Under the cover of darkness: foraging behaviour increases on cloudy, new moon nights in a pelagic seabird

Supporting Information

Appendix S1: Impacts of tagging

We evaluated the effects of GPS tagging on breeding European storm-petrels by assessing differences in body mass pre- and post-tag deployment, and nest abandonment rates between tagged and control nests.

Body Mass

All European storm-petrels were weighed both before tag deployment and immediately following tag removal. In 2016, 6 out of 11 storm-petrels gained weight during deployment, while only two lost weight. We analysed pre- and post-deployment body mass using a paired t-test, incorporating data from 2020, 2023, and 2024. No significant change in body mass was found (pre-deployment mean ± SD: 27.81 ± 2.18 g; post-deployment: 27.87 ± 2.02 g; t_{11} = 0.07, p = 0.94). However, body mass changes in this species are difficult to interpret due to variability in the amount of food carried for the chick.

Nest Abandonment

In 2024, nest abandonment was monitored between 11 experimental burrows (with GPS-tagged adults) and 12 control burrows (no handling). Of the experimental burrows, 7 (64%) remained active, 3 (27%) were abandoned following deployment (all incubating birds), and 1 (9%) had unknown status as we had to leave the colony before tag retrieval was possible. Among control burrows, 7 (58%) remained active and 5 (42%) were abandoned (all during incubation) by our final visit to the colony. While the abandonment rate was similar between experimental and control burrows, interpretation is limited by

the fact that monitoring the control nests still involved some, albeit minimal, disturbance that could not be measured.

Appendix S2: Tag Recovery Rates

Over the course of the study, 21 out of 35 GPS tags (60%) were successfully retrieved. However, recovery rates varied between years.

- 2016: 7/11 (63%)
- 2020: 5/6 (83.3%)
- 2023: 1/5 (20%)
- 2024: 8/13 (61.5%)

Despite using the same capture and recapture methods in both 2020 and 2023 (nets draped over the dry-stone walls enclosing the nests), recovery success differed. Several factors may have contributed to the low recovery rate in 2023:

1. Windy conditions on several retrieval nights in 2023 may have made the nets more visible, deterring birds from returning to their burrows.
2. By 2023, the nets had been used extensively for catching storm-petrels and as a result had a strong scent. Given this species has good olfactory senses, the storm-petrel scent outside their burrows introduced by the nets may have discouraged some birds from re-entering their nests.
3. Properly positioning nets over uneven stone walls is difficult. Loose areas can create pockets that trap birds, while taut sections may prevent entanglement, reducing capture efficiency.

In contrast, the nests used at High Island in 2016 and the Magharee Islands in 2024 were accessible, allowing birds to be captured by hand. This is the approach we recommend for future deployments where possible.

Table S1. λ (lambda) values used in the Box-Cox transformation of variables prior to model fitting.

Variable	**λ (offshore model)**	**λ (nearshore model)**
Seabed Depth	0.182	0.545
Seabed Slope	0.101	-0.061
Distance to the coast	0.384	0.303
Distance to the shelf edge	0.222	
Distance to the colony		0.343
Chlorophyll *a* concentration	-0.586	-0.424
Sea Surface Temperature	-2	-2
Eddy Kinetic Energy	0.263	0.222

Table S2. GAM terms explaining the probability of nocturnal foraging in offshore areas.

Model Term	**edf**	**X^2 value**	**p-value**
te(moon fraction, cloud cover)	1.799	7.451	0.006
s(chlorophyll *a* concentration)	1.921	6.968	0.017
s(seabed slope)	0.830	5.072	0.010
s(distance to the coast)	0.744	3.355	0.028
s(time after sunset)	0.650	2.166	0.061

Table S3. GAM terms explaining the probability of nocturnal foraging in nearshore areas.

Model Term	**edf**	**X^2 value**	**p-value**
s(chlorophyll *a* concentration)	0.819	4.717	0.013
s(seabed slope)	0.799	4.371	0.017
s(time after sunset)	0.799	4.343	0.019
s(distance to the colony)	0.383	0.733	0.161