

SMM Grants in Aid of Research 2021

Final Report by Florencia Vilches (fvilches@ucsc.edu)

Change with the times: assessing Southwestern Atlantic southern right whales' flexibility to a changing ocean

Instituto de Conservación de Ballenas, Argentina

University of California Santa Cruz, U.S.A.

Project summary. Global warming is reducing Antarctic sea ice where krill feed. Adapting to such changes will be extremely difficult for long-lived krill consumers such as whales. Therefore, individual trophic and migratory flexibility will be critical to their survival. The project aims to examine southern right whales' (*Eubalaena australis*) foraging and migratory responses to climate-driven fluctuations in prey availability. We conducted bulk carbon and nitrogen isotope analysis of subsampled baleen plates collected at Península Valdés, Argentina (1987-2009) from 14 adults and juveniles to reconstruct the migratory patterns over the ~7 years previous to death represented by each plate.

Preliminary results. Data for both isotope ratios ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) in 14 baleen plates subsampled at a resolution of 2 cm and represented by 950 subsamples showed $\delta^{13}\text{C}$ values between -25.7‰ and -15.7‰ and a mean of -21.8‰, while $\delta^{15}\text{N}$ values ranged from 3.8‰ and 15.1‰ and a mean of 7.9‰. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ showed standard deviations of 1.98 and 2.54, respectively.

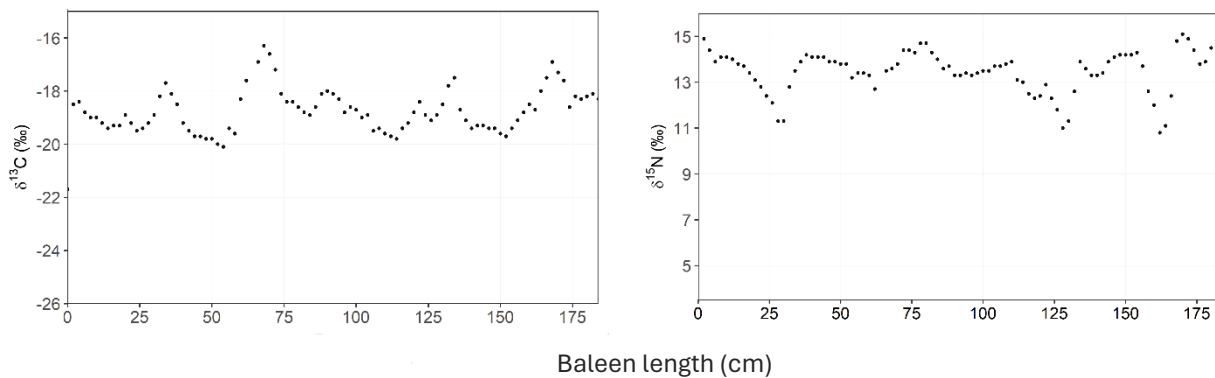


Figure 1. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ profiles in the baleen plate of an adult female southern right whale (*Eubalaena australis*) from Península Valdés, Argentina.

Preliminary analysis of 14 whales showed annual oscillations, likely reflecting migrations and physiological changes driven by (summer) feeding and (winter) fasting. Three individuals (21%) had high $\delta^{13}\text{C}$ values reflecting prey consumed in temperate latitudes, two (15%) had low $\delta^{13}\text{C}$ values reflecting prey consumed in higher latitudes, and nine (64%) showed year-to-year shifts in the use of temperate versus high latitudes. Most $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ cycles were largely synchronous. We plan to examine the relationship between baleen isotopic composition, krill densities, and oceanographic anomalies to test whether whales forage year-round at high-latitude grounds or switch to temperate-latitude prey when krill availability is reduced. An abstract was submitted to the 25th Biennial Conference on the Biology of Marine Mammals to present the results of this study.