

Antipodean albatross fisheries overlap 2020

Progress report

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New Zealand Government

Purpose

To assess the second year of intensive satellite tracking of Antipodean albatross, in 2020, to describe areas of fisheries overlap

- ▶ quantify the overlap of Antipodean albatross distribution with pelagic longline fishing activity
- ▶ describe pelagic longline fisheries overlap by bird age class, sex and breeding state
- ▶ Identify pelagic longline fishing fleets that overlap with bird distribution and quantify the degree of overlap
- ▶ identify the ports most frequently used by pelagic longline fishing vessels that fish in areas overlapping bird distribution

Presentation outline

1. Methods
2. Input data
3. Bird occurrence
4. Overlap with pelagic longline fishing effort
5. Conclusions & outlook



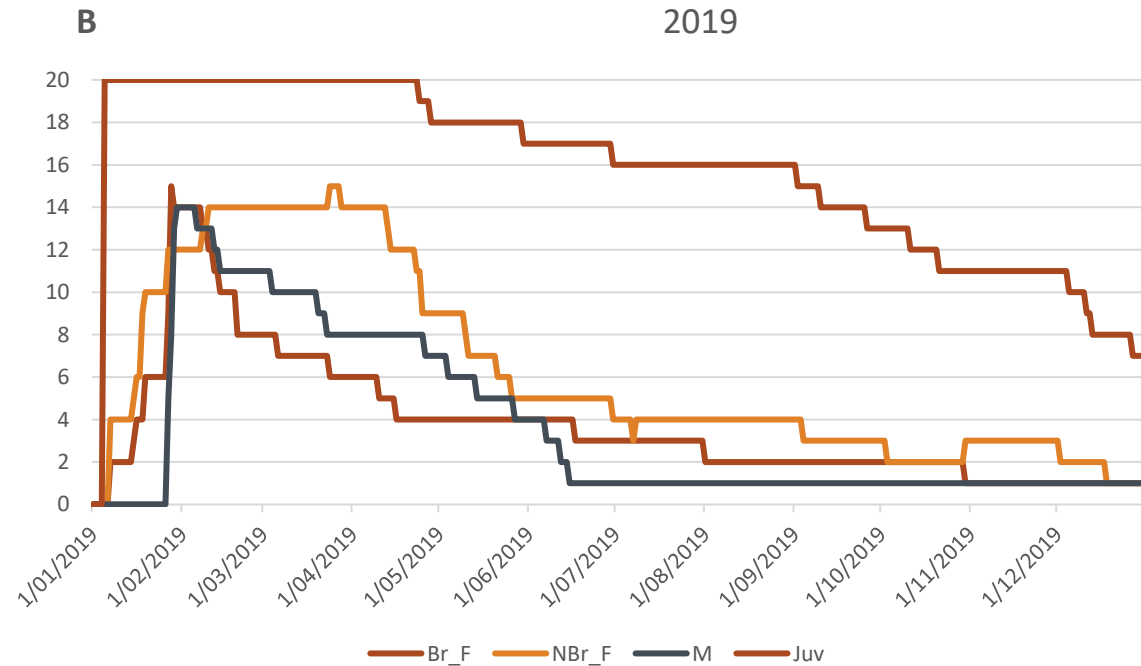
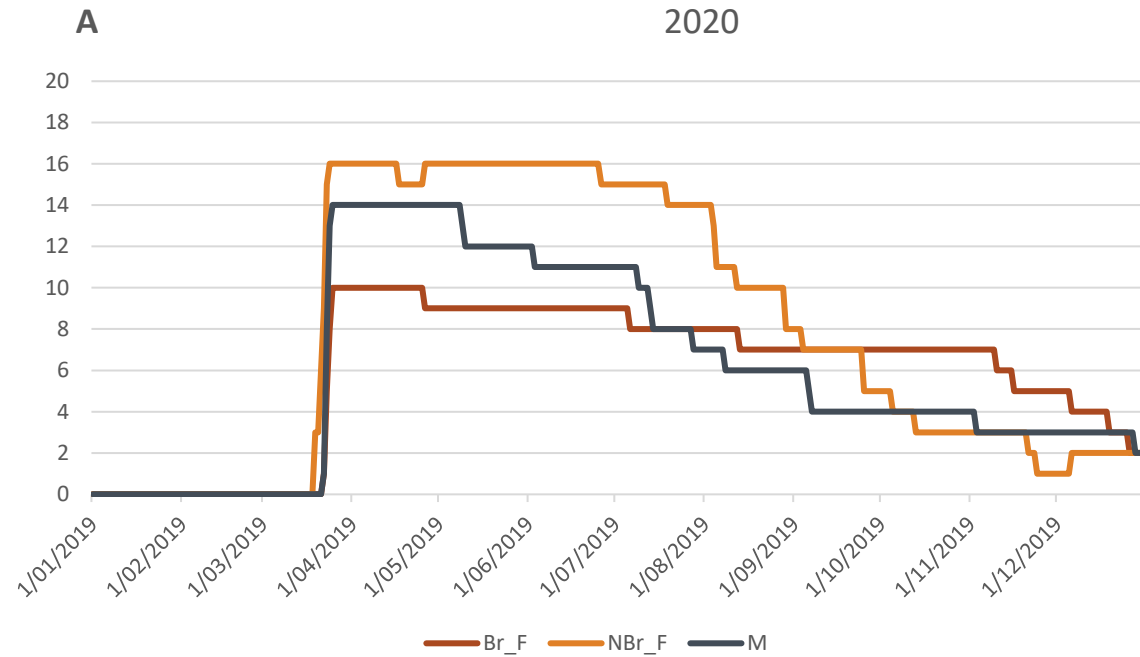
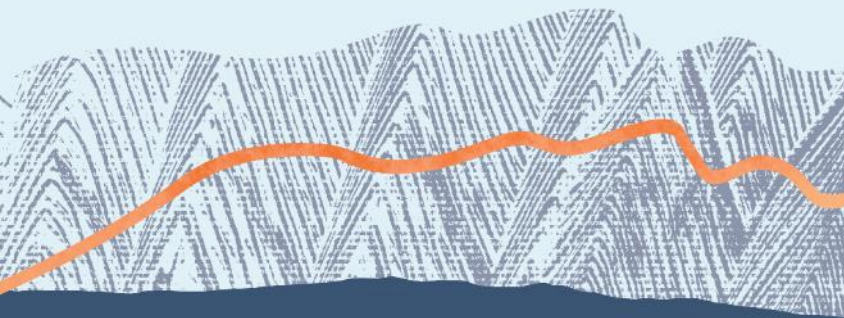
Methods

- ▶ Based on 2019 overlap assessment ([Bose & Debski 2020](#))
- ▶ Overlap was defined as a bird location within 100km and on the same day as a vessel location
- ▶ New bird and fishing effort input data
- ▶ New Global Fishing Watch dataset using improved algorithm for deriving fishing effort (also updated 2019 data)
- ▶ New filter for bird tracking data developed to allow use of more data points:
 - ARGOS class 0 locations now used, subject to filtering
 - Gives better coverage in mid-Pacific
 - Also applied to 2019 data
- ▶ Area overlap was calculated based on location of vessel not bird
- ▶ Different cohort definitions used for more meaningful comparison between years

Input data

Tracking sample size

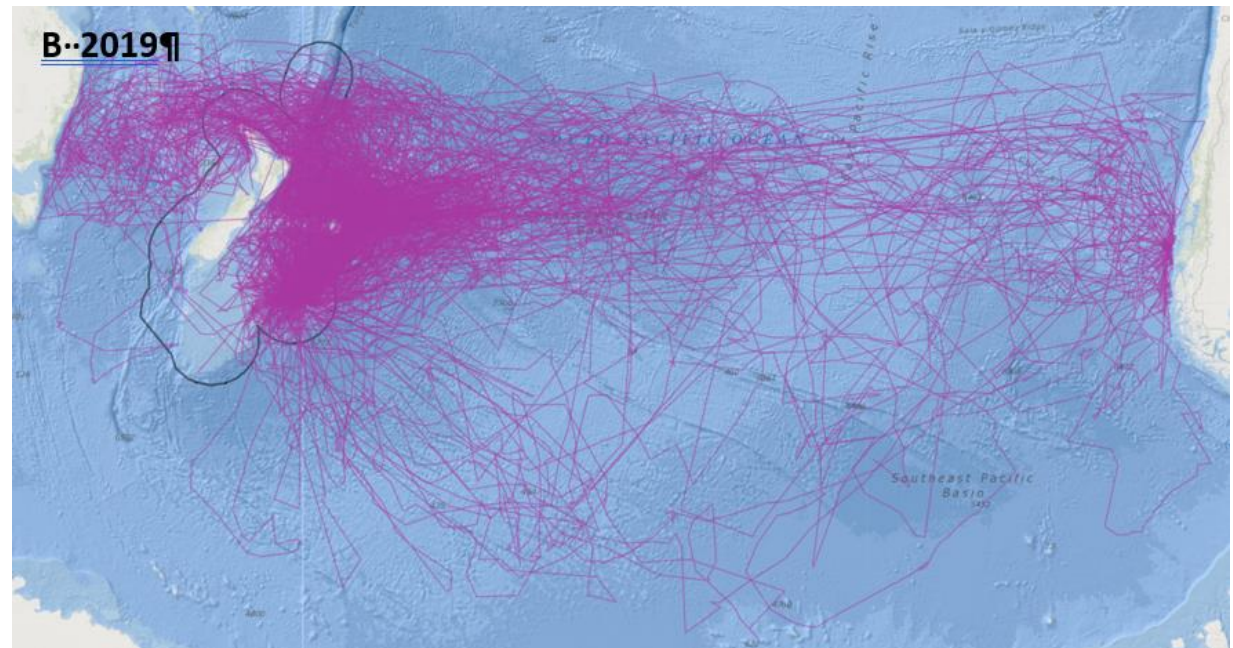
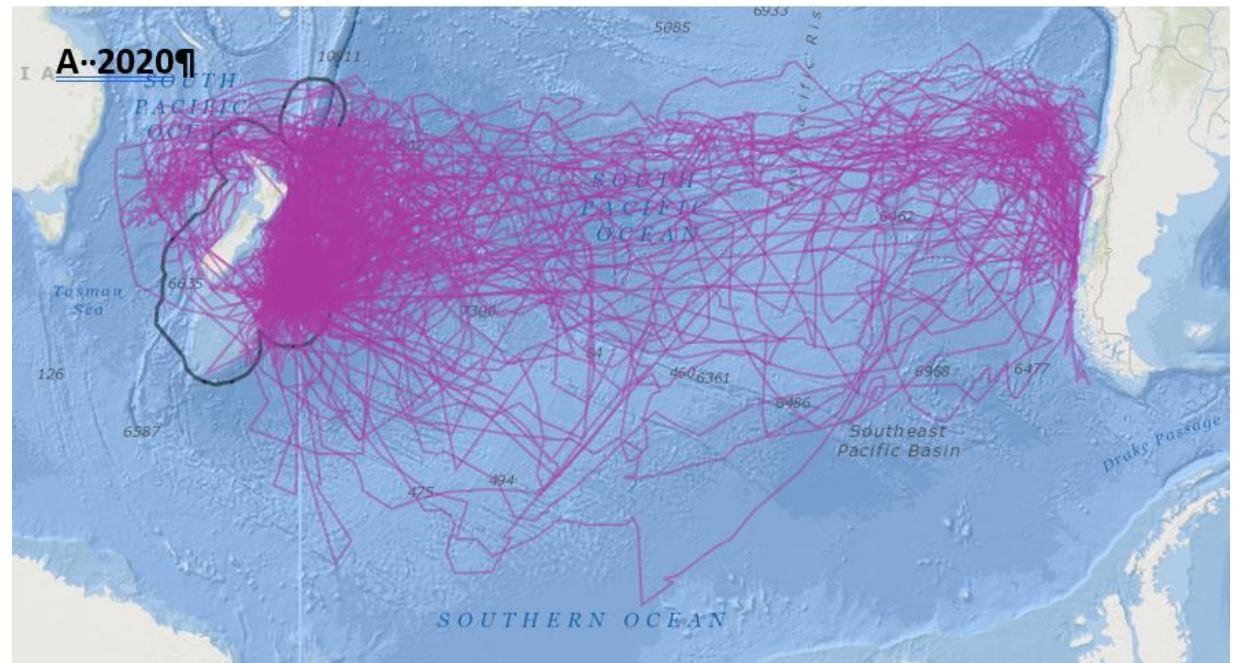
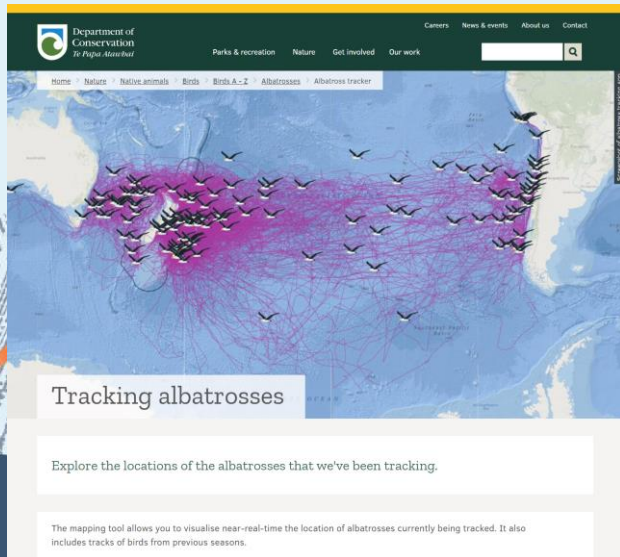
Sample size of working tags for breeding female (Br_F), non-breeding female (NBr_F), male (M) and juvenile (Juv) Antipodean albatross over a) 2020 and b) 2019.



Input data

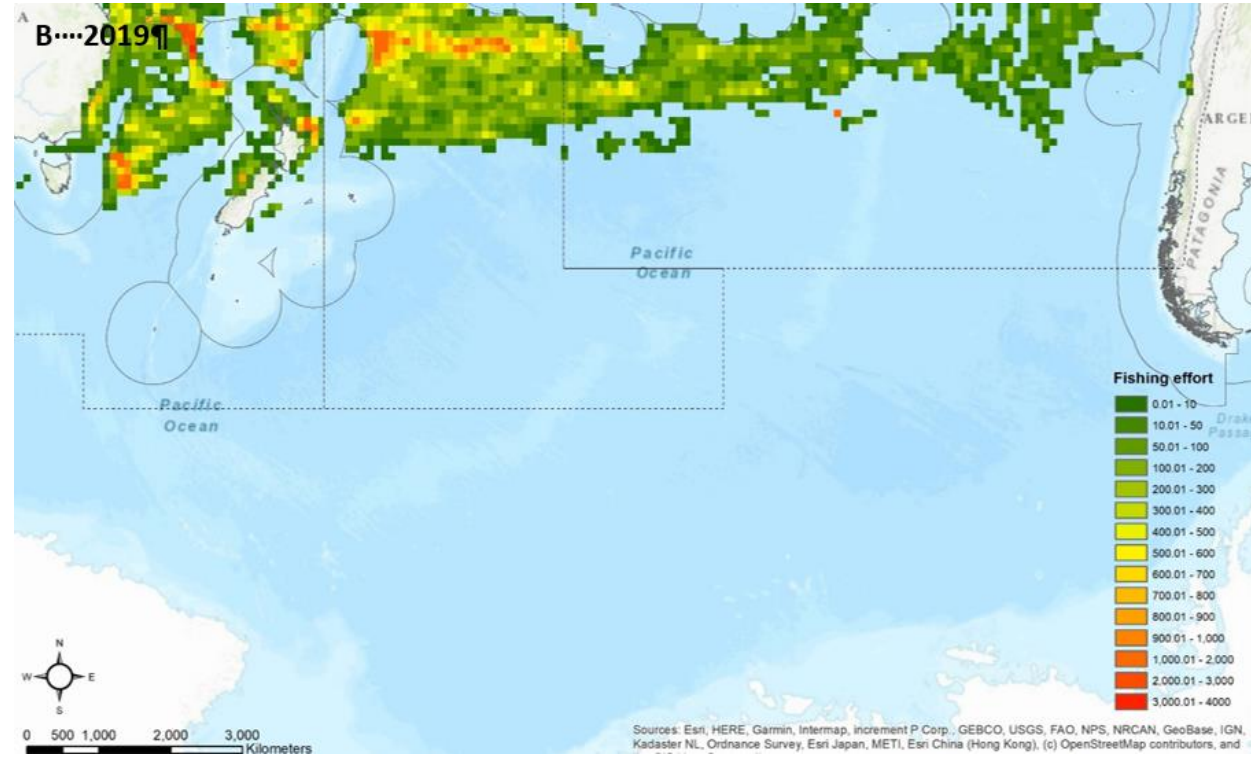
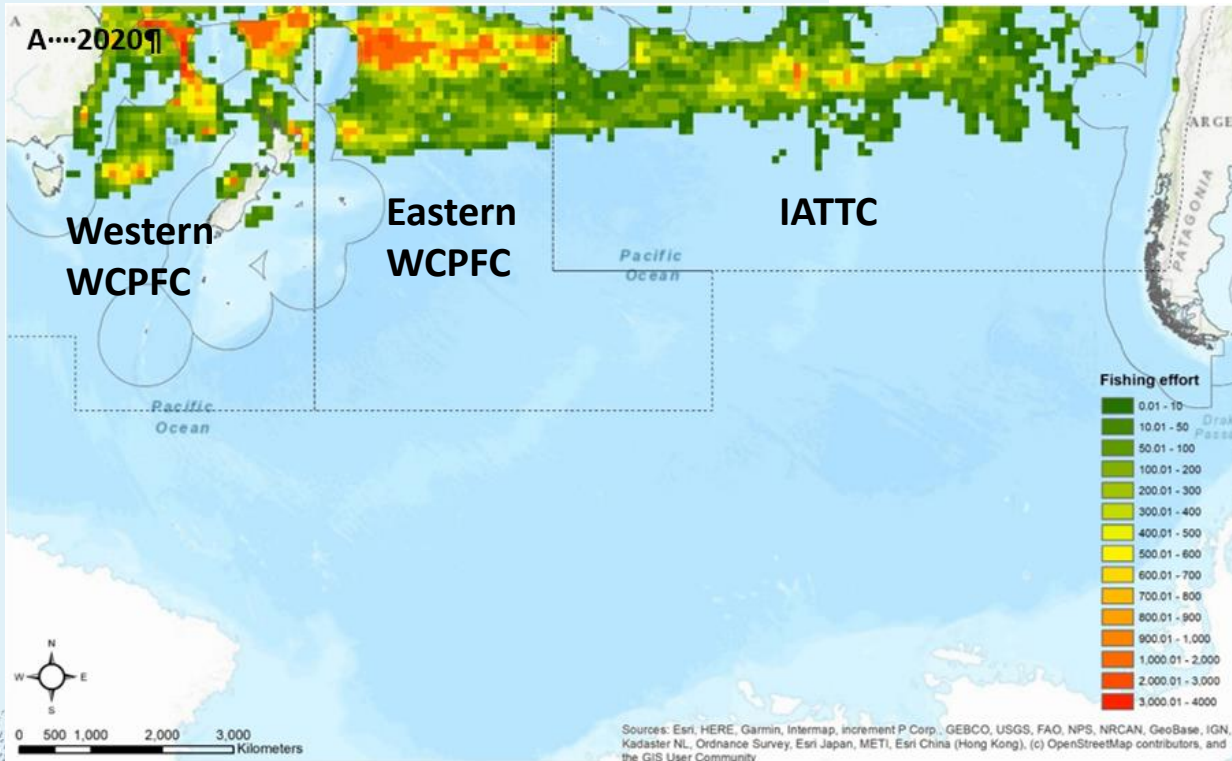
Raw tracks

<https://www.doc.govt.nz/albatrosstracker>



Input data

Fishing effort

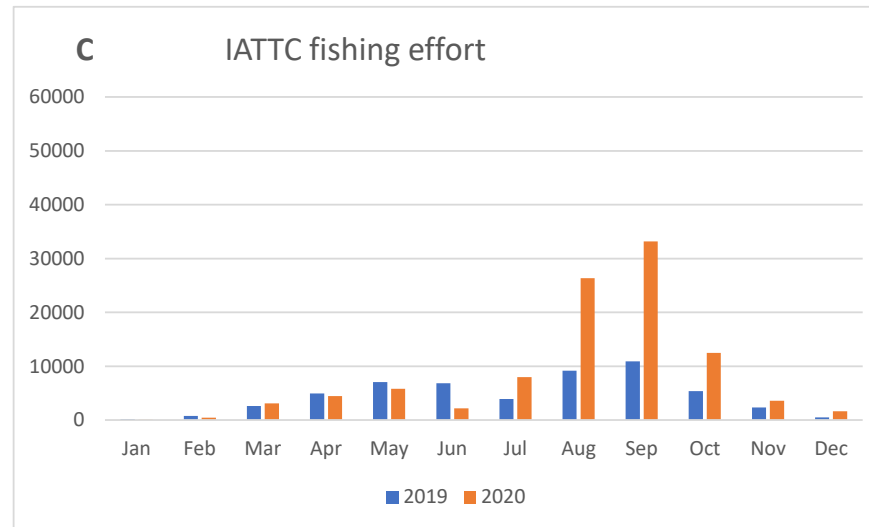
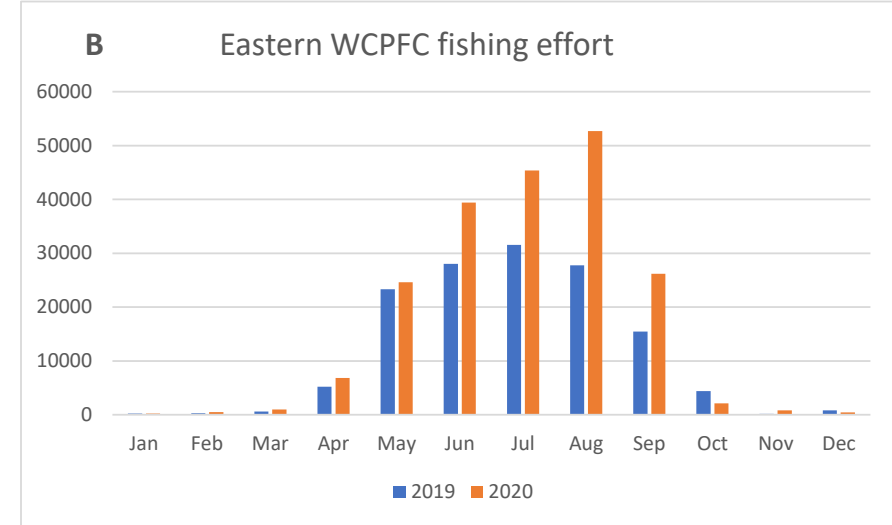
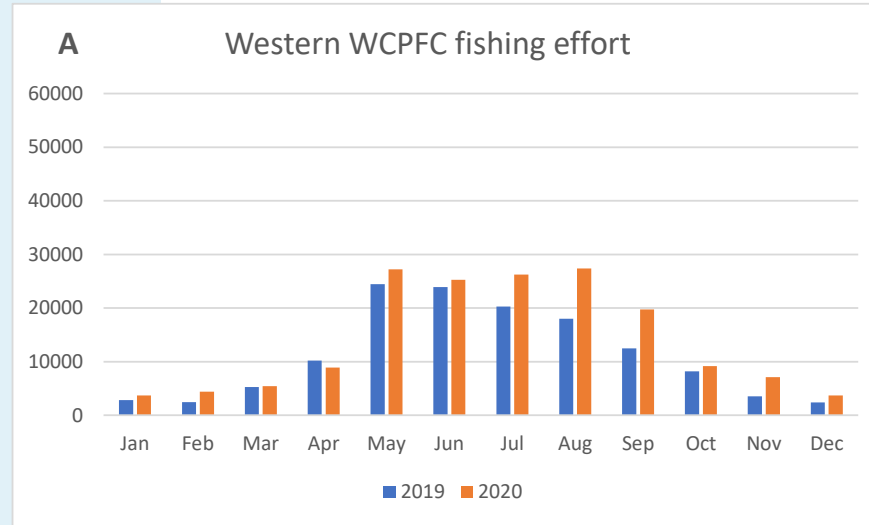


Pelagic longline fishing effort (hours) derived from AIS data. Red is highest effort, dark green is lowest overlap. Dashed lines indicate RFMO boundaries. Data obtained from Global Fishing Watch.

Input data

Fishing effort

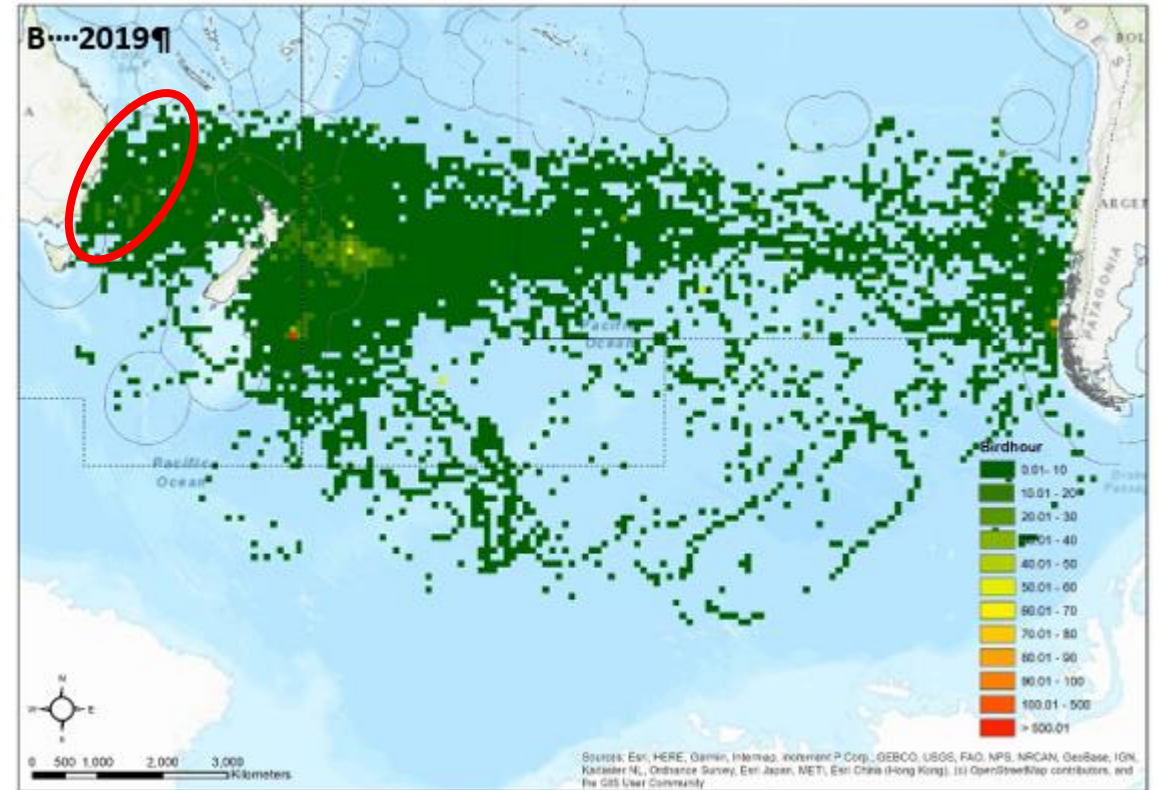
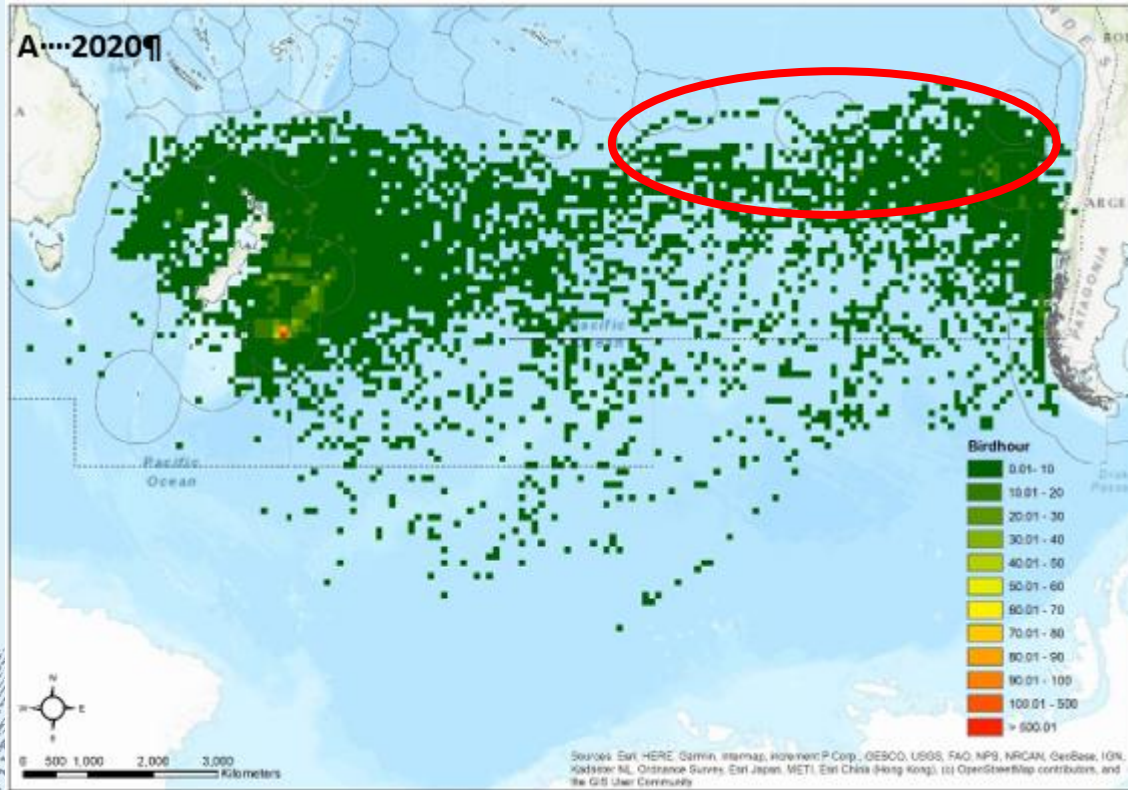
Pelagic longline fishing effort (hours) derived from AIS by month for 2019 (blue) and 2020 (orange) for three high-seas areas; a) Western WCPFC, b) Eastern WCPFC and c) IATTC. Data obtained from Global Fishing Watch.



Bird occurrence

All birds

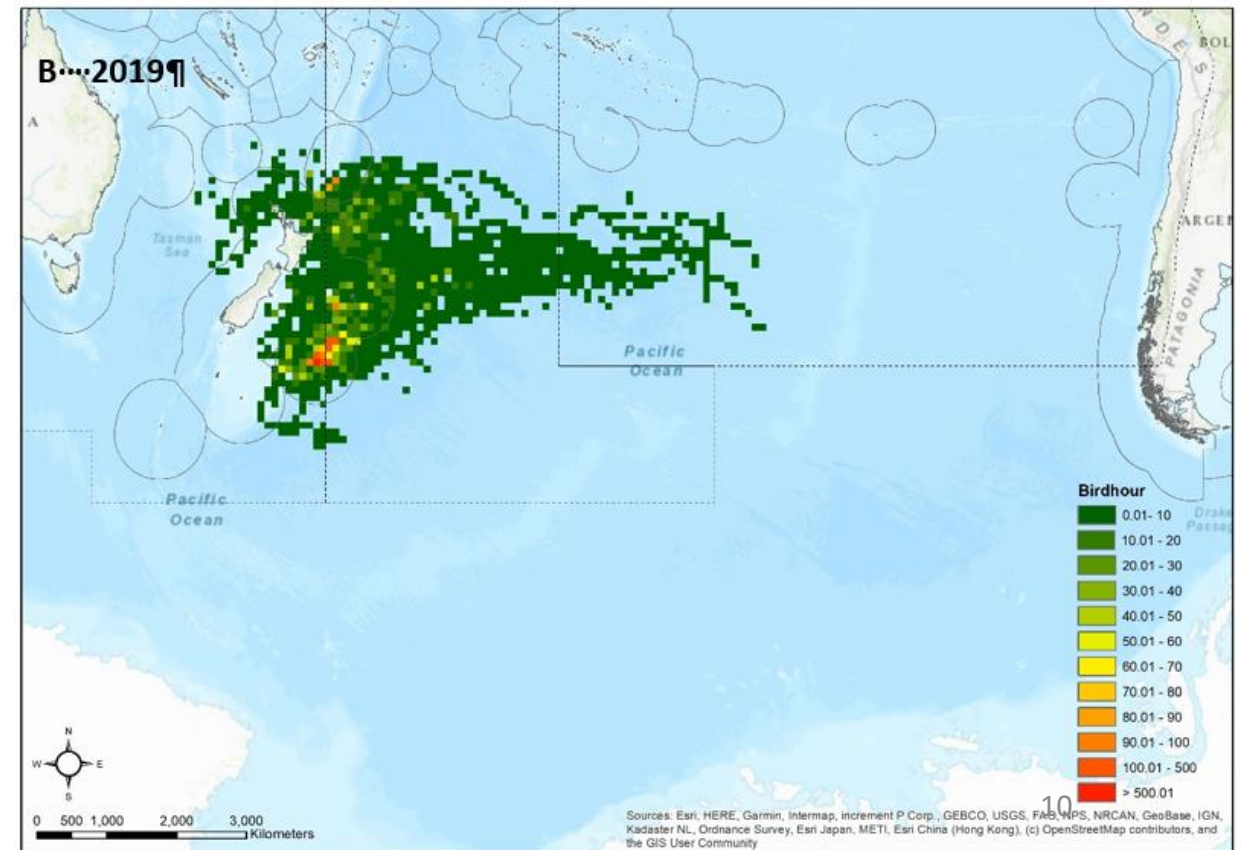
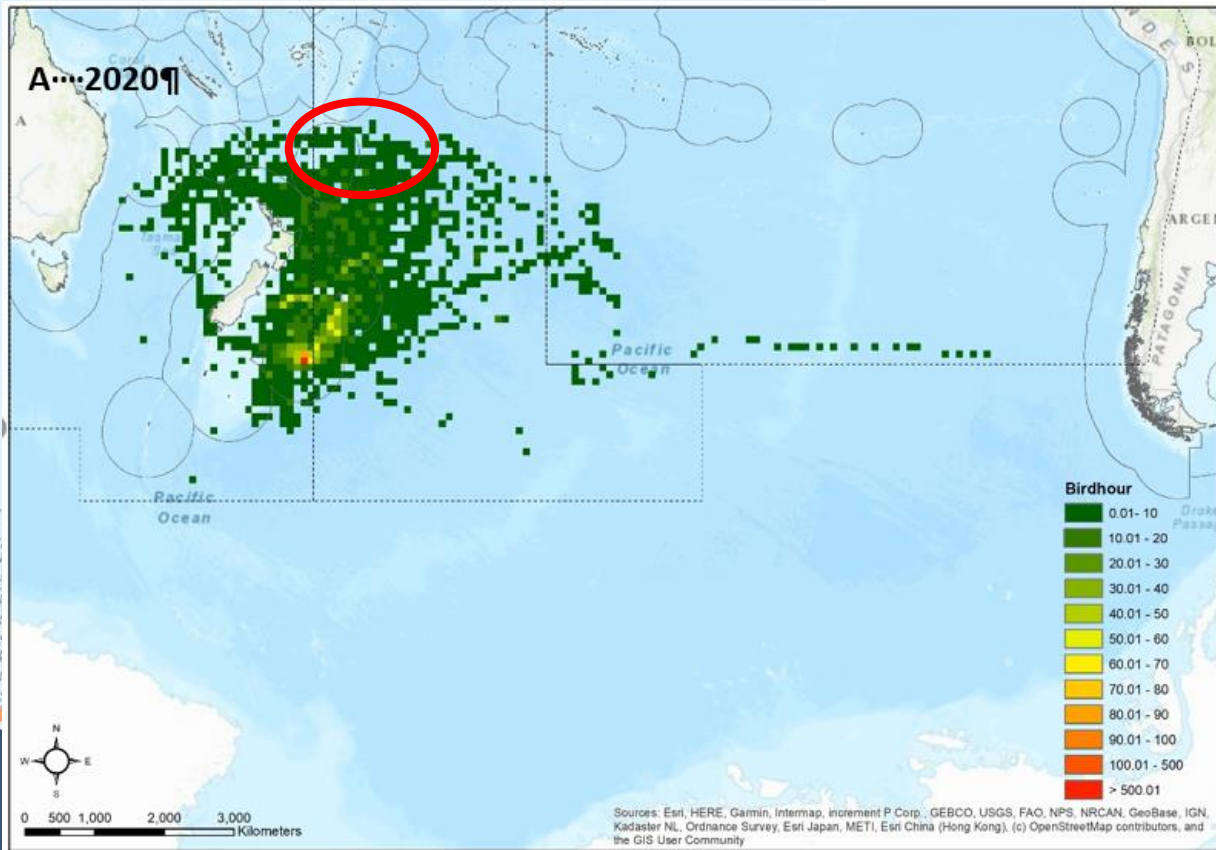
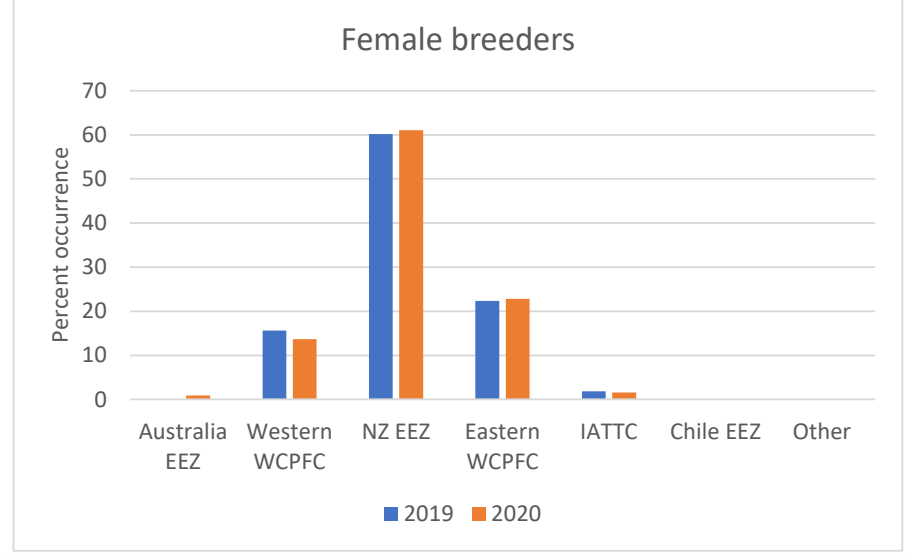
Spatial distribution of all tracked Antipodean albatross in a) 2020 and b) 2019 (average number of bird hours per 100km x 100km grid cell). Red is highest occurrence, dark green lowest. Dashed lines indicate RFMO boundaries.



Bird occurrence

Breeding females

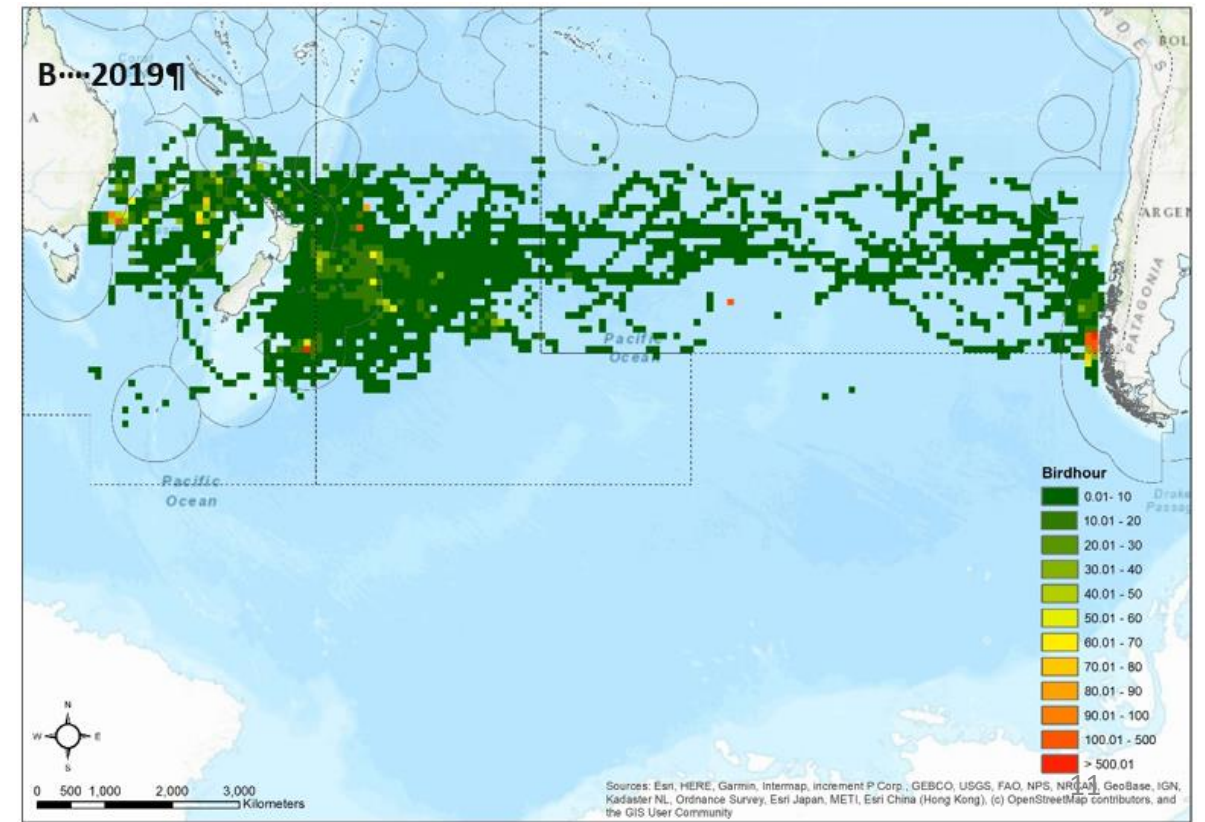
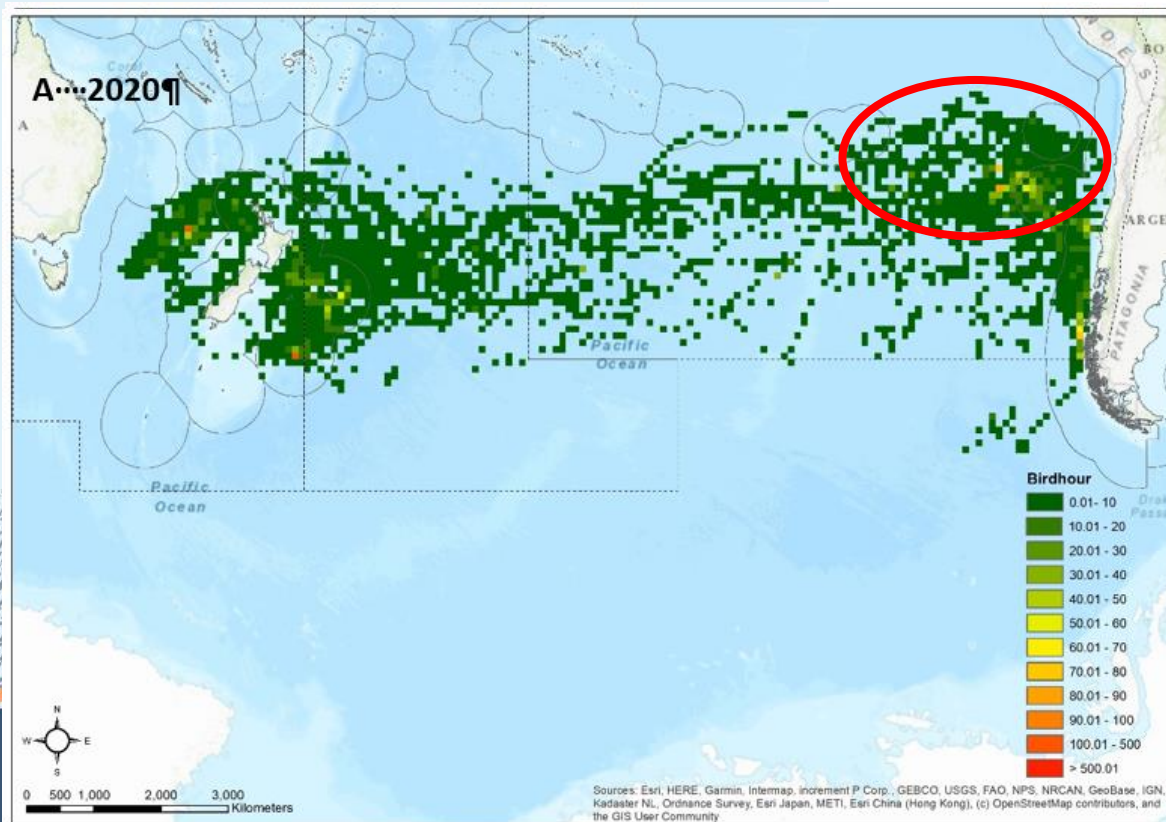
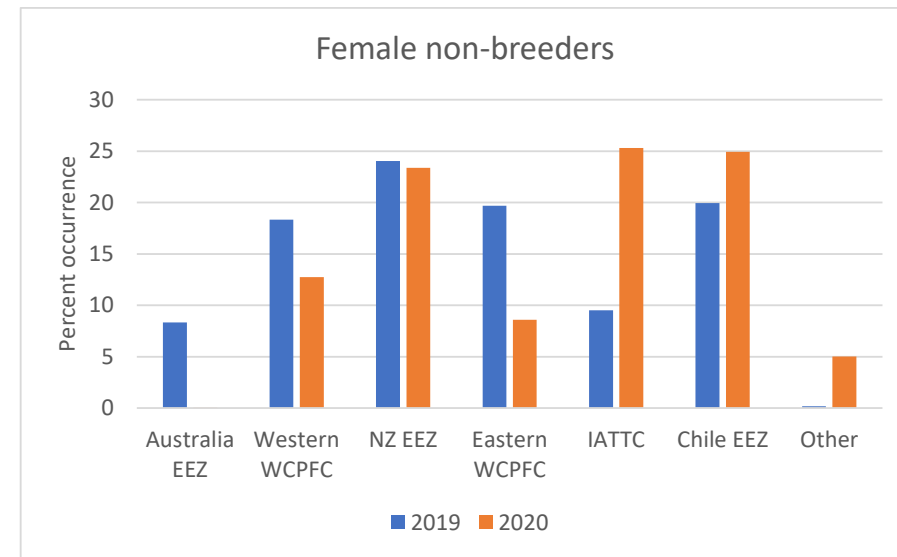
Spatial distribution of tracked female breeding Antipodean albatross in a) 2020 and b) 2019 (average number of bird hours per 100km x 100km grid cell). Red is highest occurrence, dark green lowest. Dashed lines indicate RFMO boundaries.



Bird occurrence

Non-breeding females

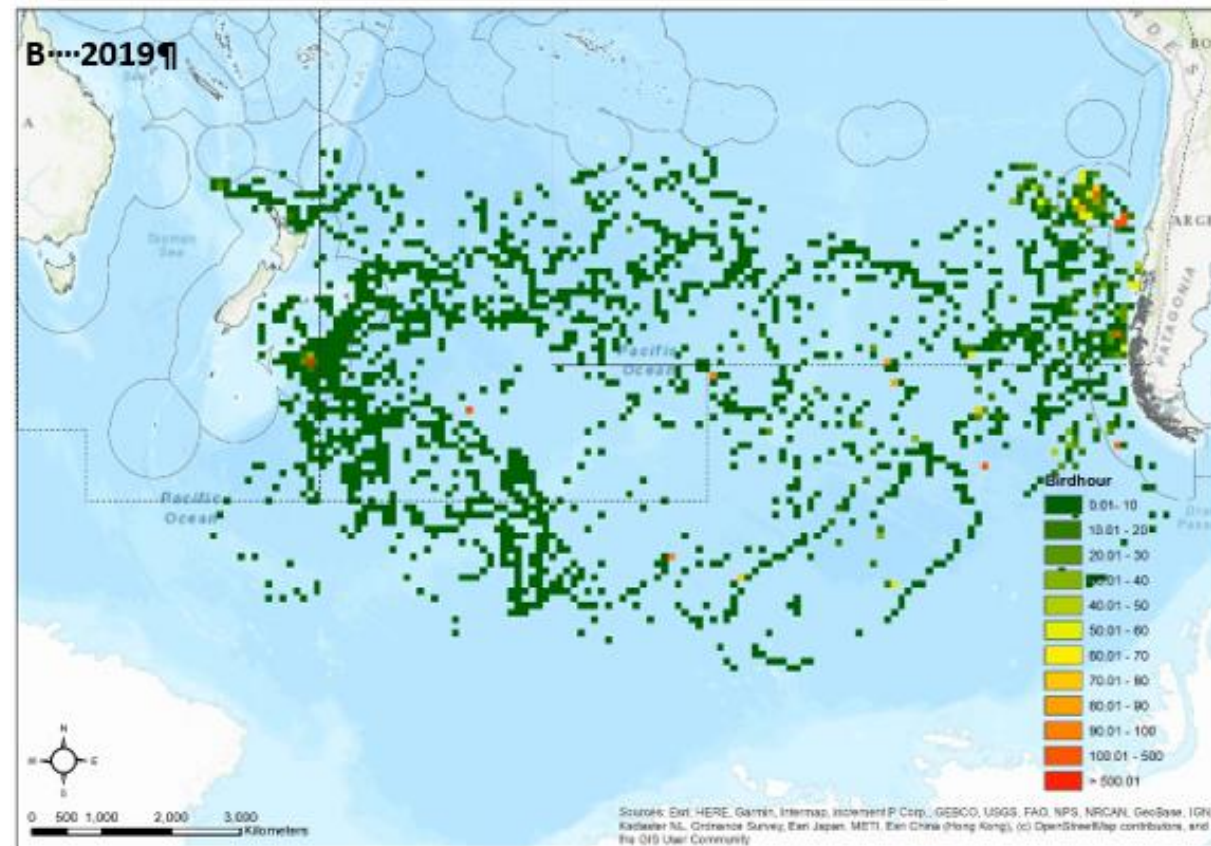
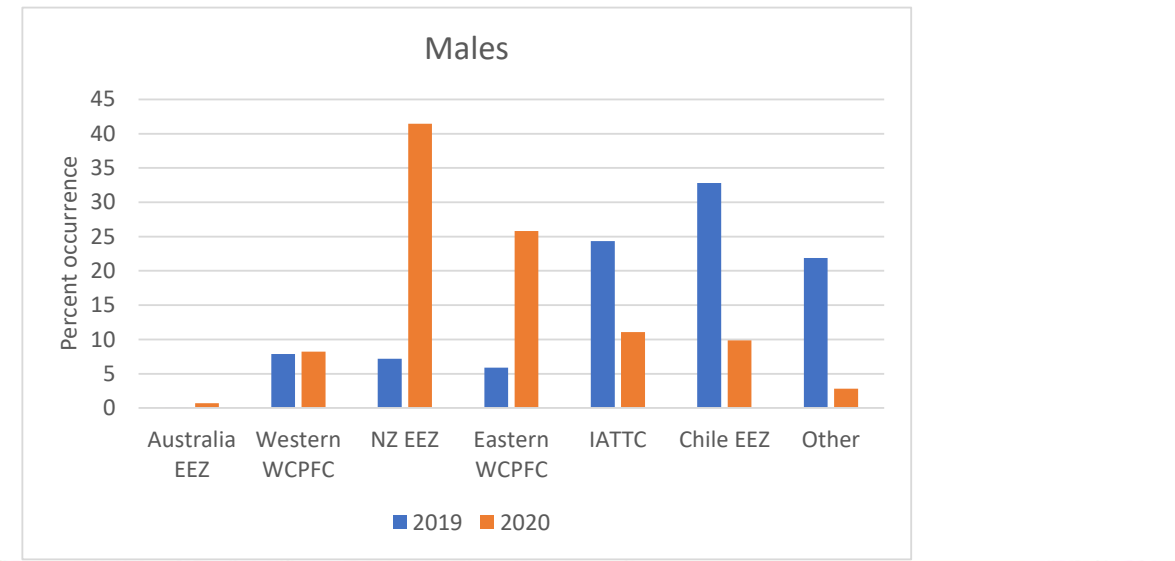
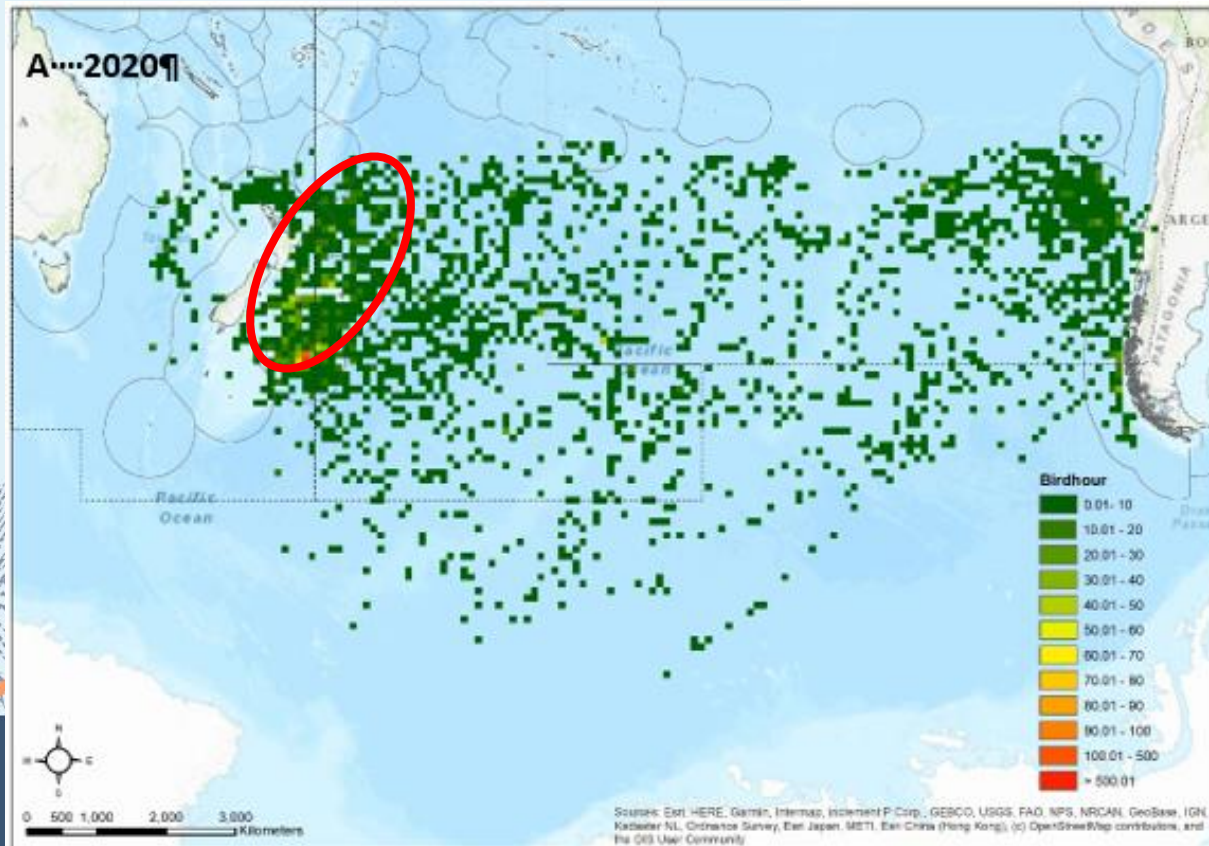
Spatial distribution of tracked female non-breeding Antipodean albatross in a) 2020 and b) 2019 (average number of bird hours per 100km x 100km grid cell). Red is highest occurrence, dark green lowest. Dashed lines indicate RFMO boundaries.



Bird occurrence

Males

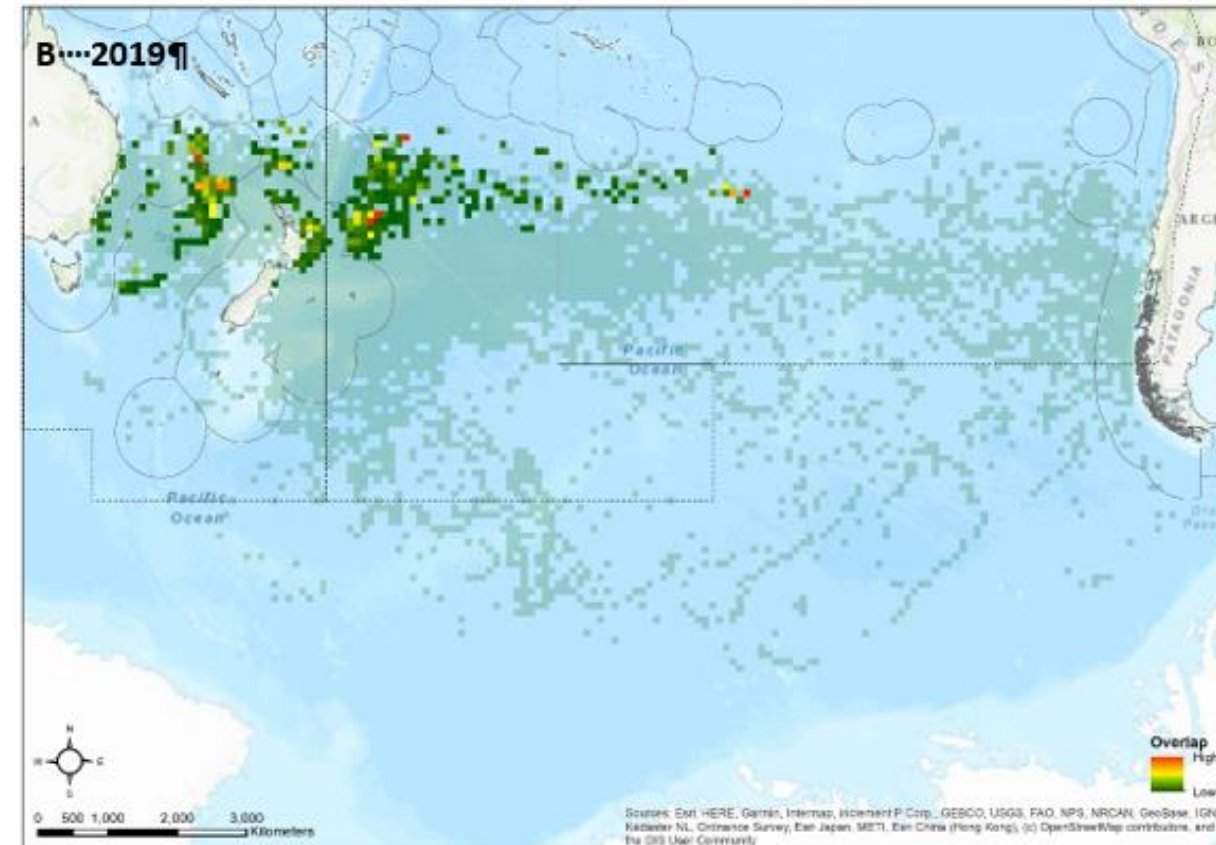
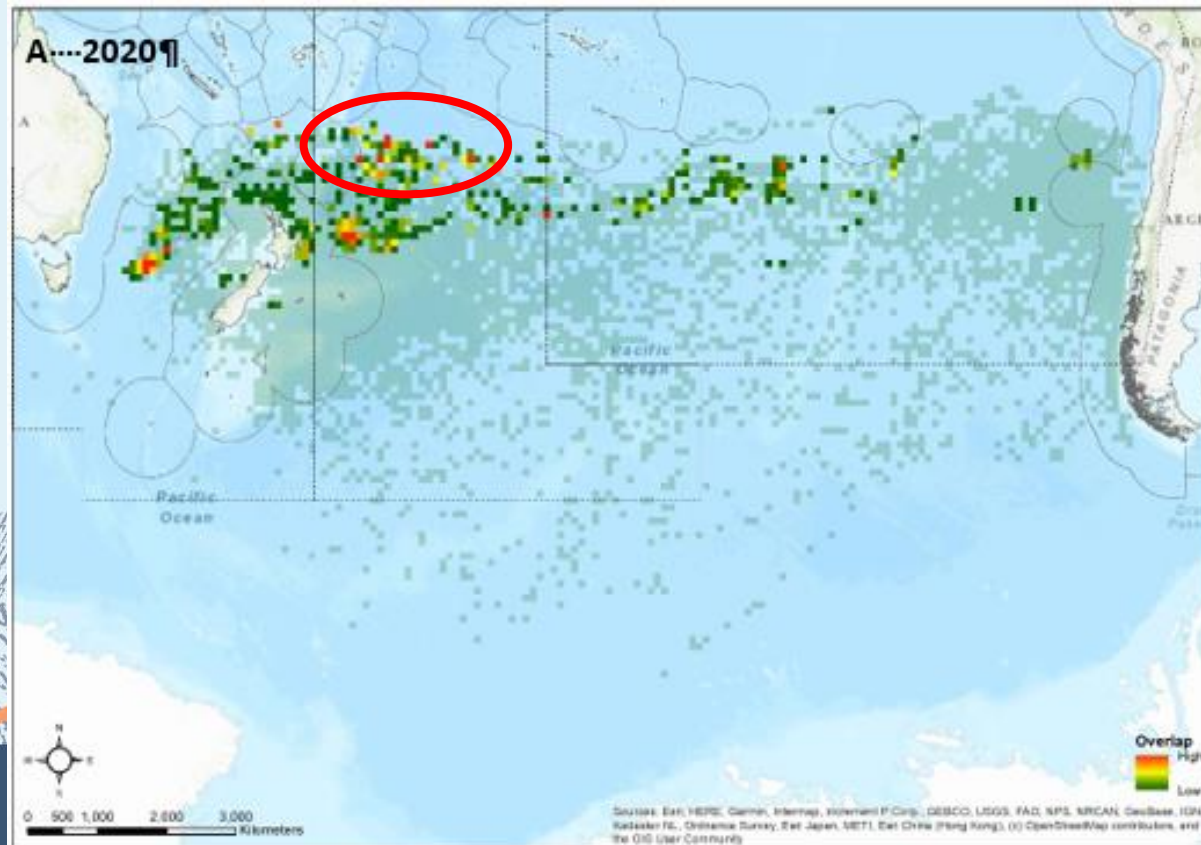
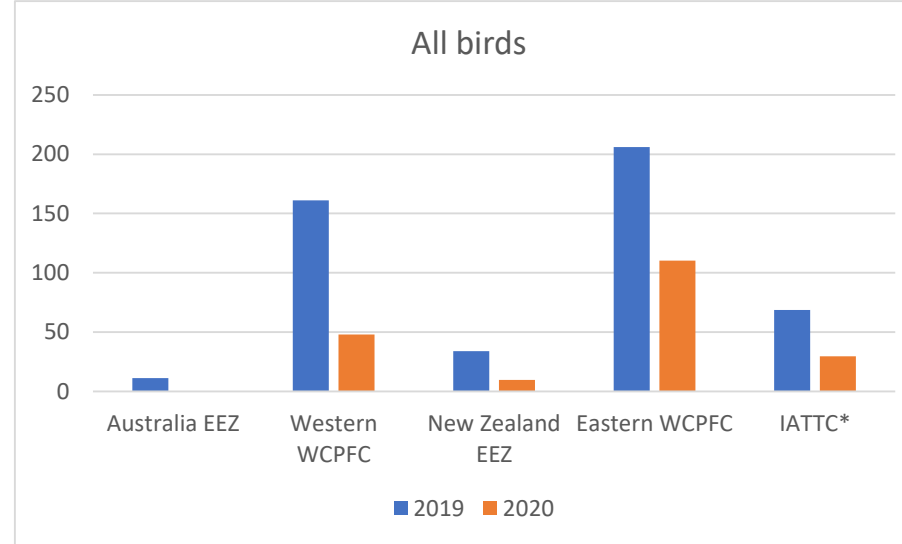
Spatial distribution of tracked male Antipodean albatross in a) 2020 and b) 2019 (average number of bird hours per 100km x 100km grid cell). Red is highest occurrence, dark green lowest. Dashed lines indicate RFMO boundaries.



Overlap

Maps – all birds

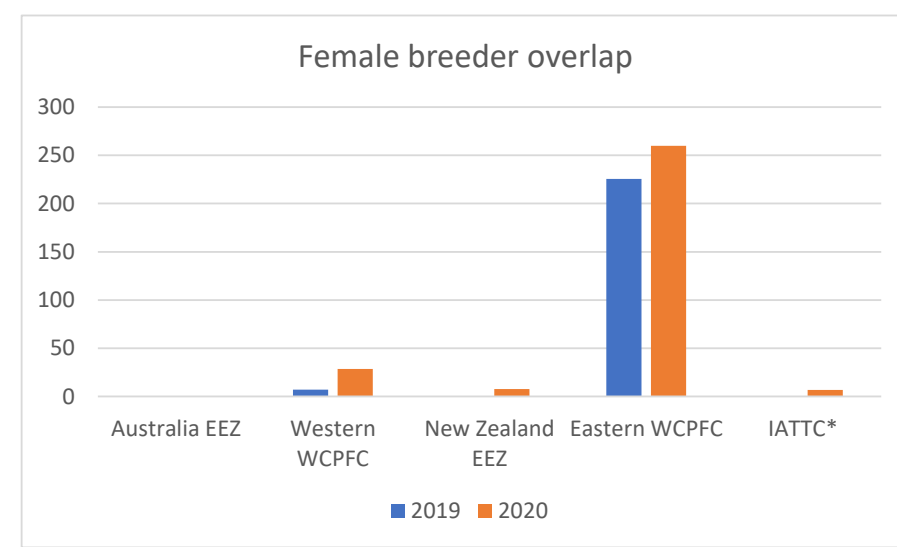
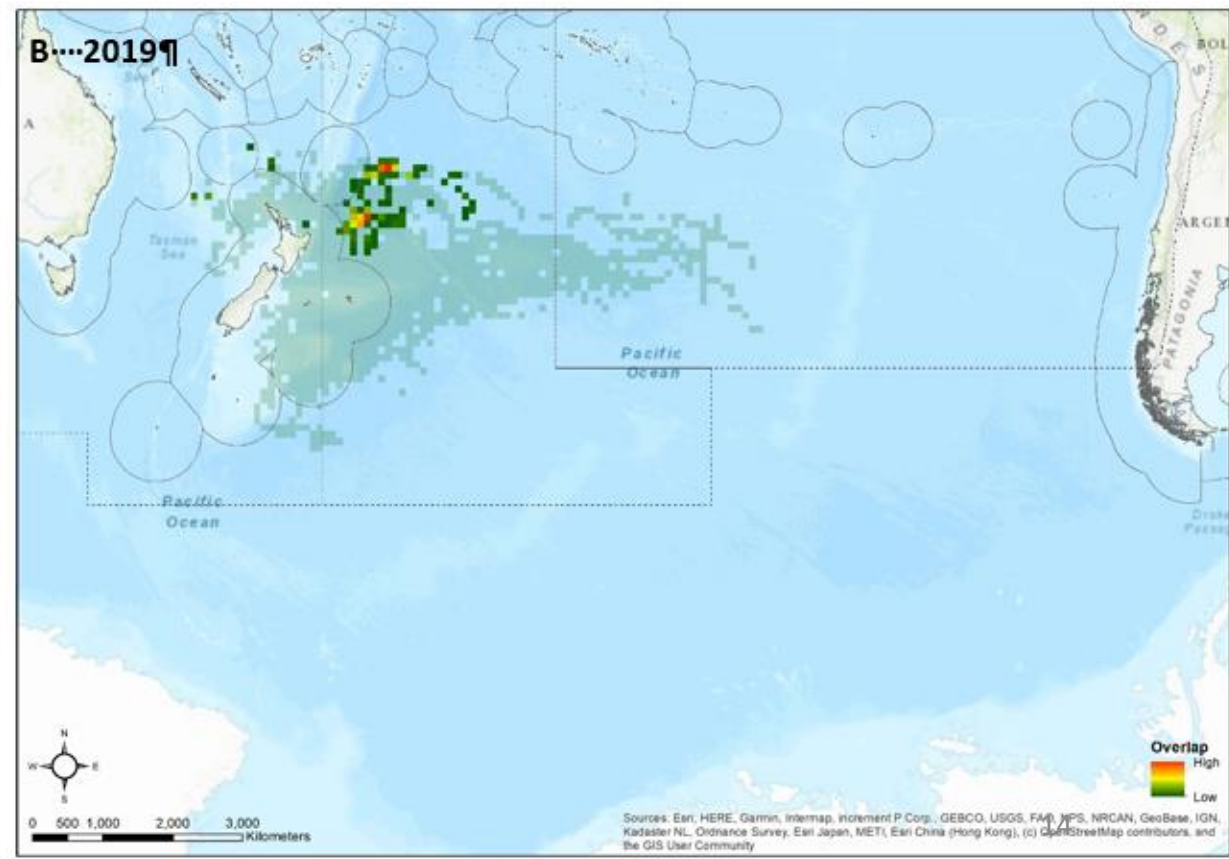
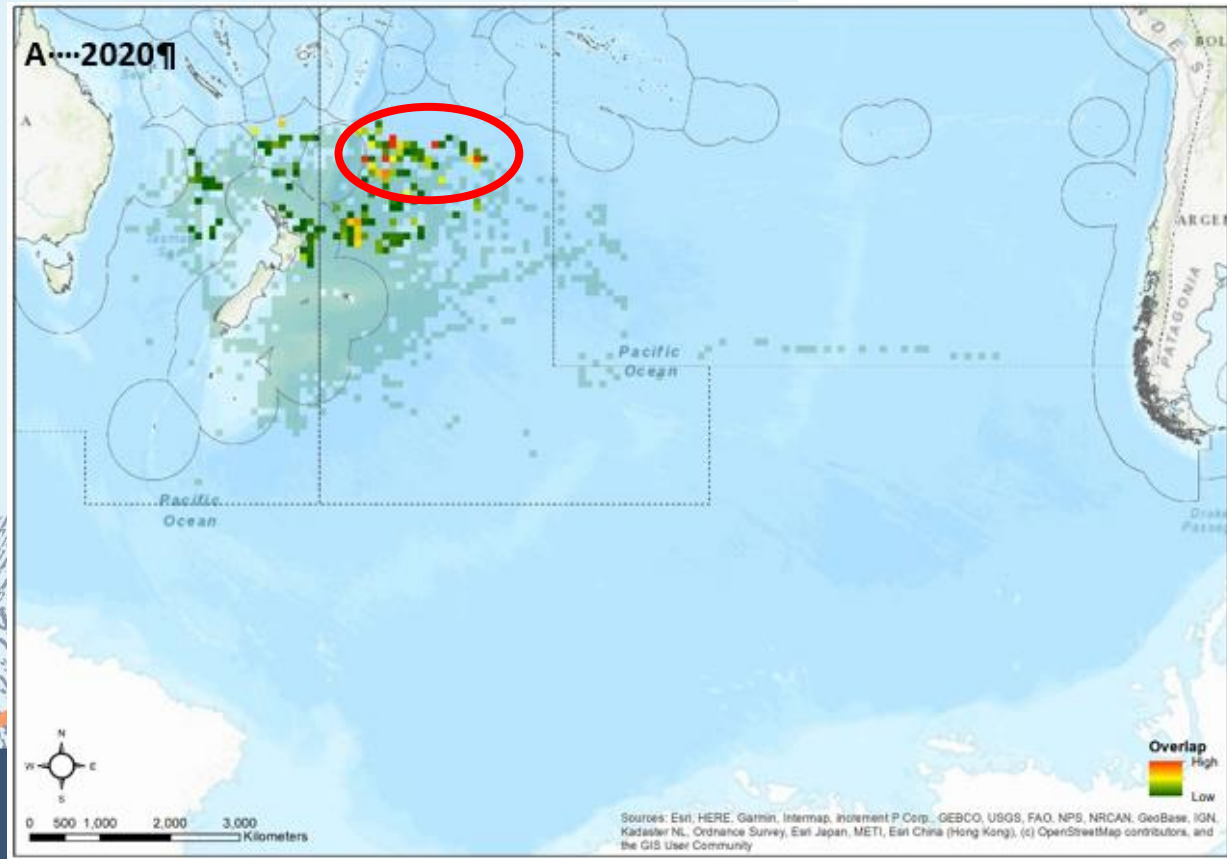
Year-round cumulative daily overlap of all tracked Antipodean albatross with pelagic longline fishing effort in a) 2020 and b) 2019 at 100 km by 100 km grid scale. Red is highest overlap, dark green is lowest overlap, and translucent green cells represent bird occurrence with no overlap.



Overlap

Maps – female breeders

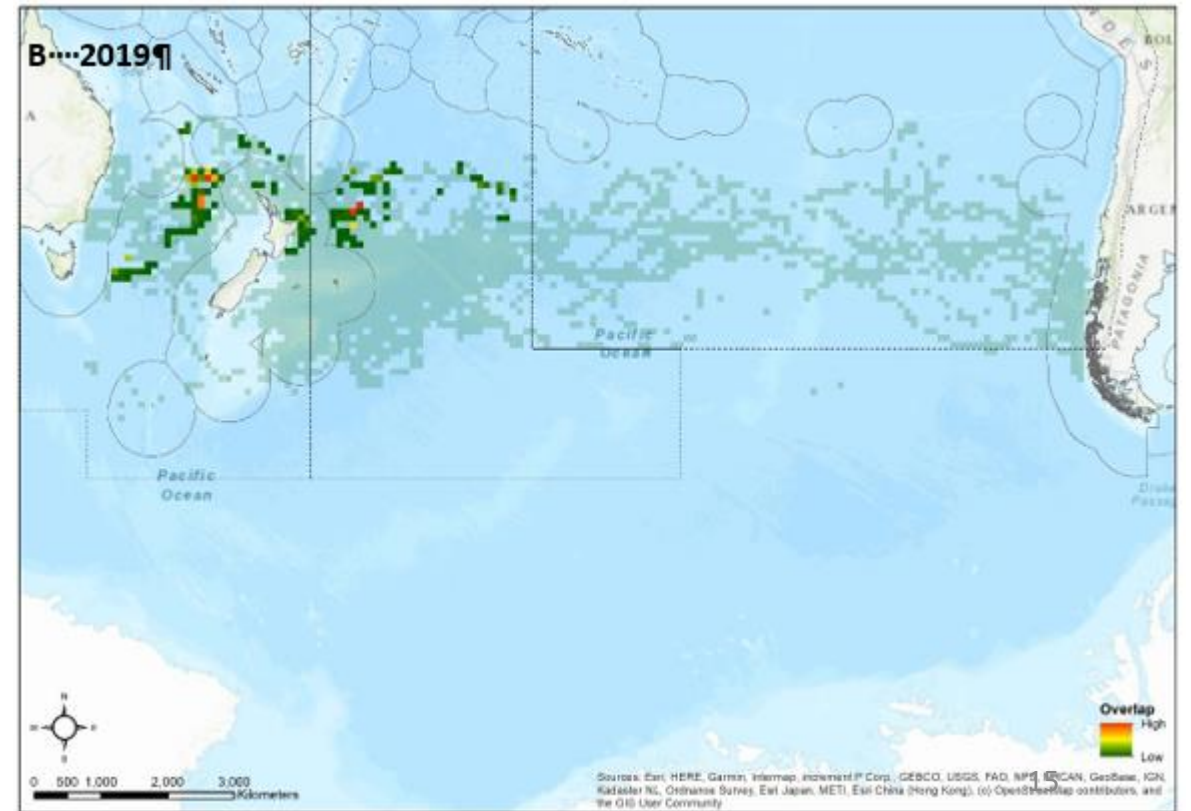
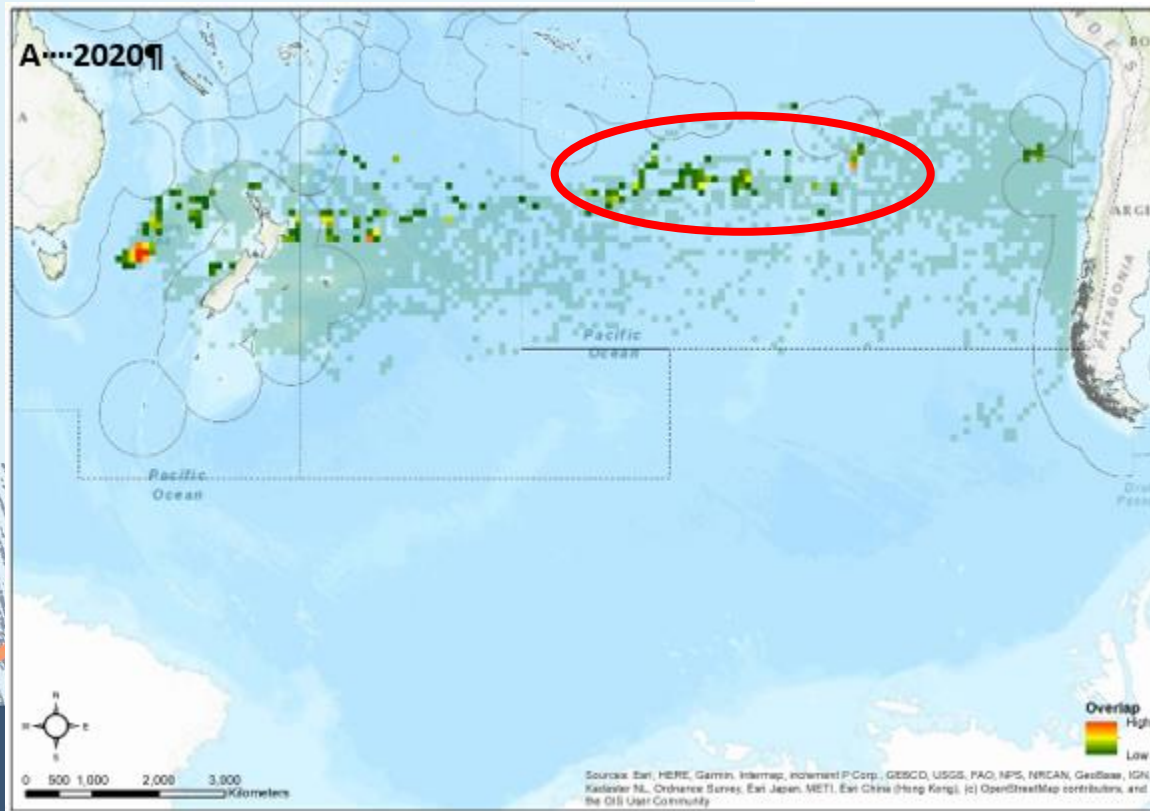
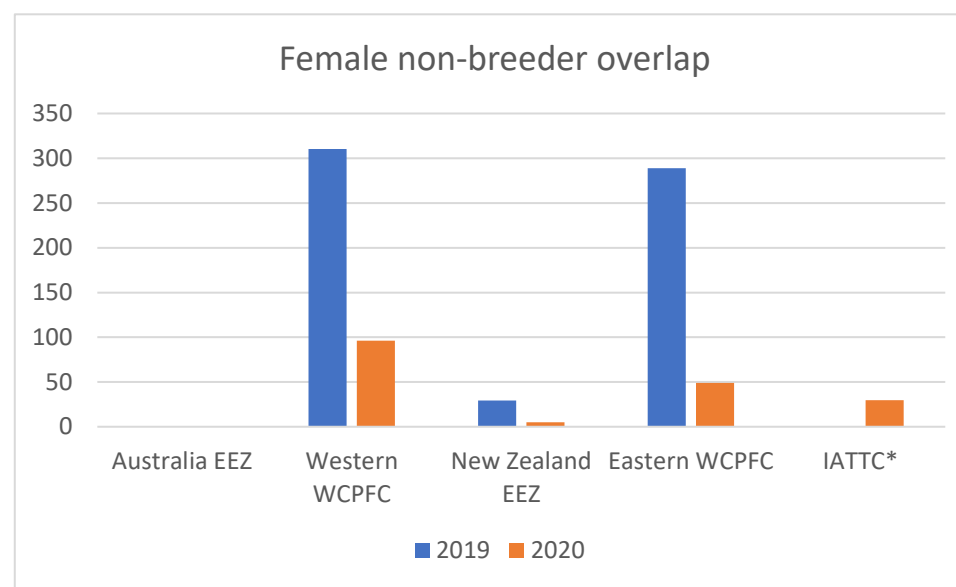
Year-round cumulative daily overlap of tracked female breeding Antipodean albatross with pelagic longline fishing effort in a) 2020 and b) 2019 at 100 km by 100 km grid scale. Red is highest overlap, dark green is lowest overlap, and translucent green cells represent bird occurrence with no overlap.



Overlap

Maps – females non-breeders

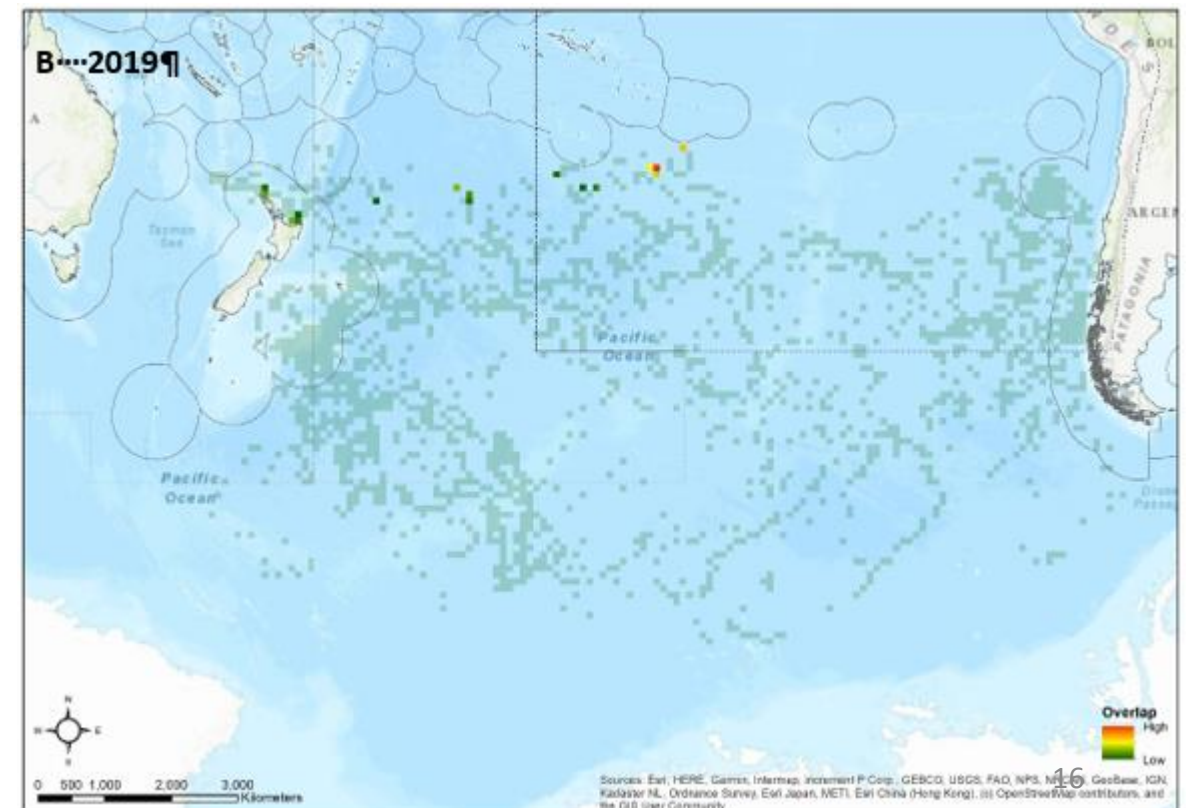
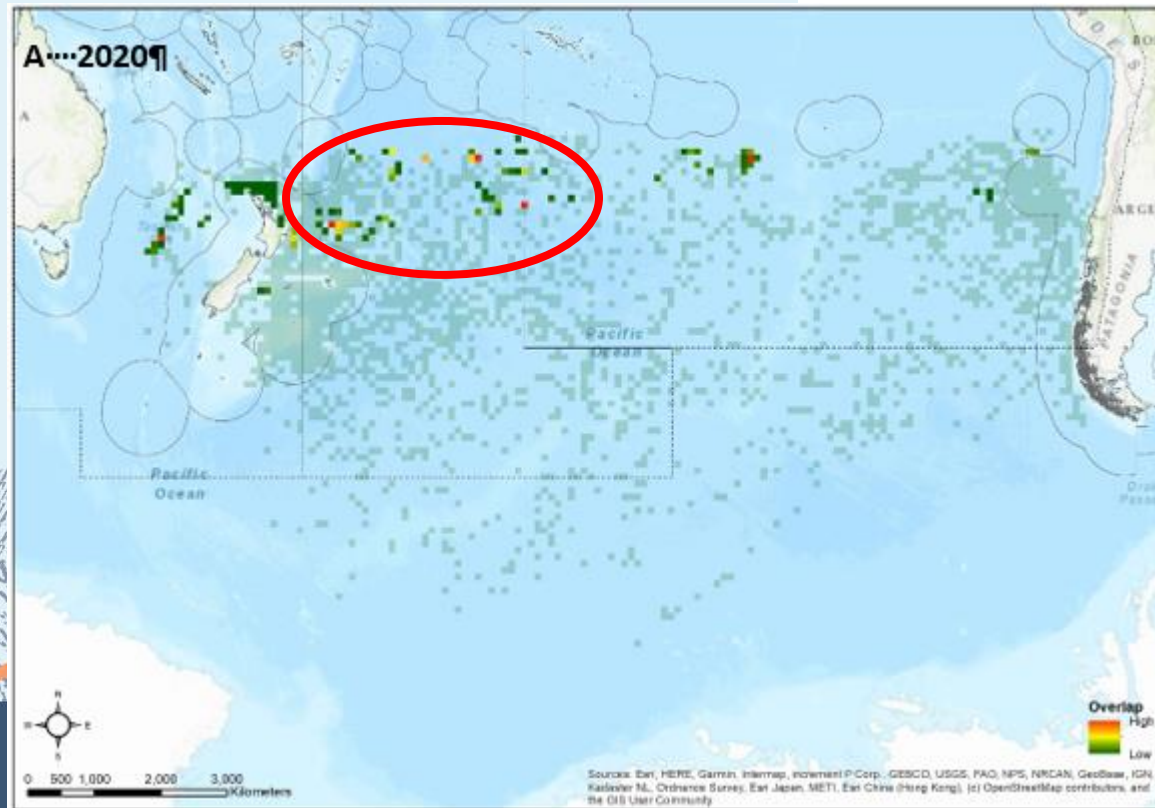
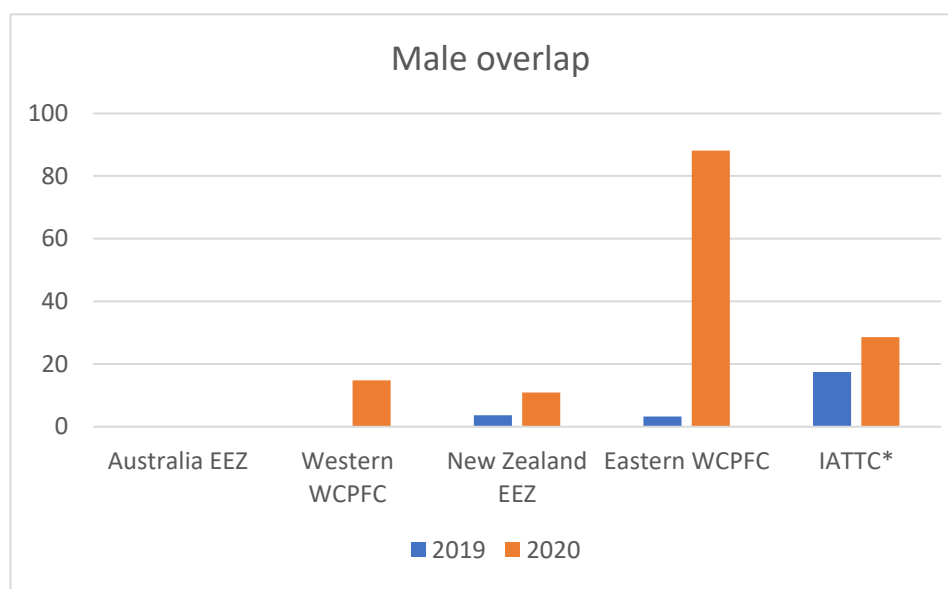
Year-round cumulative daily overlap of tracked female non-breeding Antipodean albatross with pelagic longline fishing effort in a) 2020 and b) 2019 at 100 km by 100 km grid scale. Red is highest overlap, dark green is lowest overlap, and translucent green cells represent bird occurrence with no overlap.



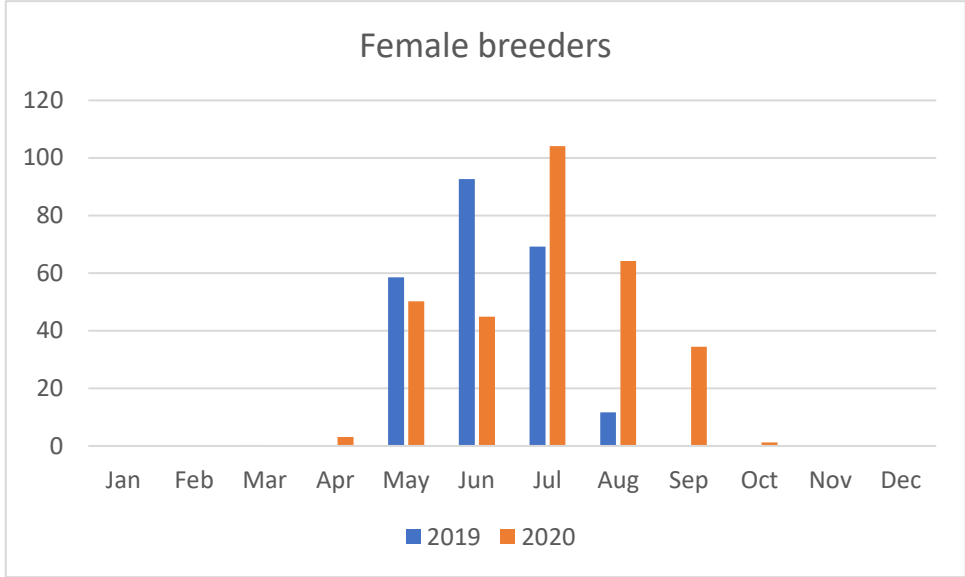
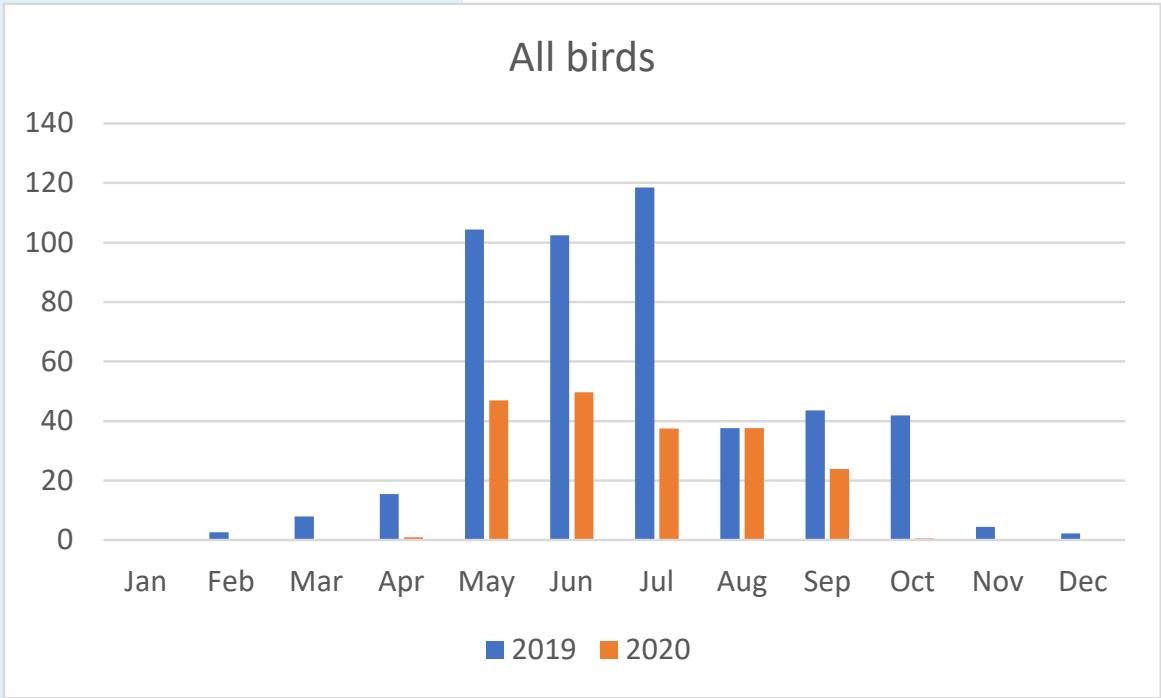
Overlap

Maps – males

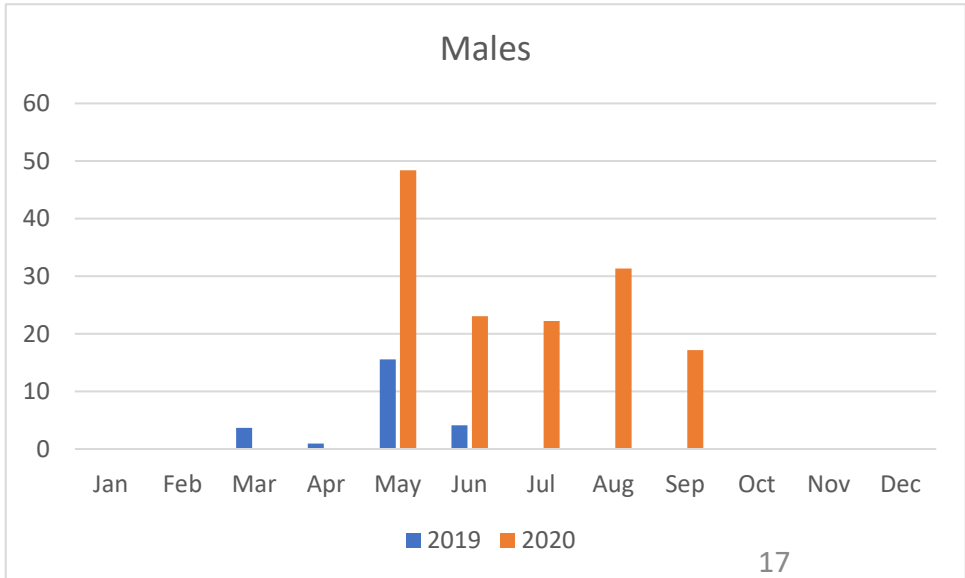
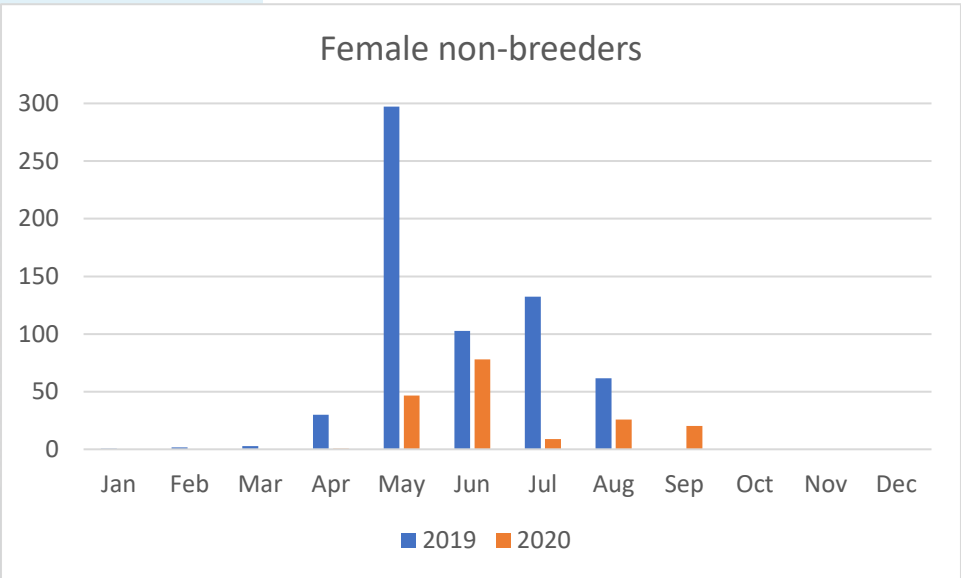
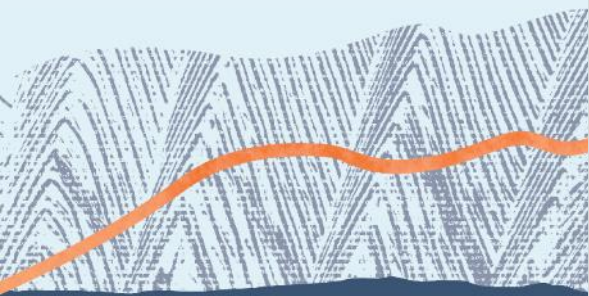
Year-round cumulative daily overlap of tracked male Antipodean albatross with pelagic longline fishing effort in a) 2020 and b) 2019 at 100 km by 100 km grid scale. Red is highest overlap, dark green is lowest overlap, and translucent green cells represent bird occurrence with no overlap.



Overlap By month

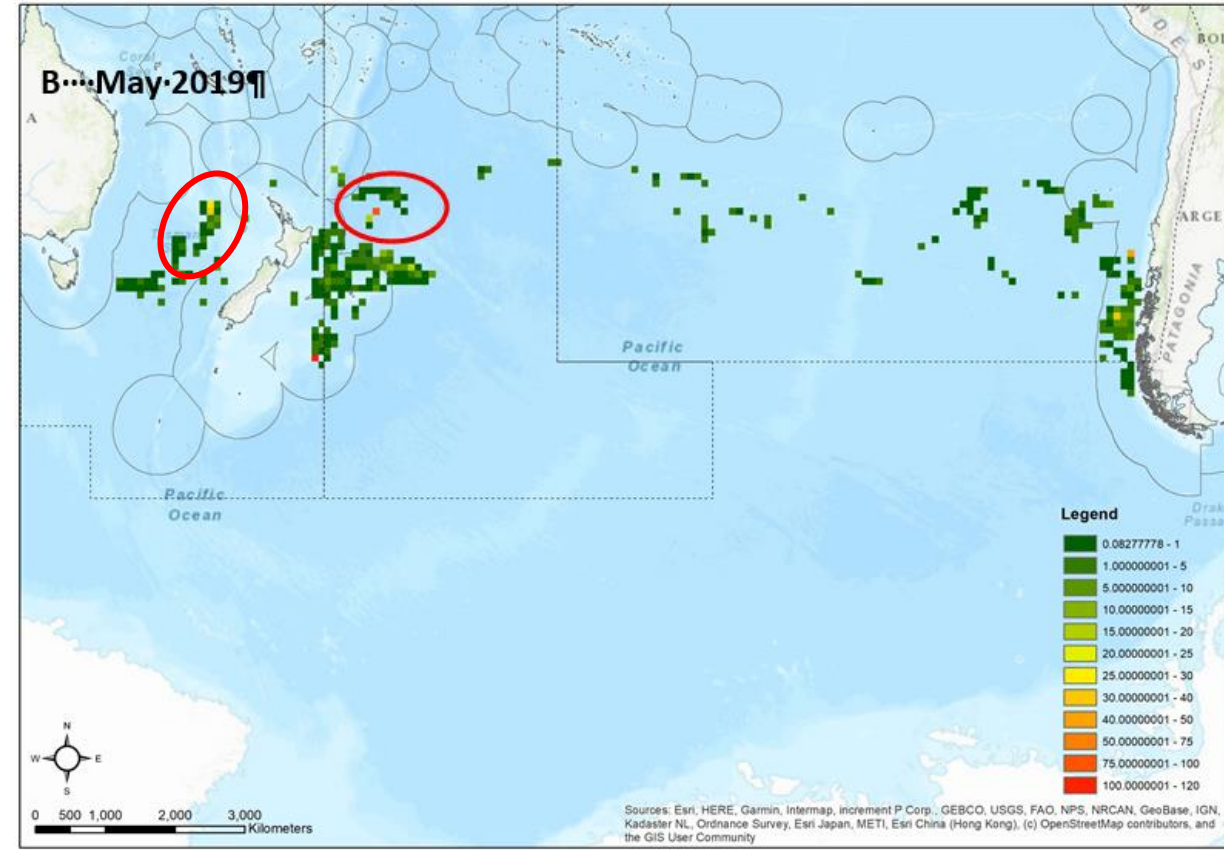
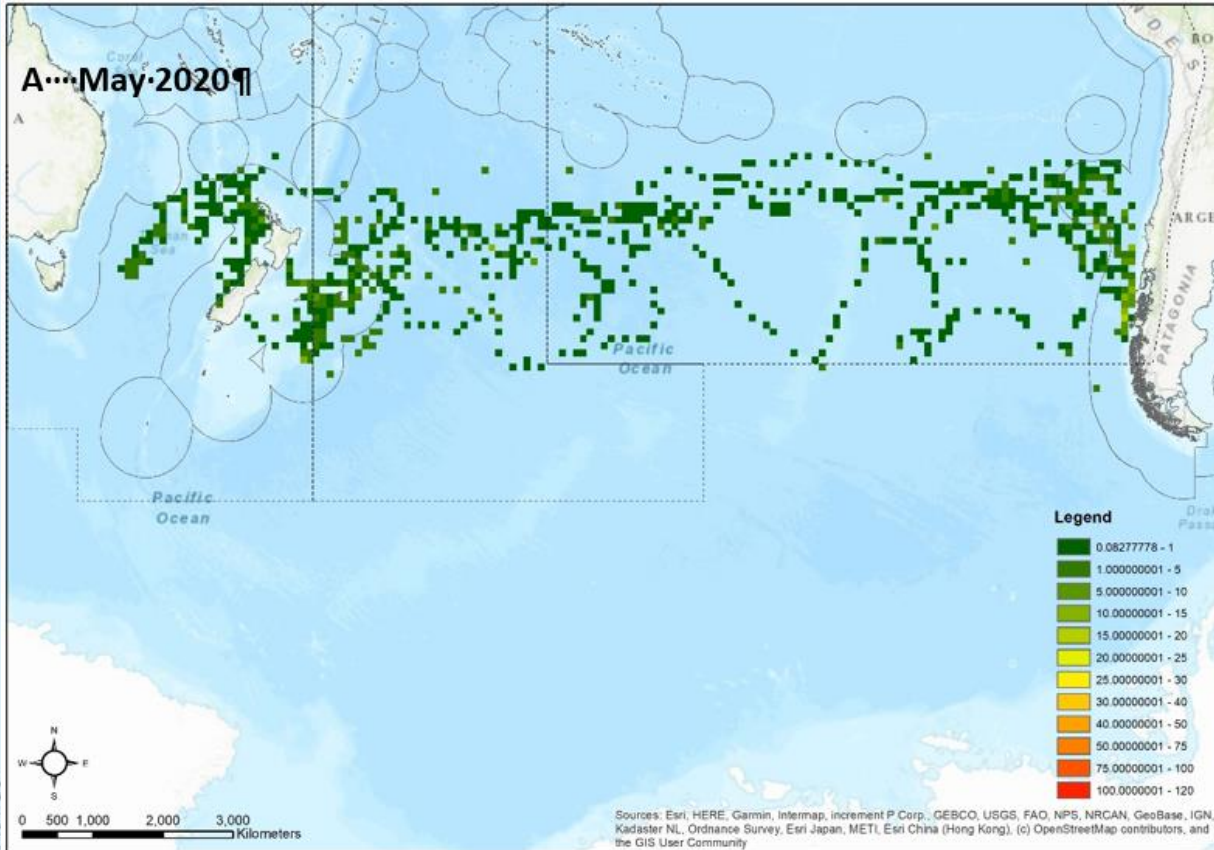


Monthly cumulative daily overlap of tracked Antipodean albatross with pelagic longline fishing effort.



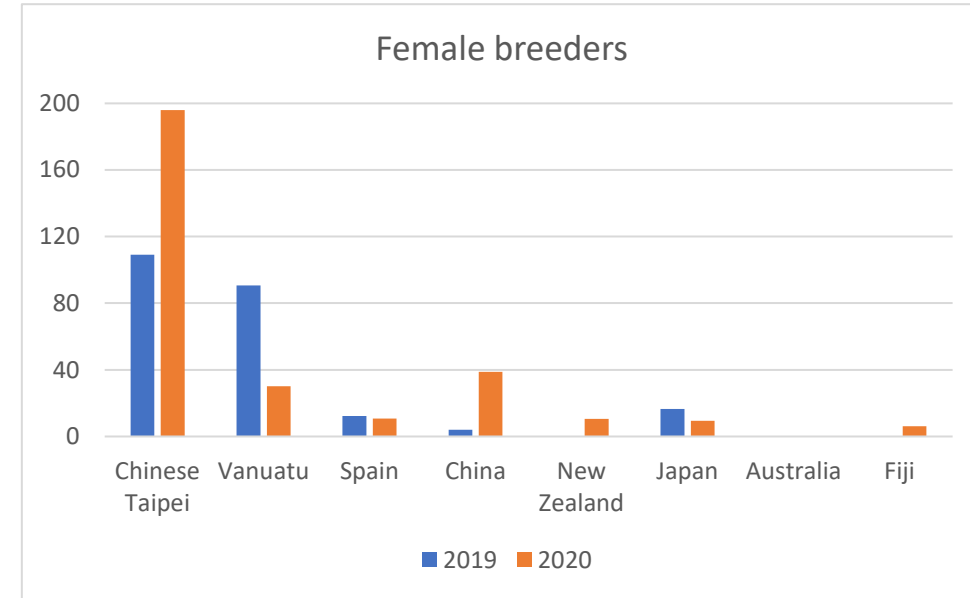
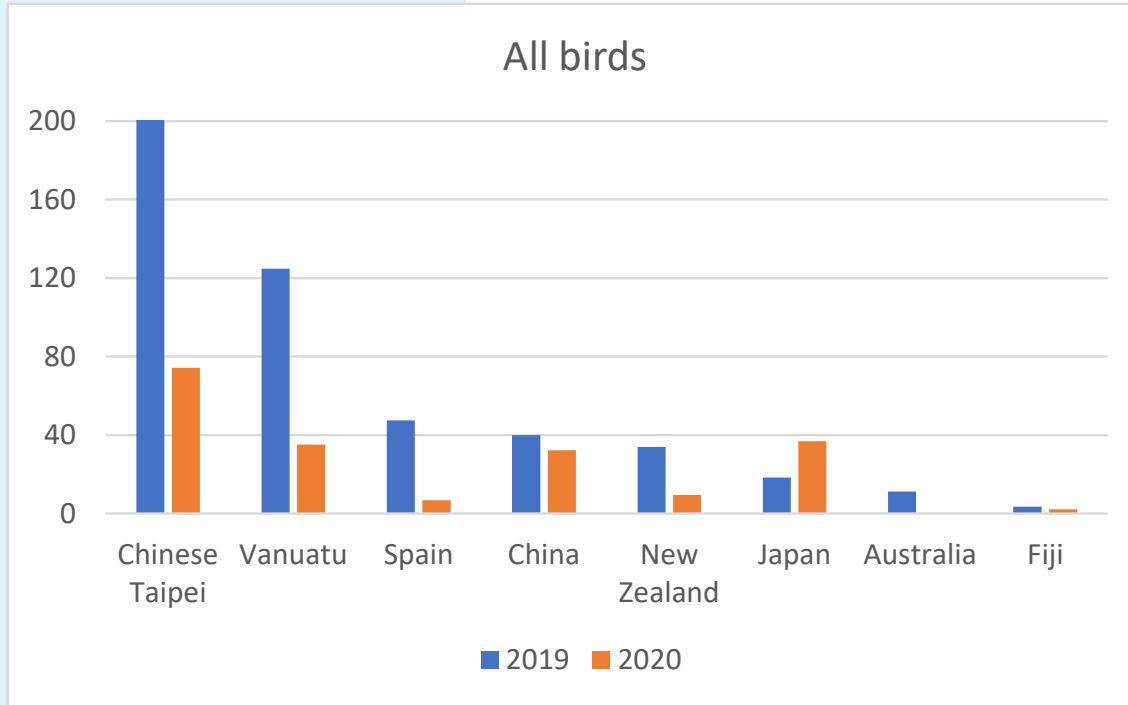
Females non-breeder

May

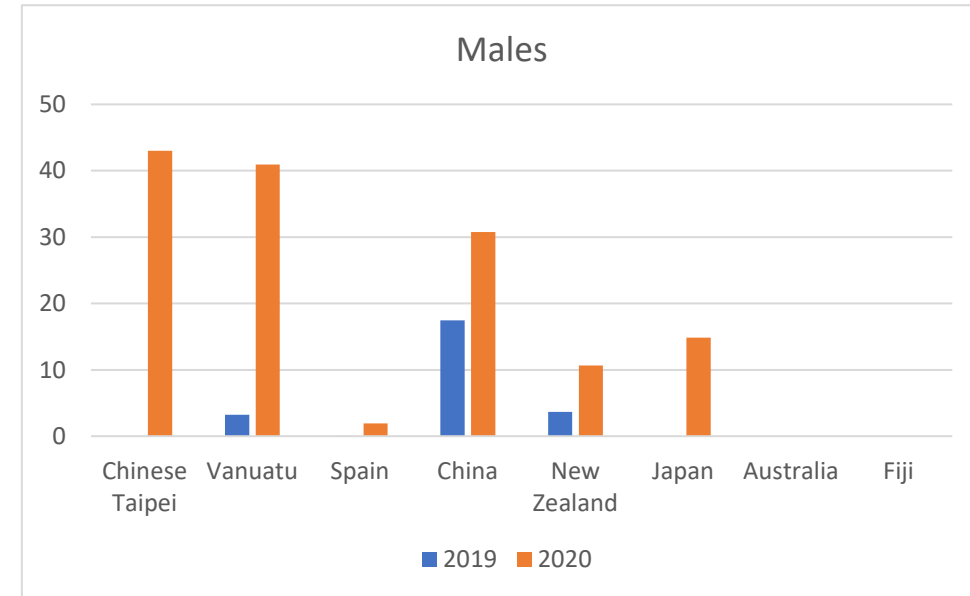
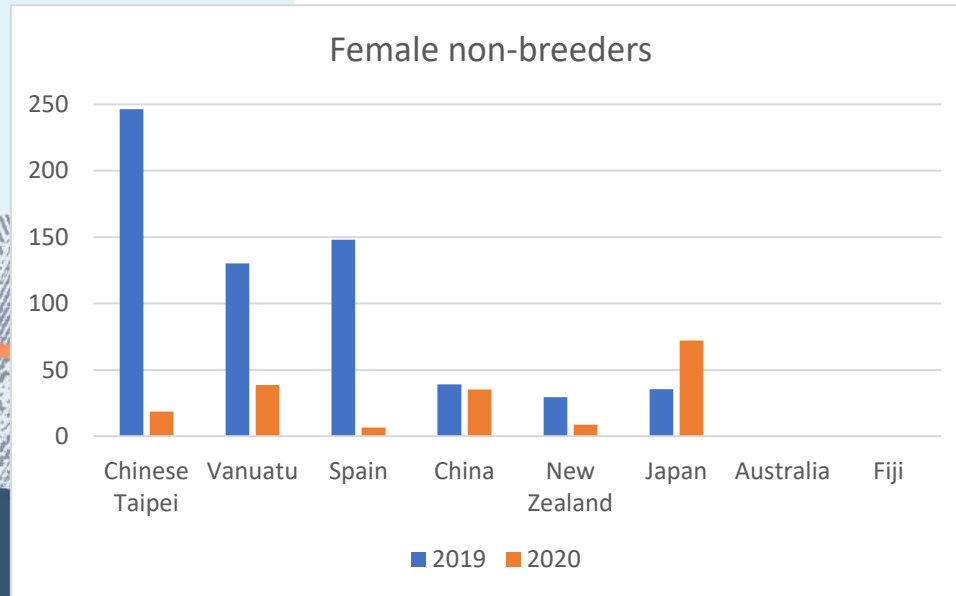


Spatial distribution of tracked female non-breeding Antipodean albatross in a) May 2020 and b) May 2019 (average number of bird hours per 100km x 100km grid cell), highlight areas of high occurrence that overlapped pelagic longline fishing effort. Red is highest occurrence, dark green lowest. Dashed lines indicate RFMO boundaries.

Overlap By fleet

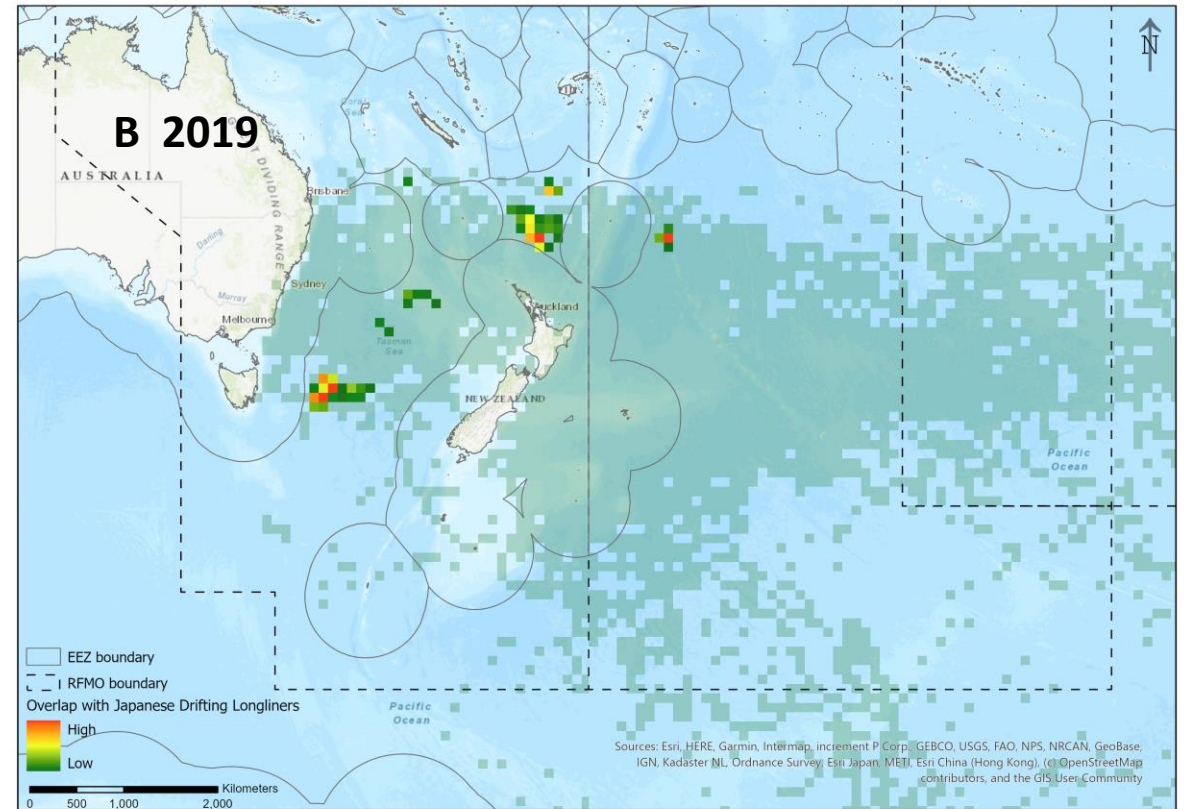
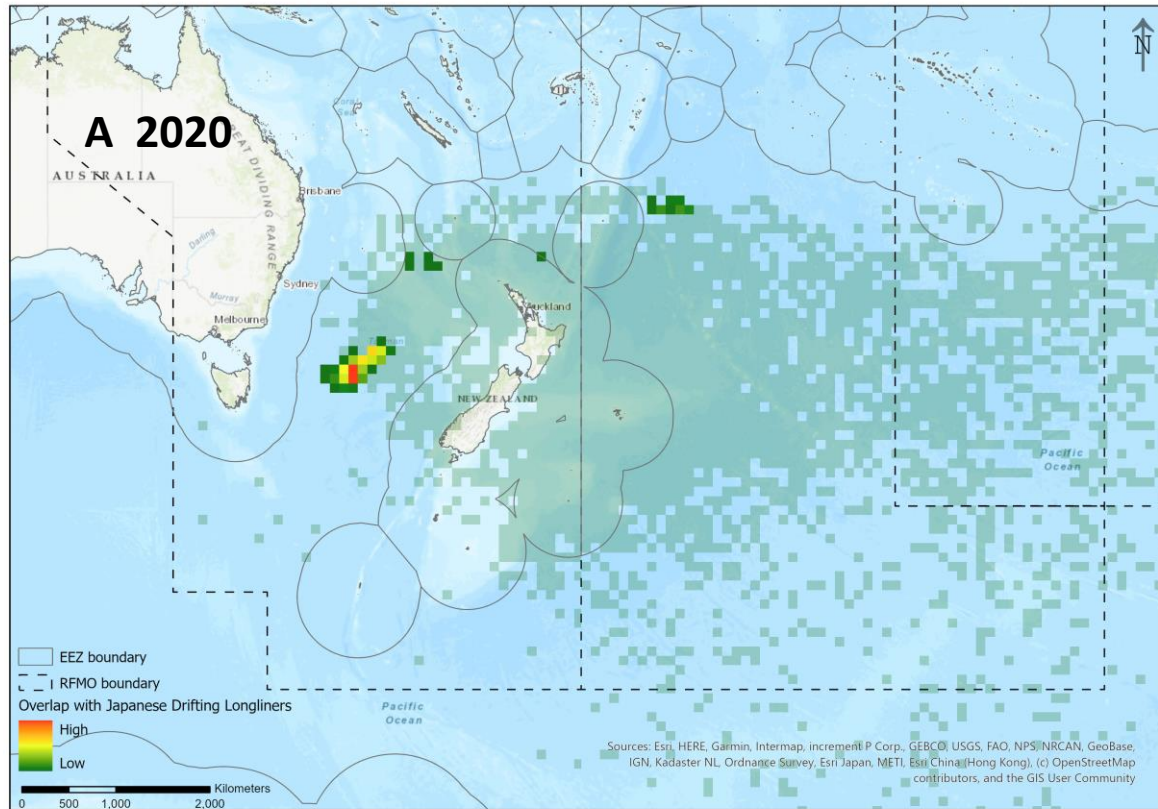


Annual cumulative daily overlap of Antipodean albatross with pelagic longline fishing effort by flag state for all birds and each comparable cohort in 2019 and 2020.



Overlap

Example maps by fleet - Japan

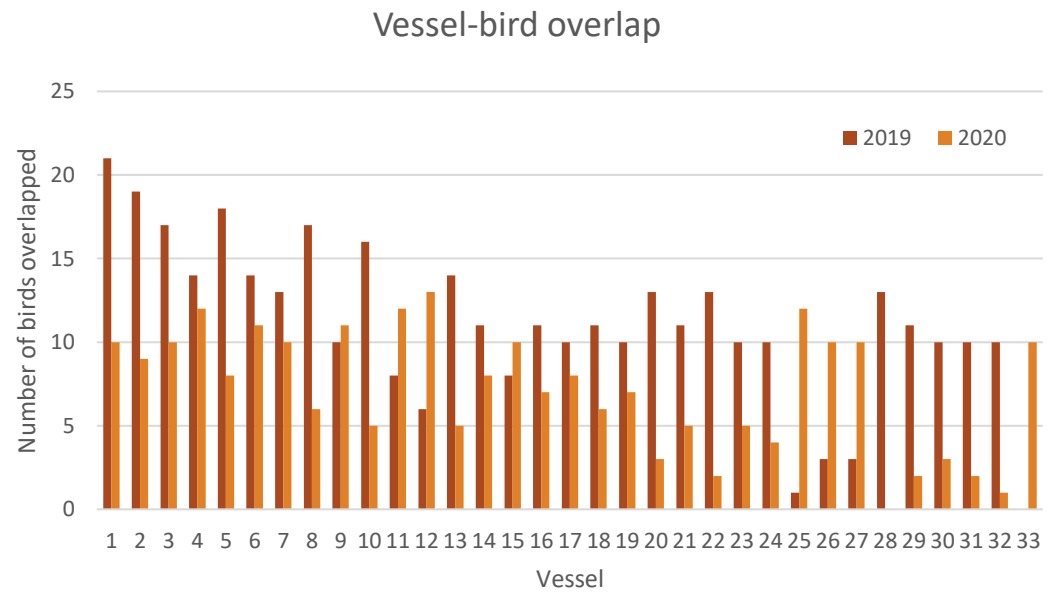


Year-round cumulative daily overlap of tracked Antipodean albatross with pelagic longline fishing effort by Japan-flagged vessels in a) 2020 and b) 2019 at 100 km by 100 km grid scale. Red is highest overlap, dark green is lowest overlap, and translucent green cells represent bird occurrence with no overlap.

Overlap

By pelagic longline fishing vessel

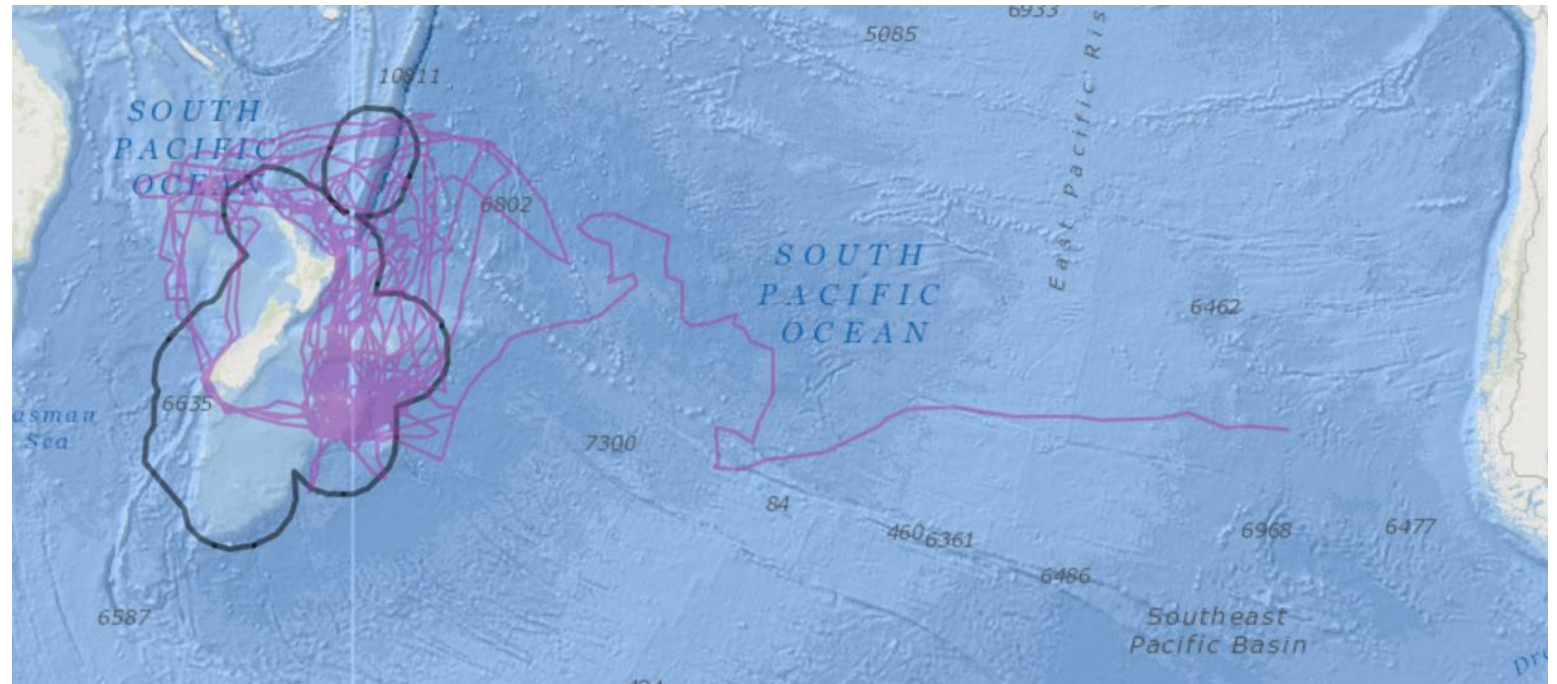
- 136 vessels identified in 2019
 - 26 vessels overlapped with ≥ 10 birds
 - one vessel overlapped with 21 of 63 tracked birds
- 188 vessels identified in 2020
 - 13 vessels overlapped with ≥ 10 birds
 - one vessel overlapped with 13 of 40 tracked birds
- Most vessels with greatest overlap identified in both years



Overlap

By birds with pelagic
longline fishing vessels

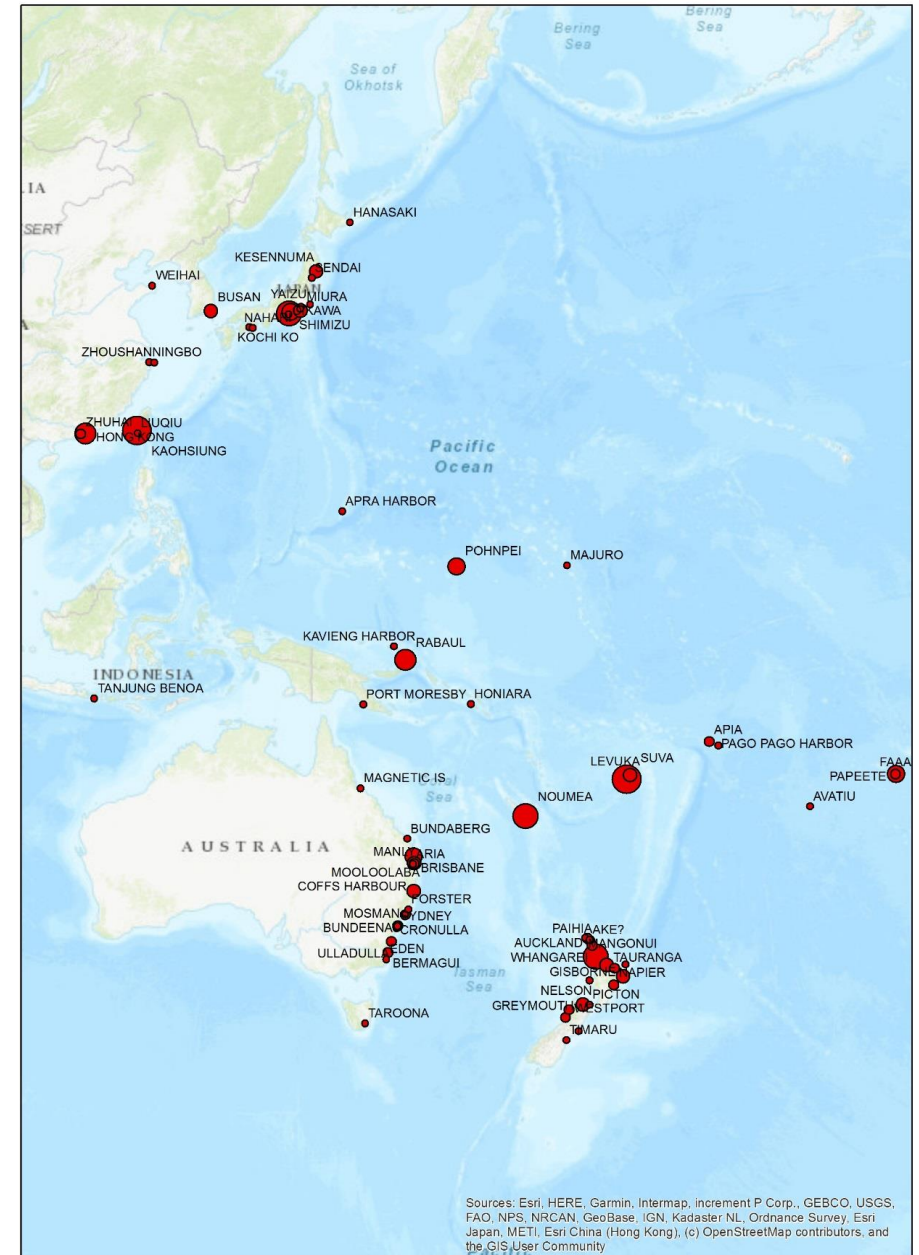
- 38 out of 63 birds tracked in 2019 overlapped with pelagic longline effort
 - one bird overlapped with 54 vessels
- 33 out of 40 birds tracked in 2020 overlapped with pelagic longline effort
 - one bird overlapped with 88 vessels



Overlap

Ports used by pelagic longline fishing vessels that overlapped with Antipodean albatross

Analysis still underway: results for 2019 shown



Conclusions

- ▶ A delayed and shortened field season in 2020 influenced the age-sex sample, and timing, of bird tagging make comparisons to 2019 complex.
- ▶ Between comparable cohorts, breeding females showed similar distribution patterns between years, but non-breeding females differed.
- ▶ The greatest overlap of tracked birds with pelagic longline fishing effort in 2020 was in the eastern WCPFC area.
- ▶ In 2020 breeding females had a slightly higher overlap with pelagic longline fishing effort, and a slightly more northerly distribution, compared to 2019.
- ▶ In 2020 non-breeding females had a much lower overlap with pelagic longline fishing effort, with a distribution skewed much more towards the eastern IATTC, compared to 2019.

Conclusions

Contd.

- ▶ Males had lower overlap with pelagic longline fishing effort, across the same areas, and with the same fleets, compared to females.
- ▶ In 2020 birds overlapped with the same fishing fleets compared to 2019, highest overlap being with Chinese Taipei-flagged vessels in both years.
- ▶ Individual vessels overlapped with as many 13 of 40 tracked birds in 2020.
- ▶ Most vessels overlapping with most birds were identified in both years.
- ▶ Most tracked birds overlapped fishing effort (33 out of 40 tracked birds in 2020).
- ▶ Individual tracked birds overlapped as many as 88 pelagic longline vessels in less than one year.

Outlook

- ▶ 66 tags were deployed in early 2021 (juveniles, adult females and adult males).
- ▶ Planning stage for further tag deployment in early 2022.
- ▶ Satellite tagging was expanded to northern royal albatross in 2021, and additional taxa, including Gibson's albatross, are planned for 2022.
- ▶ Opportunities are being sought for international collaboration to expand the analyses and test against fishery-collected data.

Acknowledgements

Field research to deploy tracking devices was funded by DOC and undertaken by Kath Walker and Graeme Elliott using methods approved by the DOC Animal Ethics Committee (AEC 338). Satellite tracking tags were funded by DOC, Fisheries New Zealand, Live Ocean and Southern Seabirds. We are also very grateful to the support provided by Global Fishing Watch in facilitating access to relevant fishing activity data.

