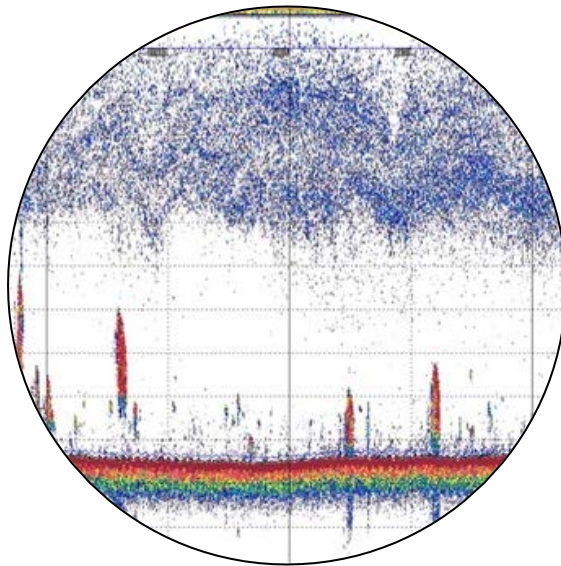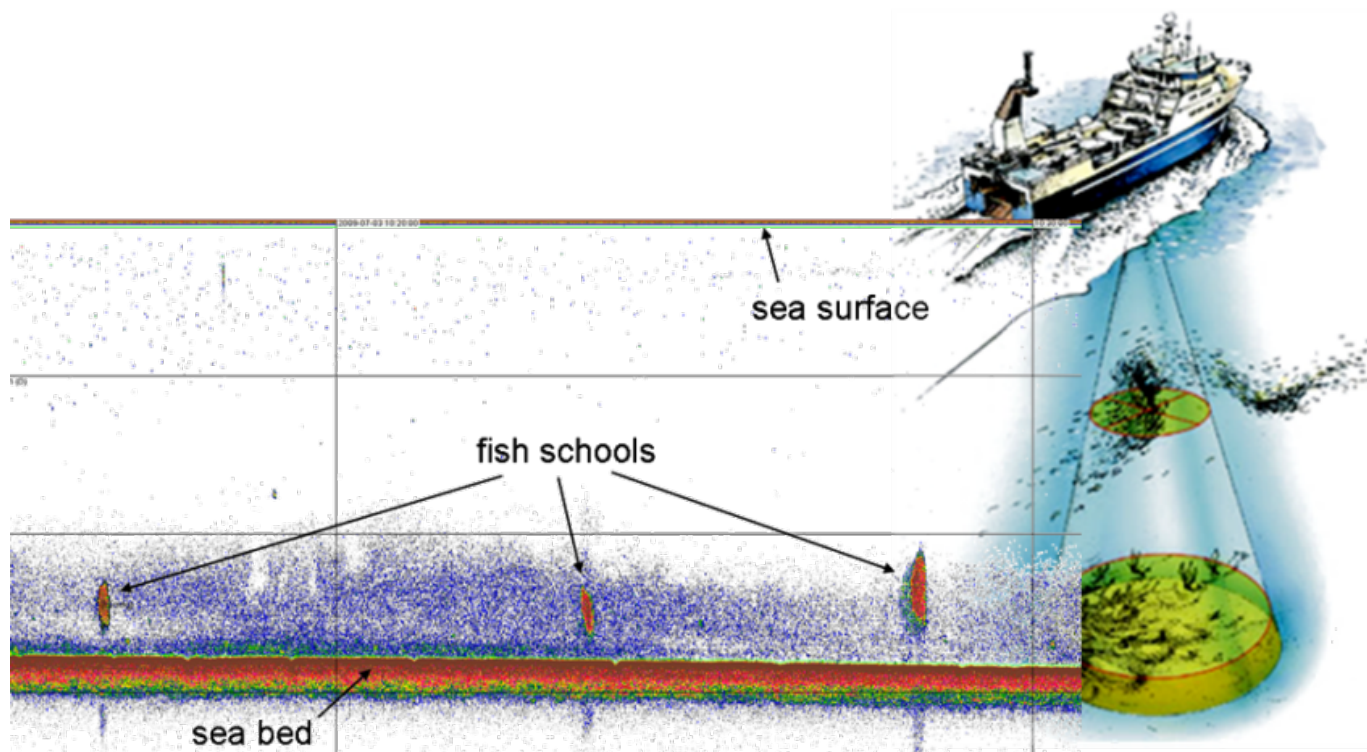# Determining herring habitat quality from acoustically derived zooplankton abundance in the northern North Sea

Sascha M.M. Fässler, Lorna R. Teal, Susan M. Lusseau and Piet Ruardij

Introduction

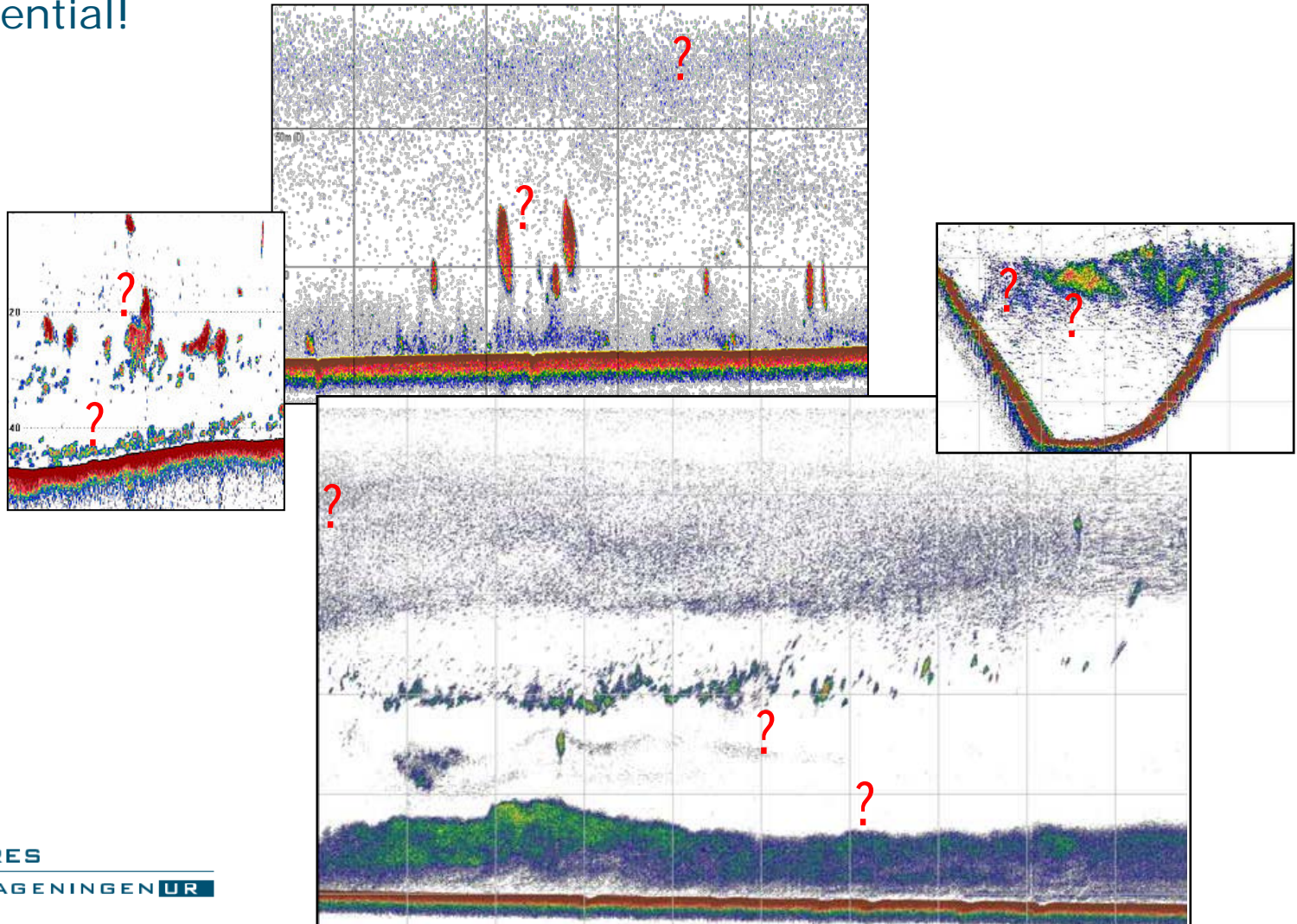- Acoustic "fish survey" data: not used to full potential!

Introduction

- Acoustic "fish survey" data: not used to full potential!
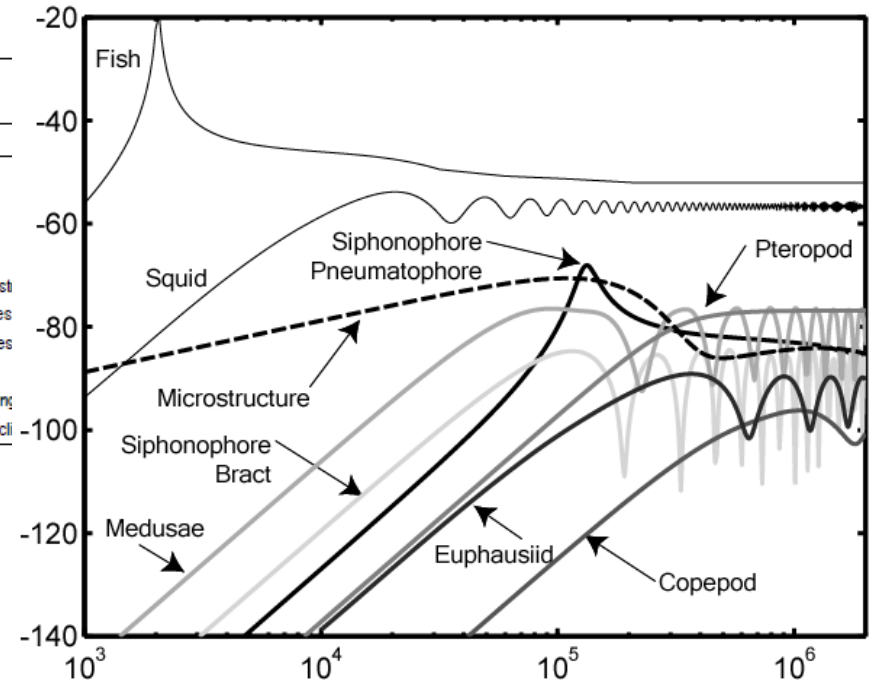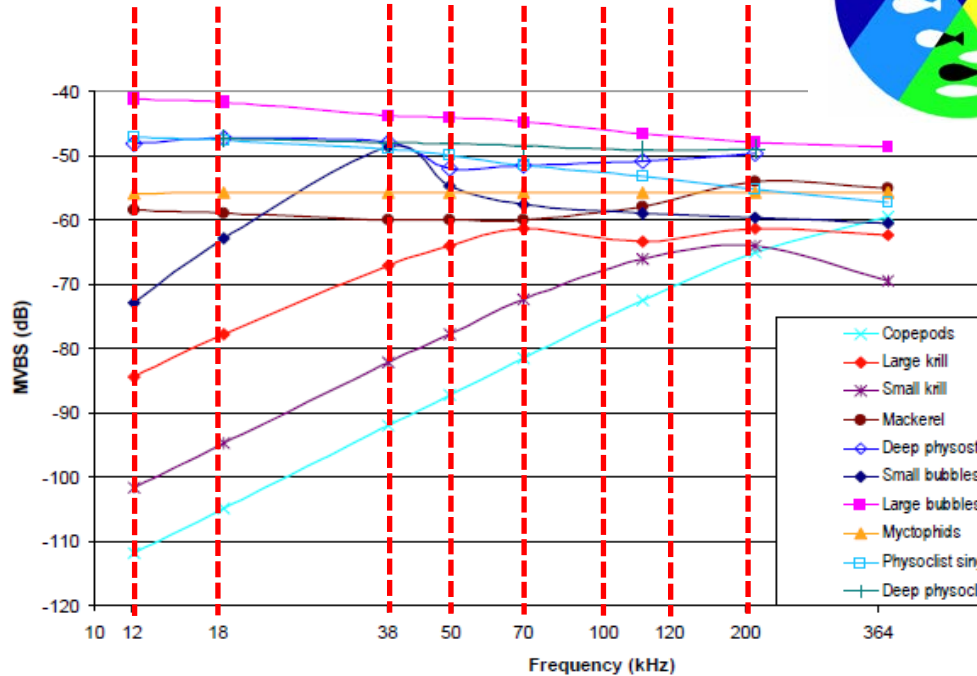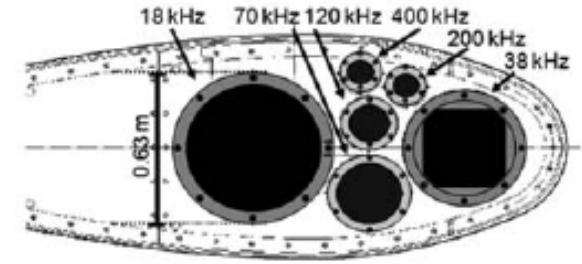
Introduction

- Multifrequency species identification

Introduction

- Example: simple macrozooplankton algorithm

Progress in Oceanography 91 (2011) 360–381

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Is there enough zooplankton to feed forage fish populations off Peru? An acoustic (positive) answer

Michael Ballón [a,b,*], Arnaud Bertrand [a,b], Anne Lebourges-Dhaussy [c], Mariano Gutiérrez [d], Patricia Avón [a]. Daniel Grados [a,b]. Francois Gerlotto [b]

| Vol. 439: 151–168, 2011 doi: 10.3354/meps09318	MARINE ECOLOGY PROGRESS SERIES Mar Ecol Prog Ser	Published October 20

Spatial patterns and scale-dependent relationships between macrozooplankton and fish in the Bay of Biscay: an acoustic study

Ainhoa Lezama-Ochoa [1,*], Michael Ballón [2,3], Mathieu Woillez [4], Daniel Grados [2,3], Xabier Irigoien [1,5], Arnaud Bertrand [2,3]
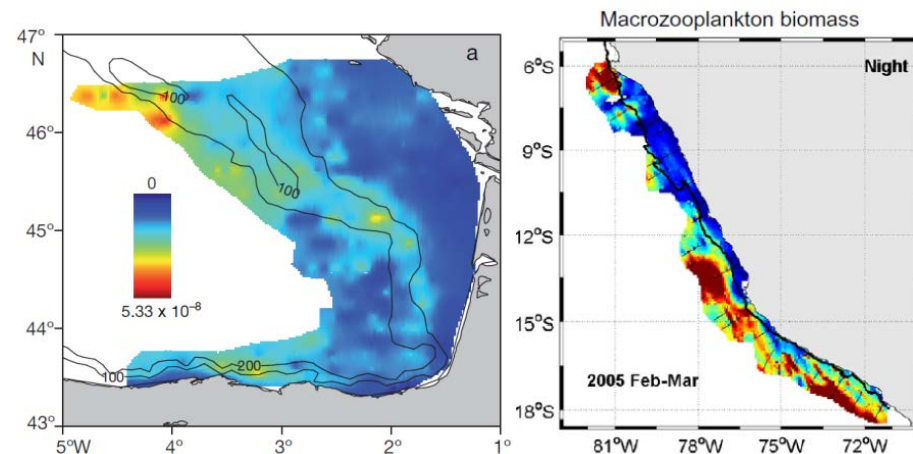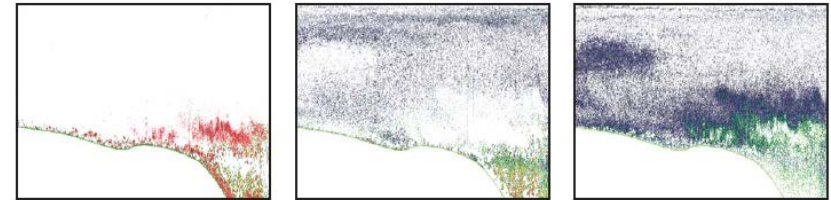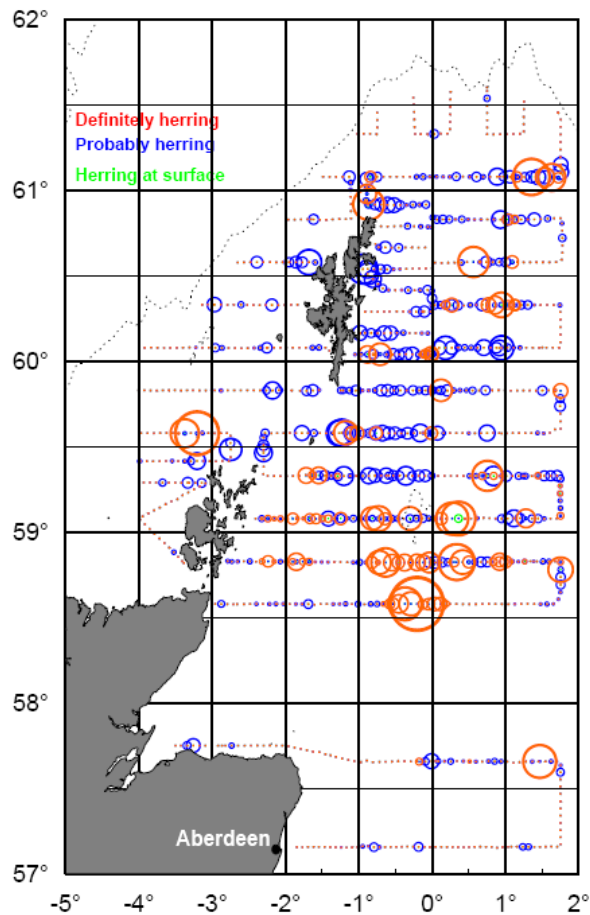
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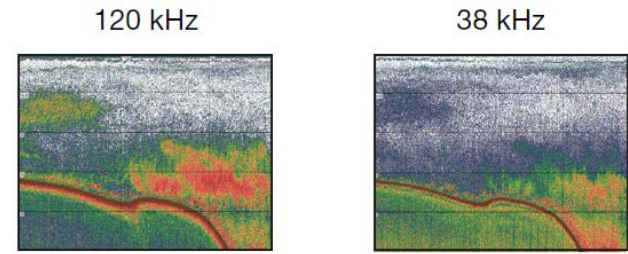
Methods

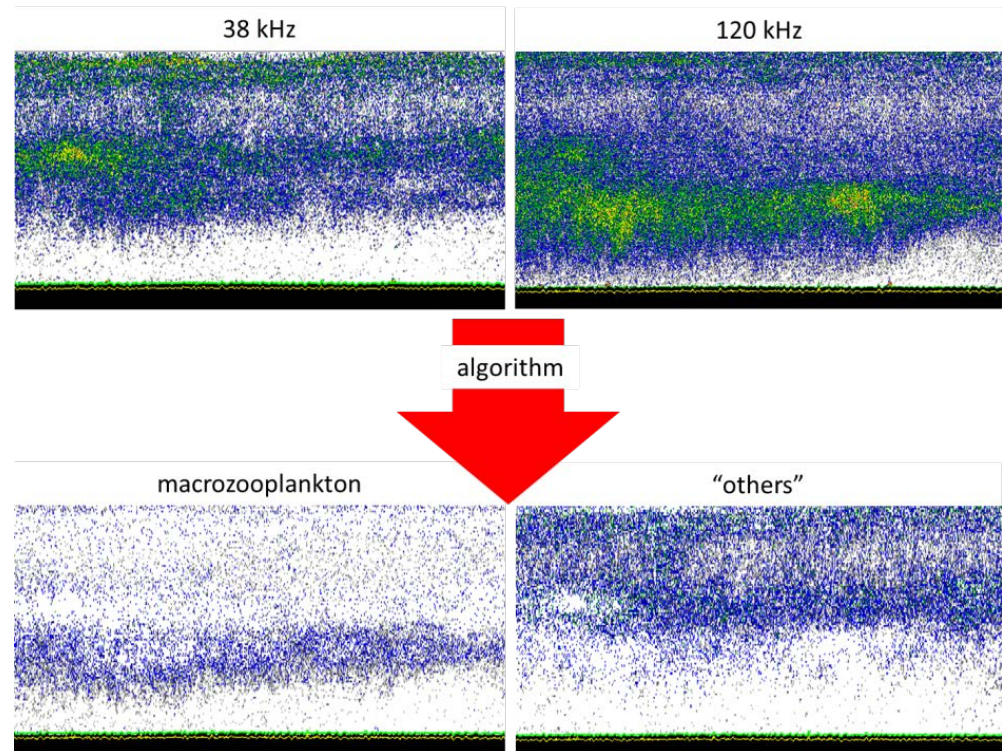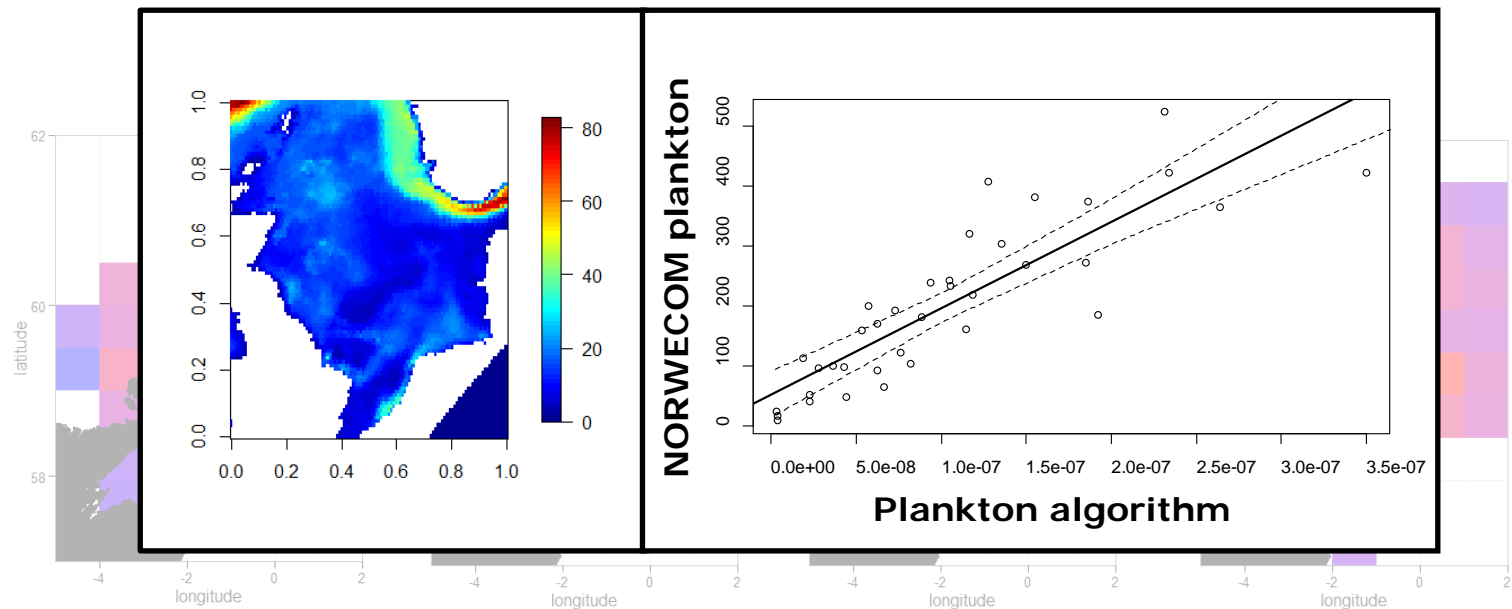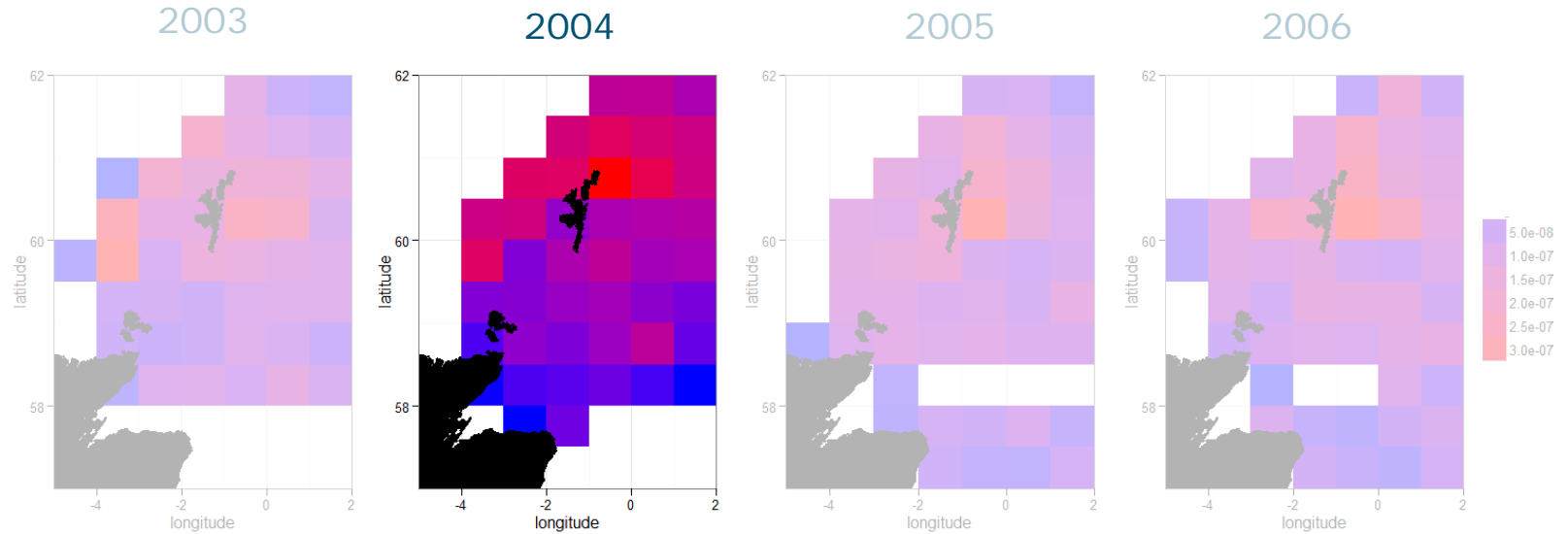- North Sea herring acoustic survey: Scottish part 2003-2010

  - June/July
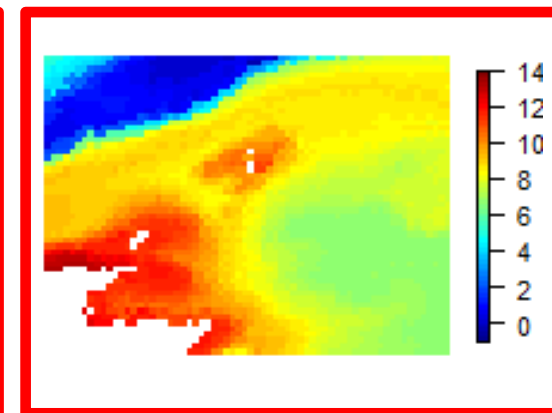
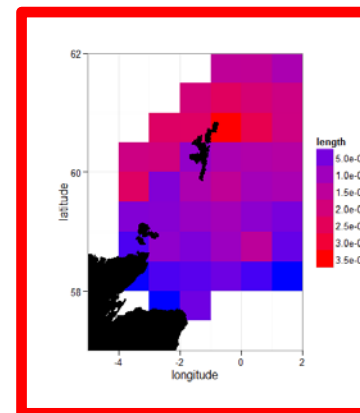 - EK60 echsounder @ 4 frequencies (18,38,120,200 kHz)
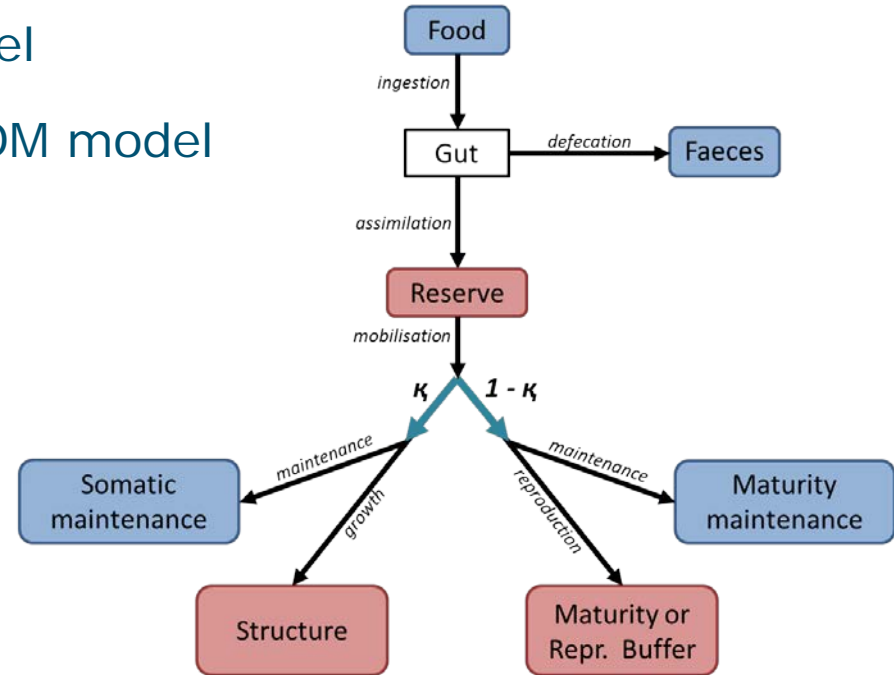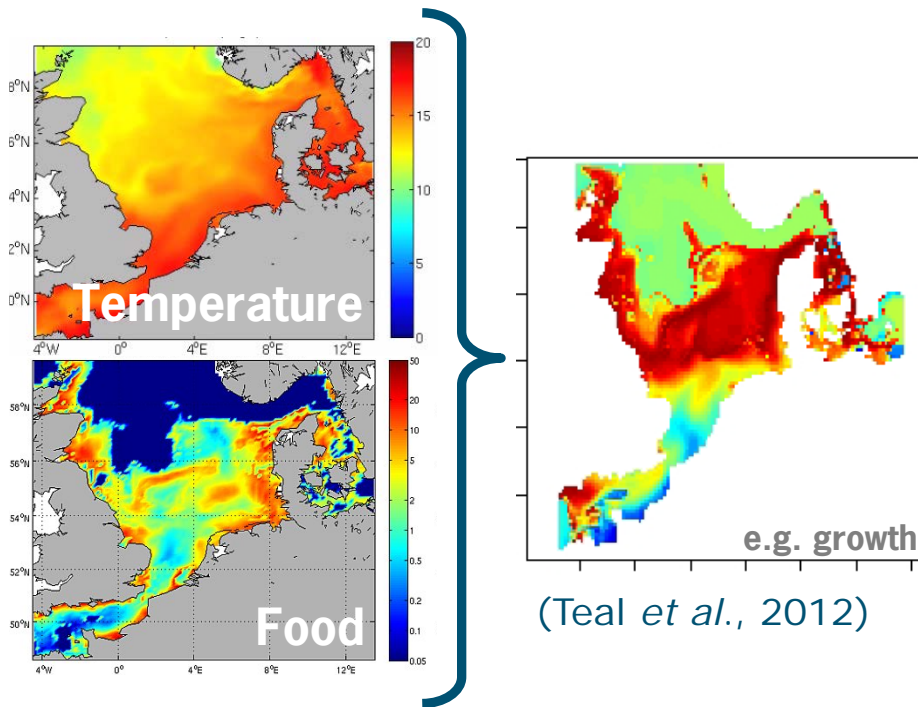
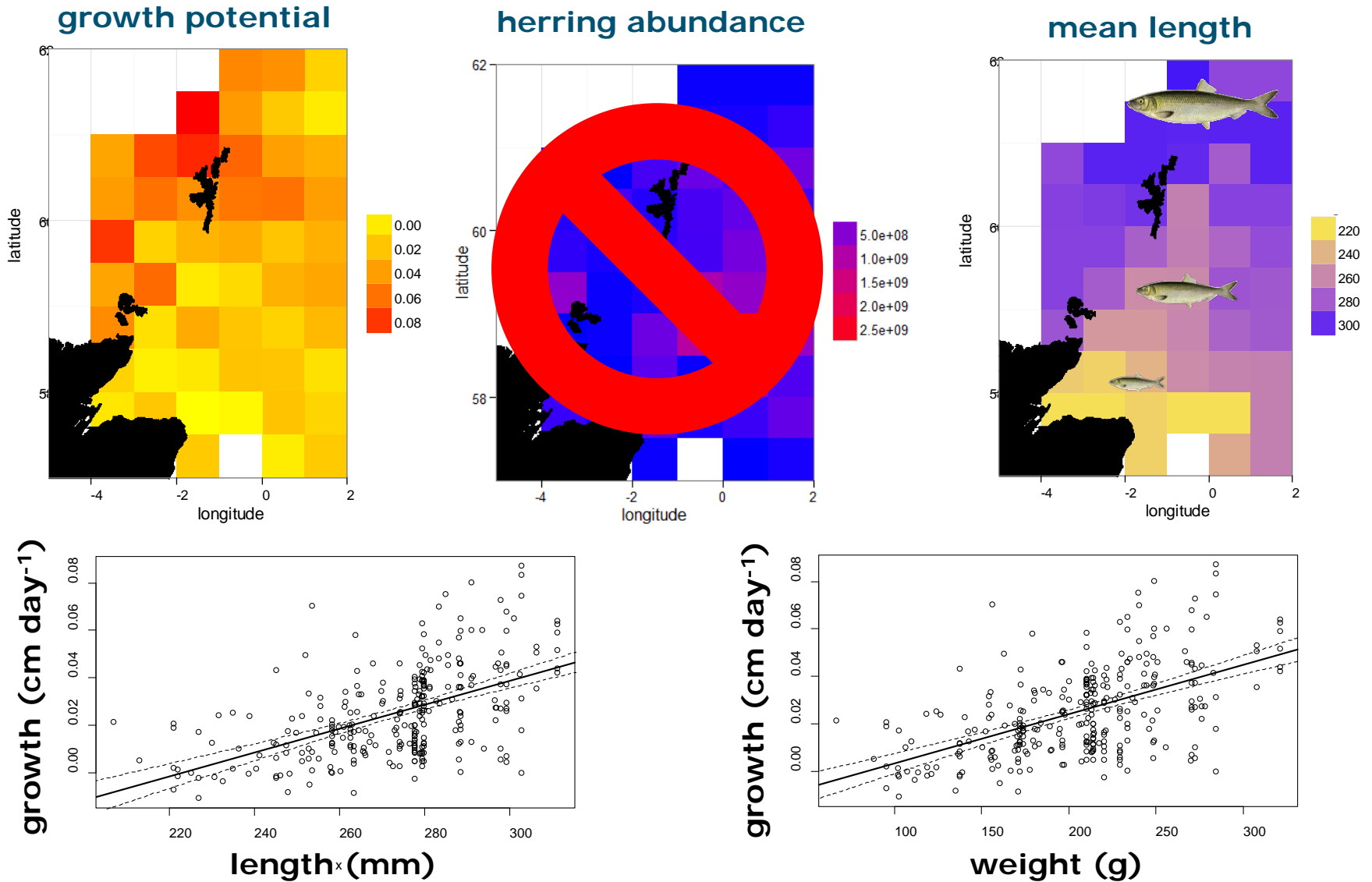 - Use same plankton algorithm:

Results: zooplankton abundance

Methods: herring habitat quality

- Dynamic Energy Budget (DEB) model

  - temperatures from NORWECOM model

  - plankton abundance as food

Temperature

Food

e.g. growth

(Teal *et al.*, 2012)

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Results: herring habitat quality

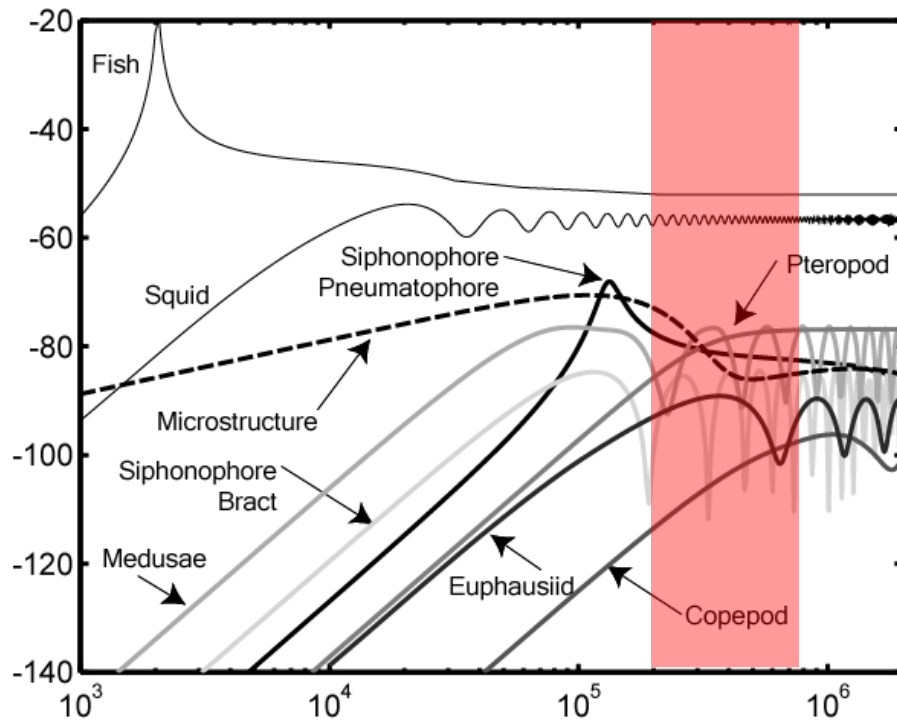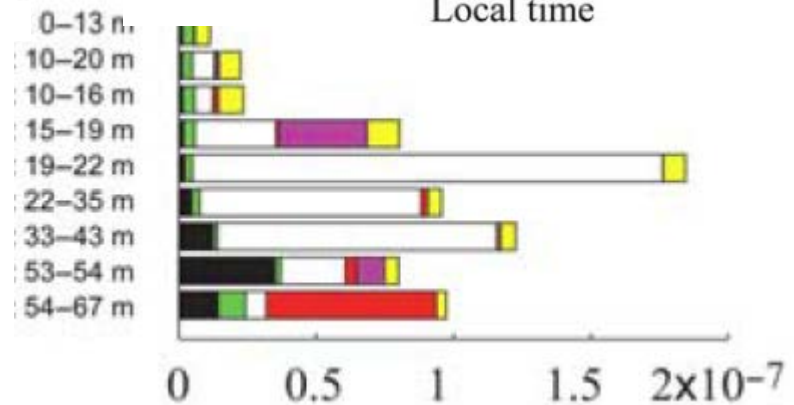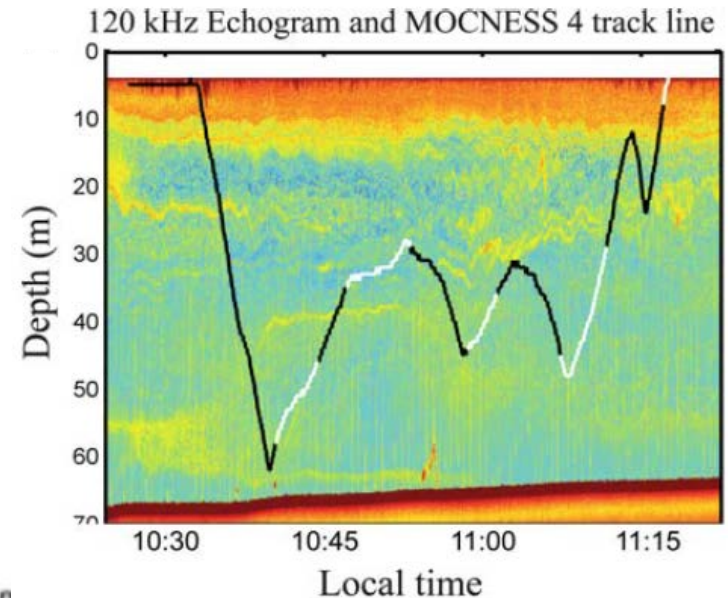growth potential   herring abundance   mean length

Conclusions

- Possibility of extracting "plankton group" from ≥ 2 frequency acoustic data

- High-resolution plankton ("food") maps to validate spatial models

- Larger herring are in areas with better growth potential. No relationship with abundance.

- Further, look at more detailed information (size, area) for different years & use more frequencies in algorithm

- Ground-truthing?

- Using acoustic techniques to full potential is key when moving towards whole ecosystem surveys!
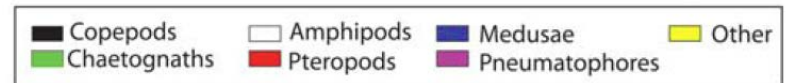
Broadband acoustic data
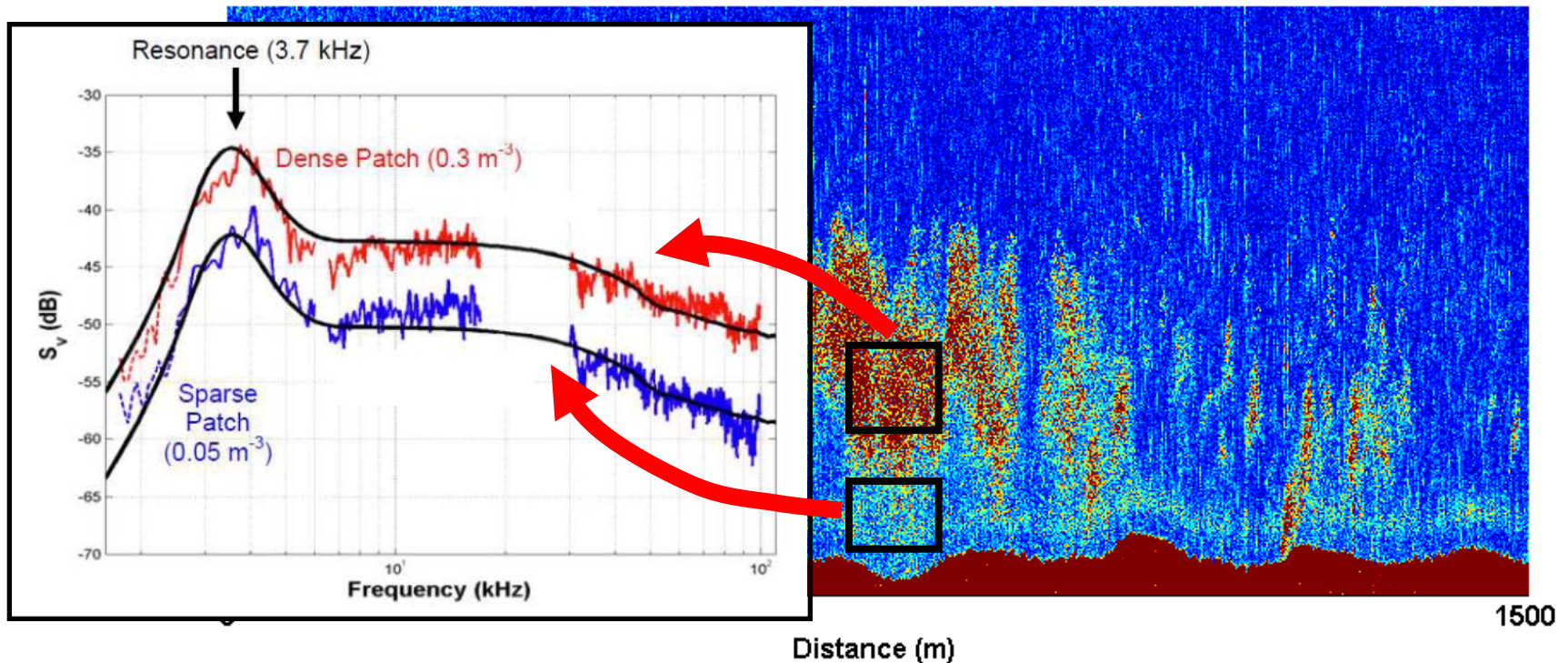
- Plankton identification:

(Lavery *et al.*, 2010)

120 kHz Echogram and MOCNESS 4 track line

Local time

Relative Contribution to Total Acoustic Backscattering

| Copepods | Amphipods | Medusae | Other |
| Chaetognaths | Pteropods | Pneumatophores | |

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Broadband acoustic data

- Fish size/density determination :

(Stanton *et al.*, 2010)

Thanks!