Niche partitioning among marine mammals inhabiting a positive estuary as revealed by stable isotopes of C, N, S and O.

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Full article:

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INTRODUCTION

Stable isotope analysis is and effective tool to study the habitat use of marine mammals. Here, we use $\delta^{13}C$, $\delta^{15}N$, $\delta^{18}O$ and $\delta^{34}S$ values from bone of seven marine mammal species to characterize their isotopic niches, in order to provide a fine resolution model of habitat partition between species in estuarine habitats.

South American fur seal
Arctocephalus australis

South American sea lion
Otaria flavescens

Bottlenose dolphin
Tursiops truncatus

METHODS

- The Río de la Plata estuary represents the largest freshwater runoff in the SW Atlantic Ocean, with marked salinity and redox gradients (fig. 1).
- The $\delta^{13}C$, $\delta^{15}N$, $\delta^{18}O$ and $\delta^{34}S$ values of the seven species were compared using one-way ANOVA followed by a Scheffe post-hoc test, and isotopic niches were assessed with two-dimensional "SIBER" plots using R.

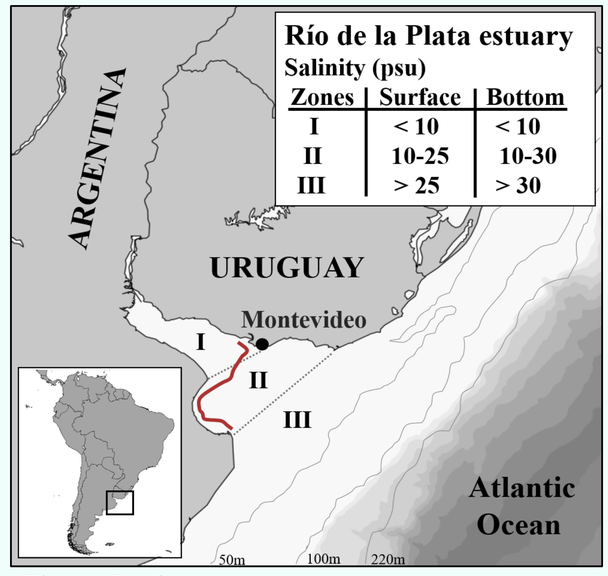

Fig. 1. Study area.

RESULTS & DISCUSSION

The isotopic data suggested an extensive use of the estuary by most species (fig. 2 and 3):

- Bottlenose dolphins, South American sea lions and fur seals showed affinity for the low salinity areas above the salt wedge, influenced by salt marshes and phytoplankton.
- Burmeister´s porpoises, franciscana dolphins, and false killer whales seem to prefer the saltier waters close to the bottom of the estuary; the former showed higher affinity to the maximum turbidity zone influenced by terrestrial detritus, whereas the last two showed a higher influence from salt marsh detritus.
- Fraser´s dolphins were the only truly marine species, with preference for high salinity areas with phytoplankton influence.

Burmeister's porpoise
Phocoena phocoena

False killer whale
Pseudorca crassidens

Franciscana dolphin
Pontoporia blainvillei

Fraser's dolphin
Lagenodelphis hosei

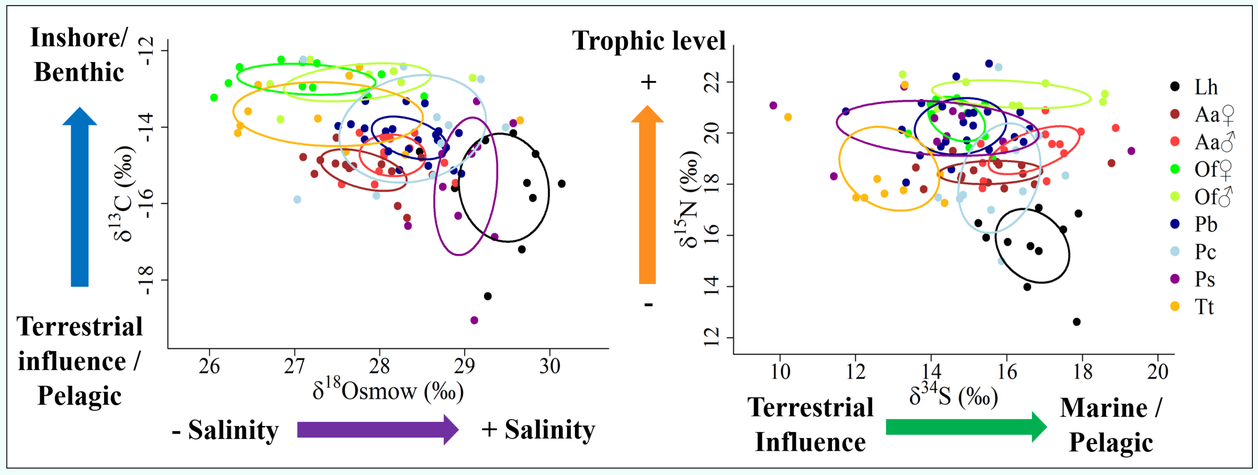

Fig. 2. Standard Ellipse Areas.

CONCLUTIONS

The combination of the four habitat tracers allowed a better visualization of the different dimensions that make up the isotopic niche, improving the understanding of habitat partitioning between marine mammal species.

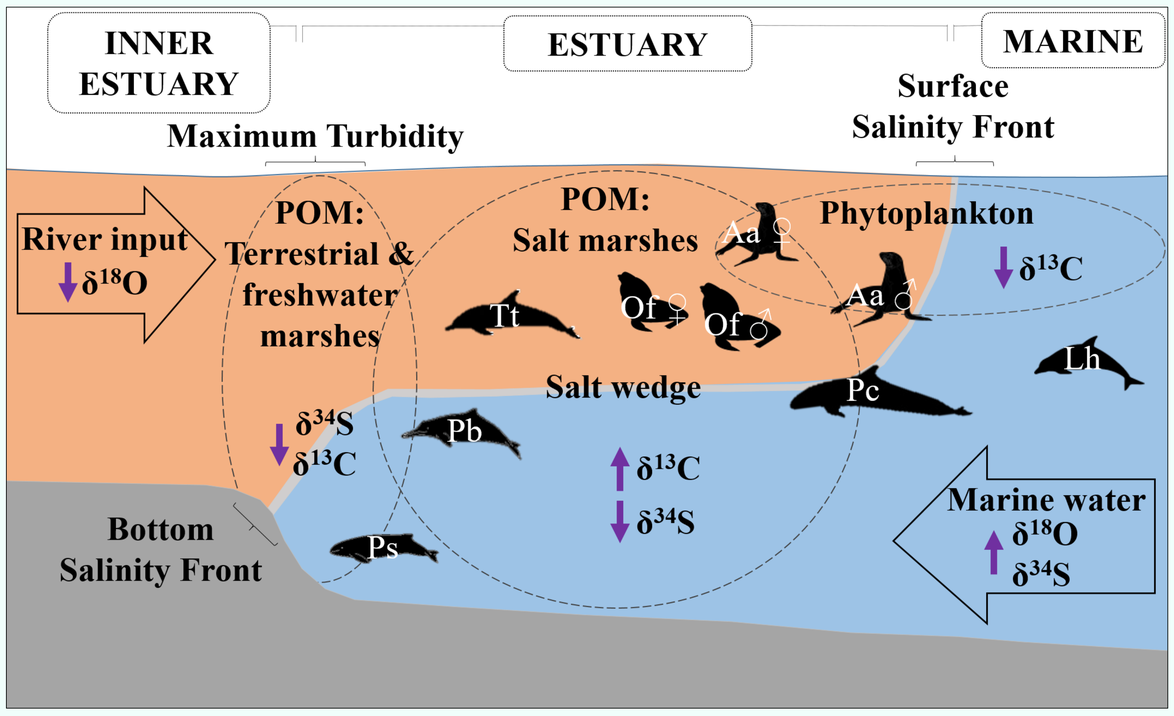

Fig. 3. Estimated habitat preferences. POM: particulate organic matter