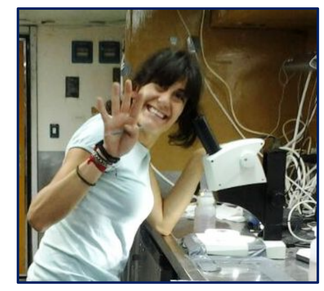
Multifrequency study of the epipelagic food web in Alboran Sea

SOME ACOUSTIC
May25th -28th 2015



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UN OCÉANO, UN FUTURO

MEDIAS
MEDiterranean International Acoustic Survey

Introduction

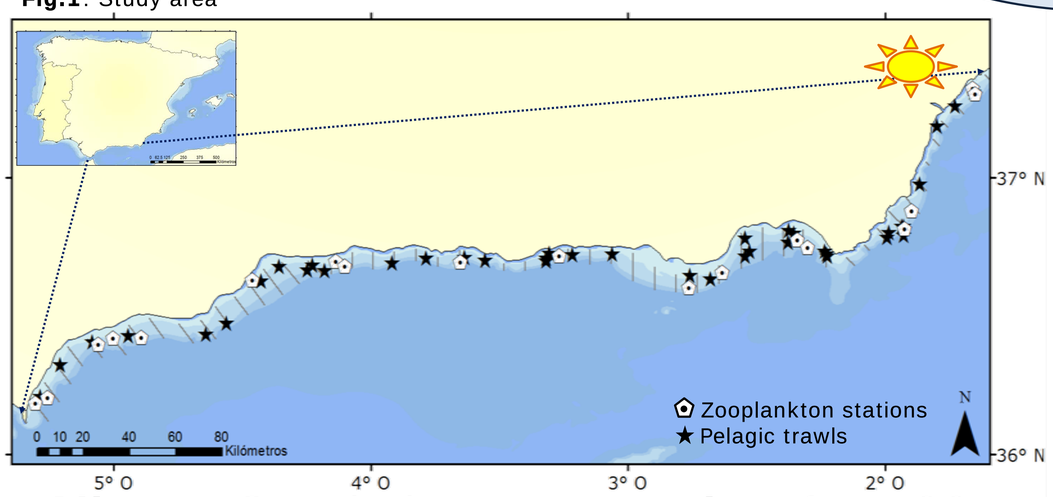
Acoustic surveys for stock assessment are perfect platforms to monitoring changes in pelagic ecosystems. Since different scattering group (fluid like, gas bearing, elastic shelled) have specific frequency responses, multifrequency water-column data can be used as a powerful toll to identificate trophic levels.

Main Question

Which levels of the epipelagic trophic chain are detected during acoustic surveys??

Material

Fig.1: Study area



Alboran Sea during **summer time** from **30 to 200 m.**

Acoustical samplers

5 Simrad **EK60** scientific echosounders: **18, 38, 70, 120, 200 kHz**.	**Scanmar** sensor coupled to the plankton nets.

Biological samplers

Phytoplankton Chlorophyll a	Zooplankton Macro & Meso		Pelagic community
CTD	2 nets 4 meshes		Pelagic trawl
Fluorometer	Bongo 40 250 & 333µ	Bongo 90 500 & 2000µ	20 mm cod end

Methods

Acoustic data

Epipelagic Scattering layer (ESL): Net track, monitoring in real time, was imported in Echoview. The acoustic sampled volume per net was calculate accurately. S_v (Volume backscattering strength) values were then exported.

Pelagic community assessment was made follow the MEDiterranean International Acoustic Survey (MEDIAS) protocol.

Biological data

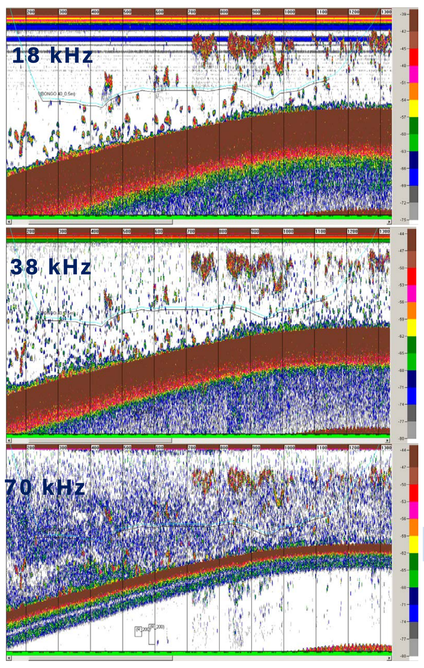
Zooplankton samples. Abundance (ind/m^3) was determinate under a magnifying glass, 3 aliquots (10 ml each) were taken and all the individual by taxonomical groups were counted.

Fish catches Total biomass and abundance per species was calculate in each haul.

Correlation between **florescence (mg/m^3 Chl a)** and ESL was examined.

ESL: 6 different acoustic pattern were detected according to their similarity on frequency response (k-mean clustering) and their species composition was identified (SIMPROF test). Here **2 different situation** are presented**: onshore and offshore areas.**

Results



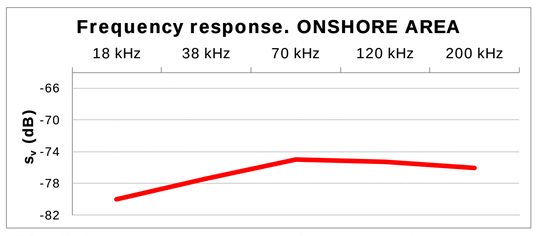


Fig.2:Pattern detected in 3 of the 18 stations

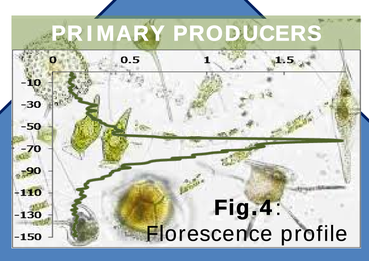


Fig.4: Florescence profile

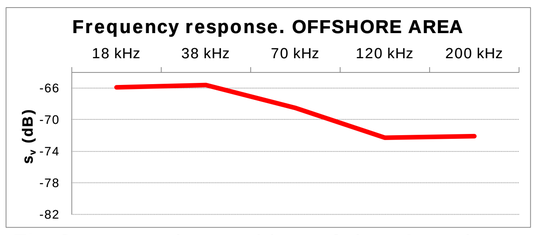


Fig.3:Pattern detected in 4 of the 18 stations

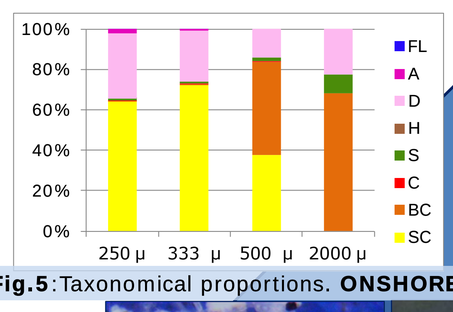


Fig.5:Taxonomical proportions. **ONSHORE**

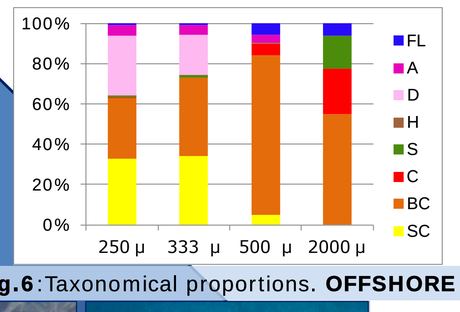
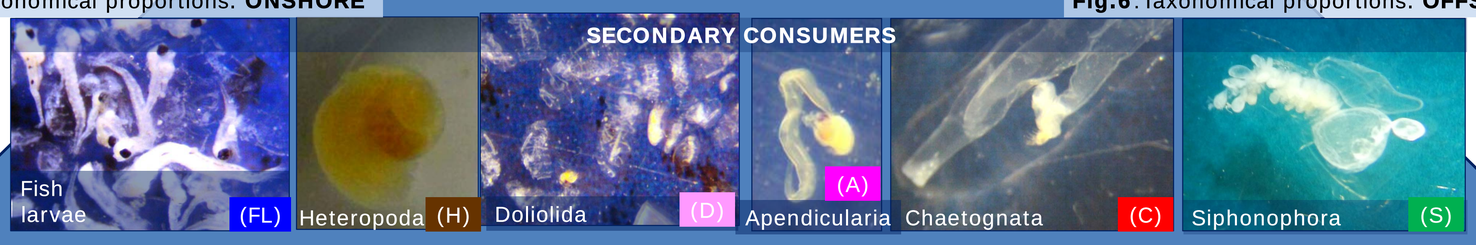


Fig.6:Taxonomical proportions. **OFFSHORE**



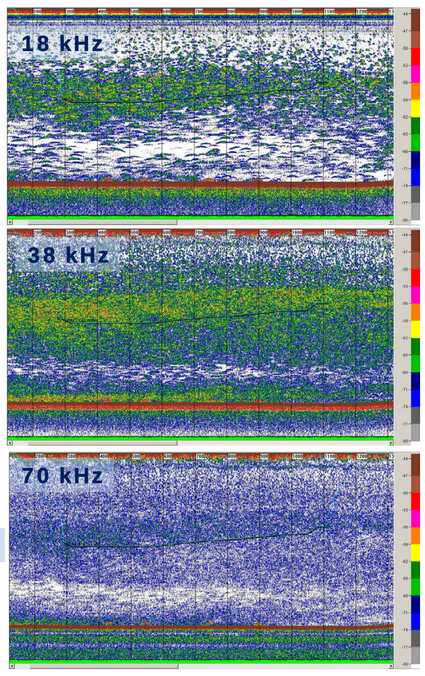


Fig.7: St05.
Echogram at 3 frequencies
Year= 2014
Mean depth = 30m.
Threshold=-80 dB.

Fig.8: St14.
Echogram at 3 frequencies
Year=2013
Mean depth = 125 m.
Threshold=-80 dB.

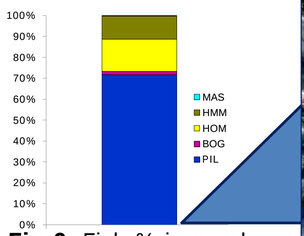


Fig.9. Fish % in number **ONSHORE**

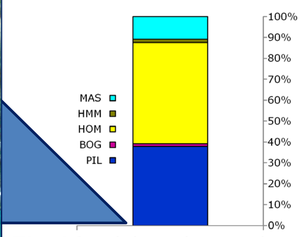


Fig.10. Fish % in number **OFFSHORE**

Conclusions

Thanks to everyone who has made this work possible

- ✓ **Fluorescence** (phytoplankton indicator) have no relation with the epipelagic scattering layer.
- ✓ **Small crustacean** (primary consumers) can be detected on shore area at 70 kHz.
- ✓ **Fish larvae** and **apendicularia** are detected properly at 18 and 38 kHz.
- ✓ Although 38 kHz is the assessment frequency, **fishes** are better detected in 18 kHz.
- ✓ The **offshore community** is more diverse than the onshore one, including most of the zooplankton secondary consumers.