Agreement on the Conservation of Albatrosses and Petrels

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Preliminary results from collaborative satellite tracking of Grey-headed Albatrosses from Campbell Island, New Zealand, and Islas Diego Ramírez, Chile, and plans for expanded multi-site tracking in 2026-27

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SUMMARY

Grey-headed Albatrosses (*Thalassarche chrysostoma*) are a circumpolar, highly migratory species subject to a range of threats (e.g., fisheries bycatch), and thus, the species is listed as Endangered on the IUCN Red List and included on Annex II of the Convention on Migratory Species (CMS). Different Grey-headed Albatross colonies exhibit vastly different population trajectories, but underlying drivers remain unknown. To elucidate potential drivers of divergent population trends, we tracked 20 breeding adults from Campbell Island, New Zealand, which has suffered steep (93%) declines, at the same time as 10 breeding adults from Islas Diego Ramírez, Chile, which has remained stable or is increasing. Preliminary tracking results during December 2025 to April 2026 indicate clear separate ranges between these two colonies. Birds from Campbell Island ranged considerably wider throughout the South Pacific. Birds from Islas Diego Ramírez remained more restricted within the eastern South Pacific and the Drake Passage, although there was a small area of overlap between the two populations in the eastern South Pacific. Further contemporary tracking, with the support from the ACAP Small Grants Scheme, from multiple colonies is planned during the 2026/27 season to provide a more robust dataset to investigate drivers of divergent population trends from.

1. INTRODUCTION

Grey-headed Albatrosses (*Thalassarche chrysostoma*) are a circumpolar, highly migratory species that traverse vast areas of the Southern Ocean and encounter a wide range of at-sea threats, predominantly fisheries bycatch, as well as land-based pressures at a small number of breeding sites. As a consequence of these cumulative threats, the species is listed as Endangered on the IUCN Red List and included on Annex II of the Convention on Migratory Species (CMS). Recent demographic studies have revealed severe, ongoing declines at several major breeding sites. At Campbell Island, New Zealand, declines have been estimated at 93% since 1944 (Fischer et al. 2026), and at South Georgia (Islas Georgias del Sur)[1], numbers have fallen by 76% since 1984 (Poncet et al. 2006, 2017, Mackley et al. 2025), despite both island groups being free of invasive species. These trends indicate large-scale impacts associated with fisheries bycatch, changing climate, and altered oceanography (e.g., Pardo et al. 2017). South Georgia (Islas Georgias del Sur)[1] now hold approximately 13,400 breeding pairs (24% of the global population), while Campbell Island supports around 4,700 breeding pairs (8%). Other major breeding sites support significant portions of the global population, including Islas Diego Ramírez (~18,400 pairs; 32%), Marion Island (~7,500; 13%), Crozet (~6,300; 11%), and Kerguelen (~6,500; 11%) (Edwards et al. 2025). Several of these colonies show relatively stable population trends, contrasting with the concerning declines at Campbell Island and South Georgia (Islas Georgias del Sur)[1], underscoring the importance of understanding population-specific at-sea risks.

Tracking of Grey-headed Albatrosses over the past two decades has primarily relied on shorter-term, high-resolution GPS deployments and long-term, low-resolution GLS loggers at a limited number of colonies, including South Georgia (Islas Georgias del Sur)[1] (Wood et al. 2003, Clay et al. 2016, Frankish et al. 2021), Marion Island (Nel et al. 2001), and Campbell Island (Waugh et al. 2000, Goetz et al. 2022). Many of these tracking datasets were obtained before high-resolution AIS vessel movement data, including vessel identity and flag state, became publicly available through Global Fishing Watch (GFW; Kroodsma et al. 2018). As such, previous studies have been unable to provide detailed insights into fine-scale spatiotemporal overlap between Grey-headed Albatross populations and individual fishing fleets operating under the jurisdiction of ACAP Parties (Chile, France, New Zealand, South Africa, and the United Kingdom), other Range States, and the high seas.

Contemporary high-resolution tracking data are essential to elucidate population specific trajectories (Corbeau et al. 2021, Warwick-Evens et al. 2025, 2026). Simultaneous high-resolution GPS–Argos satellite tracking from multiple breeding sites would enable quantification of population-specific exposure to different fleets, link population trends to relative bycatch risk, and help identify key fleets for targeted engagement and implementation of best-practice mitigation. To address these knowledge gaps, a coordinated circumpolar tracking initiative was initiated during the 2025–26 breeding season, with the simultaneous deployment of satellite transmitters at Campbell Island (New Zealand) and Islas Diego Ramírez (Chile). These deployments form the foundation of a broader, range-wide tracking initiative intended to span all major ocean basins in which this species breeds.

[1] A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty of the Falkland Islands (Islas Malvinas), South Georgia and the South Sandwich Islands (Islas Georgias del Sur e Islas Sandwich del Sur) and the surrounding maritime areas.

2. METHODS

2.1. Study Sites

Campbel Island lies in the West corner of the South Pacific within the New Zealand subantarctic region at 52°33′S, 169°09′E. It is the southernmost New Zealand subantarctic island. Campbell Island supports the only Grey-headed Albatross colony in New Zealand which, historically, was one of the largest globally (Fischer et al. 2026). The breeding population is concentrated along sea cliffs and headlands in the northwestern parts of the island. Long-term monitoring indicates a concerning 93% decline since 1944, despite successful eradication of invasive mammals (most recently Norway Rats in 2001; Towns & Broome 2010, Brown *et al.* 2023).

At the opposite longitudinal end of the South Pacific (~8,000 km from Campbell Island), the Islas Diego Ramírez lies at 56°31′S, 68°43′W, ~100 km southwest of Cape Horn. These remote islands represent the southernmost terrestrial point of the Americas and form part of Chile's protected network of subantarctic islands. Islas Diego Ramírez supports the largest known Grey-headed Albatross colony globally, with an estimated ~18,400 breeding pairs (~32% of the world population) which been relatively stable to slowly increasing (Robertson et al. 2007).

2.2. Satellite tag deployment and programming

During December 2025, a total of 30 satellite transmitters were deployed across the two study sites. At Campbell Island, 20 transmitters were fitted to breeding adult Grey-headed Albatrosses. These devices comprised ten battery-powered Telonics TAV2930 Argos PTT transmitters (Mesa, Arizona, USA) and ten solar-powered Druid Yawl C4 GPS/PTT transmitters (Chengdu, China). At Islas Diego Ramírez, a further ten Druid Yawl C4 GPS/PTT transmitters were deployed on breeding adults. All tags were mounted using temporary tape-based attachments to back-contour feathers following well-established techniques.

The two transmitter types were programmed according to their technical specifications and expected battery performance. Specifically, the PTT transmitters were programmed to acquire fixes and transmit two scheduled location windows per day, providing a low-intensity, energy-efficient duty cycle suited to long-duration deployments. In contrast, the PTT/GPS transmitters operated under a conditional GPS acquisition schedule governed by real-time battery voltage. When battery levels were high, the tags collected GPS positions at intervals of approximately 30 minutes; when battery voltage declined, the acquisition interval extended progressively to a maximum of approximately two hours. This adaptive programming approach allowed the solar-powered PTT/GPS transmitters to balance spatial resolution with battery longevity, ensuring that high-frequency data were collected whenever environmental conditions allowed sufficient solar charging.

2.3. Data processing

All location data transmitted by the PTT and PTT/GPS transmitters were processed using standard filtering and interpolation procedures to ensure positional accuracy and comparability across tag types (e.g., Rowley et al. 2024). Raw Argos PTT locations were first subjected to a speed–distance–angle filter to remove implausible positions associated with excessive movement rates or anomalous bearings. Additional filtering steps were applied as required to account for positional accuracy classes inherent to the Argos PTT system.

Following initial filtering, all tracks were linearly interpolated at a uniform temporal interval of 30 minutes to standardise temporal resolution across individuals and tag types. This approach enabled consistent derivation of movement metrics, including trip distance and maximum distance from the colony. Interpolated tracks were then used to estimate utilisation distributions (Calenge 2006), with kernel density estimates generated to summarise core (50%) and broader (75% and 99%) spatial use. All data processing was carried out using established analytical workflows for seabird telemetry studies, ensuring that movement parameters derived from differing tag models were directly comparable and suitable for subsequent spatial analyses (Rowley et al. 2024). These results represent preliminary outputs, and further refinement will be undertaken once all transmissions have seized.

3. PRELIMINARY RESULTS

All 30 tracking devices were successfully deployed on breeding adult Grey-headed Albatrosses during the 2025-26 breeding season at both Campbell Island (10 PTT and 10 PTT/GPS transmitters) and Islas Diego Ramírez (10 GPS/PTT transmitters). Transmission performance varied among individuals but was largely consistent with expectations for back-feather mounted tracking devices on albatross species. Specifically, some transmission durations were poor (< 1 week) while others provided extended transmissions lasting several months, resulting in a wide range of total tracking durations across tags (Table 1, Supplementary Table 1). The number of recorded locations differed substantially among individuals, reflecting both differences in tracking technology and variability in transmission longevity. Across both colonies, GPS/PTT transmitters typically generated higher numbers of locations over shorter time intervals, while PTT transmitters tended to provide fewer fixes over longer transmission periods. Despite this variation, all transmitters provided some data, and sufficient spatial coverage was obtained from each colony to reliably characterise movement patterns and inform utilisation distribution analyses.

Table 1. Summary of tracking deployment and transmission performance for grey-headed albatrosses tagged during the 2025–26 breeding season at Campbell Island and Islas Diego Ramírez (up until 6 April 2026). For each location and tag type, the table reports the number of tags deployed, average tag transmission duration, average tag transmission duration in days, and the total number of locations obtained.

Location	Tag type	No. Tags	Mean Duration (days)	Total No. locations
Campbell Island	GPS/PTT	10	16.4	8,952
Campbell Island	PTT	10	89.7	3,715
Islas Diego Ramírez	GPS/PTT	10	62.6	23,746

The obtained tracking data revealed extensive movements by Grey-headed albatrosses from both Campbell Island and Islas Diego Ramírez across the South Pacific (Figure 1). Particularly, individuals from Campbell Island dispersed widely across the Southern Ocean. Campbell Island birds exhibited broad dispersal across the southwest Pacific sector of the Southern Ocean, with several individuals undertaking long-distance movements into pelagic waters. Tracks from this colony reflected contributions from both PTT and GPS/PTT transmitters, resulting in variable track resolution among individuals but collectively providing extensive coverage of offshore areas used during the tracking period. In contrast, birds tracked from Islas Diego Ramírez were more restricted to the Drake Passage, the vicinity of the Antarctic Peninsula, and the Southeastern Pacific waters, but these birds did travel further south than birds from Campbell Island. Data from this colony were derived exclusively from GPS/PTT-tagged individuals and were characterised by higher spatial resolution and more continuous movement paths. Despite these differences in tag technology, clear colony-specific patterns in track density and spatial extent became evident, but birds overlapped marginally in the Southeastern Pacific.

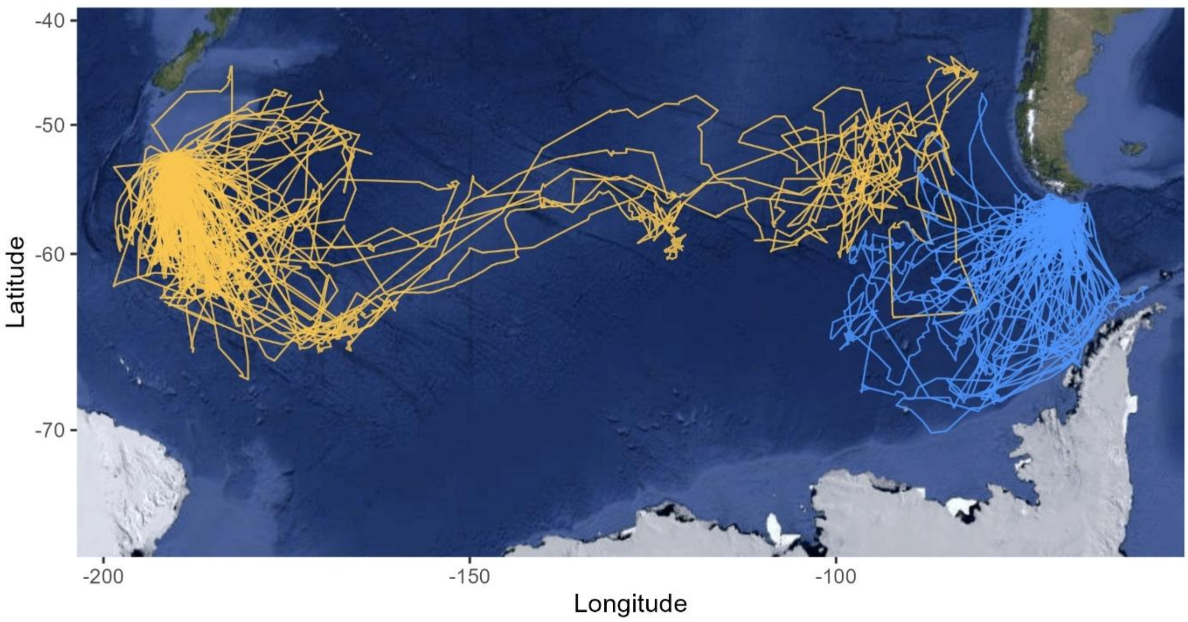

Figure 1. GPS and PTT tracking data showing movement paths of Grey-headed albatrosses from Campbell Island (orange; 10 PTT and 10 GPS/PTT tags) and Islas Diego Ramírez (blue; 10 GPS/PTT tags). Lines represent individual tracks.

Utilisation distributions (UDs) further highlighted the distinct but overlapping areas of space use for Grey-headed Albatrosses from Campbell Island and Islas Diego Ramírez (Figure 2). Kernel UDs derived from both PTT and GPS/PTT locations indicated core-use areas (50% isopleths) embedded within broader regions of space use represented by the 75% and 99% isopleths. For birds breeding at Campbell Island, core-use areas were situated predominantly within the southwest Pacific sector of the Southern Ocean, with broader UD contours extending extensively into pelagic waters. In contrast, UDs for birds breeding at Islas Diego Ramírez were concentrated within the southeast Pacific and Drake Passage regions. Between colonies, Campbell Island birds exhibited a wider range, and vice versa, Islas Diego Ramírez exhibited more concentrated core foraging areas. Overlap between colony-level UDs was evident in peripheral areas of space use in the Southeast Pacific, whereas core-use regions showed clear separation.

4. NEXT STEPS

The preliminary results presented here form the first step towards illuminating the underlying drivers of the divergent trends exhibited by different Grey-headed Albatross breeding sites dotted around the Southern Ocean. Five devices deployed on adults breeding on Campbell Island are still transmitting at the time of writing, further building on the dataset presented here. Following the tracking effort from this breeding season, further deployments are scheduled during the 2026/27 breeding season. Specifically, thanks to the support of the ACAP Small Grant Scheme (ACAP Small Grant Application 2024-07) and collaboration of circumpolar agencies, another 10 GPS/PTT transmitters are to be deployed on Islas Diego Ramírez, and the contemporary tracking efforts are to be expanded to additional breeding sites with 15 GPS/PTT transmitters that are to be deployed on South Georgia (Islas Georgias del Sur)[1] and 15 GPS/PTT transmitters that are to be deployed on Marion Island. Finally, there is also potential for further deployments at Campbell Island. Consequently, following a second year of concurrent multi-colony tracking, unprecedented insights into the space use of this species from colonies with divergent population trends will be possible. The spatial analysis will then be coupled with standardised analyses of population trends (c.f. Fischer et al. 2026), with the ultimate aim to mitigate the underlying drivers of population decline on a colony-specific level.

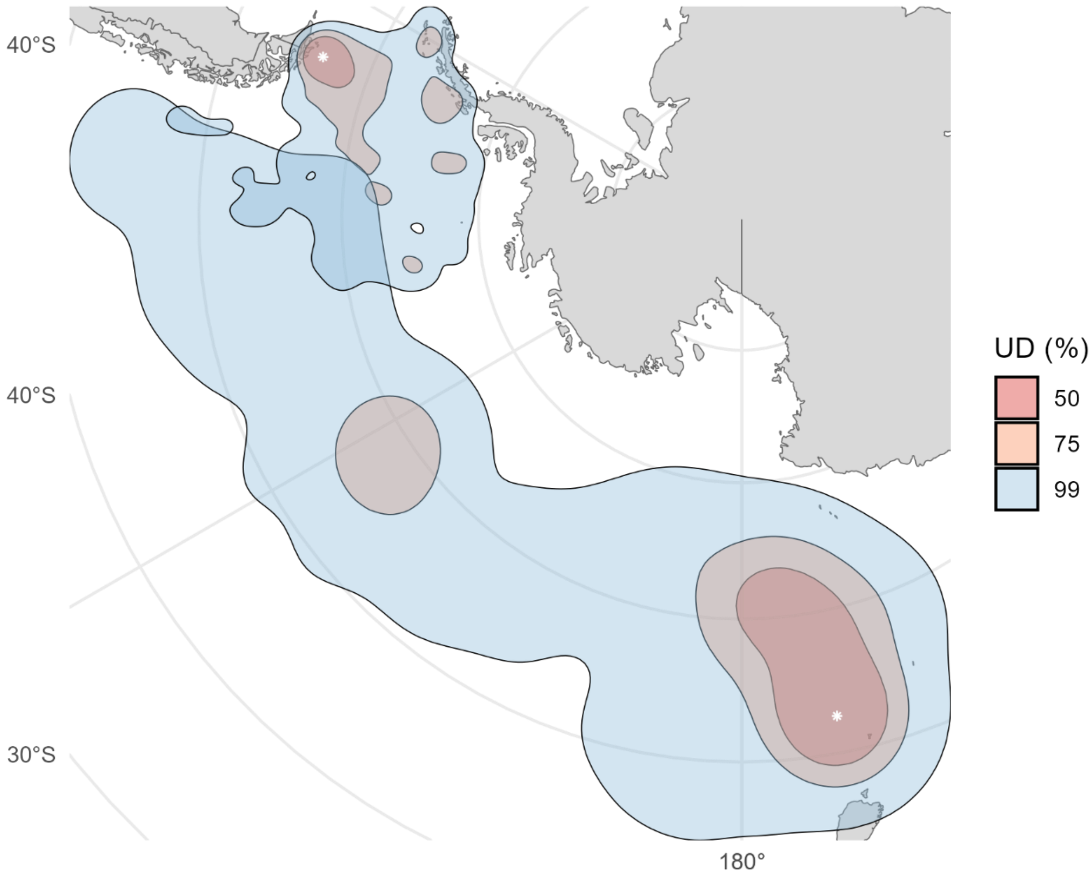

Figure 2. Kernel utilization distributions (UDs) for tracked grey-headed albatrosses from Campbell Island and Islas Diego Ramírez. Shaded polygons show 50%, 75%, and 99% UD isopleths, representing core to peripheral areas of space use. White star symbols indicate colony locations.

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SUPPLEMENTARY MATERIAL

Supplementary table 1. Breakdown of tag by location and type (up until 6 April 2026).

Tag ID	Location	Tag type	Transmission start	Transmission end	Duration (days)	No. locations
066a	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-03-05	84	1,209
066b	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-01-26	46	1,290
066c	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-02-13	64	3,322
067f	Campbell Island	GPS/PTT	2025-12-19	2025-12-23	4	204
068d	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-03-11	90	2,862
068e	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-01-19	39	1,770
068f	Campbell Island	GPS/PTT	2025-12-19	2025-12-27	8	450
41217	Campbell Island	PTT	2025-12-20	2026-04-06	107	407
41218	Campbell Island	PTT	2025-12-20	2026-04-05	106	412
41219	Campbell Island	PTT	2025-12-20	2026-04-06	108	553
41220	Campbell Island	PTT	2025-12-20	2026-03-07	77	259
41223	Campbell Island	PTT	2025-12-20	2026-03-23	93	410
41224	Campbell Island	PTT	2025-12-20	2026-01-29	40	181
41225	Campbell Island	PTT	2025-12-20	2026-02-19	61	259
41226	Campbell Island	PTT	2025-12-20	2026-04-01	102	376
41228	Campbell Island	PTT	2025-12-20	2026-04-06	107	500
41229	Campbell Island	PTT	2025-12-20	2026-03-26	96	358
667	Campbell Island	GPS/PTT	2025-12-19	2025-12-25	6	370
671	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-03-11	90	5,826
672	Campbell Island	GPS/PTT	2025-12-19	2025-12-29	10	565
673	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-01-18	38	1,650
676	Islas Diego Ramírez	GPS/PTT	2025-12-12	2026-02-11	60	1,705
677	Campbell Island	GPS/PTT	2025-12-19	2026-01-05	17	921
681	Campbell Island	GPS/PTT	2025-12-19	2025-12-24	5	179
682	Campbell Island	GPS/PTT	2025-12-19	2026-02-12	55	3,066
685	Campbell Island	GPS/PTT	2025-12-19	2026-01-04	16	1,080
687	Campbell Island	GPS/PTT	2025-12-19	2026-01-12	24	1,213
691	Campbell Island	GPS/PTT	2025-12-19	2026-01-07	19	904
694	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-03-04	83	2,557
696	Islas Diego Ramírez	GPS/PTT	2025-12-11	2026-01-12	32	1,555