Supplement

Table S1a Results of the GLM model first dimension of the PCA (Dim1) as a function of species and stage. Variables selected in the best model (final model: Dim1~ species) and reference values is blue petrel. The degrees of freedom were 32

	Estimate	Std. Error	t-value	P-value
Intercept	-0.089	0.300	-2.962	0.0058
Thin-billed prion	2.093	0.460	4.548	<0.0001

Table S1b Results of the GLM model second dimension of the PCA (Dim2) as a function of species and stage. Variables selected in the best model (final model: Dim2~ species) and reference values is blue petrel. The degrees of freedom were 32

	Estimate	Std. Error	t-value	P-value
Intercept	0.688	0.307	2.239	0.0325
Thin-billed prion	-1.622	0.472	-3.439	0.0017

Table S2a Results of the GLMM model (*glmmTMB*) trip duration as a function of species during chick-rearing. Variables selected in the best model (final model: ~ species) and reference values is blue petrel. The degrees of freedom were 19

	Estimate	Std. Error	z-value	P-value
Intercept	4.853	0.285	17.026	<0.0001
Thin-billed prion	-0.350	0.233	-1.504	0.1320

Table S2b Results of the GLMM model (*glmmTMB*) total distance travelled as a function of species during chick-rearing. Variables selected in the best model (final model: ~ species) and reference values is blue petrel. The degrees of freedom were 16

	Estimate	Std. Error	z-value	P-value
Intercept	8.071	0.245	32.97	<0.0001
Thin-billed prion	-0.664	0.231	-2.88	0.0040

Table S2c Results of the GLMM model (*glmmTMB*) maximum distance from the colony as a function of species during chick-rearing. Variables selected in the best model (final model: ~ species) and reference values is blue petrel. The degrees of freedom were 21

	Estimate	Std. Error	z-value	P-value
Intercept	7.063	0.225	31.387	<0.0001
Thin-billed prion	-0.333	0.201	-1.658	0.0973

Table S2d Results of the GLMM model (*glmmTMB*) movement speed as a function of species during chick-rearing. Variables selected in the best model (final model: ~ species) and reference values is blue petrel. The degrees of freedom were 21

	Estimate	Std. Error	z-value	P-value
Intercept	3.186	0.089	35.85	<0.0001
Thin-billed prion	-0.010	0.110	-0.91	0.132

Table S2e Results of the GLMM model (*glmmTMB*) trip duration as a function of species and type of trip (short vs long) during chick-rearing. Variables selected in the best model (final model: ~ species + type of trip) and reference values are long trip and blue petrel. The degrees of freedom were 18

	Estimate	Std. Error	z-value	P-value
Intercept	5.270	0.119	44.28	<0.0001
Thin-billed prion	-0.168	0.153	-1.10	0.2710
Short trip	-1.642	0.185	-8.87	<0.0001

Table S2f Results of the GLMM model (*glmmTMB*) total distance travelled as a function of species and type of trip (short vs long) during chick-rearing. Variables selected in the best model (final model: ~ species + type of trip) and reference values are long trip and blue petrel. The degrees of freedom were 15

	Estimate	Std. Error	z-value	P-value
Intercept	8.339	0.037	226.03	<0.0001
Thin-billed prion	-0.041	0.054	-0.76	0.4490
Short trip	-1.884	0.138	-13.69	<0.0001

Table S2g Results of the GLMM model (*glmmTMB*) maximum distance as a function of species and type of trip (short vs long) during chick-rearing. Variables selected in the best model (final model: ~ species + type of trip) and reference values are long trip and blue petrel. The degrees of freedom were 20

	Estimate	Std. Error	z-value	P-value
Intercept	7.427	0.039	192.28	<0.0001
Thin-billed prion	-0.079	0.054	-1.47	0.1410
Short trip	-1.540	0.105	-14.68	<0.0001

Table S2h Results of the GLMM model (*glmmTMB*) movement speed as a function of species and type of trip (short vs long) during chick-rearing. Variables selected in the best model (final model: ~ species + type of trip) and reference values are long trip and blue petrel. The degrees of freedom were 20

	Estimate	Std. Error	z-value	P-value
Intercept	23.618	2.192	10.773	<0.0001
Thin-billed prion	0.151	2.622	0.058	0.9540
Short trip	-1.884	2.080	-0.906	0.3650

Table S3 Generalized additive mixed model (GAMM) results for move persistence of the blue petrel from Mayes Island, Kerguelen archipelago, during the incubation period as a function of sea ice concentration (SIC), distance to the ice edge (distIE), bathymetry (bathy), slope, sea surface temperature anomaly (ssta) and spatial autocorrelation (s(x,y)). edf indicates the estimated degrees of freedom. The model explained 62.5% of the deviance. Significant results ($p < 0.05$) are in bold

Variable	Smoother edf	p value	Estimate (SE)
Intercept			1.246 (0.079)
SIC	1.20	**0.009**	
distIE	6.89	**<0.001**	
bathy	2.00	0.367	
slope	1.00	0.562	
ssta	1.79	0.643	
s(x,y)	26.48	**<0.001**	
Random intercept for bird ID	15.67	**<0.001**	

Table S4 Generalized additive mixed model (GAMM) results for move persistence of the thin-billed prion from Mayes Island, Kerguelen archipelago, during the incubation period as a function of distance to the ice edge (distIE), bathymetry (bathy), slope, sea surface temperature anomaly (ssta) and spatial autocorrelation (s(x,y)). edf indicates the estimated degrees of freedom. The model explained 69.1% of the deviance. Significant results ($p < 0.05$) are in bold

Variable	Smoother edf	p value	Estimate (SE)
Intercept			1.551 (<0.001)
distIE	1.00	**<0.001**	
bathy	5.36	**<0.001**	
slope	1.00	**<0.001**	
ssta	3.33	**0.005**	
s(x,y)	24.33	**<0.001**	
Random intercept for bird ID	9.63	**<0.001**	

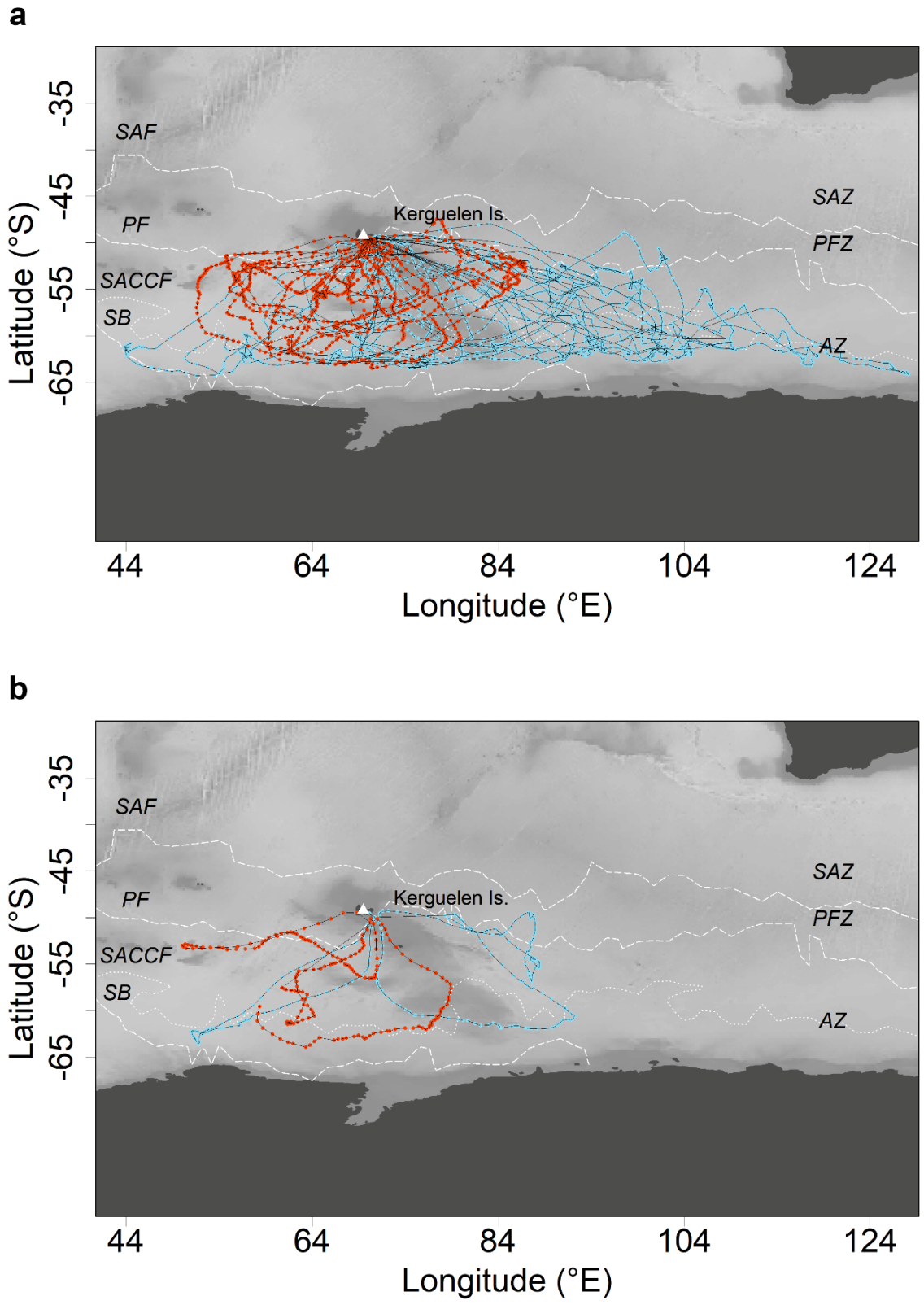
Table S5 Generalized additive mixed model (GAMM) results for move persistence for the blue petrel from Mayes Island, Kerguelen archipelago, during the chick-rearing period as a function of distance to the ice edge (distIE), bathymetry (bathy), slope and spatial autocorrelation (s(x,y)). edf indicates the estimated degrees of freedom. The model explained 80.9% of the deviance. Significant results ($p < 0.05$) are in bold

Variable	Smoother edf	p value	Estimate (SE)
Intercept			1.399 (<0.001)
distIE	4.67	**<0.001**	
bathy	2.53	0.092	
slope	1.00	0.813	
s(x,y)	26.37	**<0.001**	
Random intercept for bird ID	4.91	**<0.001**	

Table S6 Generalized additive mixed model (GAMM) results for move persistence for thin-billed prion from Mayes Island, Kerguelen archipelago, during the chick-rearing period as a function of distance to the ice edge (distIE), bathymetry (bathy), slope, sea surface height anomaly (ssha) and spatial autocorrelation (s(x,y)). edf indicates the estimated degrees of freedom. The model explained 78.6% of the deviance. Significant results ($p < 0.05$) are in bold

Variable	Smoother edf	p value	Estimate (SE)
Intercept			1.330 (<0.001)
distIE	1.00	0.529	
bathy	1.00	0.445	
slope	1.82	0.266	
ssha	3.82	**0.007**	
s(x,y)	25.66	**<0.001**	
Random intercept for bird ID	13.79	**<0.001**	

Fig. S1. Blue petrel (blue) and thin-billed prion (red) tracks during incubation (a), chick-rearing long trips (b) and chick-rearing short trips (c)



c

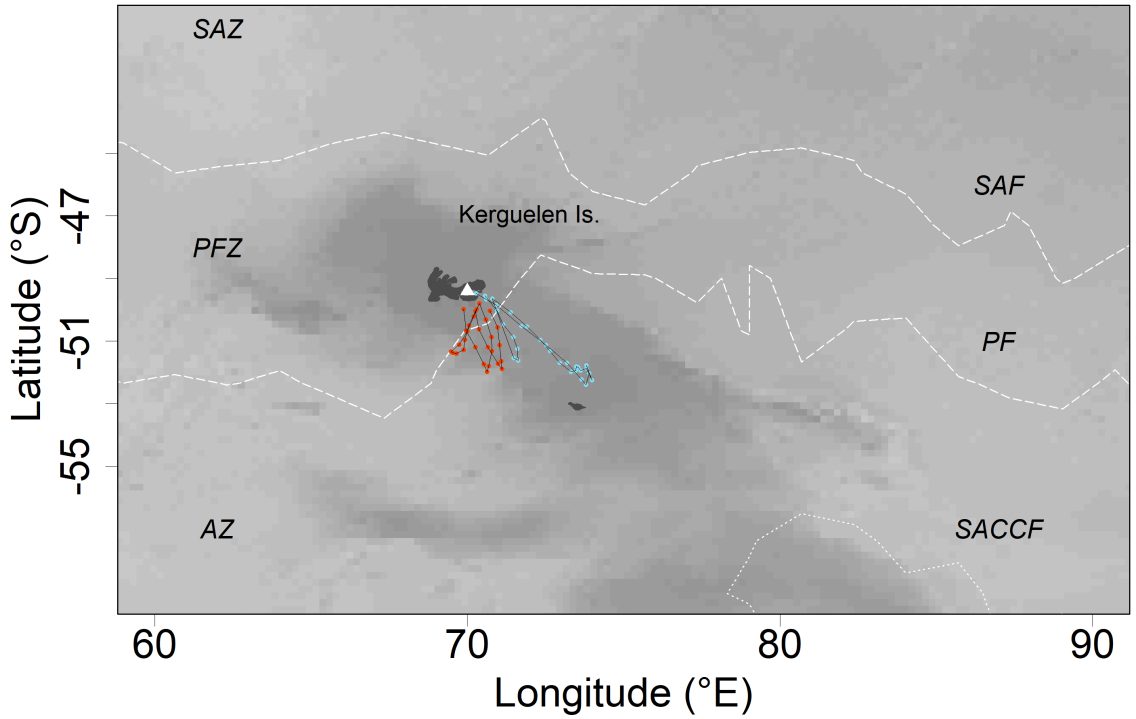
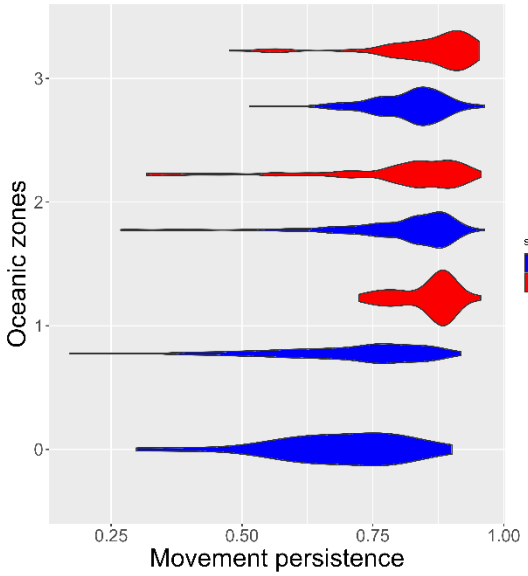

SAZ
SAF
Kerguelen Is.
PFZ
PF
AZ
SACCF
Latitude (°S)
-47
-51
-55
60
70
80
90
Longitude (°E)

Fig. S2. Violin plots of movement persistence distribution by oceanic zones of blue petrel (blue) and thin-billed prion (red) during incubation (a) and chick-rearing (b). Oceanic zones were delineate using fronts definition following (Venables et al. 2012), from north to south, (3) the polar front (PFZ), (2) the Antarctic zone AZ2-north of SACCF, (1) the Antarctic zone AZ1-south of SACCF, and (0) the zone south of the Antarctic Circumpolar Current (SACCZ).

a) Incubation



b) Chick-rearing

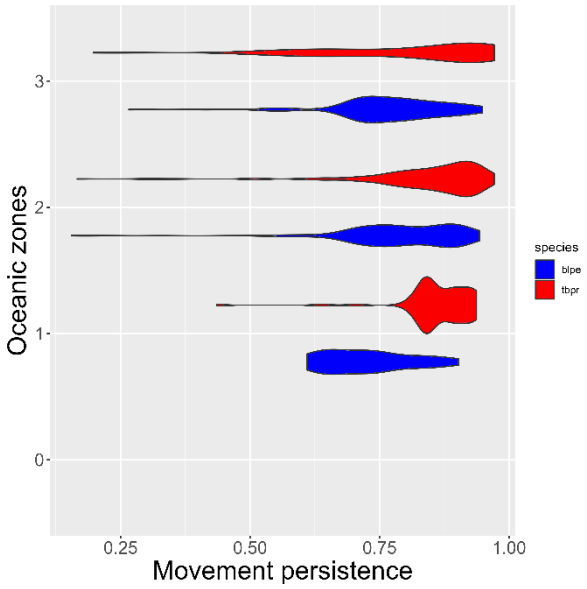


Fig. S3. Isotopic niche area based on stable isotope values ($\delta^{13}C$ and $\delta^{15}N$) in blood cells of blue petrel (blue) and thin-billed prion (red) breeding at Kerguelen Islands. The areas of the standard ellipses are represented by the solid lines, and the layman metric of convex hull area by black dotted lines

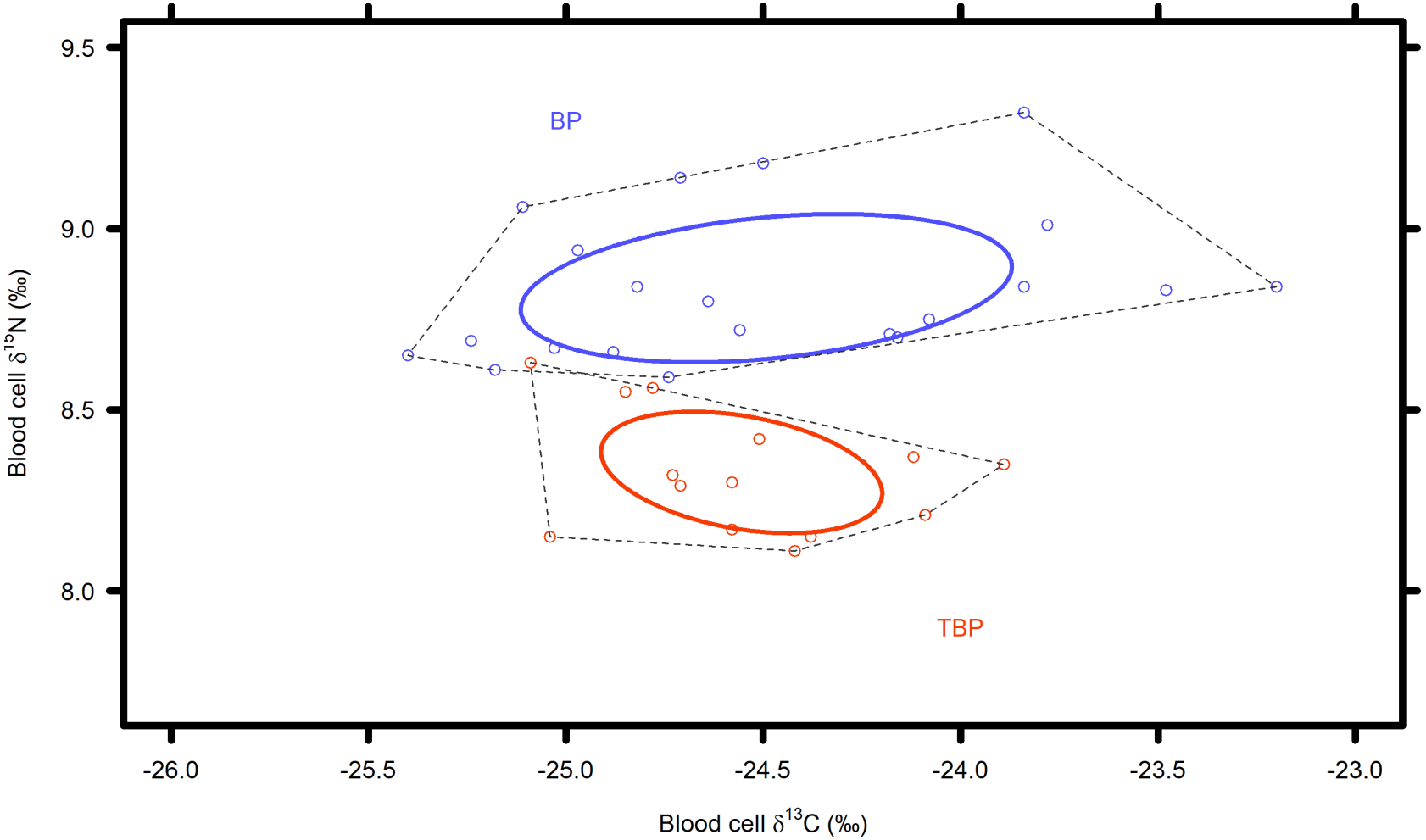


Fig. S4. Isotopic niche size for blue petrel (blue) and thin-billed prion (red) breeding at Kerguelen Islands. Niche sizes were computed based on joint probability distributions of $\delta^{15}N$ and $\delta^{13}C$ values in blood cells (top) and plasma (bottom)

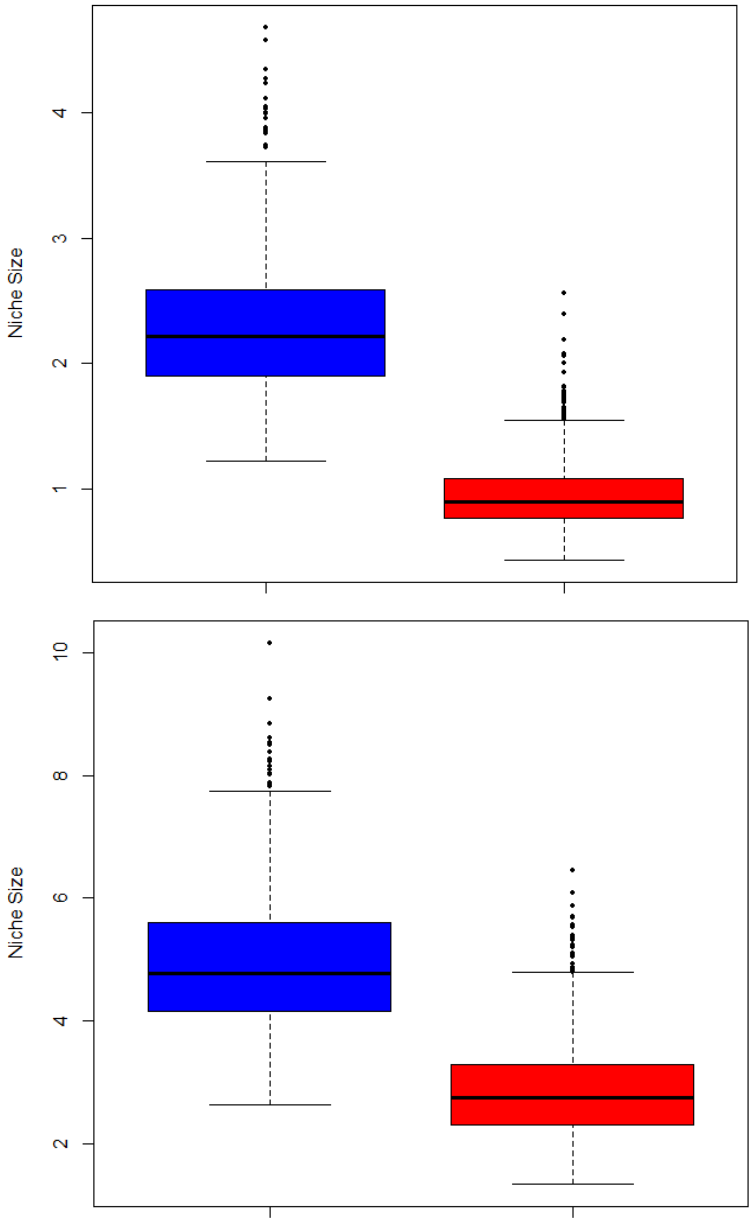
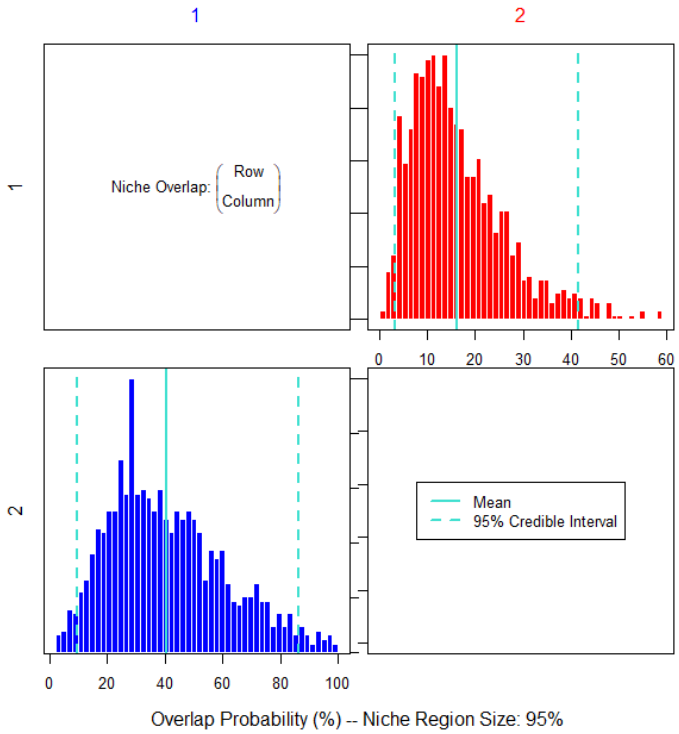


Fig. S5. Mean niche overlap probabilities (%) of blue petrel (1-blue) and thin-billed prion (2-red) breeding at Kerguelen Islands. The overlap metric is directional, such that it represents the probability that an individual from a species (row) will overlap onto the isotope niche of the other species (column). The niche size (niche region) was defined as the 95% credibility intervals of isotopic space in blood cells (top) and plasma (bottom).



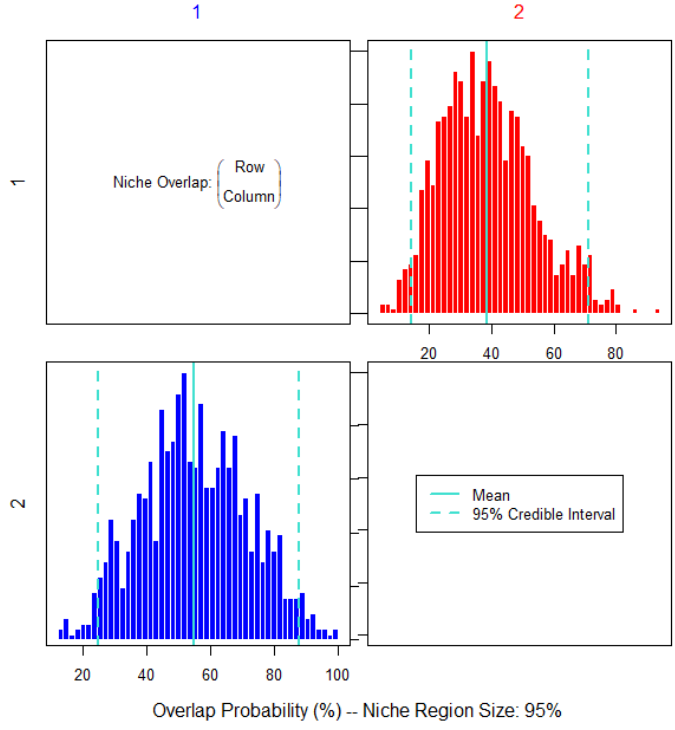


Fig. S6. Combination of biplot and cos2 score of the variables in Dimension 1 (Dim1) versus Dimension 2 (Dim2) with respect to the principal component analysis of blue petrels and thin-billed prions breeding in sympatry at Kerguelen Islands. The variables included are: the isotopic values of $\delta^{13}C$ (rbc_d13C_12C), $\delta^{15}N$ (rbc_d15N_14N) in red blood cells, $\delta^{13}C$ (plasma_d13C_12C), $\delta^{15}N$ (plasma_d15N_14N) in plasma, the percentage of foraging locations in the following oceanic zones delineate using fronts definition following (Venables et al. 2012): from north to south, (3) the polar front (PFZ), (2) the Antarctic zone AZ2-north of SACCF, (1) the Antarctic zone AZ1-south of SACCF, and (0) the zone south of the Antarctic Circumpolar Current (SACCZ)