

Switching off the Sun to observe the twilight zone spatial dynamics

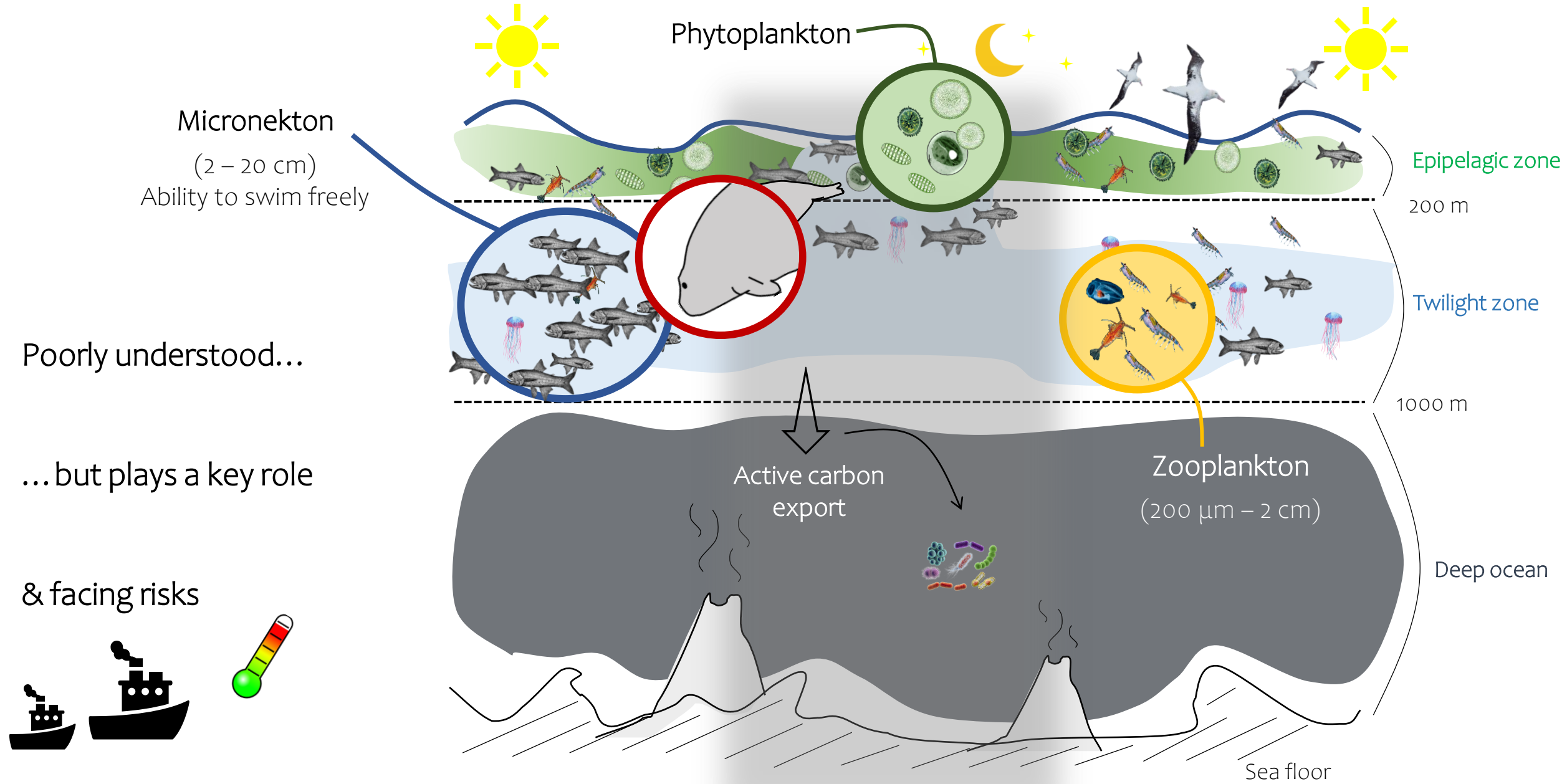
*across Saint-Paul and New Amsterdam Islands,
Southern Indian Ocean*

PhD student: L. Izard
Supervisors: C. Cotté & J.-B. Charrassin

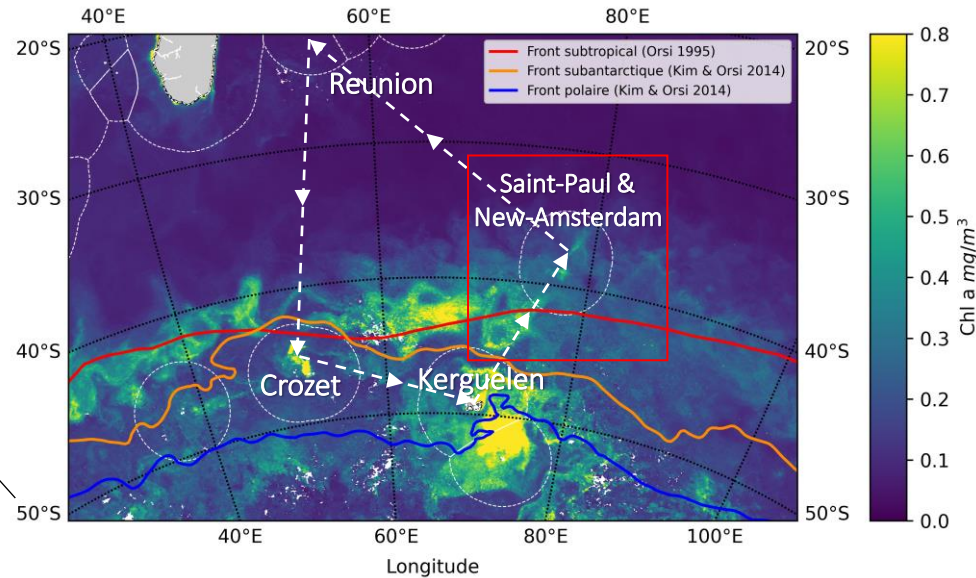
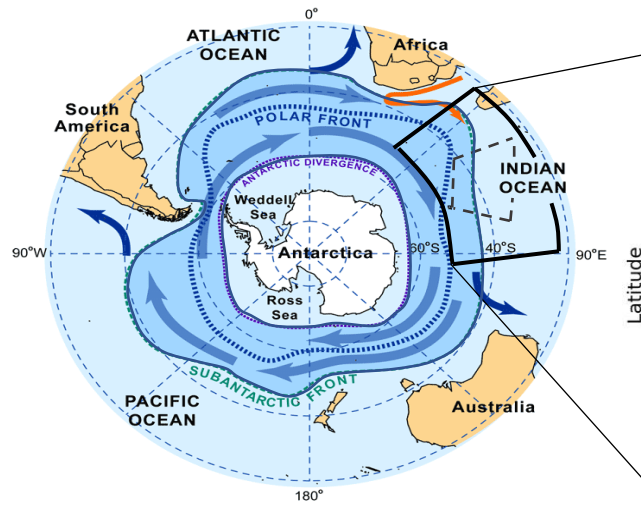


Credit: Paul Edward Caiger

The twilight zone: a **complex** ecosystem



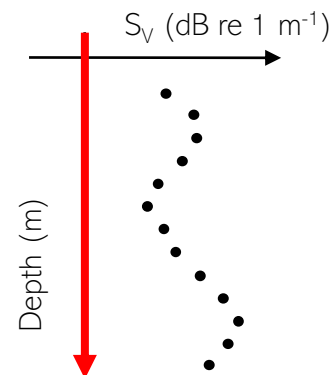
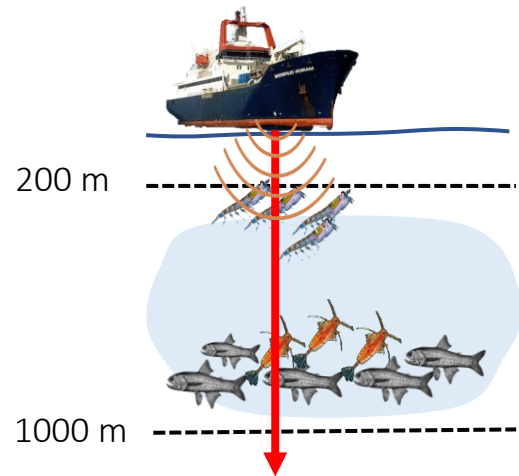
Where and how?



- Micronekton structuring
- Contrasted oceanographic domains
- Can we detect spatial changes in micronekton structuring from acoustic data and explain them by environmental factors?

Active acoustic data acquisition

- Echosounder EK80 (Simrad, Norway)
- 5 frequencies: 18, 38, 70, 120, 200 kHz

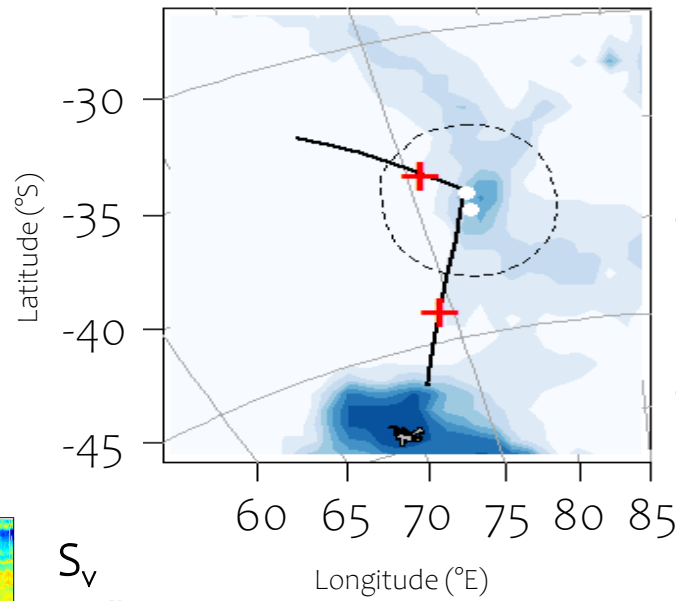
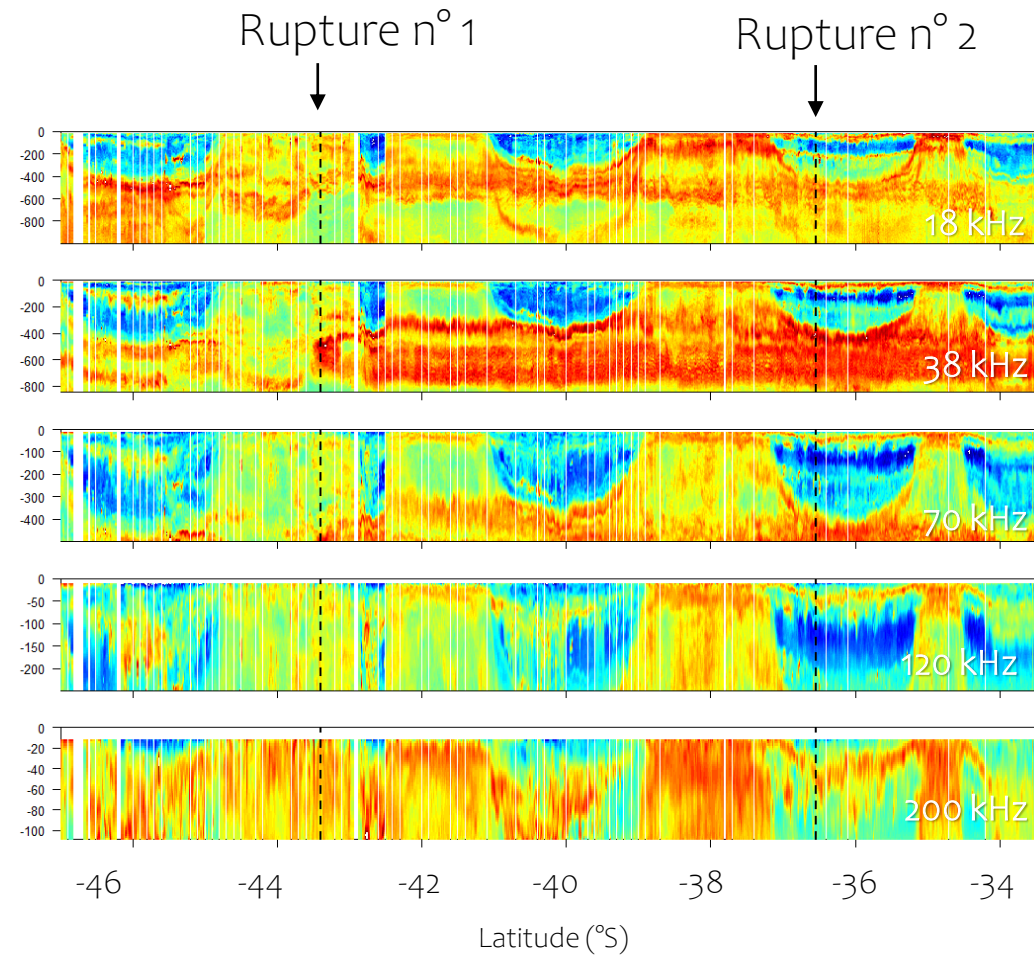


Multivariate Functional data analysis

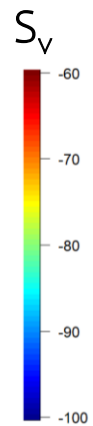
1. Discrete to functional data (Ramsay & Silverman, 2005)
2. Multivariate Functional Principal Component Analysis
 - Find modes of variability
 - Link them to temporal and/or spatial variation
3. Identify sharp transition in the spatial components

Results

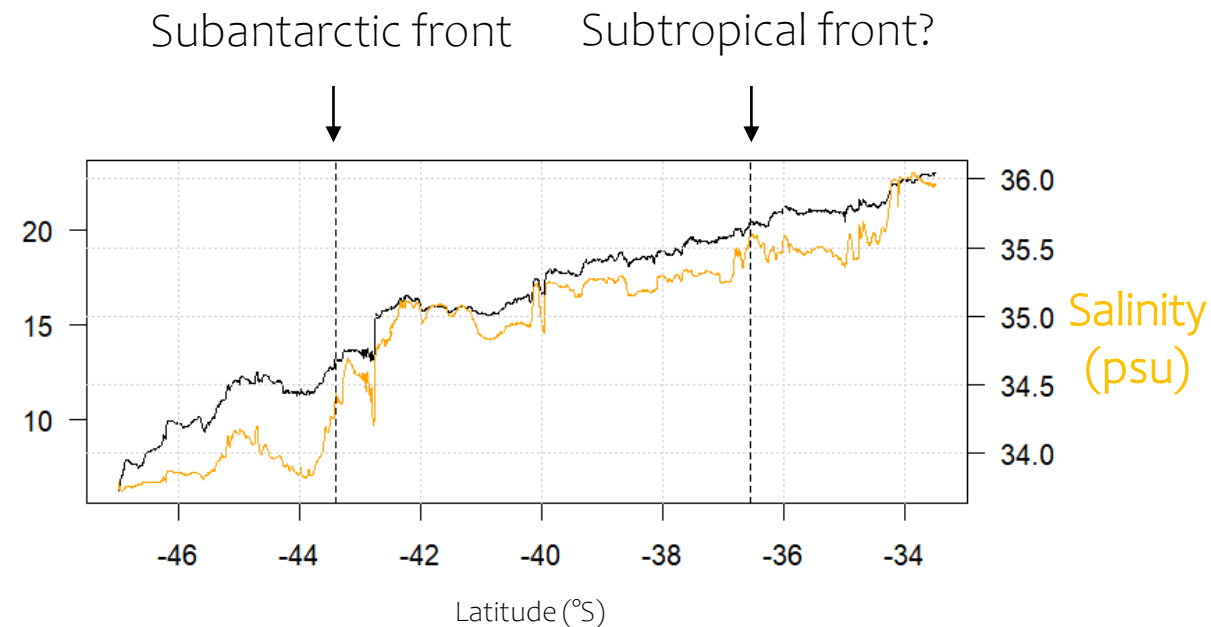
- The **statistical analysis** allow to **determine 3 zones** along the transect
- The **vertical structuring** follows a latitudinal pattern



- **Acoustic ruptures** match surface hydrological and biogeochemical gradients
- **Perspective: micronekton 3D distribution modelling**



Temperature (°C)





Thank you for your attention
More information in the poster!

