



DCLDE Workshop Jul. 2015



Investigating variables influencing click emission rate of franciscana dolphin (*Pontoporia blainvillei*).

*Artur Andriolo
Federal University of Juiz de Fora*

*Federico Sucunza, Alexandre N. Zerbini, Daniel Danilewicz, Marta J. Cremer
and Annelise Colin Holz, Edson Bruno Novais and Tiago Marques*

Conservation Issues

- High levels of bycatch in gillnet fisheries have been recorded throughout its range since the 1940s and the species is regarded the most threatened cetacean in western South Atlantic Ocean.

Secchi ER, Ott PH, Danilewicz D (2003) Effects of fishing bycatch and the conservation status of the franciscana dolphin, *pontoporia blainvillei*. In: Gales N, Hindell M, Kirkwood R (eds) Marine mammals: Fisheries, tourism and management issues. CSIRO Publishing, Collingwood, p 174-191

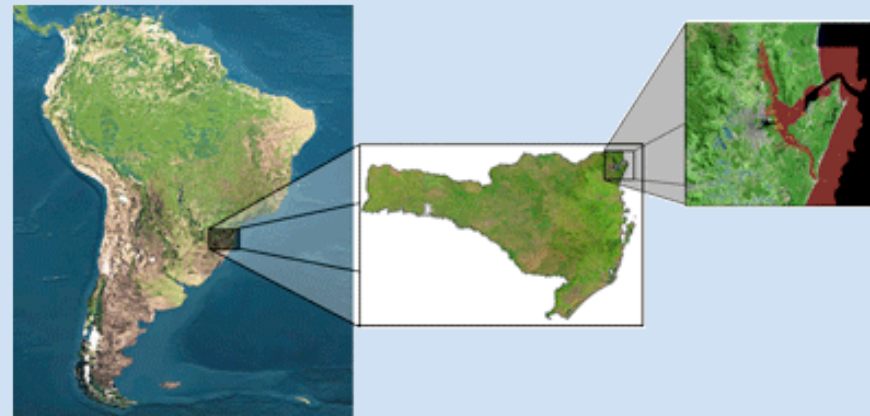


Adding passive acoustics into the big picture

- Considering the actual potential of the passive acoustics approach to add new information, we decided to go for it.
 - Abundance estimation
 - Population trends
 - Long term monitoring
- In this study we have investigated potential factors that could affect the production of high-frequency clicks in a resident population of franciscana dolphins.

Franciscana dolphin acoustics

- January 2014 - During a calibration study to estimate Franciscana group size using a helicopter at Babbitonga Bay flying at 150m, we made passive acoustic recordings of Franciscana dolphin.



Detection and Classification

An energy summation algorithm was developed for detection.

It first ignores unnecessary frequencies by applying a high pass filter of 100 kHz.

Then an energy summation on the frequency domain was applied, giving the features used for the classifier.

The classification algorithm used was k-nearest neighbor algorithm.

The machine training consisted of 15621 samples divided into two classes (with signal and non signal).

A cross validation was applied in the training set, resulting in an error rate of 0.5%.

- Matlab
 - Machine Learning Toolbox
 - Signal Processing Toolbox

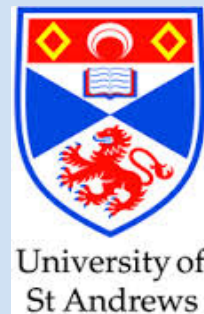
Results

- Simple linear model was used to assess whether the average frequency of clicks per minute was influenced by:
 - the presence of the helicopter,
 - group size,
 - calf presence, and
 - water transparency.
- Group size was the only significant ($p=0.0464$) predictor and indicated that click frequency increases with the number of individuals in the group.
- The results supports the use of an average franciscana individual emission rate to be used on estimates of abundance.



Acknowledgements

All the team, my students and funding agencies



Thank you!

