

Alternative migration strategies of fin whale in Svalbard Islands (Norway) revealed by passive acoustics

Papale E. ^A, Pelagatti M. ^A, Pedrazzi G. ^B, Buscaino G. ^A

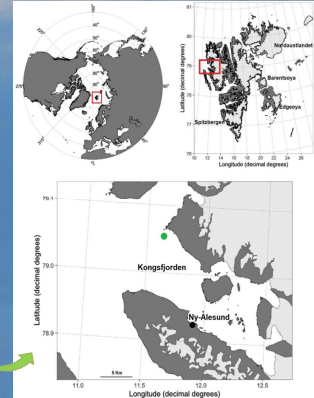
^A Institute for the Study of Anthropic Impacts and Sustainability in the Marine Environment, National Research Council, Italy

^B Department of Environmental Biology, Sapienza University of Rome, Italy



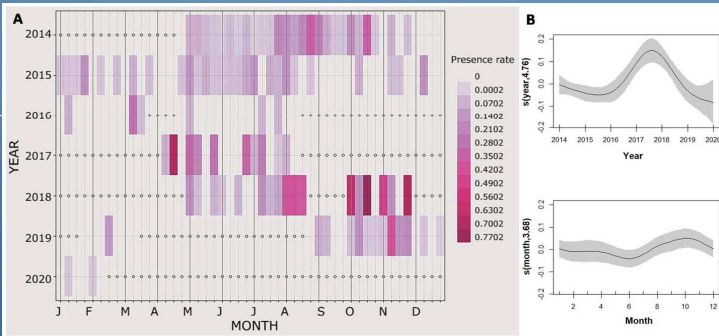
The Arctic is drastically changing due to global warming and anthropogenic activities. Current alterations are influencing the temporal and spatial habitat suitability, with consequences on migrating species. Marine mammals are sentinels of these changes.

This study unveils the undertaking of an alternative strategy to migration movements, and the potential origin of the fin whales overwintering in Svalbard.



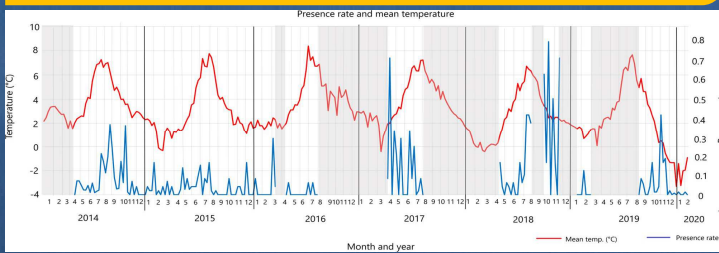
The presence of songs indicates that certain individuals possibly use the area for mating purposes. Three kinds of pulses were detected: 20 Hz pulses, beakbeat and 130 Hz pulses

Fin whales occurred all year-round: some individuals do not undertake the migratory journey through the southern breeding grounds

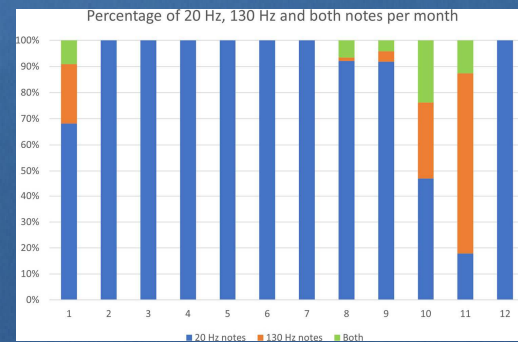


(A) Fin whale acoustic presence per week (Presence Rate) along the 7 years considered. White dots represent absence of data. (B) Response curves of the variables in the Generalized Additive Models (GAMs) performed testing PR as a function of the predictors Year and Month. The solid lines represent the smoothed estimates by the GAM, while the grey areas the approximate 95% confidence intervals. Deviance Explained 25.6%, Explanatory variable: Month F=1.0; p=0.01; Year F=7.95 p<0.001.

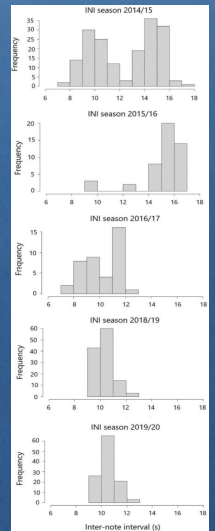
The sea surface temperature reveals conditions which could be favorable for the species to persist in the area.



Weekly whale PR (in blue) and mean Sea Surface Temperature (SST, in red). Light grey strips represent periods with no data. Positive correlation between PR and SST (Spearman S=730,064, p<0.05, rho=0.21). The highest PR values were reached at a SST range of 2–7 °C, peaking at 6–7° in July–August, and 2–3° in Spring & Fall.



Histogram representing relative percentages of 20-Hz and 130 Hz per month (1–12) over the entire dataset, and inter-note-interval distribution along the singing seasons (from September to April).



Either the fin whales are able to switch their INI patterns or populations with different INIs are visiting during the Winter

The authors would like to thank all the staff of the Italian Arctic base Dirigibile Italia

