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### Vocal foragers and silent crowds

*context-dependent vocal variation in Northeast Atlantic long-finned pilot whales*

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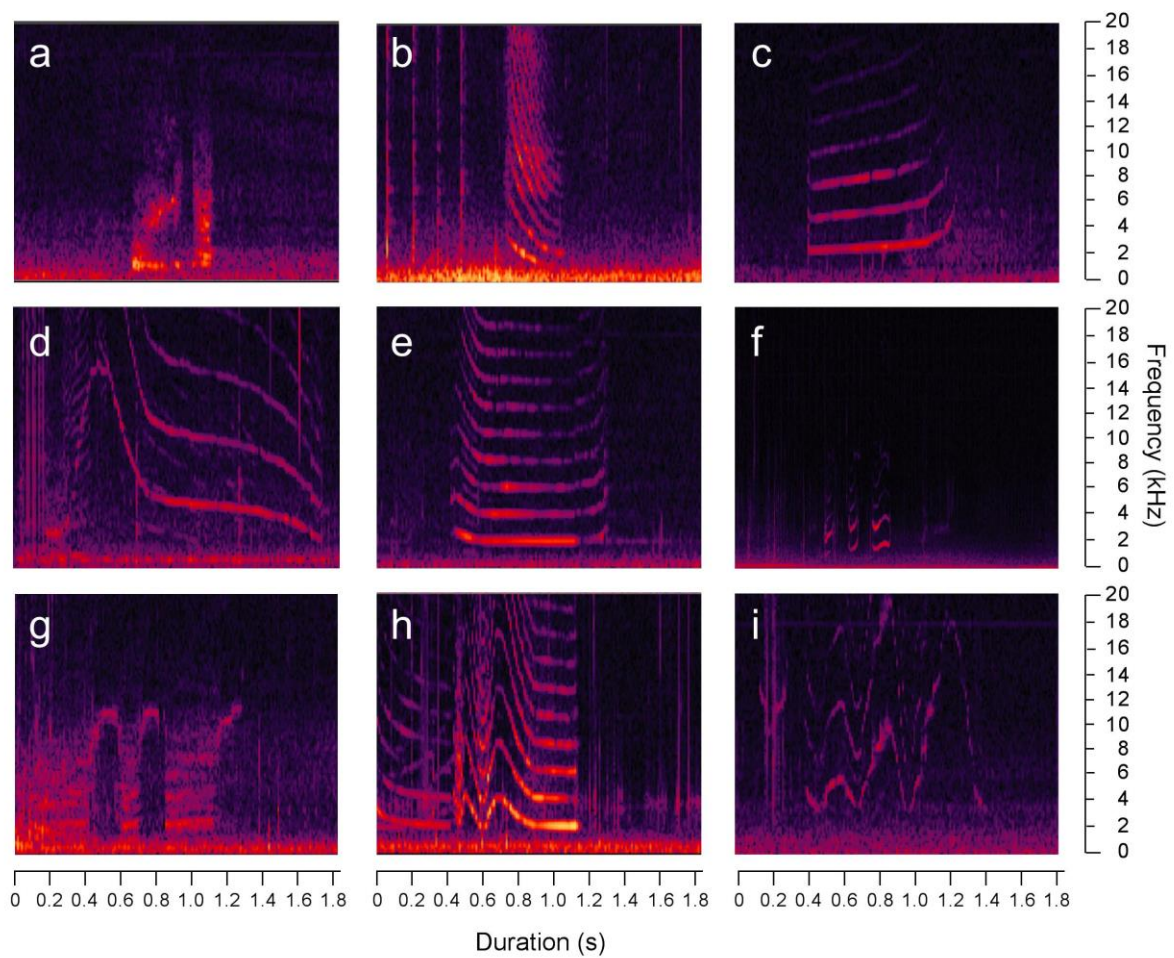
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Electronic supplementary material for the manuscript: 'Vocal foragers and silent crowds: context-dependent vocal variation in Northeast Atlantic long-finned pilot whales', in Behavioral Ecology and Sociobiology, by Fleur Visser, Annebelle CM Kok, Machiel G Oudejans, Lindesay AS Scott-Hayward, Stacy L DeRuiterd, Ana C Alves, Ricardo N Antunes, Saana Isojunno, Graham J Pierce, Hans Slabbekoorn, Jef Huisman and Patrick JO Miller.

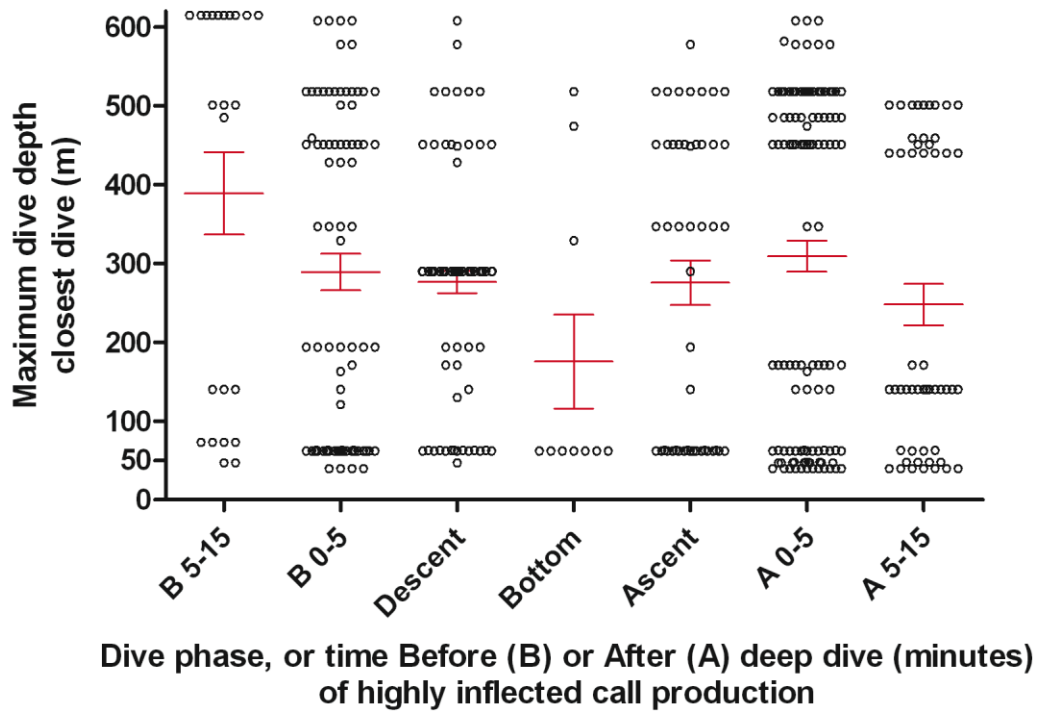
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### Supplementary Figures

**Supplementary Figure S1.** Examples of call types. a-c: non-inflected calls, d-f: inflected calls; g-i: highly inflected calls.



**Supplementary Figure S2.** Timing in the dive cycle of highly inflected calls produced 0-15 minutes prior to or post deep dives (>34 m), or in the descent, bottom or ascent phase of deep dives, as a function of maximum dive depth of the dive in/closest in time to which they occurred. Open circles: individual calls. Red lines and error bars: mean and SEM.



## Supplementary Tables

**Supplementary Table S1.** Parameter estimates and standard errors ( $\pm$ ) for retained covariates ( $P < 0.05$ ) in the two binomial GEE-based vocalisation models (silence, calls). Empty cell: parameter not retained best model. Coefficients represent the difference between the factor level and the reference factor level on the scale of the link function (logit).

Covariate(_factor level)	Vocalisation type	
	Silence	Calls
Diving state_shallow	3.7 $\pm$ 1.21	-1.8 $\pm$ 0.8
Group size	-0.06 $\pm$ 0.04 <sup>a</sup>	
No. individuals in focal area	0.1 $\pm$ 0.01 <sup>a</sup>	
Individual spacing_tight	2.4 $\pm$ 1.3	-0.7 $\pm$ 0.3
Individual spacing_loose	2.1 $\pm$ 1.0	-1.2 $\pm$ 0.5
Individual spacing_veryLoose	2.5 $\pm$ 1.2	-0.6 $\pm$ 0.4
Individual spacing_solitary	2.0 $\pm$ 1.3	-2.2 $\pm$ 0.3
Diving state_shallow:Group size	0.22 $\pm$ 0.02	
Diving state_shallow:No. individuals in focal area	-0.1 $\pm$ 0.02	
Diving state_shallow:Individual spacing_tight	-2.5 $\pm$ 1.3	1.1 $\pm$ 0.7
Diving state_shallow:Individual spacing_loose	-3.1 $\pm$ 0.9	1.7 $\pm$ 0.8
Diving state_shallow:Individual spacing_veryloose	-3.5 $\pm$ 1.2	1.0 $\pm$ 0.9
Diving state_shallow:Individual spacing_solitary	-3.6 $\pm$ 2.2	3.9 $\pm$ 0.9

<sup>a</sup>Parameter retained in best model because included in significant 2-way interaction term

**Supplementary Table S2.** Parameter estimates and standard errors ( $\pm$ ) for retained covariates ( $P < 0.05$ ) in the multinomial GEE-based vocalisation model (responses: no calls, non-inflected, inflected or highly inflected calls). Coefficients represent the difference between the factor level and the reference factor level on the scale of the link function (cumulative logit).

Covariate(_factor level)	Call modularity
Intercept 1 (no calls)	0.16 $\pm$ 0.25
Intercept 2 (non-inflected calls)	0.84 $\pm$ 0.22
Intercept 3 (inflected calls)	2.63 $\pm$ 0.24
Diving state_deep	-3.82 $\pm$ 0.62
Distance to nearest other group_100to200	-0.40 $\pm$ 0.47 <sup>a</sup>
Distance to nearest other group_10to50	-0.89 $\pm$ 0.34 <sup>a</sup>
Distance to nearest other group_200to500	-0.47 $\pm$ 0.20 <sup>a</sup>
Distance to nearest other group_500to1000	-0.10 $\pm$ 0.50 <sup>a</sup>
Distance to nearest other group_50to100	-1.24 $\pm$ 0.22 <sup>a</sup>
Individual spacing_loose	-0.56 $\pm$ 0.19
Individual spacing_solitary	-1.83 $\pm$ 1.51
Individual spacing_tight	-0.07 $\pm$ 0.11
Individual spacing_veryLoose	-0.36 $\pm$ 0.16
Diving state_deep:Distance to nearest other group_100to200	1.68 $\pm$ 0.38
Diving state_deep:Distance to nearest other group_10to50	2.46 $\pm$ 0.23
Diving state_deep:Distance to nearest other group_200to500	0.84 $\pm$ 0.29
Diving state_deep:Distance to nearest other group_500to1000	0.80 $\pm$ 1.02
Diving state_deep:Distance to nearest other group_50to100	2.49 $\pm$ 0.97
Diving state_deep:Individual spacing_loose	1.33 $\pm$ 0.34
Diving state_deep:Individual spacing_solitary	5.11 $\pm$ 1.02
Diving state_deep:Individual spacing_tight	1.31 $\pm$ 0.52
Diving state_deep:Individual spacing_veryLoose	2.22 $\pm$ 0.67

<sup>a</sup>Parameter retained in best model because included in significant 2-way interaction term.