The following supplements accompany the article

Exploiting the closest productive area: geographical segregation of foraging grounds in a critically endangered seabird

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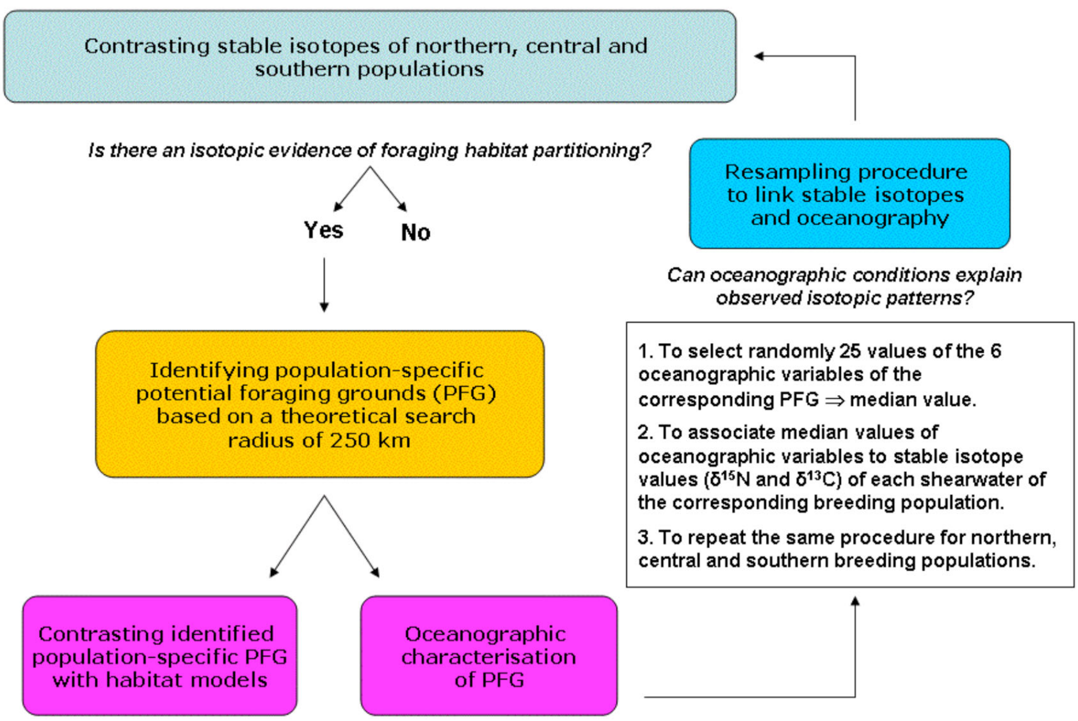
Supplement 1.

Fig. S1. *Puffinus mauretanicus.* Workflow of the comprehensive ecological study applied to identify population-specific potential foraging grounds (PFGs).

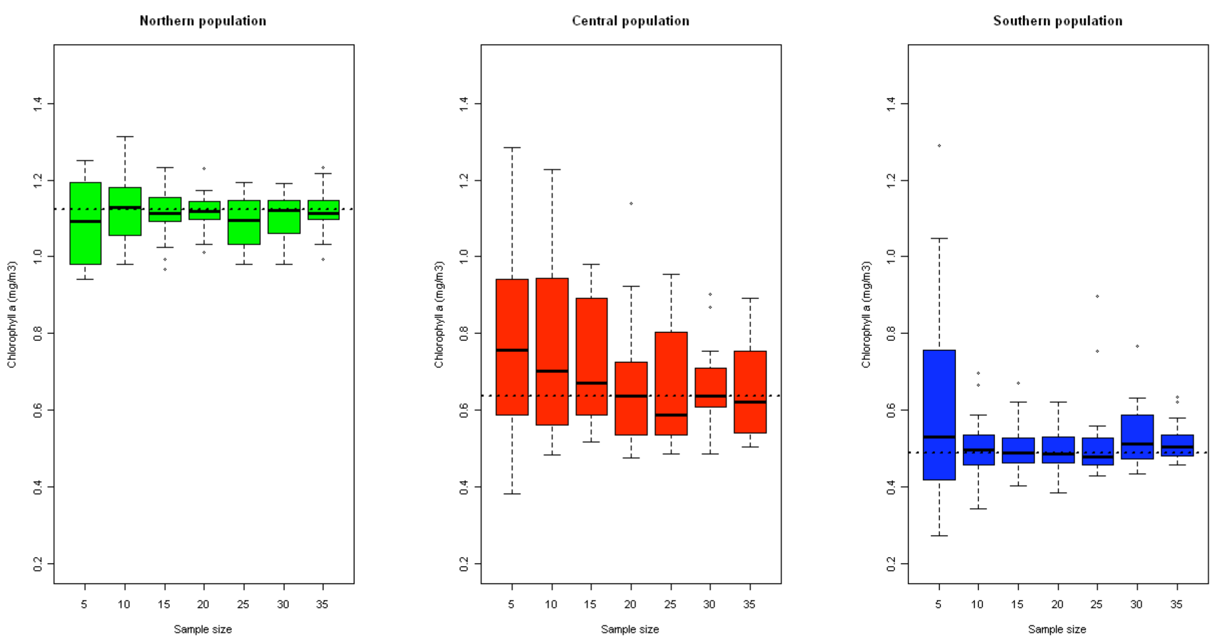


Supplement 2. Determining the minimum sample size necessary to reproduce median values of oceanographic variables in each potential foraging ground.

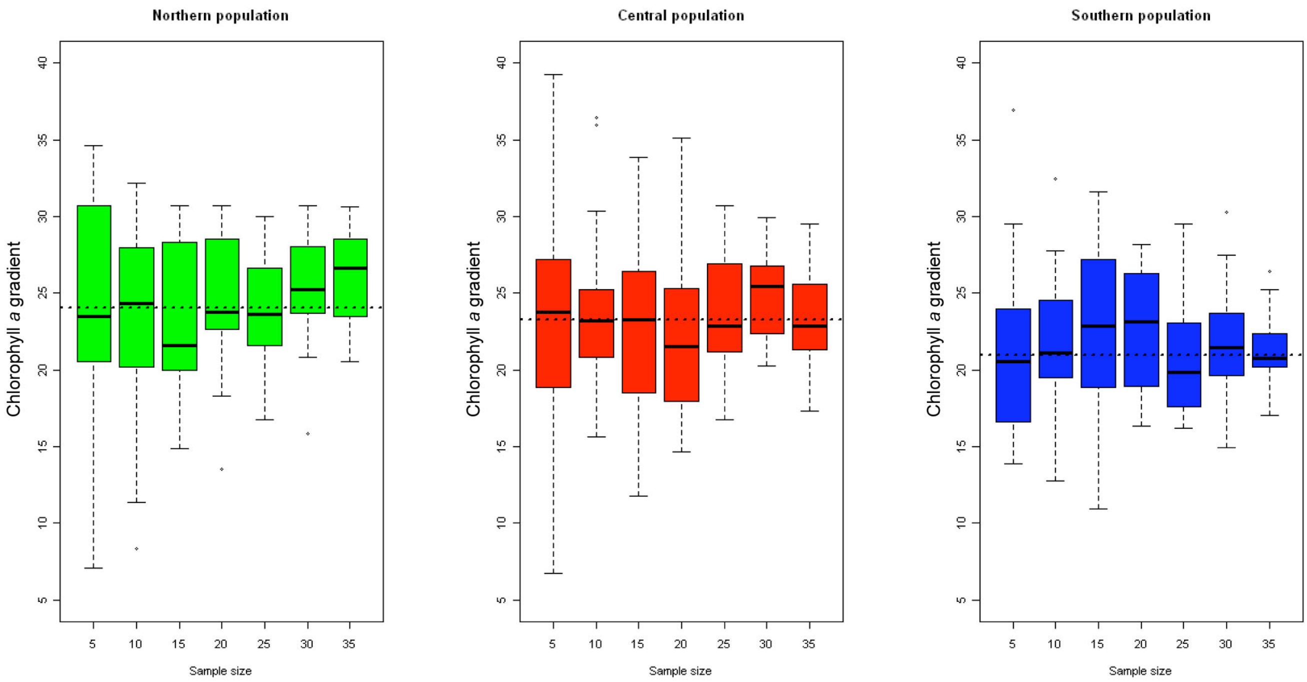
Our objective was to assess whether oceanographic conditions of potential foraging grounds (PFGs) could explain observed patterns of stable isotopes. We had to link 15, 21 and 6 stable isotope values of shearwaters from northern, central and southern populations to 71, 308 and 320 values of oceanographic data. The PFG of the northern population was smaller than those of the central and southern populations and, in turn, the number of pixels (i.e. sample size) for each potential foraging ground was different. In order to objectively link one oceanographic value to each of the stable isotopes, we randomly selected *n* values of the 6 oceanographic variables (SST, chl *a*, bathymetry and their spatial gradients) of the corresponding potential foraging ground. The critical point here was to decide the value of *n*, or the minimum sample size necessary to reproduce median values of oceanographic variables in each potential foraging ground. The maximum number of *n* was fixed by the number of pixels from the northern population (71) divided by two. To obtain a representative *n* value, we randomly selected from 5 to 35 values, and this step was repeated as many times as the maximum number of stable isotopes for one breeding population (21 stable isotope values were available from the central population). Results of this resampling procedure are reproduced in Fig. S1, and $n = 25$ seemed to objectively reproduce median values of oceanographic variables in each PFG.

Fig. S2. *Puffinus mauretanicus*. Resampled (a–c) chl *a* concentration (mg m^{-3}), (d–f) chl *a* gradient, (g–i) SST (°C), (j–l) SST gradient, (m–o) bathymetry (m) and (p–r) bathymetry gradient showing median, 25–75% interquartile range, non-outlier range, and outliers by sample size (*n*) for each breeding population. Dotted horizontal lines represent the median values of oceanographic variables in each potential foraging ground.

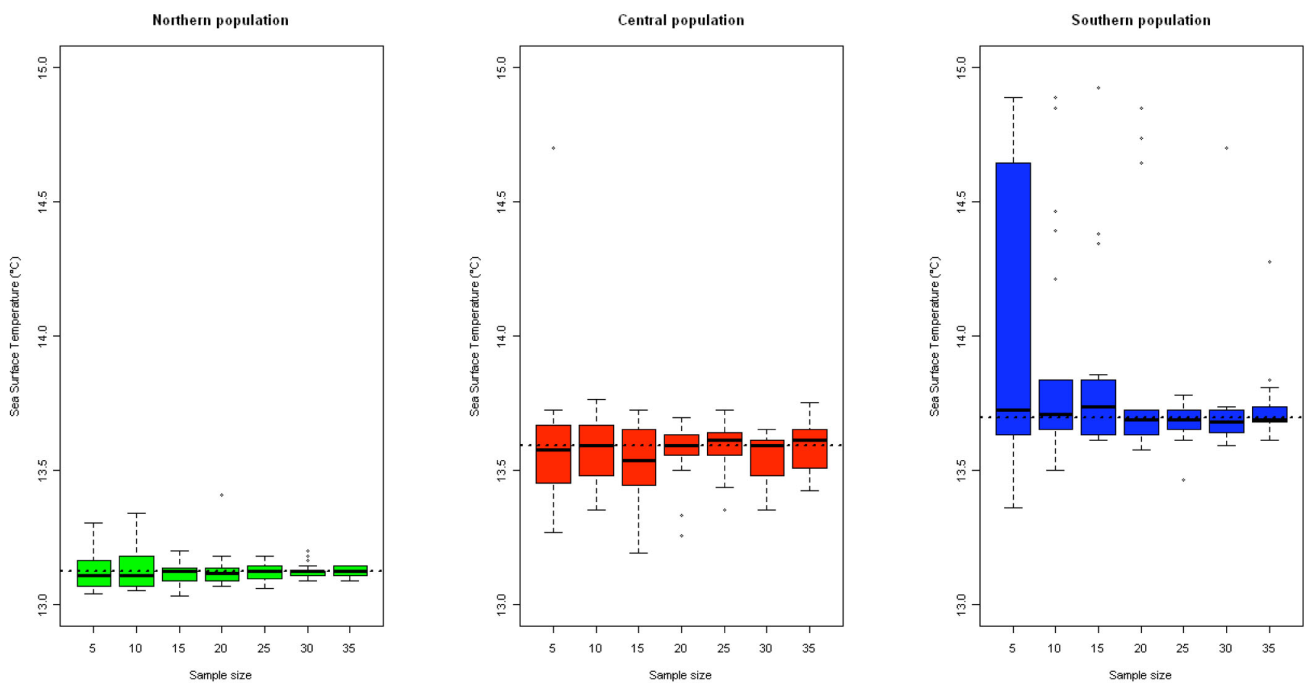
(a–c)



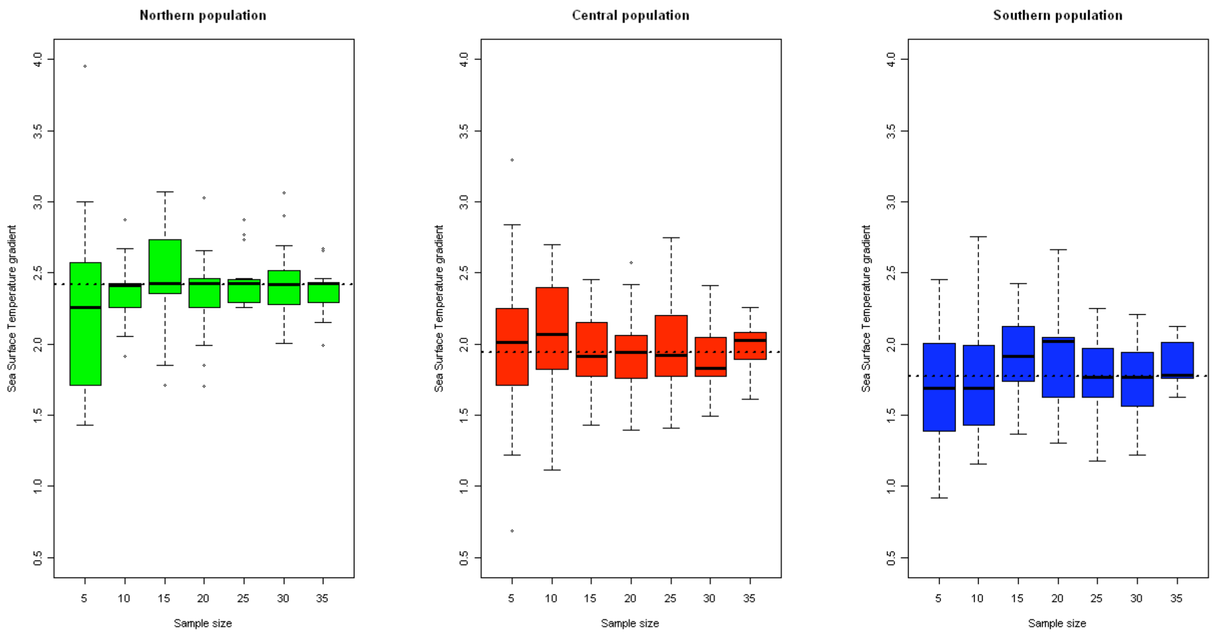
(d–f)


Northern population
Central population
Southern population
Chlorophyll a gradient
5 10 15 20 25 30 35 40
5 10 15 20 25 30 35
Sample size

(g–i)

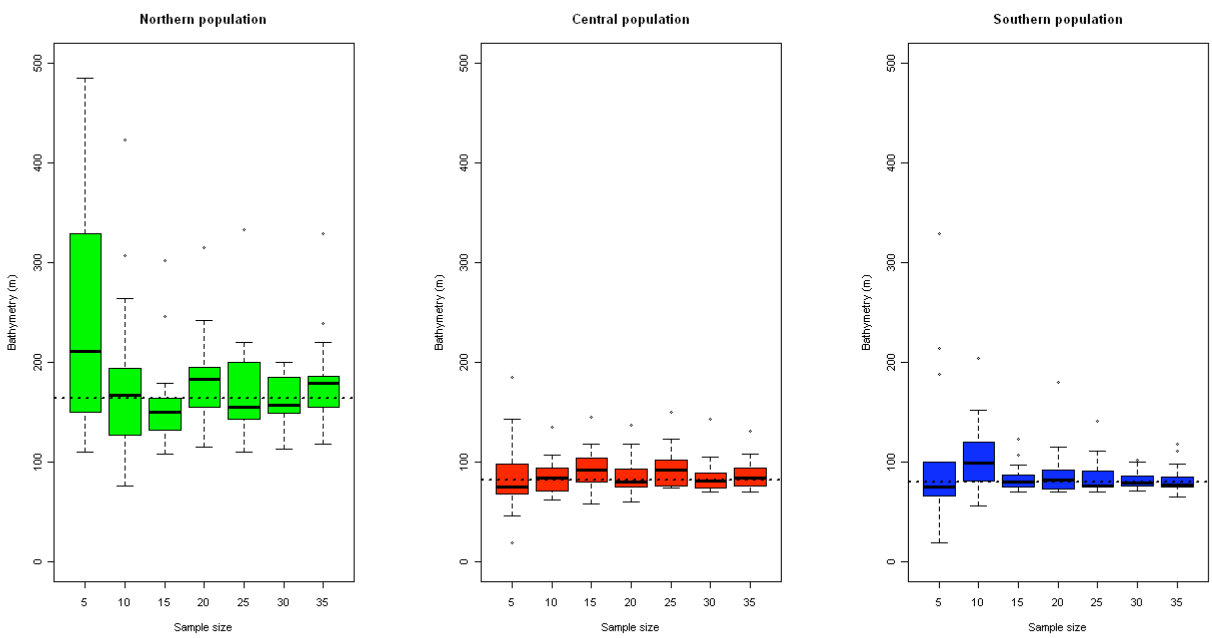

Northern population
Central population
Southern population
Sea Surface Temperature (°C)
13.0 13.5 14.0 14.5 15.0
5 10 15 20 25 30 35
Sample size

(j–l)



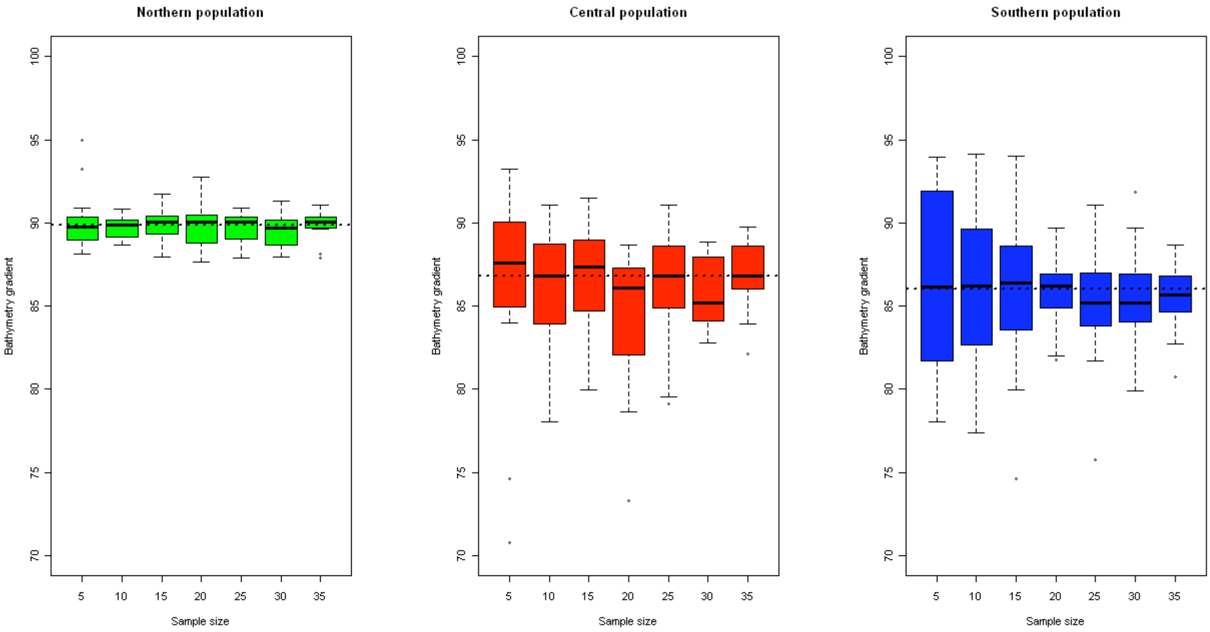
Northern population
Central population
Southern population
Sea Surface Temperature gradient
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
5
10
15
20
25
30
35
Sample size

(m–o)



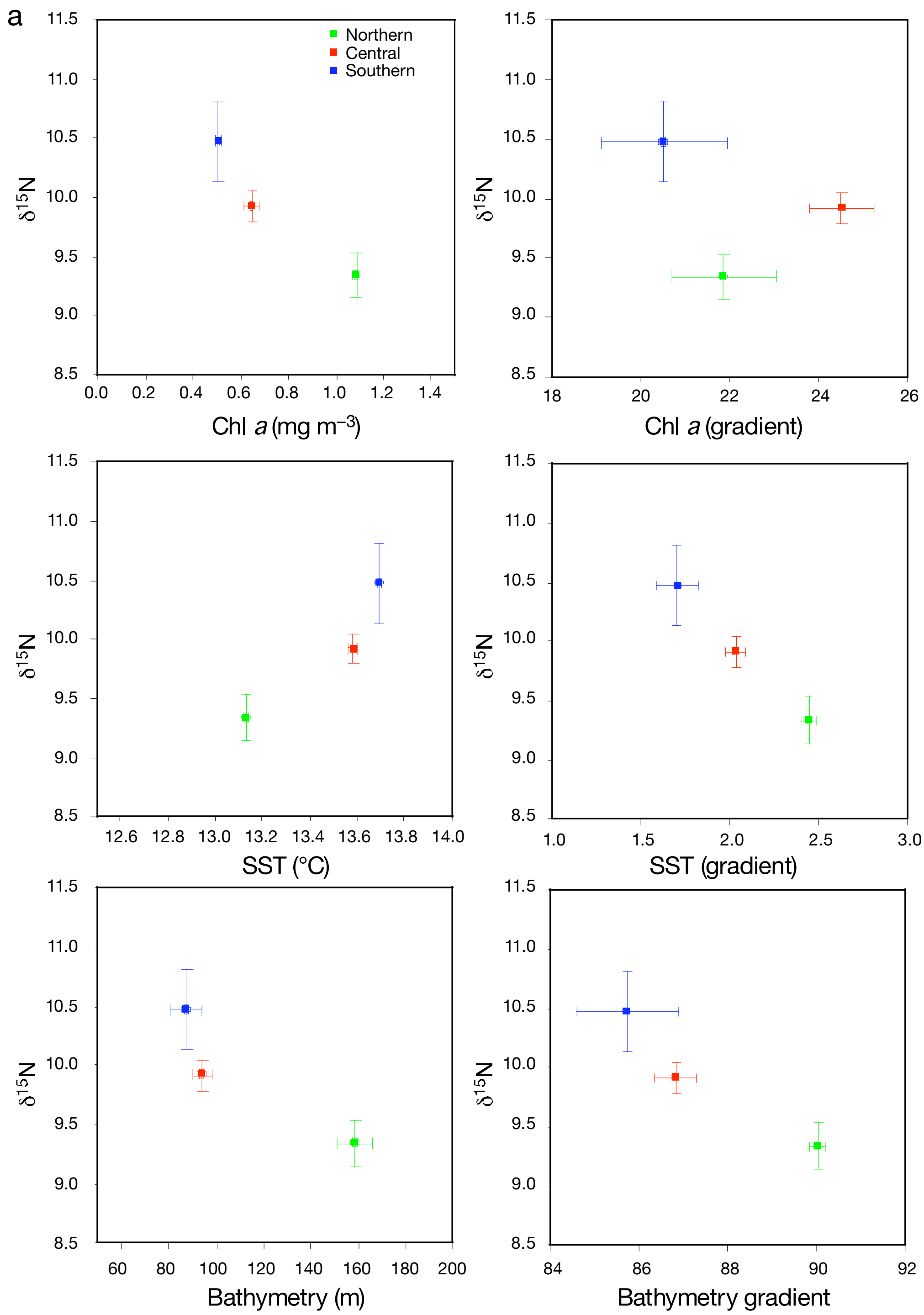
Northern population
Central population
Southern population
Bathymetry (m)
500
400
300
200
100
0
5
10
15
20
25
30
35
Sample size

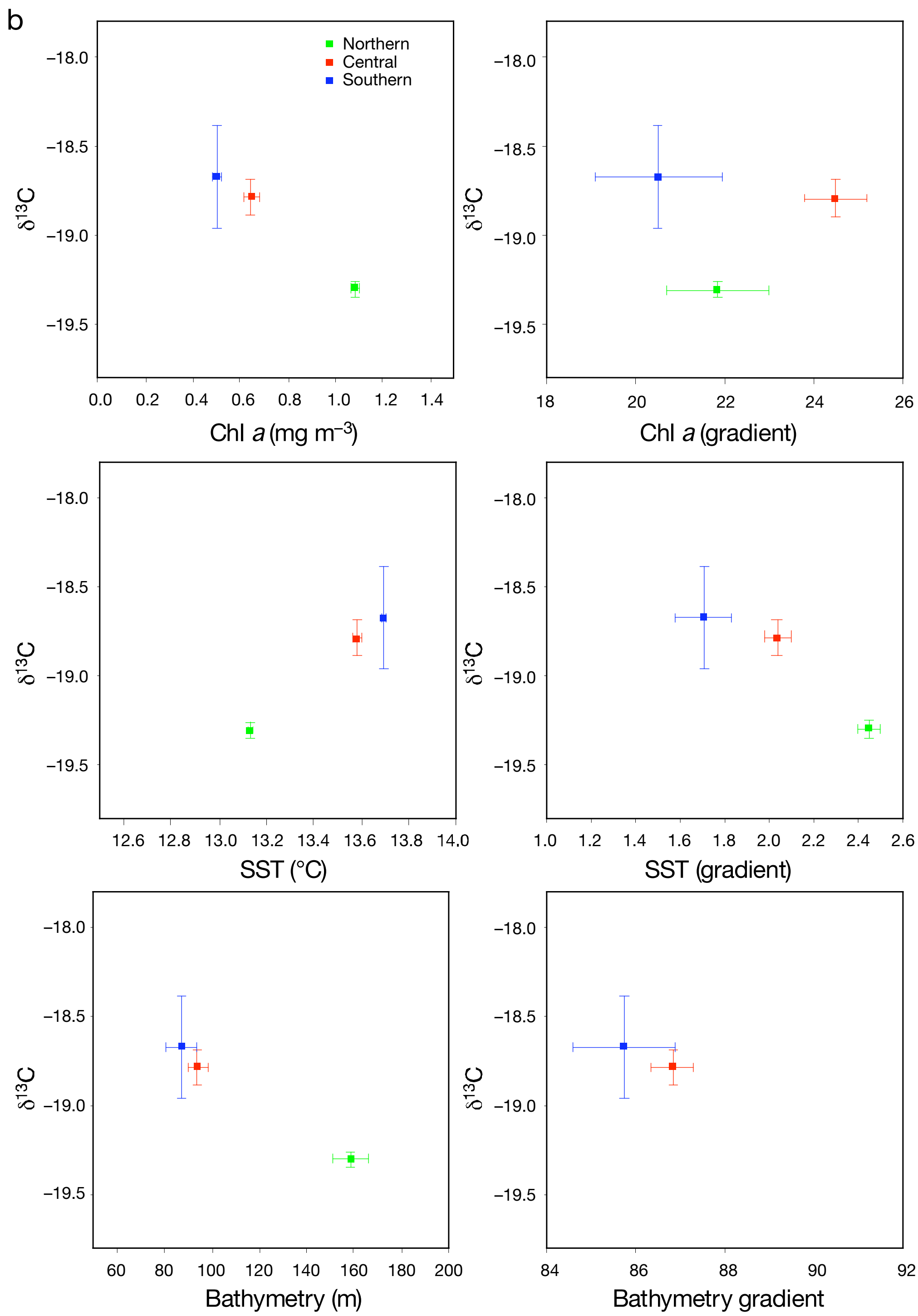
(p–r)


Northern population
Central population
Southern population
Bathymetry gradient
100
95
90
85
80
75
70
5
10
15
20
25
30
35
Sample size

Supplement 3.

Fig. S3. *Puffinus mauretanicus.* Oceanographic characterisation (mean ± SE) of (a) $\delta^{15}N$ and (g) $\delta^{13}C$ values by chl *a* concentration (mg m^{-3}), chl *a* gradient, SST (°C), SST gradient, bathymetry (m) and bathymetry gradient based on resampling procedure of northern, central and southern breeding populations




b
Northern
Central
Southern
δ13C
−18.0
−18.5
−19.0
−19.5
0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
Chl a (mg m−3)
18 20 22 24 26
Chl a (gradient)
12.6 12.8 13.0 13.2 13.4 13.6 13.8 14.0
SST (°C)
1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6
SST (gradient)
60 80 100 120 140 160 180 200
Bathymetry (m)
84 86 88 90 92
Bathymetry gradient