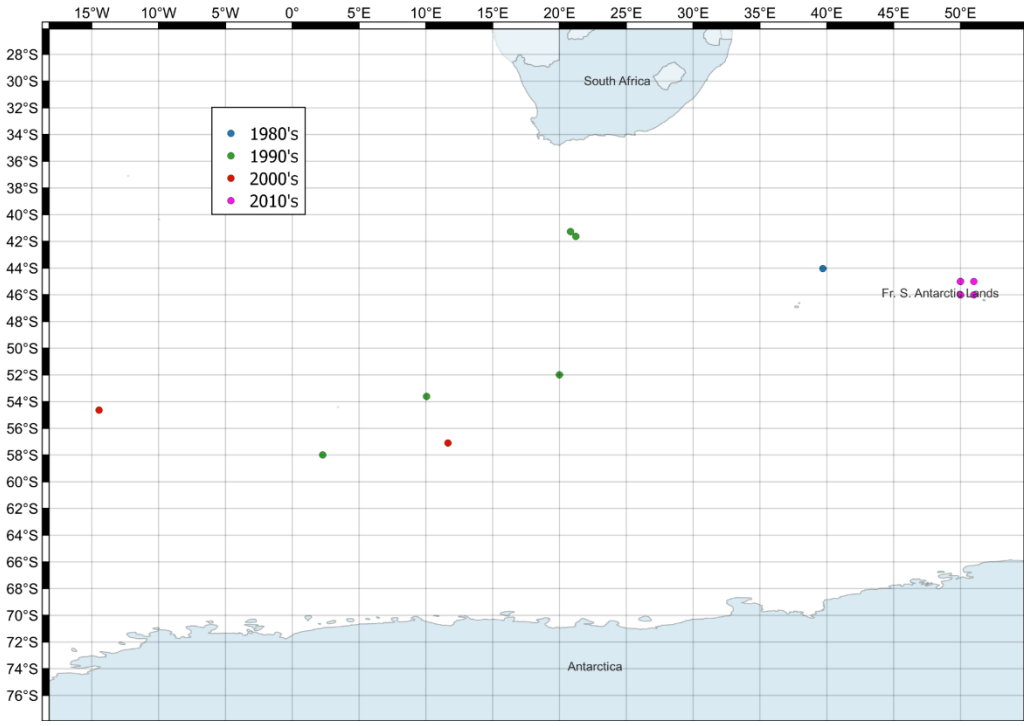

Figure 6c. Map of SRW sightings (1988-2019) in the southwestern Indian Ocean off the South African southern coast, and around the French Southern and Antarctic lands, categorized according to the decade the sighting was recorded including the 1980's (blue), 1990's (green), 2000's (red), and 2010's (pink).

Australasia

Sightings from Australasia comprised 0.6% (n=2) of total sightings (Figure 7a), with an average of 1.5w/s. Both sightings in this area were recorded during the AS (Figure 7b), with sightings ranging between 40-45°S and 113-179°E. Furthermore, half of these sightings collected were recorded during the 1990's with the other half recorded during the 2000's. No sightings were collected in the 1980's, 2010's, or during 2020 (Figure 7c). The sighting recorded during the 1990's (45°S; 179°E) was located off the eastern coast of mainland New Zealand, while the sighting recorded during the 2010's (41°S; 113°E) was located off southwestern Australia.

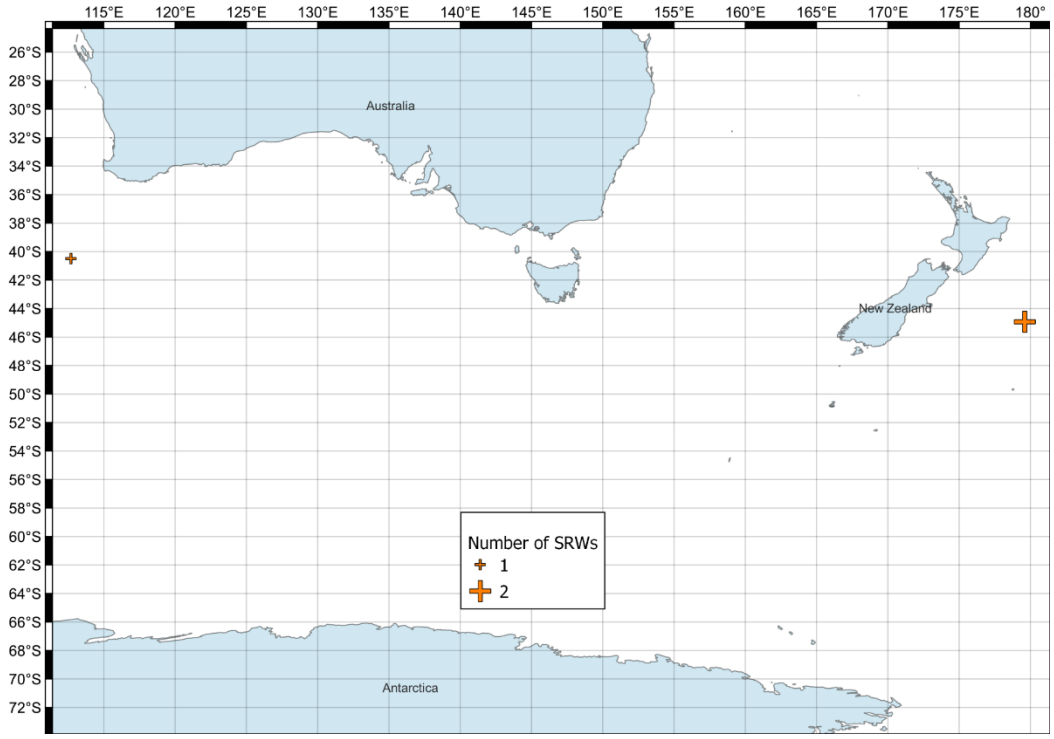

Figure 7a. Map of SRW sightings (1996-2007), around Australia and New Zealand with each mark representing a single sighting (size of marks indicating the number of SRWs recorded per sighting, see legend).

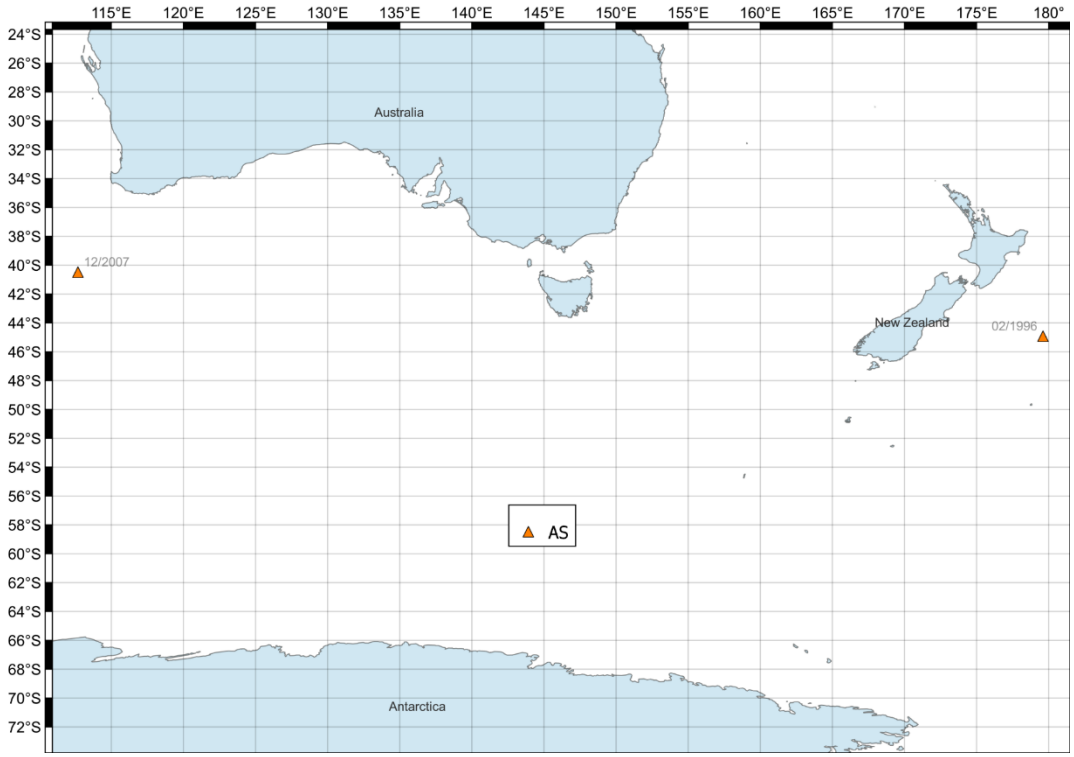

Figure 7b. Map of SRW sightings (1996-2007) per season, around Australia and New Zealand, sighting dates included for discriminating between years.

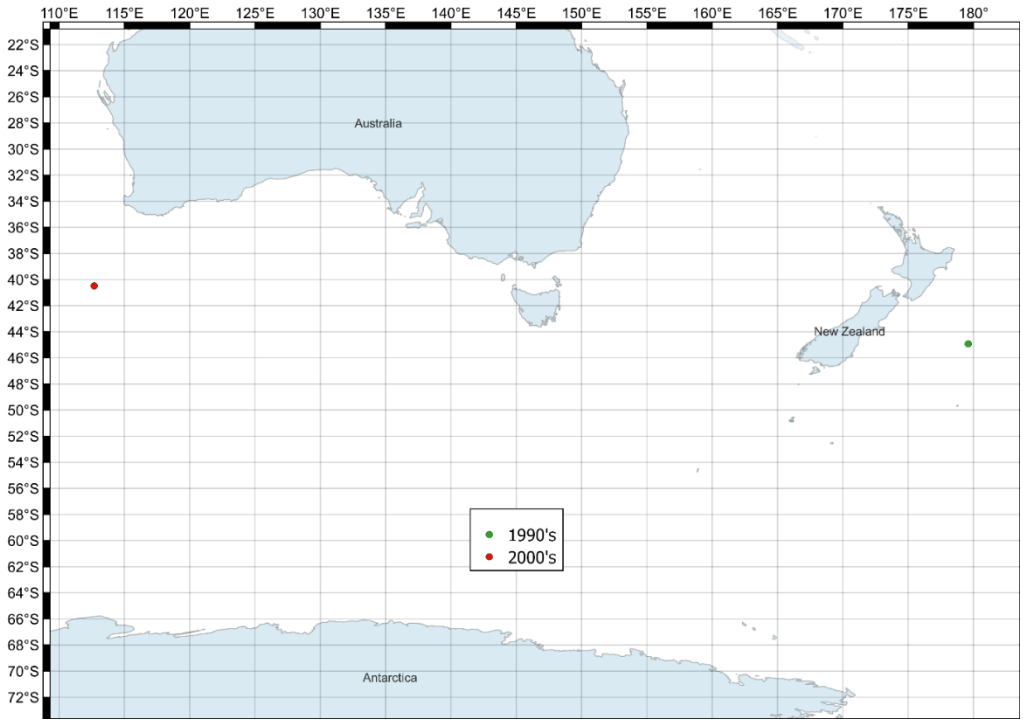

Figure 7c. Map of SRW sightings (1996-2007) around Australia and New Zealand, categorized according to the decade the sighting was recorded including the 1990's (green) and the 2000's (red).

ABSENCE DATA

Polarstern Voyages

Polarstern research voyages, occurring from 1999 to 2019 in the South Atlantic Ocean (south of the equator; 85°W-20°E) almost never observed SRWs, except for an individual sighting on the PS053 voyage (03/1999 to 05/1999 - ranging between 42-70°S and 5-20°E (Figure 8). PS053, PS058 (04/2001-05/2001), and PS065 (03/2004-05/2004) voyages took place during the AA, whilst PS071 (11/2007-02/2008) occurred at the end of the ASp and AS, with PS089 (12/2014-01/2015), and PS117 (12/2018-02/2019) occurring solely during the AS. Voyage PS069 (06/2006-08/2006) occurred during the AW, and voyage PS081 (08/2013-10/2013) took place at the end of the AW and beginning of the ASP.

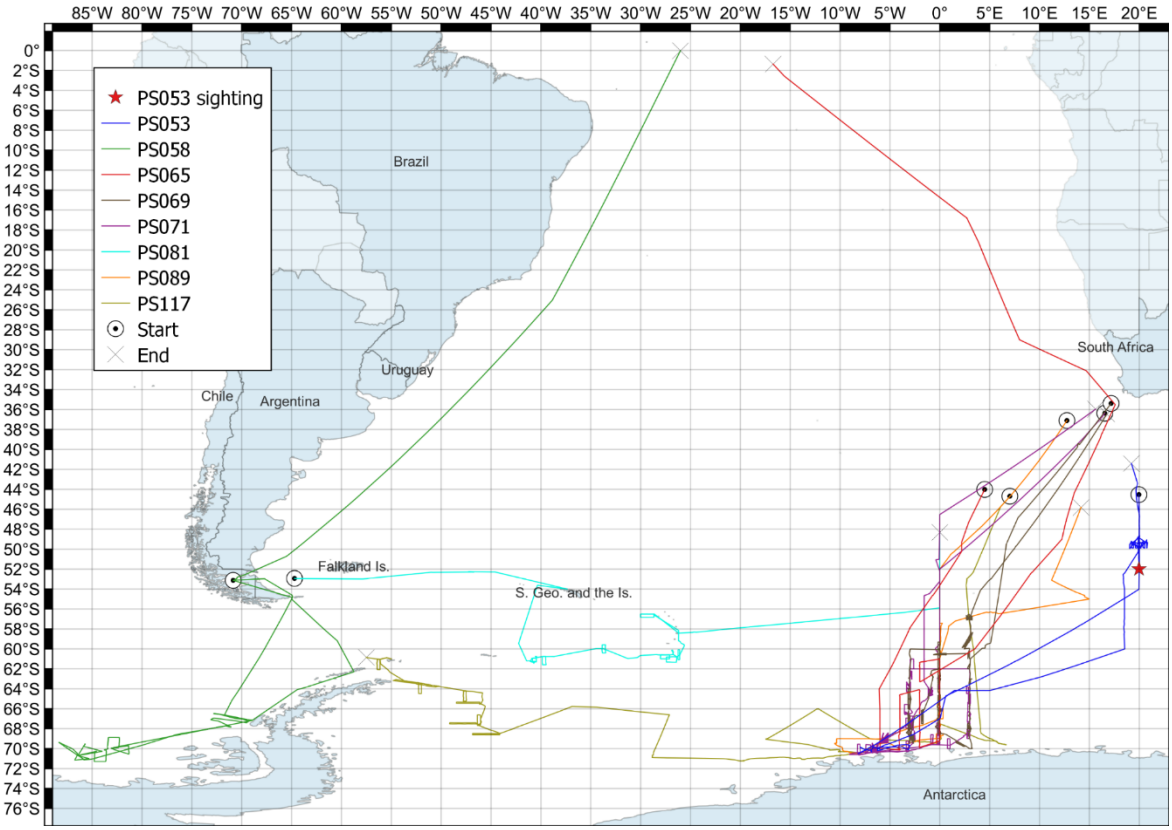

Figure 8. Map of Polarstern voyages (1999-2019) following popular SRW destinations: PS053 (dark blue line, 03/1999-05/1999 (single sighting indicated by red star)); PS058 (green line, 04/2001-05/2001); PS065 (red line, 03/2004-05/2004); PS069 (brown line, 06/2006-08/2006); PS071 (purple line, 11/2007-02/2008); PS081 (light blue line, 08/2013-10/2013); PS089 (orange line, 12/2014-01/2015); PS117 (gold line, 12/2018-02/2019). For start and end destinations for each voyage see legend.

CCAMLR data

CCAMLR (2018-2020) contributed 5,209 datapoints (Figure 9) to indicate SRW absence. The majority of these datapoints (46.6%) were recorded during the AS (n=2,427), and 23% during the AW (n=1,200). Furthermore, 18.3% of the points were recorded during the AA (n=951), and the 12.1%, were recorded during the ASp (n=631).

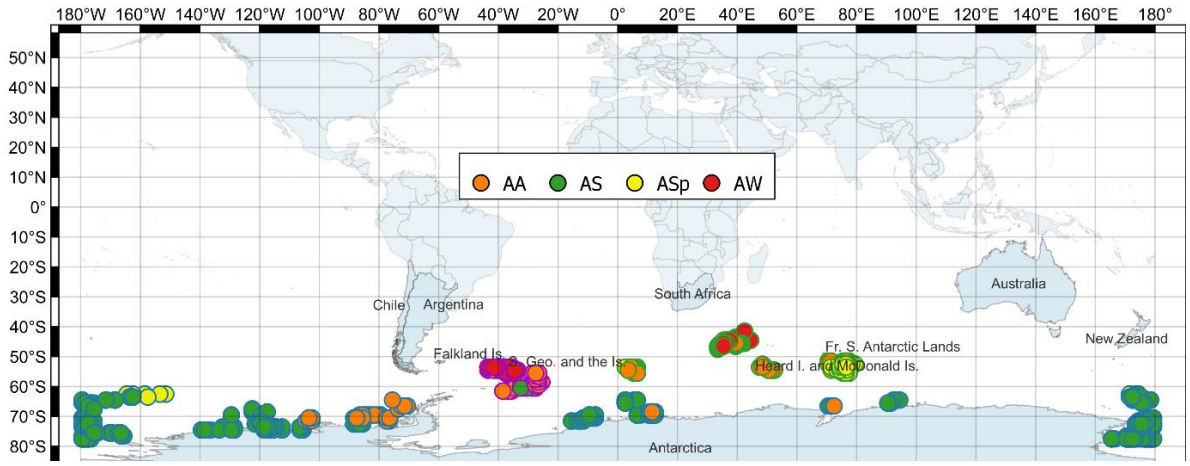

Figure 9. Map of CCAMLR data points (2018-2020) including South Georgia and South Sandwich Islands (purple boundary), southern Africa (green boundary), and the Southern Ocean (blue boundary) indicating where SRWs have not been sighted (refer to legend for season when data points were recorded).

South Georgia & South Sandwich Islands

South Georgia and South Sandwich Islands effort data included a total of 1,385 data points (26.6% of total absence data points), with temporal analysis indicating that the majority, 69.5%, being recorded during the AW (n=962), and 27% being recorded during the AA (n=374) (Figure 10). The least amount of data points was recorded during the AS (n=28) and ASp (n=21), comprising 2% and 1.5% of data points in this area respectively. Furthermore, AW data points ranged between 53-56°S and 33-44°W, while AS data points ranged between 55-61°S and 25-34°W. ASp data points were the most concentrated only being recorded between 53-55°S and 40-43°W, while AA data points were spread out over a larger area (53-62°S; 25-42°W).

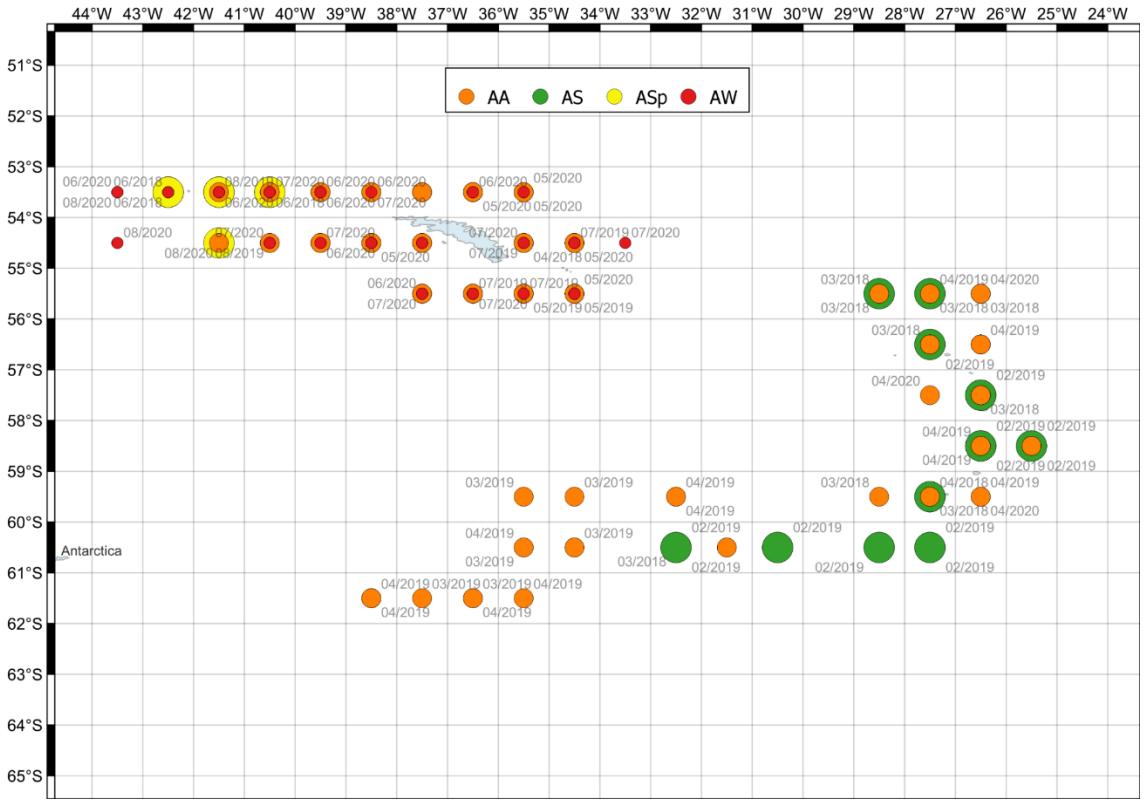

Figure 10. Map of CCAMLR data points (2018-2020) around the South Georgia and South Sandwich Islands, indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points)**.**

Southern Ocean

Effort data points from the Southern Ocean (south of 60°S) comprised 42.4% (n=2 213) of total data points. Of these data points the majority, 96%, were recorded during the AS (n=2 127), while 3% were recorded during the AA (n=63) and 1% during the ASp (n=23) (Figure 11a). No data points were recorded during the AW for this region.

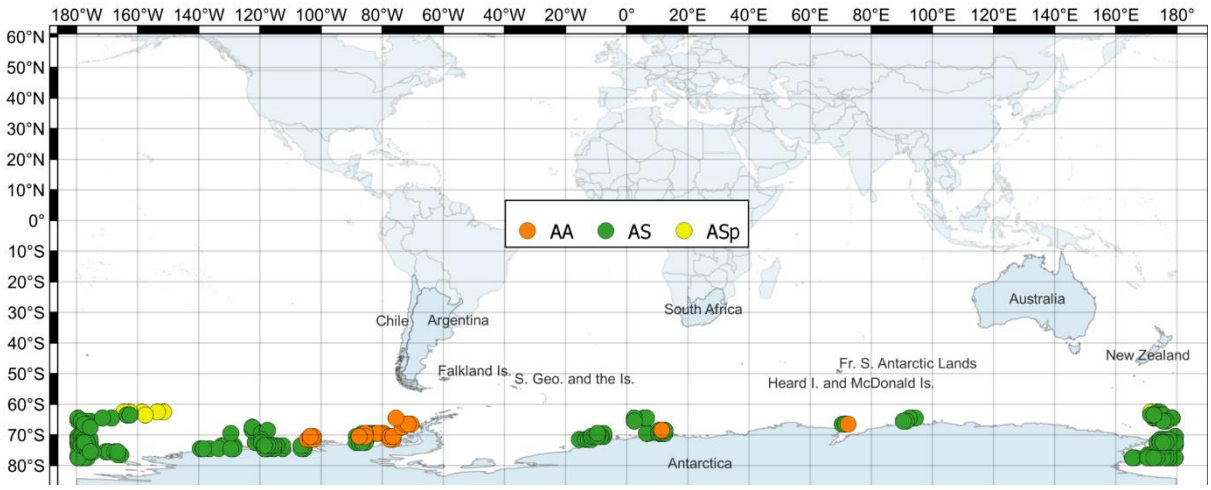

Figure 11a. Map of CCAMLR data points (2018-2020) in the Southern Ocean (south of 60°S), including data points from the Eastern Ross Sea, Western Ross Sea, Amundsen Sea, and Antarctic Peninsula, indicating where SRWs have not been sighted (refer to legend for season of data points).

Eastern Ross Sea

Effort data from the Eastern Ross Sea (n=934) comprised the majority, 42.2%, of Southern Ocean effort data points, with 99.7% of data points recorded during the AS (n=932) and 0.3% recorded during the ASp (n=2). AS data points were recorded over a larger area (62-78°S; 165-179°E) compared to ASp data points, both of which were recorded at 62.5°S, 171.5°E (Figure 11b).

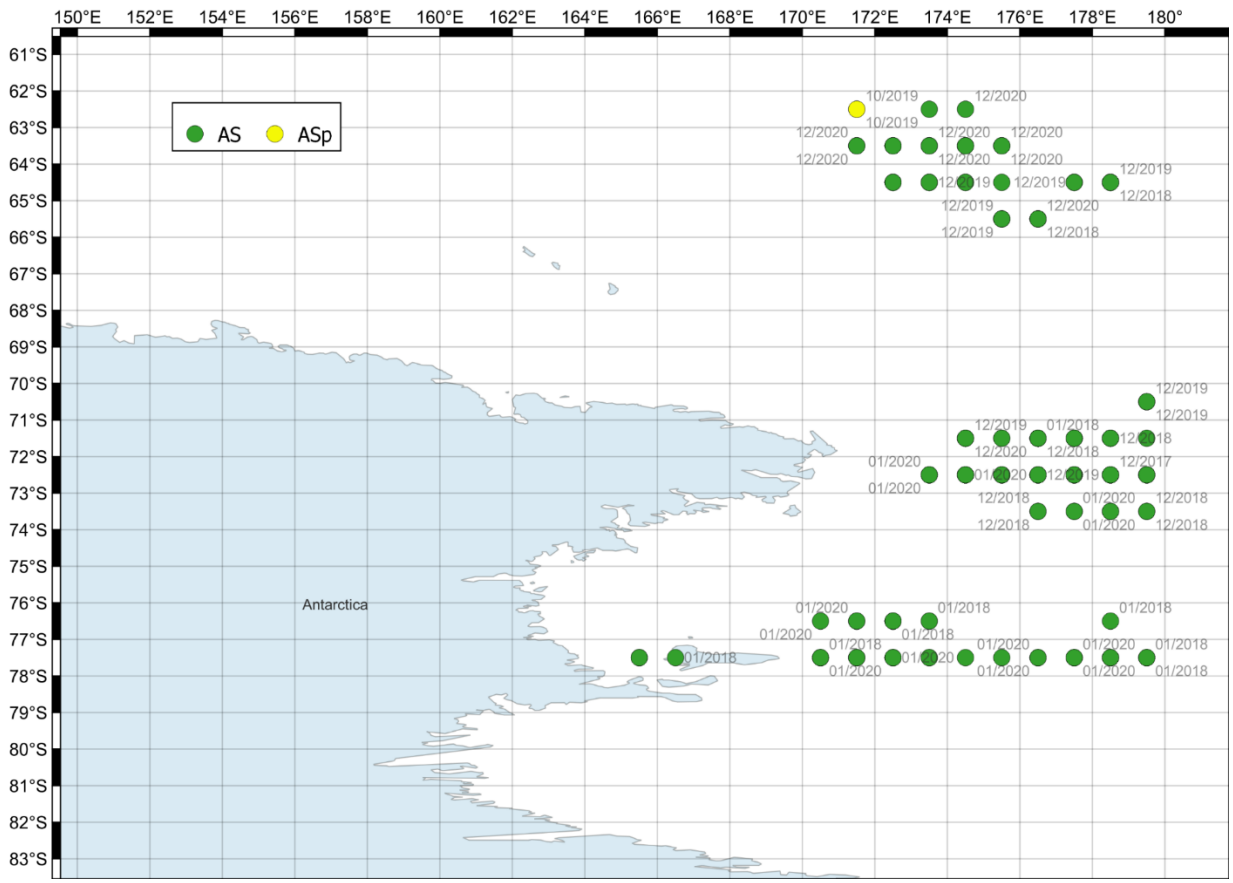

Figure 11b. Map of CCAMLR data points (2018-2020) in the Eastern Ross Sea, indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points).

Western Ross Sea

Effort data from the Western Ross Sea (n=623) made up 28.2% of Southern Ocean effort data points, with 96.6% of data points recorded during the AS (n=602) and 3.4% recorded during the ASp (n=21). Furthermore, AS data points were recorded over a larger area (63-78°S; 162-180°W) while ASp data points were concentrated around 62-64°S and 151-165°W.

Figure 11c. Map of CCAMLR data points (2018-2020) in the Western Ross Sea, indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points)**.**

Amudsen Sea

Effort data from the Amundsen Sea (n=266) made up 12% of Southern Ocean effort data points, with 95.5% of data points recorded during the AS (n=254) and 4.5% recorded during the AA (n=12). Furthermore, AS data points were recorded over a broader range (67-75°S; 105-140°W) than AA data points which were concentrated around 70-72°S and 103-105°W.

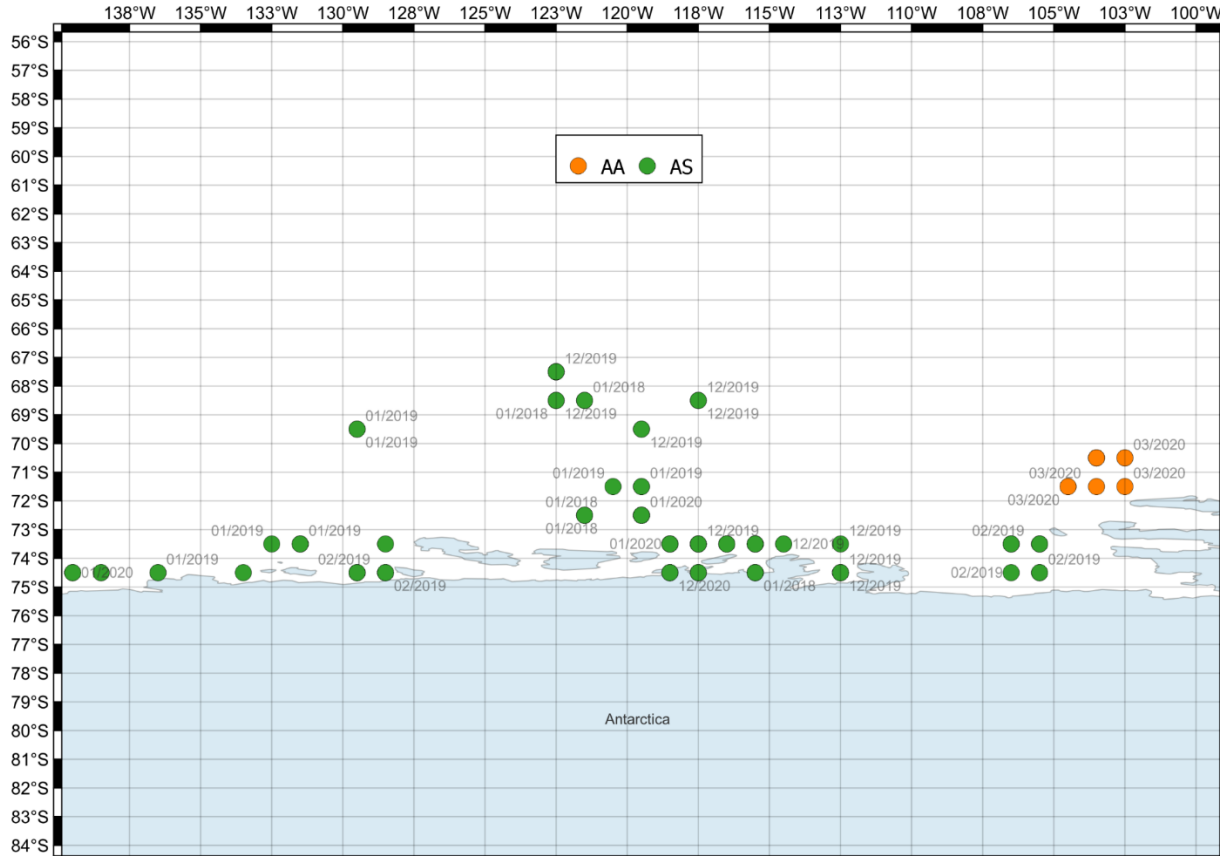

Figure 11d. Map of CCAMLR data points (2018-2020) in the Amundsen Sea, indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points).

Antarctic Peninsula

Effort data from the Antarctic Peninsula (n=65) comprised 3% of Southern Ocean effort data points, with 55.4% of the data points recorded during the AA (n=36) and 44.6% recorded during the AS (n=29). Furthermore, AA sightings were recorded over a larger range (64-72°S; 70-88°W) and extended northwards, while AS sightings were concentrated around 69-73°S and 82-89°W towards the south.

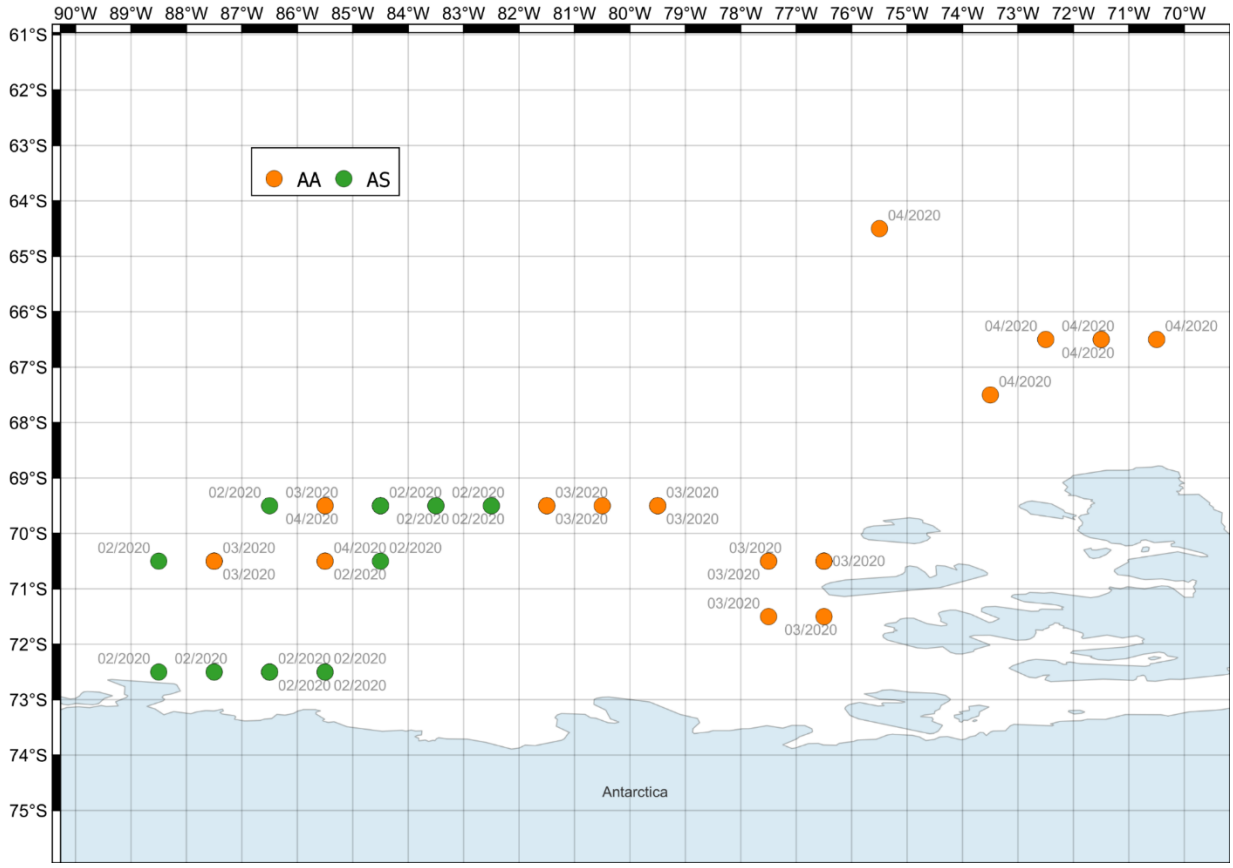

Figure 11e. Map of CCAMLR data points (2018-2020) around the Antarctic Peninsula, indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points)**.**

Other Southern Ocean data points

Effort data from the other Southern Ocean data points (n=325) (south of 60°S; 15°W-95°E) comprised 14.6% of all Southern Ocean effort data points, with 95.4% of the data points recorded during the AS (n=310) and 4.6% recorded during the AA (n=15). Both AS and AA data points were recorded over a large area, with AS data points recorded between 65-73°S and 15°W-95°E, and AA data points ranging between 65-70°S and 5-73°E.

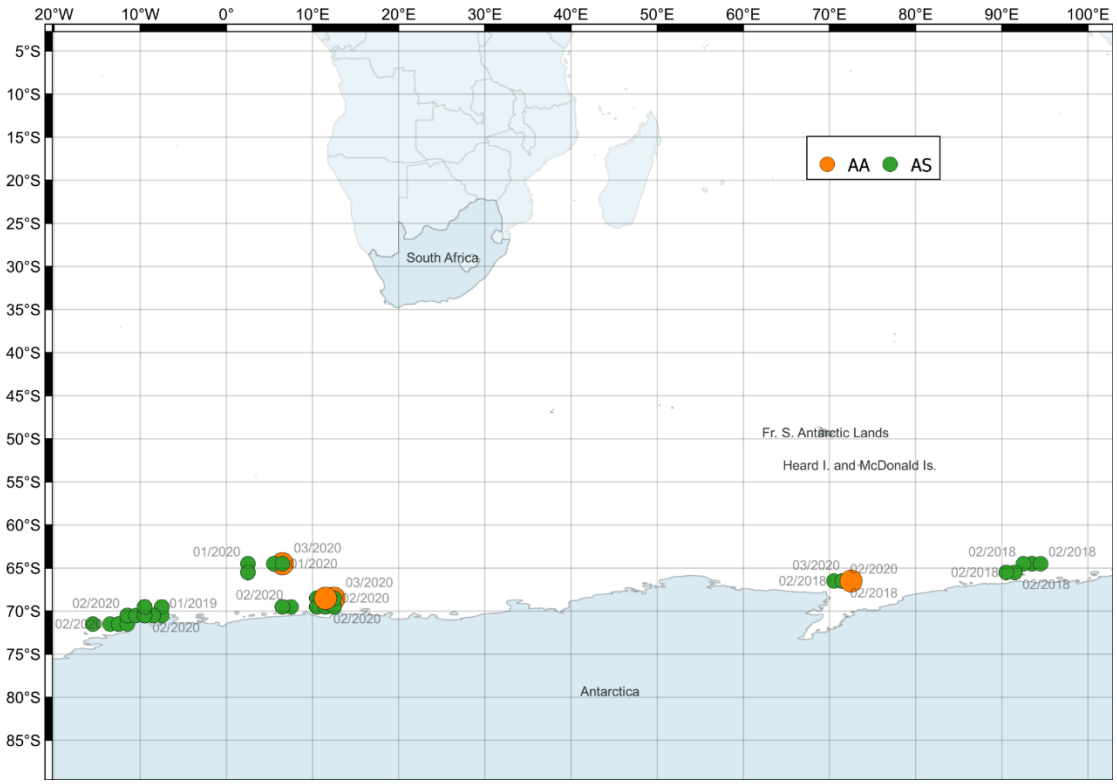

Figure 11f. Map of CCAMLR data points (2018-2020) in the Southern Ocean (south of 60°; 15°W-95°E), indicating where SRWs have not been sighted, data point dates included for discriminating between years (refer to legend for season of data points)**.**

Southern Africa

Data points recorded in this region comprised 31% (n=1 611) of all CCAMLR data points. Of these 1611 data points the majority, 36.4%, were recorded during the ASp (n=587), while the least number of points, 14.7%, were recorded during the AW (n=238) (Figure 12). Furthermore, 32% of data points were recorded during the AA (n=514), with 16.9% of data points being recorded during the AS (n=272).

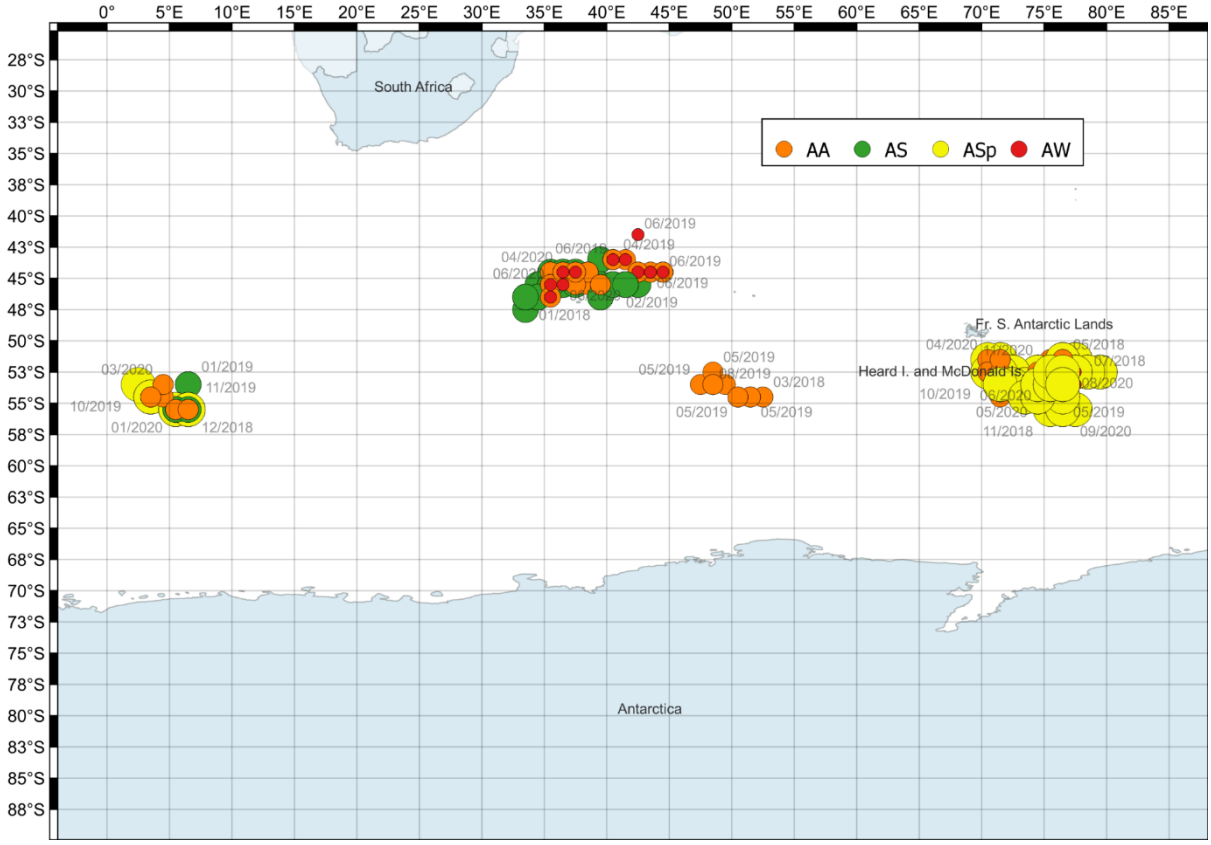

Figure 12. Map of CCAMLR data points (2018-2020) in the southwestern Indian Ocean off the South African southern coast, and around the French Southern and Antarctic lands, data points dates included for discrimination between years (see legend for season of data points).

Annex I

23/06/2021

Ref: Data request - southern right whale offshore sightings South of 40°S

To whom it may concern,

Research Theme 6 of the Southern Ocean Research Partnership (SORP) of the International Whaling Commission (IWC), entitled "*The right sentinel for climate change: linking foraging ground variability to population recovery in the southern right whale (*Eubalaena australis)", aims to investigate the impact of past and future climate variation at southern right whale foraging grounds on the population recovery of the species. For more information on this project, please visit https://iwc.int/sorp

A key part of this project is the identification of southern right whale foraging grounds. However, southern right whales are known to forage from 40 ° S to the ice edge based on historical sources. Contemporary data on feeding ground location is sparse, and thus the identification of areas of importance to the species is difficult. Currently, studies are being carried out using satellite telemetry, stable isotopes and prey sampling to clarify the matter.

Another avenue of research we are pursuing on this topic is a comprehensive desktop study to collate all available (published and unpublished, dedicated or opportunistic) data regarding southern right whale offshore sightings South of 40°S. Such information will be essential to further develop foraging ground habitat models and select appropriate environmental variables, to evaluate effects of climatic changes on the species' foraging success and ultimately reproductive success.

In our bid to collate such data, we therefore wish to inquire if:

- You or your organisation hold opportunistic data on southern right whale offshore sightings South of 40°S ,
  and
  2) You or your organisation would be willing to contribute such data to this IWC-SORP research project

IP rights of all contributed data will remain unchanged, and will, at this stage, only be tabulated. Further data analyses and processing will not occur without written consent of the respective data owners. The final table of collated data will be made publicly available on the IWC website, unless specifically requested otherwise by the data contributor. If so required, data sharing agreements can be put in place on a case-to-case basis.

For more information or further questions, please do not hesitate to contact us.

Kind regards,
IWC-SORP Theme 6 co-leads

Dr Els Vermeulen
Research Manager – MRI Whale Unit
Fellow
University of Pretoria
Els.vermeulen@up.ac.za

Dr Emma Carroll
Rutherford Discovery
University of Auckland
e.carroll@auckland.ac.nz

08 June 2021

Dr Els Vermeulen
Research Manager
Mammal Research Institute Whale Unit
Department of Zoology and Entomology
University of Pretoria, South Africa

Re: Cuyler van Jaarsveld – data collation and tabulation

Dear Dr Vermeulen,

We write on behalf of the Southern Ocean Research Partnership, Scientific Steering Committee (IWC-SORP SSC) to express our support for the collation and tabulation of data which will be conducted by Cuyler van Jaarsveld, a registered honours student at the University of Pretoria.

We understand that southern right whale sightings data will be requested from the wider scientific community to inform understanding of the location of the contemporary feeding grounds of the species.

It is envisioned that Cuyler van Jaarsveld will collate and tabulate the obtained data in the scope of his honours thesis, a process that is fully endorsed by the IWC-SORP SSC.

Due to the nature of the data request, which will include a data sharing agreement with each data contributor/owner, we support the use of the collated data in the dissertation of Cuyler van Jaarsveld.

The International Whaling Commission's Southern Ocean Research Partnership (IWC-SORP) is an international research consortium that aims to maximise conservation outcomes for Southern Ocean whale populations through non-lethal research to improve our understanding of their status, health, dynamics and environment, and the threats they face. This project will make an important contribution to our research and our understanding of southern right whales and their management and conservation needs.

Yours sincerely,

Dr Elanor Bell
IWC-SORP Manager & Coordinator

Dr Helena Herr
Chair, IWC-SORP SSC

Annex II

Survey Date	Latitude	Longitude	Number of SRWs	Photographs, video, bioacoustics	Source
21/12/1981	-41.233333	-56.166667	1	Y	SOWER
01/01/1982	-60.866667	-47.8	1	Y	SOWER
01/01/1983	-62.55	-61.65	1	N	SOWER
01/01/1983	-62.566667	-61.7	1	Y	SOWER
02/01/1983	-63.266667	-62.75	1	Y	SOWER
07/02/1985	-62.766667	81.7	1	Y	SOWER
07/01/1987	-62.233333	-39	1	Y	SOWER
07/01/1987	-62.433333	-38.866667	2	Y	SOWER
26/01/1987	-63.15	-11.816667	1	Y	SOWER
01/02/1988	-44.033333	39.7	1	Y	SOWER
29/01/1989	-64.366667	108.15	1	Y	SOWER
11/06/1992	-53.533097	-42.16048216	2	N	South Georgia Heritage Trust
20/01/1993	-65.720833	27.616667	2	Y	SOWER
07/01/1995	-41.263611	20.824444	1	Y	SOWER
07/01/1995	-41.624444	21.216667	1	Y	SOWER
29/02/1996	-44.926667	-179.609167	2	N	SOWER
22/01/1997	-61.365	-5.916667	1	Y	SOWER
27/01/1997	-53.417778	-42.101667	1	N	Moore *et al.* 1997
27/01/1997	-53.484444	-41.650833	3	N	Moore *et al.* 1997
27/01/1997	-53.5025	-41.583611	4	N	Moore *et al.* 1997
27/01/1997	-53.467222	-41.602222	3	N	Moore *et al.* 1997
27/01/1997	-53.500278	-41.600278	3	N	Moore *et al.* 1997
02/02/1997	-54.216944	-35.401389	1	N	Moore *et al.* 1997
02/02/1997	-54.134722	-35.335	1	N	Moore *et al.* 1997
02/02/1997	-54.134722	-35.35	2	N	Moore *et al.* 1997
02/02/1997	-54.116667	-35.318056	1	N	Moore *et al.* 1997
03/02/1997	-54.317222	-34.966944	1	Y (photos and Video)	Moore *et al.* 1997
07/02/1997	-53.934167	-36.7025	1	Y (photo)	Moore *et al.* 1997
12/02/1997	-53.433333	-41.966667	1	N	Moore *et al.* 1999
13/02/1997	-66.301111	-27.748056	1	Y	SOWER
18/02/1997	-57.986111	2.279167	1	Y	SOWER
20/02/1997	-53.605278	10.051389	1	Y	SOWER
29/11/1997	-53.416667	-49.23333333	1	N	South Georgia Heritage Trust
23/12/1997	-53.916667	-39.68333333	2	N	South Georgia Heritage Trust
15/01/1998	-53.55	-41.65	4	N	South Georgia Heritage Trust
22/01/1998	-62.375833	-55.733333	5	Y	SOWER
22/01/1998	-61.120556	-58.166111	2	Y	SOWER
23/01/1998	-61.601944	-53.558889	2	Y	SOWER
23/01/1998	-60.983333	-52.759167	1	N	SOWER
25/01/1998	-60.196667	-49.466667	1	N	SOWER
25/01/1998	-60.194722	-49.4825	1	N	SOWER
25/01/1998	-60.166667	-49.45	1	N	SOWER
25/01/1998	-60.166667	-49.433333	1	N	SOWER
25/01/1998	-59.841944	-48.888889	2	N	SOWER
25/01/1998	-59.823889	-48.861944	2	N	SOWER
29/01/1998	-60.787222	-38.05	1	Y	SOWER

30/01/1998	-61.351389	-33.834722	1	Y	SOWER
30/01/1998	-60.842778	-37.654722	1	Y	SOWER
07/01/1999	-61.9367	-56.91	2	N	PROANTAR
25/01/1999	-65.059722	88.754722	1	N	SOWER
26/01/1999	-63.533333	91.495556	1	N	SOWER
28/01/1999	-62.983333	95.857222	1	N	SOWER
29/01/1999	-62.991667	95.865556	1	N	SOWER
29/01/1999	-62.6725	96.208889	1	N	SOWER
29/01/1999	-62.466667	96.4	1	N	SOWER
29/01/1999	-62.4	96.488056	1	N	SOWER
31/01/1999	-62.67	99.483333	1	N	SOWER
31/01/1999	-62.25	99.978889	1	N	SOWER
01/02/1999	-61.2925	102.483333	1	N	SOWER
02/02/1999	-62.983333	100.816667	1	N	SOWER
03/02/1999	-64.237778	102.483333	1	N	SOWER
05/02/1999	-63.326389	103.48	1	N	SOWER
07/02/1999	-63.925833	105.699167	1	N	SOWER
09/02/1999	-64.523056	113.1	1	N	SOWER
11/02/1999	-64.183333	117.2425	1	N	SOWER
11/02/1999	-64.5	117.500556	1	N	SOWER
13/02/1999	-53.596667	-38.885	3	N	South Georgia Heritage Trust
14/02/1999	-64.287222	117.595278	1	N	SOWER
14/02/1999	-63.650556	118.800833	3	N	SOWER
14/02/1999	-63.583333	118.883333	3	N	SOWER
14/02/1999	-63.15	119.683333	1	N	SOWER
14/02/1999	-63.165556	119.703056	1	N	SOWER
14/02/1999	-63.156111	119.7	1	N	SOWER
14/02/1999	-62.35	118.902222	1	N	SOWER
14/02/1999	-53.558333	-38.875	1	N	South Georgia Heritage Trust
15/02/1999	-63.19	120.000556	1	N	SOWER
21/02/1999	-64.45	126.283333	1	N	SOWER
21/02/1999	-64.466667	126.316667	1	N	SOWER
21/02/1999	-64.521944	126.414444	1	N	SOWER
22/02/1999	-62	-60	2	Y (photo)	PROANTAR
22/02/1999	-64.876111	126.983333	1	N	SOWER
02/05/1999	-51.9876	19.9888	1	N	Polarstern
31/05/1999	-53.539292	-42.0202463	2	N	South Georgia Heritage Trust
21/09/1999	-53.443056	-37.835	1	N	South Georgia Heritage Trust
25/10/1999	-52.43	-40.85	8	N	South Georgia Heritage Trust
28/10/1999	-52.428333	-40.18333333	3	N	South Georgia Heritage Trust
20/02/2000	-53.8	-47.18333333	1	N	South Georgia Heritage Trust
21/02/2000	-52.475	-40.58333333	1	N	South Georgia Heritage Trust
26/02/2000	-53.816667	-41.75	1	N	South Georgia Heritage Trust
06/12/2000	-62	-58	1	N	PROANTAR
18/01/2001	-53.587616	-41.01570444	3	N	South Georgia Heritage Trust
20/02/2001	-62.4917	-43.51	1	N	PROANTAR
31/07/2001	-53.753333	-35.62833333	1	N	South Georgia Heritage Trust
29/11/2001	-54.416667	-35.93333333	1	N	South Georgia Heritage Trust
20/03/2002	-56.833667	-40.56283333	3	N	South Georgia Heritage Trust
15/01/2003	-53.75	-39.3	1	N	South Georgia Heritage Trust
20/01/2003	-53.616667	-40.93333333	1	N	South Georgia Heritage Trust
20/01/2003	-53.533333	-41.21666667	1	N	South Georgia Heritage Trust
22/01/2003	-53.567598	-42.04950323	2	N	South Georgia Heritage Trust
22/01/2003	-53.45	-42.13333333	15-25	N	South Georgia Heritage Trust

23/01/2003	-53.5	-42.4	2	N	South Georgia Heritage Trust
23/01/2003	-53.516667	-42.33333333	3	N	South Georgia Heritage Trust
24/01/2003	-53.316667	-42.38333333	2	N	South Georgia Heritage Trust
24/01/2003	-53.336903	-42.34642037	5	N	South Georgia Heritage Trust
24/01/2003	-53.35	-42.23333333	2	N	South Georgia Heritage Trust
24/01/2003	-53.366667	-42.18333333	2	N	South Georgia Heritage Trust
24/01/2003	-53.4	-42.01666667	1	N	South Georgia Heritage Trust
24/01/2003	-53.383333	-42.13333333	2	N	South Georgia Heritage Trust
24/01/2003	-53.683333	-41.16666667	1	N	South Georgia Heritage Trust
24/01/2003	-53.466667	-41.73333333	1	N	South Georgia Heritage Trust
24/01/2003	-53.483333	-41.66666667	2	N	South Georgia Heritage Trust
25/01/2003	-54.716667	-28.26666667	3	N	South Georgia Heritage Trust
25/01/2003	-54.716667	-38.38333333	1	N	South Georgia Heritage Trust
28/01/2003	-55.4	-35.88333333	1	N	South Georgia Heritage Trust
25/02/2003	-53.521667	-40.91166667	1	N	South Georgia Heritage Trust
23/04/2003	-54.883333	-34.16666667	1	N	South Georgia Heritage Trust
24/04/2003	-54.55	-35.21666667	1	N	South Georgia Heritage Trust
25/04/2003	-53.833333	-35.73333333	1	N	South Georgia Heritage Trust
06/06/2003	-53.916667	-35.9	1	N	South Georgia Heritage Trust
06/06/2003	-53.901366	-36.02117489	1	N	South Georgia Heritage Trust
09/06/2003	-53.4	-32.75	1	N	South Georgia Heritage Trust
15/07/2003	-53.8	-36.33333333	1	N	South Georgia Heritage Trust
12/08/2003	-53.716667	-36.43333333	4	N	South Georgia Heritage Trust
02/01/2004	-54.033333	-38.65	10	N	South Georgia Heritage Trust
04/01/2004	-53.733632	-38.71742768	1	N	South Georgia Heritage Trust
04/01/2004	-53.718167	-38.806	1	N	South Georgia Heritage Trust
04/01/2004	-53.783333	-39.03333333	6	N	South Georgia Heritage Trust
04/01/2004	-53.785226	-39.34571697	4	N	South Georgia Heritage Trust
04/01/2004	-53.766667	-39.22233333	1	N	South Georgia Heritage Trust
05/01/2004	-53.805667	-38.63366667	1	N	South Georgia Heritage Trust
05/01/2004	-53.798667	-38.67833333	2	N	South Georgia Heritage Trust
05/01/2004	-53.739667	-38.8145	1	N	South Georgia Heritage Trust
05/01/2004	-53.718833	-38.83866667	2	N	South Georgia Heritage Trust
05/01/2004	-53.707667	-38.954	4	N	South Georgia Heritage Trust
05/01/2004	-53.711333	-38.99866667	2	N	South Georgia Heritage Trust
05/01/2004	-53.75	-39	6	N	South Georgia Heritage Trust
21/01/2004	-53.653333	-39.60066667	1	N	South Georgia Heritage Trust
21/01/2004	-53.6485	-39.64916667	1	N	South Georgia Heritage Trust
21/01/2004	-53.629833	-39.78966667	2	N	South Georgia Heritage Trust
22/01/2004	-53.7375	-27.891	4	N	South Georgia Heritage Trust
22/01/2004	-53.867167	-37.43466667	2	N	South Georgia Heritage Trust
22/01/2004	-53.766667	-37.73333333	1	N	South Georgia Heritage Trust
22/01/2004	-53.75	-37.8425	1	N	South Georgia Heritage Trust
22/01/2004	-53.718167	-37.964	4	N	South Georgia Heritage Trust
22/01/2004	-53.744	-37.86683333	2	N	South Georgia Heritage Trust
24/01/2004	-53.724333	-39.58033333	2	N	South Georgia Heritage Trust
30/01/2004	-54.966667	-36.28333333	10	N	South Georgia Heritage Trust
02/02/2004	-53.873167	-39.21866667	1	N	South Georgia Heritage Trust
02/02/2004	-53.91	-39.28866667	1	N	South Georgia Heritage Trust
02/02/2004	-53.833799	-39.16952202	4	N	South Georgia Heritage Trust
02/02/2004	-53.8	-39.11666667	3	N	South Georgia Heritage Trust
31/03/2004	-53.604003	-42.04022333	3	N	South Georgia Heritage Trust
11/04/2004	-53.5175	-41.66794293	15	Y (photos)	South Georgia Heritage Trust
24/11/2004	-53.55	-42	6	N	South Georgia Heritage Trust

25/02/2005	-66.561667	63.866667	1	N	IWC
25/02/2005	-66.546667	63.903611	1	N	IWC
06/01/2006	-57.094722	11.6525	2	N	IWC
10/01/2006	-53.3	-44.16666667	2	N	South Georgia Heritage Trust
11/02/2006	-54.533333	-39.63333333	3	N	South Georgia Heritage Trust
17/02/2006	-53.586654	-41.63429556	8	N	South Georgia Heritage Trust
12/03/2006	-56.536667	-40.55333333	2	N	South Georgia Heritage Trust
22/10/2006	-54.63315	-14.45335	1	N	PANGAEA
19/12/2006	-63.324167	-60.983611	1	Y (photo)	Happywhale
21/01/2007	-55.783333	-49.03333333	Multiple	N	South Georgia Heritage Trust
15/02/2007	-53.478333	-42.315	2	N	South Georgia Heritage Trust
21/02/2007	-57.783336	-40.66666667	>15	N	South Georgia Heritage Trust
16/11/2007	-53.491931	-42.01666667	2	N	South Georgia Heritage Trust
26/12/2007	-40.487222	112.691389	1	N	IWC
30/09/2007	-54.633333	-37.33333333	1	N	South Georgia Heritage Trust
02/02/2008	-65.05	111.383333	2	N	IWC
02/02/2008	-65.016667	111.283333	2	N	IWC
03/02/2008	-53.526205	-42.21904613	1	N	South Georgia Heritage Trust
04/02/2008	-65.433333	107.816667	1	N	IWC
04/02/2008	-64.964167	107.514722	1	N	IWC
04/02/2008	-64.893889	107.45	1	N	IWC
05/02/2008	-64.55	107.2525	1	N	IWC
06/02/2008	-64.016667	106.914167	1	N	IWC
10/02/2008	-64.754444	106.195278	1	N	IWC
11/02/2008	-64.316667	105.331111	1	N	IWC
16/12/2008	-53.548333	-40.87666667	1	N	South Georgia Heritage Trust
20/02/2009	-63.6907	-55.5142	1	N	PROANTAR
18/01/2010	-64.590833	110.501111	1	N	SOWER
21/01/2010	-64.333333	113.916667	2	N	SOWER
23/01/2010	-64.221111	114	1	N	SOWER
23/01/2010	-64.383333	113.4	1	N	SOWER
24/01/2010	-64.4575	111.631667	3	N	SOWER
25/01/2010	-63.941667	110.553611	3	N	SOWER
25/01/2010	-63.704167	110.066667	1	N	SOWER
29/01/2010	-64.433333	108.151944	1	N	SOWER
29/01/2010	-64.481667	108.05	1	N	SOWER
29/01/2010	-64.483333	108.01	1	N	SOWER
30/01/2010	-64.5825	107.767778	2	N	SOWER
30/01/2010	-64.623056	107.633889	2	N	SOWER
30/01/2010	-64.75	107.2	1	N	SOWER
30/01/2010	-64.766667	107.183333	1	N	SOWER
30/01/2010	-64.783333	107.191667	2	N	SOWER
30/01/2010	-64.760833	107.233056	1	N	SOWER
30/01/2010	-64.2	105.948889	1	N	SOWER
30/01/2010	-64.183333	105.908333	1	N	SOWER
31/01/2010	-63.948889	105.349722	1	N	SOWER
31/01/2010	-63.916667	105.3	1	N	SOWER
31/01/2010	-64.069722	103.550278	1	N	SOWER
31/01/2010	-64.083333	103.466667	1	N	SOWER
03/02/2010	-63.703889	100.4425	2	N	SOWER
03/02/2010	-63.650833	100.331667	1	N	SOWER
03/02/2010	-63.643611	100.302778	1	N	SOWER
03/02/2010	-63.599444	100.2125	1	N	SOWER
03/02/2010	-63.515	100.166667	2	N	SOWER

03/02/2010	-63.5	100.266944	2	N	SOWER
03/02/2010	-63.533333	100.996111	2	N	SOWER
03/02/2010	-63.551111	101.135	1	N	SOWER
03/02/2010	-63.55	101.447222	1	N	SOWER
03/02/2010	-63.717222	101.766667	1	N	SOWER
04/02/2010	-63.633333	101.915278	1	N	SOWER
05/02/2010	-64.25	102.588611	1	N	SOWER
21/02/2010	-61.894	-54.8025	1	N	PROANTAR
22/02/2010	-62.0172	-51.7149	2	N	PROANTAR
22/02/2010	-62.032	-51.4515	2	N	PROANTAR
01/10/2010	-42.986111	-64.0225	1	Y (photo)	Happywhale
01/10/2010	-53.55	-42	5	N	South Georgia Heritage Trust
27/11/2010	-53.516667	-42.23333333	2	N	South Georgia Heritage Trust
05/01/2011	-53.534761	-41.96098728	2	N	South Georgia Heritage Trust
03/02/2011	-55.2	-36.36	1	N	South Georgia Heritage Trust
29/12/2011	-64.321824	-61.797237	1	Y (photo)	Happywhale
15/01/2012	-54.15	-36.1	1	N	South Georgia Heritage Trust
16/01/2012	-54.15	-36.3	2	N	South Georgia Heritage Trust
18/01/2012	-54.09	-36.42	1	N	South Georgia Heritage Trust
23/01/2012	-46	51	1	Y (photos)	Dr. Marc Eléaume
25/02/2012	-54.327	-35.446	5	N	South Georgia Heritage Trust
01/03/2013	-54.83	-35	1	N	South Georgia Heritage Trust
29/03/2013	-55	-34.41	1	Y (photo)	Nijs *et al.* 2016
01/04/2013	-57.33	-25.19	1	Y (photo)	Nijs *et al.* 2016
01/04/2013	-57.22	-26.32	1	Y (photo)	Nijs *et al.* 2016
02/04/2013	-57.47	-24.9	1	Y (photo)	Nijs *et al.* 2016
06/04/2013	-58.53	-27.02	1	Y (photo)	Nijs *et al.* 2016
09/04/2013	-55.77	-28.32	1	Y (photo)	Nijs *et al.* 2016
09/04/2013	-55.703056	-29.035	2	Y (photos)	Happywhale
31/08/2013	-53.55	-42.1	1	N	South Georgia Heritage Trust
11/01/2014	-64.361944	-61.853333	1	Y (photos)	Happywhale
01/09/2014	-53.31	-42.14	3	N	South Georgia Heritage Trust
08/11/2014	-55.163611	-65.947222	1	Y (photos)	Happywhale
09/11/2014	-55.961111	-64.876667	1	Y (photo)	Happywhale
19/11/2014	-53.618579	-40.78949	2	N	South Georgia Heritage Trust
11/02/2015	-45	50	1	N	Dr. Marc Eléaume
19/10/2015	-45	51	1	Y (photos)	Dr. Marc Eléaume
27/10/2015	-53.885833	-37.984722	1	Y (photos)	Happywhale
29/10/2015	-41.901944	-61.2975	1	Y (photos)	Happywhale
30/10/2015	-42.782778	-63.298611	1	Y (photos)	Happywhale
30/10/2015	-42.734444	-63.253056	1	Y (photos)	Happywhale
30/10/2015	-42.634167	-63.211667	1	Y (photos)	Happywhale
17/12/2015	-53.1745	-63.0898	1	Y (photo)	ObsInt
20/12/2015	-53.55	-42.027778	11	N	South Georgia Heritage Trust
23/12/2015	-53.516667	-42.257861	2	N	South Georgia Heritage Trust
16/01/2016	-53.516667	-42.257861	8	N	South Georgia Heritage Trust
27/01/2016	-53.266667	-44.333333	1	N	South Georgia Heritage Trust
27/01/2016	-53.265833	-44.332778	1	Y (photos)	Happywhale
27/01/2016	-53.3	-43.933333	2	N	South Georgia Heritage Trust
27/01/2016	-53.483333	-42.424528	9	N	South Georgia Heritage Trust
28/01/2016	-53.866667	-38.566667	3	N	South Georgia Heritage Trust
17/02/2016	-53.80547	-41.6549	3	N	ObsInt
18/02/2016	-53.301389	-42.8875	1	Y (photos)	Happywhale

27/02/2016	-55.244722	-37.949722	1	Y (photos)	Happywhale
30/03/2016	-53.85	-38.033333	1	N	South Georgia Heritage Trust
01/04/2016	-54.8333333	-35.433333	1	N	South Georgia Heritage Trust
17/11/2016	-46	50	1	N	Dr. Marc Eléaume
25/01/2017	-45	50	1	Y (photos)	Dr. Marc Eléaume
27/01/2017	-45	50	1	Y (photos)	Dr. Marc Eléaume
07/02/2017	-45	50	2	N	Dr. Marc Eléaume
14/03/2017	-53.85	-38.033333	3	N	South Georgia Heritage Trust
22/03/2017	-48.31602	-61.6387	2	N	PANGAEA
22/03/2017	-48.30873	-61.62837	2	N	PANGAEA
26/03/2017	-61.413056	-39.313611	1	Y (photos)	Happywhale
29/04/2017	-60.151944	-44.872222	1	Y (photos)	Happywhale
07/06/2017	-52.218333	-52.479722	8	Y (photos)	Happywhale
10/11/2017	-44.74262	-63.52961	1	N	ObsInt
11/11/2017	-48.49397	-62.11198	1	N	ObsInt
24/01/2018	-53.5106	-42.256	1	Y (photos)	Happywhale
19/02/2018	-62.5667	-59.3093	2	N	PROANTAR
19/02/2018	-62.4875	-59.1963	2	N	PROANTAR
25/02/2018	-45	50	2	N	Dr. Marc Eléaume
04/03/2018	-45	50	1	Y (photos)	Dr. Marc Eléaume
26/03/2018	-62.99654	-59.966	1	Y (photo)	PANGAEA
26/03/2018	-62.99741	-59.96733	2	N	PANGAEA
01/04/2018	-57.49694	-39.66797	1	Y (photos)	ObsInt
01/04/2018	-53.80279	-38.94362	2	N	ObsInt
01/04/2018	-53.8482	-38.4393	3	Y (photos)	Happywhale
01/04/2018	-53.84968	-38.43828	3	Y (photos)	ObsInt
01/04/2018	-53.85578	-38.44518	3	N	ObsInt
01/04/2018	-53.85381	-38.44423	3	N	ObsInt
01/04/2018	-53.8567	-38.4325	3	N	ObsInt
04/04/2018	-54.67087	-36.65772	1	Y (photos)	ObsInt
04/04/2018	-54.8438	-35.8088	2	Y (photos)	ObsInt
05/08/2018	-46	50	~30	N	Dr. Marc Eléaume
02/03/2019	-53.320556	-44.431389	2	Y (photos)	Happywhale
27/10/2019	-46	50	1	Y (photos)	Dr. Marc Eléaume
18/12/2019	-53.548333	-40.886111	1	Y (photos)	Happywhale
25/01/2020	-53.88685	-38.2315	1	N	ObsInt
15/02/2020	-52.704241	-51.334135	1	Y (photos)	Happywhale
17/02/2020	-53.176643	-44.643548	1	Y (photos)	Happywhale
23/02/2020	-60.225388	-51.262135	3	Y (photos)	Happywhale
01/03/2020	-53.216351	-43.414788	1	Y (photos)	Happywhale
01/03/2020	-53.515798	-41.869166	1	Y (photos)	Happywhale
01/03/2020	-54.162506	-36.083163	(2-3)	Y (photos)	Happywhale
01/03/2020	-54.031394	-36.523058	(2-4)	Y (photos)	Happywhale
01/03/2020	-54.02	-36.48	2	Y (photo)	Happywhale
10/03/2020	-61.977567	-50.821544	1	Y (photo)	Happywhale
20/03/2020	-41.293241	-58.491907	2	Y (photos)	Happywhale