

# **Fine-scale Population Structure And Trophic Interactions Of Coastal Delphinids Off The Eastern Coast Of South Africa Inferred From Stable Isotope Analysis**

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## **Submission:**

### **Background**

Dietary tracers, such as bulk stable carbon ( $\delta^{13}\text{C}$ ) and nitrogen ( $\delta^{15}\text{N}$ ) isotopes, can be used to investigate the trophic interactions of marine predators, which is useful to assess their ecological roles within communities. These tracers have also been used to elucidate population structure and substructure, which is critical for the better identification of management units for these species affected by a range of threats, particularly bycatch in fishing gears. Off eastern South Africa, large populations of Indo-Pacific bottlenose (*Tursiops aduncus*) and common dolphins (*Delphinus delphis*) co-occur and are thought to follow the pulses of shoaling sardines (*Sardinops sagax*) heading north-east in the austral winter.

### **Method**

Here we used  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  to investigate the trophic interactions and population substructure of these two species along a  $\approx 800\text{km}$  stretch of the east coast of South Africa, from Algoa Bay to the coast of KwaZulu-Natal.

### **Results**

Common and bottlenose dolphin dietary niche overlapped by 39.7% overall in our study area, with the highest overlap occurring off the Wild Coast (40.7% at Hluleka). Both stable isotopes were significantly enriched in bottlenose dolphins sampled in the western part of our study area (i.e., Algoa Bay and Amathole) compared to eastern animals (i.e., from Hluleka, Pondoland, and KZN).

### **Conclusion**

In areas where genetic information is not available or is insufficient, food web tracers (such as stable isotopes) can be used to group individuals based on trophic ecology, which can provide ecological units for management of populations. The distinct isotope signatures found here for bottlenose dolphins can, therefore, be used as management units for conservation efforts in the future.