



saba@ims.metu.edu.tr

# Upcycling Fisheries Data: Utilizing Active Acoustics to Determine Cetacean Distribution and Their Foraging Areas in the Black Sea

Saba BASKIR<sup>(1)</sup>, Batikan BILIR<sup>(1)</sup>, Meltem OK<sup>(1)</sup>, Ali Cemal GUCU<sup>(1)</sup><sup>(1)</sup>Middle East Technical University, Institute of Marine Sciences, Department of Marine Biology and Fisheries, Mersin/Turkey

## PROBLEM

In the Black Sea, Bottlenose dolphin, Common dolphin and Harbor porpoise are blamed for the decline in the anchovy stocks. Removal of cetacean hunting ban is being debated. But we lack a scientific answer to the question; Do dolphins really chase commercially important fishes?



## CONCLUSION

- Cetacean distribution was not shown to be parallel with the commercially valuable fish; anchovy, sprat and horse mackerel wintering regions.
- Cetacean populations may not have as large of a pressure on the winter fish stocks as suspected.

## OBJECTIVE

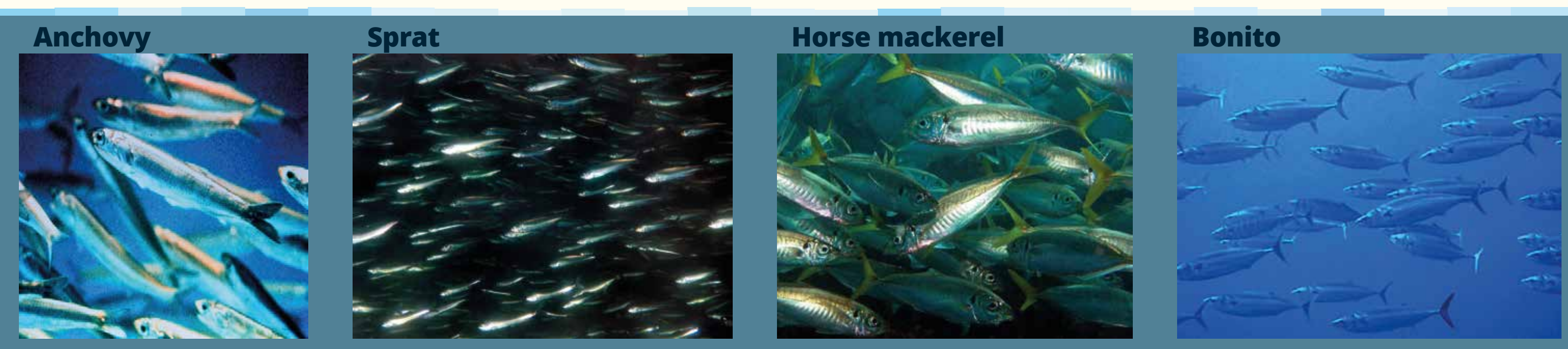
- Utilisation of Fisheries Active Acoustic data and isolate the cetacean sound marks, which are binned during fisheries aimed procedures. Shedding light on winter term foraging characteristics of Black Sea cetaceans in post-processing with Echoview Software Pty Ltd.,
- Assumption: the areas where cetacean click trains are concentrated may indicate their foraging activity; and the fishes aggregated there may indicate the type of their prey.



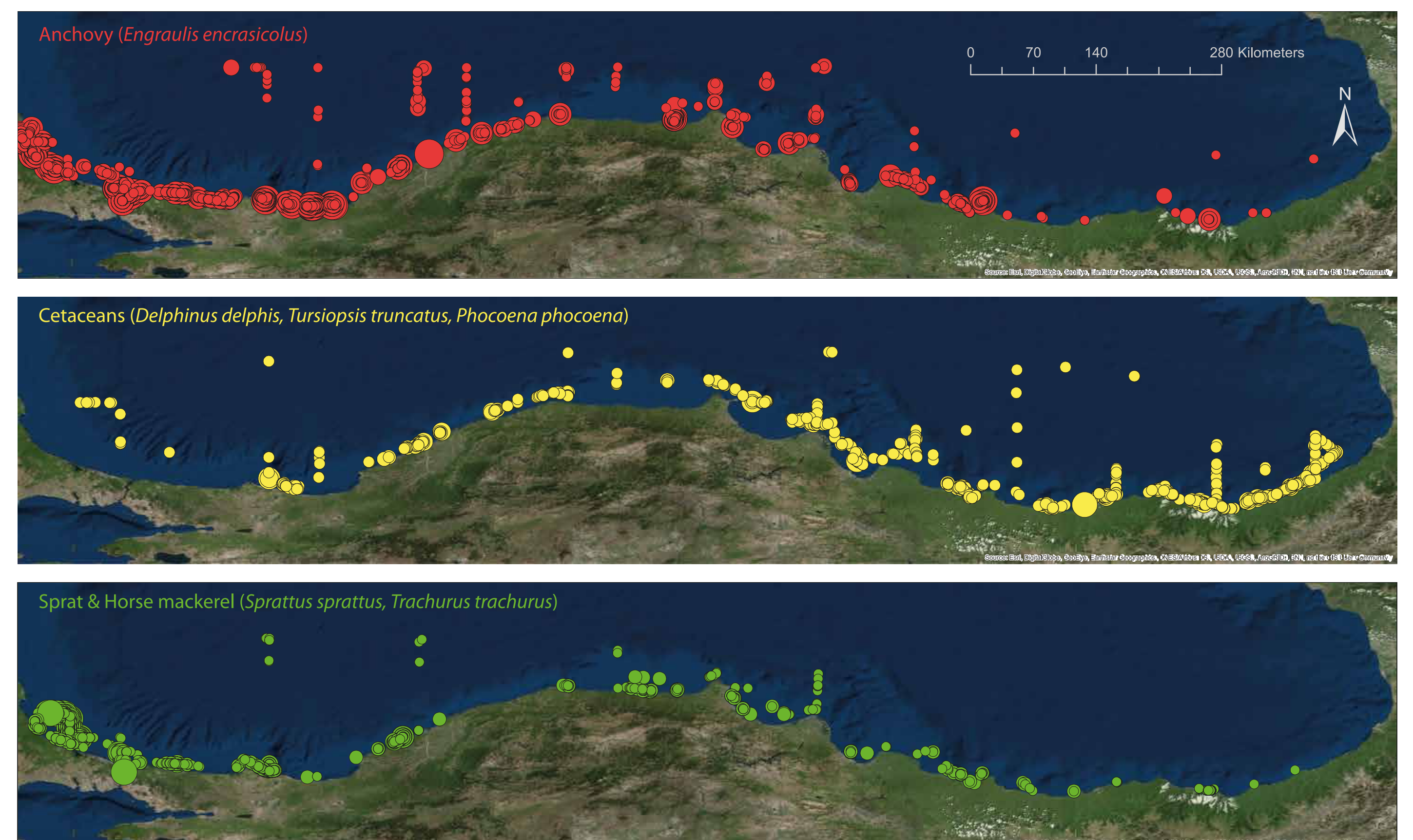
Photo by Turan UCA

## METHOD

- Active acoustic data sets of November 2016 anchovy research were collected with Bilim-II RV and Simrad EK60 echosounder.
- Trawl samples, CTD measurements and acoustic data collected throughout survey.
- Click train sounds produced during foraging, that leave distinct marks on echograms and were extracted using frequency algorithms in EchoView and distribution of foraging areas were mapped using the cetacean Presence/Absence results.
- Foraging distribution was analysed and compared to the distribution of economically valuable fish species (anchovy, mackerel and sprat).



## RESULT



- Fish schools of anchovy, sprat and horse mackerel were distributed more densely in Southwest region of the Black Sea.
- Cetacean species' density was found in the Southeast region.
- Temperature profiles shows SouthWest region, where cetacean detections are dense, is warmer than Southeast region of the BlackSea

## DISCUSSION

Cetaceans are observed in the Souteast region where the water temperatures are highest; whereas wintering anchovy was shown to be in the Southwest region of the BlackSea. This finding shows that wintering anchovy, when large schools are formed and vulnerability to predation is at its highest, pressure of the foraging cetacean may not be as dominant as suspected.

Active Acoustic Monitoring captures mainly echoes from fish that have a swimbladder. Other potentially present fish species that do not have a swimbladder are unrecognised in the echograms.

As raw data from the fisheries research surveys, cruise track is optimised to detect anchovy schools and better discrimination of click trains is disabled due to inability of following the cetacean detections en route.

This study holds potential as it enables the utilisation of previously collected fisheries data for the understanding of cetacean foraging characteristics.

## FUTURE PLANS

- Study was done only on the survey data in wintering season, which is when anchovy is the most vulnerable to predation. Data collection throughout the year to monitor all seasons would improve the coverage of understanding.
- Long term fisheries statistics, bycatch records and historical acoustic data can be utilised to project a population trend model that can predict population estimations under different fishing pressures and bycatch levels.
- Fishing statistics can be entegrated in the acoustic approach to also take into account of fish without swimbladders like bonito.

Acknowledgements: Funded by; Office of Naval Research, ONR-Global (Project BAA Number: N00014-16-R-BA01)  
TUBITAK KAMAG - 110G124 "Stock Assessment of Black Sea Anchovy Using Acoustic Method and Establishing a Monitoring Model for National Fisheries Data Collection Program".  
Ministry of Food, Agriculture and Livestock, GENERAL DIRECTORATE OF AGRICULTURAL RESEARCH AND POLICIES

For a digital copy, please scan!

