www.elsevier.com/locate/dsr2

Isotopic evidence of the effect of warming on the Northern Antarctic Peninsula ecosystem

Elisa Seyboth, Silvina Botta, Carlos Rafael Borges Mendes, Javier Negrete, Luciano Dalla Rosa, Eduardo Resende Secchi

PII: S0967-0645(17)30394-6
DOI: https://doi.org/10.1016/j.dsr2.2017.12.020
Reference: DSRII4380

To appear in: *Deep-Sea Research Part II*

Received date: 1 June 2017
Revised date: 14 December 2017
Accepted date: 26 December 2017

Cite this article as: Elisa Seyboth, Silvina Botta, Carlos Rafael Borges Mendes, Javier Negrete, Luciano Dalla Rosa and Eduardo Resende Secchi, Isotopic evidence of the effect of warming on the Northern Antarctic Peninsula ecosystem, *Deep-Sea Research Part II,* https://doi.org/10.1016/j.dsr2.2017.12.020

Isotopic evidence of the effect of warming on the Northern Antarctic Peninsula ecosystem

Elisa Seyboth[a,b], Silvina Botta[a,b], Carlos Rafael Borges Mendes[a,c], Javier Negrete[d,e], Luciano Dalla Rosa[a,b], Eduardo Resende Secchi[a,b]

[a] *Programa de Pós-Graduação em Oceanografia Biológica, Instituto de Oceanografia, Universidade Federal do Rio Grande (FURG), Av. Itália, km 8, Rio Grande, RS, 96203-900, Brazil*
[b] *Laboratório de Ecologia e Conservação da Megafauna Marinha, Instituto de Oceanografia, Universidade Federal do Rio Grande (FURG), Rio Grande, RS, 96203-900, Brazil*
[c] *Laboratório de Fitoplâncton e Microorganismos Marinhos, Instituto de Oceanografia, Universidade Federal do Rio Grande (FURG), Av. Itália, km 8, Rio Grande, RS, 96203-900, Brazil*
[d] *Departamento de Biología de Predadores Tope, Instituto Antártico Argentino, Av. 25 de Mayo 1143, San Martín, Buenos Aires, C101 AAZ, Argentina*
[e] *Facultad de Ciencias Naturales y Museo, Av.122 y 60 s/n, CP 1900, La Plata, Buenos Aires, Argentina*

*Corresponding author: Elisa Seyboth
E-mail: elisaseyboth@gmail.com

ABSTRACT

The Antarctic Peninsula (AP) region is one of the areas under faster warming rates worldwide, where food web changes have been observed in the last decades. Among these changes are the development of cryptophytes under warmer conditions in detriment of diatoms, and the reduced krill availability in the environment. An isotopic approach was used to investigate whether the temporal and spatial patterns of energy transfer from phytoplankton (using particulate organic matter – POM – as a proxy of primary producers) to baleen whales (humpback – *Megaptera novaeanglieae,* fin – *Balaenoptera physalus,* Antarctic minke – *Balaenoptera bonaerensis, and killer whales – Orcinus orca*) is similar in areas under different effects of warming around the Northern Antarctic Peninsula (NAP). Samples of POM (65), krill (29) and skin of baleen (106) and killer whales (n=5) were collected in Gerlache and Bransfield Straits (western AP) and the Powell Basin (northeastern AP) during the austral summers of 2013 to 2016. Mean isotope values for $\delta^{13}C$ and $\delta^{15}N$ values were, respectively, -26.3‰ (± 2.9) and 0.9‰ (± 1.7) for POM, -25.6‰ (± 0.9) and 5.3‰ (± 1.1) for krill, -24.1‰ (± 2) and 8.9‰ (± 1.5) for humpback, -24.6‰ (± 1.2) and 8.2‰ (± 0.7) for fin, -24.4‰ (± 1.6) and 8.7‰ (± 1) for Antarctic minke whales, and -23.6‰ (± 1.2) and 8.9‰ (± 1.7) for killer whales. Interannual significant differences were found for $\delta^{13}C$ values of POM and fin whales' samples, while spatial differences were found for $\delta^{13}C$ values of POM samples and humpback whales and for $\delta^{15}N$ values of POM, humpback and Antarctic minke whales. Lower $\delta^{13}C$ and $\delta^{15}N$ values for the base of the food web tended to be observed towards open sea regions (Powell Basin and an area under the influence of the Bellingshausen Sea waters). The isoscapes generated for