



**Analytical, Environmental and Geo-Chemistry**

has the honor to invite you to the public defense of the PhD thesis of

**Genyffer Cibele Troina**

to obtain the degree of Doctor of Sciences

Joint PhD with Federal University of Rio Grande, FURG, Brazil

Title of the PhD thesis:

**Trophic interactions and ecology of cetaceans from  
the western South Atlantic**

**Promotors:**

Prof. Frank Dehairs  
Prof. Marc Elskens  
Prof. Eduardo Secchi (FURG, Brazil)  
Prof. Silvina Botta (FURG, Brazil)

The defence will take place on

**Thursday October 17 2019 at 14h**

In auditorium I.0.02 at the Campus Humanities,  
Sciences and Engineering of the Vrije Universiteit  
Brussel, Pleinlaan 2 - 1050 Elsene

**Members of the jury:**

Prof. Harry Olde Venterink (Chairman, VUB)  
Dr. Natacha Brion (Secretary, VUB)  
Prof. Virginia Maria Tavano (FURG)  
Prof. Osmar Olinto Möller Junior (FURG)  
Dr. Valentina Franco-Trecu  
(Universidad de la República, Uruguay)  
Prof. Steven Bouillon (KULeuven)

**Curriculum vitae**

Genyffer Troina obtained her BSc. in Biological Sciences at the Federal University of Rio Grande (FURG, Brazil) in 2009, and her MSc. in Marine and Lacustrine Science and Management at the VUB, UGent and UA in 2013. During her PhD she spent a total of 60 days at sea collecting samples for her PhD research, published a peer-reviewed paper in international journal and has two papers undergoing review for publication. She presented her work in three international conferences, participated in workshops, seminars, and statistical courses. She supervised an undergrad student, evaluated a BSc. thesis and gave lessons to the Bachelor in Oceanography course at FURG.

**Abstract of the PhD research**

The aim of this study was to investigate the trophic ecology of the cetacean species occurring in the coastal and oceanic waters off Brazil. We used natural carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) stable isotopes in cetaceans and their (potential) prey to make inferences about the ontogenetic and sexual differences in the feeding habits of a coastal species (franciscanas, *Pontoboria blainvillei*), and to learn about the intra- and interspecific trophic interactions among ten free-ranging oceanic species (Delphinidae and Physteridae).  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  was analysed in tooth samples of franciscanas and their prey (muscle tissues), and in the skin samples of the oceanic cetacean species and the organisms comprising the different compartments of the food chain (particulate organic matter - POM, zooplankton, fish and squid). Characterizing the spatiotemporal patterns in  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  at the base of the food webs (baseline) is essential in ecological studies for the assessment of the feeding habits and migration patterns of marine predators. Therefore, we constructed isotopic maps (*isoscapes*) describing the latitudinal (north-to-south), longitudinal (outer continental shelf-to-offshore) and seasonal (spring-autumn) patterns in zooplankton  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ . Furthermore, we discuss the trophic ecology and interactions among the cetacean species and analyzed the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  in all organisms from primary producers and consumers to top predators in an ecosystem approach. Additionally, the trophic position of the oceanic cetacean species was estimated with the analysis of  $\delta^{15}\text{N}$  in individual amino acids.

The data presented here provide a first insight into the feeding habits, trophic interactions and ecological niche of cetaceans that inhabit the coastal and oceanic waters of the subtropical western South Atlantic. Information on baseline  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  and their spatial and seasonal patterns provided an important basis for the interpretation of the isotopic values of higher trophic level consumers, enabling a more detailed assessment of the ecology and trophic relationships among species within ecosystems, and about their habitat use. Furthermore, our study offers for the first-time information about the spatiotemporal patterns in the ecology and trophic interactions among the different cetacean species that inhabit the oceanic waters of the western south Atlantic.